

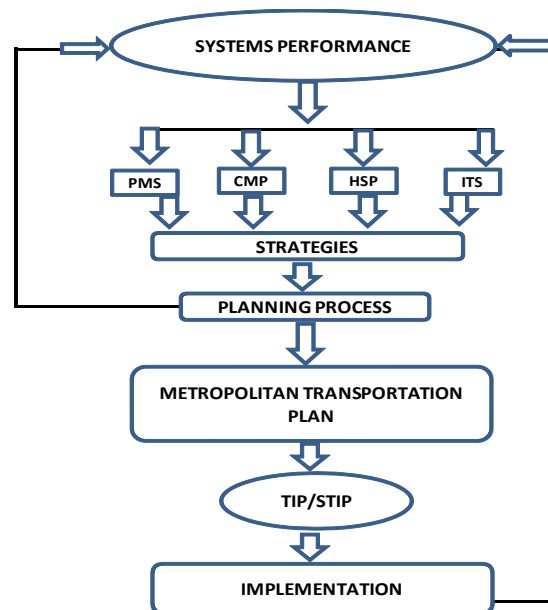
## CHAPTER 5 TRANSPORTATION MANAGEMENT SYSTEMS

### 1. OVERVIEW

As the MPO for Mahoning and Trumbull Counties, Eastgate is in position to provide local communities with information needed to aid in the selection of transportation projects. Transportation Management Systems (TMS) are used to develop, evaluate, and highlight problem areas that have: congestion, high accident rates, or deficient pavement. TMS not only identifies areas of concern, but they can also be very effective in identifying short, mid, and long term solutions to problems as well. Because of the size of each management system, this portion of the plan will provide highlights of each system. It will explain each management system and the latest information generated. All documents for each TMS can be viewed on Eastgate's webpage at [www.eastgatecog.org](http://www.eastgatecog.org).

According to 23 CFR Part 450, the planning processes provides a basic framework identifying transportation needs through the use of the management systems, as required under 23 U.S.C. 303. This section of the regulation states strategies identified under each management system will be analyzed during the development of the Metropolitan Transportation Plan (MTP), including its financial component for possible inclusion in the MTP and Transportation Improvement Program (TIP). There is a repetitive set of relationships between the planning Process, the management systems, and their performance as depicted in Figure 5.1 – Overview of Systems Performance.

Figure 5.1 – Overview of System Performance <sup>1</sup>



*FHWA's and FTA's Final Rule on Management and monitoring Systems stress that all of the management systems are designed to operate within, or in conjunction with, the planning process. The management systems develop strategies to be evaluated within the planning process for inclusion in the transportation plan and the TIP/STIP.*

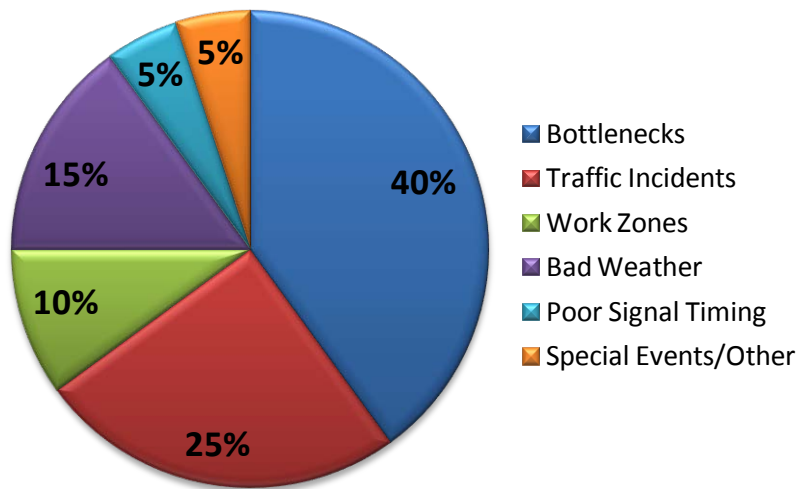
<sup>1</sup> US DOT FHWA/FTA

## 2. CONGESTION MANAGEMENT PROCESS (CMP)

Traffic congestion is a condition that occurs on a roadway network as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queuing. The most frequently used example is congestion due to vehicle use on roads. 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.<sup>2</sup>

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, activity off-side but adjacent to the road, and bad weather. One of the most common causes is the simple fact of too many cars on a road at one time. Roads are capable of handling a certain volume (capacity) of traffic. Once that volume has been exceeded, a bottleneck starts. Figure 5.2 identifies some of the Sources of Congestion.

**Figure 5.2 – Sources of Congestion**



There are two basic types of congestion:

1. **Recurring:** Congestion that is typical for a section of roadway where the amount 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.
2. **Non-Recurring:** 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.

Eastgate's 2010 CMP was created to replace the Congestion Management Systems (CMS) report developed in 1997, and the Congestion Management Reassessment report from 2005. The Congestion Management Process was developed as an integral part of Eastgate's MTP and the Transportation Improvement Program (TIP). The

---

<sup>2</sup> Wikipedia The Free Encyclopedia

CMP was written to help reduce existing congestion and to mitigate future congestion throughout the Mahoning Valley.

- **Objectives:** 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 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
- Increase High Occupancy Vehicle Trips
- Develop multimodal alternatives for people and goods

- **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
- Travel Time and Delay Studies
- Traffic Counts
- Accident Rates

- **System Performance Monitoring Plan:** 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
- Crash Data
- Housing and Commercial Data
- Transit Data
- Rideshare Data
- Population Data
- Employment Data
- Land Use Data
- Zoning Data

- **Identify and Evaluate Strategies:** To identify congested locations throughout Mahoning and Trumbull Counties, Eastgate utilizes the performance measures, data collected for performance monitoring, and analytical tools such as: Eastgate’s Travel Demand Model is used for the regional level; Highway Capacity Software is used for the local level, including intersections and corridors; traffic counts are used for time-of-day and spot locations. It should be noted that these tools do not identify non-recurring congestion per se. Input from local communities is considered regarding the location of congested areas. Eastgate continues to improve the collection, interpretation, and dissemination of data required to enhance the Congestion Management Process.

Map 5.1 on the following page shows the existing congestion on roadways throughout Mahoning and Trumbull Counties. The segments were identified using Eastgate’s Travel Demand Model and input from local communities. The road network used is based on data from 2008. The model generated a Level-of Service by direction for the road network. A Level-of-Service “E” or “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. Table 5.1 and Table 5.2 list the congested road segments for Mahoning and Trumbull Counties, along with jurisdiction and functional class.

