

**Transportation Conformity Statement
for the
*Long Range Transportation Plan for the Genesee-
Finger Lakes Region 2035*
and
*2011-2014 Transportation Improvement Program***

June 16, 2011

Prepared by the

GENESEE TRANSPORTATION COUNCIL

and the

NYS Department of Transportation-Region 4



If you have any questions or comments on this document, please contact the Genesee Transportation Council at 50 West Main Street, Suite 8112, Rochester, New York 14614; telephone (585) 232-6240, fax (585) 262-3106, or via e-mail at contactgtc@gtcmpo.org.

Financial assistance for the preparation of this report was provided by the Federal Highway Administration and Federal Transit Administration. The Genesee Transportation Council is solely responsible for its content and the views and opinions expressed herein do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

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GENESEE TRANSPORTATION COUNCIL

RESOLUTION

Resolution 11-52 Adopting the *Transportation Conformity Statement for the Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035 and the 2011-2014 Transportation Improvement Program*

WHEREAS,

1. The Genesee Transportation Council (GTC) has been designated by the Governor of New York State as the Metropolitan Planning Organization responsible for transportation planning for the nine-county Genesee-Finger Lakes Region, including the Rochester Transportation Management Area;
2. Federal regulations require that the urban transportation planning process include the cooperative development of a long range transportation plan and a transportation improvement program consisting of a staged multi-year program of projects consistent with said long range transportation plan;
3. The *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035* (LRTP) was adopted by GTC on June 16, 2011;
4. The *2011-2014 Transportation Improvement Program* (TIP) was adopted by GTC on June 17, 2010 and has been amended and modified subsequent to its adoption;
5. The United States Environmental Protection Agency designated Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne counties as basic nonattainment under the eight-hour standard for ozone on April 15, 2004;
6. 40 CFR Part 93 requires nonattainment areas to make a conformity determination when a new LRTP is adopted;
7. 40 CFR Part 93 requires nonattainment areas to make a conformity determination when a new TIP is adopted;
8. GTC and the New York State Department of Transportation (NYSDOT) have worked with the Interagency Consultation Group to achieve concurrence on the exemption status of projects and programs to be advanced in the region;
9. GTC has worked with the Interagency Consultation Group to achieve concurrence on its regional travel demand model for use in modeling regional emissions in the Rochester Transportation Management Area portion of the nonattainment area; and

10. NYS DOT has worked with the Interagency Consultation Group to achieve concurrence on its methodology for estimating regional emissions in the portion of the six-county nonattainment area outside the Rochester Transportation Management Area.

NOW, THEREFORE, BE IT RESOLVED

1. That GTC hereby adopts the *Transportation Conformity Statement for the Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035 and the 2011-2014 Transportation Improvement Program*; and
2. That this resolution takes effect immediately.

CERTIFICATION

The undersigned duly qualified Secretary of the Genesee Transportation Council certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Genesee Transportation Council held on June 16, 2011.

Date 6/17/11

Robert A. Traver
ROBERT A. TRAVER, Secretary
Genesee Transportation Council

Nonattainment Status

On April 15, 2004 the U.S. Environmental Protection Agency (EPA) designated Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne Counties as being in nonattainment of the National Ambient Air Quality Standard (NAAQS) for ground-level ozone. This six-county area comprises the Rochester, New York Nonattainment Area (Rochester Nonattainment Area).

Ground-level ozone is created when volatile organic compounds (VOCs) and Nitrogen Oxides (NOx) combine in the presence of sunlight. The subsequent photochemical reaction typically takes between five and seven hours and is a major component of smog. The health risks of smog to persons with respiratory conditions as well as children and seniors are well-documented.

When an area is designated as being in nonattainment of a NAAQS, the EPA classifies the area based on the severity of the violations that led to the nonattainment designation. The Rochester Nonattainment Area is classified as a Clean Air Act "Former Subpart 1 Basic" nonattainment area for the 8-hour ground-level ozone standard, the classification representing the least severe violations of the NAAQS for ground-level ozone.

Regardless of the classification, all areas designated as being in nonattainment of a NAAQS are required to determine if transportation improvements in these areas conform to federal air quality requirements.

Conformity

The Clean Air Act Amendments of 1990 (CAAA) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) require transportation agencies in nonattainment areas to ensure that their transportation improvements do not negatively contribute to air quality as a precondition to the continued receipt of federal transportation funds.

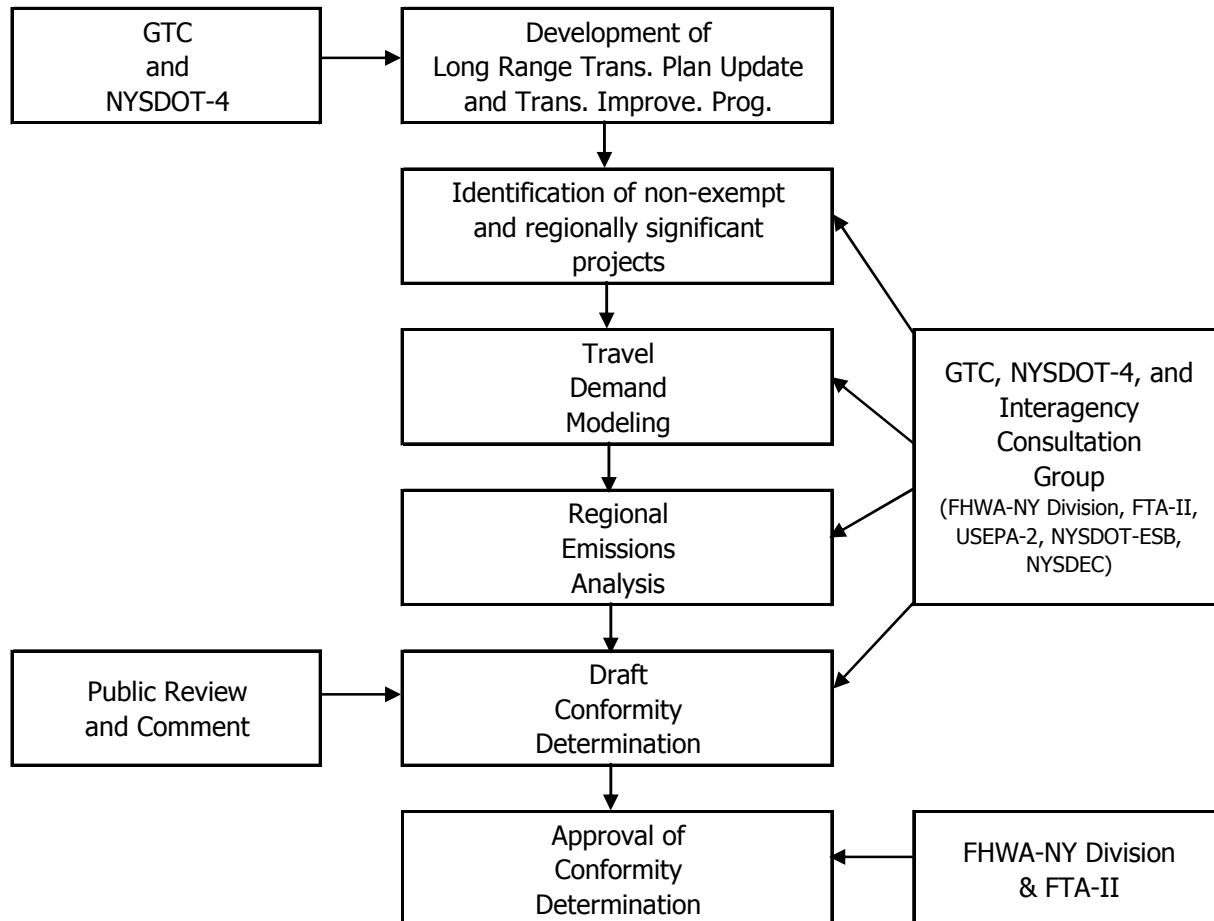
The primary geographic focus of the Genesee Transportation Council (GTC) is the Rochester Transportation Management Area (TMA). The Rochester TMA includes all of Monroe County and the adjacent developed areas of Livingston, Ontario, and Wayne counties. Projects outside of the Rochester TMA that are in the Rochester Nonattainment Area are under the purview of the New York State Department of Transportation (NYSDOT)-Region 4. Map 1 on the following page presents the Rochester Nonattainment Area with the Rochester TMA highlighted.

Accordingly, GTC and NYSDOT-Region 4 are required to determine if the current, fiscally-constrained long range transportation plan (LRTP) and transportation improvement program (TIP) conform to federal air quality standards. As established in GTC Resolution 04-41, GTC is responsible for determining conformity in the Rochester TMA and NYSDOT is responsible for determining conformity in the remainder of the Rochester Nonattainment Area.

