DRAFT AMENDMENT

EVANSVILLE MPO

METROPOLITAN TRANSPORTATION PLAN

MTP 2040

METROPOLITAN TRANSPORTATION PLAN 2040

JANUARY 2014

EMPO Policy Committee Adoption: January 8, 2014
FWHA Conformity Finding: May 19, 2014

EVANSVILLE METROPOLITAN PLANNING ORGANIZATION
1 NW Martin Luther King, Jr. Blvd.
Room 316 - Civic Center Complex
Evansville, IN 47708

This document was financed in part through the Federal Highway Administration, the Federal Transit Administration of the U.S. Department of Transportation, and the U.S. Department of Housing and Urban Development.

PREFACE FROM THE POLICY COMMITTEE CHAIRPERSON

The following document, *Metropolitan Transportation Plan 2040 (MTP 2040),* defines a multimodal transportation system vision for the Evansville-Henderson Metropolitan Area. Adopted in January 2014 by the Evansville Metropolitan Planning Organization (EMPO) Policy Committee, it serves as an update to the 2035 Transportation Plan in fulfilling federal transportation planning requirements. *MTP 2040* guides the implementation of transportation projects, policies and programs in the three county Metropolitan Planning Area through the year 2040.

A foundational element in the development of a transportation plan is land-use and transportation demand modeling. *MTP 2040* incorporates advancements to the EMPO modeling process that offer policy sensitivity to issues such as: alternative mode planning, population subgroups, mixed uses and development patterns, commuting patterns and fuel prices.

MTP 2040 was developed collaboratively with the assistance of a Citizen Advisory Committee that helped establish and refine the vision, goals and objectives that guide the plan. The plan was also substantially informed by the public involvement process carried out for the Regional Plan for Sustainable Development under development concurrently with *MTP 2040*. Representing the summation of both planning efforts, the *MTP 2040* Vision states:

> The Evansville Urbanized Area is a flourishing region with a high quality of life for its residents. Our transportation system is safe, efficient, multi-modal and accessible to all users. It supports economic vitality, respects environmental concerns and is supported by public and private consensus and efficient use of resources.

In response to substantial public support and emerging consensus on the value of a multimodal transportation system, *MTP 2040* establishes a greater focus on alternative modes of transportation. This focus is demonstrated with the introduction of a non-motorized investment strategy dedicating ten percent of federal surface transportation program funds to support bicycle and pedestrian modes of travel in the region.

MTP 2040 will serve as the transportation blueprint to be implemented through the MPO's Transportation Improvement Program (TIP). The TIP, covering a four year period, reflects public agency financial commitments to advance projects. While each public agency determines which projects are advanced, the long term framework provided by *MTP 2040* ensures that individual projects collectively support the community vision. Policies and strategies within the plan reinforce this effort.

The success of *MTP 2040* will be assessed by its effectiveness to induce progress toward the plan vision, goals and objectives. The EMPO will monitor progress toward established targets for improvement and continue to work with local, state and federal partners to identify additional opportunities to advance mobility, sustainability and quality of life in the region.

Jack Corn, Jr., Chairperson
Evansville Metropolitan Planning Organization
Policy Committee

RESOLUTION

A RESOLUTION OF THE EVANSVILLE METROPOLITAN PLANNING ORGANIZATION ADOPTING THE *METROPOLITAN TRANSPORTATION PLAN 2040*

WHEREAS, the Evansville Metropolitan Planning Organization (EMPO) is the organization designated by the Governor as the Metropolitan Planning Organization responsible, together with the State, for carrying out the provisions of 23 U.S.C. 134 (Federal-Aid Highway planning requirements), and capable of meeting the requirements of 49 U.S.C. 1603(a) (Federal Transit planning requirements) in the Evansville-Henderson Urbanized Area; and

WHEREAS, the Evansville Metropolitan Planning Organization has established a region-wide, cooperative, comprehensive, and continuing planning process to develop the unified planning work program, long range transportation plan, and transportation improvement program. The Evansville Metropolitan Planning Organization enacts the plans and programs to facilitate federal, state, and local funding for surface transportation improvements carried out by the Indiana Department of Transportation, the region's communities and counties, and transit operators, and provides technical assistance and expertise to regional transportation interests; and

WHEREAS, the Evansville Metropolitan Planning Organization conducted the planning process for the *Metropolitan Transportation Plan 2040* in an open, participatory manner, as required by the Moving Ahead for Progress in the 21st Century Act (MAP-21). The *Metropolitan Transportation Plan 2040* includes future transportation projects for the City of Evansville, Vanderburgh County, Towns of Newburgh, Chandler and Boonville, and Warrick County in Indiana, and the City of Henderson, and Henderson County, Kentucky; and

WHEREAS, the Evansville Metropolitan Planning Organization has complied with the Clean Air Act Amendments of 1990 (CAAA) requirements as they pertain to the development and conformity of the *Metropolitan Transportation Plan 2040*; and

WHEREAS, the *Metropolitan Transportation Plan 2040* conforms to the State Implementation Plan for Air Quality; and

WHEREAS, the Evansville Metropolitan Planning Organization presented the draft *Metropolitan Transportation Plan 2040* to the Citizen Advisory Committee, at the EMPO Technical and Policy Committees public meetings, and made the draft Plan open to public review through the EMPO office, various public sites, and at the EMPO website; and

WHEREAS, the Evansville Metropolitan Planning Organization requested public comments, provided a public comment period, addressed the comments and presented comments and responses to the EMPO Technical and Policy Committees for inclusion in the *Metropolitan Transportation Plan 2040*; and

NOW, THEREFORE, BE IT RESOLVED that the Evansville Metropolitan Planning Organization Policy Committee at the regular meeting of January 8th, 2014 adopts the EMPO *Metropolitan Transportation Plan 2040*.

Duly adopted by the Evansville Metropolitan Planning Organization Policy Committee on this eighth day of January, 2014.

Jack Corn, Chairman

ATTEST:

Seyed Shokouhzadeh, Executive Director

U.S. Department of Transportation
Federal Highway Administration

Indiana Division

575 North Pennsylvania Street, Room 254
Indianapolis, Indiana 46204

May 19, 2014

In Reply Refer To:
HDA-IN

Mr. Roy Nunnally, Director
Asset Planning and Management Division
Indiana Department of Transportation
100 North Senate Avenue
Indianapolis, IN 46204

Dear Mr. Nunnally:

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have completed our review of the Evansville Metropolitan Planning Organization (EMPO) 2040 Metropolitan Transportation Plan (2040 MTP), amendments to the EMPO Fiscal Year (FY) 2013-2016 Transportation Improvement Program (TIP), and the Indiana Department of Transportation's FY 2014-2017 State Transportation Improvement Program (INSTIP) for projects outside of the EMPO planning area. USEPA and IDEM have also completed their review and found that all applicable Clean Air Act conformity requirements have been addressed.

Therefore, FHWA and FTA find the EMPO 2040 MTP, FY 2013-2016 TIP as amended, and FY 2014-2017 INSTIP for projects outside the EMPO planning area conform to all applicable requirements.

If you have any questions, please contact Larry Heil of this office at (317) 226-7480 or by e-mail at larry.heil@dot.gov.

Sincerely,

for: Richard J. Marquis
Division Administrator

ACKNOWLEDGEMENTS

EVANSVILLE MPO POLICY COMMITTEE MEMBERS

Mr. Jack Corn, Jr.	Chairperson, Evansville City Council Appointment
Mr. Stephen Melcher	Vice Chairperson, Vanderburgh County Commissioner
Ms. Angela Koehler Lindsey	Vanderburgh County Council
Mr. Lloyd Winnecke	Mayor, City of Evansville
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Mr. Rick Marquis	Indiana Federal Highway Administration (NV)
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Mr. Shawn Seals	Indiana Department of Environmental Management (NV)
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Mr. Michael Hancock	Kentucky Transportation Cabinet (NV)
Mr. Keith Damron	Kentucky Transportation Cabinet (NV)
Mr. John Gowins	Kentucky Division of Air Quality (NV)

ACKNOWLEDGEMENTS

EVANSVILLE MPO TECHNICAL COMMITTEE MEMBERS

Mr. Patrick Keepes *Chairperson, Evansville City Engineer*
Mr. John Stoll *Vice-Chairperson, Vanderburgh County Engineer*

The following organizations are represented on the Technical Committee:

American Medical Response
Evansville-Vanderburgh Area Plan Commission
Bernardin, Lochmueller and Associates
Carver Community Organization
Commonwealth Engineering, Inc.
CSX Transportation
Easter Seals Rehabilitation Center
Economic Development Coalition of Southwest Indiana
EnviroKinetics, Inc.
Evansville ARC
Evansville Bicycle Club
Evansville Board of Public Safety
Evansville Chamber of Commerce
Evansville Department of Metropolitan Development
Evansville Department of Transportation and Services
Evansville Department of Urban Forestry
Evansville Environmental Protection Agency
Evansville Parks and Recreation Department
Evansville Police Department
Evansville Regional Airport
Evansville Water and Sewer Department
Federal Highway Administration (Indiana)
Federal Highway Administration (Kentucky)
Federal Transit Administration (Region V)
Green River Area Development District
Henderson Area Rapid Transit
Henderson City Engineer
Assistant Henderson City Manager
Henderson County Engineer
Henderson County Riverport
Henderson-Henderson County Chamber of Commerce
Henderson-Henderson County Plan Commission
Henderson Judge Executive
Indiana Department of Environmental Management (Indianapolis)
Indiana Department of Transportation (Indianapolis)
Indiana Department of Transportation (Vincennes)
Indiana Southern Railroad
Kentucky Transportation Cabinet (Frankfort)
Kentucky Transportation Cabinet (Madisonville)
Metropolitan Evansville Transit System
Posey County Chamber
River City Taxi
St. Mary's Trauma Hospital
SIRS Inc.
Port of Indiana - Mount Vernon
University of Evansville
Vanderburgh County Emergency Management Agency
Warrick County Economic Development
Warrick County Plan Commission
Warrick County School Corporation
Westside Improvement Association

ACKNOWLEDGEMENTS

CITIZEN'S ADVISORY COMMITTEE

Mr. A.C. Braun	*Skanska*
Mr. Abraham Brown	*HOLA*
Ms. Andrea Hays	*Welborn Baptist Foundation*
Ms. Angie Higgins	*Easter Seals Rehabilitation Center*
Mr. Ben Wills	*Young Professionals Network*
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Mr. Jim Wilsbacher	*CAJE, WATS*
Mr. Joe Ballard	*Vanderburgh County Solid Waste*
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Mr. John Kuhn	*Citizen*
Mr. John Scott Foster	*Wesselman Nature Society*
Mr. Josh Gilmore	*Evansville Museum of Arts, History and Science*
Mr. Kevin Bain	*Welborn Baptist Foundation*
Ms. Linda Cleek	*University of Southern Indiana*
Ms. Linda Jones	*CHAIN Neighborhood Association*
Ms. Marcia Learned-Au	*Evansville Vanderburgh Public Library*
Ms. Mardi File	*Welborn Baptist Foundation*
Mr. Mark Allen	*Citizen*
Mr. Martin Rowland	*Junior Achievement*
Mr. Mike O'Daniel	*Citizen*
Mr. Nate Hahn	*Evansville Regional Airport*
Mr. Nibby Priest	*Vaughn Insurance*
Ms. Pam Hendrickson	*City of Boonville*
Mr. Phil Wilzbacher	*Ports of Indiana*
Ms. Roberta Heiman	*Evansville-area Trails Coalition*
Mr. Russ Woosley	*Mulzer Stone/Keep Evansville Beautiful*
Mr. Scott Wylie	*Vanderburgh Community Foundation*
Mr. Shance Sizemore	*Growth Alliance for a Greater Evansville*
Mr. Shawn Hayden	*Eastland Mall*
Ms. Shari Sherman	*Warrick County Chamber of Commerce*
Mr. Steve Helfrich	*Vanderburgh Soil and Water Conservation District*
Mr. and Ms. Steve and Susan Harp	*Oak Hill Neighborhood Association*
Mr. Terry Phillippe	*Boonville NOW*

EVANSVILLE MPO STAFF

Mr. Seyed Shokouhzadeh	*Executive Director*
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Mr. Jeff Okes	*Transportation Technician*
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CHAPTER 1:

INTRODUCTION

INTRODUCTION

The Metropolitan Transportation Plan (MTP 2040) for the Evansville, Indiana — Henderson, Kentucky Urbanized Area documents the cooperative transportation planning process of the Evansville Metropolitan Planning Organization (EMPO). Informed by input from public officials, agency staff and citizens of the region, MTP 2040 is a guide for the implementation of multimodal transportation improvements, policies, and programs in the Metropolitan Planning Area through the year 2040.

The MTP is required by federal statute for the programming of federal funds for transportation project planning and the implementation of ground transportation modes (roadway, transit, bicycle, and pedestrian modes). By examining regional trends, transportation needs, local priorities and federal, state and local funding projections, the MTP charts a course to achieve the goals and objectives developed through the planning process. MTP 2040 replaces the 2035 Transportation Plan in fulfilling federal planning requirements.

MTP 2040 BASICS

- Establishes a vision for the region's transportation system covering a planning period of at least 20 years.
- Supports local goals targeting quality of life; environment; economic development; policy and partnership; and safety, security and health.
- Documents community priorities for the expenditure of limited resources.
- Demonstrates fiscal constraint. Projects in the plan must be consistent with reasonable projections of available funding over the period of the plan.

MPO BACKGROUND

Federal law requires that all urbanized areas over 50,000 residents establish Metropolitan Planning Organizations to undertake a "3-C" transportation planning process. This Continuous, Cooperative and Comprehensive planning process is required for a region to receive federal highway planning and improvement funding.

Established as the Evansville Urban Transportation Study (EUTS) in 1969, the Evansville MPO is the designated agency responsible for conducting the 3-C planning process within the Evansville-Henderson urbanized area. Effective transportation planning requires an organization with a regional focus and the ability to operate independent of city, county, and state lines. Accordingly, the MPO is an independent transportation policy body that is comprised of elected or appointed officials from the metropolitan area and representatives from state and local transportation agencies.

A Policy Committee and Technical Committee guide and assist the EMPO in its regional planning activities. Both committees are required elements of the EMPO by federal legislation.

The Policy Committee is the chief advisory body and is responsible for policy formulation, project guidance, and administrative coordination. This includes delegation and review of work activities for the EMPO Staff. Official actions taken by the EMPO require approval by the Policy Committee. Committee membership includes elected or appointed officials from each local government within the Planning Area, as well as representatives from the Federal Highway Administration, Federal Transit Administration, Indiana Department of Transportation, Indiana Department of Environmental Management, and the Kentucky Transportation Cabinet. The Policy Committee members are appointed for a one-year term.

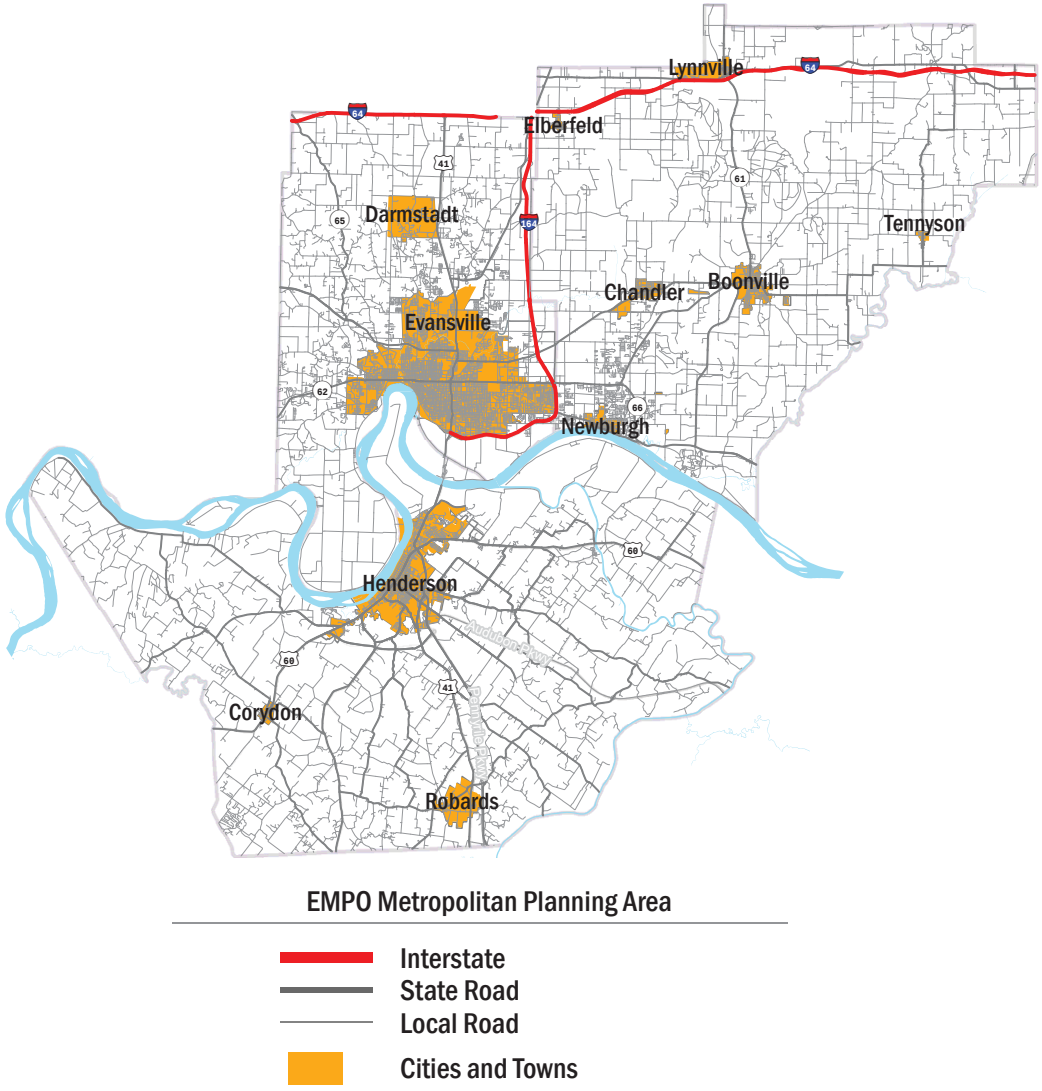
The Technical Committee is composed of planners, engineers, community representatives, and professional staff from various departments of Planning Area local public agencies. This committee is the chief working committee, providing relevant expertise and data to the EMPO. Each technical task undertaken by the EMPO staff involves the participation of the Technical Committee. The Technical Committee is directly responsible to the Policy Committee.

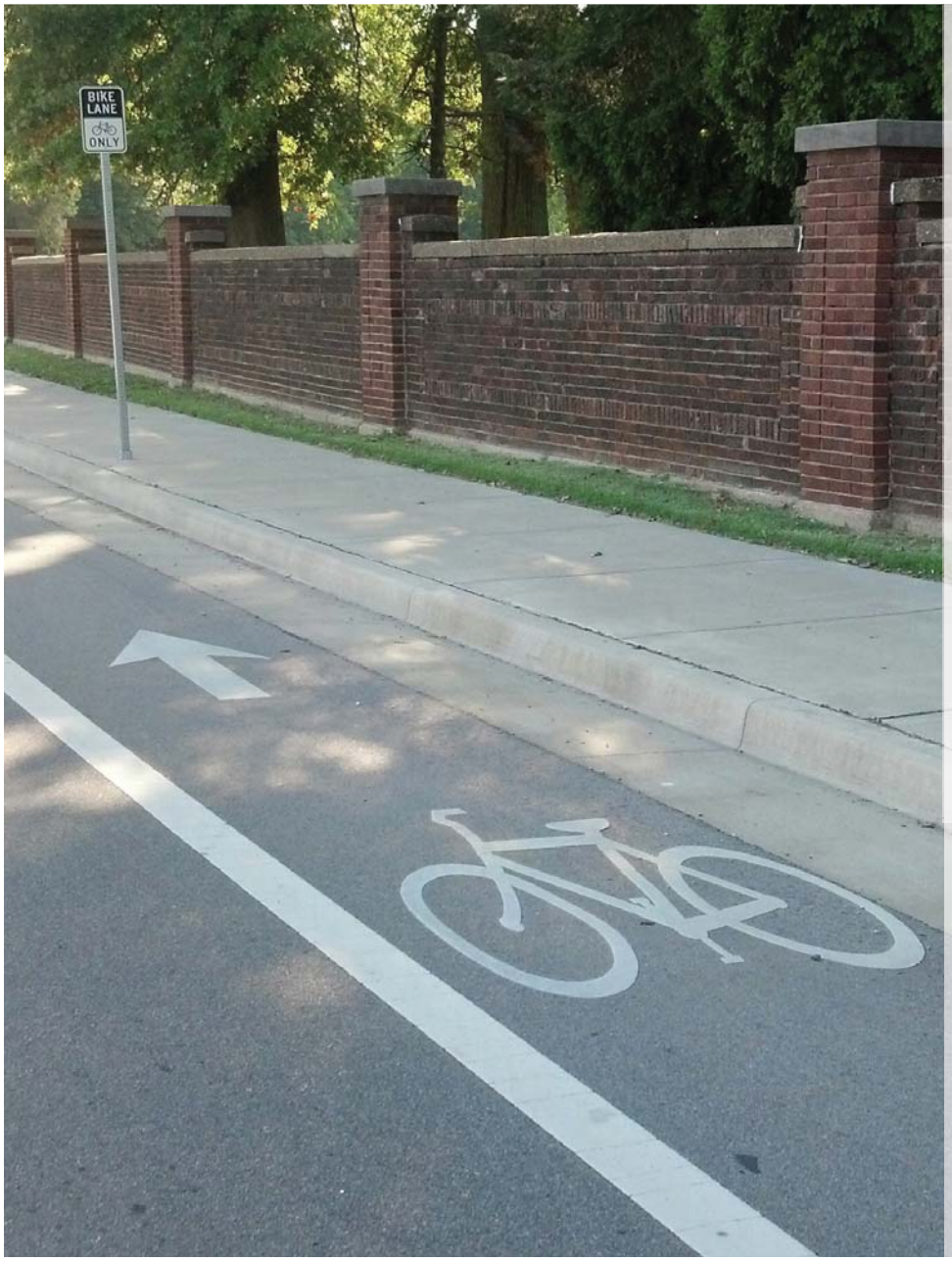
The MPO must produce a metropolitan transportation plan (MTP) every four years. The MTP provides a recommended approach for the use of federal transportation funding to improve roadway, transit, bicycle and pedestrian modes of transportation for the next 20 years. The four year renewal cycle ensures the MTP reflects ever changing community conditions. Implementation of the recommended projects in the MTP is managed through the Transportation Improvement Program (TIP), a short term programming document detailing the committed federally funded and regionally significant transportation projects. All projects in the TIP must be consistent with the MTP.

PLANNING JURISDICTION

The EMPO Metropolitan Planning Area (MPA) contains approximately 650 square miles in Indiana, including the City of Evansville, Vanderburgh County, Warrick County, and a very small area of eastern Posey County. In Kentucky, the Study Area encompasses approximately 440 square miles which includes the City of Henderson and Henderson County. With a population that exceeded 200,000 in the 2010 Census, the Evansville-Henderson urban area has been designated as a Transportation Management Area (TMA). Figure 1-1 illustrates the EMPO Metropolitan Planning Area.

Figure 1-1: EMPO Metropolitan Planning Area





FEDERAL LEGISLATION, PLANNING FACTORS AND LIVABILITY PRINCIPLES

This plan has been developed to comply with the Moving Ahead for Progress in the 21st Century Act (MAP-21). Signed into law on July 6, 2012, MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. Existing programs are simplified, substantially consolidating the program structure into a smaller number of broader core programs. Many smaller programs are eliminated, including most discretionary programs, with the eligibilities generally continuing under core programs.

Numerous changes are aimed at ensuring the timely delivery of transportation projects. Changes will improve innovation and efficiency in the development of projects, through the planning and environmental review process, to project delivery.

MAP-21 builds on and refines many of the highway, transit, bike, and pedestrian programs and policies established in 1991 with the Intermodal Surface Transportation Efficiency Act (ISTEA), and continued with the subsequent Transportation Equity Act for the 21st Century (TEA-21) and Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) legislation. A significant focus of MAP-21's highway program transformation is the transition to a performance and outcome-based program.

MAP-21 mandates the incorporation of eight Planning Factors into the metropolitan transportation planning process, and requires that the MTP address these eight Planning Factors.

PLANNING FACTORS

- Support the economic vitality of the United States, the States, and metropolitan areas, especially by enabling global competitiveness, productivity and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase the accessibility and mobility options available to people and for freight;
- Protect and enhance the environment, promote energy conservation, and improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

A second piece of significant legislation for the EMPO's planning activities is the Clean Air Act Amendments of 1990 (CAAA). While MAP-21 provides the funding and flexibility to make transportation improvements, the CAAA ties transportation improvements to air quality. Air Quality Conformity is discussed in detail in Chapter 6.

SUSTAINABLE COMMUNITIES REGIONAL PLANNING GRANT

In 2010, the EMPO applied for and was awarded a Sustainable Communities Regional Planning Grant. This grant was funded through HUD's (Housing and Urban Development) Office of Sustainable Housing and Communities, in close coordination with the US DOT (Department of Transportation) and the US EPA (Environmental Protection Agency). This program was created to support metropolitan and multijurisdictional areas in the development of a Regional Plan for Sustainable Development (RPSD). The program is intended to help develop partnerships and integrate planning for housing, land use, economic and workforce development, transportation, and infrastructure across the region.

The EMPO was one of 45 regions in the United States selected to receive this grant. Upon the award of the grant, the EMPO established the Sustainable Evansville Area Coalition (SEAC) to bring non-profit organizations, businesses, governmental agencies, and elected officials together as a consortium to help guide the development of the plan and to develop regional partnerships. Refer to Appendix A in the Regional Plan for Sustainable Development for a list of SEAC members.

The Regional Plan for Sustainable Development addresses sustainable planning efforts in the EMPO planning area. An analysis of the current regional trends determined what the region would look like in 2040 if the same development patterns continue. Future scenarios were also developed to determine what changes could be made to make the region more sustainable for future generations. Like the EMPO MTP 2040, the RPSD has a planning horizon year

of 2040. This provides an adequate length of time to see changes in development patterns, transportation, housing, and the local economy take place.

The MTP 2040 and RPSD were simultaneously developed to ensure the same planning principles were incorporated throughout the planning processes. To help the Sustainable Communities Regional Planning Grant recipients, HUD, DOT, and EPA established six livability principles guide their planning efforts. These principles were also considered as guidance for the MTP 2040. The MTP 2040 focuses on these principles from a transportation standpoint.

Livability based solutions carry multiple co-benefits. Livable communities encourage regular walking, cycling, and transit use, reducing the need for auto travel, while decreasing congestion for those that do drive. As a partner in the Sustainable Communities Regional Planning Grant Program, the Evansville MPO embraces these principles as an opportunity to envision a broader range of solutions to the transportation challenges in the region.

LIVABILITY PRINCIPLES

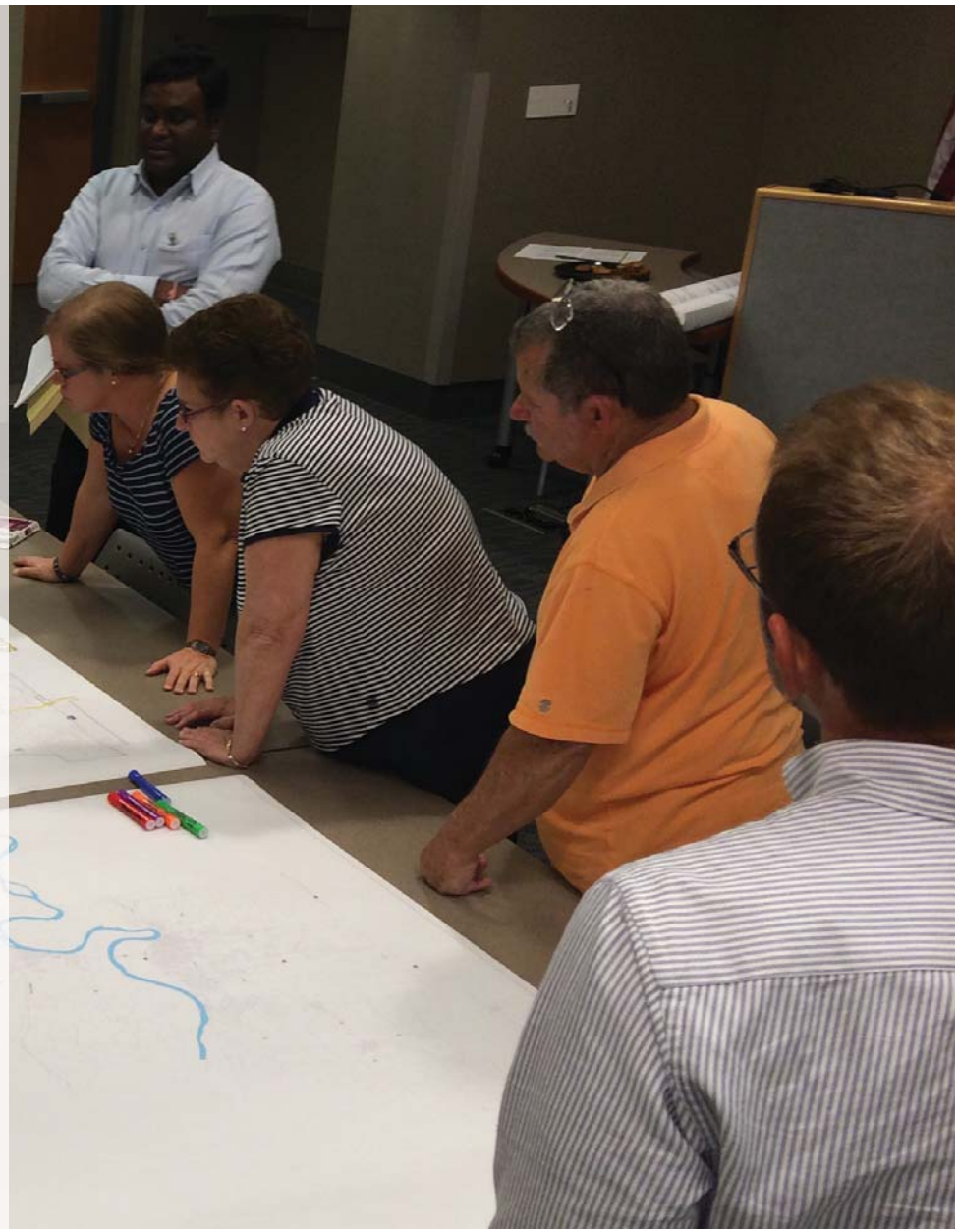
- Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.
- Promote equitable, affordable housing: Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- Enhance economic competitiveness: Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers, as well as expanded business access to markets.
- Support existing communities: Target federal funding toward existing communities – through strategies like transit-oriented, mixed-use development, and land recycling – to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- Coordinate policies and leverage investment: Align federal policies and funding to remove barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.
- Value communities and neighborhoods: Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods – rural, urban, or suburban

PLANNING PROCESS

An extensive planning process was followed in the development of MTP 2040. Essential elements include need identification and resource allocation. These are supported by the following tasks (in no sequential order):

Evansville MPO MTP 2040 Planning Process

1. Public involvement
2. Development of Vision, Goals, and Objectives
3. Forecasting socioeconomic data
4. Existing conditions and needs analysis
5. Forecasting travel demand
6. Identification of problem areas
7. Alternative analysis, fiscal constraint, and recommendations
8. Red flag analysis
9. Title VI and Environmental Justice
10. Conformity determination



1 PUBLIC INVOLVEMENT

The Evansville MPO conducted an extensive public outreach to people from all walks of life. The public outreach efforts included an online and in-person survey, City of Evansville Mayor's traveling city hall meetings, Citizens Advisory Committee (CAC) meetings, presentations to the Chamber of Commerce of Southwest Indiana, MPO policy and tech committee meetings, and outreach through traditional and social media. The public involvement section on Page 11 outlines the process followed for the MTP, and Appendix B provides more detailed information on the survey and results.

2 Vision, Goals and Objectives

The Evansville MPO worked closely with the CAC to develop the 2040 MTP Vision, Goals and Objectives. The objectives were used to develop multimodal performance targets for the horizon year. These targets serve as performance measures that will be tracked to evaluate the efficiency of the multimodal transportation system and the efficacy of the planning process.

3 Socioeconomic forecasts

Socioeconomic data such as population, households, employment, and household income levels are important to assess the future transportation needs of the MPA. The historic and current socioeconomic data available was used to develop the future population and employment numbers of the MPA. Detailed discussion of socioeconomic characteristics of the MPA is provided in Chapter 2. The regional socioeconomic data was allocated to the Traffic Analysis Zones (TAZs) using the HELPViz land use model. Four different development scenarios were developed using the land use model. These scenarios were developed in conjunction with the development of the Regional Plan for Sustainable Development (RPSD). Through an extensive public participation and technical evaluation process Development Scenario C was selected as the preferred alternative to conduct the needs analysis of the transportation system. The TAZ socioeconomic data was used in the TransCAD travel demand model (TDM) to assess the current problem areas and future travel demand within the MPA.

4 Existing condition and needs analysis

The Evansville MPO used various planning tools to conduct an existing condition and needs analysis. A detail discussion of the existing conditions and needs analysis is provided in Chapter 3. A brief discussion of the factors considered for analysis and the methodology followed to conduct the needs analysis is provided below.

Providing safe and secure access to employment, shopping, recreational and other facilities is the primary role of the transportation system. The MTP 2040 addresses the connectivity between various land uses and between various communities within the MPA. Safety and Security factors with respect to all modes of transportation are also addressed in the MTP 2040.

- Connectivity

  GIS mapping was used to examine the connectivity of all modes of transportation between residential areas and various other land uses within and between various communities within the MPA. The Areas lacking connectivity are discussed in detail in Chapter 3. The alternatives for addressing the connectivity issues for all modes are addressed in Chapter 4.

- Safety

  The state crash data sets for Kentucky and Indiana and local datasets available to identify the high crash locations within the MPA. These are discussed in detail in Chapter 3 and the recommendations to improve these locations are addressed in Chapter 4.

- Security

  Transportation system security is an important factor in the planning process. A secure transportation system provides many alternative routes and modes for the transportation system users. The security section is discussed in detail in Chapter 3.

- Multimodal transportation facilities

  Providing mobility and accessibility to all transportation system users is an important goal of the Evansville MPO. To achieve this goal the transportation system should accommodate the users of all modes of transportation including auto, freight, transit, bike, and pedestrian. The needs analysis of all modes is discussed in detail in Chapter 3 and the recommendations to fulfill those needs are provided in Chapter 4.

5 Forecasting Travel Demand

Forecasting the travel demand is an important part of transportation planning. Forecasting the future travel demand assists the local governmental agencies to identify the future needs and plan for fulfilling those needs. The travel demand models not only forecast the future trip generation but also forecast the mode splits based on affordability of a personal vehicle, availability of alternative modes of transportation, and travel behavior of the users based on time of day, facility types and travel conditions of the roadways. The Evansville MPO uses a hybrid tour based model to forecast the future travel demand. TDM is sensitive to conditions such as availability of alternative modes of transportation, urban design elements, type of controls existing at the intersections, speeds and delays, and fuel prices. Unlike the traditional 4 Step Model the hybrid model includes 12 steps.

1. Population synthesizer
2. Vehicle availability
3. Tour and stop generation
4. Activity allocation choice
5. Tour mode choice
6. Stop location choice
7. Stop sequence choice
8. Trip mode choice
9. Departure time choice
10. External model
11. Truck model
12. Network Assignment

A detailed discussion of the Travel demand forecasting methodology is provided in Appendix C: Travel Demand Forecasting Model.

6 Identification of Problem Areas/Issues

TDM was used to evaluate the existing networks performance with the future population and employment growth. To accomplish this task the Evansville MPO conducted the no-build scenario model runs with projected socioeconomic data on the existing transportation network. The results of these model runs were examined to identify the areas of transportation network that are performing at levels of service E and F, considered unacceptable driving conditions. Consideration was given to all modes of transportation including auto, freight, transit, bike and pedestrian.

7 Alternative Analysis and Recommendations

Based on the existing condition and needs analysis and the no-build scenario runs, a list of recommendations was developed to address the areas of concern. The recommendations were presented to the CAC, general public, local stakeholders, and the MPO Policy and Technical committees for review and comment. After reviewing the comments and refining the recommendations, the final list of recommendations were evaluated using the TDM as applicable. Based on the financial forecasts agreed upon by the Kentucky and Indiana DOTs, the recommendations were fiscally constrained.

8 Environmental/Red flag analysis

Environmental/red flag analysis was conducted for all roadway projects included in MTP 2040. The environmental/red flag analysis included analysis for existence of environmental items of concern with respect to:

- Infrastructure
- Water resources
- Mining/Mineral Exploration
- Hazmat
- Ecological information
- Cultural resources

A detailed discussion of the environmental/red flag analysis is provided in Appendix F.

9 Title VI and Environmental Justice

The Evansville MPO also identified the projects that are located within the primary and secondary focus areas identified in the public participation plan. A detailed discussion of this section is provided in Appendix G.

10 Conformity determination

As an attainment maintenance area for $PM_{2.5}$ the MTP 2040 is required to show conformity determination for State Implementation Plan (SIP) budgets established through an interagency consultation process. To accomplish this task the air quality post processor program (AQPP) developed in collaboration with the Indiana DOT and all the MPOs within the state of Indiana. Based on the conformity documentation, the MTP 2040 is in compliance with the National Ambient Air Quality Standards (NAAQS).

PUBLIC INVOLVEMENT

Following closely on the Regional Plan for Sustainable Development public participation process and plan development, the MTP 2040 was informed by the extensive public input gathered for RPSD. A key takeaway from the RPSD was the importance of providing a transportation system that accommodates all users and modes. This assessment was affirmed by the MTP process, and represents one of a number of challenges moving forward. Emerging issues include:

- *Fiscal Constraint:* Transportation funding has been impacted by the larger economic environment. System needs far exceed available revenues, requiring prioritization of transportation investments.
- *System Preservation:* Protecting transportation investments through sound preservation practices can improve the overall condition of the highway system at a lower cost, contributing to long term fiscal responsibility.
- *Operational Efficiency:* Capacity expansion is limited in its ability to address all of the region's transportation needs. Managing the current system more effectively is an opportunity to impact congestion and air quality by utilizing technology and other operational strategies.
- *Mobility Options:* Expanding transportation choices contributes to regional quality of life, as well as providing balance to a transportation system largely dependent on single occupancy vehicle trips. In a constrained fiscal environment, improving transit, bicycle and pedestrian system coverage while continuing to invest in roadway projects will be an important prioritization element.

Public participation is critical to the planning process and was accomplished through a variety of methods. In April of 2013, the MPO assembled a Citizen Advisory Committee to help guide the development of the plan. The CAC is comprised of approximately 45 members representing diverse interests and backgrounds.

For a complete list of CAC members and their affiliation, see the Acknowledgements section at the beginning of the MTP 2040.

In addition to the significant feedback from the CAC, input was sought from the general public by attending community forums and meetings. This process started in March of 2013 with the creation of a survey. The survey allowed participants to rate their satisfaction with the current transportation system, rank the transportation issues most important to them, and voice their overall concerns and priorities. The survey was available online from March 20th through July 5th. Along with the online survey, EMPO staff visited targeted outreach areas identified in the EMPO Participation Plan to distribute in-person surveys. Locations such as grocery stores, pharmacies, and small shopping areas were selected. Staff members spent one week at these locations in Evansville, Henderson, Newburgh, and Boonville. Staff members also attended events such as Evansville's Traveling City Hall, posted the survey on the EMPO website and Facebook page, and placed surveys in the Urban Design Center in the Arts District (a result of the RPSD). In all, 377 surveys were taken. Of those, 104 were in-person surveys. See Appendix B for the survey and survey results.

CAC and public meetings in the plan development process are documented in the following table.

Table 1-1: Public Process Overview

WHO	WHAT	WHEN	PURPOSE
CAC	SWOT Visioning Workshop	April 30, 2013	S.W.O.T. Visioning Workshop provided a realistic assessment of how the strengths and opportunities of the transportation network counter weaknesses and threats for its future.
CAC	Goals, Objectives, Performance Targets	July 23, 2013	Review and comment over the MTP 2040 goals, objectives, and performance targets. These were created based on information received from the S.W.O.T. Visioning Workshop.
CAC	Recommendations	October 1, 2013	Review and comment on proposed roadway, transit, and bicycle and pedestrian projects and improvements. Recommended projects and improvements were created based upon existing conditions and needs analysis, the MPO Traffic Demand Model, and input from the CAC.
PUBLIC OPEN HOUSE	Recommendations	October 9, 2013	Review and comment on proposed roadway, transit, and bicycle and pedestrian projects and improvements.
CAC	Draft Plan Review	December 11-12, 2013	Presented the final draft MTP 2040 to CAC members for their review and comments.
PUBLIC OPEN HOUSE	Draft Plan Review (Henderson)	December 11, 2013	Presented the final draft MTP 2040 to the public for their review and comments.
PUBLIC OPEN HOUSE	Draft Plan Review (Evansville)	December 12, 2013	Presented the final draft MTP 2040 to the public for their review and comments.

The Draft MTP was released for public comment on December 6th, 2013. As documented above, open-house meetings for disseminating information and collecting comments on the Plan were held in Henderson on December 11th and in Evansville on December 12th. Copies of the Draft MTP were available for review at selected public libraries and other public offices. Notices of the official public comment period (December 6, 2013 to January 5, 2014) were published in the Evansville Courier-Press, the Henderson Gleaner, the Standard in Warrick County, the Boonville Standard, and Our Times Newspaper. Press releases announcing the completion of the draft Plan and the opening of the official public comment period were distributed for release to local radio and television media outlets. The Draft MTP was also posted for review on the MPO website and publicized by way of the MPO's Facebook page.

Appendix B contains the text of comments received during the development and draft review public comment periods.

VISION, GOALS, OBJECTIVES, AND PERFORMANCE TARGETS

Vision

A vision statement reflects the ideal future toward which a plan guides collective action. Developed from Plan CAC discussion, and informed by the extensive visioning workshops hosted for the RPSD, the vision establishes the foundation for the plan.

The vision is supported by goals, objectives, and targets developed by the CAC in collaboration with the MPO staff. Each goal is a long-term end to which planning activities will be directed. Each objective is an intermediate end in the progression towards a goal. Targets are the measurable, achievable steps needed to accomplish the objectives.

THE MTP 2040 VISION

The Evansville Urbanized Area is a flourishing region with a high quality of life for its residents. Our transportation system is safe, efficient, multi-modal and accessible to all users. It supports economic vitality, respects environmental concerns and is supported by public and private consensus and efficient use of resources.

Goals

The MTP 2040 goals are consistent with goals found in local comprehensive plans and the RPSD. This ensures that agencies within the region are working towards achieving the same goals for improving livability within the region. Implementation of the MTP 2040 will assist communities in achieving the transportation elements of these overall goals.

QUALITY OF LIFE

Create sustainable neighborhoods by encouraging redevelopment and infill while providing a variety of accessible recreational, leisure, and cultural activities for all ages.

ENVIRONMENT

Support an environment that encourages healthy lifestyles, enhances the quality of life, preserves natural resources, and maintains a high level of air and water quality.

ECONOMIC DEVELOPMENT

Promote development that contributes to the local economy while expanding and retaining existing businesses and improving the region's standard of living.

POLICY AND PARTNERSHIP

Expand partnerships and encourage communication between and among public and private entities to ensure the region is capitalizing on its resources.

SAFETY, SECURITY, AND HEALTH

Increase the safety and security of the transportation system by building redundancies and increasing access to active transportation choices.

Objectives

Objectives are a more detailed set of projects or policies that can be implemented in order to achieve the plan's goals. Specific transportation-related objectives were drafted based on information received from the Citizen's Advisory Committee during a S.W.O.T. (strengths, weaknesses, opportunities and threats) brainstorming session. Through this process, EMPO developed 17 objectives to work towards implementation.

Performance Targets

The transportation planning process is ongoing, even though the MTP is updated every four years. An ongoing process is implementing the projects and policies outlined in the MTP while monitoring the progress of achieving the MTP goals. Measurable targets were developed as a means of tracking progress toward the MTP 2040 goals and objectives. The targets are a specific project or policy that can be tracked using benchmark data providing a quantifiable way to measure progress.

The MTP 2040 objectives and targets, broken down by mode, are listed in the following table. The table also illustrates the connections between the goals and objectives.

Table 1-2: MTP 2040 Objectives and Targets

	QUALITY OF LIFE	ENVIRONMENT	ECONOMIC DEVELOPMENT	POLICY AND PARTNERSHIP	SAFETY, SECURITY, AND HEALTH
TRENDS					
SUSTAINABLE DEVELOPMENT OBJECTIVES					
Ensure local shopping opportunities have adequate access for all modes of transportation.	●		●		●
Create attractive, walkable streetscapes by including landscaping and other streetscape ammenities.	●	●	●	●	●
Encourage jurisdictions to update their zoning and other ordinances to include more walkable and transit-oriented designs.		●	●	●	
Educate the public and elected officials on the importance of regional, corridor, and community planning.	●			●	
SYSTEMS					
ROADWAY NETWORK OBJECTIVES					
Advance roadway projects that provide safe and secure travel.			●		●
Improve the roadway network and traffic flow by repairing grid connectivity.	●	●	●		●
Improve travel times for all roadway users.	●	●	●		●
Improve ease of travel by providing well-designed and signed access roads.				●	●
Ensure interchanges and intersections are sufficient for current and future travel demands.			●	●	
Advance the interstate system within the region with an I-69 bridge across the Ohio River.	●		●	●	●
Modernize and improve the synchronization of traffic signals within the network to aid in more efficient travel times.	●		●		●
ROADWAY NETWORK TARGETS					
Improve the peak-hour level of service (LOS) on all arterial and collector roads.					
Improve existing travel times on arterial and collector roads.					
Decrease the commuter mode share in single occupancy vehicles (SOVs).					
Improve existing travel times on designated truck routes.					
Achieve $PM_{2.5}$ and Ozone attainment status for National Ambient Air Quality Standards (NAAQS).					
Decrease the per-capita VMT growth rate.					

Table 1-2: MTP 2040 Objectives and Targets Cont.

	QUALITY OF LIFE	ENVIRONMENT	ECONOMIC DEVELOPMENT	POLICY AND PARTNERSHIP	SAFETY, SECURITY, AND HEALTH
SYSTEMS CONT.					
TRANSIT OBJECTIVES					
Increase transit efficiency on a regional level.	●	●	●	●	●
Consider expanding the transit service area within each jurisdiction to reach more people and connect to more destinations.	●		●		
Increase ridership by extending services and hours.			●	●	●
Ensure bus stops are accessible by all users.	●			●	●
Consider upgrading bus stops by providing amenities, such as bus shelters.	●			●	●
Invest in technology improvements for transit systems.	●		●		
Consider creating a rideshare program.		●		●	●
Ensure transit vehicles are properly maintained.	●				
Ensure new transit vehicles are equipped with bike racks.	●		●	●	●
TRANSIT TARGETS					
Increase transit ridership.					
Increase regional connectivity among existing transit providers.					
Improve the reliability and safety of transit services.					
Enhance the transit experience through technology and improved information delivery.					
BICYCLE FACILITIES OBJECTIVES					
Improve bicycle connectivity on a regional level.	●	●	●	●	●
Improve bicycle connectivity on a local level.	●	●	●	●	●
Ensure new roadway projects accommodate bicyclists.	●			●	●
Continue to expand the bicycle network.	●	●	●	●	●
Promote Complete Street Policy adoption throughout the region.	●	●	●	●	●
PEDESTRIAN FACILITIES OBJECTIVES					
Improve pedestrian connectivity on a regional level.	●	●	●	●	●
Improve pedestrian connectivity on a local level.	●	●	●	●	●
Ensure new roadway projects accommodate pedestrians.	●			●	●
Encourage the development and/or repair of sidewalks throughout the region.	●		●	●	●
Continue to expand the pedestrian network.	●			●	●
Promote Complete Street Policy adoption throughout the region.	●	●	●	●	●

Table 1-2: MTP 2040 Objectives and Targets Cont.

	QUALITY OF LIFE	ENVIRONMENT	ECONOMIC DEVELOPMENT	POLICY AND PARTNERSHIP	SAFETY, SECURITY, AND HEALTH
SYSTEMS CONT.					
BICYCLE AND PEDESTRIAN FACILITIES TARGETS					
Increase the bicycle network by providing more connections between neighborhoods, shopping areas, recreational areas, etc.					
Expand the multi-use path systems in the region.					
Increase the number of people within 1 mile of a dedicated bikeway (on-street facilities and multi-use paths).					
Increase the number of people within 1/4 mile of a dedicated walkway (sidewalks and multi-use paths).					
Encourage LPA's to adopt the MPO's Complete Streets Policy, or a policy with similar goals.					
FREIGHT OBJECTIVES					
Improve traffic flow on priority truck routes by reducing congestion.		●	●		
Encourage freight companies to engage in short- and long-term freight corridor planning.			●	●	
Encourage railroads and local jurisdictions to work together in keeping track crossings well maintained.			●	●	●
MANAGEMENT					
MAINTENANCE					
Preserve the investment in existing surface transportation systems.				●	
Support transportation maintenance, operations, and capital investment decisions that enhance the efficient movement of freight.			●	●	
TRANSPORTATION SAFETY					
Support roadway designs and improvements that minimize conflicts between users, including bicyclists and pedestrians.	●		●	●	●
Encourage the formation of safety review boards in local jurisdictions.				●	●
Encourage reporting agencies to improve the ability to identify high-accident locations.					●
Support safety education programs.				●	●
TRANSPORTATION SAFETY TARGETS					
Reduce Index of Crash Cost (Icc) on arterial and collector roads.					
Reduce bicycle and pedestrian crashes.					


N. Fifth Ave.
1709-1715

CHAPTER 2:

REGIONAL TRENDS

SOCIOECONOMIC CHARACTERISTICS

Various activities, such as employment, shopping, education, entertainment and other social activities, significantly influence the demand on the regional transportation system. More people, more jobs, and more commercial and social destinations generate higher traffic volumes. Therefore, social and economic characteristics can be used as reliable indicators of travel behavior. By recognizing this relationship, mathematical models have been developed to estimate traffic demands based upon social and economic characteristics.

For the Metropolitan Transportation Plan 2040, a socio-economic database at the Travel Analysis Zone (TAZ) level was developed. By utilizing the population, household and employment data from the U.S. census, a 2010 base-year database was developed and incorporated into the Evansville MPO travel demand model. For 2040 projections, a separate database with county-wide population, household and employment forecasts was created for Vanderburgh, Warrick, and Henderson Counties.

POPULATION

Total Population

According to U.S. Census data, the region's population grew by approximately 6.5% between 1990 and 2000 and just over 6% between 2000 and 2010. Population statistics for all three counties and each of the communities within the region are shown in Table 2-1. The three major trends revealed in the numbers are (1) Warrick County has a much higher growth rate than the other two counties, (2) Vanderburgh County continues to grow, and (3) the City of Evansville's population continues to decline. These trends reveal a shift in the population from the more urbanized areas of Evansville to suburban areas north and east of the city's boundary.

Warrick County continues to have the highest growth in the region, growing in population by approximately 14% between 2000 and 2010. Much of this growth can be found in Ohio Township, which includes the Town of Newburgh, the Town of Chandler, and the area roughly bounded by the Vanderburgh County line on the west, Ohio River on the south, both sides of SR 261 on the east, and SR 62 on the north.

Table 2-1: Population by City, Town and County

	1990	2000	2010
Henderson County	**43,044**	**44,829**	**46,250**
Town of Corydon	790	744	720
City of Henderson	25,945	27,373	28,757
Town of Robards	N/A	564	515
Vanderburgh County	**165,058**	**171,922**	**179,703**
Town of Darmstadt	1,346	1,313	1,407
City of Evansville	126,272	121,582	117,429
Warrick County	**44,920**	**52,383**	**59,689**
City of Boonville	6,724	6,834	6,246
Town of Chandler	3,099	3,094	2,887
Town of Elberfeld	635	636	625
Town of Lynnville	640	781	888
Town of Newburgh	2,880	3,088	3,325
Town of Tennyson	267	290	279
Total Population	**253,022**	**269,134**	**285,642**

Note: Robards was incorporated in 1997

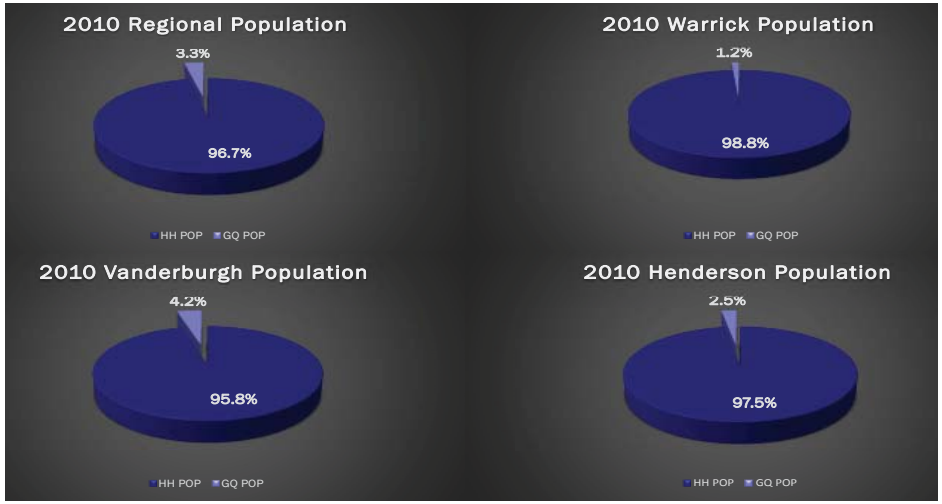
Source: 2010 U.S. Census

Household Population

Household population refers to the number of people residing in a household of any kind. A household includes all types of housing units, such as apartments, condos, mobile homes, and single-family homes. Those not residing within a household, and therefore not included in household population, include those living in correctional facilities, nursing homes, college dormitories, and other institutionalized and non-institutionalized group quarters.

The region's household population in 2010 was 96.7% of the total population. The remaining 3.3% of the population live in group quarters of some type. Vanderburgh County has the lowest percentage of people living in households with 95.8%, due to the larger number of people living in group quarters. Conversely, Warrick County has the highest percentage of people living in households with 98.8%, and a relatively low number of group quarters. Figure 2-1 shows the relationship between population and group quarter population for the entire region and the three counties.

Figure 2-1: Household and Group Quarter Population



Source: 2010 U.S. Census

Group Quarters Population

As mentioned in the previous section, the group quarters population consists of all persons not living within a household. This population could be living in an institutionalized facility or a non-institutionalized facility. Institutionalized facilities include correctional facilities for adults and juveniles, group homes and treatment centers, nursing facilities, and mental health facilities. The largest category of these facilities in Vanderburgh County and Warrick County is nursing facilities, nursing homes and other skilled nursing facilities. In Henderson County, the adult correctional facility population is the highest, more than twice the population in nursing facilities. This is driven by the Henderson County Detention Center that houses city, county, and state inmates.

Non-institutionalized facilities include college or university student housing, emergency and transitional shelters for the homeless, residential treatment centers, group homes, temporary housing for workers, and Job Corps centers. The greatest percentage of non-institutionalized population is in the college or university housing category. Approximately 76% of Vanderburgh County's non-institutionalized group quarter population lives in housing on the University of Evansville or University of Southern Indiana campuses. This category also makes up 70% of the non-institutionalized group quarter population in the entire region. Table 2-2 includes the breakdown of group quarters population for the region and the three counties.

Table 2-2: Group Quarters Population

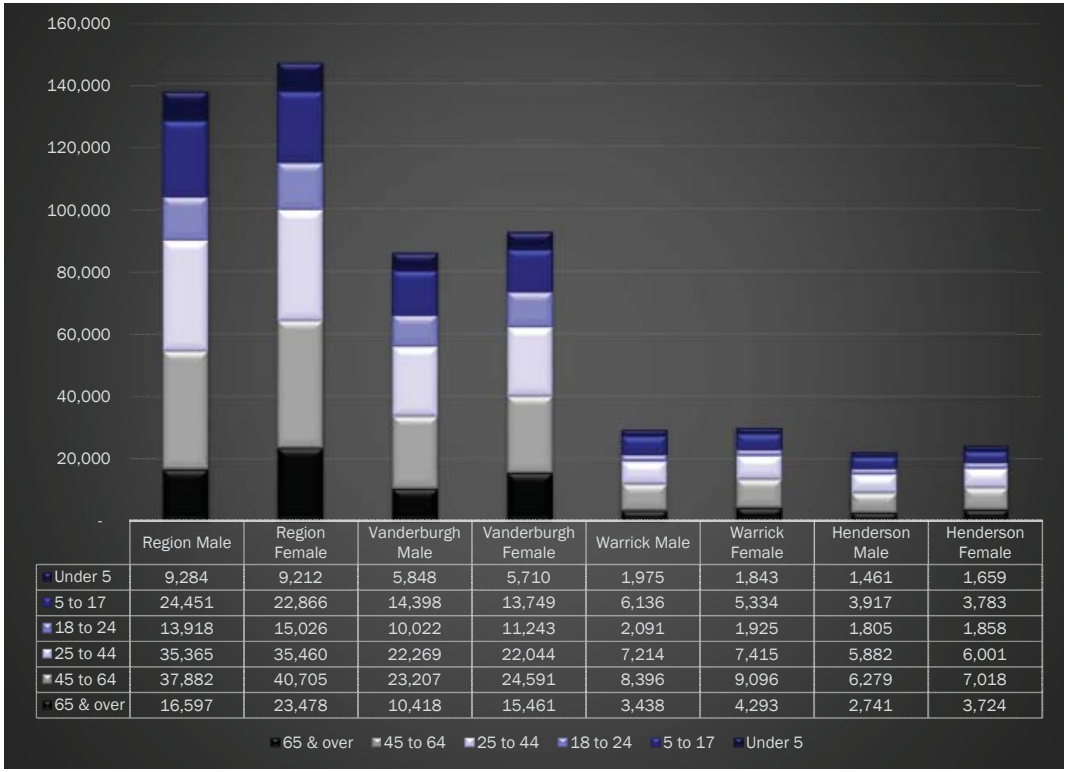
	Institutionalized			Non-Institutionalized
	Correctional	Nursing	Other	
Henderson County	544	262	0	359
Town of Corydon	0	0	0	0
City of Henderson	544	262	0	356
Town of Robards	0	0	0	0
Vanderburgh County	744	1,497	165	5,125
Town of Darmstadt	0	0	0	0
City of Evansville	744	1,194	165	2,624
Warrick County	67	598	0	61
City of Boonville	0	164	0	0
Town of Chandler	0	0	0	0
Town of Elberfeld	0	0	0	0
Town of Lynnville	0	0	0	9
Town of Newburgh	0	0	0	8
Town of Tennyson	0	0	0	0
Total Population	1,355	2,357	165	5,545

Source: 2010 U.S. Census

Age and Gender

Diversity can also be seen in the shape of the age groups for the counties in the region. Figure 2-2 shows the age groups by gender of the three counties in the region for 2010 as well as the median age. The population in all three counties is aging, with the median age for each county higher than the national median. The baby boomers that comprised a significant part of the 25 to 44 year olds in 1990 have aged to the 45 to 64 year olds in 2010. The 5 to 17 year old group has gotten smaller for each county over the 20 year span of 1990 to 2010.

Figure 2-2: Age and Gender Breakdown



	Region Male	Region Female	Vanderburgh Male	Vanderburgh Female	Warrick Male	Warrick Female	Henderson Male	Henderson Female
Under 5	9,284	9,212	5,848	5,710	1,975	1,843	1,461	1,659
5 to 17	24,451	22,866	14,398	13,749	6,136	5,334	3,917	3,783
18 to 24	13,918	15,026	10,022	11,243	2,091	1,925	1,805	1,858
25 to 44	35,365	35,460	22,269	22,044	7,214	7,415	5,882	6,001
45 to 64	37,882	40,705	23,207	24,591	8,396	9,096	6,279	7,018
65 & over	16,597	23,478	10,418	15,461	3,438	4,293	2,741	3,724

Source: 2010 U.S. Census

Household Income

Income data is important to transportation planning because increasing income tends to result in increased personal travel. Higher income households ($50,000 or higher) produce more than twice the number of daily trips than very low-income households ($10,000 or lower). Very low-income households are less likely to own vehicles and are more likely to use transit as a primary transportation mode. These very low-income households are significantly below the Federal poverty income level threshold for year 2011 defined at $22,021 for a family of four. Income level, however, is only one indicator of poverty threshold. Poverty thresholds are determined primarily by the following three factors: household income, size of the family, and ages of family members. The same thresholds are used throughout the United States and are updated annually for inflation using the Consumer Price Index for All Urban Consumers (CPI-U). Table 2-3 shows median household income for the three counties as well as the United States.

Table 2-3: Household Income

	1990		2000		2010
	1990 $	2010 $	2000 $	2010 $	2010 $
United States	$30,056	$50,145	$41,994	$53,177	$51,914
Henderson County	$25,556	$42,637	$35,892	$45,450	$40,438
Vanderburgh County	$25,798	$43,041	$36,823	$46,629	$42,396
Warrick County	$34,069	$56,840	$48,814	$61,813	$62,354

Source: U.S. Census

Race and Ethnicity

According to the U. S. Environmental Protection Agency (USEPA), environmental justice is defined as "the fair treatment and meaningful involvement of all people regardless of race, color, culture, national origin, income, and educational levels with respect to the development, implementation, and enforcement of protective environmental laws, regulations, and policies." Therefore, it is important to locate areas of racial concentration and determine if each racial group has equal access to multimodal transportation network and services. As a transportation planning agency, the Evansville MPO also ensures that the transportation projects or policies do not adversely affect these areas.

Data gathered from the 2010 U.S. Census reveals that the Evansville region is much less racially diverse than the average for the United States. While less than two-thirds of the U.S. population is non-Hispanic white, more than 87% of the Evansville region is non-Hispanic white. This can be seen in Table 2-4, which includes the racial breakdown of the U.S., the Evansville Region, and each of the three counties in the region. Vanderburgh County, with almost 15% of its population being non-white, is the most diverse of the three counties. However, there is a lack of racial distribution in the county. Figure 2-4 shows the distribution of racial groups within the MPA.

Language

In addition to providing equal opportunities for everyone regardless of their race, it is also important to ensure that individuals who do not speak English have access to public services in a language that they can comprehend. In Henderson County, 3.2% of the population speaks a language other than English according to the 2010 American Community Survey (ACS) 5-year estimate. In Vanderburgh and Warrick Counties, 4.0% of the population speaks a language other than English. For all three counties, the most common other language spoken is Spanish. Table 2-5 shows the number of people who speak only English and who speak a language other than English.