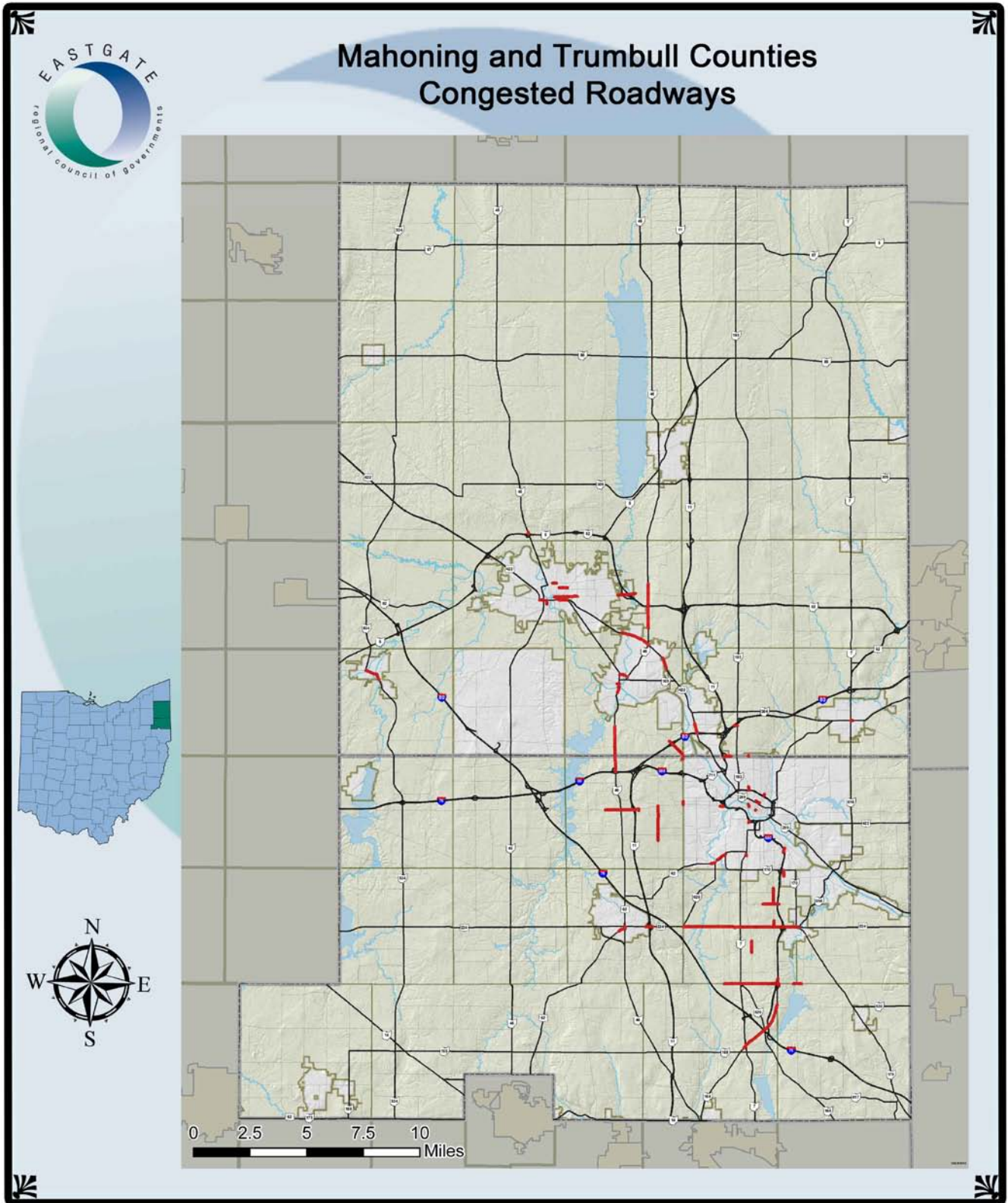
### **3. CMP Strategies**

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

1. Add Base Capacity
  - Lane Additions to Freeways and Local Roads
  - Roundabouts
  - Additional fixed transit routes
2. Operate Existing Capacity More Efficiently
  - Additional Turn Lanes
  - Intelligent Transportation Systems (ITS)
  - Traffic Signal Improvements/Synchronization
  - Geometric Evaluations/Improvements
  - Access Management
3. Encourage Alternate Means of Travel
  - Transit
  - Rideshare
  - Improved bicycle/pedestrian facilities
  - Rail
  - Airports
  - Lake and River Ports

- **Implementation and Management Strategies:** The CMP will be a useful tool in relieving congestion when the recommended strategies are put in place. However, studies need to be completed to determine which strategies are appropriate for each congested location. Eastgate, as the lead planning agency, will coordinate with ODOT and the Technical Advisory Committee when prioritizing or selecting the congested locations for further study. Eastgate will encourage and assist local communities in developing projects based on the resulting strategies. Those projects can then be included in the MTP and eventually be programmed in the TIP

Map 5.1 – Congested Roadways: Mahoning and Trumbull Counties



**Table 5.1 – Congested Road Segments: Mahoning County**

<b>Highway</b>	<b>From</b>	<b>To</b>	<b>Functional Class</b>	<b>City/Township</b>
Mahoning Ave	Wilcox Rd	Westchester Dr	16	Austintown Twp
Raccoon Rd	Kerrybrook Dr	Mahoning Ave	17	Austintown Twp
SR 46	I 80	County Line	14	Austintown Twp
Westchester Dr	Plaza Entrance	Mahoning Ave	9	Austintown Twp
SR 164	School Entrance	North Lima Rd	7	Beaver Twp
I 680 Ramp	I 680	Western Reserve Rd	9	Boardman Twp
Mathews Rd	Glenridge Rd	Lightner Pl	17	Boardman Twp
South Ave	Mathews Rd	Lake Park Rd	16	Boardman Twp
South Ave	Doral Dr	US 224	16	Boardman Twp
Southern Blvd	Maple Ave	California Ave	17	Boardman Twp
US 224	SR 625	SR 616	14	Boardman Twp
Western Reserve Rd	Hitchcock Rd	I 680	17	Boardman Twp
Westview Dr	Plaza Entrance	US 224	9	Boardman Twp
US 62	Court St	SR 46	16	Canfield
US 62	Lisbon St	US 224	16	Canfield
US 224	Talsman Dr	Raccoon Rd	14	Canfield Twp
SR 170	US 224	SR 616	16	Poland
Western Reserve Rd	Ivy Hills Dr	North Lima Rd	17	Poland Township
SR 164	I 680 Ramp	Western Reserve Rd	17	Springfield Twp
Belmont Ave	Madison Ave	Caroline St	17	Youngstown
Front St	Boardman St	Belmont Ave	17	Youngstown
Goleta Ave	Gypsy Ln	Hospital Entrance	9	Youngstown
Gypsy Ln	SR 711	Maryland Ave	9	Youngstown
Lemoyne Ave	Brownlee Ave	Midlothian Blvd	9	Youngstown
Lincoln Ave	Elm St	Wick Ave	9	Youngstown
Mahoning Ave	Glacier Ave	McKinley Ave	16	Youngstown
Market St	Falls Ave	I 680	14	Youngstown
Market St	Boardman St	Federal Plaza Plz	14	Youngstown
Meridian Rd	Mahoning Ave	Oakwood Ave	16	Youngstown
Meridian Rd	Salt Springs Rd	County Line	16	Youngstown
Shirley Rd	Cooper Ave	Homewood Ave	17	Youngstown
Southern Blvd	Florida Ave	SR 7	16	Youngstown
US 62	Cohasset Dr	Glenwood Ave	16	Youngstown
US 62	Stratmore Ave	Arden Blvd	16	Youngstown
Wick Ave	Service Rd	School Entrance	16	Youngstown

**Table 5.2 – Congested Road Segments: Trumbull County**

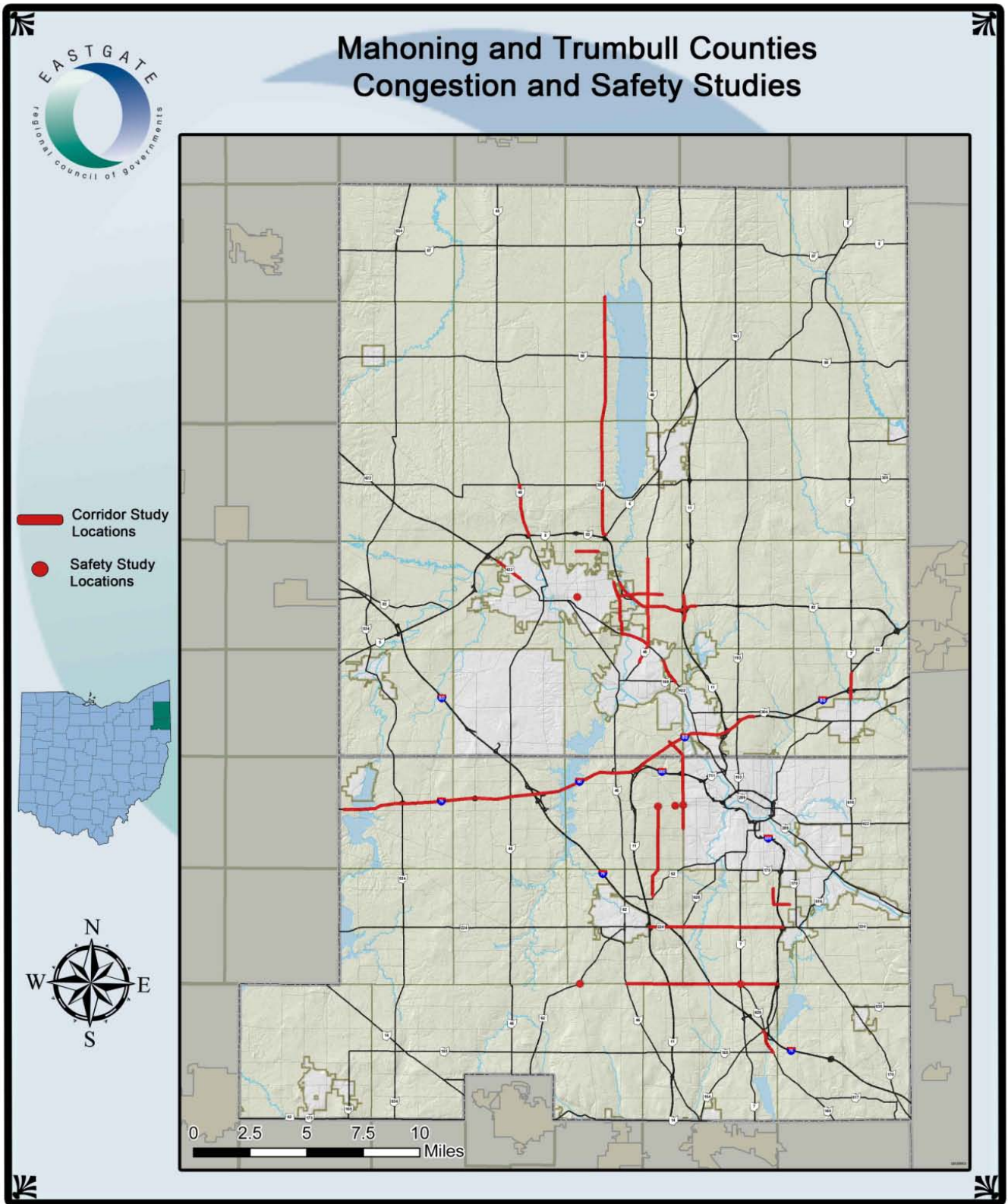
Highway	From	To	Functional Class	City/Township
SR 45	SR 5	Home Dr	14	Champion Twp
US 422	I 80	Main St	14	Girard
Market St	SR 82 Off Ramp	Sawgrass St	16	Howland Twp
Market St	North Rd	SR 82 Off Ramp	14	Howland Twp
SR 46	Eastwood Mall Blvd	Deer Creek Ln	16	Howland Twp
SR 304	US 62	Mackey St	16	Hubbard
Jones Rd	I 80	SR 193	16	Liberty Twp
SR 534	Maple Dr	Ridge Rd	17	Newton Falls
Federal St	SR 169	SR 46	17	Niles
Park St	Arlington Ave	SR 46	16	Niles
SR 46	Third St	Water St	14	Niles
US 422	North Rd	SR 46	14	Niles
Water St	Franklin Ln	SR 46	9	Niles
Atlantic St	Adams Ave	Park Ave	16	Warren
Highland Ave	Union St	US 422	17	Warren
Market St	Main St	Laird Ave	14	Warren
Park Ave	Franklin St	Market St	16	Warren
US 422	Parkman Rd	SR 45	14	Warren
US 422	Pine Ave	Chestnut Ave	14	Warren
Washington St	Mercer Ave	Elm Rd	9	Warren
Salt Springs Rd	County Line	West Liberty St	16	Weathersfield Twp
SR 46	County Line	Ohltown McDonald Rd	14	Weathersfield Twp
US 422	Belle Terre Ave	Niles Vienna Rd	14	Weathersfield Twp