The CAAA and SAFETEA-LU define what activities must be undertaken – and what agencies must be involved in each of these activities – to demonstrate conformity of the TIP. Figure 1 below presents the major activities required to determine conformity and the agencies involved in these activities.

Figure 1

Major Activities to Determine Conformity for LRTP and TIP



Interagency Consultation

To better insure that all considerations are accounted for, the CAAA requires that each state identify and involve all affected agencies in the conformity process through an Interagency Consultation Group (ICG). In New York State, the members of the ICG are defined in Title 6 Part 240 Section 6 of the New York Codes, Rules, and Regulations as:

- Federal Highway Administration – New York Division (FHWA-NY)
- Federal Transit Administration – Region II (FTA-II)
- U.S. Environmental Protection Agency – Region 2 (EPA-2)
- NYSDOT – Environmental Science Bureau (NYSDOT-ESB)
- NYS Department of Environmental Conservation (NYSDEC)

The ICG played an integral role in each of the activities required to determine conformity through the development of the draft conformity determination statement that was provided for public review and comment.

The involvement and decisions of the ICG are noted in the activities discussed below.

Development of LRTP and the TIP

Transportation policies and improvements utilizing Federal transportation funds in the Rochester Nonattainment Area are identified in the *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035 (LRTP 2035)* and the *2011-2014 Transportation Improvement Program (2011-2014 TIP)*. Both the *LRTP 2035* and the *2011-2014 TIP* must be fiscally constrained – that is, policies, programs, and projects identified in each document must not require expenditures in excess of estimates of reasonably expected Federal transportation funds and required non-Federal matching funds.

Given that the transportation improvements in the *LRTP 2035* and *2011-2014 TIP* can be implemented with reasonably expected revenues, these transportation improvements can be expected to advance and must conform to Federal air quality standards.

Long Range Transportation Plan for the Genesee-Finger Lakes Region 2035

The *LRTP 2035* provides a nearly 25-year perspective of existing and projected transportation system capabilities, needs, and objectives, as well as recommendations to meet these objectives for the nine-county Genesee-Finger Lakes Region, which includes the six-county Rochester Nonattainment Area. The *LRTP 2035* serves as a framework for guiding Federally-funded transportation planning and investment decision-making.

Development of the *LRTP 2035* began in December 2008 with the creation of a critical path schedule that identified and scheduled the steps necessary to produce the *LRTP 2035*. It was recognized immediately that the process employed to produce the *LRTP 2035* would determine its success in identifying the policies and actions that most effectively meet the needs of transportation system users over the next nearly 25 years.

The *LRTP 2035* was developed in seven distinct phases:

1. Inventory and Analysis of Existing and Projected Conditions
(December 2008-October 2010)
2. Identification of Regional Opportunities and Issues
(November/December 2010)
3. Assessment of the Regional Transportation System
(December 2010/January 2011)
4. Determination of Regional Transportation Needs
(January/February 2011)
5. Development of Alternatives
(February/March 2011)
6. Estimation of Costs and Reasonably Expected Revenues
(March 2011)

7. Selection of Preferred Alternatives (March-June 2011)

In total, the *L RTP 2035* development process included nearly three months of focused public involvement periods that included eight public meetings, as well as specific outreach to low-income and minority populations. Public comments on the *L RTP 2035* were accepted during two of the development phases: "2. Identification of Regional Opportunities and Issues" and "7. Selection of Preferred Alternatives."

The *L RTP 2035* also included extensive participation beyond the two rounds of public involvement and technical review. Many of the recommendations of the *L RTP 2035* emerged from GTC Unified Planning Work Program (UPWP)-funded plans. Over 50 UPWP-funded plans that included public involvement and technical review were evaluated as part of the development of the *L RTP 2035*.

For the *L RTP 2035*, written comments were accepted in a variety of formats. A "hard copy" comment form was developed that could be mailed or faxed to GTC. A dedicated web page on the GTC website (www.gtcmpo.org) was developed and updated during each development phase. In addition, GTC created a dedicated e-mail address (LRTP@gtcmpo.org) to which comments could be submitted.

The *L RTP 2035* was adopted by the GTC Board on June 16, 2011.

2011-2014 Transportation Improvement Program

Federal regulations require that the urban transportation planning process include the cooperative development of the Transportation Improvement Program (TIP), a staged multi-year program of projects consistent with the current long range transportation plan. This region's TIP is developed cooperatively by a team led by GTC and NYSDOT-Region 4.

GTC and NYSDOT-Region 4 work together to coordinate the programming of the projects in the Rochester TMA. The TIP development process is guided by the TIP Development Committee (TDC), which is comprised of representatives from the Rochester TMA Counties (Livingston, Monroe, Ontario, and Wayne), the City of Rochester, the Rochester-Genesee Regional Transportation Authority (RGRTA), and NYSDOT-Region 4. In addition, the Genesee/Finger Lakes Regional Planning Council participates on the TDC in an advisory capacity.

In June 2009, GTC and NYSDOT-Region 4 jointly solicited applications for new transportation projects which anticipated using Federal transportation funds to be included in the *2011-2014 TIP*, covering the time period between October 1, 2010 and September 30, 2014.

The GTC/NYSDOT team scored all project proposals pursuant to the Project Evaluation Criteria included in the project proposal solicitation package. These criteria were wholly consistent with and derived from the *Long Range Transportation Plan for the Genesee-Finger Lakes Region: 2007-2027 Update (L RTP: 2007-2027 Update)*. The resulting preliminary rankings were reviewed and discussed with the TDC and adjustments to rankings were made as necessary to reflect overall funding considerations, geographic balance, and other factors. Based on

estimates of available revenue, funding was then assigned to the ranked projects in accordance with funding availability and eligibility restrictions.

The TDC developed a fiscally-constrained program of projects for consideration by the GTC Planning Committee. The GTC Planning Committee approved the DRAFT *2011-2014 Transportation Improvement Program Project List* for a 30-day public review period on February 11, 2010. During the public review period, four public meetings were held in the Rochester TMA to solicit comments on the program of projects. Advance notice of the public meetings was sent to over 25 media outlets throughout the region, as well as over 200 organizations representing populations not traditionally well-represented in the transportation planning process.

Written comments were accepted in a variety of formats. A "hard copy" comment form was developed that could be mailed or faxed to GTC. A dedicated web page on the GTC website (www.gtcmpo.org) was developed and updated. In addition, GTC utilized a dedicated e-mail address (tipcomment@gtcmpo.org) to which comments could be submitted.

The *2011-2014 TIP* was adopted by the GTC Board on June 18, 2010.

Statewide Transportation Master Plan

NYS DOT completed a statewide master plan in Summer 2006 that identifies opportunities and issues impacting the entire New York State transportation system, as well as the associated policies to take full advantage of the opportunities and mitigate the issues. The statewide transportation master plan is not required to undergo a conformity determination.

Identification of Exempt/Non-Exempt and Regionally Significant Projects

Exempt/Non-Exempt Projects

All federally-funded transportation projects in the Rochester Nonattainment Area must be included in the *2011-2014 TIP*. GTC and NYS DOT-Region 4 staffs evaluated the projects in the *2011-2014 TIP* to determine their exempt or non-exempt status as defined by the criteria of the federal conformity rules and guidance ("Table 2 - Exempt Projects" in 40 CFR Part 93.126 and "Table 3 - Projects Exempt from Regional Emissions Analysis" in 40 CFR Part 93.127 dated July 1, 2009).

Typically, projects that improve the safety of the highway network, preserve/maintain existing transportation infrastructure, contribute to minor increases in the efficiency of public transportation services, or enhance non-motorized travel are considered exempt. Non-exempt projects are those projects that do not meet the criteria of exempt projects and must be included in the regional emissions analysis to determine their impact on air quality. GTC chooses to include all projects that can be modeled/analyzed in the regional emissions analysis.

The listing of the aforementioned transportation projects and their associated exempt/non-exempt status is provided in Appendix A. As part of the on-going management of the *2011-2014 TIP* since its adoption, GTC has enacted several TIP changes that are classified as Administrative Modifications or TIP Amendments depending on the nature of the change. The projects listed in Appendix A reflect the projects included in the *2011-2014 TIP* as of March 10, 2011. The ICG has concurred with the exempt/non-exempt status of each project. There have been no significant changes to these projects between ICG concurrence on the exempt/non-

exempt status of each project and when the travel demand model runs used in this conformity determination began.

Regionally Significant Projects

A regionally significant project is defined as a project that is expected to impact regional travel patterns but will be implemented without using federal funds. Although these projects may not be included in the MPO process, they have the potential to impact regional air quality and therefore must be included in the regional emissions analysis as part of a conformity determination.