The percentage of people who speak a language other than English includes those people who speak English very well and those who speak English less than very well. Particular attention should be paid to those areas with high concentrations of people who speak English less than very well. In Vanderburgh County, nearly 2% of the population speaks English less than very well. This amounts to over 2,800 people in the county. In both Henderson and Warrick counties, the number of people who speak English less than very well is a little under 1%, which is between 350 and 400 people in each county. The largest concentration of people who speak English less than very well is in southeastern Vanderburgh County.

Table 2-4: Racial Breakdown

	Total Population	White Non-Hispanic	Black Non-Hispanic	Asian Non-Hispanic	Other Non-Hispanic	Hispanic or Latino
United States	308,745,538	63.70%	12.20%	4.70%	3.00%	16.30%
Henderson County	46,250	88.20%	7.70%	0.40%	1.90%	1.90%
Vanderburgh County	179,703	85.20%	9.00%	1.10%	2.50%	2.20%
Warrick County	59,689	94.00%	1.30%	1.60%	1.50%	1.60%
Region Total	285,642	87.50%	7.20%	1.10%	2.20%	2.00%

Source: 2010 U.S. Census

Table 2-5: Primary Language

	Population 5 years and over	Speaks only English	Speaks a Language other than English		
			Total	Speaks English very well	Speaks English less than very well
United States	283,833,852	79.90%	20.10%	11.40%	8.70%
Henderson County	42,848	96.80%	3.20%	2.30%	0.90%
Vanderburgh County	166,739	96.00%	4.00%	2.30%	1.70%
Warrick County	54,592	96.00%	4.00%	3.30%	0.70%
Region Total	264,179	96.10%	3.90%	2.50%	1.30%

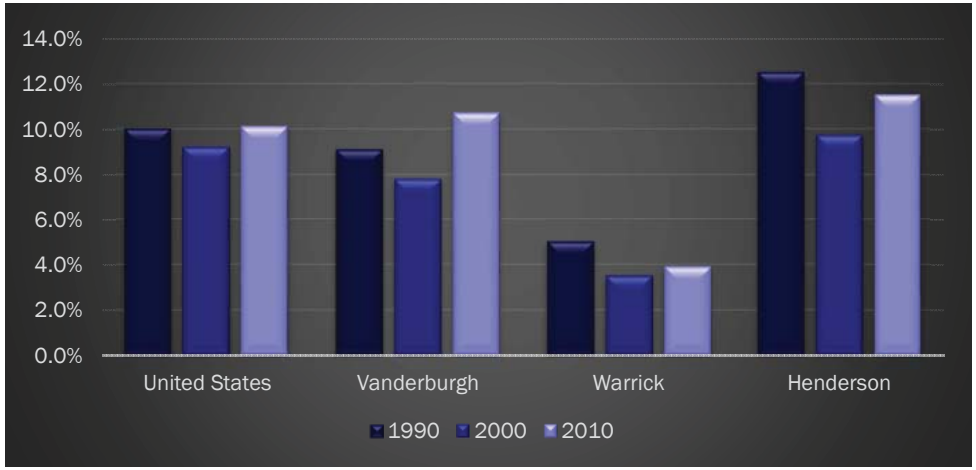
Source: 2010 U.S. Census

Poverty

In addition to race, ethnicity, and language, locating concentrations of poverty is another key element in determining how equitable a region actually is. Figure 2-3 shows the percentage of families below poverty in the United States and each of the three counties for 1990, 2000, and 2010. The U.S. Census determines poverty status of families by assigning each family to an income threshold based upon the size of the family and the age of the members. If a family's income falls below that threshold, then the family is considered to be in poverty.

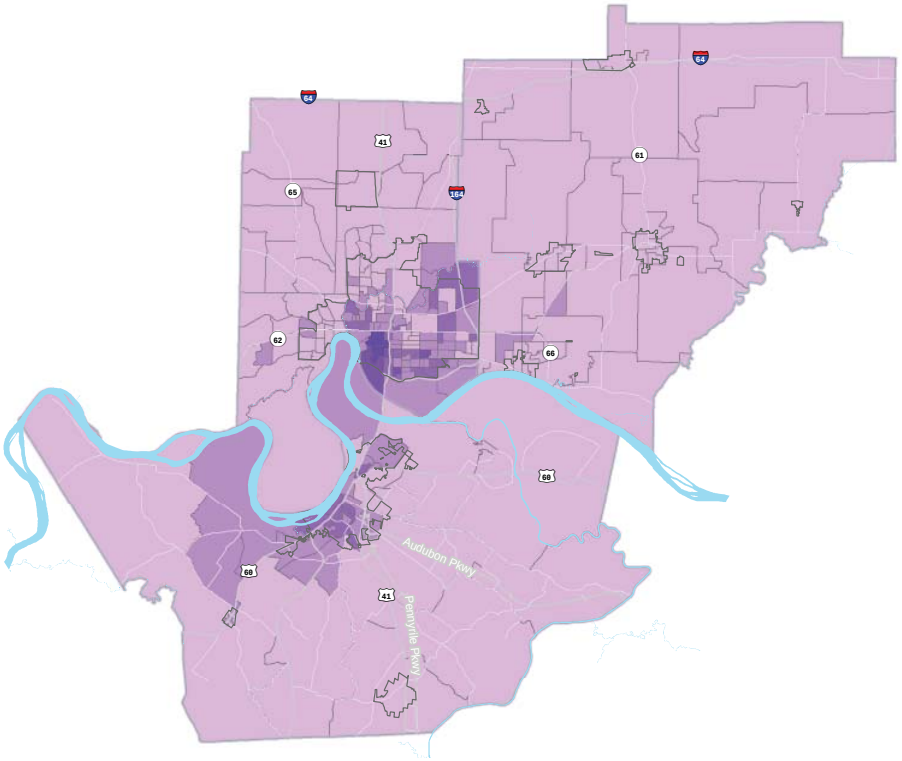
Between 1990 and 2000, the percentage of families below the poverty level declined for the United States and all three counties. However, the 2008 recession changed that downward trend and poverty levels for the United States and all three counties in 2010 reached levels higher than the 2000 percentages. In Vanderburgh County, the percentage of families in poverty in 2010 reached levels higher than in 1990 as well. Both Henderson County and Vanderburgh County have a higher percentage of families in poverty than the United States average. Figure 2-5 shows the distribution of those below the poverty level in the MPA.

Figure 2-3: Families in Poverty



Source: 2010 U.S. Census

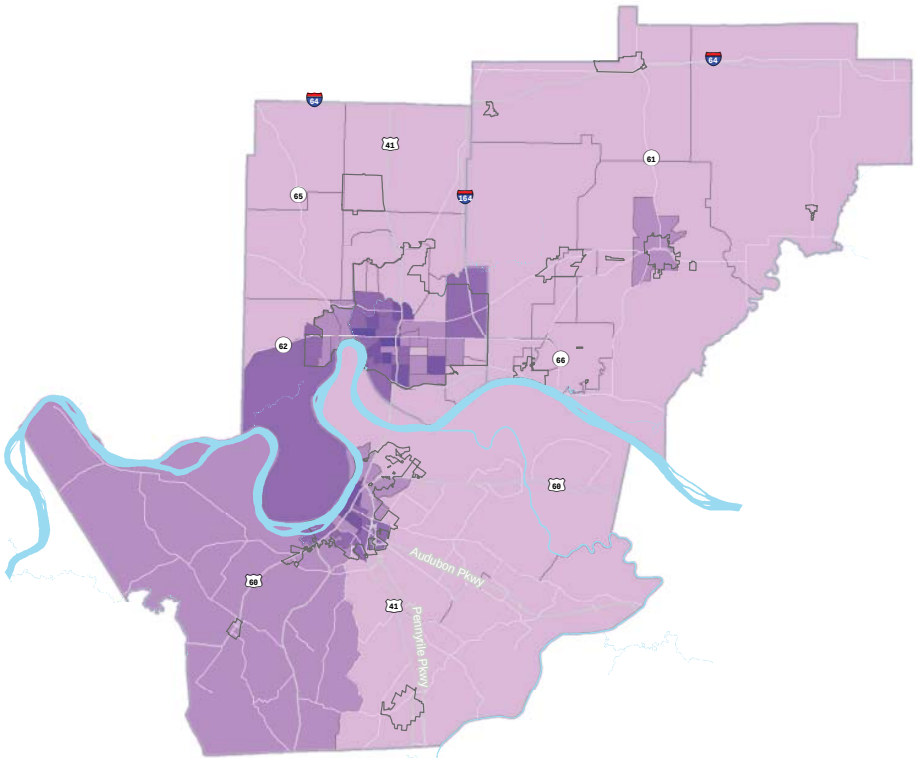
Figure 2-4: Race by Location



Race by Location

- <9% minority
- 9% - 19% minority
- 19% - 34% minority
- 34% - 50% minority
- 50% - 81% minority

Figure 2-5: Poverty by Location



Poverty by Location

- <10% below poverty
- 10% - 20% below poverty
- 20% - 30% below poverty
- 30% - 40% below poverty
- 40% - 60% below poverty

EMPLOYMENT

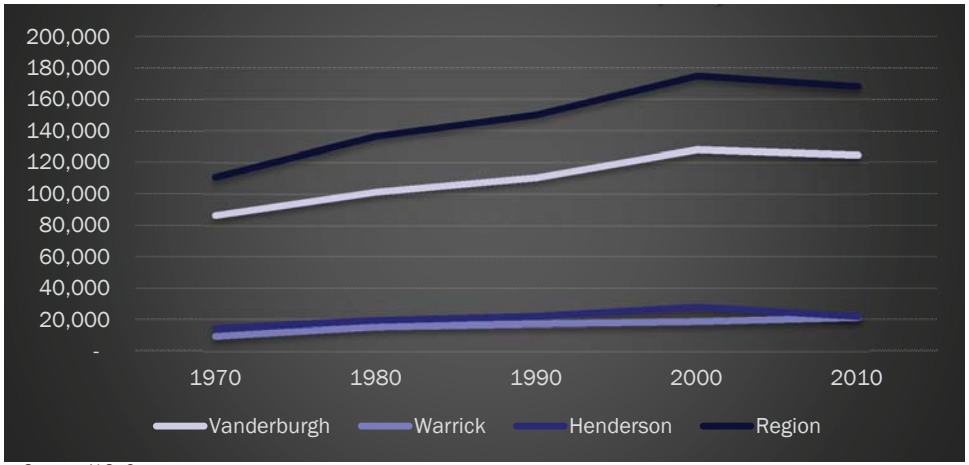
According to Woods & Poole data, the region's employment grew by approximately 16% between 1990 and 2000 and declined by 3.8% between 2000 and 2010. Employment statistics for all three counties are shown in Table 2-6 and Figure 2-6. The three major trends revealed in the numbers are (1) Warrick County has shown the economic resilience through the economic recession that started in 2008. (2) Warrick County grew at approximately 14% in the past decade while the regional employment declined by 3.8%.

Table 2-6: Employment

	1990	2000	2010
Vanderburgh	110,648	128,298	124,867
Warrick	17,484	18,657	21,308
Henderson	22,105	27,893	22,029
Total	150,237	174,848	168,204

Source: U.S. Census

Figure 2-6: Historic Employment



Source: U.S. Census

Source: http://www.pcidesign.com/fe_projects.html

Employment by Industry Sector

According to STATS Indiana, health care & social services is the largest industry within the MPA, followed by manufacturing and retail trade. Table 2-7 shows the employment industry sector data for the year 2010.

Table 2-7: Employment by Industry

NAICS *	Industry	DATA		
		Henderson	Vanderburgh	Warrick
0	Forestry, fishing, related activities	D**	D**	124
21	Mining	346	D**	334
22	Utilities	D**	928	282
23	Construction	1,076	8,282	1,501
31-33	Manufacturing	4,178	12,250	2,557
42	Wholesale trade	924	5,038	400
44-45	Retail Trade	2,395	13,879	2,259
48-49	Transportation and warehousing	D**	4,786	621
51	Information	194	2,157	150
52	Finance and insurance	502	3,483	1,073
53	Real estate and rental and leasing	246	3,385	1,204
54	Professional and technical services	507	5,013	1,126
55	Management of companies and enterprises	42	3,364	L***
56	Administrative and waste services	1,391	7,712	773
61	Educational services	98	2,543	248
62	Health care and social assistance	2,503	19,261	3,099
71	Arts, entertainment, and recreation	225	2,715	470
72	Accommodation and food services	1,294	10,285	1,059
81	Other services, except public administration	1,265	6,499	1,432
0	Government and government enterprises	2,999	10,906	2,280

* NACIS: North American Industry Classification System

** D = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

***L = Not shown to avoid disclosure of confidential information.

Source: STATS Indiana

Major Employers

The following list of major employers in the region is consistent with data above referencing healthcare and manufacturing as leading employment sectors.

Table 2-8: Major Employers in MPA

Company	Product/Service	Employees	County, State
Deaconess Hospital	Medical services	5300	Vanderburgh, IN
Toyota Motor Manufacturing, Indiana	SUVs and Vans	4500	Gibson, IN
St. Mary's Medical Center	Medical services	3800	Vanderburgh, IN
Berry Plastics	Injection-molded plastics	2400	Vanderburgh, IN
University of Southern Indiana	Education	2150	Vanderburgh, IN
Koch Enterprises, Inc.	Industrial and auto parts manufacturing	2119	Vanderburgh, IN
Patriot Coal Corp.	Mining	2000	Henderson, KY
Alcoa Warrick Operations	Aluminum sheet and ingot	1925	Warrick, IN
T.J. Maxx	Distribution center	1700	Vanderburgh, IN
Tyson Foods, Inc.	Mfg-Chicken Processing	1350	Henderson, KY
Vectren	Utility: gas and electric	1265	Vanderburgh, IN
SABIC	Plastics: Lexan, Valox, Ultem	1200	Posey, IN
Tropicana Evansville	Gaming and entertainment	1200	Vanderburgh, IN
Methodist Hospital	Regional Medical Facility	1183	Henderson, KY
Old National Bancorp	Banking and financial services	1036	Vanderburgh, IN
Mead Johnson Nutrition	Pediatric nutrition	950	Vanderburgh, IN
Springleaf Financial Services	Financial services	950	Vanderburgh, IN
Industrial Contractors | SKANSKA	Construction	900	Vanderburgh, IN
Alliance Coal Corp.	Mining	887	Henderson, KY
Toyota Boshoku Indiana	Automotive Supplier	857	Gibson, IN
Gibbs Die Casting Corp.	Machining	800	Henderson, KY
Peabody Energy Midwest	Coal mining	701	Vanderburgh, IN
AT&T	Wireless communications	650	Vanderburgh, IN
PGW Pittsburgh Glass, LLC	Automotive glass	641	Vanderburgh, IN
Big Rivers Electric Corp.	Utility: electric	621	Henderson, KY
AmeriQual	Meals: ready to eat	550	Vanderburgh, IN
Bristol-Myers Squibb	Pharmaceutical manufacturing & R/D	525	Posey, IN

Source: Economic Development Coalition of Southwest Indiana; http://www.southwestindiana.org/ss_major_employers

FORECAST SCENARIOS

The Evansville MPO examined the historic growth rates for the region over the past 50 years. Based on these growth rates the population and employment totals were extrapolated to 2040 at 5 year increments. These regional control totals were allocated to the TAZs using the land use model (HELPViz). HELPViz was developed as part of the Sustainable Evansville Area Coalition's Regional Plan for Sustainable Development.

The MPO, in collaboration with the Sustainable Evansville Area Coalition, developed four development scenarios for the MPA. Four scenarios are show in Table 2- 9 below.

These four scenarios were used to allocate regional control totals for population and employment to the TAZs. The results of the allocation at county level for all four scenarios are shown in Tables 2-10 and 2-11. The results were presented to the LIVE, WORK and PLAY technical committees involved in the development of the RPSD. Based on the feedback received at the technical committees the SEAC and the MPO has concluded to use Scenario C with the travel demand model for conducting the analysis of the existing transportation network, assessing the transportation needs, and developing the strategies and projects list for MTP 2040.

Table 2-9: Development Scenarios in MPA

Scenario		Greenfield/ New Development	Greyfield/Infill Development	Density Breakdown		
Name	Growth Type			Low (5DU/ Acre)	Med (10 DU/ Acre)	High (15 DU/Acre)
Scenario A -Trendline to 2040	"Business as Usual"	90%	10%	80%	15%	5%
Scenario B - Predominately New Development	"More New Development/ Some Infill"	65%	35%	50%	25%	25%
Scenario C- Predominately Infill	"More Infill/ Some New Development"	35%	65%	35%	30%	35%
Scenario D - Green Growth 2040	"Extreme Infill/ Growth Limits"	10%	90%	20%	30%	50%

Table 2-10: Population Distribution Scenarios

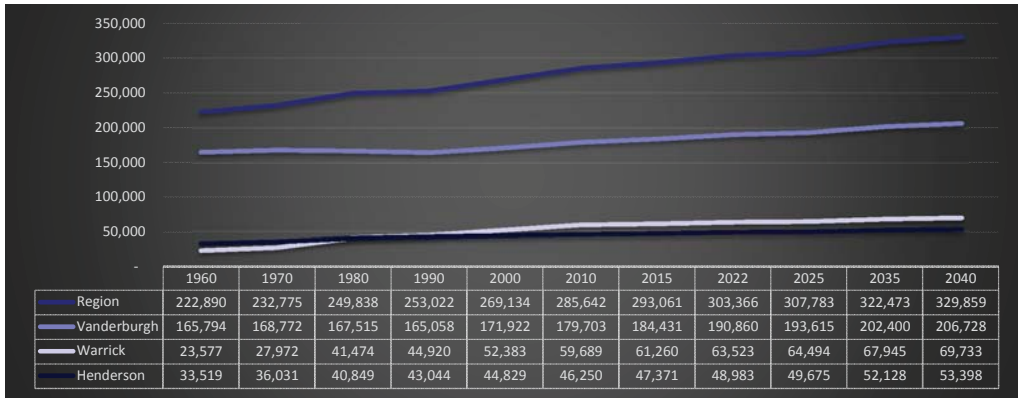
Population Scenario A						
	2010	2015	2022	2025	2035	2040
Vanderburgh	179,703	184,346	190,178	192,677	199,827	203,289
Warrick	59,689	61,350	64,097	65,275	70,057	72,574
Henderson	46,250	47,366	49,088	49,826	52,584	53,997
Total	285,642	293,062	303,363	307,778	322,468	329,860
Population Scenario B						
	2010	2015	2022	2025	2035	2040
Vanderburgh	179,703	183,988	189,525	191,898	199,066	202,608
Warrick	59,689	61,735	64,875	66,221	71,206	73,751
Henderson	46,250	47,338	48,960	49,656	52,199	53,510
Total	285,642	293,060	303,360	307,774	322,470	329,869
Population Scenario C						
	2010	2015	2022	2025	2035	2040
Vanderburgh	179,703	184,431	190,860	193,615	202,400	206,728
Warrick	59,689	61,260	63,523	64,494	67,945	69,733
Henderson	46,250	47,371	48,983	49,675	52,128	53,398
Total	285,642	293,061	303,366	307,783	322,473	329,859
Population Scenario D						
	2010	2015	2022	2025	2035	2040
Vanderburgh	179,703	185,344	193,068	196,379	207,033	212,293
Warrick	59,689	60,309	61,226	61,619	63,106	63,903
Henderson	46,250	47,377	49,048	49,764	52,343	53,662
Total	285,642	293,029	303,341	307,761	322,482	329,858

Table 2-11: Employment Scenarios

Employment Scenario A						
	2010	2015	2022	2025	2035	2040
Vanderburgh	124,867	131,171	138,406	141,507	149,555	153,570
Warrick	21,308	23,221	25,591	26,607	29,725	31,370
Henderson	22,029	23,298	25,008	25,741	28,146	29,376
Total	168,204	177,689	189,005	193,854	207,425	214,316
Employment Scenario B						
	2010	2015	2022	2025	2035	2040
Vanderburgh	124,867	130,943	138,032	141,071	149,195	153,266
Warrick	21,308	23,271	25,603	26,602	29,488	31,005
Henderson	22,029	23,476	25,368	26,180	28,741	30,046
Total	168,204	177,690	189,003	193,852	207,423	214,317
Employment Scenario C						
	2010	2015	2022	2025	2035	2040
Vanderburgh	124,867	130,963	138,137	141,211	149,566	153,768
Warrick	21,308	23,257	25,541	26,520	29,271	30,708
Henderson	22,029	23,470	25,326	26,121	28,586	29,840
Total	168,204	177,690	189,003	193,852	207,422	214,316
Employment Scenario D						
	2010	2015	2022	2025	2035	2040
Vanderburgh	124,867	131,234	138,760	141,986	150,796	155,221
Warrick	21,308	23,207	25,437	26,392	29,097	30,515
Henderson	22,029	23,249	24,806	25,474	27,530	28,581
Total	168,204	177,690	189,003	193,852	207,423	214,317

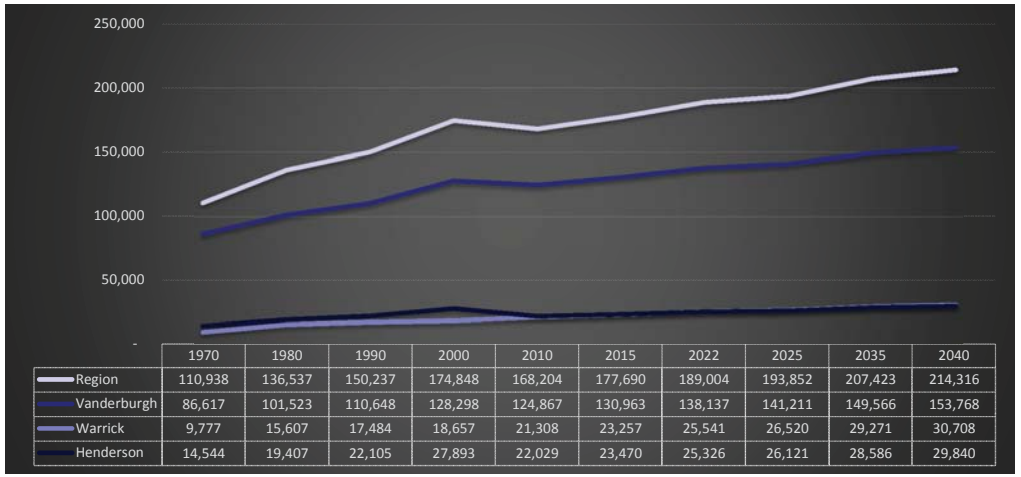
Figure 2-7 and 2-8 shows the population and employment growth for the entire region and the three counties between 1960 and 2010 as well as Scenario C projections to the year 2040. The region is projected to increase in population by about 15% between 2010 and 2040; Vanderburgh, Warrick and Henderson counties are expected to increase by 15%, 17% and 15% respectively.

Figure 2-7: Regional Population Forecasts

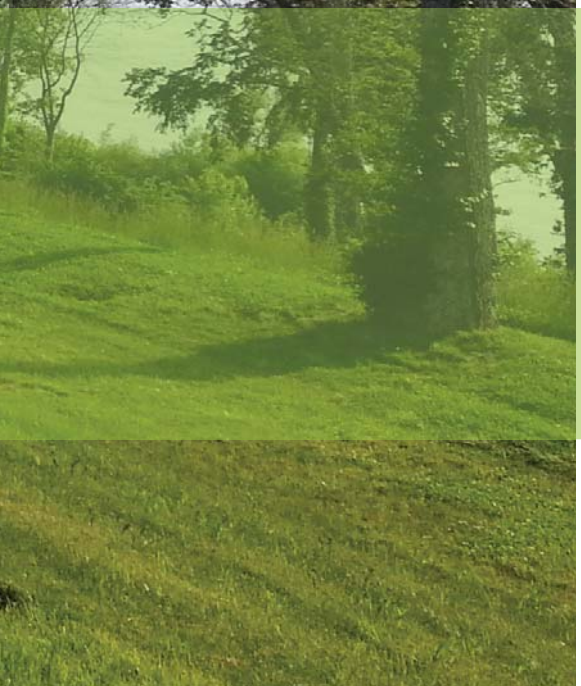


	1960	1970	1980	1990	2000	2010	2015	2022	2025	2035	2040
Region	222,890	232,775	249,838	253,022	269,134	285,642	293,061	303,366	307,783	322,473	329,859
Vanderburgh	165,794	168,772	167,515	165,058	171,922	179,703	184,431	190,860	193,615	202,400	206,728
Warrick	23,577	27,972	41,474	44,920	52,383	59,689	61,260	63,523	64,494	67,945	69,733
Henderson	33,519	36,031	40,849	43,044	44,829	46,250	47,371	48,983	49,675	52,128	53,398

Figure 2-8: Regional Employment Forecasts



	1970	1980	1990	2000	2010	2015	2022	2025	2035	2040
Region	110,938	136,537	150,237	174,848	168,204	177,690	189,004	193,852	207,423	214,316
Vanderburgh	86,617	101,523	110,648	128,298	124,867	130,963	138,137	141,211	149,566	153,768
Warrick	9,777	15,607	17,484	18,657	21,308	23,257	25,541	26,520	29,271	30,708
Henderson	14,544	19,407	22,105	27,893	22,029	23,470	25,326	26,121	28,586	29,840



CHAPTER 3:

EXISTING NETWORK

ROADWAY NETWORK

The Evansville MPA is provided access and mobility through approximately 3,066 miles of roadway network. The roadway network is grouped into hierarchical functional classification systems and subsystems based on the character of the service the roadway is intended to provide.

National Highway System

The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. The National Highway System (NHS) network includes Interstates, Other Principal Arterials, Strategic Highway Network (STRAHNET), Major Strategic Highway Network Connectors and Intermodal Connectors.

Specifically, the NHS routes in the Indiana portion of the MPA include Lloyd Expressway (SR62/66), U.S. Highway 41, I-164 (future I-69), and I-64. The NHS routes for the Kentucky portion of the MPA include U.S. Highway 60 from the Henderson Bypass to U.S. Highway 41, U.S. U. S. Highway 41 from the Vanderburgh County line south to the E.T. Breathitt Parkway, the E.T. Breathitt Parkway (future I-69), the Audubon Parkway (future I-369), and KY 425 (Henderson Bypass). These roadways should be given the highest priority for improvements and/or repairs.

Regional State Facilities

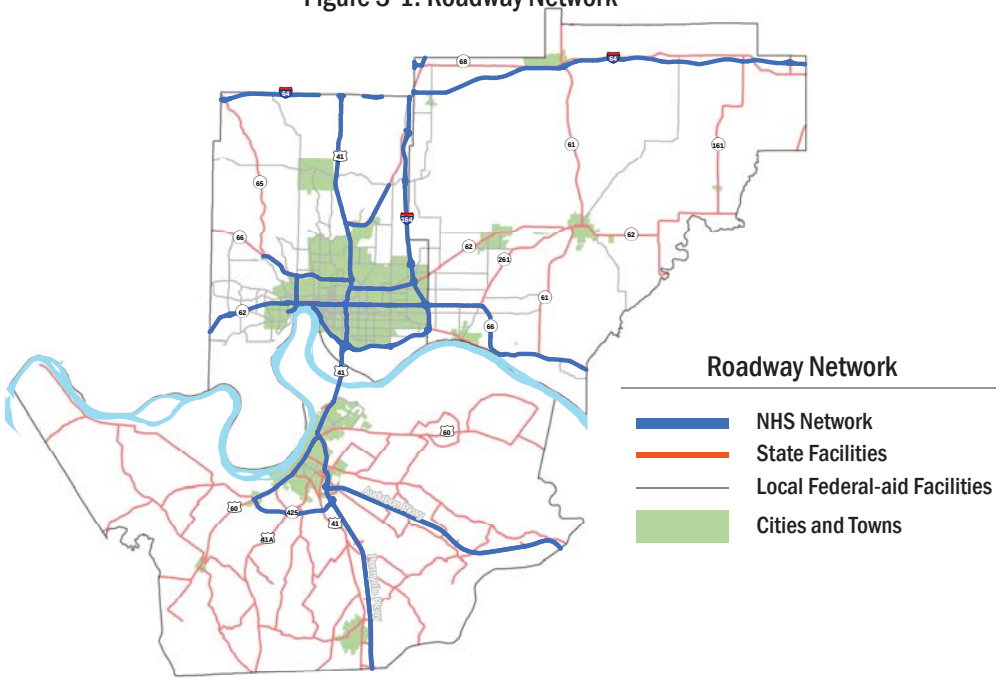
There are nine major highways providing various levels of access and mobility to the study area in Indiana. These highways consist of two lane roads, such as SR 57 and SR 65; four lane divided highways, such as Interstates 64, 69 and 164, SR 62, SR 66 and U.S. Highway 41; and six lane divided highways, such as sections of SR 62, SR 66, and U.S. Highway 41. These roads are essential for travel within the region, as well as for travel to cities outside of the region.

The major roadways providing access to the Kentucky portion of the study area include U.S. Highway 60 (Green Street), U.S. Highway 41, U.S. Highway 41A, Audubon Parkway (possible I-69 spur to Owensboro), E.T. Breathitt Parkway (Pennyrile)(future I-69), and KY 425 (Henderson Bypass).

Local Facilities

Within the Evansville metropolitan planning area there is an extensive system of arterial and collector streets that serve vehicular traffic. In addition to the City of Evansville, the largest incorporated city within the study area, there are four smaller Indiana towns: Boonville, Chandler, Darmstadt, and Newburgh. In Kentucky, incorporated cities include Henderson, Corydon and Robards. Each of these municipalities has an established roadway system to accommodate travel demand. Many of the collector and arterial streets extend beyond the municipal boundaries into Vanderburgh, Warrick, and Henderson counties, where they provide interconnection between the cities and counties and serve the regional transportation needs.

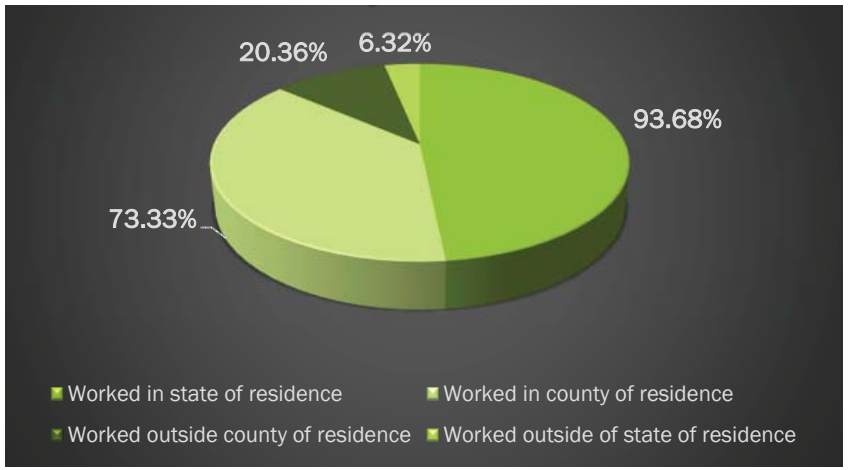
Figure 3-1: Roadway Network



Travel Patterns

Understanding the traffic flow between the counties within the MPA, as well as to and from the MPA from neighboring counties, is important for planning the future transportation needs of the MPA. The majority of MPA residents work within their county of residence. Figure 3-2 shows the 2007 – 2011 American Community Survey Estimates from the US Census Bureau.

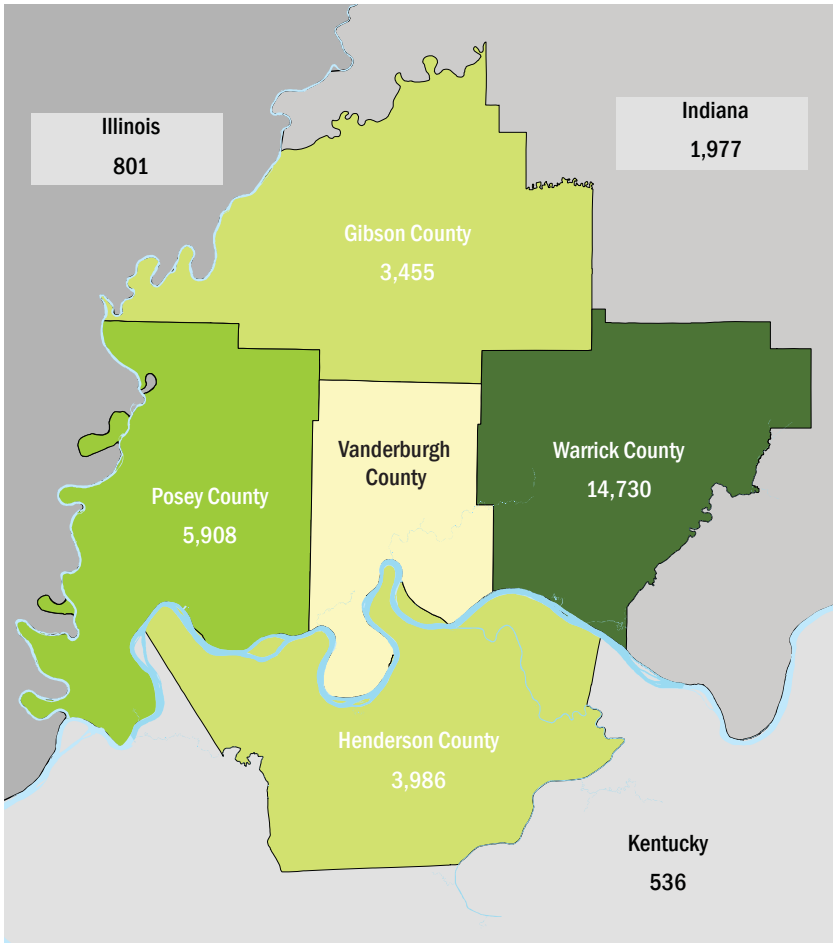
Figure 3-2: Workers by Place of Work



Source: 2007-2011 American Community Survey

Being a major employment center in all of southwestern Indiana, the City of Evansville and Vanderburgh County attract a majority of the daily commuters from within the MPA and outside of the MPA in both Indiana and Kentucky. Figure 3-3 shows the number of daily commuters to Vanderburgh County from the MPA and surrounding counties in Indiana and Kentucky. Roughly 2,060 commuters travel from Indiana counties to Kentucky counties surrounding the MPA daily, and around 5,690 commuters travel from the Kentucky counties to the Indiana counties.

Figure 3-3: Commuter Volumes into Vanderburgh County



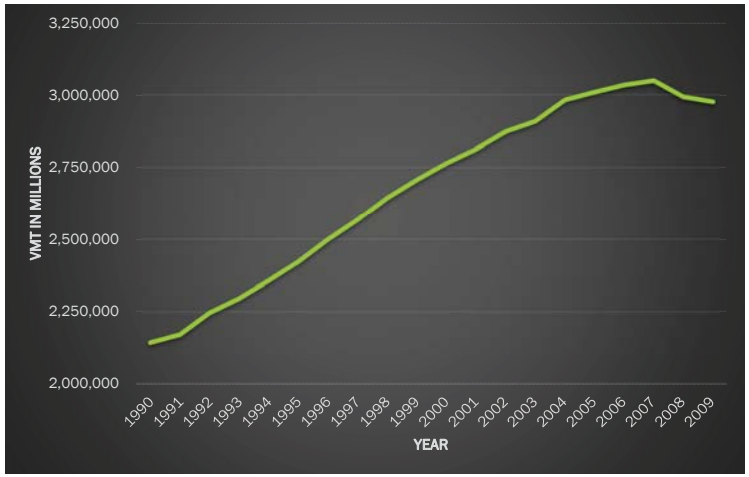
Source: STATS Indiana

Vehicle Miles Traveled

The usage of the road network is measured in vehicle miles traveled (VMT). VMT is the distance traveled by all vehicles in a given area over a specific period of time. VMT has regularly increased in the United States since World War II. This increase can be attributed to a number of factors, including increases in the median household income, low density suburban development and the affordability of private automobiles. While VMT growth has been the long-term national trend, since 2008 numerous factors (economic and social) have converged to reverse this trend at the national level. Figure 3-4 shows VMT trends from 1990 to 2009 in the United States.

In contrast, daily VMT in the Evansville MPA area has continued to trend up since 2010. A contributing factor to VMT growth is the dependence on personal vehicle to travel. The majority of residents within the Evansville MPA use a personal vehicle as their primary mode of transportation. This is evident from the 2010 Census data and the 2040 MTP survey. Table 3-1 documents the means of transportation to work from the 2010 Census and Figure 3-4 illustrates the preferred transportation modes cited in the 2040 MTP survey.

Figure 3-4: VMT Trend in the U.S.



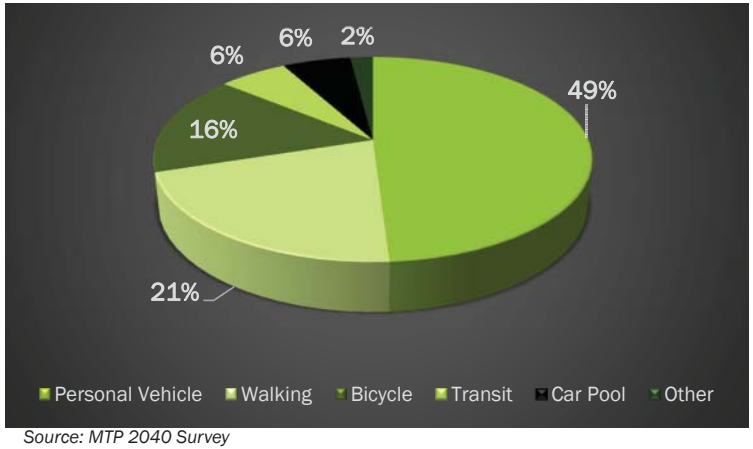
Source: FHWA

Table 3-1: Means of Transportation to Work

	Percent of persons commute to work mode 2010						
	Drive Alone	Carpool	Public Transportation	Walk	Bicycle	Other	Work at Home
National	76.30%	9.70%	4.90%	2.80%	0.60%	1.30%	4.40%
Henderson County	86.20%	9.60%	0.40%	1.00%	0.20%	0.90%	1.70%
Vanderburgh County	83.20%	9.60%	1.30%	2.50%	0.30%	0.90%	2.20%
Warrick County	88.00%	7.50%	0.10%	0.70%	0.10%	0.80%	2.90%

Source: 2010 U.S. Census

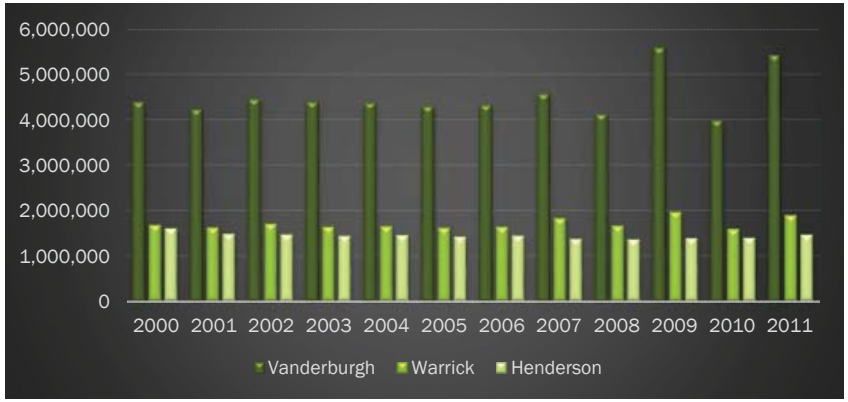
Figure 3-5: 2040 MTP Survey Means of Transportation to Work



Source: MTP 2040 Survey

VMT is also influenced by community density. Typically, low density suburbanized communities have a higher per-capita VMT than urbanized high density communities due to longer trips for daily activities such as employment, shopping, recreation, etc. Figure 3-6 shows the total daily VMT in each county from 2000 to 2011. Total VMT in the MPA area has grown at an average growth rate of 1.16% between 2000 and 2011.

Figure 3-6: Total Daily Vehicle Miles Traveled by County



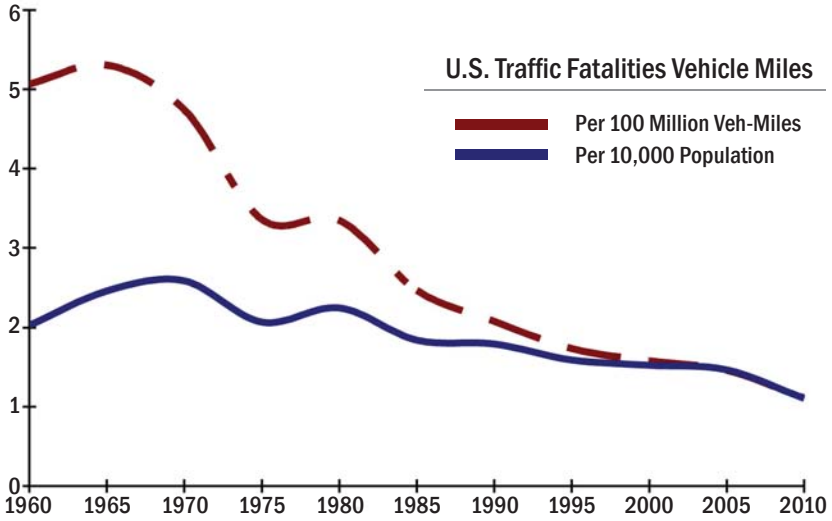
Source: INDOT and KYTC

Decreasing the VMT growth rate by two percent and decreasing the commuter mode share in SOVs by two percent by 2040 are the performance measures listed in Chapter 1. These performance measures will be tracked by the Evansville MPO every four years to evaluate the effectiveness of the recommendations listed in Chapter 4.

Increase in VMT can have many adverse effects on the region, such as:

- ***Traffic Congestion:*** The majority of the daily travel happens during the peak hour morning and evening commutes. Increase in total VMT will increase the peak hour volumes on the transportation network. This will result in increase in peak hour congestion within the MPA.
- ***Increase in capital investment, operation and maintenance costs:*** Increased VMT contributes to faster deterioration of road conditions. This will force municipalities to divert financial resources from other community needs to fund higher operation and maintenance costs.
- ***Congested freight movements:*** Increased VMT will result in congested freight movements through MPA.
- ***Safety:*** Increased VMT can lead to higher rates of crash severity. The U.S. traffic fatality rates per vehicle miles are shown in Figure 3-7.
- ***Air Quality:*** Increased VMT will result in increased green-house gas emissions from mobile sources.

Figure 3-7: U.S. Traffic Fatalities vs. Vehicle Miles



This figure illustrates traffic fatality trends over six decades. Per mile crash rates declined substantially, but per capita crash rates declined little despite significant traffic safety efforts. Both crash rates declined together after 2000 when per capita vehicle travel started to decline.

Source: Safe Travels: Evaluating Mobility Management Traffic Safety Impacts, Victoria Transport Policy Institue

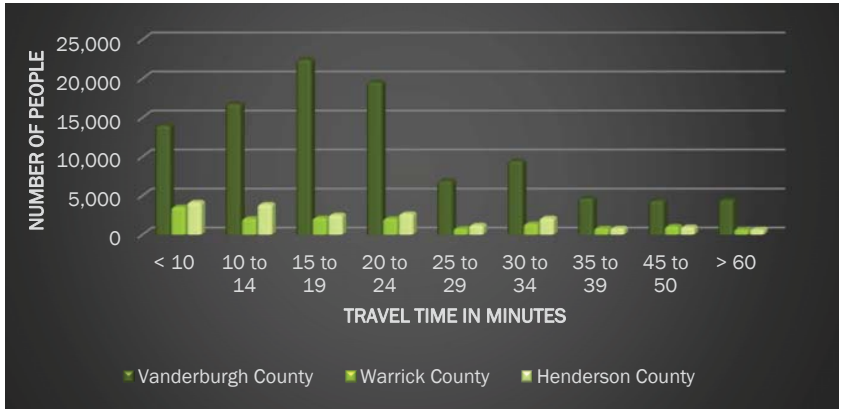
Connectivity and Accessibility

Connectivity plays an important role in a region's quality of life. A transportation network that is well connected with different land-uses (residential, commercial, recreational, etc.) provides greater mobility and access to the residents of region. This improves the efficiency and reliability of the road network by providing multiple alternatives for people and goods to move from points of origin to destinations.

An extensive transportation network in the Evansville MPA provides good connectivity between all the incorporated areas. At the regional level, the established network facilitates travel to major regional cities such as St. Louis, MO, Indianapolis, IN, Louisville, KY and Nashville, TN within three hours. It also provides easy access between residential areas and major employment centers, commercial and recreational areas located in all three counties. As a result the transportation network users report reliable and satisfactory commute times. This is supported by the 2007 – 2010 American Community Survey results and the 2040 Metropolitan Transportation Plan Survey results shown in Figures 3-8, 3-9, 3-10, and 3-11. A majority of survey respondents were satisfied, or more than satisfied, with commute time to and from work, reliability of their commute time and access to shopping.

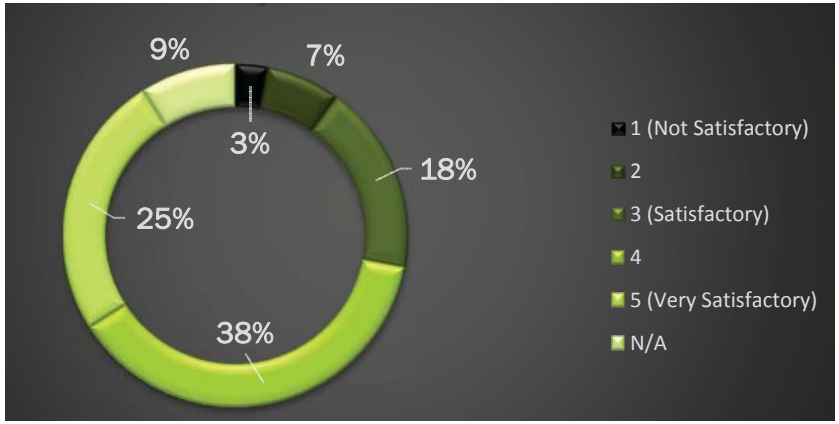
Although the extensive road network within the Evansville MPA provides reasonably secure connectivity and reliable access, deficiencies remain that provide opportunities to secure greater network distribution and redundancy. Currently, there are only two east-west thoroughfares (Lloyd Expressway and Morgan/Diamond Avenues) that connect populated areas in Warrick and Vanderburgh counties. Similarly, the only access between the Indiana and Kentucky portions of the MPA is provided by the US Highway 41 twin bridges across the Ohio River. The limited alternative routes make daily commuters within the MPA vulnerable to delayed commute times and hazardous travel conditions if there is an incident on these routes.

Figure 3-8: MPA Travel Time to Work



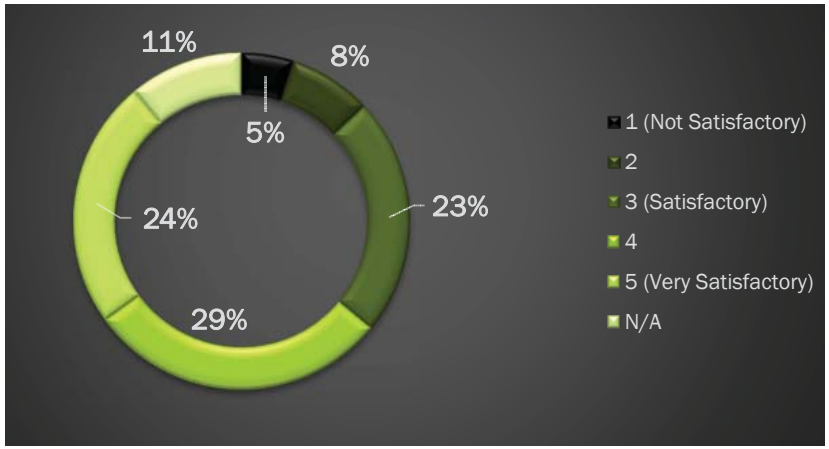
Source: 2010 U.S. Census

Figure 3-9: Reliability of Commute Time



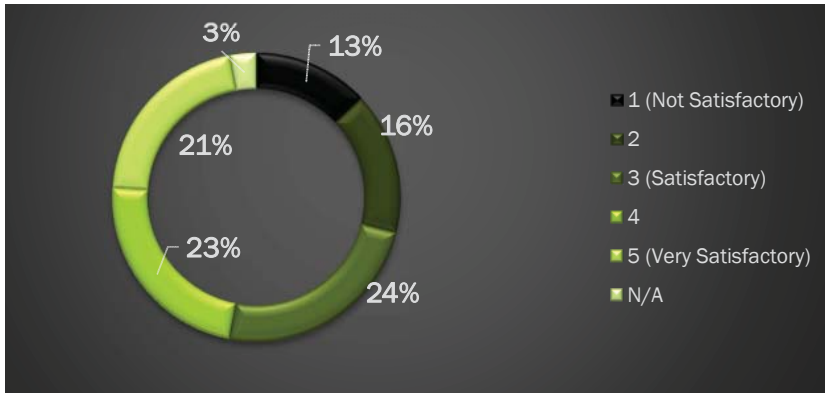
Source: MTP 2040 Survey

Figure 3-10: Commute Time to and from Work



Source: MTP 2040 Survey

Figure 3-11: Access to Shopping from Home and Work



Source: MTP 2040 Survey

Transportation Network Operations, Preservation and Maintenance

Transportation network operations, such traffic signal control, incident management, and similar activities, are conducted by the local agencies. The Evansville MPO coordinates with the local agencies in optimizing the operations as needed. Agencies directly responsible for the operations often work closely with other stakeholders to provide a safe, secure and efficient transportation system. A list of all the stakeholders involved in transportation operations are shown Table 3-2.

Table 3-2: Transportation Operation Stakeholders

Stakeholder Name	Stakeholder Description
City of Evansville Transportation Services	Operates and maintains streets in City of Evansville.
City of Henderson Public Works Department	Operates and maintains streets in City of Henderson.
Commercial Vehicle operators	Operates commercial vehicles passing thought the region.
Computer Services, City of Evansville/Vanderburgh County	Provides computing services and personnel to the Evansville Vanderburgh Traffic Signal Control.
Evansville Vanderburgh Traffic Signal Control	Operates traffic signals in Vanderburgh County. Will also operate Wabash avenue rail crossing system when it becomes operational.
Henderson Area Rapid Transit (HART)	Operates fixed route and demand responsive bus service within the City of Henderson.
Indiana/Kentucky Public Safety Agencies	This stakeholder includes Emergency Management, police, fire, EMS and dispatch for emergency vehicles in the Indiana portion of the architecture area. Relays information to Indianapolis TMC.
INDOT	Relays information Evansville/Vanderburgh County public safety agencies from the Indianapolis Traffic Management Center (TMC)
Kentucky Transportation Cabinet (KYTC)	KYTC oversees state and US roadway facilities in Henderson County.
Metropolitan Evansville Transit System	Operates fixed route and demand responsive bus service within the City of Evansville.
National Weather Services	Provides weather watch and warnings.
Railroad companies	Operates and maintains the grade crossings.

Coordination and collaboration between all the stakeholders from multiple jurisdictions involved in direct operations will improve regional outcomes in the following areas:

- Investment decisions based on the best combination of capital investments and operations strategies (performance-based planning).
- Solutions (project) selection process and criteria provide a level playing field for operational improvements and investments.
- Address operations activities (e.g., incident management, traveler information) in multimodal corridor planning.
- Use of operations performance audits (e.g., corridor-wide) as a tool for guiding investment choices.
- Leverage operations to achieve regional goals (or meet other commonly sought outcomes).

Asset Management

The transportation network is a major infrastructure asset for the LPAs. Preserving and maintaining the transportation network increases the existing transportation system safety, security, efficiency and reliability. The states of Indiana, Kentucky and the LPAs within the MPA spend a significant amount of their annual budgets on system preservation, maintenance and operations. Preserving and maintaining the existing transportation network is a cost-effective long term practice, when compared to future costs of major reconstruction. To illustrate this point, INDOT estimates that $1 spent on pavement preservation can save $6 to $14 on future repairs. In fiscal year 2012, INDOT's pavement preservation efforts generated more than 7,800 additional lane mile years at a cost of about $23 million.

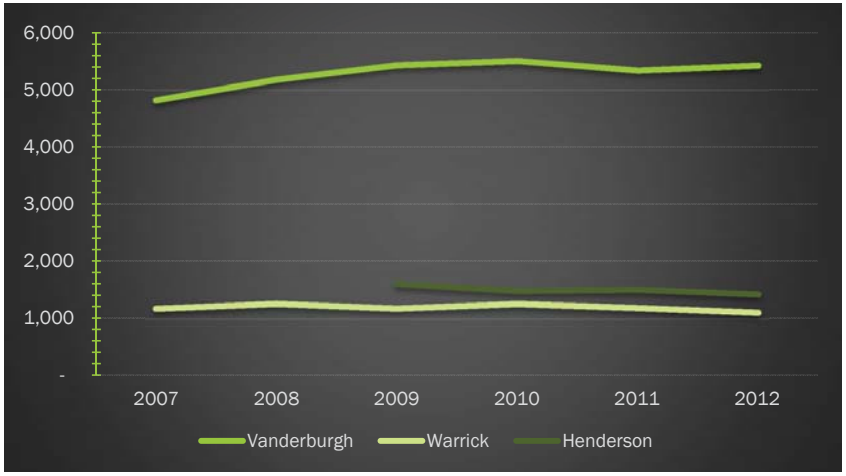
The local LPAs within the MPA follow a general procedure of public hearings and manual pavement monitoring for routine pavement maintenance and repairs. Upgrading local pavement management processes to incorporate available technologies is an opportunity to increase their cost effectiveness.

Transportation Safety

With MAP-21, safety remains a "stand-alone" planning factor with a dedicated funding source, Highway Safety Improvement Program (HSIP) funds. These funds are what the MPO uses to increase the safety of the transportation system for motorized and non-motorized users. State crash data is used to help determine where these funds are best targeted. Data is downloaded from the state databases yearly for each county within the MPA. The data sets are imported into the MPO's GIS database and are "cleaned" as necessary.

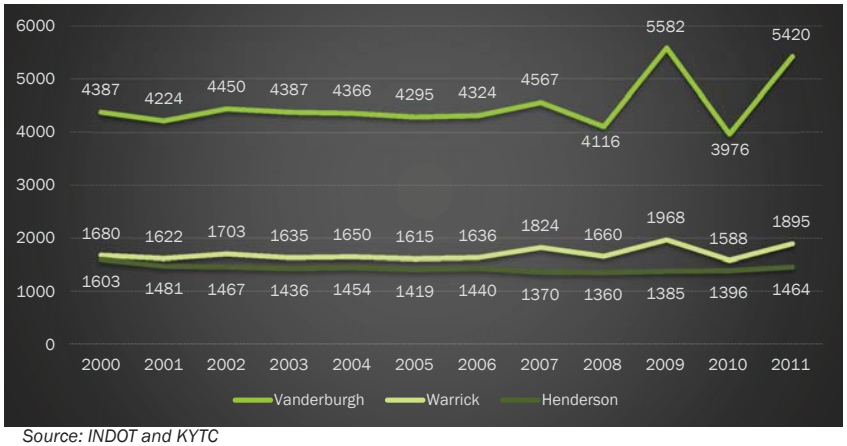
Indicated in Figure 3-12, Total Crashes by County, crashes in Warrick and Henderson counties are either flat or declining slightly. Vanderburgh County crashes are much greater in total volume and the trend is increasing. These volumes and trends are generally reflected in the Vehicle Miles Travelled (VMT) shown in millions in Figure 3-13.

Figure 3-12: Total Number of Crashes by County



Source: State Crash Databases

Figure 3-13: Vehicle Miles Travelled (in millions)



Source: INDOT and KYTC

Angle collisions and rear end crashes predominate in Vanderburgh and Warrick counties. These typically occur at intersections. Henderson County is also high in rear end crashes, but single vehicle crashes, which include run-off-road crashes, predominate. Since all counties show indications of high intersection crashes, an intersection crash analysis was undertaken. High volume crash intersections were selected from the 2009 crash dataset. A review of crashes for 2009 through 2011 was completed. Intersections in Indiana were ranked based on their Index of Crash Cost (Icc) obtained from the Hazard Analysis Software. Intersections in the City of Henderson and Henderson County were ranked based on their Crash Rate. In Indiana, several intersections with an Icc of greater than 2.00 were identified as needing safety improvements. The results are listed in Appendix G. The basic crash statistics by county is also included in the appendix.

Additional safety reviews take place on an individual basis when a complaint or request is received by the LPA. Most of the LPA's participate in an informal Road Safety Audit where various stakeholders are asked to join in on the discussion. This usually includes law enforcement, city/county engineers, highway departments, and signal timing experts, but has also included urban forestry professionals, etc. In these reviews crash data is always considered, and recommendations are made in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), or recommendations and guidelines in AASHTO's A Policy on Geometric Design of Highways and Streets (The Green Book), ITE's Traffic Engineering Handbook, and the many and various publications by the FHWA. In Indiana, if a review results in an Icc of 2.00 or greater, the project will be added to the safety review list for project consideration.

Transportation Security

The transportation system is one of the most important infrastructure facilities of the Evansville MPO region as it provides access to surrounding areas with road, rail, water and air transport. It also provides mobility to the people and goods within the region, providing links between various land uses such as residential neighborhoods, recreational facilities, retail stores, manufacturing plants, and health care providers. Maintaining and securing the transportation system is important because disruption to the transportation system can negatively impact the region's economy and quality of life. MTP security goals and objectives are outlined in Chapter 1 of this document along with the other transportation planning goals. In addition to the transportation planning goals, the MPO will support the policies and strategies addressed by each county's Comprehensive Emergency Management Plans (CEMPs).

Transportation security is now considered a "stand-alone" planning factor. Previously, the safety and security of the transportation system were one planning factor. The security factor is to "increase the security of the transportation system for motorized and non-motorized users." The Federal Highway Administration (FHWA) along with the Evansville MPO has conducted a GAP analysis and suggested five steps for creating the new stand-alone factor. The five steps suggested by FHWA are as follows:

- Review current statewide and metropolitan transportation plans for emergency planning/security elements.
- Incorporate the Transit System Security Program Plan (required for passenger rail system) into metropolitan plan.
- Define the role of the public transportation operators/MPO/State in promoting security.
- Identify critical facilities and transportation system elements.
- Develop security goals and appropriate strategies.

EMERGENCY PLANNING IN EVANSVILLE MPO REGION

Under the guidance of the Federal and State Departments of Homeland Security and the Federal and State Emergency Management Agencies (EMAs) the county-wide EMAs for Vanderburgh, Warrick and Henderson Counties provide emergency planning for their respective counties.

The EMAs in each of the three counties, with the coordination of all the government agencies responsible for the security of the region, have adopted county-wide CEMP's. A CEMP documents the county level emergency planning process that establishes policies and procedures needed to prepare for, respond to, recover from, and mitigate the impacts of all types of natural, technological, and criminal/hostile disasters. The CEMPs followed the emergency support function concept and identified the Federal Emergency Management Agency's support functions and the roles and responsibilities of the primary coordinating agencies for each support function. All three CEMPs identify the transportation system as a key infrastructure for carrying out emergency response activities in the region.

Various Federal, State and local governmental agencies provide the day to day security for all four modes of transportation in the Evansville MPO region. These agencies also provide the emergency response in the event of an unexpected disaster. Table 3-3 lists the various governmental agencies that are responsible for the four modes of transportation in the MPO region.

Table 3-3: Agencies Responsible for the Security of the Four Modes of Transportation

Transportation System	Agency
Road Network	Indiana/Kentucky State Police
	All three County Sheriff's Department
	City Police
	Fire Departments of all Townships
Water Transportation / Ohio River	US Coast Guard
	State
	Fire Departments provide immediate response
Air Transport	Transportation Security Administration
	Airport Fire Department
Railroads	Indiana/Kentucky State Police
	All three County Sheriff's Department
	City Police
	Fire Departments in cities/towns and Townships

Roles of the MPO and Public Transportation Providers

As mentioned previously, the transportation system is one of the key infrastructure facilities used in emergency response activities in the region. The Evansville MPO, as the lead transportation planning agency in the region, supports the local EMAs in the emergency planning process.

Public transit is provided by the Metropolitan Evansville Transit System (METS) in Evansville, Warrick Area Transit System (WATS) in Warrick County, and Henderson Area Rapid Transit (HART) in Henderson, KY. METS and HART provide service in Evansville and Henderson respectively and WATS provides transit service within and between the towns of Newburgh, Chandler and City of Boonville. The potential roles and responsibilities of the Evansville MPO and the public transit operators for each of Federal Emergency Management Agency's support function are stated in Table 3-4.

Table 3-4: Potential Roles and Responsibilities of the EMPO and Transit Providers

Potential Roles and Responsibilities		
Support Function	**Evansville MPO**	**Public Transit Operator**
Transportation	Provides technical assistance with as requested by the EMA	Provides assistance in evacuation as requested by the EMA
Communications	Not applicable	Not applicable
Public Works and Engineering	Provides assistance as requested by EMA	Not applicable
Firefighting	Not applicable	Not applicable
Information and Planning	Provides assistance as requested by EMA	Provides assistance in evacuation as requested by the EMA
Shelter and Mass cure	Not applicable	Not applicable
Resource Support	Not applicable	Not applicable
Health and Medical	Not applicable	Not applicable
Search and Rescue	Not applicable	Not applicable
Hazardous Materials	Provides assistance as requested by EMA	Not applicable
Food and Water	Provides assistance as requested by EMA	Provides assistance in delivery if requested by EMA
Energy	Provides assistance as requested by EMA	Not applicable
Evacuation	Provides assistance as requested by EMA	Provides assistance in evacuating people to a shelter
Military Support	Not applicable	Not applicable
Public Information	Provides assistance as requested by EMA	Provides assistance as requested by the EMA
Volunteers and Donations	Provides assistance as requested by EMA	Provides assistance as requested by the EMA
Law Enforcement and Security	Provides assistance as requested by EMA	Provides assistance as requested by the EMA
Animal Protection	Not applicable	Not applicable

Critical Facilities

In the Evansville MPO region there are many facilities and systems that are considered critical. The continued and uninterrupted operation of these facilities is necessary for the health, safety, and wellbeing of the general public. The interruptions in operations of these facilities could lead to:

- Disruption to the ability to initiate and sustain emergency response operations;
- Increased safety risks to the community from the release of hazardous materials or dangerous substances;
- Disruption of all types of governmental functions, including utilities, public safety, education, and similar critical operations;
- Threats to institutions and public gathering places serving large numbers of individuals, posing higher vulnerability to the health and safety of these individuals;
- Threats to the economic vitality of the State, region and its businesses; and
- Damage or disruption to components of the transportation or utility infrastructure resulting in additional physical or economic consequences.

Critical facilities include government buildings, public safety facilities, medical facilities, schools, community centers, manufacturing plants and locations storing or using designated hazardous materials. Potentially vulnerable utilities include communications facilities, bridges, and components of water and sewage treatment systems. In addition, the entire highway and railroad network in the region, as well as the airport(s) and river ports, are considered vulnerable infrastructure and facility components.

CONGESTION MANAGEMENT PROCESS

Appendix C of the Plan addresses the Congestion Management Process (CMP) in detail. The Evansville MPO's CMP was developed as an integral part of the transportation planning process. The CMP clearly delineates the CMP network, includes congestion management objectives, analysis of the current CMP network, and identifies performance measures, travel demand management strategies, and operational strategies to improve the efficiency of the existing and new transportation facilities. The CMP also includes performance monitoring plan and evaluation of CMP strategies.