• **Monitor 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. Map 5.2 shows the areas where Congestion and Safety Studies for Mahoning and Trumbull Counties have been completed or nearing 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 5.3 lists the studies completed; including the County, Route, Date, and Location.

Map 5.2 – Congestion and Safety Studies –Mahoning and Trumbull Counties





**Table 5.3 – Studies Completed**

County	Route	Date	Location	Projects Status		
				Planned	Programmed	Completed
MAH/TRU	I 76/I 80 corridor study*	2004	I 71 to SR 193	X	X	X
MAH	US 224 corridor study*	2007	SR 11 to I 680	X	X	X
TRU	US 422 corridor study*	2005	area around Eastwood Mall	X	X	X
TRU	US 62	1999	slm 4.58 - 5.71			X
MAH	SR 7 @ SR 626/Western Reserve Rd	2004	Intersection		X	
MAH	SR 626	2002	slm 0.00 - 1.09			X
TRU	SR 45 Champion Township	1999	SR 5/82 to SR 305			X
TRU	SR 45	2002	slm 9.8 - 10.54 & 11.2 - 12.96			X
TRU	US 422 corridor	2003	Girard Corp to Niles Corp	X		
MAH	Western Reserve Rd	2001	SR 46 to I 680	X	X	X
MAH/TRU	Meridian Rd	2000	Burkey Rd to West Liberty St			X
TRU	North River Rd	2006	North Park Ave to Elm Rd	X		
MAH	Mathews Rd	2006	South Ave to Sheridan Rd	X	X	
MAH	South Ave	2008	Mathews Rd to Lake Park Blvd	X		
TRU	US 422 Parkman Rd	2007	N. Leavitt Rd to Northfield Ave	X	X	
MAH	Mahoning Ave @ Meridian Rd	2009	Intersection			
MAH	Mahoning Ave @ Four Mile Run Rd	2009	Intersection		X	
MAH	Mahoning Ave @ Raccoon Rd	2009	Intersection	X		
MAH	US 62 @ Western Reserve Rd	2007	Intersection			X
TRU	West Market St @ Laird Ave	2007	Intersection	X		
MAH	Raccoon Rd Corridor	2008	US 62 to Mahoning Ave			
TRU	Hogland Blackstub Rd	2006	SR 5 to SR 88			X

\*Includes numerous projects of independent utility

#### 4. CMP Conclusion

Congestion mitigation is an important part of the metropolitan planning process. Reduction in congestion leads to safer roads, less stress, 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 projects to be incorporated into the MTP and TIP.

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 place to live and work.

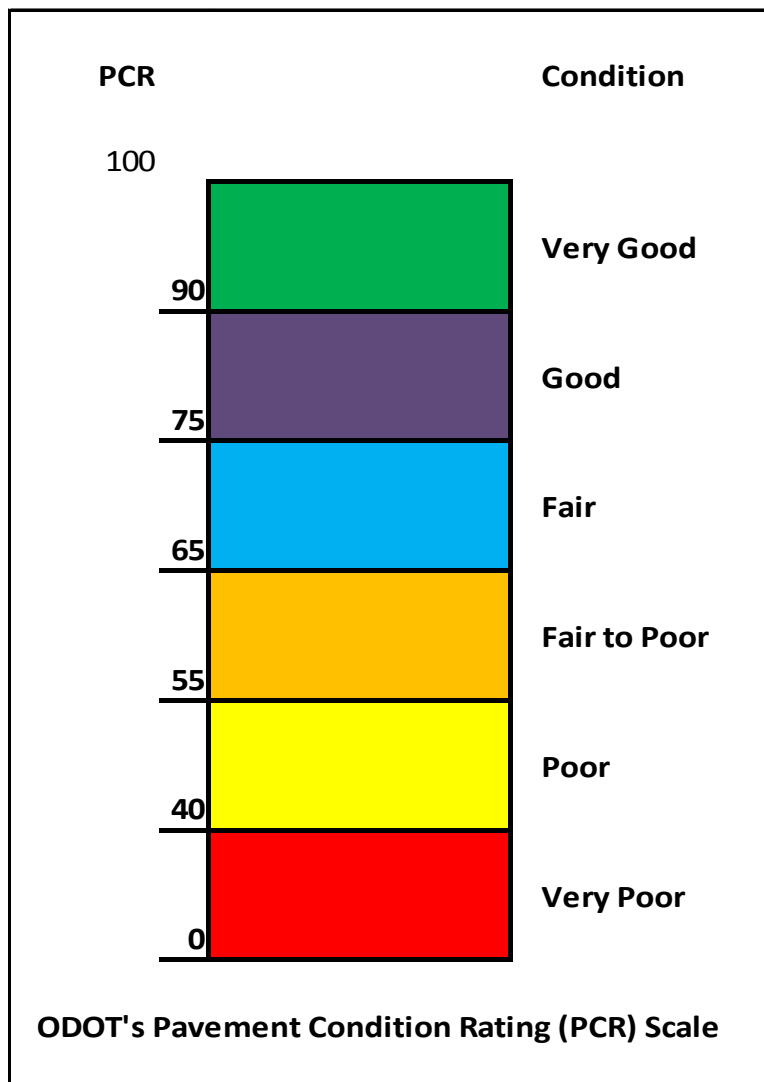
For more information log onto Eastgate’s webpage at [www.eastgatecog.org](http://www.eastgatecog.org) click on Transportation Planning; from the pull down menu select Congestion Management.

## 5. PAVEMENT MANAGEMENT SYSTEM (PMS)

Pavement Management Systems (PMS) are important to all levels of government due to the deteriorating condition of our nations' highway infrastructure. Government officials are looking to maximize the benefit of every dollar spent at a time of limited funding. PMS is not intended to be a regulatory requirement. Instead, it is an information system that is to be used as a guide in the transportation planning and programming decision making process. The goal of a PMS is to use objective information in an organized framework to identify and rank cost-effective project selection and maintenance strategies. The planning process includes coordinating the findings and strategy recommendations of this activity with the other active management systems to develop projects for the transportation plan.

The process begins with a Pavement Condition Rating (PCR) which is based upon a visual inspection of pavement distress. ODOT uses a mathematical formula to develop a rating based from 0 to 100. A PCR of 100 represents perfect pavement as shown in Figure 5.3 – ODOT's PCR Scale.