For the purposes of this conformity determination, GTC and NYSDOT-Region 4 staffs reviewed the current and pending capital improvement programs (CIPs) of the City of Rochester, Monroe County, RGRTA, and Ontario County. Discussions were conducted with those agencies that do not produce a CIP or whose CIP does not contain sufficient detail to determine regional significance. In an effort to be as thorough as possible, surveys were distributed to those agencies in order for GTC and NYSDOT-Region 4 staffs to make determinations of regional significance on their non-Federally-funded projects.

None of the projects reviewed for this conformity determination were deemed to be regionally significant.

Travel Demand Modeling

Model Validation

GTC uses a computer software package (the GTC travel demand model) to estimate existing traffic volumes and forecast future volumes based on the highway network and land uses in the Rochester TMA. The GTC travel demand model was documented to describe how the model was developed, calibrated, and updated to estimate current and project future traffic volumes and speeds.

This documentation was provided to the ICG to obtain concurrence that the model meets the federally-defined minimum requirements necessary to complete a conformity determination and incorporates suggested good practice to insure that the information provided will result in a reliable regional emissions calculation.

The *GTC Travel Demand Model Validation* document is provided in Appendix B. Upon review of this document, the ICG concurred that the model is valid for determining the conformity of the LRTP and TIP on December 10, 2009. The travel demand model runs used in this conformity determination began on Tuesday, March 29, 2011 (i.e., the "lock-in" date).

Use of Latest Planning Assumptions

1. Estimates of current and future population, employment, travel, and congestion

The GTC travel demand model was used to perform the emissions analysis for the part of the Rochester Nonattainment Area within the Rochester TMA. The GTC travel demand model uses

data on employment and number of households to generate and distribute trips between transportation analysis zones (TAZs).

Data on the number of households (classified by vehicle ownership) were obtained at the TAZ-level from the 2000 Census of Population and Housing (Census) and 2000 Census Transportation Planning Package (CTPP). Forecasts of this data (for the base year of 2002 and analysis years of 2015, 2025, and 2035) were interpolated based on projections prepared by the Genesee/Finger Lakes Regional Planning Council for 2010, 2020, 2030, and 2040.

Data on employment (classified by type) were obtained from the New York State Department of Labor (NYSDOL) at the county-level. Employment for 2002 and forecasted employment for the analysis years of 2015, 2025, and 2035 at the TAZ-level were prepared by GTC using historical data from 1975 through 2009.

The travel demand model produces estimates of current and forecasts of future traffic volumes and speeds, which are used in the emissions analysis. It also produces estimates of traffic congestion measures such as the volume-to-capacity (v/c) ratio. The GTC travel demand model was calibrated in 2009, confirming that its assigned traffic volumes and speeds reasonably represented observed traffic volumes and speeds.

2. Transit operating policies and ridership trends

The 2000 Census showed transit shares of journey-to-work trips at 1.9% for the six-county MSA and 2.6% for Monroe County. Ridership, as measured in annual unlinked passenger trips, is increasing for all of the transit services within the MSA and is rebounding from declines in the 1990s.

3. Transit service and fare changes, road, and bridge tolls

The transit operators within the Rochester Nonattainment Area are the Regional Transit Service (Monroe County), Batavia Bus Service (Genesee County), Livingston Area Transportation Service, County Area Transit System (Ontario County), Orleans Transit Service, and Wayne Area Transportation Service.

The Regional Transit Service (RTS) operates in Monroe County and provides the vast majority (over 95 percent) of trips via public transportation in the Rochester Nonattainment Area. RTS operates on a flat fare system.

There are currently no plans to change the fare structures of any of the public transportation operators in the Rochester Nonattainment Area. The peak-hour one-way fare structures for public transportation services in the Rochester Nonattainment Area are shown in Figure 2 on the following page.

4. Status of Transportation Control Measures implementation

There are no Transportation Control Measures (TCMs) in the current New York State Implementation Plan (SIP) for the Rochester Nonattainment Area.

Figure 2

Peak-Hour Fare Structure (One-Way) for Public Transportation Services in the Rochester Nonattainment Area

| Public Transportation Operator | Adults | Seniors | Disabled Persons | Children 5 & Under | Children 6 & Above |
|---|--------|---------|------------------|--------------------|--------------------|
| Regional Transit Service | \$1.00 | \$1.00 | \$1.00 | Free | \$0.50 |
| Batavia Bus Service | | | | | |
| Intracommunity | \$1.00 | \$0.50 | \$0.50 | Free | \$0.50 |
| Intercommunity | \$3.00 | \$1.50 | \$1.50 | Free | \$0.50 |
| Livingston Area Transportation Service | | | | | |
| Intracommunity | \$1.00 | \$0.50 | \$0.50 | Free | \$0.50 |
| Intercommunity | \$2.00 | \$1.00 | \$1.00 | Free | \$1.00 |
| County Area Transit System | \$1.00 | \$0.50 | \$0.50 | Free | \$1.00 |
| Orleans Transit Service | | | | | |
| Intracommunity | \$1.00 | \$0.50 | \$0.50 | Free | \$0.50 |
| Intercommunity | \$3.00 | \$1.50 | \$1.50 | Free | \$1.50 |
| Wayne Area Transportation Service | \$1.00 | \$0.50 | \$0.50 | Free | \$0.50 |

5. Other key assumptions - Travel estimates for roadways outside the Rochester TMA

As noted on Page 1, Monroe County and portions of Livingston, Ontario, and Wayne Counties are within the Rochester TMA. NYSDOT is responsible for estimating emissions in Genesee and Orleans Counties, and the portions of Livingston, Ontario, and Wayne Counties outside the Rochester TMA (i.e., the "donut area"). To perform a regional emissions analysis for this five county "donut area," the most recent Highway Performance Monitoring System (HPMS) estimates of Daily Vehicle Miles Traveled (DVMT) developed in 2009 and speed estimates for the "donut area" counties used in the New York SIP for air quality were utilized. The methodology for estimating emissions in the "donut area" is described in Appendix D.

The analysis and horizon years must be defined

Analysis years were defined based on the most recent conformity guidance. The base, analysis, and horizon years for the emissions analysis are:

- 2002 – Base year required by current federal conformity regulation

- 2015 – Intermediate year not more than five years beyond the year in which the determination is being made (2011)
- 2025 – Intermediate year not more than 10 years prior to last year of the *L RTP 2035*
- 2035 – Last year of *L RTP 2035* (Horizon Year)

The action scenario must be defined

All projects in the *2011-2014 TIP*, City of Rochester, Monroe County, RGRTA, and Ontario County Capital Improvement Programs, and those resulting from outreach to the Highway Departments in Livingston, Ontario, and Wayne counties that could be accommodated in the modeling process were included in the GTC travel demand model “build” conformity analysis scenarios. The scenarios, therefore, include not only the effects of the non-exempt and regionally significant projects but also a number of exempt projects that could be modeled and that produce system changes.

The inclusion of TIP projects in an analysis year travel demand model was based on the expected year of their completion (i.e., a project scheduled for completion in 2014, for example, is included in the 2015, 2025, and 2035 models).

Regional Emissions Analysis

Latest Emissions Model

In order to conduct the required regional emissions analyses for the Rochester Nonattainment Area, emission factor tables developed by the NYSDOT-ESB were used. The emission factors were generated using the EPA motor vehicle emissions model, MOBILE6.2. The modeling inputs and parameters used to develop the emission factor tables are the most recent inputs for Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne Counties established in consultation with NYSDEC and the ICG. Specific modeling inputs and parameters used to develop these emission factor tables are described below:

Evaluation Month - The month of July (i.e., summertime conditions) was specified in the VOC and NOx emission factor input files.

Vehicle Registration Distribution – Year 2002 registration data were used to model the 2002 base year. Year 2007 registration data were used to model all future analysis years.

Vehicle Mileage Accumulation Rate – The EPA default mileage accumulation rate data (provided with the MOBILE6.2 model) were used for all analysis years.

I/M Programs – NYSDEC inspection and maintenance (I/M) program data were used in the emission modeling. The NYSDEC file, NYVIPup.d, contains data for the Upstate New York I/M program. This file was used for modeling all future analysis years. No I/M program was in place in the Rochester Nonattainment Area in the 2002 base year.