ITS ARCHITECTURE

The use of technology to increase the efficiency and safety of an existing infrastructure is becoming an important concept across the nation. Intelligent Transportation Systems (ITS) uses technology to collect traffic information, determining the location and causes of congestion as it develops. This information can then be provided to users of the system, allowing them to make informed decisions regarding their travel. This information can also be used to control the system by adjusting traffic control devices. Benefits of ITS technologies accrue to all users of the transportation network, including; drivers, transit providers and patrons, emergency responders, commercial vehicle operators, dispatchers, etc.

Examples of ITS Technology currently in operation in the MPO Study Area include an advance warning signal at the intersection of Ohio Street /Fulton Avenue and the downtown traffic signals in Evansville. The advance warning signal was implemented in 2008 and is currently operated by the Evansville Vanderburgh Traffic Signal Control. The downtown traffic signals were modernized in 2010 and are being operated by the Evansville Vanderburgh Traffic Signal Control. This project was implemented to spur economic development in downtown central business district, reduce driver travel times, reduce pollution caused by idling vehicles, better manage the traffic flow during events at the downtown Ford Center, and to replace an aging intersection infrastructure. The City of Evansville is undertaking additional signal modernization effort in the near downtown area.

The U.S. Department of Transportation requires that areas deploying ITS projects develop an ITS Architecture. The architecture defines how agencies, modes and systems are to operate and interact and identifies ITS projects. An update to the current architecture for the EMPO Study Area is being developed concurrently with the MTP 2040 and will serve to identify and promote ITS projects and integration within the area.

PUBLIC TRANSPORTATION

Public transportation is a critical mode of the region's transportation system. It provides transportation for individuals unable to access private transportation, providing a vital link for seniors, youth, the economically disadvantaged, and the disabled populations in our community. Without affordable and reliable public transportation, these vulnerable groups cannot access employment, healthcare, recreation, shopping and many other every day activities. In fact, the lack of reliable, adequate transportation is one of the greatest barriers to successfully moving the unemployed into the workforce and allowing the disabled and seniors to remain independent. Public transportation is also a critical mode of our region's transportation system because it provides an economical and environmentally-friendlier alternative to the personal vehicle for those who have a choice to use either public or private transportation.

A quality transit system provides an attractive transportation choice that enhances the quality of life, through reduced traffic congestion and improvements to the environment, and makes the region a more desirable place to live and work. According to the 2013 EMPO Metropolitan Transportation Plan survey, expanding and/or improving transit opportunities and facilities was the fourth most common response when asked to cite a top priority.

When assessing public transportation in the area, there is much work still to be done. In fact, requests for improved transit services include higher frequency routes, later hours of service, additional routes, Sunday service, increased amenities, and improved technology. These are potential areas of improvement that will be examined in this plan.

As detailed in the Emergency Planning discussion, the region is served by three transit agencies. Service is provided by METS in the City of Evansville, HART in the City of Henderson, and WATS in Warrick County.

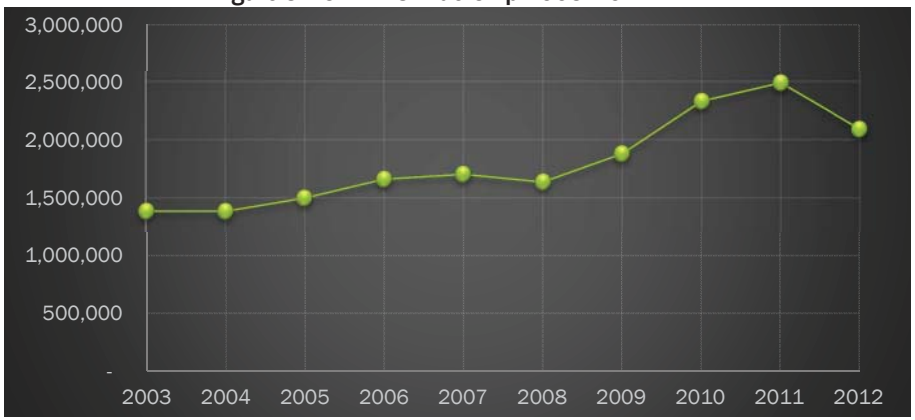
Metropolitan Evansville Transit System (METS)

METS operates fixed route buses, all wheelchair-accessible, on 18 routes, Monday through Saturday, from 5:45 a.m. to 6:15 p.m. A reduced number of routes have extended service from 5:45 a.m. to 12:15 a.m., Monday through Saturday.

In addition to fixed route service, METS provides a paratransit service, METS Mobility, to the elderly and individuals with disabilities who are unable to use the fixed route service. METS Mobility provides door-to-door paratransit service in accordance with the Americans with Disabilities Act. METS Mobility is an increasingly utilized service which has gone beyond METS' current capacity. METS also has METS Connection, which allows riders of underserved areas access to fixed route service through a "door-to-transit" connection.

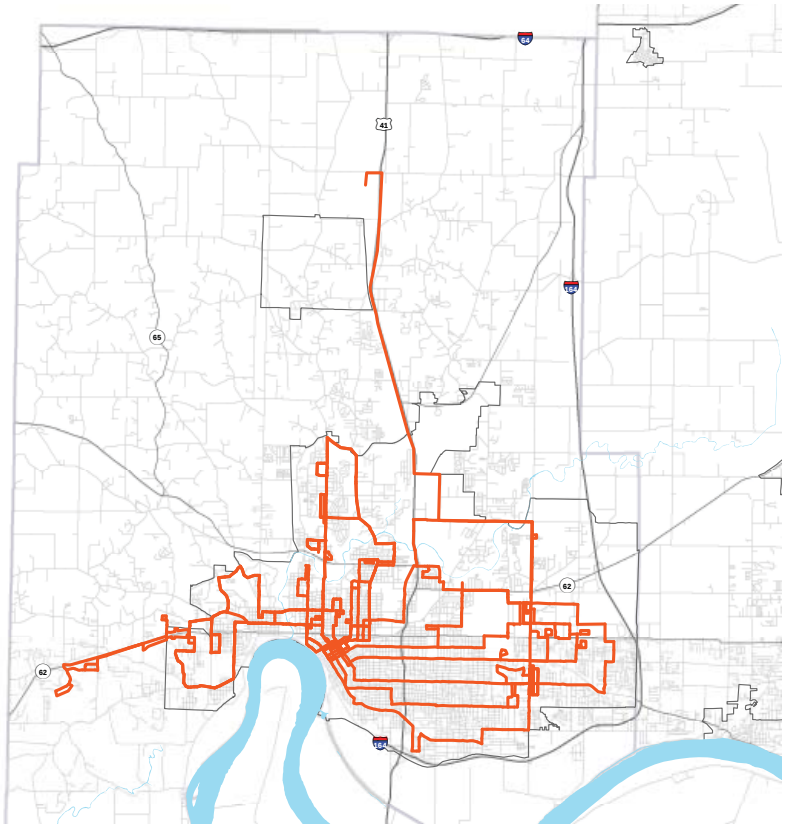
As seen in Figure 15, METS ridership in the past 10 years has slowly increased from approximately 1.5 million to 2 million passengers. In addition, METS has added, expanded and revised routes so that METS service is more widely available. As proof of expanded service, Total Vehicle Miles (TVM) was 1,641,090 in 2011 while in 2012 the TVM was 2,004,171, an increase of 22%.

Figure 3-15: METS Ridership 2003-2012



Source: NTD (National Transit Database

Figure 3-14: METS Fixed Routes



METS ACCOMPLISHMENTS SINCE THE 2035 MTP

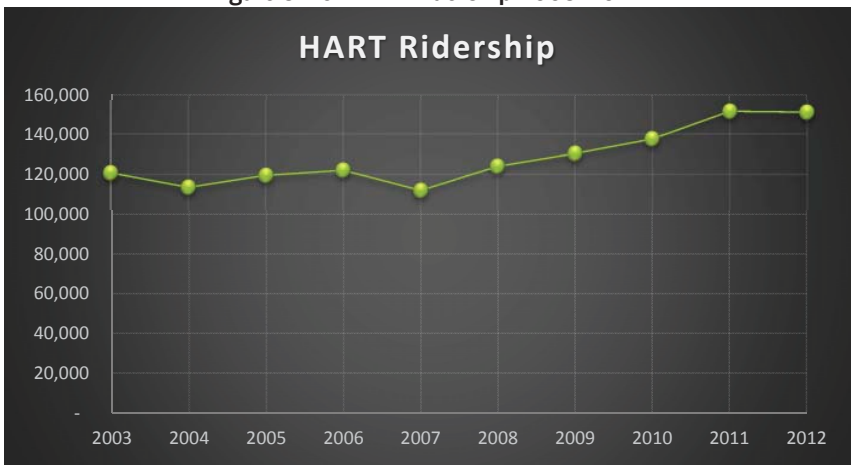
- Adopted a new connection route on U.S. Highway 41 in northern Vanderburgh County
- Adopted a third route on the University of Southern Indiana (USI) campus
- Promoted use of public transportation which included "Free Fridays" and "Free Ozone Alert Days"
- All fixed route vehicles are equipped with bicycle racks.
- METS established a transfer point with WATS in Warrick County to promote regional connectivity.

Henderson Area Rapid Transit (HART)

HART provides public transportation service in the City of Henderson, Kentucky. HART provides both fixed route and on-demand paratransit services for seniors and the disabled. Fixed route service is provided Monday through Saturday from 6:00 a.m. to 5:30 p.m. HART has five fixed routes and the College Shuttle. The College Shuttle makes three daily trips to Henderson Community College.

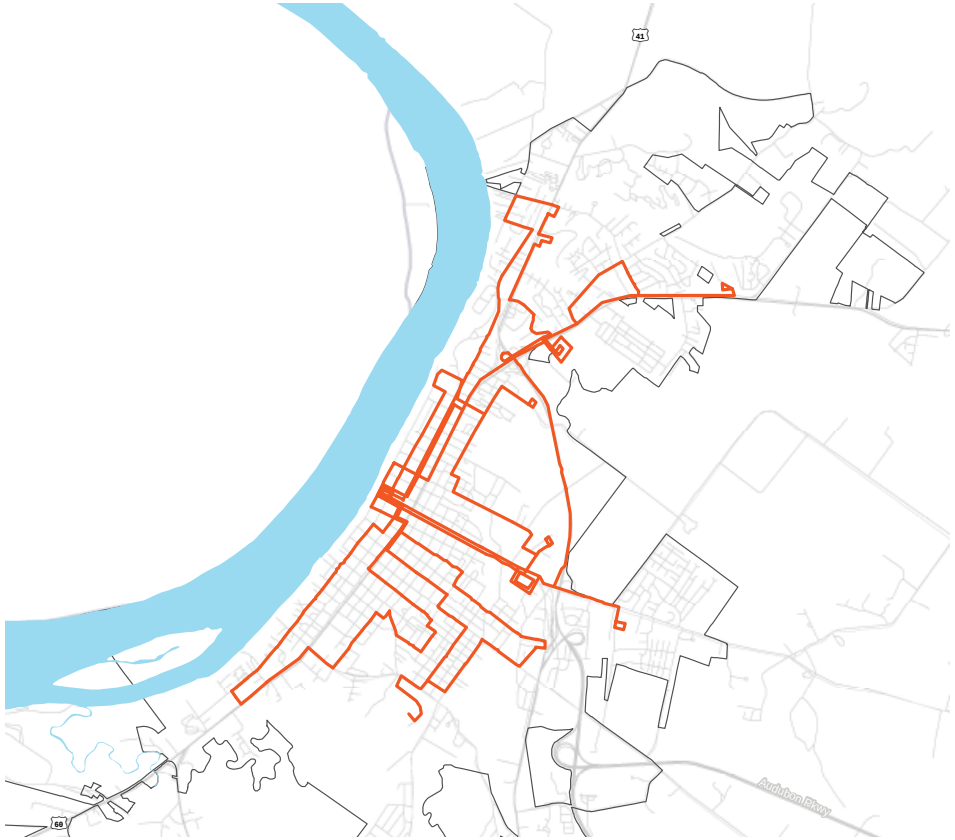
HART also provides individuals with a demand-response transportation service to the City of Henderson for the elderly and disabled.

Figure 3-16: HART Ridership 2003-2012



Source: NTD (National Transit Database

Figure 3-17: HART Routes



HART ACCOMPLISHMENTS SINCE THE 2035 MTP

- Implemented revisions to its fixed route system
- Created ride guides of the fixed route system
- Installed new passenger benches and shelters
- Acquired new paratransit vehicles
- Improved the maintenance facility

Warrick Area Transit System (WATS)

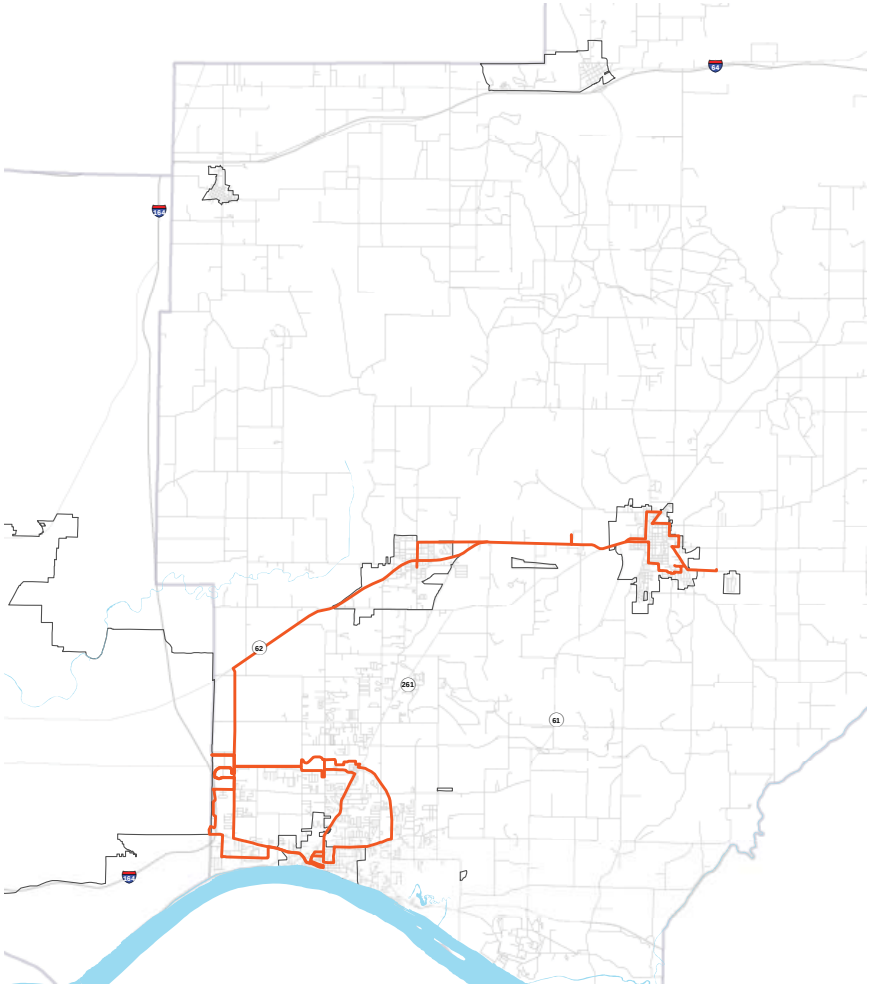
WATS provides public transportation service in Warrick County and in the Towns of Newburgh, Chandler, and Boonville. Fixed route transit service is provided Monday through Saturday from 6:00 a.m. to 6:00 p.m. Service began on August 9, 2010 with the Newburgh Route. WATS has added three new routes since then. There are now four hourly routes. WATS provides an hourly connection to METS at the METS/WATS transfer point located at the ITT Campus in Warrick County.

WATS total ridership in 2011was 16,649 (first full year of service)
WATS total ridership in 2012 was 27,030.

WATS ACCOMPLISHMENTS SINCE INCEPTION

- Fixed Route service in Warrick County began in 2010 with the Newburgh Route
- Launched four fixed routes: Newburgh East, Newburgh West, Chandler and Boonville
- WATS established a transfer point with METS in Warrick County

Figure 3-18: WATS Fixed Routes



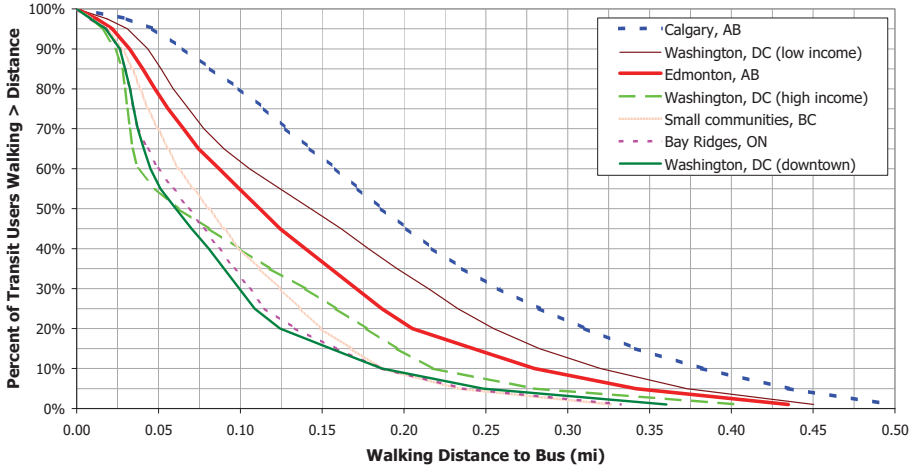
Regional Assessment

To facilitate progress toward the transit objectives developed through the planning process and listed in Chapter 1, a general assessment of transit in the region is necessary. The following review considers strengths, weaknesses and opportunities for improvement in public transit.

Coverage, Proximity, and Accessibility

Proximity to a transit route is a leading indicator of transit use. Generally, a one-quarter mile is an accepted distance a transit user is willing to walk to use public transportation. As seen in Figure 3-19, the percent of transit users willing to walk greater than one-quarter mile ranges from 35% to as low as 5%.

Figure 3-19: Transit Usage by Walking Distance from Route



Source: Transit Capacity and Quality of Service Manual (Second Edition. Exhibit 3–5) by the Transportation Research Board.

Table 3-5 shows the number and percentage of people who live within one-quarter mile of a fixed transit route in Vanderburgh, Warrick and Henderson counties. The following maps illustrate this by the showing a one-quarter mile buffer on either side of a route.

Approximately 71% of the residents of Vanderburgh County live within one-quarter mile of a fixed transit route, 54.1% in Henderson County and 48.8% in Warrick County for a total of 182,291 individuals living within the one-quarter mile buffer. The total population for Vanderburgh, Warrick and Henderson counties is 282,642.

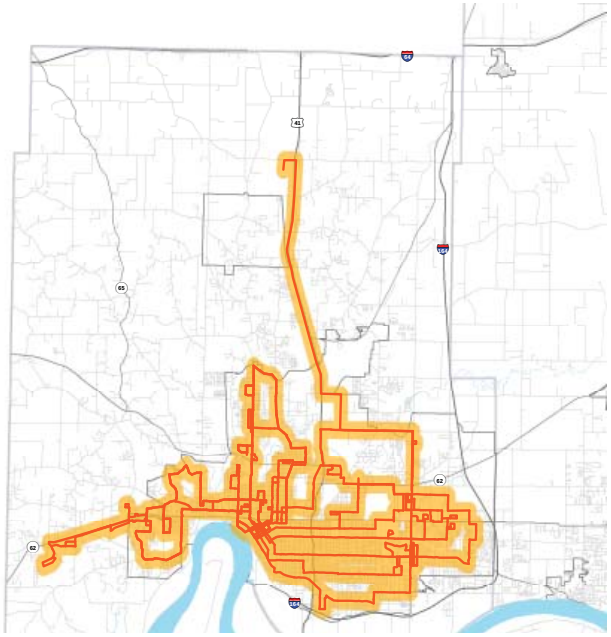
There are approximately 99,751 residents, or 35.3% of the population, who live beyond the one-quarter mile buffer in the three county area.

While the quarter-mile distance is considered practicable for walking access, there are strategies that may encourage riders to access routes further than a quarter-mile distant. The walking environment must be perceived as safe, and the pedestrian way should be clean, well lit and free of obstructions and tripping hazards. In the EMPO survey, 17% of transit users said they were not satisfied with the proximity of transit routes within walking distance to their homes. There are various efforts to improve the pedestrian environment in the region. These efforts will have a positive impact on transit accessibility and are further detailed in the pedestrian element of this plan.

Table 3-5: Transit Coverage

	Transit Coverage		
	METS	HART	WATS
People within one quarter mile	128,137	25,027	29,127
Percent which transit is available within one quarter mile	71.30%	54.10%	48.80%
County Jurisdiction	Vanderburgh Co. 179,703	Henderson Co. 46,250	Warrick Co. 59,689

Figure 3-20: METS One-Quarter Mile Coverage



METS Accessibility

METS Routes

One-Quarter Mile

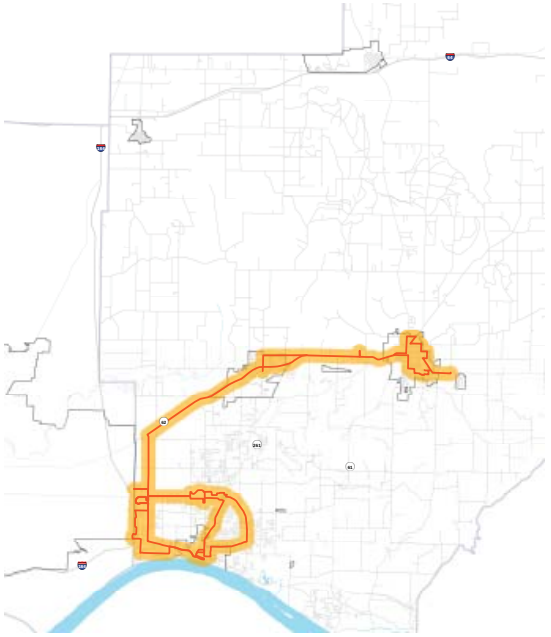
Figure 3-21: HART One-Quarter Mile Coverage

HART Accessibility

HART Routes

One-Quarter Mile

Figure 3-22: WATS One-Quarter Mile Coverage



WATS Accessibility

WATS Routes

One-Quarter Mile

Transit ridership in the region is low compared to the national average. This is illustrated in Table 3-6, by the use of public transportation for commuting to work. Relatively low population density in the region inhibits public transportation's efficiency and viability. Transit riders in the region are mostly transit-dependent, meaning that they rely on public transportation and have no other reliable, affordable transportation options. The transit agencies have been unable to attract the "rider of choice", which is defined as a rider who is not dependent on transit but chooses to use transit as a transportation alternative. Finally, funding for public transportation is relatively low, which poses an annual challenge to maintain current services.

The EMPO survey showed that 8% of survey respondents do not have access to a motor vehicle. According to the 2010 Census, approximately 9% of households in Vanderburgh County, 8% in Henderson County, and 2% in Warrick County do not own a vehicle (Table 3-7).

Table 3-6: Percent of Persons Commuting to Work Mode

	Drive Alone	Carpool	Public Transportation	Walk	Bicycle	Other	Work at Home
National	76.30%	9.70%	4.90%	2.80%	0.60%	1.30%	4.40%
Henderson County	86.20%	9.60%	0.40%	1.00%	0.20%	0.90%	1.70%
Vanderburgh County	83.20%	9.60%	1.30%	2.50%	0.30%	0.90%	2.20%
Warrick County	88.00%	7.50%	0.10%	0.70%	0.10%	0.80%	2.90%

Source: 2010 U.S. Census

Table 3-7: Percent of Households Who Do Not Own Vehicle

Henderson County	7.92%
Vanderburgh County	9.14%
Warrick County	2.37%

Source: 2010 U.S. Census

In order for the region's transit agencies to grow at a faster rate than has occurred in the past, public transportation must attract more choice riders. In the Evansville region, according to the EMPO survey, 88% of survey respondents never ride transit and only 12% of the people surveyed ride transit at least one day a week. Choice riders represent a large and diverse, untapped group potentially willing to use transit.

There are several options to attract choice riders; expand transit service to those who do not have access to transit, increase route frequency and reduce travel time, evaluate bus stops to determine increased accessibility, safety, and needed amenities, and ensure transit vehicles are safe, clean and comfortable.

An effective action a transit system can implement to increase ridership is to increase existing route frequency or "headway" which is a measure of time or distance between vehicles on a specific route. A shorter headway means more frequent service. Although the most utilized METS' routes have headway of one half hour, most METS routes have one hour headway, as do HART and WATS.

Weekend and evening public transportation is another means to increase ridership. Currently, none of the three public transportation providers offer service on Sunday, and WATS does not provide fixed route service on Saturday. Lack of Sunday service is a frequently cited issue on surveys and at public meetings. In addition, HART and WATS do not provide service past 6 p.m. METS does provide limited service in the evening, though it does not provide service past midnight.

Table 3-8: METS, HART and WATS Ridership

	2010	2011	2012
HART	137,658	151,454	150,984
METS	2,331,220	2,489,507	2,090,715
WATS	NA	16,649	27,030

Source: NTD (National Transit Database

Regional Connectivity

The transit systems servicing the cities of Henderson (HART) and Evansville (METS) are separated by the Ohio River. Currently, there is no transit connection between the two cities and the transit-dependent residents of Evansville and Henderson remain in their communities. The EMPO, METS and HART should explore any opportunity to link these two transit agencies.

There has been recent progress toward regional connectivity. Since the establishment of WATS in 2010, METS and WATS share a transfer point at the ITT campus in Warrick County allowing residents of Warrick County access to employment, commerce and medical services in Evansville, and vice versa. The next step; a METS connection with HART, coupled with the established METS-WATS connection would create tri-jurisdictional regional transit coverage.

Transit Reliability

Transit unreliability (passenger delays, missed trips and poor on-time performance) is one of the top reasons for rider dissatisfaction and consequentially reduced use of public transportation. Studies have shown that transit riders value consistent travel times even more than shorter travel times. This makes reliability an especially important issue for agencies to emphasis if they want to retain customers. Frequent, consistent and reliable transfers between stops are an important issue to riders. One way to achieve this is to reduce unnecessary or redundant vehicle stops. This enhances transit operations by improving travel time and reducing maintenance costs.

The public transportation providers must have reasonable and measurable standards in place to address the issues of consistency, on time performance and reliability. The following are measurable objectives that can help meet these standards:

- Improve on-time performance
- Reduce major vehicle failure resulting in significant passenger delays
- Improve Passenger Safety
- Increase staff safety training
- Reduce the number of vehicles in service that are beyond their useful life

Safe Accessibility

The public transportation providers must continue to expand on and upgrade bus shelters, benches and other rider amenities in the service area. Bus stops are an important component of the public transportation experience. Poorly maintained stops that are difficult to access and void of benches and shelters do not contribute to a positive experience. Stops may be located on uneven and unpaved ground which poses a physical risk of injury to the rider. In addition, accessing a stop may entail walking on broken or uneven sidewalks or no sidewalks at all. The construction of accessible pedestrian facilities to and from bus stop locations, within developments, and in areas where pedestrian facilities currently do not exist should be encouraged. The MPO's Complete Streets Policy encourages consultation between local planning agencies and transit agencies.

A relatively small number of stops have benches or shelters. Bus stops should be upgraded to have a bench and on the more highly utilized routes, a shelter to provide cover from inclement weather. Transportation providers should also seek to standardize the distance between bus stops in various settings.

Technology and Rider Convenience

Public transportation competes with other public entities for a finite amount of public funding. Transit agencies must first and foremost accomplish their core mission which is to provide reliable, safe, comprehensive and affordable transportation to individuals who do not have access to alternative modes of transportation. Due to a lack of funding, the region's transit agencies have not made the necessary investments to implement and maintain modern transit technology. As a result, the transit experience for the rider is little changed from past decades.

Proven technologies such as electronic fare payment, smart phone transit apps, and real-time GPS vehicle location tracking are common in urban areas. These and other technologies (some free, such as Google Transit Trip Planner) allow the rider to avoid costly delays and inconveniences and improve information delivery to the rider. This contributes to a more efficient and positive experience. For captive riders, delay and inconvenience are indicative of poor service. For the choice riders, delay and inconvenience are factors in choosing alternatives to public transportation.

Technologies that may be utilized to enhance the transit experience:

- Social media
- Audible announcements of vehicle stops
- Real-time vehicle information via vehicle GPS available to access on transit agency website
- Smart phone app which provides route information and delays
- Electronic fare payment
- Free Wi-Fi on all vehicles
- Google Transit
- Interactive digital route display of system at downtown terminal and on transit agency website

Coordinated Public Transit-Human Services Transportation Plan

Since the passage of SAFETEA-LU in 2005 and later the passage of MAP-21 in 2012, the Federal government has made it a priority for local organizations to improve transportation services coordination for low income, seniors and disabled populations to remove barriers between individuals and the services necessary to assist them in maintaining productive lives. The lack of effective coordination between transit, employers and human service organizations has been cited as an obstacle to that desired coordination. As a result, localities are required to develop a Coordinated Public Transit-Human Services Transportation Plan.

The Coordinated Plan assists in creating collaboration among all transportation providers for the targeted populations in the region by helping to direct funding for projects that maximize the goals and eliminate existing overlapping transportation services. The funding to achieve these goals comes from three Federal grant programs.

BICYCLE AND PEDESTRIAN

Active transportation in the forms of walking and bicycling are a demonstrated priority of citizens and policy makers throughout the communities served by the MPO. Despite these modes sometimes being called "alternatives", for many people, walking or bicycling are their only means of travel. Almost everyone is a pedestrian for at least a portion of each trip taken, as final destinations are arrived at by foot. Additionally, in recent years, rising fuel prices have driven a resurgence of bicycling as an economical and non-polluting transportation choice.

An accessible and connected bicycle and pedestrian network facilitates mode choice for users, lessening dependence on single-occupant vehicle (SOV) travel. Benefits of active transportation include enhanced efficiency of the existing roadway network, better community air quality and positive health and economic impacts.

A commitment by local communities to plan for active modes of transportation is a fundamental component of addressing the system-wide transportation needs of the future. Planning and research conducted by the MPO can serve as a foundation for developing policies and directing investments in active transportation facilities. The acknowledged benefits of walking and bicycling for transportation include:

- Bicycling and walking are inexpensive (or no cost) alternatives to automobile travel;
- Increased exercise from walking or biking often leads to health improvement;
- Bicycling and walking are environmentally sustainable ways to travel;
- Reductions in automobile traffic leads to improved quality of life for individuals and community; and
- Active transportation provides more opportunities for personal interaction with others.

The emergence of the automobile and the consequent shift of urban development patterns in the United States, from dense city neighborhoods to dispersed suburban subdivisions, have made walking and bicycling much less practical for travel purposes. However, walking and bicycling remain viable means of travel for work, school, and other trips for many people. Safe, connected, and continuous facilities for bicycling and walking are vital to encourage and support travel by foot or bicycle, and also help to promote transit use.

The design of the built environment has a major impact on the safety, efficiency, and comfort of pedestrians and bicyclists. Design elements that provide for short and direct trips facilitate walking and cycling. Straight and interconnected streets, shallow building setbacks, small blocks, trees and landscaping, public spaces, and continuous facilities all encourage pedestrian and bicycle activity, as do mixed-use developments. Once an area has been developed with deficiencies for pedestrian and bicycle circulation, it can be difficult to go back and add sidewalks, bike lanes, or multi-use paths.

Vanderburgh, Henderson, and Warrick counties all strive to make bicycling and walking a more safe and realistic mode of transportation and form of recreation for residents. Communities in the region recognize the value and importance of providing an accessible bicycle and pedestrian network, and have made improvements to their existing bicycle networks in the last several years. Improvements have included greenway extensions, signing bike routes, designating bike lanes, and sidewalk and curb ramp repairs.

The EUTS Regional Bicycle and Pedestrian Plan (2000) is the most current stand-alone plan for Vanderburgh and Warrick Counties. The City of Evansville will be working with the Department of Parks and Recreation to update a comprehensive bicycle and pedestrian connectivity plan in early 2014. The City of Henderson and Henderson County are currently in the process of updating their 2003 Greater Henderson Bicycle and Pedestrian Plan. The updated plan is expected to be complete by January 2014.

In March, 2012, the MPO adopted the region's first Complete Streets Policy. A Complete Streets Policy promotes roadways that are designed to safely and comfortably accommodate all users of all ages and abilities, including, but not limited to motorists, bicyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders. The MPO Complete Streets Policy requires that all projects receiving MPO allocated federal funding adhere to the policy. Because this is an MPO-level policy, local jurisdictions completing projects with only local funds are encouraged, but not required to adhere to the policy.

Bikeways

The City of Evansville has installed approximately 20 miles of urban signed bike routes. These routes are shared routes, meaning the bicyclists and motorists share the travel lane. Connections to the west side, downtown, eastside, and several neighborhoods to the north and south were created when these routes were established. These bike routes include:

- An east side-to-downtown route along Lincoln Avenue from the Vanderburgh/Warrick County line to Rotherwood Avenue, and along Bellemeade Avenue from Rotherwood to SE Eighth Street downtown. Much of the Lincoln Avenue section exists due to the road diet project that reduced the travel lanes from four lanes to two with a center turn lane.
- A west side-crosstown route from Howell Park to West Franklin Street, where the route links to the Pigeon Creek Greenway Passage, and across town to Oak Hill Road using Michigan and Virginia Streets.
- A downtown bike route on Martin Luther King, Jr. Boulevard (from Mary Street to Cherry Street), with spurs on Cherry Street leading south to the riverfront and Pigeon Creek Greenway Passage, and north to the Bellemeade Avenue route and the downtown Central Library.
- A bike route on East Franklin Street and Michigan Street, linking Oak Hill Road and Wesselman Park.

In 2011, Evansville completed its first complete streets project – a north-south route along Oak Hill Road, from US 41 to Morgan Avenue (the next phase of this project will extend the bike lane to Lynch Road). Sidewalk and curb ramp improvements were also included in this project. Ultimately, Oak Hill Road will connect with the planned Hi-Rail Corridor segment of the Pigeon Creek Greenway Passage along US 41.

In addition to the urban signed bike routes within the city, there are more than 32 miles of signed bike routes in Union Township, Vanderburgh County, that are part of the Burdette Park Discovery Trail. This network is comprised of four separate routes that connect to Burdette Park, where a trailhead with information, bicycle parking, and showers are available for cyclists' use. Implemented in the summer of 2006, this was Vanderburgh County's first comprehensive network for recreational "road cyclists" in the region.

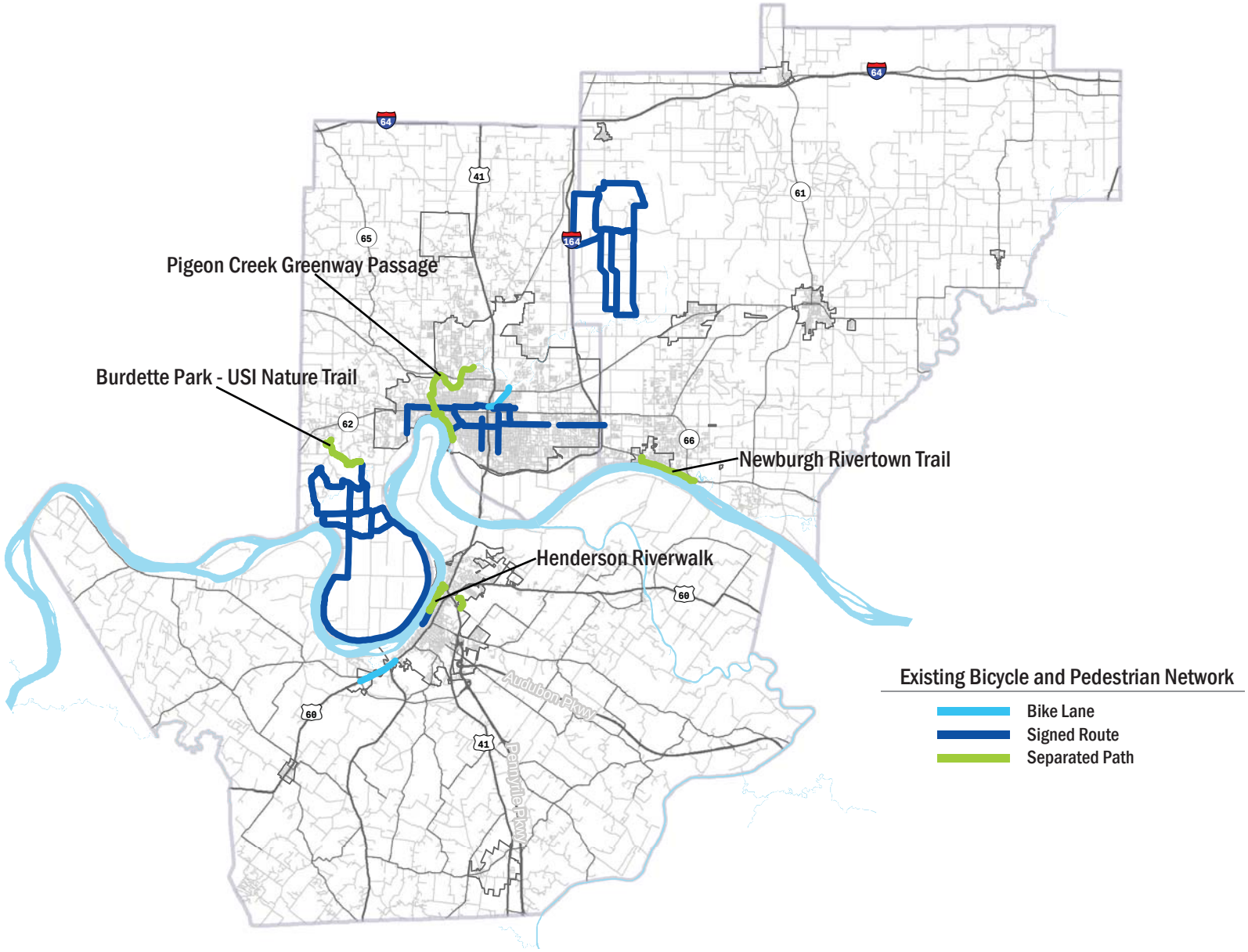
In 2011, Warrick County designated over 30 miles of rural roadways as bike routes near the Bluegrass Fish and Wildlife Area. Similar to the Burdette Park Discovery Trail routes in Vanderburgh County, these routes are composed of four connected routes with a trailhead located at New Harmony Road and Zoar Church Road. A route map, parking, and seating are provided at this trailhead.

In 2009, Henderson reconstructed a portion of US 60 southwest of the downtown core. During the reconstruction process, a dedicated bike lane and sidewalks were installed on both sides of US 60. The bike lanes and sidewalks are slightly over one and one-half miles long and stretch from just west of Drury Lane to the Henderson Bypass (SR 425). Water Street in downtown Henderson is also marked as a bike route (shared lane markings as opposed to a dedicated lane). This route is marked from 7th Street to Powell Street, and connects the Henderson Riverwalk with downtown.

HENDERSON COUNTY ACCOMPLISHMENTS SINCE 2035 MTP

- **Bike lanes added on US 60 reconstruction project**
- **Henderson Riverwalk extended**
- **Signed route designated along portions of Water Street**
- **Received Safe Routes to School funding for South Heights Elementary/South Middle Schools**

Figure 3-23: Existing Bicycle and Pedestrian Network



Greenways

The Pigeon Creek Greenway Passage in Evansville has been under development since the early 1990s by the Department of Parks and Recreation. The greenway provides a safe place for walking, jogging, bicycling, roller-skating, and other activities. Currently, almost seven miles of greenway connects Sunset Park downtown to the Heidelbach Canoe Launch and Trailhead. Several trailheads with vehicle parking are located along the greenway for easy access. These locations include Sunrise Park Trailhead, Shirley James Gateway Plaza and Mead Johnson Trailhead, Lamasco Park Trailhead, Ulhorn Trailhead, Garvin Park Trailhead, and Heidelbach Canoe Launch and Trailhead.
Vanderburgh County also has approximately three miles of trail, the Burdette Park – USI Nature Trail, that connects University of Southern Indiana to Burdette Park, as well as to the Burdette Park Discovery Trail bike routes. Trailheads are located at both USI and Burdette Park, with an additional trailhead at Broadway Avenue.

Newburgh's Rivertown Trail is approximately three miles long and extends from the Aurand Trailhead at the intersection of SR 662 and Frame/Yorkshire Road to the Old Locks and Dam Park. Ultimately, the Rivertown Trail is envisioned to connect to Angel Mounds State Historic Park. Vanderburgh County is also planning to connect to Angel Mounds State Historic Park from the west to create a regional connection.

The Riverwalk in Henderson is a separated, multi-use trail that overlooks the Ohio River. The Riverwalk is just over one and one-half miles and winds through Atkinson Park before running parallel to Merritt Drive. Currently, the Riverwalk stops at 7th Street where the bike route begins. Sidewalks are present on Water Street where the Riverwalk ends. Recently, a separated path was constructed along a drainage ditch to connect Kimsey Lane to Barrett Boulevard and Hoffman Plaza (the Walmart shopping complex). It is approximately three-quarters of a mile long, and provides an accessible way for residents west of the US 41 and US 60 interchange to travel to this shopping complex by bicycle or foot. Kimsey Lane crosses over US 41 as an overpass, so residents do not have to cross US 41 at-grade or use the interchange ramps.

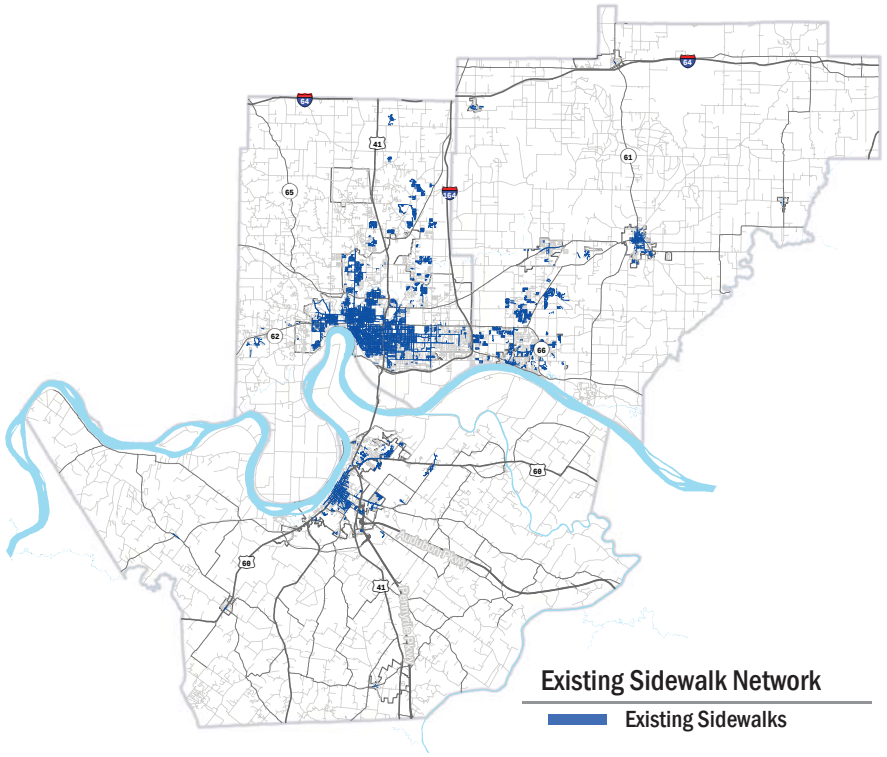
Sidewalks

In Evansville, there are approximately 500 miles of sidewalks (including both sides of the street where applicable), and they are primarily located in the downtown area and in older, more established neighborhoods. A majority of the city's sidewalks are located between First Avenue and Vann Avenue, and mostly south of Diamond Avenue. A solid network of sidewalks is also located throughout Howell neighborhood on the west side and surrounding the North Country Club neighborhood on north First Avenue. East of Vann Avenue, sidewalks are typically only present on major streets, such as Lincoln Avenue and Washington Avenue, and portions of Covert Avenue and Pollack Avenue. In Vanderburgh County, sidewalks are sparse, but can be found in several newer subdivisions. Several of these subdivisions are located on or around golf courses. There is approximately an additional 75 miles of sidewalk located in the county.

In the Town of Newburgh, there are roughly six miles of sidewalks, with a majority of them located along downtown streets. Streets between Gray Street and the Ohio River have portions of sidewalks, with some streets having sidewalks on only one side. State Street, the main north/south street through downtown, has sidewalks to Sharon Road. The Town of Chandler has very few sidewalks, approximately four miles, which are mostly located along SR 62. State Road 62 has sidewalks on both sides between Tennessee Street and Birkshire Avenue, which covers the length of the town boundary from east to west. Portions of State Street, Oak Street, Illinois Street and Washington Street are the only other locations within the town limits that have sidewalks. The City of Boonville has sidewalks on a majority of the streets within the city boundary. The only area within the city that does not have a constant network of sidewalks is located around Maple Grove Cemetery. There are only a few streets on the east side of the city near Park Lane Drive that do not have sidewalks, as well as a few streets on the northwest side of the city. In all, Boonville has approximately 27 miles of sidewalks. There are several subdivisions in Warrick County that have constructed sidewalks. Almost all of these subdivisions are located between Newburgh and Boonville along State Road 261.

Henderson County has approximately 100 miles of sidewalks. Nearly 90% of the county's sidewalks are located within Henderson's city boundary, most of which are in the downtown area. Several residential subdivisions located within the city also have sidewalks. In the county, a majority of the neighborhood surrounding the Henderson Country Club has sidewalks. In Corydon, approximately four blocks downtown on Main Street (US 60) has segments of sidewalks.

Figure 3-24: Existing Sidewalks Network



VANDERBURGH COUNTY ACCOMPLISHMENTS SINCE 2035 MTP

- Pigeon Creek Greenway Passage connected to create a continuous 6.75 mile segment
- Road diet with designated bike route completed
- Completion of 3 mile Burdette Park/USI Nature Trail
- Received Safe Routes to School funding for Tekoppel Elementary School

Accessibility

It is important to ensure residents have access to bicycle and pedestrian facilities. In most urban areas, using a bicycle for transportation requires that bicyclists use public roads. To safely do this, bicyclists must act as drivers of vehicles, exercising the same rights and responsibilities that motorists do – a concept known as vehicular cycling. For vehicular cycling, bicyclists need continuous routes that have been designed or retrofitted to accommodate bicycles, and which link to community activity centers such as central business districts, schools, parks, and shopping areas. Ensuring bicycle and pedestrian facilities are easily accessible from residents' homes, or within a reasonable distance, is important and will encourage more people to bicycle and walk to their destinations.

Bicycle Access

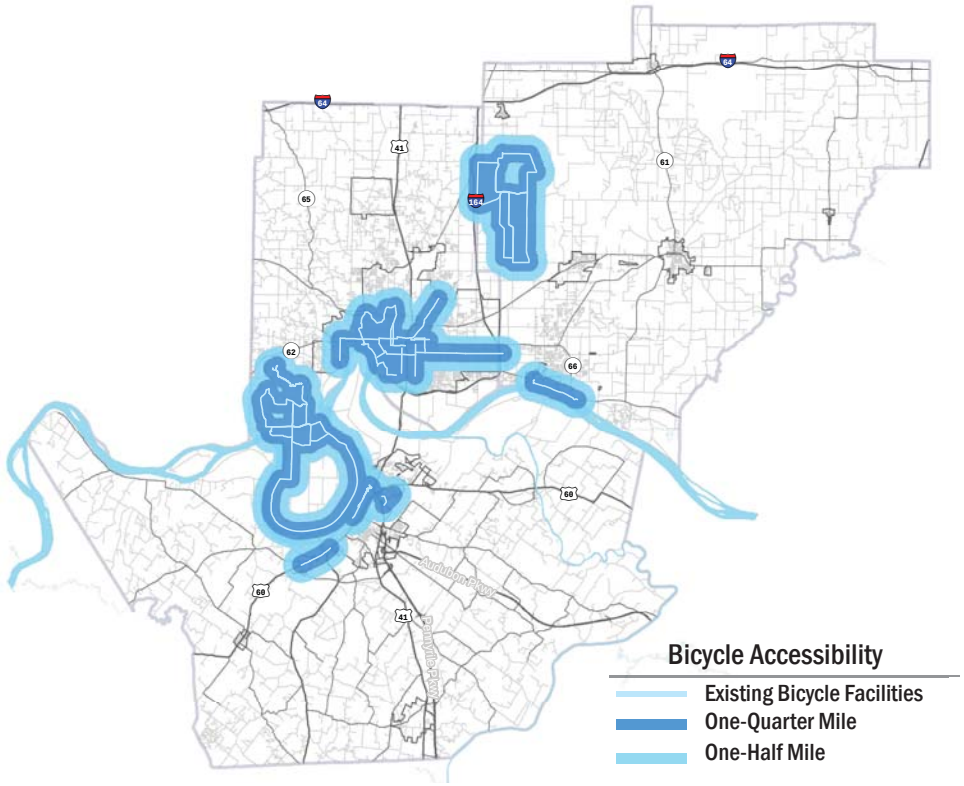
According to the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (4th edition), an experienced/confident rider is usually willing to ride more than five miles roundtrip to and from destinations. However, the average casual/less confident rider tends to cycle a roundtrip distance of one to five miles. In order to provide usable facilities for all skill levels, it is important to plan as if all users will be casual or less confident riders and provide facilities close to as many homes as possible for easy accessibility.

Many residents living within the core of Evansville have access to either the Pigeon Creek Greenway Passage or one of the 20+ miles of the signed bike routes. Henderson and Newburgh residents that live along the Riverwalk and Rivertown Trail, respectively, have easy access to these facilities. These facilities, however, are both located in and adjacent to downtown, leaving residents in outlying neighborhoods with a longer distance to travel. Even though a significant portion of the signed bike routes are located within the Burdette Park Discovery Trail routes and the Bluegrass Fish and Wildlife Area, they do not provide many residents with convenient access due to their rural locations.

Currently, 40% of the three county MPO study area population lives within one-half mile of an on-street bicycle facility or greenway (115,980 people). Nearly 57% of the three county population lives within one mile of an on-street bicycle facility or greenway (163,782 people).

In order to expand the bicycle network to reach as many residents as possible, it is important to identify areas in the planning area are not located within an accessible distance from a bike facility. According to the user survey results, accessibility to bike routes rated 2.3 out of 5. Expanding bike facilities to provide accessibility to more residents is an MTP targeted measure and represents an opportunity for improvement. Areas not within at least one mile of an existing bike facility are in most need of improvements.

Figure 3-25: Bicycle Facilities One-Quarter and One-Half Mile Accessibility



A majority of the City of Evansville is within one mile of a bike facility; however, most of the southeast portion of the city (east of Boeke Avenue and south of Covert Avenue) is not. Portions of the west side and north side, particularly north of Diamond Avenue, are also located at least a half-mile away from the existing bike routes. The transportation network east of Green River Road is extremely auto-dependent, making bicycle travel very difficult. See Figure X for one-half mile and one mile distances.

Many residents that live within the town boundaries of Newburgh have access to the Rivertown Trail along the Ohio River. Most of the town located south of Sharon Road is within one-half mile distance of the trail, while the remainder of the town is located within one mile. Henderson accessibility is similar to Newburgh in that the primary facility for biking is along the riverfront. A majority of the incorporated city is not within a miles distance from the riverfront. The areas along US 41 and US 60 (due to the bike lanes) are closest to bike facilities, but are among the most dangerous areas to bicycle due to the amount of vehicle traffic.

Pedestrian Access

According to the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, the majority of pedestrian trips are one-quarter mile or less, with one mile generally being the limit that most people are willing to travel on foot. Most people are willing to walk five to ten minutes at a comfortable pace to reach a destination. Higher density communities with mixed land use patterns have higher levels of walking because destinations are more likely to be located within walking distances of homes and businesses.

Nearly half of Vanderburgh County and Warrick County residents have access to sidewalks; however, nearly all of these sidewalks are located within the urban cores of Evansville, Newburgh, and Boonville. A majority of sidewalks located in the county are in residential subdivisions and typically serves as a recreational walking space for residents as opposed to a viable transportation option outside of the subdivision. In Henderson County, only 37% of the residents have access to sidewalks. Again, a majority of the sidewalks are located within the downtown. Only seven miles of sidewalks are provided within subdivisions that are outside of the city boundary.

See Figure 3-24 for the existing sidewalk locations.

Connectivity

Connectivity is vital to a convenient, user-friendly network of any mode, but especially for bicyclists and pedestrians. Connections between neighborhoods, shopping areas, schools, and parks are important to create a local network, but it is also important to expand existing facilities as part of the regional transportation network. Currently in the three-county study area, each community has their own set of bicycle facilities, greenway systems, and sidewalk networks, but connections with one another are lacking.

Out of the 317 people that completed the "priorities" portion of the survey, just under 250 listed greenway expansions and bicycle facilities improvements as one of their top three priorities.

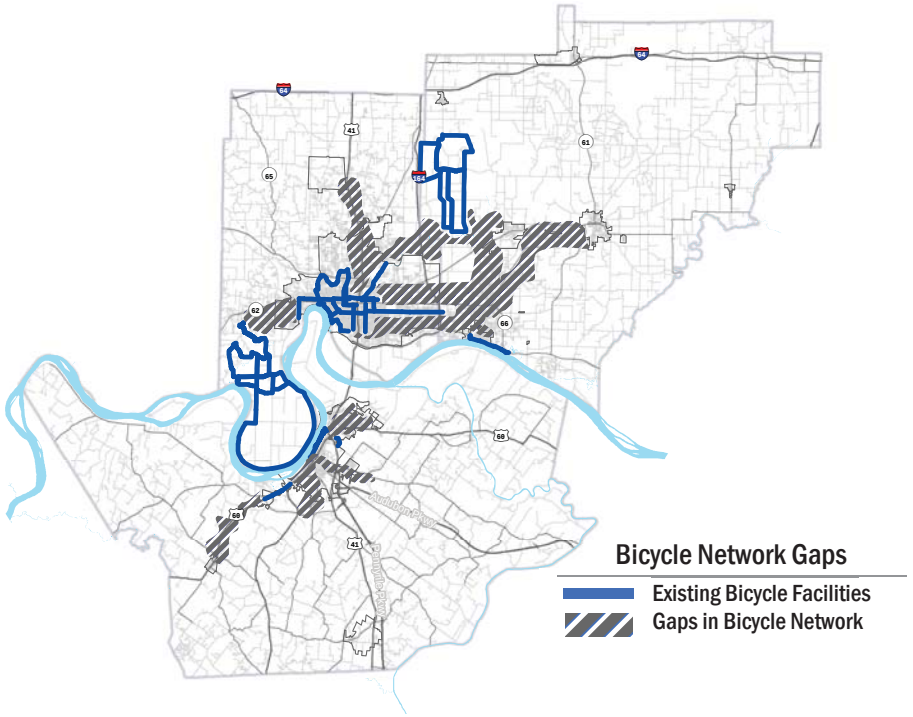
Bicycle Connectivity

In Vanderburgh County, Lincoln Avenue and Franklin Street serve as the major east/west bicycle route. Kentucky Avenue, Rotherwood Avenue and Alvord Boulevard are north/south connectors, but do not necessarily connect at an intersecting bicycle route. For many, the Pigeon Creek Greenway Passage serves as a north/south connector. In Vanderburgh County alone, there are three separate bicycle networks that are not connected with one another - the Burdette Park - USI Nature Trail/Burdette Park Discovery Trail routes, the Pigeon Creek Greenway Passage, and signed urban routes. These three networks combined constitute nearly 60 miles of existing network and residents would benefit by incorporating additional routes to connect these networks together.

In Warrick County, the Newburgh Rivertown Trail and the Blue Grass Fish and Wildlife routes are the only existing bicycle networks. Currently, there are no designated bicycle facilities leading from outlying neighborhoods to either system, let alone a connection to the bicycle systems in Vanderburgh County. Creating a connection between the Newburgh Rivertown Trail and the Pigeon Creek Greenway Passage would form the start to a regional bicycle and pedestrian system.

Henderson primarily has one designated east/west connection that varies between the Riverwalk, the downtown bike route and sidewalks, and dedicated bike lanes on US 60. The facilities downtown are currently not connected with the bike lanes on US 60 (at Drury Lane), but the City is in the process of determining how best to connect these two facilities. Once connected, one could easily get from the northeast side of downtown to the 425 Bypass (nearly to the Henderson Community College) by bicycle. Henderson has developed a walking/bicycle path that leads to Hoffman Plaza (Walmart and surrounding stores), and is in the process of linking more neighborhoods with shopping areas.

Figure 3-26: Bicycle Network Connectivity Gaps



Pedestrian Connectivity

In Vanderburgh County, the majority of sidewalks are located south of the Pigeon Creek. First Avenue is the only major north/ south corridor that has a sidewalk network branching out into the surrounding neighborhoods. Neighborhoods around Vanderburgh County that have a connected sidewalk system include Howell and the Lamasco/Franklin Street area on the west side, Jacobsville and other neighborhoods around downtown, and neighborhoods surrounding the University of Evansville. All of these neighborhoods are some of the original neighborhoods established when Evansville was being developed. In recent decades, as development has moved farther away from the downtown area, sidewalk connectivity becomes sparser.

WARRICK COUNTY ACCOMPLISHMENTS SINCE 2035 MTP

- Completed 3 miles of the Rivertown Trail, with additional segments planned
- Designated over 30 miles of rural signed routes within the Blue Grass Fish and Wildlife Area

Downtown Newburgh and Boonville have sidewalks located within the central part of their downtowns, but the sidewalks tend to end when they reach more residential areas. There are sidewalks located within many subdivisions along US 261; however, these sidewalks often times do not extend beyond the subdivision limits.

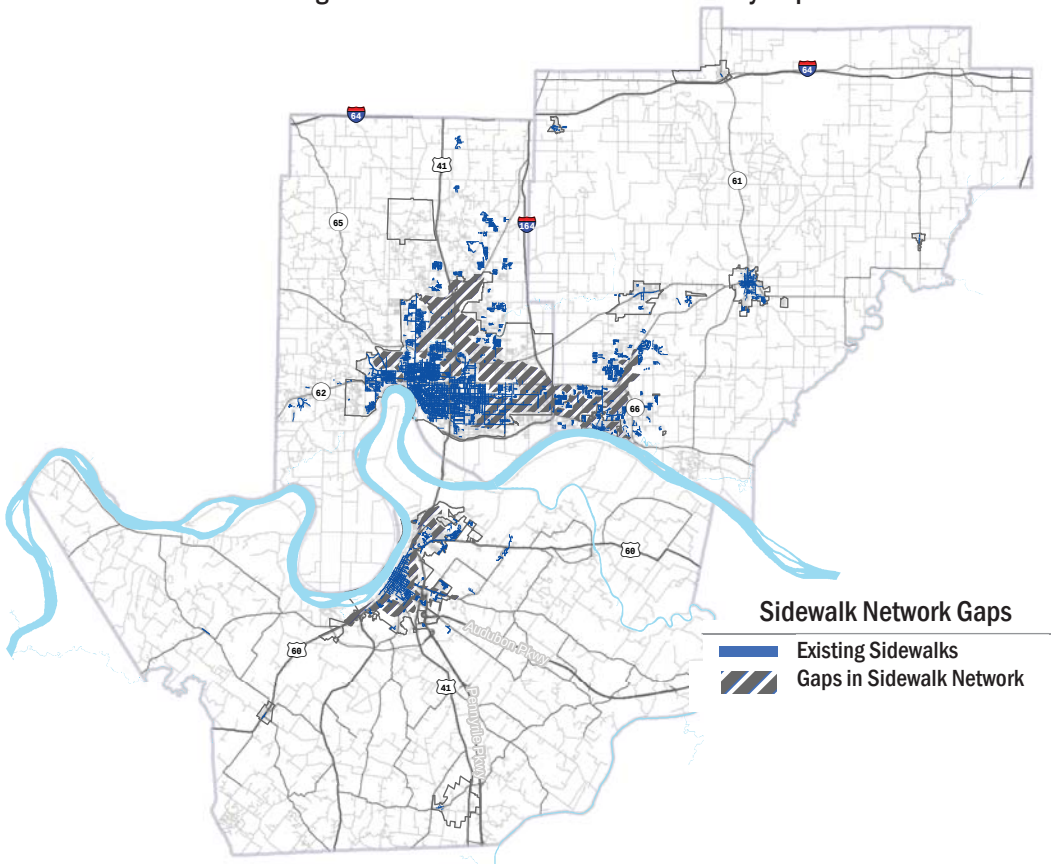
Castle High School, Castle North Middle School, and John H. Castle Elementary School are all located within three-quarters of a mile on SR 261 just north of SR 66, and Castle South Middle School is located on Casey Road just south of Castle High School. These schools are within walking distance from many neighborhoods were potential walking connections can be made across SR 66 and SR 261.

The City of Henderson lacks pedestrian accommodations along one of the busiest corridors in the community – US 41. This route creates a barrier between neighborhoods on the west side of US 41 and commercial centers on the east side. Lack of pedestrian facilities also makes traveling to Audubon State Park by foot difficult.

Downtown Henderson, along with the surrounding residential areas, have access to sidewalks. However, as neighborhoods move south along US 60, sidewalks begin to become sparser. Some subdivisions located within the county have sidewalks, but like Warrick County, these sidewalks do not extend beyond the subdivision limits.

Figure 3-27 shows areas within the MPO Planning Area that are major residential and commerical areas that are lacking sidewalks.

Figure 3-27: Sidewalk Network Connectivity Gaps



Bicycle and pedestrian safety

Safety is always a major concern for a community when designating bicycle and pedestrian ways. Ensuring the safety of bicyclists and pedestrians is a difficult task, because doing so requires all roadway users to make sound judgments. Facilities should be designed in a way that will encourage users to make safe decisions, but sometimes, accidents are not avoidable.

The Evansville MPO receives crash statistics from both the Indiana and Kentucky State Police. In Indiana, a bicyclist is considered an automobile due to the fact that they are using the roadway and following the same traffic laws as motor vehicles. Therefore, Indiana does not have data for the amount of bicyclists involved in crashes. Kentucky, however, does separate bicyclists from motor vehicles on crash reports. Table 3-9 shows the amount of crashes involving a bicyclist in recent years in Henderson County.

Table 3-9: Henderson County Crashes Involving Bicyclists

	2009	2010	2011	2012
Henderson	7	7	5	8

Source: State Crash Databases

Both states keep track of the amount of pedestrian crashes that occur. Vanderburgh County had significantly more pedestrian crashes than Henderson and Warrick counties, but this is due to the larger population in Vanderburgh County. Table 3-10 shows the amount of crashes involving a pedestrian in recent years in Henderson, Vanderburgh, and Warrick counties.

