



ROOM 223 – 1101 BEACH STREET

FLINT, MICHIGAN 48502-1470

TELEPHONE (810) 257-3010 FAX (810) 257-3185

ROBERT JOHNSON – 732-9089  
CHAIRPERSON  
ROBERT COLE – 735-5050  
VICE-CHAIRPERSON  
MARIAN MICHALIK – 736-7799  
TREASURER

TRUSTEES  
BILL BAIN – 659-0001  
JOHN GILBERT – 635-9762  
DENNIS HEIDENFELDT – 813-5430  
WILLIAM KOVL – 686-5850  
ROBERT WIDIGAN – 569-8296  
PATRICIA WITTE – 640-2000

**Genesee County Metropolitan Planning Commission  
Metropolitan Alliance Committee (METRO)**

**Genesee County Administration Building  
Harris Auditorium  
1101 Beach Street, 3<sup>rd</sup> Floor  
Flint, Michigan 48502**

**Wednesday, October 15, 2014  
7:00 P.M.**

**AGENDA**

- I. Call to Order
- II. Pledge of Allegiance
- III. Roll Call
- IV. Minutes
  - \*\*\*A. Minutes of the September 17, 2014 Regular Meeting (attached)
- V. Introduction Of Guests
- VI. Public Comment
- VII. Public Hearing
  - A. FY 2014-2017 Transportation Improvement Program (TIP) Amendment #5
- VIII. Finances
  - \*\*\*A. FY 2015 Dues for Local Units and to Pay Secretarial

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- IX. Committee Reports
  - A. METRO Bylaw Review
- X. Old Business
  - \*\*\*A. Genesee County Model Update Technical Report (attached)
  - \*\*\*B. Draft Coordinated Plan Technical Report (attached)
- XI. New Business
  - A. Draft Genesee County Regional Non-Motorized Plan (attached)
  - \*\*\*B. FY 2014-2017 Transportation Improvement Program (TIP) Amendment #5 (attached)
  - C. Statewide National Functional Classification (NFC) Review (attached)
- XII. Other Business
- XIII. Announcements
- XIV. Adjournment

\*\*\*Action Items

**NEXT MEETING – November 19, 2014**

# GENESEE COUNTY METROPOLITAN ALLIANCE

## Regular Meeting Minutes

September 17, 2014

The Genesee County Metropolitan Alliance Committee met at 7:00 p.m. on Wednesday, September 17, 2014, in the Harris Auditorium of the Genesee County Administration Building, 1101 Beach Street, Third Floor, Flint, Michigan.

**I. CALL TO ORDER**

Chairperson Johnson called the meeting to order at 7:00 p.m.

**II. PLEDGE OF ALLEGIANCE**

Chairperson Johnson led the Pledge of Allegiance.

**III. ROLL CALL**

Members present and absent were noted as follows:

**UNIT REPRESENTED**

**MEMBERS PRESENT**

**MEMBERS ABSENT**

Genesee County  
City of Burton

City of Clio

City of Davison  
City of Fenton

City of Flint

City of Flushing  
City of Grand Blanc

City of Linden

City of Montrose

William Kovl

Joan Snyder

Colleen Brown

Ellen Ellenburg  
Robert Spose

Eric Wiederhold  
Duane Mosher (A)

Patricia Lockwood  
Les Blanc  
Dayne Walling  
Megan Hunter  
Kay Muhammad (A)

Kevin Keane  
Dennis Bow  
Matt Telliga  
Ester Galuska

Susan Soderstrom (A)  
Ray Culbert  
Paul Zelenak

Paul Wixson (A)

City of Mt. Morris		Dennis Heidenfeldt Dan Davis
City of Swartz Creek	Mark Middleton (A) John Gilbert	
Argentine Township	Robert Cole	Ronald Schultz
Atlas Township		Denise Graves (A) Shirley Kautman-Jones Paulette Johnson Tere Onica (A) Chris Gehringer
Clayton Township	Robert Widigan	
Davison Township		Rick Caruso (A) Matthew Karr
Fenton Township	Robert Cotrell	
Flint Township		Vince Lorraine Andy Marko Robert Krug (A) Karyn Miller
Flushing Township	David Arceo	Tracey Tucker (A) Rian Birchmeier
Forest Township	Bill Bain	Shirley Gage (A) Mary Ann Price
Gaines Township	Burt Banks	
Genesee Township	Chuck Timmons Kenneth Draper	Mark Martin (A)
Grand Blanc Township	Patricia Witte	Diane Hyrman (A)
Montrose Township	Marian Michalik	
Mt. Morris Township	Scott Bennett Tom Tithof	Jerry Deloney
Mundy Township	Robert Johnson Brian Baxter (A) Kay Doerr Deidre Zettel	
Richfield Township		Bill Morey (A)
Thetford Township	Gerry Masters	
Vienna Township		David Cain Randy Taylor (A)
Goodrich Village	Doug McAbee	
Otisville Village		

Otter Lake Village  
Lennon Village  
Gaines Village

Joan Skias

Sam Stiff  
Dave Lobdell  
Kathy Volkening (A)  
Andrea Dewey  
Jeff Wright

Federal Highway Admin  
Gen Cty Drain Comm  
Gen Cty Road Comm  
GCMPC  
Mass Trans Authority  
Mich Dept of Trans

Christine Durgan  
Ed Benning

Jay Reithel  
Pamela Boyd  
Linda Burchell

**OTHERS PRESENT:** Rich Tesner, Jason Nordberg, Sharon Gregory and Alberta Gunsell

**IV. MINUTES**

**A. Minutes of the June 18, 2014 Regular Meeting**

Chairperson Johnson requested corrections and/or additions to the minutes of the July 16, 2014, regular meeting.

Action Taken: Motion by Mr. Cole, supported by Ms. Michalik, to approve the minutes of the July 16, 2014, regular meeting as presented.

Motion Carried Unanimously

**V. INTRODUCTION OF GUESTS**

No one spoke at this time.

**VI. PUBLIC COMMENT**

No one spoke at this time.

**VII. PUBLIC HEARING**

There was no Public Hearing.

**VIII. FINANCES**

**A. FY 2015 Dues for Local Units**

Ms. Michalik stated that there will be a meeting in October at 6:30 p.m. for Officers and Trustees to discuss dues for 2015. It was requested that a reminder email be sent to the Officers and Trustees reminding them of the 6:30 p.m. meeting.

Ms. Michalik stated that the current bank balance is \$179.40 as of August 31, 2014.

Action Taken: Motion by Mr. Bain, Supported by Ms. Witte, to accept the Treasurer's report as presented.

Motion Carried Unanimously

**IX. COMMITTEE REPORTS**

There were no Committee Reports.

**X. OLD BUSINESS**

**A. Transit System Technical Report**

Ms. Gregory stated that the Transit System Technical Report was presented in July for review and comments. No changes were made to the report. At this time the Technical Advisory Committee is recommending approval to the Metropolitan Alliance for the Transit System Technical Report.

Action Taken: Motion by Ms. Michalik, Supported by Mr. Cole, to approve the Transit System Technical Report as presented.

Motion Carried Unanimously

**B. Intermodal Freight Technical Report**

Ms. Gregory stated that the Intermodal Freight Technical Report was provided in July for review and comment. Comments were received and staff incorporated these into the technical report. The Technical Advisory Committee is recommending approval to the Metropolitan Alliance for the Intermodal Freight Technical Report.

Action Taken: Motion by Mr. Cole, Supported by Ms. Michalik, to approve the Intermodal Freight Technical Report as presented.

Motion Carried Unanimously

**C. FY 2016 Safety Project Prioritization**

Ms. Gregory stated that MDOT Safety Program is currently holding their Call for Projects. Applications were due to MDOT by September 15, 2014. Applicants were asked to submit their applications to the Genesee County Metropolitan Planning Commission. The MPOs prioritize and forward a Resolution of Support to MDOT. Staff reviewed the applications according to the MDOT Time-of-Return Analysis and provides a prioritized list. The Genesee County Road Commission was the only agency that submitted applications. Discussion ensued.

Action Taken: Motion by Ms. Witte, Supported by Mr. Widigan, to approve the Michigan Department of Transportation Local Safety Program prioritized list by a Resolution as presented.

Motion Carried Unanimously

**D. FY 2014-2017 TIP Update**

Ms. Gregory stated that MDOT has provided notice that obligational authority for FY 2014 transportation projects in the State of Michigan has run out as of August 1, 2014. MDOT is currently waiting to hear if any additional monies will become available in September prior to the end of FY 2014. The majority of Genesee County projects were obligated prior to the deadline. Staff will meet with road agencies with FY 2014 and FY 2015 Transportation Improvement Program projects to review the status of their projects. If there are any questions, contact Sharon Gregory.

**XI. NEW BUSINESS**

**A. Draft Genesee County 2040 Long Range Transportation Plan (LRTP) Project List and Illustrative Project List**

Ms. Gregory stated that Genesee County held a 2040 LRTP Call for Projects in June. Staff received 13 projects from the Genesee County Road Commission. Staff also received a list of projects from the Mass Transportation Authority and was provided with MDOT's list of Genesee County projects from its 2014-2018 Five-Year Plan. These projects were added to the current list of projects in the FY 2014-2017 TIP to create the draft 2040 LRTP Project List. The list of projects was analyzed according to our Congestion Management Process and reviewed for fiscal constraint. Projected funding was not available for all projects so an Illustrative List of Projects was created. Three public input sessions during September have been organized so that concerned citizens will have the opportunity to review and comment on these projects. Staff asked the Metropolitan Alliance to review the projects and to provide Sharon Gregory with any comments by September 26, 2014.

**B. Draft Genesee County Model Update Technical Report**

Ms. Gregory stated that as part of the Genesee County 2040 Long Range Transportation Plan the 2005 model has been updated to include new socioeconomic data which was derived from the 2010 Census. School and university data was also updated for the external stations. Other updates include attribute and alignment changes to the road network and transit routes, and additions/deletions to the traffic signals. In addition to these changes, an additional modeling year, with associated attribute data, was added to allow analysis for the 2040 year of the plan. MDOT has provided minor edits to the narrative, which were incorporated. Staff is requesting the Metropolitan Alliance to review and provide any comments to Christine Pobocik by Friday, September 26<sup>th</sup>.

C. **Draft Coordinated Plan Technical Report**

Ms. Gregory stated that the Coordinated Plan Technical Report is defined as a locally developed, coordinated public transit-human services transportation plan that identifies the transportation needs of individuals with disabilities, the elderly and those with low income. The Coordinated Plan Workshop where stakeholders were invited re-identified the gaps in services, developed strategies to address those needs and reprioritized the strategies. The report also provides an overview of available transportation services in Genesee County. Staff is requesting the Metropolitan Alliance to review and provide any comments to Jacob Maurer by Friday, September 26<sup>th</sup>.

D. **Memorandum of Agreements with Surrounding Agencies**

Ms. Gregory stated that the new Adjusted Census Urban Boundaries, developed from the 2010 Census data, represent the urbanized area in Genesee County and received federal approval in October of 2013. Prior to this update the urbanized area boundary extended outside of Genesee County requiring the Genesee County Metropolitan Alliance to put in place agreements with the Shiawassee County Road Commission (SCRC) and the Saginaw Metropolitan Area Transportation Study (SMATS). The new urbanized boundaries no longer extend outside of Genesee County into SCRC and SMATS jurisdiction. The agreements require a written notice from one of the identified parties to terminate the agreement. The Technical Advisory Committee is recommending that the Metropolitan Alliance send a notice to both SCRC and SMATS to terminate the agreement as the Genesee County Urbanized Boundary no longer extends into their jurisdiction. Discussion ensued.

Action Taken: Motion by Mr. Cole, Supported by MS. Michalik, to approve staff to send a notice to Shiawassee County Road Commission and Saginaw Metropolitan Area Transportation Study to terminate the agreement as the Genesee County Urbanized Boundary no longer extends into their jurisdiction.

Motion Carried Unanimously

XII. **OTHER BUSINESS**

There was no Other Business.

XIII. **ANNOUNCEMENTS**

A. **2014 PASER Finalized**

Mr. Nordberg stated that staff spent the summer collecting PASER data. Staff is finalizing the PASER documents at this time.



**B. Traffic Counts Website**

Mr. Nordberg stated that staff is requesting that local road agencies that use our website for traffic count information review and sign a new three-year agreement.

**C. MTA Millage Discussion**

Mr. Benning stated that the MTA has lost millions of dollars. In November the MTA will be asking for a recovery millage. If the millage does not pass it will mean cutting staff and/or services. Service is needed more today than previously. Discussion ensued.

Mr. Nordberg stated that the Fall Household Hazardous Waste collection day is scheduled for September 27<sup>th</sup> from 10:00 a.m. to 2:00 p.m. at the Goodrich Middle School and the Flint Water Service Center.

**XIV. ADJOURNMENT**

Chairperson Johnson adjourned the meeting at 7:49 p.m.

Respectfully submitted,  
Alberta Gunsell, Secretary  
Genesee County Metropolitan Planning Commission

DRAFT



## MEMORANDUM

**TO:** Members of the Genesee County Metropolitan Alliance

**FROM:** Christine Pobocik, GIS Specialist  
Genesee County Metropolitan Planning Commission

**DATE:** October 15, 2014

**SUBJECT:** **Genesee County Model Update Technical Report**

The Genesee County Model Update Technical Report was provided to the Long Range Transportation Plan Steering Committee (LRTPSC) as a draft in June of 2014, and as a final draft in July 2014. The Model Update Technical Report was then provided to the Metropolitan Alliance in September for review and comment. No comments were received and no changes were made to the report.

At this time, the Technical Advisory Committee is recommending approval to the Metropolitan Alliance for the Genesee County Model Update Technical Report.

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# DRAFT

## Genesee County Model Update Technical Report



# Table of Contents

<b>Introduction.....</b>	<b>1</b>
<b>Traffic Analysis Zone (TAZ) Updates.....</b>	<b>1</b>
Population and Household Data.....	3
Employment Data.....	4
School Enrollment.....	6
External Stations.....	8
<b>Road Network and Node Updates.....</b>	<b>11</b>
Road Network.....	13
Traffic Signals.....	15
<b>Transit Network Updates.....</b>	<b>17</b>

## List of Figures

Figure 1: Map of Traffic Analysis Zones.....	2
Figure 2: Graph of City of Flint Projected Percent Reduction in Households.....	4
Figure 3: Map of External Station Locations.....	9
Figure 4: Genesee County Roadway Segments and Centroids.....	12
Figure 5: Mass Transportation Authority Primary Bus Routes.....	18
Figure 6: 2018 – 2040 Model Representation of Flint MTA Bus Routes.....	20

## List of Tables

Table 1: Genesee County 2040 Employment Projections by Sector.....	5
Table 2: Genesee County 2040 University Enrollment Projections.....	7

Table 3: Genesee County 2040 K-12 Enrollment Projections..... 8

Table 4: Annual Growth Rate of Auto and Truck Trips.....10

Table 5: Road Network Changes 2005 to 2017.....14

Table 6: Signal Changes Made in the Node Network.....16

Table 7: MTA Fixed Route System Changes.....19

## **Appendix A**

2005 Model Calibration Report

## **Appendix B**

2005 Base Year Population Data 2040 Population Projections Methodology Report

## **Appendix C**

2005 Base Year Employment Data 2040 Employment Projections Methodology Report

## **Introduction**

The Genesee County Travel Demand Model is a representation of travel patterns of the major roads in the county. The model uses population and employment projections to project where people may be traveling on the Genesee County road network in the future. Staff utilizes the model in determining the road network capacity deficiencies (congested areas), developing the list of capacity improvement (widening) projects for the 2040 LRTP, testing different alternative projects to alleviate congestion and for air quality conformity analysis on the LRTP and any future TIP projects that require analysis.

The 2005 Model was developed through a cooperative effort consisting of GCMPC staff, MDOT and the modeling consultants Bernardin Lochmueller and Associates. The development of the model took over a year and was guided by the Genesee County Model Development Committee. The model has a 2005 base year, meaning that the outputs of the model were calibrated to 2005 traffic counts and was originally developed for the 2035 Long Range Transportation Plan. The Genesee County Model was developed for the following years as part of the 2035 plan: 2005, 2011, 2018, 2025 and 2035. This model is a significant improvement on the previous model and appropriate for a medium-sized MPO such as Genesee County. The model exceeds MDOT and FHWA standards for calibration and is ready for use in the development of the 2040 LRTP. See Appendix A for the 2005 Model Calibration Report.

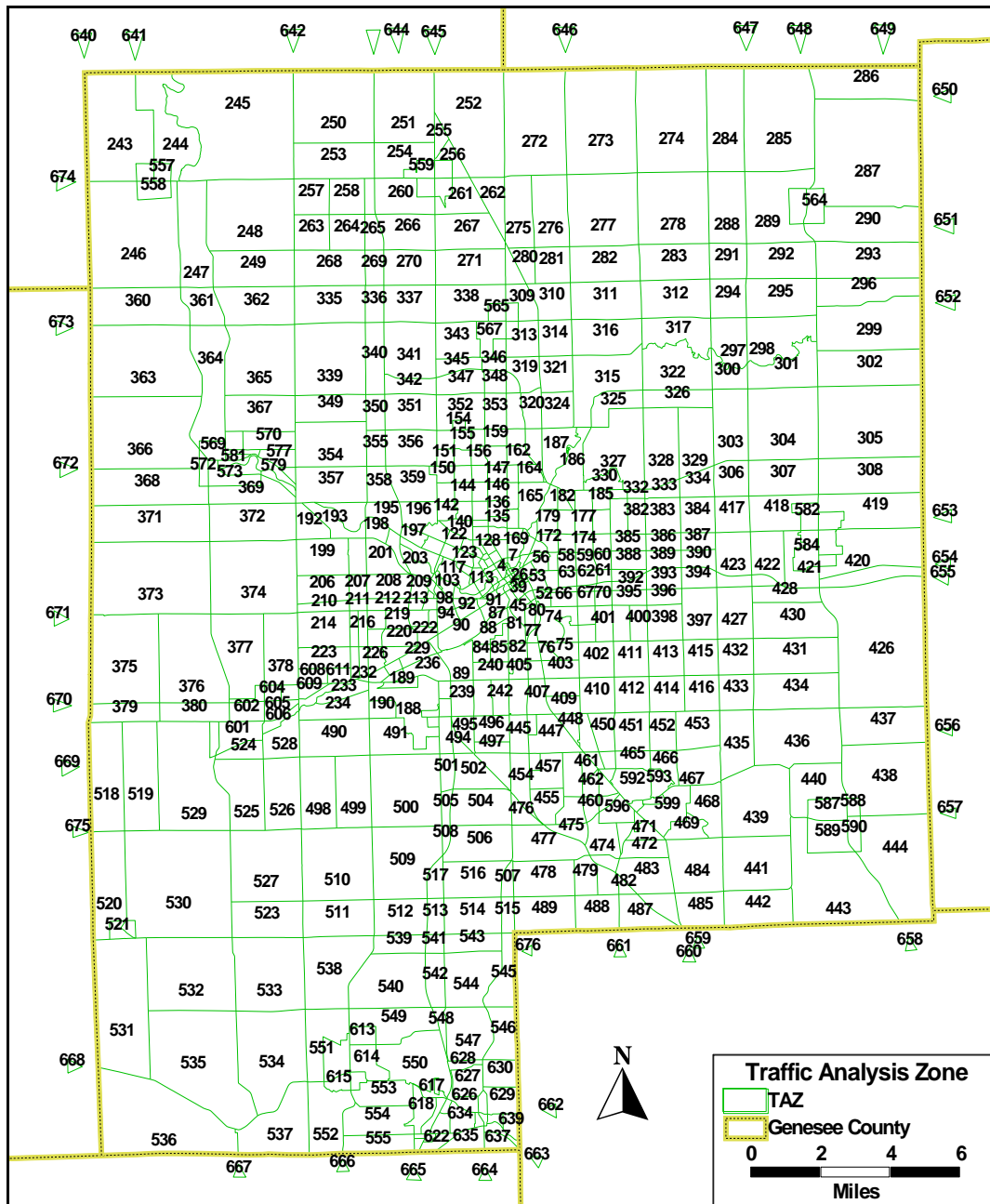
As part of the Genesee County 2040 Long Rang Transportation Plan, the 676 Traffic Analysis Zones (TAZ) in the 2005 Model were updated to include new socioeconomic data which was derived from the 2010 Census. School and University data was also updated as well as the data for the external stations. Other updates include attribute and alignment changes to the road network and transit routes, and additions/deletions to the traffic signals. In addition to these changes, an additional modeling year, with associated attribute data, was added to allow analysis for the 2040 year of the plan. The Genesee County Model is run for the following years as part of this plan: 2005 (calibrated base year), 2011, 2018, 2025, 2035 and 2040. Various sections of the LRTP include analysis based on data from this updated model.

## **Traffic Analysis Zone (TAZ) Updates**

The study area of the Genesee county model contains 639 traffic analysis zones (See Figure 1). There are 37 external zones and the TAZ layer consists

of a total of 676 zones. The internal-zone attributes include land area, county name/number, TAZ number and detailed categorization of population, households, vehicle ownership, mean household income, school enrollment, university enrollment and employment by economic sector. These demographic and employment features are the inputs for trip generation. The TAZ layer contains the multi-year attribute data, including the data not only for the 2005 base year but also for the future years.

Figure 1: Genesee County Traffic Analysis Zones



## **Population and Household Data**

The Genesee County 2040 Population Projections were used to update the population, households and persons per household attribute fields in the TAZ layer of the model. The new projections were used to populate the 2011 modeling year and all subsequent modeling years out to 2040.

**2005 and 2010 Years of the 2040 Population Projections:** The population projections for Genesee County were produced on a traffic analysis zone (TAZ) level where growth/decline was calculated for each TAZ which can then be aggregated up to the municipality level for all cities and townships and some villages. The 2005 base year projections are based on 2000 census data derived from the 2000 Census transportation Planning Package (CTPP) which provided household data information to the TAZ level.

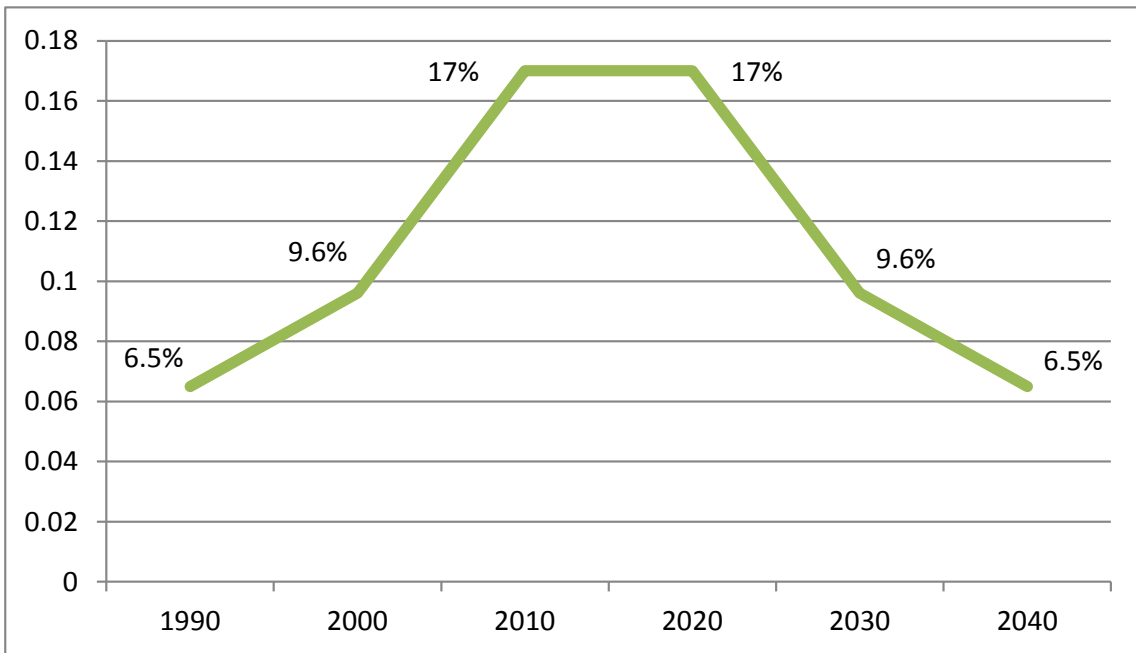
In the development of the 2035 projections, which includes the 2005 base year of the 2040 projections, staff used building permit data (new builds and demolitions) to depict the areas of growth/decline in Genesee County. Building permit data was collected from every municipality, geo-located and aggregated to the TAZ level. Building permits include single-family residential, multi-family residential, and mobile homes all weighted equally per housing unit. Data was used from the years 2000 through 2006. Comparing the 1990 and 2000 Census and Genesee County building permit data for the same time period it was decided that a reduction factor of .42 would be used to compensate for building permits issued but not completed and vacancy rates. The factored net change was then averaged out from the seven years of data into an average yearly growth/decline factor that will be identified from this point on as the 2035 Annual TAZ Household Growth Factors. This factor was used to project the 2005 base year data from 2000 Census data. 2010 TAZ level data was validated using 2010 Census data

**Methodology for Projections Beyond 2010:** All local units of Government in Genesee County (including the City of Flint) were projected using the same methodology for the 2035 LRTP Population Projections. The 2040 projections use different methodology for the City of Flint than what is used for all other local units of government in Genesee County. The primary reason for this separation is that the City of Flint is a unique case as it has lost on average 19,000 people per decade since 1980. No other local unit of government in Genesee County has a fraction of the continued loss realized in the City of Flint.



Genesee County population projections are driven by changes to households. Staff used historic percent changes to households in the City of Flint to project future percent changes to households. The percent change in households increased each decade since 1980 leading up to the 2010 Census and the future projection reverse the pattern decreasing the percent change in households for the decades out to 2040. This approach tappers back the percent household reduction in the future and resembles a bell curve pattern as seen in the chart below. Appendix B describes in detail the methodology used for areas outside the City of Flint and for the City of Flint itself.

Figure 2: This graph illustrates a bell curve pattern for existing and projected Percent Reduction in households for the City of Flint.



### Employment Data

The Genesee County 2040 Employment Projections were used to update the following employment attribute fields within the TAZ layer: manufacturing, other, transportation, finance, retail, wholesale, service and government employment, and total employment. The new projections were used to populate the 2011 modeling year and all subsequent modeling years out to 2040.

**Employment Projection Methodology:** The Genesee County Metropolitan Planning Commission (GCMPC) utilized the 2005 base year employment data of the 2035 Long Range Transportation Plan's (LRTP) Transportation Model as the base year of 2040 projections. This model, which has been calibrated and validated, supplied staff with geographically located employers in Genesee County, their number of employees, and industry codes.

GCMPC staff chose the year 2010 as the next significant year to validate the projection data to as it is both a census year and a compatible year with other datasets. To calculate figures for 2010, staff reviewed various dataset projections for similar trends of increase and decrease between 2005 and 2010 in all employment sectors. After review of all available datasets, factors from the Regional Economic Models, Inc. (REMI) figures were used to grow the employment projections out to 2040. REMI was selected because it shows similar trends in Genesee County employment sectors and provides figures out to 2040 needed for projecting.

The 2010 preliminary employment data was calculated by applying the 2005-2010 REMI percent change (a different percentage for each employment sector) to the 2005 GCMPC base year, for each of the 639 traffic analysis zones (TAZ's) in each employment sector. The preliminary 2010 employment figures for Genesee County were validated against the 2010 Bureau of Economic Analysis (BEA) data. After all adjustments and calculations were complete, the jobs from each traffic analysis zones, in each of the eight employment sectors were tallied to create the 2040 Genesee County Employment Projections (Table 1). Appendix C describes in detail the methodology for the employment projections.

*Table 1: Genesee County 2040 Employment Projections by Sector*

<b>Employment Sector</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Manufacturing	24,433	10,415	10,672	10,398	9,948	9,630	9,267	8,909
Other	12,677	9,798	10,840	11,333	11,374	11,274	11,007	10,766
Transportation and Public Utilities	5,768	4,501	4,667	4,724	4,725	4,802	4,973	5,176
Finance, Insurance and Real Estate	14,400	15,778	16,671	17,264	16,945	16,528	16,223	15,911
Retail Trade	27,984	24,291	24,125	23,956	23,451	22,838	22,618	22,315
Wholesale Trade	7,244	5,772	5,775	5,767	5,728	5,638	5,524	5,337
Services	92,713	88,040	95,427	103,017	109,041	111,229	114,412	117,516
Government	26,443	24,731	24,105	25,570	25,875	26,123	26,433	26,646
<b>Total</b>	<b>211,662</b>	<b>183,326</b>	<b>192,282</b>	<b>202,029</b>	<b>207,087</b>	<b>208,062</b>	<b>210,457</b>	<b>212,576</b>

## School Enrollment

Fall enrollment data was used to update the 11\_ENRL\_UNIV and 11\_ENRL\_K-12 attribute fields within the TAZ layer. New projections were created and used to populate the 2018 modeling year and all subsequent modeling years out to 2040.

**University Enrollment Updates:** There are five colleges/universities in Genesee County that are identified in the model: University of Michigan – Flint (UM-Flint), Mott Community College, Kettering University, Baker College and Davenport. The location of each was verified in the model to make sure they were correctly located in the correct TAZ. Davenport University was relocated to TAZ 226 on Miller Road from TAZ 359 on Pierson Road. Since 2005, the Detroit College of Business became Davenport University and relocated to Miller Road.

Fall enrollment numbers were obtained from the website, <http://colleges.findthebest.com>, which provided rankings and reviews of the colleges and universities located in Genesee County. One category of data provided was the total number of students enrolled in the fall of 2011. This number was used to update the 2011 modeling year scenario. Enrollment was then projected for 2018, 2025, 2035 and 2040 modeling years. The current model uses an annual growth rate of 15.83 students for university enrollment and this same rate was applied to the most recent enrollment numbers except for the UM–Flint. The annual growth rate was applied to the 2012 enrollment numbers for Baker College and Kettering University and the 2013 enrollment numbers for Mott Community College. Davenport University started from the 2011 enrollment numbers.

Enrollment trend data obtained from the UM-Flint (<http://www-lb.umflint.edu/enrollment-trends>) shows that since 2004, enrollment has increased by 27.7 percent or an average increase of 263 students per year. Because of this increase over the last nine years, the UM-Flint was given an annual growth rate of 53 students per year. This number is derived by subtracting the 2013 enrollment of 8555 students from the UM-Flint capacity of 10,000 students (“University of Michigan-Flint Breaks Enrollment Record”, by Sara Schuch, September 19, 2013, mlive.com) and dividing by 27 (2040-2013=27) to obtain the average annual growth rate. This growth rate is higher than the rate used by the current model which reflects the rapid growth in enrollment for the UM-Flint while keeping the number of students under the 10,000 capacity limit in the 2040 modeling year scenario. See Table 2 for the university enrollment projections.

Table 2: Genesee County 2040 University Enrollment Projections

University/College	2011	2018	2025	2035	2040
UM-Flint	8262	8820	9191	9721	9986
Mott Community College	11760	10219	10330	10488	10567
Kettering University	2079	2142	2254	2419	2491
Baker College	12436	11598	11710	11868	11947
Davenport	2873	2984	3095	3254	3333

**K-12 Enrollment Updates:** According to the 2010 Census, the population of Genesee County has decreased by 2.4% since the 2000 census. Since 2005, the enrollment of K-12 students has decreased by 13.0% (Genesee Intermediate School District (GISD), Student Accounting Report 2011-2012). Because of this decline in population and thus school enrollment, many schools within the County have closed. At the same time several new schools have been added and students consolidated into existing schools.

To identify the locations of new schools and those that have been closed, a list of public and private schools was obtained from the “National Center for Education Statistics: CCD School Data 2011-2012”. These schools were geolocated and assigned a TAZ number. The school enrollment numbers were then aggregated for each TAZ to obtain a total student enrollment number. This enrollment number was then used to populate the 11\_ENRL\_K-12 field in the TAZ Layer. In 2005, there were 143 TAZ with school enrollment data. In 2011, the number of TAZ with enrollment data decreased to 128. Enrollment numbers for these 128 TAZ were then projected for the remaining modeling scenario years.

To project the 2018 enrollment numbers, the GISD 5-Year Enrollment Projections were used. The projected enrollment from 2013 to 2017 was based on 3-year average and birth data. The GISD is projecting a 15.23% decrease from the 2011 actual enrollment of 73,460 students to 62,272 students in 2017. The 2018 enrollment was calculated by decreasing the 2011 enrollment numbers by 15% to reflect the projected decrease in student enrollment. These numbers were used to populate the 18\_ENRL\_K-12 field in the TAZ layer.

The enrollment for 2025, 2035, and 2040 was then projected using the data obtained from the 2040 population projections. The enrollment numbers were projected by using the percent change in persons per households. As the persons per household decreases, the enrollment

slowly decreases between 2018 and 2035. Between 2035 and 2040 the decline in school enrollment levels off.

Table 3: Genesee County 2040 K-12 Enrollment Projections

	2011	2018	2025	2035	2040
Enrollment K-12	75,586	64,249	61,925	61,035	61,038

### External Stations

One trip has two ends, one is origin and the other is destination. The trips with one end in the study area are referred to as External-Internal (EI) or Internal-External (IE) trips while the trips with no ends in the study area are referred to as through or External-External (EE) trips. The end point on the roadway outside the study area or on the roadway where the study area bound line is crossed is referred to as an external station/zone. The Genesee model update requires that the 37 external stations in the TAZ layer be updated to accurately reflect the external-internal and the external-external trips (See Figure 30). Eleven major external stations are on interstate, expressway and principal arterial. Data obtained from the Michigan statewide travel demand model was used to get new external station growth rates and thru trip percentages. These numbers were used to update the auto growth factor and the truck growth factor attribute fields in the TAZ layer for the 2040 Travel Demand model. New auto and truck growth factors were used to populate the 2018 modeling year and all subsequent modeling years out to 2040.

**Methodology:** The TransCAD's subarea analysis in the Michigan statewide travel demand model was used to generate two preliminary external trip tables for Genesee County. One external trip table is for auto vehicle class and the other is for truck. The annual growth rates of auto vehicle and truck trips were calculated using the number of trips in the 2005 and 2035 external trip tables. The annual growth rates were used to calculate the 2040 total external trips and external-external trips. The Michigan statewide model covers a less dense network and thus only twenty-five external stations of the Genesee County model. For the other ten external stations not in the statewide model, the annual growth rates were assumed, and the general assumption is there are no external-external trips of these ten external stations. In other words, the external trips of those ten external stations that are not in the Michigan statewide model network are all EI-IE trips. In addition, this approach can also be used to estimate the external trip tables of any year in between 2005 and 2040.

See Appendix A for a detailed methodology of the creation of the 2005 external station data.

Figure 3: Genesee County External Stations

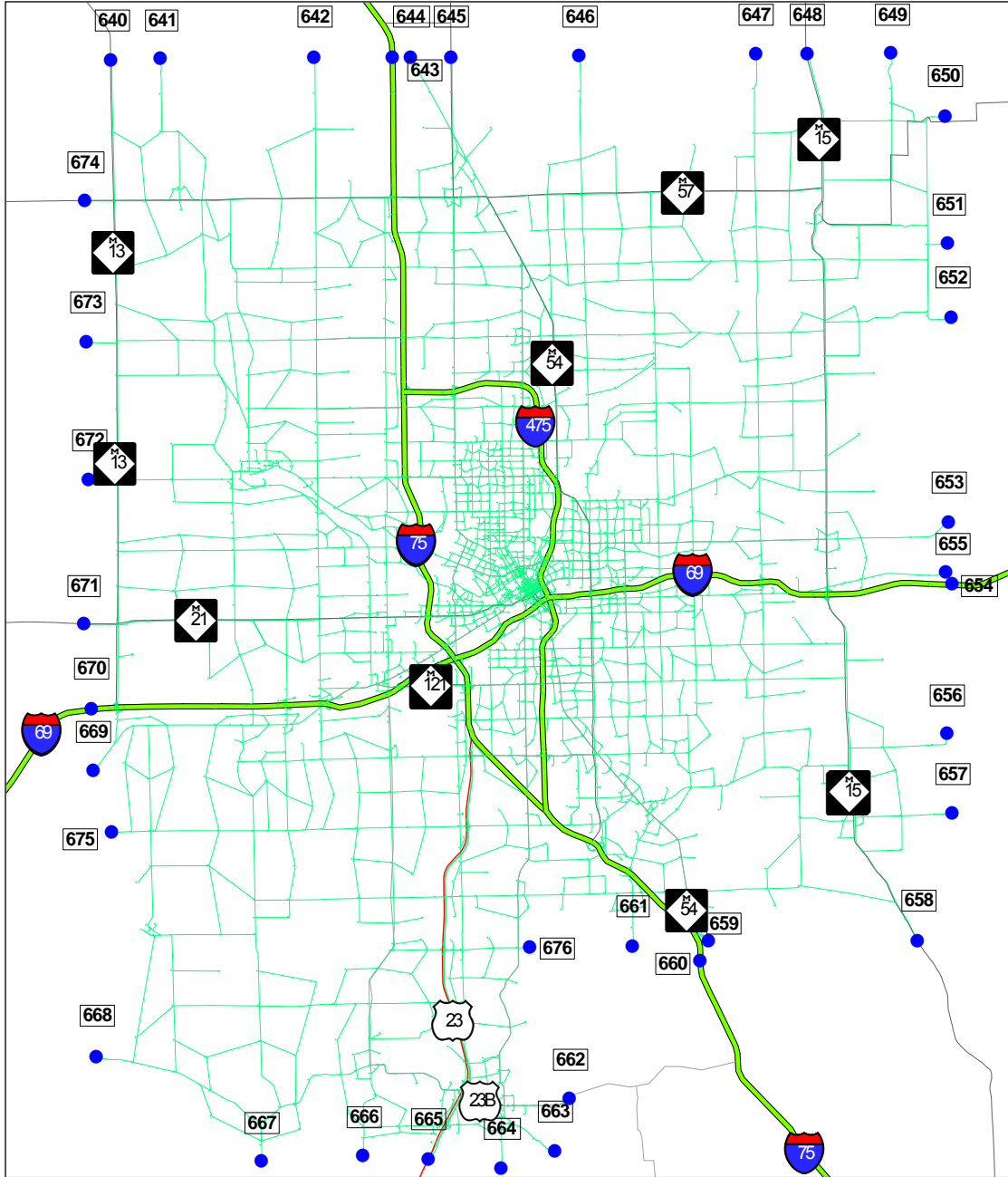


Table 4: Annual Growth Rate of Auto and Truck Trips

NAME	TAZ ID	2018 Volumes & Annual Growth Rate				2025 Volumes & Annual Growth Rate			
		Auto	Truck	Auto GR	Truck GR	Auto	Truck	Auto GR	Truck GR
Sheridan	640	4,562	251	0.000%	-3.883%	4820	282	0.003	-0.022
Nichols Rd	641	617	71	0.330%	0.144%	628	72	0.003	0.001
Elms Rd	642	1,227	154	-3.072%	-3.179%	1247	155	-0.019	-0.020
I-75 (N)	643	58,958	6,657	2.290%	-0.148%	60100	7505	0.016	0.005
Dixie (N)	644	6,597	391	1.601%	1.433%	6735	394	0.012	0.010
Clio Rd	645	2,963	130	-1.492%	-1.119%	3081	143	-0.008	-0.003
Bray	646	1,911	206	-2.132%	-2.123%	1911	207	-0.014	-0.014
Irish Rd	647	915	55	-0.389%	-0.447%	928	55	-0.002	-0.003
State	648	7,159	254	-0.822%	0.251%	7217	285	-0.005	0.008
Henderson Rd	649	914	187	1.485%	1.413%	926	188	0.010	0.010
Lake/Otter Lake	650	2,533	155	0.059%	0.137%	2579	158	0.001	0.002
Columbiaville	651	2,988	184	0.623%	0.752%	3027	191	0.005	0.007
Mount Morris	652	899	54	-5.913%	-5.923%	915	54	-0.038	-0.038
Davison	653	5,159	555	2.599%	2.984%	5185	574	0.017	0.022
Lapeer Rd	654	2,654	164	2.433%	2.673%	2690	170	0.017	0.020
I-69 (E)	655	29,758	4,147	-0.568%	-1.047%	30345	4923	-0.003	0.001
Hill Rd	656	1,798	104	-1.192%	-1.454%	1807	105	-0.008	-0.009
Hegel Rd	657	767	41	-4.182%	-4.210%	777	41	-0.027	-0.027
Ortonville	658	11,881	552	-1.212%	2.049%	11918	619	-0.008	0.021
Dixie (S)	659	13,411	515	0.004%	0.010%	13812	548	0.002	0.003
I-75 (S)	660	43,963	4,303	1.017%	-1.133%	44625	5016	0.007	0.000
N Holly	661	7,089	402	-1.473%	-1.851%	7175	408	-0.009	-0.012
Main St.	662	9,648	624	-1.624%	-1.778%	9932	633	-0.009	-0.011
S Holly Rd	663	4,576	166	-2.223%	-2.548%	4767	168	-0.013	-0.016
Adelaide St	664	2,711	198	-1.109%	-1.708%	2903	204	-0.004	-0.010
US-23	665	50,216	4,101	2.198%	-0.420%	50997	4456	0.015	0.001
Linden	666	4,256	163	-3.404%	-3.438%	4314	164	-0.022	-0.022
Seymour	667	3,069	181	-1.838%	-1.993%	3207	186	-0.010	-0.012
Silver Lake	668	3,131	195	-1.289%	-1.098%	3140	203	-0.008	-0.005
Lansing	669	5,818	356	5.197%	5.355%	5934	368	0.035	0.038
I-69 (W)	670	20,852	5,988	-1.037%	0.999%	20971	7005	-0.006	0.016
M-21	671	6,665	608	-1.708%	2.700%	6738	705	-0.011	0.028
Pierson	672	1,193	72	0.257%	0.195%	1209	72	0.002	0.002
W. Mt. Morris	673	418	26	-6.102%	-6.092%	429	26	-0.039	-0.039
Vienna	674	4,385	459	0.448%	-0.793%	4493	491	0.004	-0.002
Grand Blanc Rd	675	2,661	231	-1.843%	-1.760%	2727	239	-0.011	-0.010
Thompson Rd	676	510	38	-1.658%	-1.822%	525	38	-0.010	-0.012

Table 4: Annual Growth Rate of Auto and Truck Trips (Continued)

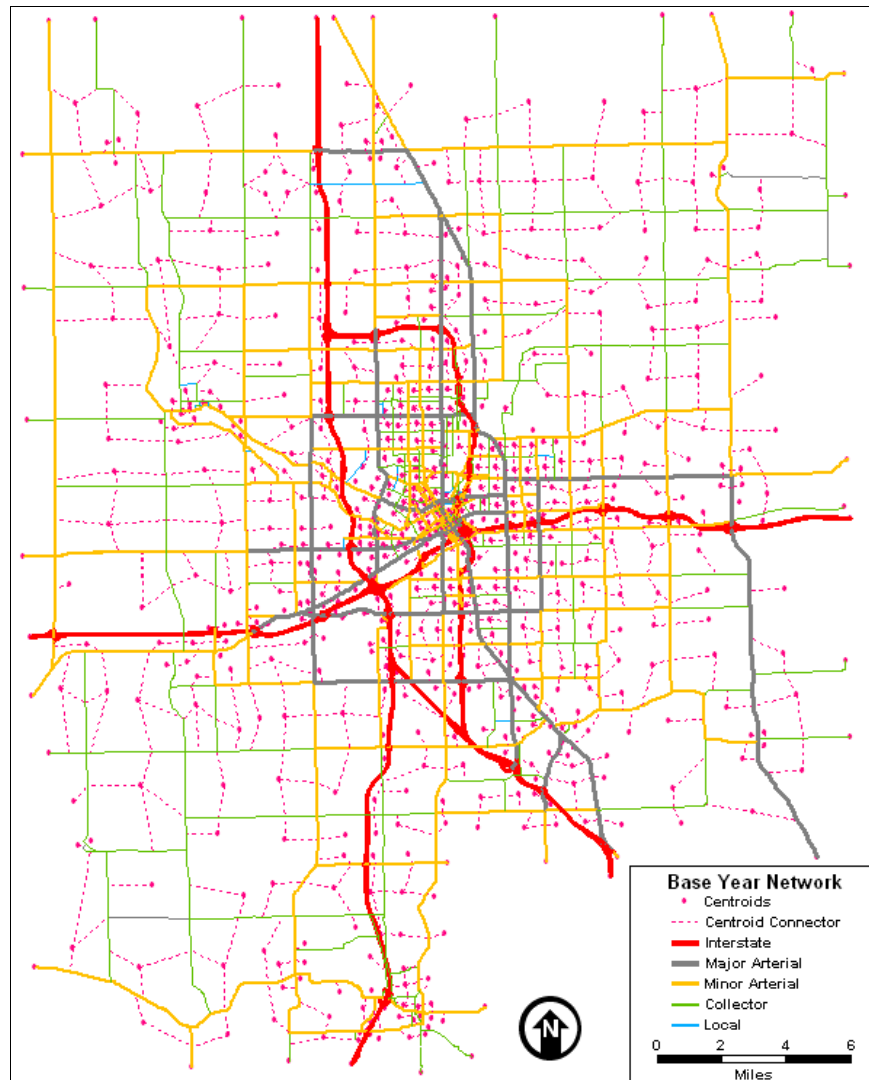
NAME	TAZ ID	2035 Volumes & Annual Growth Rate				2040 Volumes & Annual Growth Rate			
		Auto	Truck	Auto GR	Truck GR	Auto	Truck	Auto GR	Truck GR
Sheridan	640	5311	326	0.547%	-1.184%	5556	349	0.622%	-0.889%
Nichols Rd	641	648	73	0.313%	0.119%	657	73	0.316%	0.117%
Elms Rd	642	1287	156	-1.233%	-1.345%	1306	157	-1.030%	-1.144%
I-75 (N)	643	61825	8717	1.203%	0.947%	62688	9323	1.085%	1.067%
Dixie (N)	644	6940	398	0.903%	0.688%	7043	400	0.828%	0.606%
Clio Rd	645	3307	161	-0.335%	0.202%	3411	170	-0.206%	0.346%
Bray	646	1912	209	-0.923%	-0.879%	1914	210	-0.789%	-0.743%
Irish Rd	647	946	56	-0.063%	-0.141%	955	56	-0.027%	-0.107%
State	648	7277	329	-0.307%	1.118%	7316	350	-0.249%	1.213%
Henderson Rd	649	944	190	0.777%	0.679%	953	191	0.699%	0.598%
Lake/Otter Lake	650	2646	162	0.174%	0.228%	2675	165	0.183%	0.238%
Columbiaville	651	3064	200	0.361%	0.625%	3093	204	0.340%	0.611%
Mount Morris	652	939	55	-2.528%	-2.554%	949	55	-2.159%	-2.186%
Davison	653	5239	601	1.195%	1.671%	5257	614	1.038%	1.528%
Lapeer Rd	654	2743	178	1.201%	1.525%	2769	182	1.067%	1.400%
I-69 (E)	655	30794	6031	-0.138%	0.855%	31085	6585	-0.093%	1.063%
Hill Rd	656	1853	106	-0.430%	-0.585%	1882	106	-0.331%	-0.490%
Hegel Rd	657	792	41	-1.761%	-1.799%	800	42	-1.497%	-1.535%
Ortonville	658	12229	714	-0.443%	2.125%	12390	762	-0.347%	2.134%
Dixie (S)	659	14408	596	0.250%	0.529%	14804	619	0.298%	0.586%
I-75 (S)	660	46630	6034	0.670%	0.653%	47934	6543	0.670%	0.848%
N Holly	661	7508	416	-0.479%	-0.717%	7698	420	-0.349%	-0.593%
Main St.	662	10382	645	-0.504%	-0.685%	10608	651	-0.379%	-0.565%
S Holly Rd	663	5117	171	-0.683%	-1.029%	5293	173	-0.507%	-0.863%
Adelaide St	664	3229	214	0.064%	-0.528%	3401	219	0.210%	-0.399%
US-23	665	52290	4962	1.129%	0.479%	52927	5215	1.015%	0.578%
Linden	666	4398	165	-1.413%	-1.459%	4440	166	-1.195%	-1.242%
Seymour	667	3372	193	-0.545%	-0.701%	3468	196	-0.400%	-0.560%
Silver Lake	668	3128	214	-0.561%	-0.197%	3139	220	-0.473%	-0.099%
Lansing	669	6111	385	2.533%	2.783%	6201	394	2.245%	2.502%
I-69 (W)	670	21091	8458	-0.416%	1.986%	21195	9184	-0.344%	2.094%
M-21	671	6835	844	-0.674%	2.916%	6881	913	-0.562%	2.940%
Pierson	672	1232	73	0.227%	0.142%	1244	73	0.223%	0.136%
W. Mt. Morris	673	443	27	-2.604%	-2.594%	450	28	-2.222%	-2.212%
Vienna	674	4641	536	0.400%	0.157%	4714	559	0.393%	0.261%
Grand Blanc Rd	675	2816	250	-0.651%	-0.552%	2861	256	-0.522%	-0.421%
Thompson Rd	676	548	39	-0.526%	-0.746%	559	39	-0.402%	-0.629%



## Road Network and Node Updates

In the roadway network, links and nodes are used to represent roadway segments. The base year of the Genesee County Model contains approximately 4239 links, 2898 nodes and 1413 centroid connectors. Figure 4 shows the Genesee County roadway segments. These links contain the geographic and functional data associated with each roadway link. The road network was updated with road projects completed since 2005 and any projects committed in the 2014 - 2017 Genesee County Transportation Improvement Plan (TIP). The node layer also contains data associated with each node. The node layer was updated with new traffic signal attribute data. A new 2040 scenario was added to the master network for the roadway links and the nodes.

Figure 4: Genesee County Roadway Segments and Centroids



## Road Network

Data for the road network changes was obtained by reviewing the 2011-2014 Transportation Improvement Program (TIP), 2014-17 TIP and by requesting data from the Michigan Department of Transportation (MDOT), the Genesee County Road Commission and local units of government. This data was used to update the street attributes of the Genesee County model network. Attribute data for the following fields for each of the affected modeling scenarios was updated: Num-Lanes\_xx, Thru\_lanes\_xx, Trfc\_Op\_CD\_xx, and Dir\_xx. Break-Scenario\_40 and Net\_40 were also added along with all of the corresponding attribute data for the 2040 modeling year.

Any projects that change capacity were added to a table to be updated in the model. An example of a capacity change would be a “road diet” which is a reconfiguration or restriping which reduces the number of traffic lanes on a roadway, typically from four lanes down to three. In the model, the network would be coded with a three in the number of lanes with two in the thru lanes. Also projects that increase capacity by adding additional lanes were identified.

Projects which changed the direction of travel, i.e. one-way to two-way were also included. The “Flint Downtown Traffic and Parking Study” recommended several roadway and network improvements which included converting several downtown streets from one-way to two way streets and changed the number of lanes on several other roads in the downtown Flint area. These changes occurred in 2010 and were updated in the 2011 model scenario year.

Lastly, any project which increased capacity by adding new roads or reconfiguring existing roads was added. An example would be the Dort Highway extension which is modeled in the 2018 scenario year. New road segments were added along with all the corresponding attribute data from 2018 through the 2040 model years. See Appendix A for a complete description of all road network attributes. An example of a reconfiguration would be the Fox street realignment or the Bristol Rd at I75 roundabout which are both modeled in the 2018 scenario. See Table 5 for a complete list of the road network changes from 2005 thru 2017.

Table 5: Road Network Changes 2005 to 2017

Location	Model Year	Termini	Lanes	Direction
Beach St	2011	I-69 to 4th	4	1 way
Beach St	2011	4th to Kearsley	2	1 way
Church St	2011	W. Fifth to Kearsley	3	1 way
1st St	2011	SB Ceasar Chaves to Grand Traverse	3 total 2 thru	2 way
Grand Traverse	2011	Kearsley to 9th	3 total 2 thru	2 way
Harrison	2011	2nd to 4th	3	1 way
Harrison	2011	4th to 5th	2	1 way
Kearsley/Glenwood	2011	Harrison to Chevrolet	3 total 2 thru	2 way
M21/Court/5th	2011	Ann Arbor to NB Chavez	4	1 way
Saginaw	2011	4th to Union	3 total 2 thru	2 way
Saginaw	2011	7th to 4th	4	2 way
2nd St	2011	Grand Traverse to NB Cesar Chavez	3 total 2 thru	2 way
Stevens	2011	5th to 4th St	4 total	2 way
Stevens	2011	4th to 1st	3 total 2 thru	2 way
3rd St	2011	NB Chavez to Grand Traverse	3 total 2 thru	2 way
4th St	2011	Beach to Saginaw	3 total 2 thru	2 way
Grand Blanc Rd	2011	W. City Limits to Saginaw	3 total 2 thru	2 way
Chevrolet	2011	University Ave to Glenwood	3 total 2 thru	2 way
Linden Rd	2011	Maple Ave to Bristol	4 to 5	2 way
Hill Rd	2011	Center to Genesee	2 to 3	2 way
Baldwin	2011	Widen bridge to Holly Rd	2 to 5	2 way
Morrish	2011	I-69 overpass to Bristol	3 total 2 thru	2 way
Morrish	2011	Maple Ave to Miller	3 total 2 thru	2 way
Morrish	2011	Miller to I69	3 total 2 thru	2 way
Corunna	2011	Court to Ballenger	3 total 2 thru	2 way
5th Ave	2011	James P. Cole to Saginaw	5 total 4 thru	2 way
5th Ave	2011	MLK to Saginaw	4 total 4 thru	2 way
5th Ave	2011	Prospect to MLK	3 total 2 thru	2 way

Table 5: Road Network Changes 2005 to 2017 (Continued)

Location	Model Year	Termini	Lanes	Direction
Carpenter	2011	Clio to Fleming - resurface	4 total	2 way
Elms	2011	Potter to Flushing	3 total 2 thru	2 way
Carpenter	2011	Fleming to Dupont - resurface	5 total 4 thru	2 way
M15	2011	Mill Point to S. Hegel Mill & HMA overlay	3 total 2 thru	2 way
Carpenter	2018	Dupont to Saginaw	3 total 2 thru	2 way
Irish	2018	Irish @ Potter add center left turn lane	3 total 2 thru	2 way
Flushing	2018	Mill to Eldorado	3 total 2 thru	2 way
Davison (E. Flint)	2018	M15 to E. City Limits resurface	3 total 2 thru	2 way
Fox St	2018	Realignment Court to Glenwood	3 total 2 thru	2 way
Fenton Rd	2018	N Fenton City Limits to Butcher	2 to 3	2 way
Dort	2018	I75 @ M54 interchange new route	4 total	2 way
I75	2018	I75 @ Holly loop ramp to NB I75		1 way
I75	2018	Bristol @ I75 NB roundabout		2 way
M15	2018	Davison Rd to N. City Limit - add left turn lane	5 total 4 thru	2 way
M15	2018	Colonial to Potter - center left turn lane	3 total 2 thru	2 way

## Traffic Signals

Traffic signal data was obtained from the Genesee County Road Commission and the City of Flint. This data was used to update the node attributes of the Genesee County model network. Attribute data for the following fields were updated: Traffic Signal, At\_Grd\_int, Signal TSID, Signal Type, Signal Cycle, Signal Timing, Intersection, Road\_1, and Road\_2. Break-Scenario\_40 and Traffic Signal\_40 were also added.

The new signal data was compared to the 2005 node network to identify any changes. A total of 61 changes were made to the node layer. There were five nodes changed from flashers to signals while two were changed from signals to flashers. There were three signals removed and 44 signals were added. There were six signals relocated due to being incorrectly located in the 2005 base year. Table 6 identifies the changes made to the signals in the node layer.

Table 6: Signal Changes Made in the Node Network

Signal ID	Road 1	Road 2	Type	Change	Ownership
T369	M-15 STATE	GREEN	FL	Added to 2018 - 2040	State
T719	M-15 STATE	HEGEL ( ERIE )	EPAC	Added to 2018 - 2040	State
T808	M-21 CORUNNA	TA MANSOUR	EPAC	Added to 2011 - 2040	State
T884	US-23 SB	SILVERLAKE	EPAC	Added to 2018 - 2040	State
T880	US-23 NB	THOMPSON	EPAC	Added to 2018 - 2040	State
T729	US-23 SB	THOMPSON	EPAC	Flasher to Signal	State
T879	M-54 SAGINAW	WILSON	FL	Added to 2018 - 2040	State
T881	M-57 VIENNA	BELSAY	FL	Added to 2018 - 2040	State
T876	M-57 VIENNA	LINDEN	EPAC	Added to 2011 - 2040	State
T736	I-69 EB	MORRISH	EPAC	Changed to Flasher	State
T886	I-69 WB	MORRISH	EPAC	Added to 2018 - 2040	State
	I-75 SB	MT. MORRIS	EPAC	Added to 2011 - 2040	State
T331	BELSAY	MAPLE (E. LEG)	FL	Added to 2011 - 2040	Burton
T259	CENTER	COURTLAND MALL	EPAC	Relocated in model	Burton
T030	MILL	SMITH	EPAC	Added to 2018 - 2040	Clio
T056	OWEN	SILVRKPRKWY	EPAC	Relocated in Model	Fenton
T883	OWEN	TARGET	EPAC	Added to 2011 - 2040	Fenton
T077	SHIAWASEE	ROUNDS	EPAC	Added to 2018 - 2040	Fenton
T882	SILVERLAKE	POPLAR	EPAC	Added to 2018 - 2040	Fenton
T057	SILVRPRKWY	SILVRLKE VILL.	EPIC	Relocated in Model	Fenton
T055	TORREY	S LONG LAKE	EPAC	Flasher to Signal	Fenton
T063	SAGINAW	BELLA VISTA	ECONO	Relocated	Grand Blanc
T018	SAGINAW	HOLLY	ECONO	Relocated	Grand Blanc
T069	SAGINAW	REID	ECONO	Added to 2011 - 2040	Grand Blanc
T025	MILLER	FAIRCHILD	EPAC	Added to 2018 - 2040	Swartz Creek
T039	MILLER	WINSTON	FL	changed to T025	Swartz Creek
T292	MILLER	CARRIAGE PLAZA	EF-140	Removed 2018 -2040	Swartz Creek
	COURT ST	FOX/MILLER	EPAC	Added to 2011 - 2040	City of Flint
	PIERSON	LONGFELLOW		Removed 2018 -2040	City of Flint
T126	BEECHER	CALKINS	EPAC	Added to 2011 - 2040	County
T349	BEECHER	MORRISH	FL	Added to 2011 - 2040	County
T360	BRISTOL	BISHOP EAST	EPAC	Added to 2011 - 2040	County
T359	BRISTOL	BISHOP MAIN	MARC	Added to 2011 - 2040	County
T358	BRISTOL	BISHOP WEST	EPAC	Added to 2011 - 2040	County
T114	CENTER	RICHFIELD	EPAC	Flasher to Signal 2011-40	County
T222	CLIO	CLIO COURT		Removed 2011 - 2040	County
T111	COLDWATER	HORTON	FL	Signal to Flasher 2011 - 40	County
T356	DAVISON	GALE	EPAC	Added to 2011 - 2040	County
T346	ELMS	HILL	FL	Added to 2011 - 2040	County
T339	HOLLY	COOK (EAST LEG)	EPAC	Added to 2011 - 2040	County

Table 6: Signal Changes Made in the Node Network (Continued)

Signal ID	Road 1	Road 2	Type	Change	Ownership
T297	HOLLY	COOK (WEST LEG)	EPAC	Flasher to Signal 2011-40	County
T340	HOLLY	McCANDLISH	EPAC	Added to 2011 - 2040	County
T354	LAHRING	TORREY	FL	Added to 2011 - 2040	County
T303	LAPEER	VASSAR	EPAC	Flasher to Signal 2011-40	County
T353	LENNON	MORRISH	FL	Added to 2011 - 2040	County
T357	LENNON	SEYMOUR	FL	Added to 2011 - 2040	County
T336	LEWIS	WILSON	FL	Added to 2011 - 2040	County
T372	LINDEN	MENARDS	FL	Added to 2011 - 2040	County
T352	LINDEN	THOMPSON	FL	Added to 2011 - 2040	County
T327	LINDEN H.S.	SILVERLKE RD.	EPAC	Relocated	County
T302	MILLER	SEYMOUR	EPIC	Added to 2011 - 2040	County
T370	MT MORRIS	JENNINGS	FL	Added to 2011 - 2040	County
T342	PERRY	BELSAY	EPAC	Added to 2011 - 2040	County
T341	PERRY	GENESEEE	EPAC	Added to 2011 - 2040	County
T355	PERRY	PERRY M SCHOOL	EPAC	Added to 2011 - 2040	County
T350	SAGINAW	HERITAGE PARK	EPAC	Added to 2011 - 2040	County
T335	SAGINAW	McCANDLISH	EPAC	Added to 2011 - 2040	County
T362	SEYMOUR	BALDWIN	FL	Added to 2011 - 2040	County
T207	STANLEY	CURVE,W OF GEN.	FL	Added to 2011 - 2040	County
T366	TUSCOLA	LAKE	FL	Added to 2011 - 2040	County
T363	WILSON RD	HENDERSON	FL	Added to 2011 - 2040	County

## **Transit Network Updates**

The transit network section documents the updates made to the transit route system in the model. The Flint MTA operates 14 distinct routes during a typical weekday (See Figure 5). Route service information collected from the Flint MTA in January of 2014 was used to update the transit route system and the bus stop table in the model. The transit route system uses a master network, which keeps all future network scenarios in one file, thus a new 2040 network scenario with all of the associated attribute information was added to the transit routes as well as the bus stop tables.

A review of the 2014 transit routes revealed that no new routes needed to be created and none of the existing routes were eliminated. Since the bus routes were changed in 2014 the 2005 and 2011 scenarios were left unchanged. However, some routes were realigned to match the slight changes in the transit routes in the 2018, 2025, 2035 and 2040 scenarios (See Figure 6). Some changes of note include the addition of a roundabout in 2018 on Bristol road which required realignment thru the roundabout on the Fenton Road routes. Several minor changes were identified in the downtown area that realigned the approach to the MTA downtown service center. Table 7 details the changes made to the

routes. Figure 6 shows the results of the route realignments in TransCAD for the 2018 thru 2040 modeling scenarios. See Appendix A for a complete description of the development of the transit network.

Figure 5: Mass Transportation Authority Primary Bus Routes

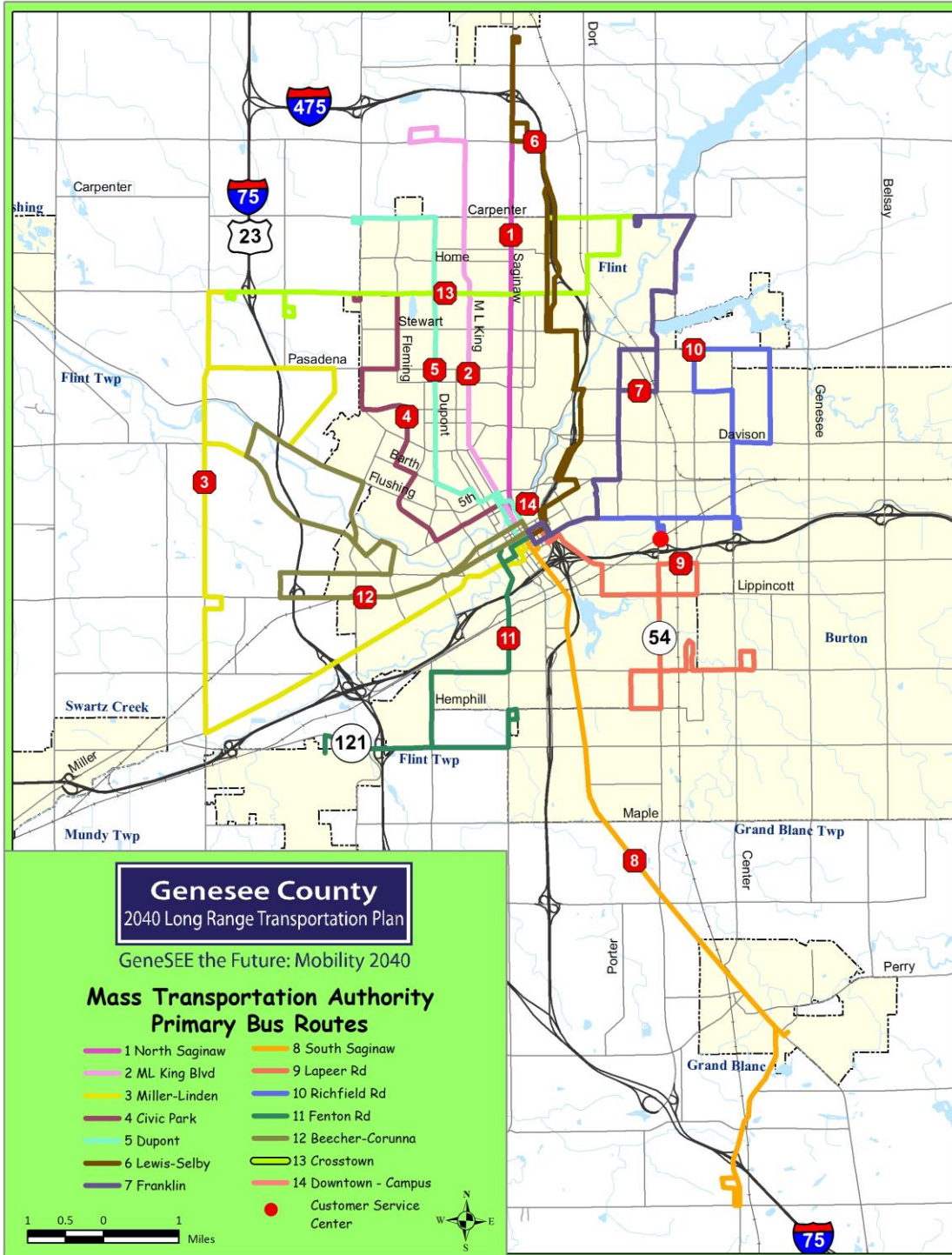
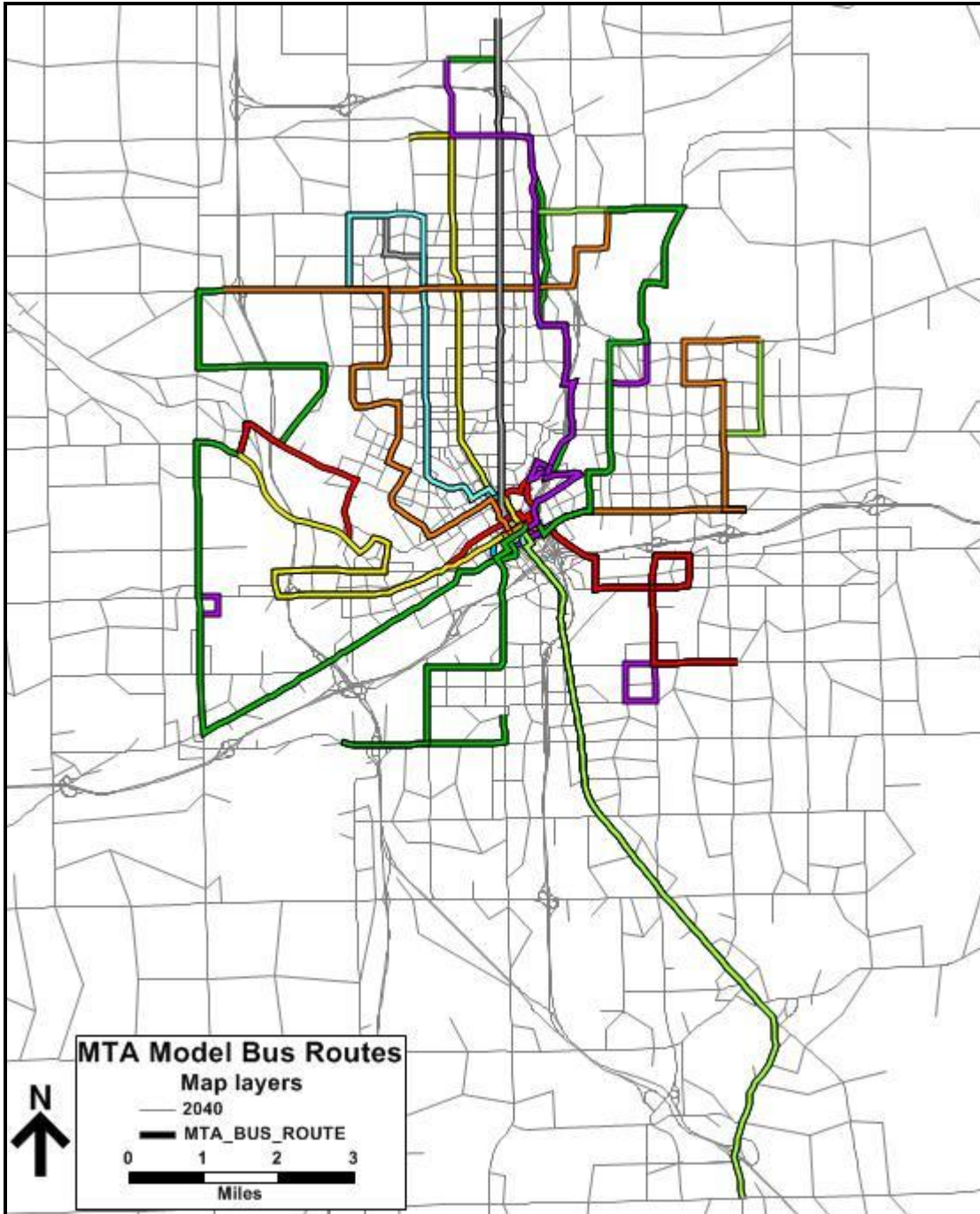


Table 7: MTA Fixed Route System Changes

Name	Route ID	Route Dir	Route Description	Change
1NB	50	Outbound	North Saginaw	No Change
1SB	51	Inbound	North Saginaw	Beach to 3rd to Church to 2nd
2NB	52	Outbound	ML King Avenue	No Change
2SB	53	Inbound	ML King Avenue	Beach to 3rd to Church to 2nd
3NB	58	Outbound	Miller-Linden	2nd to Wahlenberg to Court, adjust stops
3SB	59	Inbound	Miller-Linden	No Change
4NB	63	Outbound	Civic Park	No Change
4SB	64	Inbound	Civic Park	3rd to Beach, removed stops on Mason and 2nd Ave
5NB	55	Outbound	Dupont	Clio to Hallwood Plaza, remove stops on Stedron and Cloverlawn
5SB	54	Inbound	Dupont	Beach to 3rd to Church to 2nd
6NB	47	Outbound	Lewis-Selby	No Change
6SB	48	Inbound	Lewis-Selby	Chavez to Robert T. Longway to Kearsley to Chavez, added stops along new route
7NB	73	Outbound	Franklin	No Change
7SB	72	Inbound	Franklin	No Change
8LNB	69	Inbound	South Saginaw	No Change
8LSB	68	Outbound	South Saginaw	No Change
8SNB	67	Inbound	South Saginaw	No Change
8SSB	66	Outbound	South Saginaw	No Change
9LNB	16	Inbound	Lapeer Road	No Change
9NB	49	Inbound	Lapeer Road	No Change
9SB	15	Outbound	Lapeer Road	2nd to Cesar Chavez to 5th, remove stops on Stevens add on Cesar Chavez
10NB	71	Outbound	Richfield Road	No Change
10SB	70	Inbound	Richfield Road	No Change
11NB	62	Inbound	Fenton Road	Delete Bristol to Airport remove stops on segment, Realign thru roundabout on Bristol
11SB	61	Outbound	Fenton Road	Realign thru roundabout on Bristol
12EB	65	Inbound	Beecher-Corunna	No Change
12WB	60	Outbound	Beecher-Corunna	Kearsley to Church to 3rd St, adjust stops
13EB	57	Inbound	Crosstown North	No Change
13WB	56	Outbound	Crosstown North	No Change
14	74	Loop	Downtown-Campus	Chavez to 1st to Stevens



Figure 6: 2018 - 2040 Model Representation of Flint MTA Bus Routes



## Appendices

### **Appendix A**

2005 Model Calibration Report

### **Appendix B**

2005 Base Year Population Data 2040 Population Projections Methodology Report

### **Appendix C**

2005 Base Year Employment Data 2040 Employment Projections Methodology Report

## **Appendix A: 2005 Model Calibration Report**

# **GENESEE COUNTY URBAN TRAVEL DEMAND MODEL IMPROVMENTS**

## **Model Development and Validation Report**

Prepared for the  
**Genesee County Metropolitan Planning Commission**

January 2009  
Revised March 2009

Prepared by  
**Bernardin, Lochmueller & Associates**

**TABLE OF CONTENTS**

I. OVERVIEW ..... 1

II. MODEL AREA ..... 5

III. TAZ DEVELOPMENT ..... 6

IV. NETWORK UPDATE AND TRANSIT ROUTE DEVELOPMENT ..... 7

V. FREE-FLOW SPEED AND CAPACITY ESTIMATION ..... 11

VI. DELAYS ON INTERRUPTED FACILITIES ..... 18

VII. GENESEE TRAVEL MODEL COMPONENTS ..... 19

    A. EXTERNAL MODELS ..... 20

    B. TRIP GENERATION MODEL ..... 34

    C. TRIP DISTRIBUTION MODEL ..... 49

    D. MODE CHOICE MODEL ..... 54

    E. TIME-OF-DAY MODEL ..... 56

    F. TRUCK MODEL ..... 60

    G. VEHICLE TRIP ASSIGNMENT AND FEEDBACK LOOP ..... 63

    H. TRANSIT TRIP ASSIGNMENT ..... 67

    I. CALIBRATION/VALIDATION ..... 70

VIII. GENESEE MODEL POST-PROCESSORS ..... 75

    A. POST\_ALT ..... 75

## **I. OVERVIEW**

This report presents model development procedures used to develop the Genesee County Travel Demand Model. The Genesee County model utilizes a GIS-based travel demand modeling software, TransCAD. Using TransCAD's GIS techniques, the model incorporates extensive geographic and traffic operational databases into the highway network and the traffic analysis zone (TAZ) GIS layer for use in the modeling process. Peak-period modeling capabilities are also embedded in this model through time-of-day (TOD) models. The "MI Travel Counts" household survey together with the 2007 transit on-board survey was fully analyzed to derive key modeling components such as trip generation rates, trip length frequency distributions, mode shares, time-of-day distributions and vehicle occupancy rates.

The Genesee County model is structured to implement "four-step" processes with travel time feedback loop. Four steps are trip generation, trip distribution, mode choice and trip assignment. Based on this structure, the model runs four steps assignment initially, and then "feedback" the congested travel time from assignments back to trip distribution and starts subsequent model runs. With the feedback routine, trips are distributed and assigned on the network in a more effective and realistic manner since trip destination and route choices are determined based on congested network condition. In addition, the transit trip assignment is based on the congested travel time from the last iteration of model runs.

Major features of the Genesee TransCAD model are summarized as follows:

- **Study Area.** The model fully covers Genesee County. Trips external to this study area (i.e., external-internal or external-external trips) are captured by 37 external stations.
- **TAZ Development.** TAZs were appropriately defined throughout the study area to be bounded by the modeled roadway network with a minimum of network passing through any zone. Each TAZ is filled by demographics and employment attributes not only for the 2005 base year but also for the future years.
- **Network Update and Transit Route Development.** The Genesee County highway network was updated with more roadway data sources and the current traffic count data. The network includes extensive geometric and operational link attributes. Traffic signals were also coded in the network to estimate delays associated with this control device. Consistent with the new TAZs, network details with proper centroid connectors were appropriately added throughout the study area. The transit route component has been developed concurrently with the development of the roadway network and traffic analysis zones (TAZ), so that any special considerations needed for transit modeling are accommodated in the design of the new TAZ structure and/or road network. The development is done for all fixed bus service routes.
- **Improved Estimation of Free-Flow Speeds and Link Capacity.** Instead of using posted speed limits as a surrogate for free-flow speeds, free-flow speeds were estimated based on a tool developed by Bernardin Lochmuller and Associates. The new tool was developed from GPS and other speed surveys conducted in the Genesee County and other areas. Based on the speed surveys, the relationship between free-flow speeds and several determining factors such as posted speed, access control and area type was identified for each facility type. This relationship was expressed in various forms of nonlinear regression models. Geometric and operational link data were utilized for improved estimation of link capacities. It calculates the speed and capacities based on the concepts presented in the HCM2000. This methodology derives various capacity adjustment factors from a series of bi-factor nonlinear regression

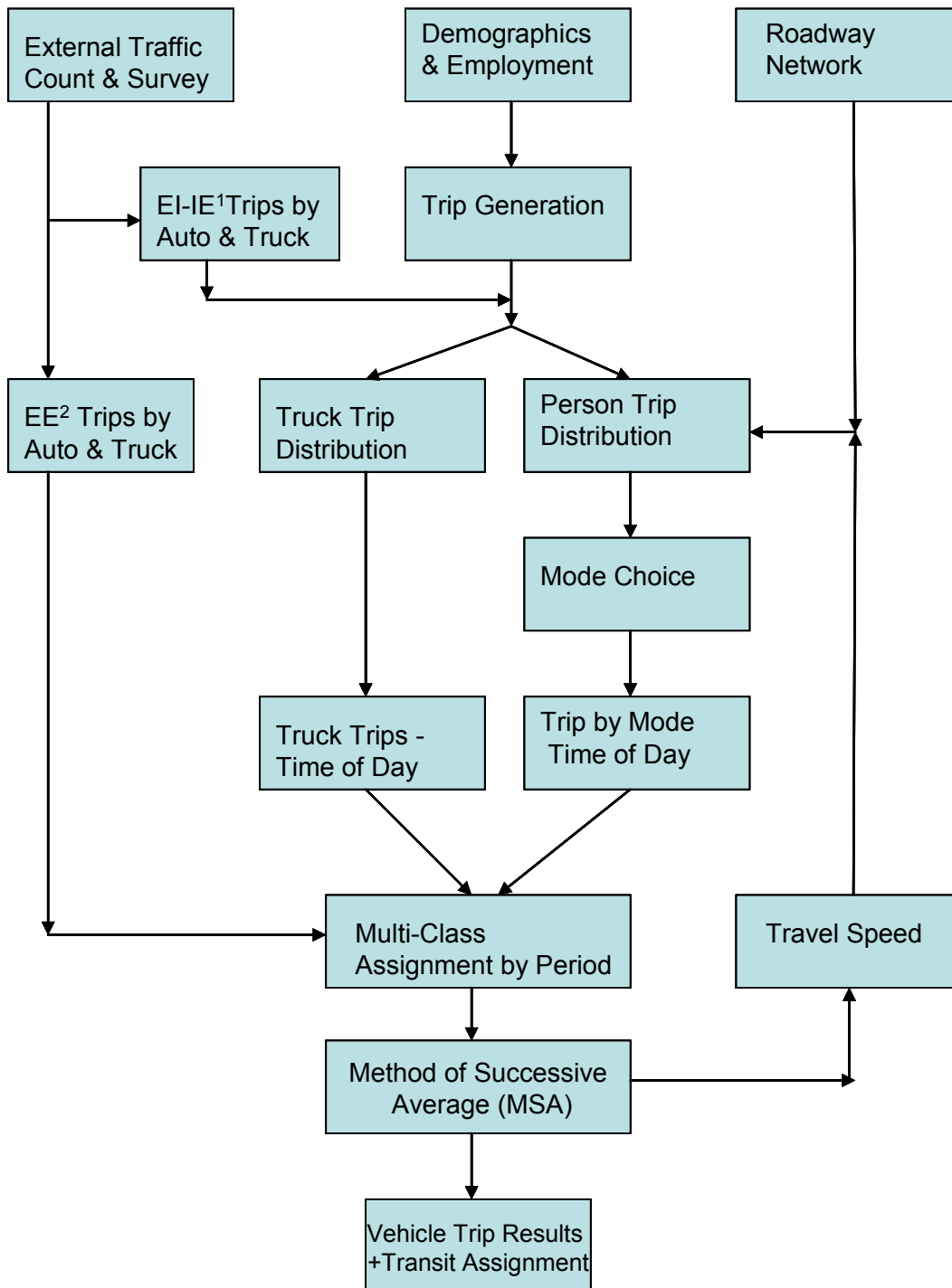
formulas. The estimated peak-hour capacities were then converted to peak and off-peak period capacities.

- **Intersection Delays.** Delays associated with traffic signals were estimated to adjust directional link free-flow speeds and capacities. The HCM 2000 method of calculating vehicle delay that takes into consideration green time and progression effect was adopted.
- **External Trip Estimation.** TransCAD's subarea analysis method was used in the Michigan statewide travel demand model to generate preliminary auto vehicle and truck external trip tables for Genesee County. Then these external trip tables of 2005 were adjusted to match the base year traffic counts at all external stations, and the 2005 adjustment amounts were applied to the 2030 preliminary tables to form the final 2030 external trip tables. The annual growth rates of auto and truck external trips were calculated using the number of trips in the 2005 and 2030 external trip tables. Finally the 2035 external trips were obtained by applying these growth rates to the 2005 external trips.
- **Trip Generation Model.** Simply speaking, travel demand modeling is the process of translating different types of trips into vehicular traffic on the network. Trip production and attraction models were developed for each of these trip purposes through various statistical analyses using trip data from the *MI Travel Counts Household Travel Survey data*.
- **Trip Distribution Model.** During the development of the Genesee County model, unique friction factor tables were calibrated to survey data for each of the trip purposes, including truck trips.
- **Mode Choice Model.** The Genesee County model takes account of auto, transit, bike and pedestrian. This mode choice model has the factors for daily only and are derived from the *Travel Counts Household Travel Survey data and the bus on-board survey*.
- **Time-of-Day Models.** The Genesee County model consists of four time-of-day (TOD) models: morning peak, midday, evening peak and night. Most modeling factors that are unique to each time period were derived from the *MI Travel Counts Household Travel Survey data*. Compared to a single daily model, the TOD modeling generates a more accurate travel model by treating each period uniquely.
- **Truck Model.** Travel patterns of trucks are different from those of passenger cars, thus it is desirable to have a separate truck mode in the model. In each of the four step processes, the Genesee County model maintains a separate truck model to address the unique travel characteristics of trucks. Truck trips are separately generated and distributed. Then, they are assigned to the network for each TOD simultaneously with the corresponding passenger car assignments.
- **Vehicle Trip Assignment and Feedback Loop.** Link free-flow speeds derive the first phase of the model run, or initial assignment. It is used for network skimming, trip distribution and route choice. Following the first phase, link congested-speeds are estimated and used to redistribute trips in subsequent model runs, or feedback assignments. The final assignment results are obtained from the feedback assignment.
- **Transit Trip Assignment.** The link congested-speeds and travel time are used to assign the transit passengers onto the transit routes. The assignment rule is to find the shortest path of the general cost for passengers. The general cost is a combination of travel time, cost and other factors.

- **Post-processors.** The Genesee County model is equipped with several post-processors. These post-processors report (1) calibration statistics through a program “CAL\_REP”, (2) a variety of performance measures of the model through a program “POST\_ALT”. These post-processors are embedded in the model user interface.
- **User-friendly Travel Model Geographic User Interface (GUI).** Using TransCAD’s programming capability, GISDK script a user friendly model interface was designed to run the model by automating the entire modeling and post-processing procedures. The first part of the interface elicits from the user all necessary inputs to the model, including the highway network, the TAZ database and the location of model component files. The second part is the selection of type of model runs. The remaining part is post-processing. Detailed descriptions of the model GUI are provided in the *Model Users Guide*.

The first part of this report is devoted to describing the model coverage area and the model input GIS databases. Then, the new speed and capacity estimation procedures are explained in detail. Modeling components of the Genesee County model are described with associated tables and figures. Later, model validation results are presented with key performance measures such as loading error, VMT error, and percent root mean square error. Post-processors developed for the model are also described.





Note <sup>1</sup> EI-IE: External-to-Internal/Internal-to-External

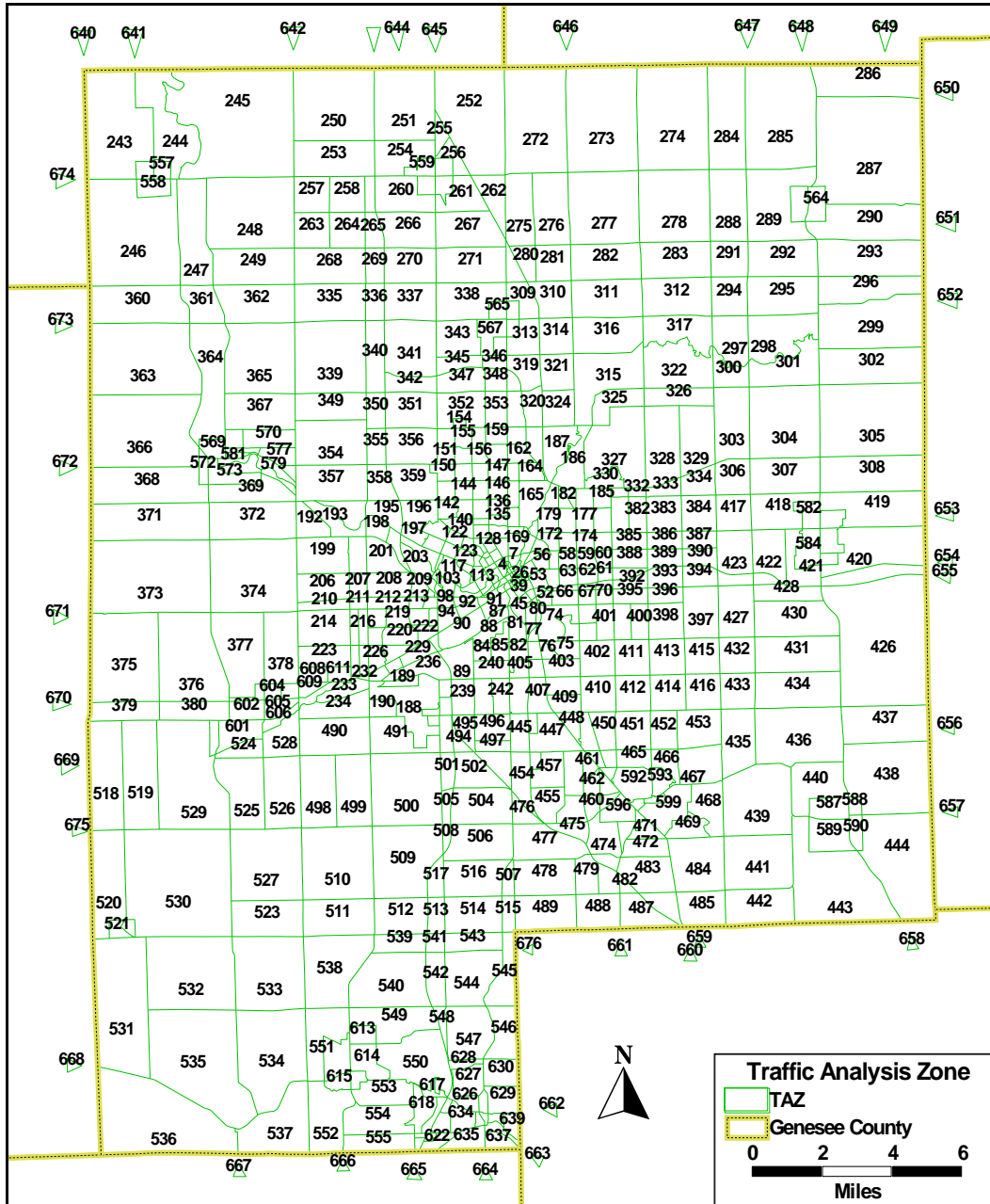
<sup>2</sup> EE: External-to-External

**Figure 1. Flow Chart of Model Process**



**III. TAZ DEVELOPMENT**

The study area of the Genesee county model was disaggregated into 639 traffic analysis zones (Shown in Figure 3). There are 37 external zones and the TAZ layer consists of a total of 676 zones. The internal-zone attributes include land area, county name/number, TAZ number and detailed categorization of population, households, vehicle ownership, mean household income, school enrollment, university enrollment and employment by economic sector. These demographic and employment features are the inputs for trip generation. The TAZ layer contains the multi-year attribute data, including the data not only for the 2005 base year but also for the future years. For details about TAZ attributes, refer to the *Model Users Guide*.



**Figure 3. Genesee County TAZ**

### **IV. NETWORK UPDATE AND TRANSIT ROUTE DEVELOPMENT**

#### **Network Update**

A substantial effort was undertaken on the Genesee county model network to update a TransCAD-based network that included all necessary highways (freeway, arterials, and collectors) to be analyzed along with the highway attributes. There are 4,330 links serving the 676 zones in the Genesee County travel model. Over 1,413 centroid connectors are used to link the centroids to the greater network. There are thirty-seven external stations in the network. **Figure 4** shows the final Genesee County Travel Model network.

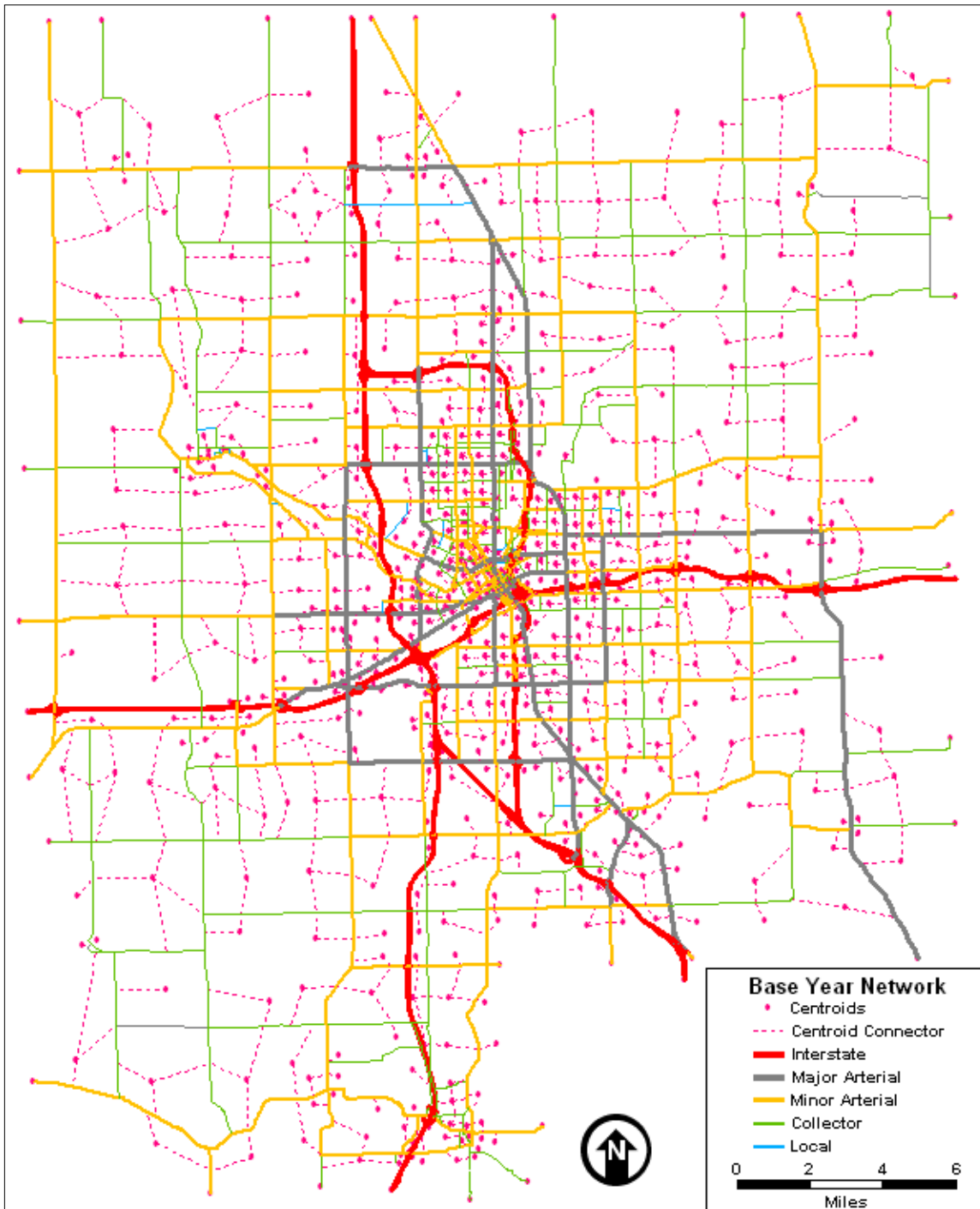
The updated Genesee model network, developed using TransCAD software, includes the following fundamental elements of travel model networks:

- Nodes are elements that describe the position of intersections, junctions or switches in roadway or railway networks. Centroids are nodes that lie at the center of a Traffic Analysis Zone (TAZ).
- Signalized intersections are marked in the network for the accurate estimation of link speed and capacity.
- Links are network model elements that connect the nodes and have attributes including direction, speed, capacity, functional classification, and observed traffic. They represent the street grid.
- Centroid connectors link the zones to the network. They represent the distance to be covered between a zone's center of gravity and the highway nodes or transit stops in the region.
- 2005 base year traffic count data is inputted by using the data resource from MDOT, MPO and cities.

The following rules were used in the network update:

- The Michigan Geographic Framework Version 6C was used to edit or confirm the location of roads with respect to cities, villages, townships and the roadway system itself. Transit service lines were respected so that a transit network could be built on the highway network.
- Centroid connectors were given a thorough review using Genesee County digital aerials. The roadway network was used to align connectors where feasible. Each centroid ID was coded onto the centroid connectors so that it could be referenced by the travel model if needed. Wherever logical access points exist, a centroid connector was added.
- External stations were given a thorough review by Genesee County. As a result of this analysis, a small set of very low traffic external points was removed. The TAZ, connector and network were edited to reflect this change.
- Geometry and grade separation were reviewed on major roads and interchanges.
- A list of network validation tests was established and begun. These include the testing of the network with an artificial "matrix of ones" that shows which segments and connectors have zero volumes.

The incorporation of geometric and operational data was one of the major improvements made in the Genesee County model. These detailed data on the roadway characteristics provided valuable information for estimating various inputs (such as capacities and speeds) to the subsequent modeling processes. Tables of the link attributes can be found in the *Model Users Guide*.



**Figure 4. Genesee County Highway Network**

### **Transit Route System**

The transit network component has been developed concurrently with the development of the roadway network and traffic analysis zones (TAZ), so that any special considerations needed for transit modeling are accommodated in the design of the new TAZ structure and/or road network.

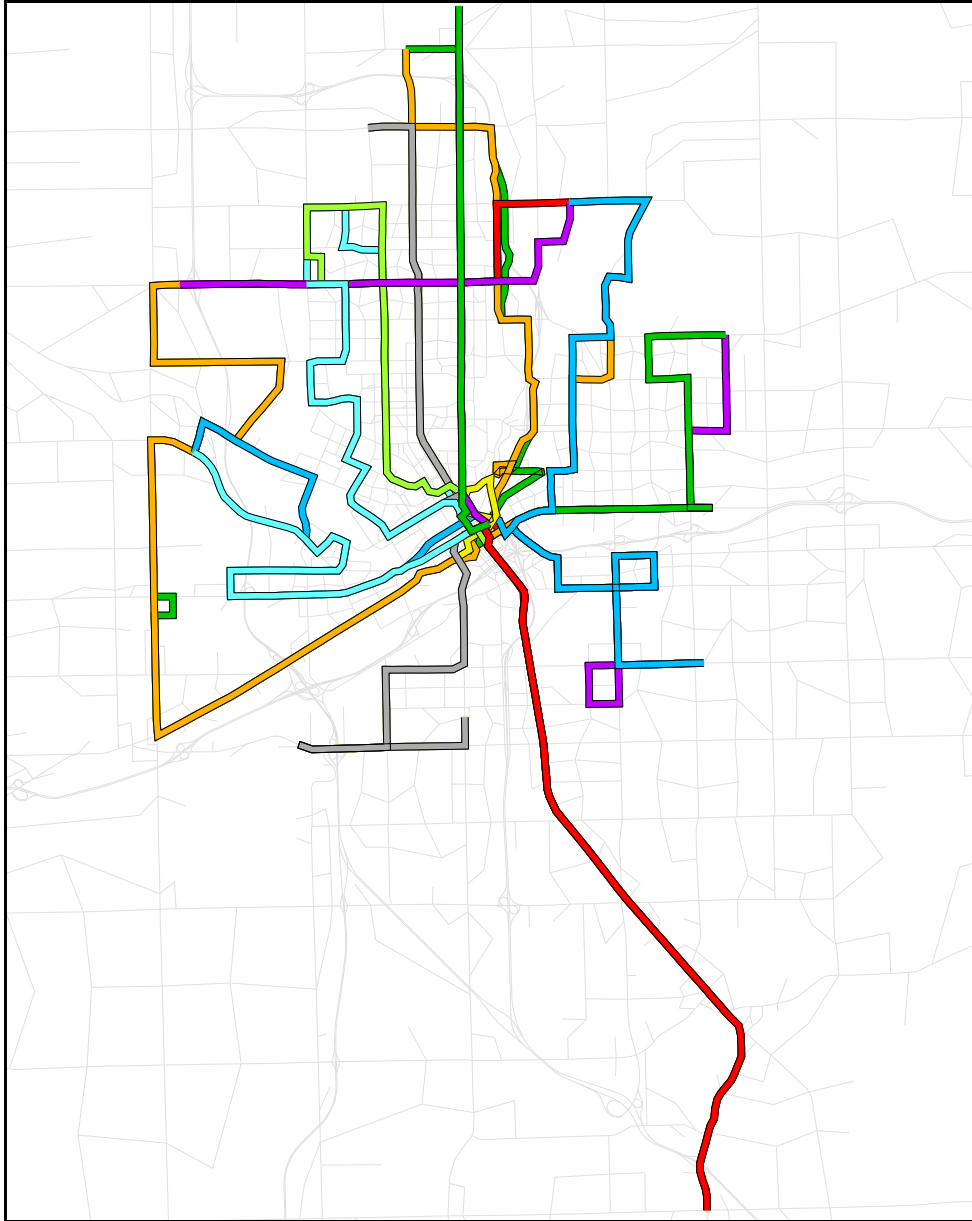
- Route service information was collected from MTA
- GIS files related to MTA routes and bus stops were assembled
- GIS files from the MTA on-board survey were used to identify active stops
- MTA fixed route system was coded as TransCAD route system

The Flint MTA system, operates both fixed route and curb-to-curb “Your Ride” service. Only the fixed route portion of the system was represented in the TransCAD model. The fixed-route bus system structure is a classic hub and spoke system centered on the downtown Flint transit center. The Flint MTA operates 14 distinct routes during a typical weekday. Route alignments and headways vary by time of day.

The developed transit route system is displayed in **Figure 5**. Tables of the route attributes, such as headway, seat capacity and so on, can be found in the *Model Users Guide*. The following fundamental elements are included in the transit route development:

- The transit network was created using the new 2005 base year road network geographic file which was originally developed from the MGF version 6, but has been significantly edited and modified to become the new Genesee County model network.
- Transit routes in the model are represented via TransCAD’s special data structure called a route system. Each of the bus routes were coded by hand using the TransCAD route system editing toolkit. Future edits to the route system must use the same method. Also, because of the desire to use a master network, which keeps all future network scenarios in one file, the transit route system scenarios is kept in a single TransCAD routing system file with attributes to identify which routes belong to each unique scenario.
- During development and coding of the transit system in TransCAD, some additional roadway network links were added to accommodate the bus routes. However, this was only done in cases where the transit route uses significant public roadways. In several cases, the transit routes go onto private property (shopping centers, commercial complexes, etc.) or on minor non-functionally classed roadway, and the decision was made to not code those into the road and transit network system in TransCAD.
- The MTA route structure varies by time of day, and the model has 4 time periods. The model’s time periods are AM and PM 3 hour peak periods, a 6 hour mid-day period, and a 12 hour off-peak period. The route system was coded to accommodate these needs. For the off-peak period, headways were coded such that they reflect only the times when the transit service is operating.
- Transit stops were added based on several datasets.
  1. GCMPC supplied GIS layer of route alignments and stop points
  2. MTA 2007 on-board survey, geocoded “on/off stop” locations
  3. MTA 2008 route sheets, public information brochures and website (see appendix)

- The final base year model transit routes as they are represented in the TransCAD route system are shown in the following figure.



**Figure 5. Flint MTA Bus Routes**

## **V. FREE-FLOW SPEED AND CAPACITY ESTIMATION**

### **Free-flow Speed Estimation**

By definition, “free-flow” speed is the speed that occurs when traffic density (vehicles per lane mile) and traffic flow (vehicles per hour) are zero. Thus, factors determining free-flow speed only include the geometrics of the road and the posted speed without any influences by traffic, weather or accidents. Free-flow link speeds are used in most elements of the assignment procedures including network skim, trip distribution and trip assignment. The importance of using correct free-flow speeds cannot be overstated.

Most travel models use posted speed limits as a surrogate for free-flow speeds. The previous Genesee County Urban Travel Demand Model falls in this category. This common practice does not provide true free-flow inputs to the travel model, and raises the risk of a significant mis-estimation of travel times.

Another widely used method relies on a detailed speed table that determines free-flow speeds based on the roadway’s area type, functional class, posted speed and number of lanes. This table is constructed from various statistical analyses on field data collected from an extensive speed survey. Using the speed table, more realistic free-flow speeds can be input to the above mentioned models.

Bernardin Lochmueller and Associates has developed a tool which calculates the free-flow speeds based on the methodologies presented in the *Highway Capacity Manual 2000* (HCM 2000). This new speed estimation procedure further improves the previous method. The previous method is heavily dependent on the roadway’s functional class definition. However, definition of the functional class is somewhat judgmental and can lead to incorrect interpretation of actual geometric and functional roadway conditions. On this ground, the new procedure utilizes roadway’s facility type instead of relying on its functional class.

The tool was originally developed for the Indiana Statewide Travel demand model, and has been refined for several subsequent urban model applications around the nation. For the original work, a speed survey was conducted in an area of 26 counties and relationships between facility type and free-flow speed was investigated. The facility type was determined based on area type, total number of lanes, median type (divided vs. undivided), directionality (one-way vs. bi-directional), and access control type (full, partial or none). For each unique facility type, observed speeds that represent free-flow conditions were compared with their respective posted speed limits. The relationship between the observed free-flow speeds and the posted speeds was then formulated by curve fitting these two data items using nonlinear regressions. **Table 1** lists the nonlinear formula developed for major facility types. The speeds for other minor variations in facility type such as one-way streets were derived from these formula based on similarity in geometric and functional characteristics of the roadway.



**Genesee County Travel Demand Model**

**Table 1. Free-Flow Speed Estimation Formula**

Area Type	Free-Flow Speed <sup>1,2</sup>	Condition	Note
<b>2-lane 2-way undivided highways</b>			
Rural	$0.009751 \cdot \text{PSPD}^2 + 30.03397$	$25 \leq \text{PSPD} \leq 55$	No or Partial Access Control
	25	$\text{PSPD} < 25$	
Suburban	$117.640917 \cdot \text{PSPD}^{0.0015+0.001279\text{PSPD}} - 98.065483$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
Urban	$6.189 + 0.9437 \cdot \text{PSPD}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
<b>2-lane 2-way divided highways</b>			
Rural	$\left(0.000017 \cdot (\text{PSPD} - 72.323105)^2 + 0.019702\right)^{-1} + 19.835323$	$25 \leq \text{PSPD} \leq 55$	No Access Control
	25	$\text{PSPD} < 25$	
Suburban	$3.180682 \cdot \text{PSPD}^{0.857638} - 84.105587 \cdot e^{-41.803252 \text{PSPD}}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
Urban	$\left(0.119687 - 0.023365 \cdot \ln(\text{PSPD})\right)^{-1} + 0.373821 \cdot \text{PSPD}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
<b>Multilane undivided highways</b>			
Rural	$\left(0.000017 \cdot (\text{PSPD} - 72.323105)^2 + 0.019702\right)^{-1} + 19.835323$	$25 \leq \text{PSPD} \leq 65$	
	25	$\text{PSPD} < 25$	
Suburban	$3.180682 \cdot \text{PSPD}^{0.857638} - 84.105587 \cdot e^{-41.803252 \text{PSPD}}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
Urban	$\left(0.119687 - 0.023365 \cdot \ln(\text{PSPD})\right)^{-1} + 0.373821 \cdot \text{PSPD}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
<b>Multilane divided highways</b>			
Rural	$2.836165 \cdot \text{PSPD} - 0.071256 \cdot \text{PSPD}^2 + 0.000744 \cdot \text{PSPD}^3$	$25 \leq \text{PSPD} \leq 50$	No or Partial Access Control
	$16.0359 + 0.8223 \cdot \text{PSPD}$	$50 < \text{PSPD} \leq 65$	
	25	$\text{PSPD} < 25$	
Suburban	$\left(0.000071 \cdot (\text{PSPD} - 64.166165)^2 + 0.035258\right)^{-1} + 9.061039 \cdot \ln(\text{PSPD})$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
Urban	$\left(0.081714 - 0.016217 \cdot \ln(\text{PSPD})\right)^{-1}$	$25 \leq \text{PSPD} \leq 55$	
	25	$\text{PSPD} < 25$	
<b>Full access controlled highways</b>			
	55.00	$\text{PSPD} = 55$	
	58.00	$\text{PSPD} = 60$	
	62.00	$\text{PSPD} = 65$	
	65.00	$\text{PSPD} = 70$	

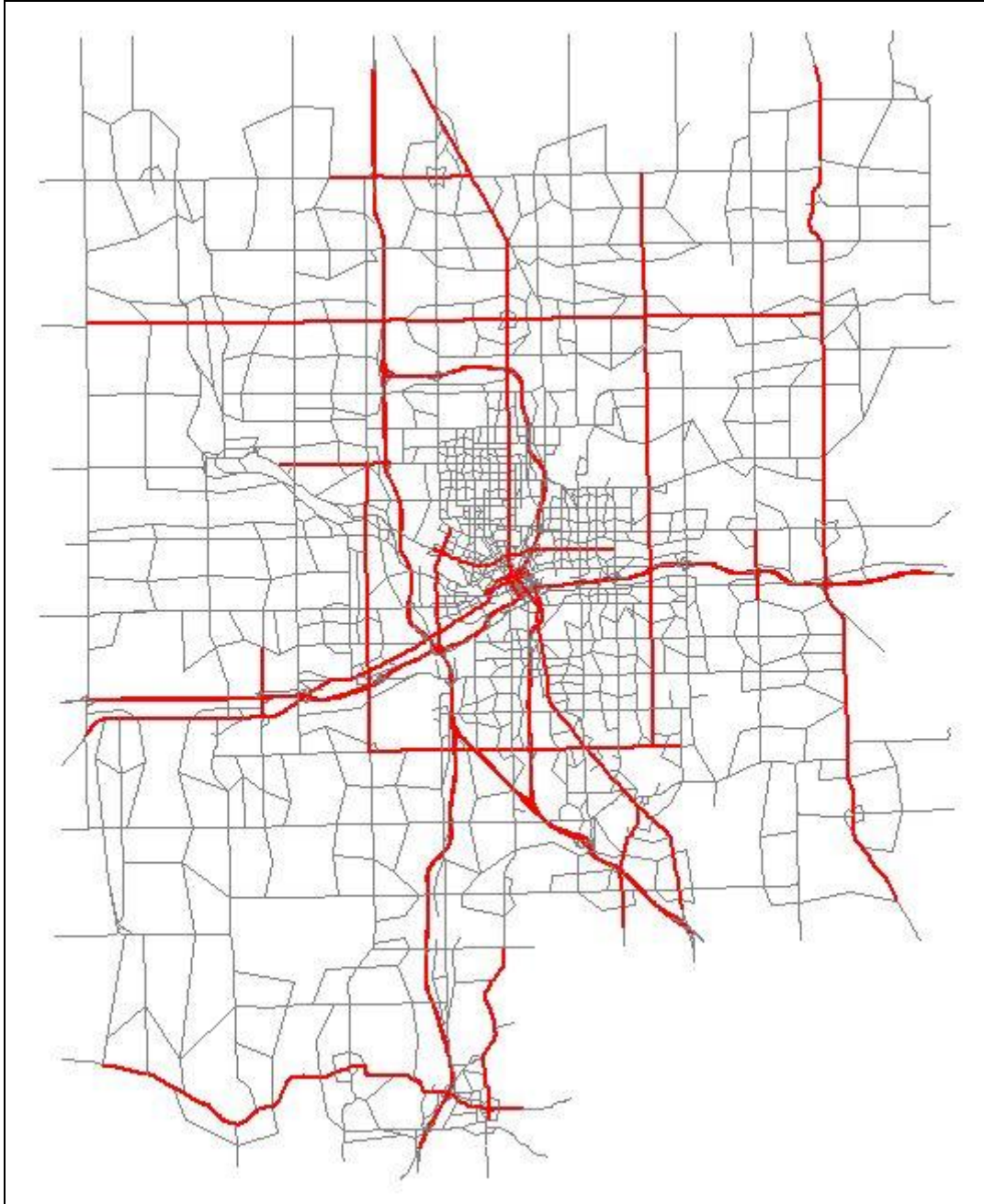
Note: <sup>1</sup> Free-flow speeds in mph, <sup>2</sup> PSPD: Posted speeds in mph

For the speed calculations, links on the Genesee County road network was categorized into facility types. The facility types are defined differently from what is coded in the network in the fields "LINK\_TYPE\_CD" or "FACILITY\_TYPE\_CD". Instead, the new categories are defined from the following attributes: number of lanes, divided/undivided and area type. The naming convention is: <lanes> + <divided/undivided> + <area type>. An example of new facility type categories is "2xd\_rur" which means, 2 lane highway, undivided, rural area. The following fields from the network were used to obtain the needed information:

- 1- *Directionality of the links:* Field "Dir"
- 2- *Number of Lanes:* Filed "NUM\_LANES" gives total number of lanes. Also the line layer has "THRU\_LANES" coded. "NUM\_LANES" includes the Left Turn Only Center Lanes and Left Turn Bays at intersections. For Speed Calculations "THRU\_LANES" is used.
- 3- *Divided/Undivided:* Filed FACILITY\_TYPE\_CD defines Freeways when its value is 1 and Divided Arterials when its value is 2. These two type roads are the undivided roads. DIV\_UNDIV was created as a new data field based on the information from FACILITY\_TYPE\_CD.
- 4- *Area Type:* Filed "AREA\_TYPE\_CD" defines 5 area types.
- 5- *Access Control:* Filed TRFC\_OP\_CD gives the information about the access control. TRFC\_OP\_CD = 1 implies the full access control while TRFC\_OP\_CD = 2 implies the partial access control. It is the variable used for the speed and capacity calculations.
- 6- *Posted Speeds:* Field "POSTED\_SPEED"

### **GPS Speed Survey**

A GPS speed survey for Genesee County was conducted in 2007-2008 by planning commission staff. The survey covers large portions of Genesee County and provides a sufficient sampling of the higher functional class road system with coverage that includes the full range of area types and varying types of roadways (median divided, center turn lane, signalized, freeway, etc.). The survey data was processed and the used to update the equations for model links such that they reflect the road specifics and drivers behavior in the area. The posted speed breakpoints for each functional type were revised. **Figure 6** shows the location of the speed survey coverage.



**Figure 6. GPS Speed Survey Coverage**

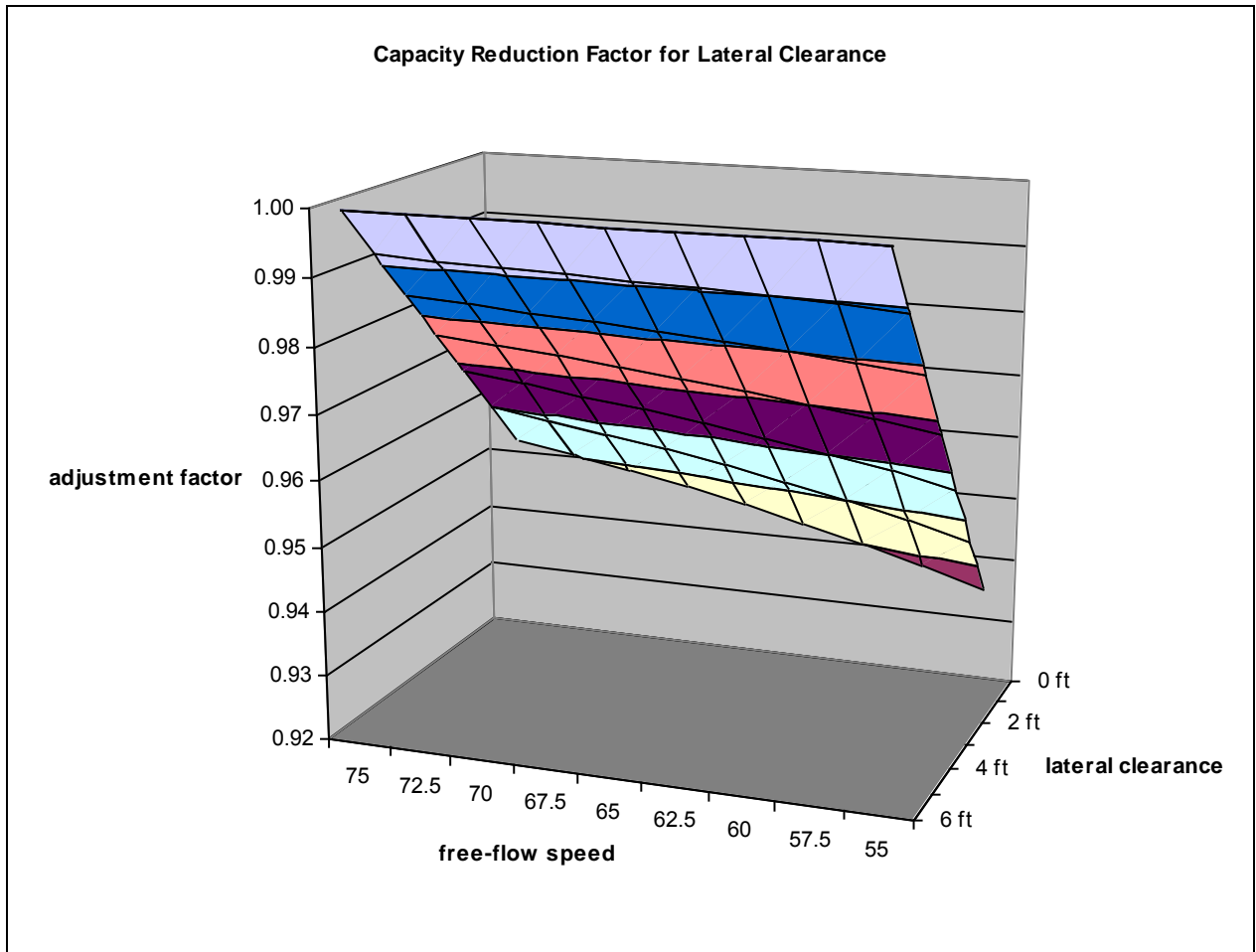
### **Capacity Estimation**

The common practice applied in most travel models ascribes a roadway capacity based on a simplified link-capacity system that in many cases over or underestimates the true capacity of the roadway. Generally, they use several inputs factors in the capacity calculators. The most common used factors are: facility type, area type and number of lanes. The capacity calculator used in the 2002 previous Genesee County Travel Demand Model falls in this category too. Although these calculators are easy to understand and practical to use, they ignore the effect on capacity of other factors such as lane width, shoulder width, signal spacing, and other elements. For the 2005 model, peak-hour roadway capacities of the Genesee County regional network were estimated based on the *Highway Capacity Manual 2000* (HCM 2000) procedure. In this new procedure, detailed link data on geometric and operational characteristics incorporated in the network link attributes were used for improved estimates of link capacities. First, all links in the model area were set to “maximum hourly service flows” as specified in HCM with respect to their functional class. Then, the maximum service flows were adjusted to “hourly service flows” based on several of limiting factors. These capacity reduction factors include: right-shoulder lateral clearance, heavy vehicles, driver population, lane width, number of lanes, interchange density, median type, access points, and directional distribution.

A significant effort was given to develop these limiting factors from HCM 2000. For each of these factors, the manual provides adjustments (or reductions) in free-flow speeds that reflect negative effect of the factor. The reductions are determined based on geometric features of the roadway. For instance, for adjustments for lateral clearance for freeways, two geometric variables (right-shoulder lateral clearance and number of lanes) are cross-referenced to estimate the reduction in free-flow speed. These adjustments are then applied to base free-flow speed to obtain *actual* free-flow speed that takes into consideration unique physical conditions of the roadway. For example, reductions in free-flow speed for varying right-shoulder lateral clearance for basic freeway segments are shown **Figure 7**.

As the first step to derive the capacity reduction factors, a possible range of free-flow speed is set based on facility type. In the above example for freeways, free-flow speeds from 55 mph to 75 mph in an increment of 2.5 mph are used. For each combination of these preset free-flow speeds and the geometric variables, a ratio of the reduced free-flow speed to the original free-flow speed is calculated. This process resulted in a two-dimensional table (i.e., one dimension containing a range of free-flow speed and the other containing the geometric variables), which is populated with the ratios, or free-flow speed reduction factors. Under the assumption that the maximum service flow can be adjusted to the service flow with the same reduction percentage as the speed reduction factor, these free-flow speed reduction factors are used to estimate hourly service flows.

The two-dimensional table can be represented in a 3-dimension space as exemplified in **Figure 7**. The factors in this space were then generalized by curve fitting the factors using bi-factor nonlinear regression technique. As an example, **Table 2** lists curve-fitted formula for capacity reduction factors for lateral clearance. This procedure was applied to other capacity limiting factors such as adjustments for access point densities, lane widths, and other.



**Figure 7. Capacity Reduction Factors for Lateral Clearance (Basic Freeway Segments)**

In the Genesee County line layer:

- 1- Lane width is given in field: "LANE\_WIDTH"
- 2- Right Shoulder Width is given in field: "SHOULDER\_WIDTH" –this field is filled only for trunk lines. This information of non-trunk line is not available.
- 3- Federal Highway Functional Classes are given in field: "FUNCLASS"
- 4- *Number of Lanes*: Filed "NUM\_LANES" gives total number of lanes. Also the line layer has "THRU\_LANES" coded. "NUM\_LANES" includes the Left Turn Only Center Lanes and Left Turn Bays at intersections. Capacity calculations is based on the "THRU\_LANES".