Anti-Tampering Program – The anti-tampering program data described in the table below was used to model all analysis years:

| Anti-Tampering Program Data | |
|--|---------------------------------------|
| Parameter | Years 2002 – 2035 |
| Beginning calendar year | 1984 |
| Earliest model year | (Current yr – 25 yrs) |
| Final model year | (Current yr – 2 yrs) |
| Light-duty vehicles subject to inspection | LDGV, LDGT1, LDGT2, LDGT3, LDGT4 |
| Heavy-duty vehicles subject to inspection | HDGV2B, HDGV3, HDGV4 |
| Annual or biennial | Annual |
| Compliance rate | 98% |
| Component inspections (see MOBILE6.2 User's Guide) | All except tailpipe lead deposit test |

Fuel Program and Fuel RVP – Average and maximum fuel sulfur levels and fuel Reid Vapor Pressure (RVP) levels as provided by NYSDEC in Spring 2009 were specified in the input files (as listed in the below).

| Fuel Sulfur and RVP Levels | | | | |
|---|--------|--------------------------|---------|-----------|
| Genesee, Livingston, Monroe, Ontario, Orleans and Wayne Counties | | | | |
| Year(s) | Season | Fuel Sulfur Levels (ppm) | | RVP (psi) |
| | | Average | Maximum | |
| 2002 | Summer | 297.0 | 1000.0 | 8.3 |
| | Winter | 293.0 | 1000.0 | 12.1 |
| 2015, 2025, 2035 | Summer | 30.0 | 80.0 | 8.6 |
| | Winter | 30.0 | 80.0 | 12.5 |

Gasoline fuel oxygenate data were also specified in the input files (as listed in the Table below).

| Gasoline Fuel Oxygenate Data | | | | |
|---|---------------|----------------|---------------------------------|------------------------------------|
| Genesee, Livingston, Monroe, Ontario, Orleans and Wayne Counties | | | | |
| Year(s) | Season | Oxygenate Type | Oxygenate Content (% by volume) | Market Share Fraction of Oxygenate |
| 2002 | Summer | MTBE | 1.74% | 1.00 |
| | Winter | MTBE | 1.37% | 1.00 |
| 2015, 2025, 2035 | Summer/Winter | Ethanol | 5% | 1.00 |

Temperature and Humidity – For the summer season, county-specific hourly temperatures and relative humidity levels as verified by NYSDEC in Spring 2009 were used in the modeling.

Diesel Sale Fractions – Diesel sale fractions for NYSDOT-Region 4 were used in the modeling. Year 2002 diesel fractions were used to model the 2002 base year. Year 2007 diesel sale fractions were used to model all future analysis years.

Vehicle Start Distribution – County-specific vehicle start distribution data as received from NYSDEC in Spring 2009 were used in the modeling.

VMT by Hour – County-specific VMT data (allocated by hour of day) as verified by NYSDEC in Spring 2009 were used in the modeling.

Low-Emission Vehicle (LEV) Standards – The following files were used to model the effects of implementing California’s LEV I/LEV II programs in New York State:

- L2CERT.d – Specifies the LEV II 50,000-mile certification standards
- L2EVAP.d – Specifies the phase-in schedule for the LEV II evaporative emission standards
- L2EXH.d – Specifies the phase-in schedule for the LEV II exhaust emission standards
- LEV2.d – Provides fleet penetration fractions for light-duty gasoline vehicles under the LEV I/LEV II programs

Weighted emissions by vehicle type – The emission factors for each individual vehicle type were weighted according to the NYSDOT-Region 4 vehicle distributions by roadway functional class and then summed to obtain composite emission factors. NYSDOT developed the vehicle distribution data in 2004 using the most recently available traffic count data.

These model inputs include the latest existing and future emissions control programs included in NYSDEC’s statewide mobile source emission inventory, and the latest MOBILE6.2 input assumptions for the existing and future vehicle fleets traveling on roadways in the GTC and NYSDOT-Region 4 planning area. The MOBILE6.2 input and external data files are available by contacting the NYSDOT-ESB.

GTC staff applied the emissions factors for VOC and NO_x to data from its travel demand model in a spreadsheet-based post-processor. The emissions post-processor applies MOBILE6.2 emissions factors for VOC and NO_x to links within the travel demand model scenarios based on each link’s vehicle miles traveled (VMT) and congested speed. The link-specific results are then summed to arrive at totals for the Rochester TMA.

Model VMT for 2007 (total and by roadway classification) was compared to Highway Performance Monitoring System (HPMS) VMT estimates for 2007 for the Rochester Urbanized Area (see Page 17 of Appendix B). In light of the reasonable proximity of the model VMT to the HPMS VMT estimates, GTC staff concluded that it was not necessary to use any adjustment factors to increase VMT on local roads or include any off-model VMT in the analysis.

The non-exempt projects included in the scenarios (along with a description of the individual project) are:

- PIN 439023: I-390 Interchange Improvements @ Rt. 15 (Exit 16 Part 2)
Reconfigure ramps, intersections, and service roads to address safety and operational issues. Add a slip ramp from Route 15 northbound to I-390 northbound and eliminate existing left turn from Route 15 northbound to I-390 northbound.
- PIN 475377: Westfall Road Reconstruction III
Reconstruct an approximately 1.2 mile section of Westfall Road from East Henrietta Road to Lac de Ville Blvd., including widening to three lanes (continuous two way left turn lane). Additional turn lanes will be considered at the Westfall Road and South Clinton Avenue intersection. Bike space and sidewalks will be planned into the improvements.
- PIN 475415: John Street Extension
Construct an approximately 0.5 mile extension of John Street from its current terminus to Lehigh Station Road to improve connectivity, circulation, and access to I-390. Currently, traffic (including many trucks) from the business park area served by John Street is required to make extensively circuitous trips along primarily residential roads to access I-390 and the NYS Thruway.

Two non-exempt projects were not included in the travel demand model scenarios. The non-exempt projects not included in the scenarios (along with a description of the individual project and why it is not included in the scenarios) are:

- PIN 482073: Renaissance Square Transit Center (formerly Downtown Transit Center)
Construct a bus terminal in downtown Rochester to replace the existing outdoor, on-street transit transfer facility. This project was not included because there is no evidence that emissions from buses will change at the project site since the number of buses that currently queue along the street at the project site will not be increased and the route structures these buses serve will be essentially the same.

The same conclusion was reached as part of the National Environmental Protection Act – Environmental Assessment/State Environmental Quality Review Act – Draft Environmental Impact Statement for the Rochester Central Station and the Draft Renaissance Square Environmental Assessment and Section 4(f) Evaluation – the predecessors to the Downtown Transit Center – both of which included the same transit component.

- PIN 475424: Paul Road-Fisher Road Corridor Improvements
Extend Jetview Drive approximately 0.5 miles from its current terminus to connect to Wegmans Market Street. Reconstruct the intersection of Paul Road/Jetview Drive/International Drive in accordance with a NYSDOT-issued State Highway Work Permit. The reconstruction will include widening Paul Road approximately 800 feet in each direction to accommodate a westbound right-turn lane from Paul Road to Jetview Drive and dedicated left-turn lanes in each direction, widening approximately 250 feet of

Jetview Drive to accommodate a left-turn lane onto Paul Road and widening approximately 100 feet of International Drive to accommodate a left-turn lane onto Paul Road. Improve the turning radii at all four corners of the intersection and install a traffic signal to control all four legs of the intersection. Rehabilitate pavement (mill & fill) on Beahan Road from Chili Avenue to Paul Road, Paul Road from Chili Avenue to King Road, and King Road from Paul Road to Union Street. Review the intersection of Paul Road, and Archer Road to determine if improvements are needed.

Currently, Jetview Drive is not included in the GTC Travel Demand Model because it is a local road serving an industrial park. Fisher Road (also a local road) which runs parallel to the proposed Jetview Drive extension is in the model. For the purposes of regional travel demand modeling and conformity analyses, Fisher Road serves as a reasonable surrogate for the proposed Jetview Drive connection. The VMT (including trucks) for Fisher Road as it is currently modeled is equivalent to the total VMT expected for both Fisher Road and Jetview Drive once a connection is constructed. Accordingly, this project was not included in the travel demand model scenarios.

Please note: there is one non-exempt project outside of the Rochester TMA which is not covered by the GTC travel demand model.

- PIN 475556: Geneva City-wide Traffic Signal Optimization
Replace the obsolete traffic control system in the City of Geneva with a modern traffic control system. The system will include optimization of 16 signalized intersections.

Identification of projects analyzed with an "off-model" process

The air quality impact of the Geneva City-wide Traffic Signal Optimization project (PIN 475556) is accounted for with an "off-model" process (as noted in Appendix D). Traffic volumes on the affected roadways in the project area were based on local and State ground counts collected between the years 2005 and 2009. These volumes were multiplied by the distance of each affected roadway link and a seasonal adjustment factor of 1.12 was applied to estimate DVMT in the project area during the summer ozone season.

