



EASTGATE

Regional Council of Governments

Congestion Management Process July 2019

Title VI/Non-Discrimination Policy

It is Eastgate's Policy that all recipients of federal funds that pass through this agency ensure that they are in full compliance with Title VI and all related regulations and directives in all programs and activities.

No person shall, on the grounds of race, color, national origin, sex, age, disability, low-income status, or limited English proficiency be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any of Eastgate's programs, policies, or activities.

This report was financed by the Ohio Department of Transportation and Eastgate Regional Council of Governments.

EASTGATE REGIONAL COUNCIL OF GOVERNMENTS

Serving Northeast Ohio since 1973

The Eastgate Regional Council of Governments is a multipurpose Regional Council of Governments for Ashtabula, Mahoning and Trumbull Counties, as established by Section 167.01 of the Ohio Revised Code. Eastgate is the agency designated or recognized to perform the following functions:

- Serve as the Metropolitan Planning Organization (MPO) in Mahoning and Trumbull counties, with responsibility for the comprehensive, coordinated, and continuous planning for highways, public transit, and other transportation modes, as defined in Fixing America's Surface Transportation Act (FAST Act) legislation.
- Perform continuous water quality planning functions in cooperation with Ohio and U.S. EPA.
- Provide planning to meet air quality requirements under FAST Act and the Clean Air Act Amendments of 1990.
- Administration of the Economic Development District Program of the Economic Development Administration.
- Administration of the Local Development District of the Appalachian Regional Commission.
- Administration of the State Capital Improvement Program for the District 6 Public Works Integrating Committee.
- Administer the area clearinghouse function, which includes providing local government with the opportunity to review a wide variety of local or state applications for federal funds.
- Administration of the Clean Ohio Conservation Funds
- Administration of the regional Rideshare Program for Ashtabula, Mahoning, and Trumbull Counties.
- With General Policy Board direction, provide planning assistance to local governments that comprise the Eastgate planning area.

GENERAL POLICY BOARD (2019)

Chair – Pat Ginnetti, Mahoning County

Vice Chair – Julie Green, Trumbull County

Mayor Eric Augustein, Village of Beloit
Mayor Ruth Bennett, Village of Orangeville
Mayor Jamael Tito Brown, City of Youngstown
Mauro Cantalamessa, Trumbull County Commissioner
Mayor John Darko, City of Hubbard
David Ditzler, Mahoning County Commissioner
J.P. Ducro, IV, Ashtabula County Commissioner
Dean Harris, Executive Director, Western Reserve
Transit Authority
Mayor Herman Frank II, Village of Washingtonville
Mayor Douglas Franklin, City of Warren
Mayor Richard Duffett, City of Canfield
Frank Fuda, Trumbull County Commissioner
Fred Hanley, Hubbard Township Trustee
Mayor James Harp, Village of Sebring
Mayor Arno Hill, Village of Lordstown
Mayor James Iudiciani, Village of Lowellville
Mayor Harry Kale, Village of New Middletown
Casey Kozlowski, Ashtabula County Commissioner
Paul Makosky, City of Warren
Mayor Shirley McIntosh, Village of West Farmington
Mayor Steve Mientkiewicz, City of Niles
Mayor James Melfi, City of Girard
John Moliterno, Western Reserve Port Authority

Mayor Nick Phillips, City of Campbell
John Picuri, District Deputy Director, ODOT District 4
James J. Pirko, Citizens Advisory Board
Representative, Trumbull County
Mayor Glen. M. Puckett, Village of McDonald
Daniel Polivka, Trumbull County Commissioner
Kurt Princic, OEPA NE District Chief
Carol Rimedio-Righetti, Mahoning County Commissioner
Michael Salamone, Trumbull County Transit
Randy Samulka, Citizens Advisory Board
Representative, Mahoning County
Mayor Timothy Sicafuse, Village of Poland
Randy Smith, Trumbull County Engineer
Mayor Dave Spencer, Village of Craig Beach
Mayor Terry Stocker, City of Struthers
Zachary Svette, Trumbull County Metro Parks
Anthony Traficanti, Mahoning County Commissioner
Mayor Lyle A. Waddell, Village of Newton Falls
Kathryn Whittington, Ashtabula County Commissioner
Mark Winchell, Ashtabula County
Joanne Wollet, Poland Township Trustee
Mayor James Woofter, City of Cortland
Aaron Young, Mill Creek Metro Parks

TECHNICAL ADVISORY COMMITTEE (2019)

Chair - Gary Shaffer

Vice Chair - Kristen Olmi

CITIZENS ADVISORY BOARD (2019)

Chair - Randy Samulka

Vice Chair - James J. Pirko

Table of Contents

- Introduction 1
- Background 2
 - Congestion 2
 - Figure 1: Sources of Congestion..... 2
 - Congestion Management Process 3
- Step 1 - Develop Regional Objectives for Congestion Management..... 4
- Step 2 - Define CMP Network..... 4
 - Figure 2: Eastgate MPO Area..... 5
- Freeway System..... 6
 - Figure 3: Map of Youngstown and Surrounding Locations 6
- Arterial and Collector System 7
- Step 3 - Develop Multimodal Performance Measures 7
 - Level of Service..... 7
 - Travel Time and Delay Studies 8
 - Average Travel Time..... 8
 - Average Travel Speed 8
 - Total Delay..... 8
 - Traffic Counts 8
 - Accident Rates..... 8
- Step 4 - Collect Data / Monitor System Performance..... 9
 - Traffic Count Data..... 9
 - Crash Data..... 9
 - Figure 4: Top Ranked Segments in 2016 Regional Safety Plan..... 10
 - Figure 5: Top Ranked Intersections in 2016 Regional Safety Plan..... 11
 - Figure 6: Safety Hot Spots Identified in 2016 Regional Safety Plan..... 12
- Housing and Commercial Data 13
 - Figure 8: 2018 Aerial of Bailey Road / IR 76 13
 - Figure 7: 2015 Aerial of Bailey Road / IR 76 13
- Transit Data..... 13
- Rideshare Data 14
- Bicycle / Pedestrian Data..... 14
- Additional Data 14

Step 5 - Analyze Congestion Problems and Needs	14
Identify Congested Locations	14
Analytical Tools	14
Travel Demand Model	14
Highway Capacity Tools	15
Streetlight Data	15
Congested Segments	15
Table 1: High Priority Locations - Mahoning County	16
Table 2: High Priority Locations - Trumbull County	17
Figure 9: Congestion Identified by Model	18
Figure 10: Congestion Identified by Streetlight	19
Figure 11: High Priority Congestion Locations - Trumbull County	20
Figure 12: High Priority Congestion Locations - Mahoning County	21
Step 6 - Identify and Assess Strategies	22
Add Base Capacity	22
Roundabouts	22
Figure 13: Roundabout Diagram	22
Additional fixed transit routes	22
Figure 14: WRTA Fixed Transit Routes	23
Lane Additions to Freeways and Local Roads	24
Operate Existing Capacity More Efficiently	24
Additional Turn Lanes	24
ITS	24
Traffic Signal Improvements/Synchronization	24
Geometric Evaluations/Improvements	25
Access Management	25
Encourage Alternate Means of Travel	26
Transit	26
Rideshare	26
Improved bicycle/pedestrian facilities	27
Airports - Passenger Service	27
Lake and River Ports	27
Step 7 - Program and Implement CMP Strategies	27

Regional Strategies.....	27
Corridor Strategies.....	27
Project Strategies.....	28
Step 8 - Evaluate Strategy Effectiveness	28
Table 3: Study Locations	28
Figure 15: Study Locations	29
Conclusion.....	30

Introduction

The Eastgate Regional Council of Governments (Eastgate) 2019 Congestion Management Process (CMP) was created to replace the previous CMP developed in 2010. The CMP was developed as an integral part of Eastgate's Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP). This report was written to help reduce existing congestion and to mitigate future congestion throughout the Mahoning Valley.

A major component of any metropolitan area is its regional transportation system, which has a basic purpose of providing the means to accommodate local area travel demand. At the same time, this system must provide for logical development within the region, satisfy requirements for the safe and efficient movement of people and goods, and be accomplished with the most cost-effective use of available resources. Long range strategies must emphasize the transportation system's effects within the area's physical, demographic, social, and economic environment. A regional transportation plan is required in order to maintain this system as a viable part of the metropolitan environment, capable of accommodating present and anticipated demands. This long-range plan is intended to provide the documented framework for comprehensive transportation development within Mahoning and Trumbull counties.

Eastgate is the MPO for the urban area of Mahoning and Trumbull counties, or Youngstown, OH-PA. Eastgate is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Ohio Department of Transportation (ODOT), as well as local member governments. Eastgate is also a council of governments, fulfilling other roles as allowed by the Ohio Revised Code (ORC) in planning and the administration of public funding. Eastgate is governed by a policy board, the General Policy Board (GPB), that is comprised of representatives from local governments and transportation entities. The GPB is assisted by Eastgate staff and the Technical Advisory Committee (TAC) that prepare studies and technical assessments, facilitate public input, and foster interagency coordination.

The Metropolitan Transportation Plan documents the planning process carried out by Eastgate and its partners, identifying strategies and projects to maintain and improve the transportation system over a twenty-year horizon. The MTP, per federal law, must include both long-range and short-range program strategies that lead to the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods. It is developed through four key steps: identifying trends and forces shaping the region, working with the public stakeholders to develop a collective vision and goals for regional development, then recommending strategies to help achieve the vision. The MTP provides the basis for how federal transportation funding is spent to improve surface transportation such as roads, bridges, and transit operations. The MTP must be fiscally constrained, meaning proposed projects cannot exceed projected funding.

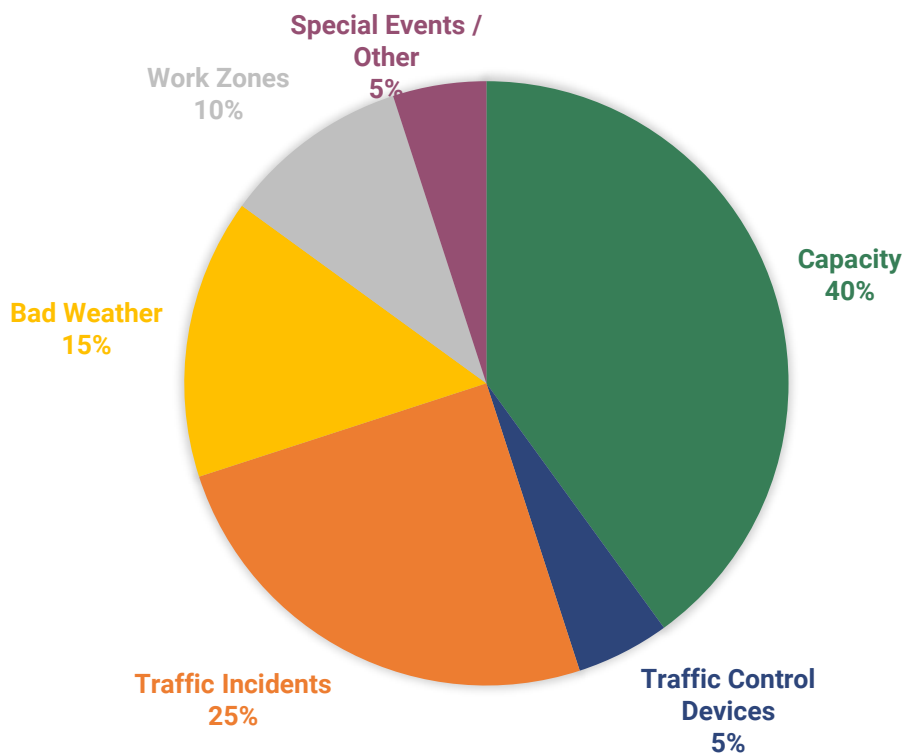
Background

Congestion

Traffic congestion is a condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most common example is the physical use of roads by vehicles. When traffic demand is great enough that the interaction between vehicles slows the speed of the traffic stream, congestion is incurred. As demand approaches the capacity of a road, or of the intersections along the road, extreme traffic congestion sets in. When vehicles are fully stopped for periods of time, this is colloquially known as a traffic jam.