Figure 5.3 – ODOT's PCR Scale

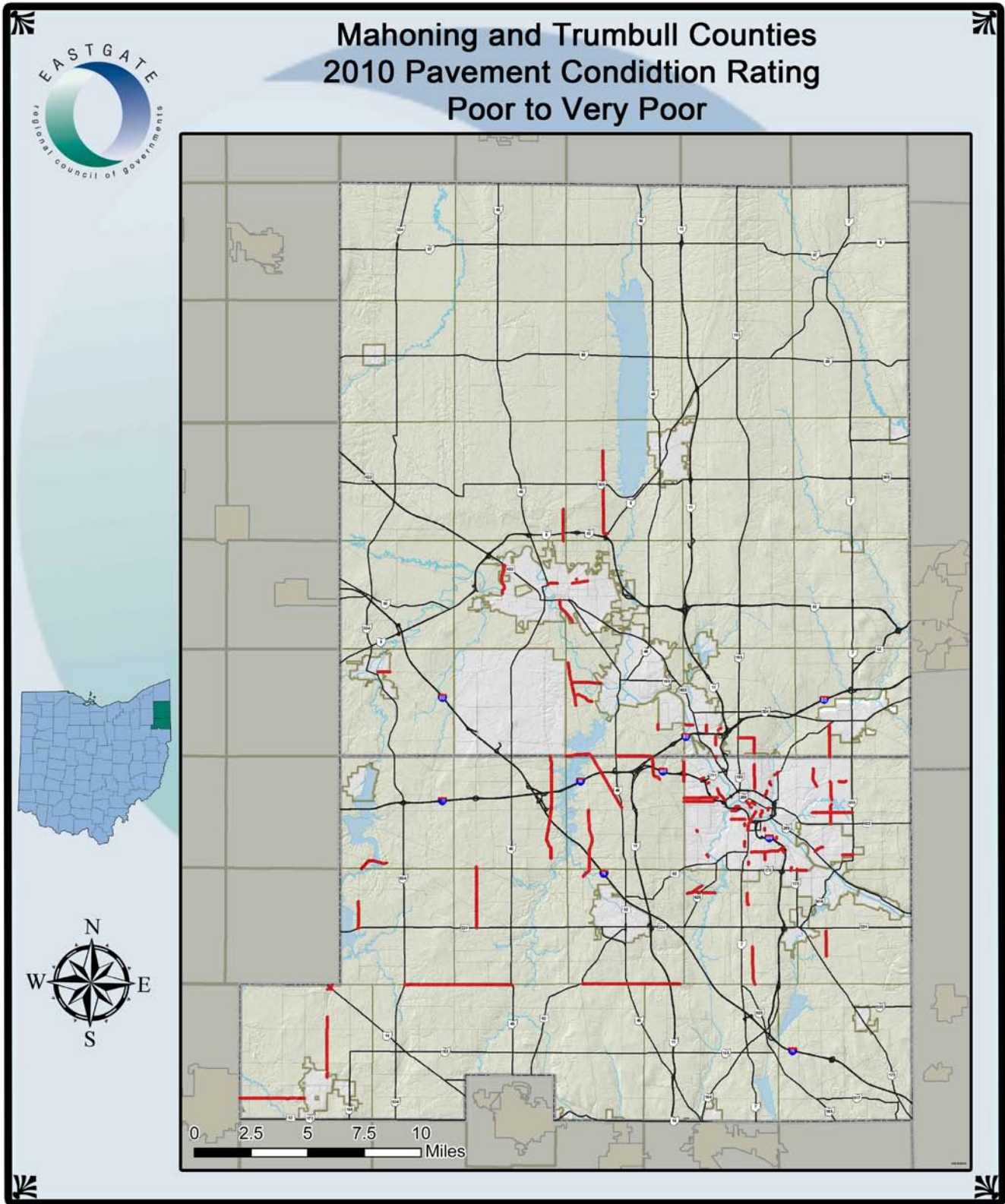


Local units of government are encouraged to establish a pavement management system using the resources of Eastgate. Since the development of the PMS, Eastgate has helped numerous cities, villages and townships in Mahoning and Trumbull Counties initiate and implement PMS programs in their communities. Eastgate services have included distributing PMS materials to the local officials and training highway maintenance personnel in the collection and use of PMS. Eastgate has hosted two pavement condition rating workshops for local communities in 2005 and 2008. The workshops were conducted by ODOT's Office of Pavement Engineering. The workshops covered the pavement rating process, explanations of the rating method, and reviewed the different types of pavement distress (cracking, patching, potholes, etc.). Field exercises followed where participants were able to visually inspect a few sections along some local roads. ODOT introduced everyone to the Local PCR Access Database software, and demonstrated how to create new road sections and enter the pavement information collected from the field exercises. Everyone attending received a pavement condition rating manual and a copy of the Local PCR Access Database software.

As well as the state system of roadways, ODOT performs pavement ratings on non-state functional class roads every two years. Eastgate creates maps and tables with the data and provides it to the local communities. Comparison maps between the latest ratings and the previous ratings are also created and displayed. The maps show the local communities the importance of a PCR system by helping them create maintenance or paving schedules. Map 5.3 displays 2010 pavement condition ratings, from poor to very poor – or 55 and lower, for Mahoning and Trumbull Counties.

Table 5.4 and Table 5.5 shown on the following pages list the results from ODOT's last pavement condition rating that was taken along local roads in Mahoning and Trumbull Counties. Contiguous segments were combined for these tables, and the lowest PCRs, Poor to Very Poor – or 55 and lower, were used for the entire combined segment.