Annual traffic growth rates of 0.5% and 1.1% for arterials and collectors, respectively, consistent with growth rates in the State Implementation Plan for the Rochester Area, were applied to the DVMT estimates in future analysis years 2015, 2025, and 2035. "Build" and "no-build" condition speed estimates from the TIP Project Application Form and corresponding emission factors in the NYSDOT MOBILE6.2 Emission Factor Tables dated April 2008 were used to estimate the emission impact of the project. The results of these calculations were incorporated into the "build" condition emissions estimate for the Rochester "donut area."

At its meeting on April 21, 2010, the ICG concurred that this analysis approach is acceptable to capture the impact of PIN 475556 in the regional emissions analysis.

As described in Appendix D, VMT and VMT growth are accounted for in the donut area outside the Rochester TMA by using HPMS data.

Regional Emissions Test

The official interim emissions test used to determine conformity for the *LRTP 2035* and *2011-2014 TIP* is the "Build less than 2002" emission test (i.e., the emissions resulting from implementing the *LRTP 2035* and *2011-2014 TIP* are not greater than the emissions resulting in 2002).

Figure 3

Daily Emissions Resulting from Implementation of the *LRTP 2035 and 2011-2014 TIP*

| Analysis Year | Volatile Organic Compounds (VOC) in Kilograms per Day | Oxides of Nitrogen (NOx) in Kilograms per Day |
|---------------|---|---|
| 2002 | 39,888 | 61,575 |
| 2015 | 12,556 | 17,053 |
| 2025 | 7,556 | 8,268 |
| 2035 | 7,788 | 6,223 |

Based on the analysis summarized in Figure 3, the implementation of the *LRTP 2035* and *2011-2014 TIP* (the "build" scenario) will result in lower emissions of VOCs and NOx than in 2002.

Public Review

This document was made available for public review from Monday, April 25, 2011 to Tuesday, May 24, 2011. A public meeting was held at Rochester City Hall – Room 208A, 30 Church Street, Rochester on Tuesday, May 3, 2011 at 6:00 p.m. to discuss the conformity determination and gather input from the public. The public review period and meeting were advertised via a legal notice in the Rochester *Democrat & Chronicle* and on the GTC website. GTC did not receive any comments on the draft document.

Statement of Conformity

The analysis documented above demonstrates that the *LRTP 2035* and *2011-2014 TIP* in the Rochester Nonattainment Area is in conformity with the rules and regulations established by EPA and NYSDEC, and as such the State Implementation Plan (SIP). This statement was adopted via Resolution 11-52, which was passed by the Genesee Transportation Council Board on June 16, 2011. A copy of Resolution 11-52 is included in the beginning of this document.