Everyone has experienced congestion on our local roadways at some point in time. Whether it is a certain time of day or certain time of the year, a number of roadways and intersections throughout Mahoning and Trumbull Counties are notorious for slow traffic. Congestion can be caused by a variety of issues such as geometrics or roadway attributes, traffic accidents, work zones, signal timing, and bad weather. One of the most common causes is the simple fact of too many cars on a given road segment at one time. Roads are capable of handling a certain volume of traffic. Once that volume has been exceeded, a bottleneck starts. Figure 1 identifies some of the sources of congestion.

Figure 1: Sources of Congestion



There are two basic types of congestion, recurring and non-recurring.

Recurring - Congestion that is typical for a section of roadway where the number of vehicles exceeds the traffic carrying capacity. Congestion begins at regular times of the day and often occurs at the same locations. Recurring congestion is often defined as routine disruption in traffic flow.

Non-Recurring - Congestion that is defined as an unexpected disruption in traffic flow. Congestion is caused by a sudden event such as a traffic accident, disabled vehicle, or weather incident. A special event, such as a county fair or festival, can also cause non-recurring congestion.

Congestion Management Process

According to Federal Highway Administration (FHWA), an urbanized area with a population over 200,000 is designated a Transportation Management Area (TMA) and is required to create, maintain and use a CMP. This was initially spelled out in the Safe Accountable Flexible Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU). The CMP is a regional approach to manage and monitor the transportation system. The CMP is intended to serve as an organized and transparent way for our planning area to identify and manage congestion, connect performance measures to support funding for projects, and evaluate recommended strategies to ensure we are effectively addressing congestion.

Eastgate created the CMP for Mahoning and Trumbull Counties by following the U.S. Department of Transportation Federal Highway Administration's "Congestion Management Process: A Guidebook". The following describes the contents of a CMP:

A congestion management process is a systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs. The CMP is intended to move these congestion management strategies into the funding and implementation stages.

The CMP, as defined in federal regulation, is intended to serve as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system. The process includes:

- *Development of congestion management objectives*
- *Establishment of measures of multimodal transportation system performance*
- *Collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of congestion*
- *Identification of congestion management strategies*
- *Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy*
- *Evaluation of the effectiveness of implemented strategies*

The elements of a successful CMP defined in the process model that follows serve as a guide for the actions to be taken in developing a CMP. These eight actions include:

- 1. Develop Regional Objectives for Congestion Management*
- 2. Define CMP Network*
- 3. Develop Multimodal Performance Measures*
- 4. Collect Data / Monitor System Performance*
- 5. Analyze Congestion Problems and Needs*
- 6. Identify and Assess Strategies*
- 7. Program and Implement Strategies*
- 8. Evaluate Strategy Effectiveness*

Step 1 - Develop Regional Objectives for Congestion Management

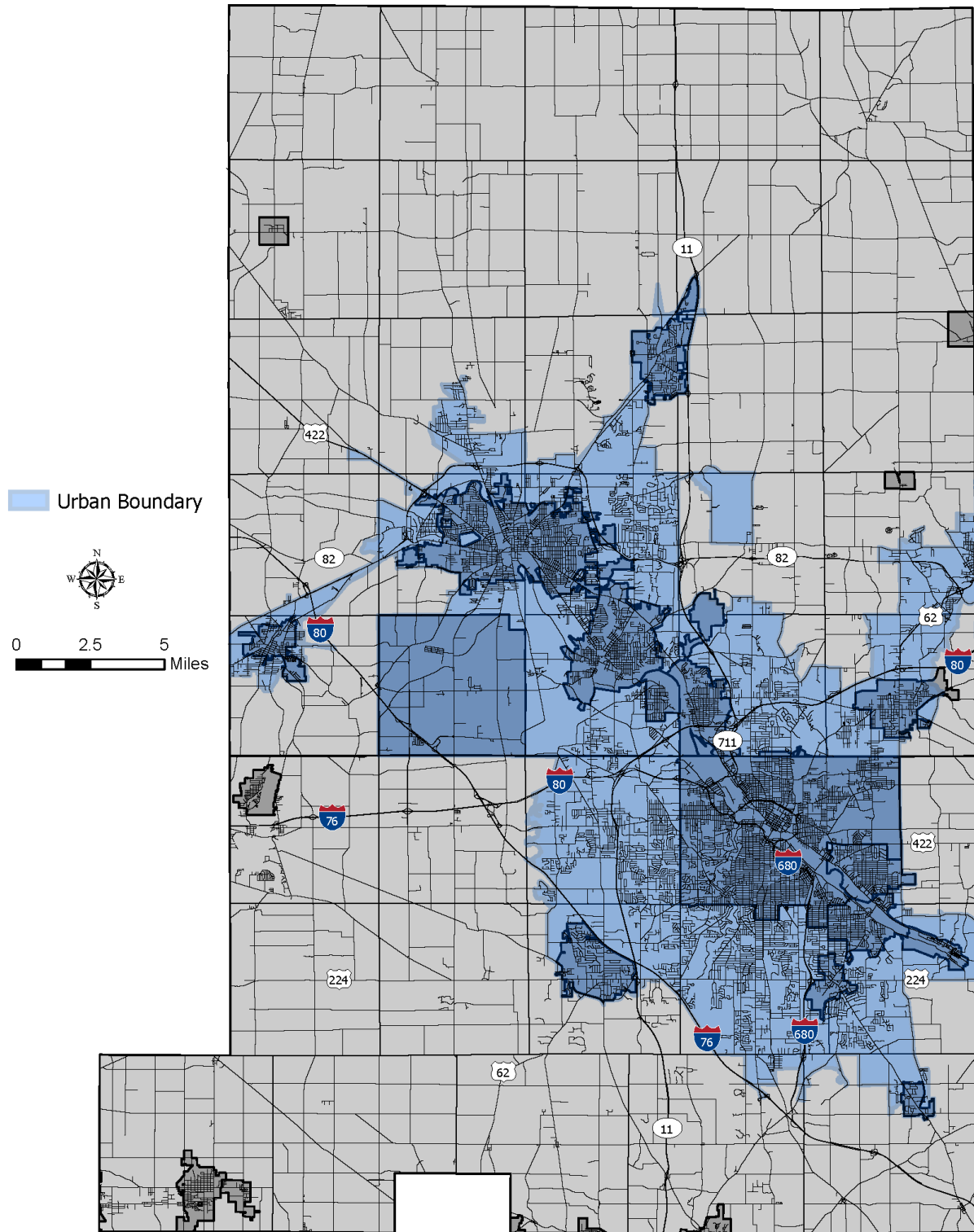
The following objectives were derived by using input from local communities and Eastgate's Technical Advisory Committee. The objectives are also linked to Eastgate's Metropolitan Transportation Plan (MTP) which covers all modes of transportation. The objectives are ideas to help alleviate congestion throughout Mahoning and Trumbull Counties. The overall focus of the CMP is to reduce congestion through the use of better management and operations of the existing transportation system.

- Maximize effectiveness and efficiency of existing transportation system
- Reduce Intersection Delay
- Reduce Corridor Delay
- Reduce Traffic Accidents
- Develop multimodal alternatives for people and goods

Step 2 - Define CMP Network

Eastgate's planning area consists of Mahoning and Trumbull Counties. The network for the Congestion Management Process includes all of both counties. Figure 2 illustrates the physical extent of the Eastgate MPO area along with the urban boundary. Both counties cover a total of 1,049 square miles. In 2010, the two counties had a combined population of 449,135 with an urban area population of 387,550. The two largest cities are Youngstown in Mahoning County and Warren in Trumbull County. Together those cities along with a few smaller municipalities represent the urban core of the area. The urban core also parallels the Mahoning River which once attracted heavy industry. The presence of the Mahoning River also leads itself to a nickname for the area, "The Mahoning Valley".

Figure 2: Eastgate MPO Area



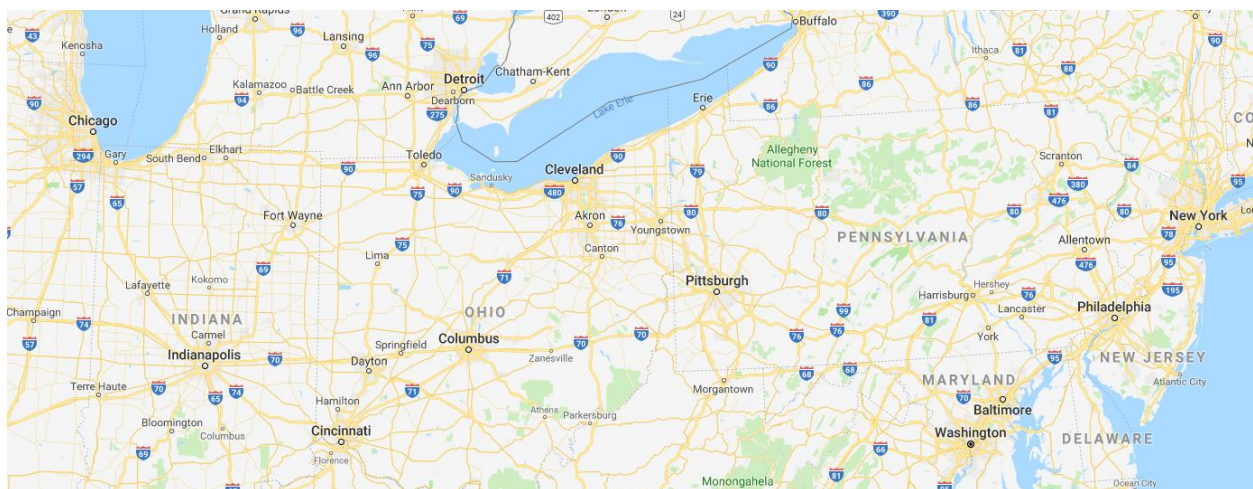
Like many communities across the country, the Eastgate area experienced suburban sprawl at the expense of the older cities. Townships bordering the cities were scarcely populated in 1970 and grew rapidly in just 30 years. Today, those townships are no longer growing in population, but the housing continues to spread further out. The fast pace of residential and commercial expansions along with a lack of planning and regulations, have contributed to congestion problems on certain arterials. Transportation planners were unable to keep pace with the development. The growth of the townships has slowed greatly and, in some cases, begun to decline. However, the problems with the road network remain. The slower growth has given transportation planners time to “catch-up” with the congestion caused from rapid growth of the past.