Map 5.3 2010 Pavement Condition Rating – Poor to Very Poor



**Table 5.4 – PCR Mahoning County: Very Poor to Poor**

County	Street Name	Begin	End	PCR	Date	Functional Class	Jurisdiction
MAH	12TH ST	SEBRING NCL	HEISLER RD	52	8/26/2010	7	SMITH
MAH	12TH ST	VERMONT AVE	PINE LAKE RD	54	8/26/2010	17	SEBRING
MAH	5TH AVE	PARK AVE	BRADLEY LN	53	6/2/2011	16	YOUNGSTOWN
MAH	ANDREWS AVE	S OF RAYEN AVE	SR 289	37	5/17/2011	17	YOUNGSTOWN
MAH	ANDREWS AVE	S OF RANDALL AVE	BISSELL AVE	44	5/17/2011	17	YOUNGSTOWN
MAH	BAILEY RD	US 224	PALMYRA RD	39	8/27/2010	7	ELLSWORTH
MAH	BEARS DEN RD	SCHENLEY AVE	MC COLLUM RD	43	4/18/2011	17	YOUNGSTOWN
MAH	BEARS DEN RD	S OF HERMOSA	NORMANDY DR	54	4/18/2011	17	YOUNGSTOWN
MAH	BEDELL RD	US 224	HEISLER RD	44	8/26/2010	7	BERLIN
MAH	BOARDMAN ST	MARTIN LUTHER KING JR BLVD	CHESTNUT ST	49	5/16/2011	17	YOUNGSTOWN
MAH	CENTER ST	12TH ST	SR 14	46	8/26/2010	7	SMITH
MAH	CLINGAN RD	DOBBINS RD	RIDGELY PARK	52	8/27/2010	17	POLAND
MAH	COMMERCE ST	FEDERAL PLZ	WATT ST	53	5/4/2011	16	YOUNGSTOWN
MAH	CONNECTICUT	BELLE VISTA AVE	MERIDIAN RD	49	5/5/2011	17	YOUNGSTOWN
MAH	COOPER ST	INDIANOLA AVE	SHIRLEY RD	51	5/24/2011	17	YOUNGSTOWN
MAH	DAVIS ST	BECK ST	TRU CO LINE	52	6/2/2011	17	YOUNGSTOWN
MAH	ELBEREN ST	SR 711 ON RAMP	SALT SPRINGS RD	46	5/5/2011	17	YOUNGSTOWN
MAH	ELLSWORTH RD	MILL RD	SE RIVER RD	51	8/26/2010	7	MILTON
MAH	MARTIN LUTHER KING JR BLVD	BELMONT AVE	SR 289	44	5/17/2011	16	YOUNGSTOWN
MAH	FOUR MILE RUN RD	LANTERMAN RD	OHLTOWN GIRARD RD	49	8/30/2010	17	AUSTINTOWN
MAH	GIBSON ST	AVONDALE AVE	INDIANOLA AVE	51	5/25/2011	17	YOUNGSTOWN
MAH	GIBSON ST	WILLIAMSON AVE	MYRTLE AVE	51	5/25/2011	17	YOUNGSTOWN
MAH	HELSEL RD	SR 14	WESTERN RESERVE RD	37	8/26/2010	7	SMITH
MAH	HIGH ST	GLENWOOD AVE	EDWARDS ST	49	5/25/2011	17	YOUNGSTOWN
MAH	HOPKINS RD	SHIELDS RD	TRUESDALE RD	40	4/18/2011	17	BOARDMAN
MAH	HUBBARD RD	CRAB CREEK	US 62	53	6/2/2011	17	YOUNGSTOWN
MAH	JACOBS RD	S OF LIBERTY RD	MCGUFFEY RD	41	5/25/2011	17	YOUNGSTOWN
MAH	JACOBS RD	US 422	BEACHWOOD DR	49	5/25/2011	17	YOUNGSTOWN
MAH	LAKE PARK BLVD	STA CO LINE	JOHNSTON RD	46	8/26/2010	17	SMITH
MAH	LIBERTY RD	MCGUFFY RD	WARDLE AVE	54	6/1/2011	17	YOUNGSTOWN
MAH	LIPKEY RD	KIRK RD	YERKE YOUNG RD	42	8/30/2010	7	JACKSON
MAH	LOVELAND RD	MIDLOTHIAN BLVD	HEIGHTS AVE	49	5/18/2011	16	YOUNGSTOWN
MAH	MAHONING AVE	EDWARDS ST	WEST AVE	46	6/6/2011	16	YOUNGSTOWN
MAH	OHLTOWN GIRARD RD	SR 46	FOUR MILE RUN RD	43	8/30/2010	16	AUSTINTOWN
MAH	MARKET ST	WILLIAMSON AVE	FRONT ST	46	5/17/2011	14	YOUNGSTOWN
MAH	SOUTHERN BLVD	MATHEWS RD	MEADOWBROOK AVE	53	8/30/2010	16	BOARDMAN
MAH	MCGUFFEY RD	LLOYD ST	VAN DYKE AVE	50	6/1/2011	17	YOUNGSTOWN
MAH	MERIDIAN RD	CRUM RD	LANTERMAN RD	49	4/6/2011	16	YOUNGSTOWN
MAH	MIDLOTHIAN BLVD	SR 170	8TH ST	51	5/4/2011	16	YOUNGSTOWN
MAH	MILL RD	BERLIN TWP LINE	ELLSWORTH RD	36	8/26/2010	7	MILTON
MAH	OAK ST	LAMAR AVE	SR 616	49	5/25/2011	17	YOUNGSTOWN
MAH	OAK HILL AVE	BREADEN ST	ESSEX ST	45	5/25/2011	17	YOUNGSTOWN
MAH	OAK HILL AVE	DEWEY AVE	GLENAVEN AVE	53	5/25/2011	17	YOUNGSTOWN
MAH	OAKWOOD AVE	MERIDIAN RD	PORTLAND AVE	46	5/5/2011	17	YOUNGSTOWN
MAH	OHLTOWN RD	SR 46	TRU CO LINE	33	8/30/2010	17	AUSTINTOWN
MAH	WOODLAND AVE	IR680 BRIDGE	MARKET ST	54	5/18/2011	17	YOUNGSTOWN
MAH	POWERSDALE AVE	ALEXANDER ST	S OF POLAND AVE	30	5/24/2011	17	YOUNGSTOWN
MAH	ROBINSON	STRUTHERS LIBERTY RD	SR 616	50	5/24/2011	17	CAMPBELL
MAH	SALT SPRINGS RD	SR 711	STEEL ST	36	5/5/2011	16	YOUNGSTOWN
MAH	SHERIDAN RD	SR 170	POINT VIEW AVE	51	5/18/2011	17	YOUNGSTOWN
MAH	SHIELDS RD	TIPPWOOD CT	SHEBAN DR	54	8/27/2010	16	BOARDMAN
MAH	SOUTH AVE	S OF FRONT ST	FEDERAL PLZ	50	5/4/2011	16	YOUNGSTOWN
MAH	SOUTHERN BLVD	MEADOWBROOK AVE	INDIANOLA AVE	50	4/7/2011	16	BOARDMAN
MAH	SOUTHERN BLVD	WESTERN RESERVE RD	BOARDMAN BLVD	51	4/7/2011	17	BOARDMAN
MAH	SOUTHERN BLVD	RAVENWOOD AVE	LUCIUS AVE	52	4/7/2011	16	YOUNGSTOWN
MAH	TENNEY AVE	WARHURST RD	12TH ST	54	5/24/2011	17	CAMPBELL
MAH	TURNER RD	GIBSON RD	MAHONING AVE	49	8/30/2010	17	AUSTINTOWN
MAH	VESTAL RD	IR680 BRIDGE	SALT SPRINGS RD	47	5/5/2011	17	YOUNGSTOWN
MAH	WARHURST RD	SR 289	ROOSEVELT DR	49	5/24/2011	17	CAMPBELL
MAH	WELLINGTON AVE	STEEL ST	BELLE VISTA AVE	45	5/5/2011	17	YOUNGSTOWN
MAH	WESTERN RESERVE RD	US 62	TIPPECANOE RD	41	8/27/2010	7	GREEN
MAH	WESTERN RESERVE RD	SR 534	SR 45	42	8/27/2010	7	GOSHEN
MAH	WICK AVE	SERVICE W BOUND	LINDEN AVE	51	6/2/2011	17	YOUNGSTOWN
MAH	WOOD ST	5TH AVE	ELM ST	43	5/16/2011	17	YOUNGSTOWN
MAH	WOODLAND AVE	GLENWOOD AVE	OAK HILL AVE	49	5/18/2011	17	YOUNGSTOWN
MAH	INDIANOLA AVE	Y&S RR	IR680	55	5/25/2011	16	YOUNGSTOWN

**Table 5.5 – PCR Trumbull County: Very Poor to Poor**

County	Street Name	Begin Description	End Description	PCR	Date	Functional Class	Jurisdiction
TRU	5TH AVE	YOUNGSTOWN NCL	GOLDIE RD	55	7/5/2011	17	LIBERTY
TRU	ARLINGTON RD	MILTON BLVD	NEWTON FALLS ECL	50	6/14/2011	17	NEWTON FALLS
TRU	ATLANTIC ST	ELM RD	GENESEE AVE	51	7/6/2011	16	WARREN
TRU	ATLANTIC ST	SR 45	NORTH PARK AVE	53	6/7/2011	16	WARREN
TRU	AUSTINTOWN WARREN RD	CARSON SALT SPRINGS RD	WARREN TWP LINE	49	6/8/2011	17	WEATHERSFIELD
TRU	AUSTINTOWN WARREN RD	YERK YOUNG RD	OHLTOWN RD	44	6/29/2011	17	WEATHERSFIELD
TRU	DAVIS ST	TRUMBULL AVE	IOWA AVE	54	7/5/2011	17	GIRARD
TRU	GOLDIE RD	SR 193	5TH AVE	53	7/5/2011	17	LIBERTY
TRU	HIGHLAND AVE	MORRIS AVE	LIBERTY ST	47	6/7/2011	17	GIRARD
TRU	HOAGLAND-BLACKSTUB RD	SR 5	EVERETT HULL RD	50	5/4/2011	17	BAZETTA
TRU	HOLLYWOOD ST	ELM RD	LAIRD AVE	48	7/6/2011	17	WARREN
TRU	JACOBS RD	MAH CO LINE	SR 62	49	6/29/2011	17	HUBBARD
TRU	LIBERTY ST	W OF CARLTON ST	HIGH ST	53	6/30/2011	16	GIRARD
TRU	LOVERS LN	MARKET ST	US 422	47	6/15/2011	17	WARREN
TRU	MOSER AVE	PARK DR	PARK DR	49	7/5/2011	17	GIRARD
TRU	OWSLEY-NORTH RD	MCDONALD SCL	WATSON MARSHALL RD	55	6/30/2011	17	MCDONALD
TRU	PARK AVE	AUSTINTOWN WARREN RD	SHARKEY RD	44	6/29/2011	17	WEATHERSFIELD
TRU	PARK AVE	WARREN TWP LINE	CHAMPION AVE	55	7/7/2011	17	CHAMPION
TRU	PINE AVE	BURTON ST	US 422	48	6/8/2011	16	WARREN
TRU	SALTSPRINGS RD	AUSTINTOWN WARREN RD	CARSON SALT SPRINGS RD	51	6/15/2011	17	WEATHERSFIELD

## 6. HIGHWAY SAFETY PROGRAM

The study of traffic crash statistics is an important part of Eastgate’s overall transportation planning process. Specific traffic crash information is a pivotal factor from which transportation engineers/planners work in order to improve the safety and operation of the local transportation system. According to the Ohio Department of Public Safety (ODPS), 135 people died in auto accidents from 2008 through 2010 in the Mahoning Valley. The total includes 76 in Trumbull County and 59 in Mahoning County. Eastgate along with the State of Ohio have been proactive in addressing the FHWA’s 4 E’s of highway safety as shown in Table 5.6.