Table 3-10: Crashes Involving Pedestrians

	2007	2008	2009	2010	2011	2012
Henderson	-	-	6	11	11	14
Vanderburgh	35	30	37	26	19	31
Warrick	3	2	5	1	3	3
TOTAL	38	32	48	38	33	51

Source: State Crash Databases

Design Countermeasures

A number of design countermeasures based on FHWA standards can be applied to address the most common types of pedestrian and bicycle crashes.

1 Crossing mid-block at crosswalk

1. Conflicts –
   a. high-speed vehicles fail to slow or stop for pedestrians at crossing without medians, signs, or signals.
2. Countermeasures –
   a. over12,000 AADT, a marked crosswalk will reduce crashes.
   b. over 15,000 AADT, a pedestrian median will further reduce crashes.
   c. over 40 mph, pedestrian signals are also required.

2 Crossing at an un-signalized intersection

1. Conflict –
   a. vehicles turning at intersection.
2. Countermeasures –
   a. Reduce crosswalk length with smaller curb radii, or include curb extensions.

3 Night time crossing

1. Conflict –
   a. vehicles fail to see pedestrians and bicyclists in time at poorly lighted intersections.
2. Countermeasures –
   a. Install pedestrian lighting.
   b. Improve roadway lighting.

4 Absence of sidewalk, narrow shoulder

1. Conflicts –
    a. vehicles fail to slow, watch for, and/or go around pedestrians and bicyclists along the road side.
2. Countermeasure –
    b. Install minimum 5 ft. sidewalks and 5 ft. shoulders.

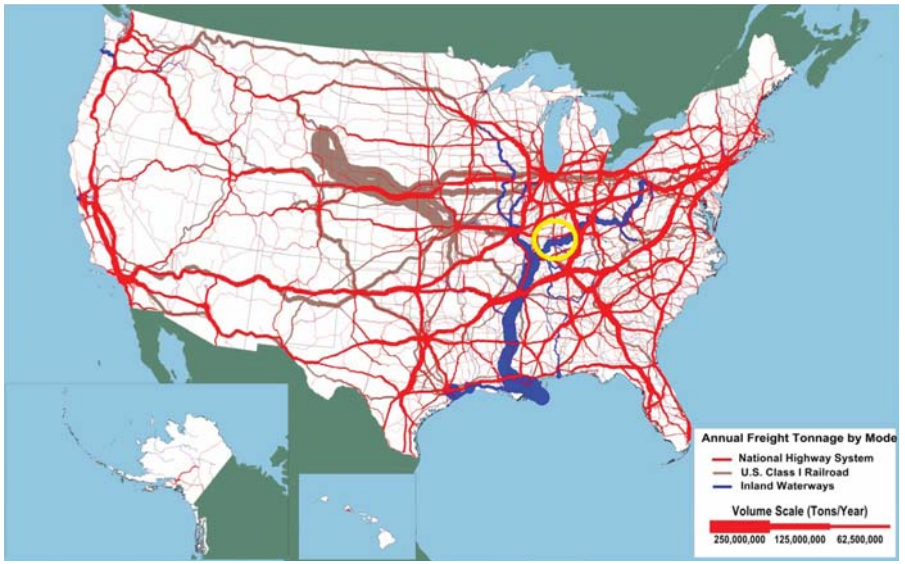
These countermeasures, along with guidelines for pedestrian and bicycle facilities, street crossings, signals, signage, streetscape design, and traffic calming measures, can be found in the EMPO's Completing the Street – A Complete Streets Toolkit.

FREIGHT-RELATED TRANSPORTATION

In the past, connection to railroads or highways ensured the prosperity of a region. Today, regional economies depend on their connections with global supply chains. Shippers are concerned with their total distribution cost, from supplier to consumer. Even modest changes in the cost of distribution can have dramatic impacts on manufacturing sources and the modes of transportation used by businesses.

As overall national freight movements across all modes are expected to increase significantly, congestion, reliability, safety, and system preservation will continue to be of major concern for the foreseeable future, despite improvements in operational efficiencies currently planned. Figure 3-28 shows the Tonnage on Highways, Railroads, and Inland Waterways as of 2007. Through the planning area, logically, the Ohio River carries the heaviest amount of freight goods, seconded by rail and truck freight. On the other hand, the highest dollar value of product is expected to be handled in this region by trucks, given that this is the mode of choice in the planning area for just in time deliveries.

Figure 3-28: Tonnage on Highways, Railroads, and Inland Waterways (2007)

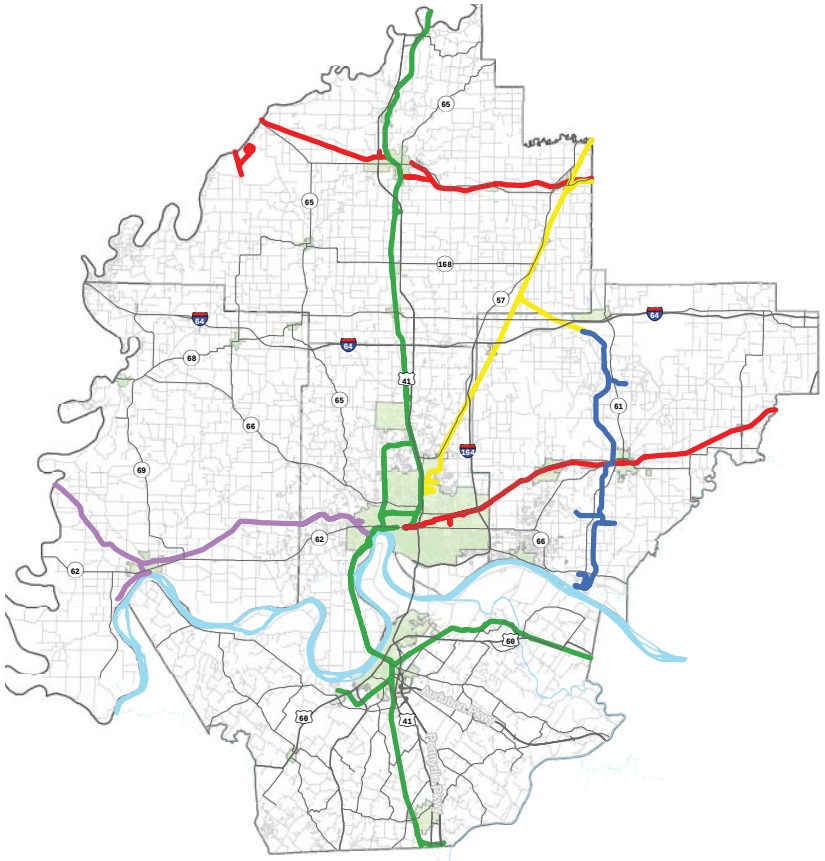


Sources: Highways: U.S. Department of Transportation, Federal Highway Administration, Freight Analysis Framework, Version 3.4, 2012. Rail: Based on Surface Transportation Board, Annual Carload Waybill Sample and rail frieght flow assignments done by Oak Ridge National Laboratory. Inland Waterways: U.S. Army Corps of Engineers (USACE), Annual Vessel Operating Activity and Lock Performance Monitoring System data, as processed for USACE by the Tennessee Valley Authority; and USACE, Institute for Water Resources, Waterborne Foreign Trade Data, Water flow assignments done by Oak Ridge National Laboratory.

Rail Freight Network

Evansville and Henderson are located on one of three major railroad corridors in the tri-state area. Railroads are an integral part of the transportation system for the region, and compete with water and truck-based services for the movement of bulk materials. Rail lines radiate from the planning area in all directions providing needed connections to the regional and national networks. All rail lines serving this region carry freight only, as passenger service was discontinued in 1971.

Figure 3-29: Regional Rail System Ownership



Source: State of Indiana 2008 Rail System Map, INDOT; Kentucky Statewide Rail Plan, 2002; local investigation

As illustrated in Figure 3-29, the Evansville MPO Planning Area rail system presently consists of five companies currently in operation with lines radiating in all directions. Of these, two are Class I railroads (operating revenue over $250 million per year):

CSX Transportation (CSXT)

CSX Transportation (CSXT) is the primary railroad company in the region, and has the most extensive rail system within the study area. This system consists of two mainlines running north and south through the region, along CSX's Southeastern Corridor. The CSXT facilities through this region are primarily single-track lines. The vertical clearance on the CSXT lines meets the minimum requirements to accommodate double stacked containers. CSXT is the only rail company within the study area to have access to Kentucky through a channel span rail bridge over the Ohio River. This bridge is owned and maintained by CSXT. Though the NS has the largest share of the rail market in the State of Indiana per the Indiana Rail Plan, CSXT is the largest rail company in the State of Kentucky and the southwestern Indiana region. The CSX intermodal facility (CSXI) operates out of Howell Yards in Evansville.

Norfolk Southern Railway (NS)

Norfolk Southern Railway (NS) operates one mainline that originates in Evansville and runs east parallel to SR 62, on the right-of-way of the old Wabash and Erie Canal, through Vanderburgh and Warrick counties. This route runs between Huntingburg, Indiana and Evansville with one train daily. The second NS route runs east and west in Gibson County, through Princeton. The NS lines also meet the minimum requirements to accommodate double stacked containers within the region.

Indiana Southern Railroad (ISRR)

Indiana Southern Railroad (ISRR) operates one mainline between Indianapolis and Evansville where it converges with the CSXT lines. This is currently the only direct rail connection between the Study Area and Indianapolis. The primary commodity carried through this region is coal, but it does carry a significant amount of farm products and chemicals.

Evansville Western Railway (EVWR)

Evansville Western Railway (EVWR) operates 124.5 miles of CSX former L&N RR St. Louis Subdivision from Evansville Howell Yard to Okawville, IL through western Vanderburgh and Posey County. The EVWR serves the Port of Indiana-Mt. Vernon and major industrial facilities in southern Posey County. The EVWR took over the line in December 2005 and interchanges with BNSF and Union Pacific in Illinois in addition to CSX at Howell Yard. The EVWR is based in Mt. Vernon, IN and is owned by Four Rivers Transportation.

Squaw Creek Southern (SCS)

Squaw Creek Southern (SCS) operates 21.3 miles on former Yankeetown Dock (YDC) track from Lynnville Mine to Yankeetown Dock on trackage rights obtained from Norfolk Southern (NS) when NS purchased the rail portion of YDC from Peabody in 2003. SCS is based in the former YDC maintenance facility in Yankeetown and is division of Respondek Railroad Corporation of Crossville, IL. Respondek also provides industrial switching services to a number of industrial, port, and mining facilities in the region and provides car repair, car storage and track maintenance services to other railroads and industrial customers. SCS interchanges with Indiana Southern (ISRR) at Lynnville Mine.

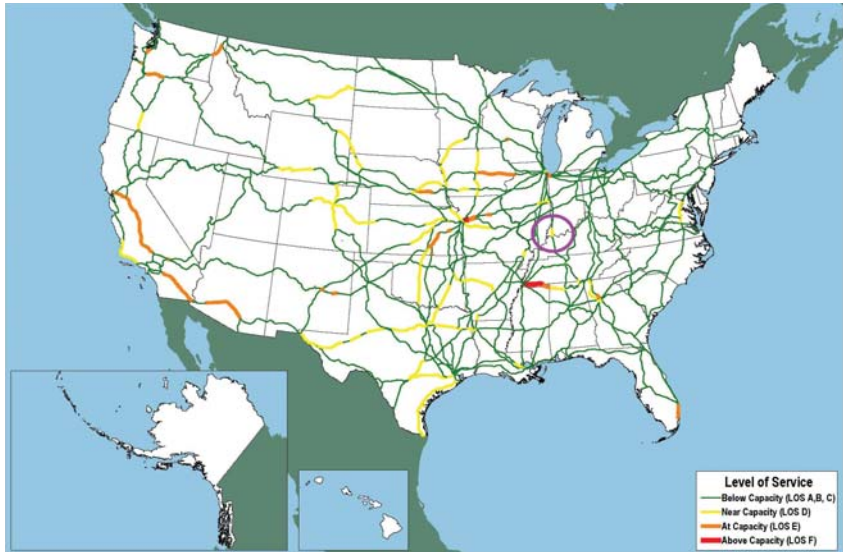
Figure 3-30: Evansville Western Railway System

Source: http://evwr.biz/system_map.htm

Capacity

According to nationwide data collected in 2007 (Figure 3-31), The CSX line running north-south through the planning area is below or near capacity. It has been projected that this same rail line will be over capacity by 2035 (Figure 3-32).

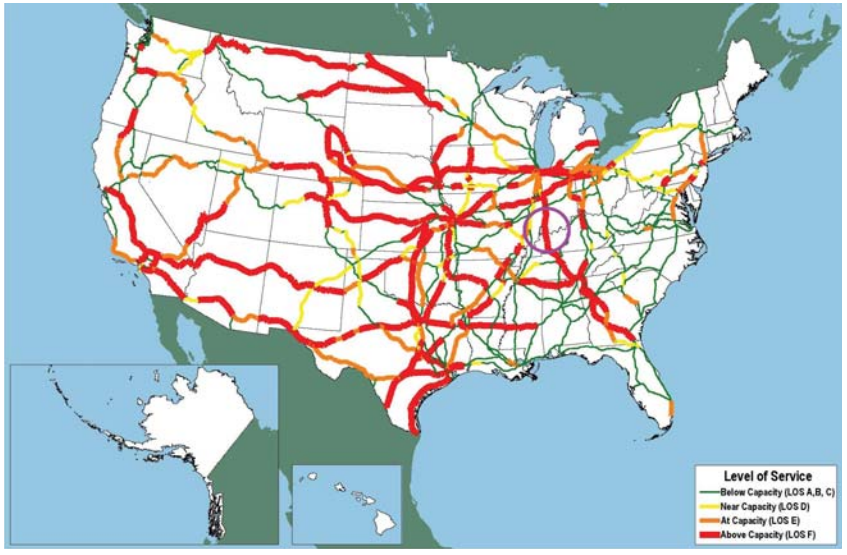
Figure 3-31: Train Volumes and LOS (2007)



Note: Level of Service (LOS) A through F approximates the conditions described in Transportation Research Board, Highway Capacity Manual 2000 period.

Source: Association of American Railroad National Rail Infrastructre Capacity and Investment Study, prepared by Cambridge Systematics, Inc. (Washington, DC: September 2007), figure 4.4, page 4-10.

Figure 3-32: Expected 2035 Train Volumes and LOS



Note: Level of Service (LOS) A through F approximates the conditions described in Transportation Research Board, Highway Capacity Manual 2000.

Source: Association of American Railroad National Rail Infrastructre Capacity and Investment Study, prepared by Cambridge Systematics, Inc. (Washington, DC: September 2007), figure 5.4, page 5-5.

Safety, Security, and Sustainability

Improving rail safety is largely dependent on improving at-grade crossing safety features or eliminating at-grade crossings when possible. Derailing can also cause major safety concerns for communities when hazardous materials are being transported. The Common Carrier Obligation of 49 U.S.C. § 11101 requires railroads to provide reasonable transportation services and rates for the shipment of freight, including hazardous materials, when requested by a shipper. This is unique among the freight transportation modes. According to the Bureau of Transportation Statistics (July 2010), more than half of the total tonnage of hazardous material shipments were carried by truck, though ton-miles by truck represent only 32% of total hazardous material ton miles. Hazardous material shipments by rail and water, though representing only 5.8% and 6.7% of respective total tonnage, constituted 28.5% (rail) and 11.55% (water) of ton miles. For Toxic by Inhalation (TIH) shipments specifically, although movement by truck accounts for approximately 60% of the value of TIH shipments, compared to 26% by rail, the average miles by shipment are 112 miles (truck) and 580 miles (rail). The movement of TIH gases is almost exclusively by single mode, with rail comprising 62% of ton miles, and 99.7% by single mode.

RAIL ACCOMPLISHMENTS SINCE 2035 MTP

- Elimination of one at-grade crossing (2009)
- Installation of overpass with new road alignment (2011)
- Installation of additional rail line to Berry Plastics to supply needed product due to expansion (2013)

While progress has been made in recent years, there are still challenges being faced today, including:

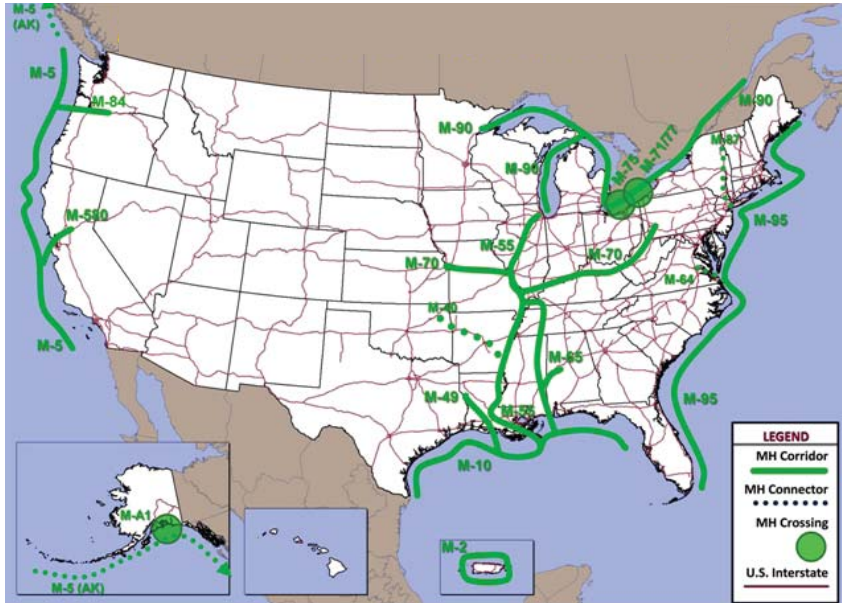
Challenges

- Encouraging railroad participation in the MPO planning process
- Funding the elimination of at-grade crossings (Railroad vs. Local vs. MPO/Federal)
- Adding direct rail service to manufacturing facilities
- State-wide freight advisory committee that includes the MPOs
- Guidance on the MPO's role in railroad planning beyond the roadway intersection
- Comprehensive and accessible data reporting system
- Better working relationship between LPA's and rail entities
- Dedicated freight funding for MPO's that can be used for private freight improvements

Waterways Freight

The Ohio River has historically been the main impetus to growth in the Evansville MPO region. Today, the Ohio River is designated a Marine Highway (M-70). A marine highway is a designated route for transporting cargo on water, reducing pollution and congestion on roads. Since 2009, the Department of Transportation has designated 21 Marine Highway routes, and invested $130 million in projects supporting Marine Highway services. In addition to highlighting the role waterways play in moving freight throughout the region, designated Marine Highways receive preferential treatment for any future federal assistance from the Department or the Maritime Administration.

Figure 3-33: Designated Marine Highway Corridors



Source: U.S. Department of Transportation Maritime Administration

Several industries in the area utilize barge transportation for incoming and outgoing freight movement, and there are two public riverports that have a major impact on the flow of commodities throughout the entire tri-state region.

Henderson County Riverport (HCR)

The port is located at milepost 808 on the Ohio River, west of the City of Henderson. It is an all-commodities terminal offering full port facilities, coal loading, bulk and cargo handling, warehousing, yard storage, and intermodal transfers between barge, rail and truck. The site encompasses 395 acres including an industrial park which supports 11 industries with room to expand.
(http://hendersonport.wordpress.com/)

- 125-ton electric pedestal crane
- 134-barge fleeting area
- 2.4 miles of interior rail
- Rail service by CSXT
- Highway access to future I-69 (E.T. Breathitt Parkway)
- 395–acre facility includes industrial park
- Foreign-Trade Zone

Port of Indiana-Mount Vernon (POI-MV, formerly Southwind Maritime Center)

According to the port's website, it ranks 7th in U.S. waterborne shipping and 15th in total domestic/international shipping. The major cargoes are cement, coal, containers, dried distillers grain, ethanol, fertilizer, grain/soybeans, ingots/billets, minerals, pig iron, project cargo, salt, super sacks, and steel coils/slabs/scrap. It is the largest public port within 175 miles of the Ohio River-Mississippi River intersection and is accessible from all directions year around.
(http://www.portsofindiana.com/poi/mount_vernon/)

- 60-ton, dual-lift overhead crane
- 400-barge fleeting area
- 200-car rail storage capacity
- Rail service by Evansville Western
- Highway connection to I-64
- Foreign-Trade Zone #177
- Recent $4 million dock expansion
- 6 miles of interior rail
- Heavy-haul roads; no weight limit
- 965-acre facility includes industrial park

Image Source: http://www.portsofindiana.com/poi/mount_vernon/

There are two lock and dam stations on the Ohio River within the planning area, the Newburgh Lock and Dam in Warrick County and the John T. Myers Lock and Dam in Posey County. Both are operated from the northern shore of the river. The John T. Myers station was authorized for new construction in 2013 with little or no funding available to complete the project (USACE, 2013). The new estimated completion data for a major rehabilitation on this lock is in 2081 (Waterways Council, Inc, 2013).

Capacity

Both public ports report adequate space for expansion and the ability to handle any additional containerized traffic expected from the expansion of the Panama Canal. Questions remain as to whether the locking system on the inland waterways can handle this traffic without needed improvements.

Safety and Security

Safety for freight movers on the river is generally restricted to collisions, either with fixed assets like bridge abutments or other river traffic including recreational boaters. Security concerns in this area are generally limited to the transfer and storage of hazardous materials. All modes are in the process of evaluating hazardous material tracking procedures.

Table 3-11: Review of Security Preparedness by Mode

Regulatory Approaches	Inland Waterway	Highway	Rail
Security & Planning Preparedness	✔	✔	✔
Credentialing	✔	✔	✔
Voluntary Reporting of Suspicious Activity	✔	✔	✔
Real-Time Tracking/ Dynamic Risk Management	Partial	Evolving (R&D under 1554 of the 9/11 Act).	Partial (de-centralized tracking)

Source: Presentation by Michael Sowinski, Coldstream Digital, LLC; August 14, 2013, "Certain Dangerous Cargo on the Inland Waterways", presented at the 2013 Barge and Rail Symposium

The US Coast Guard's (USCG) Notice of Arrival/Departure (NOAD) system for marine ports and the Automatic Identification System (AIS) provide a major portion of the information needed to meet the need of Marine Domain Awareness (73 FR, p. 76298). This does not apply to inland waterways. The USCG's Inland River Vessel Movement Center (IRVMC), used for inland waterway vessel tracking, was suspended as of January, 2011.

IRVMC RNA 2003 Federal Register:

> *"The Coast Guard encourages the submission of alternative reporting methods. It is the Coast Guard's hope that companies will embrace current modern technology as it becomes available to automatically report the locations of towing vessels and the CDC (Certain Dangerous Cargoes) barges they are responsible for directly to the Coast Guard in real or as close to real time as possible."*

WATERWAYS ACCOMPLISHMENTS SINCE 2035 MTP

- **Good working relationship between area ports and the MPO**

Some challenges that are still faced include:

- Ohio River Lock and Dam Infrastructure Improvements
- Dredging to maximize capacity for barges
- Dedicated freight funding
- Statewide freight advisory committee that includes the MPOs
- Comprehensive and accessible data reporting system
- Inland Waterways Trust Fund insufficient revenues to efficiently fund new construction and major rehabilitation projects (USACE, 2013)
- Guidance on role of MPO in waterway freight planning beyond roadway connections

Air Freight

The Planning Area is served by three airports: the Evansville Regional Airport and Skylane Airport within the City of Evansville, and the Henderson City-County Airport located in Henderson County, Kentucky.

Evansville Regional Airport (Identified KEVV)

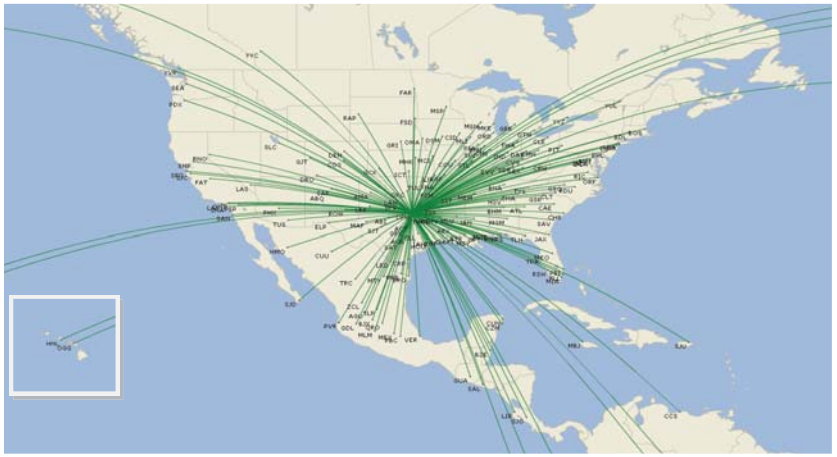
The Evansville Regional Airport, the largest airport in the region, is located in the southeast quadrant of SR 57 and US Highway 41, in the City of Evansville, Vanderburgh County. The operation of the 1,260 acre property which includes sites for commercial development is overseen by the Evansville-Vanderburgh Airport Authority District. The Federal Aviation Administration (FAA) classifies the airport as a Primary - Non-hub facility. This implies that the airport will serve as a starting point or a destination rather than an in route stopover for travelers to other destinations.

While freight shipments have always been available, freight cargo has historically played a secondary role to passenger travel. Types of cargo demand which typically occur at the airport are airline cargo, all-cargo and charter service shipments. The major airlines and commuter airlines transport airline cargo in the hold of passenger aircraft. Airline cargo typically includes small packages, express cargo (i.e. tropical fish, flowers, etc) and mail. This is sometime referred to as “over the counter” cargo or “next flight out” cargo.

Figure 3-34: American Airlines - Chicago ORD

Source: American Airlines

Figure 3-35: American Airlines - Dallas DFW

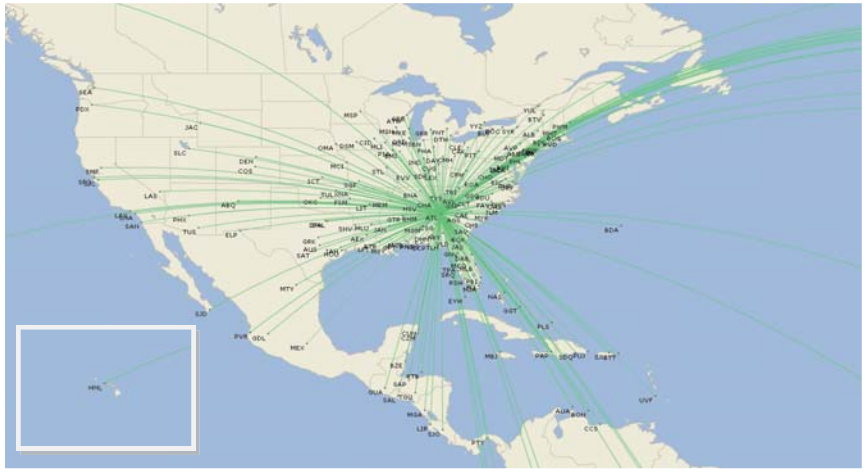


Source: American Airlines

Figure 3-36: Delta Airlines - Detroit DTW

Source: Delta Airlines

Figure 3-37: Delta Airlines - Atlanta ATL



Source: Delta Airlines

All-cargo carriers range from freight forwarders operating their own fleet (such as UPS and FedEx) to carriers operating on an intermittent basis. Two years ago, FedEx began weekday flights of time sensitive, early delivery cargo from Memphis, TN. No information has been made available on the amount or value of cargo that is shipped using this facility.

Daily flights with American Airlines and Delta from this airport connect passengers and potentially freight cargo to major hubs including Chicago, Dallas-Fort Worth, Detroit and Atlanta which in turn connect to international destinations on virtually any continent.

Henderson City-County Airport (identified KEHR)

The Henderson City-County Airport is located west of the City of Henderson, Henderson County, Kentucky, on KY 136. The facility is owned and operated by the Henderson City-County Air Board. The airport has one paved runway and offers chartered passenger and freight service, flight training, maintenance, fueling, and hangar facilities. There is no current information on the amount of cargo shipped using this facility.

Skylane Airport (Identifier 3EV)

Skylane Airport, located on the northwest side of Evansville off Allen Road, is the third and smallest public airport serving this region. This airport has one unpaved runway and offers fueling capabilities for the smaller single engine planes which could be used as a charter freight service.

Highway Freight

Trucks are the most visible of all the freight modes in the region because they share the same highway network as transit and passenger vehicles.

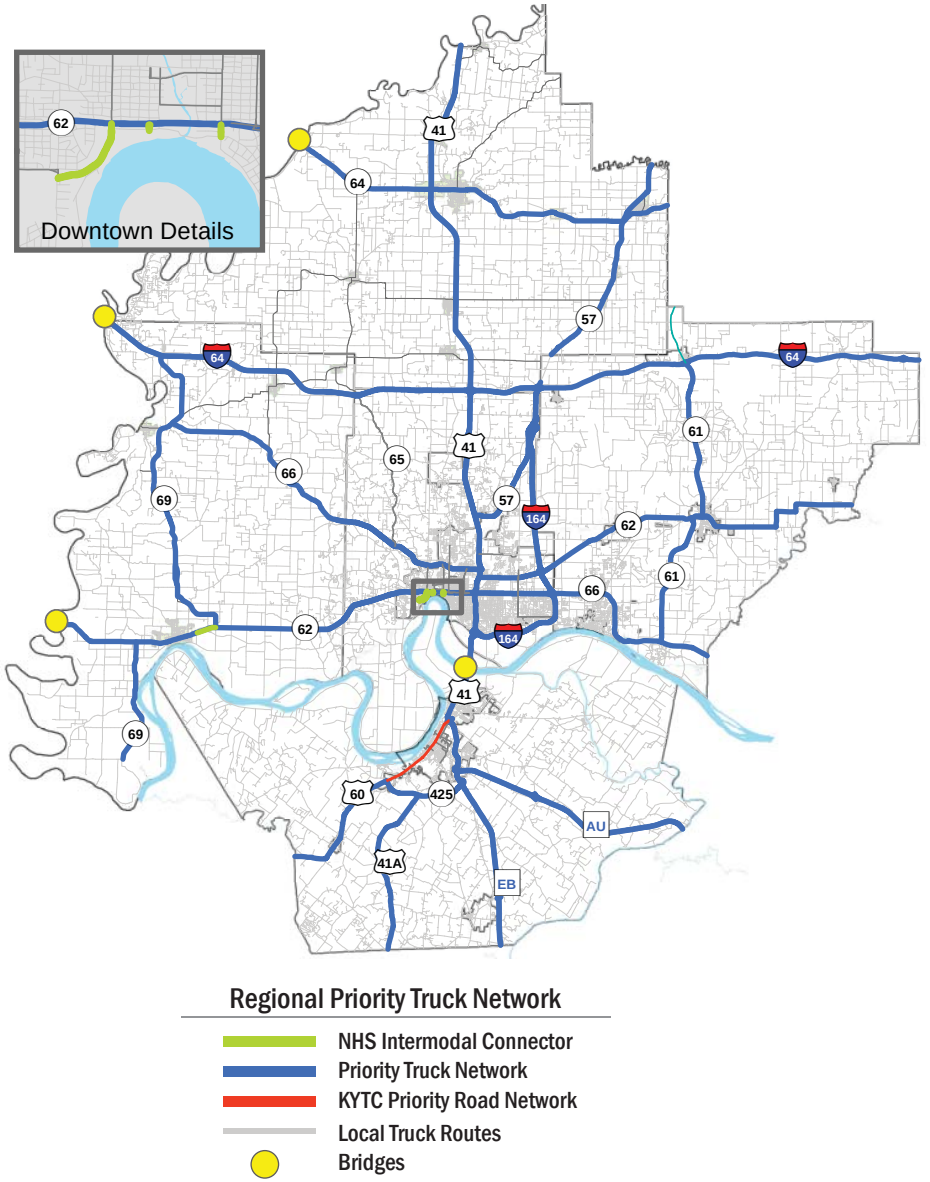
Network

Commercial vehicles are permitted on any roadway unless strictly prohibited, but generally municipalities restrict larger truck deliveries to the shortest route from a designated truck route. Figure 3-38, represents the MPO designated Regional Priority Truck Network for the study area. This network includes freight-related National Highway System (NHS) Intermodal Connectors, National Truck Network routes, the Kentucky Transportation Cabinet's (KYTC) Priority Road Network (if not already included in the NHS routes), and locally designated primary truck routes. All of these routes together, though originally designated by different entities, have been established to improve freight movement. The MPO gives additional priority to improvements on this network during the project selection process, and will monitor congestion through the Congestion Mitigation Process laid out in Appendix C on this network for needed improvements.

HIGHWAY ACCOMPLISHMENTS SINCE 2035 MTP

Fulton Avenue/SR 62 interchange improvements

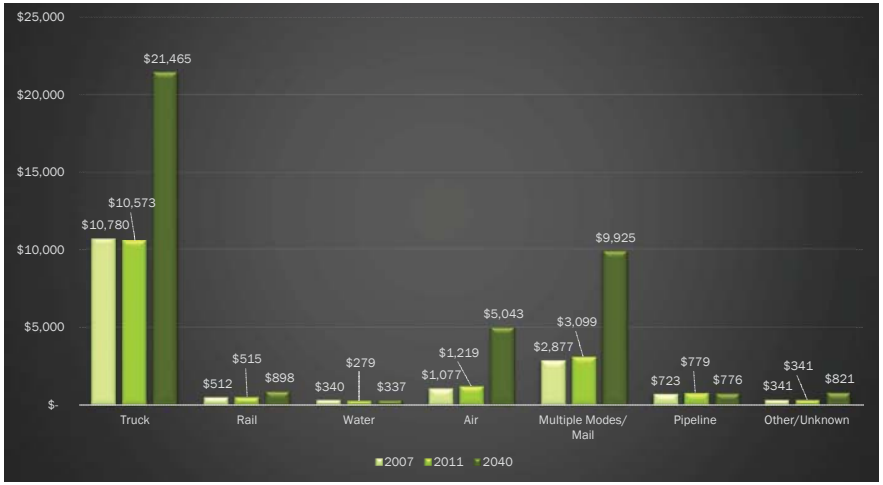
Figure 3-38: Regional Priority Truck Network



Capacity

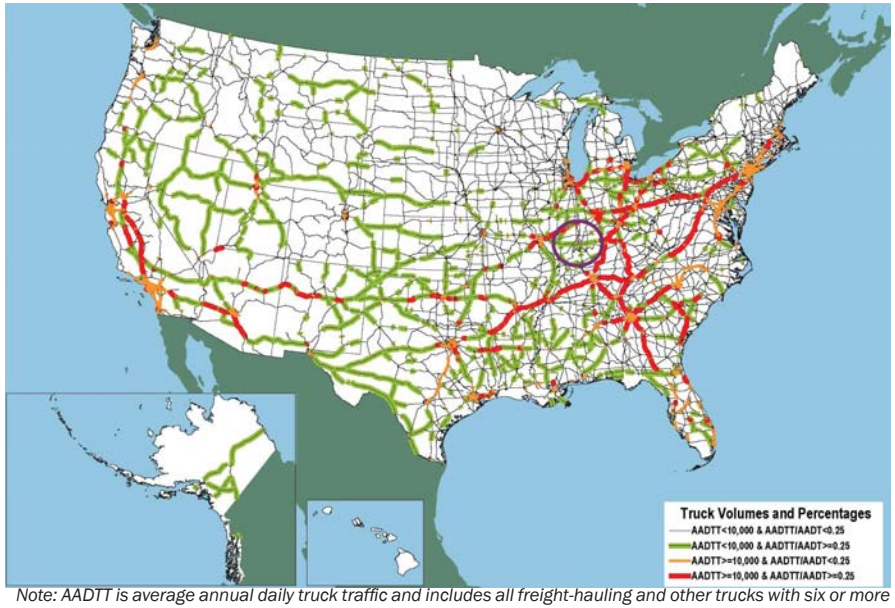
According to the FHWA's Freight Analysis Framework (FAF), the value of trucked goods is expected to rise 168% from the year 2002 to 2035 (Figure 3-39), and truck volumes are expected to follow accordingly (Figure 3-40 and 3-41). Based on national statistics, trucks carry more freight by value than any other mode.

Figure 3-39: 2002, 2007 and 2035 National Value by Mode



Source: FHWA's Freight Analysis Framework

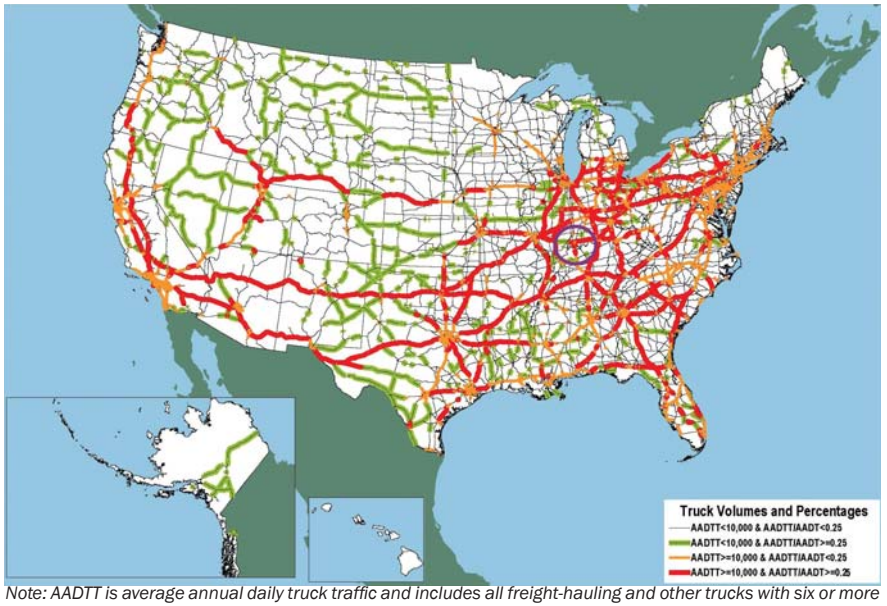
Figure 3-40: Truck Volumes on National Highway System (2002)



Note: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles.

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Figure 3-41: Truck Volumes on National Highway System (2035)

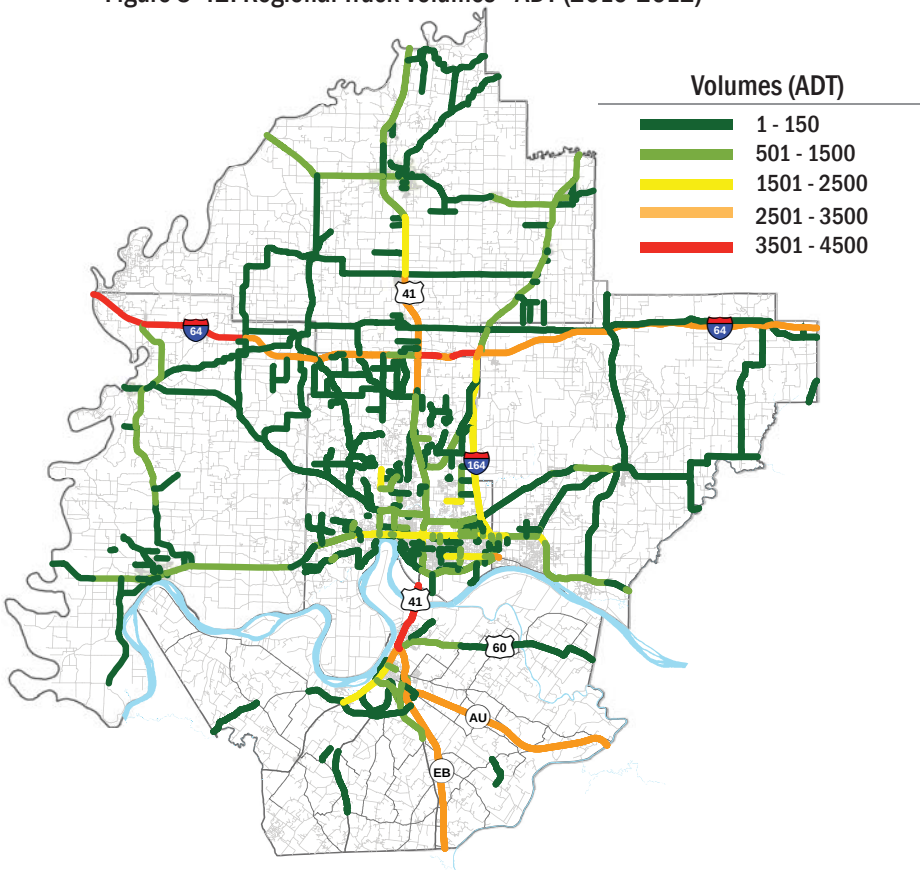


Note: AADTT is average annual daily truck traffic and includes all freight-hauling and other trucks with six or more tires. AADT is average annual daily traffic and includes all motor vehicles.

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 2.2, 2007.

Current regional truck volumes (Figure 3-42) indicate the interstates, parkways and state facilities are the most heavily used by trucks. Obvious hot spots are the Henderson US 41 Corridor, which funnels truck traffic over the Ohio River Twin Bridges; I-64 near the SR 69 interchange in northern Posey County; and I-64 between US Highway 41 and I-164 (which bypasses Evansville). While volumes alone do not indicate impaired freight movement, these areas should be monitored through the CMP for congestion and delay. Volumes can also help determine where local truck routes are needed to support freight movements.

Figure 3-42: Regional Truck Volumes - ADT (2010-2012)



Safety and Security

Safety concerns for highway freight are similar to those presented in this chapter for the highway network as well as the added concern of transporting hazardous materials. In addition, new regulations are now in effect regarding the number of hours a commercial truck driver can be on the road.

Some challenges in highway freight still being faced include:

Challenges

- Identifying and reducing congestion and “bottlenecks”
- Increase signal spacing and/or coordinate signal timings, especially on state facilities
- Maintain significant route pavement & rail crossings
- Design intersections with appropriate turning radii
- Comprehensive and accessible data reporting system
- Consider freight deliveries in site design
- Dedicated funding for freight improvements
- Quick clearance of non-recurring congestion (i.e. crashes)

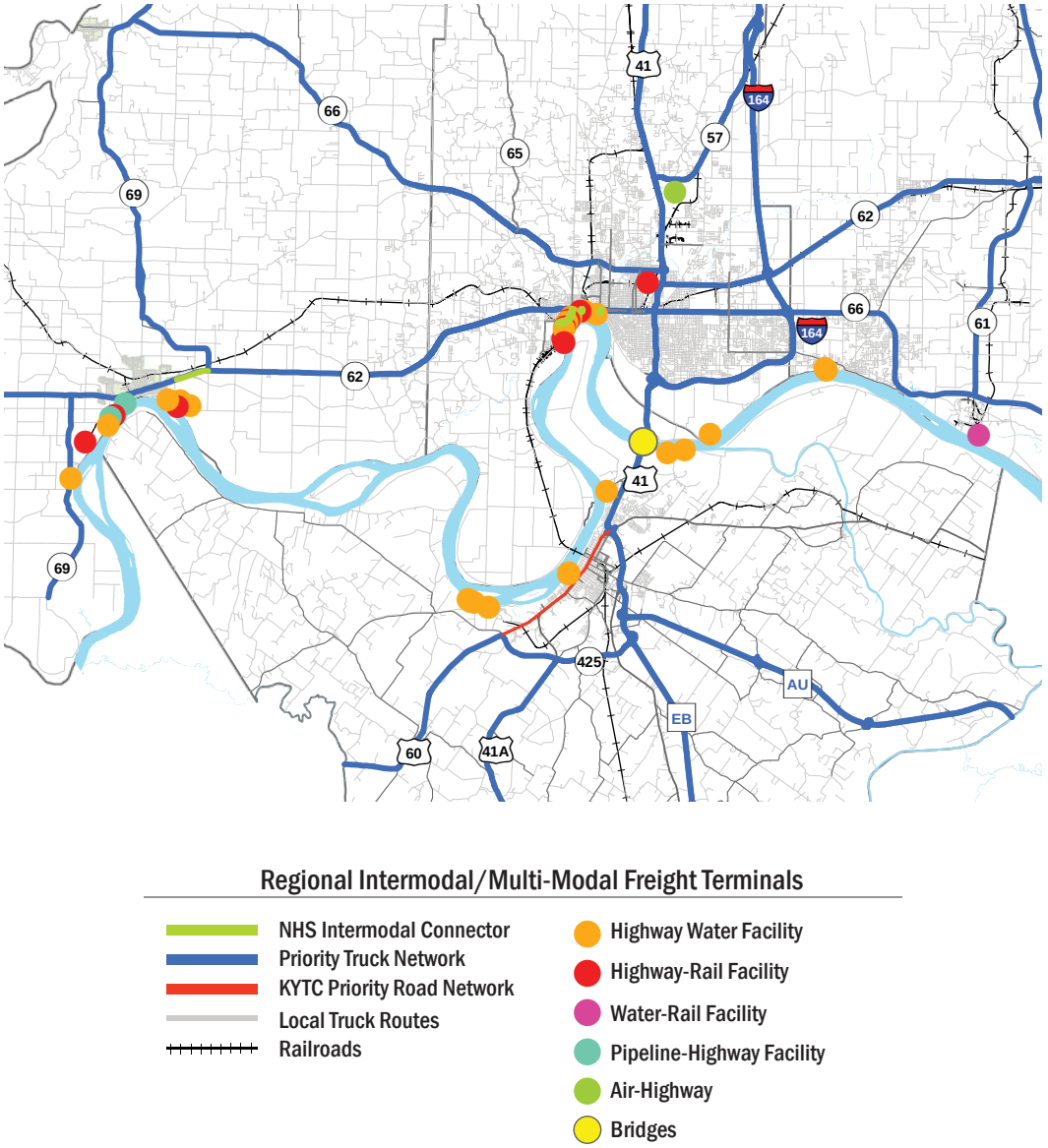
Pipeline

Pipelines are generally the lowest cost, highest volume and least flexible mode of goods transport. Natural gas and petroleum products are the primary commodities delivered by a local pipeline distribution network.

Intermodal/Multi-Modal Freight

Multi-modal and intermodal shipments move by a combination of two or more transportation modes. Intermodal shipments are generally containerized and the actual cargo is never touched. Unless a business is located along a dedicated rail siding, positioned within an airport, or has its own port, river dock, or pipeline connection, a transfer to another shipment mode will be necessary. Figure 3-43, shows the regional intermodal/multi-modal facilities identified by their largest mode connections (either known or assumed). Of those identified, the three largest would be CSXI-Howell Yard, Evansville; Henderson County Riverport, and the Port of Indiana-Mt. Vernon (Posey County). All three are also public facilities. The NHS Intermodal Connectors represented in the figure below serves two of these terminals.

Figure 3-43: Regional Intermodal/Multi-Modal Freight Terminals



CHAPTER 4:

RECOMMENDATIONS

PROJECT SELECTION

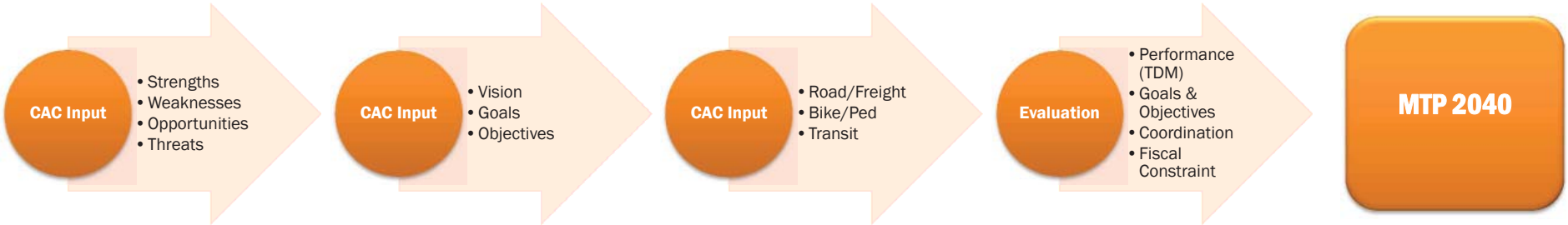
The foundation of the project selection process was formed around the public participation process. Project identification and selection was the focus of several meetings with citizens, elected officials, stakeholder groups, engineers, and Department of Transportation representatives.

Roadway projects were grouped in the milestone year periods of 2015, 2022, 2035, and 2040 for the purpose of air quality analysis. The performance of roadway projects, for both air quality and roadway capacity, was evaluated using Travel Demand Modeling. Projects were also reviewed with consideration given to safety, freight, CMP, bike/pedestrian, and transit factors. For non-roadway projects, outcome from the consultation with Citizen Advisory Committee (CAC) and stakeholder groups was the first step in the development of the recommendations with planning judgment used for the final evaluation of effectiveness in meeting the mode goals and objectives. The final step was to refine the program to meet fiscal targets.

MTP RECOMMENDATIONS

The MTP 2040 recommends a program of projects and strategies intended to reduce existing and projected congestion, support increased mode choice, and address deficiencies within the transportation network. Implementing these recommendations will help the region achieve the goals, objectives, and performance targets set forth for the Plan. It is emphasized that the MTP is a dynamic document, one that will undergo future updates to reflect changing conditions and needs.

When compared to the NOX and $PM_{2.5}$ budgets for the budget years, the proposed Transportation Plan generates fewer emissions than the budgets allow; therefore, the proposed Plan meets the air quality conformity requirements. The recommendations presented are divided into five categories: Roadways, Public Transportation, Bicycle and Pedestrian Transportation, Freight-Related Transportation, and Illustrative Needs.



ROADWAY RECOMMENDATIONS

Roadway network Objectives discussed in Chapter 1 were developed with the help of the Citizen Advisory Committee (CAC) which included representatives from the local communities within the MPA. To achieve these objectives the MPO developed various strategies and projects listed in the following sections. These strategies were identified through an extensive planning process that included consultation with planning partners and local public agencies, analysis of growth and travel patterns, assessment of the existing multi-modal transportation network, public participation through online and in-person surveys, and CAC meetings.

Objective: Advance roadway projects that provide safe and secure travel.

- Preserve and maintain the existing network before adding new facilities.
- Continue to track crashes to aid in planning for needed safety improvements.
- Use road safety audit teams to review needed safety improvements.
- Use roundabouts instead of traffic control signals in appropriate locations.
- Encourage agencies to adopt access management principles.
- Build redundancies into the system to provide alternate routes in emergency situations.
- Coordinate with public welfare agencies to produce driver awareness education.
- Use road diets in appropriate locations to reduce the number and severity of crashes.
- Encourage appropriate signs that meet the MUTCD standards for placement and reflectivity.
- Install appropriate way-finding signs.

Objective: Improve the roadway network and traffic flow by repairing grid connectivity.

- Avoid right-of-way vacations and developments that dead end previously connecting streets.
- Construct an additional Ohio River crossing.
- Construct/Upgrade east-west thoroughfares within, and connecting, Warrick and Vanderburgh counties.

Objective: Improve travel times for all roadway users.

- Slow Growth in Vehicle Miles Travelled (VMT):
  - Expand active/alternative modes of transportation.
  - Encourage more compact, high-density, mixed-use neighborhoods closer to the city cores.
  - Adopt travel demand management strategies.
- Improve Level of Service (LOS) on the Congestion Management Process (CMP) network.
  - Eliminating bottlenecks.
  - Quick clearance of traffic incidents.
  - Warning travelers of bad weather.
  - Provide advance warning of work zones.
  - Improving traffic signal timing/coordination.
  - Adding capacity where needed.
  - Adopt access management strategies.

Objective: Improve ease of travel by providing well-designed and signed access roads.

- Encourage developers of private access drives to install appropriate way-finding signs.

Objective: Ensure interchanges and intersections are sufficient for current and future travel demands.

- Encourage early coordination with land use planners to determine needed capacity.

Objective: Advance the Interstate system with the I-69 Ohio River Crossing.

- Support all state (Indiana and Kentucky) efforts to fund the I-69 Ohio River Crossing project.

Objective: Modernize and improve the synchronization of traffic signals within the network to aid in more efficient travel times.

- Encourage the installation of coordinated traffic signal systems on state facilities with multiple evenly spaced signals such as US Highway 41 in Vanderburgh County and the City of Henderson.

Goal: Environment (Improve air quality)

- Achieve $PM_{2.5}$ attainment status for NAAQS standards by 2040.

FISCALLY REASONABLE HIGHWAY RECOMMENDATIONS

The MTP 2040 fiscally reasonable highway recommendations are designed to provide a network that will alleviate existing and future congestion in the MPO Planning Area. These recommendations include 46 projects that should be implemented during the next twenty-eight years. The total construction cost of these projects is estimated to be in the range of $518 - $544M.

The listed projects are intended to alleviate the majority of transportation system deficiencies in the EMPO Planning Area. However, it is understood that all future deficiencies cannot be precisely or accurately modeled or predicted. Therefore, the EMPO believes that it is important to continually monitor the transportation network and implement short-term improvements. Many of these improvements use federal funds, such as Congestion Mitigation and Air Quality, Highway Safety Improvement Program, Transportation Alternatives, or railroad funds. The EMPO will continue to evaluate needed short-term improvements and will implement any new federally funded projects through the Call for Projects process and Transportation Improvement Program (TIP) and MTP update processes.

The MTP 2040 fiscally reasonable recommendations have been grouped into “Exempt”, Non-Exempt” and four implementation stages (2015, 2016-2022, 2023-2035, and 2036-2040) based on air quality conformity analysis requirements. Tables 4-1 - 4-8 show the project lists. The projects lists also illustrate the potential positive impacts the proposed projects will have on the five planning elements. The project number begins with the two-digit year in which the project is anticipated to be completed and opened to traffic. Figure 4-1 illustrates project locations and Figures 4-2 - 4-7 illustrate potential project profiles.

Table 4-1: MTP 2011-2015 Proposed Non-Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
Reference Current TIP -No Additional Projects											
Vanderburgh County											
Reference Current TIP -No Additional Projects											
Warrick County											
Reference Current TIP -No Additional Projects											
City of Henderson/Henderson County											
15-1	E.T. Breathitt Parkway - KY 416	Interchange Modification	Reconstruct	2014 - 2015	Federal/State	$4.70	●				

Table 4-2: MTP 2011-2015 Proposed Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
Reference Current TIP -No Additional Projects											
Warrick County											
Reference Current TIP -No Additional Projects											
City of Henderson/Henderson County											
Reference Current TIP -No Additional Projects											

Table 4-3: MTP 2016-2022 Proposed Non-Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
22-1	Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	2016 - 2022	Local	$6.0		●	●	●	
22-2	US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct	2016 - 2022	Federal/ State	$30.5	●			●	●
22-3	Columbia St	Hirschland Rd to Cross Pointe Blvd	New	2016 - 2022	Other	NA		●	●	●	
22-4	Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	2016 - 2022	Other	NA		●	●	●	
Vanderburgh County											
22-5	Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	2016 - 2022	Local	$6.3		●			
22-6	Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (3 Lns)	2016 - 2022	STP U/Local	$9.5		●			
Warrick County											
22-7	Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	2016 - 2022	STP U/Local	$5.5		●			●
22-8	Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	2016 - 2022	STP U/Local	$5.1		●	●		
22-9	Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	2016 - 2022	STP U/Local	$3.0		●			
22-10	Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	2016 - 2022	STP U/Local	$5.6		●			
22-11	SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)	2016 - 2022	Federal/ State	$15.5	●				●
22-12	High Pointe Dr	Grimm Rd to Libbert Rd	New	2016 - 2022	Other	NA		●			●
City of Henderson/Henderson County											
22-13	US 60	City of Corydon Bypass	New	2016 - 2022	Federal/ State	$30.7	●				
22-14	US 60	Wathen Ln to KY 2183/ Holloway-Rucker Rd	Widen (4 Lns)	2016 - 2022	Federal/ State	$5.5	●		●		
22-15	US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	2016 - 2022	Federal/ State	$4.3	●				

Table 4-4: MTP 2016-2022 Proposed Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
No Exempt Projects											
Vanderburgh County											
No Exempt Projects											
Warrick County											
No Exempt Projects											
City of Henderson/Henderson County											
22-16	Wathen Ln	US 60 to City Limit	Upgrade	2016 - 2022	SHN/Local	$4.5	●	●		●	●
22-17	KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	2016 - 2022	Federal/ State	$1.0	●		●		
22-18	US 60	Corydon to KY 425/Henderson Bypass	Reconstruct	2016 - 2022	Federal/ State	$24.2	●				
22-19	US 60	Waverly, KY to Corydon, KY	Reconstruct	2016 - 2022	Federal/ State	$20.0	●				
22-20	US 41 - US 60	Interchange Modification	Reconstruct	2016 - 2022	Federal/ State	$20.0	●		●		
22-21	KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	2016 - 2022	Federal/ State	$3.0					
22-22	US 60	New Bridge over Green River at Spottsville	Reconstruct	2016 - 2022	Federal/ State	$25.0	●				

Table 4-5: MTP 2023-2035 Proposed Non-Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
35-1	Lincoln Ave	Green River Rd to Newburgh Rd	Widen (3 Lns)	2023 - 2035	STP U/Local	3.2 - 3.5		●	●	●	●
35-2	Lincoln Ave	Burkhardt Rd to Martin Ln	Widen (3 Lns)	2023 - 2035	STP U/Local	1.6 - 1.8		●	●		●
35-3	Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	2023 - 2035	STP U/Local	3.9 - 4.3		●			●
35-4	Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	2023 - 2035	STP U/Local	3.7 - 4.0		●	●	●	●
35-5	Mt. Vernon Ave	Franklin St to Tekoppel Ave with Intersection Improvements	Widen (3 Lns)	2023 - 2035	STP U/Local	4.5 - 5.0		●	●	●	●
35-6	Stringtown Rd	Diamond Ave to Mill Rd	Upgrade/ Widen	2023 - 2035	STP U/Local	7.4 - 8.2		●	●		
Vanderburgh County											
35-7	Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	2023 - 2035	Local	3.6 - 4.0		●			
35-8	University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	2023 - 2035	STP R/Local	49.0 - 54.0	●				
Warrick County											
No Projects											
City of Henderson/Henderson County											
35-9	KY 425/ Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	2023 - 2035	Federal/ State	26.0 - 29.0	●		●		
35-10	US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	2023 - 2035	Federal/ State	36.0 - 39.0	●				
Vanderburgh/Henderson County											
35-0RC	I-69	I-69 Ohio River Crossing, from I-69 in Evansville, IN to I-69 on the south side of Henderson, KY	New	2023 - 2035	NHPP/ State/ P3	1,200.0 - 1,600.0	●			●	●

Table 4-6: MTP 2023-2035 Proposed Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
35-11	Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	2022 - 2035	STP U/Local	2.0 - 2.2	●	●	●	●	●
35-12	Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	2022 - 2035	STP U/Local	10.0 - 11.0		●	●		
Vanderburgh County											
No Exempt Projects											
Warrick County											
35-13	Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	2022 - 2035	STP U/Local	5.8 - 6.3		●			
35-14	Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	2022 - 2035	STP U/Local	6.2 - 6.9		●			●
City of Henderson/Henderson County											
35-15	North Elm St	Watson Ln to 12th St	Upgrade	2015 - 2022	SHN/Local	6.0 - 6.6			●		

Table 4-7: MTP 2036-2040 Proposed Non-Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
No Non-Exempt Projects											
Vanderburgh County											
40-1	University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	2036 - 2040	STP R/Local	64.7 - 71.2	●				
40-2	Baseline Rd	US 41 to Old State Rd	Widen (3Lns)	2036 - 2040	STP R/Local	3.2 - 3.4		●			●
Warrick County											
No Non-Exempt Projects											
City of Henderson/Henderson County											
No Non-Exempt Projects											

Table 4-8: MTP 2036-2040 Proposed Exempt Project List

MTP ID	Road	Limits	Type	Completed Between	Funding Source	Estimated Cost in Millions	Freight	Bike & Ped	Transit	CMP	Safety
City of Evansville											
40-3	Claremont Ave	Red Bank Rd to Barker Ave	Reconstruct	2036 - 2040	STP U/Local	4.8 - 5.3		●	●		
40-4	Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	2036 - 2040	STP U/Local	9.0 - 9.9			●		●
Vanderburgh County											
40-5	Boonville-New Harmony Rd	Petersburgh Rd to Green River Rd	Upgrade	2036 - 2040	STP R/Local	6.2 - 6.9					●
Warrick County											
40-6	Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	2036 - 2040	STP U/Local	4.9 - 5.4					
City of Henderson/Henderson County											
No Exempt Projects											

Figure 4-1: MTP 2011-2040 Project Locations

Amended to include the Ohio River Crossing

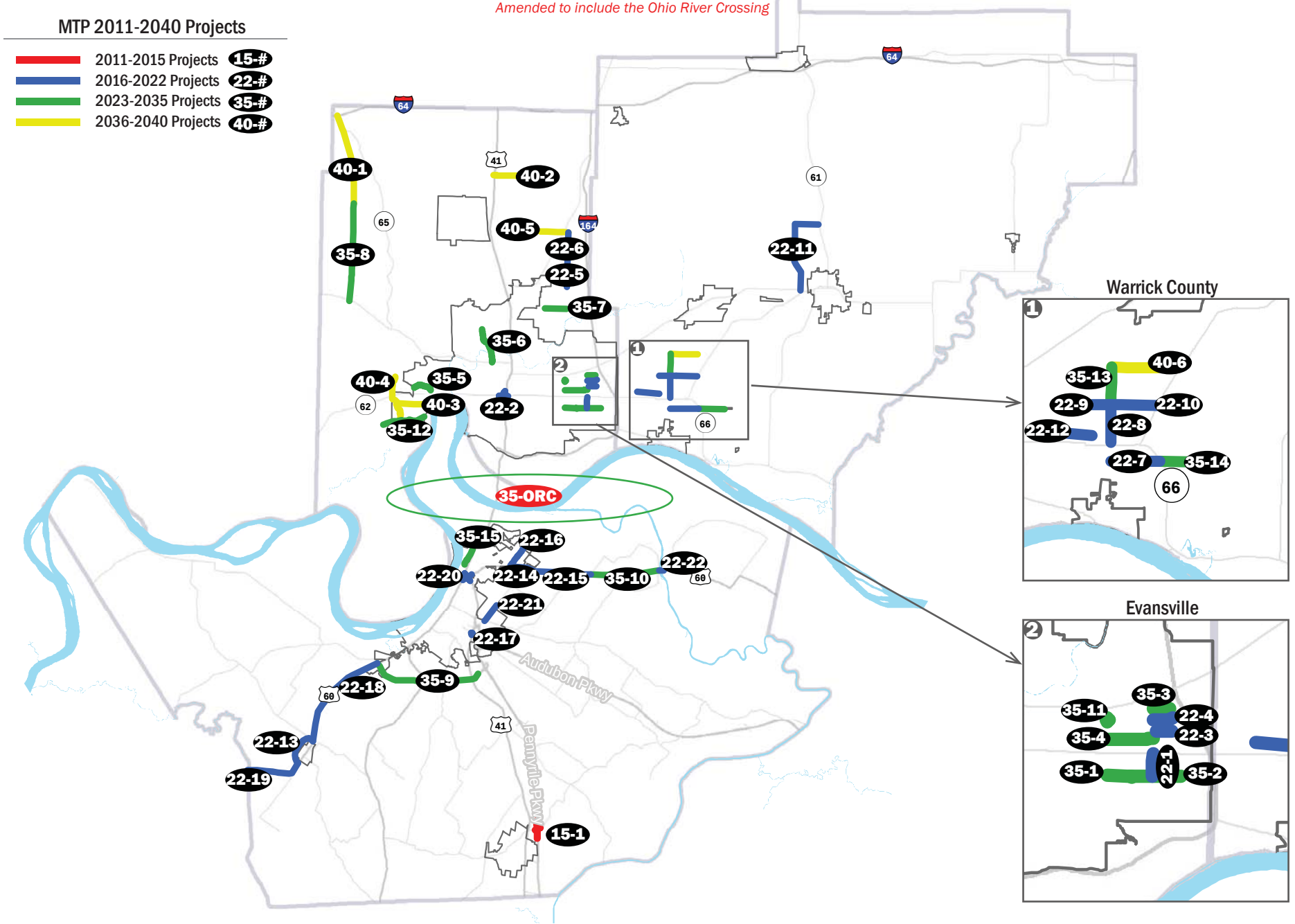


Figure 4-2: Three-Lane Street with Shared Lanes (sharrows)

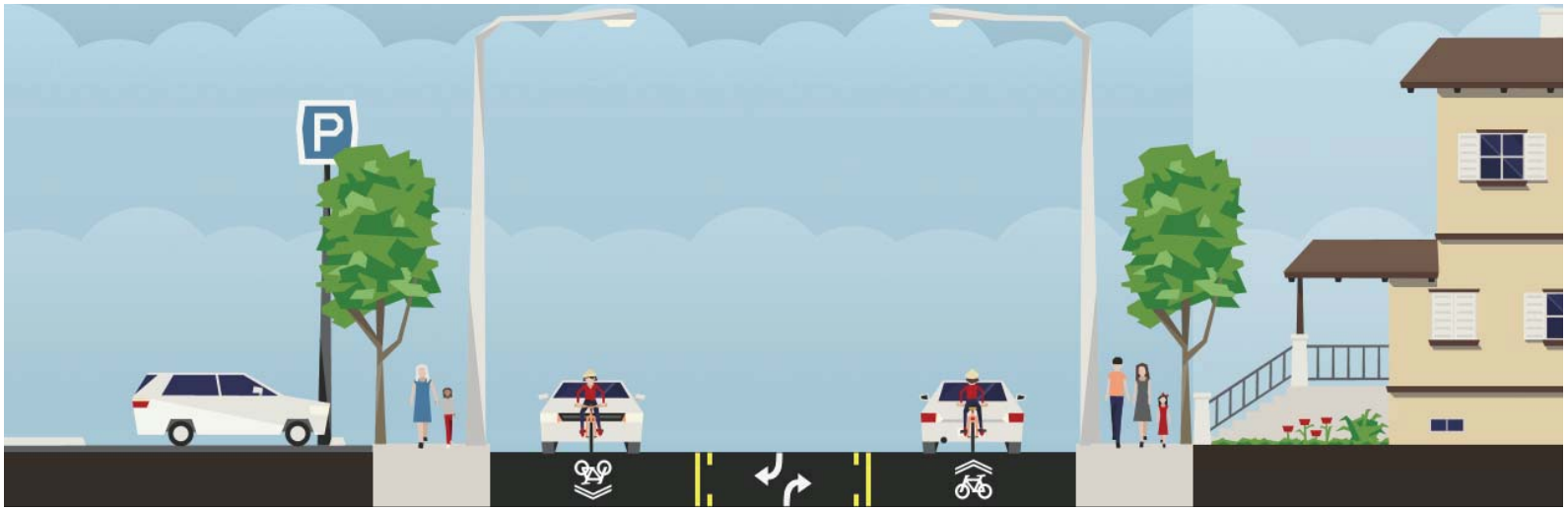


Figure 4-3: Three-Lane Street with Bike Lanes

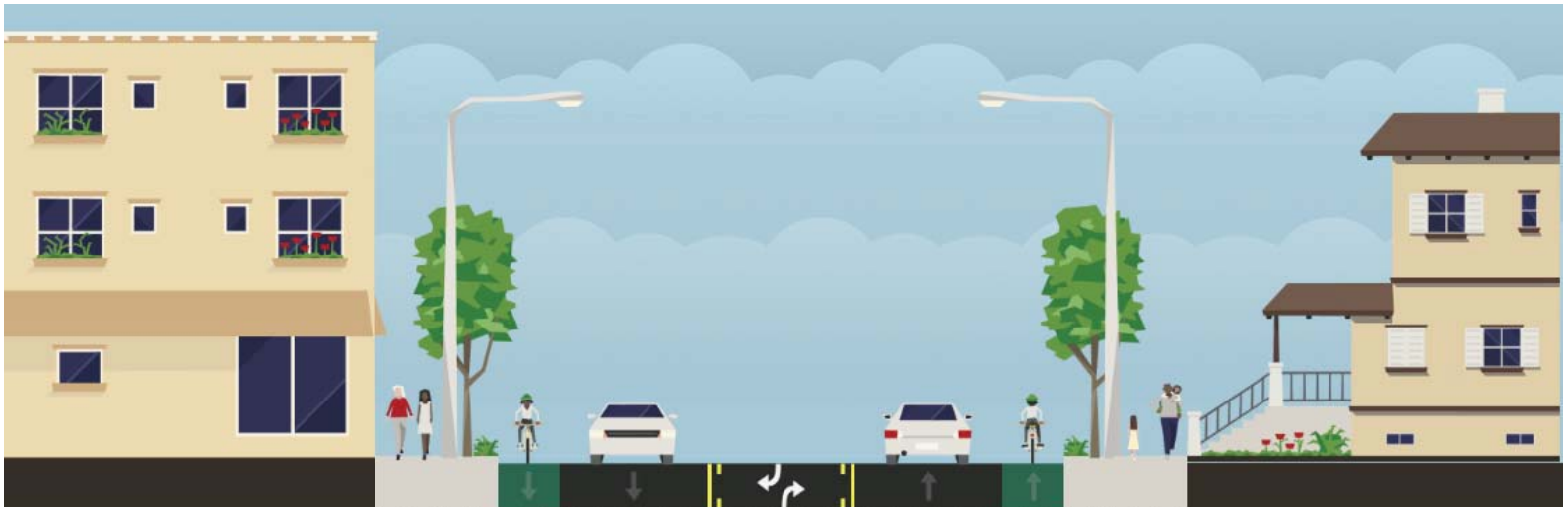


Figure 4-4: Three-Lane Complete Street

Figure 4-5: Four-Lane Street with Separated Multi-Use Path

Figure 4-6: Five Lane Street with Sidewalks

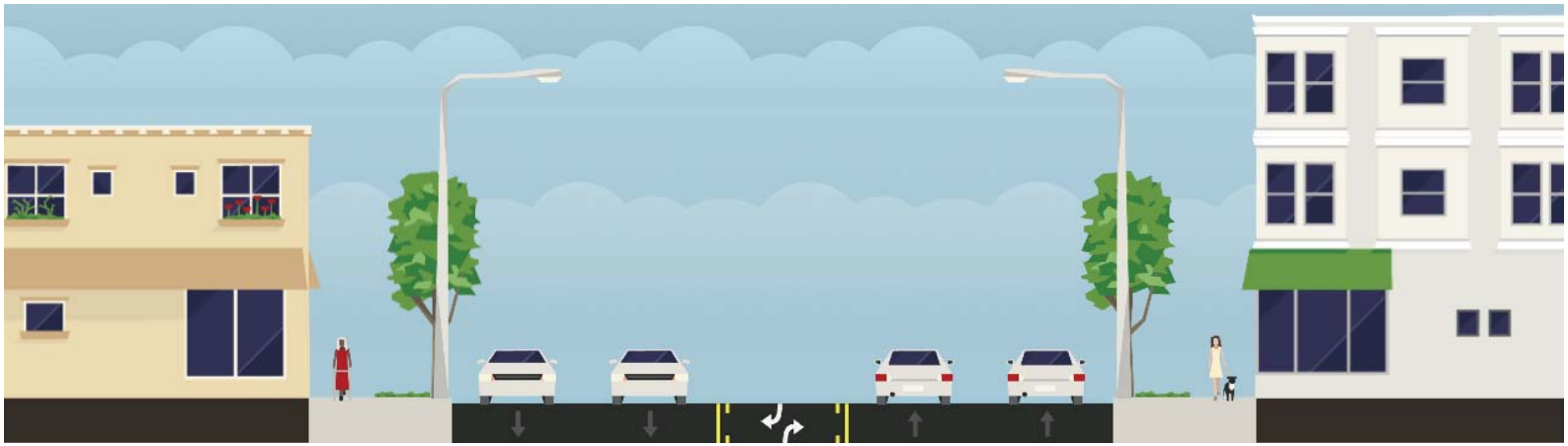


Figure 4-7: Urban Street

EMPO ILLUSTRATIVE NEEDS PROJECTS

Beyond the fiscally constrained projects listed in this chapter, the plan development process identified unmet transportation needs in the Planning Area. Table 4-9 lists the projects that were included in the original unconstrained project lists evaluated for the MTP 2040. Due to financial constraints, these projects could not be included in the constrained project list. Should additional funding become available during the timeframe of the MTP 2040 these projects could be reconsidered for inclusion in the constrained project list.