**Table 2: Capacity Reduction Factors for Lateral Clearance**

Class	Reduction Factor <sup>1</sup>	Note
<b>Interstates and Freeways</b>		
2 lanes in one direction	$\frac{-6.00001 + \text{RSLC}}{0.0001 + 1.66667 \cdot \text{FSPD}} + 1$	Min. 0.9345
3 lanes in one direction	$\frac{-5.99999 + \text{RSLC}}{-0.00084 + 2.50001 \cdot \text{FSPD}} + 1$	Min. 0.9564
4 lanes in one direction	$\frac{-6.00001 + \text{RSLC}}{-0.00002 + 5 \cdot \text{FSPD}} + 1$	Min. 0.9782
≥5 lanes in one direction	$\frac{-6.00002 + \text{RSLC}}{0.00371 + 9.99994 \cdot \text{FSPD}} + 1$	Min. 0.9891
<b>Multilane Highways</b>		
4 total lanes	$\frac{1095.74797 + \text{FSPD}}{1280.33942 + 6.53454 \cdot \text{RSLC}^2} + 0.03975 \cdot \text{RSLC}$	Min. 0.8800
6 total lanes	$\frac{1485.4381 + \text{FSPD}}{1660.34815 + 3.0981 \cdot \text{RSLC}^2} + 0.02166 \cdot \text{RSLC}$	Min. 0.9133
<b>Two-Lane Highways</b>		
Shoulder width < 2 ft	$1.20306 \cdot \text{FSPD}^{(0.27207 - 0.08633 \ln(\text{LW}))} - \frac{7.09882}{\text{LW}}$	Min. 0.8400
Shoulder width < 4 ft	$1.43621 \cdot \text{FSPD}^{(0.26354 - 0.09366 \ln(\text{LW}))} - \frac{8.06484}{\text{LW}}$	Min. 0.8800
Shoulder width < 6 ft	$1.58362 \cdot \text{FSPD}^{(0.24881 - 0.09472 \ln(\text{LW}))} - \frac{8.34158}{\text{LW}}$	Min. 0.9125

Note: <sup>1</sup> RSLC: right-shoulder lateral clearance (ft), FSPD: free-flow speed (mph), LW: lane width (ft)

The 2005 Genesee County model consists of four different time-of-day models; thus, each of the time periods is analyzed with roadway capacities that are specific to the respective time period. The peak hour capacity obtained using the nonlinear curve fitting methods is then converted to period capacities by multiplying appropriate number of hours in each time period. In this model, morning and evening peak periods is defined as three hour spans, and midday is from 9AM to 3PM. The remaining hours are defined as an off-peak period.

The peak-period capacity is then converted to directional capacities. Changes in directional capacities by time period are estimated according to changes in lane usage by time-of-day. The capacity for the off-peak period is obtained by applying K-factors to the directional peak-hour capacity. The K-factors are used by area type based on the recommendation in the *Florida's Level of Service Standards and Guidelines Manual for Planning, FDOT, 1995*.

## **VI. DELAYS ON INTERRUPTED FACILITIES**

Free-flow speeds and roadway capacities estimated in the previous steps needed to be adjusted to account for delays associated with traffic signals. The adjustment was made directionally according to the methodology described below.

Traffic signals were entered in the network as link attributes with designations of approach prioritization and multiple signals. If the approach to the signalized intersection was a higher functional class than crossroad, it was coded as “high” priority. If it was on par with the crossroad, it was assumed to have “equal” priority. If it was a lower functional class than the crossroad, it was given “low” priority. The number of multiple upstream signals was coded to account for progression effect as a result of signal coordination.

The speed and capacity adjustment for traffic signal delay followed a HCM methodology that uses the following equation:

$$d = 0.5C \left( 1 - \frac{g}{C} \right)^2 \cdot PF$$

where,  $d$  = delay per vehicle,  
 $g$  = effective green time,  
 $C$  = cycle length, and  
 $PF$  = progression adjustment factor.

Delay estimated from the above equation is added to the free-flow speed-based link travel-time to come up with an “adjusted” free-flow travel time. Based on the fact that the mainline road is given a higher priority than the lower-class crossroad, varying green time ratios ( $g/C$ ) were assumed by the priority code of the signal approach. HCM provides the progression adjustment factor as a function of the green time ratio and the arrival type. The arrival type for the signal approach is assumed based on multiple signals coded in the network. With the assumed green time ratio and the arrival type, an appropriate progression factor in HCM is sought and used to estimate signal delay of the approach.

The capacity reduction methodology is based on travel-speed reductions resulting from delays on the flow-interrupted facilities. The service flow rate is a function of the travel time along a road segment. Increasing signal densities effectively reduces travel speeds, and, in turn, reduces the amount of traffic flow that is possible. The reduction in service flow is calculated by dividing the maximum service flow approximate based on free-flow speed by the maximum service flow approximates based on speeds with traffic signal delays.

These speed and capacity adjustments due to traffic signals are made directionally. Thus, signal approach lane(s) and lane(s) in the other direction are estimated with different speed and capacity values. In the 2005 Genesee County node layer, signal information is stored in the field: “TRAFFIC SIGNAL”. The presence of a signal is indicated by filling this field with “Y”. For the 2005 model, a new convention was developed for filling this field to consider the presence of left turn lanes by approach in the capacity calculations.

## **VII. GENESEE TRAVEL MODEL COMPONENTS**

The Genesee County Travel Demand Model is built upon a model of the population of Genesee County. Fundamentally, it is people that make trips, and within a travel demand model, trip making and ultimately traffic volumes on roadway segments and VMT in a region are driven by the people who live and work there. All travel demand models in the U.S. are based on Census data about the population of the model area.

The way in which Census data is used in various models differs widely. In some of the oldest and simplest models, trip making and other aspects of travel demand like mode choice are based on the number of people or households in each traffic analysis zone and their aggregate or average characteristics (average automobiles owned per household, etc.). However, this very simple approach inevitably results in a variety of errors because it is not able to capture the complexities of the people and behaviors involved. Many of the behaviors involved, such as trip-making, are not linearly related to the variables used to predict them. Although trip making can be represented simply by an average trip rate, for instance 0.48 home-based shop/personal business trips per person from the *MI Travel Counts Household Travel Survey*, a household with one person produces 0.92 trips on average while a household with four or more people produces an average of only 1.71 such trips. There are a number of reasons for these sort of nonlinearity, but for instance, it stands to reason that just because a household had more people does not necessarily mean that it needs to make more trips to buy groceries each week; they may simply buy more groceries in a single trip.

The traditional way of dealing with these nonlinearities in travel behavior is to segment the population and use averages specific to each segment. So, for instance, based on the average number of persons per household, predict the number of one person households, two person households, etc., and apply a trip rate specific to each type of household. Typically this is done using two variables, such as number of persons per household and number of vehicles per household. This approach is called cross-classification. There are several difficulties with this approach. The most notable is that it severely limits the number of variables that can be used to explain trip making, mode choice and other aspects of travel behavior. The limitations of the traditional approach have motivated the development of alternative approaches.

The common alternative to the traditional approach which has been experimented with in research and practice is activity-based modeling. In activity-based modeling, average characteristics of the population from Census data are used to build a simulated population which has the same average attributes as the real population. Then, each simulated person or household makes choices hopefully similar to the real choices people make about what to do, where to do it and how to get there. The two main drawbacks of activity-based modeling are that they are simulation based or probabilistic models rather than deterministic models (which complicates the comparison of results for different alternatives) and that they require many more component models which in turn require more data to estimate and considerably more computer power and time to run.

The Genesee County model takes an intermediate approach. It begins by building a synthetic population of simulated households, very much like an activity based model, but then uses a more traditional, trip-based rather than activity-based framework for modeling people's travel. Using a synthetic population, however, allows even trip-based models to incorporate many more variables and capture many of the advantages, increased realism and increased sensitivity to more policy variables, offered by activity-based models without the disadvantages of the complexities of simulation modeling or long run times. For instance, the Genesee County model responds to an



increase in households with seniors (age 65+) and predict less work trips, but more shop trips, less trips by foot or bike, and more trips during the middle of the day and less during the peak hours. Traditional models do not offer this kind of sensitivity. Activity-based models offer this and more, but at much greater cost in run time and development cost. The Genesee County disaggregate deterministic approach offers this sort of additional sensitivity at no greater cost than a simpler traditional model.

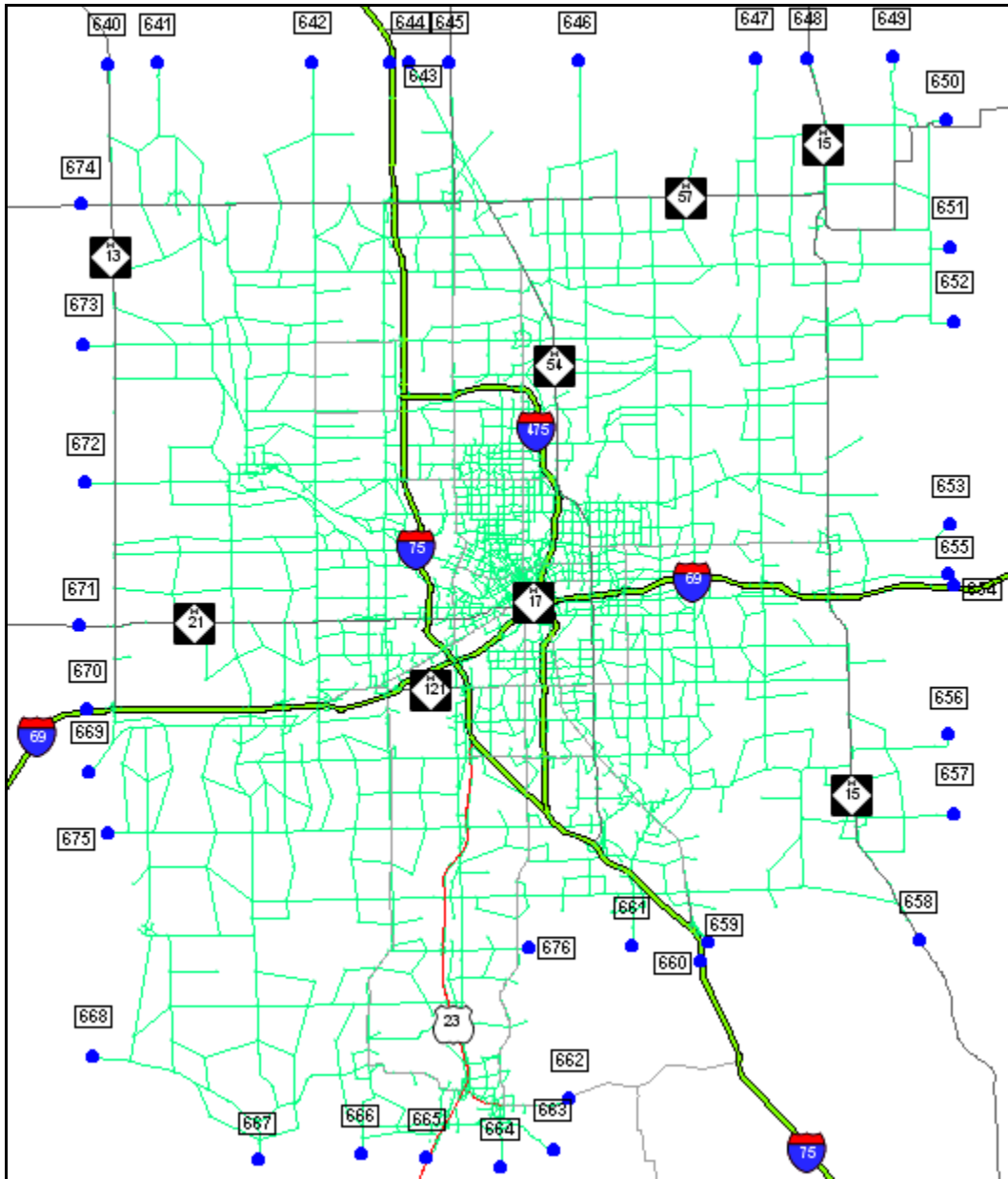
### **A. EXTERNAL MODELS**

One trip has two ends, one is origin and the other is destination. The trips with one end in the study area are referred to as External-Internal (EI) or Internal-External (IE) trips while the trips with no ends in the study area are referred to as through or External-External (EE) trips. The end point on the roadway outside the study area or on the roadway where the study area bound line is crossed is referred to as an external station/zone.

Three vehicle classes, bus, truck and auto vehicle, are considered in the Genesee travel demand model. A commercial vehicle with six tires or above belongs to the truck class while a motorcycle, a passenger car or a commercial vehicle with four tires belongs to the auto vehicle class. Only truck and auto vehicle classes are taken into account in the external trip estimation.

Considering that there is no external travel survey for Genesee County and the external trip estimation method introduced in NCHRP Report 365 is not applicable for a study area with a population over 100,000, an alternative method was proposed to use the TransCAD's subarea analysis in the Michigan statewide travel demand model to generate two preliminary external trip tables for Genesee County. One external trip table is for auto vehicle class and the other is for truck. Then these external trip tables were adjusted to match the base year traffic counts at all external stations. The Michigan statewide model covers only major roads in Genesee County. The general assumption of the alternative method is the external-external trips exist from one external station to another only if there are trips between these two locations in the Michigan statewide model.

The 2035 external trip estimation is required for the Genesee model update. The 2030 preliminary external trip tables were generated by the subarea analysis in the 2030 Michigan statewide model. The 2030 preliminary external trip tables were adjusted by the 2005 adjustment amounts, and then the annual growth rates of auto vehicle and truck trips were calculated using the number of trips in the 2005 and 2030 external trip tables. The annual growth rates were used to calculate the 2035 total external trips and external-external trips, and the Fratar model was used to compute the 2035 external-external trip matrices for auto vehicle and truck. The Michigan statewide model covers only twenty-five external stations of the Genesee County model. For the other ten external stations not in the statewide model, the annual growth rates were assumed, and the general assumption is there are no external-external trips of these ten external stations. In other words, the external trips of those ten external stations that are not in the Michigan statewide model network are all EI-IE trips. In addition, this approach can also be used to estimate the external trip tables of any year in between 2005 and 2035.



**Figure 8. External Station Locations and IDs**

**Base Year External Station Summary**

The detail information of these thirty-seven external stations shown in **Figure 8** is given in **Table 3**. It includes the name, location, functional class, daily traffic count, daily truck count and truck percent of each external station. **Table 3** also summarizes the daily traffic count, daily truck count and truck percent for all external stations. Among those thirty-seven external stations, thirty are in rural areas and seven are in urban areas. Six major external stations are on interstate, expressway and principal arterial, and ID numbers are 643, 655, 658, 660, 665 and 670. The Average Daily Traffic (ADT) counts vary from 662 to 52,222 and the ADT truck counts vary from 50 to 6,788. The highest truck percent is 18.03%, the lowest truck percent is 2.98% and the average truck percent is 9.7% for all external stations.

**Table 3. External Station Summary**

External Station				ADT Traffic	ADT Truck	Truck
ID	Name	Location	Functional Class	Count	Count	Percent
640	Sheridan Ave	North of Study Area	Rural Minor Arterial	5,068	506	9.98%
641	Nichols Rd	North of Study Area	Rural Major Collector	662	70	10.57%
642	Elms Rd	North of Study Area	Rural Major Collector	2,302	262	11.38%
643	<b>I 75 North</b>	North of Study Area	Rural Interstate	52,222	6,788	13.00%
644	Saginaw Rd	North of Study Area	Rural Minor Arterial	5,790	330	5.70%
645	Clio Rd	North of Study Area	Urban Minor Arterial	4,558	152	3.33%
646	Bray Rd	North of Study Area	Rural Major Collector	2,650	284	10.72%
647	Irish Rd	North of Study Area	Rural Major Collector	1,206	58	4.81%
648	State Rd	North of Study Area	Rural Minor Arterial	8,262	246	2.98%
649	Henderson Rd	North of Study Area	Rural Major Collector	924	158	17.10%
650	Lake Rd	East of Study Area	Rural Minor Arterial	2,666	152	5.70%
651	Columbiaville Rd	East of Study Area	Rural Major Collector	2,932	168	5.73%
652	E Mount Morris Rd	East of Study Area	Rural Major Collector	4,120	234	5.68%
653	Davison Rd	East of Study Area	Rural Minor Arterial	5,854	400	6.83%
654	Lapeer Rd	East of Study Area	Rural Major Collector	2,138	122	5.71%
655	<b>I 69 East</b>	East of Study Area	Rural Interstate	36,928	4,800	13.00%
656	Hill Rd	East of Study Area	Rural Major Collector	2,256	128	5.67%
657	Hegel Rd	East of Study Area	Rural Major Collector	1,570	90	5.73%
658	<b>Ortonville Rd</b>	South of Study Area	Rural Principal Arterial	14,538	436	3.00%
659	Dixie Hwy	South of Study Area	Urban Minor Arterial	13,918	514	3.69%
660	<b>I 75 South</b>	South of Study Area	Rural Interstate	43,874	5,046	11.50%
661	N Holly Rd	South of Study Area	Rural Minor Arterial	9,298	530	5.70%
662	Main St	South of Study Area	Rural Minor Arterial	13,042	812	6.23%
663	S Holly Rd	South of Study Area	Urban Collector	6,684	248	3.71%
664	Adelaide St	SW of Study Area	Urban Collector	3,420	254	7.43%
665	<b>S US 23</b>	SW of Study Area	Urban Expressway	43,394	4,338	10.00%
666	Linden Rd	South of Study Area	Urban Collector	6,122	294	4.80%
667	Seymour Rd	SW of Study Area	Rural Minor Arterial	4,276	244	5.71%
668	Silver Lake Rd	West of Study Area	Rural Minor Arterial	4,054	228	5.62%
669	Lansing Rd	West of Study Area	Rural Minor Arterial	3,682	210	5.70%
670	<b>I 69 West</b>	West of Study Area	Rural Interstate	29,400	5,300	18.03%
671	M 21	West of Study Area	Rural Minor Arterial	9,016	450	4.99%
672	Pierson Rd	West of Study Area	Rural Major Collector	1,224	70	5.72%
673	W Mount Morris Rd	West of Study Area	Rural Major Collector	2,166	124	5.72%
674	Vienna Rd	West of Study Area	Rural Minor Arterial	4,656	512	11.00%
675	Grand Blanc Rd	West of Study Area	Rural Collector	3,800	300	7.89%
676	Thompson Rd	South of Study Area	Urban Minor Arterial	700	50	7.14%
<b>Total</b>				<b>359,372</b>	<b>34,908</b>	<b>9.71%</b>

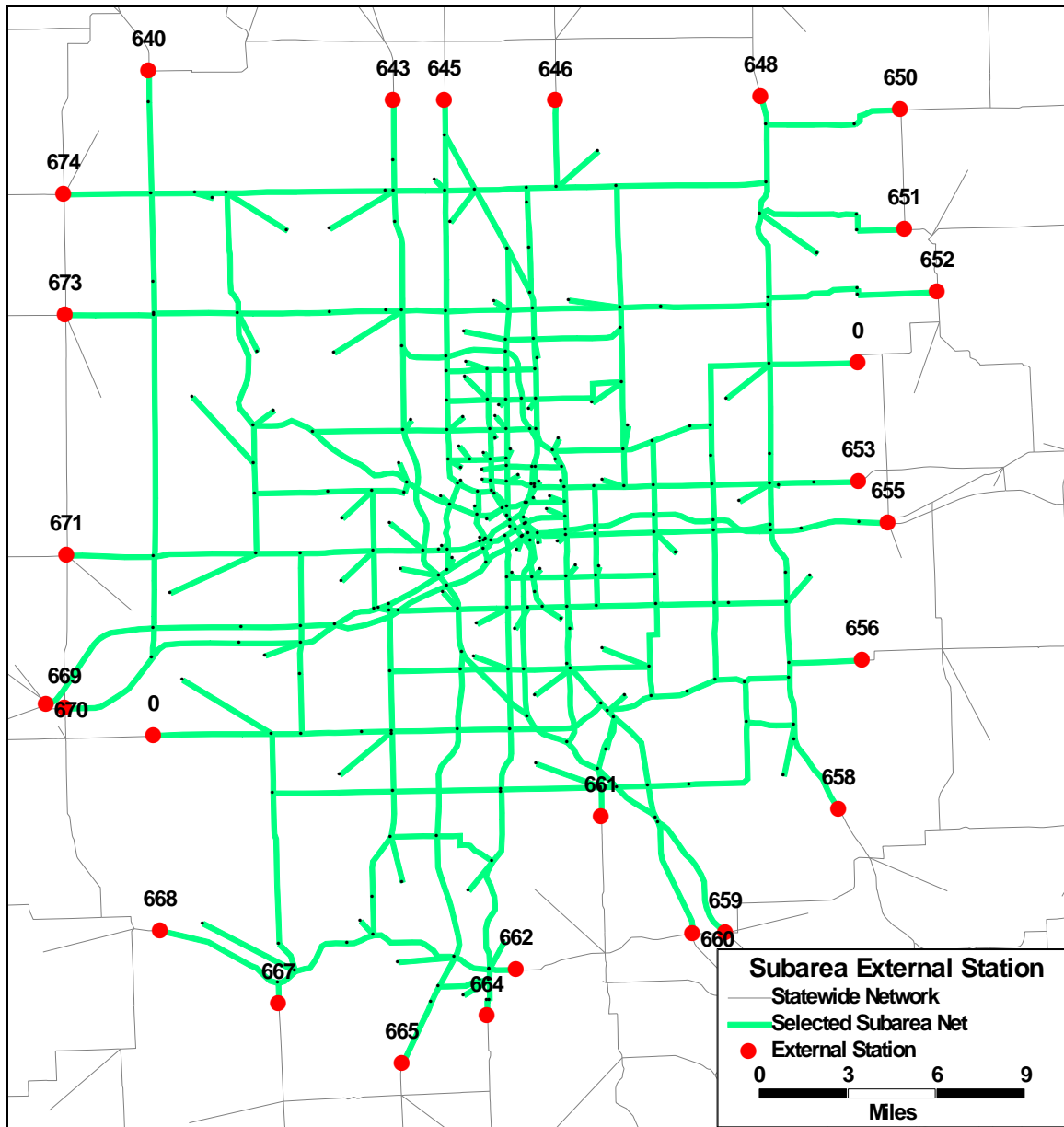
### **Base Year External Trip Estimation**

The base year external trip estimation has three steps, i.e. subarea analysis, trip table adjustment and EI-IE trip calculation by trip purpose. Genesee County was selected as the subarea in the Michigan statewide travel demand model, and the subarea analysis was performed to generate two preliminary external trip tables. One external trip table is for auto vehicle class and the other is for truck. These external trip tables were adjusted to match the base year traffic counts at all external stations. Finally the EI-IE trips were calculated by three trip purposes, i.e. non-work, EI and IE work purposes. This calculation used the split ratios obtained from the “MI Travel Counts” household travel survey and the 2000 Census Transportation Planning Package (CTPP). The Michigan statewide model covers only major roads in Genesee County. The general assumption of the alternative method is the external-external trips exist from one external station to another only if there are trips between these two locations in the Michigan statewide model. In other words, the external trips of external stations on some roadways that are not in the Michigan statewide model network are all EI-IE trips. The following section introduces the Michigan statewide travel demand model.

The 2005 and 2030 trip tables along with the network of the Michigan statewide travel demand model were obtained for this project. The statewide model has no breakout between autos, trucks, or transit. The trip tables include the following trip purposes: Home Based Work Business (HBWB), Home Based Social Recreation (HBSR), Home Based Other (HBO), Non-Home Based Work Business (NHBWB), and Non-Home Based Other (NHBO). In the statewide model, a trip table (matrix) of all trips - all purposes combined is generated for the trip assignment. The assignment method is the all-or-nothing traffic assignment.

With the network and trip tables a subarea analysis can be performed to get a smaller version of the statewide model just for Genesee County. Genesee County is defined as a subarea in the Michigan statewide model. **Figure 9** displays the selected subarea and twenty-seven gates (points), i.e. external stations for the Genesee county model. The trips in the statewide model go into or leave Genesee County through those gates. Two external stations on Grand Blanc Road (west of the study area) and Flint Street (east of study area) do not exist in the Genesee county model, and its ID numbers are zero. Ten external stations in the Genesee model are on lower-function roadways and do not exist in the statewide model. It is assumed that there are no external-external trips for those ten external stations.

The subarea analysis of Multi-Modal Multi-Class Assignment (MMA) was performed in TransCAD to get the subarea trip table for each trip purpose mentioned above for estimating the truck external trip table. A preliminary truck trip table was estimated by adding 20% NHBO and 10% NHBWB trips together, and the preliminary auto trip table is equal to the difference between all-vehicle trip table and the truck trip table. Since the all-or-nothing method was used in the assignment, the inbound and outbound traffic volumes are unbalanced. The symmetric matrix processing is necessary to get the balance inbound and outbound volumes.



**Figure 9. Subarea Model External Stations**

The preliminary external trip tables from the subarea analysis need to be adjusted to match the Average Daily Traffic (ADT) counts. The following steps are proposed for the external trip table adjustment,

- (1) Determining daily Origin (O) and Destination (D) trips by auto vehicle and truck for each external station from ADT counts
- (2) Generating the symmetric trip matrices (tables) if these matrices are asymmetric
- (3) Splitting EI-IE and EE trips and computing the final EE O-D matrices for auto vehicle and truck
- (4) Calculating EI-IE O and D trips by auto vehicle and truck.

**Fratat Model**

The doubly-constrained growth factor method is also known as Fratar model that keeps the total balance to both origins and destinations, or productions and attractions. The final O-D matrix should be such that the sum of each row (i.e., origin trips per zone) is within a given convergence criterion of the corresponding forecast origin trips for that zone, and the sum of each column (i.e., destination trips per zone) is within a given convergence criterion of the corresponding forecast destination trips. The goal is to solve the following equation:

$$T_{ij} = t_{ij} \cdot o_i \cdot d_j$$

subject to:

$$\sum_j T_{ij} = O_i$$

$$\sum_i T_{ij} = D_j$$
(1)

where

- $T_{ij}$  = Output trips from zone  $i$  to zone  $j$
- $t_{ij}$  = Original trips from zone  $i$  to zone  $j$
- $o_i$  = Balancing factor for row
- $d_j$  = Balancing factor for column
- $O_i$  = Origin trips of zone  $i$
- $D_j$  = Destination trips of zone  $j$

The following steps are proposed for applying the Fratar Model in the external trip adjustment of each vehicle class,

- (i) Splitting the EE and EI-IE trips in the subarea trip table from the statewide model
- (ii) Factoring the preliminary EE and EI-IE O & D trips to match the base year traffic counts at each external station
- (iii) Balancing the factored EE O & D trips by the *Weighted Sum (50% O to 50% D) method in TransCAD*. Balance process makes total EE O trips are equal to total EE D trips of all external stations
- (iv) Obtaining the final EE O-D table by applying the balanced EE O & D to the preliminary EE O-D table using the Fratar model. This is the process to adjust the preliminary EE O-D matrix obtained from the statewide model to replicate the current local traffic conditions
- (v) Obtaining the EI-IE (O +D) by (O+D) minus EE (O+D).

**Tables 4 and 5** show 2005 ADT counts, 2005 statewide model volumes, 2005 final EE O & D, and 2005 final EI-IE (O+D) for auto vehicle and truck trips. **Tables 6 and 7** display the EE O-D trip tables for auto vehicle and truck.

**Genesee County Travel Demand Model**

**Table 4. 2005 External Auto Trip Estimation**

ID	NAME	2005 Auto ADT Count	2005 SW Model Auto Volume	2005 Auto External Trip Results				
				O	D	EE O	EE D	EI-IE O+D
640	Sheridan Ave	4,562	6,358	2,281	2,281	1,549	1,549	1,464
641	Nichols Rd	592	0	296	296	0	0	592
642	Elms Rd	2,042	0	1,021	1,021	0	0	2,042
643	I 75 North	45,434	53,596	22,717	22,717	13,468	13,468	18,498
644	Saginaw Rd	5,460	0	2,730	2,730	0	0	5,460
645	Clio Rd	3,676	6,238	1,838	1,838	556	556	2,564
646	Bray Rd	2,644	3,272	1,322	1,322	13	13	2,618
647	Irish Rd	964	0	482	482	0	0	964
648	State Rd	8,016	7,376	4,008	4,008	1,186	1,186	5,644
649	Henderson Rd	766	0	383	383	0	0	766
650	Lake Rd	2,514	2,122	1,257	1,257	526	526	1,462
651	Columbiaville Rd	2,764	2,226	1,382	1,382	1,051	1,051	662
652	E Mount Morris Rd	3,886	1,038	1,943	1,943	18	18	3,850
653	Davison Rd	3,856	0	1,928	1,928	0	0	3,856
654	Lapeer Rd	2,016	0	1,008	1,008	0	0	2,016
655	I 69 East	32,128	44,798	16,064	16,064	7,914	7,914	16,300
656	Hill Rd	2,128	3,686	1,064	1,064	94	94	1,940
657	Hegel Rd	1,680	0	840	840	0	0	1,680
658	Ortonville RD	14,102	11,328	7,051	7,051	613	613	12,876
659	Dixie Hwy	13,404	0	6,702	6,702	0	0	13,404
660	I 75 South	38,828	55,428	19,414	19,414	3,865	3,865	31,098
661	N Holly Rd	8,768	826	4,384	4,384	2,388	2,388	3,992
662	Main St	12,230	162	6,115	6,115	3,170	3,170	5,890
663	S Holly Rd	6,436	0	3,218	3,218	0	0	6,436
664	Adelaide St	3,168	0	1,584	1,584	0	0	3,168
665	S US 23	39,056	50,618	19,528	19,528	5,865	5,865	27,326
666	Linden Rd	7,634	0	3,817	3,817	0	0	7,634
667	Seymour Rd	4,032	2,028	2,016	2,016	96	96	3,840
668	Silver Lake Rd	3,762	4,148	1,881	1,881	96	96	3,570
669	Lansing Rd	3,472	0	1,736	1,736	0	0	3,472
670	I 69 West	24,100	33,442	12,050	12,050	6,346	6,346	11,408
671	M 21	8,566	8,268	4,283	4,283	831	831	6,904
672	Pierson Rd	1,154	0	577	577	0	0	1,154
673	W Mount Morris Rd	2,042	1,970	1,021	1,021	208	208	1,626
674	Vienna Rd	4,144	7,200	2,072	2,072	981	981	2,182
675	Grand Blanc Rd	3,500	0	1,750	1,750	0	0	3,500
676	Thompson Rd	650	0	325	325	0	0	650
	<b>Total</b>	<b>324,176</b>	<b>306,128</b>	<b>162,088</b>	<b>162,088</b>	<b>50,834</b>	<b>50,834</b>	<b>222,508</b>

**Genesee County Travel Demand Model**

**Table 5. 2005 External Truck Trip Estimation**

ID	NAME	2005 Truck ADT Count	2005 SW Model Truck Volume	2005 External Truck Trip Results				
				O	D	EE O	EE D	EI-IE O+D
640	Sheridan Ave	506	694	253	253	176	176	154
641	Nichols Rd	70	0	35	35	0	0	70
642	Elms Rd	262	0	131	131	0	0	262
643	I 75 North	6,788	5,626	3,394	3,394	2,140	2,140	2,508
644	Saginaw Rd	330	0	165	165	0	0	330
645	Clio Rd	152	570	76	76	15	15	122
646	Bray Rd	284	272	142	142	2	2	280
647	Irish Rd	58	0	29	29	0	0	58
648	State Rd	246	690	123	123	41	41	164
649	Henderson Rd	158	0	79	79	0	0	158
650	Lake Rd	152	214	76	76	26	26	100
651	Columbiaville Rd	168	144	84	84	63	63	42
652	E Mount Morris Rd	234	88	117	117	0	0	234
653	Davison Rd	400	0	200	200	0	0	400
654	Lapeer Rd	122	0	61	61	0	0	122
655	I 69 East	4,800	3,618	2,400	2,400	1,542	1,542	1,716
656	Hill Rd	128	254	64	64	11	11	106
657	Hegel Rd	90	0	45	45	0	0	90
658	Ortonville RD	436	838	218	218	24	24	388
659	Dixie Hwy	514	0	257	257	0	0	514
660	I 75 South	5,046	7,234	2,523	2,523	489	489	4,068
661	N Holly Rd	530	72	265	265	176	176	178
662	Main St	812	14	406	406	232	232	348
663	S Holly Rd	248	0	124	124	0	0	248
664	Adelaide St	254	0	127	127	0	0	254
665	S US 23	4,338	5,538	2,169	2,169	717	717	2,904
666	Linden Rd	294	0	147	147	0	0	294
667	Seymour Rd	244	156	122	122	7	7	230
668	Silver Lake Rd	228	300	114	114	7	7	214
669	Lansing Rd	210	0	105	105	0	0	210
670	I 69 West	5,300	3,732	2,650	2,650	1,454	1,454	2,392
671	M 21	450	676	225	225	69	69	312
672	Pierson Rd	70	0	35	35	0	0	70
673	W Mount Morris Rd	124	188	62	62	13	13	98
674	Vienna Rd	512	680	256	256	126	126	260
675	Grand Blanc Rd	300	0	150	150	0	0	300
676	Thompson Rd	50	0	25	25	0	0	50
	<b>Total</b>	<b>34,908</b>	<b>31,598</b>	<b>17,454</b>	<b>17,454</b>	<b>7,330</b>	<b>7,330</b>	<b>20,248</b>



**Table 6. 2005 External-to-External Auto Trips**

	640	643	645	646	648	650	651	652	655	656	658	660	661	662	665	667	668	670	671	673	674	Sum	
640	--	--	--	--	--	1.9	0.7	--	11.1	0.1	0.0	19.5	1.0	--	16.0	--	--	879.6	311.5	106.2	201.4	1549.0	
643	--	--	--	--	--	--	--	--	3718.5	56.9	16.7	3293.4	1315.3	--	2261.2	--	--	2348.0	250.4	36.5	171.2	13468.0	
645	--	--	--	--	--	--	511.9	--	31.2	0.8	12.1	--	--	--	--	--	--	--	--	--	--	556.0	
646	--	--	--	--	--	--	--	--	--	--	--	10.7	2.3	--	--	--	--	--	--	--	--	--	13.0
648	--	--	--	--	--	459.0	449.3	--	79.4	10.7	46.1	0.4	16.7	--	10.9	--	--	88.9	2.3	0.7	21.5	1186.0	
650	1.9	--	--	--	459.0	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5	2.7	61.8	526.0	
651	0.7	--	511.9	--	449.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	89.0	1051.0	
652	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.0	18.0	
655	11.1	3718.5	31.2	--	79.4	--	--	--	--	--	515.7	13.7	722.1	--	236.1	--	--	2298.6	68.8	16.4	203.5	7915.0	
656	0.1	56.9	0.8	--	10.7	--	--	--	--	--	--	--	--	--	4.4	--	0.0	17.4	0.6	0.1	3.0	94.0	
658	0.0	16.7	12.1	--	46.1	--	--	--	515.7	--	--	--	--	--	--	--	--	--	22.1	0.0	0.0	0.2	613.0
660	19.5	3293.4	--	10.7	0.4	--	--	--	13.7	--	--	--	--	--	--	--	--	--	322.4	108.2	12.2	84.6	3865.0
661	1.0	1315.3	--	2.3	16.7	--	--	--	722.1	--	--	--	--	--	--	--	--	--	268.6	11.6	1.1	49.4	2388.0
662	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3170.0	--	0.0	--	--	--	--	3170.0	
665	16.0	2261.2	--	--	10.9	--	--	--	236.1	4.4	--	--	--	3170.0	--	--	--	--	40.7	77.0	14.2	34.7	5865.0
667	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	96.0	--	--	--	--	96.0	
668	--	--	--	--	--	--	--	--	--	0.0	--	--	--	0.0	--	96.0	--	--	--	--	--	96.0	
670	879.6	2348.0	--	--	88.9	--	--	--	2298.6	17.4	22.1	322.4	268.6	--	40.7	--	--	--	--	--	--	60.7	6347.0
671	311.5	250.4	--	--	2.3	0.5	--	--	68.8	0.6	0.0	108.2	11.6	--	77.0	--	--	--	--	--	--	--	831.0
673	106.2	36.5	--	--	0.7	2.7	0.0	18.0	16.4	0.1	0.0	12.2	1.1	--	14.2	--	--	--	--	--	--	--	208.0
674	201.4	171.2	--	--	21.5	61.8	89.0	--	203.5	3.0	0.2	84.6	49.4	--	34.7	--	--	--	60.7	--	--	--	981.0
Sum	1549.0	13468.0	556.0	13.0	1186.0	526.0	1051.0	18.0	7915.0	94.0	613.0	3865.0	2388.0	3170.0	5865.0	96.0	96.0	6347.0	831.0	208.0	981.0	50836.0	

**Table 7. 2005 External-to-External Truck Trips**

	640	643	645	646	648	650	651	652	655	656	658	660	661	662	665	667	668	670	671	673	674	Sum	
640	--	--	--	--	--	0.5	0.3	--	2.2	0.0	0.0	2.0	0.1	--	2.1	--	--	133.6	16.9	5.5	12.9	176.0	
643	--	--	--	--	--	--	--	--	681.7	6.9	0.5	402.9	82.0	--	400.8	--	--	531.8	19.1	2.2	12.0	2140.0	
645	--	--	--	--	--	--	14.2	--	0.7	0.0	0.1	--	--	--	--	--	--	--	--	--	--	15.0	
646	--	--	--	--	--	--	--	--	--	--	--	1.7	0.3	--	--	--	--	--	--	--	--	2.0	
648	--	--	--	--	--	12.6	20.0	--	2.7	0.2	0.3	0.0	0.2	--	0.4	--	--	4.2	0.1	0.0	0.3	41.0	
650	0.5	--	--	--	12.6	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	0.5	12.3	26.0	
651	0.3	--	14.2	--	20.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	28.5	63.0	
652	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	0.0	
655	2.2	681.7	0.7	--	2.7	--	--	--	--	--	22.6	1.8	64.5	--	50.4	--	--	671.2	11.1	2.0	31.1	1542.0	
656	0.0	6.9	0.0	--	0.2	--	--	--	--	--	--	--	--	--	0.6	--	0.0	2.9	0.0	0.0	0.3	11.0	
658	0.0	0.5	0.1	--	0.3	--	--	--	22.6	--	--	--	--	--	--	--	--	0.5	0.0	0.0	0.0	24.0	
660	2.0	402.9	--	1.7	0.0	--	--	--	1.8	--	--	--	--	--	--	--	--	59.5	10.7	1.2	9.1	489.0	
661	0.1	82.0	--	0.3	0.2	--	--	--	64.5	--	--	--	--	--	--	--	--	25.5	0.6	0.1	2.7	176.0	
662	--	--	--	--	--	--	--	--	--	--	--	--	--	--	232.0	--	0.0	--	--	--	--	232.0	
665	2.1	400.8	--	--	0.4	--	--	--	50.4	0.6	--	--	--	232.0	--	--	--	13.5	10.3	1.5	5.4	717.0	
667	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0	--	--	--	--	7.0	
668	--	--	--	--	--	--	--	--	--	0.0	--	--	--	0.0	--	7.0	--	--	--	--	--	7.0	
670	133.6	531.8	--	--	4.2	--	--	--	671.2	2.9	0.5	59.5	25.5	--	13.5	--	--	--	--	--	--	11.5	1454.0
671	16.9	19.1	--	--	0.1	0.1	--	--	11.1	0.0	0.0	10.7	0.6	--	10.3	--	--	--	--	--	--	--	69.0
673	5.5	2.2	--	--	0.0	0.5	0.0	0.0	2.0	0.0	0.0	1.2	0.1	--	1.5	--	--	--	--	--	--	--	13.0
674	12.9	12.0	--	--	0.3	12.3	28.5	--	31.1	0.3	0.0	9.1	2.7	--	5.4	--	--	11.5	--	--	--	--	126.0
Sum	176.0	2140.0	15.0	2.0	41.0	26.0	63.0	0.0	1542.0	11.0	24.0	489.0	176.0	232.0	717.0	7.0	7.0	1454.0	69.0	13.0	126.0	7330.0	

Genesee County not only serves as a bedroom community to several neighboring counties, but also attracts trips into the region for other purposes, including working. For this reason, three separate purposes of EI-IE auto trips were defined:

- EI\_Work (EI\_W). The EI\_W trips represent the inbound commute to work and return from work made by residents outside of Genesee County. Trip Productions (P) are assigned at external stations as a percent of total volumes based on MI Travel Counts and CTPP JTW and trip attractions are estimated at internal zones as function of HBW attractions
- IE\_Work (IE\_W). The IE\_W trips represent the outbound work commute and return from work made by residents inside Genesee County. Trip productions estimated to internal TAZs as a function of HBW and trip attractions using MI Travel Count data and attractions are assigned to external stations as a percentage of total outbound traffic
- External NonWork (E\_NW). The E\_NW trips represent other external trips that are not related to work. Trip productions are assigned at external station as a percent of total volume, and trip attractions estimated at internal zones as function of HBO and HBSH attractions.

In Technical Memorandum 5.2 – Trip Generation, a table was made to report the number of records in the survey database disaggregated based on EI\_work, IE\_work, External NonWork by region. The table is copied in the following and the distribution percents by purpose were calculated based on the number of records of each trip purpose.

**Table 8. EI-IE Trip Percent by Purpose**

Entry Region	EI_W Trips	IE_W Trips	E_NW Trips	Total	EI_W Percent	IE_W Percent	E_NW Percent	Total
North	100	44	362	506	20%	9%	72%	100%
East	59	26	212	297	20%	9%	71%	100%
West	94	37	217	348	27%	11%	62%	100%
South	43	230	154	427	10%	54%	36%	100%
Southwest	64	114	170	348	18%	33%	49%	100%
Total	360	451	1,115	1,926	19%	23%	58%	100%

**Table 8** reports the external station locations, 2005 auto EI-IE trip production & attraction, distribution percent by purpose, EI\_Work trip production, IE\_Work trip attraction and External NonWork trip production. The 2005 auto EI-IE trip productions and attractions are equal to the 2005 auto EI-IE trip origins and destinations in **Table 9**.

## Genesee County Travel Demand Model

**Table 9. 2005 EI-IE Trips by Purpose**

ID	NAME	Location	2005 AUTO EI-IE P+A	Percent			EI_W Production	IE_W Attraction	E_NW Production
				EI_W P	IE_W A	E_NW P			
640	Sheridan Ave	North of Study Area	1,464	20%	9%	71%	293	132	1,039
641	Nichols Rd	North of Study Area	592	20%	9%	71%	118	53	420
642	Elms Rd	North of Study Area	2,042	20%	9%	71%	408	184	1,450
643	I 75 North	North of Study Area	18,498	20%	9%	71%	3,700	1,665	13,134
644	Saginaw Rd	North of Study Area	5,460	20%	9%	71%	1,092	491	3,877
645	Clio Rd	North of Study Area	2,564	20%	9%	71%	513	231	1,820
646	Bray Rd	North of Study Area	2,618	20%	9%	71%	524	236	1,859
647	Irish Rd	North of Study Area	964	20%	9%	71%	193	87	684
648	State Rd	North of Study Area	5,644	20%	9%	71%	1,129	508	4,007
649	Henderson Rd	North of Study Area	766	20%	9%	71%	153	69	544
650	Lake Rd	East of Study Area	1,462	20%	9%	71%	292	132	1,038
651	Columbiaville Rd	East of Study Area	662	20%	9%	71%	132	60	470
652	E Mount Morris Rd	East of Study Area	3,850	20%	9%	71%	770	347	2,734
653	Davison Rd	East of Study Area	3,856	20%	9%	71%	771	347	2,738
654	Lapeer Rd	East of Study Area	2,016	20%	9%	71%	403	181	1,431
655	I 69 East	East of Study Area	16,300	20%	9%	71%	3,260	1,467	11,573
656	Hill Rd	East of Study Area	1,940	20%	9%	71%	388	175	1,377
657	Hegel Rd	East of Study Area	1,680	20%	9%	71%	336	151	1,193
658	Ortonville RD	South of Study Area	12,876	10%	54%	36%	1,288	6,953	4,635
659	Dixie Hwy	South of Study Area	13,404	10%	54%	36%	1,340	7,238	4,825
660	I 75 South	South of Study Area	31,098	10%	54%	36%	3,110	16,793	11,195
661	N Holly Rd	South of Study Area	3,992	10%	54%	36%	399	2,156	1,437
662	Main St	South of Study Area	5,890	10%	54%	36%	589	3,181	2,120
663	S Holly Rd	South of Study Area	6,436	10%	54%	36%	644	3,475	2,317
664	Adelaide St	SW of Study Area	3,167	18%	33%	49%	570	1,045	1,552
665	S US 23	SW of Study Area	27,326	18%	33%	49%	4,919	9,018	13,390
666	Linden Rd	South of Study Area	7,634	10%	54%	36%	763	4,122	2,748
667	Seymour Rd	SW of Study Area	3,840	18%	33%	49%	691	1,267	1,882
668	Silver Lake Rd	West of Study Area	3,570	27%	11%	62%	964	393	2,213
669	Lansing Rd	West of Study Area	3,472	27%	11%	62%	937	382	2,153
670	I 69 West	West of Study Area	11,408	27%	11%	62%	3,080	1,255	7,073
671	M 21	West of Study Area	6,904	27%	11%	62%	1,864	759	4,280
672	Pierson Rd	West of Study Area	1,154	27%	11%	62%	312	127	715
673	W Mount Morris Rd	West of Study Area	1,626	27%	11%	62%	439	179	1,008
674	Vienna Rd	West of Study Area	2,182	27%	11%	62%	589	240	1,353
675	Grand Blanc Rd	West of Study Area	3,500	27%	11%	62%	945	385	2,170
676	Thompson Rd	South of Study Area	650	10%	54%	36%	65	351	234
	Total		222,507				37,984	65,833	118,690

### **Future Year External Trip Estimation**

The 2035 external trip table estimation is required for the Genesee model update. The Michigan statewide travel demand model has two horizontal years, i.e. 2005 and 2030. The 2030 preliminary external trip tables were generated by the subarea analysis in the 2030 Michigan statewide model. The 2030 preliminary external trip tables were adjusted by the 2005 adjustment amounts, and then the annual growth rates of auto vehicle and truck trips were calculated using the number of trips in the 2005 and 2030 external trip tables. The annual growth rates were used to calculate the 2035 total external trips and external-external trips, and the Fratar model was used to compute the 2035 external-external trip matrices for auto vehicle and Truck. The Michigan statewide model covers only twenty-five external stations of the Genesee county model. For other ten external stations not in the statewide model, the annual growth rates were assumed, and the general assumption is there are no external-external trips of these ten external stations. In other words, the external trips of those ten external stations that are not in the Michigan statewide model network are all EI-IE trips. In addition, this approach was coded in the Genesee model and can be used to calculate the external trip table of any year in between 2005 and 2035. Finally the EI-IE trips were calculated by three trip purposes, i.e. non-work, EI and IE work purposes.

The subarea analysis of Multi-Modal Multi-Class Assignment (MMA) was performed in TransCAD to get the external trip tables (matrix) for each trip purpose defined in the statewide model. The preliminary external truck trip table is estimated by adding 20% NHBO and 10% NHBWB matrices together, and the preliminary auto external trip matrix is equal to the difference between all-vehicle trip matrix and the truck external trip matrix. There were adjustments to the statewide model results in the 2005 external trip estimation, and those adjustments were applied to the 2030 statewide model results as well. The final 2030 external trip calculation of each vehicle class can be explained by the following equation:

$$2030 \text{ External Trips} = 2030 \text{ SW Model Trips} + (2005 \text{ ADT Count} - 2005 \text{ SW Model Trips}) \quad (2)$$

The final 2035 external traffic volumes of auto vehicle and truck are listed in **Table 11**. The trip growth calculation equation is given below,

$$Vol_{2035} = Vol_{2005} * (1+r)^{(2035-2005)} \quad (3)$$

Where  $Vol_{2035}$  is the 2035 external traffic volumes, i.e. total trip origins and destinations  
 $Vol_{2005}$  is the 2005 external traffic volumes  
 $r$  is the annual growth rate

**Table 10** shows the calculated growth rates of twenty-five external stations for auto vehicle and truck. These rates were calculated based on the equation below,

$$r = \exp\{[\ln(Vol_{2035}) - \ln(Vol_{2005})]/25\} - 1 \quad (4)$$

where  $\exp()$  is the function returning the value of the constant  $e$  raised to a power  
 $\ln()$  is the function returning the natural logarithm of a number

**Table 10. Annual Growth Rate of Auto and Truck Trips**

ID	NAME	Rate Type	Annual Auto Growth Rate	Annual Truck Growth Rate
640	Sheridan Ave	calculated	2.5%	0.6%
641	Nichols Rd	assumed	0.8%	0.5%
642	Elms Rd	assumed	0.8%	0.5%
643	I 75 North	calculated	1.3%	0.4%
644	Saginaw Rd	assumed	0.8%	0.5%
645	Clio Rd	calculated	3.0%	1.6%
646	Bray Rd	calculated	0.8%	0.1%
647	Irish Rd	assumed	0.8%	0.5%
648	State Rd	calculated	0.8%	0.8%
649	Henderson Rd	assumed	0.8%	0.5%
650	Lake Rd	calculated	1.2%	0.3%
651	Columbiaville Rd	calculated	3.2%	0.5%
652	E Mount Morris Rd	calculated	0.3%	0.1%
653	Davison Rd	assumed	0.8%	0.5%
654	Lapeer Rd	assumed	0.8%	0.5%
655	I 69 East	calculated	2.4%	0.6%
656	Hill Rd	calculated	1.0%	0.1%
657	Hegel Rd	assumed	0.8%	0.5%
658	Ortonville RD	calculated	1.1%	0.9%
659	Dixie Hwy	assumed	0.8%	0.5%
660	I 75 South	calculated	1.9%	0.5%
661	N Holly Rd	calculated	0.4%	0.2%
662	Main St	calculated	0.1%	0.1%
663	S Holly Rd	assumed	0.8%	0.5%
664	Adelaide St	assumed	0.8%	0.5%
665	S US 23	calculated	2.3%	0.9%
666	Linden Rd	assumed	0.8%	0.5%
667	Seymour Rd	calculated	1.0%	0.4%
668	Silver Lake Rd	calculated	1.0%	0.6%
669	Lansing Rd	assumed	0.8%	0.5%
670	I 69 West	calculated	2.2%	0.4%
671	M 21	calculated	0.9%	0.3%
672	Pierson Rd	assumed	0.8%	0.5%
673	W Mount Morris Rd	calculated	0.7%	0.4%
674	Vienna Rd	calculated	2.1%	0.5%
675	Grand Blanc Rd	assumed	0.8%	0.5%
676	Thompson Rd	assumed	0.4%	0.2%

If a rate is less than 0.1%, this rate is assigned with 0.1%. Ten external stations that are not in the Michigan statewide model are on low functional classification roadway, such as collector and minor arterial. Its annual growth rates were assumed as 0.8% for auto vehicle trips and 0.5% for truck trips. However, the annual growth rates of external station 676 were assumed as 0.4% for auto trips and 0.2% for truck trips in consideration of the development conditions in the areas around this external station.

Based on the annual growth rates in **Table 10** and the 2005 external trips in **Table 3**, the number of 2035 External-Internal and Internal-External (EI-IE) trips can be calculated by use of Equation (3). Then 2035 EI-IE trips can be further disaggregated into the 2035 External-Internal Work (EI\_W) trip productions, Internal-External Work (IE\_W) trip attractions and External NonWork (E\_NW) trip productions by use of the distribution percent in **Table 8**.

The number of 2035 external-external (EE) trips can be calculated using Equation (3) in a similar way. For each vehicle class, the 2035 external trips are the EE trips plus the EI-IE trips. **Table 11**

## ***Genesee County Travel Demand Model***

reports the results of the 2035 external trip estimation. The 2005 external trip numbers were added in the table for comparison reason. Overall the number of truck trips increases 17.1% from 2005 to 2035 while the number of auto trips increases 59.6%.

**Table 11. 2035 External Trips**

ID	NAME	2005 Truck ADT Count	2035 Truck	Increase (%)	2005 Auto ADT Count	2035 Auto O+D	Increase (%)	2035 AUTO EI-IE P+A	2035 EI_W Production	2035 IE_W Attraction	2035 E_NW Production
640	Sheridan Ave	506	600	18.6%	4,562	9,460	107.4%	3,036	607	273	2,156
641	Nichols Rd	70	81	15.7%	592	751	26.9%	751	150	68	533
642	Elms Rd	262	304	16.0%	2,042	2,593	27.0%	2,593	519	233	1,841
643	I 75 North	6,788	7,736	14.0%	45,434	66,266	45.9%	26,980	5,396	2,428	19,156
644	Saginaw Rd	330	383	16.1%	5,460	6,934	27.0%	6,934	1,387	624	4,923
645	Clio Rd	152	244	60.5%	3,676	8,850	140.8%	6,174	1,235	556	4,384
646	Bray Rd	284	291	2.5%	2,644	3,400	28.6%	3,368	674	303	2,391
647	Irish Rd	58	67	15.5%	964	1,224	27.0%	1,224	245	110	869
648	State Rd	246	308	25.2%	8,016	10,182	27.0%	7,170	1,434	645	5,091
649	Henderson Rd	158	183	15.8%	766	972	26.9%	972	194	87	690
650	Lake Rd	152	163	7.2%	2,514	3,591	42.8%	2,089	418	188	1,483
651	Columbiaville Rd	168	195	16.1%	2,764	7,116	157.5%	1,704	341	153	1,210
652	E Mount Morris	234	241	3.0%	3,886	4,223	8.7%	4,185	837	377	2,971
653	Davison Rd	400	464	16.0%	3,856	4,897	27.0%	4,897	979	441	3,477
654	Lapeer Rd	122	141	15.6%	2,016	2,560	27.0%	2,560	512	230	1,818
655	I 69 East	4,800	5,734	19.5%	32,128	65,069	102.5%	33,013	6,603	2,971	23,439
656	Hill Rd	128	129	0.8%	2,128	2,861	34.4%	2,609	522	235	1,852
657	Hegel Rd	90	104	15.6%	1,680	2,133	27.0%	2,133	427	192	1,514
658	Ortonville RD	436	565	29.6%	14,102	19,504	38.3%	17,810	1,781	9,617	6,412
659	Dixie Hwy	514	596	16.0%	13,404	17,023	27.0%	17,023	1,702	9,192	6,128
660	I 75 South	5,046	5,874	16.4%	38,828	67,711	74.4%	54,231	5,423	29,285	19,523
661	N Holly Rd	530	563	6.2%	8,768	9,815	11.9%	4,469	447	2,413	1,609
662	Main St	812	836	3.0%	12,230	12,601	3.0%	6,069	607	3,277	2,185
663	S Holly Rd	248	288	16.1%	6,436	8,173	27.0%	8,173	817	4,413	2,942
664	Adelaide St	254	294	15.7%	3,168	4,022	27.0%	4,022	724	1,327	1,971
665	S US 23	4,338	5,626	29.7%	39,056	76,600	96.1%	53,594	9,647	17,686	26,261
666	Linden Rd	294	341	16.0%	7,634	9,695	27.0%	9,695	970	5,235	3,490
667	Seymour Rd	244	271	11.1%	4,032	5,418	34.4%	5,160	929	1,703	2,528
668	Silver Lake Rd	228	273	19.7%	3,762	5,059	34.5%	4,801	1,296	528	2,977
669	Lansing Rd	210	243	15.7%	3,472	4,409	27.0%	4,409	1,190	485	2,734
670	I 69 West	5,300	6,048	14.1%	24,100	46,560	93.2%	22,040	5,951	2,424	13,665
671	M 21	450	486	8.0%	8,566	11,051	29.0%	8,907	2,405	980	5,522
672	Pierson Rd	70	81	15.7%	1,154	1,465	26.9%	1,465	396	161	908
673	W Mount Morris	124	137	10.5%	2,042	2,499	22.4%	1,991	538	219	1,234
674	Vienna Rd	512	589	15.0%	4,144	7,671	85.1%	4,039	1,091	444	2,504
675	Grand Blac Rd	300	348	16.0%	3,500	4,445	27.0%	4,445	845	845	2,756
676	Thompson Rd	50	53	6.0%	650	732	12.6%	732	146	66	520
	Total	34,908	40,880	17.1%	324,176	517,535	59.6%	345,467	59,382	100,417	185,668

**B. TRIP GENERATION MODEL**

The trip generation component of the Genesee County model consists of trip production models for several trip purposes. The models were estimated using multiple regression techniques based on the *MI Travel Counts Household Travel Survey*.

For the Genesee County model, trip purposes were categorized as follows:

- Home Based Work Low Income (HBWLo)
- Home Based Work High Income (HBWHi)
- Home Based Shopping (HBS)
- Home Based Other (HBO)
- Home Based School – K12 (HBSCH)
- Home Based School – Univ / College (HBU)
- Non Home Based Other (NHBO)
- Non Home Based Work (NHBW)

**Household Stratification**

Based on the selection of trip purposes and cross classification variables, it is necessary to disaggregate the zonal households into the following categories:

- Household Size: 1, 2, 3 and 4+ Persons
- Household Workers: 0, 1, 2, and 3+ Workers per Household
- Vehicles per Household: 0, 1, 2 and 3+ Vehicles per Household
- Household Income: Low and High.

Households with an annual income less than \$42,500 are categorized as the lower income group and all others are in the high income group. The cross classification of households necessary for trip production estimation is based on a cross multiplication of the necessary single dimension distributions to develop the two or three dimensional distribution of households. The single distributions were calibrated for Genesee County using Census for Transportation Planning Package (CTPP) Part 1 Data Tables at the CTPP TAZ level of geography. The specific tables used are shown in the following table.

**Table 12. Household Stratification Calibration CTPP Data Sources**

Variable	CTPP Table
Household Size	Table 62: Household Size by Number of Workers in Household Table 47: Total Number of Persons
Household Workers	Table 62: Household Size by Number of Workers in Household Table 17: Industry by Time Leaving Home to Go to Work
Vehicles per Household	Table 63: Household Size by Vehicles Available
Household Income	Table 66: Number of Workers in Household by Household Income

Using the CTPP TAZ Geography and corresponding data from the above tables, the distribution of households into each category was calculated from the CTPP data. In addition the independent variables were estimated for each CTPP TAZ. The independent variables used include:

- Household Size: Average Household Size
- Workers per Household: Average Number of Workers per Household
- Vehicles per Household: Average Number of Vehicles per Household
- Income: Zonal Average Income / Regional Average Income

Using SPSS, regression models were estimated for each size bin of the four dimensions using linear, quadratic and cubic functions. The resulting R squared, constant and coefficients for each model are presented in Table 2. In the application, a model must be chosen for each size category and applied using the zonal independent variable. A second consideration is how to “normalize” the resulting percentages to 1.0 or 100%. One approach proposed is to consider one size category as a residual. Thus the other size categories are estimated and the fourth category is then 1 minus the sum of the other categories. A final consideration in application is the treatment of values at the extreme ends of the curves. The predictive value of the models does not hold at the extremes, for example household size = 1. Thus the curves must be normalized to provide the correct result at the extreme minimum and maximum values of the independent variable.

Following is a series of figures that show the relationship between the zonal independent variable and observed percentages in each size category along with the calibrated models.



**Table 13. Household Stratification Curve Estimation**

Dependent	Model	R Square	Constant	b1	b2	b3
HH1	Linear	0.43108	0.771676	-0.20003		
	Quadratic	0.515363	1.350802	-0.65898	0.087752	
	Cubic	0.517791	1.556084	-0.91045	0.18395	-0.01156
HH2	Linear	0.042613	0.46252	-0.05072		
	Quadratic	0.076601	0.165912	0.184336	-0.04494	
	Cubic	0.080061	-0.03174	0.426456	-0.13757	0.01113
HH3	Linear	0.098116	-0.01445	0.072559		
	Quadratic	0.106726	-0.15519	0.184096	-0.02133	
	Cubic	0.109656	-0.32666	0.394147	-0.10168	0.009656
HH4	Linear	0.531357	-0.21975	0.178194		
	Quadratic	0.539203	-0.36153	0.29055	-0.02148	
	Cubic	0.541605	-0.19768	0.089848	0.055295	-0.00923

Independent: Average Household Size

Dependent	Model	R Square	Constant	b1	b2	b3
W0	Linear	0.634243	0.679496	-0.34407		
	Quadratic	0.717014	0.93788	-0.79967	0.184965	
	Cubic	0.719771	1.010131	-1.01074	0.364115	-0.04495
W1	Linear	0.025984	0.447983	-0.06093		
	Quadratic	0.074507	0.274906	0.244248	-0.1239	
	Cubic	0.148535	-0.05264	1.201123	-0.93606	0.203758
W2	Linear	0.478866	-0.05584	0.290012		
	Quadratic	0.502828	-0.1907	0.527793	-0.09654	
	Cubic	0.525725	0.011283	-0.06226	0.404278	-0.12565
W3	Linear	0.391397	-0.07164	0.114991		
	Quadratic	0.408214	-0.02209	0.027625	0.035469	
	Cubic	0.416509	0.031226	-0.12813	0.167666	-0.03317

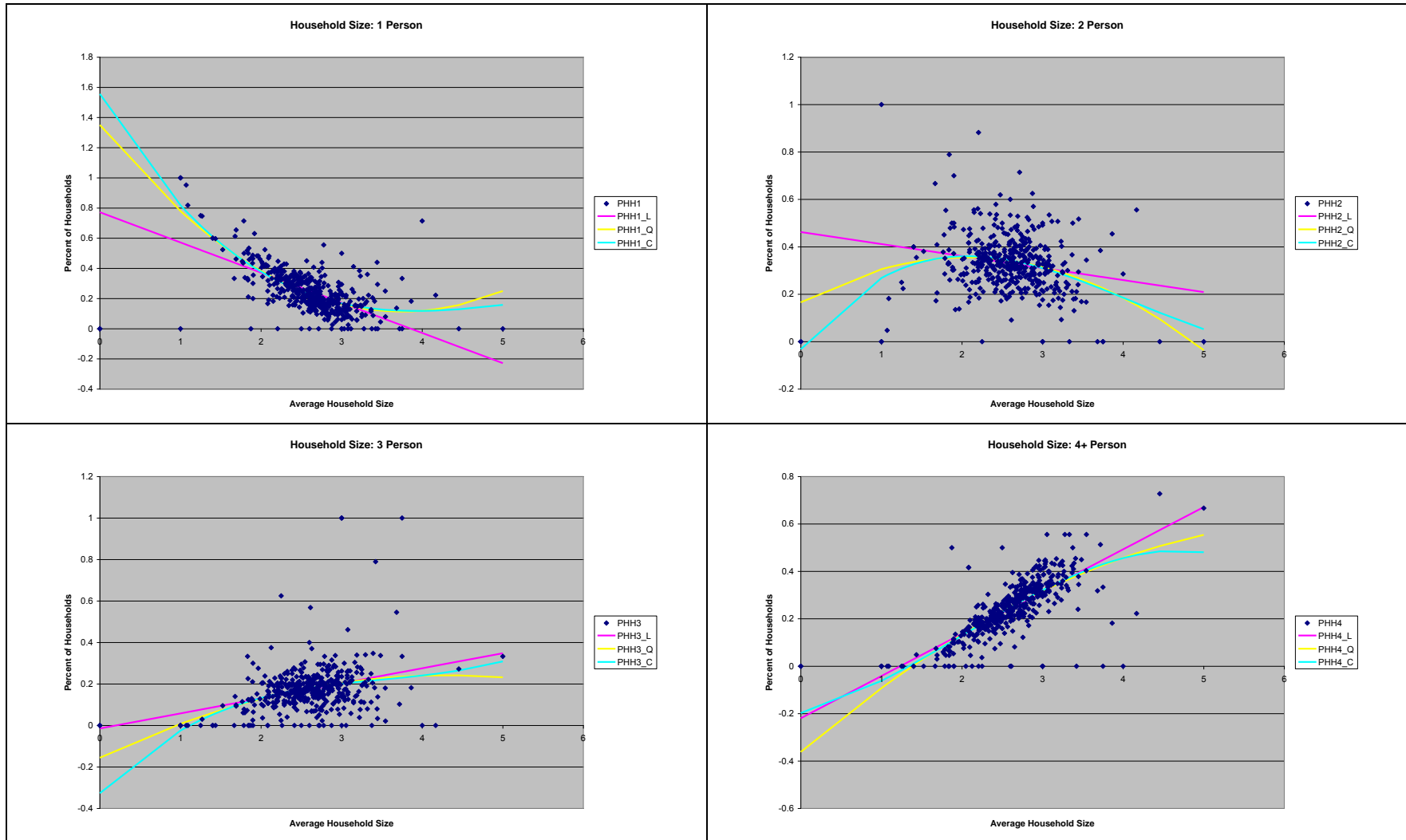
Independent: Average Workers per Household

Dependent	Model	R Square	Constant	b1	b2	b3
V0	Linear	0.241045	0.198656	-0.06944		
	Quadratic	0.312985	0.339316	-0.22679	0.038314	
	Cubic	0.316623	0.397091	-0.33226	0.094188	-0.00875
V1	Linear	0.234151	0.525783	-0.11049		
	Quadratic	0.285691	0.71801	-0.32553	0.05236	
	Cubic	0.314217	0.456779	0.15138	-0.20028	0.03955
V2	Linear	0.216445	0.22872	0.100784		
	Quadratic	0.253326	0.074451	0.273361	-0.04202	
	Cubic	0.253496	0.055315	0.308297	-0.06053	0.002897
V3	Linear	0.21816	0.046842	0.079143		
	Quadratic	0.298975	-0.13178	0.27896	-0.04865	
	Cubic	0.336587	0.090814	-0.12741	0.166616	-0.0337

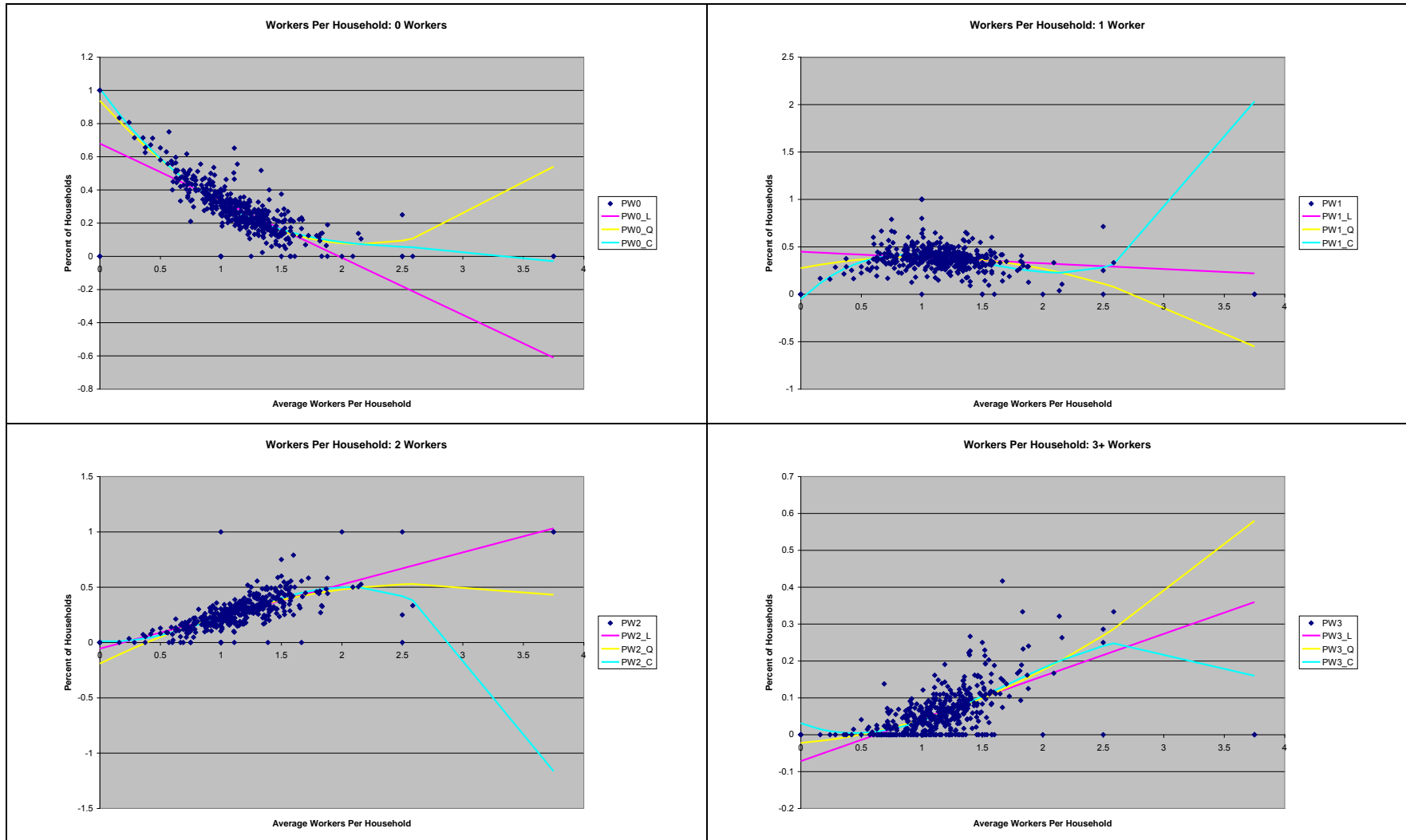
Independent: Average Vehicles per Household

Dependent	Model	R Square	Constant	b1	b2	b3
LOW	Linear	0.575313	0.902518	-0.41562		
	Quadratic	0.616462	1.116436	-0.86429	0.203395	
	Cubic	0.627002	0.927256	-0.22615	-0.40785	0.172674
HIGH	Linear	0.575313	0.097482	0.415616		
	Quadratic	0.616462	-0.11644	0.864292	-0.2034	
	Cubic	0.627002	0.072744	0.226147	0.407847	-0.17267

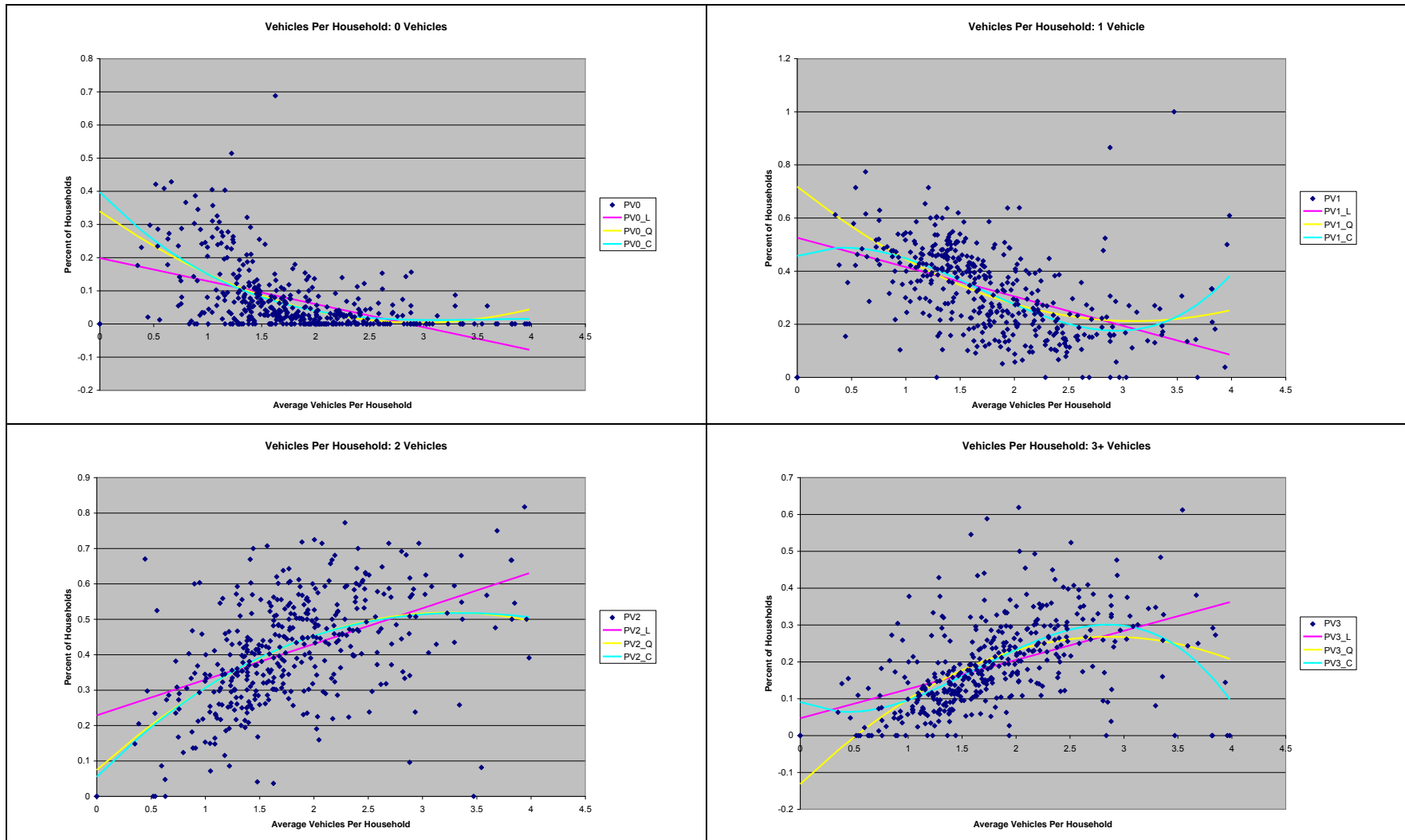
Independent: Zonal Average Income / Regional Average Income



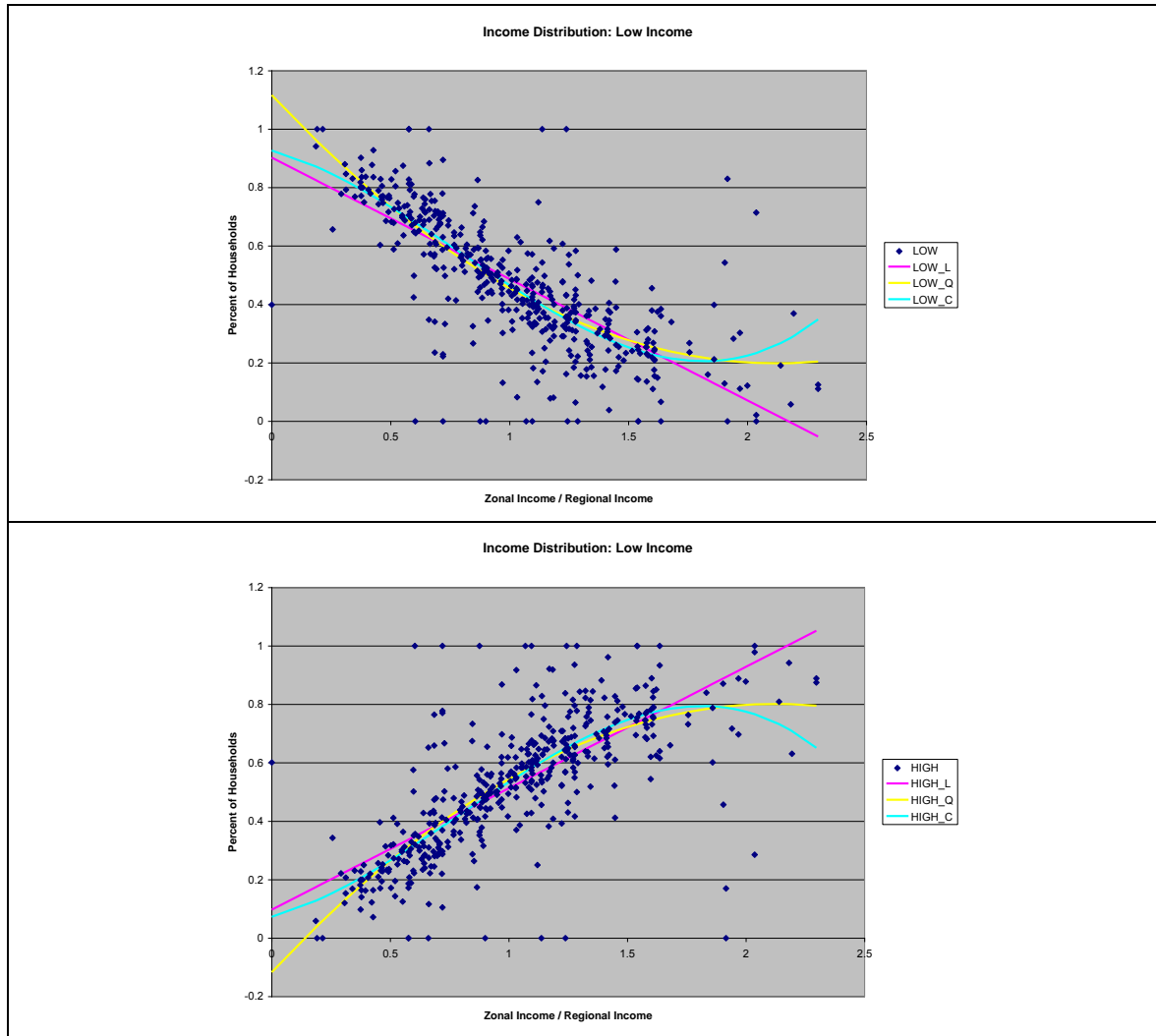
**Figure 10. Household Size Stratification Models**



**Figure 11. Workers per Household Stratification Models**



**Figure 12. Vehicles per Household Stratification Models**



**Figure 13. Income Stratification Models**

In application, it is important to compare the resulting distribution of households to the CTPP distributions used to calibrate the stratification models. Following is a series of household distributions based on the CTPP data for Genesee County.

**Table 14. Household Distribution by Vehicles, Workers and Income**

		Household Size			
		1	2	3	4
Vehicles per Household	0	4.1%	1.5%	1.0%	1.1%
	1	18.2%	9.2%	4.0%	4.3%
	2	3.4%	17.6%	7.3%	11.4%
	3	0.8%	3.9%	4.9%	7.3%
		Workers per Household			
		0	1	2	3
Vehicles per Household	0	2.3%	3.0%	2.1%	0.4%
	1	10.5%	13.6%	9.5%	2.0%
	2	11.7%	15.1%	10.6%	2.2%
	3	5.1%	6.6%	4.6%	0.9%
		Workers per Household			
		0	1	2	3
Income	Low	23.7%	20.7%	5.7%	0.4%
	High	5.7%	17.6%	21.0%	5.1%

**Trip Production Model**

From the standpoint of trip generation, the vast majority of trips are generated by households within the study area. The *MI Travel Counts survey* was used to develop cross-classification models of daily number of household trips (broken down by trip purpose) based on various characteristics of the household and its accessibility to employment of various types. The following series of tables present the calibrated trip production rates using the cell compression and income stratifications described above. The trip production rates were calibrated using the combined TMA samples from the *MI Travel Counts* and were weighted by the expansion factors. Because the *MI Travel Counts survey* covered a two day period, trip rates were calculated based on the two day period and then multiplied by 0.50 to create an average trip rate for each day.

**Table 15. Work Related Trip Production Rates**

HBW Low Income		Workers per Household				
Trips		0	1	2	3	
Vehicles per Household	0		1.188			
	1		0.852	1.791		
	2		0.726	1.971	2.250	
	3		0.792	2.387	1.000	
					Total	0.350
HBW High Income		Workers per Household				
Trips		0	1	2	3	
Vehicles per Household	0		0.000			
	1		0.554	0.000		
	2		0.644	1.846	3.000	
	3		0.737	1.622	2.524	
					Total	0.594
NHBW Trips		Workers per Household				
Trips		0	1	2	3	
Vehicles per Household	0		0.067			
	1		0.507	0.409		
	2		0.304	1.271	0.400	
	3		0.330	1.022	1.195	
					Total	0.483

**Table 2. Non Work Related Trip Production Rates**

HBO Trips		Household Size				
		1	2	3	4	
Vehicles per Household	0	0.569	1.907			Total 1.947
	1	1.046	1.727	1.752		
	2		1.904	2.694	3.724	
	3			2.465	3.096	
		Total				1.947
HBSH Trips		Household Size				
		1	2	3	4	
Vehicles per Household	0	0.351	0.771			Total 0.708
	1	0.431	0.740	0.570		
	2		0.788	0.872	1.127	
	3			0.261	0.311	
		Total				0.708
NHBO Trips		Household Size				
		1	2	3	4	
Vehicles per Household	0	0.130	1.612			Total 1.744
	1	0.578	1.564	1.928		
	2		1.838	2.452	3.945	
	3			1.732	2.734	
		Total				1.744

**Table 3. School Trips Production Rates**

HBSC (K-12) Trips		Household Size				
		1	2	3	4	
Vehicles per Household	0	0.000	1.715			Total 1.169
	1	0.028	0.397	3.180		
	2		0.131	1.373	3.534	
	3			0.838	2.951	
		Total				1.169
HBU (College - Univ.)		Household Size				
		1	2	3	4	
Vehicles per Household	0	0.000	0.111			Total 0.050
	1	0.000	0.000	0.042		
	2		0.020	0.011	0.097	
	3			0.218	0.244	
		Total				0.050

Some variables have been included, despite marginal statistical significance, based on the plausibility of their influence on the dependent variable and the reasonableness of their parameter.



## ***Genesee County Travel Demand Model***

The following series of tables represent a combined average trip rate for all purposes.

**Table 18. Aggregated Average Daily Production Rate**

HHVH	HBW	HBO	HBSH	NHBO	NHBW	HBSC(K12)	HBSC(U)	HH
0	4,901	18,511	8,635	12,299	333	11,771	762	16,387
1	31,045	76,454	29,835	65,073	15,724	53,982	632	53,548
2	54,426	123,807	42,966	124,593	33,124	68,109	1,808	48,115
3	42,463	67,228	22,548	54,246	22,062	37,871	4,179	28,854
Total	132,835	285,999	103,984	256,211	71,243	171,732	7,382	146,904

HHVH	HBW	HBO	HBSH	NHBO	NHBW	HBSC(K12)	HBSC(U)	Total
0	0.03	0.13	0.06	0.08	0.00	0.08	0.01	0.39
1	0.21	0.52	0.20	0.44	0.11	0.37	0.00	1.86
2	0.37	0.84	0.29	0.85	0.23	0.46	0.01	3.06
3	0.29	0.46	0.15	0.37	0.15	0.26	0.03	1.71
Total	0.90	1.95	0.71	1.74	0.48	1.17	0.05	7.01

### **Trip Attraction Model**

In terms of a travel demand model, the demand for trips is partly determined by the attractiveness of each zone. Attractions can be places of work, shopping locations, service locations, recreation areas, etc. Strictly speaking, attractions do not produce any trips – they attract trips (households are where trips are produced).

Productions and attractions are often confused with origins and destinations. Certainly when a person is leaving home to go to work, that trip is traveling from an origin which is a production to a destination which is an attraction. However, when that person makes the return trip home, that trip leaves from an origin (the workplace) which is an attraction to go to a destination (the household) which is a production. A location that is an attraction is labeled as an attraction irrespective of the direction of travel. The trip attraction model is not based merely on the number of attractions, or the size of the attractions, in a given area, such as a TAZ. The important element is the number of trip ends associated with the attractions in a TAZ, whatever the number of possible attractions. The trip attraction model defines the attractiveness of each area.

The attractions for each trip purpose are calculated using a linear regression model that was calibrated using the MI Travel Counts database with records specific to internal trips made within Genesee County. The following logical steps were taken to come up with attraction equations:

1. Correlation between surveyed attractions and available socioeconomic variables was investigated. The investigation involves main examination of Pearson Correlation and the 2-Tailed Level of Significance. Supplemental to these statistics, nonparametric correlations such as Kendall's tau\_b and Spearman's rho were also compared. From this analysis, significantly correlated variables with attractions were selected as a pool of candidates for independent variables.
2. Since the analysis involves numerous combinations of many socioeconomic variables, to be efficient, stepwise regression technique was employed. The stepwise technique is appropriate to

deal with multiple explanatory variables and is superior to one-step multiple regression, forward and backward selection technique. In implementing the stepwise technique, no constants were forced during the analysis since the model without a constant produced better results in most cases.

3. Regression results were analyzed for the following main statistics:
  - a. Adjusted R Square
  - b. Overall model F-statistics and its significance level
  - c. Model coefficients (magnitude and signs)
  - d. t-statistics for each of entered variables and its significance level
  - e. Multicollinearity among entered variables
4. The model selection process was not solely dependent on one statistic such as Adjusted R Square. Rather the process was based on combinational effects of the above statistics. For example, a model's R Square would increase as more independent variables are added, but it does not necessarily imply that the model is getting better. The performance of each of the entered variables need to be checked.
5. Besides the above statistics, logical judgments were made for appropriateness of each variable. For example, one shows statistically significant, thus it is natural to include the variable in the model since it improves the model. However, the variable may not make a logical connection to trip attractions for a specific trip purpose. In this case, it was decided that the variable does not have reasonable explanatory power and the variable was subsequently removed from the model even though it sacrificed the model performance.

As described above, SPSS was used to calculate the correlation between the attractions for each trip purpose to the socioeconomic variables in each district. The detailed employment variables, as well as the total employment were used. In addition, total household was tested as a variable. For the home based school purpose, k-12 enrollment was not tested but was used as the independent variable in the regression analysis. The results of the correlation analysis are shown below. The pool of potential variables used in the Step-Wise Regression Analysis was based on these results.

**Table 19. Correlation Analysis of Observed Trip Ends**

Variable	HBW_Z		HBO_Z		HBSH_Z	
	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
TOTAL	0.825	9.83063E-22	0.830	3.32349E-22	0.681	1.34745E-12
MANUF	0.349	0.001206609	0.392	0.000248532	0.304	0.005162387
OTHER	0.534	1.97513E-07	0.677	2.17671E-12	0.528	2.96917E-07
TRANSP	0.390	0.00027187	0.223	0.04285578	0.235	0.032758661
FINC	0.492	2.25871E-06	0.495	1.99994E-06	0.378	0.000428053
RETAIL	0.707	8.28991E-14	0.779	4.48302E-18	0.835	1.06834E-22
WHOLES	0.443	2.6906E-05	0.469	7.80357E-06	0.406	0.000142811
SERV	0.819	2.83839E-21	0.821	2.16369E-21	0.652	2.42493E-11
GOV	0.291	0.007639842	0.188	0.087967695	0.091	0.412728639
HH	0.642	6.3666E-11	0.801	1.0335E-19	0.651	2.7962E-11

Variable	NHBO		NHBW_W		NHBW_O	
	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
TOTAL	0.836	8.09512E-23	0.779	4.22651E-18	0.804	6.12084E-20

## ***Genesee County Travel Demand Model***

MANUF	0.400	0.000178715	0.323	0.002906852	0.381	0.000386895
OTHER	0.680	1.57424E-12	0.621	3.74632E-10	0.672	3.37598E-12
TRANSP	0.270	0.013603047	0.442	2.91837E-05	0.332	0.002170822
FINC	0.469	7.84888E-06	0.447	2.2494E-05	0.421	7.31097E-05
RETAIL	0.822	1.70307E-21	0.717	2.56601E-14	0.699	2.00946E-13
WHOLES	0.491	2.4492E-06	0.472	6.53312E-06	0.484	3.46734E-06
SERV	0.829	3.91063E-22	0.776	6.90774E-18	0.799	1.29755E-19
GOV	0.153	0.168352035	0.195	0.077496333	0.201	0.068466087
HH	0.794	3.71824E-19	0.651	2.78481E-11	0.779	4.40691E-18

Once the variables for use in Regression Analysis were selected based on the correlation analysis, Step-Wise Regression was used to determine the best model for each trip purpose. As discussed above, R squared was used as one selection variable. The final model was selected based on a combination of R squared, logical variables and reasonableness of the coefficients.

**Table 4. Trip Attraction Step-Wise Regression Results**

	HBW	HBO	HBSH	NHBO	NHBW_W	NHBW_O	HBSC1	HBSCU
TOTAL	0.590	0.000	0.000	0.000	0.309	0.000	0.000	0.000
MANUF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OTHER	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TRANSP	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FINC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RETAIL	0.000	3.069	3.403	7.567	0.000	0.504	0.000	0.000
WHOLES	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SERV	0.000	0.961	0.000	1.499	0.000	0.336	0.000	0.000
GOV	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HH	0.000	0.624	0.000	0.797	0.000	0.171	0.000	0.000
K12	0.000	0.000	0.000	0.505	0.000	0.000	1.838	0.000
U	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209
R-squared	0.898	0.931	0.887	0.938	0.869	0.893	0.887	0.900

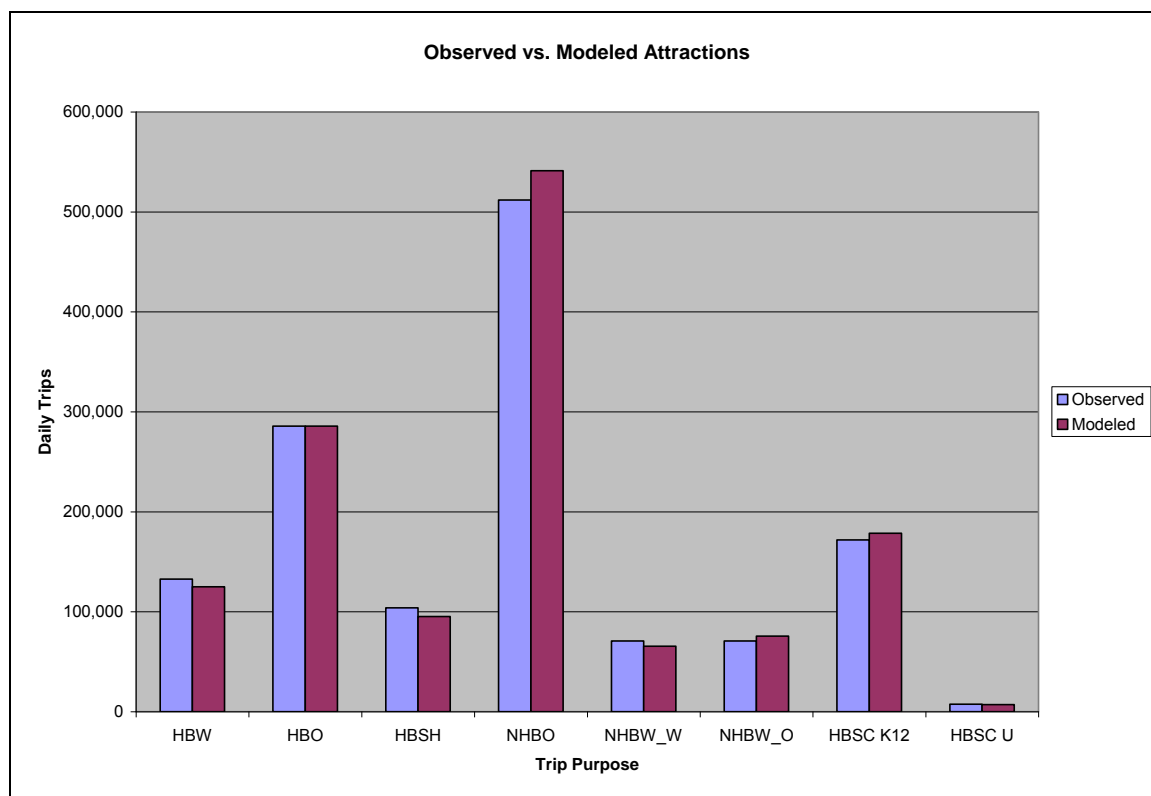
In the above table, the NHBO Coefficients are scaled to estimate the total number of trips ends which includes both the production and attraction ends of the trip. In application, the NHBO attraction model is used to estimate only the attraction end of the trip. Thus in application, the coefficients for the Genesee County model should be reduced by 0.50.

The model was then applied to the aggregated data. The comparison between the survey expanded trip ends by purpose follows.

## Genesee County Travel Demand Model

**Table 5. Observed vs. Modeled Attractions by Purpose**

Purpose	Observed	Modeled
HBW	132,692	124,881
HBO	285,570	285,688
HBSH	103,984	95,216
NHBO	511,766	541,155
NHBW_W	70,706	65,404
NHBW_O	70,706	75,592
HBSC K12	171,732	178,580
HBSC U	7,382	7,073



**Figure 14. Comparison of Survey and Model Attraction Trip Ends**

The coefficients to be applied by income group for the zonal employment categories are presented below.

**Table 6. Percent Distribution of Employment Type**

Income	Employment							
	MANUF	OTHER	TRANSP	FINC	RETAIL	WHOLES	SERV	GOV
Low	0.247	0.238	0.23	0.29	0.41	0.23	0.355	0.19
High	0.753	0.762	0.77	0.71	0.59	0.77	0.645	0.81

### **Under-Report and Area Adjustment Factor**

After trip distribution and assignment, the assigned trips are checked against the ground traffic counts to verify if the trip production and attraction rates are under-reported in the household survey. For the Genesee County model, the following area factors are introduced to solve the under-report problem. These factors are multiplied with the trips estimated from the above mentioned method.

- CBD area, factor =1.1
- Urban area, factor=1.4
- Suburban area, factor =1.48
- Rural area, factor= 1.3

The under-report problems occur at the parts of Grand Blanc Road and Hill Road corridors. The under report factors for the 15-TAZ area around these parts of the two corridors are saved in SG000.dbf under the file directory \tg\ .

### **Special Generator**

The airport (TAZ 188) is defined as the only special trip generator in the model. The following equations are used to calculate the trips

$$\text{Number of person trips (tot\_trip)} = \text{Employment} * 13.4 * 1.65 * 1.59$$

$$\text{NHBO\_Prod} = \text{tot\_trip} * 34\% / 2$$

$$\text{NHBO\_Attr} = \text{tot\_trip} * 34\% / 2$$

$$\text{HBO\_Attr} = \text{tot\_trip} * 38\%$$

$$\text{ENW\_Attr} = \text{tot\_trip} * 28\%$$

### **Trip Balance**

When trip productions and attractions are calculated by purpose, it is necessary for their total sum of each trip purpose to be balanced as inputs to the trip distribution (gravity) model. The balancing procedure for trip productions and attractions of the Genesee County model uses three different methods in TransCAD. For NHBO trips, the weighted average of production and attraction is used, and for IE work trips, the balance method is to hold attractions constant. For other purpose trips, the balance method is to hold production constant. Since all trips of external stations are actual traffic count numbers, these trips were withheld with no changes in balance processes.

### **C. TRIP DISTRIBUTION MODEL**

The Genesee travel demand model uses a four-step modeling process with a travel time feedback loop. These four steps are trip generation, trip distribution, mode choice, and traffic assignment. Trip distribution links the trip productions and attractions for each pair of Traffic Analysis Zones (TAZs) in Genesee County. The gravity model is the most widely used model for trip distribution. This model estimates the relative number of trips of each trip purpose, proportional to the number of productions and attractions, made between two geographical areas (TAZs), and inversely proportional to a function of travel time between the TAZs.

The gravity model is the most widely used model for trip distribution. Based on Newton's law of gravitation, it assumes that the trips (i.e. trip productions) from a Traffic Analysis Zone (TAZ) are distributed to any TAZ (i.e., trip attractions) in direct proportion to the number of trip attraction and in inverse proportion to the spatial separation between adjacent TAZs. In general, the number of trips attracted to a TAZ reflects the size of the attraction TAZ and the interzonal travel time of the spatial separation between the TAZs. The gravity model with friction factor is employed for trip distribution.

The gravity model is sensitive to changes in the transportation network such as travel speed of roadway, and incorporation of a new facility, etc. In accordance with these changes, the gravity model re-estimates the trip interchange of person trips based on changes in the network link impedance.

The form of the gravity model is expressed as:

$$T_{ij} = P_i \left( \frac{A_j F_{ij} K_{ij}}{\sum_{k=1}^{zones} A_k F_{ik} K_{ik}} \right)$$

Where,

- $T_{ij}$  = O-D trips between TAZ i and TAZ j,
- $P_i$  = total trip productions of TAZ i,
- $D_j$  = total trips attractions of TAZ j,
- $F_{ij}$  = friction factor between TAZ i and TAZ j, and
- $K_{ij}$  = socioeconomic factor between TAZ i and TAZ j.

In the Genesee model, all Ks are equal to 1. The trip distribution modeling process incorporated the following data inputs and modeling elements:

- Production (P) and Attraction (A) trip ends by trip purpose from the trip generation model, and for each trip purpose the total P must be equal to the total A,
- Interzonal and intrazonal travel times computed using the Genesee County roadway network,
- Friction factors calibrated for each trip purpose using gravity model procedures,
- Socioeconomic adjustment factors, or K-factors, developed as part of the overall model validation process, and
- Gravity model applications by trip purpose using TransCAD procedures.

Shortest path travel time is used as travel impedance between Traffic Analysis Zones (TAZs). The time impedance between TAZs includes the travel time on roadway and terminal time. The terminal time is the time using to walk to/from vehicle and start or park the vehicle. It is defined as below,

- 3 minutes for the CBD and urban area
- 2 minutes for the suburban and rural area
- 5 minutes for the external station

**Gravity Model Calibration and Evaluation**

The calibration process is to adjust friction factor in the gravity model to replicate the actual Trip Length Frequency Distribution (TLFD) and average travel time. This process is similar to what is introduced in NCHRP report 365, but it uses the friction factor table instead of the gamma function. For each trip purpose, it starts with the standard friction factors from NCHRP report 365 and then adjusts it to generate the trip length frequency distribution and average travel time close to those from the MI Travel Counts. **Table 23** reports the average travel time for external-internal and internal-external (EI-IE) trips, and **Table 24** and **Figure 15** displays the trip length frequency distribution data from the MI Travel Counts. The calibration of friction factors involves iterative procedures as follows:

1. Gravity model is evaluated with initial set of friction factors from NCHRP report 365.
2. TLFD's and average trip lengths from the Gravity model run are estimated.
3. The trip length estimates are compared with the observed trip lengths patterns.
4. Revise the initial set of friction factors based on the comparison in Step 3.
5. Run Gravity model with the revised friction factors and return to Step 2.
6. Repeat Steps 2 to 5 until the following conditions are met,
  - (a) the observed TLFD's and model TLFD's are relatively close to one another, and
  - (b) average trip lengths become stable.

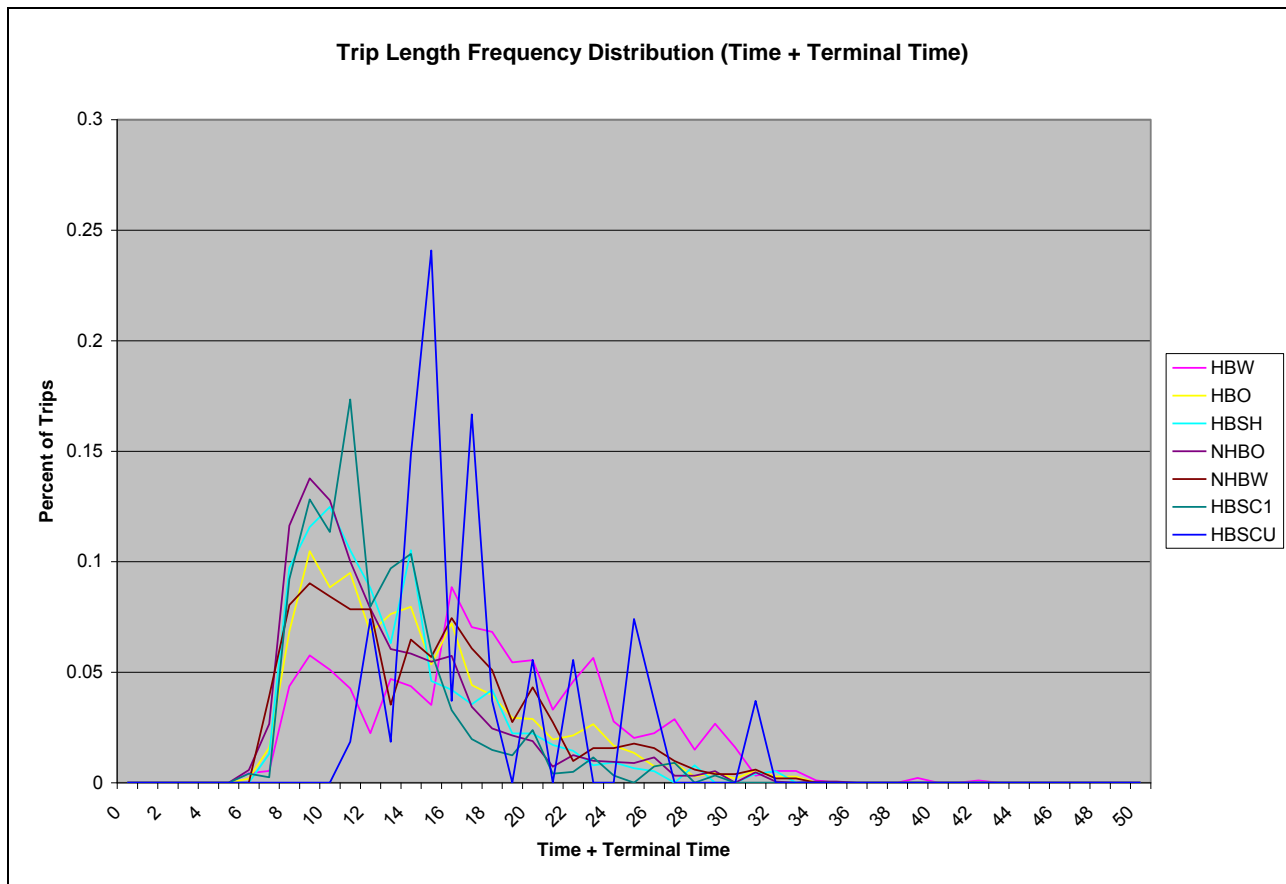
Using the Genesee County specific trip records, the average trip length and trip length frequency distribution were calculated for each trip purpose. For each record in the MI Travel Counts database, a TAZ was assigned for the origin and destination based on the geocoded coordinates provided by MORPACE. The origin and destination TAZs were then used to assign a skimmed travel time from the model network with free-flow travel time and terminal time. Then the skimmed travel time was aggregated and averaged to represent the actual (survey) trip length frequency distribution and average travel time.

**Table 23** shows the average travel time from the calibrated model as well. This average travel time was calculated based on the congested travel time, and the congested travel time was calculated from the model runs with time feedback loop. The calibrated fraction factors are shown in **Table 25**.

**Table 23. Average Trip Length (Travel +Terminal Time)**

	Average Travel Time by Purpose (Minutes)									
	HBW	HBO	HBSCH	HBS	HBU	NHBW	NHBO	EIW	IEW	ENW
<b>Actual</b>	17.73	14.17	12.29	13.15	17.39	14.46	12.8	16.74	18.35	16.65
<b>Model</b>	18.31	14.1	14.04	13.95	18.56	11.6	15.08	18.69	22.2	17.37

The friction factor in the Gravity model is a key component that represents the magnitude of frictions (or impedances) in traffic flows between pairs of TAZs. Friction factors are derived by trip purpose through trip-length frequency distributions and average trip lengths from a base year origin-destination travel survey.



**Figure 15. Trip Length Frequency Distribution (Travel Time+ Terminal Time)**



**Genesee County Travel Demand Model**

**Table 24. Trip Length Frequency: Average Travel Time + Terminal Time**

Time_TT	HBW	HBO	HBSH	NHBO	NHBW	HBSC1	HBSCU
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0.004264	0.001861	0	0.005735	0	0.004108	0
7	0.005533	0.015821	0.013141	0.02659	0.039216	0.002465	0
8	0.04371	0.068404	0.09724	0.116267	0.080392	0.09203	0
9	0.057569	0.1047	0.115637	0.137643	0.090196	0.128184	0
10	0.051173	0.088413	0.124836	0.127737	0.084314	0.113394	0
11	0.042644	0.094928	0.105125	0.100104	0.078431	0.173377	0.018519
12	0.022388	0.067939	0.088042	0.078728	0.078431	0.079704	0.074074
13	0.046908	0.076315	0.063075	0.06048	0.035294	0.09696	0.018519
14	0.04371	0.079572	0.105125	0.058394	0.064706	0.103533	0.148148
15	0.035181	0.053513	0.045992	0.054745	0.056863	0.059162	0.240741
16	0.088486	0.072127	0.04205	0.057351	0.07451	0.032868	0.037037
17	0.070362	0.044207	0.03548	0.034411	0.060784	0.019721	0.166667
18	0.06823	0.039553	0.04205	0.024505	0.05098	0.01479	0.037037
19	0.054371	0.029316	0.022339	0.021376	0.027451	0.012325	0
20	0.055437	0.028851	0.022339	0.01877	0.043137	0.023829	0.055556
21	0.033049	0.019544	0.017083	0.007299	0.027451	0.004108	0
22	0.045842	0.021405	0.014455	0.012513	0.009804	0.00493	0.055556
23	0.056503	0.026524	0.007884	0.009906	0.015686	0.011504	0
24	0.027719	0.016752	0.009198	0.009385	0.015686	0.003287	0
25	0.020256	0.013495	0.00657	0.008863	0.017647	0	0.074074
26	0.022388	0.007445	0.005256	0.01147	0.015686	0.007395	0.037037
27	0.028785	0.008841	0	0.003128	0.009804	0.009039	0
28	0.014925	0.002792	0.007884	0.003128	0.005882	0	0
29	0.026652	0.004653	0	0.005214	0.003922	0.003287	0
30	0.015991	0.001861	0	0	0.003922	0	0
31	0.003198	0.005584	0.003942	0.004692	0.005882	0	0.037037
32	0.005533	0.002792	0.005256	0.000521	0.001961	0	0
33	0.005533	0.002792	0	0	0.001961	0	0
34	0.001066	0	0	0.000521	0	0	0
35	0	0	0	0.000521	0	0	0
36	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0
39	0.002132	0	0	0	0	0	0
40	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0
42	0.001066	0	0	0	0	0	0
43	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0

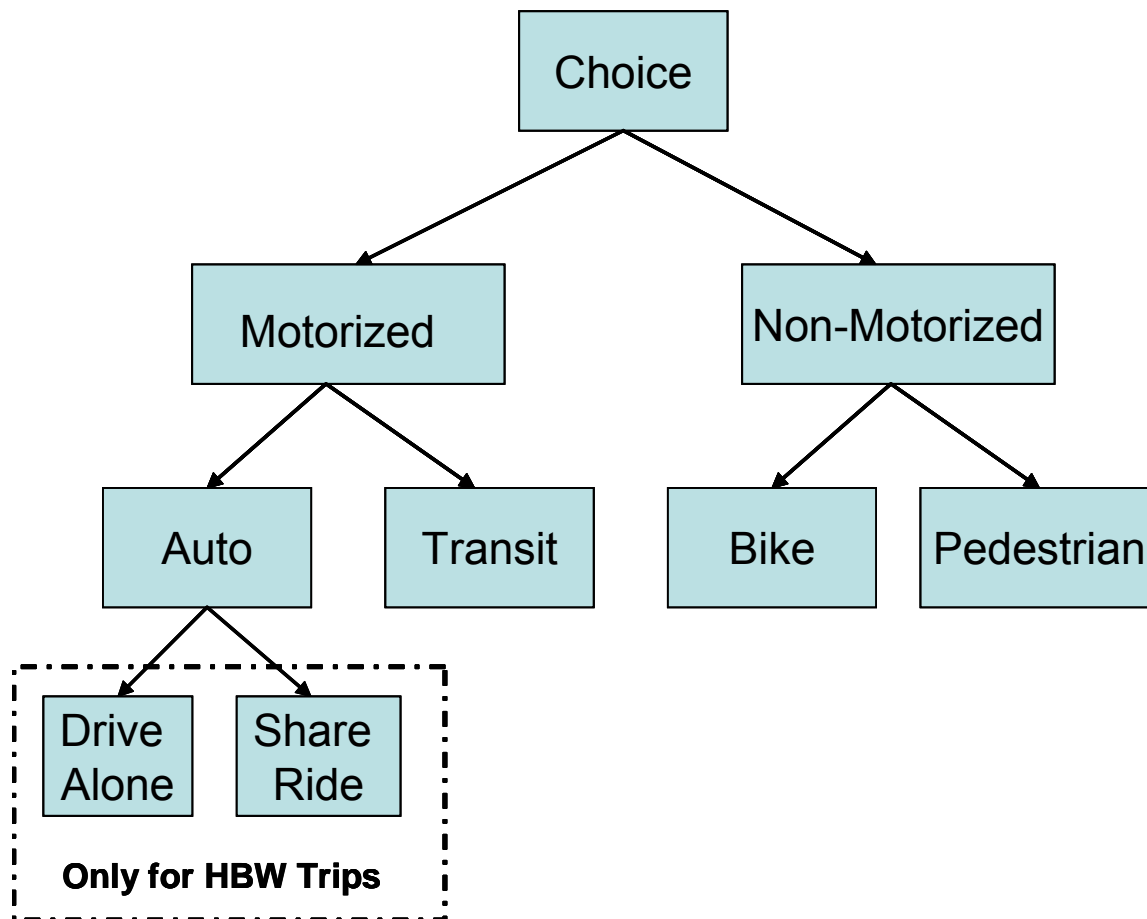
## Genesee County Travel Demand Model

**Table 25. Calibrated Friction Factors <sup>1</sup>**

Time	Trip Purpose									
	HBW	HBO	HBSCH	HBS	HBU	NHBW	NHBO	EIW	IEW	ENW
1	25207.704	126686.78	1008.3	126686.78	2409.6	198261.641	198261.641	25207.7042	25207.704	198261.6
2	21983.38	23662.144	1008.3	17324.287	2409.6	17814.6504	17814.6504	5495.84508	5495.8451	17814.65
3	19282.104	8528.2884	1635.1	20584.865	3721.3	1952.34811	3063.45922	1809.12267	1809.1227	4174.57
4	16952.644	6523.0293	1789.7	26092.117	14987.5	1448.39315	2073.39313	1059.54022	1059.5402	1448.393
5	405700.79	14585.153	13135.5188	617013.2	22026.3	1947.11044	3294.46803	108144.931	108144.93	849850
6	100900.01	4310.7665	3920.076	100354.6	3.682E+09	638.888889	202.777778	98174.5678	98174.568	98599011
7	100892.15	3535.0429	3916.58829	103580.51	5.346E+10	464.674122	147.355082	88620.3119	88620.312	1710843
8	90883.145	1366.1196	2764.036	64848.013	1.972E+10	352.483087	110.943156	730636.379	730636.38	4511440
9	90747.345	1165.191	2716.25599	65575.006	3.843E+09	276.160963	87.381395	30130.2396	30130.24	7625.697
10	18155.658	570.5566	594.447	18182.708	91377161	189.81375	67.86869	8134.24374	8134.2437	619286.3
11	18148.514	484.36909	546.092	17712.82	81484233	148.298076	55.990396	1516.38127	1516.3813	1004.389
12	8159.305	354.03258	328.214317	4031.346	802253.05	65.775683	45.158819	597.497187	597.49719	744.2418
13	7195.849	320.30154	250.894055	3792.413	485308.91	50.089893	38.395757	418.172984	418.17298	93.5088
14	7115.084	226.17143	243.5	3679.533	31169.052	41.052704	32.879959	357.017847	357.01785	131.3112
15	7109.71	207.03247	202.118	3122.454	4467.7184	15.601178	28.638627	91.44831	91.44831	5.515182
16	7047.819	124.15125	200.81	970.632	38.450178	10.928855	25.06773	44.425003	44.425003	0.210961
17	7022.878	111.23227	90.817	967.46119	34.635625	3.411834	18.507322	34.698558	34.698558	3.271203
18	5809.621	63.831	75.391	165.87718	3.601994	2.999792	16.481401	25.40012	25.40012	0.028432
19	5801.756	59.474576	36.415151	154.548	2.697	1.214666	3.602452	22.182484	22.182484	0.180414
20	2776.73	8.693373	32.329	120.221	2.6	0.711577	3.19534	11.073575	11.073575	0.089869
21	2767.959	7.83919	30.828	90.28	2.223	0.511642	2.851703	6.862122	6.862122	0.000538
22	1909.404	6.627091	20.369594	85.182	2.1	0.264004	2.510709	4.778796	4.778796	0.027473
23	1830.734	6.246609	16.926	58.646	1.1	0.225622	2.216192	2.391633	2.391633	0.000025
24	1025.3572	5.806958	16.485072	51.99	1.1	0.20388	1.89149	1.754653	1.754653	0.009065
25	1013.969	5.448	10.651372	49.23	1.1	0.186914	1.724941	0.803485	0.803485	0.000223
26	1010.415	4.599538	14.87277	25.305	1.1	0.165928	0.789471	0.695669	0.695669	0.001807
27	985.661	4.038407	11.048	18.024	1.1	0.145489	0.702748	0.43523	0.43523	0.000448
28	941.272	3.656763	10.199	17.283	1.1	0.130555	0.648047	0.372925	0.372925	0.000079
29	656.63764	3.092345	4.083	16.708	1.1	0.095132	0.557917	0.335319	0.335319	0.000328
30	575.49656	2.670867	4.149	5.525633	1.1	0.059574	0.46575	0.29658	0.29658	0.000002
31	2.016734	0.755132	2.333	5.422	1.1	0.05393	0.11366	0.13778	0.13778	0.000091
32	0.1	0.642875	1.422	6.748773	1.1	0.047188	0.086251	0.106811	0.106811	0.000005
33	0.08	0.341667	1.068	3.277	1.1	0.04289	0.070438	0.078925	0.078925	0.00001
34	0.08	0.317882	0.838	2.917	1.1	0.039535	0.0577	0.07384	0.07384	0.000002
35	0.08	0.279343	0.8	2.694	1.1	0.034341	0.047403	0.056294	0.056294	0.000005
36	0.08	0.255889	0.7	2.212	1.1	0.031333	0.039049	0.044184	0.044184	0.000001
37	0.08	0.229459	0.642	2.19	1.1	0.029328	0.03225	0.036502	0.036502	0.000007
38	0.04	0.197237	0.422	2.095	1.014	0.0267	0.0267	0.03285	0.03285	0.000002
39	0.03	0.182821	0.28	2.03	1.01	0.022156	0.022156	0.025434	0.025434	0.000005
40	0.01	0.182775	0.24	1.977	1.01	0.018426	0.018426	0.020799	0.020799	0.000026
41	0.01	0.169902	0.19	1.966	1.01	0.015356	0.015356	0.018932	0.018932	0
42	0.01	0.143667	0.18	1.534	1.01	0.012822	0.012822	0.017563	0.017563	0.000054
43	0.01	0.126953	0.14	1.459	1.01	0.010727	0.010727	0.016465	0.016465	0.010727
44	0.01	0.118136	0.13	1.398	1	0.008991	0.008991	0.015467	0.015467	0.008991
45	0.01	0.093533	0	1.209	0.82	0.007548	0.007548	0.014443	0.014443	0.007548
46	0.01	0.075196	0	1.159	0.7	0.006348	0.006348	0.013772	0.013772	0.006348
47	0.01	0.062085	0.1	0.918	0.6	0.005346	0.005346	0.012876	0.012876	0.005346
48	0.005	0.053312	0.1	0.759	0.5	0.00451	0.00451	0.012147	0.012147	0.00451
49	0.005	0.027755	0.1	0.66	0.4	0.00381	0.00381	0.011091	0.011091	0.00381
50	0.005	0.02604	0.1	0.602	0.4	0.003223	0.003223	0.010497	0.010497	0.003223
51	0.005	0.020922	0.1	0.567	0.36	0.00273	0.00273	0.007579	0.007579	0.00273
52	0.005	0.016173	0.1	0.541	0.35	0.002315	0.002315	0.005156	0.005156	0.002315
53	0.003	0.015283	0.1	0.1	0.35	0.001966	0.001966	0.004572	0.004572	0.001966
54	0.003	0.011	0.1	0.1	0.34	0.001672	0.001672	0.00423	0.00423	0.001672
55	0.003	0.010745	0.1	0.1	0.33	0.001423	0.001423	0.003752	0.003752	0.001423
56	0.003	0.008625	0	0.1	0	0.001212	0.001212	0.003452	0.003452	0.001212
57	0.002	0.006374	0	0.1	0	0.001034	0.001034	0.00299	0.00299	0.001034
58	0.002	0.005576	0	0.1	0	0.000883	0.000883	0.002664	0.002664	0.000883
59	0.002	0.004881	0	0.1	0	0.000755	0.000755	0.000439	0.000439	0.000755

**D. MODE CHOICE MODEL**

The trip generation models generate numbers of person trips and the trip distribution models allocate these trips for trip production zones to attraction zones for each trip purpose. These trips must be further divided into trips by various transportation modes and then converted to vehicle trips and passenger trips for the purpose of predicting vehicle flows on the roadway network and passenger flows on the transit routes. The Genesee County model divides the person trips into trips of five modes: car driver alone, car share ride, transit (bus), and non-motorized (walk/bike). The nested logit model is decided to be used for the Genesee County model, and its structure is shown as follows:



**Figure 16. Structure of Mode Choice Models**

The mathematical formulation of the nested multinomial logit model structure is as follows:

$$P_{DA} = P(DA | Auto, M) * P(Auto | M) * P(M)$$

$$P_{SR} = P(SR | Auto, M) * P(Auto | M) * P(M)$$

$$P_{Tr} = P(Tr | M) * P(M)$$

$$P_{Walk} = P(Walk | NM) * P(NM)$$

$$P_{Bike} = P(Bike | NM) * P(NM)$$

Where:  $P_i$  is the probability of choosing mode alternative  $i$ ,  
 $i$  is Drive Alone(DA), Share Ride(SR), Transit(Tr), Walk or Bike,  
 $P(i | Auto, M)$  is the conditional probability of choosing  $i$  from among DA and SR,  
 $P(j | M)$  is the conditional probability of choosing  $j$  from among Auto and Transit,  
 $P(s | NM)$  is the conditional probability of choosing  $s$  from among Walk and Bike,  
 $P(M)$  is the probability of choosing Motorized mode,  
 $P(NM)$  is the probability of choosing Non-Motorized mode.

$$P(M) = \frac{e^{U_M}}{e^{U_M} + e^{U_{NM}}} \quad \text{and} \quad P(NM) = \frac{e^{U_{NM}}}{e^{U_M} + e^{U_{NM}}}$$

$U_M$  and  $U_{NM}$  are the Utilities of the motorized and non-motorized modes, and its expressions are,

$$U_M = a1 + \text{Logsum}(M) * \ln(e^{U_{Auto}} + e^{U_{Tr}})$$

$$U_{NM} = a2 + \text{Logsum}(NM) * \ln(e^{U_{Walk}} + e^{U_{Bike}})$$

$$P(j | M) = \frac{e^{U_j}}{e^{U_{Auto}} + e^{U_{Tr}}} \quad \text{and} \quad P(s | NM) = \frac{e^{U_s}}{e^{U_{Walk}} + e^{U_{Bike}}}$$

Logsum(M), Logsum(NM),  $a1$  and  $a2$  are constants.  $U_A$  is the Utility of the auto modes and its expressions is,

$$U_{Auto} = a3 + \text{Logsum}(A) * \ln(e^{U_{DA}} + e^{U_{SR}})$$

$$P(i | Auto, M) = \frac{e^{U_i}}{e^{U_{DA}} + e^{U_{SR}}}$$

The utility expression for each available choice mode ( $i$ ) is specified as a linear function:

$$U_i = b_1 * IVTT_i + b_2 * OVTT_i + b_3 * Cost_i + b_4 * SE1_i + b_5 * SE2_i + b_6 * SE3_i + b_0$$

Where:  $IVTT_i$  is the In-Vehicle Travel time of mode alternative  $i$   
 $OVTT_i$  is the Out-Vehicle Travel Time of the description of alternative  $i$   
 Cost is the fare related cost when choice bus otherwise it is the distance related cost  
 $SE1_i$ ,  $SE2_i$  and  $SE3_i$  are the socio-economic indicators of alternative  $i$

## ***Genesee County Travel Demand Model***

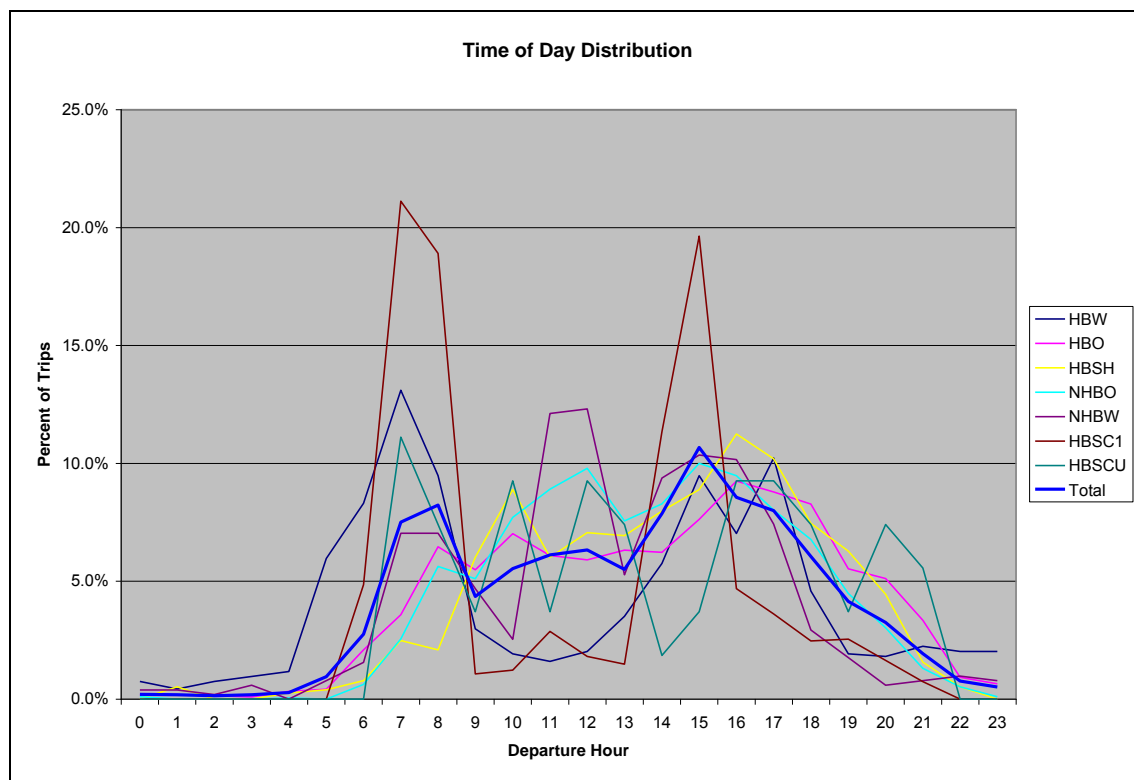
The mode choice model calibration is based on the *Travel Counts Household Travel Survey data and the 2007 bus on-board survey*. The 2000 CTPP data is used as the reference for HBW trip as well. The indicators and coefficients mentioned above can be found in the following table.