For the Eastgate Congestion Management Process, the transportation network of interest consists of the entire road network which includes all vehicle types (cars, trucks, buses), non-motorized types (bicycles, pedestrians), and intermodal facilities (park-and-ride lots, bike trails, rail facilities, airports). An emphasis is placed on the existing road network consisting of over 3,800 center lane miles.

Freeway System

The Mahoning Valley is centrally located between east coast cities (New York, Philadelphia, Baltimore and Washington DC) and Chicago in the Midwest. Figure 3 shows Youngstown’s central location between the East Coast and Midwest. Because of its geographic position, the Mahoning Valley is a major freight corridor for goods. Within Eastgate’s vicinity, Interstates 76 and 80 are major east/west highways that currently have truck volumes in excess of 29%, and in some areas more than 41%. Truck traffic along these corridors is projected to increase greatly. Eastgate also has a significant number of truck stops in the area to service the freight haulers on their way to and from the East Coast. State Route 11 is the main north/south highway connecting Lake Erie ports to the north and Ohio River ports to the south. Interstate 680 is the main freeway traveling through Youngstown while connecting Interstate 76 and 80. The busiest freeway section currently has approximately 56,000 vehicles a day.

Figure 3: Map of Youngstown and Surrounding Locations



Arterial and Collector System

The arterial streets throughout Mahoning and Trumbull Counties generally have the most commercial activity. Arterials around the Mahoning Valley are typically 2 to 4 lane facilities. Collector streets feed traffic to the arterial streets and are comprised mostly of residential activity. However, there are some collectors with significant commercial activity. Collector streets are predominantly two-lane roads with a few having 3 or 4 lanes. The arterial and collector system for the Eastgate area is where most of the congestion exists. It is most prevalent on commercial suburban corridors with numerous signals and curb cuts. The busiest arterial street in the area has approximately 34,000 vehicles a day traveling on a 4-lane facility.

Even though Mahoning and Trumbull Counties have been losing population, the traffic pattern has not paralleled that change. Throughout much of the decade, the Daily Vehicle Miles Traveled (DVMT) on Functional Class roads has increased slightly or remained the same. This may be due in part to an increase in the number of vehicles per household. According to the Federal Highway Administration, the number of vehicles per household in 1969 was 1.16. In 2009, vehicles per household had risen to 1.9. Persons per household also decreased in that time from 3.2 to 2.5. Only in the last several years has the DVMT decreased. This may be attributed to the economic downturn throughout the country.

Step 3 - Develop Multimodal Performance Measures

Performance measures are defined as specific indicators used to evaluate how well a person, organization, or a system is operating. Performance measures for the CMP were developed to allow Eastgate the tools to assess the operation of the transportation network. These tools can be used for either a large area (MPO region) or a smaller defined area (corridor or intersection). The performance measures also allow Eastgate to convey the information to local communities and the public. The performance measures are constantly used to update, monitor, and verify the CMP is working as it should. The following performance measures can be utilized when assessing the transportation system.

Level of Service

The most common measure currently used to define congestion involves Level-of-Service (LOS) values as defined in the Highway Capacity Manual (HCM). LOS is a qualitative measure describing operational conditions of a segment or traffic stream. Six different levels are defined (LOS A, B, C, D, E, and F).

- A = Free flow
- B = Reasonable free flow
- C = Stable flow
- D = Approaching unstable flow
- E = Unstable flow
- F = Forced or breakdown flow

Generally, a section of roadway with a LOS of either E or F is considered congested. In the past, a LOS of C was the transitional area where the flow rate began to change from stable to unstable. However, many MPOs and ODOT are now accepting a LOS of D for some roadway classifications, such as freeways and multi-lane arterials. Eastgate's acceptable level of service is determined on

a case-by-case basis. Level of service can be defined and measured differently depending upon the roadway facility it is describing. Because of the various methods of determining LOS, these values are usually not comparable between roadway classifications. For signalized intersections, LOS is defined in terms of average stopped delay per vehicle for a 15-minute period. Additionally, a roadway segment or intersection with a volume-to-capacity ratio greater than 1.0 is immediately considered to be a LOS F.

Travel Time and Delay Studies

Average Travel Time

The average travel time is defined as the total time to traverse a length of a roadway under prevailing traffic conditions. All stopped delays are included in the average travel time. This measure can be used to compare the quality of service of various alternate routes from a point of origin to a point of the destination.

Average Travel Speed

The average travel speed is calculated by dividing the distance traveled by the average total time to travel along a given length of roadway. The total time includes stopped delays in addition to the actual time the vehicle is in motion. The number of travel time runs depends on the variance in travel time, the acceptable degree of precision, and the level of confidence desired.

Total Delay

Total delay or stopped delay is the time that a vehicle is stopped in traffic or at an intersection. Expressed in seconds per vehicle, stopped delay can be measured as the actual “locked wheel” time, or in terms of time less than a very slow speed, such as 5 mph. The Highway Capacity Manual’s (HCM) delay equation uses turning movement volumes to capacity ratios to determine stopped delays at intersections. Intersection delay is not a good performance measure for the following two reasons:

1. The inability to forecast turning movements of an intersection, and
2. It is not readily adaptable as a corridor or area wide measure.

However, delay studies are useful for determining the locations, causes and lengths of delays. Total delay information can only be used to locate and measure spot areas of congestion.

Traffic Counts

When monitored correctly, the amount of traffic on the road network can be useful in identifying potential congested areas. Roads and intersections are designed to handle only so much traffic at any given time. The number and type of vehicles are often good indicators of existing or future problems. Traffic counts are collected over time for specific locations which allows Eastgate to observe increasing or decreasing counts. In addition to obtaining the traffic volume on a given roadway, traffic counts can also be used to identify the classification of the traveling vehicles.

Accident Rates

Traffic accidents can cause non-recurring congestion by temporarily blocking one or more lanes of traffic. Time is needed for emergency response professionals (police, firefighters, emergency medical services, emergency management agency) to perform their jobs. This also includes “clear time” to remove the vehicles and debris from the roadway and crash site. Accidents at an

intersection can affect the entire function of the intersection. During a fatal accident, the roadway is often completely closed for hours. Eastgate's Regional Safety Plan uses the three most recent years of crash data to identify high crash intersections and corridors. High crash corridors are based on the total number of crashes occurring along each corridor in a community. Intersections were ranked by a composite score dependent on crash frequency (number of crashes), crash rate (crashes per volume of traffic) and severity (number of injuries and fatalities).

Step 4 - Collect Data / Monitor System Performance

Performance measures depend on the collection of data. Eastgate's Long Range Transportation Plan consists of a coordinated data collection effort. Many types of data are collected from a wide variety of sources. Much of this data is also used in conjunction with the Congestion Management Process. Eastgate understands the limitations such as availability and cost for gathering data. The following data is useful in determining existing and future congestion, as well as, determining the cause of congestion.

Traffic Count Data

Eastgate's traffic counting program allows us to monitor any increases or decreases in traffic over time. Eastgate collects count data each year by using advanced radar counters and lane counters. The counters used by Eastgate are capable of collecting volume, speed, and classification counts. When looking for more detailed classification counts, Eastgate uses its lane counters. To aid the Highway Performance Monitoring System (HPMS), Eastgate collects count data on functionally classed roadways. These counts are done at a minimum of every six years. Likewise, the Ohio Department of Transportation (ODOT) collects volume and classification counts on all the State (SR), United States (US), and Interstate (I) highways every three years. When combined, the traffic count coverage for Mahoning and Trumbull Counties is comprehensive and complete.

Crash Data

Eastgate's safety program collects, manages, and maps more than 12,000 accidents a year. The crash database has more than 120 fields of data for each accident which can be queried in numerous ways. The latest Regional Safety Plan identifies and prioritizes high accident corridors and intersections for each community in Mahoning and Trumbull Counties. The crash rates are based on the most recent Ohio Department of Public Safety crash data available. High crash locations are ranked using information such as the number of crashes, the average daily traffic, and the severity of crashes. Statistics are also provided regarding the circumstances of crashes in each community. The crash statistics summarize weather and light conditions, vehicle types, cause of accidents, type of impact, age of drivers, day of week, time of day, and month of the accident. The community specific crash data and maps contained in the Regional Safety Plan will help communities identify areas of concern in the roadway network, as well as justify the need for safety upgrades and safety funding. Figure 4, Figure 5, and Figure 6 show a collection of the top ranked intersections and segments in each county as ranked in Eastgate's 2016 Regional Safety Plan and the "Hot Spot" safety locations identified by ODOT.