Table 4-9: MTP 2040 Illustrative Needs Project List

ID	Road	Limits	Type
IL - 1	Oak Hill Rd	Lynch Rd to Millersburgh Rd	Widen (3 Lns)
IL - 2	Lynch Rd	Extension from US 41 to Diamond Ave	New (4 Lns)
IL - 3	SR 66/Lloyd Expy-Burkhardt Rd (incl. Wal-Mart Entrance)	Intersection Upgrade to Interchange	New
IL - 4	SR 62/Lloyd Expy	Red Bank Rd to Pigeon Creek Bridge (w/interchange)	New/Widen (6Lns)
IL - 5	US 41	Diamond Ave to St George Rd	Widen (6 Lns)
IL - 6	SR 62/Lloyd Expy	Red Bank Rd to Pigeon Creek Bridge (w/interchange)	New/Widen (6Lns)
IL - 7	SR 62/Lloyd Expy - University Parkway	Interchange Modification	Reconstruct
IL - 8	US 41	St George Rd to SR 57	Widen (6 Lns)
IL - 9	Boonville-New Harmony Rd	University Parkway to SR 61	Reconstruct
IL - 10	Baseline Rd	SR 65/Big Cynthiana Rd to SR 61	New (4 Lns)
IL - 11	SR 57 Extension - West	US 41 to SR 65	New
IL - 12	Elberfeld I-69 Connector	Bluebell Rd Overpass at I-64	New
IL - 13	Watson Ln	US 60 to US 41	Upgrade
IL - 14	Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct
IL - 15	I-164/I-69	Airport Access Alternative	New

Amended to move the Ohio River Crossing from Illustrative to Committed.

ALTERNATIVE MODES

Transit, Bicycle and Pedestrian

In recent years, the number of people bicycling, walking, and using public transportation as an alternative to single-occupancy vehicle travel has increased. Due to this increase, either because of a personal choice or financial reasons, improving the public transportation and bicycle and pedestrian networks have been among the most highly-mentioned needs discussed by the Citizens Advisory Committee and the public. Building on existing efforts made by the City of Evansville to provide alternative modes of transportation, two separate plans will be completed in 2014 that will outline specific transit and bicycle and pedestrian improvements. A Comprehensive Operational Analysis (COA) will be completed for the Metropolitan Evansville Transit System (METS) that will include items such as specific transit route additions, deletions, and modifications. A Bicycle and Pedestrian Connectivity Master Plan will also be completed to provide guidance on how to increase the bicycle mode share and identify future projects and needed improvements to the existing system.

While analyzing the existing transit and bicycle and pedestrian networks, as well as reviewing information received from the CAC and during public meetings, areas in need of services and facilities were identified. For the MTP 2040 recommendations, these areas have been identified as areas for potential improvements. These improvements could include possible connections between existing facilities and jurisdictions, areas where facilities could be extended to reach currently underserved areas, and technological improvements, such as automated voice announcements on transit vehicles. Due to these upcoming plans, the recommendations for public transportation and bicycle and pedestrian improvements will be a generalized list of potential improvements. Specific routes and facility types, as well as project prioritization and funding, will be included in the COA and Bicycle and Pedestrian Master Plan.

PUBLIC TRANSPORTATION RECOMMENDATIONS

General Recommendations from Chapter 3:

- Increase transit ridership by expanding transit coverage, rider accessibility and bus stop proximity
- Attract choice riders by increasing route frequency, expanding hours to include weekends and overnight, improving bus stop shelter and benches, reducing travel time, and by making vehicles safe, clean and comfortable
- Increase regional connectivity among the transit providers
- Improve the reliability and safety of transit use
- Enhance the transit experience through technology and improved infrastructure delivery

Project Recommendations:

Objective: Increase Regional Connectivity

1. Create a North-South Route connecting the cities of Evansville and Henderson.

   There are several options to provide a connection. One is to deviate existing routes so that one HART route and one METS route meet hourly at a common transfer point. Another is to create a new METS route dedicated to provide hourly service between the METS Terminal and the HART Terminal. The third option is a METS route running between the Evansville and Henderson Terminals as an on-demand route instead of an ongoing hourly route.

   Agencies Affected: METS, HART

Objective: Increase Transit Ridership

2. Create an Evansville East-West Express Route or Bus Rapid Transit.

   METS could establish an East-West Express Route from Evansville's Eastside, to the Downtown Transfer Terminal, and to the Westside.

   Agency Affected: METS

3. Offer limited Sunday service.

   The transit agencies should explore Sunday service which may be limited to the most frequented destinations and during the times most heavily utilized by riders.

   Agencies Affected: METS, HART

4. Install bike racks on transit vehicles.

   HART should consider purchasing and installing bike racks on HART's fixed route vehicles.

   Agency Affected: HART

5. Expand Weekend and overnight Service Hours.

   The transit agencies should explore providing geographically limited, expanded weekend and overnight service hours to determine if a need exists.

6. Improve travel time and reduce waiting by reducing headway on routes from one hour to one half hour.

   METS currently runs two vehicles one half hour apart on its most utilized fixed routes while HART only runs one vehicle per route. METS and HART should identify and explore the feasibility of reducing headway on all its routes.

   Agencies Affected: METS, HART

Objective: Enhance the Transit Experience through Technology

7 Invest in information technologies designed to improve information delivery and enhance the transit rider's experience.

The transit agencies should invest in existing technologies that are commonly used in the public transportation sector including vehicle GPS for real-time vehicle location, interactive ride guides with transit trip planner, and electronic payment options such as swipeable transit passes, credit cards and debit cards.

Agencies Affected: METS, HART

8 Install automatic voice location announcement systems on fixed route vehicles.

METS and HART should install a system on their fixed route vehicles which automatically announces approaching intersections and side streets. This would assist riders who are visually impaired or are unfamiliar with the city.

Agencies Affected: METS, HART

Objective: Improve Reliability and Safety

9 Provide an annual process to evaluate unserved or underserved areas in the cities of Evansville and Henderson and make recommendations as needed.

Elements of this initiative may include annual public meetings, collecting public comments throughout the year, and taking drivers' input to identify possible unserved and underserved areas of service.

Agencies Affected: METS, HART

10 Improve vehicle reliability by developing a Fleet Maintenance and Acquisition Plan.

Elements of this initiative include the development of a plan to improve vehicle fleet reliability.

Agencies Affected: METS, HART

11 Improve safety and security by developing a Bus Stop Safety and Accessibility Plan and install surveillance cameras on vehicles.

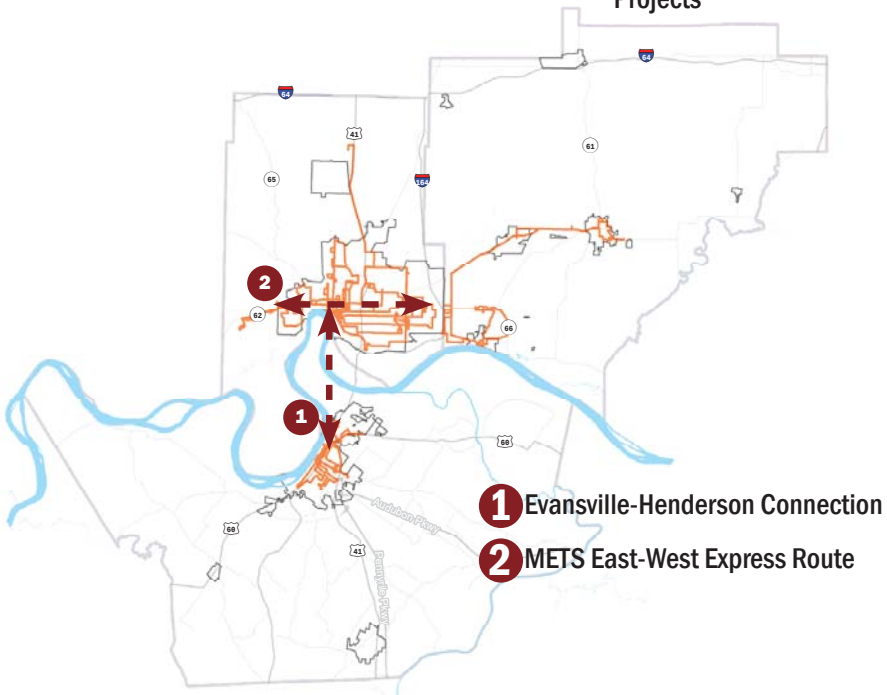
Elements of this initiative include the development of a plan to improve the bus stops and installation of surveillance cameras to improve security on transit vehicles.

Agencies Affected: METS, HART

Other transit elements for future consideration:

- Regional Transit Authority
- Transit Oriented Design
- Park and Ride
- Bus Rapid Transit
- Hybrid Vehicles
- Limited Stop Express

Figure 4-8: MTP 2040 Potential Transit Projects



BICYCLE AND PEDESTRIAN RECOMMENDATIONS

There is a clear desire throughout the EMPO planning area for a range of bicycle and pedestrian improvements. The survey conducted by the EMPO (see Appendix B) shows that pedestrian and/or bicycle safety or facilities improvements were among the most frequently-cited responses to the top three priorities section of the survey. Communities within the MPO planning area are continuing their efforts in providing transit, bicycle, and pedestrian facilities by being pro-active in the planning efforts. The City of Henderson and Henderson County is currently working with the EMPO on updating their Greater Henderson Bicycle and Pedestrian Plan from 2003 with an expected completion date of January 2014. The City of Evansville is at the beginning stages of updating the 2000 EUTS (formerly EMPO) Regional Bicycle and Pedestrian Plan. The plan is expected to fully begin in early 2014.

These plans will provide specific recommendations regarding future route selections, facility type, greenway extensions, and funding. Because of the specifics that will be included within these plan updates, the MTP 2040 bicycle and pedestrian recommendations will be more broadly focused on potential areas that could benefit from facility expansions or new facilities. The recommendations in this section should be considered as the stand-alone bicycle and pedestrian plans are being completed.

The following are areas of potential improvements that were identified during the MTP 2040 analysis phase, and by the CAC and public. These recommendations are broad and intended to be developed further during the planning processes for the stand-alone bicycle and pedestrian master plan updates.

Target: Communities within the MPO planning area are encouraged to adopt the Complete Streets Policy, or a policy with similar goals, on the local level.

In March, 2012, the MPO adopted the region's first Complete Streets Policy. The Policy requires that all projects receiving MPO allocated federal funding adhere to the policy. Because this is an MPO-level policy, local jurisdictions completing projects with only local funds are encouraged, but not required to adhere to the policy. Communities in the MPO planning area would benefit from adopting a local-level Complete Streets Policy that would guide future roadway projects. With a policy in place, local jurisdictions would evaluate facilities for opportunities to accommodate all roadway users, where appropriate, for locally funded projects.

Target: Expand the multi-use path systems in the region.
Target: Increase the number of people within ¼ mile of a dedicated walkway.
Target: Increase the number of people within 1 mile of a dedicated bikeway.

1 *Greenway Connections* - Build connections between the two existing greenway networks on the west side of Evansville and Vanderburgh County.

The EMPO supports the continued planning and construction of greenway systems within the planning area, including connections to the existing Pigeon Creek Greenway Passage, the Burdette-USI Nature Trail, Newburgh's Rivertown Trail, and Henderson's Riverwalk. Creating additional connections from these existing facilities to residential, commercial and recreational areas will assist in lessening roadway congestion and pollution.

Creating connections on the west side of Evansville has a starting point with the recently completed Burdette Park-USI Nature Trail linking the University of Southern Indiana with Burdette Park. Future connections could include USI to Pearl Drive and University Drive, and ultimately linkage to the Pigeon Creek Greenway Passage.

2 *Greenway North Expansion* - Continue to expand the Pigeon Creek Greenway Passage along the Pigeon Creek on the north side of Evansville.

The major greenway system within Vanderburgh County is the Pigeon Creek Greenway Passage. According to the Evansville Greenway Passage Master Plan (1994), the Greenway Passage is envisioned as a 42-mile long greenway system that would essentially create a loop around Evansville. Currently, the northern terminus of the greenway is at the Heidelbach Canoe Launch. The next recommended phase of the Pigeon Creek Greenway Passage is to continue along the creek to connect to the existing bike lanes on Oak Hill Road.

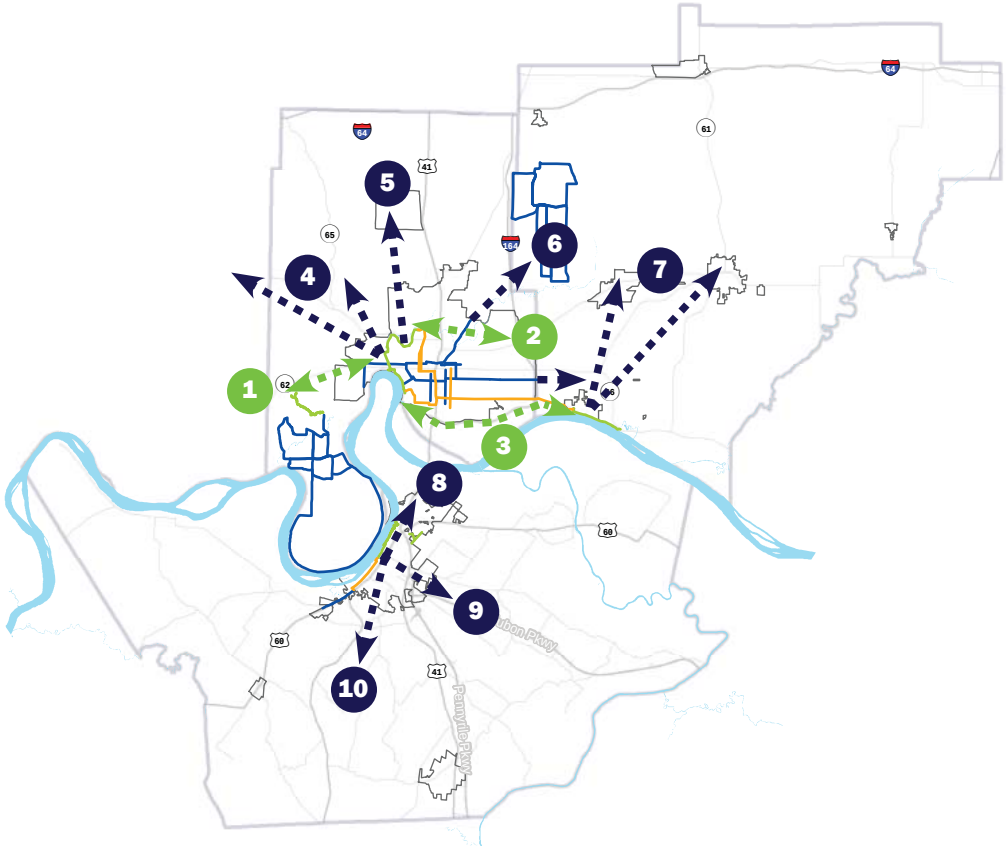
3 *Greenway South Expansion* - Continue to expand the Pigeon Creek Greenway Passage through the south side of Evansville along the I-164 Bypass to ultimately connect to Newburgh.

The current Evansville Greenway Passage Master Plan (1994) recommends using the levee along the I-164 Bypass to expand the Pigeon Creek Greenway Passage east. This path would provide a transportation/recreation corridor that could potentially connect into Warrick County and Newburgh.

TARGET: INCREASE THE BICYCLE NETWORK TO PROVIDE MORE CONNECTIONS BETWEEN NEIGHBORHOODS, SHOPPING AREAS, AND RECREATIONAL AREAS.

TARGET: INCREASE THE NUMBER OF PEOPLE WITHIN 1 MILE OF A DEDICATED BIKEWAY.

Figure 4-9: MTP 2040 Potential Bicycle and Pedestrian Projects



4 *Westside Connections* - Designate additional on-street bicycle connections to expand the network. Potential routes and destinations include Hilltop Neighborhood, Mesker Park Zoo, and extending the Franklin Street route.

Currently, the west side of Evansville has two primary bicycle routes – Barker Avenue and West Franklin Street. With the compact neighborhood layouts in historic areas and destinations such as Mesker Park Zoo, additional routes spurring from existing routes are recommended to expand the network on the west side. Potential streets for bicycle routes may include Franklin Street, Mt. Vernon Avenue, Harmony Way,

Wimberg Avenue, Mesker Park Drive, St. Joseph Avenue and Maryland Street. These routes would create an additional loop on the west side, while directly connecting to the Pigeon Creek Greenway Passage at Maryland Street.

5 *Northside Connections* - Expand the on-street bicycle network with additional designated routes on the northside of Evansville. Potential routes and destinations include Jacobsville and Diamond-Stringtown neighborhoods, North Park shopping area, and the Town of Darmstadt.

One area within Evansville in need of bicycle facilities is the north side. Currently, the east/west connector on Franklin Street/Michigan Street is as far north as on-street facilities are located. The Pigeon Creek Greenway Passage currently ends at the northern-most point of the Heidelbach Canoe Launch. There are many neighborhoods and major shopping centers, as well as schools and community colleges that would benefit with extended bicycle facilities on the north side.

6 *Northeast/Warrick Connections* - Expand the regional on-street network by creating connections between Vanderburgh County and Warrick County. Potential routes and destinations include Oak Hill Neighborhood, Blue Grass Fish and Wildlife Area, and the Town of Chandler.

Creating a regional bicycle and pedestrian network is a MTP 2040 goal. By establishing routes in the northeastern portion of Vanderburgh County, a link to the existing Blue Grass Fish and Wildlife Area bike routes would be created. Likewise, routes could be established in and around Chandler to connect to the Blue Grass Fish and Wildlife Area to form a northeast and Warrick County regional network.

7 *Warrick County Connections* - Create regional connections within Warrick County by designating routes between Newburgh, Chandler, and Boonville.

During the MTP 2040 public involvement process, better connections between Newburgh, Chandler, and Boonville were mentioned not only from a bicycle and pedestrian network focus, but also for the roadway network and transit connections. There are currently no bicycle and pedestrian connections between communities within Warrick County.

8 *North Henderson Connections* - Establish connections on Henderson's north side. Potential routes and destinations include the north 41 commercial areas and Audubon State Park.

The northern portion of the City of Henderson is predominately automobile-focused, with little room for bicyclists and pedestrians. The Greater Henderson Bicycle and Pedestrian Master Plan update (2013) identifies routes and connections to shopping centers and Audubon State Park.

9 *2nd Street Connections* - Develop a complete street corridor by restriping 2nd Street/Zion Road to incorporate bike lanes and narrower vehicle travel lanes. This can create a safe downtown to Henderson County High School connection.

Providing on-street bicycle facilities is recommended whenever possible, as it is typically a cheaper alternative to separated paths. Second Street/Zion Road (KY 351) stretches from the riverfront in downtown east through Henderson County. This corridor has been identified in The Greater Henderson Bicycle and Pedestrian Mast Plan update (2013) as a candidate for complete street improvements. Restriping the roadway has

been recommended to include narrower vehicle travel lanes, providing room for dedicated bicycle lanes. Sidewalks are, for the most part, present.

10 *South Henderson Connections* - Establish connections between Henderson Community College and the current revitalization efforts in the East End Neighborhood.

Coinciding with the Regional Plan for Sustainable Development, the East End Neighborhood in Henderson is beginning to see reinvestment. Establishing bicycle and pedestrian networks within the south side of Henderson, and west to the Henderson Community College, will further the revitalization efforts.

NON-MOTORIZED INVESTMENT STRATEGY

MTP 2040 endorses a funding strategy which reserves 10% of Federal Surface Transportation Program (STP/SHN) funds, the largest federal funding source for roadways in the MPO region, for bicycle and pedestrian infrastructure and activities. Eligible projects may include, but are not limited to: infrastructure such as crosswalks, trails and sidewalks, and related support activities. This strategy to increase available funding for active transportation facilities will result in greater mode choice in the MPO region as the active transportation network is expanded.

FREIGHT RECOMMENDATIONS

Freight Objectives discussed in Chapter 1 were formulated with the help of the Citizen Advisory Committee which included representatives from the local freight industry. Specific projects have been identified through the MPO's 2005 Freight Survey and/or interviews with stakeholders within the freight planning area.

OBJECTIVE: IMPROVE TRAFFIC FLOW ON PRIORITY TRUCK ROUTES BY REDUCING CONGESTION.

Strategies & Projects:

- Improve signal timing and coordination
  - US Highway 41 through Vanderburgh County and Henderson Commercial Corridor to US Highway 60 interchange
- Remove signals where possible
  - US Highway 41-SR 62/SR 66/Lloyd Expressway interchange modification
  - SR 66/Lloyd Expressway-Burkhardt Rd Interchange
- Provide alternate routes to and connections to interstates
  - I-69 Ohio River Bridge crossing
  - I-69 connection to and upgrade of E. T. Breathitt Parkway
  - Kansas Rd upgrade, SR 57 to I-164
  - Kansas Rd-I-164 interchange
- Quick clearance of non-recurring congestion
  - Eemergency services coordination (IN-TIME, Indiana Traffic Incident Management Effort)
  - ITS, Dynamic Message Signs
- Provide freight friendly road geometry (i.e. limit steep grades and sharp horizontal curves; provide adequate lane widths, shoulders and turning radii, etc.)

- SR 61, Boonville to I-64
- KY 416, E. T. Breathitt Parkway to US Highway 41
- US Highway 60 through Henderson County (west of downtown proceeding)
- Southbound US Highway 41 to westbound Columbia St

- Provide dedicated truck lanes on interstates
- Slow Growth in Vehicle Miles Travelled (VMT) by switching Single Occupancy Vehicle drivers to alternative modes. (See Roadway Recommendations)
  - SR 57, Vanderburgh County
  - SR 62/Lloyd Expressway, Vanderburgh County
  - SR 66/Lloyd Expressway, Vanderburgh County
  - US Highway 41, Vanderburgh County
  - US Highway 41A, Henderson County
  - Lynch Rd, US Highway 41 to I-164
- Provide turn lanes/deceleration lanes
  - US Highway 41, SR 57 to I-64
  - US Highway 41, Henderson County
  - US Highway 41A, Henderson County
- Reduce the number of conflict points by applying access management techniques at the site development stage
  - US Highway 41, Vanderburgh County
  - Henderson Commercial Corridor, Ohio River to US Highway 60 Interchange
  - Lynch Rd, US Highway 41 to Burkhardt Rd
- Add capacity (need determined by travel time study, LOS and/or Travel Demand Model)
  - SR 62/Lloyd Expressway, Posey County Line to US Highway 41
  - US Highway 41, Vanderburgh County

Objective: Encourage freight companies to engage in short- and long-term freight corridor planning.

Strategies:

- Dedicate federal, state and local funding specifically for freight improvements
- Create a local roundtable where freight issues can be discussed

Objective: Encourage railroads and local jurisdictions to work together in keeping track crossings well maintained.

Strategies:

- Dedicate state and local funding for crossing repairs

http://www.pbase.com/image/80056401


sports bar &
restaurant
RESTAURANT

CHAPTER 5:

FINANCING MTP 2040

Under federal regulations, the MTP must include a financial plan that demonstrates how the adopted transportation plan can be implemented. The financial plan shall compare the estimates of funds that are reasonably expected to be available for transportation uses, including transit, and the cost of constructing, maintaining and operating the total (existing, plus planned) transportation system over the period of the plan. As such, the development of reasonable funding estimates and costs is essential to the development of a transportation plan that is consistent with the federal requirements for fiscal constraint.

OPERATION AND MAINTENANCE COSTS

For the review of operation and maintenance costs for all modes, the LPA's were requested to submit costs for operating and maintaining their respective networks and transit systems.

Roadway

The average operations and maintenance costs are found in Table 5-1. Included are system maintenance costs for the preservation of the transportation system such as snow & ice removal; patching pot holes and repairing shoulders; traffic control devices, including signs and signals; and highway department labor cost; administrative costs, utilities and rent, etc.

Transit

Operating and maintenance costs for transit include the operator's salaries, materials, supplies, activities associated with maintaining the current fleet of buses, and operations of the transit system. Internal sources of revenue to fund these operations include fare revenue, advertising, and charter services. The local source is derived from the City's general fund. Federal and State also pay a portion of these costs. METS and HART operating and maintenance costs are taken into consideration and referenced in the development of Table 5-3 as noted.

LOCAL REVENUE ESTIMATES

Revenue sources available to the LPAs are shown in Table 5-2. According to information provided, the MPO's Planning Area LPAs collective revenue is nearly $50 million per year.

Table 5-1: Local Highway Operations and Maintenance Costs

(Roadway, Sidewalks, and Trails)

	Average Operations & Maintenance Costs
Indiana	
Vanderburgh County	$7,012,269
City of Evansville	$6,381,012
Warrick County	$3,111,172
Town of Newburgh	$50,099
Kentucky	
Henderson County	$3,982,037
City of Henderson	$1,310,476

Table 5-2: Local Revenue Sources and Historical Averages

Revenue Source	5-year Historical Averages
MVHA	$8,158,547
LRSA	$2,986,273
LOHUT	$6,575,524
CVET	$30,298
Non-motorized Vehicle Tax	$0
CBF	$2,341,389
MBF	$0
EDIT	$8,483,348
COIT	$3,250,000
CAGIT	$0
Financial Institution Tax	$15,210
Permit Fees/User Fees	$522,308
Gaming Funds	$1,980,074
BIF	$0
General Fund Transfers	$3,325,440
Capital Development Fund	$1,102,864
Fuel Tax Reimbursements	$49,164
TIF	$6,154,494
TRF	$0
TIFIA	$0
Bonds	$210,261
Other Bonds	$552,614
Municipal Road Aid	$570,435
County Road Aid	$1,122,905
Local Economic Assistance	$575,100
Rural Secondary Road	$150,697
Advertising and Promotional	$94,066
Private Donations	$0
Congressional Earmarks	$0
Public/Private Matches	$0
Transit Fares	$1,248,296
Investments	$106,786
Subsidies	$187,405
Total	49,793,497

To demonstrate the potential for the local agencies to support the implementation of the MTP, consideration must be given to the local funding needed to ensure the preservation of the existing transportation system, including requirements for operational improvements, resurfacing, restoration, and rehabilitation of existing and future roadways, as well as operations, maintenance, modernization, and rehabilitation of existing and future transit facilities. Table 5-3 demonstrates how local revenues available for the implementation of the MTP are estimated. The basic equation was this:

Total Revenues – Estimated Operations and Maintenance Costs = Available Revenues

Table 5-3: Available Local Revenues

	Estimated Available Local Revenues		
	2013 Average Local Revenues	2013 Average Ops & Maintenance Costs	2013 Average Available Revenues
Indiana			
Vanderburgh County	$15,731,718	$7,012,269	$8,719,449
City of Evansville including METS	$15,738,151	$10,725,823	$5,012,328
Warrick County	$16,211,638	$3,111,172	$13,100,466
Kentucky			
Henderson County	$4,074,301	$3,982,037	$92,264
City of Henderson including HART	$1,875,823	$1,875,823	$0

Using the 2013 average available local revenues from table 5-3, the estimated local funding available for the implementation of the MTP was calculated and is presented in Table 5-4.

Table 5-4: Projected Indiana Local Available Revenue

Indiana	2013-2015	2016-2021	2022-2034	2035-2040
Vanderburgh County	$26,652,684	$56,799,421	$141,937,355	$75,370,034
City of Evansville including METS	$15,263,667	$32,650,840	$81,591,920	$43,326,056
Warrick County	$39,893,867	$85,337,833	$213,252,638	$113,239,101
TOTAL	**$81,810,217**	**$174,788,094**	**$436,781,913**	**$231,935,191**

The following assumptions were made when reviewing the financial capabilities of the LPAs in the study area:

- The fiscal analysis will cover the period of 2013 to 2040.
- Estimated operations and maintenance costs are assumed to remain the same percentage of the revenue budget over the life of the Plan.
- Construction cost estimates submitted by the Local Public Agencies (LPAs) are Year-of-Expenditure compliant or projected at 4% to YOE from the last known estimate.
- The average local revenues have been estimated by using a 5-year historical average (2008-2012). These revenues are projected to increase at a conservative rate of 1.5% per year to the year 2040.
- The revenues and operation and maintenance costs for transit projects are included in the revenues and costs for the governing LPA.
- Historical averages are used when appropriate.

Because the City of Henderson is estimating a zero balance of available local funds to apply to the local match for capital projects listed in the Plan (revenues are consumed by operation and maintenance costs), projects will require additional general fund transfers to cover the additional costs collaboration with Henderson County on mutually beneficial improvement projects, or the use of toll credits to reduce the required local match as appropriate. The county may participate financially, or with in-kind services, to help reduce any local cost incurred.

FEDERAL-AID FOR LOCAL PROJECTS

The federal funding for which the MPO is responsible for prioritizing and allocating is the Urban Surface Transportation Program (STP-U in Indiana; SHN funds in Kentucky) funds. These funds may be used to finance surface transportation projects on federal-aid system roads within the urbanized area boundary. STP funds are distributed to urbanized areas based upon population levels from the latest decennial census. Under the current funding legislation (MAP-21), the apportionment of STP funds to the Evansville-Henderson urban area in Indiana is approximately $3,500,000 annually. In Kentucky, the annual STP-U (SHN) apportionment to the urban area of Henderson is approximately $600,000 per year.

Indiana also provides STP funding outside of urban areas on a statewide competitive basis. The rural STP funding available to the two county area in Indiana is a maximum of $5,000,000 (estimated $2,500,000 per County) in a 5-year period.

In addition to the relevant assumptions made in the analysis of local financial capabilities; Federal funding feasibility assumes the following:

- The annual growth rate for Urban STP funds in Indiana are flat-lined (0%) and in Kentucky, are grown at a 3%. (per INDOT & KYTC input)

- Projected federal revenues for roadway projects include projected STP-U funds, un-obligated prior year STP-U funds, approved earmark funding and the maximum rural STP funding that may be available.
- 10% of STP funds for both Indiana and Kentucky have been set aside for bicycle and pedestrian improvements.

Table 5-5: Estimated STP/SHN Funds per Analysis Period

Analysis Period	Indiana STP	Kentucky SHN
FY 2013-2015	$18,491,747	$1,657,036
FY 2016-2022	$21,900,000	$3,500,000
FY 2023-2035	$40,600,000	$8,600,000
FY 2036-2040	$15,600,000	$4,300,000

FINANCIAL FEASIBILITY

Roadway

Tables 5-6 through 5-8 demonstrate the financial feasibility of the 2040 Transportation plan. This demonstration assumes that federal funds are applied only to construction costs. The assumed federal/local split is 80% federal and 20% local, unless the project is known to be completely funded locally or is expecting to receive a significant outside source of aid, such as an earmark.

As indicated in Tables 5-6 and 5-7, the STP and SHN total for all analysis periods remains a surplus and STP-R (Table 5-8) funding shortfalls can be covered by local funding sources. Together, the above tables indicate the MTP local system is reasonably constrained. Projects in the plan that are the responsibility of KYTC are consistent with the Long Range Statewide Transportation Plan and the 2012 Highway Plan, a document that outlines scheduled project phases

Table 5-6: Estimated Roadway Costs and Estimated STP-U Funds - Indiana

	Indiana STPU $ in Millions			
	Project Costs		FED Share	STPU Funds
2016 -2022	$28.70	Multiplied by 80%	$22.96	$21.90
2023 - 2035	$48.00		$38.40	$40.60
2036 - 2040	$18.70		$14.96	$15.60
Total	**$95.40**		**$76.32**	**$78.10**

Table 5-7: Estimated Roadway Costs and Estimated SHN Funds - Kentucky

	Henderson SHN $ in Millions			
	Project Costs		FED Share	SHN Funds
2016 -2022	$4.50	Multiplied by 80%	$3.60	$3.50
2023 - 2035	$6.00		$4.80	$8.60
2036 - 2040	$4.80		$3.84	$4.30
Total	**$15.30**		**$12.24**	**$16.40**

Table 5-8: Estimated Federal Costs and Estimated STP-R Funds

	Indiana STPR $ in Millions		
	Project Costs	STPR Funds	Local Funds
2016 -2022	$0.00	$6.00	$56.80
2023 - 2035	$49.00	$13.00	$142.00
2036 - 2040	$68.00	$4.00	$75.50
Total	**$117.00**	**$23.00**	**$274.30**
		$297.30	

for FY 2012 through FY 2018. Projects in the plan that are the responsibility of INDOT are consistent with the 2013-2035 Future Transportation Needs Report with the fiscal constraint presented in the 2014-2017 Statewide Transportation Improvement Program.

PUBLIC TRANSPORTATION

Federal Funding

It is anticipated that METS and HART will continue to receive Section 5307 Urbanized Area Formula Grant funds and Section 5339 Bus and Bus Facilities Grant to assist with capital costs in providing transit services in the area (MAP21 does allow smaller transit agencies to use a percentage of Section 5307 funds for operating costs). While considered a capital cost according to federal regulations, Preventative Maintenance is an eligible Section 5307 expense that helps transit agencies defray some operational costs that would otherwise be borne by local funds. This amount is shown and taken into consideration in Tables 5-9 and 5-11 which present the anticipated Operating and Maintenance funding.

Over the past 5 years, the area has received $11,020,366 in Section 5307 grant funds and for the 28 year period of 2013 to 2040. Based on an annual growth rate of 3%, it is expected that the area will receive $94,622,896 in Section 5307 funds. Assuming the current 80%-20% ratio of federal funds to local funds continues, $23,655,724 in local matching funds will be needed. These local matching funds come primarily from the general funds of the City of Henderson and City of Evansville. The total of federal funds and the local match is $118,278,620.

State Funding

The State of Indiana's Public Mass Transit Fund (PMTF) can be used for capital or operating expenses. The source of these funds is a fixed percentage of the Indiana State Sales Tax. The PMTF are allocated based on a formula which considers fleet size, ridership and operating costs. The State of Kentucky does not have a dedicated transit fund, although HART does receive funds and toll credits from Kentucky.

Table 5-9: METS Operating and Maintenance Average and 28 Year Projection

	5 Year Average	28 Year Projection (2013-2040)
Internal	$1,306,153	$45,038,087
Local	$4,087,200	$140,932,700
State	$1,495,264	$51,558,914
Federal	$784,025	$33,658,917
Total	**$7,672,642**	**$271,188,617**

Table 5-10: METS Average Expenses and 28 Year Projection

	5 Year Average	28 Year Projection (2013-2040)
Internal	$1,306,153	$48,394,549
Local	$4,087,200	$151,435,707
State	$1,334,286	$49,436,911
Federal	$784,025	$29,049,075
Total	**$7,511,664**	**$278,316,243**

Table 5-11: HART Operating and Maintenance Average and 28 Year Projection

	5 Year Average	28 Year Projection (2013-2040)
Internal	$37,611	$1,296,883
Local	$516,786	$17,819,545
State	$43,889	$1,513,358
Federal	$627,445	$26,936,793
Total	**$1,225,731**	**$47,566,579**

Table 5-12: HART Average Expenses and 28 Year Projection

	5 Year Average	28 Year Projection (2013-2040)
Internal	$37,611	$1,393,533
Local	$534,899	$19,818,655
State	$43,889	$1,626,141
Federal	$627,445	$23,247,597
Total	**$1,243,844**	**$46,085,926**

Tables 5-9 and 5-10 show METS Operating and Maintenance 5 year average and 28 year projection (2013-2040). Tables 5-11 and 5-12 show HART Operating and Maintenance 5 year average and 28 year projection (2013-2040).

It is assumed that local revenue would be used to cover an operating and maintenance budget deficit in the 28 year projection.

Capital Costs

Due to the high mileage and intense usage that transit vehicles experience, METS and HART continually monitor their transit fleets and adhere to a vehicle replacement schedule. In the past five years, 2008-2012, METS has acquired 13 vehicles and HART has acquired 2. It is estimated that in the next 28 years, 2013-2040, METS will need to replace 65 vehicles at an estimated cost of $20,000,000 and HART will need to replace 7 at an estimated cost of $700,000. Other capital costs such as equipment purchases, bench and shelter

replacements, and facility renovations, occur in a less predictable manner which makes it difficult to project accurate long range capital expenses.

BICYCLE AND PEDESTRIAN

As demonstrated in Table 5-13, the Indiana portion of the MPO planning area is projected to have approximately $16.7 million in federal funds available between the years 2016 and 2040. This includes Transportation Alternative Program (TAP) funds and the 10% Surface Transportation Program (STP) set-aside funds for bicycle and pedestrian improvements and activities in Vanderburgh and Warrick County. Projects eligible for these funds may include, but are not limited to, infrastructure such as crosswalks, trails and sidewalks, on-street bicycle facilities, and related support activities.

Table 5-13: TAP with STP/SHN

TAP plus 10% STP/SHN		
Analysis Period	Indiana	Kentucky
FY 2016-2022	$4,700,000	$700,000
FY 2023-2035	$8,700,000	$1,700,000
FY 2036-2040	$3,300,000	$800,000
TOTAL	**$16,700,000**	**$3,200,000**

Because the MTP 2040 does not identify specific bicycle and pedestrian projects, project-specific costs are not available. However, based on the expected TAP funds through 2040 and assumed costs of facilities per mile, the number of potential miles of facilities were estimated. These cost assumptions are:

- $1 million per mile of greenway
- $20,000 per mile of bike lane
- $10,000 per mile of shared lanes (sharrows)

Figure 5-1 shows the approximate miles of facilities that could be constructed in Indiana with the estimated $16.7 million through 2040. For example, if 17 miles of greenway were constructed through 2040, there would be no TAP money left for on-street facilities. If 12 miles of greenway were constructed through 2040, 236 miles of bike lanes (or 472 miles of shared routes, or a combination of the two) could be constructed. It is important to note that the estimated facilities are through 2040, not per year.

Henderson will have approximately $3.2 million in TAP and the 10% STP set-aside in federal funds for bicycle and pedestrian improvements. Figure 5-2 breaks down the estimated miles of facilities that could be constructed through 2040 with the approximated $3.2 million (and was based on the same per-mile cost assumptions as Vanderburgh and Warrick counties).

Figure 5-1: Approximate Greenway/Bike Facilities Miles with Projected TAP+STP Funds in Indiana

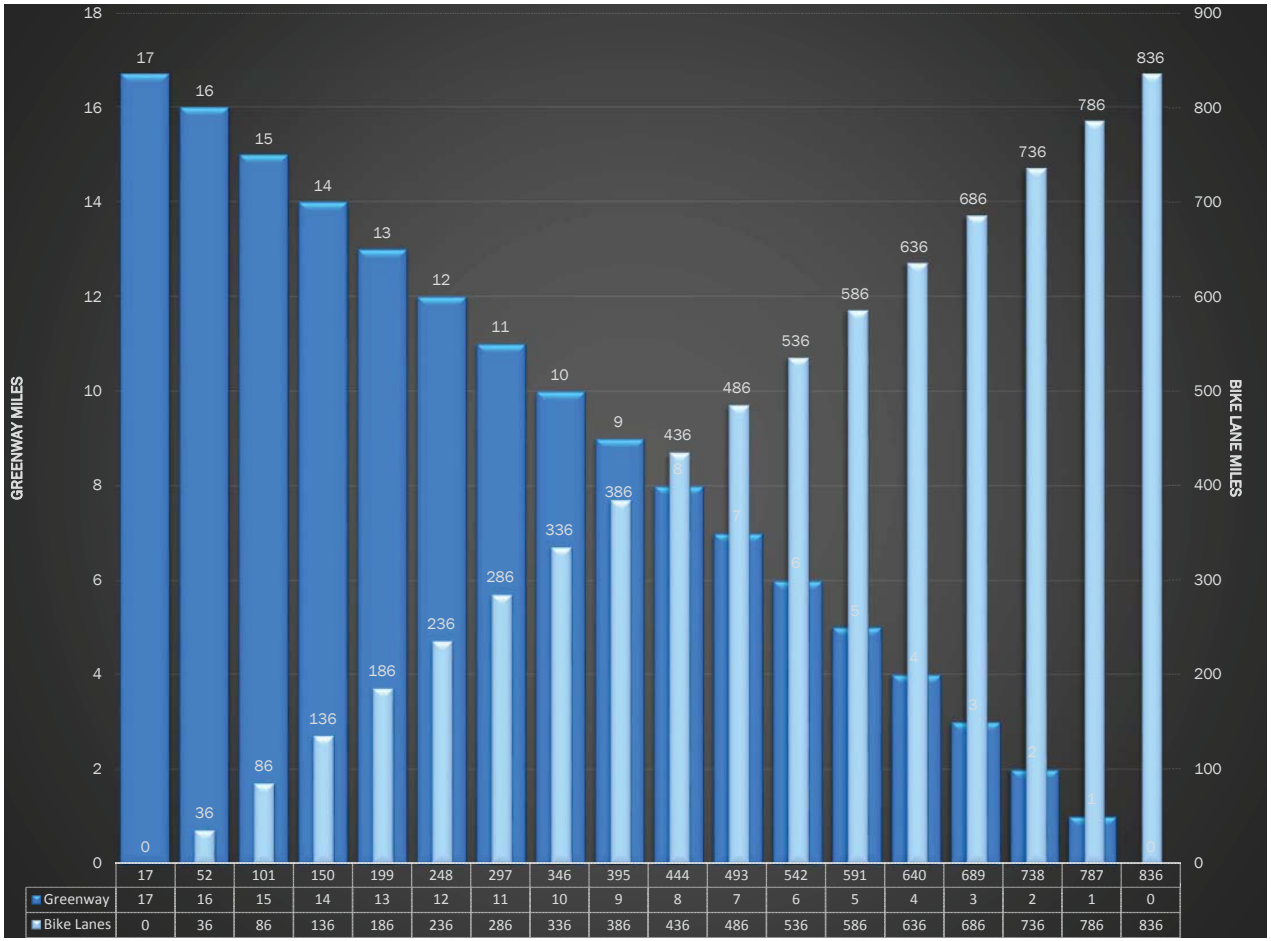
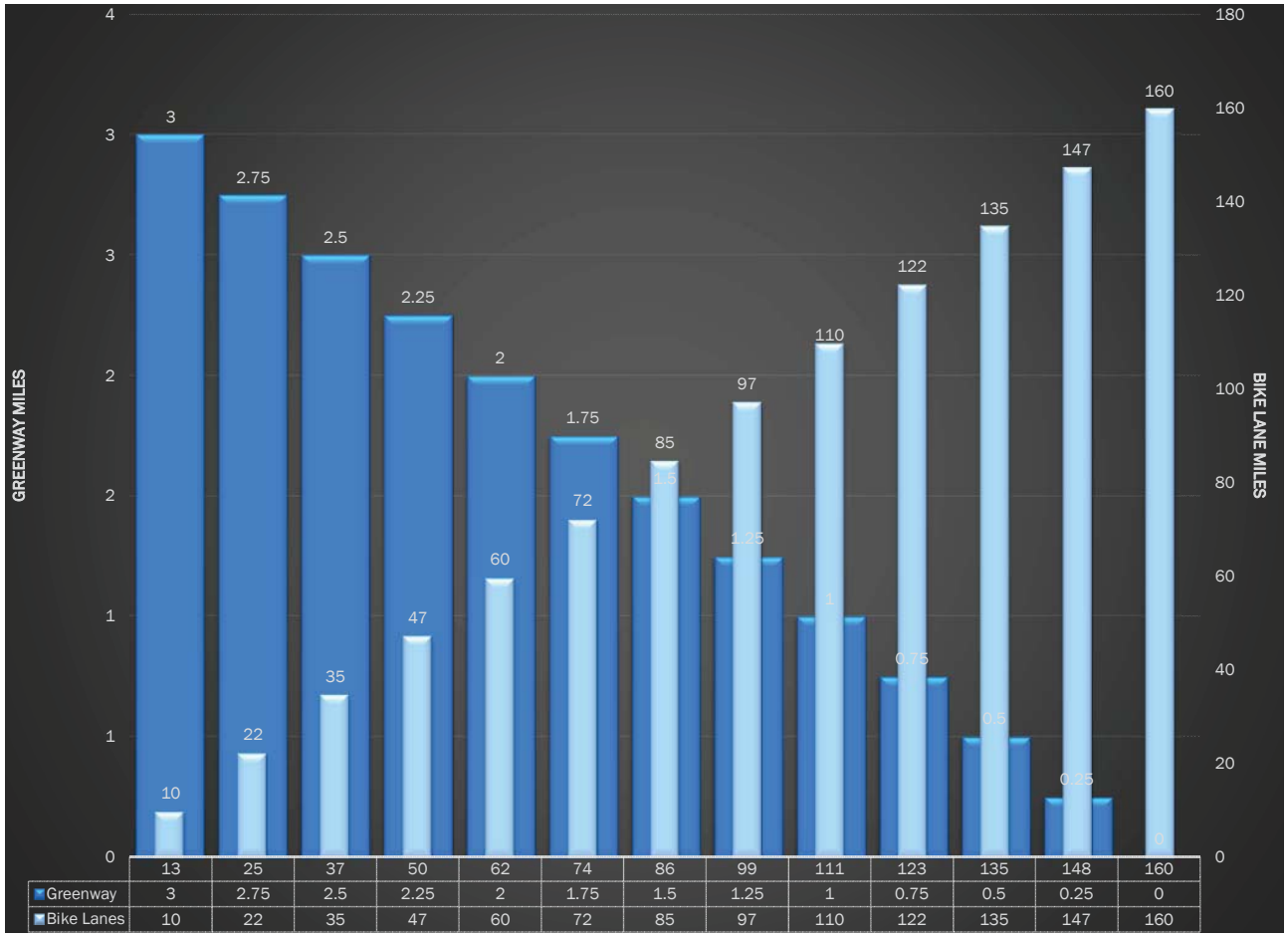


Figure 5-2: Approximate Greenway/Bike Facilities Miles with Projected TAP+STP Funds in Kentucky



OHIO RIVER CROSSING

The Interstate 69 corridor was first identified in the 1991 Intermodal Surface Transportation Efficiency Act as Corridor 18, a High Priority Corridor on the National Highway System. The entire Interstate 69 corridor, from Michigan to Texas, consists of 32 Sections of Independent Utility (SIUs). SIU 4, known locally as the Ohio River Crossing, will connect Interstate 69 in the City of Evansville, Indiana, to Interstate 69 on the south side of Henderson, KY.

Under current regulations, the financial plan included in the MTP 2040 must be fiscally constrained, which is intended to ensure that the MTP reflect realistic assumptions about future revenues, and that those revenues are "reasonably expected to be available" to implement the MTP. Projects outside of this fiscal constraint can be included in the MTP, but only as illustrative projects for consideration against future funding sources. Because the resources projected during the 2014 development of the MTP 2040 could not be shown to support the construction of the I-69 ORC, the project was included in the Illustrative Needs Project List.

On June 30, 2016, Indiana Governor Mike Pence and Kentucky Governor Matt Bevin signed a memorandum of agreement (MOA) directing both states to take the next steps in the advancement of the I-69 Ohio River Crossing (ORC) project development.

The proposed November 3, 2016 amendment to the MTP 2040 will move the ORC project from the Illustrative Needs Project List to the 2023-2035 Proposed Non-Exempt Project List (Table 4-5), MTP ID #35-ORC in the fiscally constrained list of projects.

PROJECT FISCAL CONSTRAINT

The total estimated cost to complete the project in year of expenditure dollars (estimated for 2022-2025) is between $1.2 billion and $1.6 billion. This cost range to complete comes from the I-69 Feasibility Study for the I-69 ORC, prepared in January 2014. The costs have been updated from the 2013 estimates in the study to the estimated year of expenditure utilizing a 3% annual construction inflation index. The cost estimates have taken into consideration the potential operating and maintenance costs for the crossings.

The Commonwealth of Kentucky and the State of Indiana have taken several key steps to strengthen and expand the range of strategies available to fund transportation projects. Provisions within Kentucky Revised Statutes (KRS) 175B and Indiana Code (IC) 8-15.7 allow each state to pursue Public Private Partnerships (P3) as a financial strategy for project delivery.

While the issue of fiscal constraint and schedule will be analyzed, developed and updated throughout the planning and NEPA process, Indiana and Kentucky intend to consider advancing the Ohio River Crossing (ORC) project as a P3 project. A well-structured P3 agreement can reduce demands on constrained public budgets, help ensure timely project delivery, as well as result in lower life-cycle costs of projects in the long run in case a long-term concession agreement is considered.

Implementation of the Project may also utilize a combination of traditional (federal, state and local intergovernmental grants) and alternative and innovative financing techniques that will be fully evaluated as part of the project financial plan to be developed for the selected alternative identified during the NEPA process. Such additional financial resources available to INDOT and KYTC for the ORC project includes, but is not limited to, normal Federal Aid formula funds, State funding, federal discretionary programs, federal grant programs, GARVEE bonds, and toll supported financing.

The inclusion of funding for preliminary engineering in the INDOT and KYTC current respective programs, the MOU, and the P3 legislation demonstrate the intent of the states to provide financing for the Project. The State of Indiana and the Commonwealth of Kentucky will continue to investigate all avenues of funding and financing opportunities through the preliminary phase of the project.

PUBLIC INVOLVEMENT

A public review and comment period has been publicized for October 13th to October 28th, 2016. The MTP 2040 amendment to include the ORC as a fiscally constrained project will be requested for adopted by the EMPO Policy and Technical Committees on November 3rd, 2016.

Table 5-14: Ohio River Crossing Project Financial Demonstration

(In year of expenditure $, Millions)

Project Information	2023-2035
Reasonably Anticipated Project Development and Construction Funding Needs	
Project Development, Construction, Maintenance and Operation Costs	$1,200 - $1,600
Committed, Available, and Reasonably Expected to be Available Funding Sources	
Federal-Aid, P3, State *	$1,200 - $1,600

** The source of funding for the project is subject to change. The State of Indiana and the Commonwealth of Kentucky through the preliminary phase of project development will be investigating various funding and financing opportunities.*


BIKE LANE
BEGINS

Pursuant to final rules published August 24, 2016 (40 CF Parts 50, 51 and 93), the federal Environmental Protection Agency (EPA) has revoked the 1997 primary annual standard for areas designated attainment for that standard because the EPA revised the primary annual standard in 2012. This final rule will become effective on October 24, 2016. As such, it will no longer be required that the Evansville MPO Transportation Plan and TIP demonstrate conformity to the annual fine particulate matter ($PM_{2.5}$) standards specified by EPA.

CHAPTER 6:

AIR QUALITY

The transportation conformity provisions of the 1990 Clean Air Act (CAAA) require that the EMPO, as the Metropolitan Planning Organization (MPO) for the southwestern Indiana, make a determination that the region's MTP, TIP and projects conform to applicable State Implementation Plan (SIP) and that emissions, taken as a whole from the plan, program and projects will not negatively impact the region's ability to meet the National Ambient Air Quality Standards (NAAQS) deadlines. On December 9, 1997, the U.S. EPA approved IDEM's request to re-designate Vanderburgh County from a marginal one-hour ozone non-attainment area to a maintenance area.

On June 15, 2004, U.S. EPA designated Vanderburgh and Warrick Counties as a Basic non-attainment area for the new 8-hour ozone standard. Federal regulations also required a Conformity Determination for the Transportation Plan and the TIP be made within 12-months of the designation. On June 15, 2005, the U.S. EPA revoked the 1-hour ozone standard for Vanderburgh County.

On January 30, 2006, the U.S. EPA approved IDEM's request to re-designate Vanderburgh County from a Basic 8-hour ozone non-attainment area to a maintenance area. Indiana's petition included a long-term maintenance plan to ensure that the area continued to meet the 8-hour standard for ground-level ozone in the future. Indiana also committed to maintain all emission control measures necessary to ensure continued compliance with the standard.

On May 21, 2012, USEPA formally designated Vanderburgh and Warrick Counties in attainment of the 2008 8-hour Ozone Standard. In the same Federal Register, USEPA revoked the 1997 8-hour Ozone Standard for transportation conformity purposes, effective July 20, 2012. As such, it is no longer required that the EMPO Transportation Plan and TIP demonstrate conformity to the 1997 8-hour Ozone Maintenance SIP.

Based on air quality monitoring data gathered between 2006 and 2009, Southwest Indiana (Evansville area) was designated as an attainment maintenance area for the annual $PM_{2.5}$ National Ambient Air Quality (NAAQS) by the U.S. EPA on September 27, 2011 (FR Vol. 76, No. 187). The southwest Indiana $PM_{2.5}$ attainment maintenance area includes the counties of Vanderburgh and Warrick in the MPO boundary area. The attainment maintenance area also includes a donut area adjacent to the MPO boundary comprised of Dubois County, the township of Montgomery in Gibson County, Washington Township in Pike County and Ohio Township in Spencer County.

The EMPO finds that the Metropolitan Transportation Plan 2040 conforms with the annual fine particulate matter ($PM_{2.5}$) standards specified by the United States Environmental Protection Agency. A summary of Conformity Analysis for the $PM_{2.5}$ is described in this chapter.

SUMMARY OF $PM_{2.5}$ CONFORMITY PROCESS

The entire $PM_{2.5}$ maintenance area, including the donut area, must demonstrate conformity for the federal agencies to accept the determination. This is due to the fact that there is one $PM_{2.5}$ maintenance area, and therefore one conformity demonstration that includes all non-exempt projects in the MPA and $PM_{2.5}$ donut area.

The State Implementation Plan (SIP) was developed by the Indiana Department of Environmental Management (IDEM). The SIP sets the mobile source emissions budgets for southwest Indiana counties for $PM_{2.5}$. The estimated mobile source emissions for various analysis years after running the INDOT Air Quality Post-Processor (AQPP) program are compared with the mobile source emissions budgets from the SIP. If the estimated emissions are less than the mobile source emission budgets then the MTP 2040 and the FY 2013 - 2016 TIP are said to conform to the SIP and National Ambient Air Quality Standards.

Pursuant to final rules published May 6, 2005 (40 CFR 93.102(b)(2)(iv) and (v) and 93.119(f)(9) and (10)), $PM_{2.5}$ maintenance areas

are required to perform a regional emissions analysis for NOx as a $PM_{2.5}$ precursor unless the head of the state air agency and the EPA Regional Administrator make a finding that NOx is not a significant contributor to the $PM_{2.5}$ air quality problem in a given area. Such a finding has not been made for southwest Indiana (Evansville Area), so this conformity analysis includes NOx as well as direct $PM_{2.5}$ emissions.