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. This data was used to create the Regional Safety Plan which identifies and prioritizes high accident corridors and intersections for communities in Mahoning and Trumbull Counties. 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 for each high accident location. Maps showing high crash areas are included in the Regional Safety Plan and will help communities identify areas of concern. The plan can be used to address all 4 E’s by law enforcement agencies, government officials, engineers, planners and members of the general public.

Eastgate is also an active member with the Safe Communities of both Mahoning and Trumbull Counties. The coalition is made up of law enforcement, medical professionals, transportation engineers/planners, community organizations, and private business partners. The main goal of the group is to reduce the number and severity of accidents. Other areas of emphasis are:

- Motorcycle safety
- Seatbelt usage
- Teen driving
- Texting while driving
- Alcohol and drug use

**Table 5.6 – FHWA’s 4 E’s of Highway Safety**

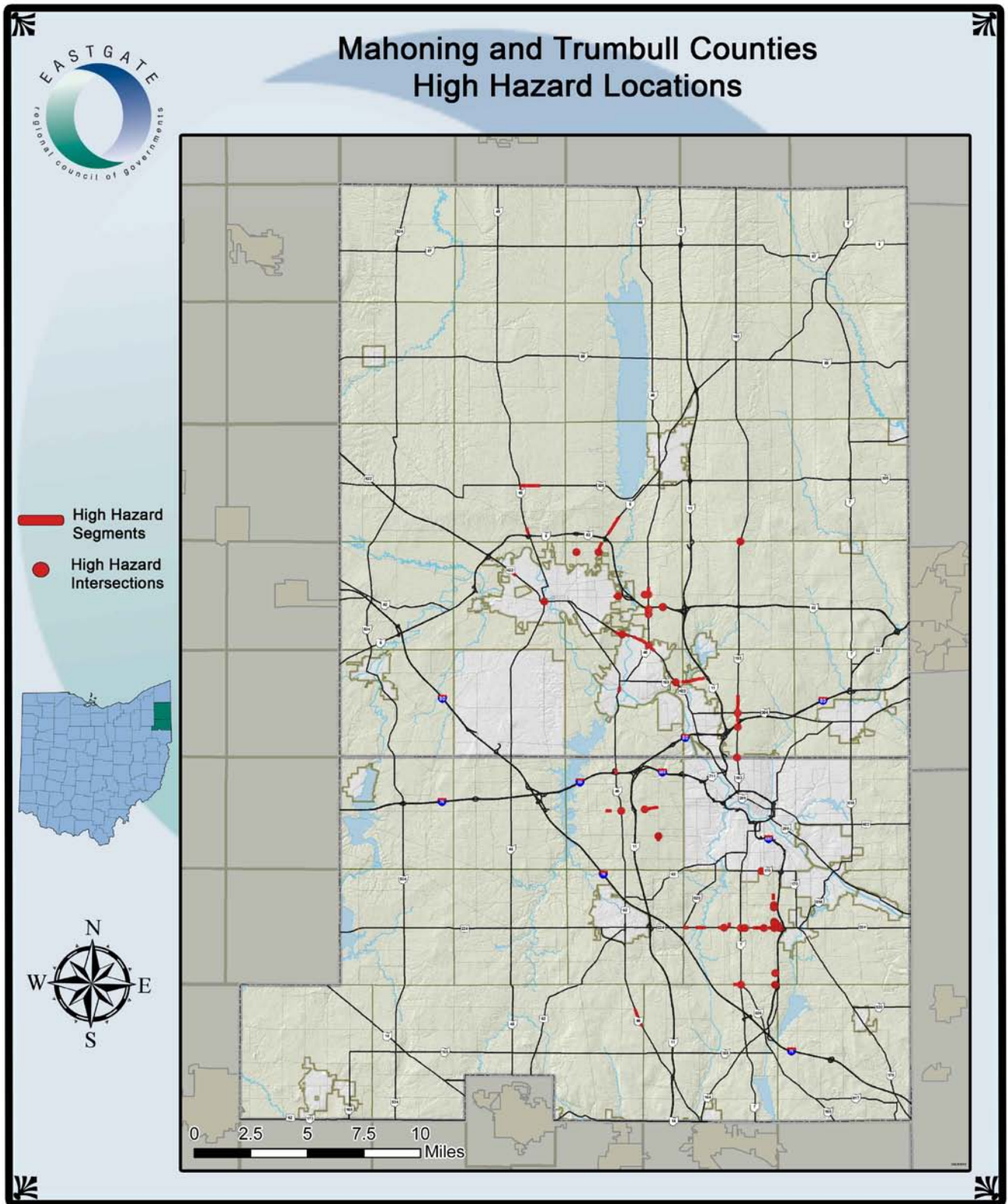
Enforcement	Targets high crash locations for speeding and aggressive behavior and develops effective enforcement policies.
Engineering	Enhances road, intersection and pedestrian safety design features to reduce road departures, minimize the severity of roadway crashes, make intersections safer for drivers and create safer pedestrian crossings.
Education	Improves public safety awareness and updates highway engineers and roadway planners on the latest safety research through videos, handbooks, websites, brochures, manuals and training courses. Targets high risk populations such as non-users of safety belts, impaired or drunk drivers, teens and young adults, commercial vehicle drivers and non-users of motorcycle helmets.
Emergency Services	Aims for a fast response to traffic crashes involving injuries, a quick clear of the roadway and effective communication and coordination with other agencies.

The coalition also meets regularly to review fatal crashes in an attempt to determine a cause for the accident and make suggestions to avoid future fatalities (i.e., education, enforcement, and engineering).

Eastgate’s commitment to safer roads is further demonstrated by its involvement with the local Operating a Vehicle Impaired (OVI) Task Forces. Both Mahoning and Trumbull Counties have qualified for funding through the Ohio Department of Public Safety’s, Ohio Traffic Safety Office. To reduce the number of alcohol-related accidents, the county task forces set up OVI checkpoints and saturation patrols throughout the two counties. Eastgate attends monthly meetings and provides the taskforces with crash data in the form of tables and maps which enables them to target the areas with higher alcohol-related accidents. Map 5.4 shows high hazard locations in Mahoning and Trumbull Counties.

The following Tables 5.7 – 5.10, are from Eastgate’s 2012 Regional Safety Plan for Mahoning and Trumbull Counties and represent the top 20 locations, by intersections and segments, for each respective county. Only 17 segments met the high hazard threshold for Trumbull County, therefore Table 5.10 has fewer segments listed. Some intersections and segments in Tables 5.7 –5.9 have the same rank – but represent different locations.

Map 5.4 – High Hazard Locations





**Table 5.7 – Top 20 Intersections: Mahoning County**

Rank	Community	Intersection	Total Crashes	Crash Rate	Ranking Score
1	Boardman Township	US 224 and Tiffany Blvd	81	1.886	11.15
2	Boardman Township	US 224 and South Ave	121	2.236	13.60
3	Austintown Township	SR 46 and Mahoning Ave	115	2.348	13.90
4	Beaver Township	SR 7 and Western Reserve Rd	73	2.372	17.05
4	Boardman Township	SR 7 and Western Reserve Rd	73	2.372	17.05
5	Austintown Township	Mahoning Ave and Idaho Rd	52	1.635	21.65
6	Austintown Township	New Rd and Raccoon Rd	66	2.399	21.75
7	Boardman Township	South Ave and McClurg Rd	33	1.795	21.95
8	Boardman Township	US 224 and Hitchcock Rd	67	1.951	28.10
9	Boardman Township	US 224 and SR 7	93	1.800	28.55
10	Boardman Township	South Ave and Mathews Rd	57	1.658	28.75
11	Boardman Township	SR 170 and South Ave	41	1.657	28.85
11	Youngstown City	SR 170 and South Ave	41	1.657	28.85
12	Boardman Township	South Ave and Larkridge Ave	38	1.356	29.55
13	Boardman Township	South Ave and Doral Dr	43	1.339	30.60
14	Boardman Township	South Ave and Trailwood Dr	40	1.408	30.65
15	Beaver Township	South Ave and Western Reserve Rd	38	1.405	32.70
15	Boardman Township	South Ave and Western Reserve Rd	38	1.405	32.70
16	Boardman Township	US 224 and Applewood Blvd	59	1.800	33.80
17	Boardman Township	US 224 and Sheldon Ave	86	2.662	34.55