**Table 26. Coefficients of Utility Function and Nested Logit Parameters**

	HBW					HBO				NHB			
	DA	SR	Transit	Walk	Bike	Auto	Transit	Walk	Bike	Auto	Transit	Walk	Bike
<b>Constant</b>	0	0.8306	-5.559	0	2.5	0	-2.962	0	2	0	-4.312	0	2
<b>Travel Time</b>	-0.069	-0.1724				-0.492				-0.108			
<b>Travel Distance</b>	-0.138	-0.0701		5.308	1.327	0.506		5.308	1.327	0.341		5.308	1.3271
<b>Distance &gt; 1 Mil</b>					2.902				2.902				2.9024
<b>WRK_HH</b>	-0.436	0.2351				-0.738							
<b>VEH_Hh</b>	0.6196	-0.8217				1.965							
<b>MED_INC</b>	0	0				1E-04							
<b>Fare</b>			-0.5059				-0.5992				-0.2912		
<b>1/IVTT</b>			0.6937				0.9384				-2.2486		
<b>1/OVTT</b>			19.4008				2.3292				0.5451		
-----													
<b>Nested Logit</b>													
<b>Coefficients</b>	<b>HBW</b>	<b>HBO</b>	<b>NHB</b>										
<b>Motorized Logsum</b>	-1.203	0.856	5.518										
<b>Motorized Constant</b>	0	0	0										
<b>Non-Motorized Logsum</b>	0.063	-0.17	0.0277										
<b>Non-Motorized Consta</b>	-4.851	0.003	-7.3087										

**E. TIME-OF-DAY CHOICE MODEL**

Using the MI Travel Counts dataset for all TMA trips, a frequency distribution was calculated by departure hour for each trip purpose. The percent distribution is shown in the Figure below.



**Figure 17. Time of Day Distribution of Trips**

The periods were identified based on observations of the hourly traffic counts available in the region. Four time periods were identified for the Genesee County model. Those periods are:

- AM Peak: 6:00am – 9:00am
- Midday: 9:00am – 3:00pm
- PM Peak: 3:00pm – 6:00pm
- Night: 6:00am – 6:00am

Based on the MI Travel Count database, and records specific to Genesee County, period factors were calibrated. The factors represent the number of trips that depart during each period as defined above. The period trips are disaggregated into P to A and A to P direction. The directional factors are developed from the MI Travel Counts using the direction of travel reported in the survey. Trips from home to work would be considered in P to A direction. Conversely, trips from work to home are in the A to P direction. The following tables report the directional factors for home based trips (HBW and HBO purposes). Non home based trips typically assume a fifty / fifty directional factor.

**Table 27. Hourly Distribution of Trips**

Departure Hour	HBW	HBO	HBSH	NHBO	NHBW	HBSC1	HBSCU	Total
0	0.7%	0.2%	0.0%	0.1%	0.4%	0.0%	0.0%	0.2%
1	0.4%	0.2%	0.5%	0.0%	0.4%	0.0%	0.0%	0.2%
2	0.7%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
3	1.0%	0.1%	0.0%	0.0%	0.6%	0.0%	0.0%	0.2%
4	1.2%	0.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.3%
5	6.0%	0.4%	0.4%	0.0%	0.8%	0.0%	0.0%	1.0%
6	8.3%	2.1%	0.8%	0.6%	1.6%	4.8%	0.0%	2.8%
7	13.1%	3.6%	2.5%	2.6%	7.0%	21.1%	11.1%	7.5%
8	9.5%	6.5%	2.1%	5.6%	7.0%	18.9%	7.4%	8.2%
9	3.0%	5.5%	6.0%	5.1%	4.7%	1.1%	3.7%	4.4%
10	1.9%	7.0%	8.9%	7.7%	2.5%	1.2%	9.3%	5.5%
11	1.6%	6.1%	6.0%	8.9%	12.1%	2.9%	3.7%	6.1%
12	2.0%	5.9%	7.1%	9.8%	12.3%	1.8%	9.3%	6.3%
13	3.5%	6.3%	6.9%	7.6%	5.3%	1.5%	7.4%	5.5%
14	5.8%	6.2%	8.0%	8.3%	9.4%	11.3%	1.9%	7.9%
15	9.5%	7.6%	8.9%	10.0%	10.4%	19.6%	3.7%	10.7%
16	7.0%	9.2%	11.2%	9.5%	10.2%	4.7%	9.3%	8.6%
17	10.2%	8.8%	10.2%	8.0%	7.4%	3.6%	9.3%	8.0%
18	4.6%	8.3%	7.5%	6.8%	2.9%	2.5%	7.4%	6.0%
19	1.9%	5.5%	6.3%	4.5%	1.8%	2.5%	3.7%	4.1%
20	1.8%	5.1%	4.4%	3.0%	0.6%	1.6%	7.4%	3.3%
21	2.2%	3.3%	1.6%	1.3%	0.8%	0.7%	5.6%	1.9%
22	2.0%	0.9%	0.5%	0.5%	1.0%	0.0%	0.0%	0.8%

**Table 28. TOD Directional Factors By Trip Purpose**

Period	HBW		HBO		NHB	
	Prod-Attr	Attr-Prod	Prod-Attr	Attr-Prod	Prod-Attr	Attr-Prod
<b>AM_Peak</b>	26.60%	2.05%	6.00%	2.50%	2.70%	2.70%
<b>Midday</b>	8.10%	10.30%	22.00%	17.40%	24.00%	24.00%
<b>PM_Peak</b>	2.30%	22.00%	11.00%	12.60%	12.50%	12.50%
<b>Overnight</b>	13.00%	15.65%	11.00%	17.50%	10.80%	10.80%
<b>Total</b>	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%

**Table 29. TOD Directional Factors for EI-IE Trips**

Period	EI Work		IE Work		E Non-Work	
	Prod-Attr	Attr-Prod	Prod-Attr	Attr-Prod	Prod-Attr	Attr-Prod
<b>AM_Peak</b>	25.00%	1.80%	24.00%	1.50%	2.00%	2.00%
<b>Midday</b>	9.10%	10.00%	9.10%	9.10%	23.00%	23.00%
<b>PM_Peak</b>	2.70%	23.35%	1.35%	22.50%	11.00%	11.00%
<b>Overnight</b>	13.20%	14.85%	15.55%	16.90%	14.00%	14.00%
<b>Total</b>	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%

**Table 30. TOD Directional Factors for Transit Trips**

<b>Period</b>	<b>EI Work</b>	
	<b>Prod-Attr</b>	<b>Attr-Prod</b>
<b>AM_Peak</b>	26.60%	2.05%
<b>Midday</b>	8.10%	10.30%
<b>PM_Peak</b>	2.30%	22.00%
<b>Overnight</b>	13.00%	15.65%
<b>Total</b>	50.00%	50.00%



**F. TRUCK MODEL**

Based on the method recommended in *Quick Response Freight Manual* (1996), a commercial vehicle model was developed for predicting trips for four-tire commercial vehicles, and trucks. Trucks include single unit trucks with six or more tires, and combination trucks consisting of a power unit (truck or tractor) and one or more trailing units. The model uses a four-step process. These steps are trip generation, distribution, choice of time of day and trip assignment.

The inputs to trip generation are the number of employees and the number of households by Traffic Analysis Zone (TAZ). The daily trip generation rates shown in the following table are for trip Origins (O) and Destinations (D). These rates were obtained by adjusting the original generation rates in *Quick Response Freight Manual*. To replicate the current truck traffic condition in the Genesee County, these rates were further adjusted by a globe factor 0.45. For example, the final combination truck rate per retail employee is 0.02925 that is equal to original rate 0.065 multiplied by 0.45.

**Table 31: Daily Trip Generation Rates**

Generator (Employment and Household)	Commercial Vehicle Trip Destinations (or Origins) per Unit per Day		
	Four -Tire Vehicles	Trucks (Single Unit 6+ Tires)	Trucks (Combination)
<b>Agriculture, Mining and Construction</b>	1.11	0.289	0.174
<b>Manufacturing, Transportation, Communications, Utilities &amp; Wholesale Trade</b>	0.938	0.242	0.104
<b>Retail</b>	0.888	0.253	0.065
<b>Office and Services</b>	0.437	0.068	0.009
<b>Households</b>	0.025	0.010	0.004

The productions of External-Internal and Internal-External (EI-IE) truck trips are obtained from the external trip model. Since there is no freight and truck survey available for Genesee County, it is assumed that the EI-IE truck trip attractions are proportional to the truck destination trips. At the beginning, the truck trip destinations are used as initial EI-IE truck trip attractions, and then the balance process scaled the total truck trip attractions to match the total truck productions, i.e. the total truck counts of all external stations. The truck trips are summarized in **Table 32**.

**Table 32. Summary of 2005 Trip Generation**

Trip Type		Number of Trips	
		Original	Balanced
<b>4-tire Commercial Vehicle</b>	Origin (O)	60,901	60,901
	Destination (D)	60,901	60,901
<b>Truck</b>	Origin (O)	19,769	19,769
	Destination (D)	19,769	19,769
<b>EI-IE Truck</b>	Production (P)	20,248	20,248
	Attraction (A)	19,769	20,248

A special truck trip generator was set up for the airport. The number of total daily truck trips of the airport is obtained by multiplying 6.0 to the transportation employment.

The EI-IE truck trips were classified as an individual type of trips because there was the trip information available from the major truck generator survey. Before the trip distribution, the Trip O and D were balanced for all TAZs and external stations for the following types of trips:

- EI-IE truck trips of all TAZs and external stations;
- Internal-to-Internal (II) truck trips of all TAZs;
- Internal-to-Internal (II) 4-tire commercial vehicle trips of all TAZs.

The gravity model was employed to distribute zonal trip origins to destinations. The form of the gravity model is expressed as:

$$T_{ij} = O_i \frac{D_j F(t_{ij})}{\sum_j D_j F(t_{ij})}$$

- Where  $T_{ij}$  = trips between TAZ  $i$  and TAZ  $j$ ;  
 $O_i$  = total trip originating at TAZ  $i$ ;  
 $D_j$  = total trip destined at TAZ  $j$ ;  
 $F(t_{ij})$  = friction factor between TAZ  $i$  and TAZ  $j$ ;  
 $t_{ij}$  = travel time between TAZ  $i$  and TAZ  $j$ .

For both internal and EI-IE truck trips, friction factors recommended in *Quick Response Freight Manual* were used as a starting point and then adjusted to replicate the local traffic condition. The recommendation has the following form:

Four-tire commercial vehicles:

$$F_{ij} = e^{-0.13 * t_{ij}}$$

Trucks:

$$F_{ij} = e^{-0.08 * t_{ij}}$$

The average travel time of all trip types are given in **Table 33**. The four-tire commercial vehicle has the shortest average travel time of 11.39 minutes while the EI-IE truck has the longest travel time of 18.38 minutes.

**Table 33. Average Travel Time by Trip Type**

<b>Trip Type</b>	<b>Average Travel Time (minutes)</b>
<b>4T commercial Vehicle</b>	11.39
<b>Internal Truck</b>	12.84
<b>EI-IE Truck</b>	18.38

The time-of-day assignments were implemented in order to obtain the better model results. To facilitate it, the trip tables from trip distribution must be factored to reflect morning peak, midday, evening peak and off-peak periods prior to trip assignment. The hourly time-of-day factors recommended in *Quick Response Freight Manual* were aggregated into the periods defined in the following table and applied for the Genesee County Travel Demand Model.

**Table 34. Time of Day Factors**

<b>Period</b>	<b>4-Tire Commercial Vehicle</b>	<b>Truck</b>	<b>EI-IE Truck</b>		
			Total	Departure	Return
AM Peak – (6-9am)	20%	17%	17%	7%	10%
PM Peak – (3-6pm)	24%	17%	17%	10%	7%
Mid-day (9am-3pm)	33%	42%	42%	21%	21%
Night (6pm-6am)	23%	24%	24%	12%	12%

As explained in the previous section, trip assignment for the Genesee county model follows time-of-day procedures instead of running a single 24-hour assignment. For each of four time periods, both a truck trip table and a 4-tire commercial vehicle trip table were developed, and then were assigned onto the network simultaneously with auto trips by using the multi-model multi-class equilibrium assignment method. Total 24-hour link volumes were then obtained by aggregating the truck, and auto loadings by time period.

## **G. VEHICLE TRIP ASSIGNMENT AND FEEDBACK LOOP**

The assignment of trips to the network is the last step of the traditional sequential modeling processes. It provides the foundation for validating the model's performance in replicating base-year travel patterns. Once the base-year assignment is validated, it is further used to forecast future traffic conditions on the network and to evaluate any transportation improvements in the future.

The Genesee County model utilizes a time-of-day modeling procedure. In this procedure, a 24-hour trip table is broken into tables of AM-Peak, PM-Peak, Mid-Day and Off-Peak periods. For each time period, a two-step assignment procedure is implemented. The first step, which is referred to as "priority pre-loading", is to assign the external-to-external auto trips and the truck trips onto the roadway network separately. Then the internal auto trips are assigned onto the network with considerations of these preloading volumes. The assignment method is user equilibrium assignment.

The assignment using the free-flow speed/travel time is a common procedure adopted by most regional and urban travel demand models. The addition of a Feedback loop is an update to the Genesee County model. After the initial assignment, link congested travel time is estimated based on loading resulted from each TOD assignment and 24-hour average travel time is calculated by weighted average method. The 24-hour congested travel time is then fed back into the Trip Distribution model to redistribute person trips in the next iteration. The redistributed trips are used to run the TOD assignments in the next iteration. The flowchart of these procedures is given in **Figure 18**.

### **Vehicle Trip Assignment Procedures**

Given a network and a demand matrix, traffic assignment allows one to establish the traffic flow patterns and analyze congestion points. Traffic assignment is a key element in the urban travel demand forecasting process. The traffic assignment model predicts the network flows that are associated with future planning scenarios, and generates estimates of the link travel times and related attributes that are the basis for benefits estimation and air quality impacts. The traffic assignment model is also used to generate the estimates of network performance that are used in the mode choice and trip distribution stages of many models.

Historically, a wide variety of traffic assignment models have been developed and applied. Equilibrium methods take account of the volume dependence of travel times, and result in the calculation of link flows and travel times that are mutually consistent. Equilibrium flow algorithms require iteration between assigning flows and calculating loaded travel times. Despite the additional computational burden, equilibrium methods almost always is preferable to other assignment models.

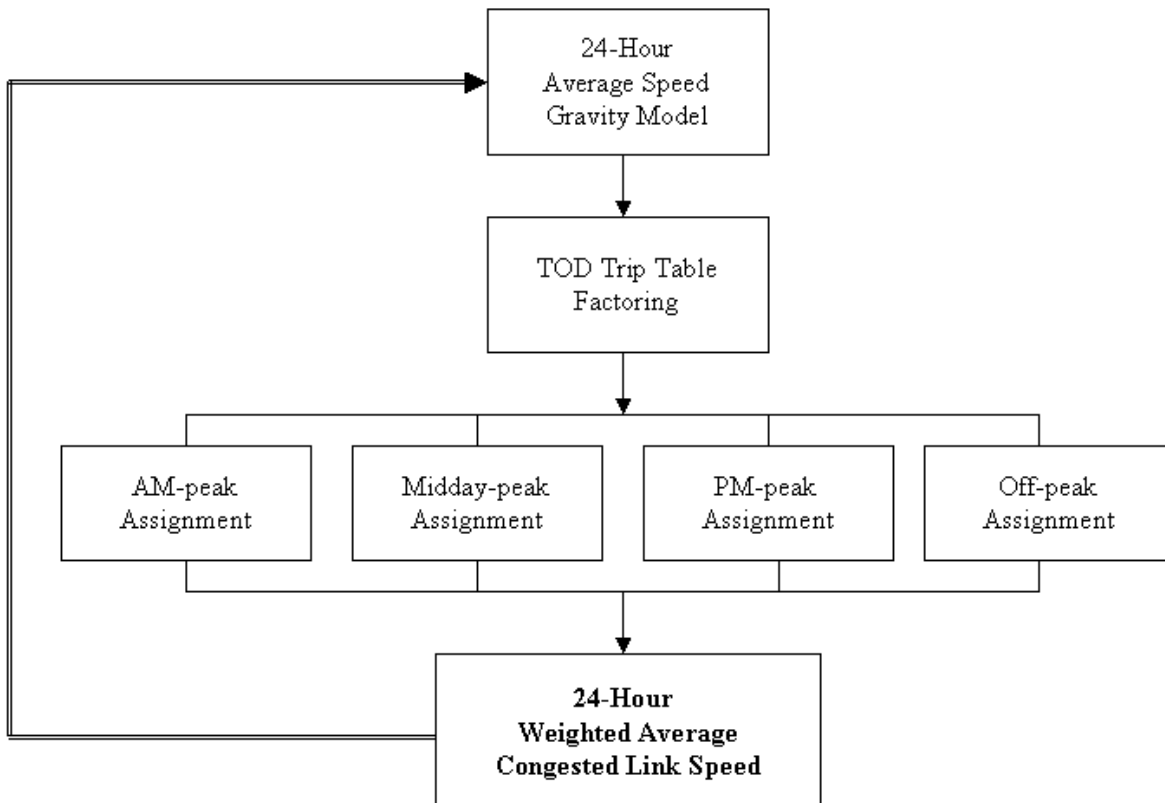
In many urban areas, there are many alternate routes that could be and are used to travel from a single origin zone to a single destination zone. Often trips from various points within an origin zone to various points in a destination zone use entirely different major roads to make the trip. In some instances, reasonable alternate routes may be so numerous that they cannot be easily counted. For the traffic assignment model to be valid, it must correctly assign car volumes to these alternative paths.

From a behavioral perspective, traffic assignment is the result of aggregating the individual route choices of travelers. Assignment models, not surprisingly, also differ in the assumptions made about how and which routes are chosen for travel.

The key behavioral assumptions underlying the User Equilibrium assignment model are that every traveler has perfect information concerning the attributes of network alternatives, all travelers choose routes that minimize their travel time or travel costs, and all travelers have the same valuations of network attributes. First proposed by Wardrop, at user equilibrium (UE), no individual travelers can unilaterally reduce their travel time by changing paths (Sheffi, 1985). A consequence of the UE principle is that all used paths for an O-D pair have the same minimum cost. Unfortunately, this is not a realistic description of loaded traffic networks (Slavin, 1996).

### **MMA Assignments**

Multi-Modal Multi-Class Assignment (MMA) is a flexible master assignment routine designed for use in major metropolitan areas, and is directly applicable in statewide or interregional models. Note that, while most MMA models are just multi-modal, the model in TransCAD is multi-modal and multi-class. The MMA model is a generalized cost assignment that lets you assign trips by individual modes or user classes to the network simultaneously. This method allows you to explicitly model the influence of toll facilities of all types as well as HOV facilities. Each mode or class can have different network exclusions, congestion impacts (passenger car equivalent values), values of time, and toll costs.



**Figure 18. The Modeling Procedures of the Genesee County Model**

As explained in the previous section, trip assignment for the Genesee County model follows time-of-day procedures instead of running a single 24-hour assignment. For each of the four time periods, a truck trip table developed for the respective time period was pre-assigned before an auto trip table was assigned. Then, an origin and destination auto trip table for the time period was assigned with truck trips preloaded. This process was repeated for all time periods. Total 24-hour link volumes were then obtained by aggregating the truck and auto loadings by time period. Each of these assignments utilized a user equilibrium method.

The congested travel time for each link is calculated by using the Bureau of Public Roads (BPR) form of the volume delay function with link specific parameters. The volume delay function is used to adjust the link's free-flow speed on the basis of its volume to capacity ratio to account for congestion related delay. The alpha and beta parameters for the BPR equation which are used in both the travel model's assignment procedure as well as the post-processing are coded on the network links. Several sets of volume-delay parameters were applied in the Genesee County model to different classes of roadway. Due to the method of capacity estimation adopted for the model which specifies an absolute capacity rather than a practical capacity, the Genesee model uses different volume delay parameters than many models which use practical capacities. The default sets of volume-delay parameters for the Genesee County regional model are presented in **Table 35**.

**Table 35. Default Volume Delay Function Parameters by Roadway Class**

<b>Function Class</b>	<b>a</b>	<b>b</b>
Rural Interstate	0.95	5.00
Rural Prin Arter	0.72	2.70
Rural Min Arteri	0.53	2.20
Rural Maj Collec	0.43	2.10
Rural Min Collec	0.43	2.10
Rural Local Road	0.43	2.10
Urban Interstate	0.95	5.00
Urban Expressway	0.95	5.00
Urban Prin Arter	0.50	2.50
Urban Min Arteri	0.45	2.30
Urban Collector	0.40	2.10
Urban Local Road	0.40	2.10
Ramp	0.68	2

### **Feedback Loop**

Steps in the travel demand model process require feedback iterations to reach systemic equilibrium. Feedback from trip assignment to trip distribution provides more accurate travel times reflecting congestion. Considering that the inter-zonal travel time is input to the distribution stage, the feedback will improve the trip distribution results for providing more reasonable trip tables to trip assignment.

In this model update, trip distribution, time-of-day choice and trip assignment were re-computed after the weighted average daily congested travel time feedbacks to the time impedance matrix. The feedback process employed the Method of Successive Average (MSA). In the MSA method, assigned link volumes from previous iteration are weighted together to produce the current iteration's link volumes; Adjusted congested time is then calculated based on the normal volume-delay function. This adjusted congested time is then fed back to calculate the travel time between each OD pair. This feedback process is kept until the maximum iteration equals 10 or the stop criterion is reached.

### **Vehicle Trip Assignment Data Inputs**

The data inputs used in trip assignment and validation process included:

- **Origin-Destination Vehicle Trip Tables.** Outputs from the trip distribution and subsequent matrix manipulation procedures. These tables are vehicle trip matrices by time-of-day.
- **Highway Network.** The Genesee County Model highway network with key link attributes such as link free-flow travel times, link peak and off-peak capacities, and link-specific BPR parameters.
- **Turn Restrictions.** Turn prohibitors at intersections and interchanges where a certain movement(s) is prohibited.

## **H. TRANSIT TRIP ASSIGNMENT**

Below are some considerations to take into account when deciding which transit assignment method to use.

Most users should use either Pathfinder or the Stochastic User Equilibrium (SUE) method. Pathfinder is easier to use, faster to compute, and more conventional in terms of application practice. SUE is more complex and is not traditional. It is intended only for advanced users.

All transit assignments should be tested and calibrated before use. For testing, an appropriate system with zonal connectivity and reasonable routings between key origin and destination pairs should be established.

One way to do this is to perform assignments using data from onboard surveys. A stop-to-stop assignment can be performed prior to an origin to destination assignment. This smaller assignment will help evaluate the routes and parameter settings that are being used.

For the methods that feature combined headways, one should not usually combine services from different modes. Travelers usually have decided which mode they will take before arriving at their boarding stop. Combining disparate services will overstate their attractiveness in this instance.

Also, services with long headways should not be combined. Empirical evidence and logic indicates that when headways are long, travelers time their arrivals at their boarding point. A maximum initial waiting time can be specified in these instances.

Different values of time may be used as well as different weights for various components of travel time. It is also important to reflect behavioral realism in the parameter settings. For example, if travelers do not make more than two transfers, the number of transfers in the assignment should be limited to a maximum of two.

The smallest differences in traveler preferences can lead to a different choice of the best transit path. For example, some travelers find walking more onerous than others and might choose a closer stop for boarding or alighting even if the service is slower in terms of total time. For the greatest accuracy, using market segmentation in transit assignment may be considered.

The use of weights is popular, but should not be ad hoc. There should be some empirical basis for weighting wait times relative to in-vehicle times. Deriving the weights from a mode choice model is not really satisfactory because the mode choice model parameters are conditional on the characteristics of the best transit paths, which are a function of the weights used in pathfinding. Stated preference surveys are one way to compute weights that breaks this dependency.

Attributes of the best transit paths are used in transit planning and for developing inputs for mode choice models. Historically, a number of transit network route choice models have been proposed. The main differences among these models are the hypotheses made on the traveler's route choice. In the user interface, TransCAD provides the shortest travel cost path method, the pathfinder method, and the optimal strategy method for finding the best paths and path attributes (skimming). The shortest travel cost path method is used in the Genesee Model, and it finds the single best path from an origin to a destination that minimizes the total generalized travel cost. On any path segment only one transit line will be chosen, even if the segment is served by several transit lines with identical travel times. Fares can be used in



finding the best path. The detail explanations of other two skimming methods can be found in the TransCAD manual.

The generalized travel costs are the combination of in vehicle travel time, access/egress time, waiting time, transfer time, dwelling time, transfer penalty and fare together with its weights. The network settings for finding Shortest Generalized Travel Cost Path include the following configurable settings:

- The travel time field to use to determine best paths, skim variables or perform assignments
- The network attributes containing route headways, transfer penalties, dwell times and layover times
- Limits on the number of transfers, maximum and minimum wait time, total trip cost, maximum transfer times, maximum access and egress times, and maximum modal travel times
- Weights to assign to waiting times, travel times, dwell times, non-transit times, and transfer times
- Fare structure information
- Mode-specific information
- Route-stop-specific information

There are six types of settings in the Shortest Path Transit Network Settings dialog box:

### SettingsDescription

- **General.**  
Sets the travel time field, path method and maximum trip cost, transfer time, maximum number of transfers, and centroids
- **Mode.**  
Sets the mode table and mode transfer table, and some mode specific restrictions and defaults. In the Genesee Model, there is no mode setting
- **Fare.**  
Sets the fare to be flat, zonal-based, or mixed
- **Weights.**  
Sets the weighing factors to be used for all components of the transit network when determining the best path
- **Other.**  
Sets the headway, transfer, dwelling and layover time parameter, and sets minimum and maximum times for waiting, access, egress, and travel times

Many transit network settings can be specified at the route level, at the mode level, or globally for all the routes in the network. Route-level values come from a field in the route layer, mode level values come from a field in the mode table, and global values are entered directly in the transit network settings dialog box. The route-level values have the highest priority. However, the route attribute may be missing, because "None" was chosen from parameter drop-down list or the value stored in the table is missing. In this case TransCAD will try to find the value in the mode table, if modes are defined in the Mode tab. If the value is also missing from the mode table, the global value will be used. The transit system configuration of the Genesee model is listed as follows:

- Time Value (\$/min.) 0.2
- Max Access Time (min.) 30
- Max Initial Waiting Time (min.) 30
- Max Egress Time (min.) 30
- Max Transfer Waiting Time (min.) 30
- Max Transfer Time (min.) 30
- Max Transfer Number 2
- Transfer Penalty Time 1.5
- Min Init Wait Time (min.) 2.00
- Min Transfer Wait Time (min.) 2.00
- Max Trip Time (min.) 120
- Max Trip Cost 120
- Dwelling Time (min.) 0.2
- Walk Weight Factor 3.00
- Wait Weight Factor 1.00
- Fare Weight Factor 1.00
- Link Time Weight Factor 1.00
- Transfer Penalty Time Weight Factor 1.00
- Dwell Time Weight Factor 1.00
- Interarrival Parameter 0.15
- Use Park and Ride NO

## **H. CALIBRATION/VALIDATION**

Total link daily assignment from the base year TOD assignments was validated by comparing the percentage difference between observed traffic count and estimated model volume on the link. The systemwide calibration/validation was performed by roadway functional classification, volume-group range, screenline, major corridors, and area type.

The calibration and validation tasks began with the development of a special calibration report program, which is referred to as “CAL\_REP”. CAL\_REP was originally developed by Bernardin, Lochmueller & Associates, Inc. as part of the Indiana Reference Modeling System (IRMS) for the purpose of quantifying model errors and assisting in the diagnosis of assignment problems. For the Genesee model, a new version of CAL\_REP which was customized to best fit to the model was developed using the Geographic Information System Developer’s Kit (GIS-DK) script language. This program was then embedded as a post-processing module in the user model interface for easy access and implementation. The features of the model interface and the post-processing module are given in the “Technical Memorandum: Travel Model User’s Guide”.

The new version of CAL\_REP was designed to report modeling errors for the:

- network as a whole,
- functional classes,
- volume group ranges,
- designated screenlines,
- designated corridors,
- area types,
- truck trip, and
- time periods.

Error statistics reported and used for diagnosing the possible sources of model error are:

- percent root mean square errors,
- systemwide average error,
- mean loading errors and percentage errors, and
- total VMT errors and percentage errors.

The calibration and validation tasks were based on following a decision-tree that begins with finding “global” problems in the model. This beginning approach to correct global problems then moved on the “sub-area” errors, and was completed by focusing on specific link problems.

The global problems were first identified by a systemwide average error and a systemwide vehicle miles traveled (VMT). All model components affecting these problems were revisited and corrected where necessary. These efforts included:

- Modification to global trip production rates,
- Adjustment of friction factors,
- Adjustment of nested logit functions,
- Adjustment of timer-of-day factors,
- Adjustment of volume-delay functions,

- Modification to external trips.

The sub-area and individual link problems were then identified and applied with the following corrections:

- Application of local adjustment factors for trip generation,
- Modification to centroid connectors, and
- Adjustment of volume-delay functions.

Criteria for acceptable errors between observed and estimated traffic volumes vary by facility type, according to the magnitude of traffic volume usage. For example, higher volume roadways have stricter calibration guidelines than those with lower volumes. Acceptable error standards used for the calibration/validation efforts in this model are shown in **Table 36**. These thresholds were adopted by the Michigan Department of Transportation (MDOT).

**Table 36: MDOT Highway Validation Standards**

Category	MDOT Standards
Total VMT % Error	± 5%
Screenline/Cutline % Error	± 10%
Freeways	± 6%
Major Arterials	± 7%
Minor Arterials	± 10%
Collectors	± 20%
Trunk Line	± 6%
All Area Types	± 10%
Volume Group 1,000 ~ 2,500 vpd	± 100%
Volume Group 2,500 ~ 5,000 vpd	± 50%
Volume Group 5,000 ~ 10,000 vpd	± 25%
Volume Group 10,000 ~ 25,000 vpd	± 20%
Volume Group 25,000 ~ 50,000 vpd	± 15%
Volume Group > 50,000 vpd	± 10%

The 2005 model daily vehicle assignment to the 2005 AADTs using the MDOT targets (see above) at the network, area type, cutline, screenline, volume group and network link levels at a minimum. On the whole, the model is at -2.84% loading error and -2.11% VMT error. The systemwide % RMSE is at 27.70%. The Percent Root Mean Square Error (% RMSE) is the traditional and single best overall error statistic used for comparing loadings to counts. It has the following mathematical formulation:

$$\% RMSE = \frac{\sqrt{\sum (Count - Loading)^2 / n}}{Mean\ Count} \times 100$$

A model is in a high degree of accuracy when the systemwide % RMSE of the network gets down in the range of 30%. When evaluating % RMSE for groups of links disaggregated by volume ranges, relatively large errors are acceptable for low volume groups. But, the errors should become smaller as volume increases.

**Table 37** lists the model performance by the roadway functional class. “% Error” represents the percentage difference between ground counts (“Average Counts”) and model estimates (“Average Loading”). **Table 38** shows the model performance by screenline/cutline.

For the links where counts are higher than 1,000 vehicles per day, comparisons were made by volume-group between modeled and observed traffic counts. **Table 39** summarizes the errors by volume-group in comparison to calibration criteria identified in **Table 36**. The “% Threshold” column shows the target error standards adopted for this model. Comparison of % Error with % Threshold indicates that the model far exceeds the calibration minimum criteria for all volume ranges. Also, as volume increases, smaller % RMSE and % errors are observed.

**Table 40** shows the model performance by time periods and **Table 41** lists the mode performance by area types.

The transit assignment model results are summarized in **Table 42**. Overall the model has 28.44% difference to the ADT ridership counts.

**Table 37. Model Performance by Functional Classification**

Functional Classification	Average Counts	Average Loading	% RMSE	% Error	VMT % Error	% Threshold (for % Error)
Rural Interstate	20,303	20,302	0.019	-0.002	0.00	±6
Rural Prin. Arterial	15,185	15,696	16.024	3.368	5.77	±7
Rural Minor Arterial	7,066	7,291	34.367	3.188	3.73	±10
Rural Major Collector	3,193	2,871	46.132	-10.068	-12.86	±20
Rural Minor Collector	1,967	2,173	54.660	10.482	15.65	±20
Rural Local Roads	0	0	0.000	0.000	0.00	n/a
Urban Interstate	28,939	30,062	12.104	3.879	1.35	±6
Urban Expressway	25,897	27,124	9.427	4.737	2.65	±7
Urban Prin. Arterial	17,357	17,258	23.438	-0.568	-0.27	±10
Urban Minor Arterial	8,586	7,820	33.826	-8.932	-10.33	±20
Urban Collectors	4,049	3,805	61.678	-6.037	-6.72	±20
Urban Local Roads	0	0	0.000	0.000	0.00	n/a
<b>Trunk Line</b>	18,582	188,442	19.550	-0.760	n/a	±6
<b>All</b>	<b>11,103</b>	<b>10,787</b>	<b>27.70</b>	<b>-2.84</b>	<b>-2.11</b>	n/a

**Table 38. Model Performance by Screenline/Cutline**

Screenline/Cutline	Average Counts	Average Loading	% RMSE	% Error	% Threshold (for % Error)
Irish Road	6,176	6,493	41.52	5.14	±10
Elms Hogan	9,851	10,574	30.52	7.34	±10
Pierson Road	13,334	14,432	27.30	8.24	±10
Hill Road	15,645	16,444	18.94	5.11	±10
Ray Road	13,227	13,201	19.62	-0.20	±10
NE CBD Screen	17,489	16,862	21.79	-3.59	±10
Flint River	20,212	21,799	21.74	7.85	±10

**Table 39. Model Performance by Link Volume Group**

Volume Range	Average Counts	Average Loading	% RMSE	% Error	% Threshold
1,001 ~ 2,000	1,520	2,219	123.99	46.01	±100
2,001 ~ 3,000	2,557	2,419	54.88	-5.40	±100
3,001 ~ 4,000	3,490	3,283	53.74	-5.93	±50
4,001 ~ 5,000	4,504	4,216	52.71	-6.40	±50
5,001 ~ 6,000	5,444	4,586	47.01	-15.76	±25
6,001 ~ 8,000	7,099	6,727	40.91	-5.24	±25
8,001 ~ 10,000	9,015	8,927	30.54	-0.97	±25
10,001 ~ 15,000	12,368	11,706	25.62	-5.35	±20
15,001 ~ 20,000	17,432	16,890	23.58	-3.11	±20
20,001 ~ 25,000	22,732	22,420	20.48	-1.37	±20
25,001 ~ 30,000	26,893	26,465	15.18	-1.59	±15
30,001 ~ 40,000	35,045	35,866	11.19	2.34	±15
40,001 ~ 50,000	44,148	45,574	8.39	3.23	±15
>50,000	0	0	0.00	0.00	±10
<b>All</b>	<b>11,103</b>	<b>10,787</b>	<b>27.70</b>	<b>-2.84</b>	

**Table 40. Model Performance by Time of Day**

<b>Period</b>	<b>Average Counts</b>	<b>Average Loading</b>	<b>% Error</b>	<b>% RMSE</b>	<b>VMT % Error</b>	<b>% Threshold</b>
AM Peak Period	1462	1321	-9.66	44.38	-13.98	n/a
Midday	3947	3724	-5.65	29.89	-3.77	n/a
PM Peak Period	2627	2594	-1.28	31.22	-0.97	n/a
Night	2913	2837	-2.61	33.30	-0.77	n/a
<b>Daily</b>	<b>11,103</b>	<b>10,787</b>	<b>-2.84</b>	<b>27.70</b>	<b>-2.11</b>	n/a

**Table 41. Model Performance by Area Type**

<b>Area</b>	<b>Average Counts</b>	<b>Average Loading</b>	<b>% Error</b>	<b>% Threshold</b>
CBD	7679	7862	2.39	±10
Urban	13731	13053	-4.94	±10
Suburban	10936	10816	-1.09	±10
Fringe	7386	7204	-2.46	±10
Rural (incls external links)	6685	6683	-0.03	±10

**Table 42. Transit Model Performance by Route**

<b>ROUTE_ID</b>	<b>ROUTE_NAME</b>	<b>Count</b>	<b>Model Result</b>	<b>Difference (%)</b>
9	Lapeer Road	1372	1943	41.59
6	Lewis-Selby	346	757	118.69
2	ML King Avenue	1596	1352	-15.27
5	Dupont	1256	1319	5.01
13	Crosstown North	388	1279	229.56
3	Miller-Linden	1282	2273	77.27
12	Beecher-Corunna	1170	969	-17.17
11	Fenton Road	666	1193	79.16
8	South Saginaw	772	1542	99.71
10	Richfield Road	890	1294	45.36
7	Franklin	1300	1256	-3.35
14	Downtown-Campus	277	436	57.47
4	Civic Park	1278	1260	-1.38
1	North Saginaw	1582	1333	-15.72
<b>Total</b>		<b>14175</b>	<b>18206</b>	<b>28.44</b>

## **VIII. MODEL POST-PROCESSORS**

### **A. POST\_ALT**

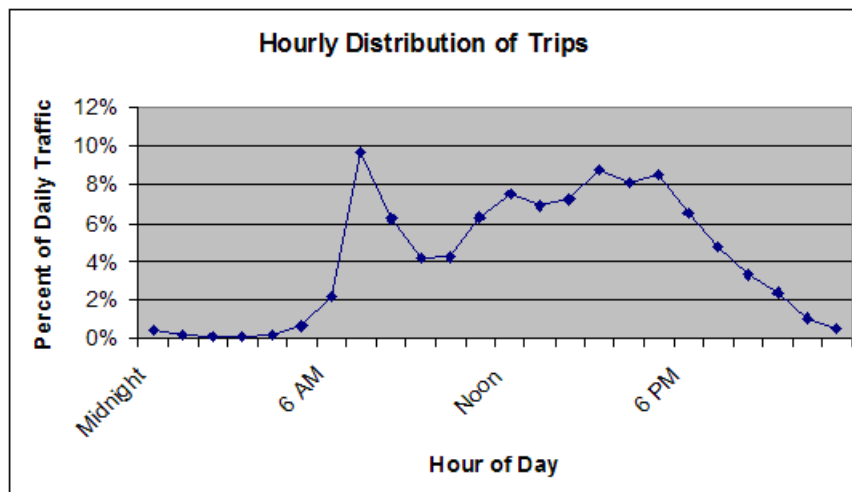
The outputs of the travel model are the loaded volumes of autos and trucks by direction and time-of-day on the various facilities in the model's roadway network. However, for planning and air quality purposes it is often important and helpful to further process the model outputs to produce estimates of speeds and level-of-service and to aggregate both these and the loadings (in terms of vehicle miles of travel) in various ways. All of this is done for the Genesee County Travel Demand Model by a post-processor to the travel model called POST\_ALT. The POST\_ALT program can be run after any model run, and produces estimates of level-of-service and average speeds by time-of-day for each link in the roadway network as well as a report which computes statistics for groupings of roadway segments in the network such as by functional class, area type, or corridor.

#### **1. Estimation of Hourly Average Speeds and Volumes**

The hourly average speed for each link is calculated by using the Bureau of Public Roads (BPR) form of the volume delay function with link specific parameters. The volume delay function is used to adjust the link's free-flow speed on the basis of its hourly volume to capacity ratio to account for congestion related delay. The alpha and beta parameters for the BPR equation which are used in both the travel model's assignment procedure as well as the post-processing are coded on the network links. Several sets of volume-delay parameters were applied in the Genesee County model to different classes of roadway. Due to the method of capacity estimation adopted for the model which specifies an absolute capacity rather than a practical capacity, the Genesee County model uses different volume delay parameters than many models which use practical capacities. Initial parameters were developed from analysis of the data on average speeds from the congestion management study and modified through the process of validation of the assignment.

The estimation of link free-flow speeds is based on posted speed and facility type and is treated in Chapter IV in this document. The capacities used in the estimation of average speeds are also the same capacities used in the travel model proper developed using techniques from the HCM 2000 and are described in detail in Chapter V in this document. The last input to the volume delay function, the volume, is estimated by apportioning the model's assigned volumes in each period and direction using an hourly distribution developed together with the peak-hour traffic percentages from observed data. The hourly distribution of trips is displayed in the figure and table below.





**Figure 19. Genesee County Hourly Distribution of Total Traffic**

**Table 43. Distribution of Total Traffic by Hour**

Period	Hour of Day	Percent of Daily Traffic	Percent of Period Assignment
Off Peak	1 AM	0.18%	0.31%
	2 AM	0.13%	0.22%
	3 AM	0.14%	0.24%
	4 AM	0.19%	0.32%
	5 AM	0.66%	1.12%
	6 AM	2.16%	3.68%
AM Peak	7 AM	9.67%	60.90%
	8 AM	6.21%	39.10%
	9 AM	4.19%	7.13%
Off Peak	10 AM	4.25%	7.24%
	11 AM	6.27%	10.67%
	Noon	7.48%	12.73%
	1 PM	6.93%	11.78%
	2 PM	7.22%	12.28%
PM Peak	3 PM	8.75%	34.53%
	4 PM	8.09%	31.90%
	5 PM	8.51%	33.57%
Off Peak	6 PM	6.50%	11.06%
	7 PM	4.74%	8.07%
	8 PM	3.32%	5.65%
	9 PM	2.38%	4.05%
	10 PM	1.05%	1.79%
	11 PM	0.53%	0.90%
	Midnight	0.45%	0.76%

POST\_ALT's speed estimation was calibrated to observed average speeds by time of day on major corridors from several congestion management studies. The calibration effort resulted in applying correction factors for signal delay and by area type. Signal delay was intentionally underrepresented in the travel model proper since using true delays would result in underloading of signalized facilities. This is due to a common psychological underestimation of the impact of signal delays on travel time. Similarly there is a psychological bias for certain trip attractors in urban areas and central business

districts, and using true speeds in the model would cause under-assignment in the more densely developed areas.

### **2. Estimation of Level of Service**

Three types of Level Of Service (LOS) estimation produced by POST\_ALT are provided for general system level planning purposes and are not intended to replace manual level of service analyses for corridor planning and design purposes. These three types of LOS estimation are,

- HCM 2000 method
- Volume/Capacity Ratio Method
- Genesee County Congestion Management System (CMS) Method

Due to a variety of factors including the general assumptions regarding the percent of traffic in peak hour and peak fifteen minute periods and inherent limitations of the travel model to reproduce peak period directional splits, POST\_ALT's estimates of level of service are not as accurate as manual estimates for particular corridors which make use of corridor specific assumptions. It is therefore important that specific level of service analyses still be done for detailed planning when examining specific corridors and improvements.

POST\_ALT estimates the HCM LOS using the criteria set forth in the HCM 2000. For the purposes of level of service analysis, the facilities in the model's roadway network are grouped into three facility types: freeways, expressways and rural multilane highways; rural two-lane roads and highways; and urban streets. Each of these facility types are dealt with separately in the Highway Capacity Manual and use differing criteria for determining level of service. Level of service for freeways, expressways and rural multilane highways is determined by peak period flow density in terms of passenger cars per lane per mile. For, rural two-lane roads and highways, level of service is determined by percent time following and average speed. For urban streets, level of service is determined on the basis of average speed alone. For all facility types, a peak hour factor of 0.92 is assumed in urban areas and 0.88 is assumed in rural areas. The peak hour volume is assumed to be 60.9% of the AM period loading or 34.53% of the PM period loading. The directional split from the model for the peak period is used.

POST\_ALT also estimate the LOS based on the Genesee County Congestion Management System (CMS). This method uses the daily capacity and loaded daily volume for the estimation.

**Appendix B: 2005 Base Year Population Data 2040 Population  
Projections Methodology Report**

# 2005 Base Year Population Data 2040 Population Projections Methodology Report



# **Genesee County Population Projections Methodology Report**

2005 and 2010 Years of the 2040 Population Projections.....1

Methodology for Projections Beyond 2010.....1

Methodology for the Local Units of Government Outside the City of Flint..2

City of Flint Population Projection Methodology.....3

Other Factors.....4

Comparison to Other Data Sources.....5

Population Projection Assumptions.....5

2040 Genesee County Population Projections.....7

## **List of Figures**

Graph of City of Flint Projected Percent Reduction in Households.....4

## **Appendix A**

Methodology Examples

## **Appendix B**

Recovery Factors and Supporting Census Data

## **Genesee County 2040 Population Projections Methodology**

### **2005 and 2010 Years of the 2040 Population Projections**

#### **TAZ Level Data**

The population projections for Genesee County were produced on a traffic analysis zone (TAZ) level where growth/decline was calculated for each TAZ which can then be aggregated up to the municipality level for all cities and townships and some villages. The 2005 base year projections are based on 2000 census data derived from the 2000 Census transportation Planning Package (CTPP) which provided household data information to the TAZ level. The 2005 projections were originally developed for 467 TAZ that represented Genesee County. When the transportation model for the 2035 Long Range Transportation Plan (LRTP) was updated the TAZ layer in the model was modified to 639 TAZ and data was migrated to the new zones.

#### **Building Permits and Demolitions**

In the development of the 2035 projections, which includes the 2005 base year of the 2040 projections, staff used building permit data (new builds and demolitions) to depict the areas of growth/decline in Genesee County. Building permit data was collected from every municipality, geo-located and aggregated to the TAZ level. Building permits include single-family residential, multi-family residential, and mobile homes all weighted equally per housing unit. Data was used from the years 2000 through 2006. Comparing the 1990 and 2000 Census and Genesee County building permit data for the same time period it was decided that a reduction factor of .42 would be used to compensate for building permits issued but not completed and vacancy rates. The factored net change was then averaged out from the seven years of data into an average yearly growth/decline factor that will be identified from this point on as the 2035 Annual TAZ Household Growth Factors. This factor was used to project the 2005 base year data from 2000 Census data.

2010 TAZ level data was validated using 2010 Census data. The remaining year projections for the 2040 Population Projections are explained in further detail in the following sections of this report.

#### **Methodology for Projections Beyond 2010**

All local units of Government in Genesee County (including the City of Flint) were projected using the same methodology for the 2035 LRTP Population Projections. The 2040 projections use different methodology for the City of Flint than what is used for all other local units of government in Genesee County. The primary reason for this separation is that the City of Flint is a unique case as it has lost on average 19,000 people per decade since 1980. No other local unit of government in Genesee County has a fraction of the continued loss realized in the City of Flint. The following sections of this report describe the methodology used for areas outside the City of Flint and for the City of Flint itself.

#### **Methodology for the Local Units of Government outside the City of Flint**

## **A. New Construction**

In the late 2000's much of the growth realized earlier in the decade was halted with the crash of the housing market and the beginning of the national recession. These conditions resulted in the following:

- An uncharacteristic number of foreclosures
- An uncharacteristic number of short sales
- An uncharacteristic number of abandoned homes
- An uncharacteristic drop in housing values

These conditions made it a lot cheaper and attractive to buy an existing home rather than building a new one. Many older homes were abandoned as homeowners were able to buy newer and larger homes for relatively the same monthly payment of their existing home. Residential development basically halted in the late 2000's. In 2012/2013 the housing market began to stabilize and new residential development was starting throughout Genesee County. While seeing positive growth, the amount and the short timeframe of the recovery leading up to the 2040 population projections did not give a firm foundation to build growth factors from. As a result the main assumption that staff made moving forward is that Genesee County communities will eventually get back to levels of growth realized in the first half of the 2000's. A large amount of infrastructure was put in place in the early 2000's as seen in partially finished subdivisions throughout the County. It is assumed that factors such as infrastructure that made areas in the County attractive for growth before the housing market crash and the national recession will continue to attract growth as the recovery continues. To determine how a community may recover staff used Census data, specifically 2010 vacancy rates, percent change in population from the 2000 to 2010 Census, and a general trend in Census population numbers from 1980 to 2010 to develop a recovery factor for each community. Charts and maps of Census data used to create the Recovery Factors and of the Recovery Factors themselves can be found in Appendix B. The recovery factors were applied to 2035 Annual TAZ HH Growth Factors creating the 2040 Annual TAZ HH Growth Factors. This allows each community to recover at its own pace until it reaches annual growth realized in the early 2000's. This growth/decline is represented as an annual change in households each year at the TAZ level. An example of how this is calculated is provided in Example 1 of Appendix A.

## **B. Vacancy**

Every community in Genesee County had a higher 2010 Census vacancy rate as compared to the 2000 Census vacancy rate. Another assumption made by staff is that the same factors that have affected new construction have also affected vacancy and that in most communities many of the houses that were vacant in 2010 will be occupied returning the community to 2000 vacancy levels. A vacancy rate is hard to project into the future as demolitions and new construction each affect the rate. At this time the Genesee County population projections do not project vacant housing units into the future and thus a

vacancy rate is not projected. To compensate for this staff identified a target number of houses in each community that will move from vacant to occupied in the future. The target was calculated by first applying the 2000 vacancy rate to the 2010 housing units. The difference in comparing the 2010 vacant units to the factored 2010 vacant units using the 2000 vacancy rate is the target. As with new construction each community will recover vacancy at a different rate so the target number of housing units is divided by the Recovery Factor to get an annual number of housing units that will move from vacant to occupied each year until the target number of units is reached. This is represented as an annual change in households each year at the TAZ level. An example of how this is calculated is provided in Example 2 of Appendix A.

### **C. Total Households**

The combination of new construction households and households recovered from vacancy represents the growth in households for a TAZ for a given year. The households in a TAZ for a given year are multiplied by the projected persons per household for the TAZ for the representative year to calculate population. An example of how this is calculated is provided in Example 3 of Appendix A.

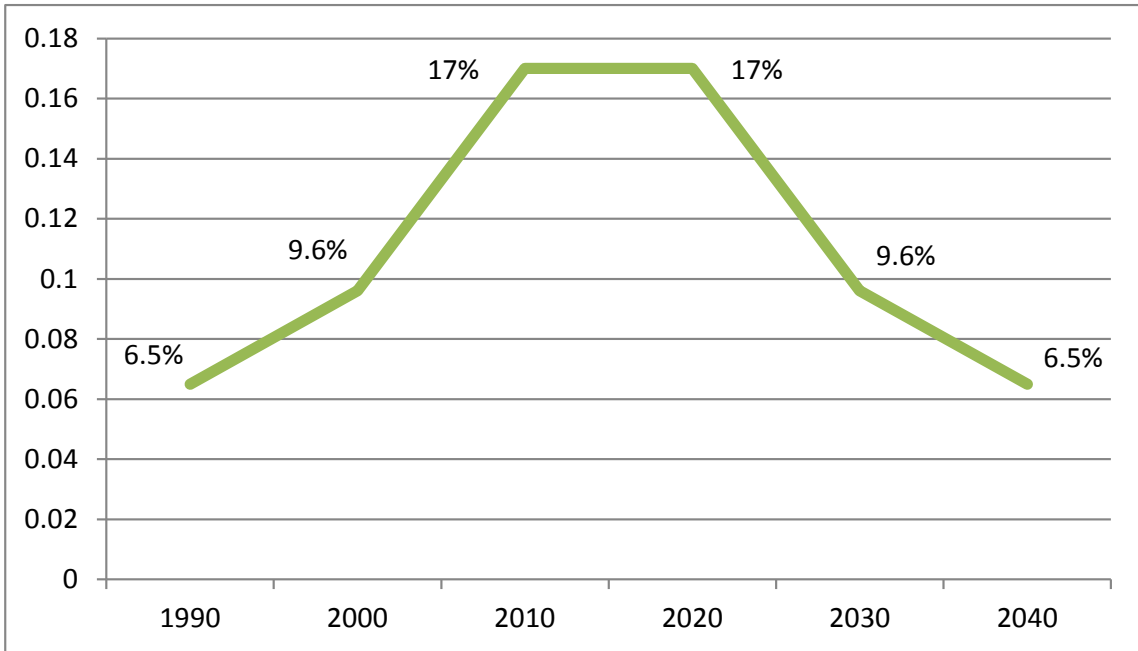
### **City of Flint Population Projection Methodology**

The City of Flint has continued to see a steady loss in population over the past several decades averaging a loss of 19,000 persons per decade since 1980. At some point in the future this rate of loss should level out, however, this is hard to estimate given the consistency of population loss in the City even with significant investments made in the community over the past decade.

Genesee County population projections are driven by changes to households. Staff used historic percent changes to households in the City of Flint to project future percent changes to households. The percent change in households increased each decade since 1980 leading up to the 2010 Census and the future projection reverse the pattern decreasing the percent change in households for the decades out to 2040. This approach tappers back the percent household reduction in the future and resembles a bell curve pattern as seen in the chart on the next page.



This graph illustrates a bell curve pattern for existing and projected Percent Reduction in households for the City of Flint.



Staff used information in the Draft City of Flint Master Plan to identify areas and levels of growth and decline. This information was coded into the TAZ representing the City of Flint and used to distribute annual HH reductions. The projections also recognized areas of growth in the City such as Smith Village, student housing, and the Durant that were not accounted for or at least not fully accounted for in the 2010 Census. The projected households for each City of Flint TAZ are multiplied by the persons per household projections for each TAZ for the representative year. An example of how the City of Flint Population Projections are calculated is provided in Example 5 (a) and 5 (b) of Appendix A.

**Other Factors**

**A. Availability for growth**

In high growth TAZs, availability of land was looked at to determine the number of housing units a TAZ can actually hold. Aerial imagery was used to determine available land and zoning ordinances were used to determine the number of units available in that area. These were applied to the high growth TAZ in the same method that was used in the previous two projections.

**B. Household Size**

Up to this point we are working with households not persons in our population forecasting. For each TAZ a person per household factor is derived from 2010 Census data. We know that the average household size is decreasing and that it is projected to continue to decrease in the future. The University of Michigan Institute for Research on Labor, Employment, and the Economy used Regional Economic Models Inc (REMI) 2040 population projection data as their base to

develop household projections for Genesee County out to the year 2040. This data is provided in five year increments and was developed for the Michigan Department of Transportation (MDOT). The information derived from this dataset for the Genesee County population projections is an annual projected change in household size. Persons per household (PPHH) is easily calculated from the UM/REMI projections by dividing the population by the number of households for each five year increment. This represents the projected UM/REMI average PPHH for Genesee County for each five year increment. The annual change in household size for years between each five year increment is calculated by dividing the difference in PPHH for two sequential five year increments by five. From this calculation each five year period is represented by an annual PPHH reduction factor that will be applied to each TAZ to project TAZ level reductions in annual household size. An example of how PPHH Reduction Factors are used at the TAZ level to project PPHH is provided in Example 4 of Appendix A.

**Comparison to other data sources**

As stated earlier the population projections are calculated at the TAZ level and then aggregated by local unit of government. The local unit of government data is further aggregated to County level projections. The County level projections are compared to and validate against other population projections such as the 2035 Genesee County LRTP Population Projections, 2040 Regional Economic Models Inc. (REMI) projections, and 2040 Woods and Poole projections.

	<b><u>2040</u></b>
2035 Genesee County LRTP Population Projections:	473,883
2040 Woods and Poole:	423,226
2040 REMI:	401,784
<b>2040 year of 2040 LRTP Population Projections:</b>	<b>423,030</b>

*A 2040 year was estimated for the 2035 Genesee County LRTP Population Projections for comparison to other projections.*

**Population Projection Assumptions**

- Data from the 2000 Census Transportation Planning Package for Genesee County is accurate for each traffic analysis zone.
- Data from the 2010 Census is accurate for each traffic analysis zone.
- Locations of building permits from 2000-2006 will represent the areas of future growth out to 2040.
- Locations of demolitions from 2000-2006 will represent areas of future decline out to 2040.
- All new building permits do not equal new housing units. The number of new housing units is a factor based on the difference between the number of new building permits between 1990 and 2000 compared to the number of new households reported by the Census during that same time period.

- Density patterns of single-family residential will continue at the current densities now present in the local unit of governments' master plan and zoning ordinances.
- Household size will continue to decline at the rates suggested in the 2040 University of Michigan Institute for Research on Labor, Employment, and the Economy/Regional Economic Models Inc (REMI) data.
- Interpolation of the five-year increments of household size in the 2040 University of Michigan Institute for Research on Labor, Employment, and the Economy/Regional Economic Models Inc (REMI) data can be analyzed to show household size changes for any given year out to 2040.
- Local planning knowledge of future development in Genesee County is a factor that is considered when applying statewide and national data to the local area and adjustments are made where known development is occurring that is not represented in the statewide and national datasets.
- Genesee County Local Units of Government will eventually get back to the levels of growth realized in the first half of the 2000's.
- Genesee County Local Units of Government will eventually get back to the levels of vacancy realized in the first half of the 2000's.
- Recovery Factors can be assigned to a community based on current and historic Census vacancy and population data and used to factor future construction and vacancy recovery.

**Draft Genesee County 2040 Long Range Transportation Plan Population Projections**

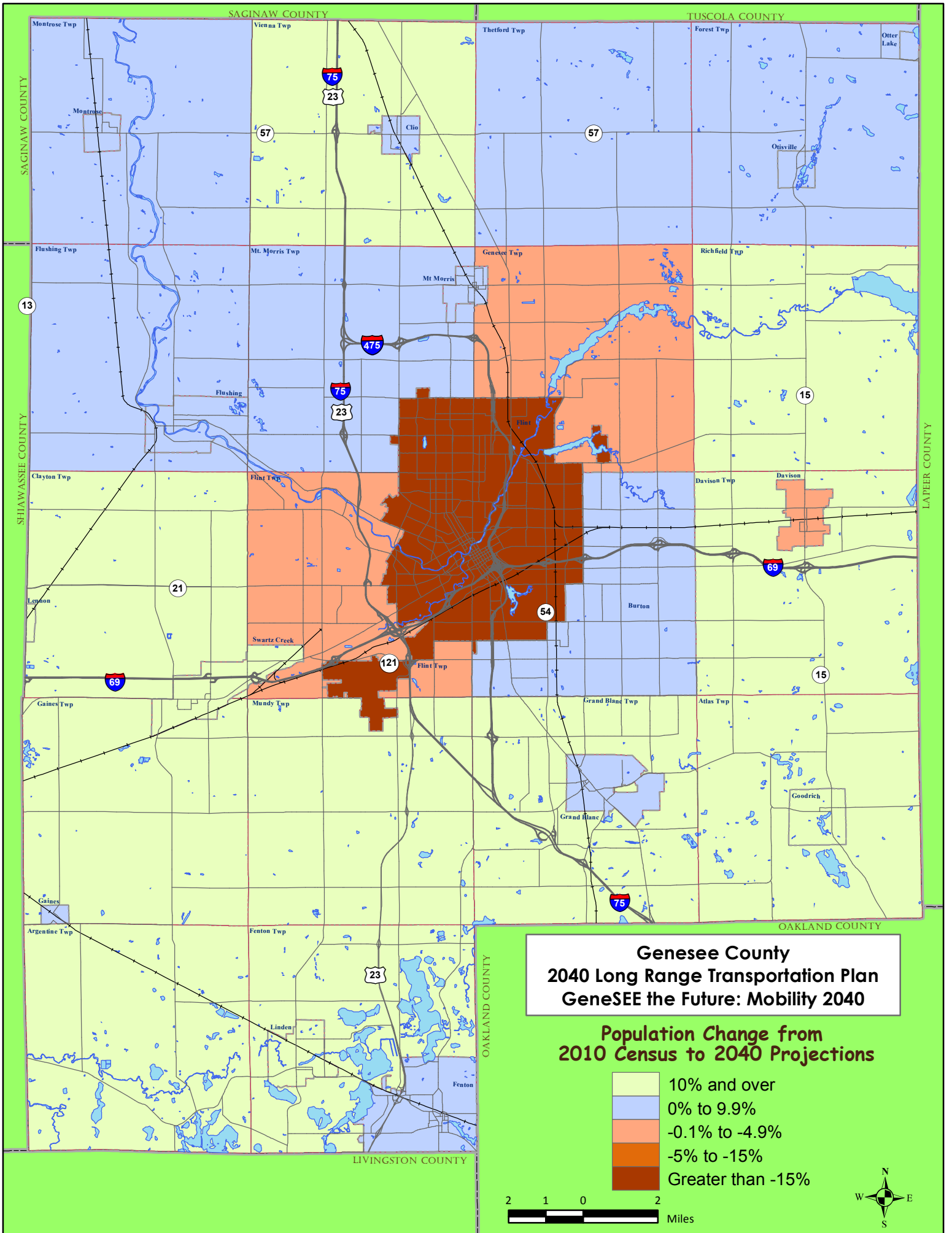
LUG	Pop 2005	Pop 2010	Pop 2012	Pop 2015	Pop 2020	Pop 2025	Pop 2030	Pop 2035	Pop 2040	2010 to 2040 Change	2010 to 2040 % Change
Argentine Twp	6,943	6,913	6,903	6,926	7,069	7,236	7,425	7,638	7,886	973	14.1%
Atlas Twp	6,215	6,133	6,102	6,085	6,139	6,267	6,412	6,576	6,768	635	10.4%
Burton City	31,305	29,999	29,874	29,742	29,700	30,065	30,473	31,068	31,821	1,822	6.1%
Clayton Twp	7,700	7,611	7,591	7,602	7,730	7,901	8,096	8,319	8,581	970	12.7%
Clio City	2,586	2,646	2,628	2,605	2,584	2,602	2,626	2,661	2,711	65	2.5%
Davison City	5,529	5,173	5,136	5,083	5,008	4,988	4,973	4,989	5,046	-127	-2.5%
Davison Twp	19,180	19,575	19,512	19,551	19,986	20,606	21,292	22,055	22,932	3,357	17.1%
Fenton City	11,625	11,746	11,771	11,878	12,201	12,344	12,466	12,628	12,861	1,115	9.5%
Fenton Twp	14,665	15,552	15,554	15,689	16,274	16,953	17,647	18,331	19,020	3,468	22.3%
Flint City	120,283	102,486	99,416	93,009	82,543	77,343	72,527	69,646	67,133	-35,353	-34.5%
Flint Twp	33,720	31,890	31,739	31,526	31,251	31,281	31,203	31,310	31,646	-244	-0.8%
Flushing City	8,464	8,389	8,352	8,306	8,268	8,332	8,364	8,429	8,541	152	1.8%
Flushing Twp	10,596	10,640	10,604	10,585	10,661	10,779	10,931	11,120	11,363	723	6.8%
Forest Twp	3,931	3,838	3,820	3,800	3,789	3,829	3,868	3,921	3,993	155	4.0%
Gaines Twp	6,420	6,442	6,436	6,460	6,592	6,736	6,900	7,086	7,305	863	13.4%
Gaines Village	450	380	379	378	377	375	375	377	380	0	0.0%
Genesee Twp	23,981	21,595	21,513	21,395	21,237	21,259	21,159	21,164	21,300	-295	-1.4%
Goodrich Village	1,566	1,860	1,855	1,868	1,940	2,045	2,155	2,271	2,396	536	28.8%
Grand Blanc City	8,078	8,276	8,227	8,181	8,187	8,257	8,358	8,492	8,674	398	4.8%
Grand Blanc Twp	35,075	37,500	37,527	37,878	39,312	40,903	42,421	43,970	45,734	8,234	22.0%
Linden City	3,603	3,991	3,997	4,029	4,142	4,239	4,342	4,417	4,514	523	13.1%
Montrose City	1,552	1,657	1,648	1,639	1,635	1,656	1,679	1,707	1,745	88	5.3%
Montrose Twp	6,496	6,224	6,203	6,180	6,172	6,232	6,290	6,380	6,499	275	4.4%
Mt Morris City	3,448	3,127	3,119	3,111	3,118	3,168	3,209	3,282	3,393	266	8.5%
Mt Morris Twp	23,795	21,460	21,421	21,370	21,331	21,477	21,422	21,482	21,684	224	1.0%
Mundy Twp	14,810	15,063	15,076	15,253	15,975	16,820	17,710	18,656	19,695	4,632	30.8%
Otisville Village	903	864	862	861	863	861	862	867	875	11	1.3%
Richfield Twp	8,726	8,730	8,690	8,684	8,823	9,073	9,349	9,654	10,005	1,275	14.6%
Swartz Creek City	5,493	5,726	5,696	5,706	5,819	5,969	6,140	6,334	6,564	838	14.6%
Thetford Twp	8,385	7,049	7,039	7,029	7,034	7,107	7,118	7,176	7,288	239	3.4%
Vienna Twp	13,627	13,255	13,228	13,248	13,449	13,681	13,957	14,282	14,677	1,422	10.7%
	449,150	425,790	421,919	415,657	409,210	410,384	411,749	416,286	423,030	-2,760	-0.6%

<b>Woods and Poole</b>	2005	2010	2012	2015	2020	2025	2030	2035	2040	2010 to 2040 Change	2010 to 2040 % Change
	442,508	425,790	421,827	421,531	421,711	422,231	422,645	422,895	423,226	-2,564	-0.6%

<b>REMI</b>	2005	2010	2012	2015	2020	2025	2030	2035	2040	2010 to 2040 Change	2010 to 2040 % Change
	442,382	425,790	422,722	418,132	411,712	407,617	404,881	403,049	401,784	-24,006	-5.6%

<b>GCMPC 2035</b>	2005	2010	2012	2015	2020	2025	2030	2035	2040	2010 to 2040 Change	2010 to 2040 % Change
	449,150	451,954	452,486	455,624	457,680	461,835	465,879	469,895	473,883	21,929	4.9%

<b>Census Estimates</b>	2005	2010	2012
	442,508	425,790	418,408



**Appendix A**  
**Methodology Examples**

**1. Example Calculation for Annual Household (HH) Growth Factor  
for Areas outside the City of Flint**

**Annual Distribution of Target**

	2035 Annual HH Growth Factor for TAZ		Recovery Factor for Community 1		2040 Annual Recovery Factor for TAZ
Community 1 TAZ 1	10	÷	5	=	2.00
Community 1 TAZ 2	5	÷	5	=	1.00
Community 1 TAZ 3	14	÷	5	=	2.80
Community 1 Total	29	÷	5	=	5.80

**2040 Annual HH Growth Factor Recovery**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Community 1 TAZ 1	2.00	4.00	6.00	8.00	10.00	10.00	10.00
Community 1 TAZ 2	1.00	2.00	3.00	4.00	5.00	5.00	5.00
Community 1 TAZ 3	2.80	5.60	8.40	11.20	14.00	14.00	14.00
Community 1 Total	5.80	11.60	17.40	23.20	29.00	29.00	29.00

*2040 Annual Recovery Factors for each TAZ are compounded each year until the 2035 Annual HH Growth Factor is reached.*

**2040 HH Projection For Community 1 Using Only 2040 Annual HH Growth Factor (no Recovered Vacancy included)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Community 1 TAZ 1	902.00	906.00	912.00	920.00	930.00	940.00	950.00
Community 1 TAZ 2	555.00	557.00	560.00	564.00	569.00	574.00	579.00
Community 1 TAZ 3	528.80	534.40	542.80	554.00	568.00	582.00	596.00
Community 1 Total	1,986	1,997	2,015	2,038	2,067	2,096	2,125
Community 1 HH Growth	5.80	11.60	17.40	23.20	29.00	29.00	29.00

*New households are added to existing households for each TAZ.*

## 2. Example Calculation for Recovered Vacancy for Areas Outside the City of Flint

### Community 1 Information

2010 Vacant Houses	220
2010 Households	1,980
2010 Housing Units	2,200
2000 Vacancy Rate	6%

2010 Factored Vacant Houses Using Census 200 Vacancy Rate	132	2,200 x 6%=132
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Difference = Target	220	-	132	=	88
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*The Target represents the number of housing units that will be moved from vacant to occupied through the timeframe of the projections. The rate at which this happens depends on the Recover Factor for the community the TAZ represents.*

### Annual Distribution of Target

	Vacant Houses	Percent of Vacant Houses this TAZ represents for the community	Distribution of Target	Recovery Factor	Annual Recovery Factor
Community 1 TAZ 1	100	45.5%	40.00	5	8.00
Community 1 TAZ 2	71	32.3%	28.40	5	5.68
Community 1 TAZ 3	49	22.3%	19.60	5	3.92
Community 1 Total	220	100.0%	88		17.60

*The Target is distributed based on the Percentage of Vacant Houses the TAZ represents for the community and is then divided by the Recovery Factor to get an Annual Recovery Factor for each TAZ.*

### 2040 Annual Vacancy Recovery

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Community 1 TAZ 1	8.00	8.00	8.00	8.00	8.00	0	0
Community 1 TAZ 2	5.68	5.68	5.68	5.68	5.68	0	0
Community 1 TAZ 3	3.92	3.92	3.92	3.92	3.92	0	0
Community 1 Total	17.60	17.60	17.60	17.60	17.60	0	0
					88		

*The Annual Recovery Factor is applied to each year until the Target of housing units is reached for the TAZ.*

### 2040 HH Projection For Community 1 Using Only Recovered Vacancy (no New Build Housing included)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Community 1 TAZ 1	908.00	916.00	924.00	932.00	940.00	940.00	940.00
Community 1 TAZ 2	559.68	565.36	571.04	576.72	582.40	582.40	582.40
Community 1 TAZ 3	529.92	533.84	537.76	541.68	545.60	545.60	545.60
Community 1 Total	1,998	2,015	2,033	2,050	2,068	2,068	2,068
					88		

*The housing units that are newly occupied from vacant houses in a given year are added to the existing households in each TAZ*



**3. Example Calculation Combining Recovered Vacancy and Household Growth Factor  
for Areas Outside the City of Flint**

**2040 Annual Vacancy Recovery**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1</b>	8.00	8.00	8.00	8.00	8.00	0.00	0.00
<b>Community 1 TAZ 2</b>	5.68	5.68	5.68	5.68	5.68	0.00	0.00
<b>Community 1 TAZ 3</b>	3.92	3.92	3.92	3.92	3.92	0.00	0.00
<b>Community 1 Total</b>	17.60	17.60	17.60	17.60	17.60	0.00	0.00

**2040 Annual HH Growth Factor Recovery**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1</b>	2.00	4.00	6.00	8.00	10.00	10.00	10.00
<b>Community 1 TAZ 2</b>	1.00	2.00	3.00	4.00	5.00	5.00	5.00
<b>Community 1 TAZ 3</b>	2.80	5.60	8.40	11.20	14.00	14.00	14.00
<b>Community 1 Total</b>	5.80	11.60	17.40	23.20	29.00	29.00	29.00

**2040 Combined Annual Vacancy Recovery and Annual HH Growth Factor Recovery**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1</b>	10.00	12.00	14.00	16.00	18.00	10.00	10.00
<b>Community 1 TAZ 2</b>	6.68	7.68	8.68	9.68	10.68	5.00	5.00
<b>Community 1 TAZ 3</b>	6.72	9.52	12.32	15.12	17.92	14.00	14.00
<b>Community 1 Total</b>	23.40	29.20	35.00	40.80	46.60	29.00	29.00

**Projected Households for Community 1**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1</b>	910.00	922.00	936.00	952.00	970.00	980.00	990.00
<b>Community 1 TAZ 2</b>	560.68	568.36	577.04	586.72	597.40	602.40	607.40
<b>Community 1 TAZ 3</b>	532.72	542.24	554.56	569.68	587.60	601.60	615.60
<b>Community 1 Total</b>	2,003	2,033	2,068	2,108	2,155	2,184	2,213

*New households from recovered vacancy and new builds are added to existing households.*

**4. Example Population Projections Combining All Factors  
for Areas Outside the City of Flint**

**Projected Households (HH) for Community 1**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1 HH</b>	910.00	922.00	936.00	952.00	970.00	980.00	990.00
<b>Community 1 TAZ 2 HH</b>	560.68	568.36	577.04	586.72	597.40	602.40	607.40
<b>Community 1 TAZ 3 HH</b>	532.72	542.24	554.56	569.68	587.60	601.60	615.60
<b>Community 1 Total HH</b>	2,003.40	2,032.60	2,067.60	2,108.40	2,155.00	2,184.00	2,213.00

**Projected Persons Per Household (PPHH)**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>PPHH Reduction Factors</b>	-0.01056	-0.01056	-0.01056	-0.01056	-0.01056	-0.00992	-0.00992
<b>Projected PPHH Comm 1 TAZ 1</b>	2.489436	2.478873	2.468309	2.457745	2.447182	2.437263	2.427345
<b>Projected PPHH Comm 1 TAZ 2</b>	2.589436	2.578873	2.568309	2.557745	2.547182	2.537263	2.527345
<b>Projected PPHH Comm 1 TAZ 3</b>	2.289436	2.278873	2.268309	2.257745	2.247182	2.237263	2.227345

*The PPHH Reduction Factor for the County for a given year is subtracted from the previous years PPHH calculation for the TAZ. This is repeated each year for each TAZ.*

**Projected Population for Community 1**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>
<b>Community 1 TAZ 1 Pop</b>	2265.387	2285.521	2310.337	2339.774	2373.766	2388.518	2403.072
<b>Community 1 TAZ 2 Pop</b>	1451.845	1465.728	1482.017	1500.68	1521.686	1528.447	1535.109
<b>Community 1 TAZ 3 Pop</b>	1219.629	1235.696	1257.913	1286.192	1320.444	1345.938	1371.154
<b>Community 1 Total Pop</b>	4936.861	4986.945	5050.268	5126.646	5215.897	5262.903	5309.334

*Population = Persons Per Household x Households.*

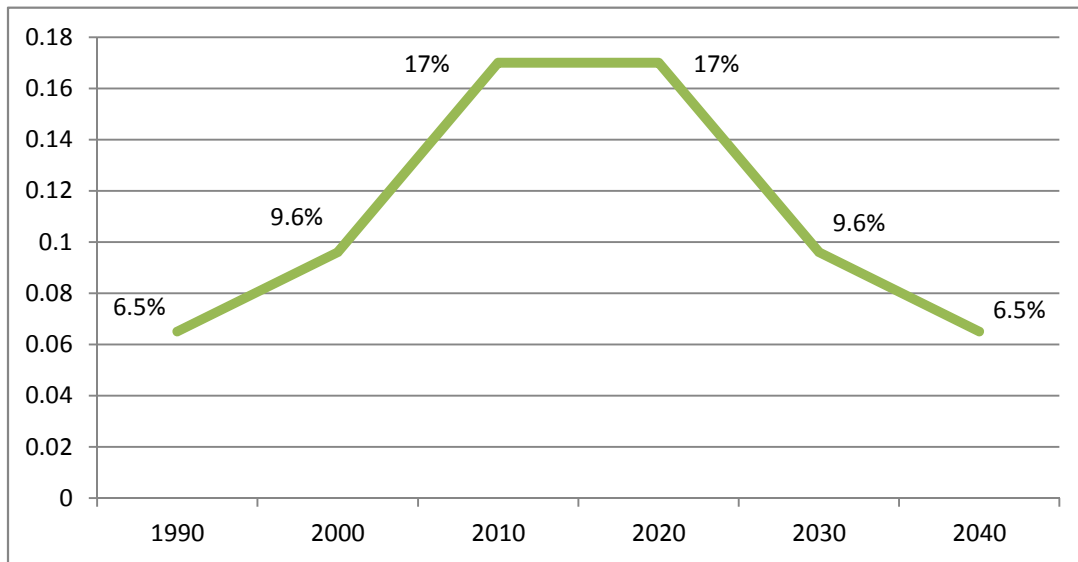
### 5 (a). Factors for City of Flint Household (HH) Reduction

Projected Percent Reduction in Households (HH) between the years:		
<b>2011 to 2020</b>	<b>2021 to 2030</b>	<b>2031 to 2040</b>
17%	9.60%	6.50%
<b>2010 Flint HH</b>	<b>2020 Flint HH (Projected)</b>	<b>2030 Flint HH( Projected)</b>
40,497	34,809	31,467
<b>2011 to 2020</b>	<b>2021 to 2030</b>	<b>2031 to 2040</b>
HH Reduction	HH Reduction	HH Reduction
6,884	3,342	2,045

*For each period the City of Flint combined households are multiplied by the Percent Reduction in Households to calculate the HH Reduction for the represented decade.*

<b>2011 to 2020</b>	<b>2021 to 2030</b>	<b>2031 to 2040</b>
HH Reduction Per Year	HH Reduction Per Year	HH Reduction Per Year
688.45	334.16	204.53

*The Household Reduction for the represented decade is divided by 10 to get an Annual Reduction Per Year.*



*This graph illustrates a bell curve pattern for existing and projected Percent Reduction in households for the City of Flint.*

5 (b).Example of How Household (HH) Reduction Factors for the City of Flint Change HHs at the TAZ Level

	Percent of HH Change This TAZ Represents	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Example Flint TAZ 1	20%	137.69	137.69	137.69	137.69	137.69	137.69	137.69	137.69	137.69	137.69	66.83	66.83
Example Flint TAZ 2	30%	206.53	206.53	206.53	206.53	206.53	206.53	206.53	206.53	206.53	206.53	100.25	100.25
Example Flint TAZ 3	40%	275.38	275.38	275.38	275.38	275.38	275.38	275.38	275.38	275.38	275.38	133.66	133.66
Example Flint TAZ 4	10%	68.84	68.84	68.84	68.84	68.84	68.84	68.84	68.84	68.84	68.84	33.42	33.42
	100%	688.45	688.45	688.45	688.45	688.45	688.45	688.45	688.45	688.45	688.45	334.16	334.16

In the chart above the *HH Reduction Per Year* for the City of Flint from 5 (a) is multiplied by the *Percent of HH Change the TAZ Represents* to get HH reduction per year per TAZ

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Example Flint TAZ 1	7961.7102	7824.02	7686.33	7548.64	7410.95	7273.26	7135.57	6997.88	6860.19	6722.50	6655.67	6588.84
Example Flint TAZ 2	11942.5653	11736.03	11529.50	11322.96	11116.43	10909.89	10703.36	10496.82	10290.29	10083.75	9983.50	9883.26
Example Flint TAZ 3	15923.4204	15648.04	15372.66	15097.28	14821.90	14546.52	14271.14	13995.76	13720.38	13445.00	13311.34	13177.67
Example Flint TAZ 4	3980.8551	3912.01	3843.17	3774.32	3705.48	3636.63	3567.79	3498.94	3430.10	3361.25	3327.83	3294.42
	39,809	39,120	38,432	37,743	37,055	36,366	35,678	34,989	34,301	33,613	33,278	32,944

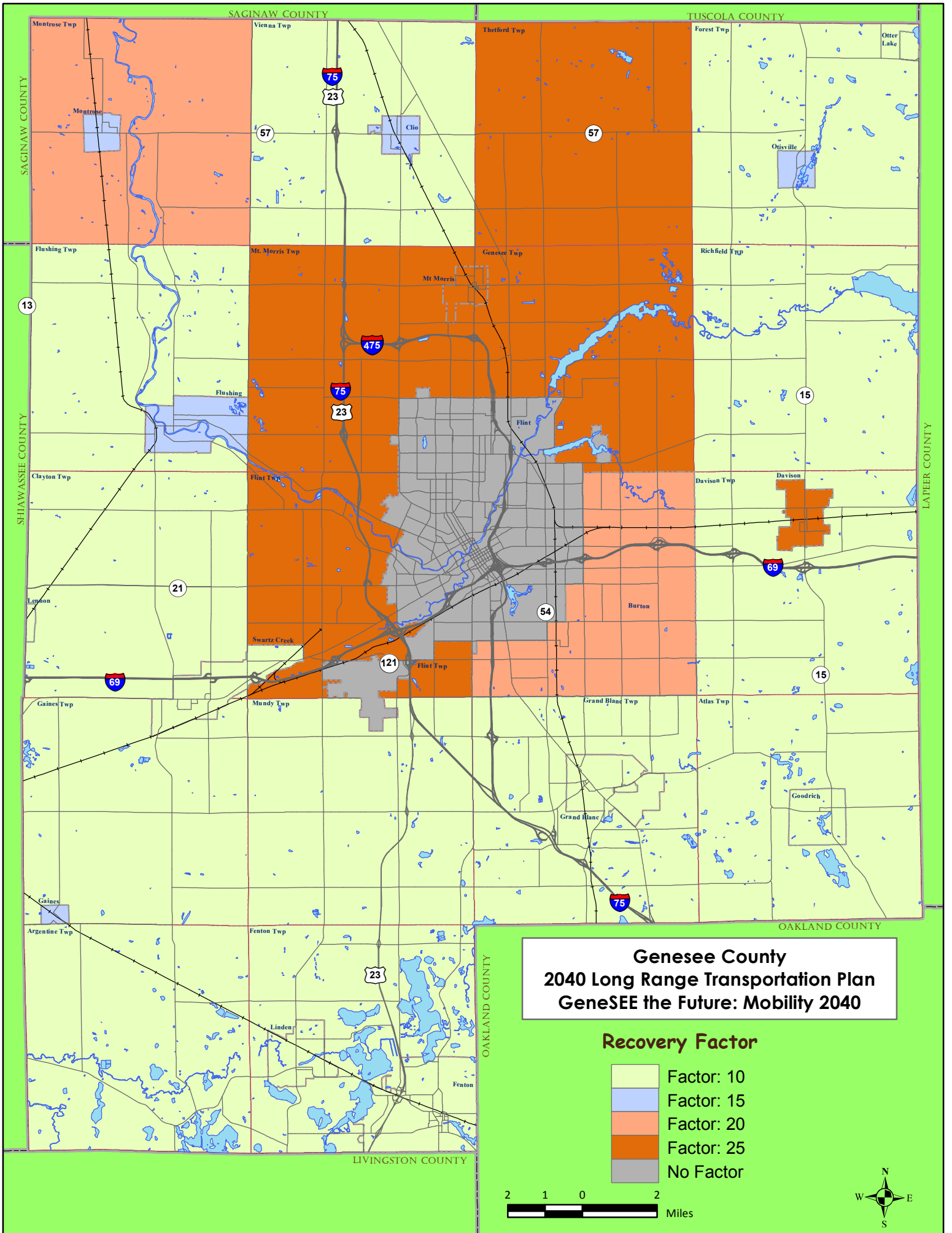
In the actual City of Flint projections new construction projects were manually added to the representing TAZ but were not included as part of this example. The City of Flint is represented by 191 TAZ in the Genesee County Transportation Model

**Appendix B**

**Recovery Factors  
and  
Supporting Census Data**

## Recovery Factors for the 2040 Population Projections

Local Unit	Recovery Factor	Summary	% Vacant	Pop Change	% Pop Change
Argentine Twp	10	Med Vac and Med Growth:Pos Growth 1980	9.9%	392	6.0%
Atlas Twp	10	Low Vac and Med Growth: Pos Growth 1990	4.1%	229	3.9%
Clayton Twp	10	Med Vac and Med Growth:Pos Growth 1980	6.5%	28	0.4%
Davison Twp	10	Med Vac and High Growth: Pos Growth 1980	6.5%	1853	10.5%
Fenton City	10	Med Vac and High Growth: Pos Growth 1980	9.1%	1164	11.0%
Fenton Twp	10	Med Vac and High Growth: Pos Growth 1980	9.1%	2584	19.9%
Flushing Twp	10	Low Vac and Med Growth: Pos Growth 1990	5.7%	410	4.0%
Gaines Twp	10	Low Vac and Med Growth: Pos Growth 1990	5.0%	329	5.1%
Goodrich Village	10	Med Vac and High Growth:Pos Growth 1980	6.4%	507	37.5%
Grand Blanc City	10	Low Vac and Med Growth:Pos Growth 1980	5.8%	34	0.4%
Grand Blanc Twp	10	Med Vac and High Growth:Pos Growth 1980	8.1%	7681	25.8%
Linden City	10	Med Vac and High Growth:Pos Growth 1980	8.4%	1130	39.5%
Mundy Twp	10	Low Vac and High Growth:Pos Growth 1980	5.9%	2891	23.7%
Otisville Village	10	Med Vac and Mild Loss:Pos Growth 1980	9.8%	-18	-2.0%
Richfield Twp	10	Low Vac and Med Growth:Pos Growth 1980	5.5%	560	6.9%
Swartz Creek City	10	Med Vac and High Growth:Pos Growth 1980	7.1%	656	12.9%
Vienna Twp	10	Med Vac and Med Growth:Pos Growth 1980	7.3%	147	1.1%
Clio City	15	High Vac and Med Growth:Flat/Neg Growth 1980	10.5%	163	6.6%
Flushing City	15	Med Vac and Med Growth: Flat/Neg Growth 1980	6.3%	41	0.5%
Forest Twp	15	Low Vac and Mild loss: Flat/Pos Growth 1980	4.0%	-18	-0.5%
Gaines Village	15	Med Vac and Med Growth:Neg Growth 1980	9.9%	14	3.8%
Montrose City	15	Med Vac and Med Growth:Flat/Neg Growth 1980	8.0%	38	2.3%
Burton City	20	Med Vac and Mild Loss:Flat Growth 1980	8.5%	-347	-1.1%
Montrose Twp	20	Med Vac and Mild Loss:Pos Growth 1980	8.2%	-112	-1.8%
Davison City	25	High Vac and High Loss: Neg Growth 1980	8.6%	-363	-6.6%
Flint Twp	25	High Vac and High Loss:Neg Growth 1980:Neg Growth 1980	10.4%	-1724	-5.1%
Genesee Twp	25	High Vac and High Loss:Neg Growth 1980	12.2%	-2535	-10.5%
Mt Morris City	25	High Vac and Mild Loss:Neg Growth 1980	12.5%	-117	-3.7%
Mt Morris Twp	25	High Vac and High Loss:Neg Growth 1980	13.8%	-2224	-9.4%
Thetford Twp	25	High Vac and High Loss:Neg Growth 1980	10.8%	-1228	-14.8%



**Genesee County  
2040 Long Range Transportation Plan  
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**Recovery Factor**

- Factor: 10
- Factor: 15
- Factor: 20
- Factor: 25
- No Factor



### Vacancy Data for the 2000 to 2010 Census

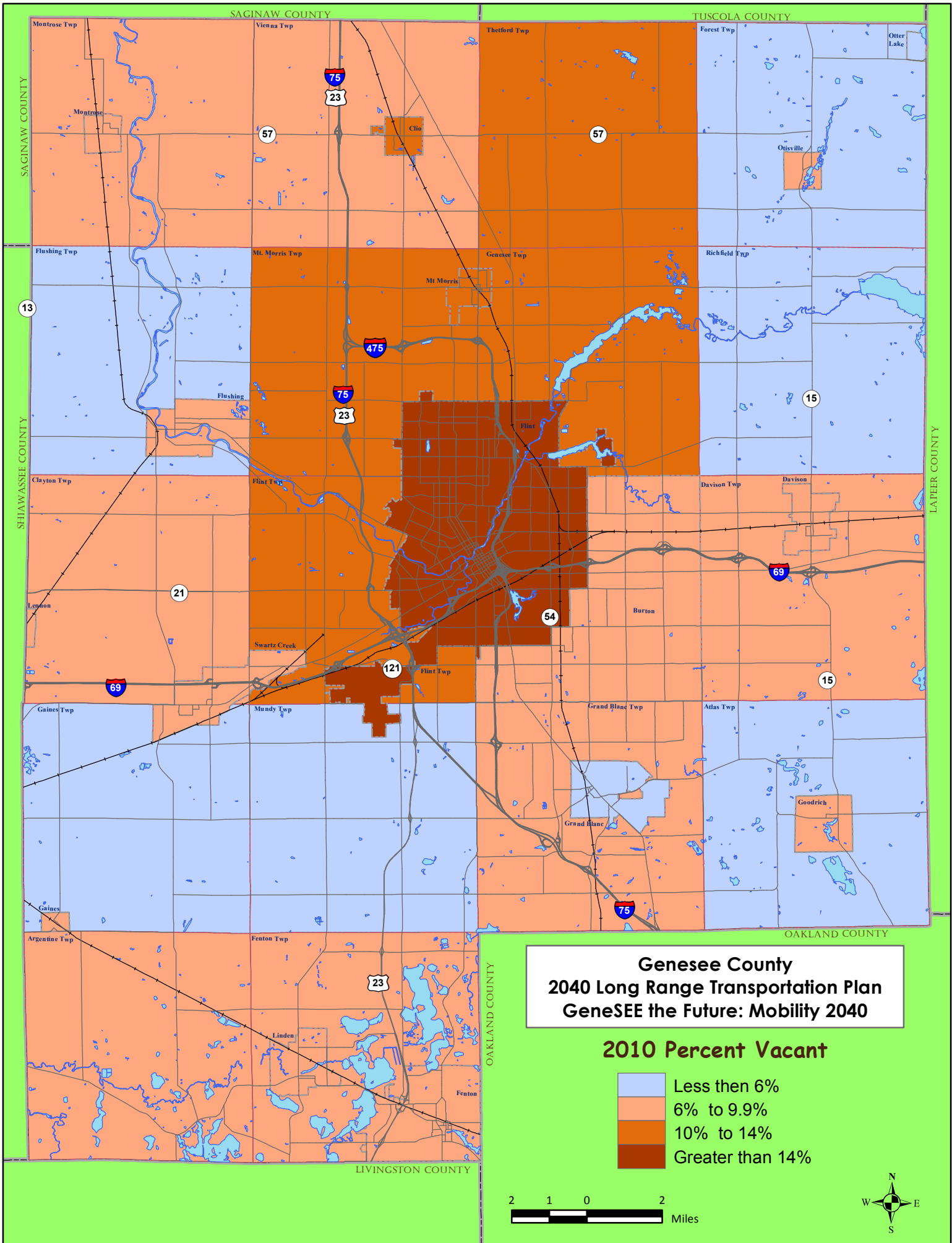
Local Unit	Summary of 2010 Percent Vacant	2010 Percent Vacant	2000 Percent Vacant	2010 Vacant	2000 Vacant
Forest Township	Low Vacancy	4.02%	2.99%	76	42
Atlas Township	Low Vacancy	4.05%	3.95%	89	80
Gaines Township	Low Vacancy	4.67%	2.43%	115	53
Richfield Township	Low Vacancy	5.45%	5.06%	187	158
Flushing Township	Low Vacancy	5.67%	4.24%	241	165
Grand Blanc City	Low Vacancy	5.76%	4.91%	218	183
Mundy Township	Low Vacancy	5.85%	3.39%	381	171
Flushing City	Medium Vacancy	6.34%	3.46%	242	123
Goodrich Village	Medium Vacancy	6.36%	6.08%	44	32
Clayton Township	Medium Vacancy	6.46%	4.93%	200	143
Davison Township	Medium Vacancy	6.49%	5.07%	570	398
Swartz Creek City	Medium Vacancy	7.09%	5.18%	195	122
Vienna Township	Medium Vacancy	7.34%	5.25%	409	273
Montrose City	Medium Vacancy	7.99%	6.44%	58	43
Grand Blanc Township	Medium Vacancy	8.07%	5.28%	1,295	657
Montrose Township	Medium Vacancy	8.22%	5.00%	196	110
Linden City	Medium Vacancy	8.44%	4.98%	143	61
Burton City	Medium Vacancy	8.50%	5.26%	1,111	649
Davison City	Medium Vacancy	8.56%	5.88%	222	156
Fenton City	Medium Vacancy	9.07%	5.12%	505	234
Fenton Township	Medium Vacancy	9.14%	6.94%	605	364
Otisville Village	Medium Vacancy	9.76%	7.05%	37	26
Argentine Township	Medium Vacancy	9.90%	8.02%	282	200
Gaines Village	Medium Vacancy	9.94%	7.74%	17	12
Flint Township	High Vacancy	10.42%	6.00%	1,548	892
Clio City	High Vacancy	10.48%	9.29%	140	112
Thetford Township	High Vacancy	10.82%	3.16%	324	97
Genesee Township	High Vacancy	12.25%	7.38%	1,181	733
Mount Morris City	High Vacancy	12.49%	6.42%	188	90
Mount Morris Township	High Vacancy	13.77%	7.42%	1,310	706

2010 Percent Vacant: 10% to 14%

2010 Percent Vacant: 6% to 9.9%

2010 Percent Vacant: Less than 6%





**Genesee County  
2040 Long Range Transportation Plan  
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**2010 Percent Vacant**

- Less than 6%
- 6% to 9.9%
- 10% to 14%
- Greater than 14%



## Population Change from 2000 to 2010 Census

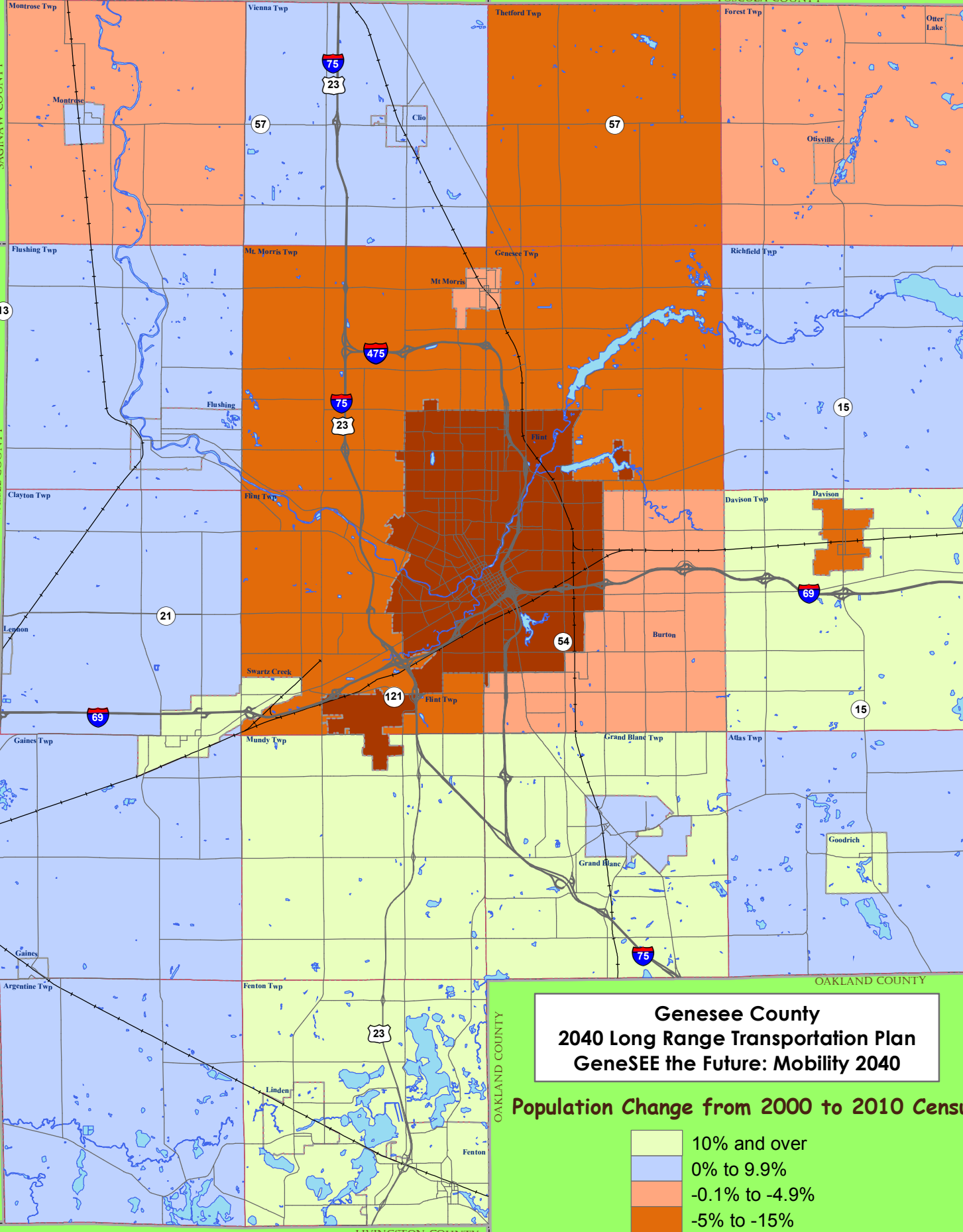
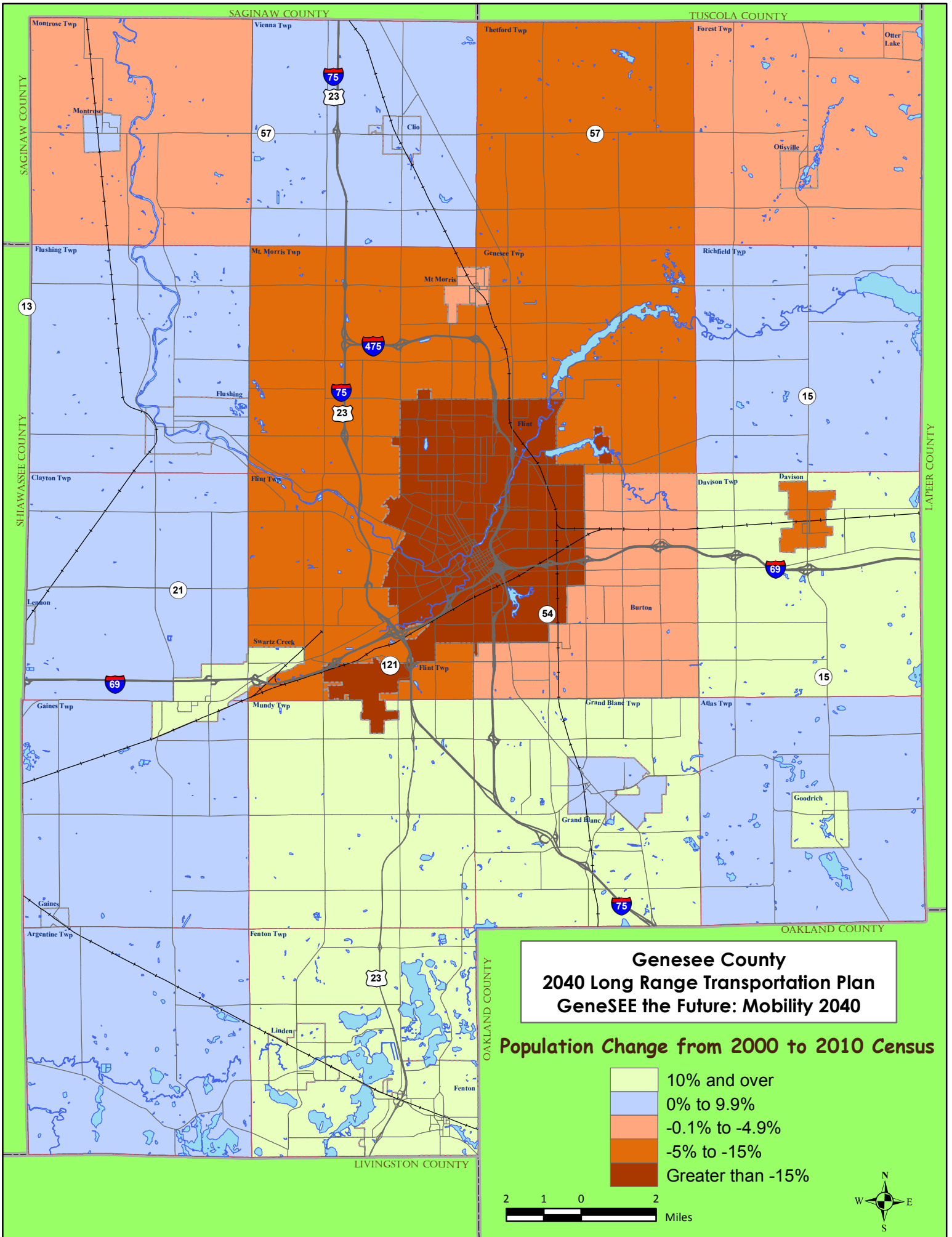
Area Name	Summary of Percent Population Change	Percent Change	Change
Linden City	High Growth	39.5%	1,130
Goodrich Village	High Growth	37.5%	507
Grand Blanc Township	High Growth	25.8%	7,681
Mundy Township	High Growth	23.7%	2,891
Fenton Township	High Growth	19.9%	2,584
Swartz Creek City	High Growth	12.9%	656
Fenton City	High Growth	11.0%	1,164
Davison Township	High Growth	10.5%	1,853
Richfield Township	Medium Growth	6.9%	560
Clio City	Medium Growth	6.6%	163
Argentine Township	Medium Growth	6.0%	392
Gaines Township	Medium Growth	5.1%	315
Flushing Township	Medium Growth	4.0%	410
Atlas Township	Medium Growth	3.9%	229
Gaines Village	Medium Growth	3.8%	14
Montrose City	Medium Growth	2.3%	38
Vienna Township	Medium Growth	1.1%	147
Flushing City	Medium Growth	0.5%	41
Grand Blanc City	Medium Growth	0.4%	34
Clayton Township	Medium Growth	0.4%	28
Forest Township	Mild Loss	-0.5%	-18
Burton City	Mild Loss	-1.1%	-347
Montrose Township	Mild Loss	-1.8%	-112
Otisville Village	Mild Loss	-2.0%	-18
Mt. Morris City	Mild Loss	-3.7%	-117
Flint Township	High Loss	-5.1%	-1,724
Davison City	High Loss	-6.6%	-363
Mt. Morris Township	High Loss	-9.4%	-2,224
Genesee Township	High Loss	-10.5%	-2,535
Thetford Township	High Loss	-14.8%	-1,228

Growth: 10% and over

Growth: 0 to 9.9%

Loss: -0.1% to -4.9%

Loss: -5% and higher loss



**Genesee County  
2040 Long Range Transportation Plan  
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**Population Change from 2000 to 2010 Census**

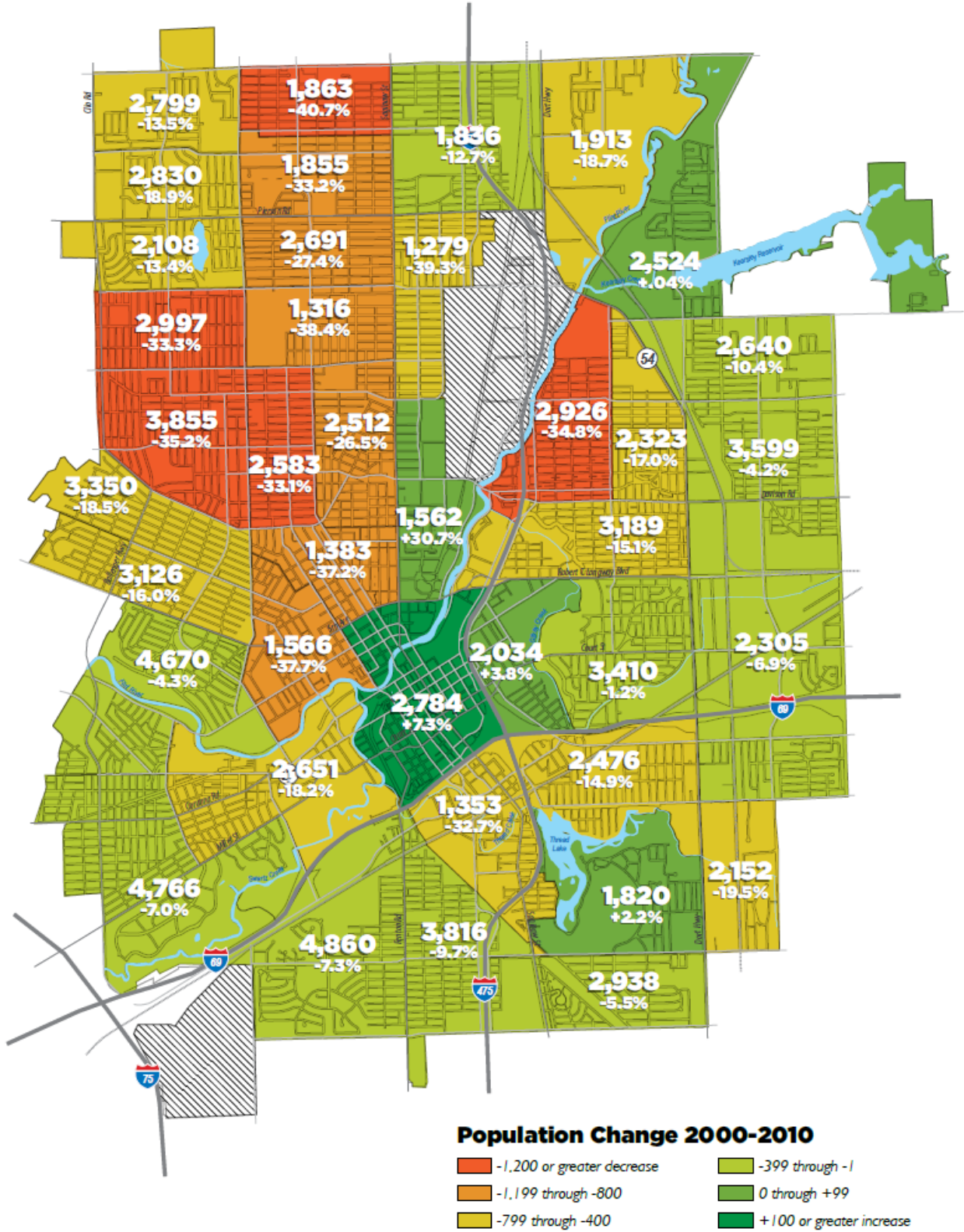
- 10% and over
- 0% to 9.9%
- 0.1% to -4.9%
- 5% to -15%
- Greater than -15%



## Historic Genesee County Census Populations

Local Unit	Summary of Population Trends Since 1980	Pop 1980	Pop 1990	Pop 2000	Pop 2010
Argentine Township	Positive Growth Since 1980	4,180	4,651	6,521	6,913
Atlas Township	Positive Growth Since 1980	4,096	4,635	5,904	6,133
Burton City	Flat Growth Since 1980	29,976	27,437	30,346	29,999
Clayton Township	Positive Growth Since 1980	7,269	7,368	7,553	7,581
Clio City	Flat/Negative Growth Since 1980	2,669	2,629	2,483	2,646
Davison City	Negative Growth Since 1980	6,087	5,693	5,536	5,173
Davison Township	Positive Growth Since 1980	13,708	14,671	17,722	19,575
Fenton Township	Positive Growth Since 1980	9,570	10,073	12,968	15,552
Fenton City	Positive Growth Since 1980	8,098	8,434	10,582	11,746
Flint Township	Negative Growth Since 1980	35,405	34,072	33,653	31,929
Flint City	Negative Growth Since 1980	159,611	140,925	124,943	102,434
Flushing Township	Positive Growth Since 1980	9,246	9,223	10,230	10,640
Flushing City	Flat/Negative Growth Since 1980	8,624	8,542	8,348	8,389
Forest Township	Flat/Positive Growth Since 1980	3,573	3,685	3,856	3,838
Gaines Township	Positive Growth Since 1980	4,769	4,964	6,125	6,440
Genesee Township	Negative Growth Since 1980	25,065	24,093	24,116	21,581
Grand Blanc Township	Positive Growth Since 1980	24,413	25,392	29,827	37,508
Grand Blanc City	Positive Growth Since 1980	6,848	7,760	8,242	8,276
Linden City	Positive Growth Since 1980	2,174	2,407	2,861	3,991
Montrose Township	Positive Growth Since 1980	6,164	6,236	6,336	6,224
Montrose City	Flat/Negative Growth Since 1980	1,706	1,811	1,619	1,657
Mount Morris City	Negative Growth Since 1980	3,246	3,292	3,203	3,086
Mount Morris Township	Negative Growth Since 1980	27,928	25,198	23,725	21,501
Mundy Township	Positive Growth Since 1980	10,786	11,536	12,191	15,082
Richfield Township	Positive Growth Since 1980	6,895	7,271	8,170	8,730
Swartz Creek City	Positive Growth Since 1980	5,013	4,851	5,102	5,758
Thetford Township	Negative Growth Since 1980	8,499	8,333	8,277	7,049
Vienna Township	Positive Growth Since 1980	12,914	13,210	13,108	13,255
Gaines Village	Negative Growth Since 1980	440	427	366	380
Goodrich Village	Positive Growth Since 1980	795	916	1,353	1,860
Otisville Village	Positive Growth Since 1980	682	724	882	864
Genesee County	Negative Growth Since 1980	450,449	430,459	436,148	425,790

# City of Flint Draft Master Plan Population Change 2000 -2010 Map Page 13



**Appendix C: 2005 Base Year Employment Data 2040 Employment  
Projections Methodology Report**

# 2005 Base Year Employment Data 2040 Employment Projections Methodology Report



# **2005 Base Year Employment Data 2040 Employment Projections Methodology Report**

May 2014



Prepared by the Genesee County Metropolitan Planning Commission Staff



## Executive Summary

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The economic downturn in recent years has played a significant role in communities throughout Genesee County resulting in an overall decrease in jobs between 2005 and 2010. Many companies have closed down their facilities and/or simply moved out of the area. The companies that choose to stay are using fewer employees to do the same amount of labor. Even with the significant decrease between 2005 and 2010, our projections indicate a gradual increase in employment overall from 2010 forward.

In calculating the 2040 Employment Projections for Genesee County, staff began with 2005 employment data as it is the base year of our current Transportation Model. In order to project ahead, staff used the Regional Economic Models, Inc. (REMI) growth rates for each 5-year period and interpolated the yearly growth rate, per employment sector & traffic analysis zone, for each year out to 2040. To increase the accuracy of the projections, the 2010 employment data was validated against the 2010 Bureau of Economic Analysis (BEA) data. Any locally significant economic impacts were applied directly to year, sector and traffic analysis zone in the final step. Table 1 reflects the final 2040 Employment Projections for Genesee County.

### Genesee County 2040 Employment Projections by Sector

Employment Sector	2005	2010	2015	2020	2025	2030	2035	2040
Manufacturing	24,433	10,415	10,672	10,398	9,948	9,630	9,267	8,909
Other	12,677	9,798	10,840	11,333	11,374	11,274	11,007	10,766
Transportation and Public Utilities	5,768	4,501	4,667	4,724	4,725	4,802	4,973	5,176
Finance, Insurance and Real Estate	14,400	15,778	16,671	17,264	16,945	16,528	16,223	15,911
Retail Trade	27,984	24,291	24,125	23,956	23,451	22,838	22,618	22,315
Wholesale Trade	7,244	5,772	5,775	5,767	5,728	5,638	5,524	5,337
Services	92,713	88,040	95,427	103,017	109,041	111,229	114,412	117,516
Government	26,443	24,731	24,105	25,570	25,875	26,123	26,433	26,646
<b>Total</b>	<b>211,662</b>	<b>183,326</b>	<b>192,282</b>	<b>202,029</b>	<b>207,087</b>	<b>208,062</b>	<b>210,457</b>	<b>212,576</b>

Table 1

The following document will take readers through a step-by-step approach, including methodology used by staff during projections. Graphs and maps are provided at the conclusion of this report depicting the individual and overall trends from 2005 to 2040.

## Step One: Calculating Preliminary 2010 Employment Figures

### Base Year Employment Data Methodology

The Genesee County Metropolitan Planning Commission (GCMPC) utilized the 2005 base year employment data of the 2035 Long Range Transportation Plan's (LRTP) Transportation Model as the base year of 2040 projections. This model, which has been calibrated and validated, supplied staff with geographically located employers in Genesee County, their number of employees, and industry codes.

GCMPC staff chose the year 2010 as the next significant year to validate the projection data to as it is both a census year and a compatible year with other datasets. To calculate figures for 2010, staff reviewed various dataset projections for similar trends of increase and decrease between 2005 and 2010 in all employment sectors. After review of all available datasets, factors from the Regional Economic Models, Inc. (REMI) figures were used to grow the employment projections out to 2040. REMI was selected because it shows similar trends in Genesee County employment sectors and provides figures out to 2040 needed for projecting.

The 2010 preliminary employment data was calculated by applying the 2005-2010 REMI percent change (a different percentage for each employment sector) to the 2005 GCMPC base year, for each of the 639 traffic analysis zones (TAZ's) in each employment sector. The preliminary 2010 employment figures for Genesee County are provided in Table 2. The preliminary employment data will later be validated against the 2010 Bureau of Economic Analysis (BEA) data in step three of the projection method.

**GCMPC Base Year 2005 and Preliminary 2010 Employment Figures**

Employment Sector	REMI 2005	REMI 2010	Difference REMI 2005 to REMI 2010	% Difference	Employment Data for GCMPC Base Year 2005	Preliminary Employment Data for GCMPC 2010
Manufacturing	28,445	11,199	-17,246	-0.6063	24,433	9,619
Other	15,114	9,916	-5,198	-0.3439	12,677	8,317
Transportation and Public Utilities	7,371	4,962	-2,409	-0.3268	5,768	3,883
Finance, Insurance, Real Estate	13,615	16,298	2,683	0.1971	14,400	17,238
Retail Trade	43,656	26,657	-16,999	-0.3894	27,984	17,087
Wholesale Trade	8,744	6,187	-2,557	-0.2924	7,244	5,126
Services	78,724	88,046	9,322	0.1184	92,713	103,690
Government	27,107	24,600	-2,507	-0.0925	26,443	23,997
<b>Total</b>	<b>222,776</b>	<b>187,865</b>	<b>-34,911</b>		<b>211,662</b>	<b>188,957</b>

Table 2

GCMPC staff coded the employees, based on the North American Industrial Classification System (NAICS) codes, into eight categories using the same categories and definitions as the previous employment estimates from the 2035 LRTP. Since the last

update, some employment forecasts have changed from the Standard Industrial Classification (SIC) system to NAICS. Table 3 shows GCMPC categories and their comparable SIC and NAICS codes to allow for the data to be easily comparable between plans. The 2035 employment projections and methodology are provided in the appendix for additional reference.