Regional emissions analyses under the annual $PM_{2.5}$ standard are not required for VOC, SOx or ammonia before an adequate or approved SIP budget for such precursors is established, unless the head of the state air agency or EPA Regional Administrator makes a finding that on-road emissions of any of these precursors is a significant contributor. Since such a finding of significance has not been made for the southwest Indiana non-maintenance area, these precursors have not been analyzed for this conformity determination.

CONFORMITY ANALYSIS PROCEDURE

The air quality conformity analysis was conducted using the EMPO regional TransCAD model for Vanderburgh and Warrick Counties and Montgomery Township in Gibson County, and the INDOT Statewide Travel Demand Model was utilized to model the balance of the donut area. The existing EMPO model was developed with the latest demographic data available and was calibrated for the year 2010. The travel model achieved a percent root mean square error of 30 percent in replicating the actual 2010 traffic counts. All forecasts have utilized the best available planning assumptions concerning development and socio-economic forecasts to the year 2040.

A more detailed discussion on the development of the EMPO regional model is provided in the Technical Memorandum: Travel Model Documentation, prepared by Bernardin, Lochmueller & Associates, Inc. (BLA) in October 2012.

MODEL NETWORKS

Traffic modeling for air quality conformity analysis used five separate networks for 2010, 2015, 2022, 2035, and 2040, each with a specific trip table and traffic assignment for the associated analysis years. The milestone years were:

- 2010 - for baseline year test
- 2015 - near-term year
- 2022 - budget year
- 2035 - interim year
- 2040 - horizon year of the transportation plan

These milestone years were determined thorough the Interagency Consultation Process. These milestone years meet the requirements of Section 93.106(a)(1) of the conformity rule. Each model network represents transportation improvement projects that are included in the proposed transportation plan to be open to traffic by January 1 of the various milestone years. All non-exempt transportation projects have been considered in the analysis.

Attachment A contains a complete listing of the specific transportation improvement projects included in each of the model networks for the milestone years. All non-exempt projects planned or programmed in the EMPO Metropolitan Transportation Plan 2040, the EMPO FY 2013-2016 TIP, and the INDOT FY 2014-2017 INSTIP were included in the conformity analysis.

CONFORMITY APPROACH FOR $PM_{2.5}$

The annual $PM_{2.5}$ NAAQS for which the southwest Indiana region must demonstrate conformity is based on annual measurements, so the emissions estimates must be annual values. The AQPP program

used calculates emissions estimates through the application of emissions rates developed in MOVES to the outputs of travel demand model. The emissions estimated by the AQPP program are for an average day.

The methodology employed in the AQPP is fairly straightforward. The AQPP takes travel demand model data as an input along with the emissions rates developed in MOVES. The travel demand model vehicle-miles-traveled are then disaggregated into a fine level of detail and factored by the emissions rates to produce emissions estimates. Figure 6-1 shows a flowchart of the post-processor's function.

To convert daily emission to annual emission, "The equivalent Weekdays per Year" (340) was used to compute annual $PM_{2.5}$ emissions. The Equivalent Weekdays per year is used to adjust for the fact that the travel demand model estimates weekday volumes and weekend days do not typically contribute as much VMT as weekdays. The value of 340 represents an assumption that weekend days contribute approximately three-quarters as much VMT as a weekday, which is consistent with the limited available data from other regions of the country. If state or local data is collected, or becomes available, it will be used to adjust this value.

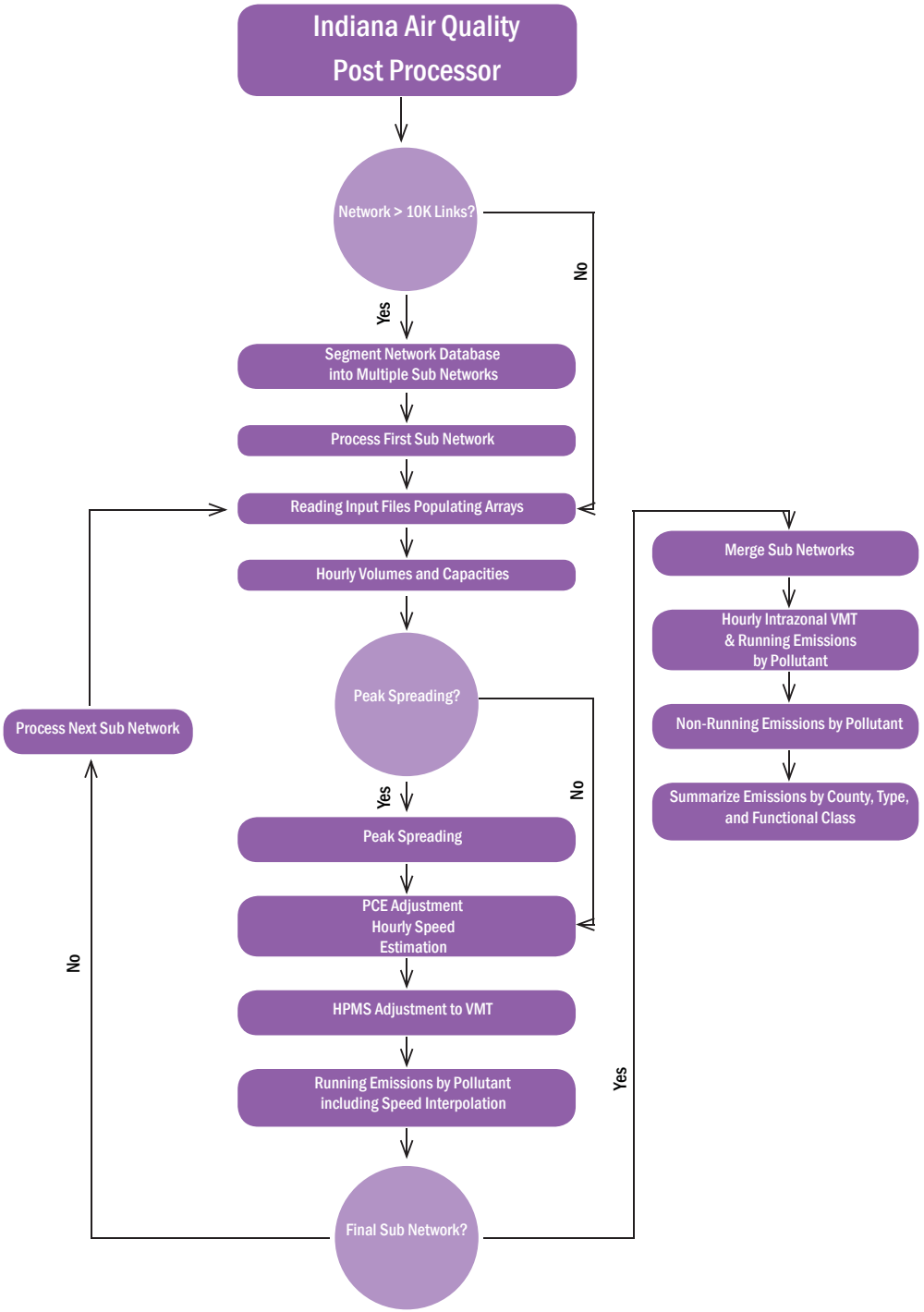
Since the emissions inventories are computed by multiplying disaggregate emission rates by the corresponding VMT, total annual VMT is not a natural byproduct of the conformity analysis.

CONFORMITY DETERMINATION FOR $PM_{2.5}$

The estimated mobile source emissions for various analysis years after running the AQPP program are compared with the mobile source emissions budgets from the SIP.

The southwest Indiana region is in maintenance for the annual $PM_{2.5}$ standard, so the emissions inventory must reflect annual emissions totals. To accomplish this, BLA in collaboration with CDM Smith

Figure 6-1: AQPP Flow Chart



developed a micro-computer program to interface with and post process the output of the EMPO TransCAD model. A detailed discussion of the program is provided in the Technical Memorandum: INDOT AQPP.

RESULTS OF CONFORMITY DETERMINATION FOR $PM_{2.5}$

The emission results from the conformity analyses for all of the maintenance area for the years 2010, 2015, 2022, 2035 and 2040 in Table 6-5 shows that the direct $PM_{2.5}$ and NOx emissions from motor vehicles are lower than the emissions budgets for years 2015, 2022, and are lower than 2022 budget for years 2035 and 2040 so conformity for the annual $PM_{2.5}$ standard is demonstrated.

Table 6-1: Mobile Source Emissions Conformity Test for EMPO Modeling Area

EMPO Running						
Year	Vanderburgh County		Warrick County		Montgomery Township Gibson County	
	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)
2010	154.77	3668.76	74.33	1844.86	5.73	142.18
2015	91.72	1947.15	40.65	931.00	3.38	76.57
2022	45.68	899.05	17.74	423.93	1.40	34.15
2035	39.02	644.75	14.16	304.58	1.08	24.77
2035+	40.02	660.48	14.34	307.79	1.08	24.77
2040	38.73	646.34	14.21	305.39	1.15	26.76
2040+	39.80	664.97	14.38	308.46	1.16	26.80

+ With I-69 South (KY) and the new Ohio River bridge added to the 2035 Network

Table 6-2: Mobile Source Emissions Conformity Test for Donut Area from INDOT

Year	Dubois County		Washington Township Pike County		Ohio Township Spencer County	
	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)
2010	25.97	703.72	5.06	136.73	7.09	181.57
2015	15.23	370.59	6.93	188.6	4.25	100.03
2022	7.6	171.12	2.45	74.08	1.95	45.23
2035	6.5	118.69	1.91	56.04	1.59	31.61
2035+	6.49	118.42	2.01	59.77	1.36	26.96
2040	6.63	122.04	2	59.43	1.64	32.8
2040+	6.72	121.93	2.11	63.73	1.39	27.51

+ With I-69 South (KY) and the new Ohio River bridge added to the 2035 Network

Table 6-3: EMPO Modeling Area

Year	Non-Running Mobile Source Emission for EMPO Modeling Area	
	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)
2010	18.75	1363.85
2015	12.37	1089.21
2022	8.34	869.97
2035	7.61	833.35
2035+	7.61	833.35
2035	7.78	871.34
2040+	7.78	871.34

Table 6-4: Donut Area

Year	Non-Running Mobile Source Emission for Southwest Indiana Donut Area	
	Direct $PM_{2.5}$ (Tons / Yr)	NO_x (Tons / Yr)
2010	5.31	365.6
2015	3.47	291.9
2022	2.32	235.04
2035	2.04	235.27
2035+	2.04	235.27
2035	2.07	254.47
2040+	2.07	254.47

Table 6-5: Mobile Source Emissions Conformity Test for $PM_{2.5}$ Maintenance Area

Year	Southwest Indiana Attainment Maintenance Area			
	Direct $PM_{2.5}$ (Tons / Yr)	SIP Budget (Tons/Yr)	NO_x (Tons / Yr)	SIP Budget (Tons/Yr)
2010	297.01		8407.27	
2015	178.01	199.93	4995.04	5642.95
2022	87.48	100.45	2752.59	3173.08
2035	73.91		2249.06	
2035+	74.95		2266.81	
2040	74.21		2318.57	
2040+	75.41		2339.21	

+ With I-69 South (KY) and the new Ohio River bridge added to the 2035 Network

Conformity determination is required for; adoption, acceptance, or approval of the EMPO MTP 2040 developed pursuant to 23 CFR Part 450 and 49 CFR Part 613. The transportation plan includes a strategy for transportation system investments over a twenty-seven year period. The SIP includes strategies for progress toward attainment of the NAAQS. The conformity determination for $PM_{2.5}$ is based on a regional emissions analysis that demonstrates compatibility between the Indiana SIP and the EMPO MTP 2040. The regional emissions analysis also includes all regionally significant capacity expansion projects, regardless of the funding sources.

Therefore, the EMPO MTP 2040 has been found to conform to the requirements of section 176(c) of the Clean Air Act Amendment and related requirements of the Final Transportation Conformity Rule (40 CFR Part 51 and 40 CFR Part 93).

APPENDIX A:

TRAVEL DEMAND FORECAST MODEL

Travel demand forecasting models (TDMs) are a major analysis tool for the development of long-range transportation plans. These mathematical models are designed to calculate the number of trips, connect their origins and destinations, forecast the mode of travel, and identify the roadways or transit routes most likely to be used in completing a trip. Models are used to determine where future transportation problems are likely to occur, as indicated by modeled roadway congestion. Once identified, the model can test the ability of roadway and transit system improvements to address those problems.

Significant elements of the EMPO TDM are as follows:

Socioeconomic Forecasts

Socioeconomic forecasts are essential to predict future travel demand. The Evansville on these growth rates the population and employment totals were extrapolated to 2040 at 5 year increments. These regional control totals were allocated to the traffic analysis zones (TAZs) using the land use model (HELPViz).

HELPViz

HELPViz was developed as part of the Sustainable Evansville Area Coalition's Regional Plan for Sustainable Development. This model offers sensitivity to land use zoning, building codes and infrastructure facilities such as transportation network, water and sewer utilities. HELPviz allocates the future population and employment regional totals to the TAZs based on build out capacities, transportation network and infrastructure facilities. HELPviz uses Nested Logit model framework and uses information at both TAZ and parcel levels.

Modeling Area

The EMPO modeling area includes five county area consisting of Gibson, Posey, Vanderburgh and Warrick counties in Indiana and Henderson County in Kentucky. The model's roadway network covers over 5000 lane miles, 954 TAZs, 28 external stations in based year and 29 external stations in the following analysis years over an area of 2015 square miles. Figures A-1 and A-2 show the EMP TDM network and TAZs.

Figure A-1: Model Area Network for TDFM Appendix

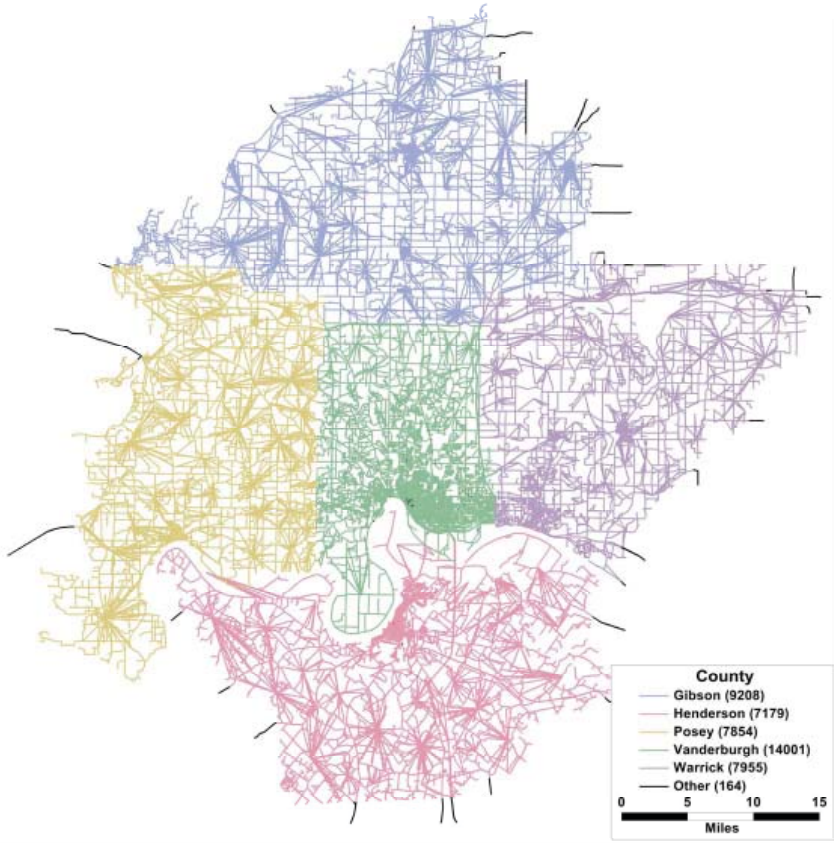
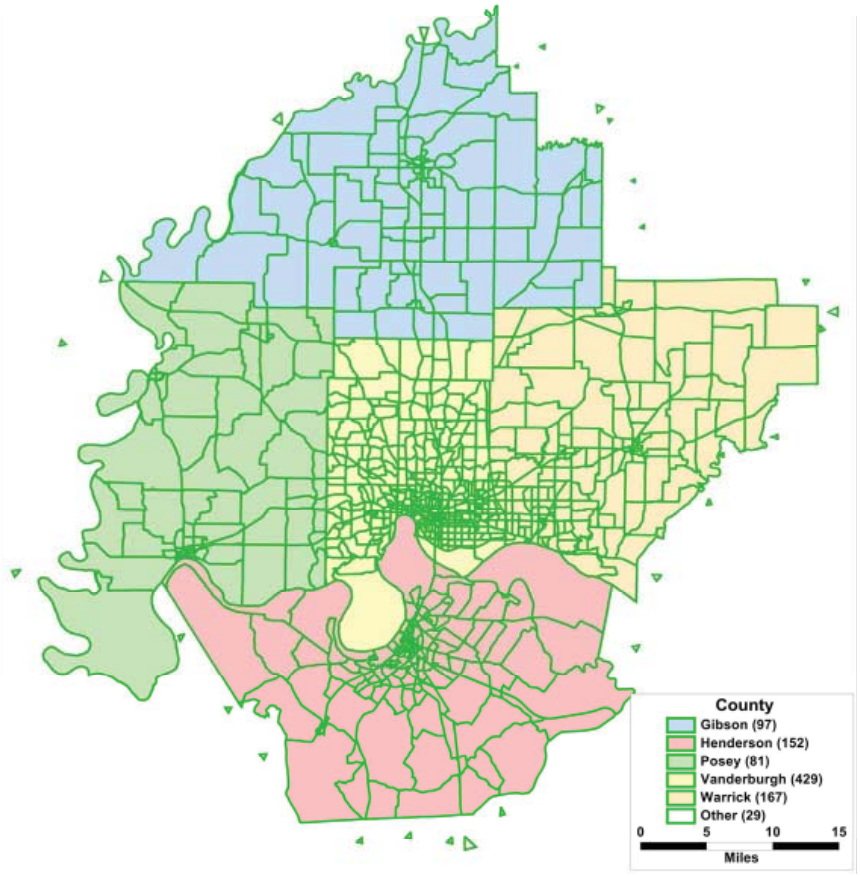


Figure A-2: Model Area TAZs for TDFM Appendix



MODELING TECHNOLOGY

The current version of the EMPO TDM is implemented in TransCAD 6.0, a GIS based travel demand modeling software, using the software's GISDK scripting language. The Evansville MPO recently transitioned from a traditional Four-Step trip based model to a hybrid Trip/Tour based model. This model offers greatly improved policy sensitivity such as:

- Sensitivity to fuel prices
- Planning capability for transit, bicycle and pedestrian modes
- More realistic representation of special populations (seniors, low income, students)
- Sensitivity to urban design (mixed uses, development density, grid vs. cul-de-sac style street networks)
- Ability to represent shifts in the timing of travel (due to congestion)
- Consistency with tours and trip-chaining behavior
- Improved traffic impacts with halo effects around major developments (malls, factories, etc.)
- More accurate commuting patterns from destination choice models
- Improved representation of speeds and delays from traffic signals, stop signs, etc.
- Improved accuracy of alternatives analysis from new assignments algorithms
- Reduction of aggregation bias which can skew model results

Unlike the traditional 4 Step Model the hybrid model includes 12 steps:

1. Population synthesis
2. Vehicle availability
3. Tour and stop generation
4. Activity allocation choice
5. Tour mode choice
6. Stop location choice
7. Stop sequence choice
8. Trip mode choice
9. Departure time choice
10. External model
11. Truck model
12. Network Assignment

A detailed discussion on the development of the Evansville MPO regional TDM is provided in the Evansville MPO Travel Model Update 2012: Model development and Validation Report. A summary of the technical memorandum is described in this Appendix.

POPULATION SYNTHESIS MODEL

The EMPO TDM is applied directly to the individual households to model their travel behavior rather than at the TAZ level. This is done to avoid the aggregation bias that occurs when non-linear demand models are applied to aggregate or average characteristics rather than to populations. The current TDM generates a synthetic population of households for each TAZ based on their demographic information such as:

- Zonal Average Household Size
- Zonal Average Workers per Household
- Zonal Average Students per Household
- Zonal Percentage of Households with Seniors
- Zonal Average Household Income
- Zonal Population Density
- Percent Zone within 0.5 miles of Bus Route
- Urban Design Factor

Each household has a total number of persons, a number of workers and students, a number of seniors and an income quartile the household belongs to: Q1 (under $25,000/year), Q2 ($25,000-$45,000/year), Q3 ($45,000-$75,000/year) Q4 (over $75,000/year). Each of these income categories comprise approximately a fourth of the households in the region.

The synthetic population is developed in two steps. First, a set of ordered response logit models for each variable (household size, number of workers, etc.) predicts the number of each degree of variables (one person, two persons, ... zero workers, one worker, two workers, ...etc.). Second, iterative proportional fitting is used to develop the synthetic population based on a seed population of households from the household travel surveys and the marginal distribution for each variable provided by the logit models.

Vehicle Availability Model

The vehicle availability is an important factor required in modeling the travel behavior. Because of its importance the vehicle availability in the EMPO TDM is not modeled simply as a demographic variable, essentially input to the travel demand model. Rather, it is modeled behaviorally with each household choosing the number of vehicles it will own, lease, etc., based on:

- Individual Household Size
- Individual Household Workers
- Individual Income
- Presence/ Absence of Seniors in HH
- Percent of Zone within one-half mile of a Bus Route
- Urban Design Factor
- Population Density
- Gas Price

The estimation of vehicle availability is accomplished by disaggregate ordered response logit choice mode. This model applied to the individual households generated in the population synthesis, can be interpreted as modeling each household's choice of how many vehicles it will have in its fleet.

TOUR AND STOP GENERATION MODEL

In the traditional four step model (trip based), various components of the model are based on trip purposes (Home-based, Non-Home-Based, etc.). In the current EMPO TDM model, the model components are segmented in a different way. Mode and destination choice is segmented by the stop (or activity) types, while the departure time choices are segmented by tour types. The tour and stop types in the EMPO TDM are classified as follows:

Tour Types:

- Work
- School
- Other (Non-Work)
- Stop/Activity Types:
- Work stops
- University stops
- School stops
- Shopping stops
- Personal business stops
- Social & recreational stops
- Eating stops
- Travel stops

The number of tours and stops of each type is estimated using either multiple regression or multinomial logit models applied to disaggregate synthetic population of households. The stops are allocated to the tours. The method offers behavioral fidelity and also allows for an improved goodness-of-fit of both tours and stops.

ACTIVITY ALLOCATION CHOICE MODEL

The activity allocation model uses household survey estimated logit models to allocate activity types (stop types) to tour types. The results are the number of each activity types that occur on each tour type by household. There are seven activity types generated for each household in generation step. Five of these types need allocation choice while work and school activities do not since they only occur on work tours and school tours respectively. The activity types are eat, personal business, shopping, social/recreational, travel, and university. A brief summary of the results of each activity allocation model are presented below:

Eat activity allocation model

In the eat activity allocation model, the probability that an eating activity would occur on other tour was sharply decreased as the number household workers grew. This means that as more household workers would lead to more work tours where eat activities might occur.

Personal business activity allocation model

In the personal business activity allocation model, household vehicles had a negative effect on allocating personal business to school tours. Increased bus fare had a negative effect on allocating personal business to other tours. The percentage of streets with sidewalks at the origin or destination had a positive effect on allocating business activities to other tours. More household workers decreased the likelihood of allocating personal business to another tour, while more students increased the likelihood of personal business on a school tour. The highest income quartile of households was the only quartile to not have significant parameters for allocating personal business to other tours.

Shopping activity allocation model

In the shopping activity model, besides the expected trend of workers and students decreasing the likelihood of allocating shopping activities to other tours, a higher number of household vehicles decreased the likelihood of a shopping activity on a school tour. This can be attributed to the fact that households with fewer vehicles are likely to allocate more activities to fewer auto tours, so that one vehicle household would be more likely to make a shopping activity on a school tour rather than making a separate tour of that activity.

Social/Recreational activity allocation model

In social/recreational activity allocation model, besides the expected trend of increased workers and students decreasing the probability of allocating this activity to other tours, it was found that the higher income households were less likely to allocate social/recreational activities to other tours.

Travel activity allocation model

In the travel activity allocation model, besides the expected trend of increased workers and students decreasing the probability of allocating this activity to other tours, it was found that more household vehicles increased the probability of a travel activity on another tour. This could be attributed to the fact that as the availability of vehicles increases the likely hood of making other tours to chauffeur someone to other activities. With fewer vehicles, a household would be more likely to chain a travel activity on a work or school tour.

University activity allocation model

In the university activity allocation model, for part time students making university stops as part of work or other tours, it was significant that the percentage of sidewalks at the origin and destination zones was significant in decreasing the probability that a university activity would be made as part of a work tour. This can be attributed to part time students who live near a walkable campus has a better ability to make a separate tour for his/her university activity. Conversely, origins and destinations with poor walkability would most likely influence the students to chain their university activity as part of an auto work tour.

TOUR MODE CHOICE MODEL

In the current EMPO TDM, the mode of travel is modeled in two stages: tour mode choice and trip mode choice. First, after tours are generated, they are assigned a primary mode by tour mode choice models. Later, after spatial distribution of stops creates trips, individual trips are assigned a mode, based on the primary mode of tour, in trip mode choice models.
The EMPO model has four primary modes:

- Private automobile
- Public Transit
- Walk / Bike
- School Bus

The choice of primary mode for work tours was modeled using a nested logit model, grouping the private automobile and public transit alternatives together as motorized modes. This structure implies that people who drive to work are more likely to switch to take a bus than to walk/bike and transit riders are more likely to switch to driving than walking/biking. This seems reasonable, particularly for work tours when travel time is more important, suggesting that workers who commute by foot or bike are different in some way, likely in that they live very close to work.

As expected in mode choice models, the number of household vehicles decreased the probability of workers to commute by bus. Gas prices for low and medium income families decreased the probability of choosing auto, while for the same families bus fare prices had a negative effect on choosing the bus. The percentage of sidewalks in a zone and the net density variable, a measure of intersection approach density on the street network had a strong positive effect on walking and biking.

The choice of primary mode of school tours was modeled using nested logit model, grouping auto and school bus alternatives together as motorized modes and walk/bike as non-motorized modes. This structure implies that students who take a motorized mode to school are more likely to switch between bus and auto modes than walking and biking to school.

The choice of primary mode of other tours did not group the private automobile and public transit alternatives together as motorized modes as for work tours. This structure implies that people who drive are as likely to walk/bike as they would be to use transit and vice versa.

Significant demographic variables in other tour mode choice model include:

- Vehicles per household
- Household income
- Net density

STOP LOCATION CHOICE MODEL

The spatial distribution of the trips in the current EMPO TDM is based on double destination choice framework of stop allocation and stop sequence choice models. The behavioral framework implied by the double destination choice of stop location and sequence is straightforward. First, travelers choose all the destinations or locations at which they will stop during the day. Next, travelers choose an origin for each destination they will visit. The stop choices made by the travelers are dependent on convenience and trip changing efficiencies amongst other effects. The stop location models used for the EMPO TDM are logit models.

The work location choice model used standard attraction or size variables, employment by industry categories. The total attraction to all work stops is simply the total employment for a TAZ. The attractions are apportioned between each income levels based on the attractions predicted using the parameters from estimation, and balanced to the number of stops produced for each stop type using in generation. The work stop location models are “doubly constrained” such that the model assigns exactly one stop for every attraction.

The school location choice mode used the school enrollment variable, travel time from home, as well as county line and river crossings. Both county line crossings and river crossings present significant barriers for school location choice as school districts respect county lines and only private school students generally attend schools out of their districts.

The stop location choice model for other activities, included variables such as: employment size, travel time, gas cost, river crossing, highway crossing and accessibility to other services.

STOP SEQUENCE CHOICE MODEL

The stop sequence model is a more procedural model that "connects the dots" (origins and destinations) produced in the stop location choice model. There is one stop sequence choice for each tour purpose. All stop location matrices produced by stop location models of one tour purposes are added together to create a table of all out of home stops, by location, for each residence location. The number of tours of that purpose is then added to the diagonal to account for stops at home. Each row vector (residence zone) in the stop location matrix then becomes the row and column marginal vector to which the gravity model is constrained. This procedure enforces the traveler conservation constraint and ensures that all travel takes place in closed tours.

TRIP MODE CHOICE MODEL

As stated, in the earlier section the travel mode is modeled in two stages: tour mode choice and trip mode choice. The trip models are developed only for private automobile tours primarily used for the vehicle occupancy for each trip. The EMPO TDM uses four trip modes for automobile tours:

- Walk
- Drive Alone
- HOV2
- HOV3+

The trip mode shares are estimated by aggregate multinomial logit models for the home-based and non-home based trips for each tour purpose.

DEPARTURE TIME CHOICE MODEL

The departure time choice models distribute the average weekday trips throughout the day. It produces not only AM, PM, and off peak trip tables for standard assignments, but also can produce trip tables for any or all 15-minute periods from 6 am to 9 pm. These 15-minute trip tables can be used for micro simulations and could be used in conjunction with dynamic network assignment.

The departure time choice models add sensitivity to new variables, such as travel times and accessibility. This model reflects the shifts in travelers' departure times to avoid longer travel times. This is commonly referred to as peak-spreading as travelers leave earlier or later to avoid peak traffic. This model also incorporates accessibility variables which allow departure times to vary geographically such as lower accessibility, rural travelers might leave for work earlier.

The departure time choice model is a multinomial logit pseudo-continuous discrete choice model.

EXTERNAL MODEL

Trips with at least one end of the trip outside the modeling area are called the external trips. External trips are classified in to External–Internal (EI) trips if only one end of the trip is outside the modeling area and as External-External (EE) trips if both ends of the trip are outside of the modeling area. The EMPO TDM has 28 external stations in the base year and 29 external stations in the following analysis years, where traffic can enter or exit the modeling area. The vehicle types are auto, Single Unit Trucks (SU) and Multi Unit Trucks (MU).

The trip generation for each vehicle type at the external stations was generated from the most recent AADT traffic counts, EE trip percentages from the year 2000 external survey. The trip attractions are modeled using doubly constrained gravity model.

TRUCK MODEL

The truck model estimates the number of trips for four-tier commercial vehicles, SUs with six or more tiers, and MUs. The Truck model uses a four-step process: trip generation, distribution, choice of time and trip assignment. In addition, the special trip generators of inter-region and inter-modal trucks were added to better replicate the current inter-region and inter-modal truck movements.
The truck trip generation and distribution is based on the following input variables:

- Number of employees
- Number of households
- Special generators

The truck assignment utilizes a time-of-day modeling procedure. In this procedure a 24 hour trip table is broken in to AM-peak, PM-peak and Off-peak periods. For each time period a two-step assignment procedure is implemented. The first step, referred to as "priority pre loading", will assign the EE trips and truck trip tables on to the roadway network separately. Then the internal auto trips are assigned on to the network with considerations of these preloading volumes. This assignment method is used in the user equilibrium assignment.

NETWORK ASSIGNMENT

Once vehicle trips have been produced for every vehicle class, they are assigned to the model's roadway network. External automobile trips, SU trips, and MU trips are loaded to the network first, on the assumption that the external trips do not divert due to congestion. Then, local automobile trips are assigned to the network on the "user equilibrium" assumption that only minimum congested travel cost routes are used. The EMPO TDM uses TransCAD 6.0's origin-based algorithm to solve for user equilibrium solution to a precision of 0.0001 relative-gap in least time.

A model is considered to be in high degree of accuracy when the system wide % Route Mean Squared Error (RMSE) of network is in the range of 30%. The system-wide RMSE of the EMPO TDM is 34.18%.

APPENDIX B:

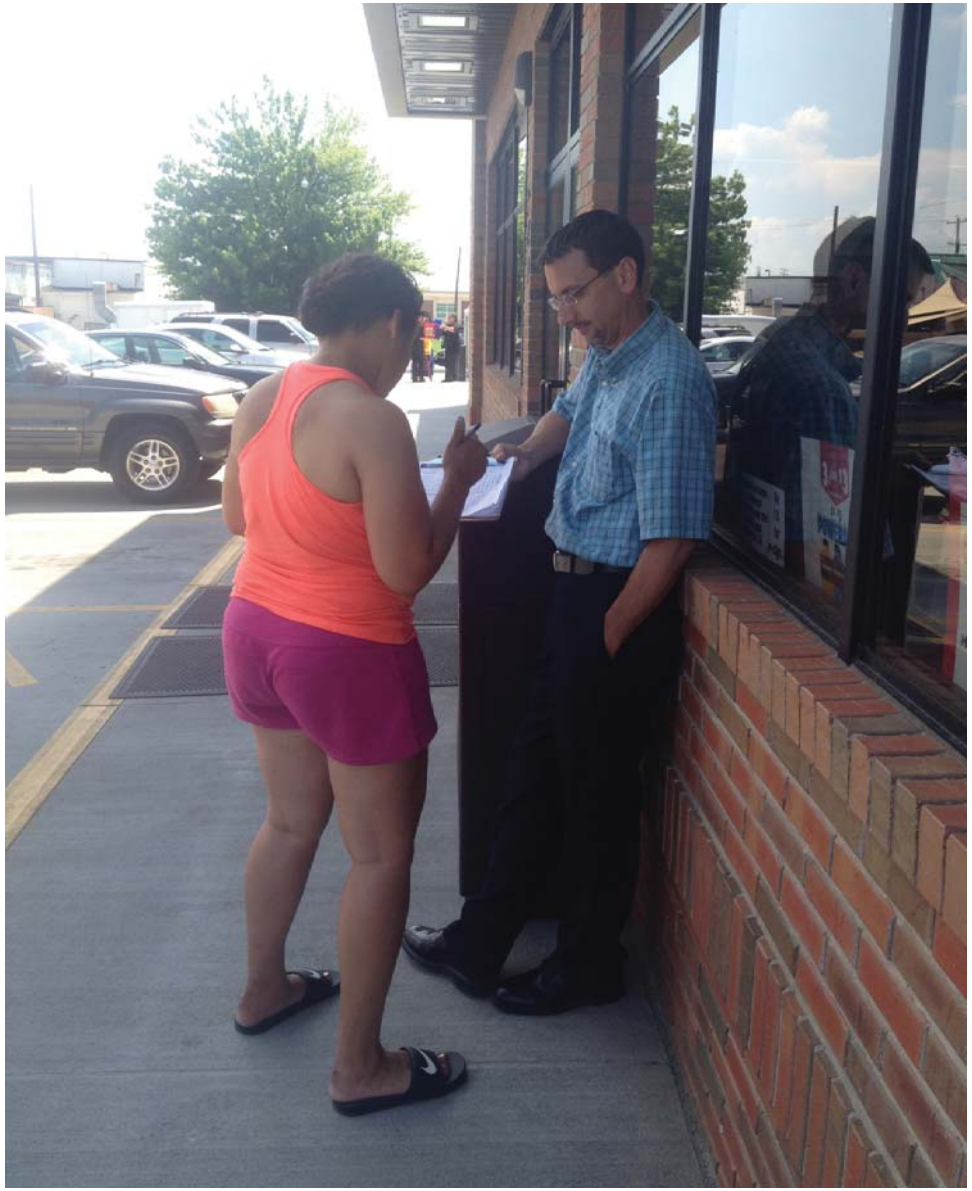
PUBLIC INVOLVEMENT

TRANSPORTATION QUESTIONNAIRE

To gather opinions on a variety of local/regional transportation issues for MTP 2040, the MPO staff created a brief public opinion survey. The survey was available online from March 20th to July 5th, 2013, and staff distributed surveys at twenty popular locations throughout Vanderburgh, Henderson and Warrick counties. Staff made short presentations at the various public forums, and distributed surveys and business cards with the survey QR code. The survey link was also published in several newsletters throughout the community.

Survey respondents were asked to answer 18 questions on the current transportation network, 16 questions on connectivity, 12 questions on the quality of life, and finally, respondents were asked to select their top three priorities for the transportation system.

The contents of the questionnaire are shown in Figures B-1 and B-2. The results from the 377 surveys received are shown in Tables B-1 - B-4. With additional staff outreach, more than three times as many surveys were completed for this update than for the previous Plan.



PUBLIC COMMENTS

The official public comment period for the Draft Transportation Plan was opened on December 6th, 2013, and closed after 30 days on January 5th, 2014. All comments received are shown in Table B-5, beginning on page B-6. Some of the comments have been summarized or paraphrased for brevity, but the intent of the comments remains intact. Summarized responses to these comments are also shown. Comments received during any amendments to this Plan will be added to this table prior to the adoption of the amended Plan.

Figure B-1: Survey Form, Page 1

Metropolitan Transportation Plan
2040
Evansville MPO

The Evansville Metropolitan Planning Organization, the transportation planning agency for the Evansville-Henderson Urbanized Area (covering Henderson, Vanderburgh and Warrick counties), is currently updating its 2035 Metropolitan Transportation Plan. The draft Plan under development will create a guide for transportation improvements through the year 2040. Please take a few minutes to answer the following questions and to share your suggestions about transportation in our region. Thank you!

A. Please rate the following issues on a scale of 1 to 5. Please circle one number.

Not satisfactory 1 2 3 4 5 Very satisfactory

My commute time to and from work (length of time for trip)	1	2	3	4	5	N/A
Reliability of commute time (time is similar day to day)	1	2	3	4	5	N/A
Time and reliability of non-commute trips, like shopping	1	2	3	4	5	N/A
Access to shopping from home and work by car, biking or walking	1	2	3	4	5	N/A
Ease of roundabout use (USI entrance, Millersburg/Oak Hill)	1	2	3	4	5	N/A
Accessibility of bus service within walking distance of your home	1	2	3	4	5	N/A
Accessibility of bus service within walking distance of your work	1	2	3	4	5	N/A
Access to health-care facilities (hospitals and clinics) by bus	1	2	3	4	5	N/A
Reliability of bus service	1	2	3	4	5	N/A
Condition of bus and bus stop (i.e. cleanliness, shelter, benches)	1	2	3	4	5	N/A
Availability of sidewalks in your locality	1	2	3	4	5	N/A
Availability of bike routes in your locality	1	2	3	4	5	N/A
Condition of sidewalks in your locality (i.e. broken pavement, curb ramps)	1	2	3	4	5	N/A
Condition of existing roads and bridges	1	2	3	4	5	N/A
Safety of area roadways	1	2	3	4	5	N/A
Safety of local on-road bicycle travel	1	2	3	4	5	N/A
Safety of pedestrian travel (walking)	1	2	3	4	5	N/A
Quality of life in the region	1	2	3	4	5	N/A

B. Please rate the following strategies to improve transportation in the Evansville-Henderson area. Please circle one number.

Least important 1 2 3 4 5 Most important

Expand or improve transit (i.e. bus) opportunities and facilities	1	2	3	4	5	N/A
Improve regional transit connectivity between Evansville, Henderson, and Warrick County	1	2	3	4	5	N/A
Include audible stop announcements on transit buses	1	2	3	4	5	N/A
Traffic signal improvements (timing; placement; coordination)	1	2	3	4	5	N/A
Intersection improvements (layout; lanes; signage; lights)	1	2	3	4	5	N/A
Improve intersections with the use of roundabouts	1	2	3	4	5	N/A
Bicycle facility improvements (routes; lanes; parking)	1	2	3	4	5	N/A
Pedestrian network improvements (sidewalks; audible signals; paths)	1	2	3	4	5	N/A
Greenway expansions and additions	1	2	3	4	5	N/A
Construct new roads	1	2	3	4	5	N/A
Alternative work hour programs (i.e. work schedules to shift start & end times to off-peak hours; fewer work days per week)	1	2	3	4	5	N/A
Ridesharing (i.e. vanpools for large employment centers)	1	2	3	4	5	N/A
Park and Ride facilities (parking lots with connections via public transport)	1	2	3	4	5	N/A
Improve freight movement through the area	1	2	3	4	5	N/A

Over ——→

Figure B-2: Survey Form, Page 2

Widen existing roads	1	2	3	4	5	N/A
Road Diets (i.e. reduce number of travel lanes, provide dedicated left turn lane, accommodate bike lanes and sidewalks)	1	2	3	4	5	N/A

C. Please rate the importance of the following strategies as a way to improve quality of life.

Least important 1 2 3 4 5 Most important

Support neighborhood businesses	1	2	3	4	5	N/A
Preserve natural environments	1	2	3	4	5	N/A
Driver safety	1	2	3	4	5	N/A
Bicyclist safety	1	2	3	4	5	N/A
Pedestrian safety	1	2	3	4	5	N/A
Cross-town mobility (i.e. ease of travel from downtown to the north)	1	2	3	4	5	N/A
Preserve community character	1	2	3	4	5	N/A
Walkable neighborhoods and commercial centers	1	2	3	4	5	N/A
Coordinated land use and transportation planning	1	2	3	4	5	N/A
Preserve historic resources (i.e. significant buildings)	1	2	3	4	5	N/A
Improve air quality	1	2	3	4	5	N/A
Accessibility to bus routes and bus stops	1	2	3	4	5	N/A

D. Transportation Priorities. Please select three transportation issues from those provided in this survey, or others, and rank them in their order of importance to you, with 1 being your top priority.

1. _____
2. _____
3. _____

Thank you for taking the time to help us with this survey. Please tell us a little about yourself:

1. What is your home zip code? _____

2. What is your work or school zip code? _____

3. Age: **0-20 21-30 31-40 41-50 51-60 61-70 71-80 80+**

4. Sex: **Male Female**

5. Do you have regular access to a motor vehicle for work and other trips?: **Yes No**

6. How many days per **week** do you ride the bus?

0 days 1-2 days 3-5 days 5+ days

7. How many days per **week** do you ride a bicycle as transportation to a destination?

0 days 1-2 days 3-5 days 5+ days

8. How many days per **week** do you walk to a destination?

0 days 1-2 days 3-5 days 5+ days

9. What type(s) of transportation do you use most often? Check up to three.

____ Personal vehicle
____ Bicycle
____ Transit (bus or other)
____ Walking
____ Car or van pool
____ Other (please specify) _____

We appreciate your time and ideas, and thank you again for your assistance!

Evansville Metropolitan Planning Organization
1 NW Martin Luther King Jr. Blvd., Room 316
Evansville, Indiana 47708
Phone: 812-436-7833; Website: www.evansvillempo.com; Email: comments@evansvillempo.com

Table B-1: Survey Results Part A - Current Transportation Satisfactory

Questions Part A (Current Transportation) Satisfactory 1-5	Mean Average	Number of Responses net N/A
Reliability of Commute Time	3.83	345
Accessibility of buses walking distance from work	3.75	247
My Commute Time to and from Work	3.68	335
Ease of Roundabouts	3.63	263
Reliability of bus service	3.49	186
Quality of Life in the Region	3.47	369
Access to health-care facilities by bus	3.37	230
Time and Reliability of Non-Commute Trips	3.30	365
Access to Shopping from Home and Work	3.23	365
Accessibility of buses walking distance from home	3.14	259
Safety of area roadways	3.14	371
Condition of existing roads and bridges	3.11	372
Condition of bus and bus stops	2.93	199
Availability of sidewalks in your locality	2.92	342
Condition of sidewalks in your locality	2.66	306
Safety of Pedestrian Travel	2.58	366
Availability of bike routes in your locality	2.30	345
Safety of local on-road bicycle travel	2.19	349

Table B-2: Survey Results Part B - Strategies to Improve Transportation

Questions Part B (Strategies to Improve Transportation) Importance 1-5	Mean Average	Number of Responses net N/A
Greenway Expansions and Additions	4.12	352
Pedestrian Network Improvements	4.12	355
Bicycle Facility Improvements	4.11	350
Traffic Signal Improvements	4.00	367
Intersection Improvements	3.99	360
Road Diets	3.96	336
Expand or Improve Transit Opportunities and Facilities	3.69	336
Improve Regional Transit Connectivity	3.67	338
Widen Existing Roads	3.55	351
Improve Intersections with Roundabouts	3.45	349
Improve Freight Movement throught the Area	3.44	344
Alternative Work Hour Programs	3.34	333
Include Audible Stop Announcements on Transit Buses	3.26	288
Park and Ride Facilities	3.24	332
Ridesharing	3.15	326
Construct New Roads	3.08	359

Table B-3: Survey Results Part C - Improving Quality of Life

Questions Part C (Improve Quality of Life) Importance 1-5	Mean Average	Number of Responses net N/A
Bicyclist Safety	4.50	361
Pedestrian Safety	4.49	362
Preserve Natural Environments	4.44	365
Improve Air Quality	4.40	363
Support Neighborhood Businesses	4.35	365
Walkable Neighborhoods and Commercial Centers	4.32	360
Coordinated Land Use and Transportation Planning	4.26	353
Driver Safety	4.23	364
Preserve Historic Resources	4.10	365
Cross Town Mobility	4.03	356
Preserve Community Character	4.01	358
Accessibility to bus routes and bus stops	3.79	326

Table B-4: Survey Results - Top Three Priorities

	Top 3 Transportation Priorities				
Response Category	No. 1	No. 2	No. 3	Total	Rank
Bicycle Facility Improvements	71	42	23	136	**1**
Greenway Expansions and Additions	26	46	33	105	**2**
Traffic Signal Improvements	39	16	21	76	**3**
Pedestrian Network Improvements	19	32	30	81	**4**
Road Diets	13	27	31	71	**5**
Expand or Improve Transit Opportunities	19	16	11	46	**6**
Intersection Improvements	13	20	19	52	**7**
Improve Regional Transit Connectivity	11	13	13	37	**8**
Improve Intersections with Roundabouts	11	11	12	34	**9**
Widen Existing Roads	10	12	10	32	**10**
Improve Freight Movement	4	6	18	28	**11**
Construct New Roads	8	4	10	22	**12**
Alternative Work Hour Programs	3	4	8	15	**13**
Park and Ride Facilities	3	4	2	9	**14**
Audible Stops on Transit Buses	2	0	2	4	**15**
Ridesharing	0	1	5	6	**16**
Totals	252	254	248	754	

Table B-5: Public Comments

Date	Submitted By	Comment	Response
12/12/2013	Nate Hahn	One item left out is a possible interchange at I-164 and Kansas Road and improvements to Kansas Road and Green River Road. With the airport's relocation of runway 4/22, Kansas Road is the logical "Airport" exit for I-164. This would create an easier path from the east side to the airport.	An I-164 interchange would be under INDOT jurisdiction. Currently, INDOT has not identified funding for non-exempt projects beyond 2016. A funding source would need to be identified by INDOT for the suggested interchange to be included in the fiscally constrained plan. The MPO will continue to coordinate with INDOT and local officials regarding the identification of potential interchange improvements along the I-164 corridor and supporting local upgrades. Green River Road improvements from Millersburg Road to Boonville-New Harmony Road are included in the Plan to be open by 2022. An interchange serving the airport has been added to the 2040 Illustrative Needs Project List.
1/3/2014	Gregory Schulten	Requests consideration be given to an Evansville - Mt. Vernon transit connection.	A transit connection with Mt. Vernon would involve the development of a transit service in Posey County for connection with the METS system. The MTP 2040 addresses transportation needs for the Metropolitan Planning area which includes only a very small portion of eastern Posey County. The EMPO is, however, under contract with Posey County and INDOT to conduct rural planning activities in Posey County. The EMPO will discuss with Posey County representatives the potential interest in establishing transit service under the rural planning effort.

APPENDIX C:

CONGESTION MANAGEMENT PROCESS

INTRODUCTION

The Congestion Management Process (CMP) is a plan for recommending and implementing appropriate strategies that can alleviate congestion and improve the performance of the transportation system. This CMP establishes a consistent and systematic process for managing congestion by producing information and recommendations on system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods. This is done with Federal and State guidance for the intended purpose of conforming to Federal air quality standards. Achieving regional air quality improvements are a potential and desired outcome of CMP planning.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 was the first Federal transportation Act to require the establishment of a Congestion Management System in Transportation Management Areas (TMAs), which are urbanized areas with a population over 200,000. The subsequent Transportation Equity Act for the 21st Century (TEA-21), SAFETEA-LU and MPA-21 all have maintained the Congestion Management requirements for TMAs.

In TMAs designated as carbon monoxide (CO) or ground-level ozone (O3) non-attainment areas, the Federal regulation prohibits projects that increase capacity for single-occupant vehicles (SOVs), unless the project emerges from a CMP. At present the EMPO study area is in attainment for CO, and ozone, both of which are considered transportation-related pollutants and that being the case, a CMP analysis is not required for transportation projects. The CMP is nonetheless, a required planning process, and the EMPO will be engaged in CMP activities on a regular basis.

Formerly, the CMP was known as the Congestion Management System (CMS), and the CMS was presented as a stand-alone document (Congestion Management System Report, July 2004). SAFETEA-LU changed the name, and required the inclusion of the CMP within the Metropolitan Transportation Plan. MAP-21 continues these requirements. The EMPO revised the Congestion Management Process, and implemented a new data collection program, in 2009 to better monitor intersections and roadways for delay and operational shortcomings. This data collection program, as well as performance measures and strategies for reducing congestion, are discussed in this appendix.

CONGESTION AND ITS MANAGEMENT

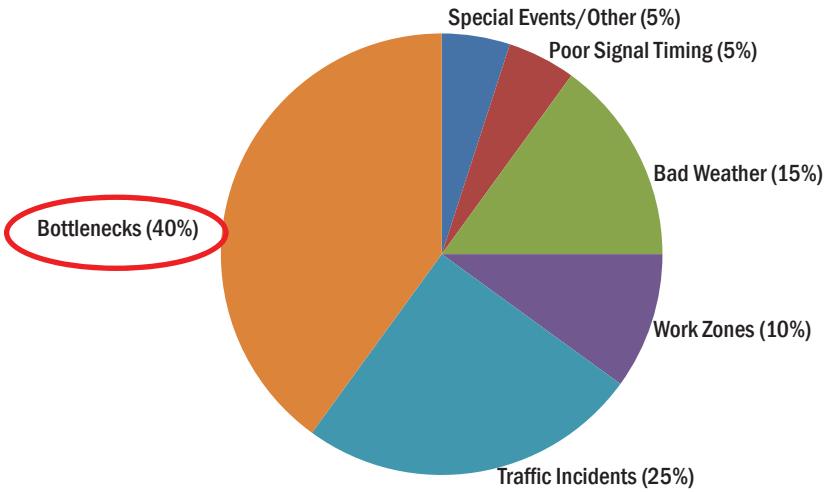
Congestion has been defined by the Federal Highway Administration (FHWA) as “The level at which transportation system performance is no longer acceptable due to traffic interference.” The level of acceptable system performance varies by type of transportation facility, geographic location, and/or time of day. In the National Strategy to Reduce Congestion on America’s Transportation Network (US Dept. of Transportation, 2006), the US DOT states that “Based on current trends, highway congestion is on its way towards becoming a problem in medium-sized cities within the next ten years, while smaller cities, towns, and the suburban and rural fringe can expect to face similar challenges over the next 10 to 15 years.”

The Transportation Research Board (TRB) has identified two types of congestion, as it relates to travel time and speed. The first and most dominant cause of congestion is recurrent congestion caused by inadequate road capacity. This simply means that there are more vehicles trying to utilize a roadway than it can physically accommodate at a single time. Historically, solutions for this type of congestion have focused on building new roads or adding travel lanes to existing roadways.

The second type of congestion results from random events such as accidents, spillages, vehicle breakdowns, inclement weather, special events or any other factor that cannot be anticipated on a typical day of travel. This type of congestion is called non-recurrent congestion because it is largely unpredictable as to when or where it will occur.

It is estimated that the majority of traffic congestion is caused from non-recurrent incidents in an urban area. Figure C-1 shows the factors of congestion. When they occur during rush hours they cause serious congestion. Incident Management, which is a sequence of pre-planned and integrated activities that applies both human and technological resources to remove incidents as quickly and safely as possible to restore capacity to the highway, is a unique solution to non-recurrent congestion incidents.

Figure C-1: Factors of Congestion



Source: FHWA, http://ops.fhwa.dot.gov/publications/fhwahop11034/ch1.htm

A successful congestion management program should address both recurrent and non-recurrent congestion. Both types of congestion can be difficult to mitigate without reducing overall travel demand. For capacity expansion to occur there must be sufficient right-of-way available for acquisition for expansion or funds available to acquire the addition right-of-way needed to build a new road or add travel lanes. Often right-of-way is difficult to acquire and costs can be prohibitive for smaller roadway projects.

Sometimes minimal or temporary relief can be provided through highway performance improvements such as traffic signal synchronization, traffic signal modernization, improved roadway signs and pavement markings and other low cost remedies. However, these improvements are often temporary and only serve to prolong the problem without actually fixing anything. Otherwise, meaningful reductions in congestion can only be accomplished with non-capacity expansion strategies, which are discussed in more detail in the following section.

The EMPO's CMP includes the eight elements of CMP discussed in the new CMP guidance document published by the FHWA. Figure C-2 shows the elements of the EMPO's CMP. The revised CMP also includes an updated CMP network.

Figure C-2: Elements of Congestion Management Process

Source: http://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/fig1.cfm

REGIONAL OBJECTIVES

Regional CMP goals and objectives are developed to support the regional goals and objectives adopted in the MTP 2040. The regional goals and objectives for the MTP 2040 were developed through an extensive planning process discussed in detail in Chapter 1 of the MTP 2040. Specific, Measurable, Realistic, and Time bound (SMART) objectives are listed below.

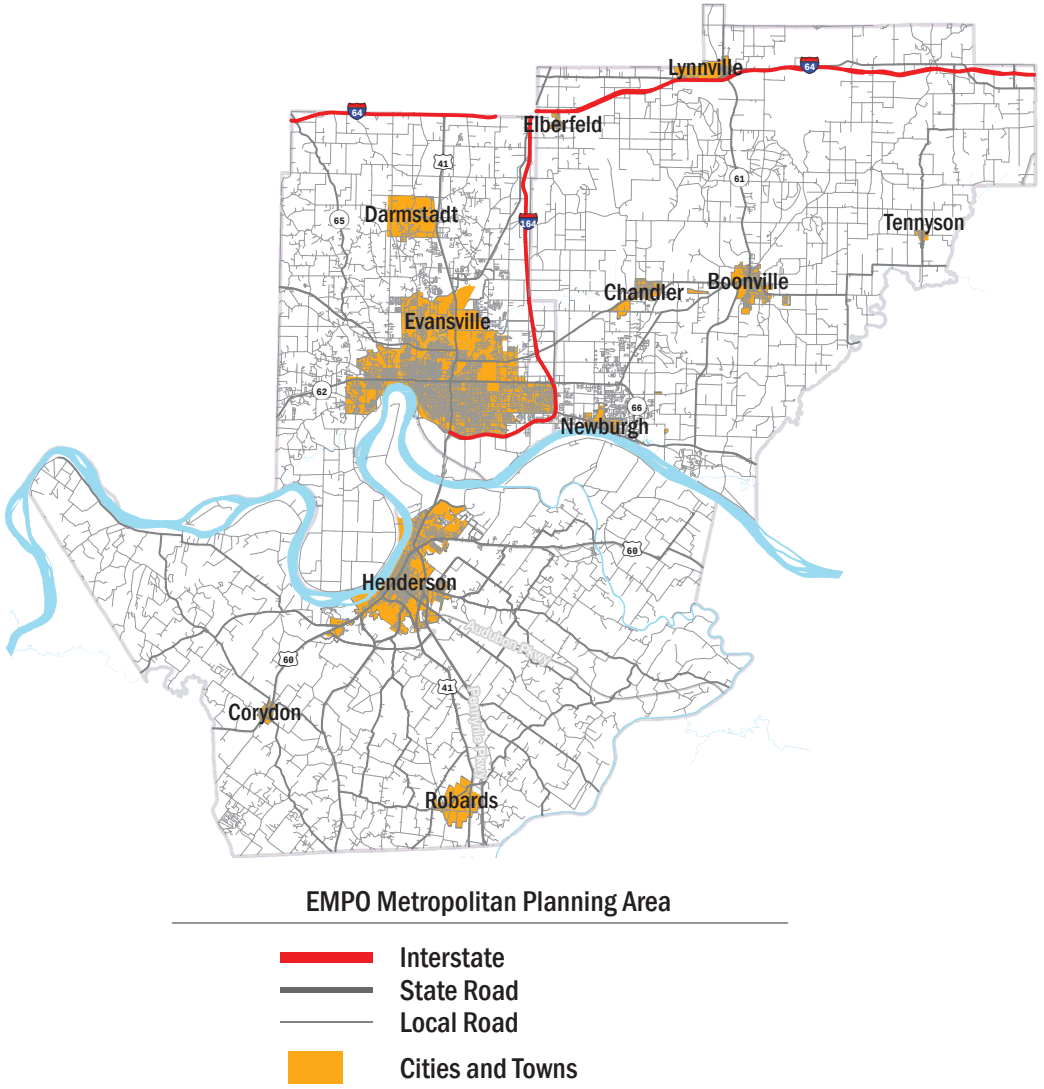
OBJECTIVES:

1. Reduce the percentage of road miles in high to severe congestion by 2% by year 2040
2. Reduce the system wide VMT and VHT by 2% by the year 2040
3. Reduce travel times on CMP network by 2% by year 2040
4. Reduce travel times on truck network by 2% by year 2040
5. Decrease per-capita VMT growth rate by 2% by year 2040
6. Decrease average delay on CMP network corridors by 5% by 2040
7. Decrease TTI on all roadway segments on the CMP network.
8. Increase the bike lane and bike route miles on CMP network by 5% by 2040
9. Increase the fixed route transit route miles on CMP network by 55 by 2040
10. Increase the transit frequency on the CMP network

CMP NETWORK

The CMP is applied to the EMPO Transportation Management Area (TMA) which contains approximately 650 square miles in Indiana, including the City of Evansville, Vanderburgh County, Warrick County, and a very small area of eastern Posey County. In Kentucky, the Study Area encompasses approximately 440 square miles which includes the City of Henderson and Henderson County. Figure C-3 shows the Evansville TMA.

Figure C-3: EMPO Metropolitan Planning Area



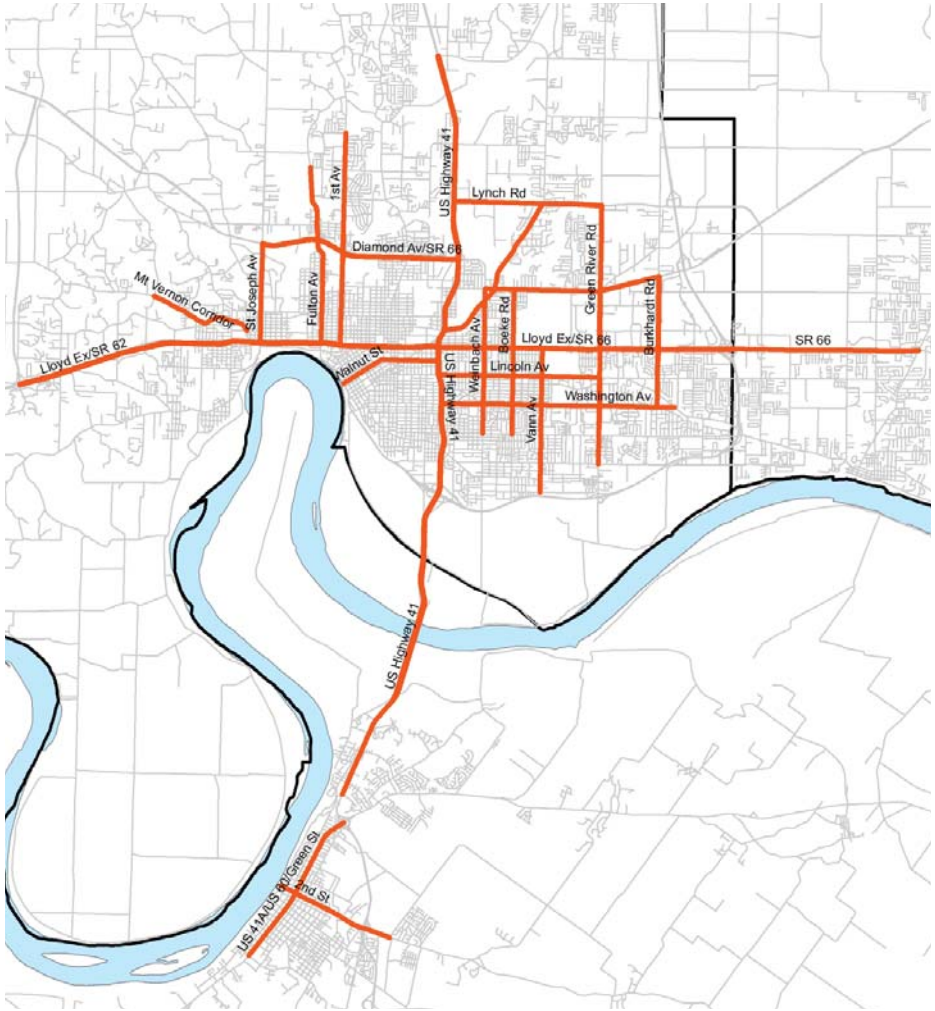
TRANSPORTATION SYSTEM

The transportation system consists of the modes and network to transport people and goods. A general CMP network may include all modes of transportation, such as walk, bike, transit, and motor vehicles. At this point in time, the EMPO's CMP focuses on addressing motor vehicle congestion mitigation strategies for major corridors or roadways and transit system congestion. This is accomplished by collecting performance measurement data, monitoring congestion conditions, and implementing CMP strategies. However, the CMP does promote other modes that help mitigate congestion problems, such as transit, pedestrian, bicycle, carpool, and vanpool modes of transportation. The promotion of these modes is considered an on-going and effective congestion mitigation strategy.

Various definitions of congestion have been proposed. The Interim Final Rule on Management and Monitoring Systems in ISTEA of 1991 by the Federal Highway Administration (FHWA) defines congestion as "the level at which the transportation system performance is no longer acceptable due to traffic interference. The level of acceptable system performance may vary by type of transportation facility, geographic location, and/or time of day." The Transportation Research Board (TRB) defines that "congestion is travel time or delay in excess of that normally incurred under light or free-flow travel conditions."

The previous CMP network included all the major thoroughfares within the TMA which included all HPMS locations, 22 corridors and 23 local turning movement locations. The data analysis is discussed in detail in the CMP data analysis section. However, after analyzing the data collected on the current CMP network and completing the planning process for development of the MTP 2040, the CMP network was expanded to include 26 corridors and 23 local intersections within the City of Evansville. The EMPO will collect the intersection turning movement data on state facilities also. The updated CMP network corridors are shown in Figure C-4.

Figure C-4: Evansville TMA CMP Travel Time Study Corridors



The CMP is a continuous cycle of transportation planning activities, designed to provide decision-makers with valuable information about transportation system performance and the effectiveness of alternative strategies to deal with congestion. Figure C-2 shows these components, and highlights the fact that a CMP is not a one-time exercise but an ongoing process of planning, action and review. By monitoring the effectiveness of congestion mitigation strategies and evaluating their benefits in an orderly and consistent manner, planners and stakeholders can improve the ability to select the most cost-effective strategies appropriate to specific local conditions and needs.