Figure 4: Top Ranked Segments in 2016 Regional Safety Plan

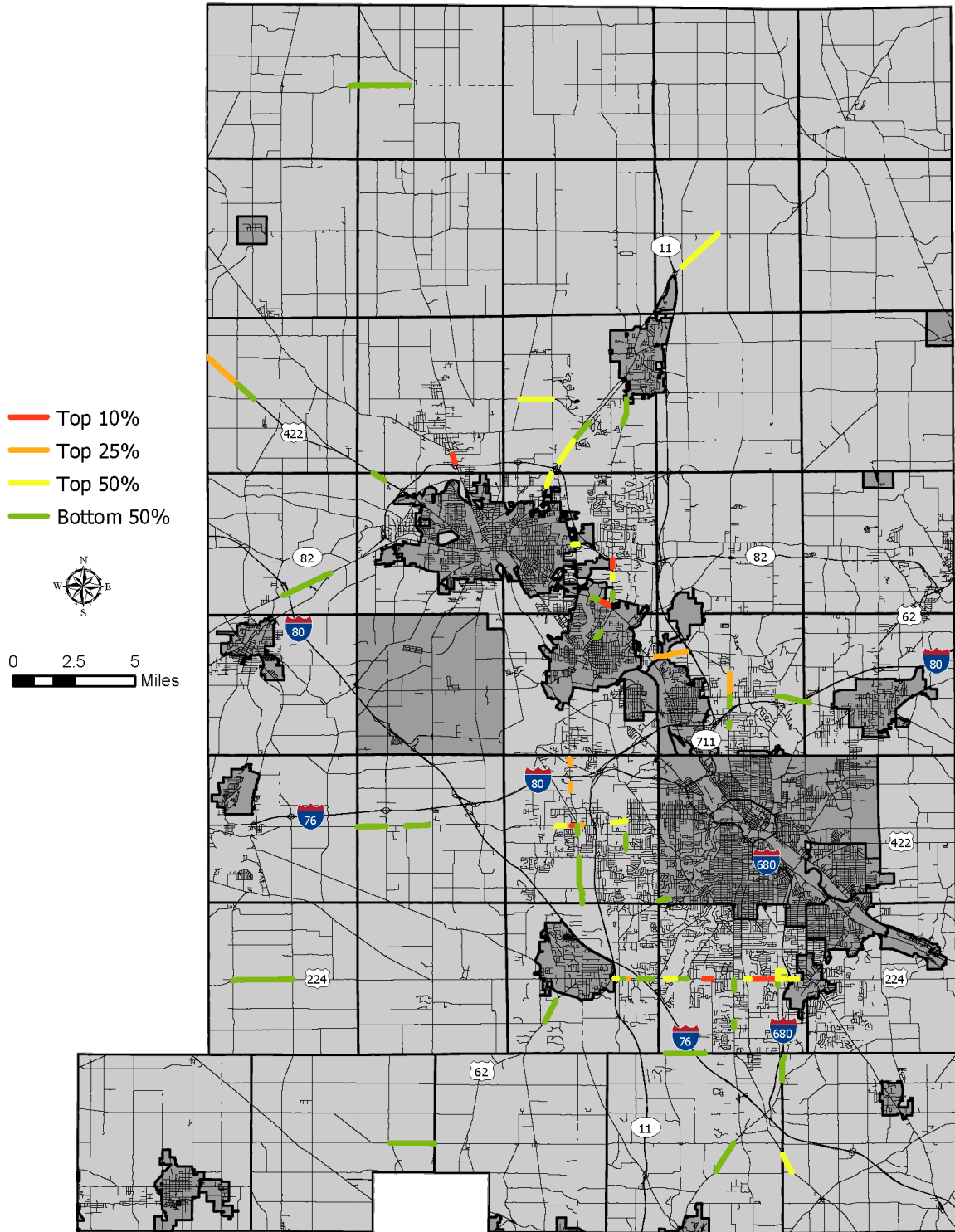


Figure 5: Top Ranked Intersections in 2016 Regional Safety Plan

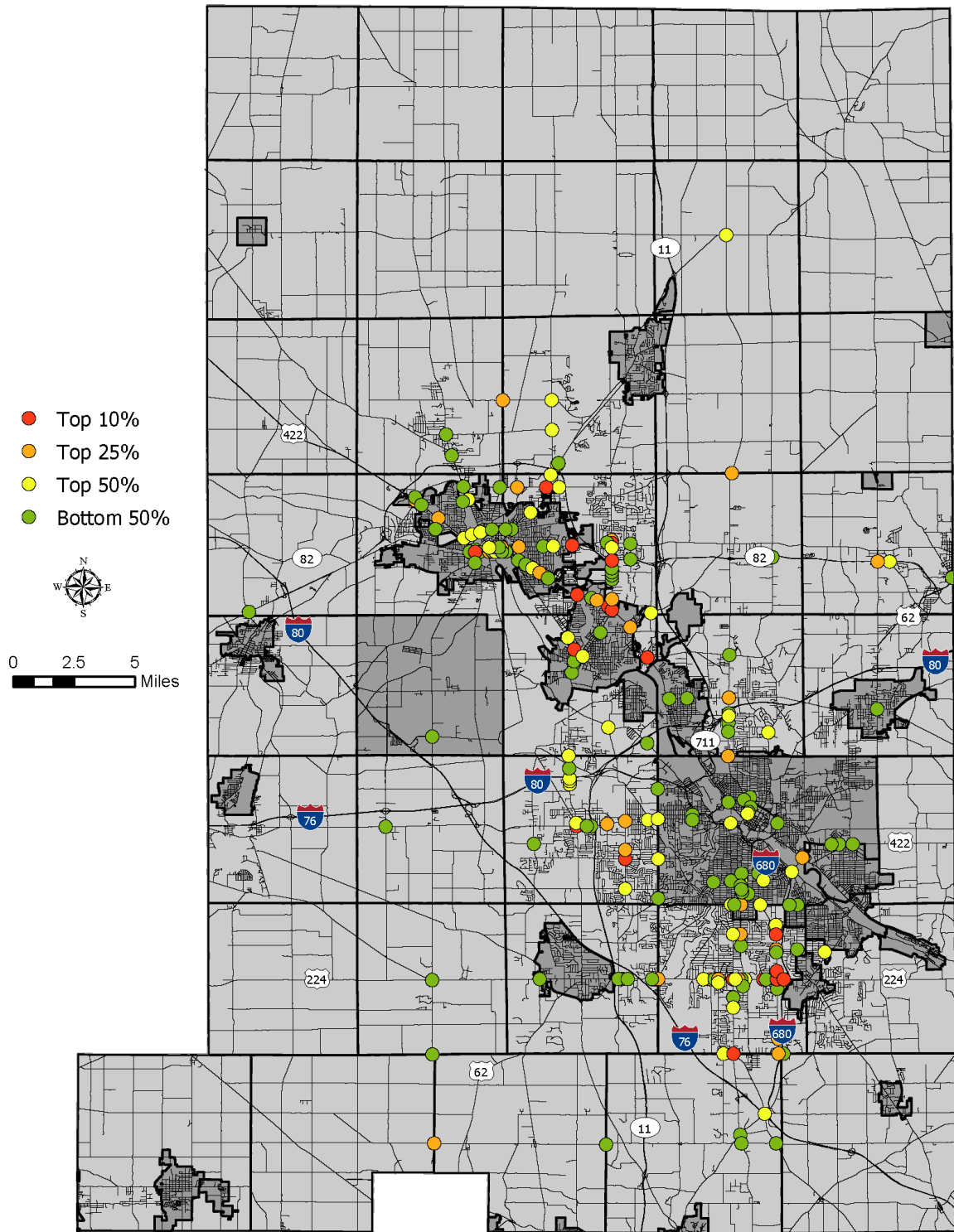
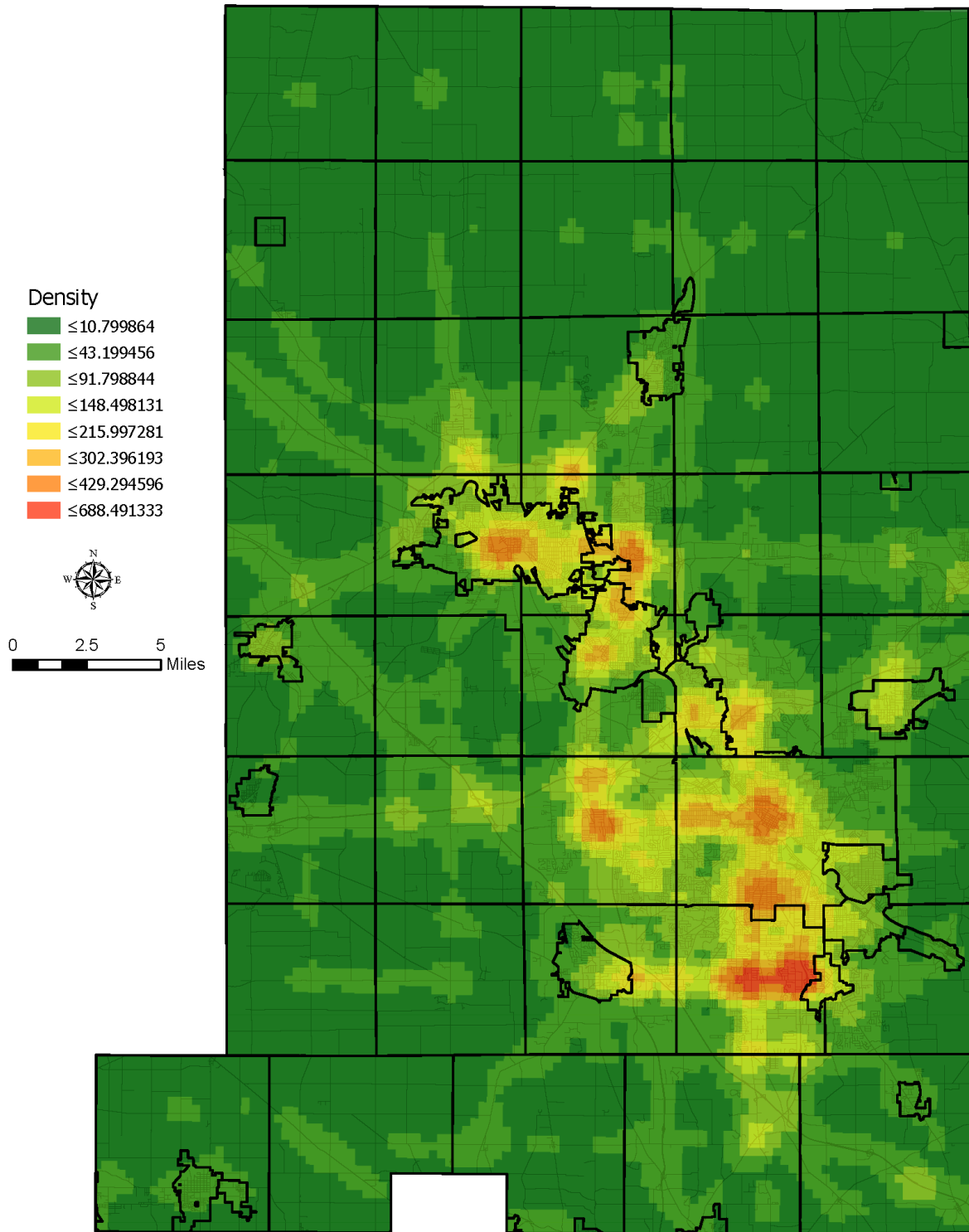


Figure 6: Safety Hot Spots Identified in 2016 Regional Safety Plan



Housing and Commercial Data

Congestion is often the result of over development. Eastgate tracks new housing and commercial developments with the aid of aerial photography. A Visual Growth Comparison Summary Report is completed when Eastgate receives a new set of aerial photographs for Mahoning and Trumbull Counties. The report shows a comparison from a base year to the latest year available. A comparison of the aerials allows Eastgate to visually show the residential and economic growth in each area. The new growth is mapped by point or polygon feature and is overlaid on a base map of Mahoning and Trumbull Counties. Figure 7 and Figure 8 show the comparison from 2015 to 2018 in the Bailey Road / IR 76 area.

Figure 7: 2015 Aerial of Bailey Road / IR 76



Figure 8: 2018 Aerial of Bailey Road / IR 76



Transit Data

The Transit Development Program (TDP) is developed on a yearly basis by Eastgate Regional Council of Governments with collaboration from local transit systems to document ongoing transit planning activities in Mahoning and Trumbull Counties. The TDP covers a five-year planning horizon and identifies future transit capital improvements, fare structures, yearly transit ridership data, and transit changes that affect the Western Reserve Transit Authority (WRTA) and the Trumbull Transit System (TTS). Eastgate utilizes the TDP as a short-range planning mechanism to identify capital improvement projects for programming future federal, state and local funding in Eastgate's Transportation Improvement Program (TIP) and the State TIP.

The TDP also gives an overview of Eastgate's bi-state urbanized area often referred to as the Youngstown OH-PA urbanized area. Federal transit allocations for urbanized areas are distributed within urban boundaries. The bi-state urbanized area funding allocations are split on a yearly basis, between the transit systems operating in the urban area. The TDP report only describes the Ohio transit systems operating in the urbanized area. Transit services in the Pennsylvania portion of the urbanized area are provided by the Shenango Valley Shuttle Service (SVSS). The SVSS transit planning activities are programmed through the Mercer County Council of Governments, the Mercer County Metropolitan Planning Organization, and the Mercer County Regional Planning Commission.

Rideshare Data

Eastgate assists with Gohio Commute which is a free to use smart commuting service. This interactive platform provides users the information they need to make smart choices that can help them save money, improve their health, and enhance air quality. Users can also connect with nearby commuters to share your ride. Gohio Commute isn't just a tool for commuters but can also be an effective tool to help employers attract and retain employees through affordable, convenient, and sustainable commute options.