**GCMPC Model Employment Categories & Corresponding SIC and NAICS Codes**

GCMPC Categories	SIC Categories	NAICS Codes	NAICS Titles
1. Manufacturing	Durables	33	Manufacturing
	Non-Durables	31-32	Manufacturing
2. Other	Mining	21	Mining
	Construction	23	Construction
	Agriculture, Forestry & Fishing	11	Agriculture, Forestry, Fishing and Hunting
	Farm	11	Agriculture, Forestry, Fishing and Hunting
3. Transportation, Warehousing & Public Utilities	Transportation & Public Utilities	48-49	Transportation and Warehousing
		22	Utilities
4. Finance, Insurance & Real Estate	Finance, Insurance & Real Estate	52	Finance and Insurance
		53	Real Estate, Rental and Leasing
5. Retail Trade	Retail Trade	44-45	Retail Trade
6. Wholesale Trade	Wholesale Trade	42	Wholesale Trade
7. Service	Service	51	Information
		54	Professional, Scientific and Technical Services
		55	Management of Companies and Enterprises
		56	Administrative, Support, Waste Management and Remediation Services
		61	Educational Services
		62	Health Care and Social Assistance
		71	Arts, Entertainment and Recreation
		72	Accommodation and Food Services
8. Government	State and Local	92	Public Administration
		92	Public Administration
		92	Public Administration

Table 3

## Step Two: Comparing Preliminary 2010 Employment Figures

To increase the accuracy of Genesee County's preliminary 2010 employment data; staff took into account other available data sources as illustrated in Table 4.

**Comparison of Genesee County Employment Data to Other Data Sources by Industry**

Employment Sector	Employment Data for GCMPC Base Year 2005	Preliminary Employment Data for GCMPC 2010	Claritas 2008	Census 2010	REMI 2010	Woods & Poole 2010	BEA 2010
type of code	NAICS	NAICS	NAICS	NAICS	NAICS	NAICS	NAICS
Manufacturing	24,433	9,619	20,053	20,881	11,199	10,551	10,418
Other	12,677	8,317	6,862	7,109	9,916	9,827	9,778
Transportation and Public Utilities	5,768	3,883	4,590	7,601	4,962	4,637	4,486
Finance, Insurance, Real Estate	14,400	17,238	9,909	7,935	16,298	16,278	15,810
Retail Trade	27,984	17,087	25,473	21,814	26,657	24,181	24,040
Wholesale Trade	7,244	5,126	6,192	4,109	6,187	5,837	5,767
Services	92,713	103,690	87,173	76,512	88,046	88,015	88,053
Government	26,443	23,997	8,491	5,852	24,600	24,689	24,732
<b>Total</b>	<b>211,662</b>	<b>188,957</b>	<b>168,743</b>	<b>151,813</b>	<b>187,865</b>	<b>184,015</b>	<b>183,084</b>

Table 4

### **Definitions of Data Sources:**

**GCMPC 2010** – The Genesee County Metropolitan Planning Commission employment data for 2010 was calculated using REMI growth factors to project the 2005 data forward to 2010.

**Claritas 2008** – Claritas Business-Facts® dataset's historical data year is 2008.

**Census 2010** – This data is the 2010 Selected Economic Characteristics from the U.S. Census website.

**REMI 2010** – Regional Economic Models, Incorporated (REMI®) is a private company that provides economic projections, models, and employment data forecasting. This dataset is based on the NAICS code system. The historical data year for this dataset is 2008.

**Woods & Poole 2010** – Woods & Poole Economics, Incorporated is an independent firm that specializes in long-term economic and demographic projections at the county level. This dataset is based on the NAICS code system. The historical data year for this dataset is 2010.

**BEA 2010** – Bureau of Economic Analysis (BEA) is part of the U.S. Department of Commerce and provides regional economic information by industry. The dataset is based on the NAICS code system. The historical data year for this dataset is 2007.

## Step Three: Finalizing Preliminary 2010 Employment Figures

Staff determined that the 2010 Genesee County employment data was slightly high overall when compared to other available datasets and would need to be factored to reduce the gap in total employment. The service employment sector in particular held far more individuals employed than any other dataset.

Bureau of Economic Analysis (BEA) data originates from the U.S. Department of Commerce and provides regional economic information by employment sector. Of the datasets available, the BEA dataset seemed most consistent with the preliminary GCMPC 2010 projections and is from a reliable source. Additionally, the use of BEA is consistent with the previous employment projections methodology. For these reasons, the BEA dataset was used to validate the 2010 GCMPC employment data.

The percent change was calculated between the 2010 Genesee County employment data to the BEA 2010 data. The resulting factors were applied to each of the 639 TAZ in the model for each of the eight employment sectors. After factoring the adjusted employment estimates for each sector, employment figures are within a few employees of the BEA 2010 totals (see Table 5).

**BEA Adjusted 2010 Genesee County Employment Data**

<b>Employment Sector</b>	<b>Preliminary Employment Data for GCMPC 2010</b>	<b>BEA 2010</b>	<b>Difference GCMPC to BEA 2010</b>	<b>% Difference GCMPC to BEA 2010</b>	<b>Adjusted Employment Data for GCMPC 2010</b>	<b>Difference new data to BEA 2010</b>
Manufacturing	9,619	10,418	799	0.0831	10,415	-3
Other	8,317	9,778	1,461	0.1757	9,798	20
Transportation and Public Utilities	3,883	4,486	603	0.1553	4,501	15
Finance, Insurance, Real Estate	17,238	15,810	-1,428	-0.0828	15,778	-32
Retail Trade	17,087	24,040	6,953	0.4069	24,041	1
Wholesale Trade	5,126	5,767	641	0.1250	5,772	5
Services	103,690	88,053	-15,637	-0.1508	88,040	-13
Government	23,997	24,732	735	0.0306	24,731	-1
<b>Total</b>	<b>188,957</b>	<b>183,084</b>	<b>-5,873</b>		<b>183,076</b>	<b>-8</b>

Table 5

Staff took into account a local increase of 250 retail trade jobs prior to 2010. Additional adjustments are further discussed in step four. Table 6 shows the 2010 employment figures in Genesee County by employment sector. This data will be used to calculate future employment estimates for the 2040 Genesee County Long Range Transportation Plan and the 2040 Urban Travel Demand Model.

**Final 2010 Genesee County Employment Data**

<b>Sector</b>	<b>2010 Genesee County Employment</b>
Manufacturing	10,415
Other	9,798
Transportation and Public Utilities	4,501
Finance, Insurance, Real Estate	15,778
Retail Trade	24,291
Wholesale Trade	5,772
Services	88,040
Government	24,731
<b>Total</b>	<b>183,326</b>

Table 6

## Step Four: Projecting Employment Figures out to 2040

### Genesee County 2040 Employment Projections Methodology

As previously stated, the Regional Economic Models, Inc. (REMI) data includes a countywide total for employment and by employment sector in 5-year increments out to the year 2040. For use in our employment projections we calculated growth rates for each 5-year period and interpolated the yearly growth rate, per employment sector, for each year from 2011-2040. The calculated growth rates are shown in Table 7 below.

**REMI 5-year Growth Rates 2011-2040**

Employment Sector	GCMPC Base Year 2005	GCMPC Adjusted 2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	2036-2040
			5-year change	5-year change*	5-year change	5-year change	5-year change	5-year change
Manufacturing	24,433	10,415	0.0040	-0.0271	-0.0447	-0.0333	-0.0394	-0.0408
Other	12,677	9,798	0.1058	0.0476	0.0080	-0.0131	-0.0274	-0.0253
Transportation & Public Utilities	5,768	4,501	0.0379	0.0160	0.0007	0.0197	0.0371	0.0426
Finance, Insurance & Real Estate	14,400	15,778	0.0579	0.0373	-0.0201	-0.0264	-0.0205	-0.0211
Retail Trade	27,984	24,291	-0.0251	-0.0088	-0.0227	-0.0271	-0.0116	-0.0153
Wholesale Trade	7,244	5,772	0.0033	-0.0049	-0.0113	-0.0195	-0.0248	-0.0377
Services	92,713	88,040	0.0858	0.0775	0.0206	0.0201	0.0288	0.0274
Government	26,443	24,731	-0.0250	0.0606	0.0125	0.0099	0.0125	0.0083
<b>Total</b>	<b>211,662</b>	<b>183,326</b>						

\*Adjusted REMI 2016-2020 Growth Rate applied due to local economic impact [Table 7](#)

Prior to finalizing the employment projections, staff took into account any significant increase or decrease in jobs that were publicized in recent news articles or revealed through local development plans. Approximately 4,100 jobs would be added between years six and eleven of the operations phase (*Economic Impact of Genesys Health Park Campus Expansion Plans*, prepared by the Anderson Economic Group, LLC, 2012). These jobs and others were located to the exact employment sector, TAZ, and applied to the nearest projected year ending in 5 or 0. Facilities built within the Health Park Campus will not be limited to hospital functions alone but is proposed to include an area for research & development, a learning institution, and senior living complexes.

The Genesee County Freight and Connectivity Study is projecting for the Genesys expansion to bring 15,000 support jobs to the region (*Genesee County Freight and Connectivity Study*, prepared by the Corradino Group of Michigan, Inc., 2011). Based on the location of the health park campus, staff felt the number of support jobs created within Genesee County would be less than the projected 15,000. After recalculating to account for the location, approximately 7,300 support jobs is projected within Genesee County. Since the exact location and amount of jobs in each TAZ is unknown, the 7,300

jobs were proportionally applied based on the existing distribution of employment in each TAZ in REMI year 2020. Staff was able to calculate a new 5-year growth rate from 2016-2020 and apply the corresponding growth rates to each employment sector resulting in Genesee County's final employment projections. After all adjustments and calculations were complete, the jobs from each traffic analysis zones, in each of the eight employment sectors were tallied to create the 2040 Genesee County Employment Projections.

### Genesee County 2040 Employment Projections by Sector

Employment Sector	2005	2010	2015	2020	2025	2030	2035	2040
Manufacturing	24,433	10,415	10,672	10,398	9,948	9,630	9,267	8,909
Other	12,677	9,798	10,840	11,333	11,374	11,274	11,007	10,766
Transportation and Public Utilities	5,768	4,501	4,667	4,724	4,725	4,802	4,973	5,176
Finance, Insurance and Real Estate	14,400	15,778	16,671	17,264	16,945	16,528	16,223	15,911
Retail Trade	27,984	24,291	24,125	23,956	23,451	22,838	22,618	22,315
Wholesale Trade	7,244	5,772	5,775	5,767	5,728	5,638	5,524	5,337
Services	92,713	88,040	95,427	103,017	109,041	111,229	114,412	117,516
Government	26,443	24,731	24,105	25,570	25,875	26,123	26,433	26,646
<b>Total</b>	<b>211,662</b>	<b>183,326</b>	<b>192,282</b>	<b>202,029</b>	<b>207,087</b>	<b>208,062</b>	<b>210,457</b>	<b>212,576</b>

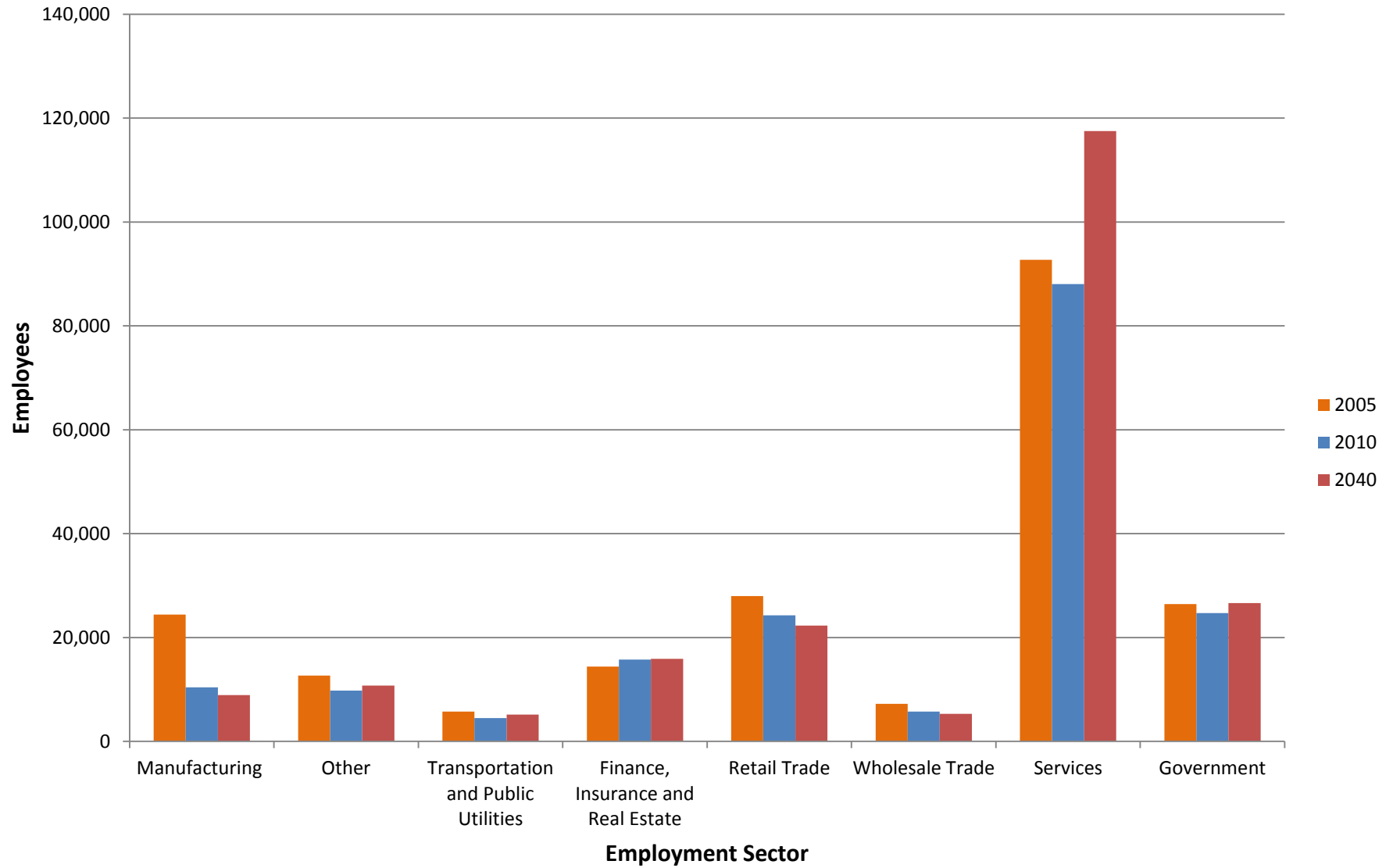
Table 8

### Conclusion

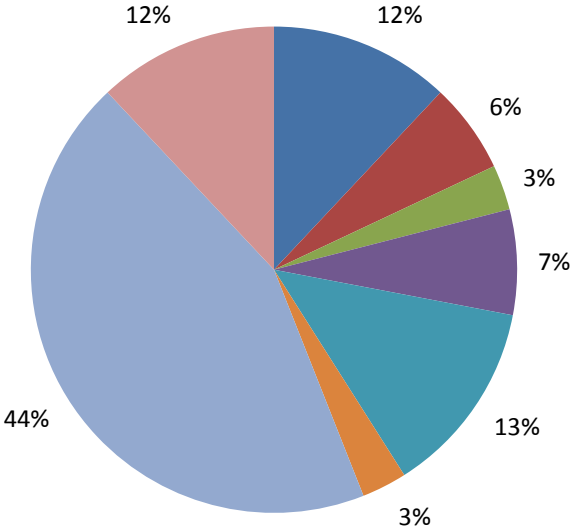
Following an economic downturn and overall decrease in jobs from 2005 to 2010, Genesee County has and is projected to continue to see modest signs of improvement in years to come. As stated in the Flint & Genesee County Comprehensive Economic Development Strategy, "to begin to replace the jobs lost, we must understand economic development can no longer happen by 'chance', but rather, through deliberate actions and strategies on the part of Genesee County and its component communities." While the manufacturing sector is projected to experience a gradual decrease in employment between 2010 and 2040, the services sector is projecting a substantial growth. Looking forward, Genesee County's total employment is projected to increase and we can conclude that job creation will vary between employment sectors.



## 2005 vs. 2010 vs. 2040 Genesee County Total Employment by Industry

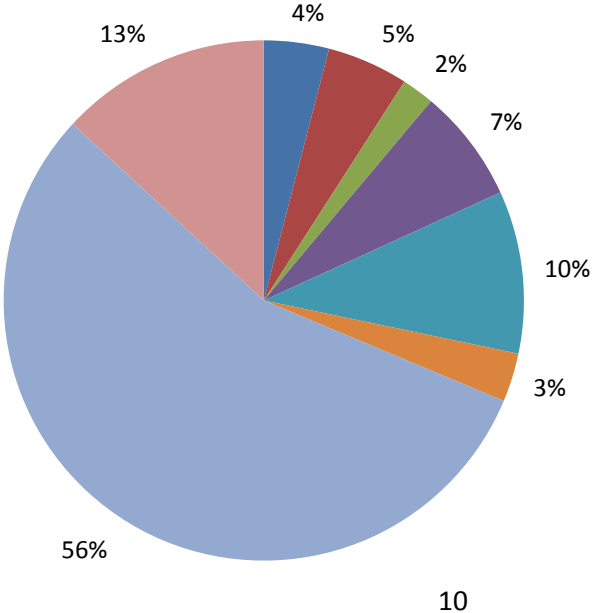


**2005 Genesee County Base Year Employment by Sector**

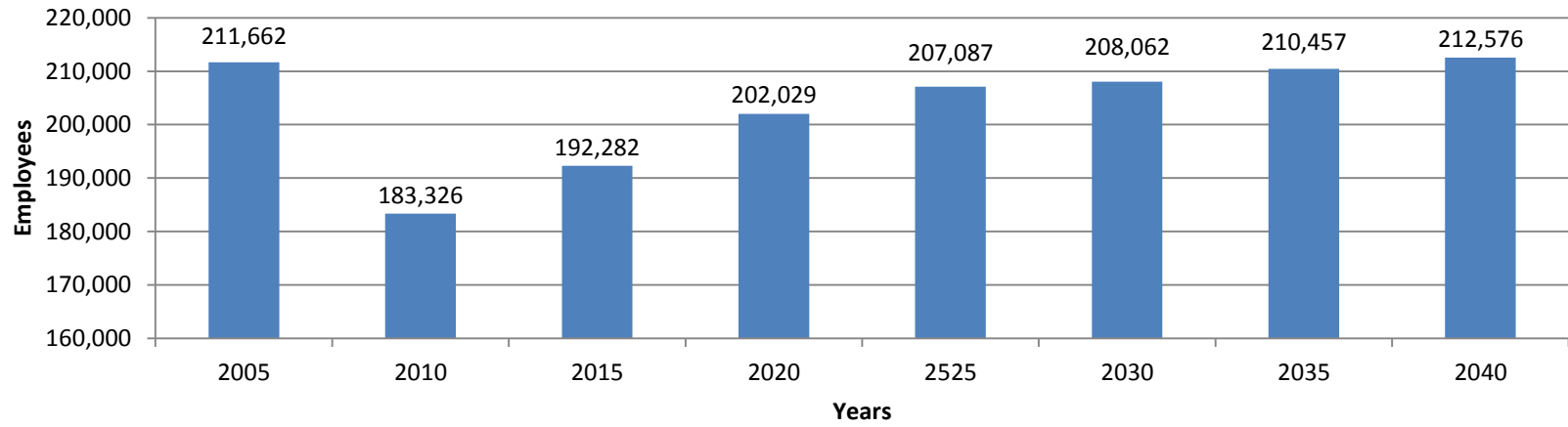


- Manufacturing
- Other
- Transportation and Public Utilities
- Finance, Insurance and Real Estate
- Retail Trade
- Wholesale Trade
- Services
- Government

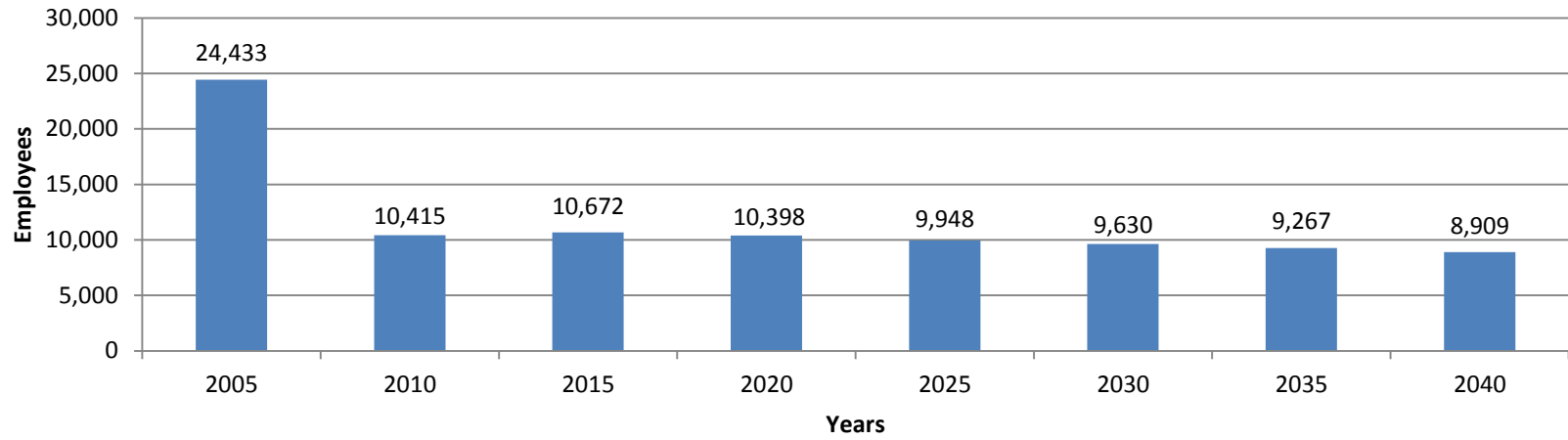
**2040 Genesee County Projected Employment by Sector**



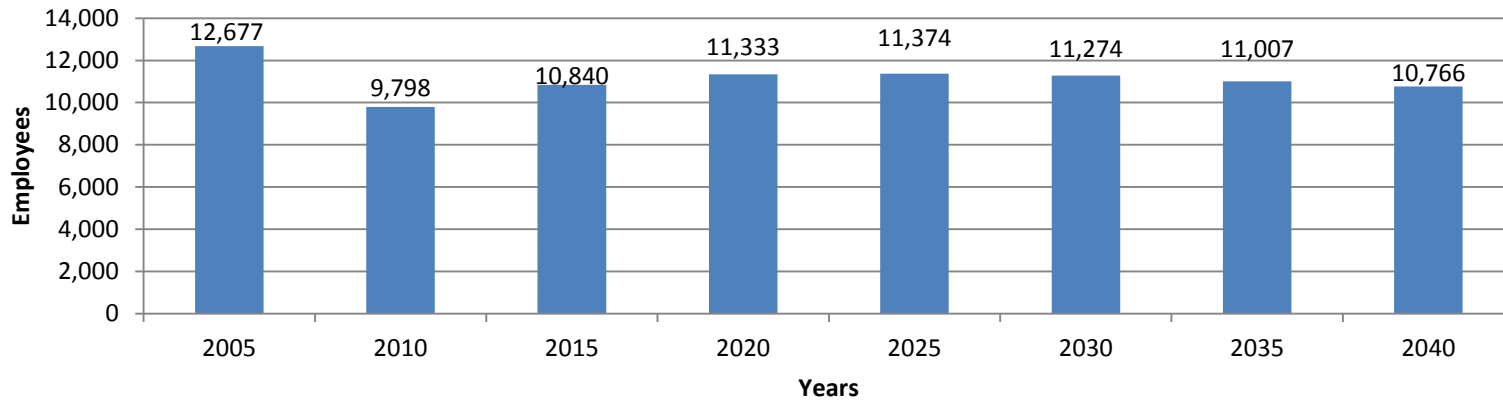
## Total Employment



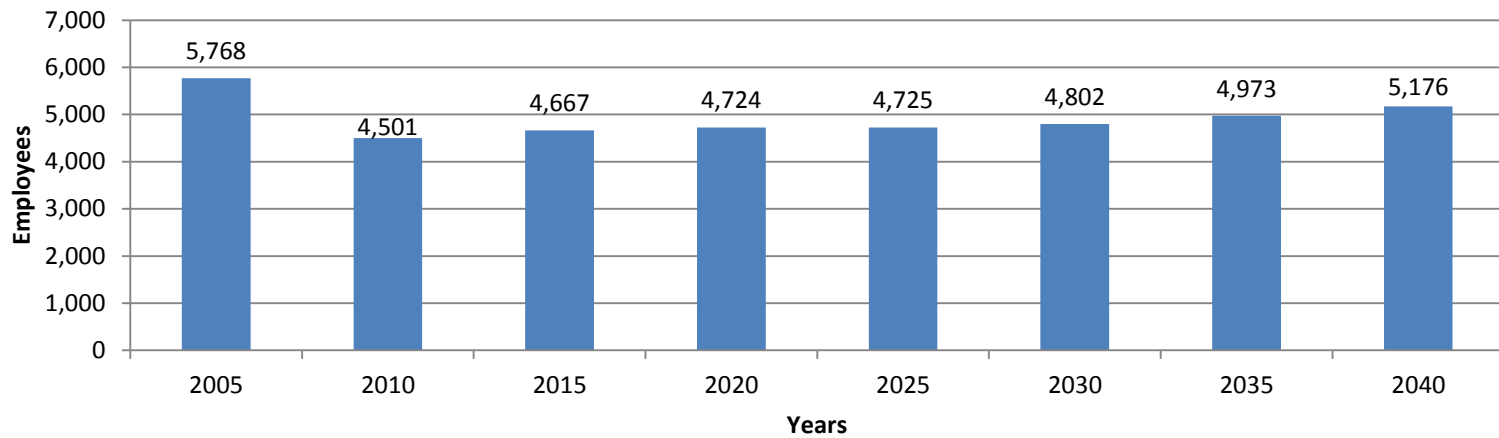
## Manufacturing



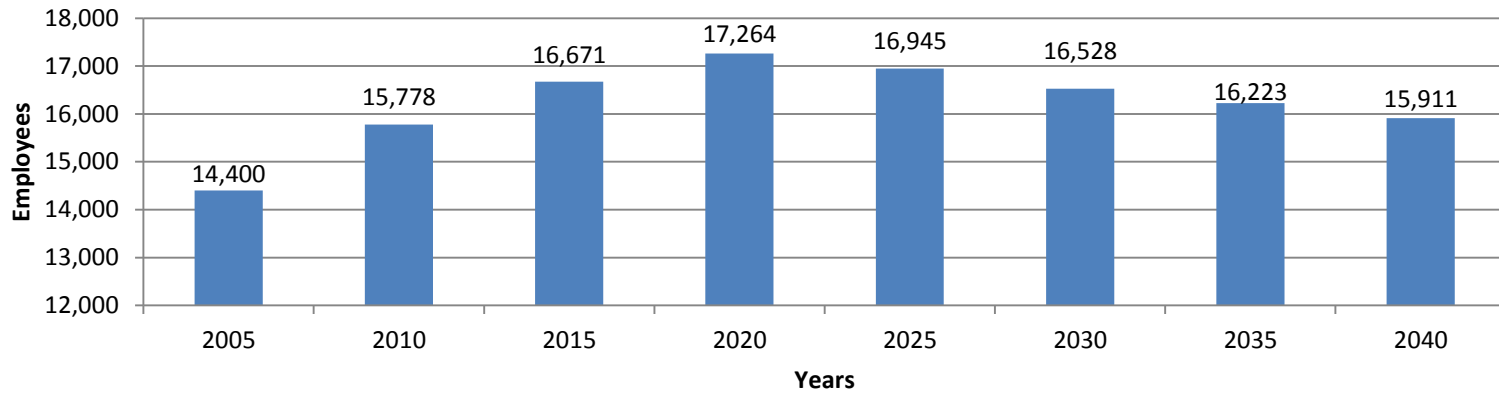
## Other



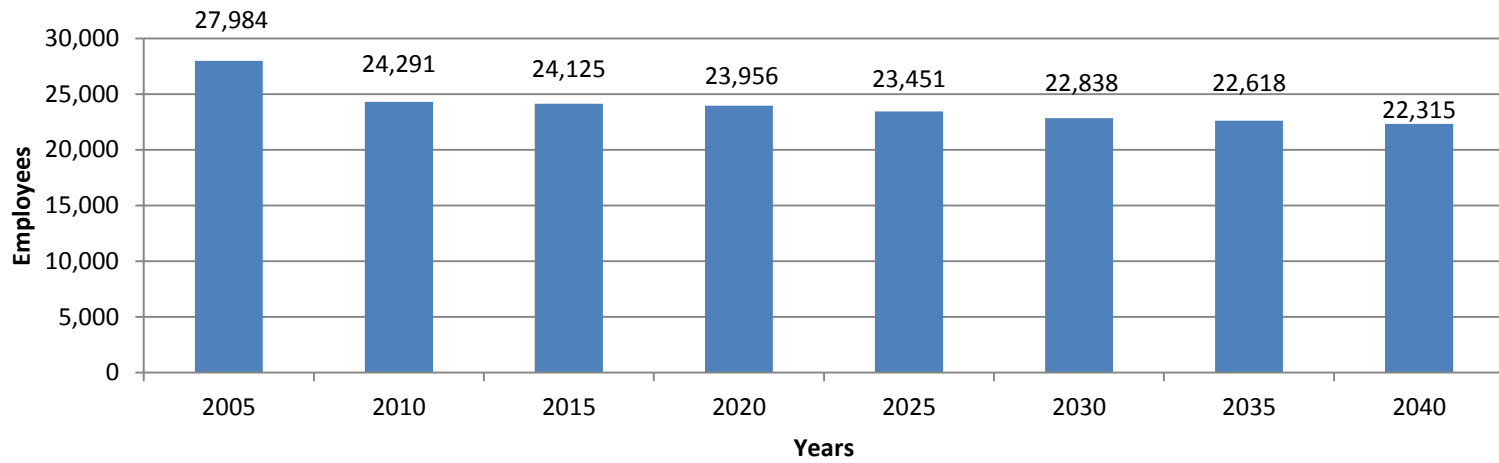
## Transportation and Public Utilities



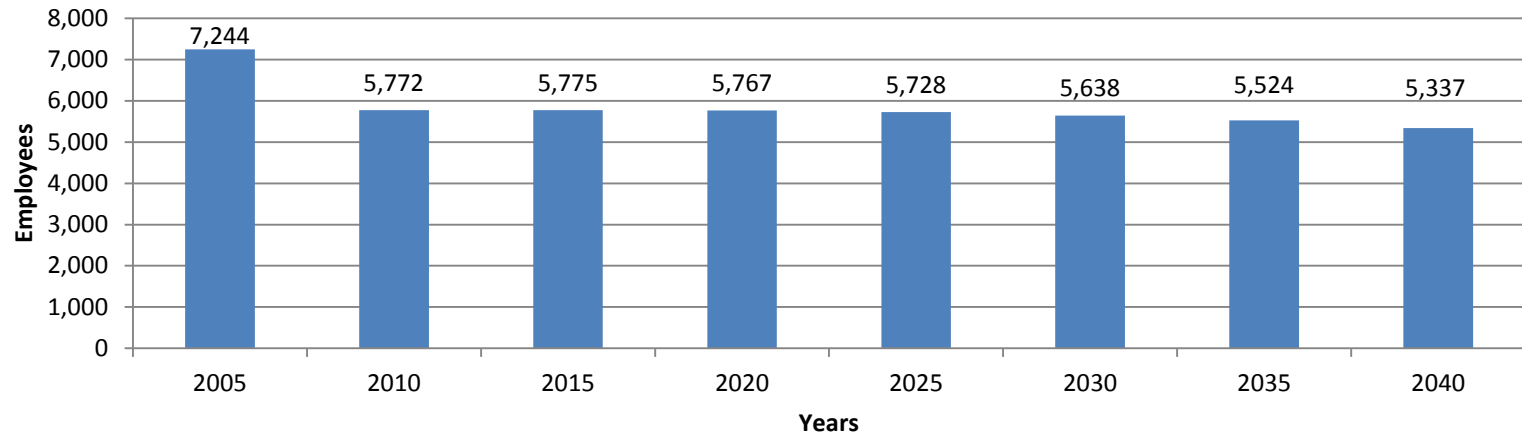
## Finance, Insurance and Real Estate



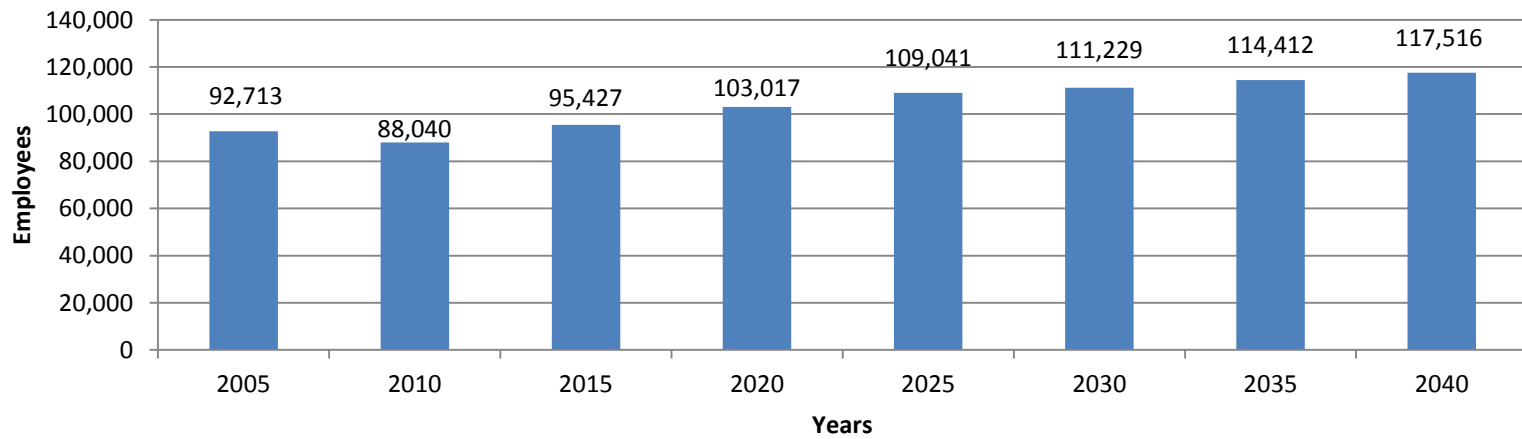
## Retail Trade



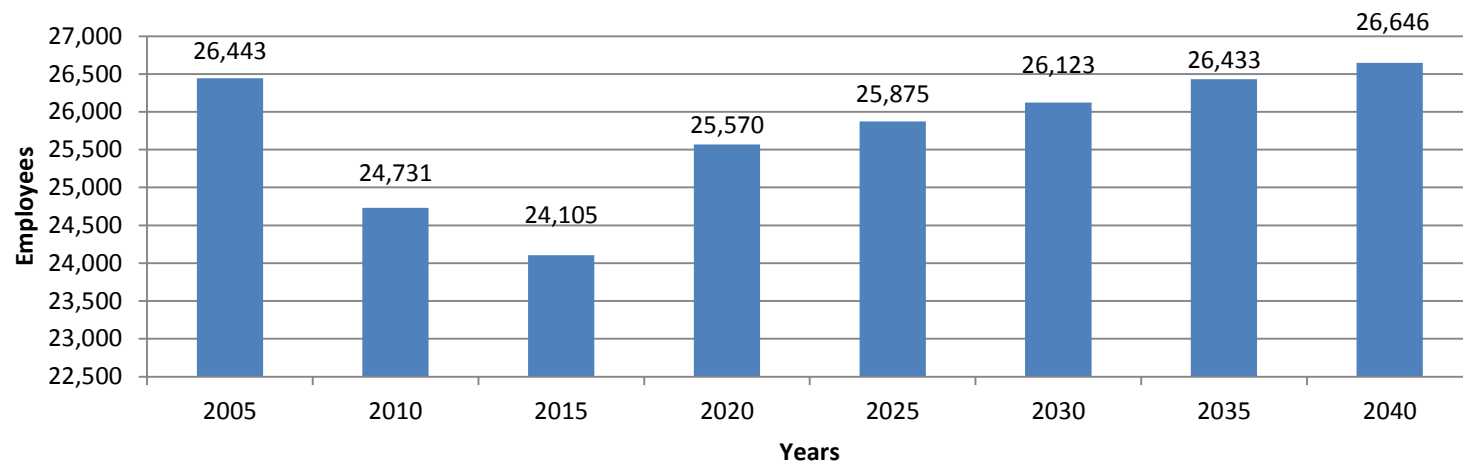
## Wholesale Trade

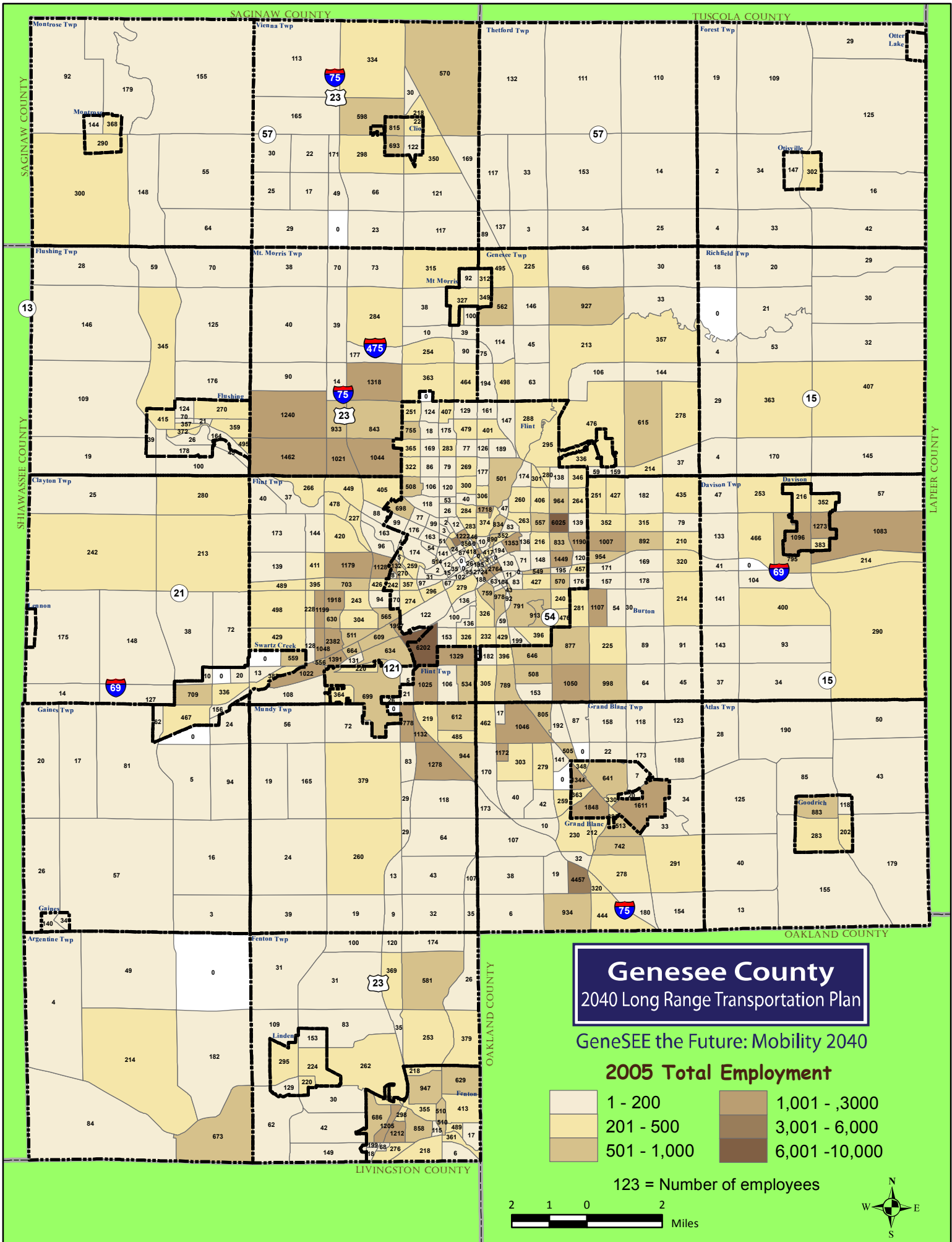


## Services

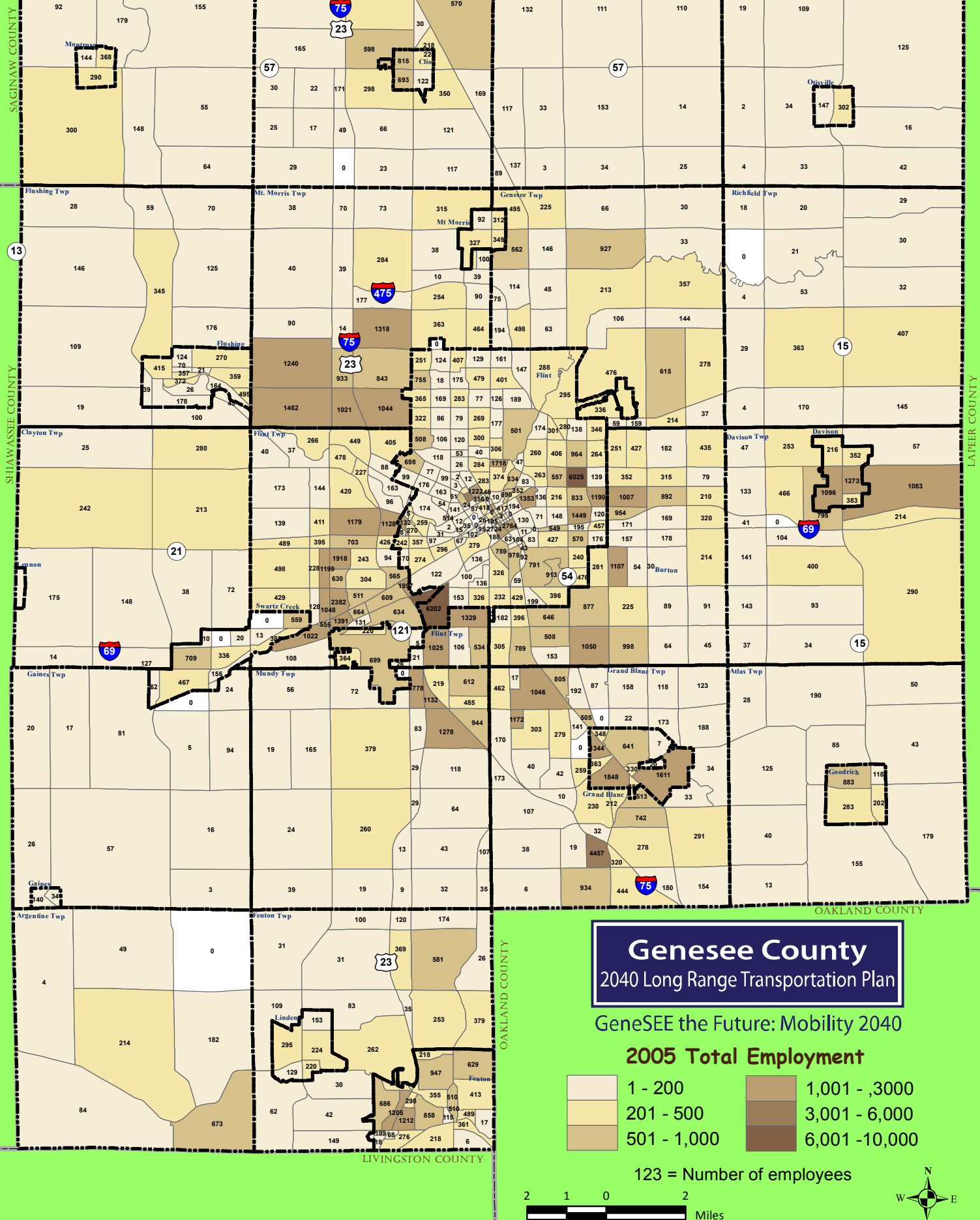


## Government





SAGINAW COUNTY      TUSCOLA COUNTY



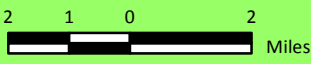
**Genesee County**  
2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040

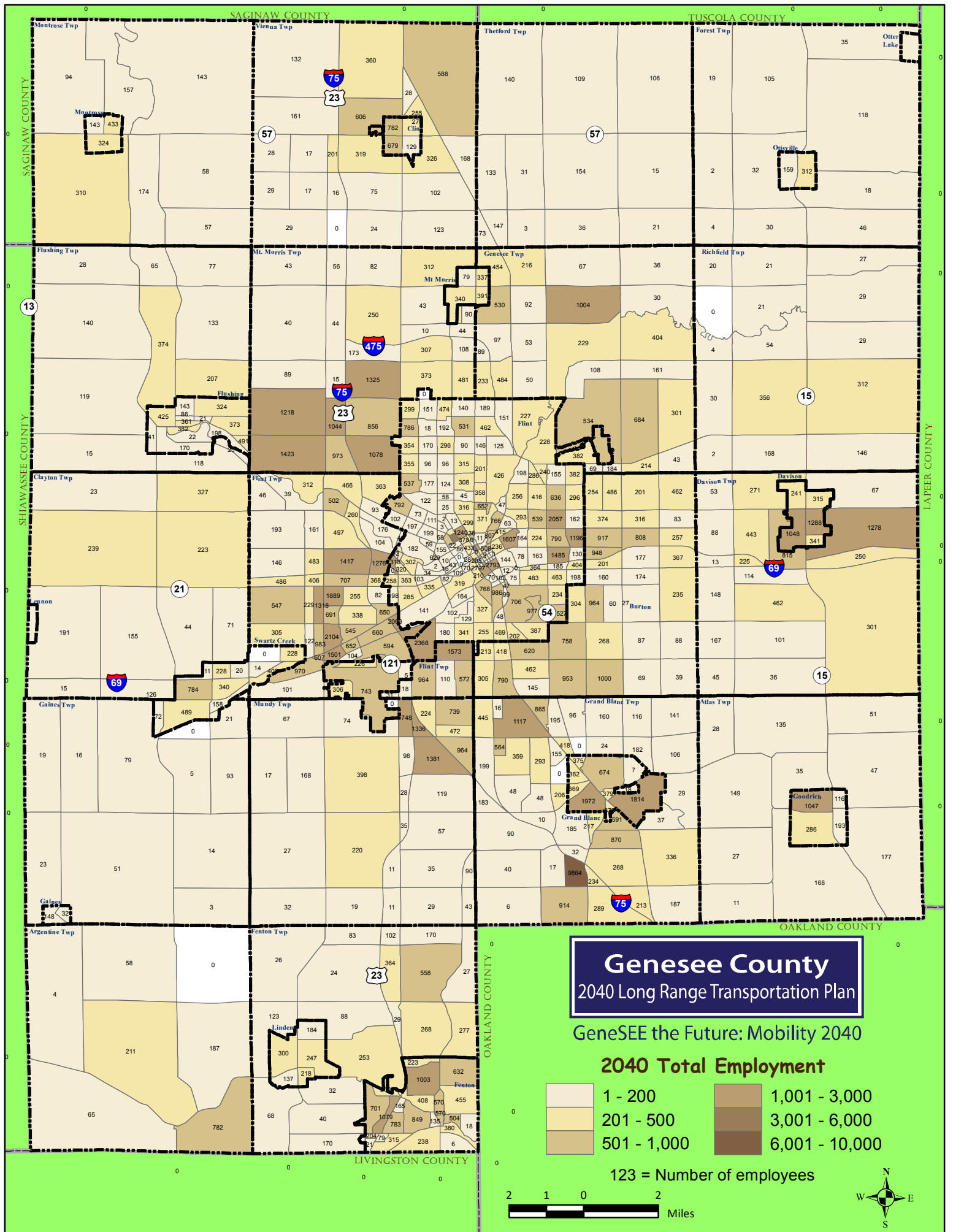
**2005 Total Employment**

1 - 200	1,001 - 3,000
201 - 500	3,001 - 6,000
501 - 1,000	6,001 - 10,000

123 = Number of employees







# Genesee County 2040 Long Range Transportation Plan

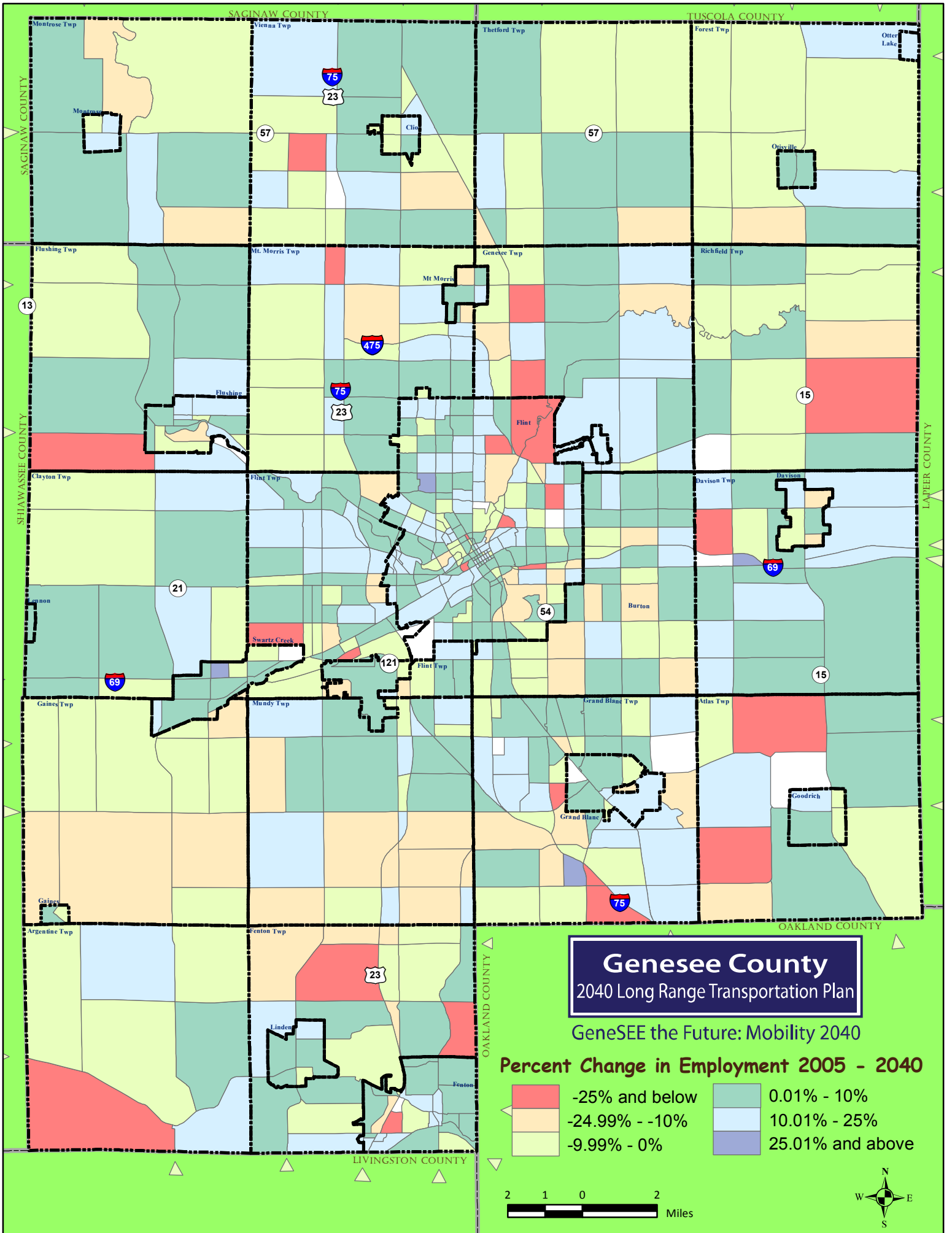
GeneSEE the Future: Mobility 2040

## 2040 Total Employment

1 - 200	1,001 - 3,000
201 - 500	3,001 - 6,000
501 - 1,000	6,001 - 10,000

123 = Number of employees





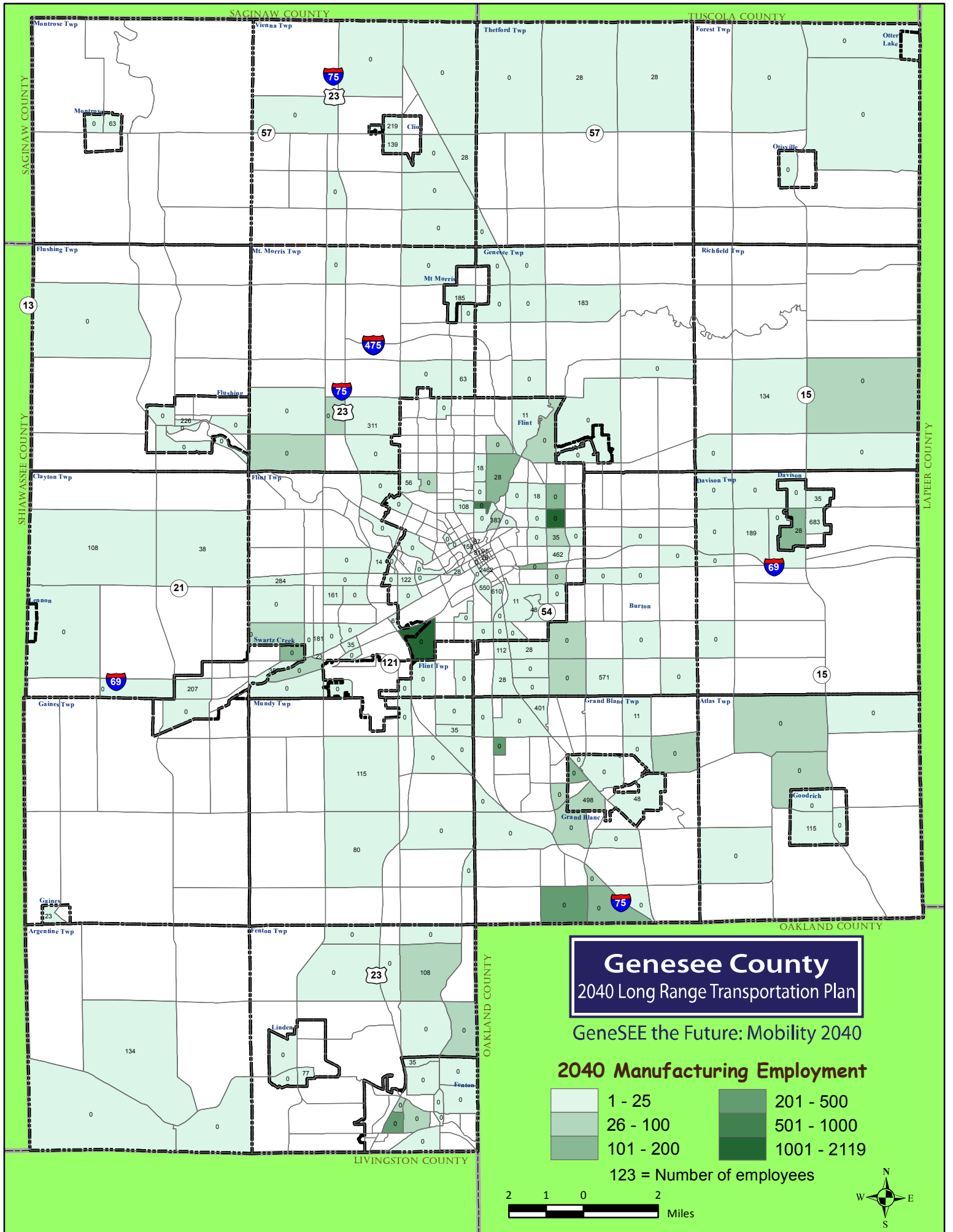
**Genesee County**  
2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040

**Percent Change in Employment 2005 - 2040**

Red	-25% and below	Light Green	0.01% - 10%
Orange	-24.99% - -10%	Light Blue	10.01% - 25%
Yellow	-9.99% - 0%	Purple	25.01% and above





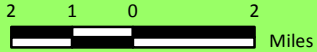
**Genesee County**  
 2040 Long Range Transportation Plan

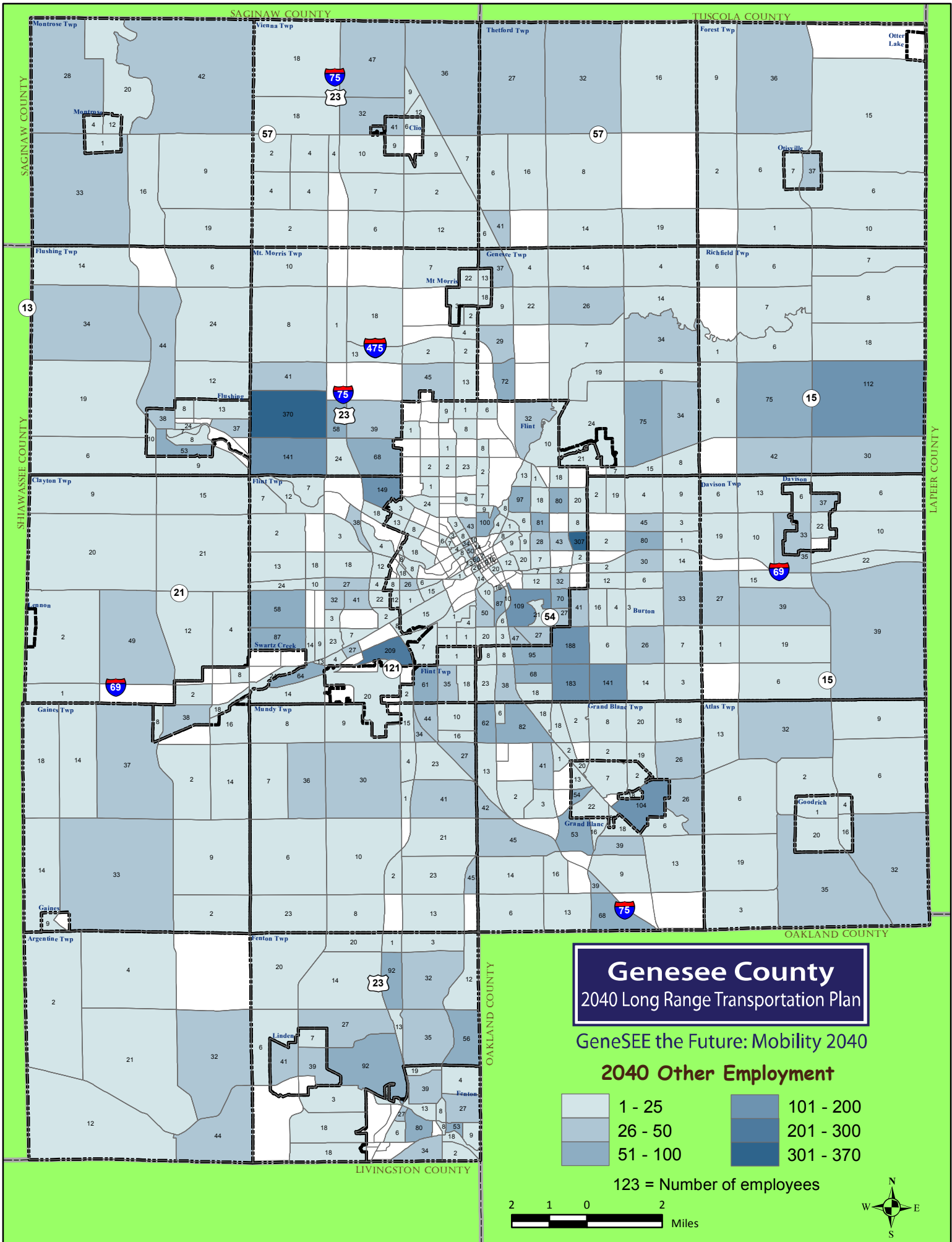
GeneSEE the Future: Mobility 2040

**2040 Manufacturing Employment**

- |  |           |  |             |
|--|-----------|--|-------------|
|  | 1 - 25    |  | 201 - 500   |
|  | 26 - 100  |  | 501 - 1000  |
|  | 101 - 200 |  | 1001 - 2119 |

123 = Number of employees

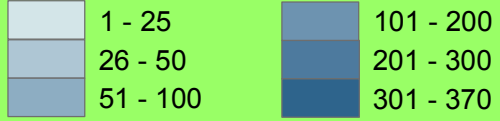




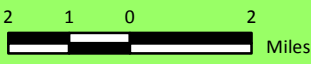
# Genesee County 2040 Long Range Transportation Plan

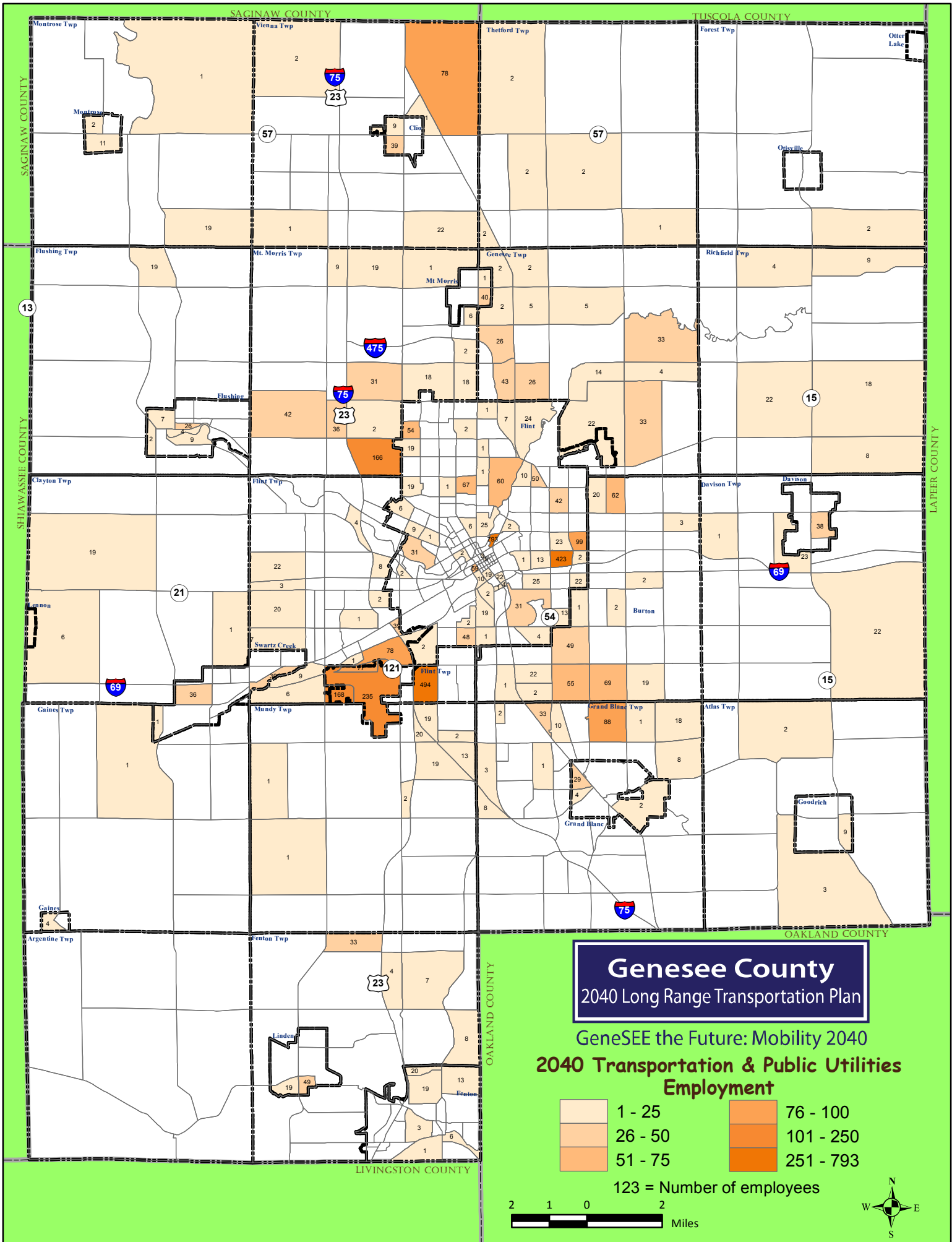
GeneSEE the Future: Mobility 2040

## 2040 Other Employment



123 = Number of employees



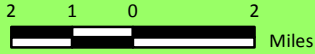


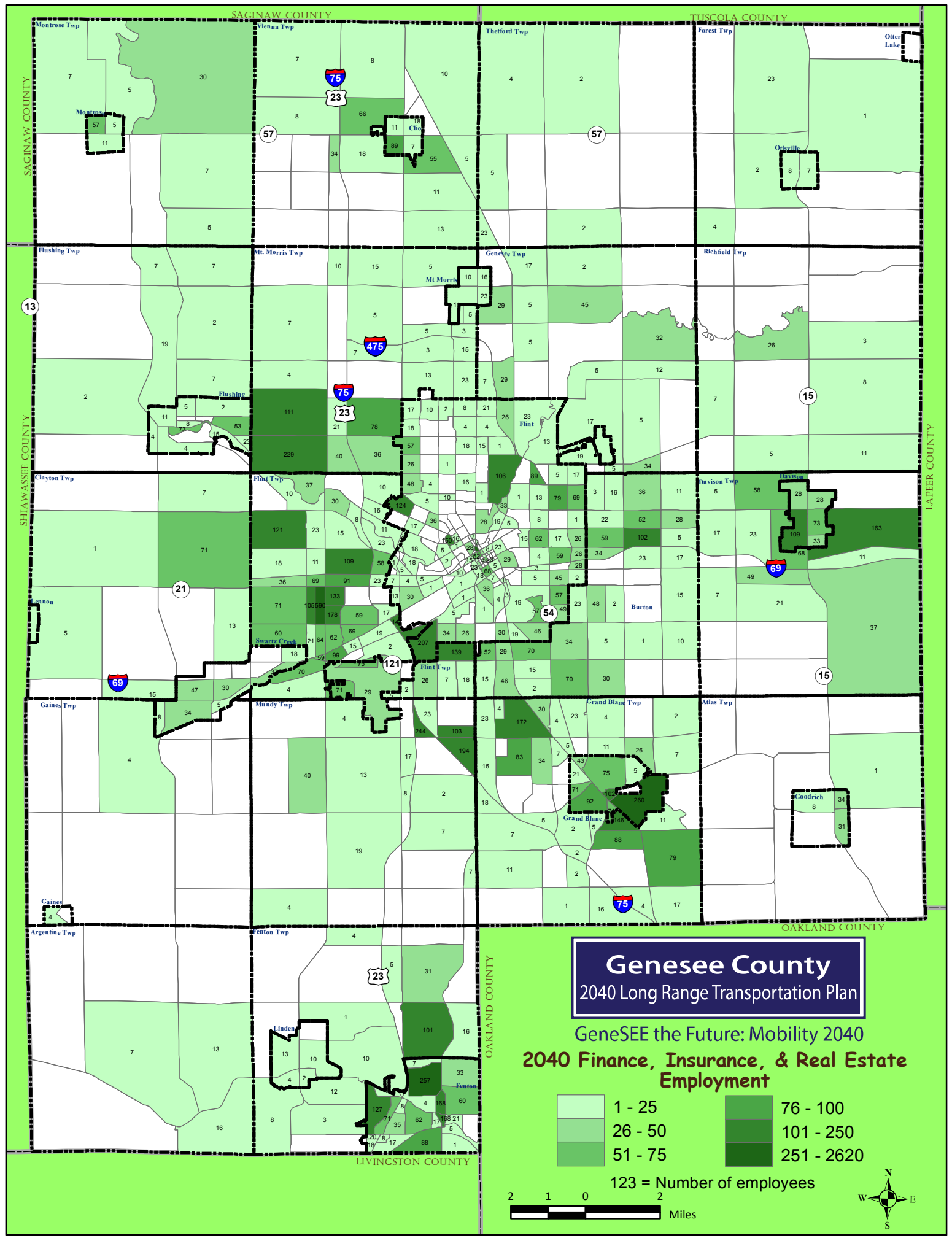
**Genesee County**  
2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040  
**2040 Transportation & Public Utilities  
Employment**

1 - 25	26 - 50	51 - 75	76 - 100	101 - 250	251 - 793
--------	---------	---------	----------	-----------	-----------

123 = Number of employees





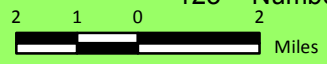
# Genesee County

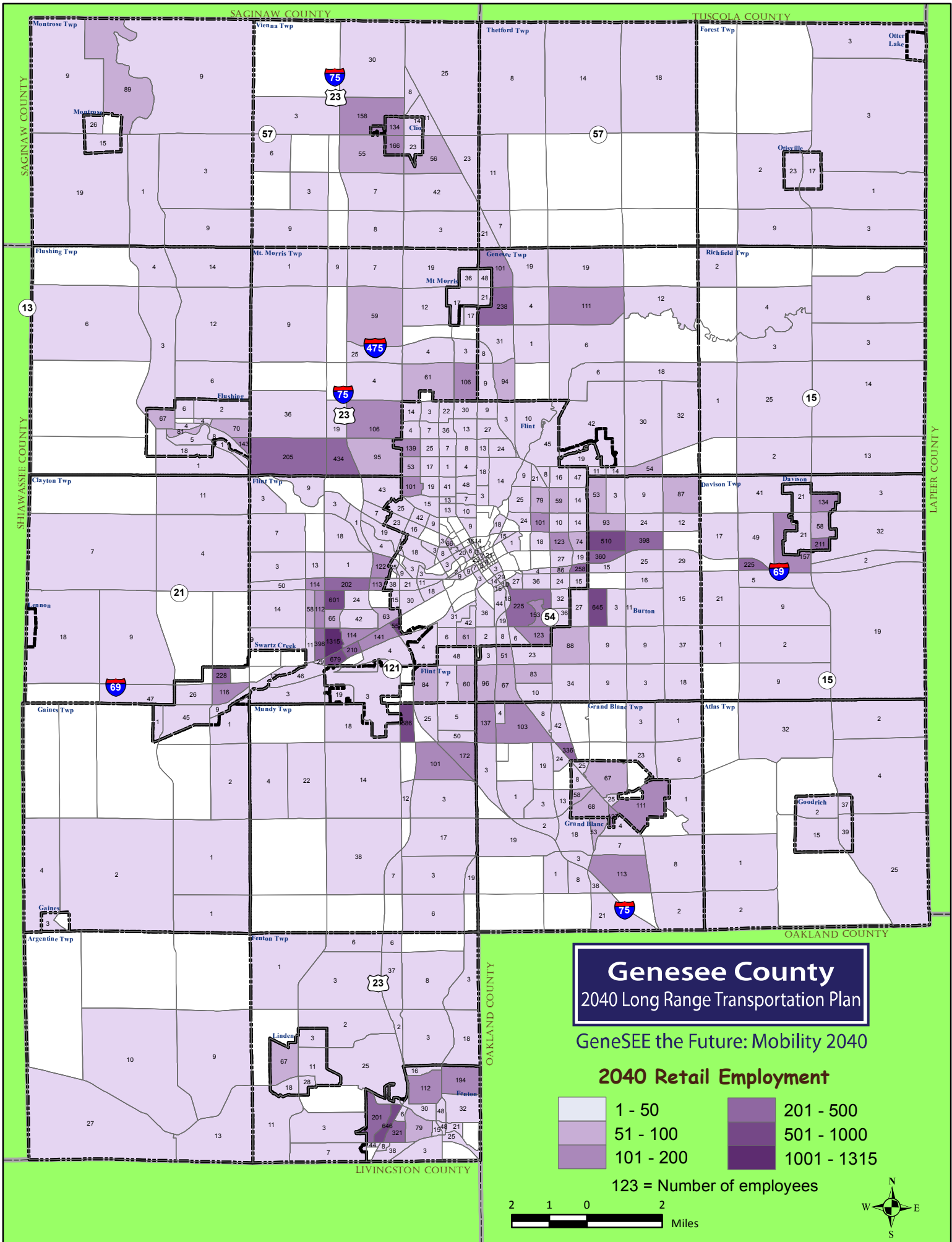
## 2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040  
**2040 Finance, Insurance, & Real Estate Employment**

	1 - 25		76 - 100
	26 - 50		101 - 250
	51 - 75		251 - 2620

123 = Number of employees





# Genesee County

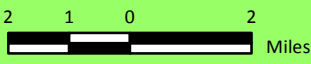
## 2040 Long Range Transportation Plan

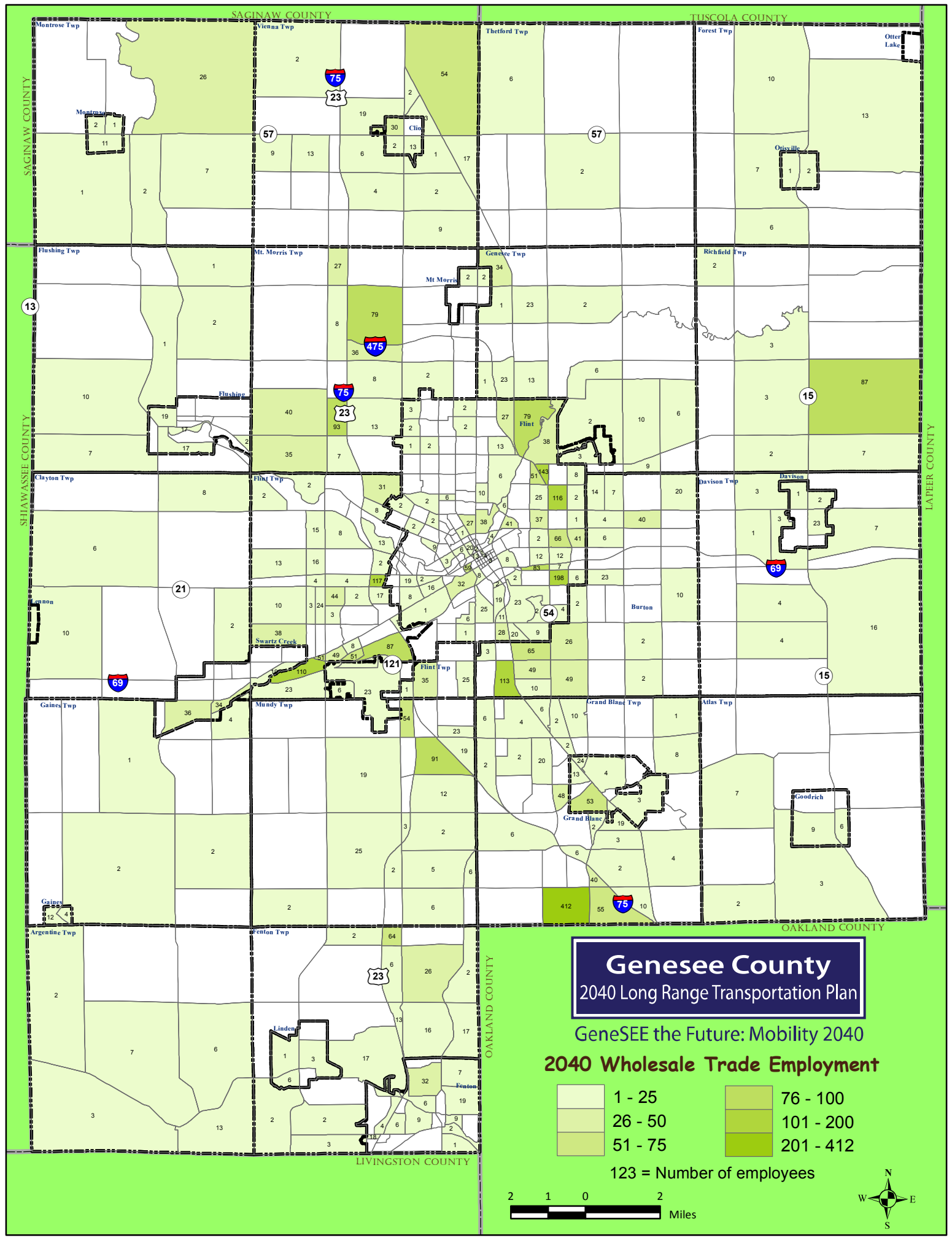
GeneSEE the Future: Mobility 2040

### 2040 Retail Employment

1 - 50	201 - 500
51 - 100	501 - 1000
101 - 200	1001 - 1315

123 = Number of employees



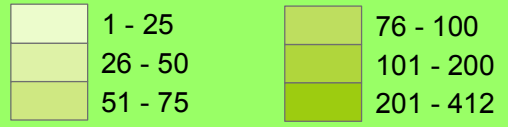


# Genesee County

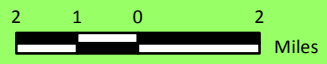
## 2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040

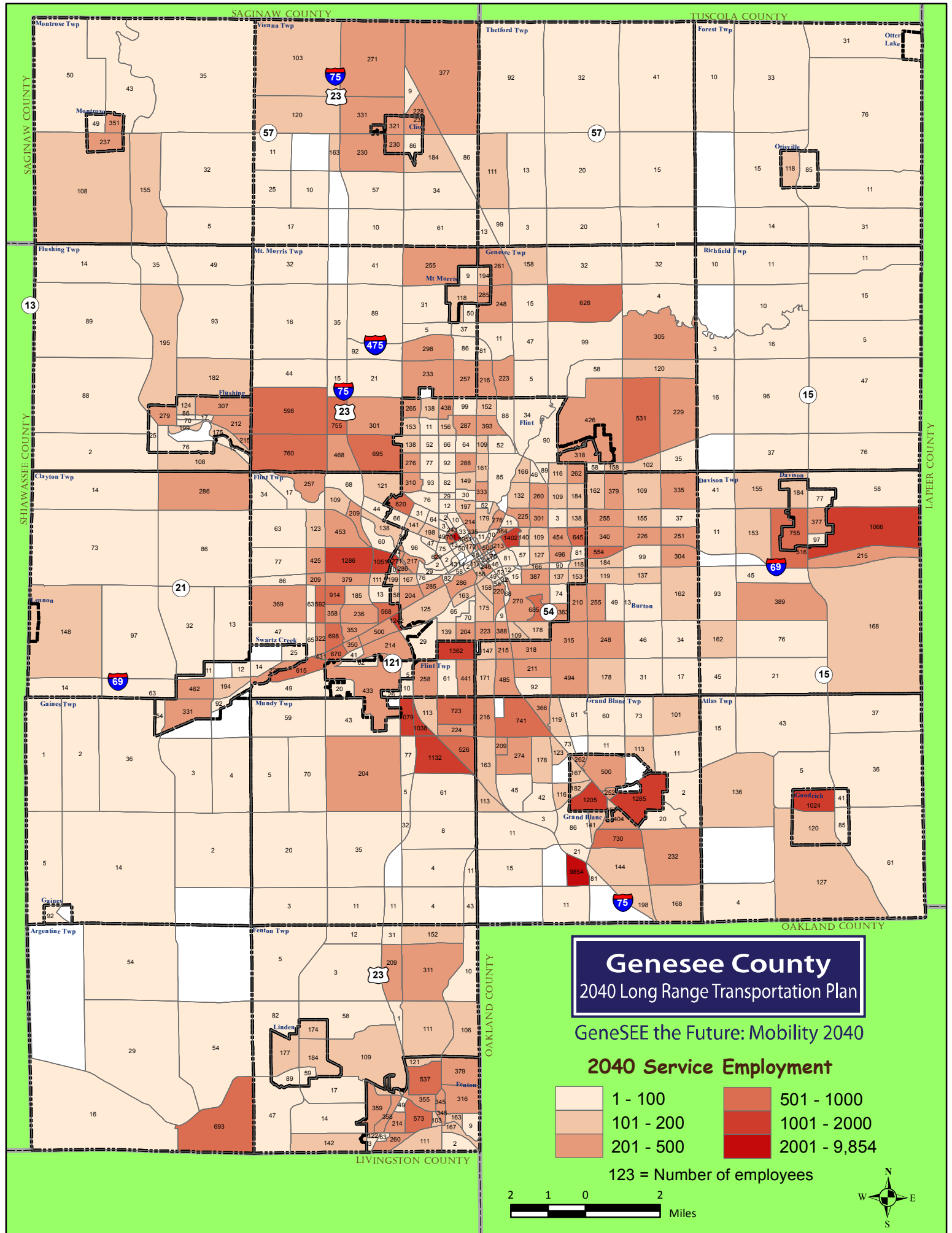
### 2040 Wholesale Trade Employment



123 = Number of employees







**Genesee County**  
2040 Long Range Transportation Plan

GeneSEE the Future: Mobility 2040

**2040 Service Employment**

1 - 100	501 - 1000
101 - 200	1001 - 2000
201 - 500	2001 - 9,854

123 = Number of employees





## **Appendix A**

### **2035 Genesee County Employment Projections**

# **2005 Base Year Employment Data**

## **2035 Employment Projections**

### **Methodology Report**

Final Report

December 2007



Prepared by the Genesee County Metropolitan Planning Commission Staff

## Base Year Employment Data Methodology

The Genesee County Metropolitan Planning Commission utilized the Claritas Business-Facts® dataset as a base for our employment projections in Genesee County. This dataset was provided by the Michigan Department of Transportation (MDOT) and provides geographically located employers in Genesee County, their number of employees, and industry codes. Claritas employment data was already updated to the year 2005 matching the base year of the model. (See appendix \_ for Claritas Business-Facts® Methodology Report)

This dataset had a higher level of accuracy in reporting employment than the previous dataset used in the 2030 model (2002 base year). The previous model had 150,073 employees geographically located and categorized by industry type. The Claritas dataset has 184,345 employees. 1,234 employees could not be geocoded (located to a place in Genesee County) due to incomplete addresses and other factors. This represented only 0.6% of the total dataset and the majorities of the employees not geocoded were businesses with only one employee and were deemed to not greatly affect the quality of the data. Employees that could not be geographically located were removed from the Genesee County total employment figures to bring the new total employees in Genesee County to 183,111.

To determine the accuracy of the new dataset and as a validation measure, Genesee County Metropolitan Planning Commission (GCMPC) staff attempted to contact all employers with over 100 employees to determine if the number of employees represented in the dataset were accurate, and if the employees were located in the correct location. Not all employers could be reached or were willing to provide the information. Out of the 209 employers contacted, any reported differences to their employee numbers or to their locations was corrected in the employment database.

GCMPC staff made a special attempt to contact the top 10 employers in Genesee County to get accurate estimates of their employment. These were also adjusted to the dataset.

Overall, the Claritas data was deemed to be fairly reliable. Most employers contacted have employment represented fairly accurately and within about 10 employees of the numbers provided in the Claritas dataset.

Some duplicate entries were removed from the dataset and some employers were no longer operating businesses in Genesee County. After contacting employers a net loss of 3,050 employees were adjusted in the dataset.

Claritas employment before contacting employers: 183,111 employees  
Employment in Genesee County after contacting employers: 180,061 employees

GCMPC staff coded the employees based on the North American Industrial Classification System (NAICS) codes into eight categories using the same categories

and definitions as the previous employment estimates from the 2030 Long Range Transportation Plan. This way the data would be easily comparable between plans and the methodology for determining the categories was determined to be sound and reliable in the previous plan. See the chart on page \_\_ for a description of the NAICS codes and the GCMPC categories. Previous to the NAICS system, employment data was categorized by the Standard Industrial Classification (SIC) system. Some employment forecasts still use the SIC coding system. In order to compare SIC to NAICS datasets the corresponding SIC categories are also included in the table.

<b>GCMPC Model Employment Code</b>	<b>Genesee County Employment Categories</b>
1	Manufacturing
2	Other
3	Transportation, Warehousing, and Public Utilities
4	Finance, Insurance and Real Estate
5	Retail Trade
6	Wholesale Trade
7	Service
8	Government

### Genesee County Employment Categories & Corresponding SIC and NAICS Codes

GCMPC Categories	SIC Categories	NAICS Codes	NAICS Titles
Manufacturing	Durables	33	Manufacturing
	Non-Durables	31-32	Manufacturing
Other	Mining	21	Mining
	Construction	23	Construction
	Agri&For&Fish Serv	11	Agriculture, Forestry, Fishing and Hunting
	Farm	11	Agriculture, Forestry, Fishing and Hunting
Transportation, Warehousing & Public Utilities	Trans.&Public Util.	48-49	Transportation and Warehousing
		22	Utilities
		52	Finance and Insurance
Finance, Insurance & Real Estate	Fin&Ins&Real Est	53	Real Estate, Rental and Leasing
Retail Trade	Retail Trade	44-45	Retail Trade
Wholesale Trade	Wholesale Trade	42	Wholesale Trade
		51	Information
		54	Professional, Scientific and Technical Services
		55	Management of Companies and Enterprises
		56	Administrative, Support, Waste Management and Remediation Services
		61	Educational Services
		62	Health Care and Social Assistance
		71	Arts, Entertainment and Recreation
		72	Accommodation and Food Services
		81	Other Services (except Public Administration)
Government	State and Local	92	Public Administration
	Federal Civilian	92	Public Administration
	Federal Military	92	Public Administration

To determine the accuracy of Genesee County's 2005 Employment Estimates the GCMPC data was compared to other available data sources categorized by industry.

## Comparisons of Genesee County Employment Data to Other Data Sources by Industry

<b>Employment Category</b>	<b>GCMPC 2002</b>	<b>Claritas 2005 (adjusted)</b>	<b>CENSUS 2000</b>	<b>REMI 2005</b>	<b>Woods &amp; Poole 2005</b>	<b>BEA 2004</b>
type of code	NAICS	NAICS	NAICS	SIC	SIC	NAICS
<b>Manufacturing</b>	25,046	26,617	46,441	28,445	24,463	24,181
<b>Other</b>	7,411	10,697	10,340	15,114	15,069	12,571
<b>Transportation and Public Utilities</b>	3,682	5,308	6,727	7,371	6,568	5,717
<b>Finance, Insurance, Real Estate</b>	4,824	12,261	9,122	13,615	14,030	14,242
<b>Retail Trade</b>	20,780	25,701	24,762	43,656	40,940	27,714
<b>Wholesale Trade</b>	5,648	6,635	5,578	8,744	8,110	7,186
<b>Services</b>	73,591	85,494	87,823	78,724	75,901	91,800
<b>Government</b>	5,162	7,348	5,176	27,107	27,137	26,174
<b>Total Workers by Year</b>	<b>146,144</b>	<b>180,061</b>	<b>192,969</b>	<b>222,776</b>	<b>212,218</b>	<b>209,585</b>

### Definitions of Data Sources:

GCMPC 2002 - The Genesee County Metropolitan Planning Commission 2002 base year employment data from the 2020 long-range plan

Claritas 2005 (adjusted) - Claritas Business-Facts® dataset with the changes noted thus far in this report

Census 2000 - Data from the U.S. Census website for the year 2000 [www.census.gov](http://www.census.gov)  
This data was determined to be too old to use for our comparisons to 2005 data

REMI 2005 – Regional Economic Models, Incorporated (REMI®) is a private company that provides economic projections, models, and employment data forecasting. This dataset is for 2005. This dataset is based on the SIC code system. The historical data year for this dataset is 2001.

Woods & Poole 2005 - Woods & Poole Economics, Incorporated is an independent firm that specializes in long term county economic and demographic projections. This dataset is for 2005. This dataset is based on the SIC code system. The historical data year for this dataset is 2003.

BEA 2004 – Bureau of Economic Analysis (BEA) is part of the U.S. Department of Commerce and provides regional economic information by industry. This dataset is based on the NAICS code system. The historical data year for this dataset is 2004.

The employees were geographically located to the corresponding traffic analysis zones (TAZs) based on their industry category.



The Model Development Committee (MDC) and staff determined that the Genesee County employment data was too low overall, although employment locations were accurate; it needed to be factored to make up for the gap in total employment. GCMPC staff recommended to the MDC that the best data source for factoring to was BEA. BEA was had the most recent historical data (2004) and the REMI and Woods & Poole data both rely heavily on BEA for their estimates. BEA should be used as a goal for our employment estimate. Since the BEA data was for the year 2004, staff determined that the increase in employment between 2004 and 2005 was 1% and increased the BEA data by 1% in all categories to be comparable with the 2005 Claritas/GCMPC dataset.

Then the percentage change was calculated between the adjusted Claritas 2005 data to the BEA 2005 data. The resulting factor was applied to each of the 467 TAZ in the model for each of the eight employment categories and total employment. The new employment estimates for each category are now within a few employees of the BEA 2005 totals. Factors were applied based on their individual TAZs share of the total employment for each category (see the chart below).

<b>Employment Category</b>	<b>Claritas 2005 (adjusted)</b>	<b>BEA 2004</b>	<b>BEA 2005 (1% increase)</b>	<b>Difference Claritas to BEA 2005</b>	<b>% Difference Claritas to BEA 2005</b>	<b>New Employment Data for GCMPC</b>	<b>Difference new data to BEA 2005</b>
<b>Manufacturing</b>	26,617	24,181	24,423	2,194	0.0824	24,433	10
<b>Other</b>	10,697	12,571	12,697	-2,000	-0.1869	12,677	-20
<b>Transportation and Public Utilities</b>	5,308	5,717	5,774	-466	-0.0878	5,768	-6
<b>Finance, Insurance, Real Estate</b>	12,261	14,242	14,384	-2,123	-0.1732	14,400	16
<b>Retail Trade</b>	25,701	27,714	27,991	-2,290	-0.0891	27,984	-7
<b>Wholesale Trade</b>	6,635	7,186	7,258	-623	-0.0939	7,244	-14
<b>Services</b>	85,494	91,800	92,718	-7,224	-0.0845	92,713	-5
<b>Government</b>	7,348	26,174	26,436	-19,088	-2.5977	26,443	7
<b>Total Workers by Year</b>	<b>180,061</b>	<b>209,585</b>	<b>211,681</b>	<b>-31,620</b>		<b>211,662</b>	<b>-19</b>

All of the categories seemed within a reasonable range to factor the employment up to BEA per industry per TAZ. The governmental category was alarmingly lower in the Claritas dataset than the BEA data.

Why the government category is so low? Claritas uses each department within a governmental unit as its own geographically located employer. This is useful when not all government employees work out of the same building. The drawback is when this method leaves out a department or under-represents employment overall for a category. We have also found that Claritas left out some of the state and federal governmental employees. Based on these findings we felt it was still reasonable to factor the government employees once it was determined those local units of government and the county, state, and federal agencies were correctly located yet underrepresented.

## Final 2005 Genesee County Base Year Employment Data

After all adjustments were made, here are the final results for employment in Genesee County mapped by industry. These will be used to create future employment estimates for the 2035 Flint-Genesee County Long Range Transportation Plan and the 2035 Urban Travel Demand Model.

<b>2005 Genesee County Employment by Industry</b>	
<b>Industry</b>	<b>2005 Genesee County Employment</b>
<b>Manufacturing</b>	24,433
<b>Other</b>	12,677
<b>Transportation and Public Utilities</b>	5,768
<b>Finance, Insurance, Real Estate</b>	14,400
<b>Retail Trade</b>	27,984
<b>Wholesale Trade</b>	7,244
<b>Services</b>	92,713
<b>Government</b>	26,443
<b>Total Genesee County Employment</b>	<b>211,662</b>

## **Genesee County 2035 Employment Projections Methodology**

2005 Genesee County base year employment data was used as a starting point for the 2035 employment projections.

Staff reviewed all available employment projection data sources. Based on consultation with the Michigan Department of Transportation (MDOT) and the Genesee County Model Development Committee the 2030 Regional Economic Models Incorporated (REMI) data was used to determine growth rates for each industry which were applied to each TAZ.

REMI data includes a countywide total for employment and by employment sector available in 5-year increments out the year 2030.

Since the out year of the model is 2035 and the REMI data only goes to the year 2030, the growth rate from years 2025 to 2030 was also applied to the years 2031 to 2035.

For use in our employment projections we calculated growth rates for each 5-year period and interpolated the yearly growth rate per industry for each year from 2006-2035.

The yearly growth factor (a different factor for every 5-year period) was applied to the base year employment data by TAZ by category.

The end result is every TAZ has employment by category by year for every year from 2005-2035.

That is  $467 \text{ TAZ} * 8 \text{ employment categories} * 31 \text{ years} = 115,816 \text{ records!}$

The data analysis was done in Excel with a separate spreadsheet for each employment category. The spreadsheet values were copied over into one main spreadsheet that was saved as a DBF4 and can be joined with any TAZ layer by TAZ ID to populate the TAZ database with records for whichever year and type of employment needed.

The following charts and graphs illustrate the changes in employment in Genesee County expected in the next 30 years.

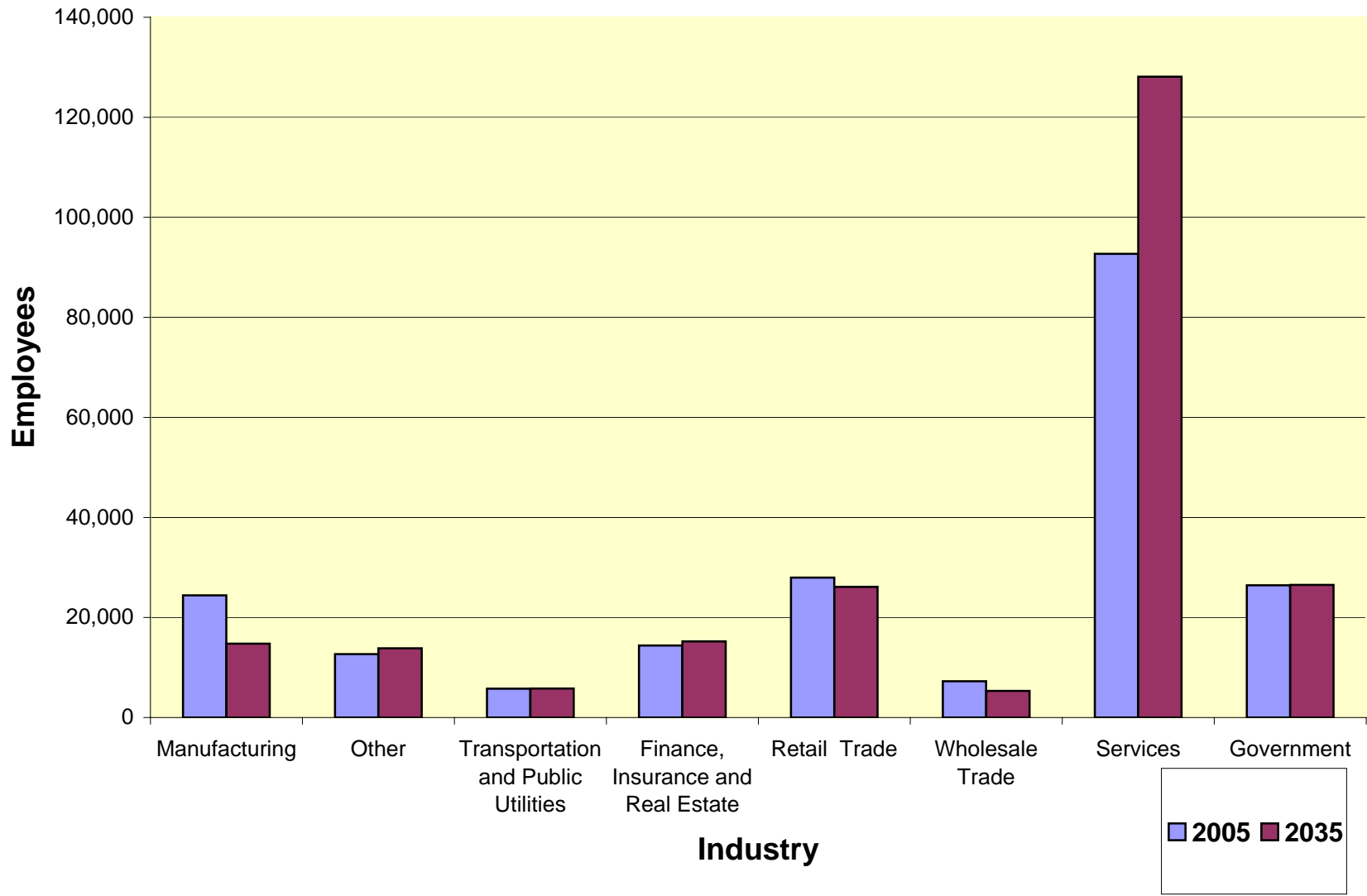
## **2035 Genesee County Employment Projection Assumptions**

- Claritas Business Facts dataset supplied by the Michigan Department of Transportation accurately represents the locations, employees and types of current employment in Genesee County for the year 2005.
- Staff adjustments to the Claritas Business Facts dataset have increased the accuracy of the dataset.
- The employment within the eight categories used by Genesee County reacts in a similar way to fluctuations in the economy per category when compared to the overall county employment.
- Bureau of Economic Analysis (BEA) employment data for 2004 grew by 1% between 2004 and 2005. BEA data by category for Genesee County is accurate for use to adjust employment from the Claritas-based dataset.
- 2030 Regional Economic Models Inc (REMI) data for future employment by category in Genesee County is the most accurate data currently available and growth rates per GCMPC category can be derived from this data and applied to Claritas Business Facts based local employment.
- Interpolation of the five-year increments of employment data in 2030 REMI can be analyzed to show employment for any given year out to 2035.
- Local planning knowledge of future development in Genesee County is a factor that is considered when applying statewide and national data to the local area and adjustments are made where known development is occurring that is not represented in the statewide and national datasets.

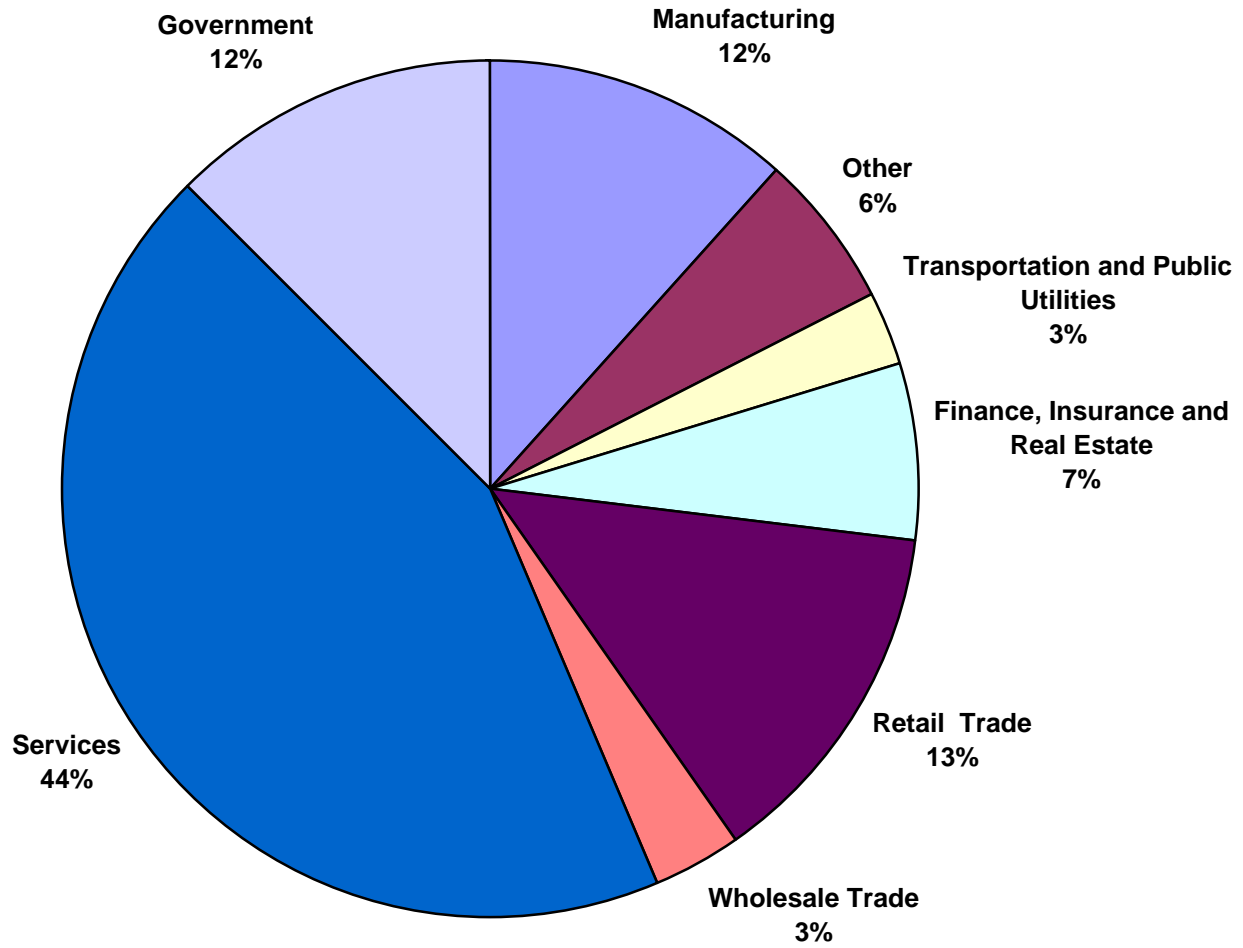
**Genesee County Employment by Industry 2005 - 2035**

<b>Employment Category</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>
Manufacturing	24,433	22,970	20,432	18,962	17,516	16,077	14,763
Other	12,677	13,102	13,693	13,876	13,778	13,804	13,846
Transportation and Public Utilities	5,768	6,075	6,187	6,189	6,053	5,932	5,798
Finance, Insurance and Real Estate	14,400	15,117	15,489	15,654	15,453	15,337	15,205
Retail Trade	27,984	28,023	27,966	27,707	27,009	26,553	26,126
Wholesale Trade	7,244	7,164	6,792	6,479	6,090	5,708	5,328
Services	92,713	105,186	112,086	117,666	120,728	124,384	128,129
Government	26,443	26,486	26,461	26,411	26,366	26,427	26,511
<b>Total</b>	<b>211,662</b>	<b>224,123</b>	<b>229,106</b>	<b>232,944</b>	<b>232,993</b>	<b>234,222</b>	<b>235,706</b>

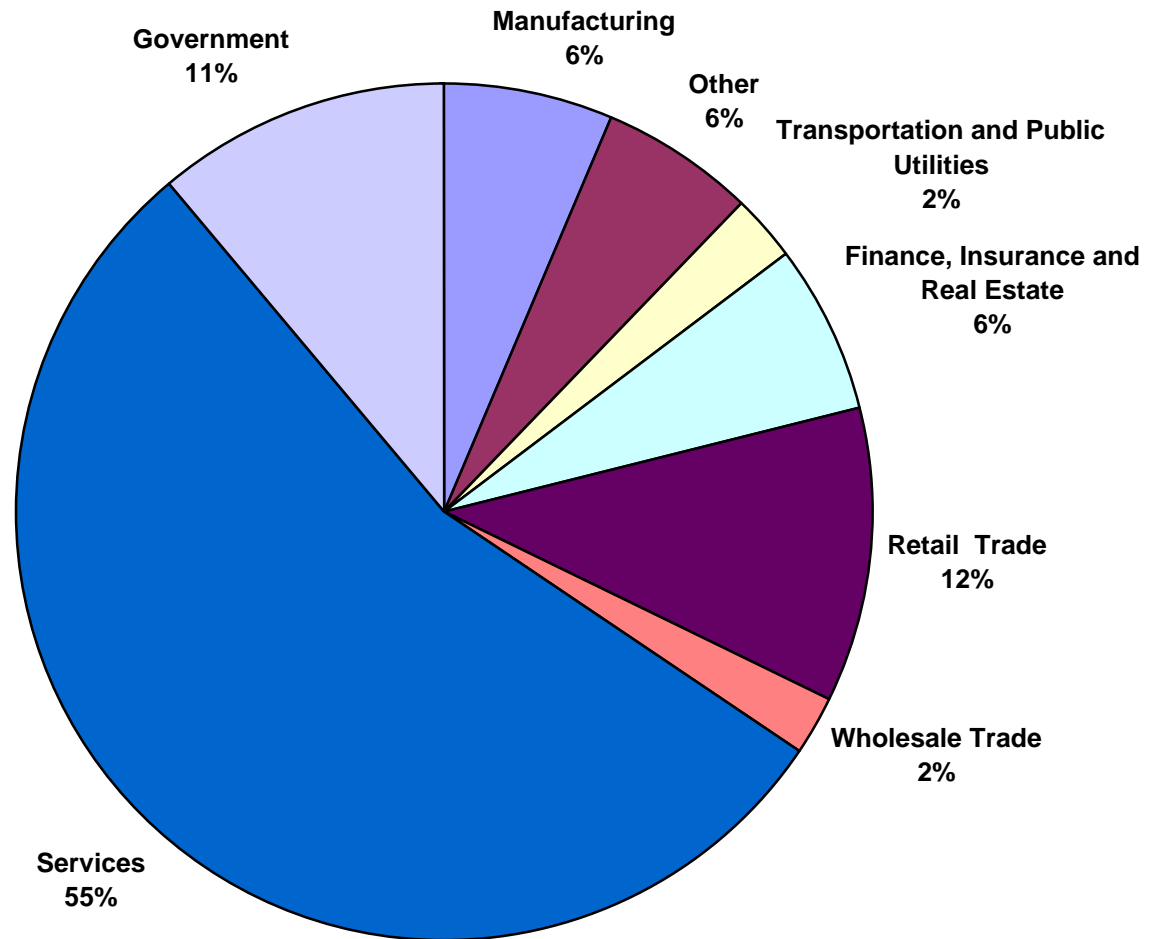
## 2005 - 2035 Genesee County Employment by Industry