PERFORMANCE MEASURES

Performance measures are at the core of the CMP and are parameters to measure the level of congestion, identify the locations, and indicate the extent of congestion on the region's transportation system. A performance measure is composed of a number and a unit of measure. The number gives us a magnitude (how much) and the unit gives the number a meaning. Performance measures quantitatively inform us of the level of congestion. They are the key indicators of how effectively or ineffectively the transportation system is operating. This leads to specific requirements for data collection, analysis, and monitoring. The information may be used to track changes in mobility/congestion over time, identify subareas or corridors with mobility problems, and identify causes of congestion.

Performance measurement is a process of assessing progress toward achieving predetermined goals. Congestion management performance measurement is the process that the EMPO uses to evaluate the progress toward the congestion management goals. At a system-level (moving people and goods), there are three possible performance measures:

1. Total high to severe congested VMT
2. High to severe congested travel time
3. High to severe congested average speed

The commonly-used vehicle-travel congestion management performance measures were inventoried as follows:

1. Travel Speed (Distance/Time) (mile/hour)
2. Travel Time – time needed to traverse a road segment or corridor (minute)
3. Travel Time Index (TTI) (Congested Travel Time / Free Flow Travel Time)
4. Planning Time Index (PTI)
5. Delay (Congested Travel Time – Free Flow Travel Time)
6. Travel Rate (Time/Distance) (min/mile)
7. Travel Rate Index (TRI) (Congested Travel Rate / Free Flow Travel Rate)
8. Level of service (LOS)
9. Volume/Capacity (V/C).

The free-flow speed is the speed that occurs when traffic is light enough that individual vehicle speeds are unaffected by the presence of other traffic. Free-flow speeds are determined for each route.

Travel Time Index (TTI) is defined as the travel time for a given roadway segment divided by the free flow travel time. The free flow travel time is determined for each segment by the EMPO's travel demand model.

Planning Time Index (PTI) is defined as the amount of extra time needed (total time needed/time needed in free flow conditions) to allow punctual arrival 95% of the time. This accounts for unexpected delays, and is an indicator of the reliability of travel.

The traditional performance measures, LOS and V/C, gauge the intensity of roadway congestion at a particular location (a segment of roadway or an intersection). They are primarily used as general indicators of roadway sufficiency or for detailed corridor studies. These measures may be converted to travel time through a series of theoretical relationships. In addition, LOS indicators, with a standardized "A" through "F" grading system, are assigned based on TTI, average peak hour speed and V/C ratio calculations.

To identify congested locations, evaluate level of congestion, and assess congestion extent, selected performance measures should meet the following criteria:

1. Clearly understood
2. Sensitive to modes
3. Sensitive to time-of-day (e.g., spreading of peak-period)
4. Not too difficult or costly to collect data
5. Able to be forecast into the future
6. Sensitive to the impact of congestion mitigation strategies (on people and/or goods).

One of the important decisions in implementing the CMP is to select the appropriate performance measures to identify congestion. On the basis of the above criteria and evaluation, the MPO selected the following performance measures to gauge the level of congestion on the freeway and arterial corridors:

1. Travel Speed
2. Travel Time
3. Travel Time Index (TTI)
4. Planning Time Index (PTI)
5. Volume-to-Capacity Ratio (V/C) – for corridor/intersection specific analysis
6. Level of Service (LOS) – for corridor/intersection specific analysis

The MPO proposes to use the above performance measures, as appropriate for the particular application or analysis, to develop its congestion management studies and reports. It is envisioned, at this point, that the TTI parameter will be the primary performance measure used since travel time is of utmost interest to transportation system users and this parameter addresses the impacts of congestion on travel time.

TRANSIT PERFORMANCE MEASURES:

Currently, all three transit systems within the TMA operate most of their trips at or under capacity. To measure congestion on transit system, the EMPO selected the following performance measures:

1. Percentage of trips operated at or above capacity
2. Percentage of trips delayed

DATA COLLECTION/SYSTEM PERFORMANCE MONITORING

The EMPO has been collecting data on the current CMP network locations on a three year cycle since year 2009. The EMPO will continue to collect traffic count data, travel time survey data and intersection turning movements data on the expanded CMP network. The data collected will be analyzed and published once every three years. Tables C-1, C-2 and C-3, show the expanded CMP network.

Table C-1: CMP Travel Time Survey Data Collection Corridors

Number	County	Street	From	To	Length in miles
1	Henderson	US 60	US 41	Sand Ln	3.6
2	Henderson	US 41	KY State line	Barrette Blvd	4.49
3	Henderson	2nd ST	Water St	Garden Mile Rd	2.16
4	Vanderburgh	Boeke Ave	Morgan Ave	Covert Ave	2.52
5	Vanderburgh	Weinbach Ave	Morgan Ave	Covert Ave	2.51
6	Vanderburgh	Vann Ave	SR 66	Reinhart Ave	2.53
7	Vanderburgh	Washington Ave	US 41	Newburg Rd	4.04
8	Vanderburgh	St. Joe Ave	SR 62	Diamond Ave	1.72
9	Vanderburgh	SR 66	I-69	US 41	5.14
10	Vanderburgh	SR 62	US 41	St. Joe	3.15
11	Vanderburgh	SR 62	St. Joe	Univ Pkw	4.4
12	Vanderburgh	US 41	SR 62	KY State line	3.68
13	Vanderburgh	US 41	SR 62	SR 57	5.19
14	Vanderburgh	1st Ave	SR 62	Old Post Rd	3.71
15	Vanderburgh	Fulton Ave	SR 62	Mill Rd	3.08
16	Vanderburgh	Diamond Ave	US 41	St Joe Ave	3.52
17	Vanderburgh	Burkhardt Rd	Washington Ave	Morgan Ave	2.27
18	Vanderburgh	Green River Rd	SR 66	Lynch Rd	2.5
19	Vanderburgh	Green River Rd	SR 66	Pollack Ave	2.01
20	Vanderburgh	Lincoln Ave	US 41	Green River Rd	2.79
21	Vanderburgh	Walnut St	US 41	Riverside Dr	1.76
22	Warrick	SR 66	I-69	SR 261	3.33
23	Vanderburgh	Mt. Vernon Ave	Franklin St	N. Red Bank Rd	1.9
24	Vanderburgh	Morgan Ave	Weinbach Ave	Burkhardt Rd	3.1
25	Vanderburgh	Lynch Rd	US 41	Green River Rd	2.6
26	Vanderburgh	Oak Hill Rd	US 41	Lynch Rd	2.9

Table C-2: CMP Traffic Count Locations

Primary Street	Count Location - Vanderburgh. Co.
Boeke Rd.	North of SR 66
Burkhardt Rd.	Wal-Mart - Virginia St.
Burkhardt Rd.	Oak Grove Rd. - Morgan Ave.
Burkhardt Rd. Rd.	Lincoln Ave. - Walnut St.
Columbia St.	Main St. - Elsas Ave.
Diamond Ave..	Stringtown Rd. - Evans Ave.
Diamond Ave..	Hiedelbach Ave. - Lafeyette St.
First Ave.	Meyer Ave. - Colorado St.
First Ave.	Virginia St. - Maryland Ave.
First Ave.	N. Park Dr. - Mill Rd.
Fulton Ave.	SR 66 - Meyer Ave.
Fulton Ave.	Riverside Ave. - Second St.
Green River Rd. Rd.	North of SR 66
Green River Rd. Rd.	South of SR 66
Green River Rd. Rd.	North of Morgan Ave.
Green River Rd. Rd.	Washington Ave. - Bellemeade Ave.
I - 164	North of SR 66
I - 164	Green River Rd. - US 41
Lincoln Ave.	East of Hebron Ave.
Lincoln Ave.	West of Fielding Rd.
Lloyd Expressway	West of US 41
Lloyd Expressway	East of US 41
Lloyd Expressway	West of Vann Ave.
Lloyd Expressway	East of Burkhardt Rd.
Lloyd Expressway	East of Weinbach Ave.
Lloyd Expressway	West of Red Bank Rd.
Lloyd Expressway	West of St. Joseph Ave.
Lynch Rd.	Oak Hill - Green River Rd.
Lynch Rd.	East of US 41
Morgan Ave.	East of Weinbach Ave.
Morgan Ave.	East of Green River Rd.
Morgan Ave.	West of US 41
Morgan Ave.	East of US 41
Old Boonville Hwy.	West of Burkhardt Rd. Rd.
Oak Hill Rd.	South of Bergdolt Rd.
Riverside Dr.	North of Locust Ave.

Primary Street	Count Location - Vanderburgh Co.
SR 57	North of Foundation Drive
St. Joseph Ave. Ave.	North of SR 66
St. Joseph Ave. Ave.	South of SR 66
Stockwell Rd.	North of SR 66
US 41	North of SR 66
US 41	At In-Ky State Line
US 41	South of Morgan Ave.
US 41	St. George Rd.- Petersburg Rd.
US 41	North of Diamond Ave.
Veterans Pkwy	Sycamore St. - Main St.
Walnut St.	West of US 41
Washington Ave.	Vann Ave. - Green River Rd.
Washington Ave.	East of US 41
Weinbach Ave. Ave.	South of SR 66
Weinbach Ave. Ave.	Morgan Ave. - Maxwell Ave.
Primary Street	**Count Location Warrick Co.**
Epworth Rd.	SR 66 - Lincoln Ave.
SR 261	North of SR 66
SR 62	East of SR 61
SR 62	West of State St.
SR 66	West of SR 261
SR 66	East of SR 261
SR 66	Epworth Rd. - Grimm Rd.
SR 66	SR 261 - Bell Rd.
SR 662	West of I-164
SR 662	East of I-164
Primary Street	**Count Location - Henderson Co.**
Green St.	South of Washington Ave.
Green St.	North of SR 136/Sand Ln.
Green St.	East of Henderson Bypass
Green St.	North of 12th St.
US 60	N/E of Barret Dr.
US 41	S. of Marywood/N. of US 60
US 41	S. of Watson Lane
US 41	S. of CR 812
US 41A	N. of Collier Rd.

Table C-3: CMP Peak Hour Intersections Turning Movements Count Locations

County	Intersection	County	Intersection
Vanderburgh	1st Ave @ Columbia	Vanderburgh	Morgan @ Green River
Vanderburgh	1st Ave @ Mill Rd	Vanderburgh	Morgan @ Stockwell
Vanderburgh	Bellemeade @ Kentucky	Vanderburgh	Morgan @ Weinbach
Vanderburgh	Bellemeade @ St Marys Dr	Vanderburgh	Oak Hill @ Morgan
Vanderburgh	Boeke @ Morgan	Vanderburgh	SR 57 @ Kansas
Vanderburgh	Burkhardt @ Lynch	Vanderburgh	SR 66 @ Fares
Vanderburgh	Burkhardt @ Virginia	Vanderburgh	SR 66 @ SR 261
Vanderburgh	Diamond @ 1st Ave	Vanderburgh	Theatre @ Green River
Vanderburgh	Diamond @ Fares	Vanderburgh	US 41 @ St George
Vanderburgh	Diamond @ Stringtown	Vanderburgh	Walnut @ SE 2nd St
Vanderburgh	Fares @ Columbia	Vanderburgh	Washington @ Green River
Vanderburgh	Fulton @ Franklin	Vanderburgh	Washington @ Weinbach
Vanderburgh	Gardner Rd @ SR 62	Vanderburgh	Lincoln @ Vann
Vanderburgh	Green River @ Kansas	Vanderburgh	Lynch @ US 41
Vanderburgh	Green River @ Theater	Warrick	Old SR 261 @ Bell Rd
Vanderburgh	Lincoln @ Kentucky	Warrick	Old SR 662 @ Epworth
Vanderburgh	Lincoln @ Weinbach	Warrick	SR 261 @ Lincoln
Vanderburgh	Lloyd Exp @ Burkhardt	Warrick	SR 261 @ Sharon Rd
Vanderburgh	Lloyd Exp @ Red Bank	Warrick	Epworth @ SR 66
Vanderburgh	Locust @ SE 2nd St	Warrick	SR 261 @ SR 66
Vanderburgh	Lynch @ Hitch-Peters	Henderson	SR 60 @ Barrett Blvd
Vanderburgh	Mary St @ Division	Henderson	Green St @ 2nd st
Vanderburgh	Mill @ St Joseph	Henderson	Green St @ Washington

DATA ANALYSIS

The traffic count data collected on the CMP network was analyzed to measure the V/C ratios for AM and PM peak hours. This V/C ratio was used to calculate the LOS. Table C-4 shows the V/C ratios corresponding to the LOS. Table C-5 and C-6 shows the CMP traffic count locations and the corresponding LOS based on AM and PM peak hour V/C ratio.

Table C-4: LOS Based on V/C Ratio

V/C Ratio	LOS
0-0.30	A
0.31 - 0.49	B
0.50 - 0.69	C
0.70 - 0.85	D
0.85 - 0.99	E
>1.0	F

Table C-5: AM Peak LOS on CMP Traffic Count Locations

CMP Traffic Count Locations		AM Peak						
STREET	LOCATION	North-East Vol	South-West Vol	Peak Hr LnCAP	V/C (North / East)	V/C (South - West)	Avg V/C	LOS
Vanderburgh County								
Boeke Rd.	Graham - Helmuth	100	72	1269	0.08	0.06	0.07	A
Boeke Rd.	Sweetser - Cass	148	87	1269	0.12	0.07	0.09	A
Boeke Rd.	North of Culverson	41	29	1269	0.03	0.02	0.03	A
Boeke Rd.	North of Reinhardt	-	31	1269	-	0.02	0.02	A
Boeke Rd.	Division - Illinois	217	285	1370	0.16	0.21	0.18	A
Boeke Rd.	At Washington	71	119	1269	0.06	0.09	0.07	A
Boeke Rd.	At Walnut	299	188	1269	0.24	0.15	0.19	A
Burkhardt Rd.	Lynch - Hirsch	53	91	1348	0.04	0.07	0.05	A
Burkhardt Rd.	Newburgh - Washington	142	137	1269	0.11	0.11	0.11	A
Burkhardt Rd.	Oak - Walnut	614	486	1418	0.43	0.34	0.39	B
Burkhardt Rd.	Lincoln - Newburgh	206	164	1269	0.16	0.13	0.15	A
Burkhardt Rd.	Lynch - Loerhlein	148	180	1348	0.11	0.13	0.12	A
Burkhardt Rd.	WalMart - Virginia	471	406	1500	0.31	0.27	0.29	A
Burkhardt Rd.	Oak Grove - Morgan	340	365	1456	0.23	0.25	0.24	A
Burkhardt Rd.	North of Virginia	511	522	1500	0.34	0.35	0.34	B
Burkhardt Rd.	North of Morgan	-	296	1407	-	0.21	0.21	A
Columbia St	West of Oakley St						0	A
Columbia St.	Pigeon Crk - Seventh Ave.	323	169	1370	0.24	0.12	0.18	A
Columbia St.	Fulton - Fourth Ave.	540	383	1269	0.43	0.3	0.36	B
Columbia St.	Main - Elsas	330	238	1269	0.26	0.19	0.22	A
Columbia St.	Elsas - Main	341	368	1269	0.27	0.29	0.28	A
Columbia St.	Third - Second	354	-	1269	0.28	-	0.28	A
Diamond Ave.	US 41 - Willemette	244	212	1711	0.14	0.12	0.13	A
Diamond Ave.	US 41 - Garrison	259	255	1636	0.16	0.16	0.16	A
Diamond Ave.	Stringtown - Kentucky	438	387	1711	0.26	0.23	0.24	A
First Ave.	Old Post - Hanover	182	258	1407	0.13	0.18	0.16	A
First Ave.	Iowa - Virginia	336	408	1250	0.27	0.33	0.3	B
First Ave.	Oregon - Maryland	319	440	1370	0.23	0.32	0.28	A
Frist Ave.	Morgan - Pigeon Crk.	400	525	1370	0.29	0.38	0.34	B
Frist Ave.	SR 66 - Meyer	406	467	1460	0.28	0.32	0.3	B
Frist Ave.	Rueger - Stonebridge	161	445	1500	0.11	0.3	0.2	A
Frist Ave.	Pigeon Crk - Avon	407	599	1370	0.3	0.44	0.37	B
Frist Ave.	Lloyd - Illinois	278	404	1370	0.2	0.29	0.25	A
Frist Ave.	Buena Vista - Sheridan	315	550	1460	0.22	0.38	0.3	B
Fulton Ave.	North of Louisiana	539	926	1389	0.39	0.67	0.53	C
Fulton Ave.	North of Buna Vista	-	56	1269		0.04	0.02	A
Fulton Ave.	Lloyd - Illinois	254	291	1389	0.18	0.21	0.2	A
Fulton Ave.	Riverside - Second	304	266	1438	0.21	0.18	0.2	A
Fulton Ave.	SR 66 - Cody	164	309	1460	0.11	0.21	0.16	A
Green River Rd.	Washington - Powell	281	485	1370	0.21	0.35	0.28	A
Green River Rd.	Millersburg - Kansas	126	300	1752	0.07	0.17	0.12	A
Green River Rd.	At Sugar Mill	428	608	1424	0.3	0.43	0.36	B
Green River Rd.	Washington - Bellemeade	428	368	1418	0.3	0.26	0.28	A
Green River Rd.	Lloyd - Virginia	684	571	1438	0.48	0.4	0.44	B
Green River Rd.	Morgan - Theater	440	517	1424	0.31	0.36	0.34	B
Green River Rd.	Tecumseh - Sycamore	639	520	1418	0.45	0.37	0.41	B

Table C-6: PM Peak LOS on CMP Traffic Count Locations

CMP Traffic Count Locations		PM Peak					
STREET	LOCATION - Vand. Co.	North-East Vol	South-West Vol	Peak Hr LnCAP	V/C (North - East)	V/C (South - West)	LOS
Vanderburgh County							
Boeke Rd.	Graham - Helmuth	125	124	1269	0.1	0.1	A
Boeke Rd.	Sweetser - Cass	162	154	1269	0.13	0.12	A
Boeke Rd.	North of Culverson	43	52	1269	0.03	0.04	A
Boeke Rd.	North of Reinhardt	-	50	1269	-	0.04	A
Boeke Rd.	Division - Illinois	308	271	1370	0.22	0.2	A
Boeke Rd.	At Washington	89	187	1269	0.07	0.15	A
Boeke Rd.	At Walnut	336	266	1269	0.26	0.21	A
Burkhardt Rd.	Lynch - Hirsch	77	61	1348	0.06	0.05	A
Burkhardt Rd.	Newburgh - Washington	165	176	1269	0.13	0.14	A
Burkhardt Rd.	Oak - Walnut	678	806	1418	0.48	0.57	C
Burkhardt Rd.	Lincoln - Newburgh	259	247	1269	0.2	0.19	A
Burkhardt Rd.	Lynch - Loerhlein	264	183	1348	0.2	0.14	A
Burkhardt Rd.	WalMart - Virginia	500	503	1500	0.33	0.34	B
Burkhardt Rd.	Oak Grove - Morgan	452	377	1456	0.31	0.26	B
Burkhardt Rd.	North of Virginia	550	566	1500	0.37	0.38	B
Burkhardt Rd.	North of Morgan	-	315	1407	-	0.22	A
Columbia St	West of Oakley St						
Columbia St.	Pigeon Crk - Seventh Ave.	195	248	1370	0.14	0.18	A
Columbia St.	Fulton - Fourth Ave.	414	502	1269	0.33	0.4	B
Columbia St.	Main - Elsas	426	394	1269	0.34	0.31	A
Columbia St.	Elsas - Main	410	331	1269	0.32	0.26	B
Columbia St.	Third - Second	419	-	1269	0.33	-	B
Diamond Ave.	US 41 - Willemette	268	337	1711	0.16	0.2	A
Diamond Ave.	US 41 - Garrison	315	374	1636	0.19	0.23	A
Diamond Ave.	Stringtown - Kentucky	455	544	1711	0.27	0.32	B
First Ave.	Old Post - Hanover	394	222	1407	0.28	0.16	A
First Ave.	Iowa - Virginia	446	318	1250	0.36	0.25	B
First Ave.	Oregon - Maryland	472	335	1370	0.34	0.24	B
Frist Ave.	Morgan - Pigeon Crk.	539	378	1370	0.39	0.28	B
Frist Ave.	SR 66 - Meyer	555	493	1460	0.38	0.34	B
Frist Ave.	Rueger - Stonebridge	385	206	1500	0.26	0.14	A
Frist Ave.	Pigeon Crk - Avon	537	443	1370	0.39	0.32	B
Frist Ave.	Lloyd - Illinois	377	284	1370	0.28	0.21	A
Frist Ave.	Buena Vista - Sheridan	480	439	1460	0.33	0.3	B
Fulton Ave.	North of Louisiana	928	636	1389	0.67	0.46	C
Fulton Ave.	North of Buna Vista	-	67	1269		0.05	A
Fulton Ave.	Lloyd - Illinois	337	285	1389	0.24	0.21	A
Fulton Ave.	Riverside - Second	359	338	1438	0.25	0.24	A
Fulton Ave.	SR 66 - Cody	320	188	1460	0.22	0.13	A
Green River Rd.	Washington - Powell	317	474	1370	0.23	0.35	B
Green River Rd.	Millersburg - Kansas	356	213	1752	0.2	0.12	B
Green River Rd.	At Sugar Mill	617	483	1424	0.43	0.34	B
Green River Rd.	Washington - Bellemeade	436	512	1418	0.31	0.36	B
Green River Rd.	Lloyd - Virginia	679	664	1438	0.47	0.46	B
Green River Rd.	Morgan - Theater	585	528	1424	0.41	0.37	B
Green River Rd.	Tecumseh - Sycamor	678	642	1418	0.48	0.45	B
Green River Rd.	At Kansas	-	205	1752	-	0.12	A

Travel time survey data was collected on 22 corridors for both AM and PM Peak hours using floating car method. Utilizing this travel time data and the free flow time from the Evansville Travel Demand Model the TTI for the corridors was calculated. TTI was used to designate the congestion level as low, moderate, high and severe. Table C-7 shows the designation of congestion levels and Figure 5 shows the CMP network with observed congestion levels based on the TTI. Table C-8 shows the observed congestion levels on CMP corridors. The corridors performing at high to severe congestion levels are highlighted.

Table C-7: Congestion Designations Based on V/C Ratios

Evansville MPO TTI thresholds for Congestion Levels				
Facility Type	No/Low Congestion	Moderate Congestion	High Congestion	Severe Congestion
Freeways	< 1.3	1.3 - 1.8	1.8 - 2.3	> 2.3
Arterials & Local Urban	< 1.5	1.5 - 1.8	1.8 - 2.0	> 2.0

Figure C-5: CMP Travel Time Study Corridors Congestion Level

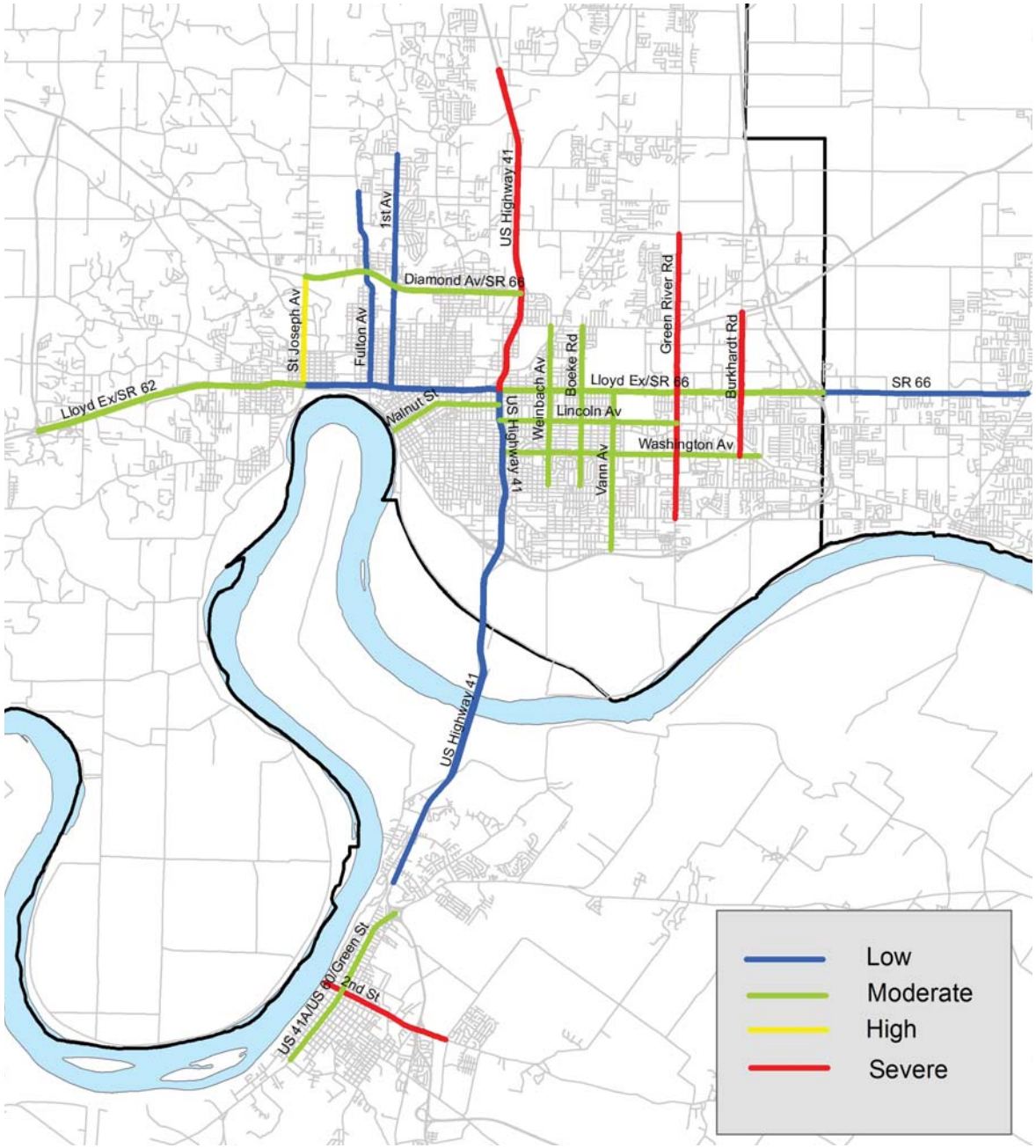


Table C-8: TTI and Congestion Levels on CMP Corridors

Street	From	To	Length	AM Peak					PM Peak				
				Avg TT	Avg Delay	FF TT	TTI	Congestion Level	Avg TT	Avg Delay	FF TT	TTI	Congestion Level
Boeke Ave	Morgan Ave	Covert Ave	2.52	6:35	1:11	4:22	1.51	Moderate	6:50	1:10	4:22	1.56	Moderate
Boeke Ave	Covert Ave	Morgan Ave	2.52	6:45	1:19	4:22	1.55	Moderate	6:54	2:24	4:22	1.58	Moderate
Weinbach Ave	Morgan Ave	Covert Ave	2.51	6:23	0:54	4:10	1.53	Moderate	6:08	0:53	4:10	1.47	Low
Weinbach Ave	Covert Ave	Morgan Ave	2.51	6:57	0:57	4:10	1.67	Moderate	6:35	1:18	4:10	1.58	Moderate
Vann Ave	SR 66	Reinhart Ave	2.53	5:53	0:47	4:26	1.33	Low	6:47	0:50	4:26	1.53	Moderate
Vann Ave	Reinhart Ave	SR 66	2.53	6:45	1:18	4:26	1.52	Moderate	7:24	1:07	4:26	1.67	Moderate
Washington Ave	US 41	Newburg Rd	4.04	7:38	0:17	6:26	1.19	Low	9:41	1:26	6:26	1.51	Moderate
Washington Ave	Newburg Rd	US 41	4.04	9:24	1:33	6:26	1.46	Low	8:30	0:00	6:26	1.32	Low
St. Joe Ave	SR 62	Diamond Ave	1.72	4:00	0:50	2:26	1.64	Moderate	4:40	1:30	2:26	1.92	High
St. Joe Ave	Diamond Ave	SR 62	1.72	4:40	1:25	2:26	1.92	High	3:58	0:51	2:26	1.63	Moderate
SR 66	I-69	SR 261	3.33	4:47	0:37	3:54	1.23	Low	5:38	1:16	3:54	1.44	Low
SR 66	SR 261	I-69	3.34	5:39	1:16	3:55	1.44	Low	5:11	0:50	3:55	1.32	Low
SR 66	I-69	US 41	5.14	7:46	0:54	5:36	1.39	Low	6:33	1:15	5:36	1.17	Low
SR 66	US 41	I-69	5.24	7:17	0:49	5:39	1.29	Low	9:09	1:51	5:39	1.62	Moderate
SR 62	US 41	St. Joe	3.15	4:20	0:16	3:44	1.16	Low	4:31	0:22	3:44	1.21	Low
SR 62	St. Joe	US 41	3.13	4:24	0:19	3:41	1.19	Low	4:22	0:16	3:41	1.19	Low
SR 62	St. Joe	Univ Pkw	4.4	6:19	0:26	4:44	1.33	Low	7:19	0:57	4:44	1.55	Moderate
SR 62	Univ Pkw	St. Joe	4.4	6:21	0:44	4:25	1.44	Low	7:35	1:46	4:25	1.72	Moderate
US 41	SR 62	KY State line	3.68	5:56	0:42	4:15	1.4	Low	6:19	0:46	4:15	1.49	Low
US 41	KY State line	SR 62	3.7	5:25	0:23	4:17	1.26	Low	5:18	0:07	4:17	1.24	Low
US 41	SR 62	SR 57	5.19	9:33	1:15	6:10	1.55	Moderate	13:08	3:43	6:10	2.13	Severe
US 41	SR 57	SR 62	5.1	8:43	1:10	6:01	1.45	Low	9:39	1:17	6:01	1.6	Moderate
1st Ave	SR 62	Old Post Rd	3.71	8:56	1:24	6:20	1.41	Low	9:21	1:30	6:20	1.48	Low
1st Ave	Old Post Rd	SR 62	3.71	8:37	1:12	6:20	1.36	Low	9:06	1:34	6:20	1.44	Low
Fulton Ave	SR 62	Mill Rd	3.08	6:51	1:03	5:27	1.26	Low	7:23	1:25	5:27	1.35	Low
Fulton Ave	Mill Rd	SR 62	3.08	6:49	0:58	5:27	1.25	Low	7:10	1:08	5:27	1.31	Low
Diamond Ave	US 41	St Joe Ave	3.52	6:26	1:08	3:56	1.64	Moderate	7:36	2:02	3:56	1.93	Moderate
Diamond Ave	St Joe Ave	US 41	3.52	6:46	1:22	3:56	1.72	Moderate	7:34	2:07	3:56	1.92	Moderate
2nd ST	Water St	Garden Mile Rd	2.16	7:44	3:20	3:26	2.25	Severe	5:56	1:40	3:26	1.73	Moderate
2nd ST	Garden Mile Rd	Water St	2.16	6:23	2:49	3:26	1.86	High	5:28	1:16	3:26	1.59	Moderate
Burkhardt Rd	Washington	Morgan Ave	2.27	8:11	2:03	3:32	2.32	Severe	21:22	14:28	3:32	6.05	Severe
Burkhardt Rd	Morgan Ave	Washington	2.27	7:42	1:47	3:32	2.18	Severe	7:45	2:41	3:32	2.19	Severe
Green River Rd	SR 66	Lynch Rd	2.5	6:36	1:16	3:34	1.85	High	7:13	1:20	3:34	2.02	Severe
Green River Rd	Lynch Rd	SR 66	2.5	5:09	0:33	3:34	1.44	Low	7:25	1:27	3:34	2.08	Severe
Green River Rd	SR 66	Pollack Ave	2.01	5:46	0:57	3:24	1.7	Moderate	5:43	0:41	3:24	1.68	Moderate
Green River Rd	Pollack Ave	SR 66	2.01	5:13	0:36	3:24	1.53	Moderate	8:04	1:52	3:24	2.37	Severe
Lincoln Ave	US 41	Green River Rd	2.79	6:24	0:58	4:44	1.35	Low	6:16	0:58	4:44	1.32	Low
Lincoln Ave	Green River Rd	US 41	2.79	7:05	1:33	4:44	1.5	Moderate	6:06	0:43	4:44	1.29	Low
US 60	US 41	Sand Ln	3.6	6:00	1:06	4:10	1.44	Low	4:53	1:06	4:10	1.17	Low
US 60	Sand Ln	US 41	3.6	5:43	0:34	4:10	1.37	Low	6:20	1:41	4:10	1.52	Moderate
US 41	KY State line	Barrette Blvd	4.49	6:21	0:11	5:35	1.14	Low	6:35	0:45	5:35	1.18	Low
US 41	Barrette Blvd	KY State line	4.49	7:27	0:35	5:35	1.33	Low	5:31	0:53	5:35	0.99	Low
Walnut St	US 41	Riverside Dr	1.76	6:39	2:26	3:06	2.15	Severe	4:39	0:56	3:06	1.5	Moderate
Walnut St	Riverside Dr	US 41	1.76	4:43	0:34	3:06	1.52	Moderate	4:31	0:55	3:06	1.46	Low

Peak hour turning movements were collected at various locations within the TMA. The peak hour turning movements and the traffic signal timings for all local facilities were used to calculate the intersection LOS based on HCS+ software. Intersection LOS analysis is presented in Table C-9. The majority of local intersections analyzed for CMP are performing at LOS A, B and C. The intersections performing at LOS D are highlighted in the Table C-9.

Table C-9: CMP Traffic Count Locations

CMP Intersection LOS														
Intersection	DATE	NB			SB			EB			WB			LOS
		Rt	TR	Lt	Rt	TR	Lt	Rt	TR	Lt	Rt	TR	Lt	
1st Ave @ Columbia AM	6/22/2011	11	100	6	12	228	40	24	104	15	10	39	10	B
1st Ave @ Columbia PM	6/22/2011	12	228	16	9	140	17	18	79	27	26	107	24	B
1st Ave @ Mill Rd AM	6/8/2011	13	46	8	17	167	17	12	29	10	8	24	42	C
1st Ave @ Mill Rd PM	6/8/2011	37	176	19	22	106	23	22	55	47	24	56	53	D
Bellemeade @ Kentucky AM	6/8/2011	2	27	2	2	9	0	5	10	3	3	22	1	A
Bellemeade @ Kentucky PM	6/8/2011	5	45	13	2	59	9	8	57	1	9	15	5	B
Bellemeade @ St Marys Dr AM	6/14/2011	5	6	9	1	30	9	42	77	4	4	28	16	A
Bellemeade @ St Marys Dr PM	6/14/2011	18	34	26	5	15	4	8	89	4	2	121	4	A
Burkhardt @ Virginia AM	6/30/2011	36	98	44	31	100	24	9	27	10	32	47	21	D
Burkhardt @ Virginia PM	6/30/2011	42	164	35	21	210	60	38	78	42	50	60	38	D
Fares @ Columbia AM	6/21/2011	4	41	8	24	35	14	5	34	13	31	60	1	A
Fares @ Columbia PM	6/21/2011	6	35	2	31	27	24	6	105	18	11	57	2	A
Fulton @ Franklin AM	6/15/2011	5	111	33	11	126	34	41	90	8	5	49	7	B
Fulton @ Franklin PM	6/15/2011	6	179	38	10	109	14	24	59	11	26	107	7	B
Lincoln @ Kentucky AM	6/7/2011	9	53	10	1	16	4	7	27	0	12	53	4	A
Lincoln @ Kentucky PM	6/7/2011	8	27	8	2	44	12	20	48	1	6	40	6	A
Lincoln @ Weinbach AM	6/16/2011	6	97	6	12	72	17	7	48	16	13	65	9	B
Lincoln @ Weinbach PM	6/16/2011	11	100	9	25	121	14	13	73	20	13	58	5	B
Locust @ SE 2nd St PM	9/9/2010	4	55	2	0	119	4	37	19	11	18	6	6	B
Mill @ St Joseph AM	6/29/2011	17	44	7	1	119	8	14	16	1	7	9	23	A
Mill @ St Joseph PM	6/29/2011	21	136	10	4	92	12	9	11	3	23	29	21	A
Walnut @ SE 2nd St PM	9/16/2010	5	37	0	3	109	33	0	13	0	27	9	14	B
Washington @ Green River AM	6/23/2011	18	126	39	42	74	23	14	49	27	35	83	20	C
Washington @ Green River PM	6/23/2011	11	148	22	38	197	72	54	120	53	42	97	35	D
Washington @ Weinbach PM	12/15/2009	18	82	13	12	94	36	17	155	12	17	136	12	B
Lincoln @ Vann PM	3/12/2008	11	140	4	10	119	54	16	131	6	32	105	13	B

CONGESTION MANAGEMENT STRATEGIES

Transportation Demand Management (TDM)

The primary purpose of TDM strategies is to reduce the number of vehicles using the road system while providing mobility options to those who want to travel. TDM strategies are designed to maximize the people-moving capacity of the transportation network, and support more efficient use of the existing transportation systems by influencing the time, route, or mode selected for a given trip. To accomplish these types of changes, TDM programs often rely on incentives to make these shifts in behavior attractive and generally work best where land uses are mixed and fairly dense, urban design is integrated with transportation systems, and there are multiple choices for travel. Incentives associated with TDM strategies include preferential parking for persons sharing carpools, vanpools, or transit; transportation allowances for transit; subsidies for transit operators; and guaranteed ride home programs. The following are some TDM alternatives that are, or may be, viable in the Evansville-Henderson area:

Ridesharing

Carpools and vanpools are typically arranged by employers. Ridesharing will reduce SOV trips and Vehicle Miles Traveled (VMT) in the region, and can be especially helpful in corridors with large employment centers. Implementation costs involve parking space and administration, although participants usually realize savings. The timeframe for implementation is usually short-term (1-5 years).

Telecommuting

This allows employees to sometimes work from home or a regional telecommute center, which helps to reduce SOV trips, and most importantly, the amount of traffic during peak travel times. Employer costs tend to decline after initial investments and the timeframe for implementation is usually short-term (1-5 years).

Alternative Work Hour Programs

This allows workers to arrive and leave work outside the traditional commute period. It may be accomplished by Compressed Work Weeks in which employees work a full week in fewer than the typical five days, or a Flexible Work Schedule that shifts work start and end times to off-peak hours of the day. Employer implementation costs vary and the timeframe for implementation is usually short-term (1-5 years).

Public Transit

Transit can be promoted as a TDM strategy when there is a demand for transit service and other TDM strategies are not able to alleviate congestion. Fare reductions (replaced by operational subsidies), increasing route coverage or frequencies, and implementing park and ride lots all have short-to-medium term (0-10 years) implementation timeframes. Costs include capital, operational, and possibly structural outlays.

Non-motorized Improvements

Bicycling and walking are important for travel purposes, especially in mixed land use development areas, and aid in reducing congestion and air pollution. New sidewalks and designated bicycle lanes increase mobility and access. Exclusive non-motorized rights-of-way for medium-to-long distance trails improve safety and reduce travel times for pedestrians and cyclists (and other wheeled non-motorized vehicles). Providing access for pedestrians and cyclists in developments and at transit facilities encourages people to walk and use bicycles. Implementation costs can be part of design and construction costs, but new facility costs for reconstruction can vary widely. The timeframe for implementation of most strategies is short-to-medium term (0-5 years).

Transportation System Management (TSM)

The TSM approach to congestion mitigation seeks to identify improvements of an operational nature to enhance the capacity of existing system. Through better management and operation of existing transportation facilities, these techniques are designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety.

Intersection and Lane Improvements

Congestion and travel time can be improved by installing traffic control devices and designs for the smooth and safe passage of both pedestrians and vehicles. The devices and designs used could be signs, turning lanes, auxiliary lanes, traffic islands, traffic channels, and other appropriate geometric designs to help reduce congestion and improve the safety and ease of travel. Implementation costs vary, but are usually moderate to high, and the timeframe for implementation of most strategies is short-to-medium term (0-10 years).

Traffic Signal Improvements

Studies have shown that changes in a signal's physical equipment and timing optimization can help significantly in congestion mitigation. Traffic flow could be improved by equipment updates, timing plan improvements, interconnected signals, traffic signal removal, or traffic signal maintenance as needed. Implementation costs vary and the timeframe for implementation is usually short-term (1-5 years).

Intelligent Transportation (ITS)

ITS technology, such as Advanced Traveler Information Systems, has been a great help in relieving congestion where other solutions have failed. These intelligent transportation systems include computers, communications, and displays. At present, two ITS projects are planned for Evansville (see Appendix D). Implementation costs vary and the timeframe for implementation is usually medium-term (5-10 years).

Incident Detection and Management Systems

To alleviate non-recurring congestion, systems typically include video monitoring, dispatch systems, and sometimes service patrol vehicles. The prompt removal of disabled vehicles from travel lanes reduces travel time and accident delay. Capital costs are variable, as are annual operating maintenance and operational costs. The timeframe for implementation is usually medium-term (5-10 years).

Other Strategies

Aside from TDM and TSM strategies, a variety of other strategies may be used to mitigate congestion. Most of these strategies and techniques are employed to some degree in the Evansville-Henderson area already, but not as part of a coordinated congestion management effort.

Land Use Strategies

Land-use techniques and urban design can be used to mitigate congestion by integrating land-use planning (e.g. zoning), site planning, innovative development styles, and landscaping within a transportation system. Mixed-Use Development, Infill and Densification, Traditional Neighborhood Design, and Transit-Oriented Development all support a reduction of SOV travel and reduction of VMT. Some of these strategies involve public costs in creating ordinances, and all involve economic incentives to encourage developer buy-in. The timeframe for implementation is usually long-term (10+ years).

Access Management

Access management consists of controlling the space and design of driveways and other curb cuts, medians, and median openings, intersections, traffic signals, and freeway interchanges. Appropriate access control can decrease the number of accidents and congestion. To have a successful access management plan, both transportation planners and land use planners have to work cooperatively. The

benefits of access management are fewer conflict points, increased mobility, fewer crashes, increased capacity, and shorter travel times. Implementation costs can be part of design and construction costs, but new signage, striping, and other new facility costs for reconstruction can vary widely. The timeframe for implementation of most strategies is short-to-medium term (0-10 years).

Highways Strategies

The traditional way to deal with congestion has been to widen a highway and add lanes, but this is usually a short-term solution because traffic acts like a gas: it expands to fill the space available. Lanes can sometimes be added without widening the highway. Geometric design improvements (as described above under Intersection and Lane Improvements), can serve to improve mobility, reduce congestion, and improve safety. Also, the conversion of existing major arterials with signalized intersections into "super streets" that feature grade-separated interchanges, as was done to create Evansville's Lloyd Expressway, also serve to increase capacity and mobility. Implementation costs can be part of design and construction costs, but new facility costs for reconstruction can vary widely. Also, there is potential for significant environmental and community impacts. The timeframe for implementation of most strategies is short-to-long term (0-10+ years).

Parking Management

Many communities have adopted parking policies to induce transportation mode shifts, increase peak-period capacity, promote access preservation, and improve environmental quality. Parking management strategies include: On-street Parking and Standing Restrictions; Employer/Landlord Parking Agreements; Location-Specific Parking Ordinances; and Preferential/Free Parking for Ride-sharers. Implementation costs vary and the timeframe for implementation of most strategies is usually short-term (1-5 years).

CONGESTION FACTORS AND POTENTIAL MITIGATION ACTIONS

The following are examples of TDM, TSM, and other congestion-reduction strategies applied to particular congestion problems:

Single Occupant Vehicle (SOV) Travel

SOV is the predominant mode of travel with the MPO area which is a major cause of congestion and deteriorating air quality.

Action: TDM: Ridesharing (carpooling, vanpooling); transit service; bikeways & walkways,; alternative work-hour programs; telecommuting, parking management.

TSM/Other: Traffic signal improvement; intersection improvement; transit-oriented development; access management; Intelligent Transportation System (ITS).

Traffic Signal Synchronization

Unsynchronized signals contribute to traffic congestion. Drivers experience stops, stop-delays, and longer travel time contributing to increased fuel consumption, congestion, and air pollution.

Action: TSM: Traffic signal improvements.

Access Management

Closely spaced driveways/curb cuts, and driveways too near intersections on arterial streets, hamper traffic movement causing congestion and air pollution.

Action: TSM/Other: Geometric design; traffic signal improvements; intersection improvement; parking management; land-use strategies (e.g. subdivision regulations; urban design).

Intersections Without Right Turn Channelization

Intersections that experience heavy right turn traffic movements without dedicated right turn lanes contribute to congestion during peak hours.

Action: TSM: Geometric design (lane marking); traffic signal improvement; intersection improvements.

School Zones on Major Arterials

The intent of the arterial street system is to emphasize mobility rather than land accessibility within the urban area. Low driving speed limits in school zones on major arterials cause traffic delays and congestion.

Action: TSM: Geometric design; traffic signal improvements; intersection improvements; parking management; access management (designated crosswalks).

Walkways

Walkways that are not properly maintained, that lack ADA accessibility ramps, and that do not properly connect residential and commercial activity centers discourage potential users.

Action: TDM: Sidewalk additions and upgrades; multi-use path additions and upgrades. TSM/Other: Traffic signal improvements, intersection improvements, urban design improvements, access management.

Bikeways

On street and off street bicycle facilities are valuable as an alternative mode of transportation, and in replacing travel by automobile help to alleviate congestion and enhance air quality.

Action: TDM: Bicycle lanes and routes; multi-use path additions and upgrades; bike parking. TSM/Other: Urban design improvements (e.g. mixed-use development), access management; traffic signal improvements, intersection improvements.

Transit Service

Enhanced travel and headway times in the urban area can mitigate congestion and improve air quality; Bus bays play an important part in reducing congestion on busy streets.

Action: TDM: Direct transit routes between activity centers and residential areas.

TSM: Bus-priority signals at intersections; geometric design (study to determine feasibility of addition of bus bays).

PROGRAM AND IMPLEMENTING STRATEGIES

To integrate CMP and the Metropolitan Transportation Plan, the EMPO has included the CMP data for project prioritization criteria, where applicable, for a determination of roadway congestion reduction. Along with the MTP the EMPO has included the CMP data such as the LOS in project scoring for STP, CMAQ, and HSIP programs. The EMPO will work with the local jurisdictions to implement the congestion management strategies. The EMPO will support local jurisdictions in the evaluation and implementation of congestion management strategies as appropriate.

EVALUATION OF CONGESTION MANAGEMENT STRATEGIES EFFECTIVENESS

The EMPO will conduct a before and after performance measures analysis for all the roadway related projects within the TMA. The evaluation process will also utilize established performance measures for implemented non-motorized congestion management strategies. An evaluation methodology for motorized traffic congestion reductions strategies will follow Table C-10. A simple evaluation system for congestion-reduction strategies, such as non-motorized improvements, will follow a format similar to the one presented in Table C-11. This table is the creation of the Victoria Transport Policy Institute, which has also developed similar tables to evaluate the benefits, equity, and application suitability of various congestion-reduction strategies. These may be viewed on the internet at http://www.vtpi.org/tdm/tdm12.htm

Table C-10: Strategy Evaluation Summary for Motorized Congestion Reduction

Strategy	Travel Impact	Rating	Comments
Added capacity	Improves LOS	1	Indicates whether strategy improves LOS
Added capacity	Improves travel speed	1	Indicates whether strategy improves travel speed
Added capacity	Improves travel time	2	Indicates whether strategy reduces travel time
Added capacity	Reduces TTI	2	Indicates whether strategy reduces TTI
Intersection Improvements	Reduces intersection delay	2	Indicates whether strategy improves intersection LOS
Signal synchronization	Reduces intersection delay	2	Indicates whether strategy improves intersection LOS
Ridesharing	Decreases SOVs in peak hours	2	Indicates whether strategy improves peak hour LOS

Table C-11: Example Travel Impact Evaluation Summary for CM Strategies

Strategy	Travel Impact	Rating	Comments
Construct extensive bikeway and transit network	Reduces total traffic.	1	Indicates whether a strategy reduces overall vehicle travel.
Construct extensive bikeway and transit network	Reduces peak period traffic.	1	Indicates whether a strategy reduces vehicle travel during peak periods.
Construct extensive bikeway and transit network	Shifts peak to off-peak periods.	0	Indicates whether a strategy encourages motorists to shift from peak- to off-peak driving.
Construct extensive bikeway and transit network	Shifts automobile travel to alternative modes.	2	Indicates whether a strategy encourages shifts to alternative modes in general.
Construct extensive bikeway and transit network	Improves access, reduces the need for travel.	1	Indicates whether a strategy improves land use access, and therefore reduces the need to travel.
Construct extensive bikeway network	Increased ridesharing.	0	Indicates whether a strategy encourages ridesharing.
Construct extensive bikeway network	Increased public transit.	1	Indicates whether a strategy encourages public transit use.
Construct extensive bikeway network	Increased cycling.	3	Indicates whether a strategy encourages cycling.
Construct extensive bikeway network	Increased walking.	1	Indicates whether a strategy encourages walking.
Construct extensive bikeway network	Increased Telework.	0	Indicates whether a strategy encourages use of telecommunications to substitute for physical travel.
Construct extensive bikeway network	Reduced freight traffic.	0	Indicates whether a strategy reduces freight travel.

Ratings range from 1 (minimal impact) to 3 (significantly contributes to this impact).

APPENDIX D:

ITS ARCHITECTURE

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

The Regional ITS Architecture Guidance published by the US Department of Transportation defines Intelligent Transportation Systems as: the application of advanced sensor, computer, electronics, and communications technologies and management strategies in an integrated manner to improve safety and efficiency of the surface transportation system.

ITS technologies are used to make the transportation network and transit system safer and more efficient for the movement of goods and people. ITS involves the integration of software, hardware and information flow between various agencies associated with the provision of transportation services. The roadway variable message boards that inform drivers of current weather, traffic, accident or construction ahead and available alternate routes are one visible example of ITS technologies.

ITS ARCHITECTURE

An ITS Architecture is the framework within which a system of ITS projects can be built. It defines the components of the system and the interconnections and information flow between the components. The primary components of an ITS Architecture are Subsystems and Information Flows.

Subsystems

Subsystems are individual pieces of the overall ITS that perform particular functions such as managing traffic, providing traveler information, or responding to emergencies. Subsystems can be associated with particular organizations such as public safety agencies, transportation services, emergency management agencies, or transit providers. They are the sources and/or users of information provided by other subsystems within the boundary of an ITS architecture. Subsystems include center systems, roadside equipment, vehicle equipment and traveler devices that participate in ITS.

Information Flows

Information Flows define the information that is exchanged between subsystems such as traffic information, or surveillance and sensor control data. They depict ITS integration by illustrating the information links between subsystems. In ITS, this integration is not only technical but also institutional. The system interfaces that are defined require cooperation and shared responsibilities on the part of owners and operators of each participating system.

EVANSVILLE MPO REGIONAL ITS ARCHITECTURE

On January 8, 2001, the US Department of Transportation published the FHWA Final Rule and FTA Policy, which implement Section 5206(e) of the Transportation Equity Act of 21st Century (TEA-21). The Final Rule/Policy, effective April 8, 2001, explains and defines how Section 5206(e) is to be implemented. TEA-21 required ITS projects funded through the highway trust fund to conform to the National ITS Architecture and applicable standards. The intention of the Rule/Policy is to foster the deployment of integrated regional ITS systems. The Rule/Policy also requires that the National Architecture be used to develop a local implementation plan or “Regional ITS Architecture” that would be tailored to address the local situation and ITS investment needs. MAP-21 continues these requirements.

As the established regional transportation planning agency, the Evansville MPO has developed the “Evansville MPO Regional ITS Architecture”. This ITS Architecture is a specific regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects in the Evansville MPO region. The

Evansville Regional ITS Architecture was updated concurrently with the MTP 2040 and is available online at www.evansvillempo.com.

ARCHITECTURE OUTLINE

Introduction, Architecture Scope and Regional Description

The Evansville MPO ITS Architecture includes Vanderburgh County and Henderson County in the Evansville MPO planning area. The MPO has considered a 10 year planning horizon in developing the Architecture.

Stakeholders

All the organizations related to the ITS elements of the transportation system have been identified as stakeholders and a brief description of each organization has been documented. The organizations identified as stakeholders are as follows:

- INDOT
- KYTC
- Public Safety agencies
- Evansville Vanderburgh Traffic Signal Control
- Computer Services, City of Evansville
- Mass transit operators
- Commercial vehicle operators
- Railroad companies
- National Weather Service

System Inventory

A list of ITS elements currently existing and planned has been documented along with a brief description of the system.

ITS Services

The regional transportation needs include: safe, secure and efficient transportation on freeways and arterials; commercial vehicle operations, public transit, emergency management and incident response. Various Market Packages that provide the services to address the above mentioned needs have been identified and listed.

Operational Concepts

The roles and responsibilities of all the stakeholders associated with the Evansville MPO Regional ITS Architecture have been documented.

Functional Requirements

Activities are performed by each system included in the ITS Architecture are defined in detail and documented in the functional requirements.

ITS Standards

The standards address the flow of information between various systems included in the ITS Architecture.

ITS Projects

The Evansville regional ITS architecture currently includes two new projects within the City of Evansville: traffic signal modernization at intersection of Fulton Ave and Ohio St, and the multiple traffic signals interconnect within the near downtown area of the City of Evansville. Both of these projects are anticipated to be completed in the year 2014. It is likely that additional project plans will be developed based on the interests indicated by stakeholders. As these projects are developed they will be incorporated into the regional architecture through a process of engaging the appropriate stakeholders. The current projects summary is:

Stakeholder

Evansville Vanderburgh Traffic Signal Control, Computer Services City of Evansville

Project

Traffic Signal Modernization at the intersection of Fulton Avenue and Ohio St

Description

This project proposes to modernize the signal equipment at the intersection of Fulton Avenue and Ohio Street, The project will include installing interconnection between this intersection and the two ramp intersections onto Fulton Avenue from SR 62 located to the north. These changes/additions are intended to increase the efficiency at all three intersections and therefore reduce the overall vehicle delay.

Figure D-1: Fulton/Ohio ITS Architecture Project

Stakeholder

Evansville Vanderburgh Traffic Signal Control, Computer Services City of Evansville

Project

Traffic Signal Interconnect within the near downtown area of the City of Evansville

Description

This project proposes to add signal- interconnect and new controller cabinets to various signalized intersections in Evansville, Indiana. The updates are intended to reduce vehicle delay time and reduce vehicle emissions

Table D-2: Downtown Signal Interconnect ITS Architecture Project

Project Intersection

Agreements

Interagency coordination and cooperation is one of the key issues related to the efficient implementation of ITS services in the area. This section documents known interagency agreements related to ITS. The development of additional agreements will be an item to address moving forward.

Future ITS issues

Architecture Utilization, Implementation and Maintenance: The regional ITS architecture will guide future ITS efforts in the region and support the long-range planning process. The MPO will maintain the current architecture and develop future iterations of it in support of ITS projects as they emerge. It is anticipated that the framework established by this first architecture will facilitate the efficient development of future projects by identifying key components required for their implementation and opportunities for institutional cooperation.

APPENDIX E:

FREIGHT

Table E-1: 2005 Freight Stakeholder Survey - Unaddressed Concerns

2005 Freight Stakeholder Survey-Unaddressed Concerns				
Jurisdiction	Truck Route	Location	Deficiency	Type
INDOT	Yes	SB US Hwy 41 to WB Columbia St	Turning radii	Modification
INDOT	Yes	SR 61, from Boonville to northern county line	Road geometry	Upgrade
INDOT	Yes	SR 57, from US Hwy 41 through Vanderburgh County	Congestion/delays	Upgrade
INDOT	Yes	SR 62/Lloyd Exp, from western county line to US Hwy 41	Congestion/delays	Add Capacity
INDOT	Yes	SR 66/Lloyd Exp, from US Hwy 41 to I-164	Congestion/delays	Upgrade
INDOT	Yes	US Hwy 41, through Vanderburgh County	Congestion/delays	Add Capacity
KYTC	Yes	KY 416, E.T. Breathitt Pkwy to US Hwy 41	Road geometry	Upgrade
KYTC	Yes	US Hwy 41, through Henderson County	Road geometry; congestion/delays	Upgrade
KYTC	Yes	US Hwy 60, through Henderson County (east of downtown)	Road geometry; congestion/delays	Upgrade
KYTC	Yes	NE Atkinson St to SE Clay St/SR 812	Turning radii	Upgrade
KYTC	Yes	US Hwy 41A, through Henderson County	Congestion/delays	Upgrade
Evansville	Yes	Lynch Rd & Hitch Peters Rd	Congestion/delays	CMP Review
Evansville	Yes	Lynch Rd, from US Hwy 41 to Oak Hill Rd	Congestion/delays	CMP Review
Evansville	Yes	First Av, from SR 62/Lloyd Exp to SR 66/Diamond Av	Congestion/delays	CMP Review
Evansville	No	WB Walnut St to NB Evans Av	Turning radii	Modification
Evansville	No	Weinbach Av	Road geometry	Upgrade
Evansville	No	Bellemeade Av	Road geometry	Upgrade
Evansville	No	Grove St, north of Maryland St	Site access	Site Development
Evansville	No	Old Boonville Hwy, west of Burkhardt Rd	Road geometry; congestion/delays	Upgrade
Evansville	No	Wabash Av & Ohio St	Congestion/delays	CMP Review
Henderson	No	Ohio Dr, north of US Hwy 60	Pavement deterioration; road geometry	Upgrade
Vanderburgh	No	Boonville - New Harmony Road, SR 65 west to county line	Road geometry	Upgrade
Vanderburgh	No	Warrick County Line Rd, north of Boonville - New Harmony Rd	Pavement deterioration	Pavement Management
Vanderburgh	No	Baumgart Rd from SR 57 to Mt. Pleasant Rd	Road geometry	Upgrade

APPENDIX F:

RED FLAG INVESTIGATIONS

PRELIMINARY ENVIRONMENTAL REVIEW

Transportation improvements, whether new roadway construction or a widening project, can have significant impacts on natural, cultural/ social, and historic resources. An effort should be made during the planning and design phases of projects to ensure that these impacts are avoided or minimized and/or mitigated. Areas of natural or ecological significance (wetlands, forests, streams, nature preserves, and areas which harbor endangered species) should be avoided in the planning and design of new roads or roadway widening. In addition to natural resources, cultural and historic resources should also be considered, and steps taken to minimize negative impacts. Although the environmental impact of a road improvement project in a previously undisturbed area may seem to be negligible, new road construction can have a significant negative impact on plant and wildlife population and habitats. In addition, the improved access may result in development of the area. This type of secondary impact should always be considered in transportation planning, as the environmental effects from a development can be much more damaging than the road project itself. In fact, transportation-related infrastructure projects should seek to complement the surrounding natural features.

Discussion of types of potential mitigation activities developed in consultation with Federal, State and Tribal land management, wildlife and regulatory agencies is required by (MAP-21). This discussion is at the policy/strategy level, not project specific. The policy level discussion considers the preliminary nature of project details available at the long range plan stage of project development. While detailed environmental analysis is not appropriate at this point, consultation with environmental resource agencies provides an opportunity to compare transportation plans with resource plans and initiate a discussion of potential mitigation activities, location of mitigation activities and identification of mitigation strategies with the greatest potential to restore and maintain environmental functions affected by the metropolitan transportation plan. Table F-1 lists resource and regulatory agencies solicited for input to the plan.

Table F-1: EMPO Environmental and Historic Resource Agency Planning Partners

Evansville Dept. of Metropolitan Development, Historic Preservation Office
Newburgh Historic Preservation Commission
Patoka River National Wildlife Refuge, US Fish and Wildlife Service
Indiana Dept. of Environmental Management, Office of Air Quality
Indiana Dept. of Natural Resources - Division of Fish and Wildlife
Indiana Dept. of Natural Resources, Division of Water, Environmental Unit
Indiana State Historic Preservation Officer (Dept. of Natural Resources)
Kentucky State Historic Preservation Officer, Kentucky Heritage Council
Kentucky Dept. of Environmental Protection, Owensboro Regional Office
Kentucky Dept. of Fish and Wildlife Resources
Kentucky Dept. for Natural Resources, Henderson Conservation District
USDA Natural Resources Conservation Service, Boonville Service Center
USDA Natural Resources Conservation Service, Evansville Service Center
USDA Natural Resources Conservation Service, Henderson Service Center
US EPA Region Five, Air and Radiation Division

Projects advancing to construction require additional study and detailed design to more clearly describe project features. This process enables environmental impacts and appropriate mitigation measures to be established. Projects using state or federal funds will require detailed environmental study and permitting in conformance with the National Environmental Policy Act (NEPA) and other federal, state and local regulations.

PRELIMINARY RED FLAG INVESTIGATION DATA

The following is a listing of potential conflicts with Infrastructure, Mining/Mineral Exploration, Hazardous Material concerns, Water Resources, and Historical Resources within a ½ mile radius of the proposed project area. The categories included in the review were chosen because they were generally available throughout the MPO study area in a GIS format.