Bicycle / Pedestrian Data

Eastgate produces a regional bicycle plan to outline the status of the area's bicycle projects. The plan also plans to take specific steps in an effort to promote a safe multi-modal transportation network of bicyclists. Eastgate's goals include identifying a regional bicycle network, providing planning and funding to see the network to development, encouraging routine accommodation for bicyclists, identifying safety projects, promoting bicycling as a means of transportation, supporting educational outreach, and collecting data useful for bicycle planning.

A bicycle suitability map was added as a new product in 2012 after numerous requests for such a map, and in an effort to consolidate several local mapping initiatives into one cohesive regional effort. The map's color-coded roads will help cyclists in Mahoning and Trumbull Counties find the most appropriate route for their comfort level and will help local planners and engineers identify where trouble spots and disconnects exist.

ODOT has proposed a statewide network of bicycle routes. Eastgate is responsible for coordinating the effort in Mahoning, Trumbull and Ashtabula Counties. The proposed routes are available as a web map on Eastgate's website.

Additional Data

Eastgate's ongoing data collection includes the following:

- Population data
- Employment data
- Land use plans for local communities

Step 5 - Analyze Congestion Problems and Needs

Identify Congested Locations

To identify congested locations throughout Mahoning and Trumbull Counties, Eastgate utilizes the performance measures, data collected for performance monitoring, and analytical tools. Input from local communities was also included as to the location of congested areas. Eastgate continues to improve the collection, interpretation, and dissemination of data required to enhance the Congestion Management Process.

Analytical Tools

Travel Demand Model

Eastgate uses a transportation model to simulate the traffic flow for Mahoning and Trumbull Counties in order to discover where there are areas of congestion, and also to determine the effects

of vehicular traffic on regional air quality. The transportation model is a network of links and nodes designed to represent the overall system of roads in a given area. This model is then combined with data representing the population of the area, as well as the economic infrastructure, in order to create a simulation of the traffic flows of the region. Travel forecasting is not a crystal ball that can precisely predict traffic patterns in small areas, especially over a longer time frame. Instead, its greatest value is comparative. The travel forecasting models offer a means by which decision makers can look at different transportation options and see the potential effects they might have at the regional or corridor level.

Highway Capacity Tools

For a more detailed capacity analysis, Highway Capacity Software (HCS) is used. The capacity software used by Eastgate is HCS 2010 by McTrans and is capable of calculating highway capacity and level of service for a variety of road types and intersections. Eastgate typically collects data such as lane configuration, lane width and turning movement counts.

Streetlight Data

Streetlight Data is an online mapping platform that allows users to study traffic patterns. Streetlight takes data from cellphones and anonymizes it to track the movement of cars on the roads allowing you to study many aspects of trips. One of the analysis you are able to create is a study of congestion on selected roads. Using road attributes and the number of cars on the roads every day interpolated from the cellphone data, streetlight is able to calculate a congestion rate for the selected road segments.

Congested Segments

Figure 9 shows the existing congestion on roadways throughout Mahoning and Trumbull Counties as identified by the travel demand model. The model generated a Level-of Service by direction for the road network. A Level-of-Service F was used to determine which road segments are classified as congested. Due to the regional nature of the model, Eastgate continues to make refinements and as such will produce updated congestion maps as needed.

Of the segments identified by the travel demand model, Figure 10 shows the ones which we also identified by the StreetLight data. Finally, with input from Eastgate's local community members, Figure 11 shows the priority congested locations. The road network used is based on data from 2013. Tables 1 and 2 list the priority congested roadway segments for each county along with jurisdiction.

Table 1: High Priority Locations - Mahoning County

Mahoning County Congested Road Segments			
Road Name	From	To	City/Township
Belmont Avenue	Madison Avenue	Caroline Street	Youngstown
Edwards Street	Marshall Street	High Street	Youngstown
Federal Street	Phelps Street	Wick Avenue	Youngstown
Front Street	Boardman Street	Belmont Avenue	Youngstown
Glenwood Avenue	Sugar Cane Drive	Green Garden Drive	Boardman Township
Goleta Avenue	Gypsy Lane	Hospital Entrance	Youngstown
Gypsy Lane	SR 711	Maryland Avenue	Youngstown
High Street	Edwards Street	I 680 Ramp	Youngstown
I 680 Ramp	I 680	Western Reserve Road	Boardman Township
I 680 Ramp	I 680	Market Street	Youngstown
Lemoyne Avenue	Brownlee Avenue	Midlothian Boulevard	Youngstown
Lincoln Avenue	Elm Street	Wick Avenue	Youngstown
Mahoning Avenue	Wilcox Road	Westchester Drive	Austintown Township
Mahoning Avenue	Glacier Avenue	McKinley Avenue	Youngstown
Market Street	Falls Avenue	I 680	Youngstown
Market Street	Boardman Street	Federal Plaza Plz	Youngstown
Mathews Road	Glenridge Road	Lightner Place	Boardman Township
Meridian Road	Mahoning Avenue	Oakwood Avenue	Youngstown
Meridian Road	Salt Springs Road	County Line	Youngstown
Poland Avenue	Hamilton Boulevard	Renee Drive	Struthers
Raccoon Road	Kerrybrook Drive	Mahoning Avenue	Austintown Township
Shirley Road	Cooper Avenue	Homewood Avenue	Youngstown
South Avenue	Mathews Road	Lake Park Road	Boardman Township
South Avenue	Cedar Way	US 224	Boardman Township
South Avenue	Lake Park Road	Indianola Road	Youngstown
Southern Boulevard	Maple Avenue	California Avenue	Boardman Township
Southern Boulevard	Florida Avenue	SR 7	Youngstown
SR 164	School Entrance	North Lima Road	Beaver Township
SR 164	I 680 Ramp	Western Reserve Road	Springfield Township
SR 170	US 224	SR 616	Poland
SR 46	I 80	County Line	Austintown Township
SR 616	5th Avenue	Hamilton Boulevard	Struthers
Stephens Street	Salt Springs Road	I 711 Ramp	Youngstown
US 224	SR 625	SR 616	Boardman Township
US 62	Court Street	SR 46	Canfield
US 62	Lisbon Street	US 224	Canfield
US 62	Cohasset Drive	Glenwood Avenue	Youngstown
US 62	Stratmore Avenue	Arden Boulevard	Youngstown
Wakefield Avenue	Lemoyne Avenue	Sheridan Road	Youngstown
Westchester Drive	Plaza Entrance	Mahoning Avenue	Austintown Township
Western Reserve Road	Hitchcock Road	I 680	Boardman Township
Western Reserve Road	Washingtonville Road	Covington Cove	Boardman Township
Western Reserve Road	Covington Cove	Youngstown Salem Road	Boardman Township
Western Reserve Road	Ivy Hills Drive	North Lima Road	Poland Township
Westview Drive	Plaza Entrance	US 224	Boardman Township
Wick Avenue	Service Road	School Entrance	Youngstown

Table 2: High Priority Locations - Trumbull County

Trumbull County Congested Road Segments			
Road Name	From	To	City/Township
Atlantic Street	Adams Avenue	Park Avenue	Warren
Bedford Road	Warren Sharon Road	Joy Road	Brookfield
Federal Street	SR 169	SR 46	Niles
Four Mile Run Road	Salt Springs Road	County Line Road	McDonald
Highland Avenue	Union Street	US 422	Warren
Market Street	SR 82 Ramp	Sawgrass Street	Howland Township
Market Street	North Road	SR 82 Off Ramp	Howland Township
Market Street	Main Street	Laird Avenue	Warren
Market Street	Park Avenue	Main Street	Warren
Niles Vienna Road	Stillwagon Road	Smith Stewart Road	Niles
Park Avenue	Franklin Street	Market Street	Warren
Park Street	Arlington Avenue	SR 46	Niles
Salt Springs Road	Austintown Warren Road	Carson Salt Springs Road	Lordstown
Salt Springs Road	County Line	West Liberty Street	Weathersfield Township
SR 11 Ramp	SR 11	Wilson Sharpsville Road	Cortland
SR 304	US 62	Mackey Street	Hubbard
SR 45	SR 5	Home Drive	Champion Township
SR 46	Eastwood Mall Boulevard	Deer Creek Lane	Howland Township
SR 46	Third Street	Water Street	Niles
SR 46	County Line	Ohltown McDonald Road	Weathersfield Township
SR 46	Depot Street	County Line Road	Weathersfield Township
US 422	I 80	Main Street	Girard
US 422	North Road	SR 46	Niles
US 422	Parkman Road	SR 45	Warren
US 422	Pine Avenue	Chestnut Avenue	Warren
US 422	Belle Terre Avenue	Niles Vienna Road	Weathersfield Township
Washington Street	Mercer Avenue	Elm Road	Warren
Water Street	Franklin Lane	SR 46	Niles