Appendix A

Exempt/Non-Exempt Status of Projects

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|----------|--|
| Rt. 5 Bridges over Honeoye Creek | B11-01-LV1 | 400535 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 5 Bridge over NFSRR | B11-02-ON2 | 400555.1 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Routes 5 & 20 in Geneva | H11-01-ON2 | 400555.2 | A.10. - Pavement resurfacing and/or rehabilitation |
| Geneva Park & Ride, Intersection of Rt. 14 and the Thruway | O07-06-ON2 | 401437 | C.1. - Continuation of ride-sharing and van-pooling promotion activities at current levels |
| Rt. 18 over Moorman Creek Reconstruction | B07-06-MN1 | 401801 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Route 19 in the Village of Brockport | H01-12-MN1 | 401917 | A.10. - Pavement resurfacing and/or rehabilitation |
| Rt. 19 Bridge over Wiscoy Creek | B11-03-WY2 | 401943 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Bethany Center Road Bridge over Rt. 20 | B11-04-GN2 | 402010 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 20 over Montague Creek Reconstruction | B07-33-LV2 | 402037 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| NYS Route 20 at Genesee County Road 35 (East Rd.) | H07-74-GN2 | 402060 | A.6. - Highway Safety Improvement Program implementation |
| Route 31 Reconstruction, Stage 3 | H99-41COR2 | 403152 | A.10. - Pavement resurfacing and/or rehabilitation |
| Rt. 33 (Buffalo Rd) and Howard Rd (Rt. 940L) Improvements | H07-03-MN1 | 403302 | A.6. - Highway Safety Improvement Program implementation |
| Rt. 33 Bridge over CSX (Main Line) | B11-05-MN1 | 403339 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Rt. 33A Bridge over Black Creek | B11-06-MN1 | 403340 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 36 over Genesee River Rehabilitation | B07-35-LV2 | 403610 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Route 36 Bridge over Rock Spring Creek Reconstruction | B07-36-LV2 | 403612 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 39 bridges over Wiscoy Creek & Tributary Reconstruction | B07-37-WY2 | 403940 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 64 over Irondequoit Creek Reconstruction | B07-07-MN1 | 406408 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 65 Bridge over Westshore Line of CSX RR | B11-07-MN1 | 406515 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Route 78 Bridge over Cattaraugus Creek Reconstruction | B07-38-WY2 | 407810 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 98 at Genesee Rd. in Wyoming County | H11-10-WY2 | 409844 | A.6. - Highway Safety Improvement Program implementation |
| Rt. 104 Bridge over Irondequoit Bay Preventive Maintenance | B11-08-MN1 | 410443 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 251 Rehabilitation | H07-04-ON1 | 425105 | A.10. - Pavement resurfacing and/or rehabilitation |
| Rt. 390 Multi-Use Trail - Canalway Trail to the 390 Bike Path at Rt. 104 | N07-02-MN1 | 439008 | C.2. - Bicycle and pedestrian facilities |
| Route 390 @ I-490 Interchange Improvements | H96-02BMN | 439013 | C.7. - Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| I-390 Rest Areas | O07-07-LV2 | 439016 | A.15. - Safety roadside rest areas |
| I-390 Interchange Improvements @ Rt. 15A (Exit 16 Part 1) | H01-10-MN1 | 439017 | D.3. - Interchange reconfiguration projects |
| I-390 Interchange Improvements @ Rt. 15 (Exit 16 Part 2) | H01-10BMN | 439023 | Non-Exempt |
| Rt. 390 Ramp Bridge over Rts. 104 and 390 Reconstruction | B07-08-MN1 | 439045 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| I-390 Concrete Pavement Restoration in Rush and Henrietta | H05-05AR41 | 439049 | A.10. - Pavement resurfacing and/or rehabilitation |
| I-390 Interchange @ East River Rd. (Exit 16A Stage 3 of 4) | H11-14-MN1 | 439059 | Non-Exempt |
| I-390 Bridges over Genesee Park Preventive Maintenance | B11-56-MN1 | 439064 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 414 from Canal to Rt. 31 & Rt. 31 from Rt. 414 to the west Village line | H07-41-WA2 | 441407 | A.10. - Pavement resurfacing and/or rehabilitation |
| I-490 Ramp to Rt 96 Bridge over I-490 Reconstruction | B07-09-MN1 | 449011 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| I-490 Bridge over Marsh Road | B11-09-MN1 | 449033 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| I-490 Bridges over CSX (West Shore Line) | B11-10-MN1 | 449034 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Route 531 Extension Project (Rt 36 to Brockport) | H03-38-MN1 | 453105 | C.7. - Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| I-590 Interchange at Winton Road | H01-07-MN1 | 459007 | D.3. - Interchange reconfiguration projects |
| Rt. 590 Bridges over Rt. 941V (Blossom Rd.) | B11-11-MN1 | 459010 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 590 Rehabilitation (Norton St. to Titus Ave.) | H07-06-MN1 | 459014 | A.10. - Pavement resurfacing and/or rehabilitation |
| Rt. 590 Bridges over Rt. 286 (Browncroft Blvd.) | B11-12-MN1 | 459016 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Clarendon Street Bridge over Falls Road Railroad | B11-13-OR2 | 475285 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Broad Street Tunnel - East Approach/Aqueduct | B99-22-MN1 | 475286 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| East Ridge Road Rehabilitation | H03-01-MN1 | 475359 | A.10. - Pavement resurfacing and/or rehabilitation |
| Mount Hope Avenue Reconstruction - Phase 1 | H03-03-MN1 | 475361 | A.10. - Pavement resurfacing and/or rehabilitation |
| Port of Rochester Security/ITS Project | O03-03-MN1 | 475374 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| Westfall Road Reconstruction III (E. Henrietta Rd - Lac de Ville Blvd) | H05-02-MN1 | 475377 | Non-Exempt |
| Lincoln Road Reconstruction | H05-03-MN1 | 475378 | A.10. - Pavement resurfacing and/or rehabilitation |
| Dorsey Road Reconstruction | H05-04-MN1 | 475379 | A.10. - Pavement resurfacing and/or rehabilitation |
| O'Connor Road Realignment | H05-06-MN1 | 475380 | A.5. - Increasing sight distance |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| Ridgeway Avenue Improvements | H05-07-MN1 | 475381 | A.10. - Pavement resurfacing and/or rehabilitation |
| Wildcat Road Bridge over Wildcat Gully | B05-19-LV2 | 475386 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Swanson Road Bridge over Buck Run Creek | B05-20-LV2 | 475387 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Edgemere Drive Bridge over Round Pond Outlet | B05-04-MN1 | 475391 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Union Street Bridge over Black Creek | B05-05-MN1 | 475392 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Kirk Road Bridge over Round Pond Creek | B05-07-MN1 | 475394 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Union Street Bridge Rehabilitation | B05-09-MN1 | 475396 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Peck Road Bridge over Salmon Creek | B05-11-MN1 | 475398 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Ferguson Road Bridge over Flint Creek | B05-22-ON2 | 475401 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Oak Orchard Road Bridge over Manning Muckland Creek | B05-24-OR2 | 475403 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Alderman Road Bridge | B05-14-WA1 | 475404 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| West Street Bridge over Cattaraugus Creek | B05-26-WY2 | 475406 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Straub Road over Round Pond Creek | B05-15-MN1 | 475407 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|---|
| Highland Park / Canalway Connector Trail | N05-01-MN1 | 475408 | C.2. - Bicycle and pedestrian facilities |
| Canandaigua Downtown Rail-with-Trail | N05-02-ON1 | 475409 | C.2. - Bicycle and pedestrian facilities |
| Genesee River Trail / Plymouth Avenue Greenway Connector | N05-03-MN1 | 475410 | C.2. - Bicycle and pedestrian facilities |
| Jefferson Avenue, Ayrault Road to Route 31F | H03-43-MN1 | 475413 | A.10. - Pavement resurfacing and/or rehabilitation |
| Mill Road II | H03-42-MN1 | 475414 | A.10. - Pavement resurfacing and/or rehabilitation |
| John Street Extension, Bailey Rd. to Lehigh Station Rd. | H05-15-MN1 | 475415 | Non-Exempt |
| Erie Canal Warehouse Rehabilitation | O05-05-WA2 | 475421 | C.14. - Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities) |
| Paul Road/Fisher Road Improvements | H05-24-MN1 | 475424 | Non-Exempt |
| Erie Station Road Reconstruction | H05-21-MN1 | 475425 | A.10. - Pavement resurfacing and/or rehabilitation |
| Lyell Avenue (Union Street to Village line) | H05-19-MN1 | 475426 | A.10. - Pavement resurfacing and/or rehabilitation |
| Construct Wayne County, NY Rails to Trails Initiative | N07-08-WA2 | 475427 | C.2. - Bicycle and pedestrian facilities |
| Long Pond Road Reconstruction | H05-20-MN1 | 475428 | A.10. - Pavement resurfacing and/or rehabilitation |
| Portland Ave. Reconstruction (City Line to Titus Ave.) | H05-22-MN1 | 475429 | A.10. - Pavement resurfacing and/or rehabilitation |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Creager Island Bridge Replacement | B05-32-WA2 | 475431 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Summit Street Reconstruction | H07-37-GN2 | 475436 | A.10. - Pavement resurfacing and/or rehabilitation |
| Cedar Street Reconstruction | H07-38-GN2 | 475437 | A.10. - Pavement resurfacing and/or rehabilitation |
| Lake Avenue Improvements | H07-08-MN1 | 475438 | A.10. - Pavement resurfacing and/or rehabilitation |
| North Winton Road Improvements | H07-09-MN1 | 475439 | A.10. - Pavement resurfacing and/or rehabilitation |
| Genesee Riverway Trail - Corn Hill Landing to Lower Falls Park Section | N07-03-MN1 | 475441 | C.2. - Bicycle and pedestrian facilities |
| Inner Loop/Sidewalk ADA-Accessible Ramps & Other Arterial Sidewalks | N07-04-MN1 | 475442 | C.2. - Bicycle and pedestrian facilities |
| Genesee Riverway Trail Neighborhood Connectors | N07-05-MN1 | 475443 | C.2. - Bicycle and pedestrian facilities |
| Rochester Bicycle Enhancement Program | N07-06-MN1 | 475444 | C.2. - Bicycle and pedestrian facilities |
| Rochester Plug-in Hybrid Vehicle Charging Stations/Vehicle Expansion Project | O07-04-MN1 | 475446 | B.2. - Purchase of support vehicles |
| Rochester DES Automated Vehicle Locator/Weather Sensor ITS Project | I07-01-MN1 | 475447 | B.5. - Purchase of operating equipment for vehicles (ie: radios, fareboxes, lifts, etc.) |
| Dewey Avenue Preventive Maintenance | H07-24-MN1 | 475448 | A.10. - Pavement resurfacing and/or rehabilitation |
| Otis Street Preventive Maintenance | H07-25-MN1 | 475449 | A.10. - Pavement resurfacing and/or rehabilitation |
| University Avenue Preventive Maintenance | H07-27-MN1 | 475450 | A.10. - Pavement resurfacing and/or rehabilitation |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| South Avenue Preventive Maintenance | H07-29-MN1 | 475451 | A.10. - Pavement resurfacing and/or rehabilitation |
| Genesee Street Preventive Maintenance | H07-30-MN1 | 475452 | A.10. - Pavement resurfacing and/or rehabilitation |
| Northland Avenue Preventive Maintenance | H07-31-MN1 | 475453 | A.10. - Pavement resurfacing and/or rehabilitation |
| Plymouth Avenue Preventive Maintenance | H07-33-MN1 | 475455 | A.10. - Pavement resurfacing and/or rehabilitation |
| Buffalo Road Preventive Maintenance | H07-34-MN1 | 475456 | A.10. - Pavement resurfacing and/or rehabilitation |
| Crittenden Boulevard Preventive Maintenance | H07-35-MN1 | 475457 | A.10. - Pavement resurfacing and/or rehabilitation |
| South Clinton Avenue Preventive Maintenance | H07-36-MN1 | 475458 | A.10. - Pavement resurfacing and/or rehabilitation |
| Deploy Ultra-Clean Switcher Locomotives | O07-02-MN1 | 475459 | Not Applicable - Off road project |
| Griswold Road over Black Creek | B07-25-GN2 | 475460 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Black Street over Mud Creek | B07-26-GN2 | 475461 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Hopkins Road over Bowen Creek | B07-27-GN2 | 475462 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| South Lyon Street over Tonawanda Creek | B07-28-GN2 | 475463 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Genesee Region Clean Community CMAQ Outreach & Implementation | O07-05-R43 | 475464 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Old State Road over Keshequa Creek | B07-30-LV2 | 475466 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|--------------|------------|--|
| Maple Beach Hill Road | H07-44-LV2 | 475467 | A.10. - Pavement resurfacing and/or rehabilitation |
| Stone Road Reconstruction | H07-01-MN1 | 475468 | A.10. - Pavement resurfacing and/or rehabilitation |
| Whitney Road Reconstruction | H07-02-MN1 | 475469 | A.10. - Pavement resurfacing and/or rehabilitation |
| Clover Street Preventive Maintenance | H07-11-MN1 | 475470 | A.10. - Pavement resurfacing and/or rehabilitation |
| Pixley Road Preventive Maintenance | H07-13-MN1 | 475471 | A.10. - Pavement resurfacing and/or rehabilitation |
| Lee Road Preventive Maintenance | H07-15-MN1 | 475472 | A.10. - Pavement resurfacing and/or rehabilitation |
| Fetzner Road Preventive Maintenance | H07-16-MN1 | 475473 | A.10. - Pavement resurfacing and/or rehabilitation |
| Vintage Lane Preventive Maintenance (Long Pond Rd. to Rt. 390) | H07-17-MN1 | 475474 | A.10. - Pavement resurfacing and/or rehabilitation |
| Vintage Lane Preventive Maintenance (Rt. 390 to Mt. Read Blvd) | H07-18-MN1 | 475475 | A.10. - Pavement resurfacing and/or rehabilitation |
| Elmwood Avenue Preventive Maintenance | H07-19-MN1 | 475476 | A.10. - Pavement resurfacing and/or rehabilitation |
| Long Pond Road Bridge over Round Pond Creek Rehabilitation | B07-01-MN1 | 475477 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Edgewood Avenue Bridge over Allens Creek Reconstruction | B07-02-MN1 | 475478 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Klem Road Bridge over Mill Creek Tributary Reconstruction | B07-03-MN1 | 475479 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Penfield Road Bridge over Irondequoit Creek Rehabilitation | B07-04-MN1 | 475480 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Twin Bridge Road over Oatka Creek Rehabilitation | B07-05-MN1 | 475481 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Burnt Mill Road Bridge over Black Creek Preventive Maintenance | B07-18-MN1 | 475482 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| County Road 10 Preventive Maintenance | H07-45-ON2 | 475483 | A.10. - Pavement resurfacing and/or rehabilitation |
| County Road 5 Preventive Maintenance | H07-46-ON2 | 475484 | A.10. - Pavement resurfacing and/or rehabilitation |
| Bates Road Reconstruction | H07-42-OR2 | 475485 | A.10. - Pavement resurfacing and/or rehabilitation |
| Park Road Reconstruction | H07-39-GN2 | 475486 | A.10. - Pavement resurfacing and/or rehabilitation |
| Corwin Road Bridge Preventive Maintenance | B07-17-MN1 | 475487 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Collamer Road Bridge over West Creek Reconstruction | B07-13-MN1 | 475488 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Hill Road Bridge over Brockport Creek Reconstruction | B07-14-MN1 | 475489 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Hill Road Bridge over Salmon Creek Reconstruction | B07-15-MN1 | 475490 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Woodsville Road Bridge over Bradner Creek Reconstruction | B07-46-LV2 | 475491 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Erie-Attica Trail to Avon | N07-01-LV1 | 475492 | C.2. - Bicycle and pedestrian facilities |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| Route 88 Reconstruction | H07-40-WA2 | 475494 | A.10. - Pavement resurfacing and/or rehabilitation |