Table F-2: Infrastructure RFI

Infrastructure													
Road	Limits	Type	Religious Facility	School	Cemetery	Pipeline	Trail/Proposed Trail	Recreational Facility	Hospital	Managed Land/Park	Airport	Railroad
City of Evansville													
Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	2	1	0	1	0	1	1	0	0	0
Lincoln Ave	Green River Rd to Newburgh Rd		3	6	1	1	0	3	1	0	0	0
Lincoln Ave	Newburgh Rd to Martin Ln	Widen (3 Lns)	2	2	0	7	1	2	1	0	0	0
US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct	1	4	1	0	2	5	0	1	0	4
Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	0	0	0	0	1	0	0	0	0	0
Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	0	2	0	2	0	3	0	0	0	0
Mt. Vernon Ave	Franklin St to Tekoppel Av w/ Intersection Improvements	Widen (3 Lns)	2	5	1	1	1	7	0	2	0	1
Stringtown Rd	Maxwell Ave to Petersburg Rd	Upgrade/Widen	3	5	1	2	1	8	0	1	0	2
Columbia St	Hirschland Rd to Cross Pointe Blvd	New	0	2	0	1	1	0	0	0	0	0
Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	0	0	0	1	1	0	0	0	0	1
Claremont Ave	Redbank Rd to Barker Ave	Reconstruct	1	1	0	1	2	3	0	1	0	3
Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	4	2	1	1	1	4	0	0	0	1
Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	0	1	0	0	0	3	0	0	0	1
Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	4	2	0	1	1	5	0	2	0	1
Vanderburgh County													
Oak Hill Rd	Lynch Rd to Millersburg Rd	Widen (3 Lns)	7	3	1	2	1	0	0	0	1	1
Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	2	0	0	0	0	0	0	0	0	0
University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	0	0	1	1	0	0	0	0	0	0
University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	1	0	1	3	1	0	0	0	1	1
Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (3 Lns)	2	0	0	0	0	0	0	0	0	1
Boonville-New Harmony Rd	Green River Rd to Petersburg Rd	Reconstruct	0	0	0	0	0	0	0	0	0	1
Baseline Rd	US Highway 41 to Old State Rd	Widen (3 Lns)	1	2	0	1	0	0	0	0	0	1
Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	3	2	1	0	0	0	0	1	0	1
Warrick County													
Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	0	2	0	3	0	1	0	0	0	0
SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)	0	0	0	2	0	1	0	0	0	3
Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	1	0	1	3	0	0	0	0	0	0
Oak Grove Rd	Libbert Rd to SR 261	Widen (3 Lns)	1	1	0	1	0	0	0	0	0	0
Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	1	1	0	1	0	0	0	0	0	0
Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	0	3	0	0	0	3	0	0	0	0
High Pointe Dr	Grimm Rd to Libbert Rd	New	0	1	0	3	0	1	0	0	0	0
Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	0	0	0	0	0	0	0	0	0	0
Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	0	1	0	0	0	0	0	0	0	0
Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	0	1	0	2	0	2	0	1	0	0
City of Henderson-Henderson County													
US 60	City of Corydon Bypass	New										
E.T. Breathitt Parkway - KY 416	Interchange Modification	New	0	0	0	DNA	DNA	DNA	0	0	0	0
US 60	Wathen Ln to KY 2183/Holloway-Rucker Rd	Widen (4 Lns)	0	0	0	DNA	DNA	DNA	0	0	0	1
US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	0	0	0	DNA	DNA	DNA	0	0	0	0
KY 425/Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	1	0	0	DNA	DNA	DNA	0	0	0	1
US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	2	1	0	DNA	DNA	DNA	0	0	0	1
North Elm St	Watson Ln to 12th St	Upgrade	0	0	0	DNA	DNA	DNA	0	2	0	0
Watson Ln	US 60 to US 41	Upgrade	1	1	0	DNA	DNA	DNA	0	1	0	0
US 60	Corydon to KY 425/Henderson Bypass	Reconstruct										
US 60	Waverly, KY to Corydon, KY	Reconstruct										
Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct	0	1	0	DNA	DNA	DNA	0	1	0	2
Wathen Ln	US 60 to city limit line	Upgrade	0	0	0	DNA	DNA	DNA	0	0	0	0
US 41 - US 60	Interchange Modification	Reconstruct	0	0	0	DNA	DNA	DNA	1	1	0	0
KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	0	2	0	DNA	DNA	DNA	0	0	0	0
US 60	New Bridge over Green River at Spottsville	Reconstruct	0	0	0	DNA	DNA	DNA	0	0	0	1
KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	0	0	0	DNA	DNA	DNA	0	0	0	1

DNA Data Not Available

Environmental Underway/Complete

Table F-3: Mining and Mineral RFI

Mining and Mineral Resources						
Road	Limits	Type	Mine-Surface	Mine-Underground	Petroleum Well	Petroleum Field
City of Evansville						
Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	0	0	0	0
Lincoln Ave	Green River Rd to Newburgh Rd		0	0	0	0
Lincoln Ave	Newburgh Rd to Martin Ln	Widen (3 Lns)	0	0	0	0
US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct	0	0	0	0
Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	0	0	0	0
Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	0	0	1	0
Mt. Vernon Ave	Franklin St to Tekoppel Av w/ Intersection Improvements	Widen (3 Lns)	0	2	0	0
Stringtown Rd	Maxwell Ave to Petersburg Rd	Upgrade/Widen	0	2	1	0
Columbia St	Hirschland Rd to Cross Pointe Blvd	New	0	0	0	0
Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	0	0	0	0
Claremont Ave	Redbank Rd to Barker Ave	Reconstruct	0	1	0	0
Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	0	0	1	0
Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	0	0	1	0
Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	0	1	4	0
Vanderburgh County						
Oak Hill Rd	Lynch Rd to Millersburg Rd	Widen (3 Lns)	0	0	2	0
Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	0	0	1	0
University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	0	0	31	4
University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	0	0	75	1
Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (3 Lns)	0	0	1	0
Boonville-New Harmony Rd	Green River Rd to Petersburg Rd	Reconstruct	0	0	2	0
Baseline Rd	US Highway 41 to Old State Rd	Widen (3 Lns)	0	0	15	2
Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	0	0	1	0
Warrick County						
Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	0	2	0	0
SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)	3	1	7	1
Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	0	0	0	0
Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	0	0	0	0
Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	0	1	0	0
High Pointe Dr	Grimm Rd to Libbert Rd	New	0	1	0	0
Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	0	0	1	0
Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	0	0	3	0
Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	2	0	2	0
City of Henderson-Henderson County						
US 60	City of Corydon Bypass	New				
E.T. Breathitt Parkway - KY 416	Interchange Modification	New	DNA	0	DNA	DNA
US 60	Wathen Ln to KY 2183/Holloway-Rucker Rd	Widen (4 Lns)	DNA	0	DNA	DNA
US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	DNA	1	DNA	DNA
KY 425/Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	DNA	1	DNA	DNA
US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	DNA	3	DNA	DNA
North Elm St	Watson Ln to 12th St	Upgrade	DNA	0	DNA	DNA
Watson Ln	US 60 to US 41	Upgrade	DNA	0	DNA	DNA
US 60	Corydon to KY 425/Henderson Bypass	Reconstruct				
US 60	Waverly, KY to Corydon, KY	Reconstruct				
Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct	DNA	1	DNA	DNA
Wathen Ln	US 60 to city limit line	Upgrade	DNA	1	DNA	DNA
US 41 - US 60	Interchange Modification	Reconstruct	DNA	0	DNA	DNA
KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	DNA	1	DNA	DNA
US 60	New Bridge over Green River at Spottsville	Reconstruct	DNA	1	DNA	DNA
KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	DNA	1	DNA	DNA

DNA Data Not Available
Environmental Underway/Complete

Table F-4: Hazardous Materials RFI

Hazardous Materials										
Road	Limits	Type	UG Storage Tanks	Leaking UG Storage Tanks	Waste Treatment Storage Disposal	State Cleanup Site	Brownfield	Tire Waste Site	Confined Feeding Operation	Solid Waste Landfill
City of Evansville										
Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	4	1	0	1	0	0	0	0
Lincoln Ave	Green River Rd to Newburgh Rd		6	4	0	2	0	0	0	0
Lincoln Ave	Newburgh Rd to Martin Ln	Widen (3 Lns)	1	1	0	1	0	0	0	0
US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct								
Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	2	3	3	0	0	0	0	0
Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	10	10	2	1	0	0	0	0
Mt. Vernon Ave	Franklin St to Tekoppel Av w/ Intersection Improvements	Widen (3 Lns)	7	10	1	1	0	0	0	0
Stringtown Rd	Maxwell Ave to Petersburg Rd	Upgrade/Widen	12	14	2	2	0	0	0	0
Columbia St	Hirschland Rd to Cross Pointe Blvd	New	4	0	0	0	0	0	0	0
Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	4	1	1	0	0	0	0	0
Claremont Ave	Redbank Rd to Barker Ave	Reconstruct	8	5	5	1	0	0	0	0
Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	5	5	1	1	0	0	0	0
Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	5	4	2	0	0	0	0	0
Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	5	4	1	1	0	0	0	0
Vanderburgh County										
Oak Hill Rd	Lynch Rd to Millersburg Rd	Widen (3 Lns)	1	2	1	0	0	0	0	0
Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	0	0	0	0	0	0	0	0
University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	0	0	0	0	0	0	0	0
University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	0	1	0	0	0	0	0	0
Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (3 Lns)	0	0	0	0	0	1	1	0
Boonville-New Harmony Rd	Green River Rd to Petersburg Rd	Reconstruct	0	2	0	0	0	0	0	0
Baseline Rd	US Highway 41 to Old State Rd	Widen (3 Lns)	0	0	0	0	0	0	1	0
Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	0	0	0	0	0	0	0	0
Warrick County										
Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	4	5	0	0	0	0	0	0
SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)								
Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	1	2	0	0	0	0	0	0
Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	0	0	0	0	0	0	0	0
Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	1	0	0	0	0	0	0	0
High Pointe Dr	Grimm Rd to Libbert Rd	New	0	1	0	0	0	0	0	0
Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	0	0	0	0	0	0	0	0
Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	0	0	0	0	0	0	0	0
Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	2	1	0	0	0	0	0	0
City of Henderson-Henderson County										
US 60	City of Corydon Bypass	New								
E.T. Breathitt Parkway - KY 416	Interchange Modification	New	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 60	Wathen Ln to KY 2183/Holloway-Rucker Rd	Widen (4 Lns)	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
KY 425/Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
North Elm St	Watson Ln to 12th St	Upgrade	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
Watson Ln	US 60 to US 41	Upgrade	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 60	Corydon to KY 425/Henderson Bypass	Reconstruct								
US 60	Waverly, KY to Corydon, KY	Reconstruct								
Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
Wathen Ln	US 60 to city limit line	Upgrade	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 41 - US 60	Interchange Modification	Reconstruct	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0
US 60	New Bridge over Green River at Spottsville	Reconstruct								
KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0

DNA Data Not Available

Environmental Underway/Complete

Table F-5: Water Resources RFI

Water Resources										
Road	Limits	Type	Floodplain-DFIRM	Lake	River	Wetland Areas	Stream-Impaired	Canal Route-Historic	National Wetland Inventory-Line	National Wetland Inventory-Point
City of Evansville										
Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	Yes	4	4	2	0	0	0	0
Lincoln Ave	Green River Rd to Newburgh Rd	Widen (3 Lns)	Yes	0	1	0	0	0	0	0
Lincoln Ave	Newburgh Rd to Martin Ln	Widen (3 Lns)	Yes	3	4	3	0	0	0	0
US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct	No	1	0	1	0	1	0	0
Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	Yes	3	3	0	0	1	1	0
Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	Yes	7	3	5	0	0	1	0
Mt. Vernon Ave	Franklin St to Tekoppel Av w/ Intersection Improvements	Widen (3 Lns)	Yes	3	0	3	0	0	0	0
Stringtown Rd	Maxwell Ave to Petersburg Rd	Widen (3 Lns)	Yes	10	2	9	1	0	2	0
Columbia St	Hirschland Rd to Cross Pointe Blvd	New (3 Lns)	Yes	4	3	0	0	0	1	0
Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	Yes	3	3	0	0	1	1	0
Claremont Ave	Redbank Rd to Barker Ave	Reconstruct	Yes	7	2	9	1	0	1	0
Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	Yes	14	6	12	0	0	2	0
Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	Yes	1	1	2	0	1	0	0
Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	Yes	11	5	9	0	0	3	0
Vanderburgh County										
Oak Hill Rd	Lynch Rd to Millersburg Rd	Widen (3 Lns)	Yes	10	4	16	1	0	2	0
Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	Yes	12	7	12	0	0	1	1
University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	Yes	31	18	32	1	0	2	0
University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	Yes	9	11	9	0	0	2	0
Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (5 Lns)	Yes	9	13	14	0	0	1	2
Boonville-New Harmony Rd	Green River Rd to Petersburg Rd	Reconstruct	Yes	21	5	22	0	0	1	2
Baseline Rd	US Highway 41 to Old State Rd	Widen (3 Lns)	Yes	4	6	9	0	0	2	2
Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	Yes	8	5	10	1	0	4	0
Warrick County										
Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	Yes	10	5	11	0	0	1	0
SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)	Yes	50+	10	50+	1	0	8	1
Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	Yes	10	5	6	0	0	0	0
Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	Yes	14	3	9	0	0	0	0
Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	No	19	7	15	0	0	1	0
High Pointe Dr	Grimm Rd to Libbert Rd	New	Yes	5	4	4	0	0	1	0
Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	Yes	8	4	12	0	0	2	0
Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	Yes	13	8	15	0	0	2	0
Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	Yes	13	8	15	0	0	1	0
City of Henderson-Henderson County										
US 60	City of Corydon Bypass	New								
E.T. Breathitt Parkway - KY 416	Interchange Modification	New	DNA	DNA	0	16	DNA	DNA	DNA	DNA
US 60	Wathen Ln to KY 2183/Holloway-Rucker Rd	Widen (4 Lns)	DNA	DNA	4	26	DNA	DNA	DNA	DNA
US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	DNA	DNA	1	18	DNA	DNA	DNA	DNA
KY 425/Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	DNA	DNA	6	32+	DNA	DNA	DNA	DNA
US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	DNA	DNA	3	45+	DNA	DNA	DNA	DNA
North Elm St	Watson Ln to 12th St	Upgrade	DNA	DNA	2	3	DNA	DNA	DNA	DNA
Watson Ln	US 60 to US 41	Upgrade	DNA	DNA	0	2	DNA	DNA	DNA	DNA
US 60	Corydon to KY 425/Henderson Bypass	Reconstruct								
US 60	Waverly, KY to Corydon, KY	Reconstruct								
Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct	DNA	DNA	1	4	DNA	DNA	DNA	DNA
Wathen Ln	US 60 to city limit line	Upgrade	DNA	DNA	0	11	DNA	DNA	DNA	DNA
US 41 - US 60	Interchange Modification	Reconstruct	DNA	DNA	1	6	DNA	DNA	DNA	DNA
KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	DNA	DNA	0	8	DNA	DNA	DNA	DNA
US 60	New Bridge over Green River at Spottsville	Reconstruct	DNA	DNA	1	14	DNA	DNA	DNA	DNA
KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	DNA	DNA	2	0	DNA	DNA	DNA	DNA

DNA Data Not Available

Environmental Underway/Complete

Table F-6: Historical Resources RFI

Historical Resources							
Road	Limits	Type	National Register Structures	Other Historic Structures	National Register Historic Districts	Proposed NR Historic Districts	Historic Farms
City of Evansville							
Burkhardt Rd	Lincoln Ave to Lloyd Expy	Widen (5 Lns)	1	1	0	0	DNA
Lincoln Ave	Green River Rd to Newburgh Rd		1	3	0	0	DNA
Lincoln Ave	Newburgh Rd to Martin Ln	Widen (3 Lns)	1	2	0	0	DNA
US 41-SR 62/SR 66/Lloyd Expy	Interchange Modification	Reconstruct	1	27	2	1	DNA
Oak Grove Rd	Burkhardt Rd to Cross Pointe Blvd	Widen (5 Lns)	0	0	0	0	DNA
Virginia St	Green River Rd to Burkhardt Rd	Widen (3 Lns)	0	0	0	0	DNA
Mt. Vernon Ave	Franklin St to Tekoppel Av w/ Intersection Improvements	Widen (3 Lns)	1	9	1	1	DNA
Stringtown Rd	Maxwell Ave to Petersburg Rd	Upgrade/Widen	1	12	0	0	DNA
Columbia St	Hirschland Rd to Cross Pointe Blvd	New	0	0	0	0	DNA
Vogel Rd	Burkhardt Rd to Cross Pointe Blvd	New (3 Lns)	0	0	0	0	DNA
Claremont Ave	Redbank Rd to Barker Ave	Reconstruct	0	2	0	1	DNA
Red Bank Rd	Broadway Ave to Upper Mount Vernon Rd	Reconstruct	0	5	0	0	DNA
Green River Rd - Vogel Rd	Intersection Improvements	Reconstruct	0	1	0	0	DNA
Broadway Ave	Felstead Rd to Barker Ave	Reconstruct	0	7	0	0	DNA
Vanderburgh County							
Oak Hill Rd	Lynch Rd to Millersburg Rd	Widen (3 Lns)	1	2	0	0	DNA
Green River Rd	Millersburg Rd to Kansas Rd	Widen (5 Lns)	0	0	0	0	DNA
University Parkway	SR 66/Diamond Ave to Boonville New Harmony Rd	New (4 Lns)	0	0	0	0	DNA
University Parkway	Boonville New Harmony Rd to I-64	New (4 Lns)	0	0	0	0	DNA
Green River Rd	Kansas Rd to Boonville-New Harmony Rd	Widen (3 Lns)	0	1	0	0	DNA
Boonville-New Harmony Rd	Green River Rd to Petersburg Rd	Reconstruct	0	1	0	0	DNA
Baseline Rd	US Highway 41 to Old State Rd	Widen (3 Lns)	0	0	0	0	DNA
Heckel Rd	Oak Hill Rd to Green River Rd	Widen (3 Lns)	1	1	0	0	DNA
Warrick County							
Lincoln Ave	Bell Rd to Lenn Rd	Reconstruct	0	DNA	0	DNA	DNA
SR 61 Connector	Northwest Boonville Bypass	New (2 Lns)	0	DNA	0	DNA	DNA
Bell Rd	SR 66 to Oak Grove Rd	Widen (3 Lns)	0	DNA	0	DNA	DNA
Oak Grove Rd	Libbert Rd to SR 261	Widen (3 Lns)	0	DNA	0	DNA	DNA
Oak Grove Rd	Libbert Rd to Bell Rd	Widen (3 Lns)	0	DNA	0	DNA	DNA
Oak Grove Rd	Bell Rd to SR 261	Widen (3 Lns)	0	DNA	0	DNA	DNA
High Pointe Dr	Grimm Rd to Libbert Rd	New	0	DNA	0	DNA	DNA
Bell Rd	Oak Grove Rd to Telephone Rd	Reconstruct	0	DNA	0	DNA	DNA
Telephone Rd	Bell Rd to Fuquay Rd	Reconstruct	0	DNA	0	DNA	DNA
Lincoln Ave	Lenn Rd to Anderson Rd	Reconstruct	0	DNA	0	DNA	DNA
City of Henderson-Henderson County							
US 60	City of Corydon Bypass	New					
E.T. Breathitt Parkway - KY 416	Interchange Modification	New	0	0	0	DNA	0
US 60	Wathen Ln to KY 2183/Holloway-Rucker Rd	Widen (4 Lns)	0	4	0	DNA	0
US 60	KY 2183/Holloway-Rucker Rd to KY 1078/Baskett Ln	Widen (4 Lns)	0	0	0	DNA	0
KY 425/Henderson Bypass	US 60 to E.T. Breathitt Pkwy	Widen (4 Lns)	0	0	0	DNA	1
US 60	KY 1078/Baskett Ln to Green River Bridge	Widen (4 Lns)	0	0	0	DNA	0
North Elm St	Watson Ln to 12th St	Upgrade	0	0	1	DNA	0
Watson Ln	US 60 to US 41	Upgrade	0	0	1	DNA	0
US 60	Corydon to KY 425/Henderson Bypass	Reconstruct					
US 60	Waverly, KY to Corydon, KY	Reconstruct					
Atkinson St	KY 136/Madison St to KY 351/Second St	Reconstruct	3	0	1	DNA	0
Wathen Ln	US 60 to city limit line	Upgrade	0	3	0	DNA	0
US 41 - US 60	Interchange Modification	Reconstruct	0	2	0	DNA	0
KY 1539/Zion-Larue Rd	KY 351 to Kimsey Ln	Upgrade	1	2	0	DNA	1
US 60	New Bridge over Green River at Spottsville	Reconstruct	0	0	0	DNA	0
KY 812/Clay St - US 41	Intersection Upgrade	Upgrade	0	0	0	DNA	0

DNA Data Not Available
Environmental Underway/Complete

APPENDIX G:

SAFETY STATS/CRASH ANALYSIS

Table G-1: Henderson County Crash Statistics

Level of Collision	2009	2010	2011	2012
Property Damage Only	1273	1189	1224	1114
Injury	316	284	271	301
Fatality	10	7	5	4
TOTAL	1599	1480	1500	1419

Manner of Collision	2009	2010	2011	2012
Angle	342	293	290	268
Backing	117	107	100	87
Head On	27	17	24	29
Opposing Left Turn	23	37	45	39
Rear End	419	381	392	359
Rear to Rear	3	5	7	3
Opposite Direction Sideswipe	98	64	72	55
Same Direction Sideswipe	155	141	133	146
Single Vehicle	407	426	431	425

Directional Analysis	2009	2010	2011	2012
1 Vehicle Entering or Leaving Parked Position (Not Parking Lot)	19	19	10	10
1 Vehicle Entering/Leaving Entrance	96	84	96	107
1 Vehicle Parked Position (Not Parking Lot/Driveway)	149	117	106	89
Angle Collision - Both Vehicles Going Straight	70	49	65	40
Angle Collision - 1 Vehicle Turning Left	92	77	60	64
Angle Collision - 1 Vehicle Turning Right	20	15	15	14
Angle Collision - Other	39	42	36	31
Collision With Animal	106	108	145	123
Collision With Bicycle	5	5	3	7
Collision With Bicyclist	2	2	2	1
Collision With Fixed Object In Intersection - First Event Collision 09 32	37	36	34	33
Collision With Fixed Object Non-Intersection-First Event Collision 09 - 32 Excluding 16	116	113	106	105
Collision With Fixed Object Not In Gore	3	2	4	3
Collision With Non-Fixed Object	18	14	1	6
Collision With Parked Vehicle	15	3	12	11
Collision With Pedestrian In Intersection	4	5	2	4
Collision With Pedestrian Non-Intersection	2	6	9	10
Collision With Train	1	1	0	1
Head-On Collision	11	6	5	11
Median Cross-Over Collision	0	0	2	1
Multiple Vehicle Collision On Ramp	0	0	2	5
Non-Collision Object Collision	9	5	6	12
Occupant Fell From Moving Vehicle	3	2	7	6
Opposing Left Turn	15	22	33	24
Opposite Direction - Both Vehicles Going Straight Ahead	20	14	18	16
Other Collisions On Shoulder	6	11	15	19
Other Intersection Collisions	1	3	5	2
Other Ramp Related Collisions Not Listed Above	1	1	0	1
Other Roadway or Mid-Block Collision	53	46	51	53
Overturned In Roadway	5	9	5	6
Overturned On Ramp	1	0	0	0
Ramp - Vehicle Ran Off Roadway	1	0	0	0
Ran Off Roadway (1 Vehicle with Earth Embankment/Ditch)	97	105	95	79
Rear End - Both Vehicles Going Straight	9	4	9	4
Rear End - On Ramp	2	2	5	4
Rear End - One Vehicle Stopped	47	41	46	33
Rear End - One Vehicle Turning Left	5	13	10	8
Rear End - One Vehicle Turning Right	6	4	7	6
Rear End - Other	78	83	89	77
Rear End In Traffic Lanes Both Vehicles Moving	155	135	136	138
Rear End In Traffic Lanes One Vehicle Stopped	61	67	44	60
Rear End On Shoulder	0	2	0	0
Sideswipe Collision - Opposite Direction	53	40	45	33
Sideswipe Collision - Same Direction	111	97	101	106
Vehicle Backing	50	62	51	47
Vehicle Going In Wrong Direction	1	1	3	1

Table G-2: Vanderburgh County Crash Statistics

Level of Collision	2007	2008	2009	2010	2011	2012
Property Damage Only	3751	4100	4350	4391	4231	4256
Injury	1066	1065	1058	1102	1093	1150
Fatality	14	15	16	6	13	14
TOTAL	4831	5180	5424	5499	5337	5420

Manner of Collision	2007	2008	2009	2010	2011	2012
Backing	156	194	200	188	188	182
Head On	204	233	299	317	380	312
Left Turn	289	301	258	244	256	249
Left/Right Turn	19	19	17	19	21	25
Non-collision	51	52	29	43	41	57
Opposite Direction Sideswipe	99	117	121	129	114	113
Other	145	181	170	148	149	164
Ran Off Road	441	537	414	444	408	449
Rear End	1635	1653	2000	2018	1958	1968
Rear to Rear	7	16	15	20	18	10
Right Angle	1222	1217	1238	1230	1120	1209
Right Turn	79	76	86	84	58	70
Same Direction Sideswipe	477	581	573	612	626	610

Primary Factor	2007	2008	2009	2010	2011	2012
Accelerator Failure or Defective	0	0	1	3	1	0
Alcoholic Beverages	59	8	9	2	0	0
Animal/Object in Roadway	127	144	181	195	216	195
Brake Failure or Defective	15	4	14	12	14	11
Cell Phone Usage	13	4	6	11	10	9
Disregard Signal/Reg Sign	370	356	380	362	352	364
Driver Asleep or Fatigued	35	24	21	19	17	27
Driver Distracted	159	101	95	133	89	102
Driver Illness	12	13	22	17	19	16
Engine Failure or Defective	1	1	2	2	2	0
Failure to Yield Right of Way	1095	1166	1142	1163	1091	1172
Following Too Closely	1194	1281	1603	1658	1634	1645
Glare	2	1	1	0	0	0
Headlight Defective or Not On	2	0	0	0	0	2
Holes/Ruts in Surface	0	0	2	2	2	1
Illegal Drugs	1	0	0	0	0	0
Improper Lane Usage	184	231	216	256	223	256
Improper Passing	55	56	69	60	70	69
Improper Turning	166	190	186	165	171	179
Insecure/Leaky Load	5	9	3	5	4	4
Jacknifing	2	0	1	0	0	0
Left of Center	93	105	120	121	103	109
Obstruction Not Marked	0	1	5	1	8	4
None (Driver)	1	0	0	0	0	0
Other (Driver)	413	332	309	286	318	300
Other (Environmental)	7	12	13	10	17	21
Other (Vehicle)	7	5	9	15	7	12
Other Lights Defective	0	0	1	0	0	1
Other Telematics In Use	0	0	1	1	0	3
Overcorrecting/Oversteering	65	73	74	65	56	63
Oversize/Overweight Load	2	0	0	0	0	2
Passenger Distraction	7	2	7	2	0	1
Pedestrian Action	35	30	37	26	19	31
Prescription Drugs	3	1	1	0	0	0
Ran Off Road Left	70	3	0	0	0	0
Ran Off Road Right	230	398	376	369	387	407
Road Under Construction	3	0	0	0	0	0
Roadway Surface Condition	21	71	29	47	43	15
Severe Crosswinds	0	1	2	1	2	1
Speed Too Fast For Weather Condition	78	173	118	167	109	68
Steering Failure	4	4	1	2	4	1
Tire Failure or Defective	7	6	3	4	10	6
Tow Hitch Failure	2	1	1	0	1	1
Traffic Control Inoperative/Missing/Obsc	0	0	1	1	1	0
Unsafe Backing	163	212	230	208	221	218
Unsafe Lane Movement	0	0	0	2	3	8
Unsafe Speed	100	151	121	95	103	87
Utility Work	0	0	0	0	0	0
View Obstructed	1	2	3	3	1	1
Wrong Way on One Way	5	5	7	8	7	8

Table G-3: Warrick County Crash Statistics

Level of Collision	2007	2008	2009	2010	2011	2012
Property Damage Only	1001	1098	991	1064	1007	918
Injury	172	153	182	190	180	188
Fatality	4	9	7	3	3	4
TOTAL	1177	1260	1180	1257	1190	1110

Manner of Collision	2007	2008	2009	2010	2011	2012
Backing	60	65	49	44	29	34
Head On	207	218	198	220	215	203
Left Turn	49	59	53	55	36	51
Left/Right Turn	17	19	12	12	23	21
Non-collision	10	14	10	15	5	7
Opposite Direction Sideswipe	23	31	33	30	29	29
Other	77	74	53	48	36	25
Ran Off Road	188	215	197	211	206	181
Rear End	260	280	292	322	288	233
Rear to Rear	3	2	3	2	4	3
Right Angle	203	201	213	218	233	249
Right Turn	14	15	8	12	11	9
Same Direction Sideswipe	66	66	58	67	75	64

Primary Factor	2007	2008	2009	2010	2011	2012
Accelerator Failure or Defective	1	2	1	1	5	2
Alcoholic Beverages	29	27	21	2	0	0
Animal/Object in Roadway	298	283	277	289	284	261
Brake Failure or Defective	8	4	7	4	7	6
Cell Phone Usage	11	8	7	3	2	5
Disregard Signal/Reg Sign	33	39	37	43	51	52
Driver Asleep or Fatigued	18	21	23	15	11	11
Driver Distracted	55	37	50	38	33	20
Driver Illness	11	3	1	3	6	13
Engine Failure or Defective	1	0	1	1	0	0
Failure to Yield Right of Way	142	158	174	201	188	193
Following Too Closely	135	178	180	208	184	173
Glare	4	1	1	2	0	0
Headlight Defective or Not On	0	0	1	1	0	0
Holes/Ruts in Surface	2	1	3	0	0	0
Illegal Drugs	0	0	1	0	0	0
Improper Lane Usage	27	24	19	16	21	17
Improper Passing	8	12	10	9	8	5
Improper Turning	27	27	24	24	27	21
Insecure/Leaky Load	0	5	3	2	1	2
Jacknifing	0	0	0	0	0	0
Left of Center	10	22	25	24	23	26
None (Driver)	0	1	1	1	0	0
Obstruction Not Marked	1	0	0	1	3	2
Other (Driver)	116	61	59	43	43	33
Other (Environmental)	6	8	9	7	4	11
Other (Vehicle)	8	9	4	8	7	3
Other Lights Defective	0	0	1	0	0	1
Other Telematics In Use	0	0	0	0	0	1
Overcorrecting/Oversteering	16	14	15	17	10	7
Oversize/Overweight Load	1	1	0	3	1	1
Passenger Distraction	0	0	1	0	0	0
Pedestrian Action	3	2	5	1	3	3
Prescription Drugs	0	2	1	0	0	0
Ran Off Road Left	0	0	0	1	0	0
Ran Off Road Right	51	65	76	97	105	104
Road Under Construction	1	2	2	0	0	0
Roadway Surface Condition	30	76	27	51	26	17
Severe Crosswinds	0	0	0	0	1	1
Speed Too Fast For Weather Condition	31	58	27	43	48	18
Steering Failure	5	1	3	0	0	4
Tire Failure or Defective	1	6	3	4	9	10
Tow Hitch Failure	1	1	0	1	0	0
Traffic Control Inoperative/Missing/Obsc		1	0	0	0	0
Unsafe Backing	47	56	39	34	34	41
Unsafe Lane Movement	0	0	1	13	13	5
Unsafe Speed	29	40	38	43	30	39
Utility Work	0	0	0	1	0	0
View Obstructed	6	2	1	1	1	2
Wrong Way on One Way	1	1	0	0	1	0

Table G-4: Henderson Intersection Crash Analysis 2009-2011

LPA	Location	TYPE	Crash Rate 09-11
Henderson	Martin Luther King Jr Bl & Fagan St	Stop2	3.93
KYTC	US Highway 60 & Barret Bl	Signalized	1.87
Henderson	Martin Luther King Jr Bl & Adams St	Stop2	1.71
KYTC	US HIghway 60/Green St & KY 136/KY 425/Henderson Bypass	Signalized	1.66
KYTC	US Highway 41 & KY 812/Airline Rd	Signalized	1.37
KYTC	US Highway 41A/US Highway 60/Green St & 2nd St	Signalized	1.20
KYTC	KY 425/Henderson Bypass & Old Henderson Corydon Rd	Stop2	0.95
KYTC	US Highway 41A/US Highway 60/Green St & Kresge Dr	Stop1	0.85
KYTC	US Highway 41A/US Highway 60/Green St & 5th St	Signalized	0.80
KYTC	KY 351/2nd St & Klutey Park Dr	Signalized	0.75
KYTC	US Highway 41A/US Highway 60/Green St & 1st St	Signalized	0.66
KYTC	US Highway 41A/US Highway 60/Green St & Clay St (south junction)	Stop1	0.61
KYTC	US Highway 41A/US Highway 60/Green St & 14th St	Stop2	0.58
KYTC	US Highway 41A/US Highway 60/Green St & 10th St (north junction)	Stop1	0.52
KYTC	US Highway 41A/US Highway 60/Green St & KY 136/Sand Ln	Signalized	0.51
Henderson	US Highway 41 & Rettig Rd	Signalized	0.40
KYTC	US Highway 41 & US Highway 60	Interchange	0.40
KYTC	US Highway 41A/US Highway 60/Green St & 7th St	Stop2	0.40
KYTC	US Highway 41A/US Highway 60/Green St & 4th St	Stop2	0.12

Table G-5: Vanderburgh and Warrick Intersection Crash Analysis Ranking

LPA	Intersection	Control	Icc 09-11
Evansville	Green River Rd & Lynch Rd	Signalized	4.15
Evansville	Garvin St & John St	Stop	3.99
INDOT	SR 62/Lloyd Exp & Fulton Av (under construction)	Signalized	3.34
INDOT	US 41 & Lynch Rd	Signalized	2.94
INDOT	SR 66/Lloyd Exp & Burkhardt Rd	Signalized	2.69
INDOT	US 41 & Walnut St	Signalized	2.62
Evansville	Boeke Rd & Washington Av	Signalized	2.37
Evansville	Washington Av & Weinbach Av	Signalized	2.22
Evansville	First Av & Columbia St	Signalized	2.16
Evansville/Vanderburgh	Lynch Rd & Oak Hill Rd	Signalized	1.94
INDOT	First Av/Third St/Fourth St & John St/Division St/SR 62/Lloyd Exp ramps	Signalized	1.90
Vanderburgh	New Harmony Rd & St Joe Rd/Koressel Rd	Stop	1.87
INDOT	US 41 & SR 62/Morgan Av	Signalized	1.83
INDOT	SR 62/Lloyd Exp & Rosenberger Av	Signalized	1.78
Evansville	Burkhardt Rd & Virginia St	Signalized	1.76
INDOT	SR 62/Morgan Av & Burkhardt Rd	Signalized	1.74
INDOT	SR 62/Lloyd Exp & Red Bank Rd	Signalized	1.66
Evansville	First Av & Mill Rd	Signalized	1.41
INDOT	SR 62/Lloyd Exp & St Joseph Av	Signalized	1.39
Evansville	Green River Rd & Virginia St	Signalized	1.35
INDOT	SR 62/Morgan Av & Green River Rd	Signalized	1.22
Evansville	Green River Rd & Vogel Rd	Signalized	1.07
Evansville	Green River Rd & Washington Av	Signalized	1.04
INDOT	SR 66/Lloyd Exp & Division St/US 41 northbound off ramp	Signalized	1.01
Evansville	Covert Av & Green River Rd	Signalized	0.94
INDOT	SR 66/Lloyd Exp & Stockwell Rd	Signalized	0.70
Evansville	First Av & Buena Vista Rd	Signalized	0.57
INDOT	US 41 & Virginia St	Signalized	0.52
INDOT	SR 66 & Epworth Rd	Signalized	0.48
Warrick	Old SR 261 & Lincoln Av	Signalized	0.24
INDOT	SR 66 & French Island Trail	Signalized	0.24
INDOT	SR 61/SR 62/Main St & SR 61/3rd St	Signalized	0.22
Evansville/Vanderburgh	Red Bank Rd & Pearl Dr	Signalized	0.21
INDOT	SR 66 & Bell Rd	Signalized	0.17
INDOT	SR 66 & Lincoln Av	Signalized	0.14
INDOT	SR 61/SR 62/Locust St & SR 61/3rd St	Signalized	0.02
Vanderburgh	Baseline Rd & Princeton Rd	Stop	-0.01
INDOT	SR 57 & SR 68	Signalized	-0.05
INDOT	SR 261 & Oak Grove Rd	Signalized	-0.07
Vanderburgh	Hogue Rd & Red Bank Rd	Stop	-0.08
INDOT	SR 57 & Kansas Rd	Signalized	-0.20
INDOT	SR 61 & New Harmony/Shelton	Stop2	-0.21
INDOT	SR 66 & SR 261/Old SR 261	Signalized	-0.24
INDOT	SR 66/Diamond Av & St Joe Rd	Stop	-0.24
INDOT	SR 66 & Frame Rd/Libbert Rd	Signalized	-0.27
Vanderburgh	Hogue Rd & Rosenberger Av	Stop	-0.27
Darmstadt	Boonville-New Harmony Rd & St Joseph Av	Stop	-0.31
Warrick	Oak Grove Rd & Bell Rd	Stop4	-0.41
Vanderburgh	Green River Rd & Millersburg Rd	Signalized	-0.42
Darmstadt	Boonville-New Harmony Rd & Darmstadt Rd	Stop	-0.44
Warrick	Bell Rd & Bell Oaks Dr (north junction)	Stop1	-0.47
Vanderburgh	St Joseph Av & Allens Ln	Signalized	-0.52
INDOT	Green River Rd & SR 66/Lloyd Exp ramp signals	Signalized	-0.52
INDOT	SR 62/Lloyd Exp & US 41 southbound off ramp	Signalized	-0.60
Warrick	Vann Rd & Anderson Rd	Stop2	-0.61
Warrick	Old SR 261 & Bell Oaks Dr	Stop1	-0.66
Vanderburgh	Upper Mt Vernon Rd & Boehne Camp Rd	Stop	-0.66
Vanderburgh	Green River Rd & Kansas Rd	Stop	-0.72
Vanderburgh	Green River Rd & Heckel Rd	Stop	-0.72
Vanderburgh/Evansville	Covert Av & Fuquay Rd	Stop	-0.78
INDOT	US 41 & Rusher Creek Rd	Stop	-0.78
Evansville	First Av & Fairway Dr	Stop	-0.81
Darmstadt	Darmstadt Rd & Wortman Rd	Stop	-0.84
Vanderburgh	St Joseph Av & Wimberg Rd	Stop	-0.95
Vanderburgh	Oak Hill Rd & St George Rd	Signalized	-0.95
Vanderburgh	Upper Mt Vernon Rd & Red Bank Rd	Stop	-0.96
Vanderburgh	Green River Rd & Surrey Wa	Stop	-1.01
Warrick	Lincoln Av & Epworth Rd	Signalized	-1.04
INDOT	SR 261 & Fruitwood Dr	Stop1	-1.06
INDOT	SR 65/Big Cynthiana Rd & St Wendel Rd	Stop	-1.11
INDOT	SR 261 & Vann Rd (north junction)	Stop1	-1.25
Darmstadt	Boonville-New Harmony Rd & Hoing Rd	Stop	-1.27
Vanderburgh/Evansville	Green River Rd & Hirsch Rd	Stop	-1.37
Darmstadt	Boonville-New Harmony Rd & Lurey Dr	Stop	-1.37
Darmstadt	Darmstadt Rd & Korb Manor Dr	Stop	-1.38

APPENDIX H:

TITLE VI / ENVIRONMENTAL JUSTICE

PLANNING, TITLE VI AND ENVIRONMENTAL JUSTICE

Federal law requires that the Evansville MPO ensures that individuals not be excluded from participating in, denied the benefits of, or be subjected to discrimination under any program or activity receiving federal funding on the basis of race, color, national origin. Federal law also requires that the Evansville MPO identifies and addresses areas of disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority and low-income populations.

Title VI of the 1964 Civil Rights Act requires that no person, because of race, color, religion, national origin, sex, age, or handicap, be excluded from participation in, denied benefits of, or be subjected to discrimination by and federal aid activity. Executive Order 12898 Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, issued on February 11, 1994, broadens this requirement to require that disproportionately high and adverse health or environmental impacts to minority and low-income populations be avoided or minimized to the extent feasible. Projects that include actions that are proposed, funded, authorized or permitted by federal agencies are subject to this Executive Order.

There are three fundamental Environmental Justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority population and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The intent of the Executive Order and of U.S. DOT's Environmental Justice guidance is to ensure that communities of concern, defined as minority population and low-income populations, are included in the transportation planning process, and to ensure that they may benefit equally from the transportation system without experiencing a disproportionate share of its burdens.

OVERLAY PROJECTS' MAP

A base map was created to identify areas where the principles of Environmental Justice should be considered; minority populations and/or low-income populations. Using 2010 decennial data and 2005-2010 American Community Survey estimates from the U.S. Census Bureau, the EMPO selected data tables that estimated the number of people in the following five categories; individuals below poverty, individuals age 65 or older, minority, disabled, and limited English speaking. Using these five categories and data from all seventy census tracts in Vanderburgh, Warrick and Henderson counties, the average percentage for each category was determined. To identify the census tracts that have large percentages of the above populations, the EMPO identified those census tracks that had the ten highest percentages in each of the five categories. If a census tract had one category in the top ten, it was identified as a Secondary Focus Areas. If a census tract had two or more categories in the top ten, it was identified as a Primary Focus Area.

Figures H-1, H-2, and H-3 illustrates the areas of potential impacts and potential benefits to the minority populations and low-income populations within Vanderburgh County, Henderson County, and Warrick County, respectively, based on the location of recommended transportation projects within the 2040 Metropolitan Transportation Plan (see Chapter 4 for project lists). These recommendations include 46 projects that should be implemented during the next 28 years. The total construction cost of these projects is estimated to be $518 - $544M.

PROJECT IMPACT

All groups, including minority populations and low-income populations will benefit from the planned transportation improvements in the area. Many of the improvements will have positive impacts to these populations in terms of increased access to the community and additional transportation options. Continued transit service will be provided and roadways will include design improvements to make the roads safer and less congested.

All segments of the population who live near roadway construction projects may experience short-term impacts, however, neither low-income nor minority populations in the region will experience high and disproportionate impacts due to the projects proposed in the 2040 Plan.

The project selection process was developed from the public participation process. Project identification and selection was the focus of several meetings with citizens, elected officials, stakeholder groups, engineers, and Department of Transportation representatives. In addition, efforts were made to ensure meaningful opportunities for public participation in order to increase outreach for low-income and minority population participation during the planning process. Low-income and minority participation is important to the decision-making process and helped to ensure that the transportation needs of the target populations are met to the extent possible in the MTP 2040. It is the goal of the EMPO to ensure inclusion of all persons in the transportation planning process.

Figures H-1, H-2, and H-3 illustrates that there is a fair distribution of transportation projects within Vanderburgh County, Henderson County, and Warrick County, respectively, and that no group, specifically minorities and low-income, will experience disproportionately high and adverse human health and environmental effects. There are no Environmental Justice issues related to the selection of projects in the MTP 2040.

Figure H-1: Vanderburgh County Focus Areas

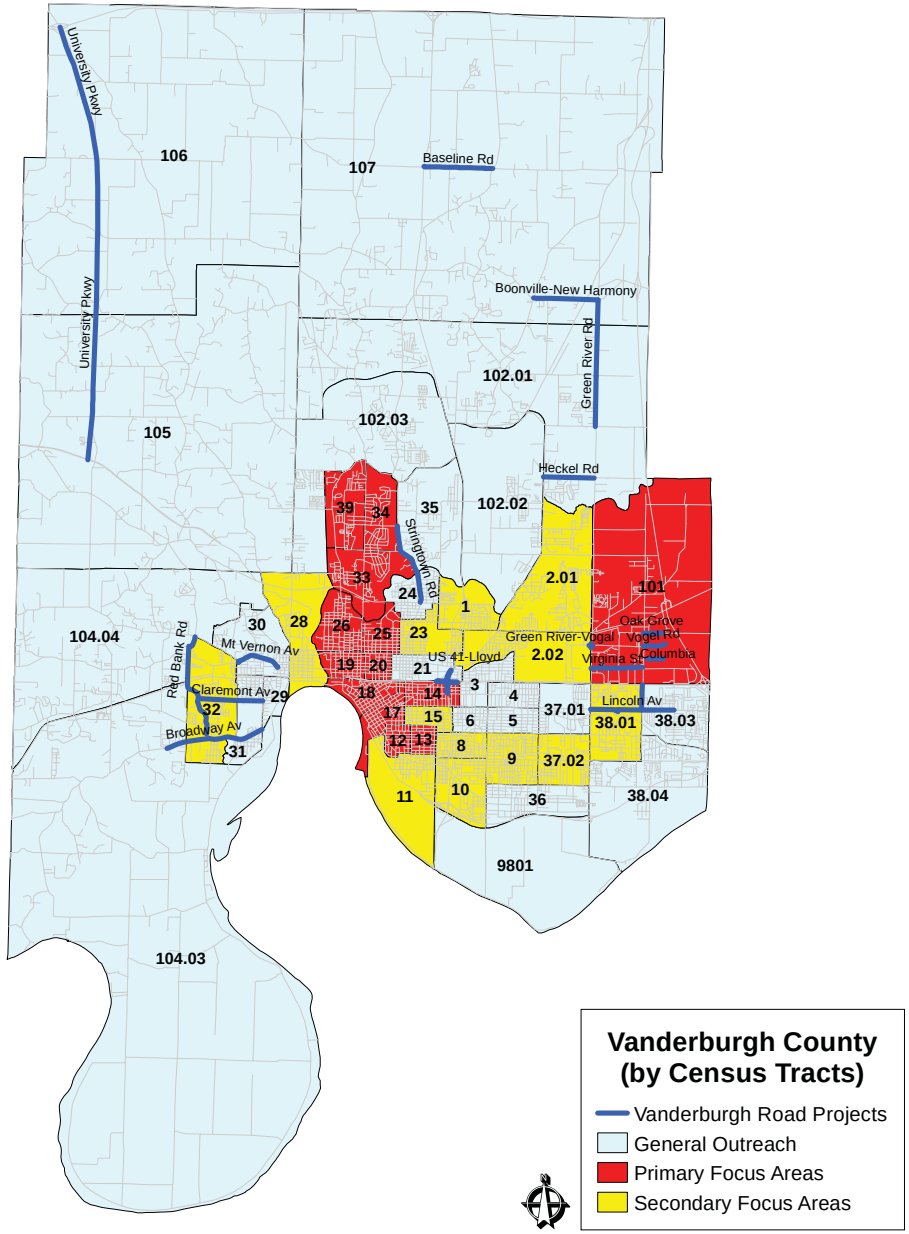


Figure H-2: Henderson County Focus Areas

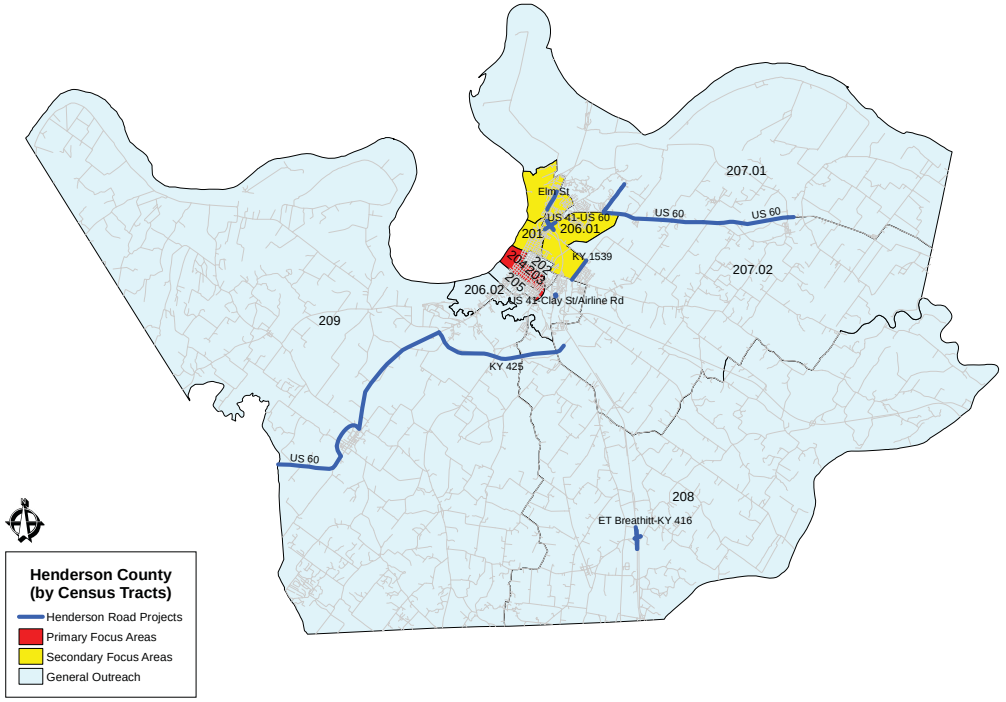
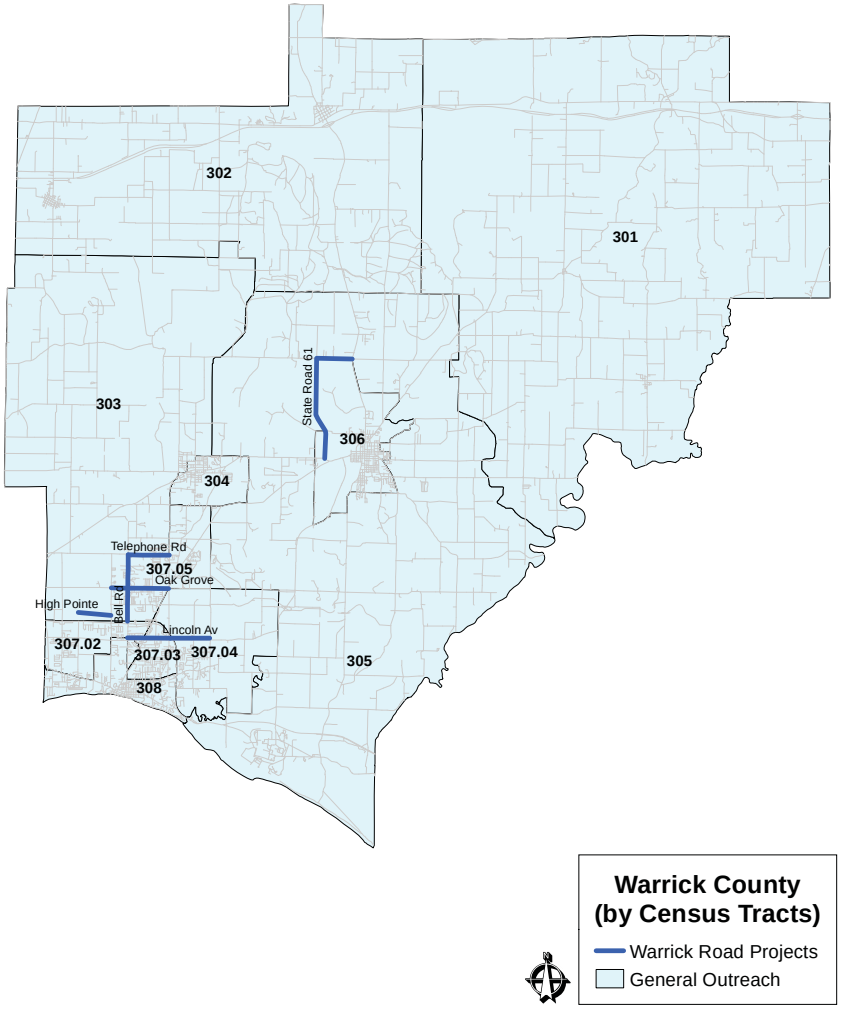


Figure G-3: Warrick County Focus Areas



APPENDIX I:

GLOSSARY

ABBREVIATIONS

AADT – Average Annual Daily Traffic
ADA - Americans with Disabilities Act
AQPP - INDOT Air Quality Post-Processor
CAAA - Clean Air Act Amendments of 1990
CAC - Citizens Advisory Committee
CBF - Cumulative Bridge Fund
CMAQ - Congestion Mitigation & Air Quality
CMP - Congestion Management Process
COA - Comprehensive Operational Analysis
COIT - County Option Income Tax
CVET - Commercial Vehicle Excise Tax
EDIT - Economic Development Income Tax
EMPO - Evansville Metropolitan Planning Organization
EPA - U.S. Environmental Protection Agency
FAA - Federal Aviation Administration
FHWA - Federal Highway Administration
FRA - Federal Railroad Administration
FTA - Federal Transit Administration
HART - Henderson Area Rapid Transit
HES - Hazard Elimination Safety
HSIP - Highway Safety Improvement Program
HUD - U.S. Housing and Urban Development
IDEM - Indiana Department of Environmental Management
INDOT - Indiana Department of Transportation
ISTEA – Intermodal Surface Transportation Efficiency Act
KYTC - Kentucky Transportation Cabinet
LOHUT - Local Option Highway User Tax (or Wheel Tax)
LOS - Level of Service
LRSA - Local Road and Street Account
MARAD - US Department of Transportation Marine Administration
MVHA - Motor Vehicle Highway Account
MAP-21 - Moving Ahead for Progress in the 21st Century Act
METS - Metropolitan Evansville Transit System
MPA - Metropolitan Planning Area
MTP - Metropolitan Transportation Plan
MUTCD - Manual on Uniform Traffic Control Devices
NAAQS – National Ambient Air Quality Standards
NHPP - National Highway Performance Program
NHS - National Highway System
RPSD - Regional Plan for Sustainable Development
SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SEAC - Sustainable Evansville Area Coalition
SIP - State Implementation Plan
SRTS - Safe Routes to School
STP - Surface Transportation Program
TAP - Transportation Alternatives Program
TAZ - Traffic Analysis Zone
TDM - Travel Demand Model
TE - Transportation Enhancement
TEA-21 - Transportation Equity Act for the 21st Century
TIF - Tax Increment Financing
TIP - Transportation Improvement Program
TMA - Transportation Management Area
VMT - Vehicle Miles Travelled
WATS - Warrick Area Transit System

GLOSSARY

Active Transportation
Active transportation includes any method of travel that is human-powered, but most commonly refers to walking and bicycling.

Air Quality Attainment Area
An area considered to have air quality as good or as better than that required by the National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. Areas that have not met the required standards are classified as nonattainment. An area may be an attainment area for one pollutant and a nonattainment area for other pollutants. (see National Ambient Air Quality Standards, air quality maintenance area, air quality nonattainment area)

Air Quality Maintenance Area
An area that has been redesignated from nonattainment to attainment is an attainment maintenance area.

Average Annual Daily Traffic (AADT)
The average number of vehicles on a roadway segment during a 24 hour period. Raw data counts are adjusted to reflect an annual average volume.

Arterial
A major thoroughfare, used primarily for through traffic rather than for access to adjacent land, that is characterized by high vehicular capacity and continuity of movement.

Bonds
Municipal Bonds are typically used for debt financing of non-proprietary functional expenditures such as roads and schools. The amount of general obligation debt, which local governments and special districts may incur, is limited to 2% of the net locally assessed property value in Indiana.

Capital Development Fund
The Capital Development Fund is a levy on property to raise money for capital improvements within the county or municipality.

Carbon Monoxide (CO)
Carbon Monoxide - a criteria pollutant – a product of incomplete combustion.

Collector
Roadways providing direct access to neighborhoods as well as direct access to arterials.

Commercial Vehicle Excise Tax (CVET)
CVET is paid in addition to Indiana's registration fees for all tractors, trucks, truck-tractors, road tractors, recovery vehicles (wreckers), trailers, and semi-trailers and is distributed back to local tax districts in Indiana based on the certified assessed value of applicable commercial vehicles.

Conformity
Transportation conformity is a mechanism for ensuring that transportation activities are reviewed and evaluated for their impacts on air quality prior to their funding or approval. Transportation plans and TIPs must conform to the State Implementation Plan (SIP). (see State Implementation Plan)

Congestion Management Process (CMP)
A plan for recommending and implementing appropriate strategies that can alleviate congestion and improve the performance of the transportation system. A CMP establishes a consistent and systematic process for managing congestion

County Option Income Tax (COIT)
A local Indiana LPA (county, city or town) may pledge a share of COIT (County Option Income Tax) to pay debt service for road, street and bridge financings. (IC 6-3.5-6) COIT - "COIT is treated as additional revenue and may be used to fund locally provided homestead tax credits."

County Road Aid
County Road Aid Co-op Program funded by 18.3% of the motor fuels taxes in Kentucky. The funds are used for construction, reconstruction and maintenance of county roads. The funds are allocated to the 120 counties by the same formula as the Rural Secondary Program, but are expended by the fiscal court. Our co-op program makes funds available up front based on projected revenues and sets aside 3%

of each participating county's allocation into a statewide emergency fund. The co-op program is voluntary and if a county does not participate, they receive a monthly check based on the previous month's actual collections and there is no emergency fund.

Cumulative Bridge Fund

CBF is a supplemental source of revenue for the construction and repair of county highway bridges and grade separations in Indiana. Indiana statutes authorize the County Commissioners of the individual county units to establish a countywide tax levy on all taxable personal and real property for the construction and repair of county highway bridges. The yearly income from this source depends on the amount of the tax levy, the assessed valuation for the county, and return on investments. Receipts from this fund must be used exclusively for construction of bridges on the county road system.

Economic Development Income Tax (EDIT)

A local Indiana LPA (county, city or town) may pledge a share of Economic Development Income Tax (EDIT) to pay debt service for road, street and bridge financings. (IC 6-3.5-7) EDIT - "A city, town or county by ordinance of the fiscal body may issue bonds payable from the unit's EDIT distribution for economic development projects and for any capital purpose for which the unit could issue general obligation bonds. EDIT may be used to retire bonds or pay lease rentals for an economic development project which will promote significant opportunities for gainful employment; attract a major new business enterprise to the unit or; retain or expand a significant business enterprise within the unit. It can be used for the acquisition of land; site and infrastructure improvements, buildings and structures; rehabilitation, renovation and enlargement of buildings and structures; machinery, equipment, furnishings, and facilities; administrative expenses associated with a project, etc."

Environmental Protection Agency (EPA)

The EPA is the federal agency responsible for issuing and enforcing air quality and emissions regulations and approving State Implementation Plans (SIPs). The EPA is also responsible for regulating water pollution, toxic chemical production & use, hazardous waste disposal, solid waste disposal, pesticides, radiation, and noise pollution. (see State Implementation Plan)

Financial/Fiscal Constraint

Financial constraint ensures that a planning document will be financially feasible. The total estimated cost of proposed transportation improvements is equal to, or less than, the estimated revenue for the time period. This consideration seeks to ensure a "realistic" plan.

Intermodal

The ability to connect, and the connections between, modes of transportation.

Level of Service (LOS)

A standard measure of roadway congestion reflecting the relative ease of traffic flow on a scale of A to F, with free-flow being rated A and congested conditions rated as F.

Local (Government) Economic Assistance

Local Government Economic Assistance Fund may receive state appropriations, gifts, grants, and federal funds and shall be disbursed by the State Treasurer of Kentucky. Income earned by the tax of the sale of coal and minerals/rights is disbursed to coal producing and coal impact counties according to each county's allocable part of the fund. 30% of these direct funds must be spent on the coal haul road system, the remaining 70% can go to anything except administrative costs.

Local Option Highway User Tax (LOHUT)
Commonly known as the wheel tax, this tax is a flat tax on all motor vehicles registered in a participating Indiana county. The revenue from this tax can only be used in maintaining the current road network in each county through reconstruction and rehabilitation projects.

Local Road and Street Account
LRSA funds provide an important source of revenue for both city and county highway departments in Indiana. The funds are dedicated for engineering, construction or reconstruction of roads, streets, sidewalks, trails and bridges, as well as for the payment of bonds and interest to finance a project of this type.

Local Roadway (functional classification)
Road or street whose principal function is to provide direct access to abutting land.

Metropolitan Planning Area (MPA)
A Metropolitan Planning Area is defined in the Code of Federal Regulations as the geographic area in which the metropolitan transportation planning process must be carried out. The MPA boundary shall, as a minimum, cover the UZA(s) and the contiguous geographic area(s) likely to become urbanized within the twenty year forecast period covered by the transportation plan.

Metropolitan Planning Organization (MPO)
Formed in cooperation with the state, MPO's develop transportation plans and programs for metropolitan areas. For each urbanized area, a Metropolitan Planning Organization (MPO) must be designated by agreement between the Governor and local units of government representing 75% of the affected population (in the metropolitan area), including the central cities or cities as defined by the Bureau of the Census, or in accordance with procedures established by applicable state or local law.

Minor Arterial
Streets and highways linking cities and larger towns in rural areas in distributing trips to small geographic areas in urban areas.

Motor Vehicle Highway Account (MVHA)
These funds are a source of revenue from the General Fund of the State of Indiana which, by statue, is credited with the collection of the first six cents of the motor fuel and fuel use taxes, plus statutory fees for motor vehicle registration and operation. These highway-use taxes are collected by the State. A portion of the MVHA are distributed back to the cities and counties for administration, budgeting and expenditure by local officials to aid in the purchase of materials, labor, and/or equipment required in the maintenance and construction of roads, sidewalks, greenways, and bridges.

Municipal Road Aid
Municipal Road Aid Co-op Program is funded by 7.7% of the motor fuels taxes in Kentucky. The funds are used for the construction, reconstruction and maintenance of urban roads and streets. These funds are allocated to incorporated cities and unincorporated urban places based on their population only. This co-op program works in the same manner as the County Road Aid Co-op Program.

National Ambient Air Quality Standards (NAAQS)
Limits established by the EPA for various pollutants, known as criteria pollutants, in ambient (air representatively sampled) air that are the target in local air quality improvement or protection programs. The primary standard protects public health; the secondary standard protects public welfare. Stricter standards may be established by state government. The three major transportation related criteria pollutants are: Ozone, Particulate matter, and Carbon Monoxide.

NOx
Oxides of nitrogen - a collective term for all compounds of nitrogen and oxygen (include nitrogen monoxide, nitrogen dioxide, etc.).

Ozone (O3)
Ozone - a criteria pollutant - is an oxygen compound that can develop when NOx, VOC, and sunlight interact in the lower atmosphere; the primary constituent of smog.

Particulate Matter (PM_{10} and $PM_{2.5}$)
The term used for a mixture of solid particles and liquid droplets found in the air. PM - a criteria pollutant - can be emitted directly by a source or formed in the atmosphere by the transformation of gaseous emissions. Fine particles, under 2.5 microns ($PM_{2.5}$), result from fuel combustion by motor vehicles and other sources, as well as transformation of gaseous emissions. Coarser particles up to 10 microns in diameter (PM_{10}) generally consist to windblown dust from a variety of sources.

Principal Arterial (functional classification)
Major streets or highways, many with multi-lane or freeway design, serving high volume traffic corridor movements that connect major generators of travel.

Right-of-Way (RW)
The land (usually a strip) acquired for or devoted to highway transportation purposes.

Rural Secondary Road
Rural Secondary Program is funded by 22.2% of the motor fuels taxes in Kentucky. The funds are used for the construction, reconstruction and maintenance of secondary and rural roads in each county (state or locally maintained). The funds are allocated to the 120 counties by a Four-Part Formula (the Fifths Formula) and are expended by the Transportation Cabinet.

State Implementation Plan (SIP)
A document prepared by each state, and submitted to EPA for approval, that identifies actions and programs to be undertaken by the state and localities to implement its responsibilities under the Clean Air Act.

Tax Incremental Financing (TIF)
TIF funds are taxes collected by LPAs on commercial developments in established TIF districts to help pay for the construction of needed improvements in that specific district.

Toll Credits
Toll Credits, or excess toll revenues, may be used as a credit toward the non-Federal matching share of federally assisted transit projects (or non-transit projects). Toll Credits do not provide cash to the project to which they are applied, but their use effectively raises the federal share up to 100 percent on projects receiving Toll Credits. Normally, Toll Credits are used for capital projects. They are exclusively used in Kentucky.

Transportation Control Measure (TCM)
Steps taken by a locality to adjust traffic patterns or to reduce vehicle use to reduce vehicular emissions of air pollutants.

Transportation Improvement Program (TIP)
A prioritized program of transportation projects to be implemented in appropriate stages over several years. Current regulations require that TIPs cover a four year period. The projects are recommended from those in the transportation systems management element and the long-range element (transportation plan) of the planning process. This program is required as a condition for a locality to receive federal transit and highway funds.

Transportation Management Area (TMA)
Is an area designated by the Secretary of Transportation, having an urbanized area population of over 200,000.

Urbanized Area
Areas with a population of 50,000 or more, at a minimum, encompass an entire urbanized area in a state, as designated by the US Bureau of Census. The Federal Highway Administration (FHWA) approved, adjusted urbanized area boundaries include the census defined urbanized areas plus transportation centers, shopping centers, major places of employment, satellite communities, and other major trip generators near the edge of the urbanized area.

VOC
Volatile organic compounds – gaseous compounds made of carbon and hydrogen (used interchangeably with Hydrocarbons, or HC).

METROPOLITAN TRANSPORTATION PLAN
2040

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