Figure 7: Congestion Identified by Model

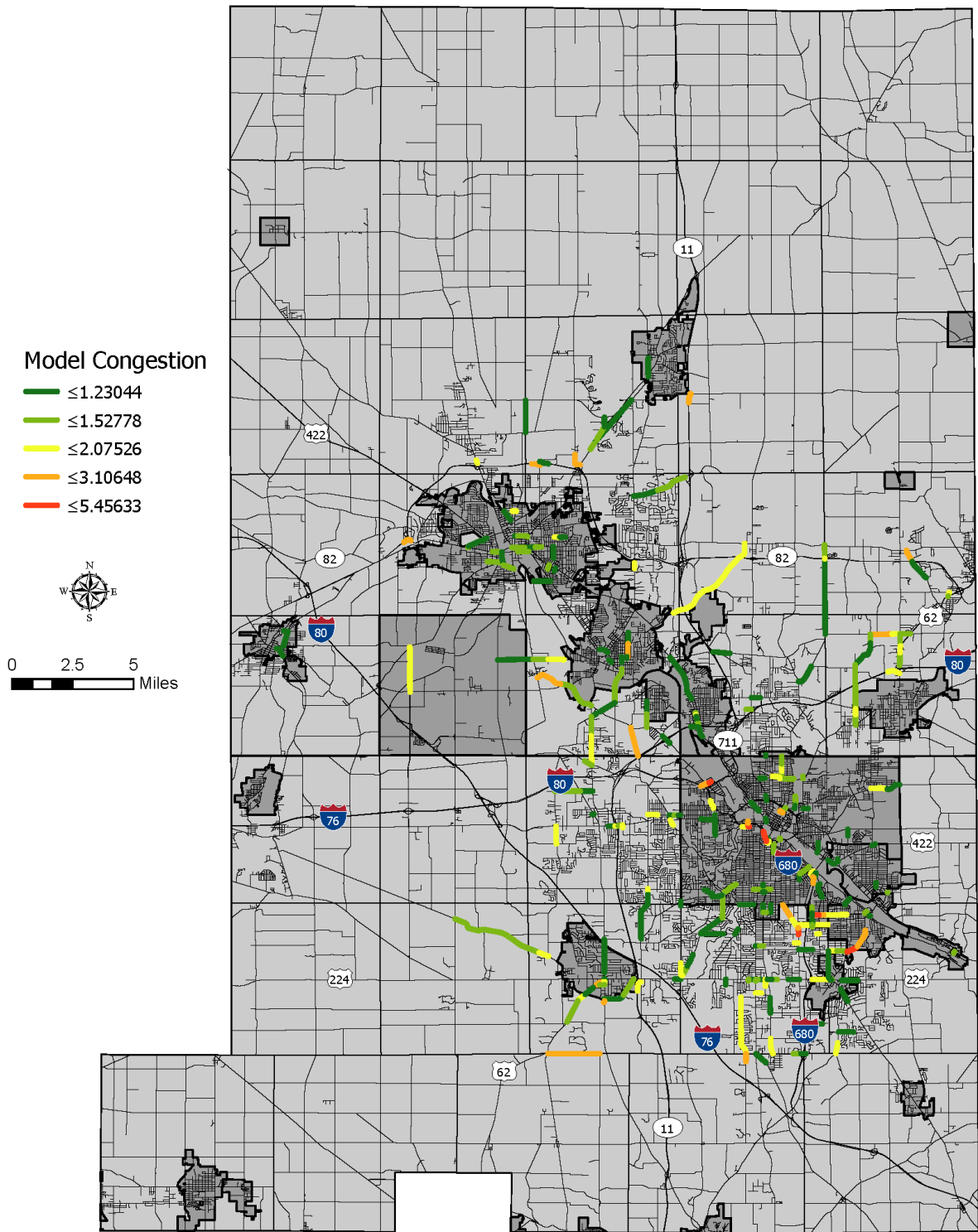


Figure 8: Congestion Identified by Streetlight

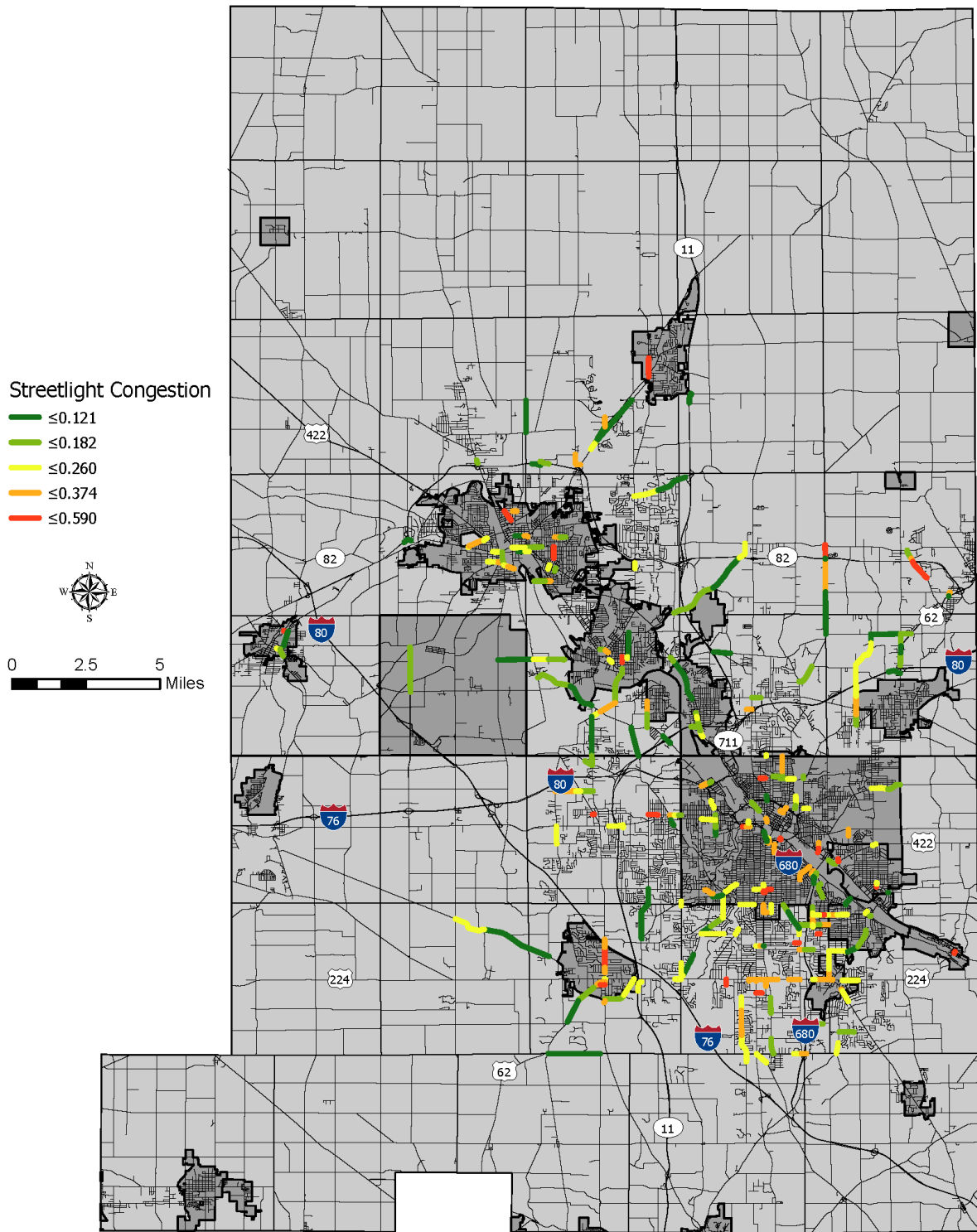


Figure 9: High Priority Congestion Locations - Trumbull County

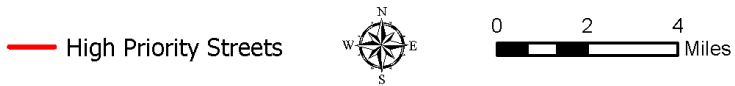
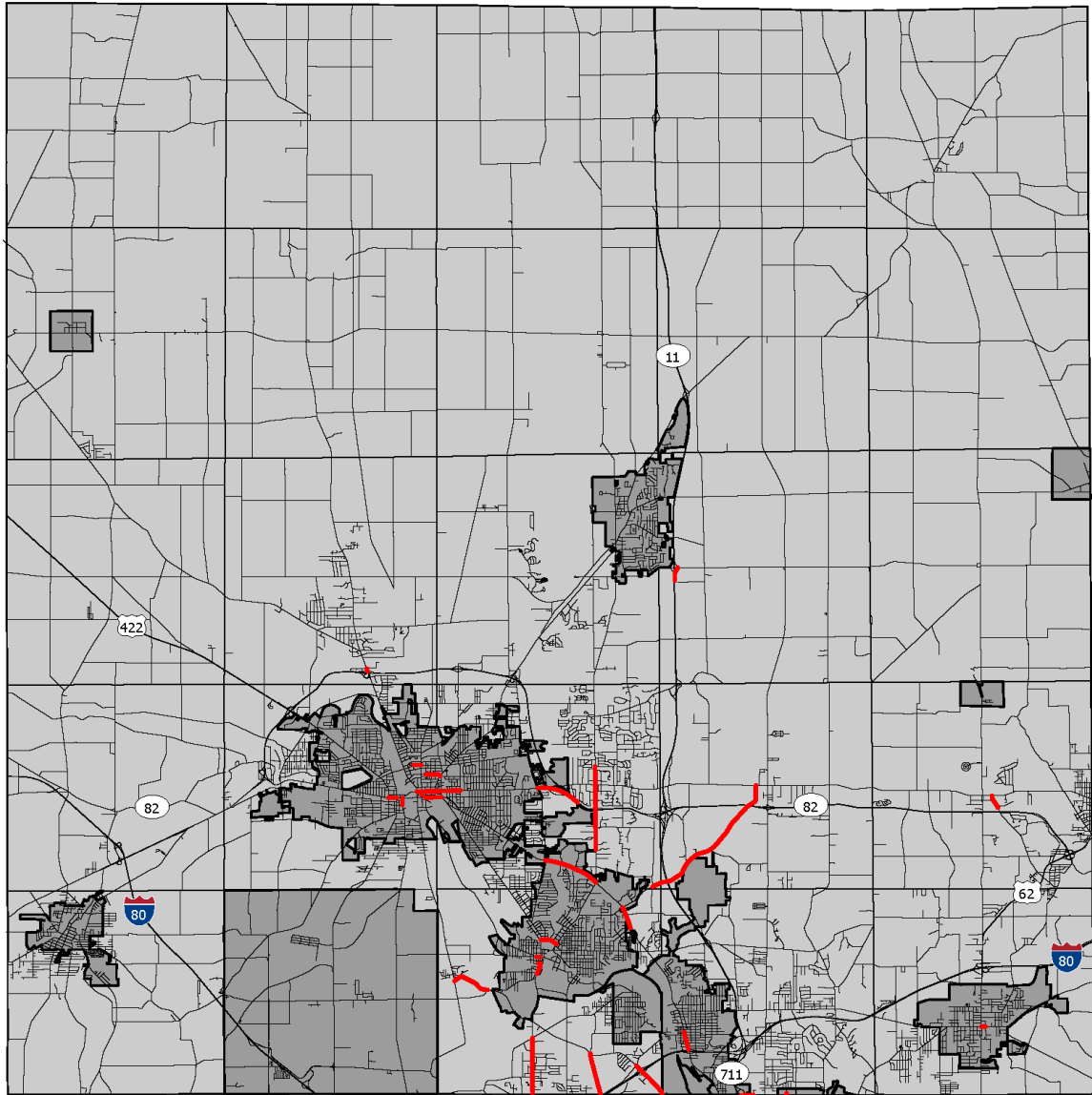
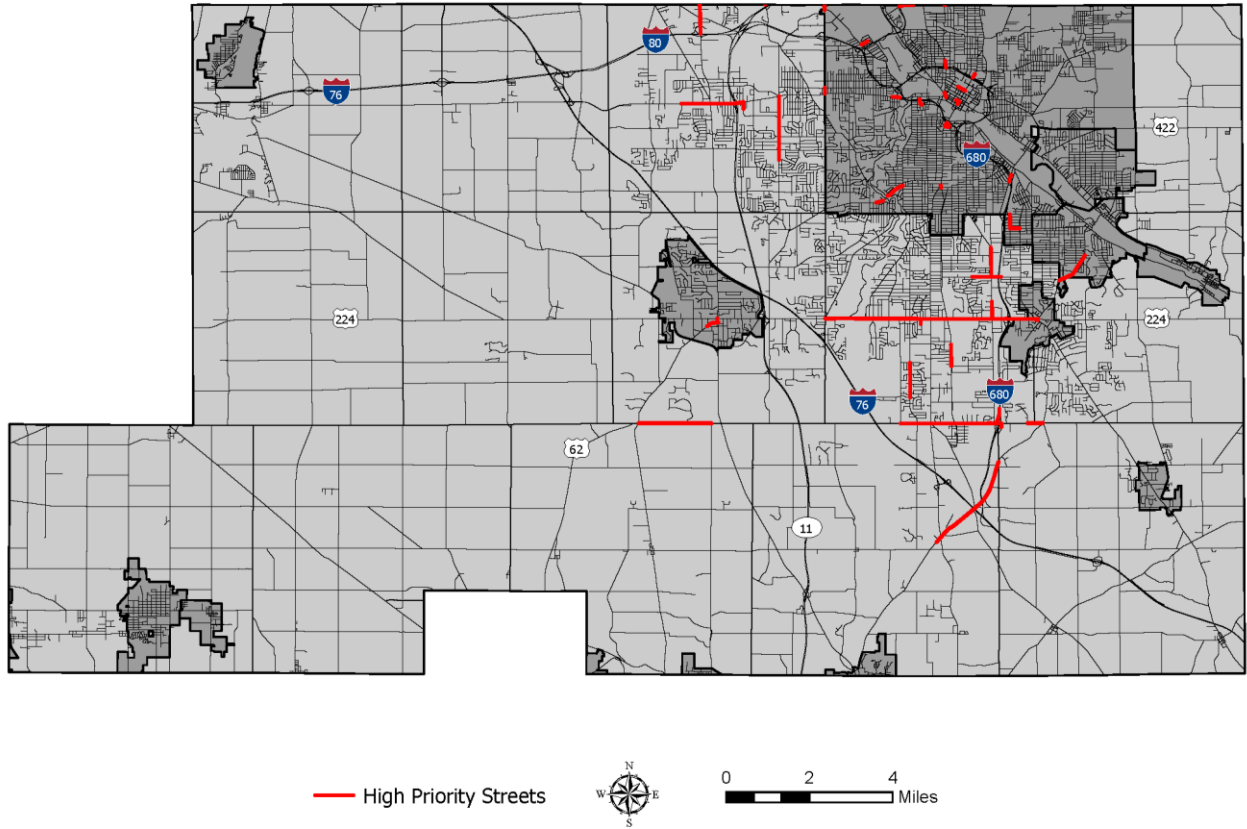


Figure 10: High Priority Congestion Locations - Mahoning County



Step 6 - Identify and Assess Strategies

The following strategies are considered for road segments and intersections currently experiencing congestion.