| Scott Crescent Bridge Replacement over Millrace | B07-16-MN1 | 475495 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Arcadia-Zurich-Norris Rd. Bridge (CR #236) over Salmon Creek Reconstruction | B07-45-WA2 | 475497 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Dutch Hollow Road over Glade Creek Replacement | B07-52-WY2 | 475500 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Allen Street over Oatka Creek Reconstruction | B07-47-WY2 | 475501 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Griffith Road over East Koy Creek Reconstruction | B07-48-WY2 | 475502 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Main Street Fishers Bridge over Irondequoit Creek Reconstruction | B07-12-ON1 | 475503 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Old Mill Road Bridge over Flint Creek Reconstruction | B07-43-ON2 | 475504 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Ontario County Bridge Preventive Maintenance (2011) | B07-24-ON3 | 475505 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Multi-Agency Green Fueling Stations Project | O07-01-MN1 | 475506 | B.8. - Reconstruction or renovation of transit buildings & structures (ie: rail or bus buildings, storage & maintenance facilities, stations, terminals, ancillary structures) |
| County Road 10 & County Road 46 Intersection Improvement | H07-07-ON1 | 475507 | D.1. - Intersection channelization projects |
| Panorama Trail Preventive Maintenance | H07-14-MN1 | 475508 | A.10. - Pavement resurfacing and/or rehabilitation |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|---|
| South Winton Road Preventive Maintenance | H07-12-MN1 | 475509 | A.10. - Pavement resurfacing and/or rehabilitation |
| Union Street Preventive Maintenance | H07-26-MN1 | 475510 | A.10. - Pavement resurfacing and/or rehabilitation |
| Ontario County Bridge Preventive Maintenance (2012) | B07-22-ON1 | 475514 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Jefferson Avenue Preventive Maintenance | H07-28-MN1 | 475515 | A.10. - Pavement resurfacing and/or rehabilitation |
| Construction/Enhancement of Motts Lane | H07-67-MN1 | 475517 | A.6. - Highway Safety Improvement Program implementation |
| Calkins/Mendon Center Road Corridor Improvements | H07-67-MN1 | 475521 | C.2. - Bicycle and pedestrian facilities |
| Jefferson Avenue Rehabilitation Project | H07-72-MN1 | 475524 | C.14. - Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities) |
| Midtown Redevelopment Transportation Infrastructure Improvements | H07-73-MN1 | 475525 | D.1. - Intersection channelization projects |
| Monroe County Bridge Preventive Maintenance Projects | B11-15-MN1 | 475526 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Ontario County 2013 Bridge Preventive Maintenance | B11-16-ON3 | 475527 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Ontario County 2014 Bridge Preventive Maintenance | B11-17-ON3 | 475528 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Route 279 over Oak Orchard Creek Preventive Maintenance | B11-18-OR2 | 475529 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Driving Park Avenue Bridge over Genesee River Preventive Maintenance | B11-19-MN1 | 475530 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Wyoming County Bridge Preventive Maintenance | B11-20-WY2 | 475531 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Elmwood Avenue Bridge Rehabilitation | B11-21-MN1 | 475532 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Walnut Street Bridge over Keshequa Creek | B11-22-LV2 | 475533 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Monroe-Orleans County Line Road over East Branch Sandy Creek | B11-23-OR2 | 475534 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Noble Road Bridge over Black Creek | B11-24-WA2 | 475535 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Yellow Mills Road Bridge over Ganargua Creek | B11-25-WA1 | 475536 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Allen Padgham Road over Ganargua Creek | B11-26-ON1 | 475537 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| BOCES Boulevard Bridge over Thomas Creek | B11-27-MN1 | 475538 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Coldwater Road Bridge over Little Black Creek | B11-28-MN1 | 475539 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Dunlop Road over Oak Orchard Creek | B11-29-OR2 | 475540 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| East Scott Road over Fish Creek | B11-30-OR2 | 475541 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Hulberton Road over West Branch Sandy Creek | B11-31-OR2 | 475542 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Killian Road (CR 32) over Tonawanda Creek | B11-32-GN2 | 475543 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Stroh Road (CR 1) over Tonawanda Creek | B11-33-GN2 | 475544 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Upton Road over Bowen Creek | B11-34-GN2 | 475545 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| C.R. 1 (Dale Road) over Kennedy Gulf | B11-35-WY2 | 475546 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Carton Road over Sandy Creek | B11-36-OR2 | 475547 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Culvert Road over Fish Creek | B11-37-OR2 | 475548 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Faulkner Road Bridge over Canaseraga Creek | B11-38-LV2 | 475549 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Lake-to-Lake Road Bridge over Flint Creek | B11-14-ON2 | 475550 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Main Street Joy Bridge over Salmon Creek | B11-39-WA2 | 475551 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rix Hill Road Bridge over Hemlock Outlet | B11-40-LV2 | 475552 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Sibley Road over Honeoye Creek | B11-41-MN1 | 475553 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Mount Hope Avenue Improvements - Phase 2 | H11-02-MN1 | 475554 | D.4. - Changes in vertical and horizontal alignment |
| Dewey Avenue & Driving Park Intersection Realignment | H11-03-MN1 | 475555 | D.1. - Intersection channelization projects |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| Geneva City-wide Traffic Signal Optimization | I11-01-ON2 | 475556 | Non-Exempt |
| High Street Reconstruction | H07-84-MN1 | 475558 | A.10. - Pavement resurfacing and/or rehabilitation |
| Poags Hole Bridge over Canaseraga Creek Preventive Maintenance | B11-57-LV2 | 475559 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| City of Rochester 2013 Bridge Preventive Maintenance | B11-60-MN1 | 475560 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Wyoming County 2013 Bridge Preventive Maintenance Group 3 | B11-61-WY2 | 475561 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Fowlerville Road over Genesee River Preventive Maintenance | B11-62-LV1 | 475562 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Wyoming County 2013 Bridge Preventive Maintenance Group 2 | B11-63-WY2 | 475563 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Monroe County 2013 Bridge Preventive Maintenance | B11-64-MN1 | 475564 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Monroe County Bridge Rustic Railing Preventive Maintenance | B11-66-MN1 | 475565 | A.9. - Guiderails, median barriers, crash cushions |
| Ontario County 2013 Group 2 Bridge Preventive Maintenance | B11-67-ON3 | 475566 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Church Street Bridge over Keshequa Creek Preventive Maintenance | B11-68-LV2 | 475567 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| DeGroff Road Bridge over Keshequa Creek Preventive Maintenance | B11-69-LV2 | 475568 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|---|
| CR 26 (Bullis Rd.) Bridge over Cayuga Creek Preventive Maintenance | B11-58-WY2 | 475569 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| North Pembroke Road over Tonawanda Creek Preventive Maintenance | B11-71-GN2 | 475570 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Butterhole-Seneca Park Rail Trail Project | N05-05-MN1 | 476033 | C.14. - Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities) |
| Town of Marion Hamlet Connectivity | N07-16-WA2 | 476041 | C.2. - Bicycle and pedestrian facilities |
| Erie Canalway Trail Development (Town of Arcadia) | N07-17-WA2 | 476042 | C.2. - Bicycle and pedestrian facilities |
| Hindsburg and Allens Rd. Canal Bridges | B11-42-OR2 | 480566 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| NYSDOT Bridge Bearing and Pedestal Repair | B11-43-MN1 | 480591 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| NYSDOT Bridge Substructure Repairs | B11-55-R43 | 480620 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| NYSDOT Bridge Bearing Replacements and Pedestal Repairs | B11-59-R43 | 480621 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| NYSDOT Prestressed Concrete Box Beam Bridge Repairs | B11-65-R43 | 480623 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Preventive Maintenance | T97-11-MN1 | 482071 | B.1. - Operating assistance to transit agencies (or entities that provide transit service) |
| Transit Enhancements | T99-01-MN1 | 482072 | C.14. - Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| Renaissance Square Transit Center | T99-02-MN1 | 482073 | Non-Exempt |
| Rochester/Monroe County Traffic Control Center | O94-07-MN1 | 482109 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| Replace 15 RTS Transit Buses (FFY 2010) | T05-02-MN1 | 482149 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Replace 6 Lift Line Buses (FFY 2010) | T05-03-MN1 | 482150 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Technology Initiatives for Driving Excellence (TIDE) | T07-08-MN1 | 482167 | B.6. - Construction or renovation of power, signal, and communications systems (including new systems to inform passengers of transit line schedule + status) |
| Replace 33 Transit Buses (FFY 2012) | T07-02-MN1 | 482168 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Purchase 24 Lift Line Buses (FFY 2012) | T07-01-MN1 | 482172 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Replace 10 Articulated Transit Buses (FY 2012) | T07-03-MN1 | 482173 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Purchase 18 Lift Line Buses (FFY 2013) | T07-04-MN1 | 482174 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Preventive Maintenance (2011) | T11-04-MN1 | 482175 | B.5. - Purchase of operating equipment for vehicles (ie: radios, fareboxes, lifts, etc.) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| Replace 20 RTS Buses (2013) | T11-01-MN1 | 482182 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Replace 20 RTS Buses (2014) | T11-02-MN1 | 482183 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| Replace 4 Lift Line Paratransit Buses | T11-03-MN1 | 482184 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| On-Board Video System Replacements | T11-17-MN1 | 482197 | B.5. - Purchase of operating equipment for vehicles (ie: radios, fareboxes, lifts, etc.) |
| Fluids Management System for RTS & Lift Line | T11-18-MN1 | 482198 | B.4. - Purchase of office, shop, and operating equipment for existing facilities |
| RGRTA Server Virtualization | T11-19-MN1 | 482199 | B.4. - Purchase of office, shop, and operating equipment for existing facilities |
| RGRTA Software for Claims and Workers Compensation | T11-20-MN1 | 482200 | B.4. - Purchase of office, shop, and operating equipment for existing facilities |
| Mt. Hope Station | T07-21-MN1 | 482485 | B.7. - Construction of small passenger shelters and information kiosks |
| Rt. 39 (Main St.) over Norfolk Southern Rail Crossing | H07-56-WY2 | 493284 | A.8. - Railroad/highway crossing warning devices |
| Maple St. over CSX Rail Crossing | H07-54-MN1 | 493347 | A.8. - Railroad/highway crossing warning devices |
| O'Connor Road Railroad Crossing | H07-82-MN1 | 493357 | A.1. - Railroad/highway crossing |
| Wilkinson Road Railroad Crossing (CSX RR) | H11-15-GN2 | 493358 | A.1. - Railroad/highway crossing |
| Evans Road Railroad Crossing (R&S RR) | H11-17-WY2 | 493360 | A.1. - Railroad/highway crossing |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|--|------------|--------|--|
| R&S Highway-Rail Grade Crossing Bypass in Silver Springs | R05-01-WY2 | 493586 | A.1. - Railroad/highway crossing |
| Rochester Amtrak Station Improvements | | 493604 | Not Applicable - Off road project |
| Empire Corridor West - Phase 1 Third Track Initiative | | 493605 | Not Applicable - Off road project |
| Quaker Street Bridge over the Erie Canal Rehabilitation | B07-10-WA1 | 494098 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Canandaigua Road Bridge over the Erie Canal Rehabilitation | B07-11-WA1 | 494099 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Rt. 940L (Howard Rd.) over the Railroad | B11-44-MN1 | 4940L3 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Inner Loop Bridge over Brown's Raceway | B03-02-MN1 | 4940T5 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Inner Loop Scoping Determination | H01-05-MN1 | 4940T7 | C.7. - Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action |
| Rt. 947A (LOSP) Bridge over Salmon Creek | B11-45-MN1 | 494710 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |
| Local Bridge Inspections | B93-52-R43 | 4B1202 | C.3. - Planning and technical studies |
| Underwater Bridge Inspection | B03-14-R43 | 4B1203 | C.3. - Planning and technical studies |
| State Bridge Inspections | B93-51-R43 | 4B1301 | C.3. - Planning and technical studies |
| Highway Bridge Block Program | B11-46-R43 | 4HBP14 | A.19. - Widening narrow pavements or reconstructing bridges (no additional travel lanes) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|------------|--------|--|
| Highway Emergency Local Patrol (HELP) Program | O03-01-MN1 | 4ITS10 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| Intelligent Transportation Systems | O05-03-MN1 | 4ITS13 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| Regional Traffic Operations Center Operations Staffing | I07-02-R43 | 4ITS14 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| ITS Operation | O98-05-R43 | 4ITV05 | A.7. - Traffic control devices and operating assistance other than signalization projects (including ITS maintenance and ITS operations for incident management/safety warnings) |
| RGRTA Site and Facility Improvements | T09-06-MN1 | 4LS085 | B.8. - Reconstruction or renovation of transit buildings & structures (ie: rail or bus buildings, storage & maintenance facilities, stations, terminals, ancillary structures) |
| Conesus Inlet Fish & Wildlife Management Area Trail | N07-19-LV2 | 4RTP01 | C.2. - Bicycle and pedestrian facilities |
| Junction Lock Trailhead and Trail | N07-20-MN1 | 4RTP02 | C.2. - Bicycle and pedestrian facilities |
| Finger Lakes Spur at Grimes Glen County Park | N07-21-ON2 | 4RTP03 | C.2. - Bicycle and pedestrian facilities |
| Highway Safety Improvement Block Program | H11-05-R43 | 4SIP14 | A.2. - Hazard elimination program |
| Campus Loop Road Extension for St. John Fisher College | H07-71-MN1 | 4SJF01 | D.1. - Intersection channelization projects |
| Interstate Overhead Sign Structure Improvement (2010) MbC | H07-78-MN1 | 4T5010 | C.13. - Directional and informational signs (including ITS maintenance and ITS operations projects) |