## 2005 Genesee County Employment by Industry

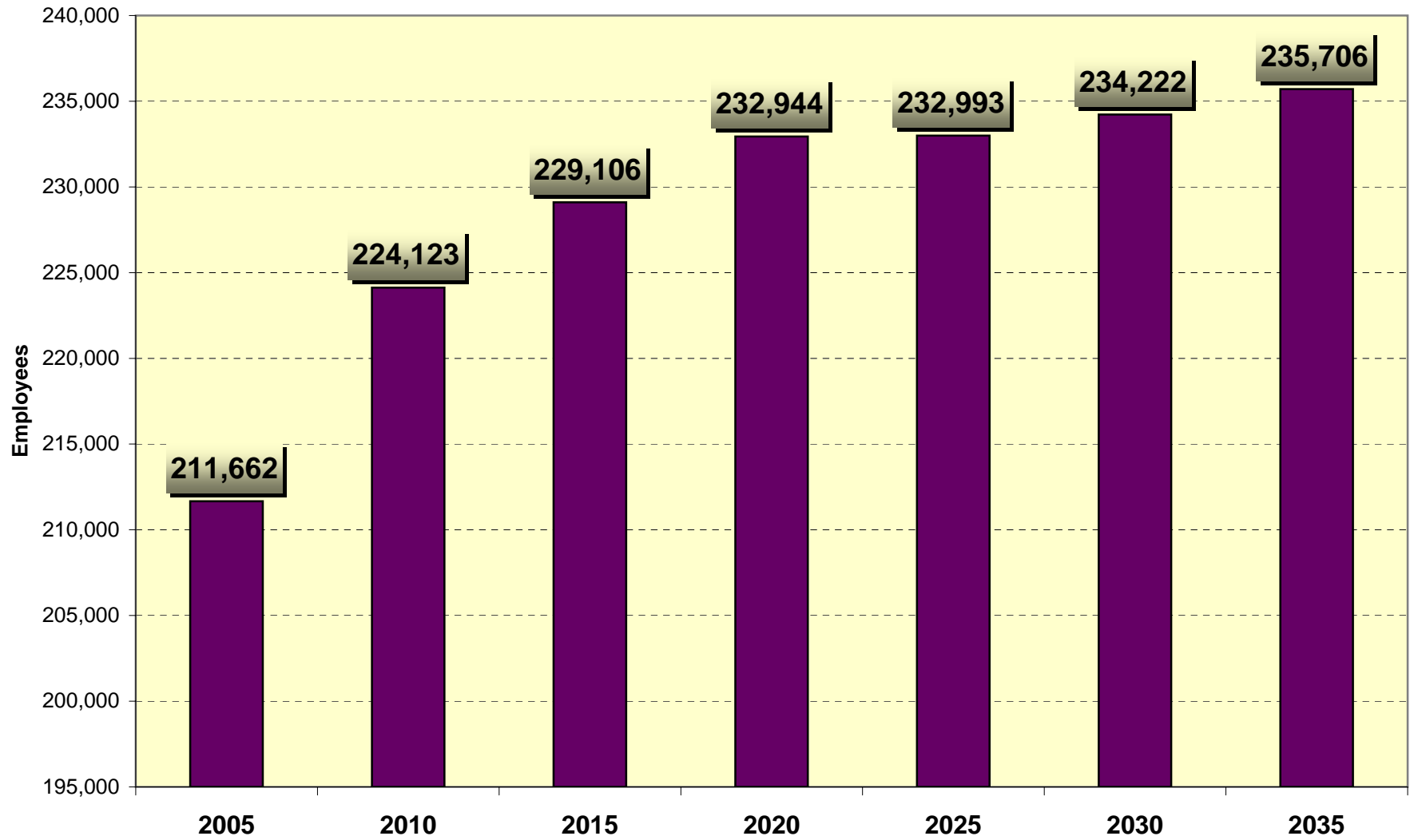


## 2035 Genesee County Employment by Industry

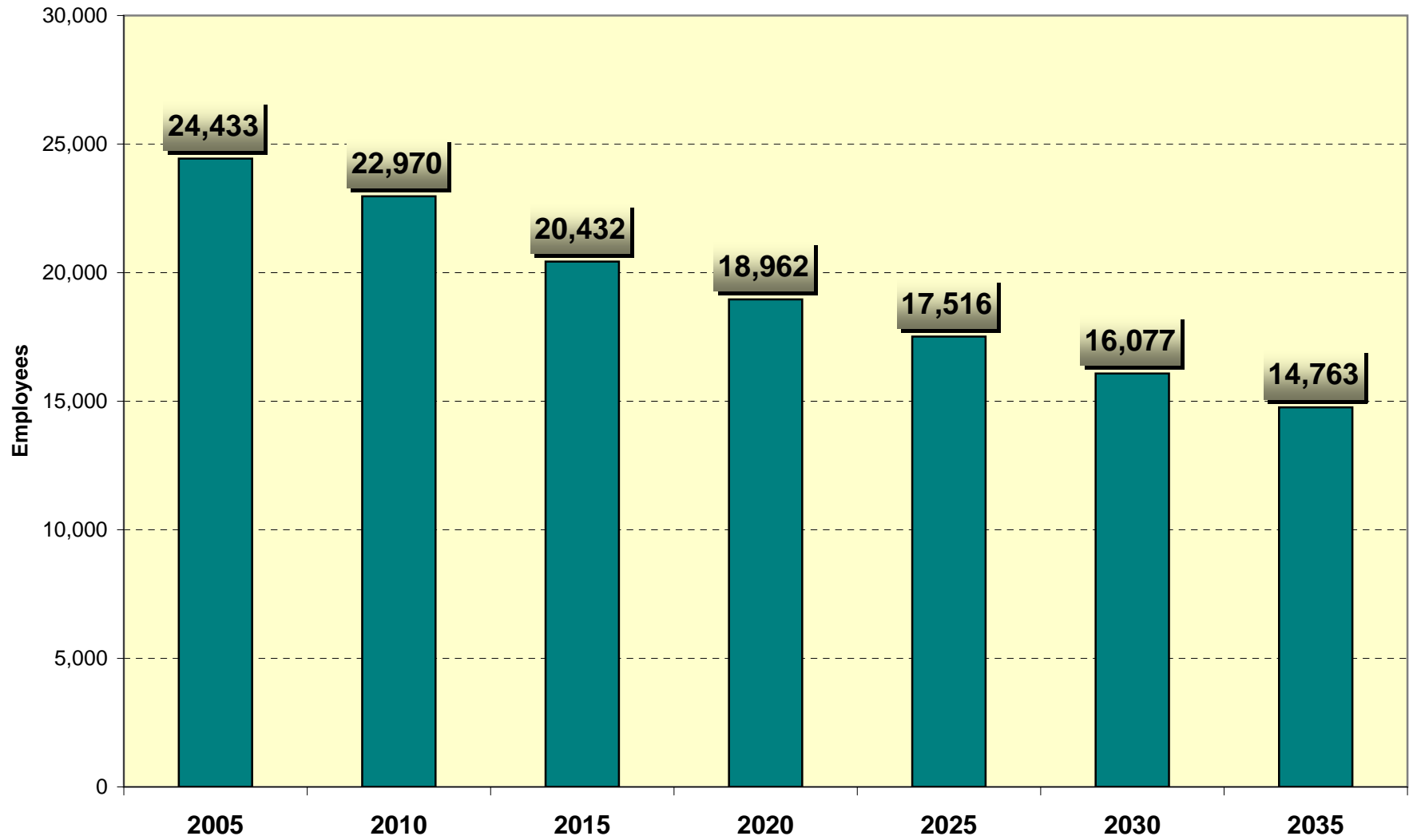




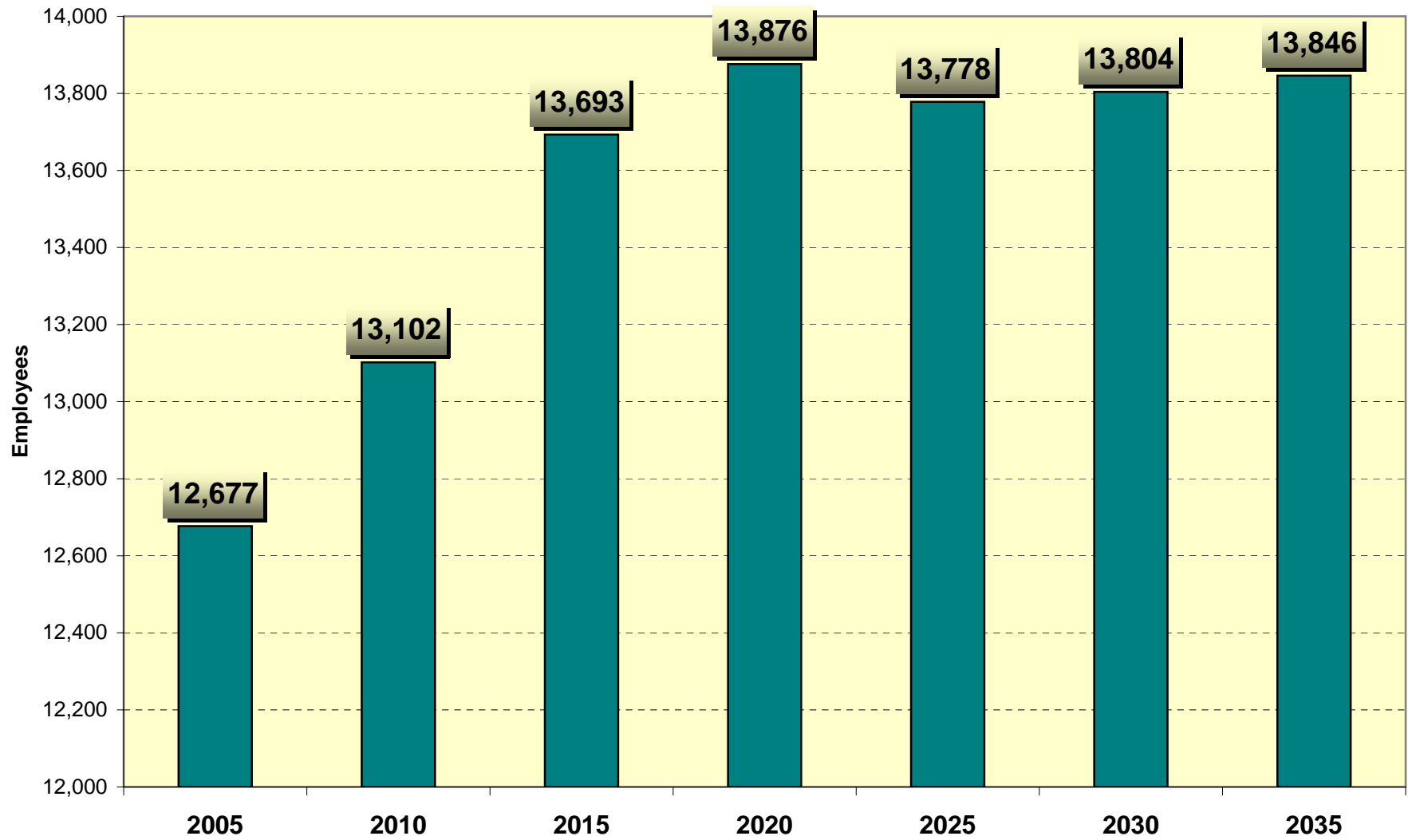
## Total Employment



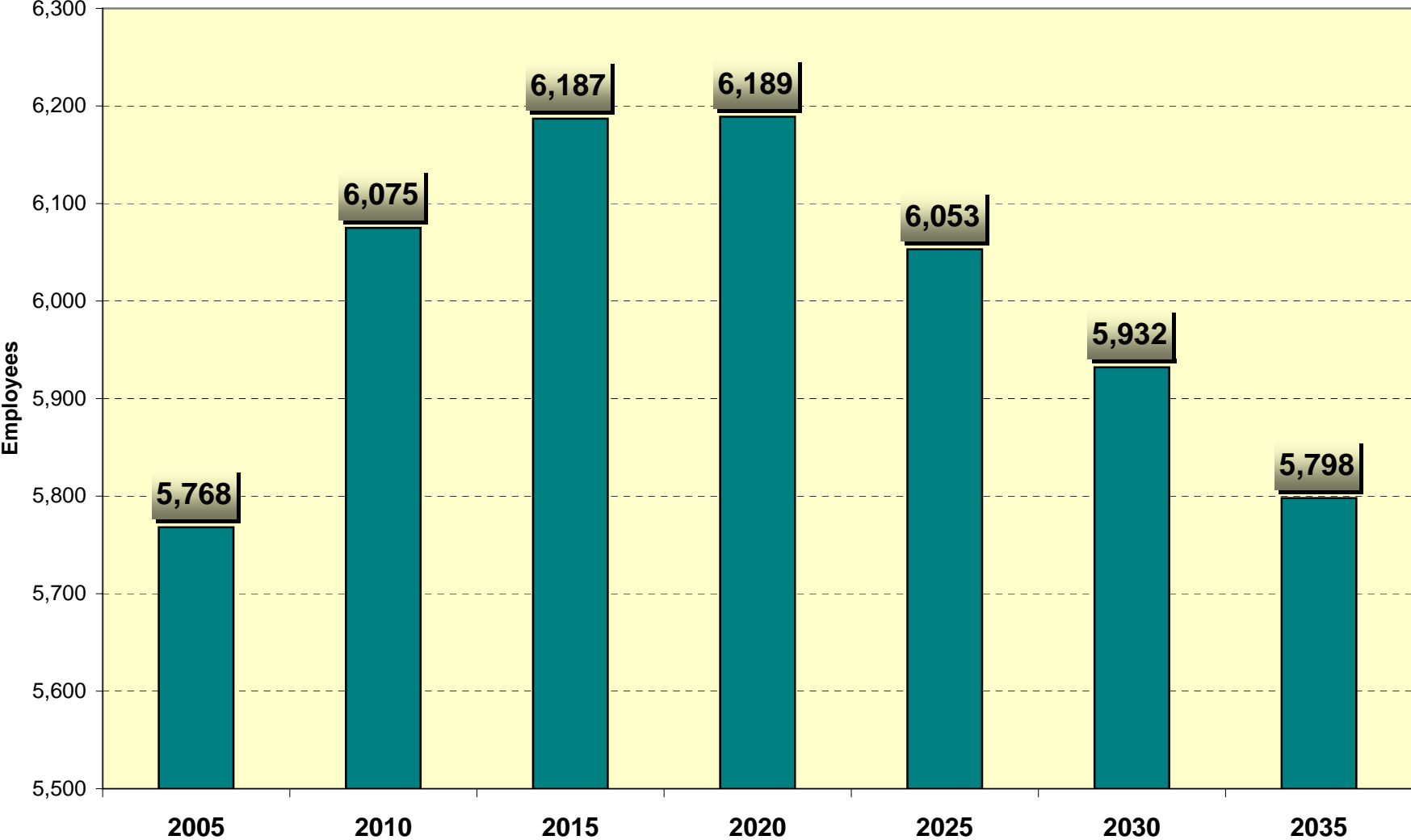
# Manufacturing



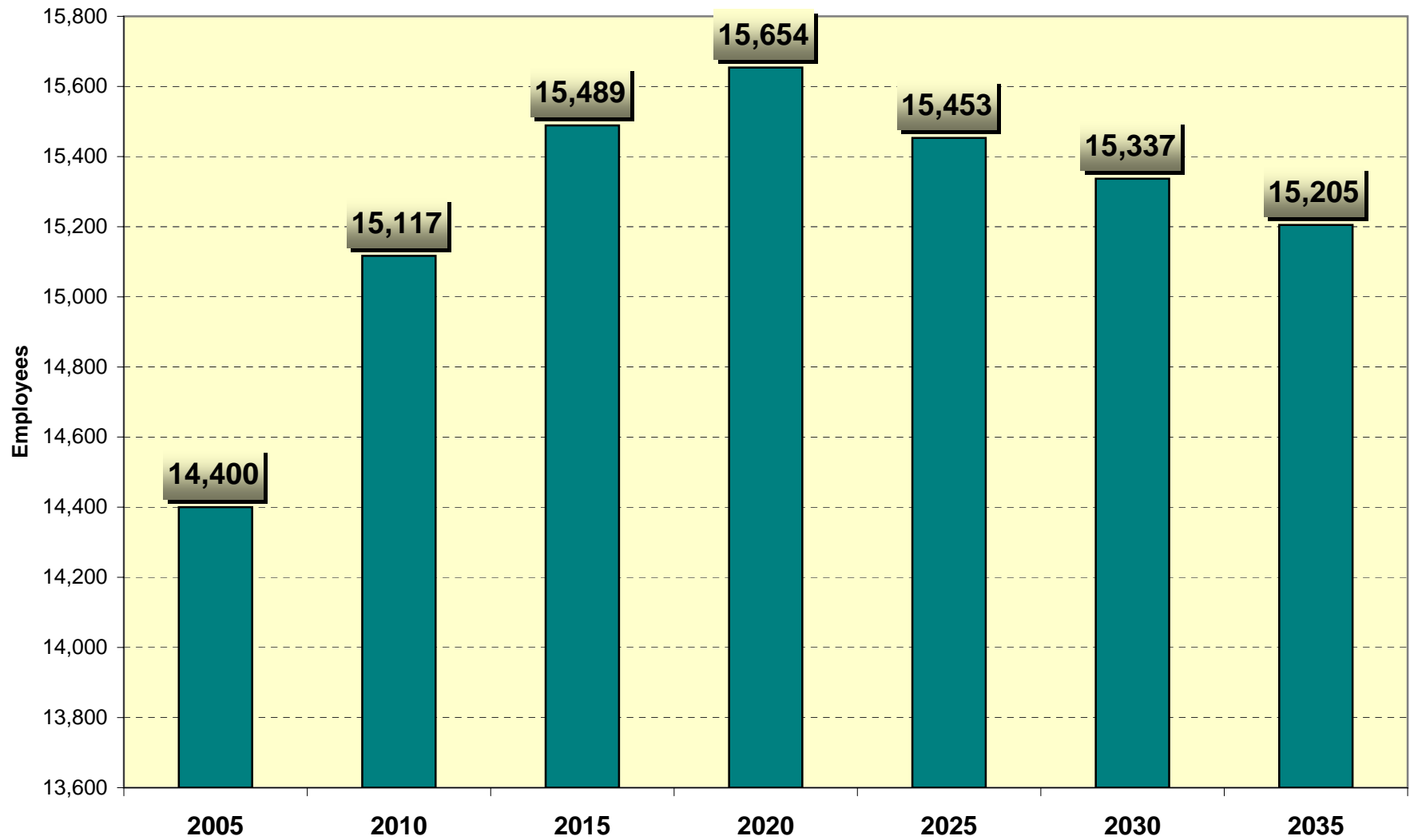
## Other



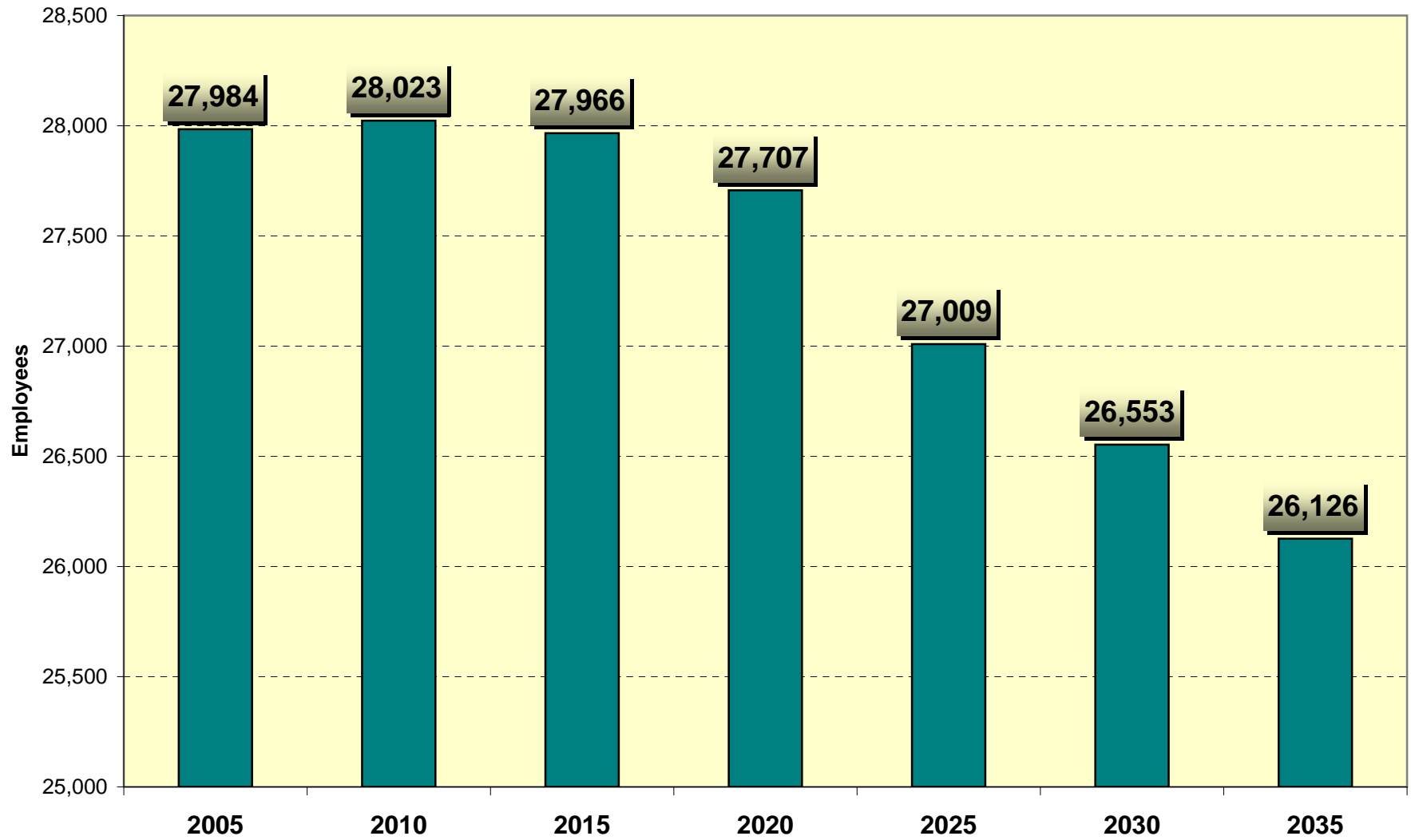
# Transportation and Public Utilities



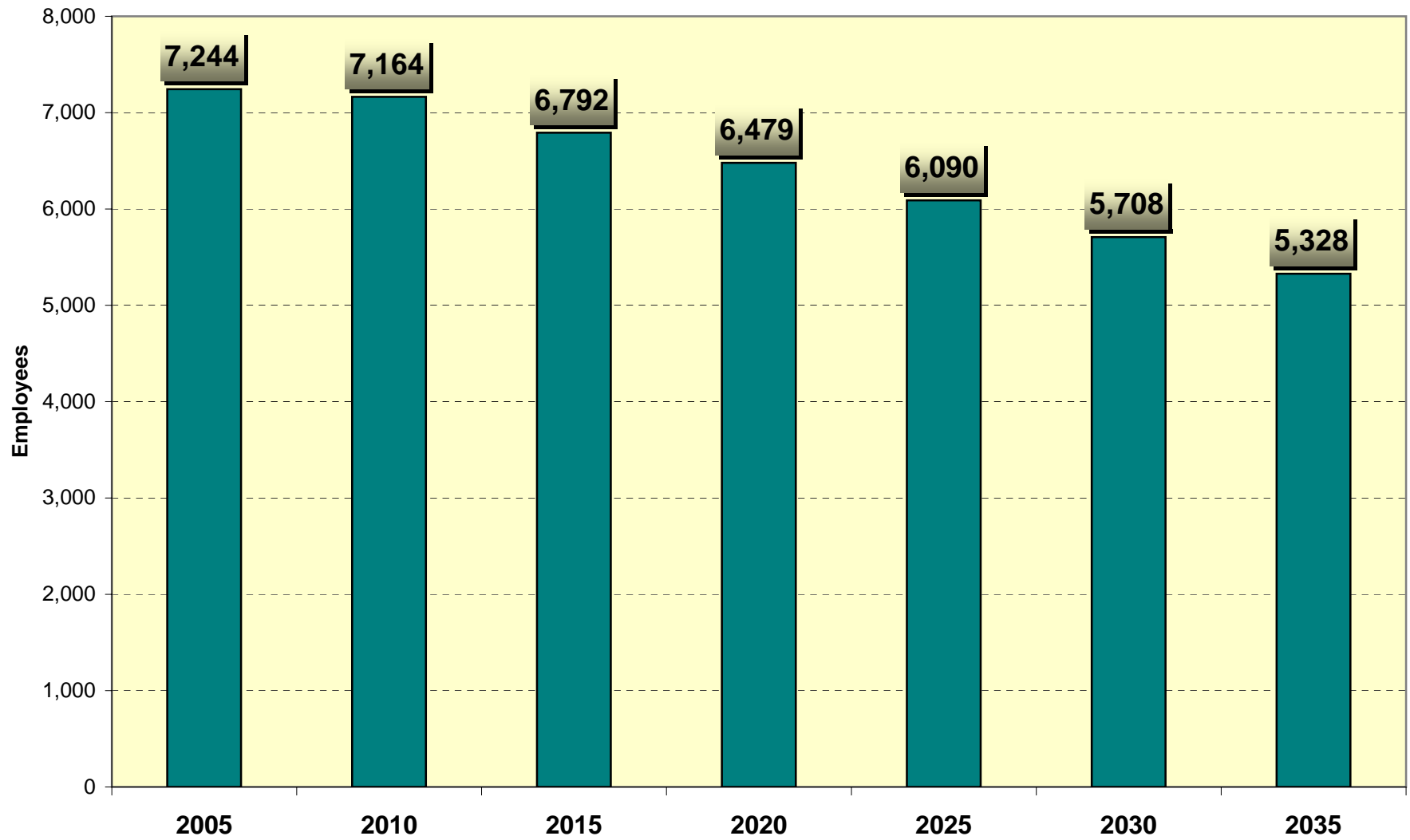
## Finance, Insurance and Real Estate



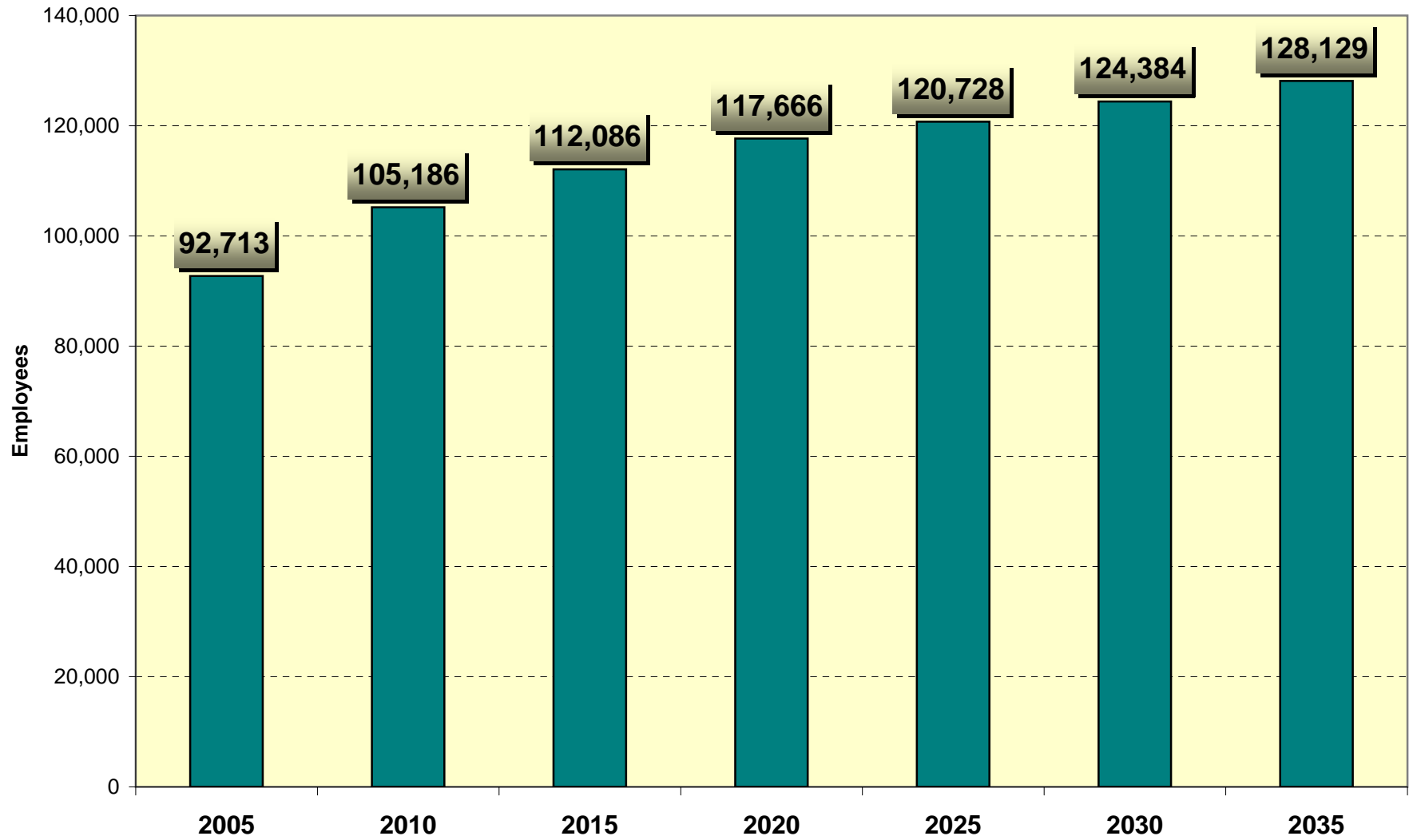
## Retail Trade



## Wholesale Trade

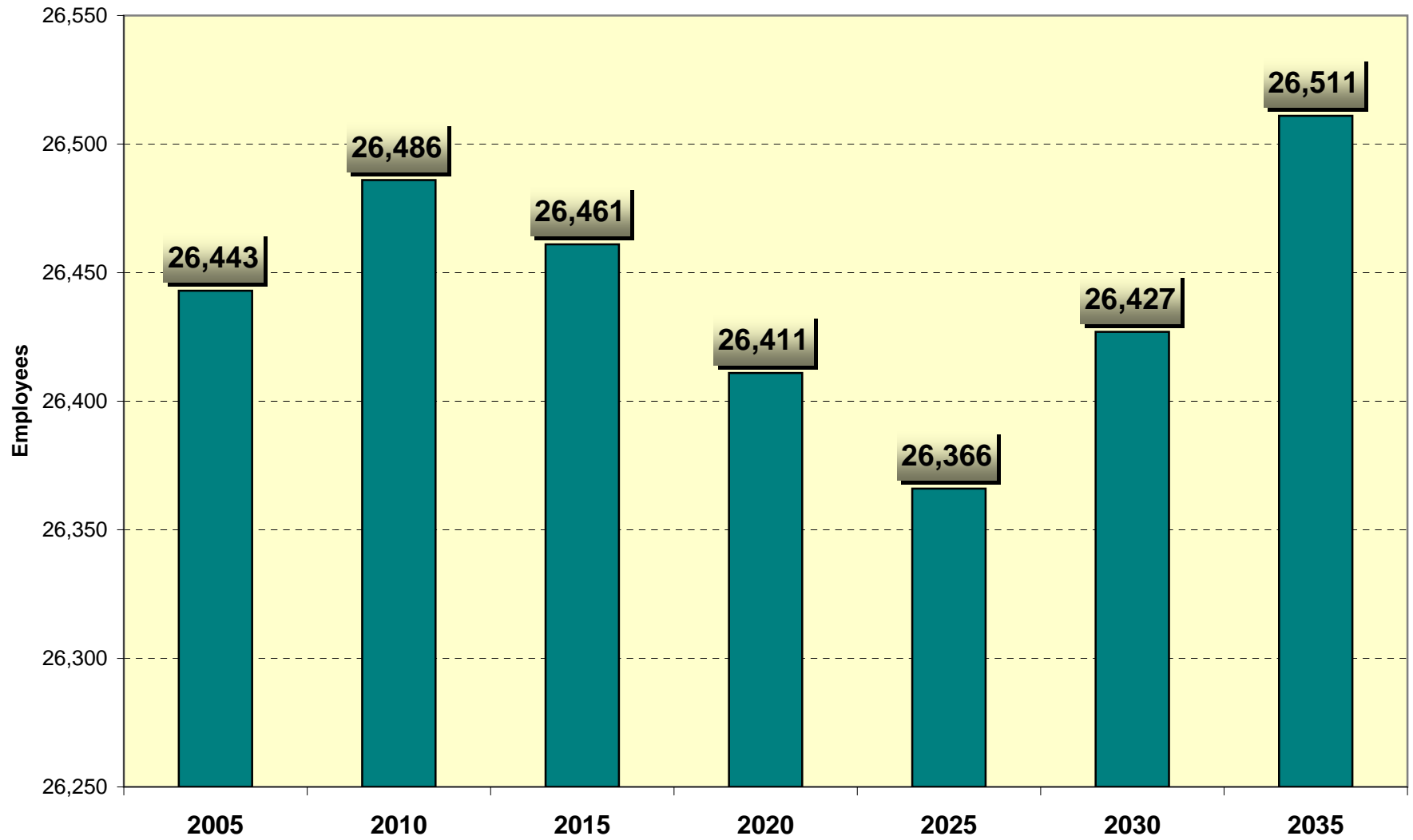


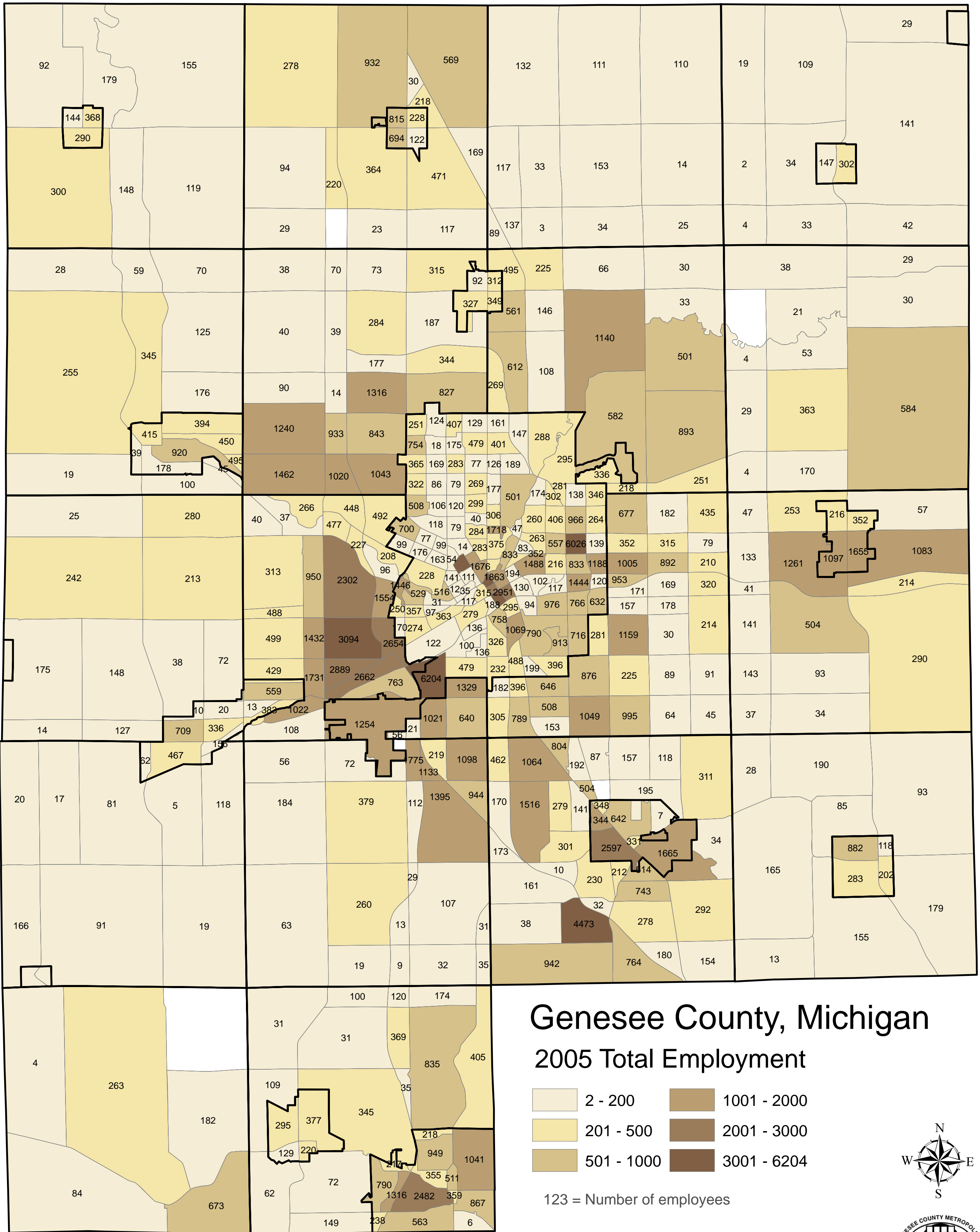
## Services





# Government



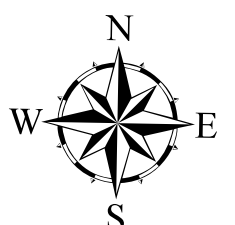


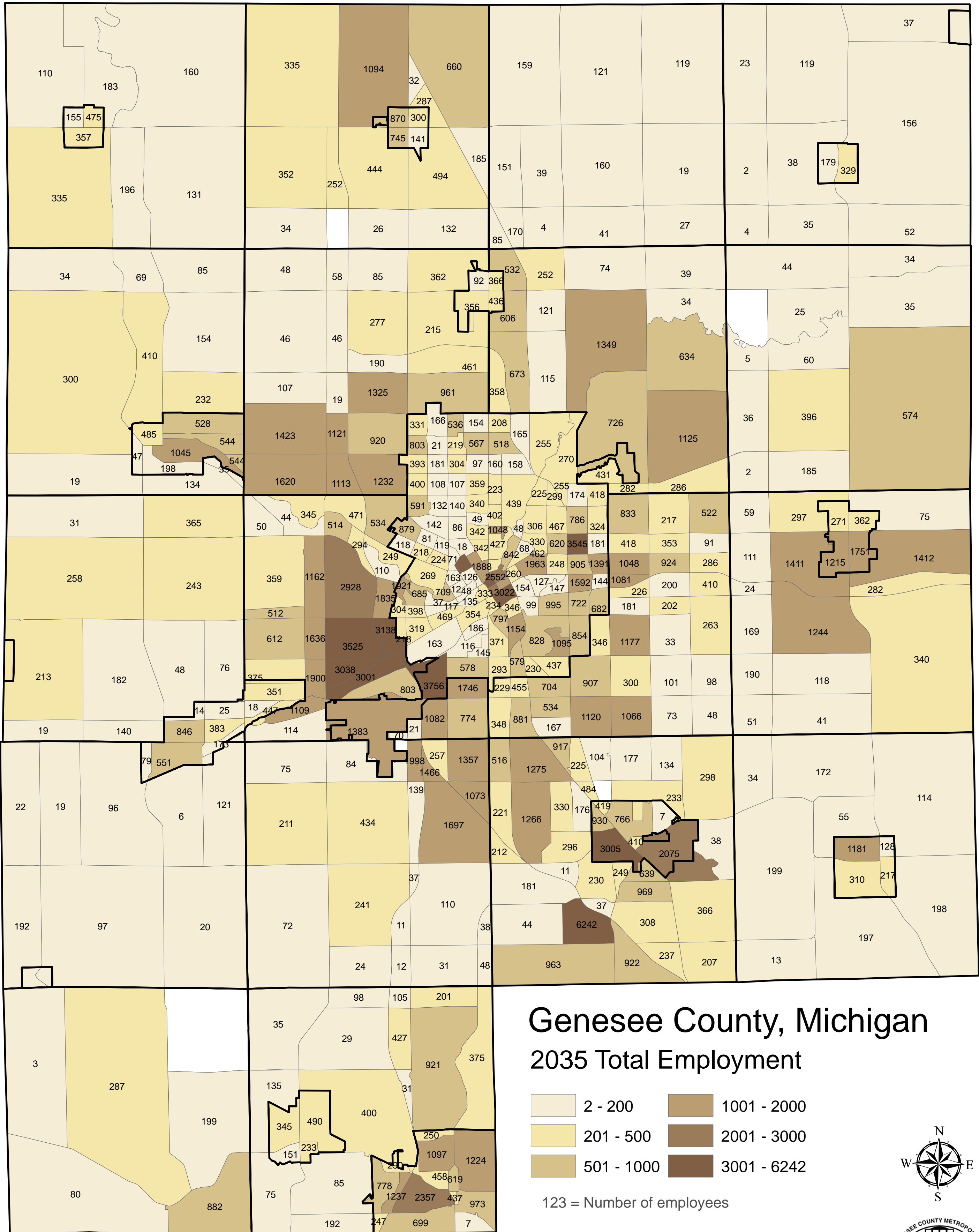
# Genesee County, Michigan

## 2005 Total Employment

- |  |            |  |             |
|--|------------|--|-------------|
|  | 2 - 200    |  | 1001 - 2000 |
|  | 201 - 500  |  | 2001 - 3000 |
|  | 501 - 1000 |  | 3001 - 6204 |

123 = Number of employees

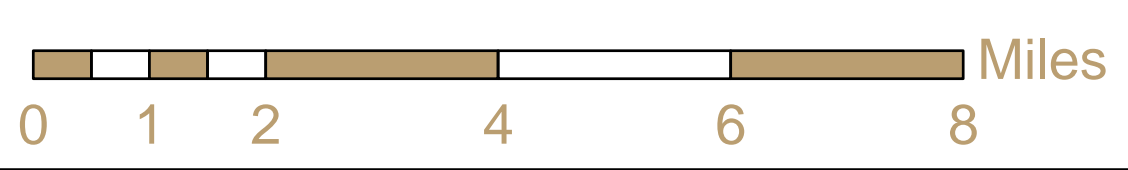
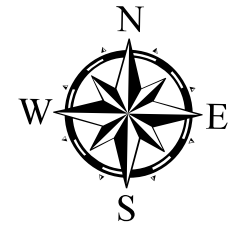


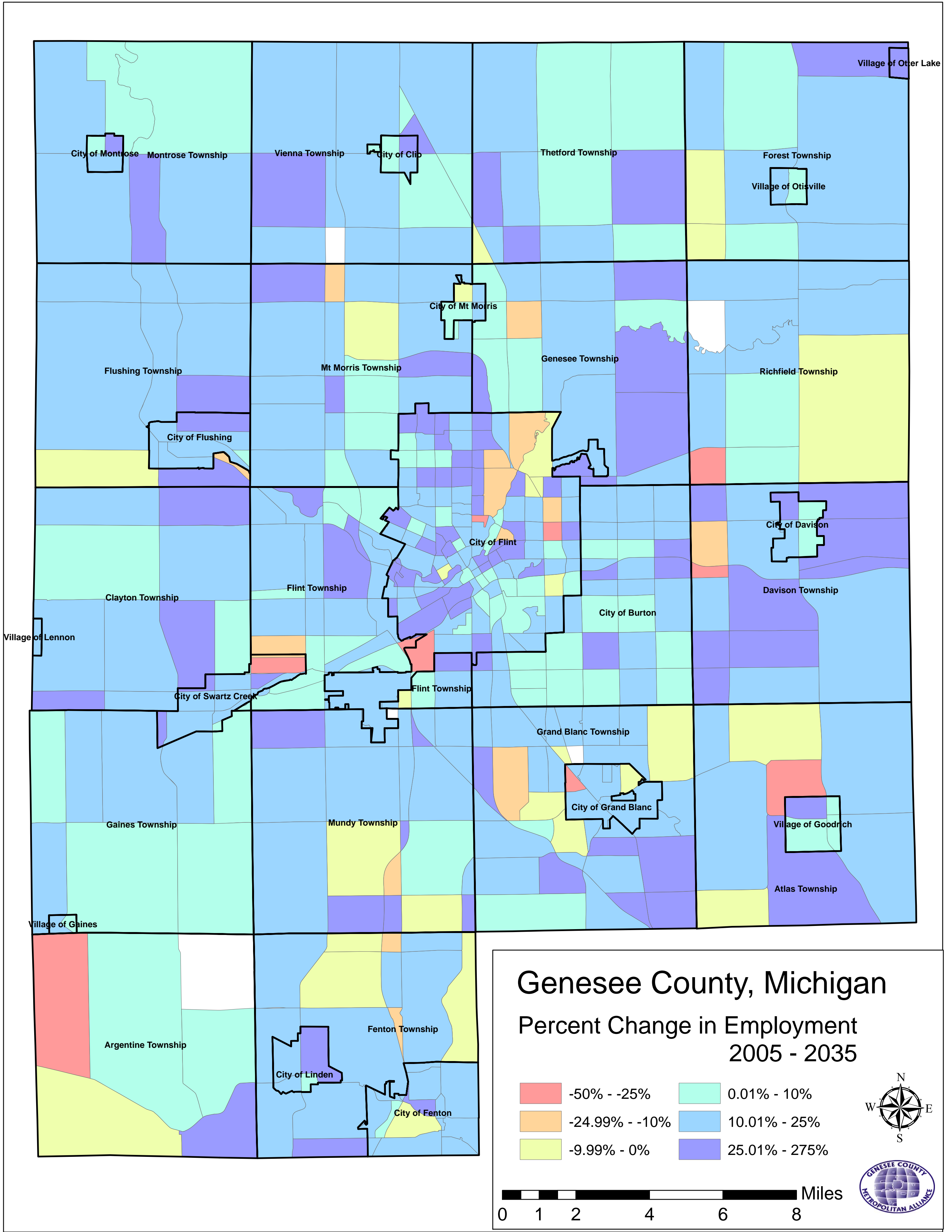


# Genesee County, Michigan 2035 Total Employment

- |  |            |  |             |
|--|------------|--|-------------|
|  | 2 - 200    |  | 1001 - 2000 |
|  | 201 - 500  |  | 2001 - 3000 |
|  | 501 - 1000 |  | 3001 - 6242 |

123 = Number of employees





City of Montrose

Montrose Township

Vienna Township

City of Clip

Thetford Township

Forest Township

Village of Otter Lake

Village of Otisville

City of Mt Morris

Flushing Township

Mt Morris Township

Genesee Township

Richfield Township

City of Flushing

Clayton Township

Flint Township

City of Flint

City of Burton

City of Davison

Davison Township

Village of Lennon

City of Swartz Creek

Flint Township

Grand Blanc Township

City of Grand Blanc

Village of Goodrich

Gaines Township

Mundy Township

Atlas Township

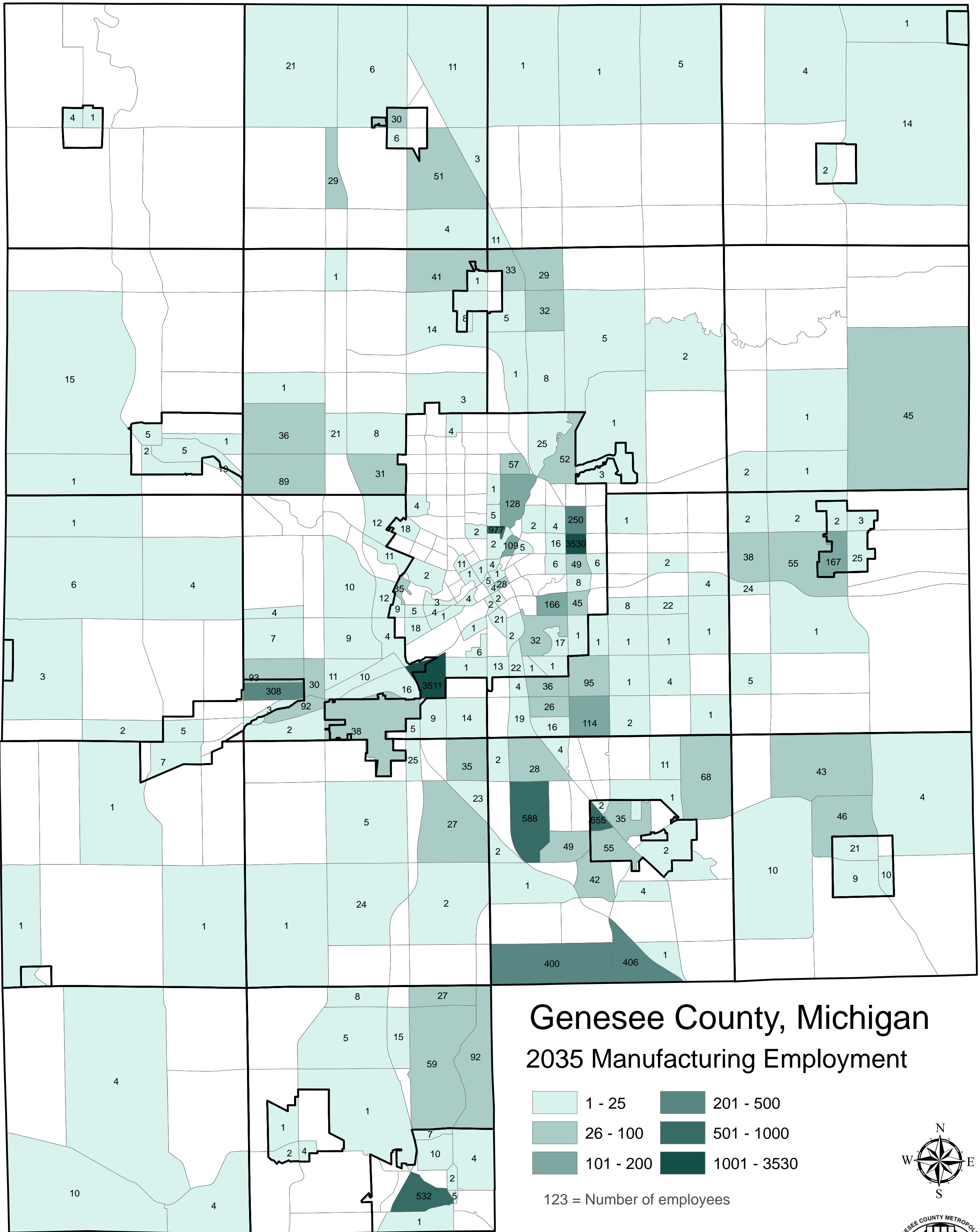
Village of Gaines

Argentine Township

City of Linden

Fenton Township

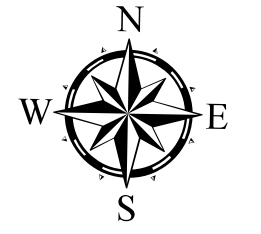
City of Fenton

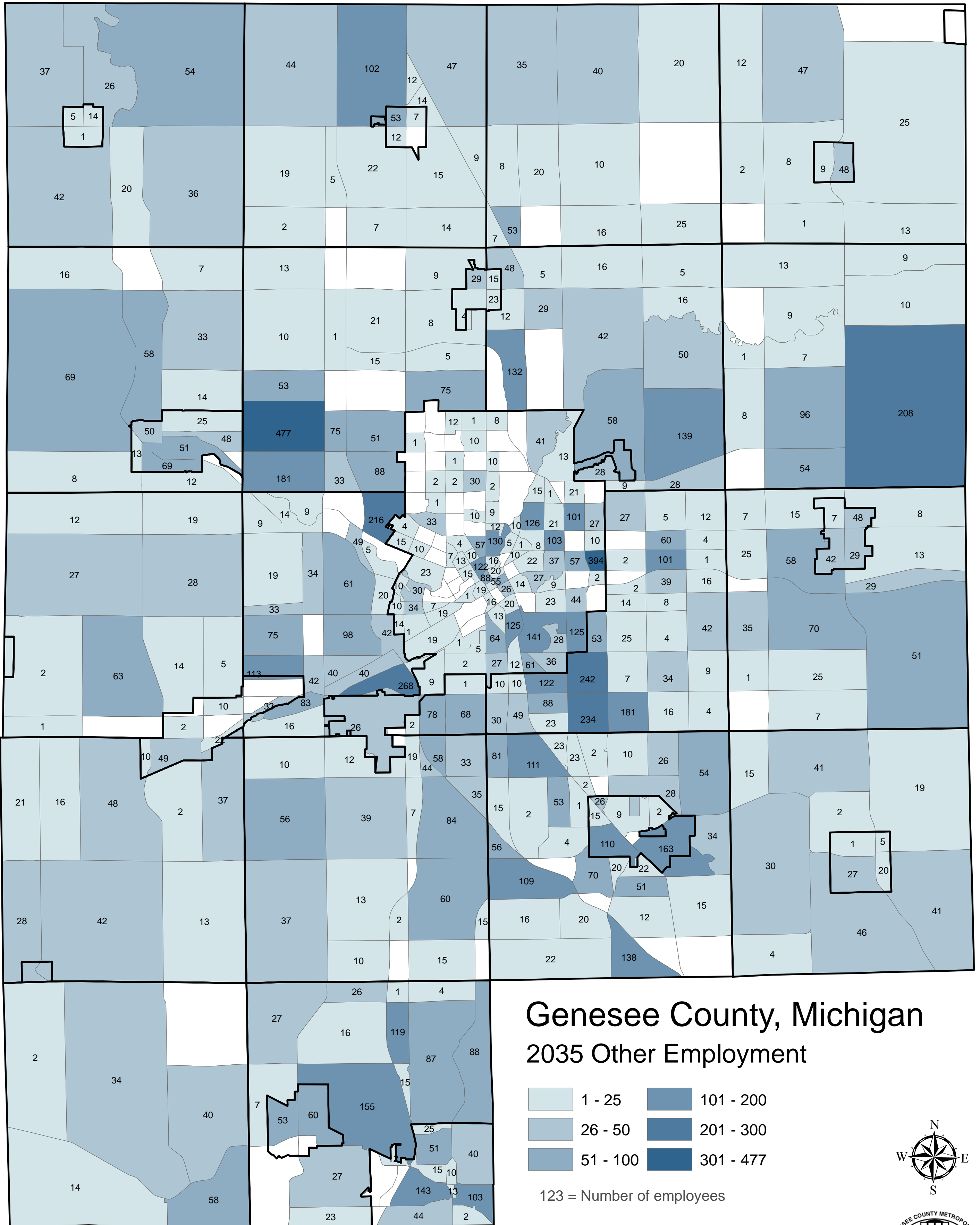


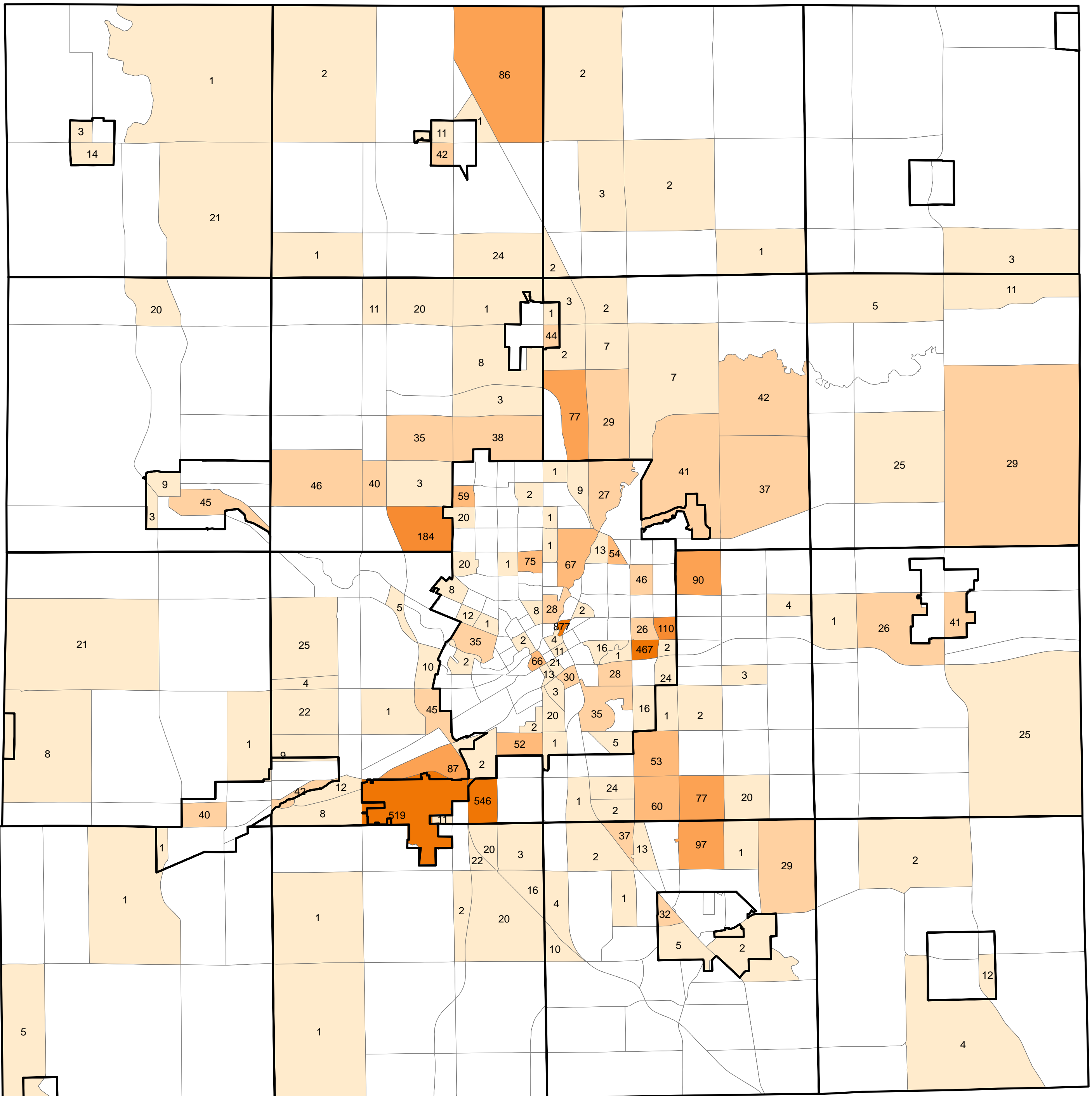
# Genesee County, Michigan 2035 Manufacturing Employment

- |  |           |  |             |
|--|-----------|--|-------------|
|  | 1 - 25    |  | 201 - 500   |
|  | 26 - 100  |  | 501 - 1000  |
|  | 101 - 200 |  | 1001 - 3530 |

123 = Number of employees

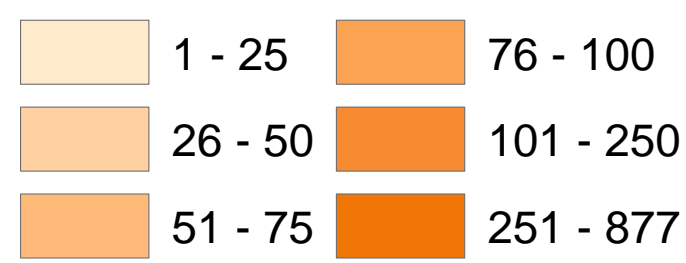




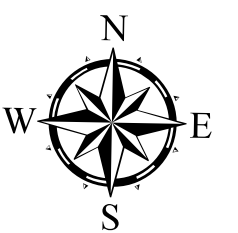


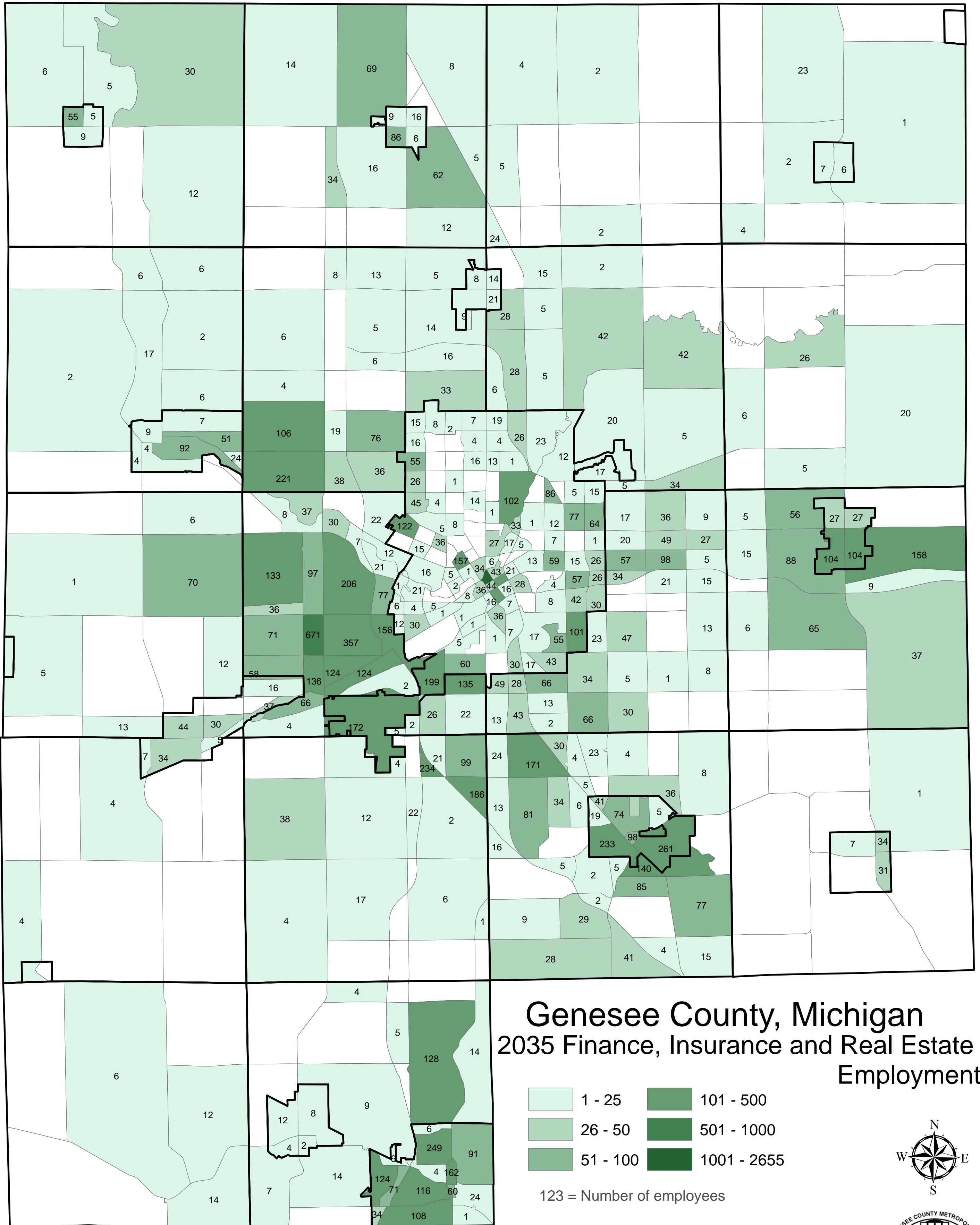
# Genesee County, Michigan

## 2035 Transportation and Public Utilities Employment

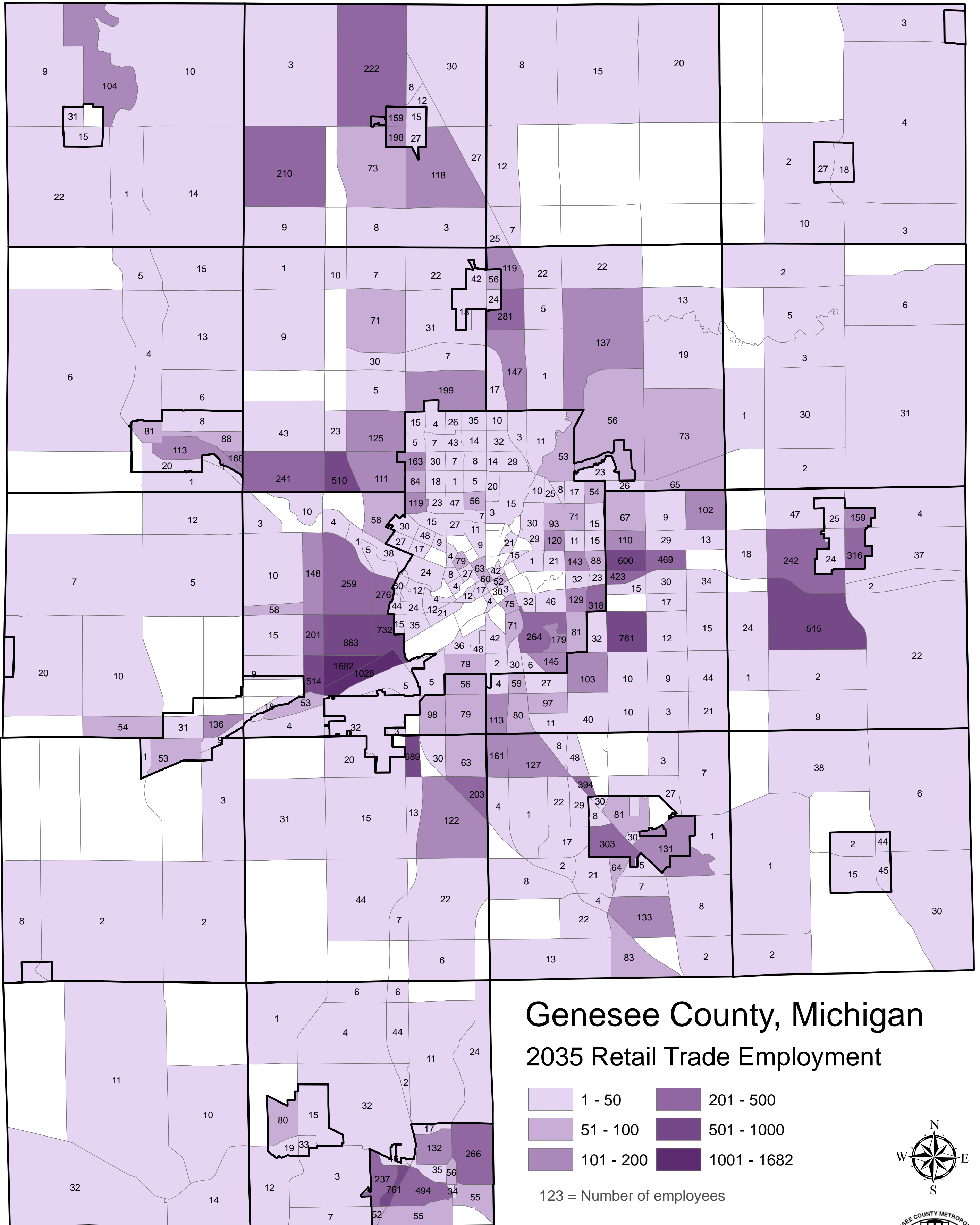


123 = Number of employees





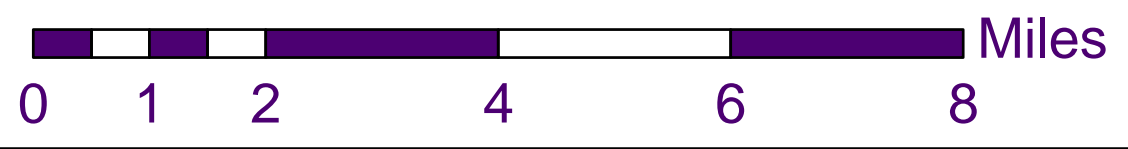
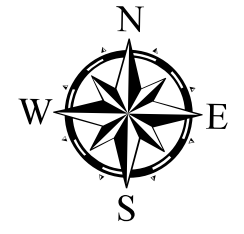


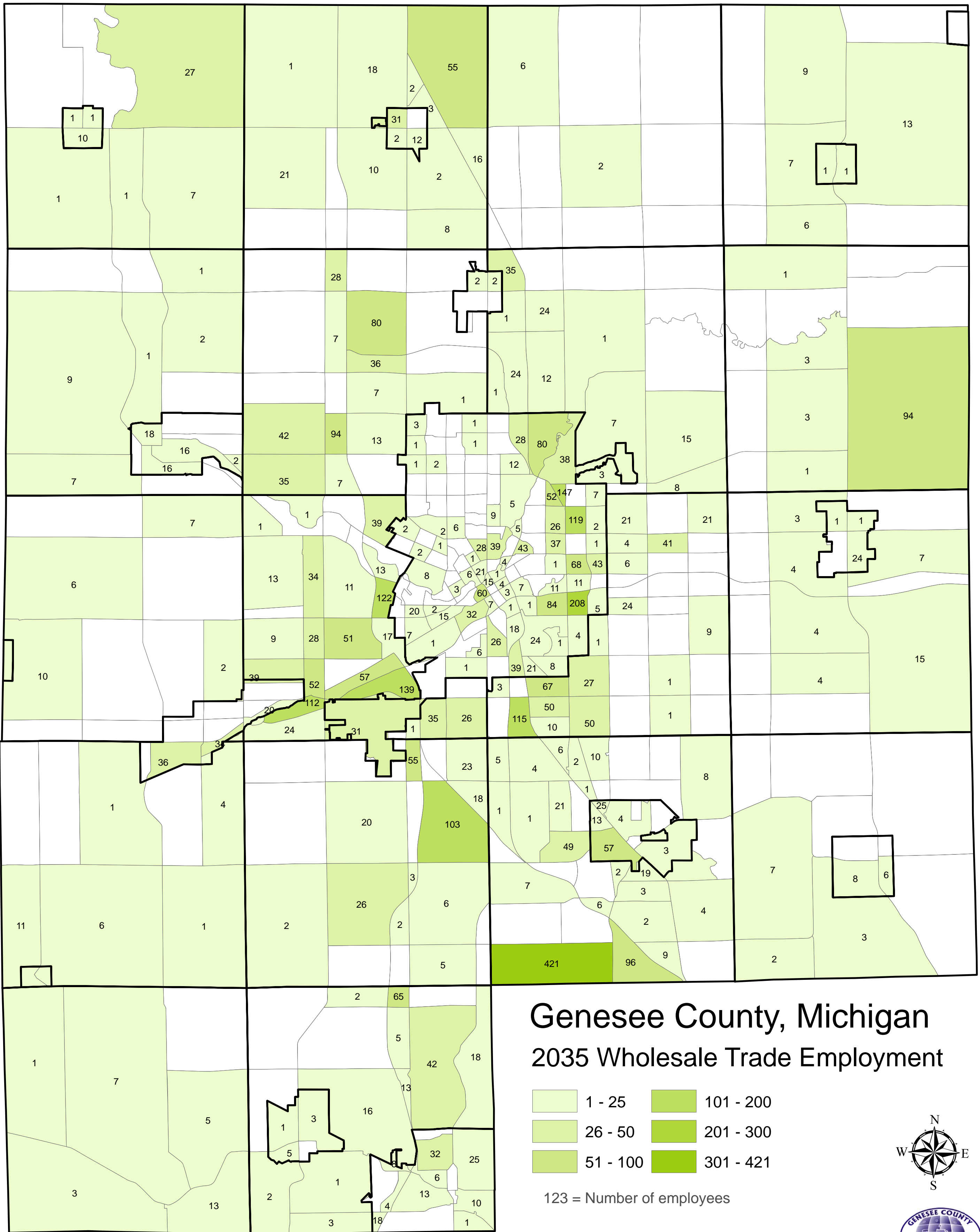


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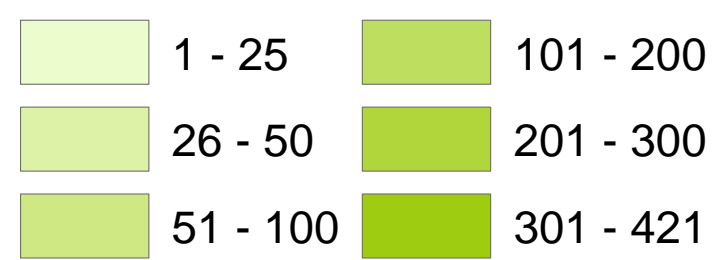
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|--|-----------|--|-------------|
|  | 1 - 50    |  | 201 - 500   |
|  | 51 - 100  |  | 501 - 1000  |
|  | 101 - 200 |  | 1001 - 1682 |

123 = Number of employees

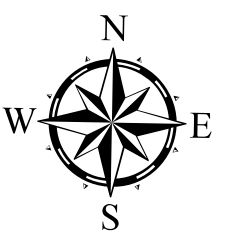


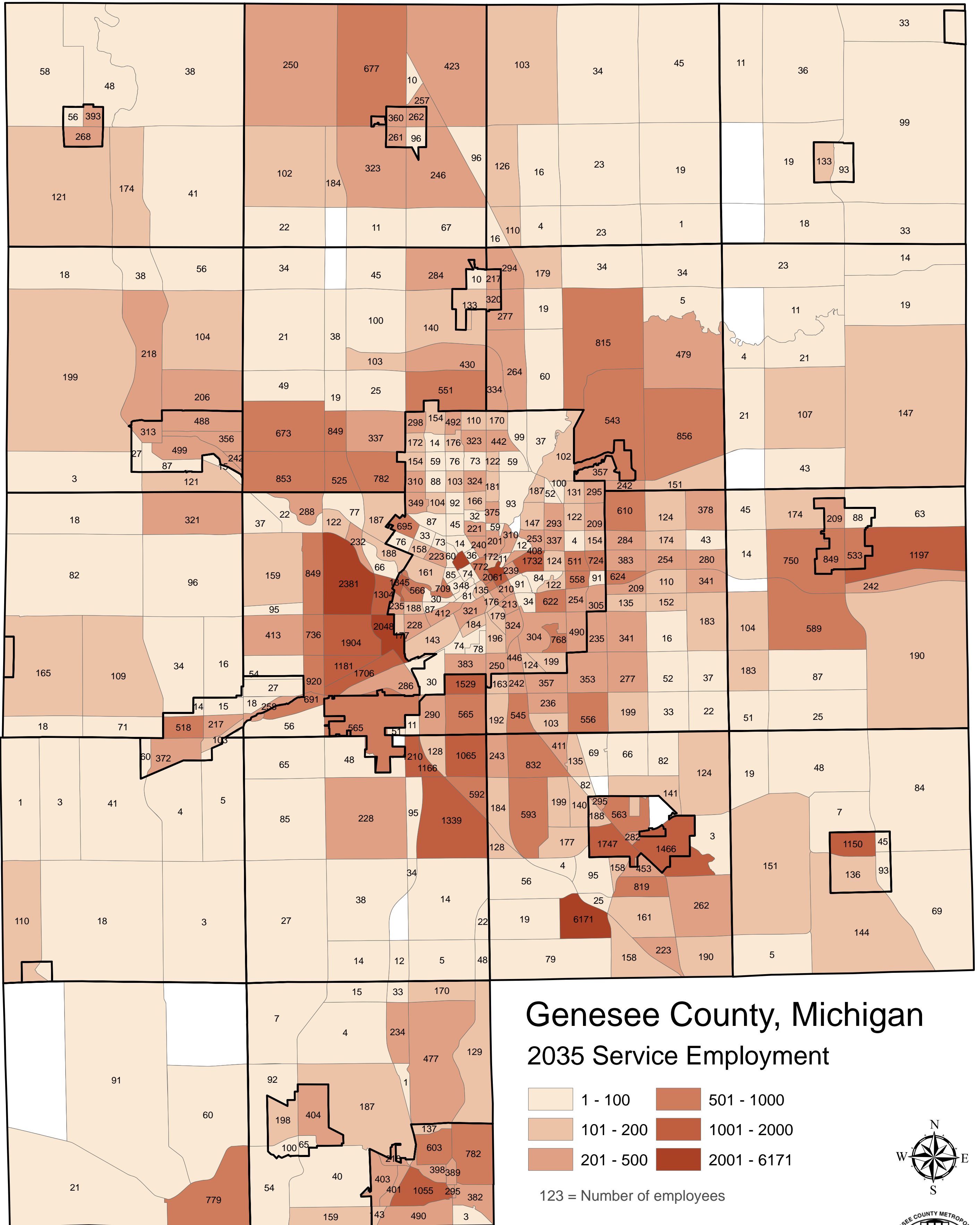


# Genesee County, Michigan 2035 Wholesale Trade Employment



123 = Number of employees

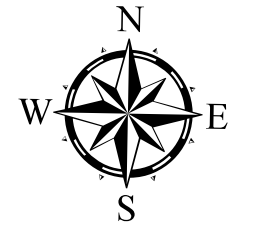
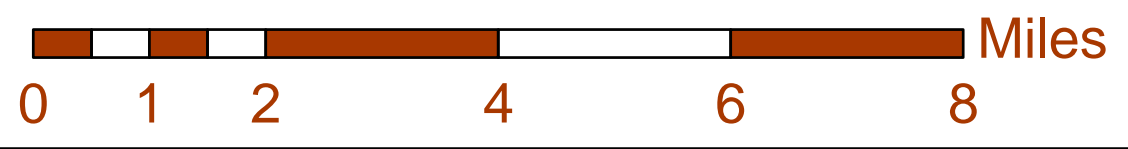


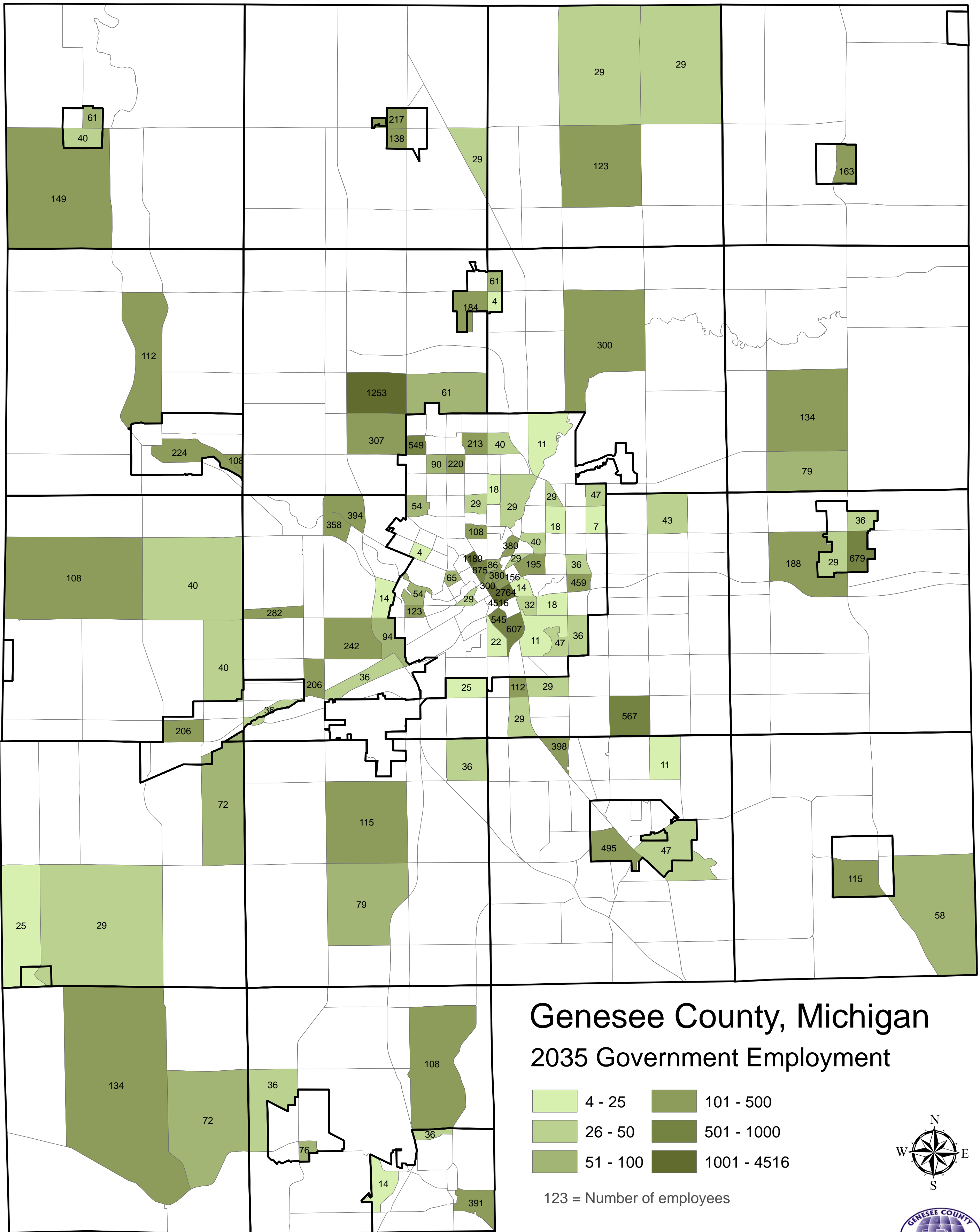


# Genesee County, Michigan 2035 Service Employment

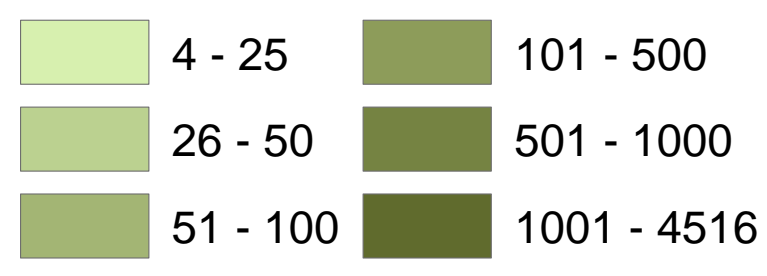
- 1 - 100
- 101 - 200
- 201 - 500
- 501 - 1000
- 1001 - 2000
- 2001 - 6171

123 = Number of employees





# Genesee County, Michigan 2035 Government Employment



123 = Number of employees





ROOM 223 – 1101 BEACH STREET

FLINT, MICHIGAN 48502-1470

TELEPHONE (810) 257-3010 FAX (810) 257-3185

## MEMORANDUM

**TO:** Members of the Genesee County Metropolitan Alliance

**FROM:** Jacob Maurer, Planner I  
Genesee County Metropolitan Planning Commission

**DATE:** October 15, 2014

**SUBJECT:** **Draft Coordinated Plan Technical Report**

The draft Coordinated Plan Technical Report was provided to the Long Range Transportation Plan Steering Committee (LRTPSC) as a draft in June of 2014, and as a final draft in July 2014. The Coordinated Technical Report was then provided to the Metropolitan Alliance in September for review and comment. No changes were made to the report.

At this time, the Technical Advisory Committee is recommending approval to the Metropolitan Alliance for the draft Coordinated Plan Technical Report.

AN EQUAL OPPORTUNITY ORGANIZATION

**Draft**

# Coordinated Public Transit- Human Services Transportation Plan



## Table of Contents

<b>Introduction</b> .....	<b>1</b>
Requirements .....	1
Definition of the Plan.....	2
<b>Target Populations in Genesee County</b> .....	<b>3</b>
Elderly Populations .....	3
Persons with Disabilities .....	5
Persons of Low Income .....	7
<b>Identification of Appropriate Stakeholders</b> .....	<b>9</b>
List of Stakeholders Invited to Participate .....	9
<b>Public Participation Efforts for the Coordinated Plan</b> .....	<b>11</b>
<b>Assessment of Available Services</b> .....	<b>13</b>
Summary of Current Services .....	13
Summary of Transportation Services Received .....	15
<b>Assessment of Transportation Needs</b> .....	<b>20</b>
Unmet Needs / Gaps in Services Narrative .....	21
<b>Strategies to Address the Unmet Needs and Gaps in Services</b> .....	<b>28</b>
<b>Priorities for Implementation</b> .....	<b>29</b>
<b>Next Steps</b> .....	<b>30</b>

## Table of Figures

Figure 1: Population 65 and Over .....	4
Figure 2: Disabled Population .....	6
Figure 3: Population below Poverty .....	8

## List of Tables

Table 1: Transportation Service Inventories Received .....	19
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### **Appendix A**

Workshop Mail-Out Packet

### **Appendix B**

RSVP Postcard

### **Appendix C**

Workshop Sign-in Sheet, Handouts, and Evaluations

### **Appendix D**

Public Participation Documentation



## **Introduction**

The Genesee County Metropolitan Alliance (GCMA) is the Metropolitan Planning Organization (MPO) for Genesee County. An MPO is the forum for cooperative transportation decision making for a metropolitan planning area, and members of GCMA include representatives from local units of government and local citizens. They meet monthly in the Genesee County Administration Building in downtown Flint. GCMA cooperates with the State of Michigan, transit operators, local units of government, and other key transportation entities to carry out the planning process. Staffing for GCMA is provided by the Genesee County Metropolitan Planning Commission (GCMPC). GCMPC administers the programs that distribute federal funding to local transportation projects.

In addition to the Coordinated Plan process that produced this document, GCMPC also participates in community planning efforts by attending the Local Advisory Council (LAC) meetings on a regular basis, by working with local social service agencies, and by funding related programs, such as Emergency Shelter Grants and Supportive Housing Programs. These programs assist emergency shelters, transitional housing facilities, and agencies that provide mediation and supportive service for the homeless or near-homeless population in Genesee County. GCMPC administers the Community Development Block Grant Program (CDBG) as well. Its primary objective is to develop viable urban communities by providing decent housing, a suitable living environment, and expanded economic opportunities for people of low and moderate income.

GCMPC staff, afterwards referred to just as "staff", prepared this Coordinated Plan on behalf of the Mass Transportation Authority (MTA) in Genesee County. The MTA is the designated recipient of the State's Specialized Services Program funds and is the supporting/coordinating agency for a number of recipients of the Section 5310 and Section 5317 Programs.

## **Requirements**

### MAP-21 Surface Transportation Act

The federal surface transportation legislation, Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21), was signed into law in July of 2012. This legislation replaces the SAFETEA-LU Act of 2005. The new legislation continues to hold the requirement that all funded projects be derived from a locally developed, coordinated public transit-human services

transportation plan. Furthermore, the coordinated plan shall be developed through a process that includes representatives of public, private, non-profit and human services transportation providers and participation by members of the public.

Under MAP-21, Section 5316: *Job Access and Reverse Commute* and Section 5317: *New Freedom* was repealed. Activities eligible under both sections are incorporated elsewhere. The Job Access and Reverse Commute (JARC) grant is moved to the Federal Transit Authority's urban and rural formula programs. The New Freedom grant program merges with Section 5310: *Enhanced Mobility of Seniors and Individuals with Disabilities*.

### **Definition of the Plan**

The plan is defined as a locally developed, coordinated public transit-human services transportation plan that identifies the transportation needs of individuals with disabilities, elderly individuals, and individuals with low incomes, provides strategies for meeting those local needs, and prioritizes transportation services for funding and implementation.

### Required Elements of the Plan

There are five required elements for the Coordinated Plan. The elements are as follows, along with the page numbers where they can be found in this document:

1. Identify the stakeholders in the process. (See page 9.)
2. Provide an assessment of available services that identifies current providers (public, private and non-profit). (See page 13.)
3. Provide an assessment of transportation needs for individuals with disabilities, elderly individuals, and individuals with low incomes. (See page 20.)
4. Provide strategies and/or activities to address the identified gaps between current services and needs, as well as opportunities to achieve efficiencies in service delivery. (See page 27.)
5. Provide priorities for implementation based on resources, time, and feasibility for implementing specific strategies and activities identified. (See page 29.)

## **Target Populations in Genesee County**

The Coordinated Plan focuses on three populations in Genesee County: the elderly, persons with disabilities and persons of low income. Individuals in these three groups tend to have a greater need for public transit services, or private transit services. For this reason, a description of these populations in Genesee County is included here.

### **Elderly Populations**

The population of Genesee County in 2010 was 425,790. Of this number, approximately 58,189 persons were age 65 and older. This is 13.7% of the County population, and is almost exactly the same as the state average of 13.8%. Of these 58,189 elderly persons, 24,664 (42%) were male and 33,525 (58%) were female. Currently in Genesee County, there are fifteen senior citizen centers spread throughout the county. Most of these provide some limited form of transportation for the seniors they serve. See Figure 1 for a map showing the locations of the elderly population in Genesee County.

Elderly passengers may experience limitations that affect their use of transit services. Although perhaps physically capable of riding a Fixed Route bus, their general frailty and feelings of vulnerability may prevent them from doing so. If elderly passengers have recently stopped driving due to declining abilities, they will be lacking in transit experience. Their fear of the unknown and reluctance to try something new can be overcome through positive transit experiences. Travel training for new passengers can teach them what they need to know about the transit system. This knowledge will give them the freedom to get around, while providing a feeling of comfort and security, leading to an overall positive experience.

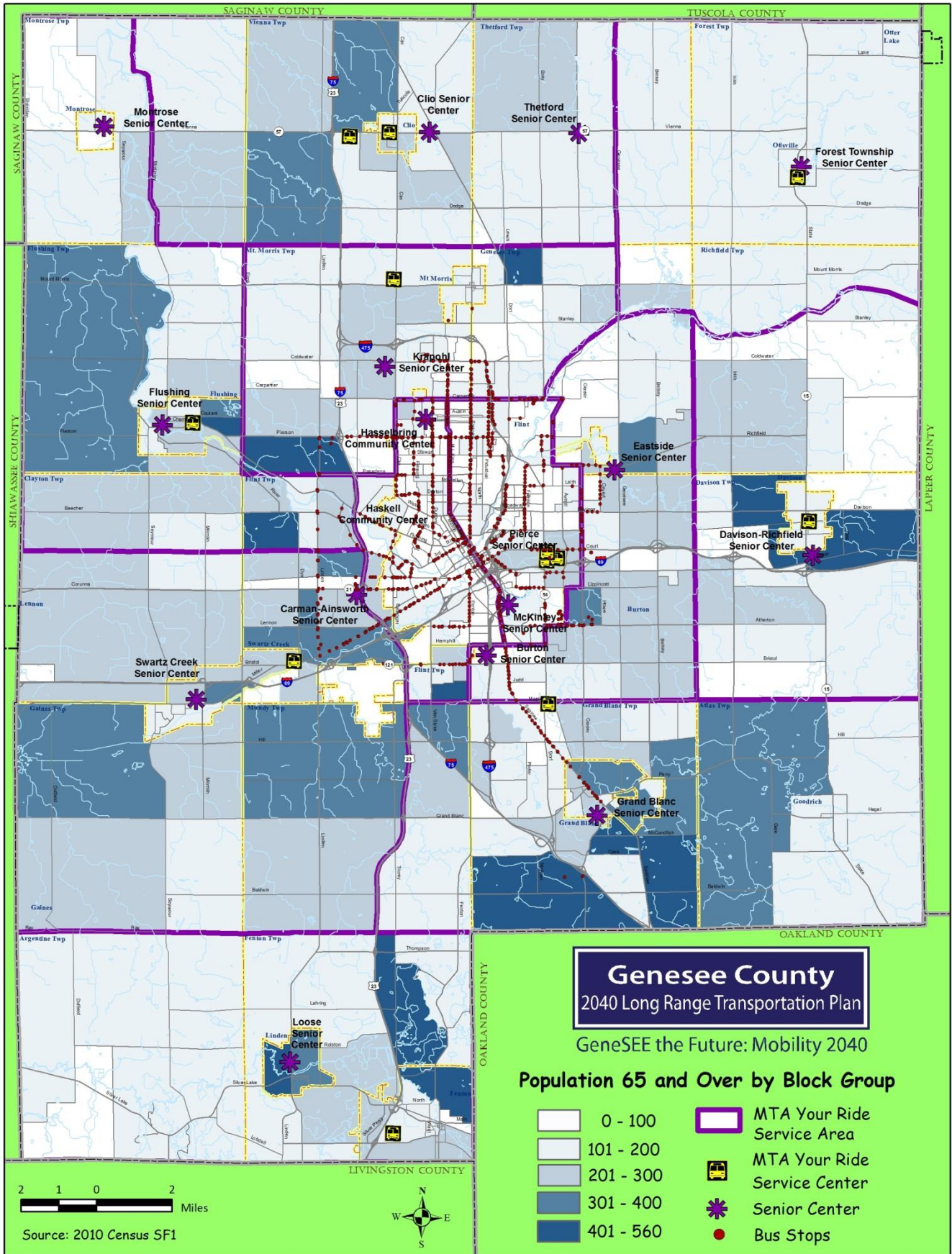


Figure 1: Population 65 and Over

## **Persons with Disabilities**

The United States Census Bureau defines a disability as a significant limitation in sensory, physical, or mental functions, the ability to provide self-care, or the ability to function outside of one's home. Many individuals with disabilities rely on public transportation as their sole means of transportation. According to the 2010 U.S. Census, 39% of Genesee County's population aged 65 and over reported having a disability, which is higher than the State of Michigan's figures. Persons with disabilities have used MTA services in increasing numbers, and comprise nearly fifty percent (50%) of all paratransit passengers. See Figure 2 for a map showing the locations of the disabled population in Genesee County.

Persons with disabilities in Genesee County span a broad range of physical and mental ability. Many of these individuals are capable, sometimes with guidance, of using a Fixed Route service. Passengers with disabilities who are not able to ride a Fixed Route bus have access to the Curb-to-Curb service to meet their transportation needs. Some of them may also need assistance from the curb to their door. Limitations with mobility affect the amount of time it takes some passengers to get to the vehicle, and on and off the vehicle, affecting trip schedules. There are also time constraints on how long certain passengers can tolerate riding on a vehicle. Both Fixed Route and Curb-to-Curb drivers need and receive continued training to help them understand and address the capabilities and limitations of passengers with disabilities. The Disability Network and the Visually Impaired Center provide training to the MTA vehicle operators, to help ensure that all passengers' needs are met.

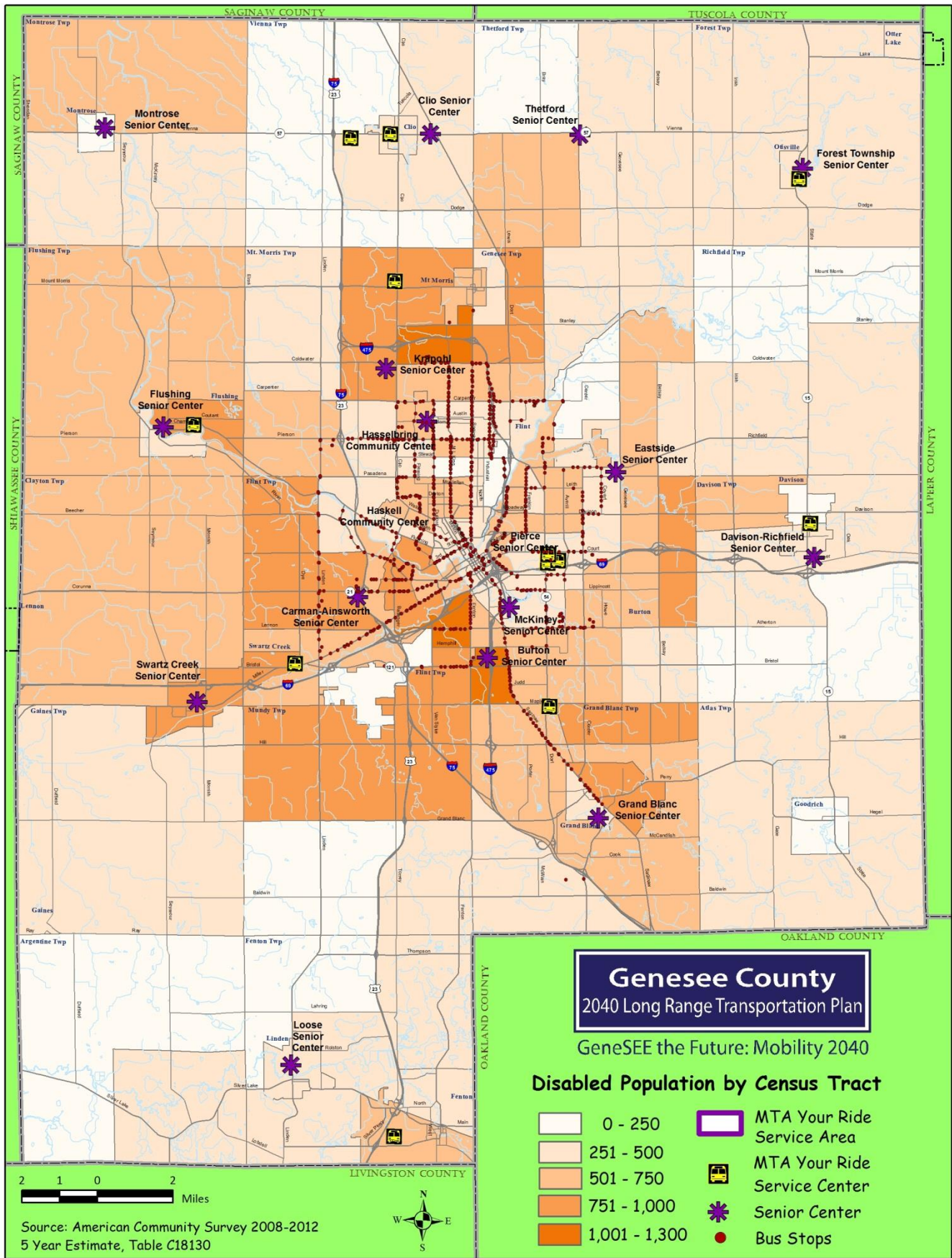


Figure 2: Disabled Population

## **Persons of Low Income**

Low income is defined as income at or below 60% of Area Median Income, as adjusted for household size. The median family income in Genesee County was estimated at \$48,979 according to the 2010 American Community Survey. This is 13% less than the State of Michigan's median family income of \$56,101. Furthermore, approximately 21% of all people in Genesee County had income in the past 12 months below the poverty line.

Persons of low income affect multiple age groups. Approximately 30% of related children under 18 years old were below the poverty level, compared with about 6% of people aged 65 years and over. Of all families, approximately 17% had incomes below the poverty level, as did approximately 39% of families with a female householder and no husband present.

The individuals struggling with low incomes in Genesee County face many challenges. They may be separated from good jobs due to lack of reliable transportation, or transportation at the times they need it, which may be different from what is currently available. There is also the challenge of affording the transportation which is available. A low income can force many people to make decisions between purchasing food, medicine, clothing, shelter, or transportation.

According to the 2010 American Community Survey 1-Year Estimates, there were approximately 40,460 unemployed individuals in Genesee County's civilian labor force of 192,273 persons. This is approximately 12.2% unemployment for the population 16 years and over. For this same period, there were 1,990 persons who took public transportation to commute to work. This is approximately 1.3% of workers 16 years and over commuting to work. See Figure 3 for a map showing the locations of the low-income population in Genesee County.

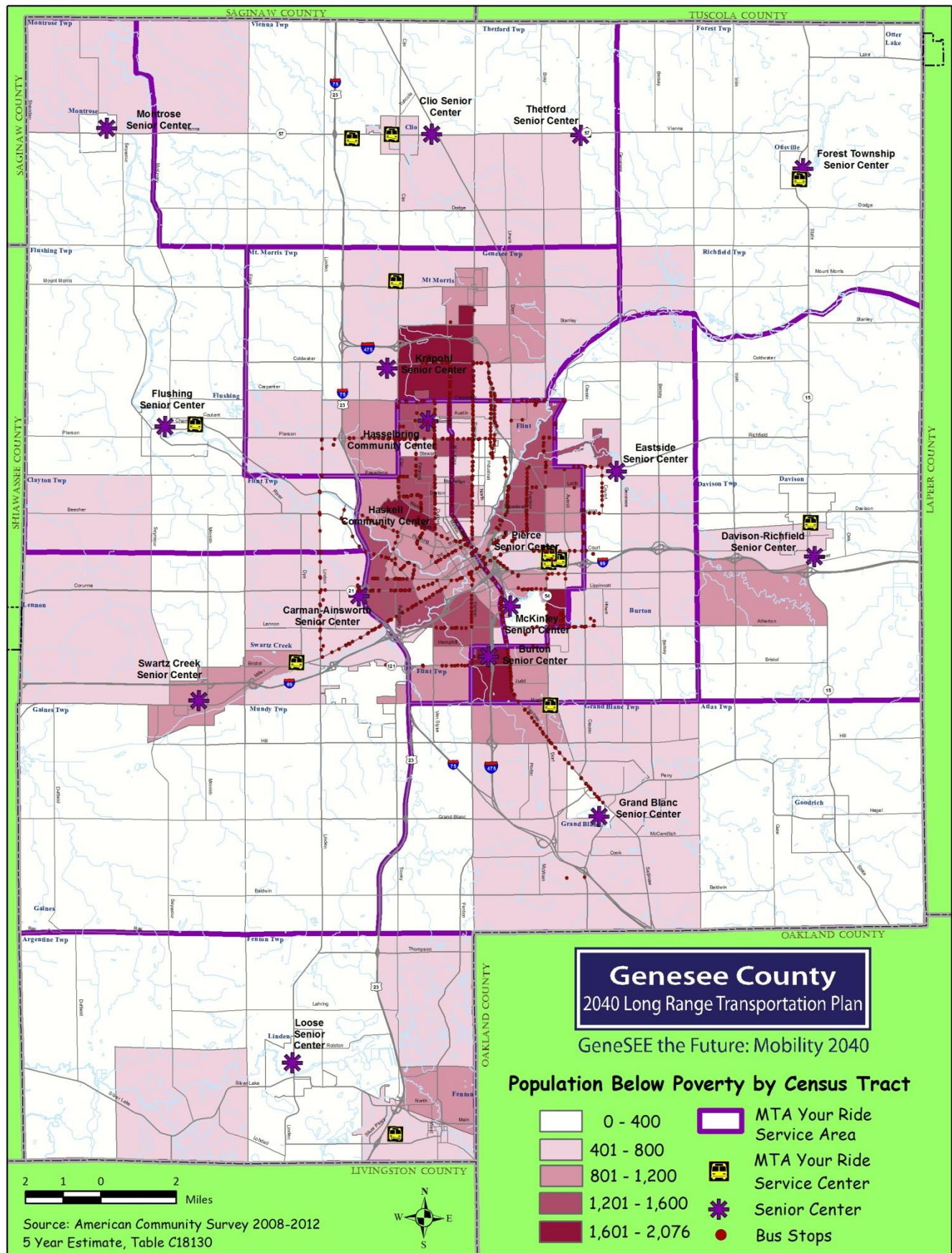


Figure 3: Population below Poverty



## Identification of Appropriate Stakeholders

Public participation efforts for the plan began with a workshop, which staff planned in order to obtain vital information from local stakeholders concerning the transportation needs of the three identified groups. This information would serve as the backbone of the Genesee County Coordinated Public Transit-Human Services Transportation Plan. First of all, staff had to decide who to invite to the workshop, and developed a mailing list of over 150 stakeholders from then public transit and human services fields. A great deal of time was spent in identifying which agencies should participate in the workshop. Staff began with the LAC list from MTA. The LACs include transit users and help keep the MTA in tune with its patrons, providing important information from which customer service determinations can be made. This basic list was then expanded by adding the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Michigan Department of Transportation (MDOT), and local units of government. Next, staff went through existing GCMPC mailing lists, and picked out appropriate transit and human service agencies for the list. Several staff discussions on the process of identifying agencies helped to round out the list. Also, several stakeholders suggested additional agencies for the list. The stakeholders include many agencies that work with the low-income population, the disabled and the elderly. The complete list of stakeholder agencies appears below and in Appendix D.

### List of Stakeholders Invited to Participate

Action Management Corporation	City of Fenton
American Arab Heritage Council	City of Flint
Amtrak-Government/Public Affairs	City of Flushing
Ann Arbor Area Trans Authority	City of Grand Blanc
Argentine Township	City of Linden
Atlas Township	City of Montrose
Baker College of Flint	City of Mt. Morris
Best Cab Company	City of Swartz Creek
Brennan Community Center, Attn: Shirley Milton	Clayton Township
Brennan Senior Center	Clio Senior Center
Bureau of Services for Blind Persons	Crim Fitness Foundation
Burton Senior Center	Davison Township
Capital Area Trans Authority	Davison-Richfield Senior Center
Carman-Ainsworth Senior Center	Diplomat Pharmacy
Carriage Town Ministries	Disabled American Veterans Chap. 3
Catholic Charities Flint	Eastside Senior Citizens Association
Catholic Outreach	Eastside Senior Citizens Center
Charles Stewart Mott Foundation	FACED
City of Burton	Family Service Agency
City of Clio	Federal Highway Administration - Michigan Division
City of Davison	Federal Transit Administration

Fenton Township  
 Flint & Genesee Chamber of Commerce  
 Flint Community Schools  
 Flint Dialysis of Davita  
 Flint Downtown Development Authority  
 Flint Genesee Job Corps  
 Flint Housing Commission  
 Flint Human Relations Commission  
 Flint NIPP  
 Flint Parks and Recreation  
 Flint Township  
 Flushing Area Senior Center  
 Flushing Township  
 Forest Township  
 Forest Township Senior Center  
 FTA  
 Gaines Township  
 Genesee Area Skill Center - Transportation  
 Services  
 Genesee County Association for Retarded  
 Citizens  
 Genesee County Community Action  
 Resource Department  
 Genesee County Community Mental Health  
 Genesee County Department of Veterans  
 Services  
 Genesee County Emergency Mgmt. &  
 Homeland Security  
 Genesee County Family Independence  
 Agency  
 Genesee County Health Department  
 Genesee County Office of Senior Services  
 Genesee Intermediate School District  
 Genesee Township  
 Genesys Health System  
 Goodwill Industries  
 Grand Blanc Senior Citizens Center  
 Grand Blanc Township  
 Great Lakes Crossing  
 Greater Flint Council of Churches  
 Greater Lapeer Trans Authority  
 Haskell Community Center  
 Hasselbring Senior Center  
 Heart of Senior Citizens Services  
 Hey, Taxi  
 Hurley Medical Center  
 Indian Trails, Inc.  
 International Taxi & Shuttle  
 Jewish Community Services - Federation &  
 Community  
 Kettering University  
 Kettering University - University Ave Corridor  
 Coalition  
 Krapohl Senior Center  
 Legal Services of Eastern Michigan

Livingston Essential Trans Service  
 Lockwood Management  
 Loose Senior Center  
 Love, Inc.  
 Mass Transportation Authority  
 McLaren Regional Medical Center  
 MCSI  
 MDOT - Office of Passenger Trans  
 MDOT - Office of Passenger Trans  
 Members of SAGE  
 Metro Housing Partnership  
 Michigan Department of Human Services  
 Michigan Department of Transportation  
 Michigan State Housing Dev Authority  
 Michigan Works Career Alliance  
 MichiVan  
 Mission of Peace  
 Montrose Senior Center  
 Montrose Township  
 Mott Children's Health Center  
 Mott Community College  
 Mt. Morris Township  
 MTA Elderly & Disabled LAC  
 Mundy Township  
 NAACP  
 Overflow Resources Transportation  
 Priority Children  
 REACH  
 Resource Genesee  
 Richfield Township  
 Saginaw Transit Authority  
 Salem Housing Task Force  
 Salvation Army  
 SCSAC  
 Shelter of Flint  
 Shiawassee Area Trans Agency  
 Stat EMS Wheelchair Services  
 Suburban Mobility Authority  
 Swartz Creek Senior Center  
 T R Harris Resource Center  
 The Disability Network  
 Thetford Senior Center  
 Thetford Township  
 U of M Flint - Chancellor Office  
 United Way of Genesee County  
 Valley Area Agency on Aging  
 Vienna Township  
 Village of Gaines  
 Village of Goodrich  
 Village of Lennon  
 Village of Otisville  
 Village of Otter Lake  
 Visually Impaired Center  
 YWCA Greater Flint

## **Public Participation Efforts for the Coordinated Plan**

A Coordinated Plan Workshop mail-out packet was put together, consisting of an invitation letter including a Self-Assessment online survey, Transportation Services Inventory form, and a postage-paid envelope. This packet was mailed to each entity on the Coordinated Plan mailing list five weeks in advance. (See a copy of the workshop mail-out packet in Appendix A.) The stakeholders were asked to fill out the survey and inventory and return them to the GCMPC offices before the workshop. Prior to the workshop, staff received 24 Transportation Service Inventories and 10 Self-Assessment surveys. Staff compiled the information from the inventories and the surveys, and presented the results as a hand-out at the Workshop. (See Appendix C for the summaries of the surveys and inventories.)

Approximately 20 attendees, plus staff, participated in the Genesee County Coordinated Public Transit-Human Services Transportation Plan Workshop, held on May 15, 2014 at the MTA Administration Building in Flint, Michigan. The workshop started with introductions as each attendee stated which agency they were representing. On the workshop sign-in sheet, 17 attendees were listed; however, 2 did not show up, 5 attended without pre-registering for a total of 20 attendees. Staff explained why a Coordinated Plan was needed, and talked about the major goals of the plan. A review of the results of the surveys and inventories was also discussed. After this point in the workshop, the attendees were broken up into three groups, and given their first task of the day.

Each group had to re-evaluate the current list that identified unmet needs and gaps in services regarding transportation for the elderly, disabled, and persons of low income. This task had a time limit of 20 minutes to discuss and report out. Staff provided a hand-out with the entire list of unmet needs originally identified in 2007. (See Appendix C for copies of the workshop hand-outs.) The groups were provided with large notepaper and markers to transcribe their revisions. Staff kept the groups on task by giving them a warning when the 20 minutes was almost up. The three groups re-evaluated and developed new lists of identified unmet needs and gaps in services for Genesee County. The lists begin on page 20.

The second workshop task was to then re-identify potential strategies to meet those unmet needs and gaps in services. Staff again provided a hand-out with the strategies originally identified during the 2007 workshop. The groups were given 25 minutes to complete the task. The participants

developed lists of potential strategies to address the identified unmet needs and gaps in services. These lists begin on page 27.

While the participants took a 10 minute break, staff took the lists of strategies from the three groups and consolidated them into one master list in front of the room. After the break, groups got back together and were directed to view the master list of strategies to begin the third workshop task of the morning. Their task was to prioritize the new list of identified strategies. Participants did so by using dot stickers to vote for the top 6 strategies their group felt were most important. The groups were given 30 minutes to discuss, assign priorities, and defend their choices in front of the audience. Rankings were determined by the number of group votes and dependent on the original order. For example if strategy #3 received more stickers than strategy #2, the third strategy has more ranking. The final prioritized list begins on page 29.

Following the final task, staff informed attendees that they would receive the initial results (*of the identified unmet needs, strategies to address those unmet needs, and their final prioritized strategies*) in approximately one week from the workshop. Attendees were also informed where the current Genesee County Coordinated Plan could be found and when approximately the new plan will be ready for review.

## **Assessment of Available Services**

Staff used the Transportation Services Inventories received from the stakeholders, and information from MTA, to develop a table (See Table 1) and a summary of available services in Genesee County. The narrative provides details of the services mentioned in the table.

### **Summary of Current Services**

The MTA, as the agency authorized to provide public transportation services in Flint and Genesee County, operates thirteen primary Fixed Routes seven days a week, except national holidays. Monday through Friday, service operates from 6:30 a.m. to 6:30 p.m., on 1/2-hour headways, and from 6:30 p.m. to 10:00 p.m. on one (1) hour headways. On Saturdays, the 13 primary fixed routes operate from 6:30 a.m. to 12:00 a.m., on one (1) hour headways. Sunday hours of service are 9:30 a.m. to 7:00 p.m., with buses operating on one (1) hour headways. The primary Fixed Routes are augmented with Primary Peak Hour Service to meet customer demand and expectations. These routes provide Peak Service, mornings and afternoons and provide service to the general public. The MTA may adjust hours of service as needed.

The MTA also operates Curb-to-Curb “Your Ride” service throughout Genesee County, seven (7) days a week. The service hours of operation are the same as Fixed Route: 6:30 a.m. to 10:00 p.m. Monday through Saturday, and 9:30 a.m. to 7:00 p.m. on Sundays. This countywide service operates through eleven (11) local service centers, three of which are located at the MTA Operations Facility on Dort Highway. Vehicles circulate within the eleven service areas, and passengers can travel outside of their service area by taking a shuttle. In areas where Curb-to-Curb service overlaps with the Fixed Route service, eligibility criteria have been established for the Curb-to-Curb service, to ensure that passengers who need this personalized level of service the most have access to it. Passengers in the East and West Flint service area must have a disability, be at least 65 years of age, or be a small child traveling alone in order to be eligible for Curb-to-Curb service. Unrestricted Curb-to-Curb service is available to all customers outside of the Fixed Route service area. Your Ride Service Centers are located throughout the county, in Burton, Mt. Morris, East Flint, West Flint, Davison, Fenton, Flushing, Grand Blanc, Swartz Creek, Clio, and Otisville. MTA also provides regional transportation services. These services interconnect with the services provided in adjoining counties by other public transit agencies such as Ann Arbor Transit Authority (AATA), Saginaw Transit Authority (STARS), Greater Lapeer

Transit Authority (GLTA), Suburban Mobility Authority for Regional Transportation (SMART), Livingston Essential Transportation Services (LETS), and Shiawassee Area Transportation Agency. This provides an economical alternative for passengers who travel between urban areas for various reasons. The Work-Related LAC focuses on addressing the concerns of access-to-work and welfare-to-work programs. Reliable transportation is a major impediment that needs to be overcome in order to transition persons off of welfare and into the regular workforce.

Many of the local senior centers also provide transportation, but these services tend to be limited. Some will only transport their seniors to a certain geographic area, and most have restrictions on the days and times that service is available. Some are unable to offer transportation at all. Many local agencies and faith-based organizations also offer limited transportation services, but usually only to their clients who are traveling to limited geographic areas.

There are several private transportation services available at any time of the day or night, but their costs may be prohibitive to low-income individuals. They also may not be equipped to handle persons with disabilities. The following tables are the results of 24 transportation service inventories received prior to the Coordinated Plan Workshop held on May 15, 2014.

## Summary of Transportation Services Received

Agency	Eligibility Restrictions	Service Area	Vehicles	Scheduling	Fares
Brennan Senior Center	Age 65+; and persons with disability or on Medicare	Genesee County	Uses MTA Your Ride	Demand Response; Monday-Sunday	\$2.25 each way
Brennan Senior Community Center	n/a	Lapeer Rd. to the north, Lippincott Blvd. to the south, Center Rd. to the east, & S. Saginaw St. to the West	Uses MTA Your Ride	Demand Response; Monday-Friday, 8:00 a.m. - 5:00 p.m. & holiday: n/a	Low fare or free bus pass
Burton Senior Center	Age 60+; residing in the City of Burton or within 5 miles of Center	Living in the City of Burton, or within 5 miles of the Center	Shuttle: 8 passenger with lift and one tie down; Van: 12 passenger without lift	Demand Response; Mon., Tues., Thurs., & Fri. 8:00 a.m. to 4:30 p.m. & holiday: n/a	\$1.00 donation
Carman-Ainsworth Senior Center	Age 60+	N-Pierson road, S-Hill road, E-Elms, W-Dort Hwy	16 passenger bus - no lift, wheelchair with 8 people	Demand Response; Monday-Friday, 8:00 a.m. - 3:00 p.m.	\$2.00 each way
Davison Area Senior Center	60+ and Genesee County resident	4 mile radius of Davison Senior Center	15 passenger van, non-handicap accessible	Demand Response; Monday-Friday, 9:00 a.m. - 4:00 p.m.; 24 hour notice	\$5.00 round trip within 4 miles
Eastside Senior Citizens Association	Senior Citizens who are 60+; who are in designated service area	North to Mt. Morris Road, East to Irish Road, South to Lippincott, and West to Court St.	2005 Ford Conversion Vehicle; 12 passenger van with lift	Demand Response; Monday-Friday, 8:00 a.m. - 4:00 p.m.	\$3.00 each way

Agency	Eligibility Restrictions	Service Area	Vehicles	Scheduling	Fares
Family Service Agency of Mid-Michigan / Foster Grandparent Program	Foster Grandparents; age 55+ ; Income 200% of poverty or less	Genesee County	One 15-passenger van	Fixed Route; Monday-Friday, 7:00 a.m. - 4:00 p.m.	Free to Client
Flushing Area Senior Center	Seniors age 50+ within Flushing School District	Flushing School District (unless pre- scheduled)	One 14-passenger van- no lift or ramp	Fixed Route; Monday-Friday, 8:30 a.m. - 2:00 p.m. and holiday: n/a	Suggested \$3.00 donation
Flushing Township	Seniors	Flushing Township, Clayton Township, & Flushing City	2 vehicles (one bus and one van)	Fixed Route; Monday-Friday, and holiday: n/a	Free to Client
Genesys Health System	PACE (program for all inclusive care for the elderly) - Spring 2015	Genesee County	TBD	Demand Response	TBD
Greater Lapeer Transportation Authority	Available to all residents	City of Lapeer, Townships of Deerfield, Elba, Oregon, Mayfield, & Lapeer	12 vehicles (seats 14); 15 vehicles (seats 22-26)	Demand Response; Monday-Friday, 6:00 a.m. - 8:00 p.m. and Saturdays 9:00 a.m. - 3:00 p.m.; and major holiday: n/a	\$1.50: Disabled & 60+; \$2.00: Students 5-18; \$3.00: 19+



Agency	Eligibility Restrictions	Service Area	Vehicles	Scheduling	Fares
Hasselbring Senior Center	Seniors age 60+ and center member	Genesee County	MTA Your Ride, & Genesee County Senior Center Van	Fixed Route, Demand Response; Monday-Friday, 9:00 a.m. - 5:00 p.m. and major holiday: n/a	Van Service: free to member
Hurley Medical Center	Emergency transportation of pediatric patients only	Genesee County	Ambulance	Demand Response	n/a
Jewish Community Services - <i>Highway to Health</i>	Must be a Genesee County resident for out-of-County medical appointments	Ann Arbor, Saginaw, Lansing, & Detroit area	One 9-passenger van ( <i>with lift</i> ), One 7 passenger van ( <i>space for 1 wheelchair</i> ), One 6 passenger van ( <i>space for 2 wheelchairs</i> )	Demand Response; Four week days, 1st call/1st serve basis & holiday: n/a	Sliding Fee Scale, Medicaid reimbursement
Jewish Community Services - <i>Local Transportation Services</i>	Must be a Genesee County resident	Genesee County	One 15-passenger bus ( <i>with lift</i> ), One 12 passenger bus ( <i>space for 1 wheelchair</i> ), One 9 passenger bus ( <i>space for 2 wheelchairs</i> )	Demand Response; Monday-Friday, 8:30 a.m. - 4:30 p.m. & holiday: n/a	\$2.25 each way, rides are not denied if client is unable to pay
Loose Senior Center	Case by case basis (only provide monthly / daily bus passes)	Genesee County	Uses MTA busses and Your Ride	Demand Response; Monday-Friday, 8:00 a.m. - 4:00 p.m. & holiday: n/a	n/a

Agency	Eligibility Restrictions	Service Area	Vehicles	Scheduling	Fares
Love Inc.	Case by case basis (only provide monthly / daily bus passes)	Genesee County	n/a	Monday-Thursday, 9:00 a.m. - 3:00 p.m. and holiday: n/a	Free to client
Mass Transportation Authority	None	Genesee County (w/ some regional routes)	Busses: 139 (fixed route), 126 (demand response); Vans: 13 (demand response); Other: 13 (Ford C-max Cars)	Fixed Route, Demand Response; Monday-Friday, 6:30 a.m. - 10:00 p.m., Saturday, 6:30 a.m. - 12:00 a.m., Sunday, 9:30 a.m. - 7:00 p.m.	Fixed Route: \$1.75 (general), \$0.85 (ADA & reduced), \$3.00 (regional); Demand Response: \$3.50 (general), \$2.25 (ADA & reduced); & Monthly passes are available
Montrose Senior Center	Anyone 60+ in our area and close proximity, also handicapped	Montrose City, Montrose Township, and close proximity	20 passenger bus with lift assist	Demand Response; Monday through Friday 9:00 a.m. -5:00 p.m. , evenings for special events	No charge, donation only
ReSource Genesee	Must have a documented appointment for healthcare, employment, or emergency need	Genesee County	Uses MTA busses and Your Ride	Monday-Friday, 9:00 a.m. - 4:30 p.m. and holiday: n/a	Free to client
Salvation Army	Must be a participant in the Pathway of Hope program.	Genesee County	Uses MTA busses and Your Ride	By appointment only	Free to client

Agency	Eligibility Restrictions	Service Area	Vehicles	Scheduling	Fares
STAT EMS	None	Genesee County, State of MI, & out of state (w/ pre-arrangements)	Multiple DOT approved vans ( <i>with bariatric ramp</i> ), multiple "car" style transportation for ambulatory patients	Demand Response; 24/7/365	\$25-\$35 one-way
Swartz Creek Area Senior Center	Seniors age 50+ within Swartz Creek Area School District	Swartz Creek Area School District	One 14-passenger bus no lift or ramp	Demand Response; Monday-Friday, 90 minutes for lunch; 3.5 hours on Tuesdays for shopping	Free to client
Vocational Independence Program	Age 65+ and persons with disability residing in MTA service area	Genesee County	8 vehicles; all but 1 accessible with lifts	Demand Response; Monday-Friday	\$4.00 per day, round trip

**Table 1:** Transportation Service Inventories Received

## Assessment of Transportation Needs

There are many unmet needs and gaps in services in Genesee County at this time. The three groups at the Coordinated Plan Workshop identified the following unmet needs and gaps in services. The needs do not appear in any type of priority order. Staff took all these identified needs and created a narrative that groups the needs into general categories. The narrative appears after the lists.

1. Needs of the Elderly and Medical Needs
  - a. Assistance learning to use the transit system
    - o “How-to-Ride” guide / YouTube video
    - o Class offered at each County Senior Center
  - b. Assistance getting from door to curb for Your Ride
    - o Volunteers to ride & assist passengers
  - c. Expanded Your Ride hours for medical-related trips
2. Needs of Disabled Individuals
  - a. Additional handicapped accessible taxis
  - b. Handicap accessible bus stops at all locations
  - c. Reduce/Eliminate cost of replacing transit card
  - d. Needs of veterans
3. Needs of Low-Income Individuals
  - a. Reliable and affordable transportation to work
  - b. Low-income transportation fees
  - c. Transportation for veterans and the homeless
  - d. Class offered at Michigan Works on how to ride transit system
4. Needs of Developmentally Challenged Riders
  - a. Bus scheduling, and travel safety
5. Needs of Parents with Children
  - a. Areas for child seating
  - b. Locations on transit for strollers, grocery bags, laundry
  - c. Bike racks that accommodate child-size bicycles
6. Need for Expanded Service Areas and Hours of Operation
  - a. Specific areas include: Davison, Mt. Morris, Fenton, and Grand Blanc
7. Needs for Curb-to-curb and Door-to-Door services

8. Need for Comprehensive List of Available Services
9. Need for Driver Training
  - a. Disability awareness training for all agencies
  - b. Handling disturbances on bus
  - c. Human-trafficking awareness
10. Need for Bus Stop Improvements
  - a. Strategic addition/deletion of bus shelters locations
  - b. Install lights and route maps at each location
  - c. Snow removal
11. Need for Safety
  - a. Planning for a major disaster
12. Needs for Complete Streets
13. Need for Improved Transit Vehicles
14. Needs for Bus Pass Improvements

## **Unmet Needs / Gaps in Services Narrative**

### Needs of the Elderly and Medical Needs

Some elderly individuals have a need for assistance in learning to use the transit system, especially if they have recently quit driving and have never used transit services before. On-board aids are needed for this, and could help passengers with choosing the right bus, using transfers, changing busses, managing bus schedules, etc. Elderly passengers could benefit from an instructional “how-to-ride” video on YouTube or in-person class offered at each County Senior Center.

Many elderly individuals need assistance in getting from their door to the curb to access the Your Ride services. Some of these seniors may hesitate to ask a friend or relative for help, knowing how time consuming it can be for someone to accompany them on a trip to the doctor’s office or the store. These individuals could benefit greatly from volunteer aides who would be able to enter their homes and assist them as needed to get to the curb for their ride.

Elderly individuals may drive their cars during daylight hours and during good weather, but should not drive at night or during bad weather.

Additional services may be needed to accommodate the transportation needs of these persons.

There is a need for expanded Your Ride service hours for medical-related trips, such as dialysis patients going for their appointments at night. Economical medical transport for patients to the out-county areas, or for patients that need to go to neighboring counties, is also a great need. Many individuals leaving the hospital have problems with obtaining transportation home. Due to medical conditions and/or aids such as crutches, casts, oxygen tanks, etc., riding on a regular bus may not be an option at that point in time. These individuals require transportation that takes into consideration their physical needs.

#### Needs of Disabled Individuals

Disabled individuals at times require access to transportation services including handicapped accessible taxis. There is a definite need for more handicapped accessible taxis in Genesee County. Also, expanded Your Ride hours, as mentioned in the section "Need for Expanded Service Areas and Hours of Operation" below, are needed.

The previous Coordinated Plan identified the need for a more efficient ADA certification process. Many of the issues with the ADA certification process have since been resolved. However, a need still exists for a program to reduce or eliminate the costs of replacing a lost transit card. Many individuals cannot afford to purchase replacement cards.

There are bus stop locations that present environmental barriers to individuals with disabilities or special needs. For example, some bus stop shelters are too close to the curb, making it impossible for wheelchair users to maneuver the shelter. Each bus shelter should be handicap accessible so that an individual in a wheelchair or with a cane, etc. can access the shelter from across the street. This requires that each nearby curb be cut in compliance with current Americans with Disabilities Act (ADA) standards. Furthermore, many of the sidewalks leading to the bus stops and shelters need repair, so that individuals using wheelchairs, walkers, canes, etc., can access them safely.

#### Needs of Low-Income Individuals

There are numerous challenges for low-income individuals regarding transportation. One of those challenges is getting reliable, affordable transportation to work. Many low-income individuals are without reliable transportation. They may have access to a vehicle, but it may not be

reliable enough to get them to work on time each day, or the repair and maintenance bills may be financially out of their reach. To obtain and keep a job, these individuals need reliable transportation that they can depend on each and every work day.

Many have trouble paying for bus rides, and many cannot afford to purchase a regular monthly bus pass. There needs to be a process in place for addressing transportation fees for the low-income population. This process could reference the availability of any transportation subsidies that may exist for our area, free or reduced-fare bus passes, or punch passes, which are good for a certain number of rides. Discharge planners need to find transportation for their clients; perhaps subsidized transportation for low-income clients. Agencies would need to have qualifications in place for the subsidized passes. Besides the monetary cost of agencies getting bus passes, there are also other associated costs, such as travel time for the agency and distributing the bus passes to those that need them.

Transportation for the homeless (no permanent address) should be addressed, as these individuals often times have fallen through the cracks in the system. They may be unsure of how to access local services or they may be unable to access them. They may require assistance to become familiar with the transportation services that are available.

Those who have cars but can't afford to drive when the price of gas gets too high, will also have to access the public transit system to get to work, school, medical appointments, run errands, etc. This situation requires extra busses or expanded Your Ride service.

#### Needs of Developmentally Challenged Riders

Persons who are developmentally challenged may have specific needs when using transportation services, and may need assistance to find the correct bus to take. These individuals possibly need help to manage bus schedules and bus transfers, travel safely, make sure they get off at the right stop, and get to their destination. On-board aides would be able to assist in these situations.

#### Needs of Parents with Children

There are issues to overcome when parents and their children use public transportation to do errands, such as laundry or grocery shopping. It can be difficult to carry grocery bags on the busses, especially with children along. Problems could arise while carrying large bundles (such as

laundry), or bulky purchases on the busses while minding the children. Parents are also concerned with the possibility of their children making a mess on the bus, or having small children riding without the benefit of car seats. Areas for child seating are needed with some type of safety seat available, as well as “child-proofing” the busses. Strollers on busses cause a problem because there never seems to be enough room to accommodate them, so there is a need for stroller areas on the bus. A “family transportation package” offering special rates to parents and their children would be very beneficial to the low-income population in Genesee County.

Busses outfitted with bike racks that accommodate not only adult bicycles, but also children's bicycles is suggested, such that parents and children can get to local parks or trails to ride their bicycles as a family.

#### Need for Expanded Service Areas and Hours of Operation

There is a need for expanded hours of services and expanded service areas. Expanded service hours are needed for MTA's Fixed Routes, Your Ride, and Regional Services. Additional transportation services in the out-county are needed, as well as economical transportation options between midnight and 6:00 a.m. throughout the whole county. This service gap of approximately six hours leaves many individuals unable to access economical transportation for work or after-hours medical clinics, etc. Many individuals require additional transportation on Sundays (such as for early church services) and holidays.

Participants of the 2014 Coordinated Plan Workshop stated that additional MTA Fixed Routes are needed in many areas of Genesee County. Specific areas in need of new routes include Davison, Grand Blanc, Mt. Morris, and Fenton. Your Ride services currently exist in these areas, but not primary fixed routes.

A need exists for transportation services that do not require an advance appointment. Scheduling rides in advance is how most services work, but there are certain times when an immediate need comes up, and transportation is required right then or on very short notice. These situations are sometimes unavoidable. Some bus routes should be revised and/or expanded during high-demand times to deal with changing ridership needs (i.e. work-related trips)



### Needs for Curb-to-Curb and Door-to-Door Services

The availability of curb-to-curb service needs to expand county-wide so that populations outside of the City of Flint can have increased access to the service. Since MTA bus routes do not service much of the out-county area, many people of low income and people without cars are limited as to where they can work, go to the doctor, shop, and more.

Additionally, there is a need for improved communication between Your Ride and the local agencies, as well as between Your Ride and its passengers. Your Ride wait times can sometimes be unpredictable, resulting in the need for a notification system to tell passengers when a vehicle will arrive.

### Need for Comprehensive List of Available Services

A great need exists for a directory of currently available services throughout the county. Many individuals and agencies are not aware of all services that are operating at this time. It is difficult for an individual to call all the potential resources and determine which agency offers what type of service. Agencies have expressed a need for an office display of current bus routes, so this information is readily available for their clients. If all this information were gathered into one publication, it would greatly simplify the process of finding out what was available.

This directory of services would need to be advertised to all the local agencies, local units of government, and the public so that people would become aware of it. Advertising would need to be multi-media and would need to include local newspapers, television, radio, internet, and billboards. Efforts would also need to include advertising the resource directory at bus stops, inside transit vehicles, and at the downtown MTA bus transfer center, to make sure transit riders are reached. Many of the human services agencies have newsletters where they could advertise the resource directory and send to individuals on their mailing lists.

### Need for Driver Training

Drivers need additional training on how to handle different situations that commonly arise on their transit vehicles and for the situations that may be unexpected. Knowing how to handle individuals with disabilities or special needs as they board and making sure they are aware when they have reached their stop is an important task. Disability awareness training or refresher courses would be helpful, across all area agencies. Increased training is necessary for handling situations when people who move

around on the bus, those who disturb others by loud or inappropriate talking, and creating general disturbances. The MTA should revisit any policies that allow drivers to accommodate the need for turn-offs when they are requested by an individual with a disability or special need.