Add Base Capacity

Roundabouts

Modern roundabouts are circular, un-signalized intersections and are designed to keep traffic moving at all times. They not only reduce congestion but also improve safety. Fewer accidents can be achieved by eliminating left turns across traffic.

Figure 13 shows the layout of a modern roundabout and how traffic moves through. Roundabouts are quickly becoming popular because of their functionality, aesthetics, minimal impacts, safety, and cost. The cost of maintenance and operation is also less. Recently, roundabouts have been constructed at the intersection of Mathews and Sheridan Roads, and at the intersection of SR 164 and SR 626 in Mahoning County. One of Mahoning County's most congested intersections, commonly referred to as five points, is currently under construction to implement a roundabout where five legs join at one location.

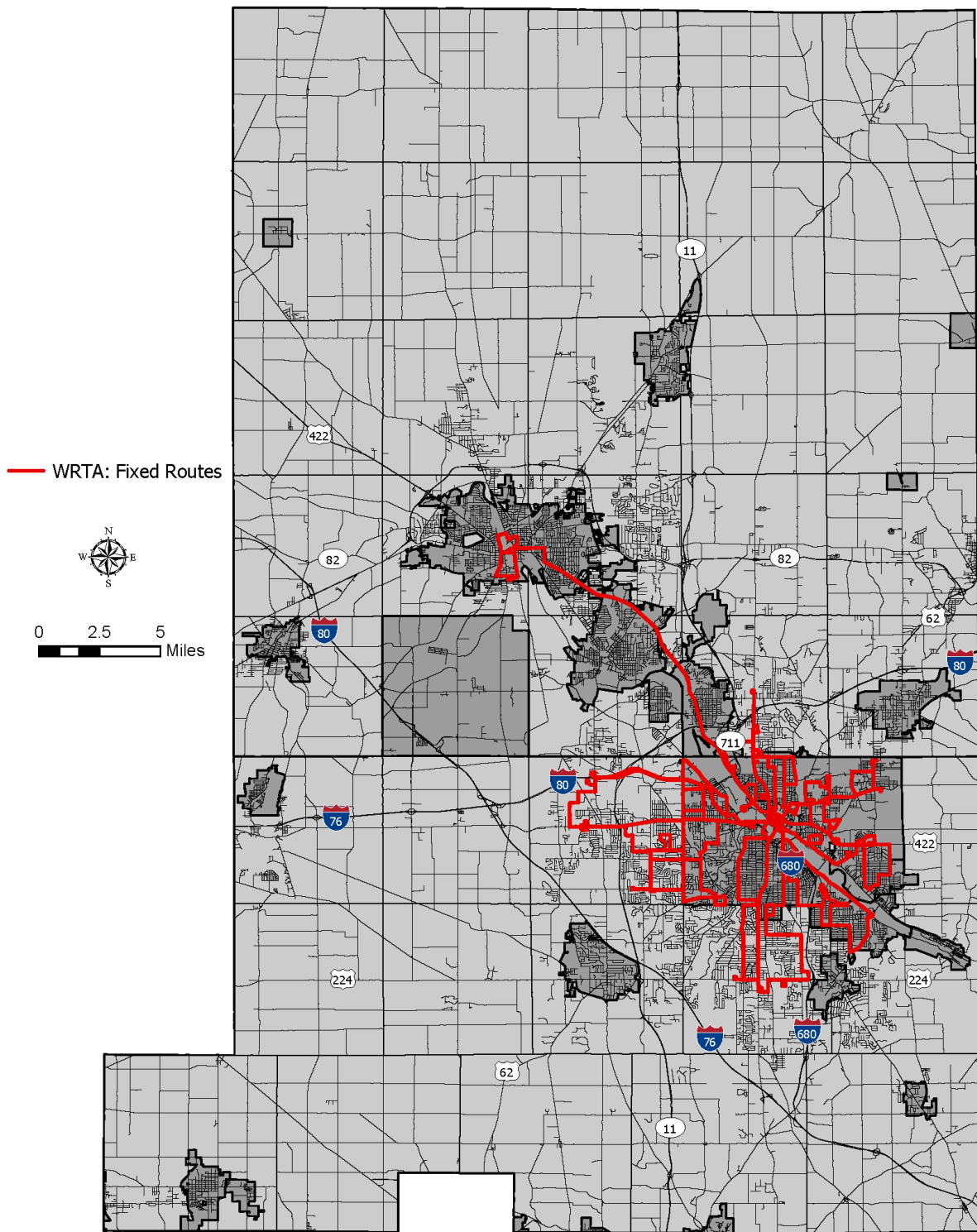
Figure 11: Roundabout Diagram



Additional fixed transit routes

There are currently 21 fixed bus routes being operated by the Western Reserve Transit Authority. WRTA is considering additional routes to expand the paratransit service area and add capacity to the fixed bus route system. Additionally, WRTA is looking to expand its fleet in the future with autonomous shuttles. These shuttles would fill in gaps in their fixed route service to focus on moving riders between high traffic locations. Figure 14 shows the fixed bus route locations throughout Youngstown and outlying townships.

Figure 12: WRTA Fixed Transit Routes



Lane Additions to Freeways and Local Roads

In severe cases of congestion, lane additions or capacity adding projects may be considered as a long-term improvement or recommendation to help alleviate congestion. Eastgate typically considers this option as a last resort after other methods have proven to be unsuccessful.

Operate Existing Capacity More Efficiently

Additional Turn Lanes

Adding turn lanes at an intersection or busy corridor can help congestion and improve safety by allowing traffic to move easier without slowing down for turning vehicles. Exclusive left turn lanes and/or right turn lanes could help lessen many congested intersections throughout Mahoning and Trumbull Counties. Recent projects that were programmed using this mode of reducing congestion include a right turn lane being added along Tibbetts Wick at US 422, a left turn lane being added along McClurg Road at SR 7, and a right turn lane being added along East Market Street at North Road.

ITS

Intelligent Transportation Systems (ITS) can be very effective at not only improving congestion, but also improving safety. Eastgate first created an ITS Regional Architecture for Mahoning and Trumbull Counties in 2004. An update to the architecture, along with a strategic plan, was started in 2010. The architecture and plan was completed in early 2011. Eastgate's ITS Architecture was updated along with the update to the 2040 Metropolitan Transportation Plan in 2018.

The following are types of ITS applications under consideration:

- Signal coordination
- Signal pre-emption
- Message boards
- Traffic Incident Management (TIM)
- Broadcast Traveler Information
- Coordinated Response
- Road/Weather Information System (RWIS)
- Highway Rail Grade Crossing
- Traffic Control Systems
- Commercial Vehicle Operations (trucks)

As more ITS projects are completed, data collection from the ITS components will be used towards the performance monitoring portion of Eastgate's CMP.

Traffic Signal Improvements/Synchronization

Traffic signals can often be a big cause for congestion. A poorly timed signal can delay traffic and create back up. Drivers experience stops, stop-delays, and longer travel time contributing to increased fuel consumption, congestion, and air pollution. The proper management and operation

of a signal or signal system can greatly reduce congestion. Adjustments to signal timing and coordination among signals in a corridor will improve congestion and safety.

ODOT has instituted a Systematic Signal Timing and Phasing Program (SSTPP) to help communities update the timing and phasing of signal systems. The program can be applied to a single intersection or an entire corridor.

Eastgate also has a significant number of older signals still operating around the Mahoning Valley. The signal heads are smaller and more difficult for approaching travelers to see, especially on east/west corridors due to sun glare. Replacing the signals with modern twelve-inch LED signal heads will help improve safety.

Removal of signals can also improve the flow of traffic. Many of the older signals around the Mahoning Valley were installed when the population of the area was much higher. Stop signs can be used to replace signals while still allowing traffic to move safely.

Multiple recent projects were implemented to coordinate signals along a route. South Avenue in Youngstown, US 224 in Canfield, and multiple streets in Downtown Youngstown have or will update multiple signals to be able to improve travel times.

Geometric Evaluations/Improvements

Geometry of an intersection can be a factor in how well traffic moves through the intersection. Older intersections can be tight with narrow lane width, consequently large trucks have difficulty making turns without affecting other lanes of traffic and/or may strike utility poles with their mirrors or trailers. Eastgate has a number of sub-standard intersections needing improvements in order to bring them up to current design standards. Improvements could include increased lane widths, additional turn lanes, fixing an offset, improved turning radii, and moving utility poles off of the curb line.

Access Management

Access management is another way to improve a corridor experiencing congestion and slow travel times. Solutions include: consolidating curb cuts, restricting left turn movements at certain locations, implement right-in right-out only movements, and replace continuous left turn lanes with raised medians. According to the Ohio Department of Transportation, Access Management is:

The proliferation of poorly located and closely spaced driveways, intersections, and traffic signals can destroy a highway's ability to move traffic and to provide convenient access. Access Management is a program to manage these features and to balance the competing demands for traffic mobility and land access. Access levels are defined based on the function of the road. Standards are set for managing the frequency, location, and design of driveways, intersections, signals, medians, turn lanes, and other features. These standards are adjusted according to each access level - more restrictive on the higher classes, less restrictive on the lower. The goal of Access Management is to protect the safety, capacity, and traffic flow on the highway system while providing access to adjacent property as appropriate and necessary.

The Mahoning Valley has a number of corridors where access management would improve congestion and safety. Projects along busy corridors and intersections will continue to be evaluated and planned to help reduce congestion in this manner.

Encourage Alternate Means of Travel

Transit

Congestion in urban areas can be improved with increased transit ridership. There are currently two transit agencies operating in Mahoning and Trumbull Counties, the Western Reserve Transit Authority (WRTA) and the Trumbull Transit System (TTS)

The WRTA has been a regional transit authority since 1971 and is a designated recipient of federal transit funding in the Ohio portion of the urbanized area. The WRTA provides fixed route and paratransit services in Mahoning County, and in several areas of Trumbull County. The WRTA implemented the EasyGo County-wide demand response service for Mahoning County in 2009. On May 15, 2017, the EasyGo County-wide service is now called “Countywide Service”. Countywide incorporates transit services beyond their fixed route and ADA All Access service area.