**Table 5.8 – Top 20 Segments: Mahoning County**

Rank	Community	Route	Location	Total Crashes	Crash Rate	Rating Score
1	Boardman Township	South Ave	US 224 to Trailwood Dr	106	3.955	4.95
2	Beaver Township	Western Reserve Rd	Glenwood Ave to MP 18.08	50	3.234	10.8
2	Boardman Township	Western Reserve Rd	Glenwood Ave to MP 18.08	50	3.234	10.8
3	Boardman Township	Tiffany Blvd	MP .04 to Doral Dr	36	2.63	12.5
4	Boardman Township	US 224	West Blvd to Hitchcock Rd	88	2.854	13.35
5	Boardman Township	Glenwood Ave	US 224 to Rockdale Ave	27	2.441	14.8
6	Boardman Township	US 224	South Ave to Tiffany Blvd	60	1.907	16
7	Boardman Township	Doral Dr	South Ave to Tiffany Blvd	25	2.984	16.6
8	Green Township	SR 46	MP 4.94 to Calla Rd	89	27.103	16.85
9	Austintown Township	Mahoning Ave	Viall Rd to Raccoon Rd	44	2.45	17.75
10	Austintown Township	Mahoning Ave	Wilcox Rd to Fitch Blvd	41	2.179	18.3
11	Boardman Township	US 224	Tanglewood Dr to Applewood Blvd	83	2.601	18.4
12	Boardman Township	South Ave	Afton Ave to Indianola Rd	35	1.806	18.75
13	Austintown Township	SR 46	Clarkins Dr to IR 80 Eastbound Ramp	33	1.492	19.1
13	Boardman Township	SR 170	South Ave to Simon Rd	34	2.21	19.1
13	Youngstown City	SR 170	South Ave to Simon Rd	34	2.21	19.1
14	Boardman Township	US 224	Bristlewood Dr to South Ave	48	1.59	20.15
15	Boardman Township	US 224	SR 625 to Pheasant Dr	35	1.332	21.9
16	Boardman Township	US 224	Golf Dr to Pinewood Dr	44	2.378	23.55
17	Austintown Township	Raccoon Rd	Kerrybrook Dr to New Rd	24	1.442	26.5

**Table 5.9 – Top 20 Intersections: Trumbull County**

Rank	Community	Intersection	Total Crashes	Crash Rate	Rating Score
1	How land Tow nship	SR 46 and E Market St	63	1.950	6.90
2	Weathersfield Tow nship	US 422 and SR 169	80	2.623	8.65
3	How land Tow nship	East Market St and North Rd	71	1.667	13.00
3	Warren City	East Market St and North Rd	71	1.667	13.00
4	Liberty Tow nship	SR 193 and Gypsy Ln	39	1.884	13.10
5	Warren City	SR 45 and West Market St	50	2.537	16.25
6	How land Tow nship	East Market St and Willow Dr	34	1.826	17.35
7	Liberty Tow nship	SR 193 and SR 304	52	2.038	17.50
8	Fow ler Tow nship	SR 193 and King Graves Rd	18	4.376	17.55
8	Vienna Tow nship	SR 193 and King Graves Rd	18	4.376	17.55
9	How land Tow nship	Elm Rd and North River Rd	59	1.738	17.80
9	Warren City	Elm Rd and North River Rd	59	1.738	17.80
10	Niles City	US 422 and North Rd	59	1.633	18.30
10	Warren City	US 422 and North Rd	59	1.633	18.30
11	How land Tow nship	North River Rd and Larchmont Ave	39	1.875	18.70
12	Niles City	US 422 and SR 46	91	2.437	20.65
13	How land Tow nship	SR 46 and Mall River Rd	94	2.453	21.05
14	How land Tow nship	SR 46 and SR 82 Eastbound Ramp	54	1.435	21.20
15	How land Tow nship	SR 82 and How land Wilson Rd	48	0.990	21.30
16	Liberty Tow nship	SR 193 and Liberty St	38	1.319	25.40

**Table 5.10 – Top 17 Segments: Trumbull County**

Rank	Community	Route	Location	Total Crashes	Crash Rate	Ranking Score
1	Weathersfield Tow nship	US 422	SR 169 to Brightw ood Ave	39	2.283	5.70
2	Champion Tow nship	SR 45	Folsom St to Educational Hw y	34	1.725	6.30
3	Niles City	US 422	SR 46 to MP 16.83	51	2.518	6.65
4	How land Tow nship	SR 46	High St to Darlington Rd	39	2.456	6.85
5	How land Tow nship	Elm Rd	North River Rd to Blair Dr	41	1.872	7.30
6	Niles City	US 422	Shaker Blvd to Frederick Ave	55	3.139	7.90
7	Liberty Tow nship	SR 193	SR 304 to Naylor Lloyd Rd	42	3.874	8.60
8	Warren City	East Market St	Marw ood Dr to North Rd	32	1.287	10.95
9	Niles City	SR 46	2nd St to State St	29	2.102	12.35
10	Warren City	US 422	MP 14.95 to North Rd	28	1.598	12.35
11	Champion Tow nship	SR 305	Center St to Western Reserve Greenw ay	24	4.871	12.60
12	Warren City	US 422	Southern Blvd to Coit Ave	28	2.459	12.70
13	Bazetta Tow nship	SR 5	Millennium Blvd to Burnett Dr	33	1.794	13.20
14	Liberty Tow nship	SR 193	SR 304 to IR 80 Westbound Ramp	21	1.135	13.50
15	Niles City	US 422	Difford Dr to Gypsy Ln	24	1.370	14.50
16	Niles City	US 422	North Rd to Park Dr	25	1.427	14.60
17	Liberty Tow nship	Tibbetts Wick Rd	MP .65 to Shannon Rd	20	1.416	16.05

For more information log onto Eastgate’s webpage at [www.eastgatecog.org](http://www.eastgatecog.org) Click on Transportation Planning; from the pull down menu select Regional Safety Plan.

## 7. INTELLIGENT TRANSPORTATION SYSTEM (ITS)

ITS provides the tools necessary to address many of our current surface transportation problems, particularly in the areas of congestion, safety improvements and better traveler information. ITS also helps transportation officials anticipate and address future demands through an intermodal strategic approach to transportation. ITS applications apply current and emerging technologies in such fields as information processing, communications, control, and electronics, and are capable of providing real-time traffic information to the traveling public. Effectively integrated and deployed, ITS technologies offer many benefits, including more efficient use of our infrastructure and energy resources, significant improvements in safety, mobility, accessibility, and productivity. ITS is a federally supported program and was formally identified and established in ISTEA, included in TEA-21, and retained in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act – A Legacy for Users (SAFETEA-LU).

This component of the 2040 MTP represents a roadmap for completing a more specific strategic plan, and for implementing ITS technologies over the next several years. It is also a summary of the overall transportation and travel-related communications needs that exist in the Mahoning Valley.

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)
- Destination Dynamic Message Signs (DDMS)

### • ITS History

1999 - Strategic Assessment for Intelligent Transportation Systems for Mahoning and Trumbull Counties

The Mahoning-Trumbull County ITS Early Deployment was an effort undertaken by Eastgate, in collaboration with the Ohio Department of Transportation (ODOT) and a coalition of private and public agencies. The overall goal was to develop a plan for deploying ITS technologies in the two-county area. The vision for the output of this project, which was completed in 1999, was to identify innovative ITS technologies for deployment in the Mahoning Valley to satisfy regional transportation needs.

2004 - Youngstown Warren Regional ITS Architecture

In 2004, Eastgate completed the first ITS Regional Architecture for Mahoning and Trumbull Counties. The plan was a roadmap for transportation system integration. The architecture was developed through a cooperative effort by the region's transportation agencies, covering all modes and all roads in the region. The architecture represented a shared vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region.