A situation that may not occur all too often but is important for transit drivers to be aware of is human trafficking. By the nature of their job, their visibility in the community, the numerous routes they drive on an hourly basis, and by their contact with the general public; there is no better group of people, other than law enforcement to be the eyes and the ears in our community. Currently drivers can use their radios to report any suspicious incident to dispatch using “key words”. On-board technology may eventually be available for the driver to press a button to inconspicuously report any situation such as a potential crime, weapon, traffic accident, or medical emergency. Our transit vehicles should be known as a safe place for citizens to run to if their life is in danger.

#### Need for Bus Stop Improvements

Many bus stops in Genesee County need to be upgraded to include a bus shelter. Multiple existing bus shelters need repairs because of vandalism or theft, and there are many ideas on how to improve the shelters. Better lighting at night, heaters during the winter, bus schedules, and a map of the bus route installed on the shelter wall is needed. Disabled individuals have specific needs that have to be met regarding bus stops and shelters (see “Needs of Disabled Individuals” above). Also, a bus stop accessibility study is in the process of being completed by the Disability Network at this time. Staff expects that the study will identify additional opportunities for improving bus stop accessibility and safety.

Strategic additions or deletions of bus shelter locations should be considered to make sure the best locations are being utilized. A more broad range of locations needs to be offered for bus stops and shelters. Ongoing maintenance is also an important need for bus stops and shelters. During the winter, snow needs to be cleared away from bus shelters; otherwise they can become inaccessible for passengers with disabilities.

#### Need for Safety

The need for a major disaster plan was reaffirmed by participants. MTA has a “System Security and Emergency Preparedness Plan” (SSEPP) that establishes security policies, procedures and standards, and is a plan for establishing system security and emergency preparedness programs. The

MTA has conducted evaluations of the current and proposed installation and use of cameras, recording devices, security staffing, mobile data terminals, automatic vehicle locator system, as well as central dispatch, 24/7 access to the MTA Dort Highway facility, Curb-to-Curb service centers, employee and passenger training, storage facilities, and fuel depots to ensure the safety and security of passengers and employees.

For everyday safety issues, perception versus reality can be an important factor. Some passengers at times may not feel as safe as other passengers do during the same trip. For example, a frail elderly passenger may feel the ride is unsafe if loud teenagers are seated nearby. However, the teenagers feel that the ride is perfectly safe.

#### Needs for Complete Streets

Additional complete streets design elements are needed in Genesee County. Complete streets are built with all different users (pedestrians, bicyclists, motorists, transit riders) in mind. Many areas of Genesee County have older street designs that do not allow for easy access for transit users. There is a need for cut-out transit stops allowing busses to safely stop without interrupting traffic. Additional sidewalks and bike lanes would make it easier for everyone to access transit services.

#### Need for Improved Transit Vehicles

There is a continued need for improved transit vehicles that provide much needed amenities for the elderly and those individuals with disabilities. In recent years, the MTA has made significant progress with the installation of transit management techniques including automatic vehicle locators (AVL) and mobile data terminals (MDT) to improve transit reliability. In early 2014, the MTA purchased 38 new vehicles to help launch the new non-emergency medical transportation service called Your Ride Plus. This will be a door to door and door thru door service with an attendant on every vehicle. All clients can expect a higher level of service and experience.

#### Needs for Bus Pass Improvements

There is a need for an improvement in the functionality of bus passes currently in use by transit riders. Furthermore, human services agencies have a need for additional bus passes as they frequently run out and are unable to give passes to their clients. The MTA is currently in the process of evaluating the various options for bus passes that will be best for all transit users and levels of income.

## Strategies to Address the Unmet Needs and Gaps in Services

To address the above transportation needs and gaps in services, the workshop participants reviewed the current list of strategies and came up with the following revised lists of potential strategies. Each group considered its list of needs, and then identified the following strategies that could be used to help the needs.

1. Maintain and Increase Funding for Services
  - Continue to seek grants to supplement costs
2. Outreach (to providers, elected officials, passengers, and potential passengers), Publication, and Marketing of MTA's Transportation Services
3. Incorporation of Technology
  - Improvement of bus shelters (scrolling data boards)
  - Improvement of transit vehicles (on-board cameras, Wi-Fi)
  - Smart phone Apps, YouTube tutorial
4. Strategies for Incorporating Door-to-Door with existing "Your Ride" Services
  - Protocol for pick-up & drop-off times
  - Automated notification (text or phone call)
  - Point of contact for problems
5. Coordination between Organizations and Businesses
  - Added effort with larger employers
6. Pocket Size Directory of All Community Services
  - Booklet explaining what transit users need to know to reduce wait times
7. Subsidized Passes/Sliding Fee Scale
  - Continue to seek grants to cover costs
8. Coordination Outside of Genesee County
  - Meetings on a monthly basis (not quarterly) to coordinate transit outside of Genesee County
9. Addressing Safety Needs and Security
  - Further communication/sharing of information between other agencies (police, fire, schools)

- Coordination throughout the community during bad weather and emergencies
- Improved lighting and supply of heat in bus shelters

10. Study on where people are currently going, where they'd like to go, times and how frequently

- Surveys of health and human service agencies such as MRS regarding employment needs

11. Service Provider Training

- Dispatchers shouldn't just say NO, offer options to help
- Passenger assistance training for operators

## **Priorities for Implementation**

As discussed previously in the "Public Participation Efforts for the Coordinated Plan" section (See page X), workshop participants prioritized list of strategies to meet the transportation needs and gaps in services for the identified populations in Genesee County. This prioritized list, along with the number of votes received, appears below.

1. Maintain and Increase Funding for Services
2. Incorporation of Technology
3. Outreach (*to providers, elected officials, passengers, and potential passengers*), Publication and Marketing of MTA's Transportation Services
4. Coordination between Organizations and Businesses
5. Coordination Outside of Genesee County
6. Addressing Safety Needs and Security
7. Study on where people are currently going, where they'd like to go, times and how frequently
8. Strategies for Incorporating Door-to-Door with existing "Your Ride" Services
9. Pocket Size Directory of All Community Services

10. Service Provider Training

11. Subsidized Passes/Sliding Fee Scale

## **Next Steps**

Staff will continue working with local transit and human service agencies, along with FHWA, MDOT and FTA, to facilitate the Coordinated Plan process. As projects are derived from the Genesee County Coordinated Public Transit-Human Services Transportation Plan, staff will participate in helping those projects move forward as necessary. The projects will go through the appropriate committee process (including TAC and GCMA) in order to be included in the Transportation Improvement Program (TIP), which is a schedule and budget of proposed transportation improvements within Genesee County.

## Appendices

**Appendix A:** Workshop Mail-Out Packet

**Appendix B:** RSVP Postcard

**Appendix C:** Workshop Sign-in Sheet, Handouts, and Evaluations

**Appendix D:** Public Participation Documentation

## Appendix A: Workshop Mail-Out Packet



March 31, 2014

Dear Stakeholder:

You are receiving this invitation because you have been identified as a provider of transportation or someone interested in transportation issues for people living in Genesee County. The Genesee County Metropolitan Planning Commission (GCMPC) has begun the process to update Genesee County's Long Range Transportation Plan. Part of this update is developing a new Coordinated Public Transit-Human Services Transportation Plan for **Genesee County**. This plan will include identification of the transportation needs of individuals with disabilities, older adults and people with low incomes. It will also provide strategies for meeting those needs, and will prioritize transportation services for funding and implementation.

As part of the process, GCMPC staff would like to gather information prior to the holding a stakeholder workshop. A tentative date for the workshop will be on Thursday, May 15, 2014. Further details will be sent via mail next month.

In order to facilitate discussion at the workshop, staff needs to obtain certain information prior to the workshop. We need an inventory of available services in the county. If you are an agency or entity that provides transportation services, please complete the enclosed Transportation Services Inventory. There is also a Self-Assessment Survey for everyone to fill out whether or not they provide transportation services. This survey helps clarify what our community is doing well and what needs to be done better. This survey is vital because the plan will identify transportation needs in the county and develop priorities to address those needs. The survey can be accessed at the following web address: <https://www.surveymonkey.com/s/B568D5Z>

Whether or not you plan to attend the workshop, please return the Transportation Services Inventory in the enclosed postage-paid return envelope and complete the online Self-Assessment Survey so that it is in our offices before **Friday, April 18, 2014**. Please feel free to contact our office if you have any questions or need further clarification at (810) 257-3010.

Sincerely,



Jacob Maurer, Planner I  
Genesee County Metropolitan Planning Commission

AN EQUAL OPPORTUNITY ORGANIZATION

## 1. OVERVIEW

The Genesee County Metropolitan Planning Commission (GCMPC) has begun the process to update Genesee County's Long Range Transportation Plan. Part of this update is developing a new Coordinated Public Transit-Human Services Transportation Plan for Genesee County. This plan will include identification of the transportation needs of individuals with disabilities, older adults and people with low incomes. It will also provide strategies for meeting those needs, and will prioritize transportation services for funding and implementation.

The five sections highlighted in this survey represent the core elements of building a fully coordinated transportation system. Please choose one of the four provided answers in each question. You will be asked to give an overall rating of each section at the end of the survey. Thank you for your time and cooperation!

[Next](#)

## 2. Section One: Making Things Happen by Working Together

### 1. Have leaders and organizations defined the need for change and articulated a new vision for the delivery of coordinated transportation services?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

### 2. Is a governing framework in place that brings together providers, agencies and consumers? Are there clear guidelines that all embrace?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

### 3. Does the governing framework cover the entire community and maintain strong relationships with neighboring communities and state agencies?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

### 4. Is there sustained support for coordinated transportation planning among elected officials, agency administrators and other community leaders?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

### 5. Is there positive momentum? Is there growing interest and commitment to coordinating human service transportation trips and maximizing resources?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

[Prev](#)[Next](#)

### 3. Section Two: Taking Stock of Community Needs and Moving Forward

1. Is there an inventory of community transportation resources and programs that fund transportation services?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

2. Is there a process for identifying duplication of services, underused assets and service gaps?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

3. Are the specific transportation needs of various target populations well documented?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

4. Has the use of technology in the transportation system been assessed to determine whether investment in transportation technology may improve services and/or reduce costs?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

5. Are transportation line items included in the annual budgets for all human service programs that provide transportation services?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

6. Have transportation users and other stakeholders participated in the community transportation assessment process?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

7. Is there a strategic plan with a clear mission and goals? Are the assessment results used to develop a set of realistic actions that improve coordination?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

8. Is clear data systematically gathered on core performance issues such as cost per delivered trip, ridership and on-time performance? Is the data systematically analyzed to determine how costs can be lowered and performance improved?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

9. Is the plan for human services transportation coordination linked to and supported by other state and local plans such as the Regional Transportation Plan or State Transportation Improvement Plan?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

10. Is data collected on the benefits of coordination? Are the results communicated strategically?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

#### 4. Section Three: Putting Customers First

1. Does the transportation system have an array of user-friendly and accessible information sources?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

2. Are travel training and consumer education programs available on an ongoing basis?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

3. Is there a seamless payment system that supports user-friendly services and promotes customer choice of the most cost-effective service?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

4. Are customer ideas and concerns gathered at each step of the coordination process? Is customer satisfaction data collected regularly?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

5. Are marketing and communications programs used to build awareness and encourage greater use of the services?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

#### 5. Section Four: Adapting Funding for Greater Mobility

1. Is there a strategy for systematic tracking of financial data across programs?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

2. Is there an automated billing system in place that supports the seamless payment system and other contracting mechanisms?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

Prev

Next

## 6. Section Five: Moving People Efficiently

1. Has an arrangement among diverse transportation providers been created to offer flexible services that are seamless to customers?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

2. Are support services coordinated to lower costs and ease management burdens?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

3. Is there a centralized dispatch system to handle requests for transportation services from agencies and individuals?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

4. Have facilities been located to promote safe, seamless and cost-effective transportation services?

- Needs to Begin
- Needs Significant Action
- Needs Action
- Done Well

Prev

Next

## 7. OVERALL COMMUNITY SELF-ASSESSMENT

Evaluation: After reviewing each of the questions and assessing our progress, please rate on a scale from 1 to 5 (with 5 being the highest rating) your overall evaluation of how well we are doing in the area of:

\*1. Making Things Happen by Working Together:

- 5
- 4
- 3
- 2
- 1

\*2. Taking Stock of Community Needs and Moving Forward:

- 5
- 4
- 3
- 2
- 1

\*3. Putting Customers First:

- 5
- 4
- 3
- 2
- 1

\*4. Adapting Funding for Greater Mobility:

- 5
- 4
- 3
- 2
- 1

\*5. Moving People Efficiently:

- 5
- 4
- 3
- 2
- 1

# Genesee County Transportation Services Inventory for Transportation Providers

Agency Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, Zip: \_\_\_\_\_

E-mail: \_\_\_\_\_

Phone: \_\_\_\_\_

The purpose of this worksheet is to provide information on the transportation services provided in Genesee County by program, kind of vehicle including accessibility, ride schedules, funding sources, etc. Please complete this worksheet and return it in the enclosed postage-paid return envelope **before April 18, 2014** whether or not you plan on attending the workshop. Staff needs to compile a master list of this information before the workshop, and your help is critical. Each transportation provider in Genesee County completes this worksheet. Thank you for your time and cooperation!

Program Name

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Eligibility Restrictions

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Service Area

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List of Vehicles (Include capacity of vehicle and how many have lifts, ramps, or none)

Busses

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Other (Describe)

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Scheduling (Circle all that apply)

Fixed Route

Demand Response

Other (Describe)

Days and Hours of Operation

Weekdays

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Saturdays

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Sundays

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Holidays

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Fares

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Specific Trip Purposes

Employment

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Shopping

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Medical

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Other (Describe)

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How to Access (Circle all that apply)

Fixed Route

Call for Each Ride

Subscription

Other (Describe)

Funding Sources (Circle all that apply)

5310

5307

5311

Non-FTA

Specialized Services

Other

## Appendix B: RSVP Postcard

Genesee County Metropolitan Planning Commission  
1101 Beach Street, Room 223  
Flint, MI 48502

PRESORTED STANDARD  
POSTAGE & FEES PAID  
FLINT, MI  
PERMIT NO. 235

AN EQUAL OPPORTUNITY ORGANIZATION

## You're Invited!

### Coordinated Public Transit-Human Services Transportation Plan Workshop

**What:** The existing Coordinated Plan was adopted in 2007. The plan identifies the transportation needs of targeted populations (elderly, disabled, and low income), provides strategies to meet those needs, and prioritizes transportation services for implementation. The workshop is designed to re-evaluate where the gaps in services are and discuss strategies to address those gaps. The current coordinated plan can be found at: [http://www.gc4me.com/departments/planning\\_commission/transportation/coordinated\\_plan.php](http://www.gc4me.com/departments/planning_commission/transportation/coordinated_plan.php)

**Where:** MTA Administration Building, 1401 S. Dort Highway Flint, MI 48503

**When:** 8:30 a.m. to 10:30 a.m. on May 15<sup>th</sup>, 2014

Please **RSVP** by 5:00 p.m. on May 9<sup>th</sup> at the following web address  
or by phone at (810)-257-3010

<https://www.surveymonkey.com/s/QNQ6S52>



## Appendix C: Workshop Sign-in Sheet, Handouts, and Evaluations

# Genesee County

## Coordinated Public Transit- Human Services Transportation Plan Workshop



May 15, 2014

8:30 – 10:30 a.m.

**COORDINATED PLAN WORKSHOP  
MAY 15, 2014**

OK	NAME	Organization	Address	Phone #	Email
✓	Jennifer Skutt	MTA			
✓	Michael Hart	City of Davison			
✓	Celeste Jennings	Hasselbring Senior Center			
✓	Chris Gilbert	Michigan Rehabilitation Services			
✓	Bill Bain	Metro Alliance Trustee			
✓	Michele Bernreuter	Hurley Medical Center/Eastside			
✓	Bill Wiseman	Resource Genesee			
✓	Mary Rice	SATA			
✓	Micki Hoffman	Grand Blanc Township			
✓	Paul Edwards	Genesee County Senior Services			
✓	Teresa McGinnis	United Way			
✓	Malissa Schutt	SATA			
✓	John Nelson	Veterans Administration			
✓	Yvonne Davis	Salvation Army Flint Corps			
✓	Jeanne Thick	Veterans Administration			
✓	Carol Wegher	Greater Lapeer Transportation			

✓	Roxy Moreno	MTA
	BEV DUPUIS	GLTA
	Bill Wisem	Resource Geosoc
	Sonna DAVIS	SAL Army
	Mary Amkete	MTA
	Vivian Nelly	MRS
	<del>Prof</del>	MRS
	Damon Forney	GCMPC
	Jacob Maurer	GCMPC
	Maurer	GCMPC

## Workshop Handouts



MTA  
Administration  
Building

May 15, 2014

8:30 - 10:30 a.m.



## What is the Coordinated Plan?

<b>Welcome</b>	8:30
<b>Survey Results</b>	8:40
<b>Gaps in Services</b>	8:50
<b>Strategy for Gaps</b>	9:10
<b>Break</b>	9:35
<b>Prioritize Strategies</b>	9:45
<b>Next Steps</b>	10:15
<b>Adjourn</b>	10:30

**Definition:** The plan is defined as a locally developed, coordinated public transit-human services transportation plan that identifies transportation needs for targeted populations. It will provide strategies to meet those local needs, and prioritizes transportation services for funding and implementation.

**Target Populations:** The Coordinated Plan focuses on three populations in Genesee County: the elderly, persons with disabilities and persons of low income. Individuals in these three groups tend to have a greater need for public transit services, or private transit services.



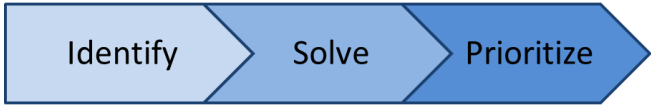
### Required Elements:

1. Identify the stakeholders in the process.
2. Provide an assessment of available services that identifies current providers (public, private and non-profit).
3. Provide an assessment of transportation needs for individuals with disabilities, elderly individuals, and individuals with low incomes.
4. Provide strategies and/or activities to address the identified gaps between current services and needs, as well as opportunities to achieve efficiencies in service delivery.
5. Provide priorities for implementation based on resources, time, and feasibility for implementing specific strategies and activities identified.



## 2040 Long Range Transportation Plan

The Genesee County Metropolitan Alliance (GCMA) is responsible for developing a Long Range Transportation Plan (LRTP) for Genesee County. The plan analyzes the condition of the transportation system in Genesee County and outlines strategies to address short-term and long-term needs up to 25 years into the future. The Genesee County Metropolitan Planning Commission (GCMPC) provides staff for the GCMA to assist in the development of the individual technical reports. The coordinated plan is part of the LRTP as a whole.



## *Small Group Activity*

### Step 1. Identify Gaps

- Is the current list of gaps in services/unmet needs sufficient?
- What are some additional gaps in services/unmet needs not listed?
- Discuss for 10 minutes, elect 1 person to report out to audience.

### Step 2. Solve Using Strategies

- Are existing strategies appropriate for the identified gaps in services?
- Should new strategies be identified to address unmet needs in services?
- Discuss for 15 minutes, elect 1 person to report out to audience.

### Step 3: Prioritize Strategies

- Determine which strategies are of the most urgency and will meet the transportation needs and gaps in services for Genesee County.
- Discuss for 10 minutes, elect 1 person to place a dot sticker next to the top 5 strategies for your group (no more than 1 dot of same color per strategy)

---

#### Genesee County Metropolitan Planning Commission

1101 Beach Street, Room 223

Flint, MI 48502

Office: 810.257.3010

Fax: 810.257.3185

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We're on the Web!

[www.gcmPC.org](http://www.gcmPC.org)

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# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014 Self-Assessment Survey Results

---

The following is a summary of the Self-Assessment Survey that was provided online to workshop attendees. The five sections highlighted in the survey represent the core elements of building a fully coordinated transportation system. This summary will help to identify areas where stakeholders believe the transportation system is working well, and areas that can be improved.

Those surveyed were asked to rate on a scale from 1 to 5 (with 5 being the highest rating) their overall evaluation of how well we are doing in the five core sections. Out of 10 answers received, the average rating for each section was the following:

Section	Rating (5 = Done Well)
Section 1: Making things Happen by Working Together	2.9
Section 2: Taking Stock of Community Needs and Moving Forward	2.8
Section 3: Putting Customers First	2.8
Section 4: Adapting Funding for Greater Mobility	2.9
Section 5: Moving People Efficiently	2.9

Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

**Draft Summary of the Transportation Services Inventories Received**

Agency	Vehicles	Scheduling
Brennan Senior Center	Uses MTA Your Ride	Demand Response; Monday-Sunday
Brennan Senior Community Center	Uses MTA Your Ride	Demand Response; Monday-Friday, 8:00 a.m. - 5:00 p.m. & holiday: n/a
Burton Senior Center	Shuttle: 8 passenger with lift and one tie down; Van: 12 passenger without lift	Demand Response; Mon., Tues., Thurs., & Fri. 8:00 a.m. to 4:30 p.m. & holiday: n/a
Carman-Ainsworth Senior Center	16 passenger bus - no lift, wheelchair with 8 people	Demand Response; Monday-Friday, 8:00 a.m. - 3:00 p.m.
Davison Area Senior Center	15 passenger van, non-handicap accessible	Demand Response; Monday-Friday, 9:00 a.m. - 4:00 p.m.; 24 hour notice
Eastside Senior Citizens Association	2005 Ford Conversion Vehicle; 12 passenger van with lift	Demand Response; Monday-Friday, 8:00 a.m. - 4:00 p.m.
Family Service Agency of Mid-Michigan / Foster Grandparent Program	One 15-passenger van	Fixed Route; Monday-Friday, 7:00 a.m. - 4:00 p.m.

Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

**Draft Summary of the Transportation Services Inventories Received**

Agency	Vehicles	Scheduling
Flushing Area Senior Center	One 14-passenger van- no lift or ramp	Fixed Route; Monday-Friday, 8:30 a.m. - 2:00 p.m. and holiday: n/a
Flushing Township	2 vehicles (one bus and one van)	Fixed Route; Monday-Friday, and holiday: n/a
Genesys Health System	TBD	Demand Response
Greater Lapeer Transportation Authority	12 vehicles (seats 14); 15 vehicles (seats 22-26)	Demand Response; Monday-Friday, 6:00 a.m. - 8:00 p.m. and Saturdays 9:00 a.m. - 3:00 p.m.; and major holiday: n/a
Hasselbring Senior Center	MTA Your Ride, & Genesee County Senior Center Van	Fixed Route, Demand Response; Monday-Friday, 9:00 a.m. - 5:00 p.m. and major holiday: n/a
Hurley Medical Center	Ambulance	Demand Response

**Draft Summary of the Transportation Services Inventories Received**

Agency	Vehicles	Scheduling
Jewish Community Services - <i>Highway to Health</i>	One 9-passenger van ( <i>with lift</i> ), One 7 passenger van ( <i>space for 1 wheelchair</i> ), One 6 passenger van ( <i>space for 2 wheelchairs</i> )	Demand Response; Four week days, 1st call/1st serve basis & holiday: n/a
Jewish Community Services - <i>Local Transportation Services</i>	One 15-passenger bus ( <i>with lift</i> ), One 12 passenger bus ( <i>space for 1 wheelchair</i> ), One 9 passenger bus ( <i>space for 2 wheelchairs</i> )	Demand Response; Monday-Friday, 8:30 a.m. - 4:30 p.m. & holiday: n/a
Loose Senior Center	Uses MTA busses and Your Ride	Demand Response; Monday-Friday, 8:00 a.m. - 4:00 p.m. & holiday: n/a
Love Inc.	n/a	Monday-Thursday, 9:00 a.m. - 3:00 p.m. and holiday: n/a
Mass Transportation Authority	Busses: 139 (fixed route), 126 (demand response); Vans: 13 (demand response); Other: 13 (Ford Cmax Cars)	Fixed Route, Demand Response; Monday-Friday, 6:30 a.m. - 10:00 p.m., Saturday, 6:30 a.m. - 12:00 a.m., Sunday, 9:30 a.m. - 7:00 p.m.

Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

**Draft Summary of the Transportation Services Inventories Received**

Agency	Vehicles	Scheduling
Montrose Senior Center	20 passenger bus with lift assist	Demand Response; Monday through Friday 9:00 a.m. -5:00 p.m. , evenings for special events
ReSource Genesee	Uses MTA busses and Your Ride	Monday-Friday, 9:00 a.m. - 4:30 p.m. and holiday: n/a
Salvation Army	Uses MTA busses and Your Ride	By appointment only
STAT EMS	Multiple DOT approved vans ( <i>with bariatric ramp</i> ), multiple "car" style transportation for ambulatory patients	Demand Response; 24/7/365
Swartz Creek Area Senior Center	One 14-passenger bus no lift or ramp	Demand Response; Monday-Friday, 90 minutes for lunch; 3.5 hours on Tuesdays for shopping
Vocational Independence Program	8 vehicles; all but 1 accessible with lifts	Demand Response; Monday-Friday

# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014 Current Unmet Needs / Gaps in Services

---

1. Needs of the Elderly and Medical Needs
  - a. Assistance learning to use the transit system
  - b. Assistance getting from door to curb for Your Ride
  - c. Expanded Your Ride hours for medical-related trips
2. Needs of Disabled Individuals
  - a. Fix ADA certification process
  - b. Additional handicapped accessible taxis
  - c. Handicap accessible bus stops at all locations
3. Needs of Low-Income Individuals
  - a. Reliable and affordable transportation to work
  - b. Low-income transportation fees
  - c. Transportation for the homeless
4. Needs of Developmentally Challenged Riders
  - a. Bus scheduling, travel safety
5. Needs of Parents with Children
  - a. Areas for child seating
  - b. Locations on transit for strollers, grocery bags, laundry
  - c. Bike racks that accommodate child-size bicycles
6. Need for Expanded Service Areas and Hours of Operation
7. Needs for Curb-to-Curb and Door-to-Door services
8. Need for Comprehensive List of Available Services
9. Need for Driver Training
  - a. Handling disturbances on vehicle
  - b. Disability awareness training
10. Need for Bus Stop Improvements
  - a. Additional bus shelter locations
  - b. Installation of lights and route maps at each location
11. Need for Safety
  - a. Major disaster plan
12. Needs for Complete Streets
13. Need for Improved Transit Vehicles
14. Needs for Bus Pass Improvements



# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

## Current Strategies

---

1. Maintain and Increase Funding for Services
  - a. Continuation of current services
2. Outreach, Publication, and Marketing of MTA's Transportation Services
  - a. Outreach toward transportation providers, elected officials, and current & potential passengers
3. Incorporation of Technology
4. Strategies for Incorporating Door-to-Door with existing "Your Ride" Services
5. Coordination between Organizations and Businesses
6. Pocket Size Directory of All Community Services
7. Subsidized Passes/Sliding Fee Scale
8. Coordination Outside of Genesee County
9. Addressing Safety Needs and Security
10. Study on Where People are Currently Going, Where They'd Like to Go, Time of Day, and How Frequently
11. Service Provider Training

Small Group Response, Visual Aids, and Photos

unmet Needs:  
 Add need for Veterans  
 trans.

#9 add (Voluntary) worksh  
 for all drivers from all  
 agencies

#10 - maintenance of shelters  
 (snow plow during winter)  
 - review of shelter locations  
 do we need more/less?

NEEDS / GAPS

1A - "How to Ride" Guide AND YOUTUBE VIDEO

- 1 -> Senior centers
- 2 -> DHS
- 3 -> Michigan Works!  
 -> Dr./Medical Offices

B. Volunteers/associates

C. Expanding Demand Response System

2a. Reduce or eliminate replacement costs for bus/misplaced trips

Need for Ride

- Jackson
- Grand Blanc
- Detroit
- Mt. Morris
- Alameda Republic
- Elderly
- Disabled
- Working

2 Year Ride Wait time unacceptable

Small Group Response from  
 the Coordinated Plan  
 Workshop on May 15, 2014

3. Technology facebook, website

- social media
- wifi on buses
- wifi on vehicles/shelters
- lighting/heat
- vehicle cameras on board tech.
- coordination w/ other agencies
- Police - Fire - schools
- Mobile Tech (apps, scrolling data boards)

6. Good!

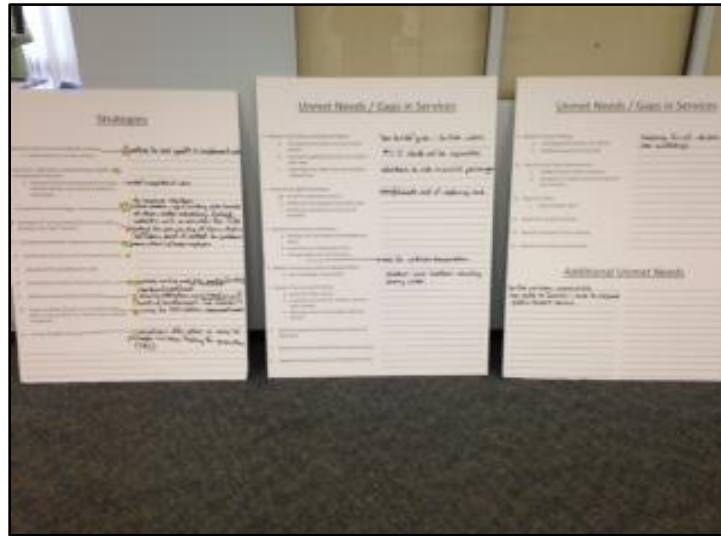
11. Better community  
 coordination during  
 inclement weather

3. Using technology to assist Dispatch re: better coordination and greater efficiency in scheduling
8. Monthly meetings w/ neighboring counties to coordinate efforts -> employment
9. Safety continues to be a concern/barrier  
 theft, tips  
 - discussions w/ law enforcement re: safety
6. Continuation of larger employers
7. Continue to seek grants to supplement costs.
8. Survey Human Service Agencies - community employment
11. Dispatch -> offer alternatives as "no"

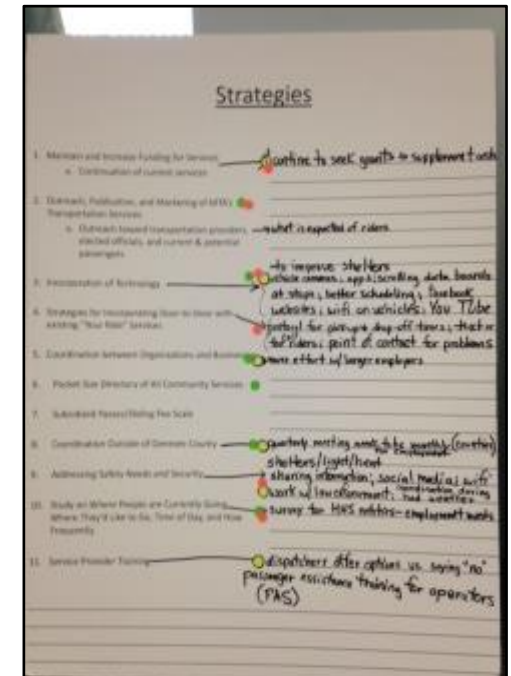
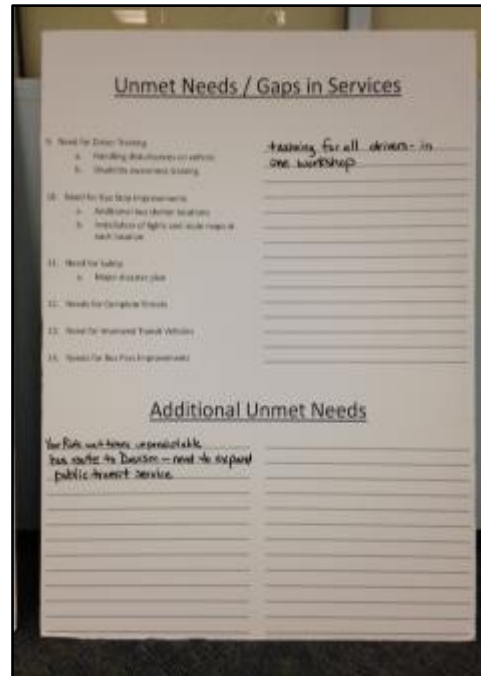
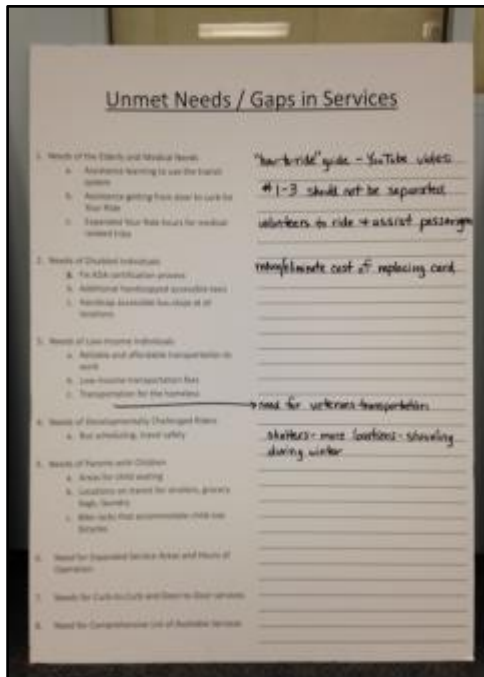
Possible Strategies

1. Protocol for Pick & drop off time

- Make 15-minute buffer between drivers
- Point of contact if business hours
- with time of pick up or drop off
- Sit a Clear Protocol for Rider/Driver
- Effort to all the communication of all
- Make it into suggested update video
- Prior Call to Driver of next ride when  
 driver is just leaving the previous pick up  
 location
- Sets an expectation for pick up time

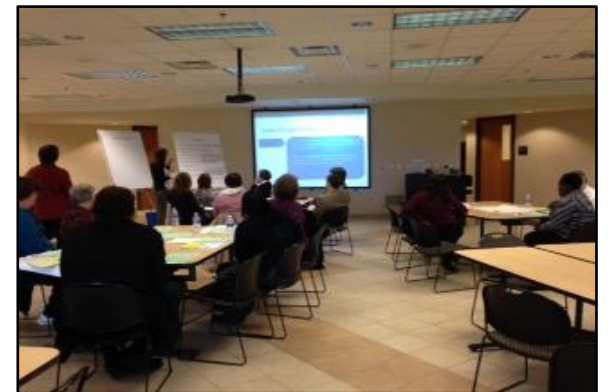
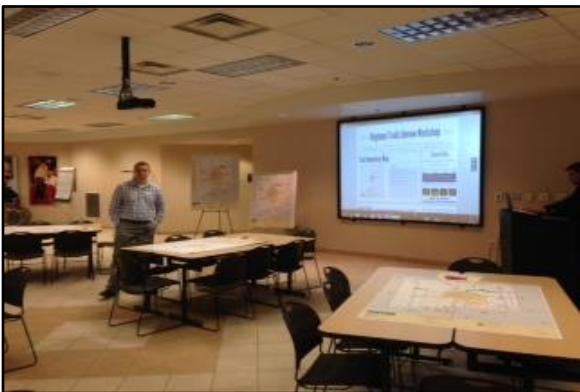


Visual Aids from the Coordinated Plan Workshop on May 15, 2014





Pictures from the  
Coordinated Plan Workshop  
on May 15, 2014



## Workshop Results and Evaluation

## Maurer, Jacob

---

**From:** Maurer, Jacob  
**Sent:** Thursday, May 22, 2014 11:58 AM  
**To:** 'jskutt@mtaflint.org'; 'mhart@cityofdavison.org'; 'celeste.jennings@ymail.com'; 'GilbertC1@michigan.gov'; 'author58@yahoo.com'; 'mbernre1@hurleymc.com'; 'info@resourcegeneseesee.org'; 'mrice@satabus.org'; Edwards, Paul; 'uawlaborliason@unitedwaygeneseesee.org'; 'mschutt@satabus.org'; 'Yvonne\_Davis@usc.salvationarmy.org'; 'cwegher@go-glta.org'; 'rmoreno@mtaflint.org'; 'mketels@mtaflint.org'; ebenning@mtaflint.org; 'neilleyv@michigan.gov'  
**Cc:** Nordberg, Jason; Gregory, Sharon; Fortney, Damon  
**Subject:** Coordinated Plan Workshop Results  
**Attachments:** Gaps\_in\_Services\_list.pdf; Prioritized\_list.pdf

Dear Workshop Participants,

Thank you once again for attending the 2014 Coordinated Plan Workshop held on May 15<sup>th</sup>. The thoughts and ideas collected was an essential component in updating Genesee County's Coordinated Public Transit-Human Services Transportation Plan. Attached to this email are the initial results of what you, the participant, identified and prioritized during the small group activity. The full report with further description will be made available later this summer. If you would like to provide further narrative to any of the unmet needs or prioritized strategies, please don't hesitate to contact me by phone or email.

If you could, please take the next 3 minutes to fill out our online evaluation survey regarding the workshop. Your input is greatly appreciated. <https://www.surveymonkey.com/s/3GKKMHY>

Sincerely,

**Jacob Maurer, Planner 1**  
Genesee County Metropolitan Planning Commission  
1101 Beach Street, Room 223  
Flint, MI 48502  
Phone 810-766-6565 | Fax: 810-257-3185  
[www.gcmpc.org](http://www.gcmpc.org)



# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

## Unmet Needs / Gaps in Services

---

1. Needs of the Elderly and Medical Needs
  - a. Assistance learning to use the transit system
    - “How-to-Ride” guide / YouTube video
    - Class offered at each County Senior Center
  - b. Assistance getting from door to curb for Your Ride
    - Volunteers to ride & assist passengers
  - c. Expanded Your Ride hours for medical-related trips
2. Needs of Disabled Individuals
  - a. Additional handicapped accessible taxis
  - b. Handicap accessible bus stops at all locations
  - c. Reduce/Eliminate cost of replacing transit card
  - d. Needs of veterans
3. Needs of Low-Income Individuals
  - a. Reliable and affordable transportation to work
  - b. Low-income transportation fees
  - c. Transportation for veterans and the homeless
  - d. Class offered at Michigan Works on how to ride transit system
4. Needs of Developmentally Challenged Riders
  - a. Bus scheduling, and travel safety
5. Needs of Parents with Children
  - a. Areas for child seating
  - b. Locations on transit for strollers, grocery bags, laundry
  - c. Bike racks that accommodate child-size bicycles



# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

## Unmet Needs / Gaps in Services

---

6. Need for Expanded Service Areas and Hours of Operation
  - a. Specific areas include: Davison, Mt. Morris, Fenton, and Grand Blanc
7. Needs for Curb-to-curb and Door-to-Door services
8. Need for Comprehensive List of Available Services
9. Need for Driver Training
  - a. Disability awareness training for all agencies
  - b. Handling disturbances on bus
  - c. Human-trafficking awareness
10. Need for Bus Stop Improvements
  - a. Strategic addition/deletion of bus shelters locations
  - b. Install lights and route maps at each location
  - c. Snow removal
11. Need for Safety
  - a. Planning for a major disaster
12. Needs for Complete Streets
13. Need for Improved Transit Vehicles
14. Needs for Bus Pass Improvements

# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

## Prioritized Strategies

---

1. Maintain and Increase Funding for Services
  - a. Continue to seek grants to supplement costs
2. Incorporation of Technology
  - a. Improvement of bus shelters (scrolling data boards)
  - b. Improvement of transit vehicles (on-board cameras, Wi-Fi)
  - c. Smart phone Apps, YouTube tutorial
3. Outreach, Publication and Marketing of MTA's Transportation Services
  - a. To providers, elected officials, passengers, and potential passengers
4. Coordination between Organizations and Businesses
  - a. Added effort with larger employers
5. Coordination Outside of Genesee County
  - a. Meetings on a monthly basis to coordinate transit outside of Genesee County
6. Addressing Safety Needs and Security
  - a. Further communication and sharing of information between other agencies (police, fire, and schools)
  - b. Coordination throughout the community during bad weather and emergencies
  - c. Improved lighting and supply of heat in bus shelters

# Coordinated Public Transit-Human Services Transportation Plan Workshop 2014

## Prioritized Strategies

---

7. Study on where people are currently going, where they'd like to go, times and how frequently
  - a. Surveys of health & human service agencies such as MRS regarding employment needs
8. Strategies for Incorporating Door-to-Door with existing "Your Ride" Services
  - a. Protocol for pick-up and drop-off times
  - b. Automated notification (text or phone call)
  - c. Point of contact for problems
9. Pocket Size Directory of All Community Services
  - a. Booklet explaining what transit users need to know to reduce wait times
10. Service Provider Training
  - a. Dispatchers shouldn't just say "NO", offer options how they can help
  - b. Passenger assistance training for operators
11. Subsidized Passes/Sliding Fee Scale
  - a. Continue to seek grants to cover costs

Welcome

Thank you for taking the time to complete the following survey. Your feedback is greatly appreciated.  
This survey should take approximately 3 minutes to complete.

Next

Powered by **SurveyMonkey**  
Check out our [sample surveys](#) and create your own now!

For each item below, please select the number/response that best expresses your opinion.  
(e.g. 1 = strongly agree, 5 = strongly disagree)

- \*1. The exercises, group discussions, examples, and explanations made the information covered understandable.  
 1                       2                       3                       4                       5
- \*2. The workshop provided a good forum for communication about public/human services transportation coordination.  
 1                       2                       3                       4                       5
- \*3. Participants at the workshop were from a broad stakeholder group.  
 1                       2                       3                       4                       5
- \*4. The Self-Assessment Survey and Transportation Services Inventory facilitated a meaningful discussion of the county's status on public transit/human services transportation coordination.  
 1                       2                       3                       4                       5
- \*5. The county prioritized action plan is comprehensive and the actions realistic.  
 1                       2                       3                       4                       5
- \*6. The county currently has a viable coordination process.  
 1                       2                       3                       4                       5
- \*7. Developing the prioritized action plan was meaningful and valuable.  
 1                       2                       3                       4                       5
- \*8. I feel the coordination process in the county will be improved based on the assessment, action plan and priorities.  
 1                       2                       3                       4                       5
- \*9. The time allotted for each group activity was:  
 too much                       about right                       not enough
- \*10. The time allotted for the entire workshop was:  
 too much                       about right                       not enough
- \*11. The facilitator was knowledgeable about the meeting process and materials.  
 1                       2                       3                       4                       5
- \*12. The information was presented in a clear, logical format.  
 1                       2                       3                       4                       5

Prev Next

13. List three (3) key points / issues presented during the meeting that were most valuable or useful:

14. List any information or meeting content you felt was omitted or needed further clarification.

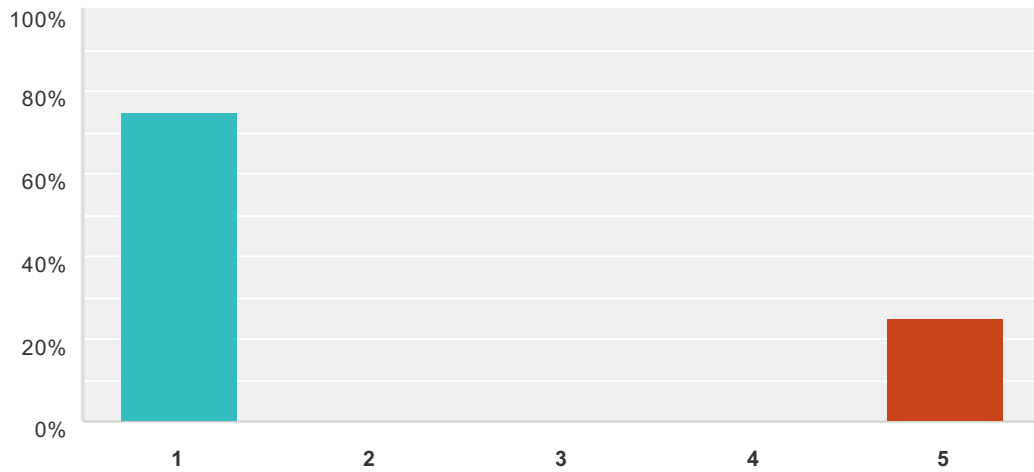
15. Any additional thoughts or comments.

Prev Done

Powered by **SurveyMonkey**  
Check out our [sample surveys](#) and create your own now!

**Q1 The exercises, group discussions, examples, and explanations made the information covered understandable.**

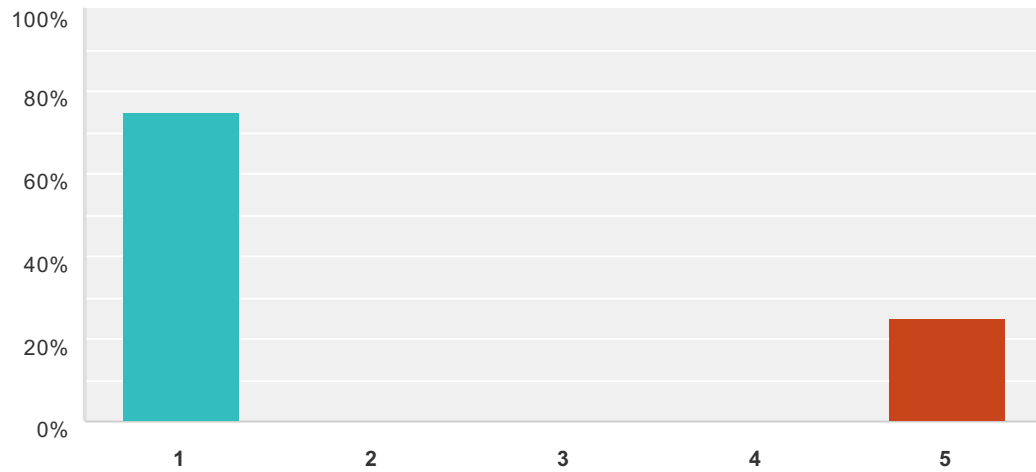
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>

**Q2 The workshop provided a good forum for communication about public/human services transportation coordination.**

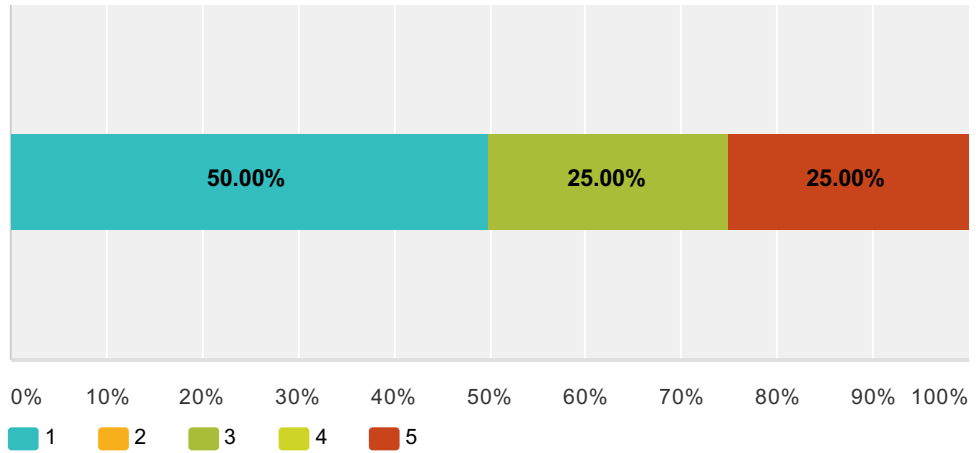
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>

### Q3 Participants at the workshop were from a broad stakeholder group.

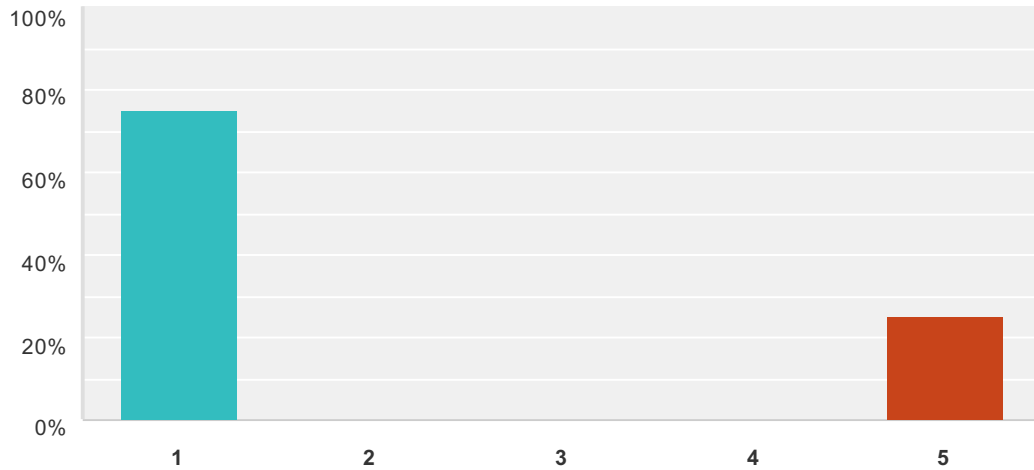
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	50.00% 2
2	0.00% 0
3	25.00% 1
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>

**Q4 The Self-Assessment Survey and Transportation Services Inventory facilitated a meaningful discussion of the county’s status on public transit/human services transportation coordination.**

Answered: 4 Skipped: 0

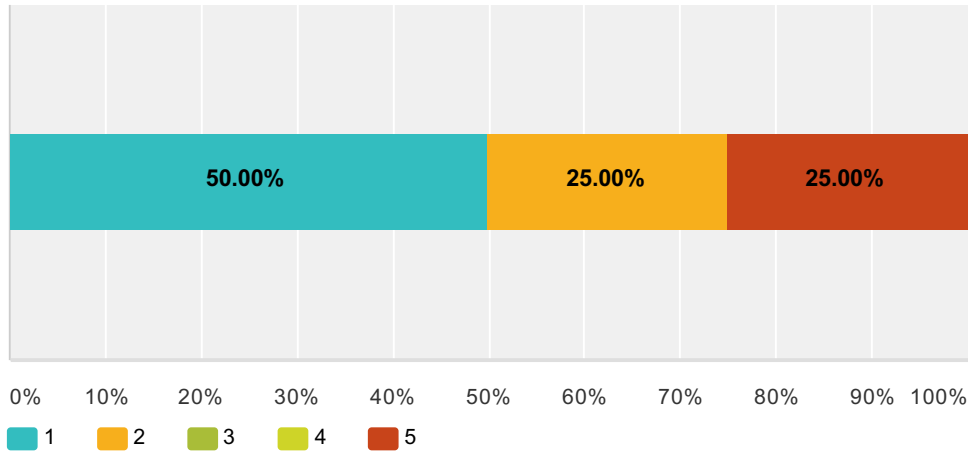


Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>



**Q5 The county prioritized action plan is comprehensive and the actions realistic.**

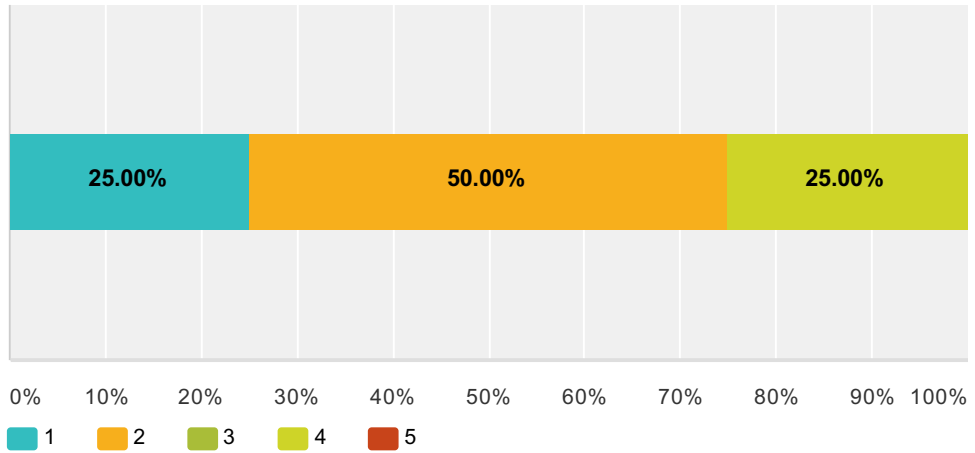
Answered: 4 Skipped: 0



Answer Choices	Responses	Count
1 <b>strongly agree</b>	50.00%	2
2	25.00%	1
3	0.00%	0
4	0.00%	0
5 <b>strongly disagree</b>	25.00%	1
<b>Total</b>		<b>4</b>

### Q6 The county currently has a viable coordination process.

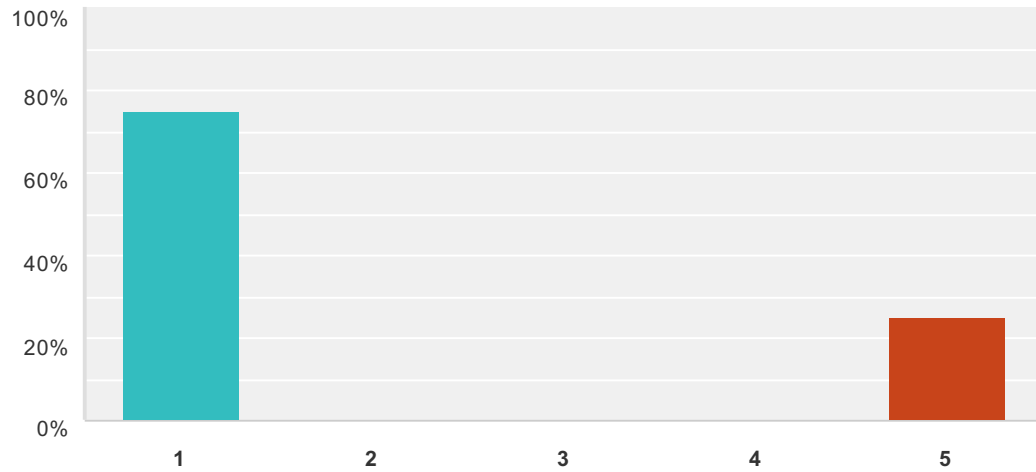
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	25.00% 1
2	50.00% 2
3	0.00% 0
4	25.00% 1
5 <b>strongly disagree</b>	0.00% 0
<b>Total</b>	<b>4</b>

### Q7 Developing the prioritized action plan was meaningful and valuable.

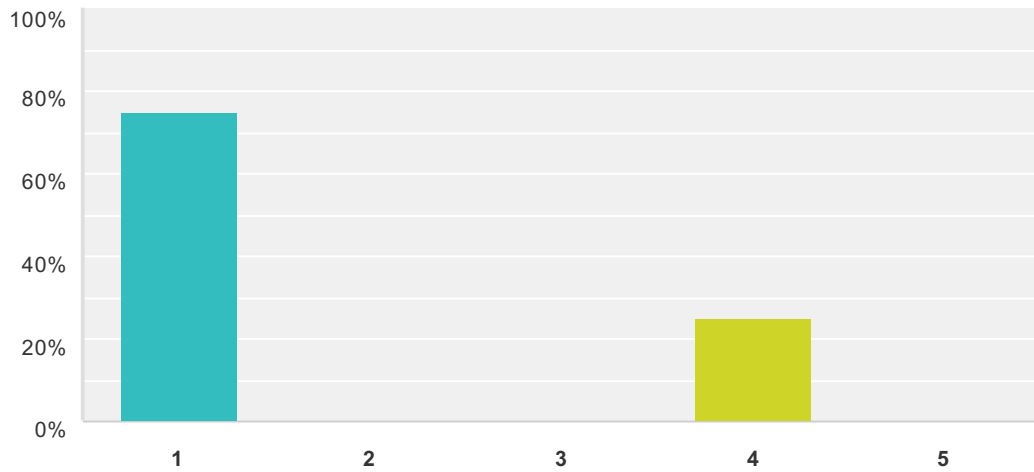
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>

**Q8 I feel the coordination process in the county will be improved based on the assessment, action plan and priorities.**

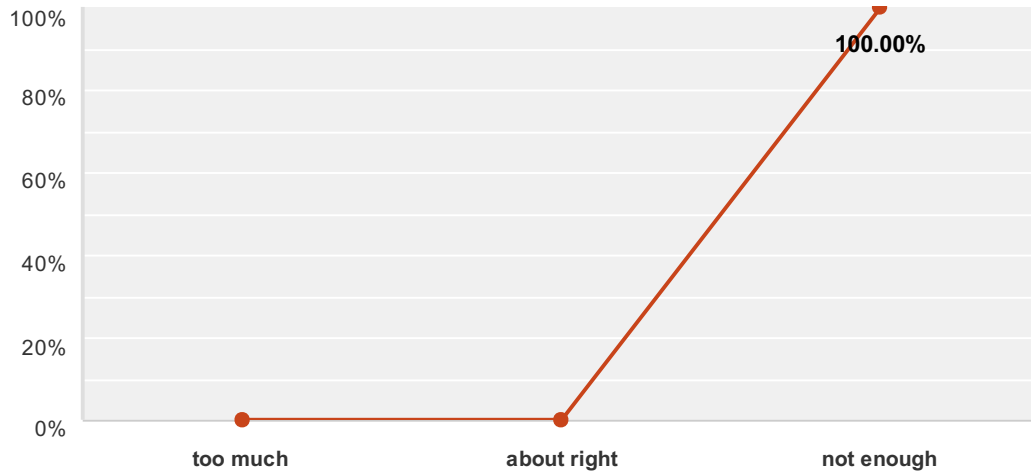
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	25.00% 1
5 <b>strongly disagree</b>	0.00% 0
<b>Total</b>	<b>4</b>

### Q9 The time allotted for each group activity was:

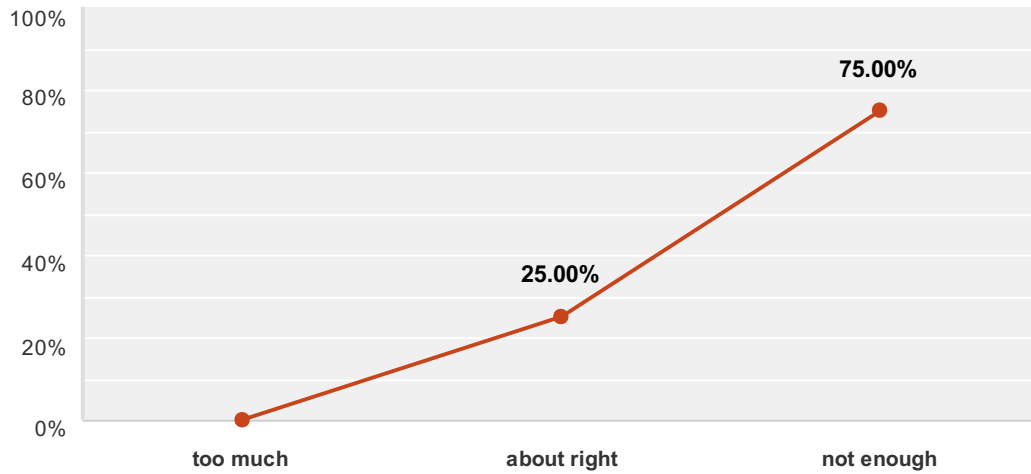
Answered: 4 Skipped: 0



Answer Choices	Responses	
too much	0.00%	0
about right	0.00%	0
not enough	100.00%	4
<b>Total</b>		<b>4</b>

### Q10 The time allotted for the entire workshop was:

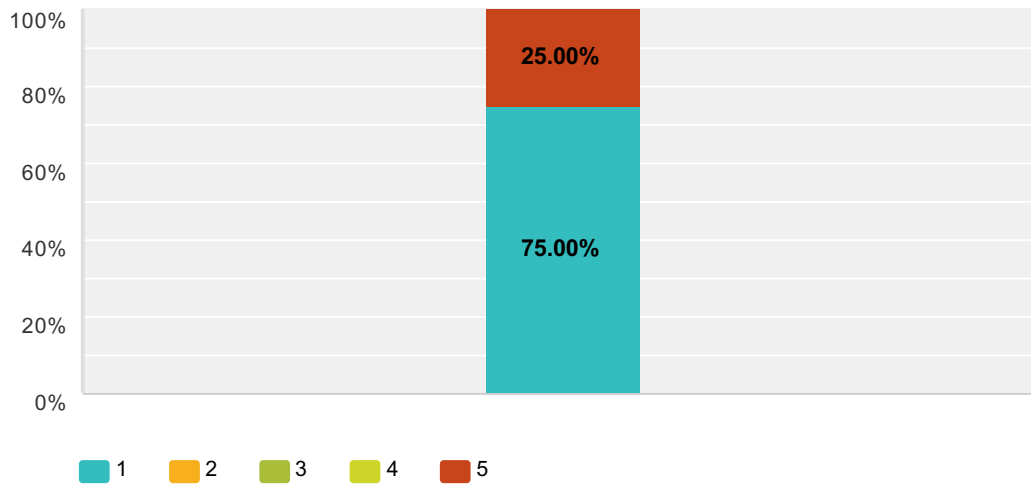
Answered: 4 Skipped: 0



Answer Choices	Responses	
too much	0.00%	0
about right	25.00%	1
not enough	75.00%	3
<b>Total</b>		<b>4</b>

### Q11 The facilitator was knowledgeable about the meeting process and materials.

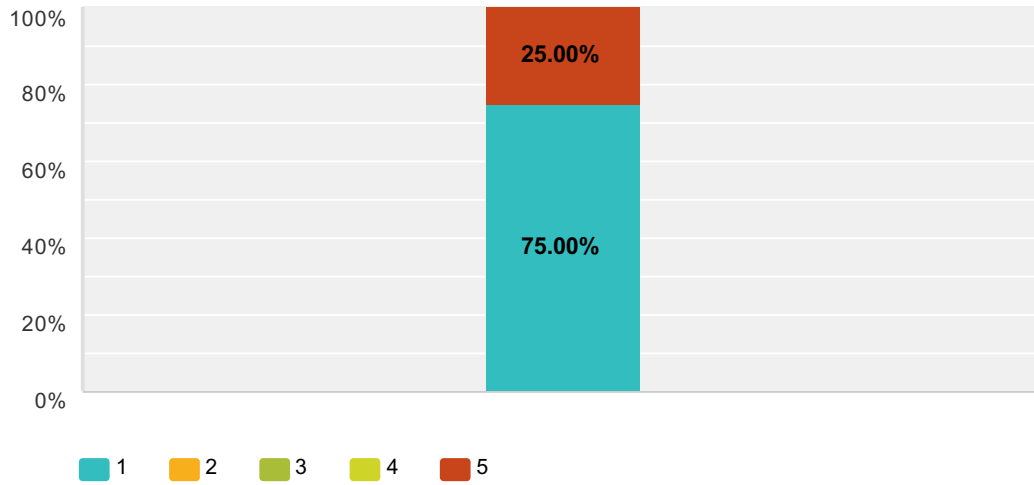
Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>

### Q12 The information was presented in a clear, logical format.

Answered: 4 Skipped: 0



Answer Choices	Responses
1 <b>strongly agree</b>	75.00% 3
2	0.00% 0
3	0.00% 0
4	0.00% 0
5 <b>strongly disagree</b>	25.00% 1
<b>Total</b>	<b>4</b>



**Q13 List three (3) key points / issues presented during the meeting that were most valuable or useful:**

Answered: 3 Skipped: 1

#	Responses	Date
1	*the idea of assisting the public learn how to use the transportation system *looking at the need to add other routes to areas that are currently not served (the Hill Road corridor) *looking at adding service to more of the suburbs such as Fenton, Flushing, Swartz Creek, etc.	5/22/2014 2:03 PM
2	To see who else was at the table- not much representation. More people should have been concerned about this topic.	5/22/2014 1:22 PM
3	Information regarding prospective changes in route schedules	5/22/2014 12:11 PM

**Q14 List any information or meeting content you felt was omitted or needed further clarification.**

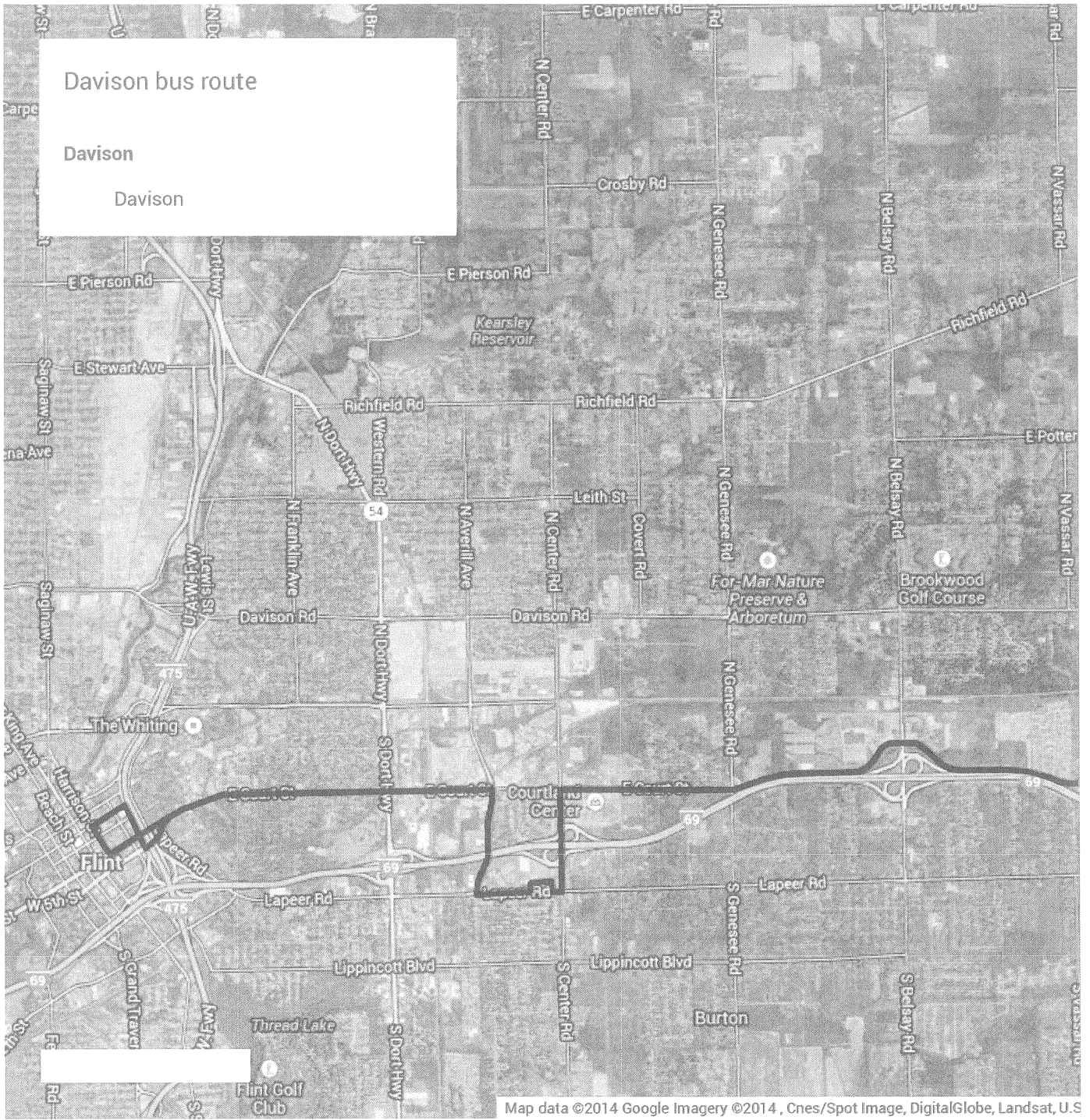
Answered: 1 Skipped: 3

#	Responses	Date
1	Where exactly will all of the funding come from to provide improved services, if the public transit services provider are losing money each year.	5/22/2014 12:11 PM

## Q15 Any additional thoughts or comments.

Answered: 2 Skipped: 2

#	Responses	Date
1	I would have like at least a few additional minutes for the group discussions. It seemed like we just kind of started to all warm up to each other and really started sharing our opinions and we had to stop.	5/22/2014 2:03 PM
2	I would really love to see improved/door to curb services for disabled and elderly, especially in the Winter months.	5/22/2014 12:11 PM



Map data ©2014 Google Imagery ©2014, Cnes/Spot Image, DigitalGlobe, Landsat, U.S.

Activity 1 - Identification of Gaps in Services

- o Suggested Transit Route

## Appendix D: Public Participation Documentation

## Coordinated Public Transit-Human Services Transportation Plan

### Stakeholder Mailing List

1. Action Management Corporation
2. American Arab Heritage Council
3. Amtrak-Government/Public Affairs
4. Ann Arbor Area Trans Authority
5. Argentine Township
6. Atlas Township
7. Baker College of Flint
8. Best Cab Company
9. Brennan Community Center, Attn: Shirley Milton
10. Brennan Senior Center
11. Bureau of Services for Blind Persons
12. Burton Senior Center
13. Capital Area Trans Authority
14. Carman-Ainsworth Senior Center
15. Carriage Town Ministries
16. Catholic Charities Flint
17. Catholic Outreach
18. Charles Stewart Mott Foundation
19. City of Burton
20. City of Clio
21. City of Davison
22. City of Fenton
23. City of Flint
24. City of Flushing
25. City of Grand Blanc
26. City of Linden
27. City of Montrose
28. City of Mt. Morris
29. City of Swartz Creek
30. Clayton Township
31. Clio Senior Center
32. Crim Fitness Foundation
33. Davison Township
34. Davison-Richfield Senior Center
35. Diplomat Pharmacy
36. Disabled American Veterans Chap. 3
37. Eastside Senior Citizens Association
38. Eastside Senior Citizens Center
39. FACED
40. Family Service Agency
41. Federal Highway Administration - Michigan Division
42. Federal Transit Administration
43. Fenton Township
44. Flint & Genesee Chamber of Commerce
45. Flint Community Schools

46. Flint Dialysis of Davita
47. Flint Downtown Development Authority
48. Flint Genesee Job Corps
49. Flint Housing Commission
50. Flint Human Relations Commission
51. Flint NIPP
52. Flint Parks and Recreation
53. Flint Township
54. Flushing Area Senior Center
55. Flushing Township
56. Forest Township
57. Forest Township Senior Center
58. FTA
59. Gaines Township
60. Genesee Area Skill Center - Transportation Services
61. Genesee County Association for Retarded Citizens
62. Genesee County Community Action Resource Department
63. Genesee County Community Mental Health
64. Genesee County Department of Veterans Services
65. Genesee County Emergency Mgmt. & Homeland Security
66. Genesee County Family Independence Agency
67. Genesee County Health Department
68. Genesee County Office of Senior Services
69. Genesee Intermediate School District
70. Genesee Township
71. Genesys Health System
72. Goodwill Industries
73. Grand Blanc Senior Citizens Center
74. Grand Blanc Township
75. Great Lakes Crossing
76. Greater Flint Council of Churches
77. Greater Lapeer Trans Authority
78. Haskell Community Center
79. Hasselbring Senior Center
80. Heart of Senior Citizens Services
81. Hey, Taxi
82. Hurley Medical Center
83. Indian Trails, Inc.
84. International Taxi & Shuttle
85. Jewish Community Services - Federation & Community
86. Kettering University
87. Kettering University - University Ave Corridor Coalition
88. Krapohl Senior Center
89. Legal Services of Eastern Michigan
90. Livingston Essential Trans Service
91. Lockwood Management
92. Loose Senior Center
93. Love, Inc.
94. Mass Transportation Authority
95. McLaren Regional Medical Center
96. MCSI

97. MDOT - Office of Passenger Trans
98. MDOT - Office of Passenger Trans
99. Members of SAGE
- 100.Metro Housing Partnership
- 101.Michigan Department of Human Services
- 102.Michigan Department of Transportation
- 103.Michigan State Housing Dev Authority
- 104.Michigan Works Career Alliance
- 105.MichiVan
- 106.Mission of Peace
- 107.Montrose Senior Center
- 108.Montrose Township
- 109.Mott Children's Health Center
- 110.Mott Community College
- 111.Mt. Morris Township
- 112.MTA Elderly & Disabled LAC
- 113.Mundy Township
- 114.NAACP
- 115.Overflow Resources Transportation
- 116.Priority Children
- 117.REACH
- 118.Resource Genesee
- 119.Richfield Township
- 120.Saginaw Transit Authority
- 121.Salem Housing Task Force
- 122.Salvation Army
- 123.SCSAC
- 124.Shelter of Flint
- 125.Shiawassee Area Trans Agency
- 126.Stat EMS Wheelchair Services
- 127.Suburban Mobility Authority
- 128.Swartz Creek Senior Center
- 129.T R Harris Resource Center
- 130.The Disability Network
- 131.Theftford Senior Center
- 132.Theftford Township
- 133.U of M Flint - Chancellor Office
- 134.United Way of Genesee County
- 135.Valley Area Agency on Aging
- 136.Vienna Township
- 137.Village of Gaines
- 138.Village of Goodrich
- 139.Village of Lennon
- 140.Village of Otisville
- 141.Village of Otter Lake
- 142.Visually Impaired Center
- 143.YWCA Greater Flint





ROOM 223 – 1101 BEACH STREET

FLINT, MICHIGAN 48502-1470

TELEPHONE (810) 257-3010 FAX (810) 257-3185

## MEMORANDUM

**TO:** Members of the Genesee County Metropolitan Alliance

**FROM:** Shane Kelley, Planner I  
Genesee County Metropolitan Planning Commission

**DATE:** October 15, 2014

**SUBJECT:** Draft Genesee County Regional Non-Motorized Plan

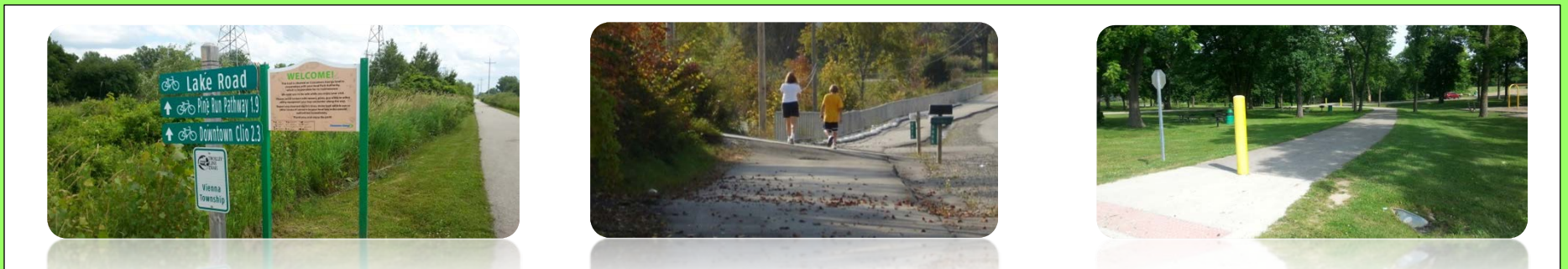
The draft Genesee County Regional Non-Motorized Plan has been developed to provide a framework for creating an interconnected system of trailways throughout Genesee County. This plan identifies potential trail connections, design standards and guidelines for trail development, funding and implementation strategies, and resources for local municipalities.

Staff is requesting that the Metropolitan Alliance review the draft technical report and provide any comments by e-mail to [skelley@co.genesee.mi.us](mailto:skelley@co.genesee.mi.us) or by phone at (810) 766-6570 by Friday, October 24, 2014.

AN EQUAL OPPORTUNITY ORGANIZATION

# DRAFT

## Genesee County Regional Non-Motorized Plan



# Genesee County Regional Non-Motorized Plan

2014



*Prepared by the Genesee County Metropolitan Planning Commission*



# Genesee County Regional Non-Motorized Plan

Genesee County Metropolitan Alliance

July 2014



GeneSEE the Future: Mobility 2040

## GENESEE COUNTY METROPOLITAN ALLIANCE



1101 Beach Street, Room 223  
Flint, Michigan 48502  
Telephone: (810) 257-3010  
Fax: (810) 257-3185

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City of Clio  
City of Davison  
City of Fenton  
City of Flint  
City of Flushing  
City of Grand Blanc  
City of Linden  
City of Montrose  
City of Mt. Morris  
City of Swartz Creek  
Argentine Township  
Atlas Township

Clayton Township  
Davison Township  
Fenton Township  
Flint Township  
Flushing Township  
Forest Township  
Gaines Township  
Genesee Township  
Grand Blanc Township  
Montrose Township  
Mt. Morris Township  
Mundy Township  
Richfield Township  
Thetford Township  
Vienna Township

Gaines Village  
Goodrich Village  
Lennon Village  
Otisville Village  
Otter Lake Village  
Federal Highway Administration  
Genesee County Drain Commission  
Genesee County Road Commission  
Genesee County Planning Commission  
Mass Transportation Authority  
Michigan Department of Transportation



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## GENESEE COUNTY METROPOLITAN PLANNING COMMISSION



1101 Beach Street, Room 223  
Flint, Michigan 48502  
Telephone: (810) 257-3010  
Fax: (810) 257-3185

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Nichole Odette, Secretary

## **ACKNOWLEDGEMENTS**

We would like to thank some of our partners in the development of this trail plan for their participation, insightful ideas, and collaborative efforts.

Technical Advisory Committee of the Metropolitan Alliance  
Genesee County Parks and Recreation  
City of Chicago Department of Transportation  
Federal Highway Administration  
Michigan Department of Transportation  
Michigan Department of Natural Resources Ruth Mott Foundation  
Center for Applied Environmental Research- University of Michigan- Flint  
Genesee County Road Commission  
Mass Transportation Authority  
Flint River Trail Partnership  
Flint River Watershed Coalition  
Friends of the Flint River Trail  
Friend of the Shiawassee  
Keepers of the Shiawassee  
Southern Lakes Parks and Recreation  
Headwaters Trails Inc.  
Safe and Active Genesee For Everyone  
Sierra Club Neppessing Chapter  
Genesee Wanderers  
Flint River Corridor Alliance  
Genesee County Land Bank  
Michigan Trails and Greenways Alliance  
National Parks Service  
Flint Journal

*And all the local units of government who helped find the best trail connections through their communities*



<b>Acknowledgements</b> .....	<b>iv</b>
<b>Table of Contents</b> .....	<b>v</b>
<b>Executive Summary</b> .....	<b>1</b>
MAP: Top Tier Trail Priorities.....	2
<b>Introduction</b> .....	<b>3</b>
<b>Chapter 1: Purpose and Process</b> .....	<b>5</b>
Project Overview .....	6
Long Range transportation Plan Steering Committee.....	6
Planning Process .....	6
Plan Development .....	7
How to Use This Plan.....	7
Definition of Trails and Water Trails .....	8
Vision Statement.....	8
Goals, Objectives and Measures of Effectiveness.....	9
Benefits of Building a Non-motorized System.....	16
<b>Chapter 2: Existing Trail Systems</b> .....	<b>18</b>
Flint River Trail.....	19
George Atkin Recreational Trail .....	19
Trolley Line Trail .....	20
Flushing Riverview Trail and Flushing Bike Lanes .....	21
Grand Blanc Bike Path and Bicentennial Park Trail .....	22
Jewett Trail .....	22
Genesee Road Trail.....	22
Swartz Creek Bike Lanes.....	23
Shiawassee River Walk.....	23
Linden Bike Lane.....	24
Linden County Park Trail.....	24
Goodrich Area Bike Path .....	24
Genesee Valley Trail .....	25
M-21 Non-Motorized Pathway .....	25
Court Street Bike Lane .....	26
M-15 Heritage Route.....	26
Black Creek Nature Trail & Abernathy Park Trail.....	26
<b>Chapter 3: Existing Trail initiatives</b> .....	<b>27</b>

Trolley Line Trail Group .....	28
M-15 Recreational Heritage Route .....	28
Friends of the Flint River Trail .....	29
Southern Lakes Trail Coalition .....	29
Grand Blanc Walk / Bike Group .....	30
University of Michigan-Flint Walk and Bike Work Group .....	30
Walk, Bike, Run Atlas Township .....	30
Safe and Active Genesee for Everyone .....	30
Southern Links Trailway .....	31
<b>Chapter 4: Existing Park Systems</b> .....	<b>32</b>
Linden County Park.....	33
For-Mar Nature Preserve and Arboretum .....	33
Genesee Recreation Area .....	34
Flushing County Park.....	34
Lack N. Abernathy Regional Park .....	35
Davison Area Dog Park .....	35
Ligon Outdoor Center .....	36
Kearsley Park – City of Flint .....	36
Flushing township Nature Park .....	37
Dauner-Martin Nature Sanctuary.....	37
Kelly Lake Park .....	37
Flint Township Nature Park .....	38
Robert Williams Nature and Historic Learning Center.....	38
<b>Chapter 5: Preferred Corridors</b> .....	<b>39</b>
Argentine Township .....	40
Atlas Township and Village of Goodrich .....	41
City of Burton.....	45
Clayton Township and Village of Lennon .....	47
Davison Township and City of Davison .....	49
City of Fenton, Linen, and Fenton Township .....	51
City of Flint .....	54
Flint Township .....	58
Flushing Township and City of Flushing .....	60
Forest Township, Village of Otisville and Village of Otter Lake.....	62
Gaines Township and City of Swartz Creek .....	64
Genesee Township .....	66
City of Grand Blanc and Grand Blanc Township.....	68
Montrose Township and City of Montrose .....	71

Mt. Morris Township and City of Mt. Morris .....	71	Trail Maintenance .....	125
Mundy Township .....	73	Maintenance Agreements .....	126
Richfield Township .....	77	Adopt-a-Trail .....	126
Thetford Township .....	79	<b>Chapter 9: Trail Signage .....</b>	<b>127</b>
Vienna Township and City of Clio .....	81	Trail and Bike Route Signs.....	129
MAP: Existing Potential Trails in Genesee County.....	83	Trail and Bike Destination Signs.....	129
MAP: Regional Connections .....	84	Local Trail Sign Personalization.....	130
Genesee County Priority Trail Segments .....	85	Share the Road Signs.....	131
Atlas Township Trails.....	89	<b>Chapter 10: Trail Resources .....</b>	<b>132</b>
Genesee Valley Trail.....	90	Michigan Comprehensive Trail Plan .....	133
Grand Traverse Greenway & Dort Highway Extension.....	91	Guide for the Development of Bicycle Facilities.....	134
Silver Lake Road .....	92	Michigan Trails Finder.....	135
Trolley Line Trail .....	93	Bay Region Road and Trail Bicycling Guide .....	135
<b>Chapter 6: Water Trails .....</b>	<b>94</b>	Online Trail Building Tool-Kit .....	136
What is a Water Trail .....	95	National Trail Training Partnership .....	136
Why are Water Trails Important?.....	95	Costs for Pedestrian and Bicycle Infrastructure Improvements .....	137
Water Trails in Genesee County.....	97	Trail Counts and Automatic Counters.....	137
Water Trail Planning .....	98	Smart Growth .....	138
National Trail System.....	100	Safe Routes to School.....	139
Michigan Great Lakes Water Trails Working Group.....	101	Context Sensitive Solutions .....	140
Current Initiatives and Interested Groups .....	103	Connecting Michigan: A Statewide Trailways and Action Plan.....	141
Water Trail Funding Sources .....	105	Michigan Trails at the Crossroads: A Vision for Connecting Michigan .....	142
MAP: River Access Sites in Genesee County.....	107	Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails .....	142
<b>Chapter 7: Design Considerations.....</b>	<b>108</b>	<b>Chapter 11: Next Steps.....</b>	<b>143</b>
General Design Guidelines .....	110	Further Trail Research.....	144
Traffic Calming .....	111	GCMPC Outreach and Education.....	147
Path in Right-of-Way.....	112	<b>Appendix A: Signage Design .....</b>	<b>148</b>
Recommended Dimensions for Non-Motorized Trails and Paths.....	113	<b>Appendix B: Sample Maintenance Agreement .....</b>	<b>149</b>
<b>Chapter 8 Funding and Implementation .....</b>	<b>114</b>	<b>Appendix C: Public Input .....</b>	<b>155</b>
Potential Funding Sources .....	115	Genesee County Regional Trails Review Workshop .....	156
Agency Policies and Contacts .....	118	Genesee County Regional Trails Prioritization Meeting .....	159
Recommendations for Implementation.....	120	Water Trail Discussion .....	167
Road Construction Projects .....	121	<b>Appendix D: Resolution of Support .....</b>	<b>169</b>
Trail Associations.....	122	<b>Appendix E: Comments .....</b>	<b>170</b>
Cost Estimates.....	122		
Applying for Funding .....	124		

## Executive Summary

The Genesee County Regional Non-Motorized Plan provides a framework for creating an interconnected system of trailways throughout Genesee County.

The goals of this plan and initiative are: trail connectivity, alternative transportation, safety for all users, recreational opportunities, and providing resources for implementation and education.

Trails provide many benefits to the community including an improved transportation system, health and safety, environmental preservation and economic vitality for the community. Trailways are an important component of creating a livable community and attracting a talented workforce to Genesee County.

There are over 81 miles of non-motorized pathways in Genesee County, yet they are not interconnected. In this plan you will discover potential trail connections identified with help from local communities, trail advocates, transportation planners, educational institutions, and public input. Every area of the county has some potential trail connections outlined in this plan.

Design standards and guidelines for good trail development have been outlined. Funding and implementation strategies are also included.

A trail way finding system for Genesee County is incorporated into this plan with informational signage that provides distance, direction and destination information. The signage standards described herein bring uniformity to the trail network while also allowing for personalization for each trail and local community.

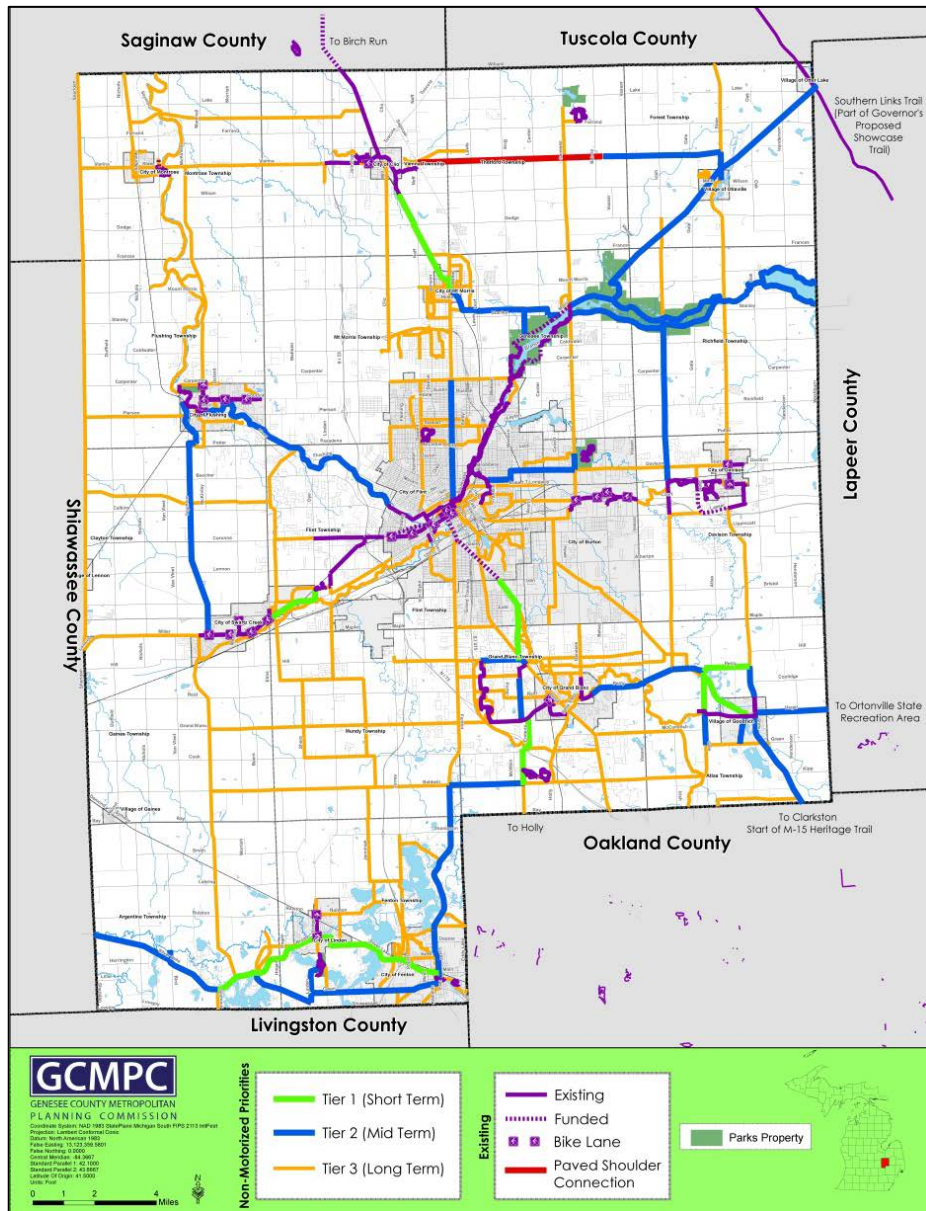
Resources for new trail development are included and contact information on new initiatives locally and statewide that can benefit Genesee County's non-motorized planning efforts.

The Genesee County Regional Non-Motorized Plan includes priority tiers for trail development and recommendations for next steps to continue the development of non-motorized pathways in Genesee County.

See you on the trails!

# Regional Non-Motorized Priority Tiers

## Executive Summary



### Tier 1: Short Term Priorities (1-10 years)

These trails represent those which have strong public support and higher priority for development in the near future.

### Tier 2: Mid Term Priorities (11-20 years)

These represent trails with public support and important connections to be developed along with or after tier 1 trails.

### Tier 3; Long Term Priorities (Beyond 20 years)

The remaining potential trails are categorized as tier 3 priorities. These represent our long term priorities beyond 20 years.

## Introducing the Genesee County Portion of the Pure Michigan Experience!



### **Gov. Rick Snyder signs bills designating Pure Michigan Trail Network**

*Snyder signs legislation creating the Pure Michigan Trail Network. He is joined by Michigan Department of Natural Resources Director Keith Creagh (second from left), bill sponsor state Rep. Dave Pagel (center), Michigan Trails and Greenways Alliance Executive Director Nancy Krupiarz (far right) and representatives from the DNR and Michigan Economic Development Corp.*

## Introduction

In a state becoming known as the “Trail State” there is a county actively pursuing and advocating for non-motorized developments: Genesee County!

Genesee County welcomes growth of its non-motorized system as well as potential connections to the Governor’s Showcase Trail.

If not the trail capital of the trail state, Genesee County is and can further develop, into a prime destination among the larger Pure Michigan Trail Network.

## Imagine...

Imagine if all the residents and visitors of Genesee County had hiking, biking, and walking trails connecting our cities and villages.

Imagine if you were able to walk to work, school, or the store through a safe and inviting trail system.

Imagine if residents had opportunities to really enjoy and experience their natural environment without having to drive hours up north.

## What If...

What if we brought together all the communities of Genesee County to form a shared vision for an interconnected trail system?

**Linking communities to each other,**



**Linking people to their community and their environment?**



# 1

## Purpose & Process



## Chapter 1: Purpose and Process

### Project Overview

In response to the growing support, a regional trail plan was created in 2007. Since its inception support has continued to grow and local municipalities have continued building and advocating for trails.

The Genesee County Metropolitan Planning Commission (GCMPC) functions as staff to the Genesee County Metropolitan Alliance (GCMA), the Metropolitan Planning Organization (MPO) for the Flint-Genesee County area. GCMPC provides staff resources, technical support and services to assist Genesee County municipalities with the needs and demands of a rapidly urbanizing county.

GCMPC has provided technical assistance to local trail groups on a project by project basis, helping to build trails one trail at a time. Since the first Regional Trail Plan of 2007 Genesee County has received \$7.5 million in funding for trails and has an additional \$3.5 million awarded as of 2014.

### Long Range Transportation Plan Steering Committee (LRTPSC)

The Long Range Transportation Plan Steering Committee (LRTPSC) is a sub-committee of the Genesee County Metropolitan Alliance (GCMA) for the development of the Long Range Transportation Plan (LRTP). The sub-committee provides guidance to the Genesee County Metropolitan Planning Commission (GCMPC) staff on the

development of the LRTP. Members of the LRTPSC include representatives from MDOT, Flint-MTA, Bishop International Airport, and various municipalities. The LRTPSC ultimately provides recommendations to the Technical Advisory Committee (TAC) and the GCMA for the approval of the individual technical reports and LRTP as a whole.

### Planning Process

The first Non-Motorized Plan, the 2007 Genesee County Regional Trail Plan was developed over a six month period with the Genesee County Regional Trail Council (an informal stakeholder group) as the steering committee. The project brought together various trail groups from across Genesee County and local government officials interested in building trail connections in their community. The plan built on park and recreation plans and individual trail plans, bringing all of these together into a comprehensive trail plan. For the 2014 update GCMPC consulted with local trail advocates, trail groups, and local municipalities. Funding and staff time for this plan has been provided by the Genesee County Metropolitan Planning Commission.





## Plan Development

As part of the 2040 Genesee County Long-Range Transportation Plan, Staff reviewed current parks and recreation plans for additional trails and composed a series of maps consisting of existing trails, proposed trails, and regional connections. This information was compiled into a Geographic Information System.

### The purpose of this plan is to:

- Provide the tools necessary to enable local units of government and trail advocates to plan for, design, fund and implement non-motorized trails throughout Genesee County.
- Unite a diverse group of stakeholders in the community to draft a vision of interconnected non-motorized trails linking communities, cultural and educational destinations and natural areas throughout Genesee County.
- Educate the public on the benefits of non-motorized trails and their importance in creating livable communities.
- Create the framework for building a safe, convenient, and attractive Regional Trail System, connecting throughout Genesee County and into the surrounding counties.

## How to use this plan

The Genesee County Non-Motorized Plan is a guide for planning and developing non-motorized pathways in Genesee County. It clarifies the regional linkages needed to connect individual non-motorized plans of our cities, townships and villages.

This plan lends support and justification for funding requests by local units of government, collaborative partnerships and transportation agencies. In nearly all sources of funding from state and federal programs to foundations and philanthropic organizations, trail projects that are part of a regional trail network and in an adopted regional plan are looked upon in a favorable light. Municipalities and trail advocates should utilize this plan to seek funding support and other assistance in their trail development and improvement efforts.

This plan is also a guide on where to locate information and resources needed to build trails and help answer questions on implementation, funding and maintenance so that our regional trail system is equitable and sustainable.

This plan is a living document that represents the current non-motorized transportation needs in Genesee County. This plan is updated periodically as sections of trails are built, other potential trail connections are found, or the needs of the community change.

## Definition of Trails

For purposes of this document “trail” will be defined as a non-motorized transportation route including:

- On-road facilities such as bike-lanes (facilities defined as bike-lanes will be labeled as such in the plan),
- multi-use non-motorized paths in the road right of way,
- multi-use non-motorized paths in utility corridors or abandoned railroad corridors,
- foot-trails or walking trails (areas defined as walking trails will be labeled as such in the plan),
- Sidewalks (areas defined as sidewalks will be labeled as such in the plan).

Where trail connections are sought and sidewalks or walking paths exist, the sidewalks or walking paths are included in the trail plan as a connector and a starting point to further upgrade at a future date into a multi-use trail. This plan does not intend to be a comprehensive inventory of sidewalks.



## Definition of Water Trails

The Department of Natural Resources (DNR) defines a “Water Trail” (also known as “Blue Trail”) as a signed water route with or without portages for non-motorized watercraft.

Water trails often include: route markers; maps and promotion of water routes; facilities for parking, boat ramps or docks, and places to camp and picnic. Specific information related to water trails is provided in Chapter 6.

## Vision Statement

### Non-Motorized Vision for Genesee County

The Genesee County Regional Trail System will provide to a diverse range of residents and visitors well maintained, countywide, multi-use, water and paved trail system that enables non-motorized users to safely access communities, natural areas, and waterways within and outside of the county.

## Goals, Objectives, and Measures of Effectiveness

*Connectivity*

*Alternative Transportation*

*Safety*

*Recreational Opportunities*

*Implementation Resources*

*Education*

### Goal: Connectivity

*To facilitate the development of an interconnected regional trail system in Genesee County comprised of accessible sidewalk systems, bike lanes and non-motorized multi-use paths*

#### Objectives:

- To combine different types of non-motorized routes such as rail-trails, road right-of-way, utility corridors, river and other natural corridors through easements, right-of-way and purchase into an interconnected non-motorized system
- To provide accessible and convenient non-motorized routes to destinations throughout the county such as schools, commercial areas, recreational facilities, community and cultural centers and other areas
- To improve existing facilities and make them more useable, well maintained, accessible to the disabled and easy to find
- To improve signage for trails through a clear and concise unified signage in Genesee County
- To link existing trails and provide return routes.
- To ensure that new facilities are built to American Association of State Highway and Transportation Officials (AASHTO) design

standards and are accessible to those with mobility challenges

- To create trail heads, turnouts, viewing stations, and interpretive signs along trails
- To connect non-motorized multi-use trails into the fixed route bus system in Genesee County where feasible

#### Measures of Effectiveness:

- Current trails are extended into neighboring cities, villages and townships
- Missing linkages in existing trails are built
- Access for persons with mobility issues is improved on existing trails and sidewalks
- Accessible bus stops interconnecting with the trail system are planned for and built
- A countywide trail way finding system is adopted and constructed



### Goal: Alternative Transportation

*To create safe, accessible, and convenient routes to schools and places of work in Genesee County that promote walking and biking as an alternative form of transportation and that integrate into other existing transportation systems.*

#### Objectives:

- To promote a Safe Routes to School program in area schools
- To promote bicycling and walking to work
- To encourage alternative transportation for short trips (under 2 miles)
- To incorporate bicycle and pedestrian friendly and design and considerations into transportation improvement projects
- To encourage local businesses to provide bicycle racks interconnected sidewalks, and employee incentives to choose alternative forms of transportation.

#### Measures of Effectiveness:

- Increased use of trailways as a transportation alternative for commuting to work
- Increased participation from local schools in the Safe Routes to School program
- Increased use of trailways as a transportation alternative for short trips (under 2 miles)



## Goal: Safety

*To have the ability to safely travel to community destinations, transit, and recreational facilities without the use of a motor vehicle.*

### Objectives:

- To minimize conflicts between pedestrians, bicyclists, and vehicles while accommodation each type of travel
- To eliminate obstacles to non-motorized travel for all users
- To improve the safety of the existing non-motorized system
- To provide signs and/or signals for at grade street crossings



### Measures of Effectiveness:

- All trailways and road crossings at-grade are properly signed and marked
- Increased awareness of bicyclists and pedestrians as valid users of the transportation system
- Decrease in the number of vehicle-bicycle crashes in Genesee County
- Decrease in the number of vehicle-pedestrian crashes in Genesee County
- Safety improvements made to the transportation system in Genesee County for pedestrians and bicyclists

## Goal: Recreational Opportunities

*To increase access to recreational opportunities for people of all ages, ethnicities, and levels of mobility*

### Objectives:

- To provide access to parks and natural areas via trail connections
- To Preserve wildlife habitat along trail corridors
- To promote active living
- To improve opportunities to exercise for Genesee County residents
- To encourage use of parks and natural areas in Genesee County



### Measures of Effectiveness:

- Increased use of trails in Genesee County for recreational purposes
- Increased use of park and recreation areas in Genesee County
- Increased use of trailways in Genesee County for organized fitness, training, and running programs.
- Increased use and awareness of Water Trails in Genesee County.



## Goal: Implementation Resources

*To provide local trail groups and municipalities with the resource knowledge needed to implement the regional trail plan*

### Objectives:

- To peruse state, federal, and private grants to help local units of government to construct non-motorized trails
- To help build relationships between local units of government and foster multi-jurisdictional planning for trails and sharing of resources for recreation and transportation means
- To identify long term maintenance solutions for existing trails
- To prioritize sections of trail for funding in an equitable manor
- To use existing right-of-way, public lands, utility and rail corridors where possible to minimize cost and implementation



### Measures of Effectiveness:

- Creation of a regional trail system in Genesee County
- Multi-jurisdictional efforts to build interconnected trails in Genesee County
- Increase in funding for trailways within Genesee County from local, state, federal, non-profit, and private funding sources.





### Goal: Education

*To build public support and awareness of trails in Genesee County*

#### Objectives:

- To inform the public about the benefits of using trails
- To teach bicycle and pedestrian safety to trail users and motorists
- To show people where trails exist in Genesee County
- To establish outdoor classrooms and signage along trails that teach historical, environmental, and natural sciences
- To educate elected and government officials on the importance of trails for healthily living, economic development, and quality of life for the residents of their community
- To develop promotional materials, maps, web pages, and education packets that highlight trails and the benefits of trails to the community
- To promote volunteerism and environmental stewardship by having the public help maintain trails through an adopt a trail program or friends of the trail group

#### Measures of Effectiveness:

- Increased awareness and use of trailways in Genesee County
- Development of trailways map for Genesee County of existing trails
- Increased public demand for trailways as a part of an interconnected, multi-modal transportation system in Genesee County
- Availability and distribution of useful educational materials on current trailways, their benefits, bicycles and pedestrian safety, and trail development resources



## Benefits of Building a Non-motorized System



## Benefits to the Community

Trails are part of creating a livable community. Trailways connect adjacent cities and also create social connections between different groups of people. They provide beautiful public spaces for people to enjoy, and can be used to enhance existing infrastructure and community facilities, such as parks, schools, libraries, downtowns and cultural centers.

## Transportation Benefits

Non-motorized trails provide an alternative form of transportation to the automobile. Trails also help to relieve congestion on our roads by getting people out of their cars and off of the streets for their trips.

## Health

Trail users have an extra opportunity for increased physical fitness. As the national obesity epidemic is quickly becoming one of the largest health problems we are currently facing, trails provide one inexpensive means to get exercise and can be part of a healthy lifestyle. Trails provide students a healthy alternative to get to and from school.

## Safety

Trails create a safe way for hikers and bikers to get to their destinations without having to use busy streets. They can also provide children with a safe route to school. Most of our community schools were designed to be walked to by students. Despite this being the case, it is an all too common scene these days to see congested streets around schools as parents pick-up and drop-off their kids. Our school parking lots become a hazardous zone with so many people arriving and departing at the same time.

## Environmental

Trailways help connect people to their physical environment and foster an appreciation for nature. Non-motorized trails are a wise use of our dwindling resources as they re-use urban land and preserve open space along river corridors and wetlands. They help to improve air quality by taking vehicles off the road and lessening our carbon output



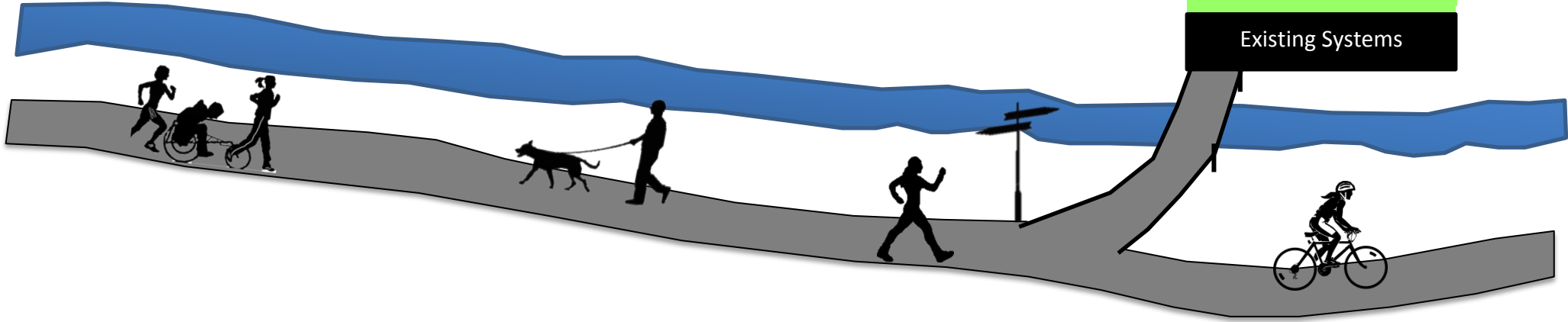
## Economic

Trails bring economic opportunity to our county. Trail users spend money in the cities and towns they travel through along the way. New businesses open up to take advantage of the increased foot traffic along the way. Businesses looking to relocate are drawn to the types of communities that provide the best quality of life for their employees and an interconnected non-motorized trail system does just that. For the consumer, trails have a great economic benefit; they save money spent on gas and the cost of car maintenance. With the cost of fuel rising every year, many more of us will be looking for alternative forms of transportation.



2

Existing Systems



## Introduction

There are over 81 miles of non-motorized pathways in Genesee County. This chapter identifies Genesee County's existing trail infrastructures. The proposed trail system for Genesee County will link these trails and add future amenities.

## Flint River Trail

The Flint River Trail is a multi-use trail that follows the complete path of the Flint River that flows within the city limits. It begins at Ballenger Hwy in the City of Flint and has two terminus in the Genesee Recreation Area, Bluebell Beach and Stepping Stone Falls. The trail is approximately 15 miles in length and includes a loop through Kearsley Park. The trail is paved and is suitable for biking, jogging or walking. Every Sunday from May through October the Friends of the Flint River Trail ride at 2:00 p.m. starting at the former Flint Farmers' Market in downtown Flint.



## George Atkin Jr. Recreational Trail and Pine Run Creek Bike Path

The George Atkin Jr. Recreational Trail and Pine Run Creek Bike Path are multi-use trails located along Pine Run Creek in the City of Clio and Vienna Township. The trails can be accessed from parking lots which are located off Jennings, Wilson and Neff Road, as well as in the Clio City Park. The trail is suitable for biking, running, walking and roller-sport activities. It winds through woodlands, parks and residential and commercial areas, and is approximately five and one-half miles long. A unique feature of this trail is the series of tunnels and bridges that offer the user an uninterrupted travel path through the local infrastructure. This trail also connects to the Trolley Line trail.



### Trolley Line Trail

The Trolley Line trail runs north to the Genesee County Line from Field Road to Willard Road, in Vienna Township. The Trolley Line Trail completes a 3-mile extension of the 6-mile Clio Area Trail Network bringing the total of this system to 9 miles and the second largest trail network in Genesee County. There are currently plans to construct a 1.7 mile connection from Willard Road in Birch Run Township (the end of the trolley line trail) to the Birch Run Premium Outlets in the village of Birch Run.



### Out-of-County Connection



## Flushing Riverview Trail

The Flushing Riverview Trail goes from the downtown Flushing Main Street Bridge to the Flushing County Park and is approximately 1.4 miles long. The trail has rest area bump-outs with benches and tables that were hewn out of the trees logged from the actual trail route. The route includes a 72' span bridge over Cole Creek and a 200' bridge over the Flint River. The trail is suitable for walking, biking, roller-sports or any other non-motorized mode of transportation. It has a fishing pier and pedestrian bridge that provide Americans with Disabilities Act (ADA) accessible fishing opportunities.



## Flushing Bike Lane

The City of Flushing has striped a bike lane on McKinley Road from the northern city limits to downtown Flushing.



## Coutant St. Bike Lane

In the City of Flushing, from McKinley to Elms Road, along Coutant St are striped and marked bike lanes on both sides of the street approximately 2 miles in length. These bike lanes connect Flushing Early Childhood Center, Central Elementary School, and Mutton Park.

## Grand Blanc Bike Path & Bicentennial Park Trail

This bike path follows Grand Blanc Road for 2 miles connecting to the Bicentennial Park Trail which extends approximately 3 additional miles. These pathways combine go from the western city limits of Grand Blanc through Bicentennial Park to Hill Road in Grand Blanc Township. It is suitable for walking, jogging, roller-sport activities and biking.



## Jewett Trail, Grand Blanc

Along the road named "Jewett Trail" is now an actual non-motorized trail! It starts at Holly road next to the high school and connects into the sidewalk system at Davis St which leads to the bike lanes on Grand Blanc Road just a few blocks over. The trail is approximately 1 mile long.

## Genesee Road Trail, Grand Blanc

A 10-ft non-motorized path runs along the western edge of Genesee Road in the City of Grand Blanc from ½ mile south of Hill Road to Perry Road. There are plans to eventually extend the trail to Hill Road in Grand Blanc Township. This pathway links into the City of Grand Blanc sidewalk system at Perry Road heading westward. The trail is approximately ¾ of a mile.



## Swartz Creek Bike Lanes

The Swartz Creek Bike lane extends along Miller Road from Seymour Road to Elms Road and Along Morrish Road from Miller to I-69 within the city limits. The bike lane has proper signage and lane markings. At the end of the bike lanes on Miller Road near Elms Road there is a portion of trail that continues north on Elms Road to Elms Park. Combine the bike lanes and trail is approximately 2 ¾ miles long.



## Shiawassee River Walk

This multi-use trail is located in the City of Fenton and is approximately 1 ½ miles long. It extends from O'Donnell Park located on the Fenton Mill Pond to Caroline Street. The River Walk, which follows the pond, has benches and is close to playground equipment and the community center.



### Linden Bike Lane

This bike lane is located in the City of Linden, and extends from Rolston Road to Silver Lake Road. It is approximately 3 ½ miles long. The bike lane has proper signage and lane markings. It extends from the west city limits to the east city limits along Broad Street (Silver Lake Road). The bike lane also follows bridge Street (Linden Road) from Broad Street to the north city limits. It then continues along Rolston Road from Bridge Street to the east city limits.

### Linden County Park Trail

Located at the Linden County Park is a paved pathway approximately 1 ½ miles long connecting to the sidewalks along Bridge Street.



### Goodrich Area Bike Path

The bike path follows Hegel Road from the intersection of Gale Rad in Atlas Township to Oak tree Elementary in the Village of Goodrich. It also extends along M-15 (State Road) within the village limits. The bike path is approximately 2 miles long.



## Genesee Valley Trail

The Genesee Valley Trail is a 10 ft asphalt non-motorized pathway that runs alongside M-21 and the old CN Railroad Line in Flint Township from the City of Flint City Limit to Linden Road along Genesee Valley Mall. The Genesee Valley Trail is approximately 2 ¾ miles long.



## M-21 Non-Motorized Path

This ten-foot-wide paved non-motorized path is located in Flint Township and follows the north side of M-21 (Corunna Road) from Dye Road to I-75. The path is approximately 1 ½ miles long.



## Court Street Bike Lane

This bike lane is located within the City of Burton and follows Court Street from Belsay Road to Vassar Road. The bike lane is approximately 1 ½ miles long and has access to Bentley Middle and High Schools.

## M-15 Heritage Route

In 2013 a 1.8 mile section of the M-15 Heritage Route was completed. It extends from M-15 east on Lapeer Road, down Russell Alger Drive, to the high school, then west to Clark Road, ending on Main Street. Portions of the trail have been constructed in the Village of Goodrich along M-15.



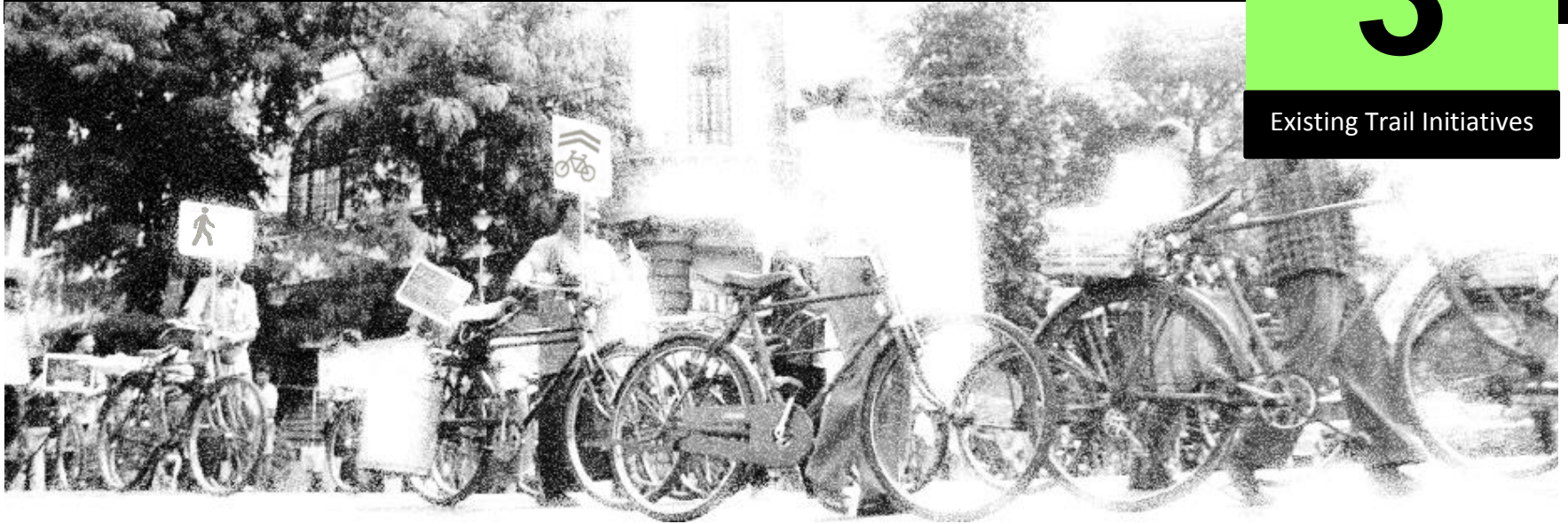
## Black Creek Nature Trail & Abernathy Park Trail

The Black Creek Nature Trail is a 1.6 mile long, non-motorized trail that runs east along Black Creek and joins the Abernathy Park trail in the City of Davison. The trail head begins at the northeast corner of the Davison Township Municipal Center parking lot. Parking is also available in Abernathy Park and at the newest connection on Gale Road. The Abernathy Park Trail is just shy of 2 miles long.



# 3

## Existing Trail Initiatives



*The Genesee County Non-Motorized Plan builds on the work of many trail initiatives that have been working to build trails in their area. This chapter introduces these groups and their projects.*

### Trolley Line Trail

The Clio Area Trolley Line Trail group worked to develop a trail along the historic Clio Trolley Line. The Clio Trolley Line is the name for the old inter-urban railway line that used to run from Saginaw through Flint to Detroit. The trail currently runs from Wilson Rd northerly to the county line connecting to a new trailhead to be constructed leading to the Birch Run Premium Outlets.



### M-15 Recreational Heritage Route

The M-15 Recreational Heritage Route was Michigan's first Recreational Heritage Route. It extends from Ortonville in Northern Oakland County to the northern terminus of M-15 east of downtown Bay City, approximately 90 miles. It covers 19 communities in Oakland, Genesee, Tuscola and Bay Counties. The Route offers summer festivals, shopping, restaurants and activities such as camping, fishing, biking, hiking and horseback riding. For more information visit their Facebook page at

<https://www.facebook.com/pages/M-15-Recreational-Heritage-Route/118185254909628>



### Friends of the Flint River Trail



The Friends of Flint River Trail (FFRT) are an active group of trail advocates whose purpose is to promote greater use of the trail through improved safety, maintenance and publicity; to improve facilities along the trail; and to extend the trail's length and move toward a city/county trail system. The FFRT host weekly bike rides along the Flint River Trail every Sunday, May through October at 2:00 p.m. beginning at the former Flint Farmers Market (rain or shine). They also work to keep the trail clean with an annual clean-up the last weekend in April. The FFRT have a website for more info or to join the group or go to:

<http://flinriver.org/blog/chapters/friends-of-the-flint-river-trail/>

### Southern Lakes Trail Coalition

The Southern Lakes Trail Coalition is a grassroots movement advocating for multiuse pathways in South-East Genesee County.

[www.facebook.com/SouthernLakesTrailCoalition](http://www.facebook.com/SouthernLakesTrailCoalition)



### Grand Blanc Walk / Bike Group

A small group of residents have started a grassroots effort to put more bike trails in Grand Blanc Township.

The group wants to see bike and walking trails similar to the ones on Perry and Grand Blanc roads.

### University of Michigan-Flint Walk and Bike Work Group

The UM-Flint Walk and Bike Work Group encourage active living and smart commuting on campus and throughout the Greater Flint area.

#### Mission

To establish a walking and bicycling friendly culture at the University of Michigan-Flint that fosters the support of safe, non-motorized transportation initiatives, policies, and infrastructures across the campus and through the greater Flint area. Increased walking and bicycling will lead to reduced congestion on campus, enhanced local and regional transportation options for current students, staff, and faculty, aid in attracting future students, and ultimately lead to a safer and healthier community for everyone in Flint, Michigan.

[www.facebook.com/umflintwalkandbikeworkgroup](http://www.facebook.com/umflintwalkandbikeworkgroup)

### Walk, Bike, Run Atlas Township

This group consists of residents and local officials working towards expanding off of the current trail along Hegel Rd and M-15. Long range goals include creating a loop by extending the current trail on Hegel Rd north to Perry, East along Perry Rd, and South on M-15 completing the loop. They also would like to connect to Davison and Grand Blanc Township.

[www.facebook.com/Walkbikerunatlastownship](http://www.facebook.com/Walkbikerunatlastownship)



### Safe and Active Genesee for Everyone

SAGE is a collaborative of local advocates, non-profit, private and government organizations working together to advocate for and support active living initiatives that promote safe opportunities for people to be physically active throughout Genesee County.