The City of Warren is the designated recipient of federal transit funding for Trumbull County. The City of Warren on March 14, 2001, authorized the City of Niles as a “designated sub-recipient” of federal transit funding for Trumbull County. On April 7, 2011, the City of Niles notified the Trumbull County Commissioners that they were relinquishing the management and operations of the Niles Trumbull Transit System (NiTTS). The City of Niles managed NiTTS from September 15, 2003 through January 7, 2012. This demand response transit system was operated by a private sector provider through a capital cost of contract with the City of Niles. On December 14, 2011, the City of Warren terminated the arrangement of “designated sub-recipient” with the City of Niles, which was recorded in the City of Warren’s Ordinance Number 12376/11. The City of Warren also integrated in this ordinance that the newly formed Trumbull County Transit Board (TCTB) would assume the grantee role of “Designated Sub-Recipient Status” of federal transit funding for Trumbull County. The TCTB would therefore manage a demand response transit system in Trumbull County similar to NiTTS. The transit system in Trumbull County is now referred to as Trumbull Transit System (TTS).

Rideshare

Eastgate assists with Gohio Commute which is a free to use smart commuting service. This interactive platform provides users the information they need to make smart choices that can help them save money, improve their health, and enhance air quality. Users can also connect with nearby commuters to share your ride. Gohio Commute isn’t just a tool for commuters but can also be an effective tool to help employers attract and retain employees through affordable, convenient, and sustainable commute options. Some carpooling advantages include:

- Saves money by splitting commuting costs for fuel, tolls and parking
- Lowers stress
- Reduces pollution
- Gives riders time for other activities such as reading, sleeping, working, and socializing

- Reduces traffic congestion
- Reduces need for parking spaces

Improved bicycle/pedestrian facilities

Eastgate has a number of existing and planned bikeways throughout the Mahoning Valley. The most significant bike path is the Great Lake-to-River Greenway (GLRG) which will connect Lake Erie to the north with the Ohio River to the South. A bicycle suitability map was added as a new product in 2012 after numerous requests for such a map, and in an effort to consolidate several local mapping initiatives into one cohesive regional effort. The map's color-coded roads will help cyclists in Mahoning and Trumbull Counties find the most appropriate route for their comfort level and will help local planners and engineers identify where trouble spots and disconnects exist.

Airports - Passenger Service

The Youngstown-Warren Regional Airport is located along SR 193, just minutes away from SR 11 and SR 82. Passenger traffic in recent years has been between 60,000 and 100,000 a year. The airport is equipped to handle up to 250,000 passengers a year and can seat up to 400 passengers at any given time.

Lake and River Ports

Due to the geographic location, there are no water ports inside Mahoning or Trumbull Counties. However, the Ports of Ashtabula and Conneaut are located on Lake Erie north of the Eastgate planning area in northern Ashtabula County. In addition, there are a total of 17 commercial docking facilities on the Ohio River in Columbiana County in either East Liverpool or Wellsville Ohio, which are both south of the Eastgate planning area. Goods from either lake or river ports are often transported by truck via SR 11 or rail through Mahoning and Trumbull Counties.

Step 7 - Program and Implement CMP Strategies

Implementation of CMP strategies occurs on three levels: system or regional, corridor, and project. This approach to implementing strategies assures that all aspects of MPO planning are integrated into the CMP and allows for a flexible incorporation of congestion management. Eastgate, as the lead planning agency, will coordinate with ODOT and the Technical Advisory Committee when prioritizing or selective the congested locations for further study.

Regional Strategies

Regional level implementation occurs through inclusion of strategies in the Metropolitan Transportation Plan and the Transportation Improvement Program. The process of prioritizing projects into the MTP and TIP potentially include a scoring element for Eastgate. When necessary to score projects, scoring is weighted to give points for relative congestion.

Corridor Strategies

More specific strategies such as bicycle and pedestrian improvements and operational improvements can be assessed in studies and implemented using a variety of funding sources. These funding sources, some of which are managed by Eastgate, include the Surface Transportation Block Grant Program (STBG), the Congestion Mitigation and Air Quality Program (CMAQ), and other state or local funding.

Project Strategies

For larger projects, in particular capacity adding projects, demand management and operational strategies should also be analyzed for incorporation into the project as part of the project development process. For Eastgate’s CMAQ program, analyzing the reduction in congestion of one project to another is the single greatest identifier of what project is prioritized in the list of recommended projects for funding.

Step 8 - Evaluate Strategy Effectiveness

Success of the CMP is dependent upon the proper monitoring of the implemented strategies. The monitoring will help decision makers determine whether strategies were successful in alleviating congestion and if so, to what degree they were successful. The evaluation of implemented strategies will be accomplished through the feedback of data collection efforts and performance measures. The following measures and data can be collected after a project has been completed to monitor effectiveness:

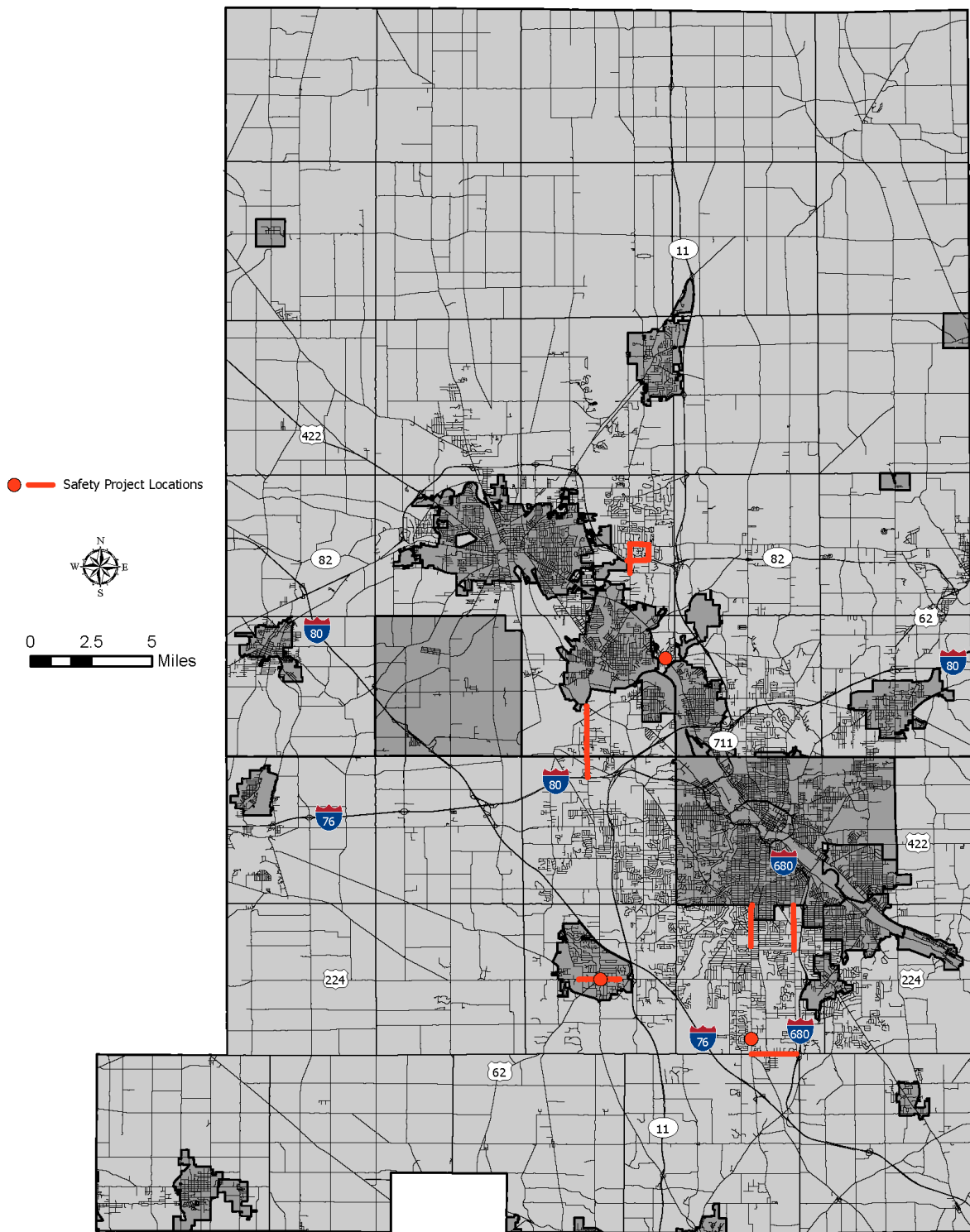
- Level of Service
- Follow-up Time and Delay Studies
- Crash Rates
- Traffic volumes

It is important to target congested locations with more detailed studies. Throughout Mahoning and Trumbull Counties, a number of studies have been completed for congested locations. In some instances, the studies were initiated because of congestion problems while others were started because of safety issues, however there is an undeniable link between congestion and safety. The results of the studies have yielded many projects, some completed and some still in the planning phase. Figure 15 shows the areas where studies have been completed or near completion over the last 10 years. When the map of study locations is compared with the map of congested locations, a direct correlation is evident. This allows Eastgate, member communities, and the public to visualize and understand the effectiveness of the CMP and the targeted congested locations. Table 3 lists the studies and their locations.

Table 3: Study Locations

County	Route	Year	Location
Mahoning	Western Reserve Road	2018	Market Street to South Avenue
Mahoning	South Avenue Intersections	2012	Mathews Road to Midlothian Boulevard
Mahoning	McClurg Road and SR 7 Signal Study	2016	McClurg Road and SR 7 Intersection
Mahoning	US 62 and SR 224 Signal Study	2014	US 62 to SR 224 Intersection
Mahoning	US 224 Time and Delay Study	2014	US 224 from Hillside to Cardinal
Mahoning	Market Street Road Diet Study	2019	Midlothian Boulevard to Meadowbrook Avenue
Trumbull	Tibbetts Wick Delay Study	2018	Tibbetts Wick and US 422 Intersection
Trumbull	SR 82 and SR 46 Area Study	2016	Area Surrounding SR 82 and SR 46 Intersection
Trumbull	SR 46 Corridor	2015	IR 80 to Salt Springs Road

Figure 13: Study Locations



Conclusion

Congestion mitigation is an important part of the Metropolitan Planning Process. Reduction in congestion leads to less stress, safer roads, shorter travel times, and improved air quality. Eastgate's Congestion Management Process is meant to identify areas where congestion is a problem and recommend a range of potentially useful strategies to alleviate congestion. Identification of congested areas can lead to more detailed studies and ultimately will lead to projects to be incorporated into the Metropolitan Transportation Plan and Transportation Improvement Program.

The Congestion Management Process for Mahoning and Trumbull Counties is designed to incorporate all modes of transportation. It is meant to coordinate with decision makers at the state and local levels. Through a continuous monitoring and update process, the CMP will evolve and change with the transportation system, in the hopes of making the Mahoning Valley a better and safer place to live and work.