## 2011 - Eastgate ITS Architecture Update and Strategic Plan

The *Eastgate Regional Council of Governments Intelligent Transportation Systems (ITS) Architecture Update and Strategic Plan Framework* was undertaken to provide Eastgate with a regional plan for Intelligent Transportation System projects and an ITS architecture. This ITS plan and architecture:

- Provided Eastgate and other agencies with tools to ensure that the planning, deployment and integration of ITS systems throughout the state is done with a common framework through ITS architecture and standards development.
  - Brought the region into compliance with requirements defined by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) for development of ITS projects.
  - And ultimately, assist in the maintenance and operations of the regional transportation network.
- Purpose of the ITS Architecture: The architecture defines possible integration opportunities between agencies within the region and identifies how cooperation between the agencies in the deployment of ITS systems can be used to satisfy transportation needs. By defining what currently exists in the area of ITS deployments, the regional ITS architecture can be used to identify gaps in needed ITS services and can identify how these gaps could be addressed. The architecture can then be used to efficiently structure implementations of ITS technologies. By creating a long range plan for the implementation of these systems and technologies, agencies can:
- Prepare for future expansion
  - Leverage funding
  - Identify standard interfaces

The following components were developed as part of this project and are now available on the internet:

- Eastgate Regional ITS Architecture Turbo Architecture Database: Eastgate's consultants used FHWA's developed software tool to capture the details of the architecture including definition of stakeholders, inventory, market packages, interconnects, interfaces, functional requirements, and standards.
- Eastgate Regional ITS Architecture Website: A website was developed and posted, which provides, in an easily accessible hyperlinked format, the same detailed descriptions of stakeholders, elements, interfaces, and functional requirements found in the Turbo Architecture database; and where the project documentation can be found, including meeting minutes and stakeholder comments. The website currently resides at <http://consystec.com/ohio/eastgate/>.
- Eastgate Regional ITS Architecture Documentation: This documentation describes the stakeholders, elements, interfaces, information flows, services, and requirements that comprise the Eastgate Regional ITS Architecture. It also summarizes the regional projects that have been identified, existing and potential agreements, and the plan for using and maintaining the Eastgate Regional ITS Architecture.
- Strategic Plan Framework: The Strategic Plan forecasts possible ITS projects that major stakeholders in the area would like to pursue. It is broken into two major time frames, 0-5 years and 6+ years; and a long term is also considered. It provides a description of the projects, lead agency capital costs; as well as operation and maintenance costs and the type of service the project will provide, so that it can be easily tied to the existing ITS architecture. TABLE 11 on the following page displays Eastgate's Regional ITS Architecture - Projects List and

shows the Agency; Project; Service Area; Description; Time Frame Short, Mid, Long (S/M/L) and Cost for each project.

For more information log onto Eastgate's webpage at [www.eastgatecog.org](http://www.eastgatecog.org) click on Transportation Planning; from the pull down menu select Intelligent Transportation Planning.

**Table 5.11 – Eastgate’s Regional ITS Architecture - Projects List**

Agency	Project	Service Area	Description	S/M/L	Cost
ODOT	Service Patrols	Emergency Management	Purchase and operate one freeway service patrol vehicle.	M	\$257,500
ODOT	Maintenance Vehicle Upgrade	Maintenance and Construction	Automatic Vehicle Location for maintenance vehicles.	L	\$1,250-\$5,800/vehicle
ODOT	Install snow and ice detection management and advanced snow plow systems.	Maintenance and Construction	Road weather information systems integrated with advanced technology snow plows. These systems provide early warning of icing and snow, and meter the amount of chemical and/or sand applied based on surface conditions, including amount of chemical already applied.	L	\$500,000
ODOT	Work Zone Safety Improvements	Maintenance and Construction	Improvements to work zones to reduce collisions. Ability to alert drivers of a construction zone, roadway hazard, or speed change.	M	\$100,000/Zone
ODOT	Highway-Rail Intersection Advanced Safety Systems	Traffic Management	Install advanced Highway-Rail Safety Systems at key crossings. A study must be conducted to identify the crossings and the preferred system.	L	\$500,000
ODOT	Traveler Information Delivery Methods	Travel Information	Implement traveler information dissemination methods which may include personalized traveler information on a subscription basis delivered to cell phones, pagers, personal computing devices. Information gathered through various detection methods could also be displayed on BuckeyeTraffic.org. The key public sector cost element will be in infrastructure to enable providing enhanced content to the private sector.	M	\$750,000
Eastgate/ County	Signal System Upgrades and Evacuation Plan Updates	Traffic Management/ Emergency Management	Signal upgrade and coordination along the major evacuation routes  Study and development of plan to evacuate Trumbull and Mahoning Counties in case of an emergency affecting mass area.	L S	Varies \$300,000
Mahoning/Trumbull Counties	Commercial Vehicle Ops	Commercial Vehicle Operations	System collecting data carried in trucks traveling on specific routes.	L	\$150,000
Municipalities	Signal pre-emption	Emergency Management/ Traffic Management	Pre-emption signal system for emergency vehicles	L	\$6,000/intersection \$2,000/vehicle
Municipalities	Computer Aided Dispatch to Emergency Vehicles	Emergency Management	Integrating the computer aided dispatch to the emergency management center that will allow the operators to dispatch emergency response vehicles to the scene more rapidly.	L	\$150,000
Trumbull County	Maintenance Vehicle Upgrade	Maintenance and Construction	Automatic Vehicle Location for maintenance vehicles.	M	\$1,250-\$5,800/vehicle
Trumbull County	The North River Road / Elm Road Safety Enhancement Project	Traffic Management	This project will consist of constructing a skid resistant surface course, upgrading pavement markings, improving traffic lane alignments, and upgrading the existing traffic signals to optimize traffic timing and flow. Access management will also be considered within the projects limits of 150 feet in all directions.	S	\$300,000
Trumbull County	Warren Sharon Road/Howland Wilson Road Intersection Project	Traffic Management	This intersection improvement project will consist of a signal improvement and the addition of left turn lanes at the intersection of Warren Sharon Road and Howland Wilson Road in Howland Township.	S	\$925,000
City of Newton Falls	Signal pre-emption	Emergency Management/ Traffic Management	Pre-emption will be provided on all approaches for four signalized intersections including W. Broad at Ridge/Windham, W. Broad at Canal, Broad at Center, and E. Broad at Milton. Seventeen emergency vehicles, including fire, EMS, and police, will be retrofitted with the proper equipment.	S	\$6,000/intersection \$3,000/vehicle \$1,000 for software
City of Newton Falls	Traffic Signal Upgrade	Traffic Management	This project will consist of the replacement and upgrade of traffic signals along SR 534 with interconnect communication.	S	\$650,000
WRTA	WRTA Passenger Management System	Public Transportation	System that provides fare reconciliation between peer agencies using a common travel card.	S	\$635,700
WRTA	WRTA Surveillance Control	Public Transportation	To include CCTV at certain locations to provide surveillance at stations and surrounding areas for security purposes	M	\$30,000 per location
WRTA	Kiosks at Transfer Points	Public Transportation	WRTA to establish kiosk at key locations to provide bus route information and trip planning	M	\$80,000
WRTA	Bus Traffic Signal Priority	Public Transportation	Study key transit corridors for applicability of bus traffic signal priority to improve transit travel time. Implement transit signal priority on traffic signals on identified corridors.	M	\$500,000
WRTA/NITTS	Transit Vehicle Updates	Public Transportation	Installation of Wireless Internet Feed on buses, automated signs, and annunciators.	S	\$2,500/Vehicle
NITTS	AVL System	Public Transportation	Installation of AVL on all NITTS vehicles.	M	\$1,000/Bus
NITTS	Google Transit	Public Transportation	NITTS will pair with Google to feed information on Google transit.	S	No Cost
NITTS	Advanced Para-Transit Scheduling and Dispatch System	Public Transportation	Implement an advanced para-transit scheduling and dispatch system at NITTS coordinated with WRTA.	S	\$750,000
Youngstown State University	Research Program	Traffic Management	Establish a research program in conjunction with ODOT, to test new implementation concepts such as crash mitigation or work zone operations systems.	M	\$250,000
Youngstown State University	Research Program: Real-Time Stress Monitoring of Highway Bridges with a Secured Wireless Sensor Network	Maintenance and Construction	This collaborative research aims to develop a real-time stress monitoring system for highway bridges with a secured wireless sensor network. The program monitors the stress of highway bridges in Mahoning County with a light-weight and reliable wireless sensor network by applying state of the art technologies in wireless networks, sensor technologies, peer-peer communications, embedded systems, and power managements. The near term goal is to collect wireless sensor data under different traffic patterns from local highway bridges. The long term goal is to build a non-destructive structural health monitoring system and derive a structural health index to predict the remaining life span of a highway bridge in order to save human lives, avoid costly failure, provide timely restoration, prevent unnecessary reconstructions, and minimize disruptions of traffic.	S	\$100,000
Private providers	Connection of Private Providers	Travel Information	Private providers to work with ODOT to establish links with private providers to deliver traffic information to more people in different facets.	L	\$500,000
	Connected Vehicle	Travel Information	Deployment of <i>Connected Vehicle</i> infrastructure, including roadside equipment and controller modifications, to implement vehicle-to-infrastructure (V2I) communications in the 2014-2020 timeframe (as vehicles are equipped). <i>Connected Vehicle</i> is a suite of technologies and applications that use wireless communications to provide connectivity that can deliver transformational safety, mobility, and environmental improvements in surface transportation. Applications provide connectivity with and among vehicles, between vehicles and the roadway infrastructure, and among vehicles, infrastructure, and wireless devices (consumer electronics, such as cell phones and PDAs) that are carried by drivers, pedestrians, and bicyclists.	L	Varies