[www.activegenesee.org](http://www.activegenesee.org)



**Safe & Active  
Genesee for Everyone**



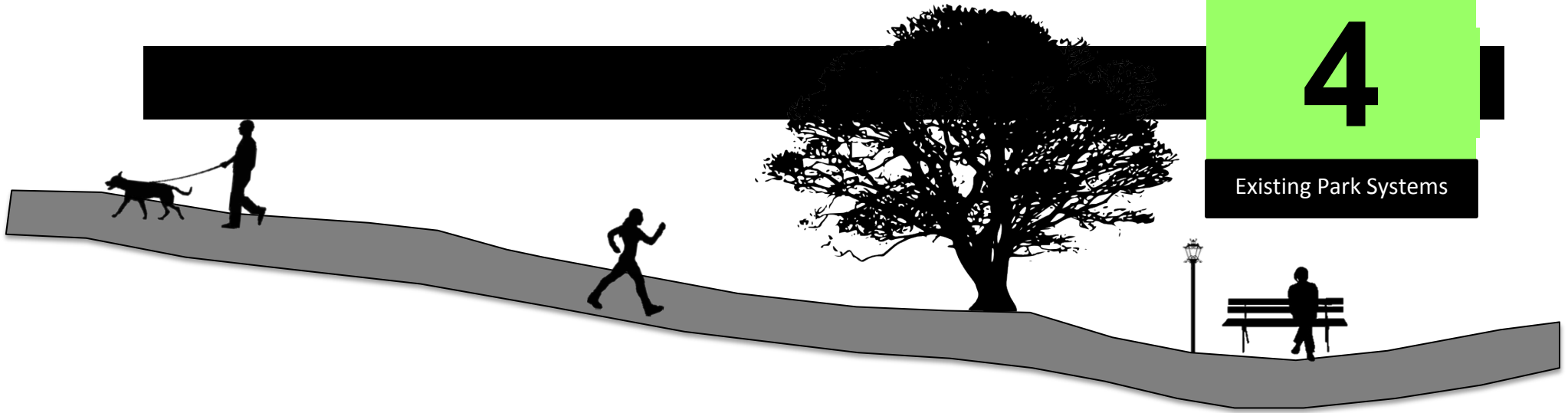
## Southern Links Trailway

The Southern Links Trailway is located on an old railroad bed and passes through portions of three counties: Genesee, Tuscola and Lapeer. This linear park spans approximately 10 miles, passing through the Village of Columbiaville, Marathon Township, the Village of Otter Lake, Forest Township, Millington Township, the Village of Millington, Vassar Township and the City of Vassar. The Friends of the Southern Links Trailway is a group of concerned trail enthusiasts who promote and support the trail's development. The Friends promote the trail to local residents, organizations and businesses. They also raise funds and provide volunteer labor for the trail. Long range goals include extending the trailway north to Reese, as well as to the Polly Ann Trail in Lapeer County and to the M-15 Heritage Route. For additional information go to their website at: [www.southernlinkstrailway.com](http://www.southernlinkstrailway.com).



# 4

Existing Park Systems



### County Parks

Many of the non-motorized trails in Genesee County are within one of our beautiful parks. This chapter lists and describes parks that have non-motorized trails. This chapter is not meant to be a full description of all of the amenities these parks have to offer.

#### Linden County Park

Linden County Park is located on Linden Road, south of Silver Lake Road in Fenton Township. It has a designated walking area with distances marked for convenience. The trail is approximately 1 ½ miles long, and is marked at the ¼ mile, ½ mile, ¾ mile, 1 mile, 1 ¼ mile and 1 ½ mile points. The trail has access to restroom facilities.



#### For-Mar Nature Preserve & Arboretum

The For-Mar Nature Preserve is located on North Genesee Road in the City of Burton, between Davison Road and Potter Road. The Preserve has designated walking trails with distances marked for convenience. There are eight named trails to choose from, along with the Maple Walk, the Lilac Walk and grass trails. The Preserve has a total of seven miles of trails, however, no biking or jogging is allowed.



### Genesee Recreation Area

The Genesee Recreation Area is located in Genesee and Richfield Townships and offers several trails, such as the Bluegill Boat Launch Trail. This trail is located at Coldwater Road and Genesee Road. It is a 1 ½ mile long paved trail, and is marked at the 1/8 mile, 1/4 mile, 1/2 mile, 3/4 mile, 1 mile, 1 ¼ mile and 1 ½ mile points. Restroom facilities are available on this trail, as well as access to Mott Lake and free parking. The Bluebell Beach Trail is approximately 5/8 of a mile long, and is marked at the 1/8 mile, 1/4 mile, 1/2 mile, and 5/8 mile points. It is located off Bray Road north of Carpenter Road in Genesee Township. The trail includes restroom facilities and has access to the Splash Pad Playscape, the beach and Mott Lake. Also, a portion of the Flint River Trail (4/5 mile long paved trail) links Carpenter Road and Bluebell Beach.



### Flushing County Park

Flushing County Park is located on North McKinley Road and has Carpenter Road as its northern border. The park's one-mile trail is marked at the 1/8 mile, 1/4 mile, 1/2 mile, 3/4 mile and one mile points. The trail has access to a playscape and links to the Flushing Riverview Trail.



## Other Parks with Trails

### Jack N. Abernathy Regional Park

Jack N. Abernathy Regional Park is located on Frank Boyce Parkway, off Dayton Street and Harvey Drive in the City of Davison. Trail offerings of the park include an 18 station fitness trail, the Black Creek Trail, and a 1.7 mile ADA (Americans with Disabilities Act) accessible trailway.



### Davison Area Dog Park

The Davison Area Environmental Team in conjunction with area volunteers and community businesses provided an off-leash dog park for the Davison and surrounding areas. The park is located adjacent to the Black Creek Nature Trail at 1285 N. Gale Road between Davison Road and Court Street, just south of the railroad tracks. People can be seen enjoying the park year round!



### Ligon Outdoor Center

Ligon Outdoor Center is located on East Farrand Road in Thetford Township. Ligon provides teachers and students in the Genesee and Lapeer Intermediate School Districts with a natural setting for learning and teaching. Ligon may also be used by any recognized organization in Genesee County for retreats, conferences, field trips and special events. Ligon includes 6.5 miles of hiking trails, including an ADA (Americans with Disabilities Act) accessible trailway, an Esker Trail and a Boardwalk



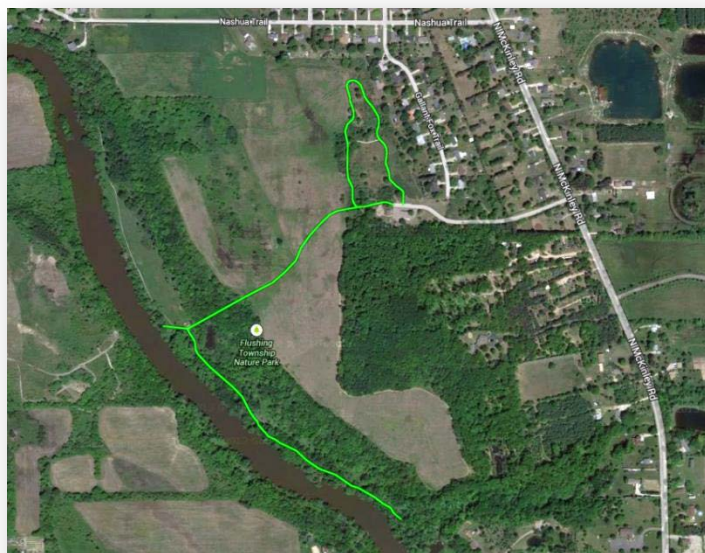
### Kearsley Park- City of Flint

Kearsley Park is located in the City of Flint off Kearsley Boulevard north of Robert T. Longway Boulevard. A portion of the Flint River Trail goes through Kearsley Park, and connects just south of Hamilton. This multi-use trail goes from Longway Boulevard near Applewood through the park, under I-475 then through Dayton Park back to the trail.



### Flushing Township Nature Park

Flushing Township Nature Park is located on McKinley Road north of Mt. Morris Rd. The park offers trails for biking, walking, jogging and horse back riding. There is a boardwalk extending over wetlands, a  $\frac{3}{4}$  mile trail adjacent to the Flint River and a scenic observation tower.



### Dauner-Martin Nature Sanctuary

Dauner-Martin Nature Sanctuary is a 150-acre park in the City of Fenton. It is located just east of Leroy Street and north of Dauner Rd. This nature area is closed to biking and is for foot traffic only. There are approximately 4.3 miles of unpaved hiking trails, with parking and entrances off of both Leroy Street and Dauner Road



### Kelly Lake Park

Kelly Lake Park is located in the City of Burton just south of I-69 and east of Genesee Road. This 40-acre park has nature trails, a pavilion, a bike path and Kelly Lake.

## Flint Township Nature Park

Flint Township Park and Trails opened in 2006. It is located at 5200 Norko Drive between Dye and Linden Roads. It includes an 3,500-ft long asphalt handicapped accessible non-motorized trail with a series of shorter wood chip trails, along the way are rest stops and picnic stations as well as a number of plaques with brief messages – mostly about local history. There is also a covered pavilion with picnic tables for public use and a small playground area.



## The Robert Williams Nature and Historical Learning Center

The Robert Williams Nature and Historical Learning Center includes the Davison Historical Museum, an art museum, and 1.26 miles of walking trails made of limestone.





# 5

## Preferred Corridors

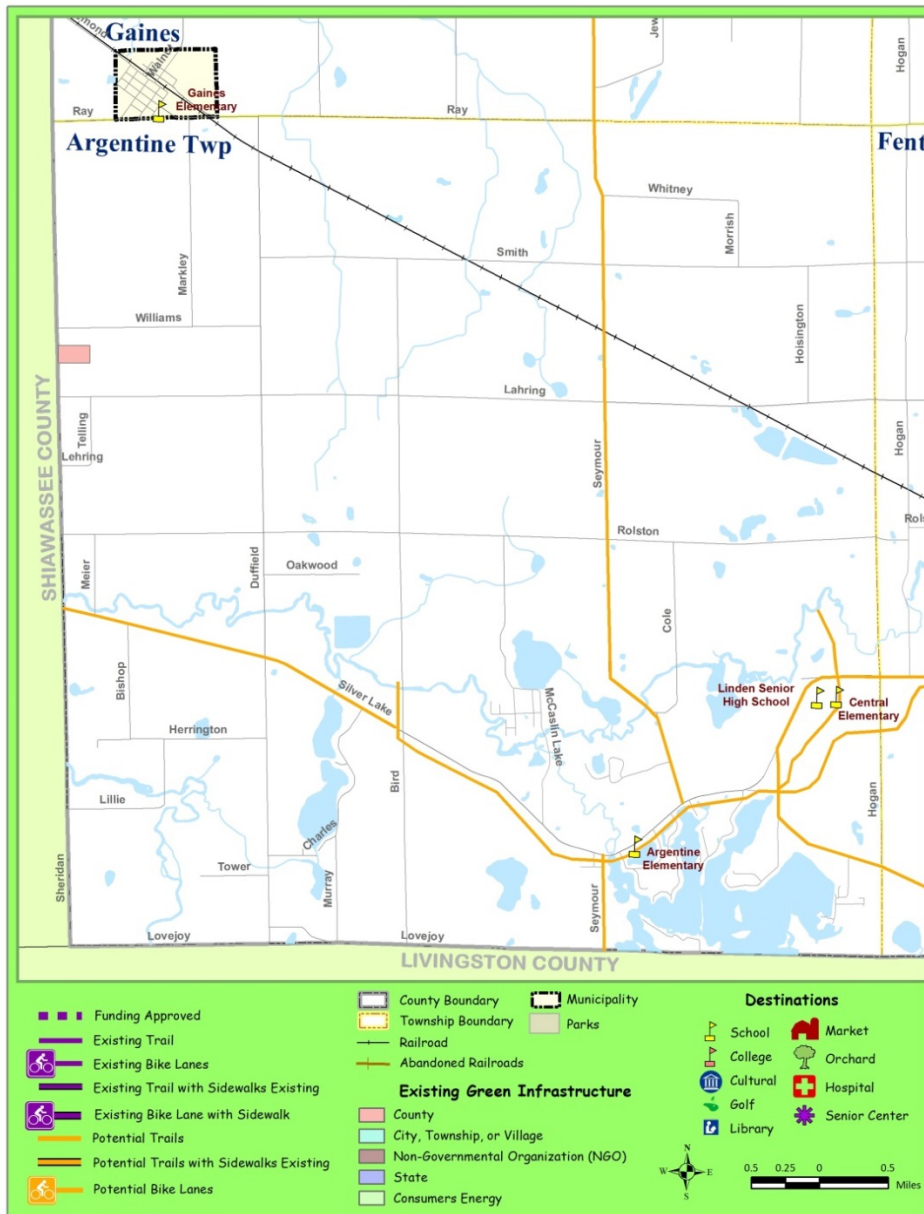


## Preferred Corridors

This section identifies potential trail connections, referred to as a preferred corridors, for each area of the county. Subsequently the regional priority trail segments are identified.

# Argentine Township

Preferred Corridors



### Regional Corridors

A 10-ft wide non-motorized pathway is proposed for the right-of-way along Silver Lake Road in Argentine Township, from the City of Linden and Fenton Township to Burns Township in Shiawassee County. As an alternate route, the trail could run down Lobdell Road behind the Linden High School, Middle School and Central Elementary, and then meet back up with Silver Lake Road at the Linden City Limits. This connection would link Argentine with the Linden Community Schools, as well as provide a potential link to Byron in the future.

Seymour Road connects Argentine Township to the City of Swartz Creek to the north and south into Livingston County. A 10-ft wide paved trail along Seymour Road, through the entire length of the township, would provide a regional north-south linkage in this rural portion of the county. It could be constructed in mile long segments in conjunction with the reconstruction of Seymour Road by the Genesee County Road Commission.

### Trail heads

Linden Community Schools and the Market in Argentine could both serve as excellent trailheads for this area.

### Further Issues and Considerations

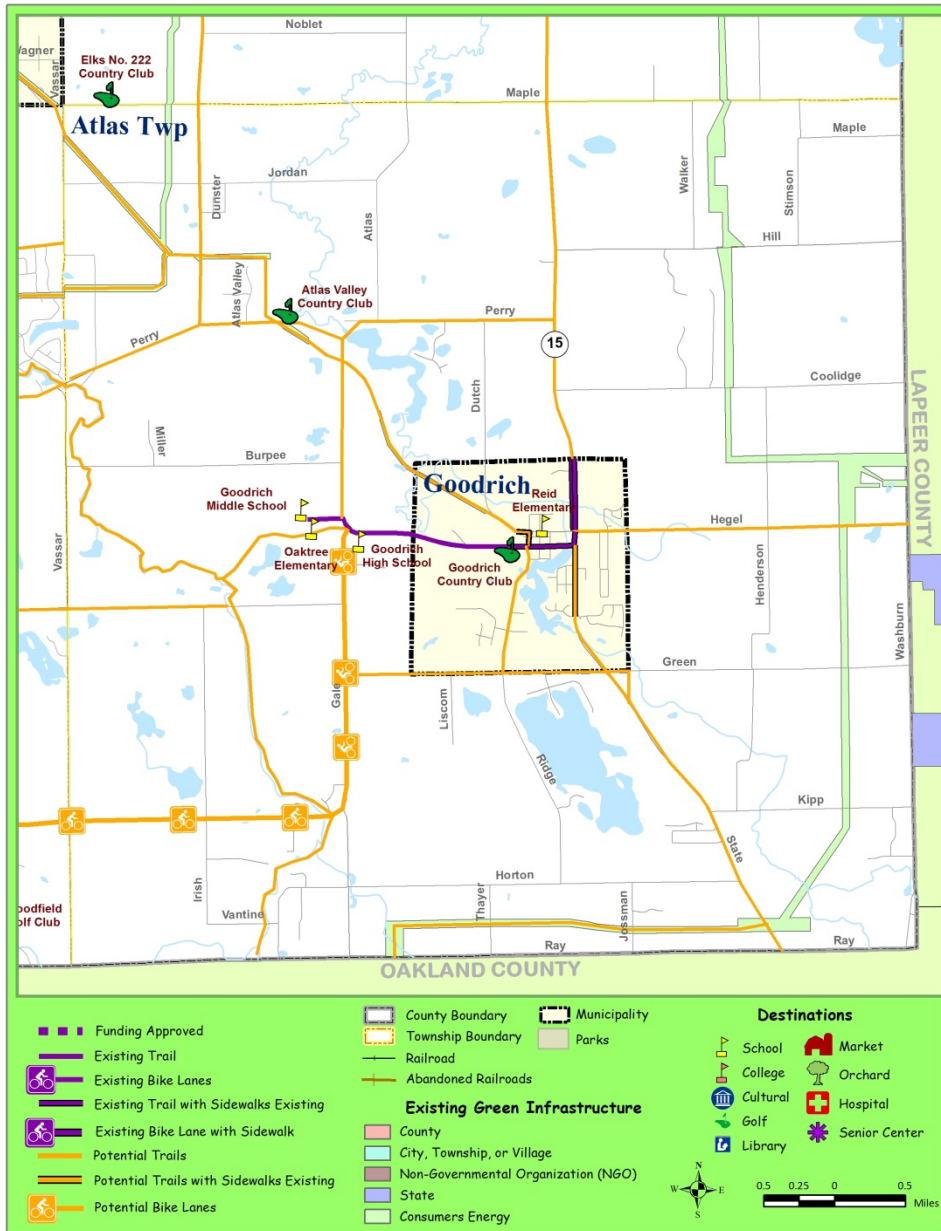
A Consumer's Energy line exists (running east/west) in Livingston County approximately 2 miles south of the county line. This line could serve as a trail corridor and would need to be developed by Livingston County, although no current considerations for this trail connection exist. It could also connect with the Oak Grove State Game Area in Livingston County



Market in Argentine on Silver Lake Road

# Atlas Township & Village of Goodrich

## Preferred Corridors



### Regional Corridors

The M-15 Recreational Heritage Route traverses through Atlas Township and the Village of Goodrich. Inside the village limits sidewalks allow for pedestrian access from Mill Pointe Drive to Hufstader Road traversing nearly the entire village. This is the only section of the Heritage Route currently built in the Atlas Township and Goodrich area.

A newly formed group named Walk, Bike, Run Atlas Township is advocating for the planning and development of a trail connecting to the existing trail on Hegel Road. The new trail would extend north to Perry Rd. From Perry Rd the trail would extend both East and West. The western portion would connect to Grand Blanc Township's sidewalk system. The eastern portion would connect to M-15 and head southward to connect to the existing trail.

The Trolley Line Trail - South is a Consumer's Energy corridor that connects the City of Burton, through Atlas to the Village of Goodrich. This trail is part of the old interurban trolley line that once ran through Genesee County. In many sections near the Village of Goodrich the land is privately held. It would take considerable effort to reconstruct this line. In order to be built, the trail would need an easement from five property owners

A Consumer's Energy corridor runs westward from M-15 south of Horton Road and turns southward just before Gale Road. This corridor connects into Oakland County and Holly Recreation Area State Park. This corridor has also been identified by Oakland County Planning and Development Commission and Headwaters Trails Inc. as a regional connection with Genesee County.

Hegel Road east of M-15 connects the Atlas Township and Goodrich area with Ortonville Recreation Area in Lapeer County. A 10-ft non-motorized path leading into the park area would connect this park to the Genesee County trail system.

The Baldwin Road and Gale Road bike lanes connect with the proposed bike lane along Baldwin Road in Grand Blanc Township. The bike lane will also serve the students of Goodrich Area Schools.

The Thread Creek Trailway is another potential connection/preservation corridor running through both Grand Blanc Township and Atlas Township along Thread Creek. A branch also extends into the Goodrich Area Schools complex on Gale Road. This corridor would involve easements through private property for most of its length, but would be a picturesque trail corridor.

### Trailheads

A trailhead could be located at the Goodrich High School located on Hegel Road, where ample parking is available. Another potential trailhead is the Goodrich Village offices on M-15 at the northern edge of the village



# City of Burton

## Preferred Corridors



### Regional Corridors

The City of Burton is bisected by a system of Consumers Energy corridors that have been identified for trail development. The feasibility of using these corridors, stretching south from I-69 to the southeast corner of the city, for trail development is promising. There are a few locations where portions of the corridor have been sold to private landowners and easements would need to be acquired to complete the connection. The development of this Consumers corridor could link the City of Burton with Atlas Township, the Village of Goodrich, and potentially Oakland County.

The abandoned CSX Railroad runs through the southwest portion of Burton potentially connecting to the Grand Traverse Greenway in the City of Flint, Grand Blanc Township and the City of Grand Blanc.

A route along Davison Road leading from the east side of the City of Flint to the City of Davison has been proposed.

### Local Connectors

City of Burton could connect Kelly Lake Park to the broader trail network. The trail presently runs along I-69 from Genesee Road to Kelly Lake. The extension of this trail south on Munson Road to Lapeer Road then west to the Consumers Energy corridor is feasible.

Also within the City of Burton, Court Street and Genesee Road have been identified as potential routes for trail development. The identified Genesee Road connection extends from Court Street within the City of Burton north to M-57 in Thetford Township.

Also identified is a bike route to For-Mar Nature Preserve that runs through the northern corner of Burton connecting it to the Flint River Trail and Kearsley Park.

### Trailheads

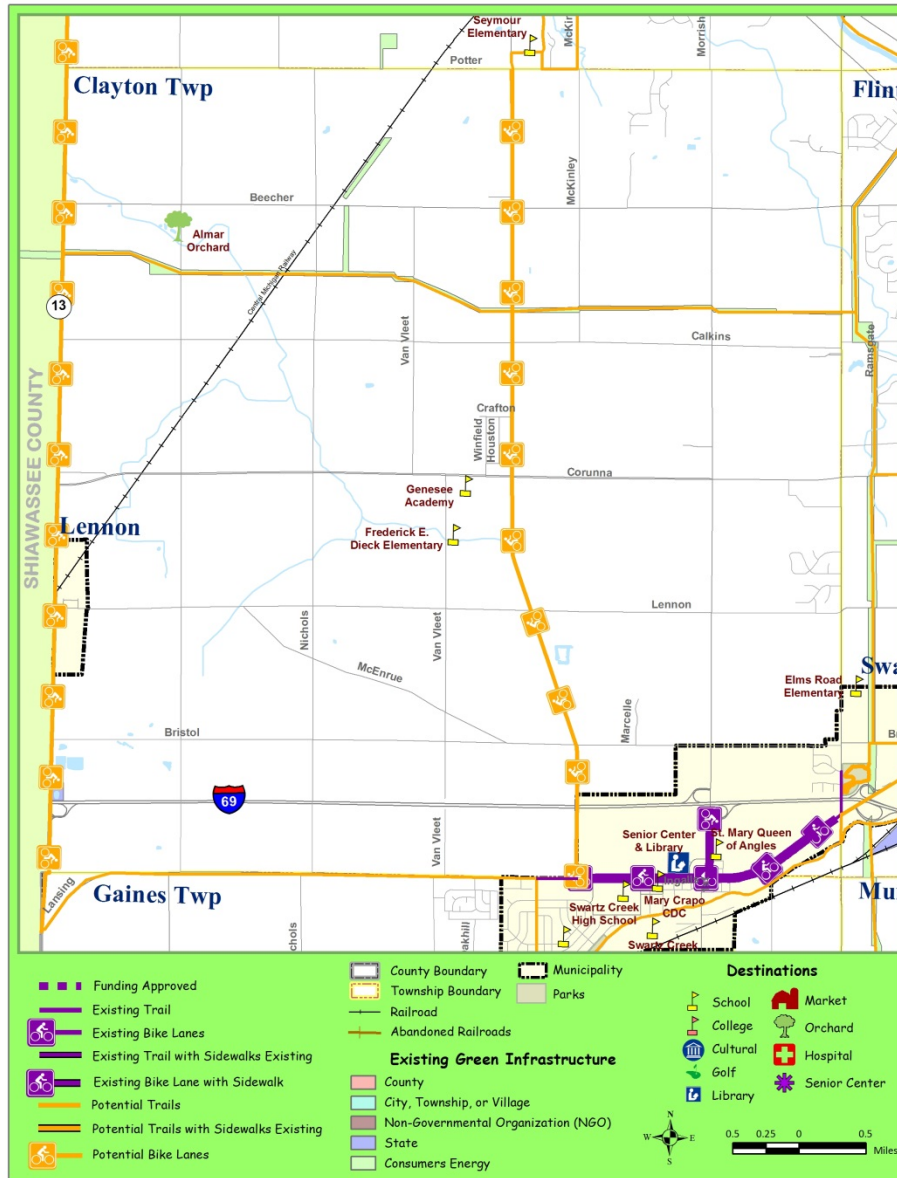
Kelly Lake Park, located just south of I-69, may be a possible location for a trailhead. Access to the park is available on Lapeer Road and parking is available at the site





# Clayton Township & Village of Lennon

Preferred Corridors



Miller Rd, Potential Trail Site



Seymour Rd Potential Bike Lane

### Regional Corridors

A proposed bike lane along Seymour Road would connect Flushing Township in the north and Gaines Township and the City of Swartz Creek to the south

Clayton Township also has an east-west utility corridor that belongs to Consumers Energy. If used for trails, this path could connect to Shiawassee County to the west and also intersect the potential Seymour Road bike lane

On the western boarder of Clayton Township, a bike lane is also proposed for the M-13 corridor from Saginaw County to Lansing Hwy/Miller Road

A proposed pathway on Lansing Hwy/Miller Road would follow the southern border of Clayton Township from the City of Swartz Creek to Shiawassee County and eventually to Durand

Another potential east-west trail or bike route would be along Grand Blanc Road or Baldwin Road, from Grand Blanc and Mundy Townships to Seymour Road

### Trailheads

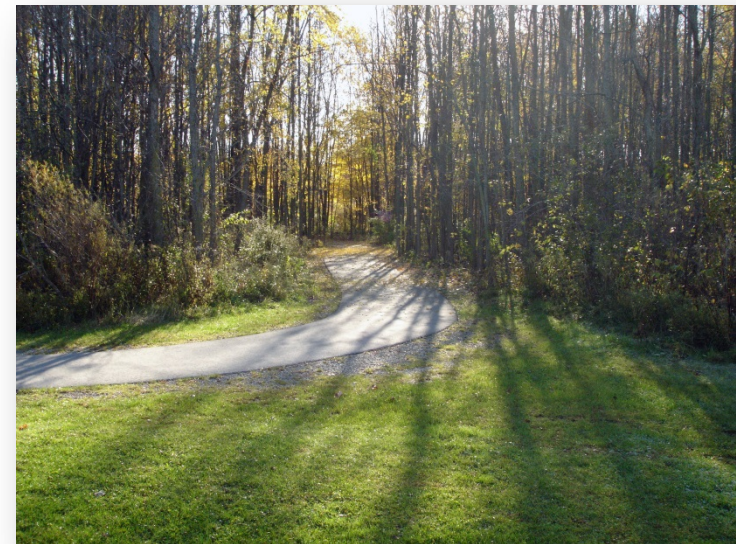
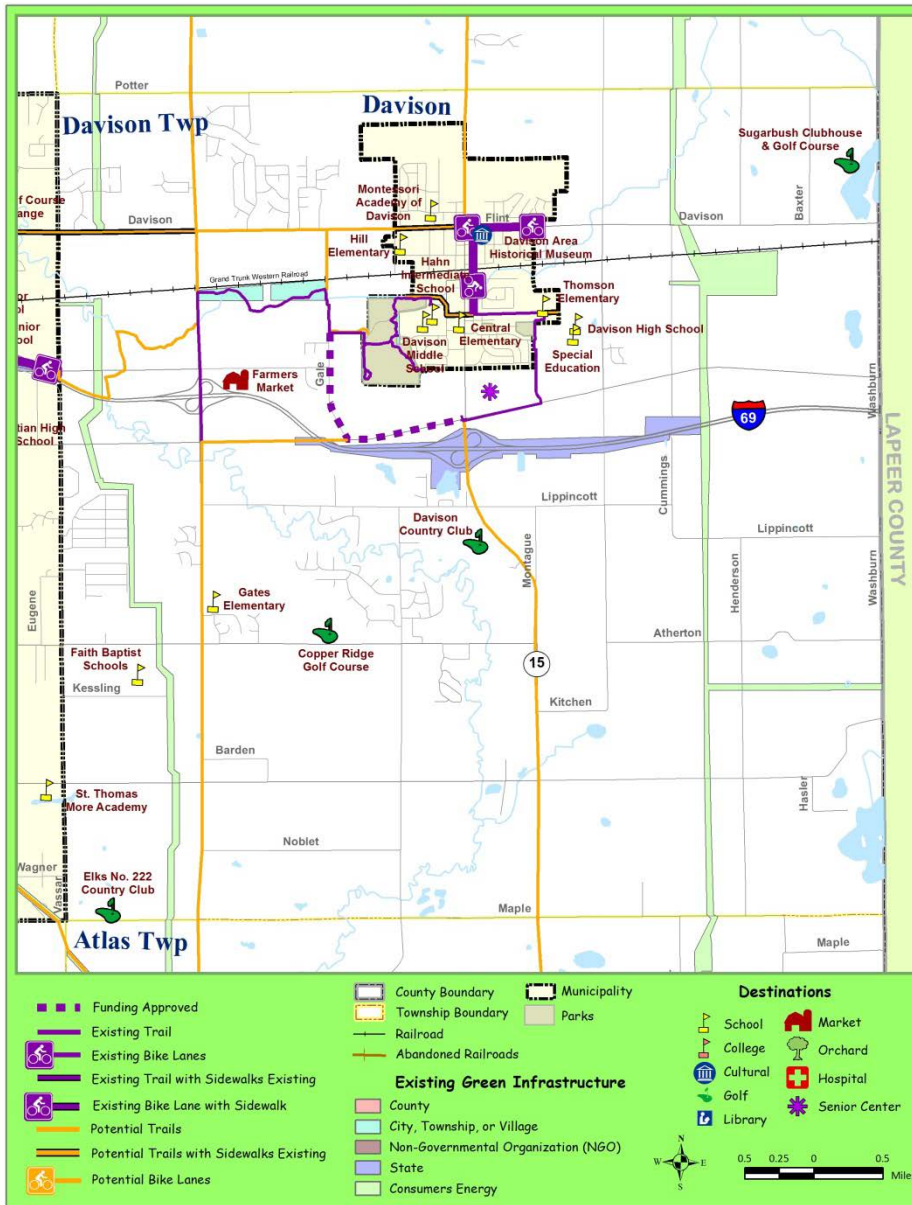
Trailhead locations and amenities may need to be identified for the potential trail on Seymour Road

### Further Issues and Considerations

Approximately one mile west of Clayton Township, in Shiawassee County, is a Consumer's Energy corridor that runs nearly the full length of the township. This corridor could be pursued for trail development in partnership with Shiawassee County

# Davison Township & City of Davison

Preferred Corridors



Abernathy Park Trail

### Regional Corridors

The M-15 Recreational Heritage Route, which is planned to extend along M-15 the entire length of the county, runs through Davison Township and the City of Davison. Currently there are several portions built. The existing portions of the M-15 route begin on Lapeer Rd and head east to Russel Alger Dr, north to Clark Rd, east along Clark St. connecting to bike lanes headed north on Main St.

The Davison Road Corridor has been identified as a regional connection linking the City of Davison to the City of Burton and providing pedestrian and bicycling access to For-Mar Nature Preserve for Davison Area residents. In the City of Davison and in Davison Township, between Vassar Road and Irish Road, the trail exists as sidewalks along both sides of Davison Road. There is a missing section between Irish Road and the City of Davison.

As an alternative route between the City of Davison and For- Mar Nature Preserve the trail could extend from the Black Creek Trail in Davison by following Irish Road north ½ mile to Davison Road to meet up with the sidewalk system on Davison Road.

### Local Connectors

A local route navigates through Jack N. Abernathy Regional Park and connects up with the regional trail system by either going into the City of Davison and up to Davison Road or by extending westward to Irish Road from the trail behind Davison Township Hall.

### Trailheads

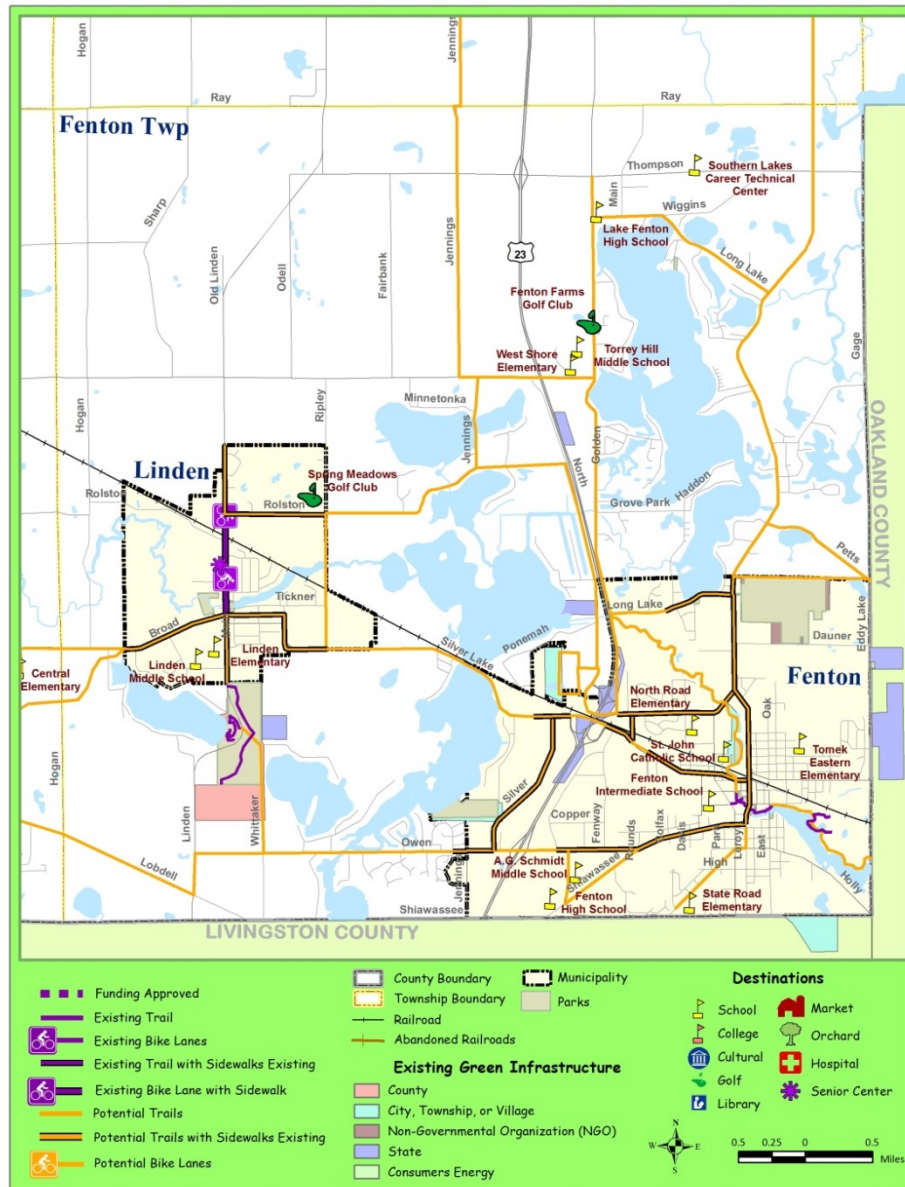
The trailhead begins at the northeast corner of the Davison Township Municipal Center parking lot. Parking is also available in Abernathy Park and at the newest connection on Gale Road.

A trailhead also exists at Jack N. Abernathy Regional Park. It includes a playscape-style playground, skate park, pavilions, volleyball, tennis and basketball courts, horseshoe pits, softball fields, concession stand, and nature trails.

Another trailhead is located at the Davison Township Hall where the Black Creek Trail begins westward eventually connecting to the Abernathy Park Trail.

# City of Fenton, Linden & Fenton Township

Preferred Corridors



### Regional Corridors

Fenton Road provides a link from the City of Fenton to northern Genesee County and into Burton and Flint. This is a heavily traveled corridor and any non-motorized facilities should be located as far off of the roadway as possible to minimize conflicts between pedestrians or bicyclists and motorists.

Petts Road, off of Fenton Road, just north of the City of Fenton connects to Seven Lakes State Park. This provides a regional linkage into Oakland County. A utility line runs from the park north into Grand Blanc Township and could provide a route into Grand Blanc from Fenton. Oakland County and the Headwaters Trails group have also identified this as a potential linkage between Oakland and Genesee Counties.

Silver Lake Road connects the City of Fenton to the City of Linden and continues further westward into Argentine Township. This connection could provide a linkage for residents of the Linden Area to access the shopping areas near Silver Parkway and Silver Lake Beach in the City of Fenton.

The Jennings Road corridor provides a link to Lake Fenton High School, as well as north into Mundy Township.

### Local Connectors

These routes provide access to various destinations in the Fenton and Linden area and connect to the regional corridors:

Dauner- Martin Nature Sanctuary

Lahring Road

Linden Road

Lobdell Road

North Road

North Long Lake Road

Owen Road

Poplar Street

Ripley Road

Rolston Road

Silver Parkway

Shiawassee River Walk Shiawassee Avenue South Long

Lake Road Torrey Road

Whitaker Road

### Trailheads

The Fenton Community Center has parking for the Shiawassee River Walk and serves as a trailhead. The Linden County Park provides parking for the Linden County Park Trail and can serve as the trailhead for a larger trail system.

### **Further Issues and Considerations**

No connections to Livingston County have been identified yet. The potential exists to connect in with the Consumers Energy corridor running east and west about two miles south of the county line in Tyrone Township.

City of Flint and Surrounding Areas







### Downtown City of Flint



## Regional Corridors

### The Flint River Trail

The City of Flint has a wonderful asset in the current Flint River Trail. This extensive 15 mile trail system provides non-motorized options to a large majority of City of Flint residents. This trail is completed in entirety with only one area identified to improve connectivity.

#### James P Cole Ave @ Hamilton Ave

At this point, the Flint River Trail currently continues on the street. There is an abandoned parking lot at the corner of these two streets owned by the General Motors Corporation. From there, running to the north, there exists a Consumers Energy Substation along the river. These two pieces of property should be examined for trail development.

### Grand Traverse Greenway

Another regional corridor within the City of Flint is the abandoned CSX Railroad which is currently being developed as the Grand Traverse Greenway. The Grand Traverse Greenway runs approximately 3 miles from the City of Burton north to the downtown Flint area. Along this abandoned line, there are refreshing natural areas including Spring Grove and a brownfield redevelopment site in the Grand Traverse Neighborhood.

### The Genesee Valley Trail

Following the abandoned Canadian National (CN) Railroad is a missing connection from the city of Flint to the Existing Genesee Valley Trail in Flint Township. The City of Flint also has plans to extend this trailway on the Chevy Commons as it is remediated and developed.

### Fenton Road / Ann Arbor St

Fenton Road provides a link from the City of Flint to southern Genesee County. For portions that are heavily traveled the non-motorized facilities should be located as far off of the roadway as possible to minimize conflicts between pedestrians or bicyclists and motorists.

## Local Connectors

A potential neighborhood bike route has been identified from Kearsley Park to For-Mar Nature Preserve:

- Missouri EB to Meade
- Meade NB to Davison
- Davison EB to Curry
- Curry NB to Risedorph
- Risedorph EB to Blackthorn
- Blackthorn NB to Thorntree
- Thorntree EB to Genesee @ For-Mar Entrance

On the northern tier of the City of Flint, the Friends of the Flint River Trail (FFRT) have identified a small route for trail development. This trail would connect into Forest Park and a small trail portion identified in the City of Flint Parks and Recreation Plan with the proposed route:

- Along Dupont NB to Thackery
- Along Thackery & Wager EB to Selby
- Bike Lane SB on Selby, NB on Andrew
- Bike Lane from Stewart to James P. Cole
- Bike Lane from James P. Cole to Massachusetts
- Massachusetts through industrial park to Pasadena

### **Downtown Bike Lanes**

As a part of a public review meeting members of the public and stakeholder organizations added recommendations for bike lane development in the downtown Flint area:

- Second Street: from U of M campus, Flint Cultural Center, and Mott Community College
- Beach/Garland Street: from 5th Ave. to I-69
- Clio Rd from Welch to Stewart Ave.
- Stewart from the Western city limits to the Flint River Trail
- Saginaw Street from downtown to northern city limits
- Carpenter Rd from western city limits to Saginaw St

# Flint Township

## Preferred Corridors



### Regional Corridors

Flint Township serves as a link between the City of Flint and the City of Swartz Creek. The Genesee Valley Trail connects the city of Flint along an old rail line to the north side of the Genesee Valley Mall and then connects with Linden Road next to the north entrance of the mall across from Norko Dr. It is recommended that this trail is extended to connect to Swartz Creek along the eastern portion of Dye Rd down to Miller Rd.

Another possible connection could be to extend the M-21 pathway to the Consumers Energy utility corridor and follow it south to Swartz Creek.

Flint Township also serves as a link between the City of Flint and the City of Flushing. Connecting these three jurisdictions is the Flint River. A proposed trail corridor along the Flint River, connecting these jurisdictions, has been identified and seems feasible. Neither side of the river has been identified as better than the other, but there exists a large amount of private property on each side, and a number of easements would need to be secured

To serve as a link between the City of Flushing and the City of Swartz Creek, a Consumers Energy utility corridor has been identified. This utility line runs north/south along the west edge of Flint Twp., as well as along Mud Creek. The development of this corridor has only been identified

between the City of Swartz Creek on the south end, and the Flint River on the north

### Local Connectors

The M-21 Non-Motorized Pathway was extended in 2007 along the north side of M-21 from Maxwell Street to Dye Road, adding about one mile to the current path from I-75 westward.

Connecting to the M-21 Non-Motorized pathway is the Genesee Valley Trail.

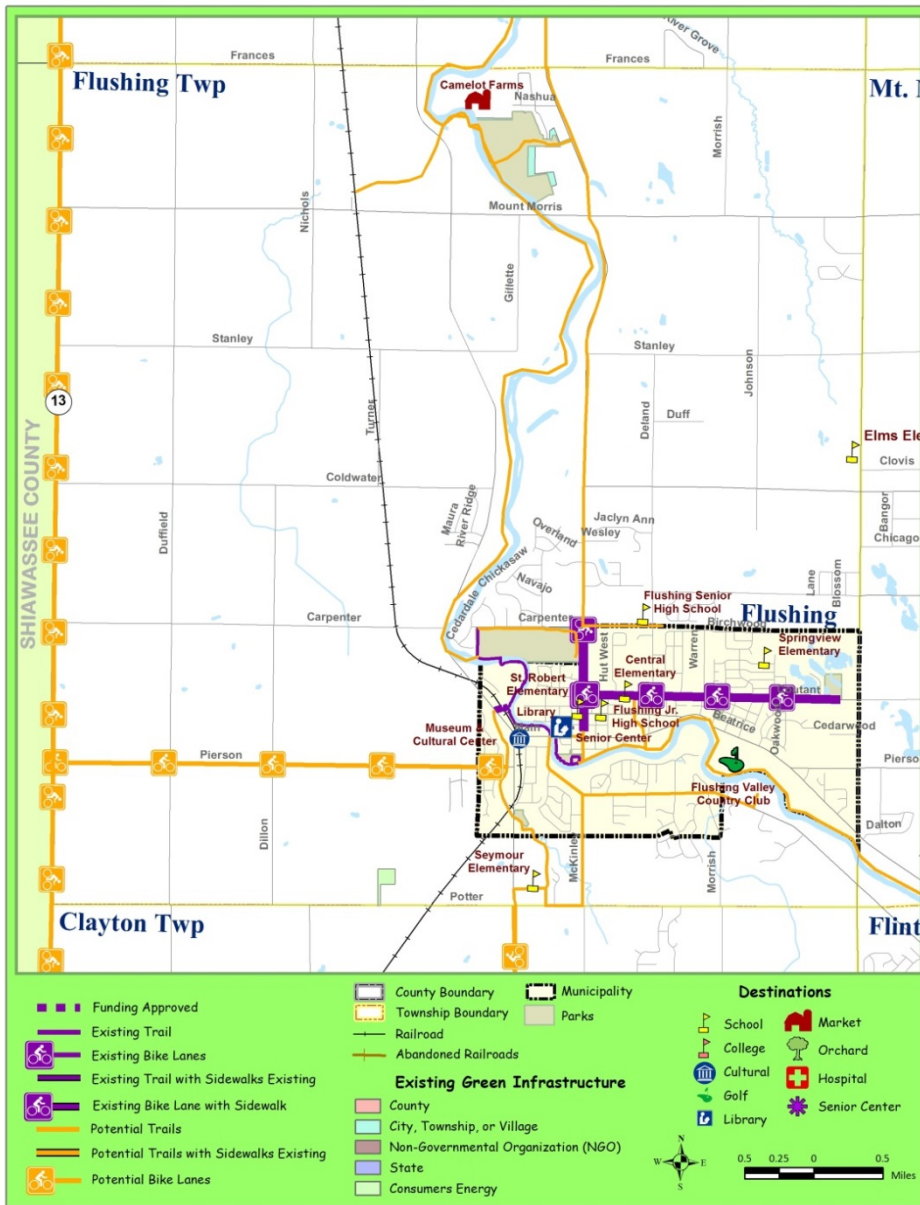
A loop of trails currently exists behind the Flint Township Police Station, opened in 2006, off of Norko Drive and Fleckstein Drive. There are plans to include paved shoulders when reconstructed to provide a connection from these trails to the Genesee Valley Trail.

### Further Issues and Consideration

A critical need exists for a pathway along Miller Road in Flint Township. With Miller Road being the highest concentration of commercial development in Genesee County, it is the source of a large amount of destinations for county residents. This entire corridor is lacking any type of travel method for non-motorized travelers, creating a serious safety hazard. The bus route along Miller Road is heavily used, yet there are no sidewalks to get to a bus stop or from a bus stop to a destination.

# Flushing Township & City of Flushing

Preferred Corridors



### Regional Corridors

The Riverview Trail in the City of Flushing provides a link between downtown Flushing and Flushing County Park. This trail along the Flint River could eventually connect to the Flushing Township Nature Park and to the City of Montrose by way of a trail along McKinley Road. This connection could also lead further northward into Saginaw County by way of the proposed trail following the Flint River.

The Riverview Trail could also be extended upstream along the Flint River into Flint Township and eventually connect with the existing Flint River Trail in the City of Flint. This would be a very scenic connection, but would involve acquiring easements from many property owners along the river.

A series of bike lanes are also proposed for Flushing Township. A bike lane along M-13 running from Saginaw County to Lansing Hwy/Miller Road just south of Clayton Township with a connector to the City of Flushing via Pierson Road is proposed. Another bike lane along Seymour Road in the City of Flushing, south to the City of Swartz Creek, is also proposed.

### Local Connectors

Bike lanes current exist along Coutant from McKinley to Elms Rd connecting local neighborhoods, an Early Childhood Education Center, and Elementary Schools, and Local park.

McKinley Rd also includes bike lanes from the Carpenter Td to Main Street connecting local neighborhoods to downtown.

### Trailheads

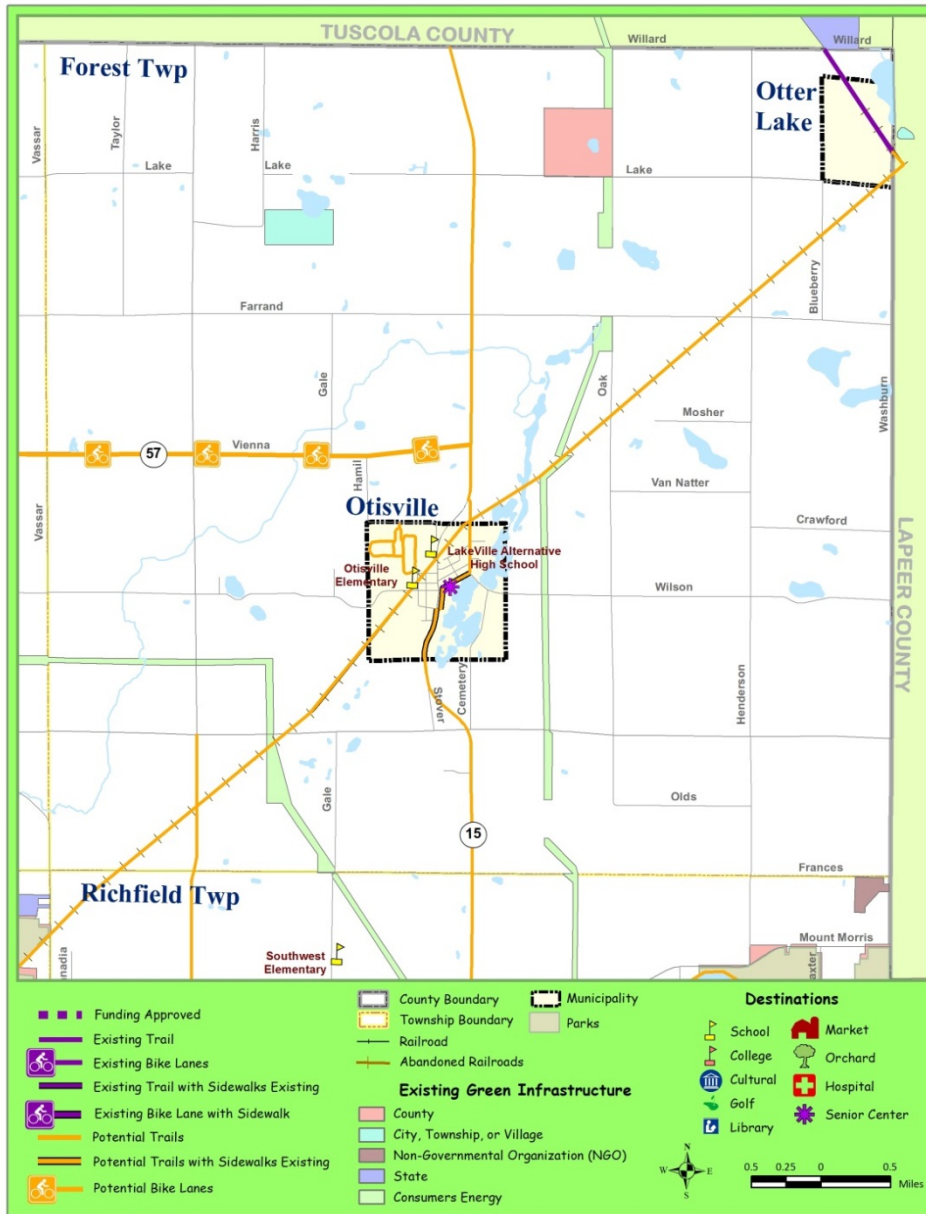
Potential trailhead locations for the identified trail on McKinley Road are Flushing County Park and Flushing Township Nature Center.

There is a trailhead located at the entrance to the Flushing Riverview Trail next to Bueche's Food Center on Main Street in Flushing and also parking for the trail in Riverview Park.



# Forest Township, Village of Otisville and Village of Otter Lake

## Preferred Corridors





### Forest Township Regional Corridors

M-15 passes through Forest Township and is part of the M-15 Heritage Route. The M-15 potential bike path would travel north-south through the entire eastern section of Genesee County, and connect with Oakland County to the south and Tuscola County to the north.

M-57 (Vienna Road) begins at M-15 in Forest Township and has been identified as a potential bike lane. This connection would head west to meet with neighboring sections of M-57 that have already been identified in an approved plan. Eventually, the whole stretch of M-57 in Genesee County would be connected as a non-motorized path. A section of wide shoulders along M-57 currently exist from Belsay Road west to Saginaw Road. Striping and signing this route as a bike lane is suggested.

An abandoned railroad bed runs through the township from Otter Lake through Otisville and into Richfield Township to the south. This abandoned railroad bed has been identified as a potential trail connection. It would connect the Southern Links Trailway to the M-15 potential trail and could join the potential trail near Mott Lake in the Genesee County Parks system. The connection from Otisville to Otter Lake along this corridor is privately owned. Easement or land acquisition from various individuals would be needed to build this trail.

The Southern Links Trailway from Columbiaville to Millington runs through Genesee County at Otter Lake.

### Forest Township Local Connectors

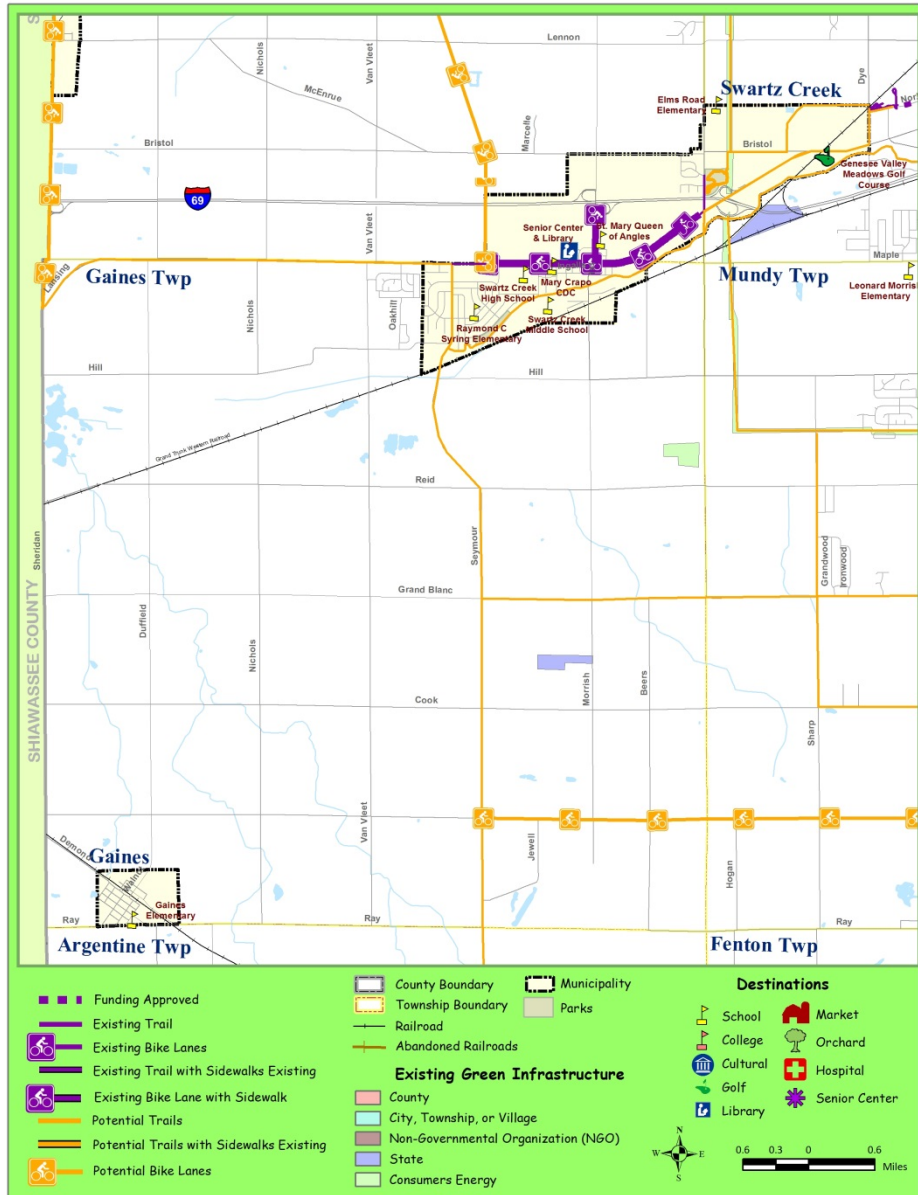
There is also a trail system identified in an approved plan that would loop through Pettit Park in the Village of Otisville for approximately 2/3 of a mile. Potential connections to link the village trail with Forest Township trails are also a possibility.

### Trailheads

Trailhead locations and amenities may need to be identified for the potential trail on M-57 (Vienna Road), the M-15 Heritage Route Trail, and the abandoned railroad trail

# Gaines Township and City of Swartz Creek

Preferred Corridors



### Regional Corridors

The Swartz Creek Trail runs along the creek from Seymour Road in the City of Swartz Creek to Elms Road where it heads north and passes through Elms Park. This trail has the potential to connect to the Genesee Valley Trail in Flint Township and into the City of Flint. There is one section of railroad corridor between Linden Road and the City of Swartz Creek that is still active. An alternative route exists by continuing the trail on Miller road to Dye Rd by conducting a road diet to include bike lanes or by including an off-street pathway to Dye Rd then northward on the eastern side of Dye road.

Miller Road and Lansing Highway provide a regional connection into Shiawassee County from Swartz Creek. This provides an important link to the Ionia-to-Owosso Trail. If the Ionia-to-Owosso Trail, after completion, is extended to Durand then this connection along Lansing Highway will allow residents of Genesee County to bike or hike all the way through four counties.

Seymour Road provides a connection through Gaines Township into Argentine Township and links up with the pathway along Silver Lake Road and into the Cities of Linden and Fenton.

### Bike Lanes

Swartz Creek has existing bike lanes on Miller Road from Elms Road to Seymour Road that serves the downtown and commercial area of the city.

A bike lane is also proposed for M-13 from Saginaw County to Miller Road/Lansing Highway in Gaines Township.

### Trailheads

Elms Park and Winshall Park could both serve as excellent trailheads for this area.

### Further Issues and Considerations

A Consumer's Power corridor exists about one mile west of the Genesee County line in Shiawassee County. The corridor extends from the Montrose area all the way to the Gaines area. This could provide a north-south link for both Shiawassee and Genesee County residents to utilize. Residents from Gaines could connect to this line easily to provide access for their community.

An abandoned railroad line exists between the communities of Durand and Byron in Shiawassee County. If this corridor was pursued by Shiawassee County, then Genesee County could connect to it from Swartz Creek and from Argentine to create a regional linkage

# Genesee Township

Preferred Corridors



### Regional Corridors

Resting to the northeast of the City of Flint is Genesee Township; also a proud owner of part of the Flint River Trail. This portion of the trail has two missing links that are currently identified for trail development by the Genesee County Parks and Recreation Commission. Along the north shore of Mott Lake, the identified connection runs parallel to Huckleberry Railroad. Along the south shore the identified connection runs from Stepping Stone Falls to the section of trail north of Coldwater Rd. These potential connections would complete the Flint River Trail from Genesee Road at Mott Lake into downtown Flint on both sides of the river. Other potential connections to the Flint River Trail have also been identified to the east of Genesee Road. Trailways running on both sides of Mott Lake to the east into Richfield Township have been identified which could potentially connect to the Southern Links Trail in Lapeer County.

Another potential regional connection identified is Genesee Road. Trail development along the identified corridor would link the City of Burton, For-Mar Nature Preserve, Buell Lake County Park, Ligon Nature Center, Genesee Township, and Thetford Township.

The abandoned railroad line linking Genesee Recreation Area and the Villages of Otisville and Otter Lake begins in Genesee Township and heads northeast.

### Local Connectors

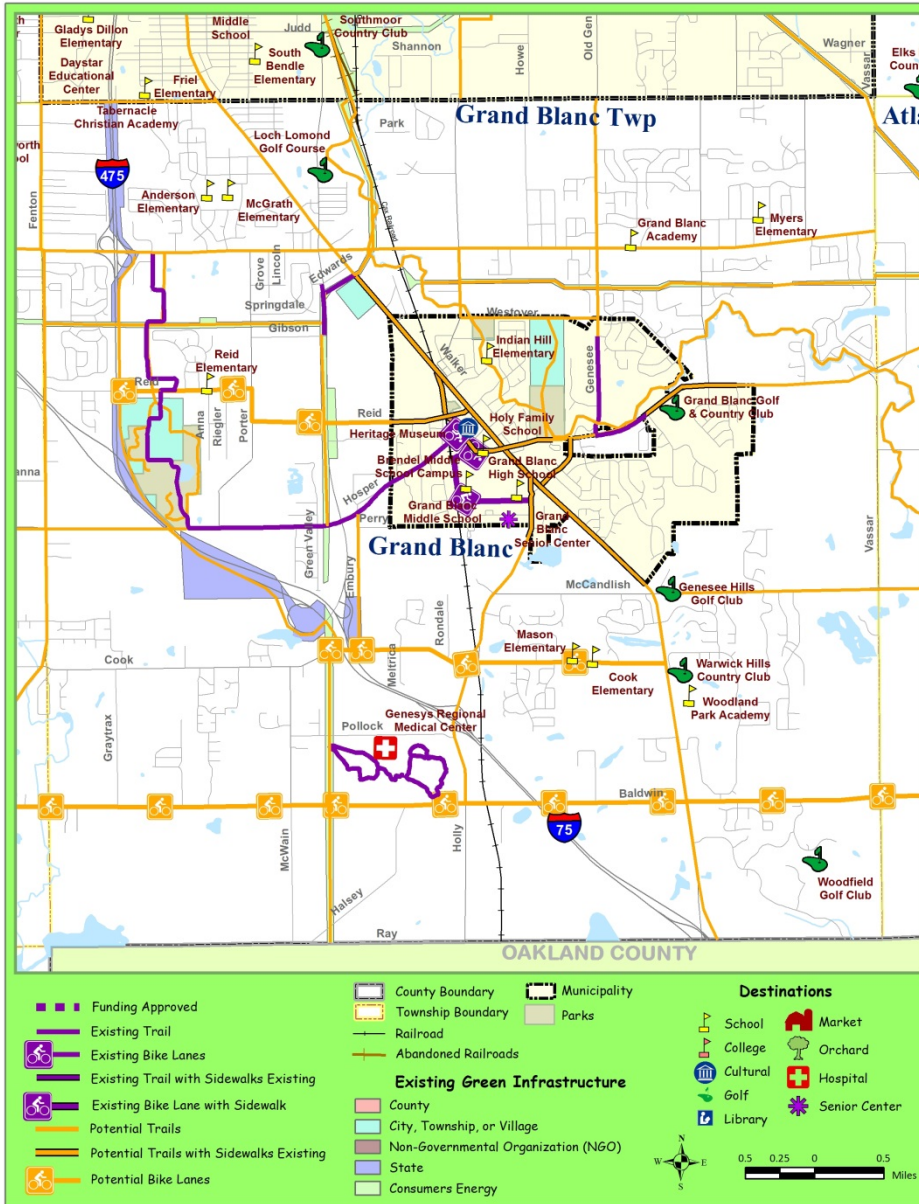
A local connector is proposed linking the Flint River Trail extension along the north side of Mott Lake to a planned trail south of the City of Mt. Morris. This potential connection follows a Consumers Energy corridor in the middle of Genesee Township and would eventually connect to the Trolley Line Trail in Clio.



**Flint River Trail**

# City of Grand Blanc & Grand Blanc Township

## Preferred Corridors



Bicentennial Park Trail



Jewett Trail

### Regional Corridors

Grand Blanc Road has an existing pathway from Hill Road to the Bicentennial Park and westward along Grand Blanc Road leading to the City of Grand Blanc. A connection can be made to trails at the Genesys Regional Medical Center by following the proposed route south on Embury Rd and then along the proposed Dort Highway Extension to Baldwin Road.

The Thread Creek Trailway was identified through the GLS Greenlinks project as a nature preservation/trail corridor. It runs through Grand Blanc and Atlas Townships, as well as the City of Grand Blanc through mostly private property along the wooded creek. This would be a very scenic trail, although a considerable effort would be needed to acquire the right-of-way for this trail corridor.

Saginaw Street is an identified corridor in the Grand Blanc Township Master Pathways Plan. This links into an existing sidewalk system in the Cities of Burton and Grand Blanc. This corridor has gaps in the sidewalk system within the township, even though the corridor is a MTA fixed bus route and commercially developed. Access to businesses along this stretch is difficult for pedestrian users, especially the handicapped, where no sidewalks exist.

Other areas within Grand Blanc provide great opportunity for pedestrians to travel via sidewalk to the

downtown area along the sidewalks on Perry Road. This sidewalk network connects the Jewett trail and the Genesee road trail. The sidewalks extends to the East Middle School.

The Consumer's Energy corridor, running east and west, parallel to and just south of Hill Road connects into the Trolley Line South trail from Burton to Goodrich and creates a large regional linkage. This trail crosses Saginaw Street and continues on and can link into Bicentennial Park.

Another Consumer's Energy corridor runs south from Cook Road under I-75 and links into Oakland County and eventually into Seven Lakes State Park. This trail could then connect through Seven Lakes State Park into the City of Fenton. Although just outside Genesee County, this would be a safe and easy connection between these two growing communities. These trails also create connections that facilitate a regional trail system:

- Dort Highway
- Embury Road
- Holly Road
- Hill Road
- Perry Road

### Bike Lanes

- Baldwin Road (regional corridor)
- Cook Road
- Reid Road

### Local Connectors

- Bella Vista Drive
- Bicentennial Park Pathways
- Bush Street
- Center Road
- Genesee Road Pathway to Hill Road
- Davis Street
- Genesys Regional Medical Center Nature Trails
- Pathway behind McFarland Library
- Perry Road
- Reid Road/Church Street
- Maple Road

### Trailheads

A trailhead could be located at Creasey Bicentennial Park on Grand Blanc Road just east of I-75. This is the largest park in the area and has an existing trail leading to it from the City of Grand Blanc

Genesys Regional Medical Center could also serve as a trailhead. There is already a system of looped trails on the Genesys grounds

Mc Farland Library on Perry Road could be used as a trailhead for the Thread Creek Trailway, which is proposed to run behind the library.

### Further Issues and Considerations

Grand Blanc Township and the City of Grand Blanc have proposed an extensive system of pathways for their area. In order to build these projects more efficiently, the community may wish to prioritize which areas to build first to create this trail system.



Trails at Genesys Regional Medical Center





### Regional Corridors

M-57 (Vienna Road) through the City of Montrose and Montrose Township has been identified as a potential bike lane, extending into Vienna Township and eventually to Otisville. The M-57 bike lane would also connect to a proposed bike lane on M-13, which has been identified as a potential bike lane from Saginaw County to Miller Road/ Lansing Hwy.

McKinley Road south of M-57 has been identified as a connection to the City of Flushing. Another potential trail route could be along the Flint River connecting to Saginaw County and Flushing Township.

North of the City of Montrose is a Consumer's Energy corridor that could be utilized as a potential trail connection from the Montrose area to the Clio area connecting into the Trolley Line Trail just north of the City of Clio.

Montrose has also identified the railroad line as a potential trail. Although the railroad is still active, there are relatively few trains that use this stretch of tracks. The potential exists to build a trail along the corridor and to have a rail-with-trail extending into Saginaw County.

### Local Connectors

Montrose Township Community Park has an existing trail that loops around the soccer fields and along the Flint River. This trail could be connected to the proposed pathway along the Flint River or McKinley Road and link up with the M-57 bike lane. There are currently plans to develop a pathway from existing trails at the Barber Memorial Park north on Seymour Rd to the Schools Campus on Allen Drive. This pathway would also connect westward to the existing sidewalks leading to downtown Montrose.

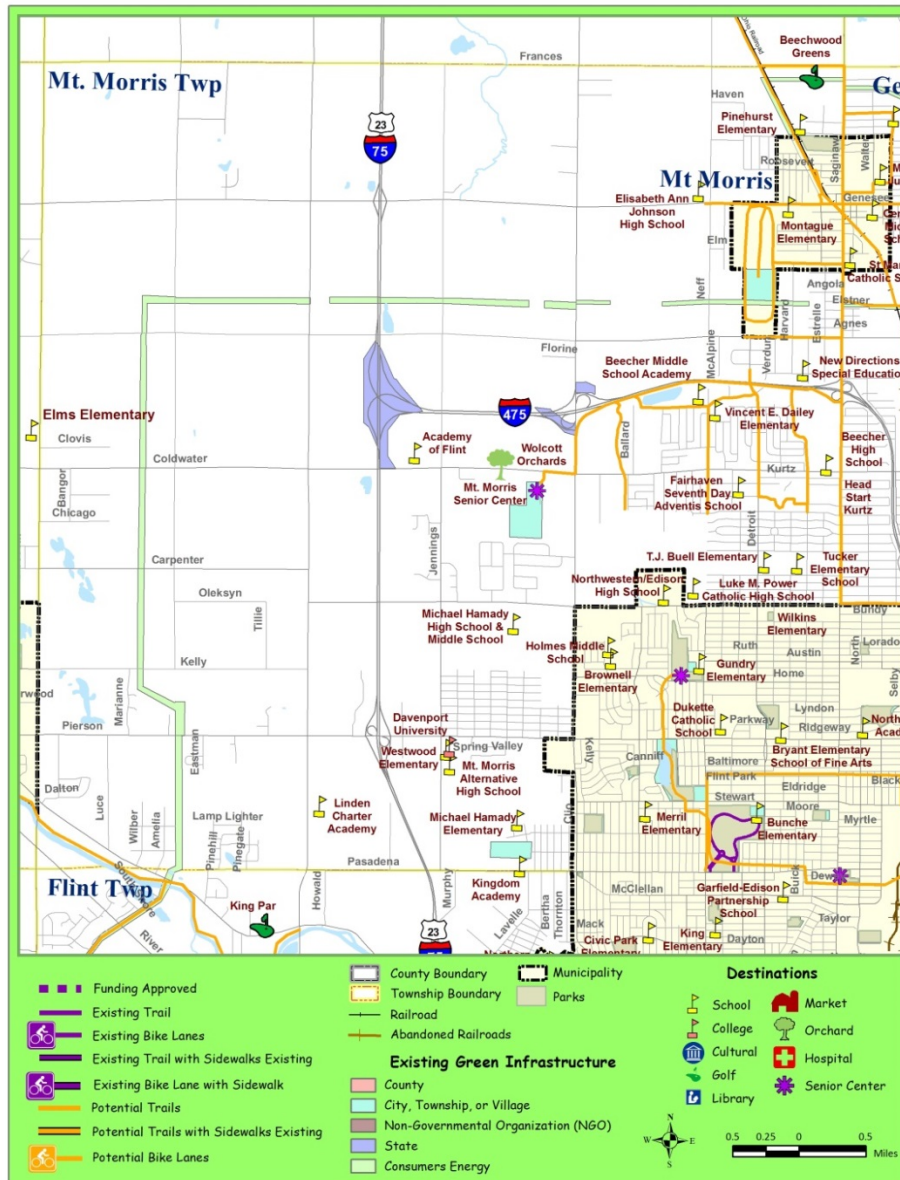
In the City of Montrose a pathway looping around the city has been identified that connects the downtown area with the school complex. The northern boundary of the City of Montrose (North Street) will be part of the proposed path and will connect to the railroad line, heading south adjacent to the railroad line to connect to the existing township park and pedestrian pathway. This link will also connect to the potential M-57 bike lane.

### Trailheads

Potential trailheads have been identified at the Hill-McCloy High School and Barber Memorial Park.

# Mt. Morris Township & City of Mt. Morris

Preferred Corridors



### Regional Corridors

Along the Consumers Energy right-of-way in Mt. Morris Township and the City of Mt. Morris, a planned regional corridor has been identified linking these local units to the Trolley Line Trail in Clio.

### Local Connectors

Within Mt. Morris Township, the Beecher Area Schools have identified a trail system linking a number of schools in the area. This project is part of the Safe Routes to Schools Initiative. Beecher Schools have a unique situation, as there are no school buses serving the school district. These pathways are proposed to connect to the regional trail system from Saginaw Road into the City of Flint and to the Genesee Recreation Area from Carpenter Road on the Genesee Township and City of Flint boarder.

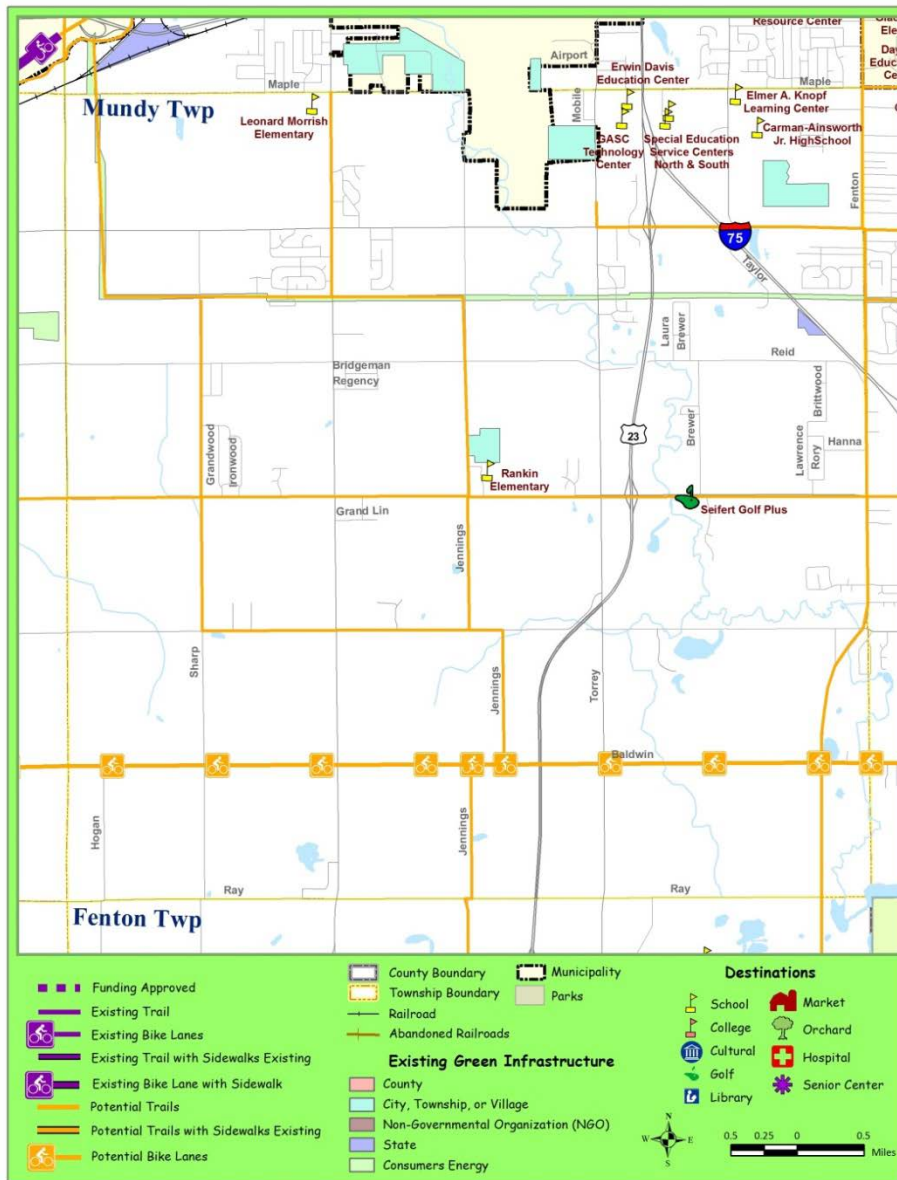
Within the City of Mt. Morris, an extensive system of routes has been identified and is planned for in the City of Mt. Morris Community Recreation Plan. This system includes future non-motorized trails, future bike lanes, and the use of existing sidewalks



Trolley Line Potential Site

# Mundy Township

## Preferred Corridors



### Regional Corridors

Grand Blanc Road links Mundy Township and Rankin to the parks and shopping areas of Grand Blanc. West of Linden Road, on Grand Blanc Road, the roadway becomes rural and is a link to the Gaines Township Seymour Road Route. In the township there are numerous subdivisions that are located off Grand Blanc Road. Due to the high traffic volume on Grand Blanc Road, it is recommended that the pathway be as far off of the road as possible. Bike lanes would not be suggested for this corridor. Another pathway option is to use Baldwin Road and connect to the trails at Genesys Regional Medical Center.

Jennings Road and the Consumer's Energy corridor combined provide a route from Swartz Creek to Rankin and into Fenton Township. Jennings Road is suggested as the preferred route because of its low traffic volume.

The Baldwin Road bike lane runs from Mundy Township at Jennings Road all the way through Grand Blanc Township and into Atlas Township.

Fenton Road is a highly traveled corridor from Fenton Township to the City of Flint. It is preferred that any facilities built are located off the roadway as far as possible to help ensure safety of trail users. Further analysis is needed to determine which side of the road the Fenton Road pathway should be located on.

Sidewalks or pathways along Hill Road in Mundy Township have also been identified that would connect into the planned pathway along Hill Road in Grand Blanc Township.

### Local Connectors

Linden Road from Maple Road, 1.5 miles south to the Consumer's Energy corridor, provides a linkage to Leonard Morris Elementary School.

Grand Blanc Road from Sharp Road, 0.6 miles east to Pepper Mill Drive, provides a connection for local subdivision residents.

Sharp Road and Cook Road provide linkages to the regional trail system for residents along these local roads.

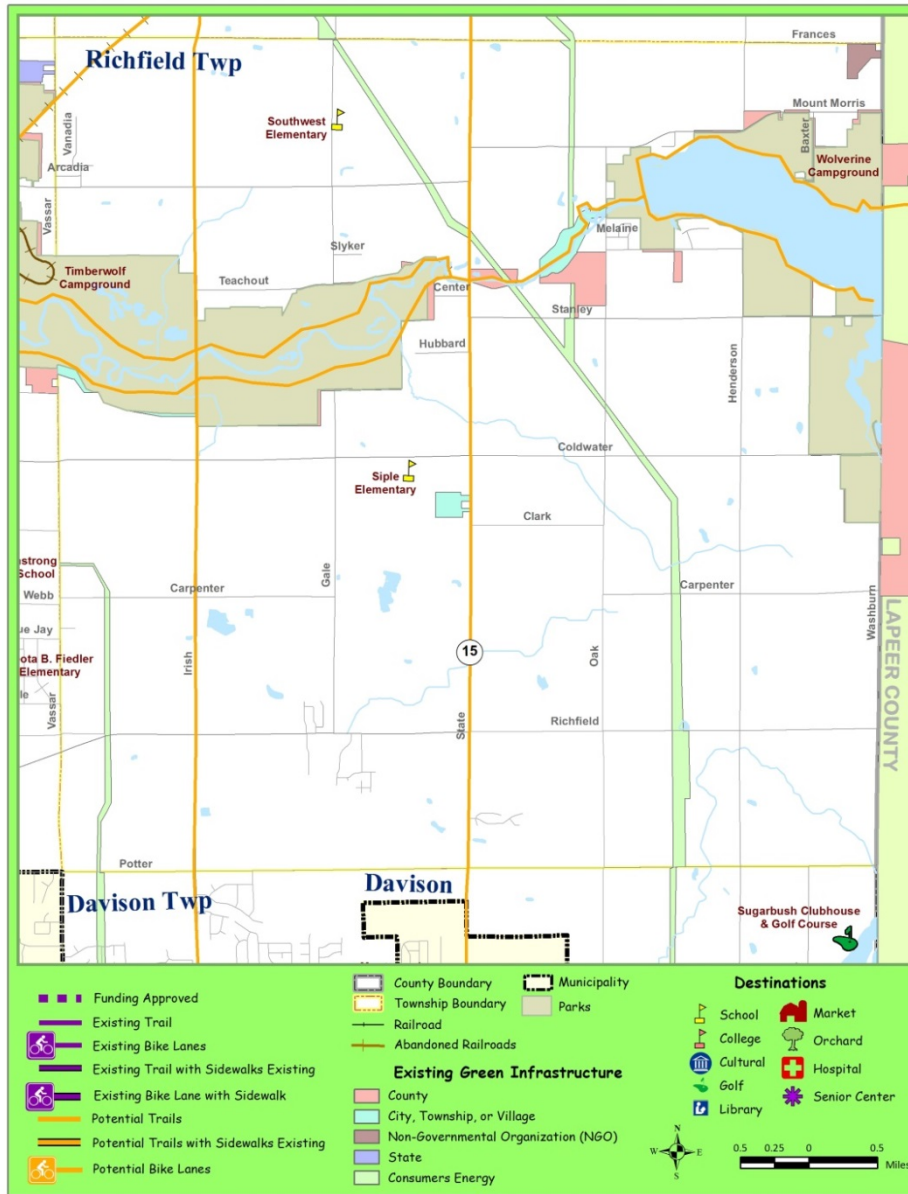
A walking path is also proposed near Rankin Elementary School on township property.

### Trailheads

Rankin Elementary School or Mundy Township Hall could serve as a trailhead for this area

# Richfield Township

## Preferred Corridors



### Regional Corridors

M-15 passes through Richfield Township and is part of the M-15 Heritage Route. M-15 is also part of a trail identified in an approved plan. This M-15 potential bike path would travel north-south through the entire eastern section of Genesee County, and connect with Oakland County to the south and Tuscola County to the north

Trail connections that follow the Holloway Reservoir in the Holloway Reservoir Regional Park have been identified. These trail connections ultimately lead to the Southern Links Trailway in Lapeer County.

### Local Connectors

Part of the Genesee County Park system is located in Richfield Township. Potential trail connections that would follow the Flint River through the park system have been identified

Part of an abandoned railroad bed runs through the township's upper left corner (in Section 6) from Forest Township to Genesee Township. This abandoned railroad bed has been identified as a potential trail connection.

### Trailheads

Trailhead locations and amenities may need to be identified for the potential trails in Richfield Township that will follow the Flint River through the Genesee Recreation Area.





# Thetford Township

## Preferred Corridors



### Regional Corridors

Thetford Township is home to a segment of M-57 (Vienna Road). Part of this segment (from the west township line to Genesee Road) is a trail identified in an approved plan. The other part of the segment (from Genesee Road to the east township line) has been identified as a potential bike lane. These trail connections would help complete a major east- west trail for the county. Wide paved shoulders currently exist on M-57 from Belsay to Saginaw Rd. Signage and striping are all that would be needed to make it a bike lane.

### Local Connectors

Genesee Road north of M-57 is already a trail identified in an approved plan. The Ligon Outdoor Center, which has 6 ½ miles of hiking trails, is located on Farrand Road. A potential trail has been identified to connect the Center with Genesee Road. Genesee Road in Thetford Township, south of M-57 has been identified as a potential trail, which would connect through Genesee Township and the Cities of Burton and Flint.

There are plans to connect the existing City of Clio pedestrian trail with Buell Lake County Park in Thetford Township.

### Trailheads

Trailhead locations and amenities may need to be identified for the potential trail on M-57 (Vienna Road) and the potential trail on Genesee Road

# Vienna Township & City of Clio

Preferred Corridors



### Regional Corridors

The M-57 bike lane traverses through Vienna Township. A section of M-57, from east of Linden Road to east of Jennings Road, is already part of an existing trail. This trail continues through Vienna Township and into the City of Clio.

There are approved plans to connect the Clio Bike Path going into Mt. Morris to the south. The northern portion ending at the Northern County Line is completed. There are plans to extend this connect this trail to the Birch Run Outlet Stores.

The City of Clio contains a segment of M-57 (Vienna Road). Part of this segment (western city limits to railroad tracks) has an existing bike lane. Another part of the segment (from Clio Bike Path to eastern city limits) is a trail identified in an approved plan. Along M-57 from Saginaw Road to Belsay Road, wide paved shoulders already exist along both sides of the roadway; these would simply need striping and signage to become bike lanes.

There are plans to connect the existing City of Clio pedestrian trail with the Clio Sports Complex and Buell Lake County Park in Thetford Township. Also planned is a bike trail extension from the Senior Center to the Clio Sports Complex, with a recommended pedestrian crossing either over or under Saginaw Road.

### Local Connectors

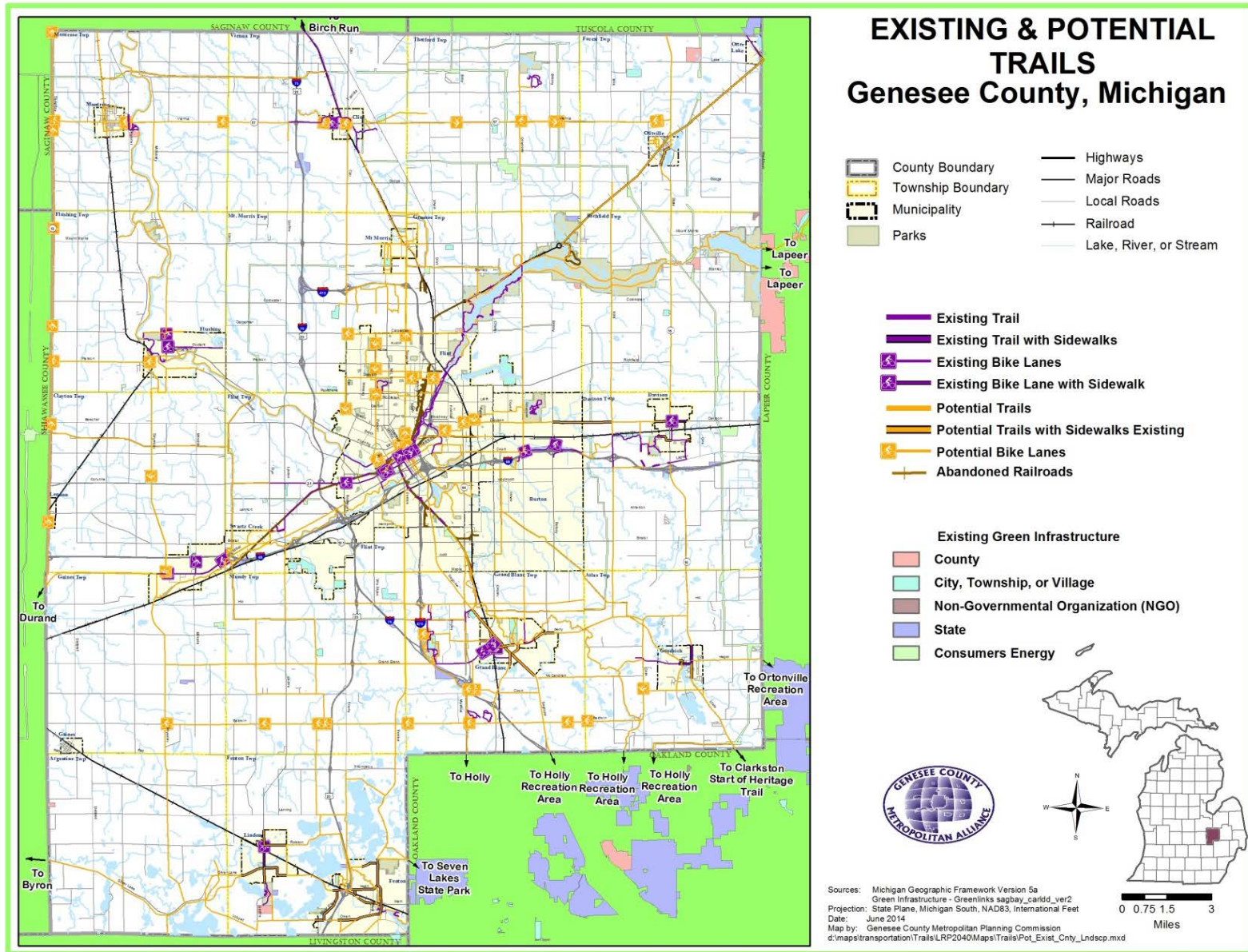
Tufford Park in Vienna Township serves as the entryway for a one and a half mile bike and pedestrian trail. This trail runs from I-75 and connects with a City of Clio trail.

### Trailheads

Trailhead locations and amenities may need to be identified for the potential trail on M-57 (Vienna Road), and for the identified trail heading to Saginaw County.

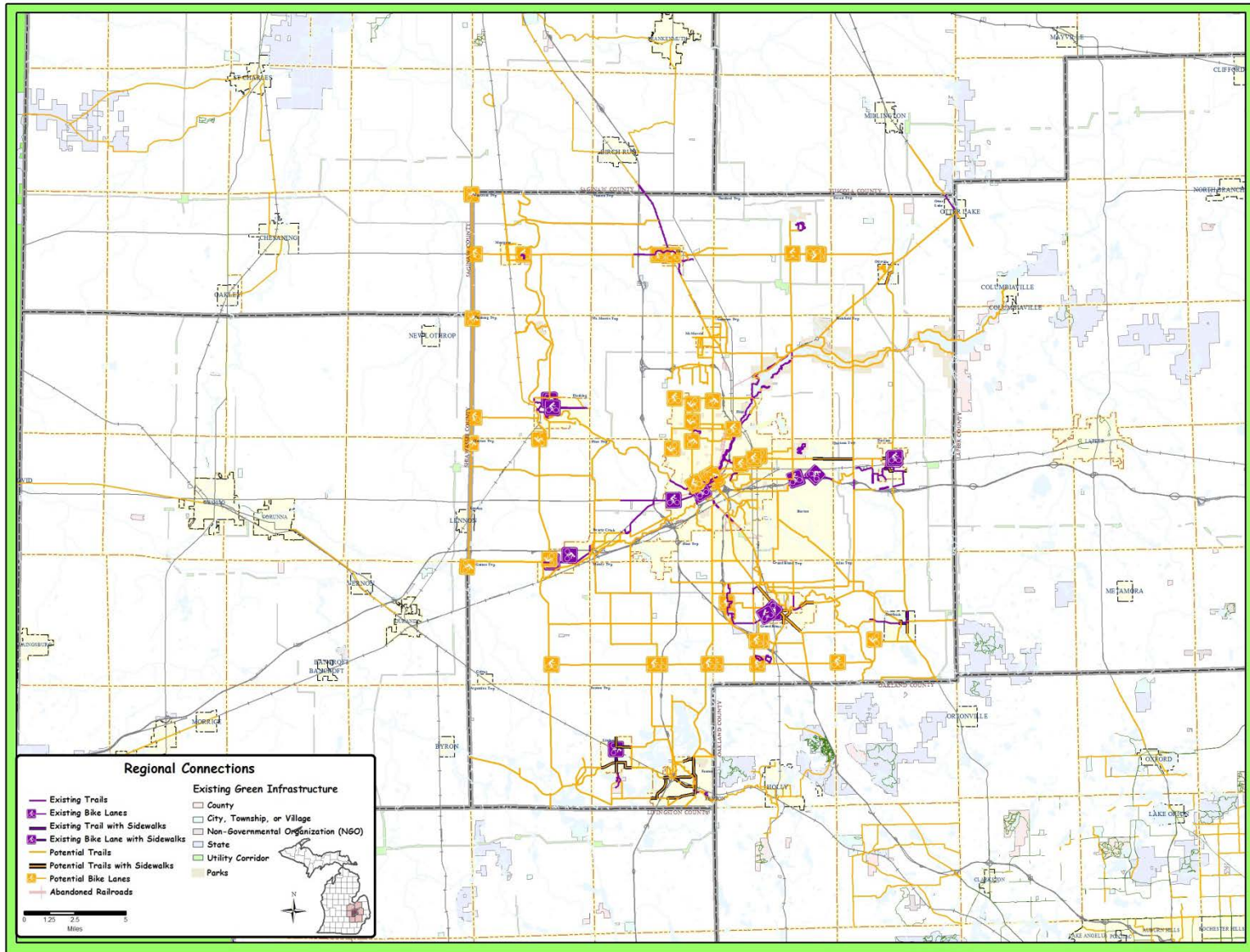
# Existing and Potential Trails in Genesee County

Preferred Corridors



# Regional Connections

Preferred  
Corridors



# Genesee County Priority Trail Segments

Preferred  
Corridors

## Genesee County Priority Trail Segments

Every trail identified in this plan is an important connection to the overall non-motorized system in Genesee County. The first goal of this plan is connectivity: development of an interconnected regional trail system in Genesee County.

Prioritization was conducted through public input at two meetings and subsequent meetings with various municipalities. The first public meeting; the “Regional Trail Review Workshop” focused on the potential trails and any revisions that may be necessary. The second public meeting; “Regional Trail Prioritization Meeting” focused on identifying trail segments and their priority.

## Regional Trail Review Workshop

The purpose of the Regional Trail Review Workshop was to discuss the trail network with specific focus on any trails missing or needing revision. This meeting brought together representatives of local units of government, trail groups, stakeholders, and members of the public.



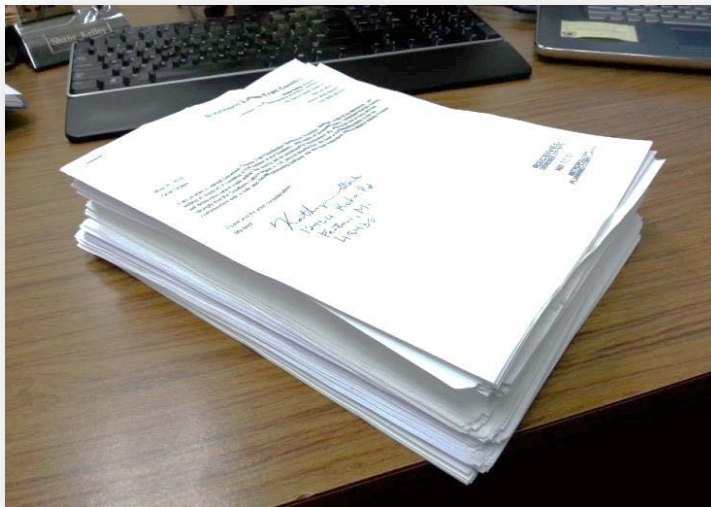
# Genesee County Priority Trail Segments

Preferred  
Corridors

## Prioritization Meeting

The prioritization meeting brought together local officials, stakeholders, trail groups, and public members interested in trails in order to prioritize them for future funding. The prioritization activity was divided into 5 steps.

During the Prioritization meeting the Southern Lakes Trail Coalition presented GCMPC staff with over 500 letters of support from local residents.



## Step 1

Each participant was given 10 stickers to place on any trails they felt should be a priority.





# Genesee County Priority Trail Segments

## Preferred Corridors

### Step 2

Each group was instructed to identify segments for prioritization by marking them at the start and finish according to the sticker placement.



### Step 3

Each group discussed the trail segments identified and narrowed the selection down to their top 5 priority segments



### Step 4

Each group discussed their top 5 selection and identified their top 3 priorities.



### Step 5

After the group activity was completed each group assigned a speaker to share their group's map and explain their reasoning for their group's priorities.



# Genesee County Priority Trail Segments

Preferred Corridors

## Results

GCMPC staff collected each map from the meeting to further review the results. In the realization that trails take lots of time and effort to design, receive funding, acquire land, and build, as well as for future flexibility in funding, the results were categorized into 3 tiers. Tier 1 priorities were derived from the final step at the prioritization meeting. GCMPC analyzed the results and met with local municipalities and trail groups in order to adjust priority segments where necessary to ensure segments were complete and reflect local interests. Tier 2 priorities were derived from step 3 at the prioritization meeting and adjusted as necessary to reflect the local municipal support. Tier 3 priorities were derived from the remaining trails after the prioritization meeting.

### Tier 1: Short Term Priorities (1-10 years)

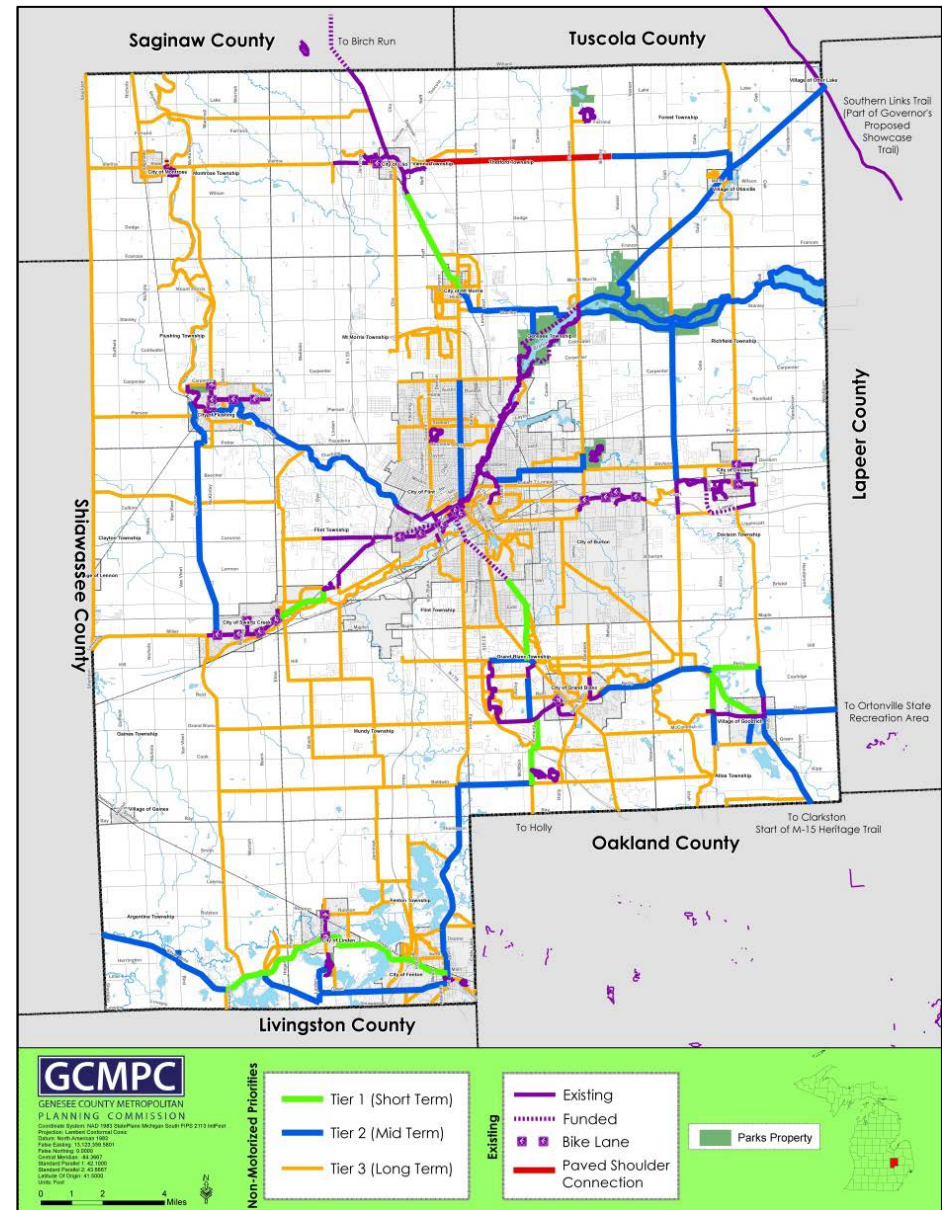
These trails represent those which have strong public support and highest priority for development.

### Tier 2: Mid-Term Priorities (11-20 years)

These represent trails with public support and important connections to be developed between 11-20 years.

### Tier 3; Long Term Priorities (Beyond 20 years)

These represent our long term priorities beyond 20 years.





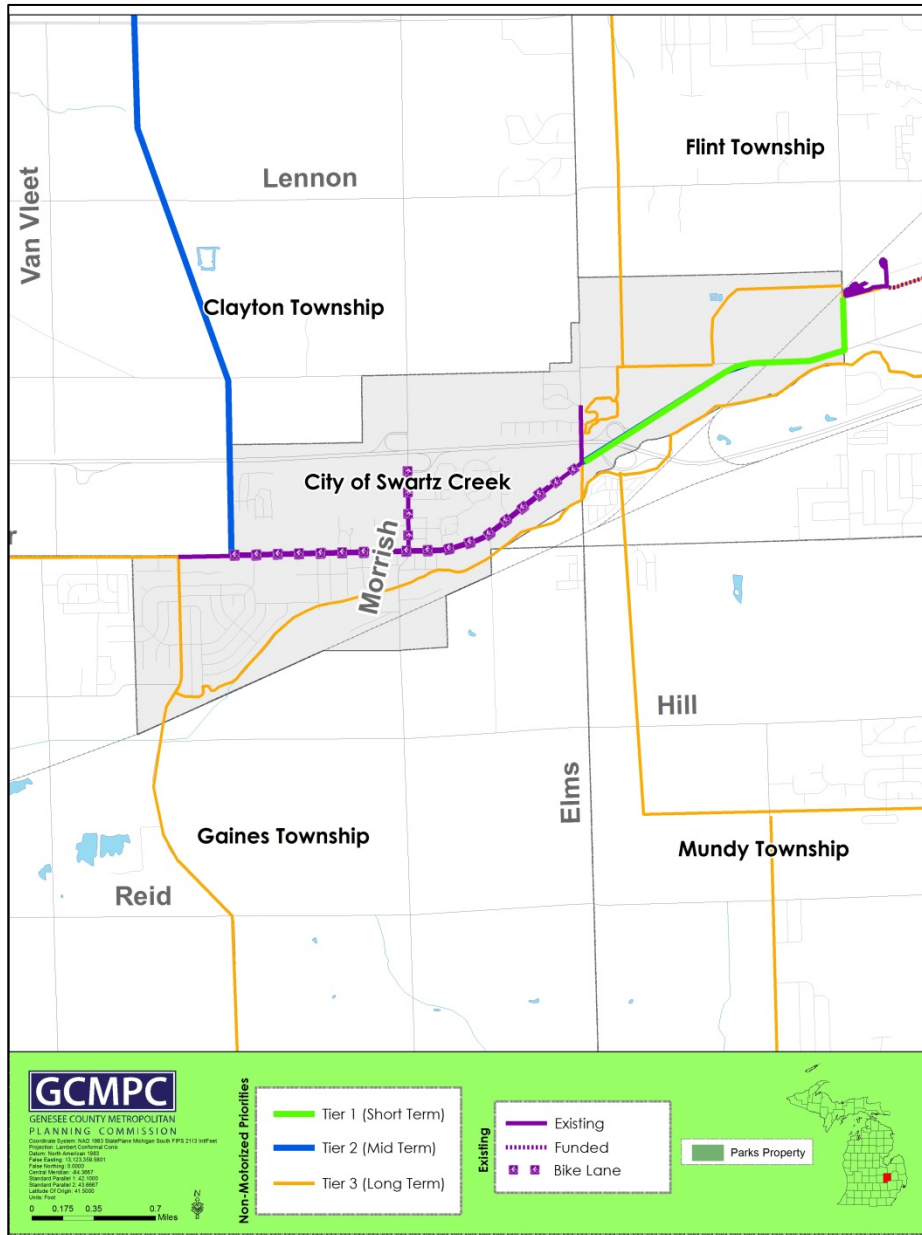
# Genesee County Priority Trail Segments

Preferred  
Corridors

*(Listed Alphabetically)*

## Genesee Valley Trail

A connection from the existing Genesee Valley Trail and Proposed Paved Shoulders on Norko Drive to the bike lanes on Miller Road has been identified as a Tier 1 priority. The preferred route would make the connection along Dye and Miller Road although an alternative could be along Dye and Bristol Road. Approximately 2 miles proposed



# Genesee County Priority Trail Segments

Preferred  
Corridors

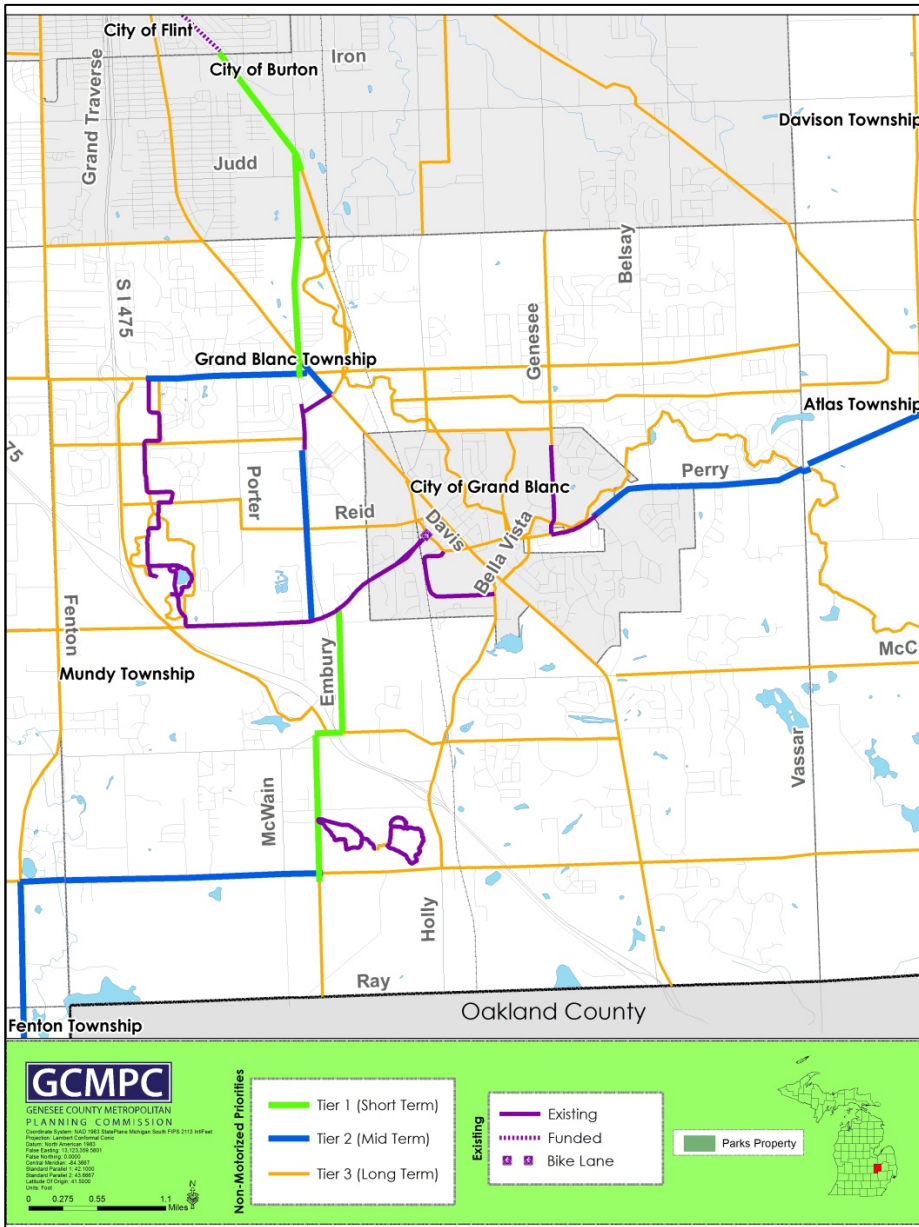
*(Listed Alphabetically)*

## Grand Traverse Greenway

The Grand Traverse Greenway, funded and expected to be completed by 2017, ends at the City of Flint and City of Burton boundary. A proposed extension South has been identified as a Tier 1 priority, extending the Grand Traverse Greenway along the former railroad southeast to Dort highway leading into Grand Blanc Township and ending at the sidewalks on Saginaw Road until future connections can be made. Approximately 3 miles proposed.

## Dort Highway Extension

A non-motorized path has been included as part of the proposed Dort Highway Extension. The path would follow Dort Highway from Baldwin Road north to Cook road. It would then continue north on Embury road connecting the current Grand Blanc Road Path to the trails at Genesys Regional Medical Center. Approximately 2 ¼ miles proposed.







# Water Trails

6

Water Trails





## What is a Water Trail?

The National Water Trails System defines water trails (also known as “Blue Trails”) as recreational routes on waterways with a network of public access points supported by broad-based community partnerships providing both conservation and recreational opportunities.

<http://www.nps.gov/WaterTrails/>

## Why are Water Trails Important?

According to the American Rivers Blue Trails, three out of every four Americans participate in active outdoor recreation each year and paddle sports are among the fastest growing segments of the industry.

### Economic

Water trails have a significant economic impact on their local community, as they are compatible with other types of water recreation such as fishing, boating, etc. further contributing to outdoor recreational opportunities. In Michigan alone outdoor recreation generates \$1.4 billion in state and local tax revenue and 194,000 direct Michigan jobs, according to the Outdoor Recreation Industry Association’s Outdoor Recreation Economy Report for Michigan.

### In Michigan

#### OUTDOOR RECREATION GENERATES...

<b>\$18.7</b> BILLION in consumer spending	<b>194K</b> direct Michigan jobs <sup>2</sup>
<b>\$5.5</b> BILLION in wages and salaries	<b>\$1.4</b> BILLION in state and local tax revenue

### Nationally

#### OUTDOOR RECREATION GENERATES...

<b>\$646</b> BILLION in consumer spending	<b>6.1</b> MILLION direct American jobs <sup>2</sup>
<b>\$39.9</b> BILLION in federal tax revenue	<b>\$39.7</b> BILLION in state and local tax revenue

[www.outdoorindustry.org/recreationaleconomy](http://www.outdoorindustry.org/recreationaleconomy)

### Education

“Heritage” Water Trails foster an interactive and educational experience by providing information of the local heritage via historical markers and educational signs that may include scientific and historic information relating to the local history of the waterway and community.

### Ecological

As water trails attract more users of local waterways it also increases awareness of the natural beauty and importance of conservation efforts and water quality standards.

## Human Health

According to the Robert Wood Johnson Foundation – Annual County Health Rankings, Genesee County is the second worst county in Michigan for overall health.

Quality of Life	Genesee County	Michigan
Poor Mental Health Days*	4.2 days	3.7 days
Health Behaviors		
Adult Obesity	36%	32%
Physical Inactivity	30%	24%

\*Average number of mentally unhealthy days reported in past 30 days

<http://www.countyhealthrankings.org/>

Water trails are a great way to combat these health conditions as they provide several health benefits.

One of the most commonly mentioned benefits of using a water trail is the reduction of stress. According to a study conducted by the University of Michigan titled: "The Cognitive Benefits of Interacting with Nature",

simple and brief interactions with nature can produce marked increases in cognitive control.

The study can be viewed at:

[http://www-personal.umich.edu/~jjonides/pdf/2008\\_2.pdf](http://www-personal.umich.edu/~jjonides/pdf/2008_2.pdf)



Another benefit of water trails is weight loss and muscle toning. While paddling along the water trail your body uses your back, shoulders, arms, hands, abdomen, chest, and your heart! According to Harvard Health Publications, a person who weighs 125 pounds burns an average of 150 calories during 30 minutes of kayaking. A person who weighs 185 pounds, meanwhile, burns 222 calories during a 30-minute kayaking workout.

## Water Trails in Genesee County

Genesee County only has one trail with a designation as a water trail; the Shiawassee River Heritage Water Trail. Aside from the Shiawassee River there is only one other major waterway that is a potential water trail; the Flint River.

### Shiawassee River Heritage Water Trail

The Shiawassee River Heritage Water Trail, begins in Oakland County and enters the southeastern border of Genesee County. Thanks to funding from the Saginaw Bay Watershed Initiative Network, portions of the river have various bridge markings, mile markers, and Informational signs. The informational signs are located at Holly Waterworks Park (Oakland County), Fenton Bush Park, Fenton, Strom Park, and at the Linden Mill Pond. An additional sign is planned for a launch on McCasslin Lake Rd in Argentine Township. There are also plans to develop a new launch in Fenton Township with parking, restrooms, and camping, off of Rolston Road. The University of Michigan-Flint's University Outreach has partnered with Keepers of the Shiawassee and several other organizations to promote the Shiawassee River's long-term protection. Thanks to a generous grant from the Fenton Community Fund of the Community Foundation of Greater Flint a water trail guide was developed.

## Flint River Water Trail

The Flint River provides beautiful scenery throughout the county and is mostly navigable with minimal portaging needed. The Flint River possesses over 14 access points and is recommended for Water Trail designation.



## Water Trail Planning

On July 1, 2014 GCMPC staff organized a water trail discussion which brought together local watershed coalitions, river stewardship organizations, and interested members of local governments and the public. At the meeting, the group discussed what the current needs are for water trails in Genesee County. Water Trail development should also be coordinated with local zoning, conservations efforts, water quality improvements, and actions of non-profit conservation entities. The following are components identified at the water trail discussion:

### ACCESS POINTS

Although several access points have been identified along the Flint and Shiawassee River, not all are considered official sites. Several of the sites are located within a residential neighborhood and do not provide necessary parking, identification, or facilities for individuals wanting to launch. The quality of these sites should be improved to provide parking, proper markings, disability access, and the necessary facilities allowing the site to be easily accessible and identified. Emergency access points should also be identified for local law enforcement and rescue. If access is limited in certain areas it is important that land be acquired. This can be funded by the Michigan Natural Resources Trust Fund.

### FACILITIES

As users paddle along the water trail it is important that the trail encourages the journey by providing restrooms and facilities to secure their belongings.

Kayak lockers provide paddlers the opportunity to secure their kayak, explore the area, use the restrooms, or simply take a break. Other considerations should be given to bicycle facilities for those wanting to bicycle back to their vehicle or into town.



## SIGNAGE

Although water trails can be very inexpensive, there is a need for informative signage. Design standards should be drafted in future plans for water trail signs in Genesee County similar to the design standards set for paved trails.



A variety of signs may be necessary such as:

- **Directional Signs / Mile Markers:** allowing users to track distances and see distances to the next destination. Some of these signs can be located on bridges also identifying the name of nearby streets.
- **Warning Signs:** for areas where paddling and landing is restricted or where hazards are present such as low wires, swift water, etc. Portaging locations should also be clearly identified.
- **Informational Signs:** showing a map of the overall route, travel times, destinations, and other useful information about the route itself and its development. Destinations along the route other than access points such as local businesses or community spaces should also be identified.
- **Educational Signs:** addressing topics such as trees and plants along the route, geology, biology of the river (such as the invasive species found in the river), and water quality measures.
- **Heritage Signs:** providing information regarding the history of the community and significance of specific places along the trail.

## AWARENESS

In order to encourage the use of water trails the public must be educated on water quality and how they can “complete the loop” when using a water trail. Users need to be informed of how they can return to the location from which they started whether it is by bicycling, walking, or public transit. Maps should be provided at access points that show options for a return route.

Awareness can be accomplished in a variety of methods such as social media, water trail websites, informative brochures, and public school presentations to list some.

## DESIGNATION

Water Trail designation allows waterways to receive recognition on a much larger scale, both state-wide and nation-wide. This recognition can encourage individuals to visit our water trails and as a result bring an economic benefit.



## **National Trails System**

The National Water Trails System is a grassroots effort that relies on local management of the designated water trails. The National Park Service (NPS) Rivers, Trails, and Conservation Assistance Program (RTCA) is the primary administrator that works in partnership with a collaborative interagency group. RTCA staff serves as a clearinghouse for information sharing and national water trail networking efforts. Agencies may nominate individual water trail designations, work in collaboration with community organizations seeking designation, help strengthen the network of water trail managers, and build the community of practice for water trails.

### Benefits of Designation:

- Designation by the Secretary of the Interior, including a letter and certificate announcing the designation as a national water trail.
- National promotion and visibility, including use by the management entity of use the National Water Trails System logo in appropriate settings and trail publications.
- Mutual support and knowledge sharing as part of a national network.
- Opportunities to obtain technical assistance and funding for planning and implementing water trail projects.

As a result of designation, national water trails may gain:

- Positive economic impact from increased tourism.
- Assistance with stewardship and sustainability projects.
- Increased protection for outdoor recreation and water resources.
- Contribution to public health and quality of life from maintaining and restoring watershed resources.
- Access to networking and training opportunities.
- Assistance with recognition and special events highlighting the trail.

All national water trails will be included in the online searchable database of trails and have a page on the national water trails systems website to share trail information including water trail descriptions, maps, photographs, water trail manager contact information, links to applicable websites, and best management strategies and practices.

## Michigan Great Lakes Water Trails Working Group

The Michigan Great Lakes Water Trails Working Group includes volunteers from Michigan Sea Grant, the Land Information Access Association (LIAA), the Michigan Department of Environmental Quality, the Parks Division of the Michigan Department of Natural Resources, the

U.S. National Park Service, Pure Michigan, Western Michigan University, the East Michigan Council of Governments, the Northeast Michigan Council of Governments, the Eastern Upper Peninsula Regional Planning and Development Commission, the Western Upper Peninsula Planning and Development Regional Commission, the Northwest Michigan Council of Governments, the West Michigan Shoreline Regional Development Commission, the West Michigan Regional Planning Commission, the Southwest Michigan Planning Commission, and paddling enthusiasts.

The Working Group has a website providing great resources for local residents or tourists to discover what attractions and activities are available near them.

<http://www.michiganwatertrails.org/>



## Maintenance

A very critical component for water trails is maintenance of access sites, facilities, as well as the waterway. Currently, several organizations organize river cleanups for the Shiawassee and Flint River. It is also imperative that new volunteers are sought to assist these organizations in order to keep interest in the endeavor and not to over burden the same volunteers of past. It is also important for local municipalities to assist in maintenance in order for the efforts to go beyond those of only volunteers. The American Rivers Blue Trails provide recommendations of maintenance to be performed regularly:

**Inspections** should occur regularly depending on the amount of use, type of use, and location. Inspections should be documented to include the condition of launches, campsites, picnic areas, signs, and other facilities.

**Sweeping** the water trail for debris such as fallen logs and other hazards is one of the most important aspects of water trail maintenance, helping ensure user safety.

**Trash removal** is important from a safety and aesthetic viewpoint. Trash removal should take place on a regularly scheduled basis, the frequency of which will depend on trail use and location.

Several woody debris removal practices must be undertaken multiple times each year in order to keep the river open. It is important that this does not ignore the competing interest of promoting fish habitat. Involving the MDNR through the planning process will ensure that the appropriate actions are taken and considerations made.

More information on managing and maintaining water trails is available at:

<http://www.bluetrailsguide.org/build/manage/>



Photo courtesy of Flint River Watershed Coalition



## Current Initiatives and Interested Groups

### Flint River Paddlers

This group of paddle sport enthusiasts from the Flint, Michigan, shares a common goal of paddling and conservation on the Flint River. The group works closely with the Flint River Watershed Coalition (FRWC) to help promote river conservation, stewardship and the recreational aspects and opportunities present in the Flint River Watershed. The “Flint River Paddlers” is a grass-root FRWC sponsored organization.

<https://www.facebook.com/pages/Flint-River-Paddlers/91349862889>

### Flint River Watershed Coalition

The Flint River Watershed Coalition (FRWC) was formed in the fall of 1997 and is collaboration between educational institutions, local government, local business, environmental groups, and concerned citizens who feel strongly that the Flint River and its tributaries are a vital resource we all need to protect. The FRWC organizes annual river cleanup events.

[www.flintriver.org/](http://www.flintriver.org/)

### Flint River Corridor Alliance

The Flint River Corridor Alliance (FRCA) is a community based organization of government, non-profit, and private sector stakeholders organized to initiate, support, and sustain projects in the Flint River Corridor that revitalize the river as a community asset while enriching the quality of life for the area’s residents, businesses, and visitors.

Their priority areas are:

- Economic Development and Neighborhood Revitalization
- Recreation and Culture
- Environmental Quality and Infrastructure

<http://www.fralliance.org>

### Genesee County Parks

The Genesee County Parks and Recreation Commission is dedicated to providing all the residents of Genesee County with affordable, quality, recreational, and educational facilities. Genesee County Parks is Michigan’s largest county park system with 11,000 acres of woods, rivers, lakes, trails, beaches and campgrounds.

<http://www.geneseecountyparks.org/>

## **Southern Lakes Park and Recreation (SLPR)**

The Southern Lakes Park and Recreation's vision is to offer park, recreational facility, & program opportunities that enhance the education, physical health, personal well-being & social interactions within the community. SLPR supports the efforts of the volunteer group Keepers of the Shiawassee.

<http://www.slpr.net>

## **Keepers of Shiawassee**

Keepers of Shiawassee is a group of volunteers that organizes kayaking events on the Shiawassee River and cares for the Shiawassee river.

## **Friends of the Shiawassee**

The mission of Friends of the Shiawassee River is to Care, by maintaining and improving the health of the river; Share, by enhancing the community's appreciation and knowledge of the river; and Enjoy, by increasing recreational access and responsible use of the river. The Friends of the Shiawassee River organize annual river clean-ups and river work days with a specific focus on the removal of invasive species.

<http://www.shiawasseeiver.org>

## **Headwaters Trails Inc.**

Headwaters Trails Inc. is a non-profit 501(c3) group whose mission is to facilitate and promote the cooperation of local governments in Southeast Michigan with specific emphasis on Holly, Rose, Groveland, Springfield, Fenton and Argentine Townships, the Village of Holly, the City of Fenton, and the City of Linden to create new recreational opportunities including the creation of a network of trails for the area residents and visitors. Headwaters trails Inc. organize river cleanups every spring, summer, and fall using the DNR's Best Practice Methods. The work involves cutting trees and brush with loppers, hand saws, and chain saws, and pulling trash from the river.

<http://headwaterstrailsinc.org/>

## Water Trail Funding Sources

The following are funding sources that will fund components of water trails. Although effort has been given to identify these funding sources it does not serve as an exhaustive list. As awareness for water trails grows and funding sources are made aware and available this information should be updated and provided on the GCMPC website.

### Michigan Department of Natural Resources (DNR)

The DNR has several grants that can be applied for water trails. Below is a list of potential grants that may be applicable to some component of a water trail. For more information visit: [www.michigan.gov/dnr-grants](http://www.michigan.gov/dnr-grants)

- Michigan Natural Resource Trust Fund
- Recreation Passport Grant Program
- Waterways Grant Program
- Recreational Trails Program Grants
- Marine Safety Grants to Counties

### Community Foundation of Greater Flint (CFGF)

The Community Foundation's grant making priorities give focus to its mission of serving the common good. CFGF

informs its grant making process by being steeped in community knowledge, relying on the contributions of foundation staff and trustees, and a broad and diverse group of community volunteers. Each year, the foundation awards grants to nonprofit organizations from its discretionary funds through a competitive grant making process. Grants may come from CFGF's Community Impact Fund (also known as unrestricted funds), Field-of-Interest Funds, Community Funds or Youth Initiative Program Funds.

<https://www.cfgf.org/cfgf/Home/tabid/326/Default.aspx>

### Saginaw Bay Watershed Initiative Network (WIN)

WIN welcomes proposals that advance the search for sustainable solutions to current watershed and community challenges. WIN is responsive to new ideas, new research and new approaches, recognizing that such innovation is necessary to move the concept of sustainability forward in the Saginaw Bay watershed. The sustainability approach integrates economic goals with environmental and social goals and is based on the premise that meeting human needs for all people today should not impair the ability of future generations to meet their needs.

<http://www.saginawbaywin.org/grants/>

## L.L.Bean - Club Fostered Stewardship Grant

L.L. Bean and the American Canoe Association have teamed up to sponsor funding to local and regional paddling clubs and organizations that undertake the stewardship projects on waterways in their area.

Eligible projects include: cleaning up waterways, clearing in-stream safety hazards, maintaining access areas, erecting signs and controlling erosion, establishing and maintaining paddle trails, acquiring threatened access points, and providing sanitary facilities. Grant amounts range from \$100-\$1,000.

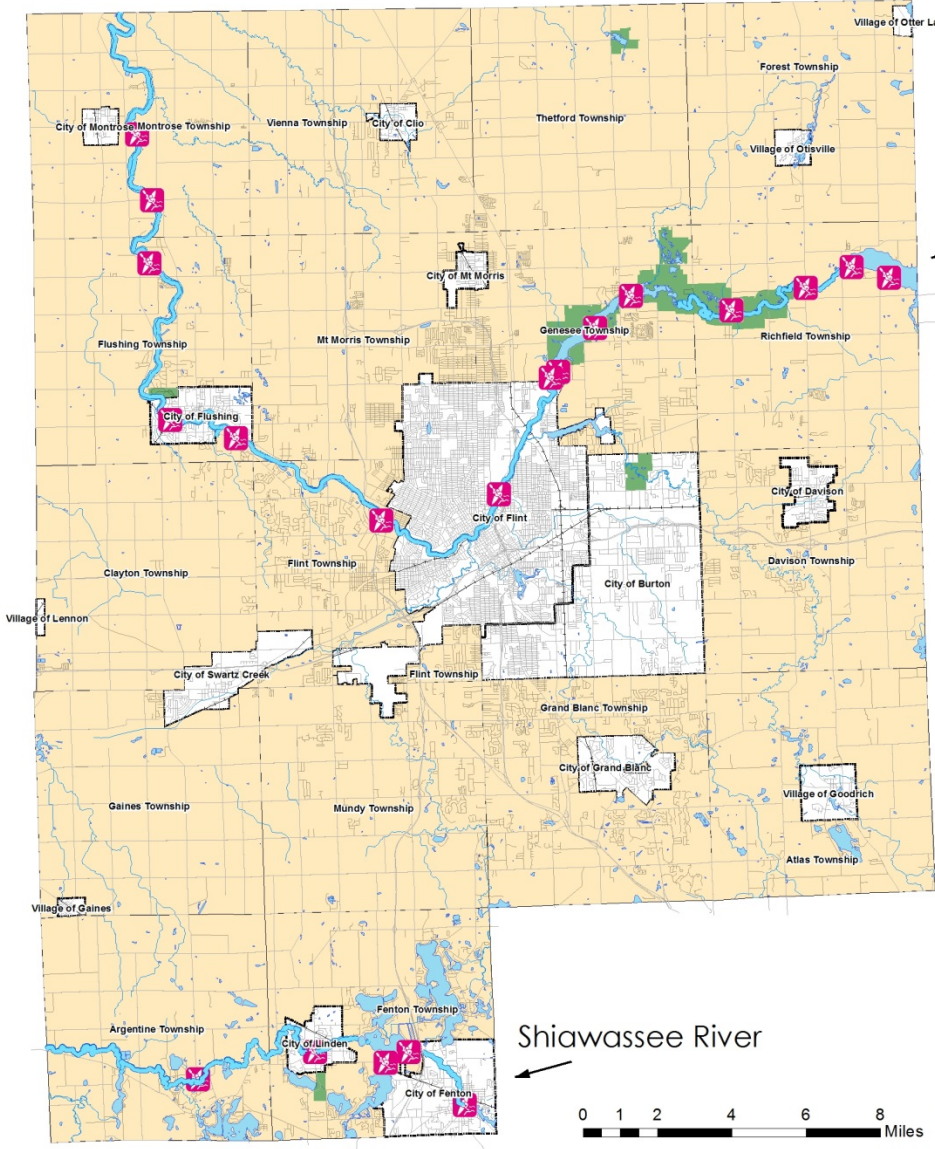
<http://www.americancanoe.org/>

## Consumers Energy Foundation Grants

The Consumers Energy Foundation is committed to helping nonprofits create sustainable communities by awarding grants in these five focus areas:

- Social Welfare
- Community and Civic Development
- Education
- Michigan Growth and Environmental Enhancement
- Culture and Arts

<https://www.consumersenergy.com/content.aspx?ID=4328>



Flint River

## River Access Sites in Genesee County

 River Access Sites

 Genesee County Parks

July 2014



# 7

## Design Considerations



Developing a trail system means bringing people together. A successful system not only accommodates multiple modes of non-motorized transportation, but also accommodates multiple types of people, including those of all ages as well as people with disabilities. In order to effectively accommodate all possible users of the trail system, all users should be involved in the planning and design of that system from the beginning. This will help ensure that the resulting trail system proves accessible to all those who desire to use it. With the vast majority of routes in Genesee County likely being multi-use, it is important to realize all possible user types. Users of multi-purpose routes may include pedestrians, bicyclists, in-line skaters, cross-country skiers, as well as those in wheelchairs.

Working through the development stages of a trail system can become very complicated. There are many different agencies that must reach consensus prior to action. Local governments, citizen advocacy groups, local businesses, and possible users should all be allowed to share their thoughts to effectively resolve any differences of opinions. This section will provide guidelines for these stakeholders to use when planning and designing their non-motorized routes. It is important to understand that these are only guidelines, often adapted from the Association of State Highway and Transportation Officials (AASHTO) among other agencies, and should be tailored to the specific situations occurring throughout Genesee County.

## General Design Guidelines

The advantage of a set of guidelines is that they are flexible and accommodating. The following guidelines set forth in this plan are meant to “guide” decision making and are not by any means an exhaustive list. Although communities and agencies using this plan are encouraged to use innovative approaches to best fit their individual conditions, they are also expected to follow any mandated standards, named separate from this document, that are required for construction.

Although there are many different types of trails and non-motorized paths, this plan only references those types one would generally find located in the Genesee County region. Those pathways include on-road bike lanes, systems separate from the roadway, but still located within the right-of-way, bike routes and shared-use paths.

## Bike Lanes

Bike lanes offer the most convenient type of pathway for communities to create within their area. This is due to the presence of the roadway, which requires no land acquisition or clearing. Often times, the roadway may be wide enough to simply draw in an on-road bike lane. This practice is called re-striping. Communities planning the restoration of old roadways or the construction of new roadways should attempt to include bike lanes wherever possible. Both lane restriping and shoulder

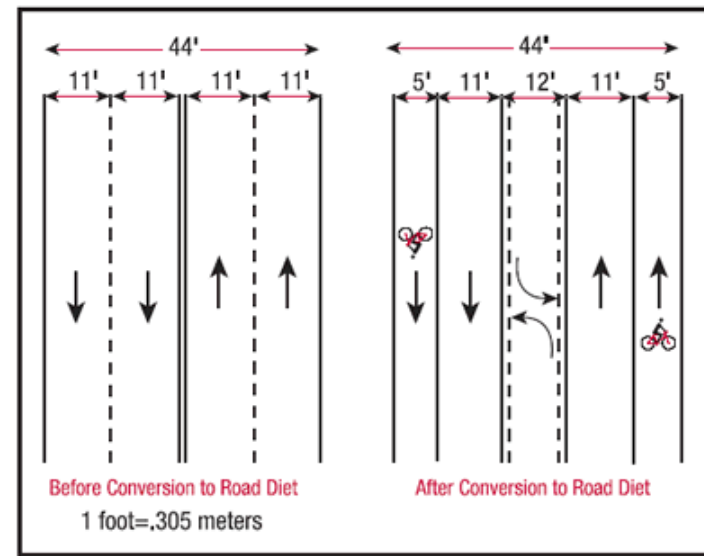
paving are common approaches for producing on-road bike routes.

## Paved Shoulders

Paved road shoulders offer a suitable way to provide non-motorized routes to bicyclists. While paving of the shoulder provides bikers with a smooth path to travel upon, this increased road width also preserves the edges of the pavement.

## Road Diets

Road Diets are often conversions of four lane undivided roads into 3 lanes (two through lanes and a center turn lane). The fourth lane may be converted to bicycle lanes, sidewalks, and/or on-street parking.

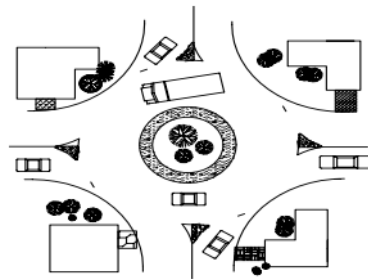




## Traffic Calming

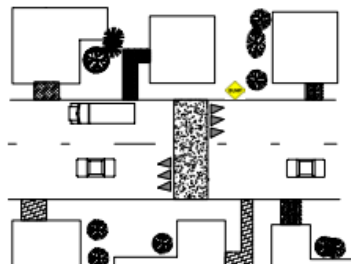
Wherever trails and roadways intersect, there is a potential safety hazard. Slower speeds produce better reaction times and a safer environment. The practice of traffic calming utilizes innovative design methods to slow traffic in certain areas. The Institute of Traffic Engineers has defined traffic calming as, "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users." Traffic circles, chicanes, narrowed streets, and speed humps are only a few of the methods used to calm traffic, and provide a safer more enjoyable experience for non-motorized travelers.

### Roundabout / Traffic Circle



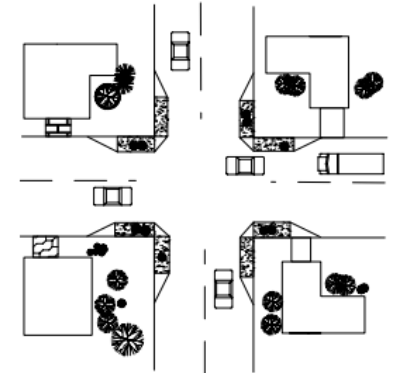
Source: City of Sparks – Guidelines for Traffic Calming

### Speed Hump



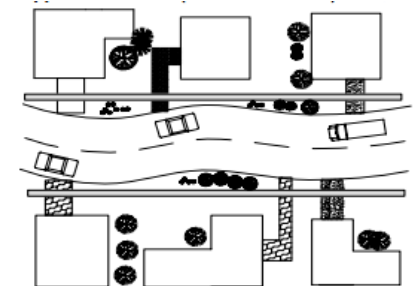
Source: City of Sparks – Guidelines for Traffic Calming

### Street Narrowing



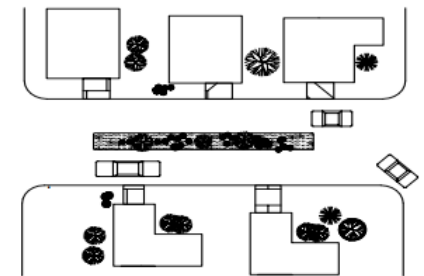
Source: City of Sparks – Guidelines for Traffic Calming

### Chicane



Source: City of Sparks – Guidelines for Traffic Calming

### Island



Source: City of Sparks – Guidelines for Traffic Calming

### **Bike Routes**

A bike route is another alternative to bike lanes for areas in Genesee County where striping a bike lane may not be feasible, but the need for accommodating bicycle activity is evident. A bike route is a suggested route through a city or a neighborhood most likely using residential streets, although it may simply indicate the safest route through a congested area. The route would be designated by bike route signs but would not involve any special road construction or other markings.

### **Path in Right-of-Way**

Aside from providing routes within roadways, paths are often found adjacent to the roadway, yet still in the right-of-way. Communities are often inclined to construct this type of path because land acquisition is not usually necessary and there are many destinations already located on the route. This brand of pathway can safely support most types of trail user; however, it still presents possible vulnerabilities and should be designed to prevent safety hazards. The AASHTO Guide for the Development of Bicycle Facilities, 1999 edition, offers plenty of suggestions:

- Paths adjacent to a roadway should utilize wide buffers separating the path and the roadway to show a distinct separation between the two.

- When wide buffers cannot be utilized, a physical barrier, such as a fence or railing, should be constructed.
- Give drivers and trail users alike ample sight distances, especially near intersections of pathways and roads.

Recommended Dimensions For Non-Motorized Trails and Paths		
Trail/Pathway Element	Recommended Dimensions	Comments
<b>RECREATION TRAILS</b>		
<b>Paved Pedestrian-Only Trail Width</b>	5 ft minimum 6 ft desirable	These trails are for exclusive use by pedestrians
<b>Unpaved Pedestrian-Only Trail Width</b>	2 ft minimum 4-6 ft desirable	Best as limited purpose facility in rural or semi-primitive areas; can provide interim solution (see Figure 35); minimum width
<b>Unpaved Shared Use Trail Width</b>	6 ft minimum 8-10 ft desirable	Only suggested as an interim solution and not appropriate for high use trails; best in
<b>Vertical Clearance</b>	8 ft minimum 10 ft desirable	Additional clearance improves visibility. Ten feet is minimum when equestrian use is expected.
<b>SHARED USE PATHS NON MOTORIZED SYSTEM</b>		
<b>Shared Use Path Width</b>	10 ft minimum 12 ft desirable 14 ft optimum	Minimum width should only be used where volumes are low and sight distances are good; width should be based on relative speed of users; higher speed users (bicyclists and
<b>Roadway Separation</b>	5 ft minimum	Minimum separation for parallel, adjacent path; a physical barrier should be installed
<b>Shoulders</b>	1 ft minimum (peds. only) 2 ft minimum (shared use)	Shoulders provide pull-off/ resting and passing space; should be graded to the same slope as the path; minimum shoulder
<b>Clear Zones</b>	1 ft minimum* 2 ft desirable*	Clear zones are additional lateral clearance on each side of the path beyond the shoulders. All obstructions (e.g. trees,
<b>Vertical Clearance</b>	8 ft minimum 10 ft desirable	Additional clearance improves visibility.

*\* If less than 1.2 m (4 ft) total lateral clearance is provided (including shoulder) between the edge of trail, and there is a vertical grade drop greater than 0.8 m (30 in), steeper than 2:1, railing may be required.*

Source: Georgia Department of Transportation Pedestrian and Streetscape Guide

# 8

## Funding & Implementation



The Genesee County Regional Non-Motorized Plan is a visionary document seeking to assist in the development of a safe, accessible and interconnected trail system within and beyond the county boundaries. The implementation of its contents depends entirely on active regional collaboration. In order for many of the important linkages proposed in this plan to materialize, it is essential for local agencies to come together on a grander scale.

While this document is not the final word on trail development in Genesee County, it is meant to provide local units and the region as a whole, with the guidance and know how to move in the right direction. This strategy is a fluid one, and is meant to be reviewed and updated as conditions and opportunities change.

### Potential Funding Sources

There are a number of agencies and organizations that offer funding for the development of non-motorized trail systems. The Federal Government, Michigan State Government, nonprofit organizations and corporations are all great places to look for trail funding. The following are a few common funding resources, but it is important to note that this list is not exhaustive and trail advocates should try to keep up on new possible sources of funding.

Additional opportunities for funding and implementation of non-motorized resources may exist within your local

community. Please contact your city, township, or village offices for additional funding and implementation resources or plans.

### Transportation Alternatives Program (TAP)

The TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways. [www.michigan.gov/mdot](http://www.michigan.gov/mdot).

Genesee County receives a small allocation of TAP funds annually to administer. Projects are selected with the Transportation Improvement Plan (TIP) call for projects. For more information please contact the Genesee County Metropolitan Planning Commission at (810) 257-3010 or visit [www.gcmopc.org](http://www.gcmopc.org).

## Michigan Natural Resources Trust Fund

Since 1976, the MNRTF has been providing financial assistance to local governments and the Department of Natural Resources (DNR) to purchase land (or rights in land) for public recreation or protection because of its environmental importance or its scenic beauty. Amounts ranging from \$15,000 to \$500,000 are available. Any person, organization, or unit of government can submit a land acquisition proposal; however, development proposals are only accepted from state and local governments. State and local units applying for these grants must include a minimum local match of 25% of the total project cost. For more information please contact the Michigan Department of Natural Resources, Grants Program at 517-373-9125 or visit [www.michigan.gov/dnr](http://www.michigan.gov/dnr).

## Land and Water Conservation Fund

The National Park Service operates the Land and Water Conservation Funds, which administers federal funding to state and local governments for the acquisition and development of public outdoor recreation areas and facilities. Grant applications are available through the Michigan Department of Natural Resources until July 1st of the application year and require a 50% local funding match. For more information please contact

the Michigan Department of Natural Resources, Grants Program at (517)373-9125 or visit [www.michigan.gov/dnr](http://www.michigan.gov/dnr).

## Community Development Block Grants

The primary objective of the Community Development Block Grant Program is to develop viable urban communities by providing decent housing, a suitable living environment and expanded economic opportunities for people of low and moderate income. CDBG funds can also be used as local match funds for federal and state grants such as Enhancement Grants.

All activities carried out under the Community Development Block Grant program must meet one of the three national objectives:

- Benefiting low to moderate income persons
- Aids in the elimination or prevention of slum or blight
- Addressing an urgent community need

Communities in Genesee County are encouraged to apply for CDBG for trail development as long as the trail will meet one of the objectives. For more information, please contact the Genesee County Metropolitan Planning Commission at (810) 257-3010 or visit [www.gcmpc.org](http://www.gcmpc.org).

## Ruth Mott Foundation

Ruth Mott Foundation's mission is to advocate, stimulate, and support community vitality. The Foundation supports the beautification of the community, in order to enhance neighborhoods and quality of life in the greater Flint area for its residents and visitors. Through a broad array of approaches, Ruth Mott Foundation seeks to engage the community in beautifying the environment, ranging from the creation of public art and architectural excellence to watershed enhancement, tree planting, community gardening, and removal of weeds, trash and blight. In the past the Ruth Mott Foundation has supported trail development in Genesee County and plans to extend that support on into the future. For more information, please call (810) 233-0170

## DALMAC Fund

Since 1975, the DALMAC fund has been supporting bicyclists and bicycle trail development throughout the State of Michigan. Administered through the Tri-County Bicycle Association (TCBA), this grant program is open to any entities performing bike safety and educational efforts, involved in the development of bike trails, or engaged in route mapping. For more information please call the TCBA at (517) 882-3700 or visit [www.biketcba.org](http://www.biketcba.org).

## People for Bikes

PeopleForBikes accepts grant applications from non-profit organizations with a focus on bicycling, active transportation, or community development, from city or county agencies or departments, and from state or federal agencies working locally. Requests must support a specific project or program; we do not grant funds for general operating costs.

PeopleForBikes accepts requests for funding of up to \$10,000.

[peopleforbikes.org](http://peopleforbikes.org)

## Recreation Passport Grants

PA 32 of 2010 created the Local Public Recreation Facilities Fund to be used for the development of public recreation facilities for local units of government. Money for this fund is derived from the sale of the Recreation Passport which replaces the resident Motor Vehicle Permit (MVP) - or window sticker - for state park entrance. The passport is required for entry to state parks, recreation areas and boating access sites. The first \$12,730,000.00 will be distributed to replace lost revenue from the elimination of the motor vehicle permit and boating access site permits, as well as to pay for administration by the Secretary of State. Ten percent of remaining revenue will be used to fund the Recreation Passport local grant program.

The grant program may only be used for local development projects. The program is focused on renovating and improving existing parks, but the development of new parks is eligible.

[Michigan.gov/dnr](http://Michigan.gov/dnr)

### **Congestion Mitigation and Air Quality Improvement (CMAQ) Program**

The Congestion Mitigation and Air Quality Improvement (CMAQ) program was established by ISTEA of 1991. The CMAQ program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, or particulate matter-nonattainment areas-and for areas that were out of compliance but have now met the standards-maintenance areas. Eligible projects include non-recreational bicycle transportation and pedestrian improvements that provide a reduction in single-occupant vehicle travel.

**Surface Transportation Program (STP)** STP funds the same projects as the TAP program.

### **Agency Policies and Contacts**

Throughout the development of this plan there were a number of governmental bodies, non-profit organizations, private businesses, and citizen advocates involved in the process. These agencies will have a substantial influence on the development of a regional trail system in Genesee County.

#### **Consumers Energy**

Consumers Energy is a major provider of electricity and natural gas in Genesee County. There are many corridors throughout the county where trail development could potentially occur. Consumers is mindful of trail projects and employs a set of policies and procedures to deal with requests to use their land. An application must be submitted, which is then reviewed by Consumers staff, which ultimately makes a decision on whether or not the proposed project is feasible. The reviewer is mainly concerned with maintaining access to Consumers infrastructure. To get an application, and/or learn more about this process, please call (517) 745-5973.



## Genesee County Road Commission

The Genesee County Road Commission (GCRC) maintains more than 1813 miles of road and streets and over 250 signalized intersections. The GCRC does allow for trail development within the county road right-of-ways and there is an application process to gain this access. For more information please call (810) 767-4920, or visit [www.gcrc.org](http://www.gcrc.org).

## Michigan Department of Transportation (MDOT)

MDOT has provided considerable support for trail development in Genesee County. They have awarded numerous TAP grants for the development of trail projects in Genesee County and regularly attend the meetings of County trail groups. MDOT has actively pursued the development of non-motorized facilities on MDOT properties, such as providing wide shoulders on state roads and trails in the right-of-way. For more information please visit [www.michigan.gov/mdot](http://www.michigan.gov/mdot).

## Genesee County Parks and Recreation Commission (GCPRC)

The GCPRC owns and operates a number of trails in and around county parks throughout Genesee County. The linkage of these trails to others within and beyond county boundaries is a positive step toward a regional trail system. The GCPRC has been involved in past trail projects, with particular interest in potential trail connections in and around county parks. To contact the GCPRC, please call (810) 736-7100 or visit [www.geneseecountyparks.org](http://www.geneseecountyparks.org).

## Genesee County Drain Commission

The Genesee County Drain Commissioner is responsible for maintaining all drains in Genesee County, dealing specifically with issues such as soil erosion and sedimentation, wastewater treatment and storm water treatment. The construction of trails can adversely affect a number of aspects of drain maintenance and the Drain Commissioner's office should be contacted any time an issue may arise. To contact the Drain Commissioner, please call (810) 732-7870 or visit [www.gcdcwws.com](http://www.gcdcwws.com).

## Recommendations for Implementation

The Genesee County Metropolitan Planning Commission (GCMPC) will continue to assist communities with trail development, including updates to the GIS layers, databases and maps. The County will gladly meet and discuss possible route connections with local units and agencies seeking the development of a regional trail system within their community. GCMPC looks forward to the continued development of trailways in Genesee County and continued collaboration with the many entities engaged in trail development.

The following actions will assist in furthering implementation efforts of an interconnected trail system within Genesee County and the surrounding region

- Local governing documents, such as master plans, parks and recreation plans, and land use and transportation plans should be amended to include content consistent with this plan.
- Communities should encourage local developers to incorporate non-motorized connections into their site design. Try to ensure that these smaller trail systems are linked with the larger regional system, or at least have the potential to connect. Connectivity within the

development, as well as with adjacent land uses, should be recommended. The inclusion of these trailways in local developments throughout Genesee County will generate a more connected trail system.

- Collaboration is vital to the success of a regional trail system. Effort should be made to cooperate and coordinate non-motorized goals, not only with neighboring communities, but also with GCMPC, the Genesee County Road Commission, and the Michigan Department of Transportation.
- A map of potential trail connections and proposed corridors should be updated on a regular basis and made available to all trail planning bodies. Also, the trail plan should be reviewed and updated accordingly.
- Gaining grant funding for local trails should remain upon the top of the to-do list. Lack of funding is often the largest barrier impeding trail development. Trail planners should be actively seeking grant funding from those programs listed in this document, but also

searching for alternative sources.

- Trail maintenance should be a top priority as systems are being developed. This will help ensure a healthy trail environment and encourage more users to utilize trailways in Genesee County.

## Road Construction Projects

Many proposed trailways identified in this plan are over, under, in, or along road right-of-ways. Collaboration with MDOT and the Genesee County Road Commission should frequently occur to discuss the possibility of utilizing these areas for trail development. These two organizations oversee the construction and maintenance of the majority of roadways in Genesee County

All transportation projects receiving federal funding in Genesee County are identified in the Transportation Improvement Program (TIP), which is posted and updated on the GCMPC website ([www.gcmPC.org](http://www.gcmPC.org)). This document represents transportation projects receiving federal funding for the identified fiscal years. Non-motorized facilities should be incorporated into TIP road projects where appropriate as outlined in the Genesee County LRTP Complete Streets Policy. Coordination with road projects will make trail development more efficient.

For more information on complete streets you may reference the 2040 LRTP Complete Streets Technical Report at [www.gcmPC.org](http://www.gcmPC.org).



## Trail Associations

Trail Associations are a great addition to a regional trail system. Committed associations are geared toward providing the best possible experience to trail users. They typically perform a number of different activities including trail promotion, public events, trail maintenance, clean-up projects, and attendance at public meetings and lobbying for trail improvements. Most trail associations select a small trail system or a particular segment to support. Citizens are encouraged to join and create trail associations as the regional system develops.



## Cost Estimates

The implementation of a trail plan requires a number of important decisions. A major consideration that will influence these decisions is cost. Cost will influence decisions from the beginning of a project to the end, ranging from material types and construction to the funding sources targeted.

	Estimated Cost Per Mile
<b>Striping a Bike Lane and Markings on Existing Shoulder</b>	\$1,000 - \$11,000
<b>Retrofitting bicycles lanes by restriping pavement marking, using techniques such as lane diets or road diets</b>	\$5,000 - \$50,000

**Source:** Pedestrian Safety Guide and Countermeasure Selection System" U.S. Department of Transportation Federal Highway Administration

Cost for Non-Motorized Facilities

Infrastructure	Description	Median	Average	Minimum	Maximum	Cost Unit
Path	Boardwalk	\$1,957,040	\$2,219,470	\$789,390	\$4,288,520	Mile
Path	Multi-Use Trail-Paved	\$261,000	\$481,140	\$64,710	\$4,288,520	Mile
Path	Multi-Use Trail - Unpaved	\$83,870	\$121,390	\$29,520	\$412,720	Mile
Pavement Marking Symbol	Pedestrian Crossing	\$310	\$360	\$240	\$1,240	Each
Pavement Marking Symbol	Shared Lane/Bicycle Marking	\$160	\$180	\$22	\$600	Each
Pavement Marking Symbol	School Crossing	\$520	\$470	\$100	\$1,150	Each

Source: "Costs for Pedestrian and Bicyclist Infrastructure Improvements" UNC Highway Safety Research Center

## Applying For Funding

The Rails-To-Trails Conservancy is an excellent resource for any agency thinking about trail development. Here are some quick tips they offer for fund raising and grant writing:

- **Develop a fund raising plan for your projects:** Begin with your estimated project cost and set funding goals from key sources. This is a valuable resource because foundations often require you to show percentages of funding anticipated from each source.
- **Identify key components of your project that can be tailored to specific funding sources:** Without compromising your project, try to develop a list of mini projects tailored to the interests of a number of different funding sources.
- **Complete all planning elements prior to submitting funding requests:** Seeking funding prematurely is not advisable as you often only get one chance to make a positive impression on a potential funder.
- **Start by writing a two-page summary letter:** This helps to succinctly define your project and your request for support. Many funding sources provide guidelines for the initial "inquiry" letter. Make sure you follow their guidelines
- **Create a credible team prior to seeking funding:** Funders are interested in not only the quality of your project, but the quality of your organization or team as well.
- **Establish strong partnerships and demonstrate coordination:** Funders are interested in strong partnerships and coordination among agencies. They especially like to see public and private sectors working together to leverage funds.
- **Establish broad community support prior to seeking funding:** At a minimum, all project partners should provide "lead" funding, both cash and in-kind services, where feasible. If you do not have "lead" funding, attach support letters from individuals, local businesses, civic groups and others to your request.
- **Submit proposals:** Once the research is completed, partners are in place, backed by a solid plan, submit proposals to your target list of funders. Make sure to follow any and all guidelines set forth by potential funders.
- **Complete all follow-up documentation; thank and recognize donors:** Make sure you send thank-you letters recognizing receipt of donations and complete any required follow-up documentation

### Trail Maintenance

Trail maintenance is an indispensable aspect of trail planning. A clean, safe trail will promote further use by residents. The implementation of a good maintenance strategy not only helps to sustain a safer trail environment, but can also instill a sense of community pride in local citizens.

There are a number of different activities associated with trail maintenance:

- Sign replacement
- Repaint pavement markings
- Trim vegetation to maintain sight distance
- Remove fallen trees
- Patch pavement holes and cracks
- Clean drainage systems
- Sweep to remove debris
- Mow shoulders and other areas
- Pick up trash, empty trash cans
- Maintain trail furniture and other support facilities
- Clean & repair restroom facilities as needed
- Remove any graffiti

The removal of snow and ice is an important concern when dealing with trail maintenance in Genesee County. Trail owners must decide whether or not their trail will be open during the winter months. If it is decided to keep it open, snow and ice must be cleared from the trailway



## Maintenance Agreements

While almost every trail planning body will agree that trail maintenance is a very important concern, an agreement on whose responsible for that maintenance is not always easy. Many grant programs require a detailed trail maintenance plan be in place for agencies to be eligible for funding. Governmental units are encouraged to make written agreements with each other to maintain different trail segments. Often times, townships will not have sufficient staff or the proper equipment to perform trail maintenance activities, in which case they may need to contract with a city or county department. In the unfortunate case that government units cannot agree, a private consultant may need to be hired to perform the needed maintenance activities. See Appendix B for a sample maintenance agreement.

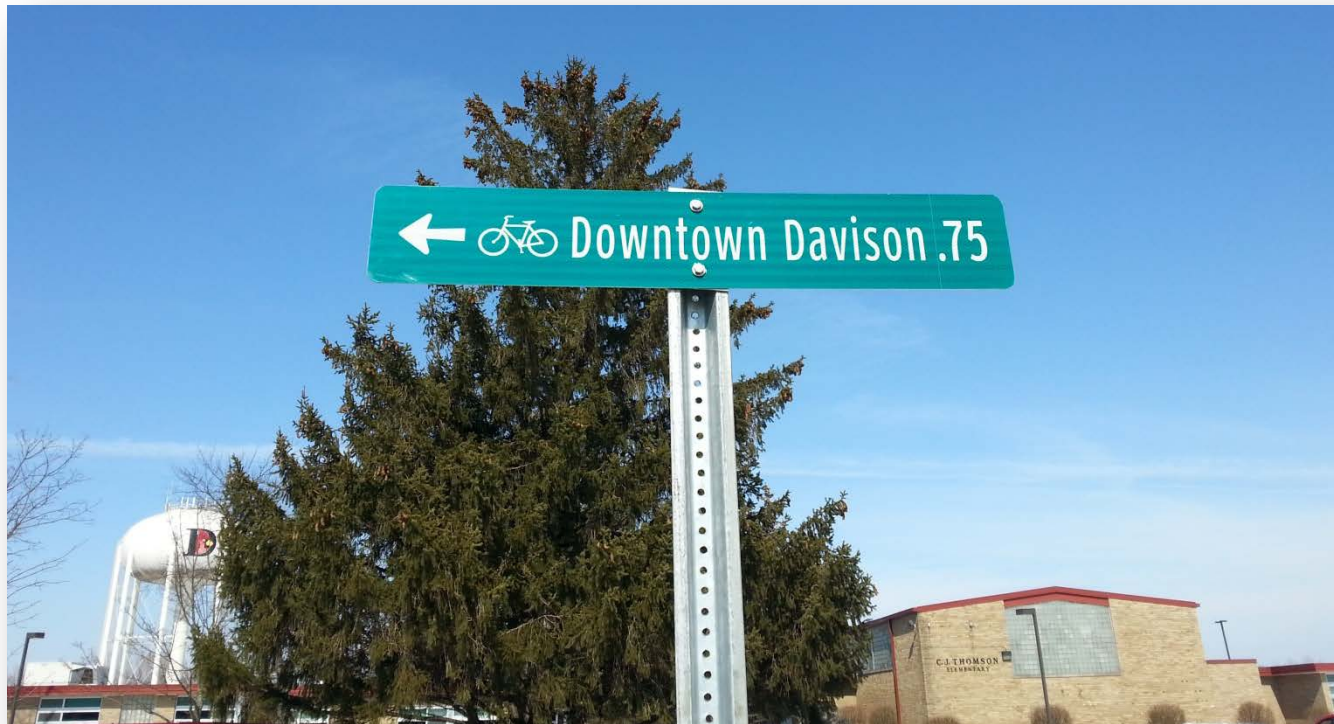
## Adopt-A-Trail

The Adopt-a-Trail program is an excellent way to help maintain a trail. This program works on a volunteer basis, with common participants being neighborhood organizations, businesses, service clubs, churches or even families. Usually a formal agreement is reached between the trail owner and the volunteer organization. This program is comparable to the Adopt-a-Highway program. Volunteers usually perform the usual clean-up and debris removal, but also perform enhancement projects such as fundraising and landscaping.



# 9

## Trail Signage





This plan promotes a trail and bike path way finding system that is consistent throughout Genesee County and is customizable to individual trails.

This signage system was developed for the City of Chicago, and the template for Genesee County.

Each sign should incorporate the three D's

- Distance
- Direction
- Destination

This system fits in with the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) standards.

This signage system is upgradeable and expandable because as a new destination is needed you can simply add it to the sign without printing an entire new sign.

It can be used on streets as well as non-motorized trails.

## Trail & Bike Route Signs

### Route Sign Placement

- Place every ¼ mile along the trail
- Place after every turn
- Place after every signalized intersection



## Trail & Bike Destination Signs

### Destination Sign Placement

- Placed at intersecting routes and decision points



### Local trail Sign Personalization

Logos for trail or organization can be added above the route marker. This helps with branding the trail and gives recognition to ownership of the trail

### Route Sign



Trail names, logos and organizations should be separated from the route and destination signs, but on the same post

### Destination Signs



## Share the Road Signs

There are locations throughout Genesee County where bike lanes and trails do not exist and the road is used for bicycle travel. Many avid bicyclists will tell you that motorists need to be reminded that cyclists are legitimate users of the road. Being alerted to their presence at high conflict locations can save lives. One easy, quick, and inexpensive way to improve traffic conditions for bicyclists and motorists is a "Share the Road" sign. These are well suited for the beginning and ending points of bike lanes or trails, popular bike routes, or any place where there is conflict between bicyclists and motor vehicles.

"Sharing the road" means that motorists and bicyclists work together to improve our individual and collective on-the-road behavior, in terms of courtesy, cooperation and safety. "Share the Road" signs are just one step in a larger plan to educate motorists and bicyclists on safe and effective ways to coexist, leading ultimately to greater safety for all





## Michigan Comprehensive Trail Plan

The Michigan Comprehensive Trail Plan is intended to meet the planning requirements of Public Acts 45 and 46 of 2010, but more importantly, acknowledge Michigan's position as the nation's Trail State. Michigan has an incredible array of trails, developed and maintained by an extensive collaboration among state and local governments, non-profits, foundations and volunteers. This plan provides recommendations on how to improve this system and to ensure the continued benefits of national prominence. While much has been accomplished there are significant opportunities left to address. The coalition that has created and is managing this spectacular trail system must together continue to plan, manage and maintain the system while recognizing the challenges presented by existing funding constraints.

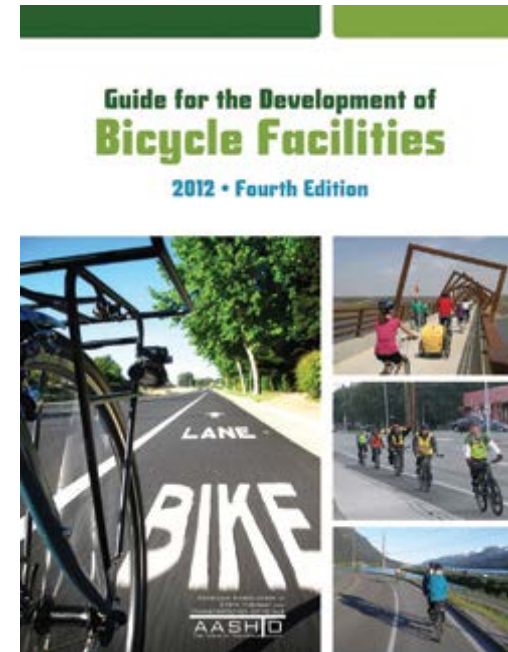


## Guide for the Development of Bicycle Facilities, 4th edition

This guide provides information on how to accommodate bicycle travel and operations in most riding environments. It is intended to present sound guidelines that result in facilities that meet the needs of bicyclists and other highway users. Sufficient flexibility is permitted to encourage designs that are sensitive to local context and incorporate the needs of bicyclists, pedestrians, and motorists. However, in some sections of this guide, suggested minimum dimensions are provided. These are recommended only where further deviation from desirable values could increase crash frequency or severity.

This guide has been updated from the previous guide referred to as the green book which was published in 1999. The fact that new guidance is presented herein does not imply that existing bicycle facilities are inadequate or unsafe, nor does it mandate the initiation of improvement projects. The intent of this document is to provide guidance to designers and planners by referencing a recommended range of design values and describing alternative design approaches.

Available at AASHTO website [www.transportation.org](http://www.transportation.org)





## Michigan Trails Finder

Michigan Trails and Greenways Alliance is a non-profit organization that fosters and facilitates the creation of an interconnected statewide system of trails and greenways for environmental/cultural preservation purposes. MTGA works at both the state and local levels by assisting public and private interests in trail and greenway planning, funding, development and maintenance. Their website provides a toolkit for trail builders and a trail finder for those interested in locating trails within their region.

[www.michigantrails.org](http://www.michigantrails.org)



## Bay Region Road and Trail Bicycling Guide

The Michigan Department of Transportation and its partners have created a series of multi-county regional maps showing road surface type, traffic volume ranges, paved/unpaved trails with regional significance, recreational facilities, points of interest, plus other facilities and amenities which help make cycling across Michigan an enjoyable tourism experience. Of specific interest to Genesee County is the Bay Region Road and Bicycling Guide.

<http://www.michigan.gov/mdot/>



## Online Trail Building Tool-kit

The Rails to Trails Conservancy (RTC) provides a comprehensive resource center online for trail building, addressing common questions and issues. This searchable tool-kit allows you to view an online library of source documents and fact sheets produced by the RTC, sign up to receive abandonment notices of railroad corridors, connect with trail advocates across the country, view a blog with the latest and greatest in trail development around the world, and contact RTC staff.

More information at: [www.railstotrails.org](http://www.railstotrails.org)



## National Trails Training Partnership

American Trails is a non-profit organization working on behalf of all trail interests in the United States. For over 25 years, American Trails has been a collective voice for a diverse coalition of enthusiasts, professionals, advocates, land managers, conservationists, and friends of the outdoors and livable cities. On their website they provide resources on a variety of trail concepts including trail building, planning, management, advocacy, and more. For more information visit their website at

<http://www.americantrails.org/resources/>





Pedestrian and Bicycle Information Center

## Costs for Pedestrian and Bicycle Infrastructure Improvements

This report is intended to be a resource for researchers, engineers, planners, and the general public. The report thoroughly examines costs of pedestrian and bicycle infrastructure improvements and why bicycle infrastructure is needed. This report was prepared for the Federal Highway Administration and supported by the Robert Wood Johnson Foundation through its Active Living Research program.

Available at: [www.pedbikinfo.org](http://www.pedbikinfo.org)

## Trail Counts and Automatic Counters

As a part of the National Bicycle and Pedestrian Documentation Project, Alta planning has created a great resource by providing information about a variety of counting technologies and reasons for tracking trail usage.

More information available at:

<http://bikepeddocumentation.org/>

**Trail Counts with Automatic Counters**

The National Bicycle and Pedestrian Documentation Project

*Responding to the Need for Improved Data on Bicycling and Walking*

alta  
PLANNING + DESIGN

Presented by:  
Jennifer Donlon, Alta Planning + Design

estimate:  
100-\$3,000 each

• Grouping poses problem

alta  
PLANNING + DESIGN

## Smart Growth<sup>1</sup>

In communities across the nation, there is a growing concern that current development patterns -- dominated by what some call "sprawl" -- are no longer in the long-term interest of our cities, existing suburbs, small towns, rural communities or wilderness areas. Though supportive of growth, communities are questioning the economic costs of abandoning infrastructure in the city, only to rebuild it further out. Spurring the smart growth movement are demographic shifts, a strong environmental ethic, increased fiscal concerns and more nuanced views of growth. Smart growth also means ensuring connectivity between pedestrian, bike, transit and road facilities.



## Ten Principles of Smart Growth

1. Mix land uses
2. Take advantage of compact building design
3. Create range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices (including non-motorized)
9. Make development decisions predictable, fair and cost effective
10. Encourage community and stakeholder collaboration

<sup>1</sup>Smart Growth Online [www.smartgrowth.org](http://www.smartgrowth.org)

## Safe Routes to School<sup>2</sup>

Safe Routes to School is an international movement to make it safe, convenient and fun for children to bicycle and walk to school. When routes are safe, walking or biking to and from school is an easy way to get the regular physical activity children need for good health. Safe Routes to School initiatives also help ease traffic jams and air pollution, unite neighborhoods and contribute to students' readiness to learn in school.

Each participating school forms a local team consisting of school administrators, teachers, parents, student leaders, law enforcement officers and other community members who are interested in children's health and safety.

- Today's children are driven to nearly all their activities. In 2009, 13% of children 5 to 14 years of age walked or bicycled to school compared to 48% in 1969.
- 25% of morning traffic is parents driving their students to school creating hazardous conditions in the school yards and increased congestion on our roadways.

## Schools in Genesee County currently participating:

Grand Blanc East Middle School, Washington Elementary School, Williams Elementary, Durant Tuuri Mott Elementary School, West Shore Elementary School, Torrey Hill Middle School, and the University of Michigan- Flint (Safe Routes to School and Work)

<sup>2</sup>Michigan's Safe Routes to School

[www.saferoutesmichigan.org](http://www.saferoutesmichigan.org)



## Context Sensitive Solutions

"Context Sensitive Solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist."

Federal Highway Administration (FHWA)

In 2003, former Governor Granholm issued an Executive Directive that requires MDOT to incorporate Context Sensitive Solutions into transportation projects whenever possible. Under CSS, MDOT solicits dialogue with local governments, road commissions, industry groups, land use advocates and state agencies early in a project's planning phase. This dialogue helps to ensure that bridges, interchanges, bike paths and other transportation projects "fit" into their communities. The CSS approach results in projects that respect a community's scenic, aesthetic, historic, economic and environmental character.

Principles of Context Sensitive Solutions:

- Incorporate early and continuous public involvement, consistent with project scope
- Utilize effective decision making
- Reflect community values
- Achieve environmental sensitivity and stewardship
- Ensure safe and feasible integrated solutions; and
- Protect scenic resources and achieve aesthetically pleasing solutions

Michigan Department of Transportation, Context Sensitive Solutions ([www.michigan.gov/mdot](http://www.michigan.gov/mdot))

## Connecting Michigan: A Statewide Trailways

### Vision and Action Plan<sup>5</sup>

Connecting Michigan is a proactive and broad-based initiative to identify and address the critical issues that are impeding Michigan's progress on developing a statewide interconnected system of trailways and greenways. The Michigan Trails and Greenways Alliance (MGTA) has lead this effort. They are a non-profit organization that fosters and facilitates the creation of an interconnected statewide system of trails and greenways for recreation, health, transportation, economic development and environmental/cultural preservation purposes. Connecting Michigan has engaged stakeholders at national, state, regional, and local levels in a process to investigate and define the critical issues, develop goals, and formulate action plans to improve state and local policies and programs



for supporting trailways. Connecting Michigan includes a history of trailways in Michigan, studies and action plans, implementation strategies and information resources. Connecting Michigan Action Plans focus on the following:

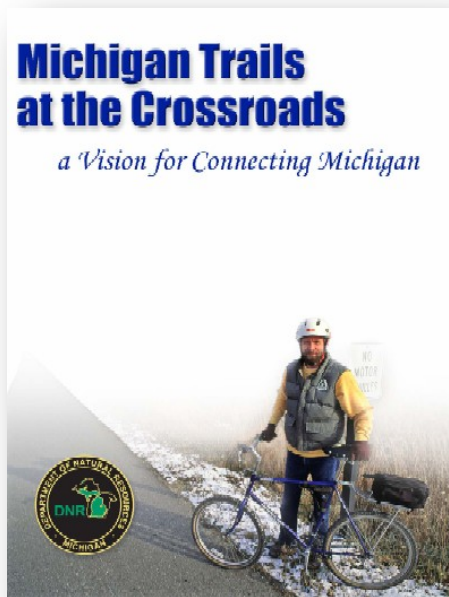
- Trailway Funding
- Database and Website
- Property Issues
- Trails Usage
- On-Road Connections
- Building Trailways Support
- Overcoming Boundaries
- Coordinating Resources
- Multi-Use Trails and Design
- Trails in a Statewide Context

## Michigan Trails at the Crossroads: A Vision for Connecting Michigan

"The future I see for Michigan is one where access to trails and recreation is available for everyone."

--Governor  
Jennifer M.  
Granholtz

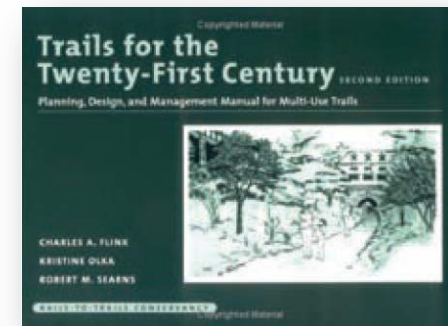
On July 18, 2006, former Governor Jennifer Granholtz announced the state will work with the Michigan Department of Natural Resources Trust fund to link Michigan's trail system by building new trails and upgrading existing trails throughout the state. This initiative, to achieve an interconnected statewide system of trails, will take the coordination of many state agencies and local trail partners. Michigan Trails at the Crossroads outlines some of the partnerships and funding mechanisms that can help create a vibrant statewide trail system.



A copy of the document can be obtained at [http://www.michigan.gov/documents/dnr/DNR\\_Trail\\_Report2-6-07\\_188399\\_7.pdf](http://www.michigan.gov/documents/dnr/DNR_Trail_Report2-6-07_188399_7.pdf)

## Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails

A must-have for any trail planner, Comprehensive Guide to Building Trails provides a wealth of information from identifying stakeholders, land ownership issues, economic development factors, site considerations, environmental issues, design standards, funding, signage and much more. It is available from the Rails to Trails Conservancy (RTC) and can be purchased from their website at [www.railstrails.org](http://www.railstrails.org).





# 11

Next Steps



Source: [www.seattletimes.com](http://www.seattletimes.com)

## Further Trail Research

The information provided in Chapter 3 of this plan gives a general view of the future trail system in Genesee County. In order to move from trails marked on a map to trails on the ground, further research will be needed into the potential trail connections.



## Trail Usage

Trail usage is an important component that is currently not being tracked or counted in Genesee County. According to the National Bicycle and Pedestrian Documentation Project there are many reasons to count trail users and various technologies available:

- Evaluate need for new trails and trail upgrades
- Evaluate community demand
- Explain trail value to community, elected officials, grant agencies
- Justify resource allocation
- Forecast demand
- Support grant applications

## Count Technologies

Passive Infrared	Detects change in thermal contrast
Active Infrared	Detects obstruction in beam
Video Imaging	Analyzes pixel changes or Data is played by and analyzed by a person
In-Pavement Magnetic Loop	Sense change in magnetic field as metal passes over
Slab Sensor	Detects change in pressure to measure footsteps

Source: The National Bicycle and Pedestrian Documentation Project



### Site Visits and Field Study

Each trail will need site visits to determine site specific issues and design elements. Some of the elements to consider in site visits and initial design phases are outlined below:

- Type of users
- Surface type
- Grade/elevation changes
- Rivers, creeks or drain crossings
- Road/driveway crossings
- Scenic view areas
- Wetlands
- Environmental Hazards
- Historical Sites
- Trailheads and Parking Areas
- Restrooms
- Benches
- Shelters and Picnic Areas
- Wildlife habitat areas
- Landscaping
- Adjacent land uses
- Lighting

Field study becomes the background for a feasibility study.

### Feasibility Study

Feasibility studies are done to provide detailed information on the applicability of a trail to be built and provide information necessary to complete a project application for funding from state or federal sources. Feasibility studies include an analysis of the route, and inventory of land use/ ownership along the route, issues and concerns, detailed maps, as well as recommendations.

### Title Searches and Right-of-Ways

In projects that involve privately held property, especially abandoned railroads, title searches are necessary to determine land ownership. There are title search companies in the area that can do a title search on railroad property or other properties.

### Application for Funding

The Genesee County Metropolitan Planning Commission could provide assistance in putting together applications for funding from state, federal and local sources. The applicant must be a local road agency or municipality.

### Environmental Issues

In trail projects that involve former industrial land or railroad property, a phase I environmental site assessment is needed. If the site is found to have a high risk of contamination, a phase II environmental site assessment is recommended. If after the phase II contamination is found to exist, site remediation of the contamination is required to make the property safe for public use. Brownfield redevelopment grants and loans are available to help with the costs of this process. The Genesee County Land Bank Authority can be of assistance to local trail groups interested in working on these types of projects.

If the proposed trail crosses a wetland, a wetlands permit may be needed and consultation is necessary with the Michigan Department of Environmental Quality. Trails may be feasible in wetlands by putting in a boardwalk or bridge

### Public Involvement

Trail planners and advocates will need to meet with adjacent landowners early on in the process to explain the project and listen to landowners concerns. Other key stakeholders should also be informed of the project.



### GCMPC Outreach and Education

- Develop and distribute educational materials (maps, brochures, trail safety info, benefits of trails) for display at community events and trail meetings
- Provide technical support for local trail projects in planning, educating residents, outlining steps to a successful trail project, attending public meetings to gain support for a trail project.
- Promotion of trails through local media outlets (TV, newspaper, events).
- Collaborate with other similar initiatives (Michigan Trails and Greenways Alliance-Statewide trail Planning Partnership, national Parks Service Technical Assistance Program and GLS greenlinks) to share resources and build on each other's experience to implement each program's strategies concurrently.

### Transit and Trailways

- Incorporate fixed route transit stops into the trail network wherever feasible.

### Trail Priority Implementation

- Follow up with trail groups regularly on their progress.
- Attend city and township meetings, as needed, for local support on projects and provide

presentations on trail implementation plans as need.

- Provide necessary link between local jurisdictions working on a priority trail project and state departments, bringing state and federal resources to the projects.
- Door to door informational assistance to residents and property owners along a potential trail to educate them and build support for the project.

### Policy Changes

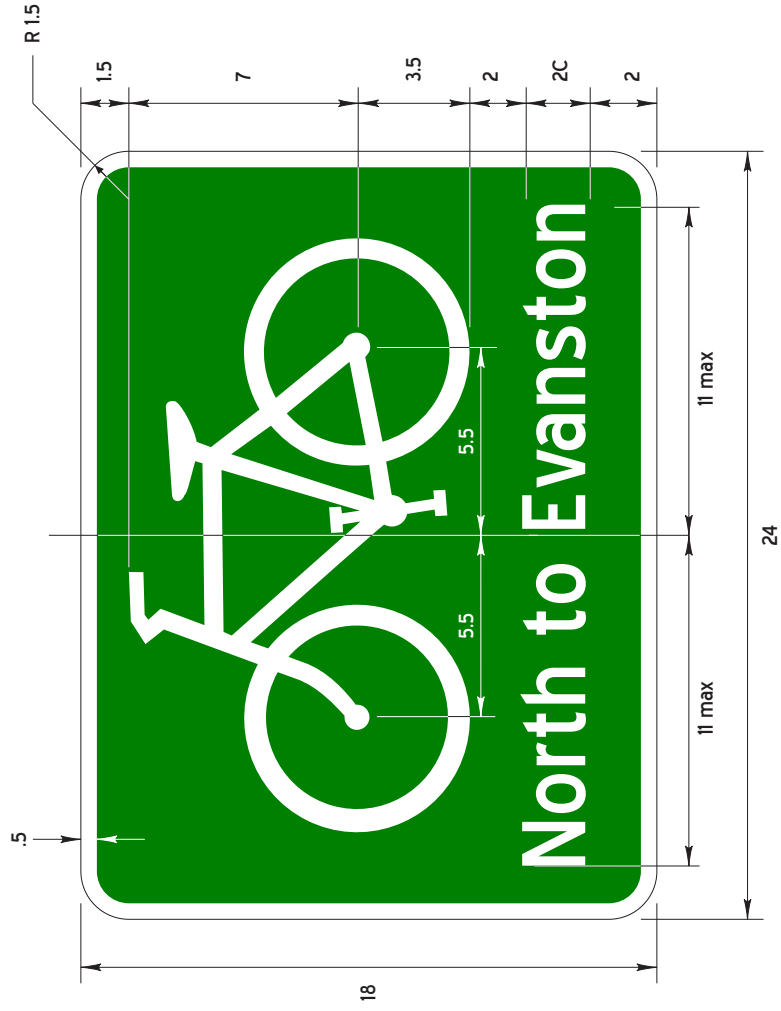
- Work towards the adoption of a comprehensive non-motorized policy for Genesee County.
- 2014 Genesee County Regional Non-Motorized Transportation Plan adopted by local units of government and local transit and road agencies.



A

Appendix

Signage Design  
CADD Drawings



- Notes:
1. Legend text spacing may be reduced by 25 percent.
  2. Legend text will vary.
  3. All units in inches.
  4. Use "D11-1 Double Line" when legend text length requires two lines of text.
  5. Center legend horizontally on sign.
  6. See page 6-7 of the FHWA Standard Highway Signs Manual for bike symbol design detail.

Colors: Legend -White (retroreflective)  
 Background -Green (retroreflective)  
 Border -White (retroreflective)

**CITY of CHICAGO**  
 DEPARTMENT of TRANSPORTATION

**SIGN DETAILS**

**D11-1 Single Line**

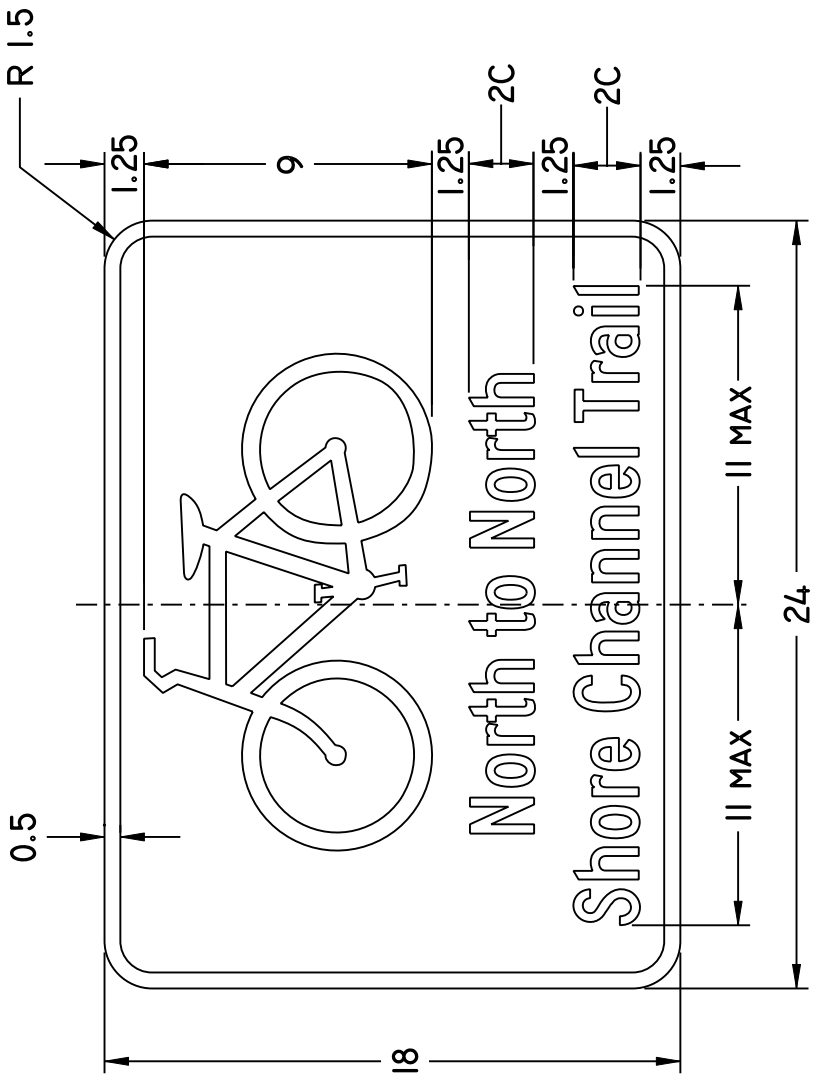
Drawn	Scale	Date
GMD	1:6	10-18-05

Project No.

D-5-100

Sheet No.

**DD-1**

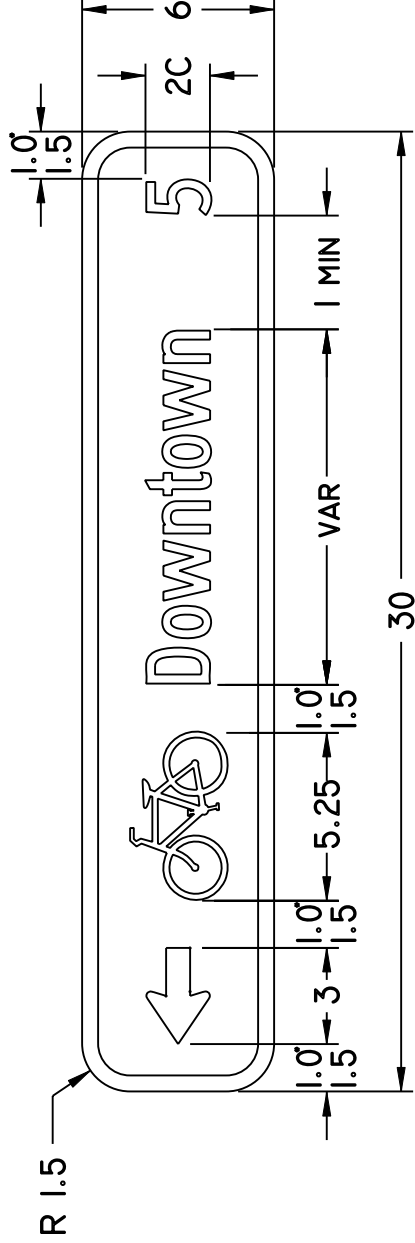
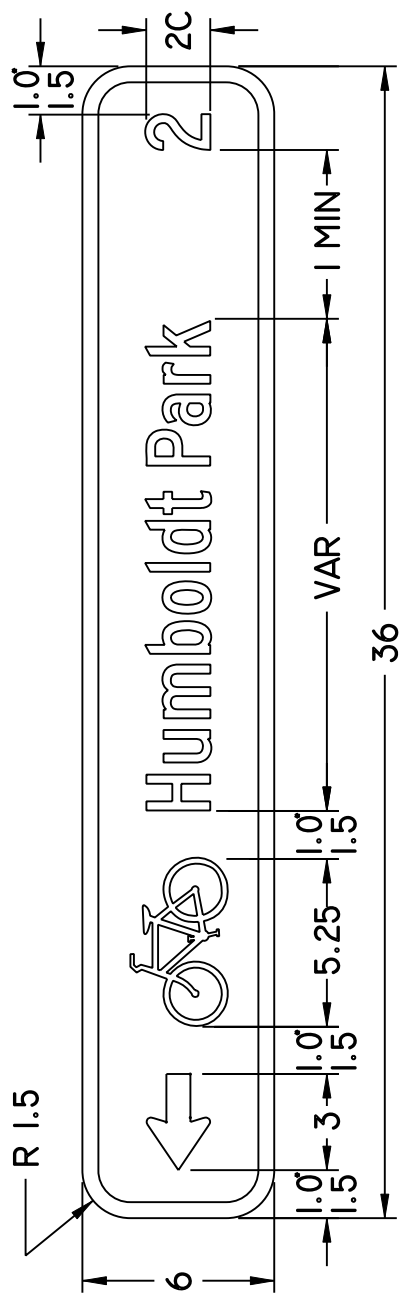


**COLORS:** LEGEND - WHITE (RETROREFLECTIVE)  
 BACKGROUND - GREEN (RETROREFLECTIVE)  
 BORDER - WHITE (RETROREFLECTIVE)

- NOTES:** 1. ALL UNITS IN INCHES.  
 2. LEGEND TEXT WILL VARY.  
 3. SEE PAGE 6-7 OF THE FHWA STANDARD HIGHWAY SIGNS MANUAL FOR BIKE SYMBOL DESIGN DETAIL.  
 4. UNLESS OTHERWISE NOTED, CENTER LEGEND HORIZONTALLY ON SIGN.  
 5. USE "DII-I SINGLE LINE" WHEN LEGEND TEXT LENGTH REQUIRES ONE LINE OF TEXT.  
 6. WHEN POSSIBLE, LEGEND TEXT FOLLOWING "to" SHALL BE ON ONE LINE.

<b>CITY OF CHICAGO</b> DEPARTMENT OF TRANSPORTATION DIVISION OF PROJECT DEVELOPMENT	TITLE <b>DII-I          DOUBLE LINE</b>		SCALE <b>1:6</b>
	DRAWN <b>GMD</b>	CHECKED <b>DBG</b>	DATE <b>10/17/05</b>
			SHEET <b>DD-IA</b>





\*NOTE: STANDARD DIMENSION IS 1.5 SPACING. 1.0 SPACING MAY BE USED WHEN LEGNED TEXT WILL NOT FIT WITH 1.5 SPACING.

COLORS: LEGEND - WHITE (RETROREFLECTIVE)  
 BACKGROUND - GREEN (RETROREFLECTIVE)  
 BORDER - WHITE (RETROREFLECTIVE)

- NOTES: 1. ALL UNITS IN INCHES.  
 2. LEGEND TEXT WILL VARY.  
 3. SEE PAGE 6-7 OF THE FHWA STANDARD HIGHWAY SIGNS MANUAL FOR BIKE SYMBOL DESIGN DETAIL.  
 4. UNLESS OTHERWISE NOTED, CENTER LEGEND VERTICALLY ON SIGN.  
 5. THE SHORTEST POSSIBLE PANEL LENGTH SHALL BE USED FOR INDEPENDENTLY MOUNTED SIGNS.  
 6. ALL PANELS IN A GIVEN ASSEMBLY SHALL BE OF EQUAL LENGTH, WHERE THE LENGTH IS BASED ON THE SHORTEST POSSIBLE PANEL LENGTH FOR THE LONGEST INDIVIDUAL LEGEND IN THAT ASSEMBLY.  
 7. UNLESS OTHERWISE NOTED, PANEL LENGTHS SHALL BE EITHER 30" OR 36".

CITY OF CHICAGO DEPARTMENT OF TRANSPORTATION DIVISION OF PROJECT DEVELOPMENT	TITLE	DI-IB	SCALE	1:6
	DRAWN	GMD	CHECKED	DBG
			DATE	1/4/06
			SHEET	DD-2

## Sample Maintenance Agreement

Sample Maintenance Agreement:

AGREEMENT FOR FUNDING  
LONG-TERM CARE AND MAINTENANCE OF TRAILS IN GREENE COUNTY, OHIO

This agreement, made the 15 day of November, 2001 between the City of Xenia, City of Beavercreek, Beavercreek Township, Greene County Park District, City of Fairborn, Village of Yellow Springs, Village of Cedarville, Greene County Engineer (hereinafter "participants") and the Board of Greene County Commissioners through the Greene County Recreation, Parks and Cultural Arts Department, as agent for the Board of Greene County Commissioners and trail management agency (hereinafter "the County"):

WITNESSETH:

WHEREAS, Section 307.15 of the Ohio Revised Code states, in part....

"The board of county commissioners may enter into an agreement with the legislative authority of any municipal corporation, township, ... park district ..., or authorities may enter into agreements with the board, whereby such board undertakes and is authorized by the contracting subdivision to exercise any power, perform any function or render any service, on behalf of the contracting subdivision or its legislative authority..." and

WHEREAS, a Trail Management Agreement was entered into to facilitate the maintenance, management and improvement of the trails in Greene County, Ohio, and

WHEREAS, the County has established a special fund to receive moneys for the maintenance and management of the trails, and

WHEREAS, the trails contain occupations of public utilities, communications and various other occupations for which fees may be paid.

NOW THEREFORE, IN CONSIDERATION OF THE MATTERS DESCRIBED IN THE ABOVE RECITALS AND IN SEPARATE AND INDEPENDENT CONSIDERATION OF THE PROMISES SET FORTH BELOW, THE PARTIES AGREE AS FOLLOWS:

1. Participant agrees to deposit all current and future moneys derived from rents and/or occupations into the fund established by the Greene County Auditor and Administered by the Board of Greene County Commissioners to provide for the long-term care and maintenance of the trails.
2. Participants will sign necessary consent legislation as required to permit the Board of Greene County Commissioners to utilize these funds for the long-term care and maintenance of the trails.
3. Long-term care and maintenance shall be defined as replacement of trees, shrubs, signs and other trail amenities, planting of additional trees and shrubs, the addition of supplemental signage and fencing, sealcoating, repaving and restriping and other maintenance and amenities that provide for the safety, enjoyment and benefit of trail users.
4. The Trail Manager, as agent for the County, will provide cost estimates to participants, in advance of any proposed expenditure, along with a benefit analysis by jurisdiction of the work to be performed. Proposed projects for improvements or maintenance will be submitted to the management committee for approval in advance of the work being performed. The trail manager will develop bid specifications and contracts as required for the conduct of all work under the requirements of the Ohio Revised Code for such work. Expenditures from the Trail Management Fund will be approved annually by the Trail Management Committee and the Greene County Board of Commissioners.
5. Specific infrastructure repairs and requests for additional services, not covered by this agreement are the responsibility of the local jurisdiction, unless agreed to unanimously by all other participants.
6. This Agreement is contingent upon approval and authorization by all parties.

NOW, THEREFORE, BE IT RESOLVED that the City of Xenia, City of Beaver creek, City of Fairborn, Village of Yellow Springs, Village of Cedarville, Beavercreek Township, Greene County Engineer, Greene County Park District, Board of Park District Commissioners and Board of County Commissioners of Greene County, Ohio enter into this Agreement for the Long- Term Care and Maintenance of Trails within Greene County, Ohio.

## MANAGEMENT AGREEMENT

for

## GREENE COUNTY GREENEWAYS

WHEREAS, the following jurisdictions have participated in ownerships, planning and developing of recreational trails in Greene County, Ohio, hereafter known as GreeneWays, and

WHEREAS, the Greene County Recreation, Parks and Cultural Arts Department has taken the responsibility and lead in the construction and management of the trails as an agent of the Greene County Commission, and

WHEREAS, the initiating agreement organizing and maintaining the GreeneWays expires on September 14, 2000

THEREFORE, Be It Resolved that the City of Beavercreek, City of Fairborn, City of Xenia, Beavercreek Township, Village of Cedarville, Village of Yellow Springs, and the Greene County Park District and Greene County enter into this five-year renewable agreement for management of 50.78 miles of trail (Greene Ways) corridors, plus connecting spurs, as documented September

1999 with the county-wide Trails Maps and any approved additions by the Greene County Commissioners and the GCRPCA; effective September 15, 2000 through September 14, 2005 with annual renewal beyond the termination date being automatic unless acted upon otherwise by the parties listed.

Any jurisdictions who violate either the management agreement or the policies of Greene County GreeneWays may be subject to fines for recovery of damages to the trails and/or loss of voting status on the Management Committee.

Prior agreements entered into for the planning and development of trails between the Greene County Park District and The

Federal Highway Administration remain in effect and on file with the Greene County Parks office.

Prior management agreements among jurisdiction nullified by this agreement, and this agreement supersedes all previous agreements for the administration, management, maintenance and patrol of trails.

## I. Administration

- A. Administration of the GreeneWays corridors will be the responsibility of the Board of Greene County Commissioners using their agents: Greene County Recreation, Parks and Cultural Department; and the Greene County Park District.
- B. A Management Committee of representatives from the participating jurisdictions shall discuss and decide future use of the corridors, including utilities and occupations, and will establish policies affecting the trails. This Committee will meet on a quarterly basis at minimum. Special meetings may be called as needed. Actions concerning Greene County GreeneWays will be regulated by a separate policy handbook, which will be the responsibility of the Management Committee.
- C. The Management Committee consists of the following representatives:
  - Greene County Administrator
  - Greene County Board of Park District Commissioners, President
  - Greene County Recreation, Parks and Cultural Department, Director
  - Greene County Recreation, Parks and Cultural Department, Trail Manager
  - City of Xenia, City Manager
  - City of Beavercreek, City Manager
  - City of Fairborn, City Manager
  - Beavercreek Township Trustees
  - Village of Yellow Springs, Village Manager
  - Village of Cedarville, MayorThese individuals or their designees shall serve and meet as indicated.
- D. Business may be enacted by a majority vote of members present at a regularly called meeting or special meeting.
- E. Future jurisdictions, or additional acquisitions for proposed trail corridors, wishing to participate in GreeneWays and be included on the committee must petition for membership and receive a majority vote of the Management Committee.
- F. Regular Operations of the GreeneWays shall be governed by the Policy Manual.

## II. Maintenance

A. Maintenance of GreeneWays shall be the responsibility of the Greene County Recreation, Parks and Cultural Department.

Greene Ways Corridors within the agreement include:

<u>Trail/Bikeway</u>	<u>Jurisdiction</u>	<u>Miles</u>
Creekside Trail	City of Xenia	6.728
	City of Beavercreek	4.891
	Greene County	.50
	Beavercreek Township	<u>2.520</u>
	TOTAL CREEKSIDE TRAIL	14.639
Little Miami Scenic Trail	City of Xenia	3.74
	Greene County Park District	3.87
	Village of Yellow Springs	<u>3.95</u>
	TOTAL LMST	11.56
Ohio to Erie Trail	City of Xenia	4.213
	Greene County Park District	1.825
	Village of Cedarville	<u>3.088</u>
	TOTAL OET	9.128
Kauffman Avenue Bikeway	Greene County	.77
	City of Fairborn	<u>3.62</u>
	TOTAL KAB	4.39
Jamestown Connector	City of Xenia (unpaved)	3.45
	Greene County (unpaved)	6.04
	Greene County (paved)	<u>1.57</u>
	TOTAL JAMESTOWN-CON	11.06



C

Appendix

Public Input



## Genesee County Regional Trails Review Workshop

# Genesee County Regional Trails Review Workshop

Tuesday  
May 13, 2014

## Agenda

- 2:30 - 2:40** Introduction
- 2:40 - 2:50** Overview of  
Inventory Map
- 2:50 - 3:40** Group Activity
- 3:40 - 4:00** Groups Report
- 4:00 - 4:30** Conclusions

## Location

**MTA Transportation  
Authority**  
1401 S. Dort Highway  
Flint, MI 48503

## Workshop Purpose

Although great strides have been made to ensure the accuracy of our trail network inventory, workshop attendees will be asked to review maps of existing and proposed trails, noting any existing trails that have been missed, and making suggestions regarding potential trails.

## Workshop Activity

We realize that regional trail priorities for potential trail locations may have changed since the last regional trail plan was developed; therefore participants will work in groups of 4-8 people to discuss and review the potential trail network. This activity will specifically focus on potential revisions, additions, and/or deletions to the proposed trail network.

**Please RSVP Online or by Phone by May 9th:**

<https://www.surveymonkey.com/s/V8QXP8Z>

(810) 257-3010



## Next Steps

Once we have a clearly defined existing, potential, and proposed trail network inventory the next step will be to prioritize these trails. On May 22<sup>nd</sup> a Regional Trail Prioritization will take place at the MTA Transportation Authority in order to guide development and funding for the future.



# Genesee County Regional Trails Review Workshop

Tuesday  
May 13, 2014

Sign In

2:30 -4:30

OK	Name	Organization
	Baughner, Carrie	Disability Network
	Bontrager, Conrad	Goodwill Industries Of Mid-Michigan Inc
<del>X</del>	Burger, Jennifer	Crim Fitness Foundation
<del>X</del>	Cole, Robert	Argentine Township
X	Dietz, Kelley	
<del>X</del>	Dunfield, Denny	Southern Lakes Trail Group/Al Serra Chev
	Dunn, Jim	
	Elbing, Lauri	
✓	Fedio, Kid Black	
	Fleury, Louis	ROWE

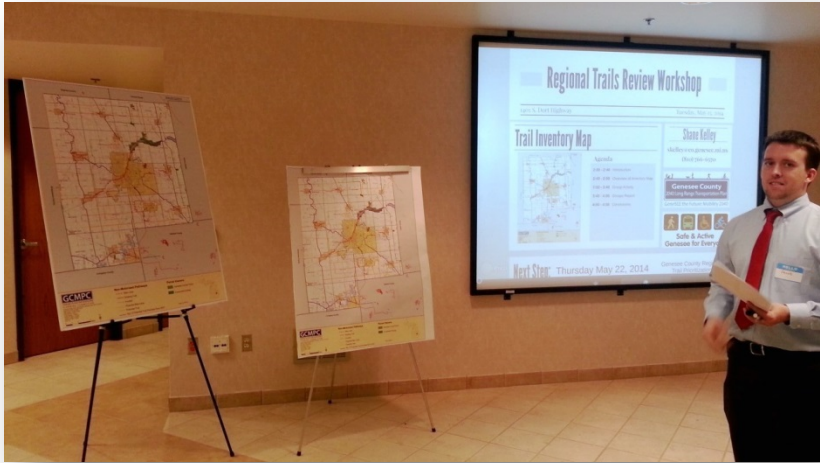
✓	Fuller, Dale	Friends of the Southern Link Trailway
X	Holaly-Zembo, Laureen	Crim Fitness Foundation
X	Johnson, Paulette	Walk, Bike, Run Committee
X	June, Barry	Genesee County Parks & Rec
X	Kautman-Jones, Shirley	Atlas Township
*	Kidd, Gary	Disability Network
Rup	Klocek, Ron	Friends of Southern Link Trailway
	Lossing, David	City of Linden
X	McMillian, Amy	Genesee County Parks & Rec
	Mathis, Bonnie	Fenton Township
X	Miller, Karen	Davison Township
X	Perkins, Patti	Grand Traverse District Trail Assoc
X	Phaneuf, Heidi	Genesee County Land Bank
X	Ralston, Linda	

X	Ralston, Tom	
X	Rash, Joel	Red Ink Flint/No Child Left On-Line youth group
X	Roach, Theresa	Crim Fitness Foundation
V	Ross, Charlie	City of Linden
	Rybarczyk, Greg	UM-Flint
X	Say, Wayne	
V	<del>Chaffer, Jim</del> Chaffer	Friends of Southern Link Trailway
V	<del>Schronce, Kevin</del> Vincent Slocum	City of Flint
V	Schultz, Doug	Consultant
V	Severn, Sondra	Flint River Watershed Coalition
V	Skutt, Jennifer	Mass Transportation Authority
V	Slattery, Bob <i>Bob Slattery</i>	Friends of Trolley Line Trail/GCRC
0	Stack, Ron <i>Ron Stack</i>	Cyclefit Sport/Fenton Community Fund

	Steere, Skye	Kettering University
	Strozier, Blake	ROWE
✓	Virkler, Ginger	
✓	Virkler, Kim	
✓	Waites, Mark	Genesee County Master Gardners Trolley Line
✓ aw	Walker, Ann	Southern Lakes Trail Coalition/Biking Bunch from Loose SC
	West, Karen	Keep Genesee County Beautiful
	Wheatley, Jack	ROWE PSC
✓	Wiederhold, Eric	City of Clio
✓	Wyatt, Tom	Genesee Habitat for Humanity
✓	Fortney, Damar	GCMPC
✓	Mauer, Jacob	GCMPC
✓	Bradshun Dal	GCMPC

	Name	Organization
✓	LUKASATZ, Victor	SOUTHERN LAKE MARLS COALITION
✓	Whizlen, Mark	
✓	Landy Smith	
✓	Cade Surfa	U-M - Flint
✓	Dorothy Dunford	

# Genesee County Regional Trails Review Workshop Pictures May 13, 2014





## Genesee County Regional Trails Prioritization Meeting

# Genesee County Regional Trail Prioritization Meeting

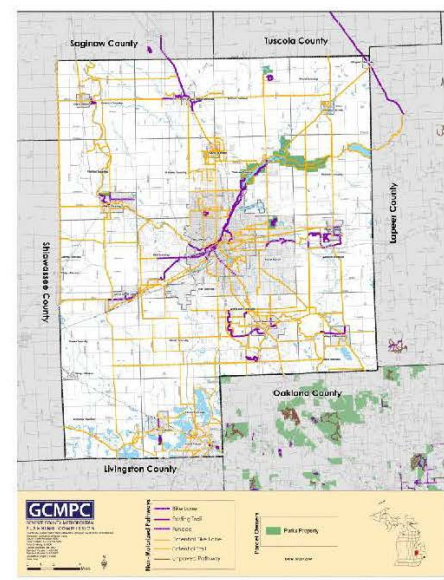
Thursday  
May 22, 2014

## Agenda

- 2:30 - 2:40 Introductions
- 2:40 - 2:50 Presentation – GMPC
- 2:50 - 3:00 Signage Presentation – SAGE
- 3:00 - 4:00 Prioritization Activity
- 4:00 – 4:30 Conclusions

## Location

**MTA Transportation Authority**  
1401 S. Dort Highway  
Flint, MI 48503



**Genesee County**  
2040 Long Range Transportation Plan  
GeneSEE the Future: Mobility 2040

**Safe & Active  
Genesee for Everyone**

**GCMPC**  
GENESEE COUNTY METROPOLITAN  
PLANNING COMMISSION

**What is a Water Trail?**  
The National Water Trails System defines water trails as recreational routes on waterways with a network of public access points supported by broad-based community partnerships providing both conservation and recreational opportunities.  
<http://www.nps.gov/Wat/trails/>

May 2014

**GCMPC** Genesee County  
GENESEE COUNTY METROPOLITAN PLANNING COMMISSION

**Genesee County Regional Trail Prioritization Meeting**

Thursday  
May 22, 2014

Sign In

2:30 -4:30

OK	Name	Organization
✓	Assenmacher, Matt	<i>Assenmacher Chev</i>
	Baughner, Carrie	Disability Network
✓	Bolen, Jan	<i>Atlas twp</i>
	Bontrager, Conrad	Goodwill Industries Of Mid-Michigan Inc
X	Burger, Jennifer	Crim Fitness Foundation
	Cole, Robert	Argentine Township
X	Dietz, Kelley	
X	Dunfield, Denny	Southern Lakes Trail Group/Al Serra Chev
	Dunn, Jim	
	Elbing, Lauri	

	McMillian, Amy	Genesee County Parks & Rec
	Mathis, Bonnie	Fenton Township
	Miller, Karen	Davison Township
	Perkins, Patti	Grand Traverse District Trail Assoc
	Phaneuf, Heidi	Genesee County Land Bank
✓	Ralston, Linda	SLTC
✓	Ralston, Tom	SLTC
	Rash, Joel	Red Ink Flint/No Child Left On-Line youth group
✓	Roach, Theresa	Crim Fitness Foundation
	Ross, Charlie	City of Linden
	Rybarczyk, Greg	UM-Flint
	Say, Wayne	
	Schaffer, Jim	Friends of Southern Link Trailway

X	Walker, Ann	Southern Lakes Trail Coalition/Biking Bunch from Loose SC
	West, Karen	Keep Genesee County Beautiful
	Wheatley, Jack	ROWE PSC
	Wiederhold, Eric	City of Clio
	Wyatt, Tom	Genesee Habitat for Humanity
✓	Victor LUKASAVITZ	Southern Lakes Trail Coalition
✓	Dennington	southern lakes <sup>Trail</sup> coalition
✓	Sandy Lubarski	southern lakes C.
✓	DON STAVEL	MILLICRESTON MI.
✓	Susan Calandri	
✓	Tom Broecker	Fenton Twp.
✓	Daniel Lossing	City of Clio
	<del>Tom RALSTON</del>	
	<del>Tom RALSTON</del>	

✓ Doug McAbee  
 Beth Cox Fenton

✓	Fedio, Kid Black	
	Fleury, Louis	ROWE
<del>X</del>	Forys, Beth	
<del>X</del>	Forys, Fred	
✓	Fuller, Dale	Friends of the Southern Link Trailway
<del>X</del>	Holaly-Zembo, Laureen	Crim Fitness Foundation
✓	Holsbeke, Mark	
✓	Johnson, Paulette	Walk, Bike, Run Committee
✓	Jones, Dave	
	June, Barry	Genesee County Parks & Rec
	Kautman-Jones, Shirley	Atlas Township
<del>X</del>	Kidd, Gary	Disability Network
✓	Klocek, Ron	Friends of Southern Link Trailway
<del>X</del>	Lossing, David	City of Linden

	Schronce, Kevin	City of Flint
	Schultz, Doug	Consultant
	Severn, Sondra	Flint River Watershed Coalition
	Seymour, Cheryl	mother of 5 student
	Skutt, Jennifer	Mass Transportation Authority
✓	Slattery, Bob	Friends of Trolley Line Trail/GCRC
✓	Stack, Rebecca	SLTC
✓	Stack, Ron	Cyclefit Sport/Fenton Community Fund
	Steere, Skye	Kettering University
	Strozier, Blake	ROWE
	Virkler, Ginger	
<del>✓</del>	<del>Virkler, Kim</del>	
	Waites, Mark	Genesee County Master Gardners Trolley Line

Susan Snow Cyclefit/Fenton

✓	Phyllis Rose	Southern Lakes Trail
✓	Judy Lukas	
✓	Cory Stange	
✓	Tracey Dawson	Southern Lakes Trail
✓	Shelley Brady	Southern Lakes Trail
✓	Theresa Bach	Crim
✓	Pat Lockwood	Fenton
✓	Paul Zieske	Southern Lakes Trail

✓ Derek Bralich

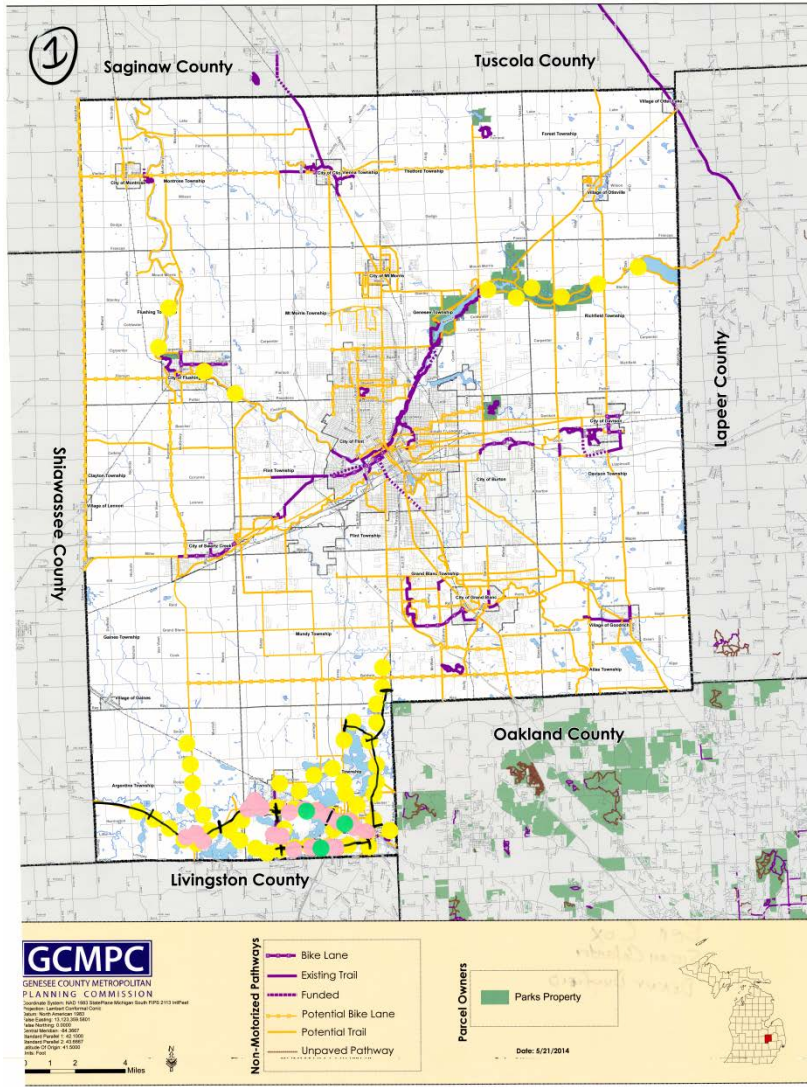
✓ Jacob Maurer

✓ Damen Fortney

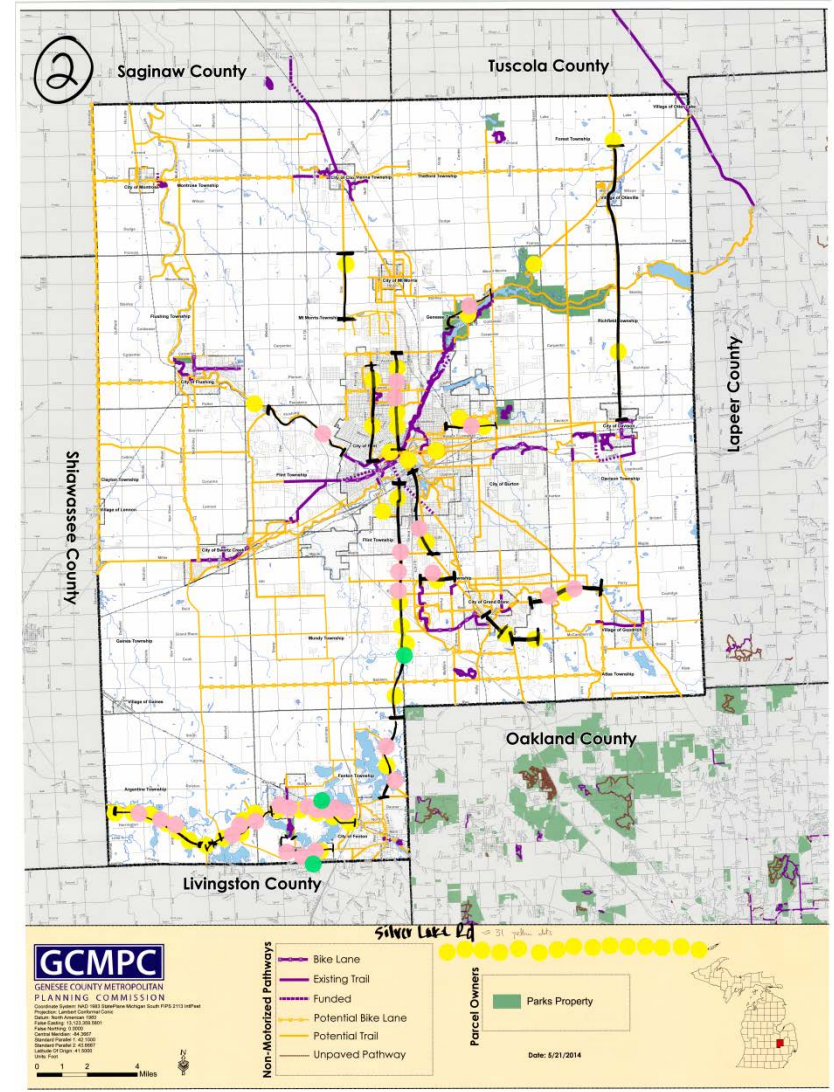


## Group Maps

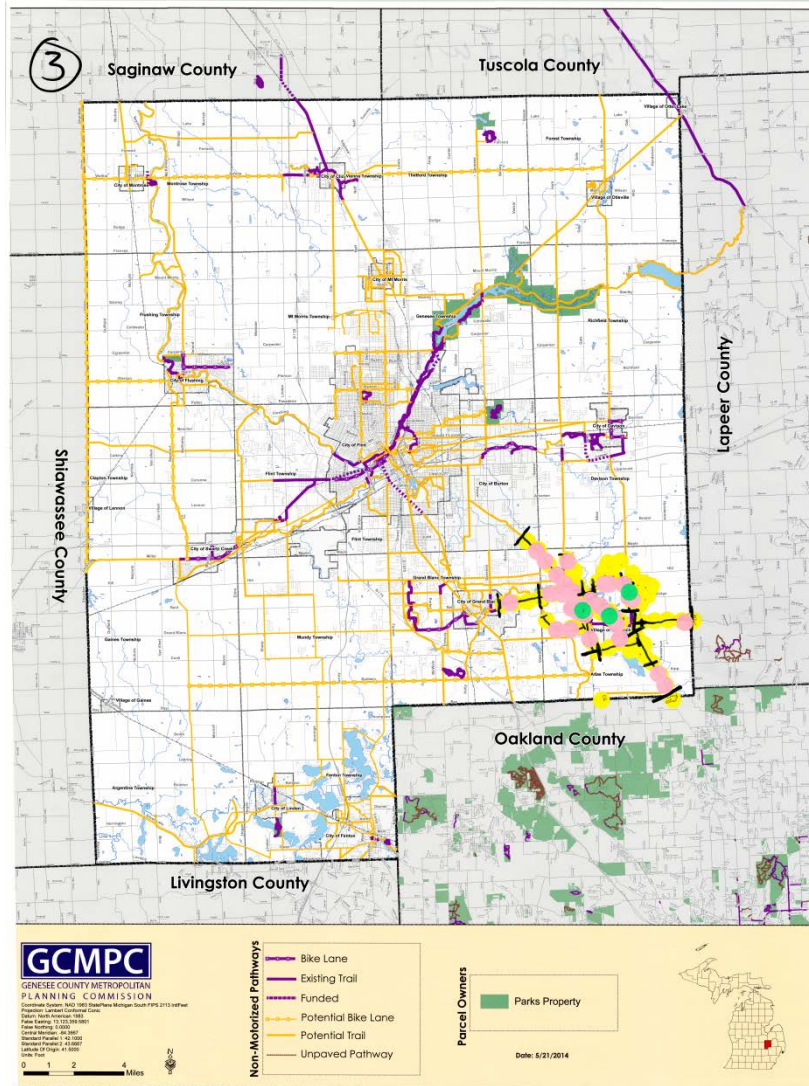
Group 1



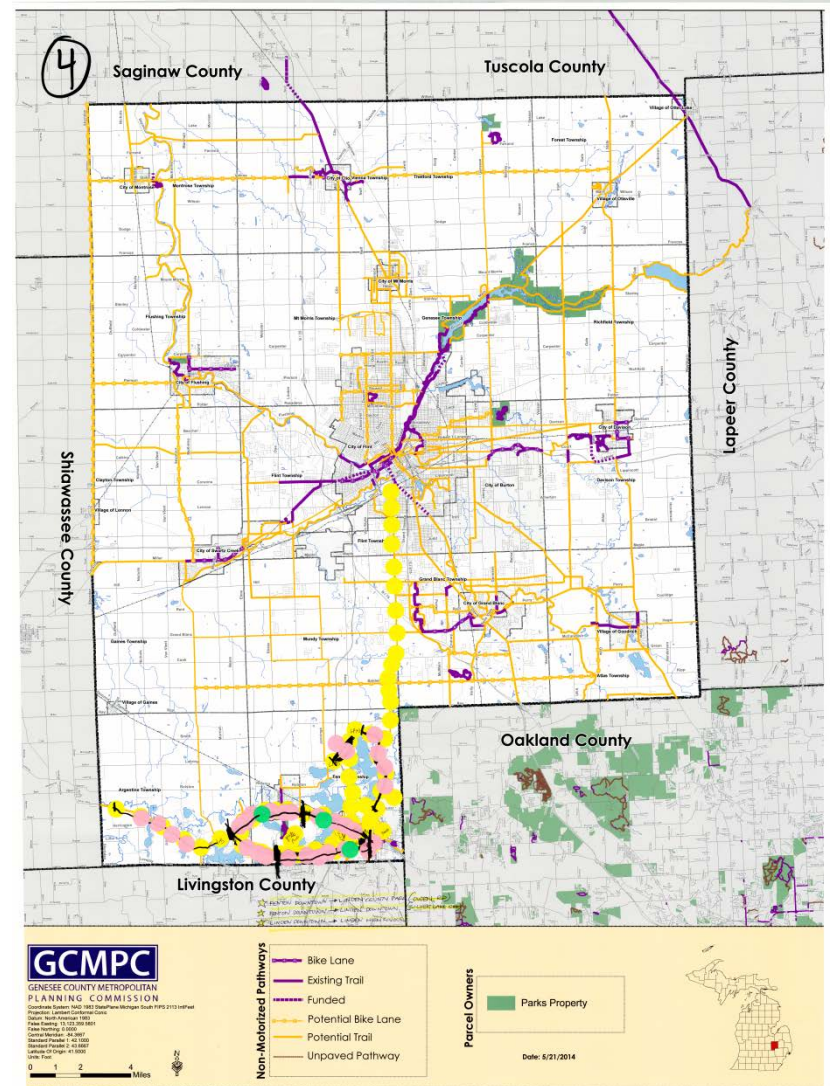
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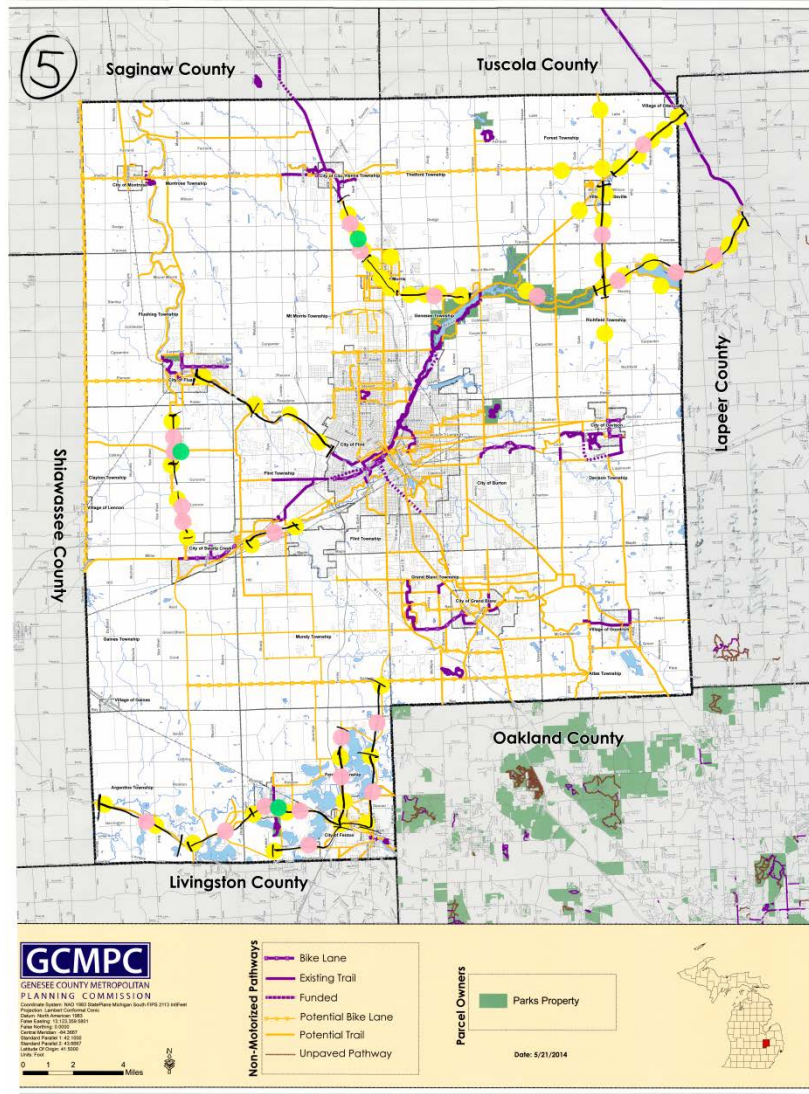
Group 3



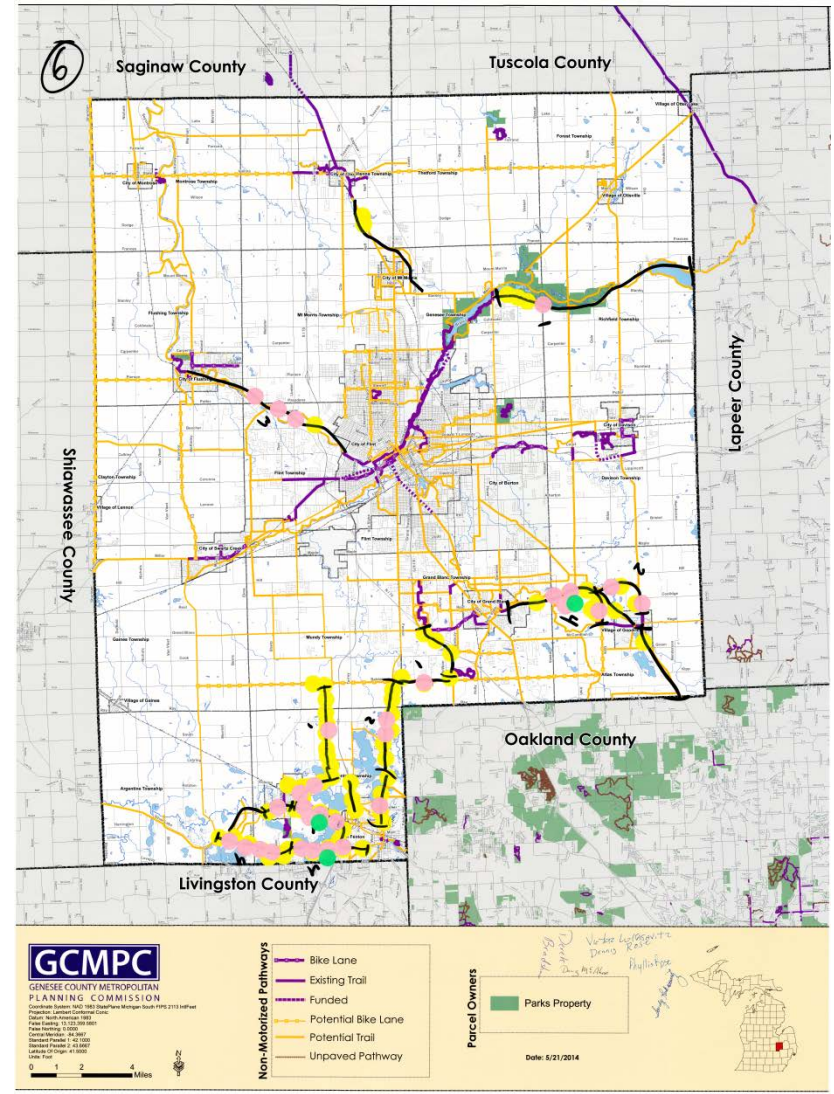
Group 4



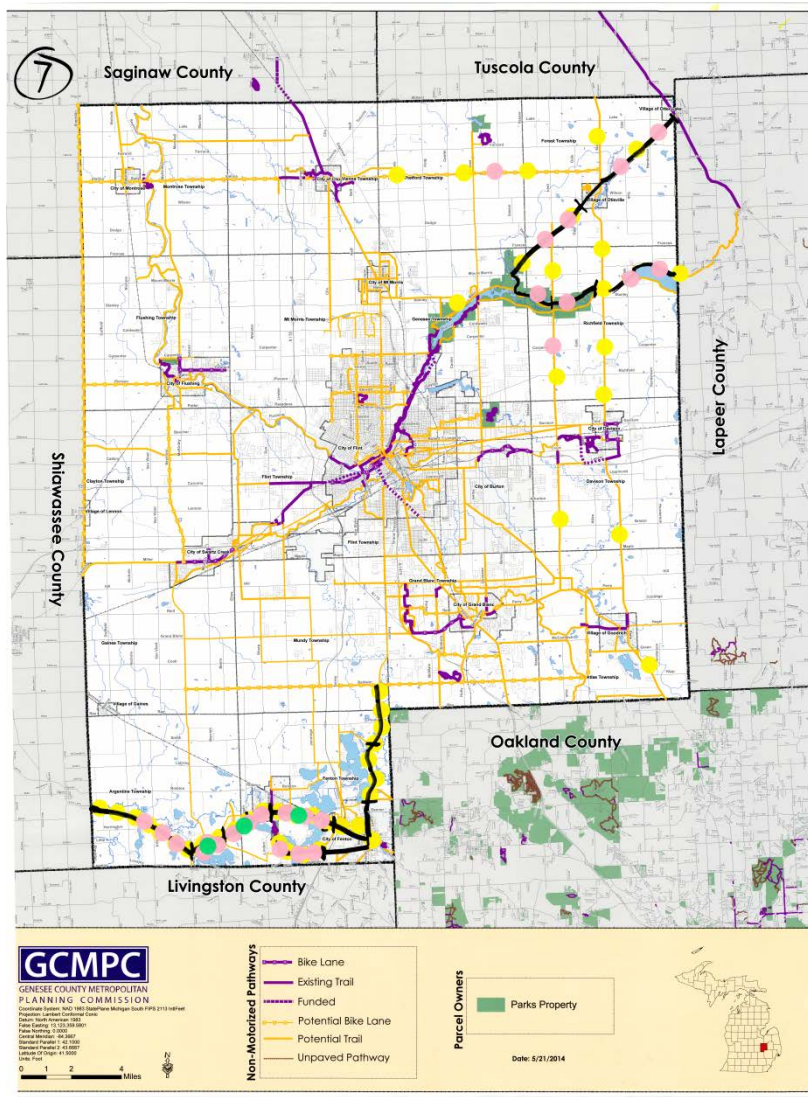
Group 5



Group 6



Group 7



# Genesee County Regional Trail Prioritization Meeting Pictures

May 22, 2014



## Water Trail Discussion

## Water Trail Discussion July 1, 2014

Name	Organization
SUSAN JULIAN	HEADWATERS TRAILS
BOB	ARGENTINE
Maggie German	Keepers of Shiaw.
KELCY DIETZ	Keepers of Shi.
Derek Bradshaw	GCMPC
AMY McMillan	G.C. Parks
Rebecca Fedewa	FRWC
Lynn Markland	City of Fenton
Brad Jacob	city of Fenton
Daryl Lossing	City of Linden
PAUL HATHAWAY	FRIENDS OF THE SHIAWASSEE RIVER



## Water Trail Discussion July 1, 2014

Name	Organization
Jacob Maurer	GCMPC
Nancy Muffley	Southern Lakes Parks & Recreation
Vince Paris	↗ " " " "
ROBIN BAKER	SLPR



# Water Trail Discussion

July 1, 2014





D

Appendix

## Long Range Transportation Plan Approval



E

Appendix

Comments

## Kelley, Shane

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**From:** Burchell, Linda (MDOT) <BurchellL@michigan.gov>  
**Sent:** Friday, August 15, 2014 4:01 PM  
**To:** Kelley, Shane  
**Subject:** RE: non motorized comment

Comments regarding draft non-motorized plan – in particular any proposed (preferred) associated with the freeways and/or limited access

- Burton
  - o There is an existing pedestrian structure crossing I-69 east of Belsay Road.
  - o An additional freeway crossing one mile west at Genesee Road is not likely – consolidate with Flint and Davison Township
  - o Trails adjacent to freeway (i.e. I-69) tend to have difficulty maintaining by Locals (limited access right of way). Not recommended. Existing??
- Clayton Township and Lennon
  - o The M-13 crossing at I-69 should not be a preferred crossing location – all of the ramp movements associated with the interchange makes for a difficult/dangerous place to incorporate pedestrians and bicyclists.
    - The proposed Seymour Road crossing of I-69 is far more practical than the M-13 location.
    - Nichols Road could be another option instead of Seymour Road– which would give more separation from Swartz Creek’s proposed Elms Road crossing and bring it closer to M-13 (for in lieu of).
  - o Two I-69 crossings in Clayton Township is not realistic.
- Davison Township and Davison
  - o There is already the I-69 crossing at Irish Road.
  - o Additional crossings at Lapeer Road and M-15 are not practical.
    - Consider something further east – Oak Rd? Could tie back into M-15 south of the freeway via Lippincott and/or Montague.
  - o Where is the meandering proposed trail to the west going? I-69 limited access right of way? Why not connect with Burton via Court St?
- Fenton, Linden & Fenton Township
  - o US-23 crossings at Lahring Road (interchange), Torrey Road, Silver Lake Road (interchange), and Owen Road (interchange)???? Highly unlikely.
    - Too many
    - Interchanges traffic with ramp movements make for a non-desirable place for pedestrians and bicyclists.
    - Reduce and consider different non-interchange crossing locations.
- Flint
  - o Maps are too busy to see preferred corridors
  - o Specify I-475 and I-69 preferences.
- Flint Township
  - o Flint River crossing at I-75 could be a hydraulic/flood plain concern. Might want to consider Flushing Road or Beecher Road.
- Gaines Township and Swartz Creek
  - o See comments from Clayton Township regarding M-13/I-69 crossing
  - o Must consolidate proposed Swartz Creek I-69 crossings
    - Seymour Road, Elms Road, Miller Road, and West Branch of Swartz Creek completely not realistic
- Genesee Township

- Carpenter Road/I-475 crossing may need adjustment in coordination with unreadable Flint plan
- Grand Blanc and Grand Blanc Township
  - Trails adjacent to freeway (i.e. I-75, I-475) tend to have difficulty maintaining by Locals (limited access right of way). Not recommended.
  - I-75 crossings at Fenton Road, Grand Blanc Road, Cook Road, Holly Road (interchange), and Baldwin Road??? Highly unlikely.
    - Too many
    - Interchanges traffic with ramp movements make for a non-desirable place for pedestrians and bicyclists.
    - Reduce and consider different non-interchange crossing locations.
  - I-475 crossings at Maple Road, Hill Road (interchange), and Reid Road??? Highly unlikely.
    - Too many
    - Interchanges traffic with ramp movements make for a non-desirable place for pedestrians and bicyclists.
    - Reduce and consider different non-interchange crossing locations.
- Mt. Morris & Mt Morris Township
  - In 2016, MDOT will be removing the existing pedestrian structure over I-475 between Detroit Street and Saginaw Road
    - Mitigation will include sidewalk crossing under I475 at Detroit Street – preferred option over crossing at Saginaw Street interchange
    - Public meeting was on June 2, 2014
  - Trails adjacent to freeway (i.e. I-475) tend to have difficulty maintaining by Locals (limited access right of way). Not recommended.
- Mundy Township
  - I-75 crossings at Hill Road, Fenton Road, and Grand Blanc Road??? Highly unlikely.
    - Too many. Reduce.
    - Coordinate consolidating I-75 crossings with Grand Blanc Township
  - US-23 crossings at Hill Road (interchange), Grand Blanc Road (interchange), and Baldwin Road??? Highly unlikely.
    - Too many
    - Interchanges traffic with ramp movements make for a non-desirable place for pedestrians and bicyclists.
    - Reduce and consider different non-interchange crossing locations.
    - Coordinate consolidating US-23 crossings with Fenton Township
- Vienna Township
  - What is the crossing of I-75 between Lake Road and Farrand Road?

**Linda**

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**From:** Kelley, Shane [mailto:SKelley@co.genesee.mi.us]  
**Sent:** Tuesday, July 22, 2014 8:06 AM  
**To:** Burchell, Linda (MDOT)  
**Subject:** RE: non motorized comment

Linda,

Thank you for bringing that to my attention.

All the best,

**Shane Kelley**, Planner I  
 Genesee County Metropolitan Planning Commission  
 1101 Beach Street, Room 223

Flint, MI 48502  
Phone: (810) 766-6570  
Fax: (810) 257-3185

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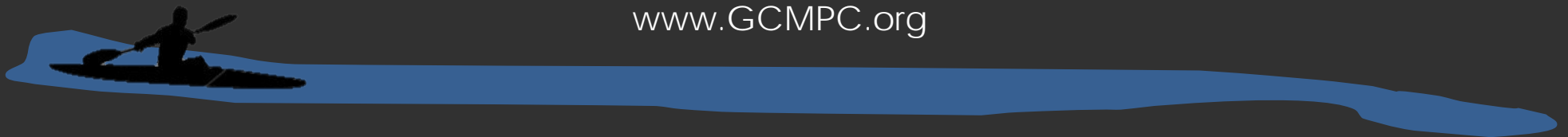
**From:** Burchell, Linda (MDOT) [<mailto:BurchellL@michigan.gov>]  
**Sent:** Monday, July 21, 2014 5:31 PM  
**To:** Kelley, Shane  
**Subject:** non motorized comment

On page 58 of the draft NM plan, the Irish Road path shows as potential. It has been constructed. It ties into the existing trail that runs adjacent to Irish Road under I-69 and continues north to just south of the railroad tracks at the Davison Township Offices where it ties into the trail at the back of their property that heads toward the east.

**Linda Burchell, P.E.**  
MDOT - Davison TSC Manager  
Office: (810) 653-7470  
Cell: (989) 737-5715



Genesee County Metropolitan Planning Commission  
 Room 223, 1101 Beach Street  
 Flint, MI 48502-1470  
 (810) 257-3010  
 (810) 257-3185 FAX  
[www.GCMPC.org](http://www.GCMPC.org)







## MEMORANDUM

**TO:** Members of the Metropolitan Alliance

**FROM:** Sharon Gregory, Planner III  
Genesee County Metropolitan Planning Commission

**DATE:** October 15, 2014

**SUBJECT:** **FY 2014-2017 Transportation Improvement Program (TIP) Amendment #5**

Attached is a description of the proposed projects in the FY 2014-2017 TIP Amendment #5. This amendment adds seven (7) projects to the TIP. This amendment contains five (5) General Program Accounts (GPAs). This means that one project is identified in the TIP and represents several smaller projects. A listing of the smaller projects each GPA represents is also provided. This amendment meets the financial constraints of the TIP and will have no disproportionately high or adverse impacts to any of the identified Environmental Justice (EJ) populations in Genesee County.

At this time the Technical Advisory Committee is recommending approval of the attached Amendment #5 to the FY 2014-2017 Transportation Improvement Program to the Genesee County Metropolitan Alliance.

AN EQUAL OPPORTUNITY ORGANIZATION

**FY 2014-2017 Transportation Improvement Program (TIP)**

**Proposed Amendment # 5**

Projects proposed to be added with a TIP Amendment												
Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	Trunkline Bridge Preservation GPA		Regionwide	Trunkline Bridge Preservation GPA		IM	\$ 645,566	\$ 71,727	\$ -	\$ 717,293	New Project
2015	MDOT	Trunkline Highway Resurfacing, Rehabilitation and Reconstruction GPA		Regionwide	Trunkline Highway Resurfacing, Rehabilitation and Reconstruction GPA		NH	\$ 178,584	\$ 39,601	\$ -	\$ 218,185	New Project
2015	MDOT	Local Transportation Livability and Sustainability GPA		Regionwide	Local Transportation Livability and Sustainability GPA		CM	\$ 122,775	\$ 27,225	\$ -	\$ 150,000	New Project
2015	MDOT	Trunkline Highway Preservation GPA		Regionwide	Trunkline Highway Preservation GPA		ST	\$ 1,913,700	\$ 402,800	\$ -	\$ 2,316,500	New Project
2015	MDOT	Trunkline Scoping and Studies GPA		Regionwide	Trunkline Scoping and Studies GPA		HSIP	\$ 4,500	\$ 500	\$ -	\$ 5,000	New Project
2015	MTA	Replacement Transit Vehicles	N/A	Genesee County	Transit Vehicle Purchase	T-Cap	STP	\$ 120,000		\$ 30,000	\$ 150,000	New Project
2017	GCRC	Gale Rd.	0.54	McCandlish to Hegel Rd.	Resurface	CON	STP	\$ 375,000		\$ 93,750	\$ 468,750	New Project

CM, CMG, CMAQ - Congestion Mitigation and Air Quality  
 HSIP--Highway Safety Improvement Program  
 IM--Interstate Maintenance

NH--National Highway System  
 ST, STP--Surface Transportation Program

**FY 2014-2017 Transportation Improvement Program (TIP)**

**GPA Breakdown**

**Trunkline Bridge Preservation GPA**

Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	I-475 over Detroit Street Bridge	0.435	Over Detroit Street	Bridge Preventive Maintenance	PE	IM	\$ 24,799	\$ 2,755	\$ -	\$ 27,544	C Phase for bridge project
2015	MDOT	I-475 over Detroit Street Bridge	0.435	Over Detroit Street	Bridge Preventive Maintenance	SUB	IM	\$ 91,749	\$ 10,194	\$ -	\$ 101,943	D Phase for bridge project
2015	MDOT	GTW RR over I-75	0.193	GTW RR over I-75	Bridge Preventive Maintenance	CON	IM	\$ 529,018	\$ 58,778	\$ -	\$ 587,796	

**Trunkline Highway Preservation GPA**

Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	M-21 Resurfacing	4.94	M-21 from M-13 to Morrish Rd	Road Preventive Maintenance	CON	ST	\$ 1,718,850	\$ 381,150	\$ -	\$ 2,100,000	
2015	MDOT	M-54 Shoulder Widening	1.015	M-54 from Coldwater Rd to Stanley Rd	Shoulder Widening for Safety Purposes	PE	HSIP	\$ 194,850	\$ 21,650	\$ -	\$ 216,500	Safety Template

**Trunkline Highway Resurfacing, Rehabilitation and Reconstruction GPA**

Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	M-54 Rehabilitation	2.027	M-54 from Coldwater Rd to Mt. Morris Rd	Road Rehabilitation	PE	NH	\$ 178,584	\$ 39,601	\$ -	\$ 218,185	Road 3R Template

**Trunkline Scoping and Studies GPA**

Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	I-75 at Bristol Road Roundabout	0.344	Bristol Road at I-75 NB Ramps	Traffic & Safety Proposed Roundabout	ROW	HSIP	\$ 4,500	\$ 500	\$ -	\$ 5,000	

**Local Transportation Livability and Sustainability GPA**

Year	Agency	Project	Length	Limits	Description	Phase	Fund Type	Federal	State	Local	Total Cost	Comments
2015	MDOT	M-15 from Bristol Road Northerly 0.4 miles C/L Turn Lane	0.4	M-15 from Bristol Road Northerly 0.4 miles C/L Turn Lane	Traffic & Safety / Operational Improvement with Center/Left Turn Lane	PE	CM	\$ 122,775	\$ 27,225	\$ -	\$ 150,000	

CM, CMG, CMAQ - Congestion Mitigation and Air Quality  
 HSIP--Highway Safety Improvement Program  
 IM--Interstate Maintenance

NH--National Highway System  
 ST, STP--Surface Transportation Program



## MEMORANDUM

**TO:** Members of the Genesee County Metropolitan Alliance

**FROM:** Damon Fortney, Planner I  
Genesee County Metropolitan Planning Commission

**DATE:** October 15, 2014

**SUBJECT:** **Statewide National Functional Classification (NFC) Review**

Every ten years, after the United States Census urban area boundary adjustments are completed, the Federal Highway Administration (FHWA) guidelines request the state to lead and cooperate with local officials to review and update the National Functional Classification (NFC) of all public roads in Michigan. The NFC determines federal-aid eligibility of roadways. Act 51 road jurisdictional agencies (county Road Commissions, Cities, and Villages) must approve any revision to a NFC route under their jurisdiction; however, all NFC revisions are subject to approval by FHWA.

The Michigan Department of Transportation (MDOT) will hold NFC meetings similar to the urban adjustment process group meetings. The NFC meetings will be coordinated through Regional Planning Agencies (RPA) and will be informational workshops to help agencies review the system and prepare NFC revision proposal(s). The anticipated timeframe for the statewide review is identified below. Staff will provide updates as more specific information becomes available.

- RPA coordinated MDOT group meetings **September 2014 – April 2015**
- Other Principal Arterial/National Highway System (NHS) proposals **Due April 30, 2015**
- Remaining NFC revision proposals **Due September 1, 2015**
- FHWA approvals (estimated) **May 2015 – November 2015**
- Local notification and Michigan Geographic Framework (MGF) mapping **June 2015 – January 2016**

AN EQUAL OPPORTUNITY ORGANIZATION