List of Projects and Exemption Status - GTC TIP Planning Area/NYSDOT Region 4

| Name | TIP # | PIN | Primary Exemption Code |
|---|--------------|------------|--|
| Interstate Overhead Sign Structure Improvement (2011) | H11-04-R43 | 4T5011 | C.13. - Directional and informational signs (including ITS maintenance and ITS operations projects) |
| FTA Section 5310 Blocked Program | T03-07-R43 | FTA 5310 | B.10. - Purchase new buses and rail cars to replace existing vehicles or for minor expansions (<10%) of the fleet. (NOTE: ICG recommends case-by-case consultation for all expansions) |
| FTA Section 5311 Blocked Program | T03-06-R43 | FTA 5311 | B.1. - Operating assistance to transit agencies (or entities that provide transit service) |
| Overhead Sign Structure Inspection | H11-06-R43 | S05529 | C.3. - Planning and technical studies |

Appendix B

GTC Travel Demand Model Validation

GTC Travel Demand Model Validation Document

November 2009

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1 - Introduction

The Genesee Transportation Council (GTC) Travel Demand Model ("the Model") is an integrated transportation demand model developed by Resource Systems Group (RSG) and GTC staff. The model uses a four-step modeling process to estimate the movement of people and vehicles within the region during an average weekday in September 2005. The model platform uses TransCAD, a transportation modeling and GIS package. The transportation model covers all of Monroe County and adjacent towns in Livingston, Ontario, and Wayne counties.

The purpose of this documentation is to describe:

- the structure of the model,
- the data sources and parameter estimations that are the foundation of the model,
- enhancements or changes made to the most recent version of the model, and
- how the model meets the minimum requirements of and responds to the suggested good practices of the New York State Department of Transportation's Environmental Science Bureau (ESB)

2 - Model Overview

The Model was originally developed in 1991 and was enhanced in 1994. New base and future year models were developed in 1998 and updated in 2004 to incorporate 2002 household and employment data as well as updated external and through trip data; however this version of the model was never calibrated. The 2002 model was based on this "updated" 1998 model. A 2005 update produced a PM peak hour model calibrated for the year 2002. This 2002 model utilized the TransCAD software platform (earlier versions ran on the TModel platform). The Interagency Consultation Group (ICG) concurred on June 9, 2006 that this 2002 Model was appropriate for use in GTC's regional emissions analyses.

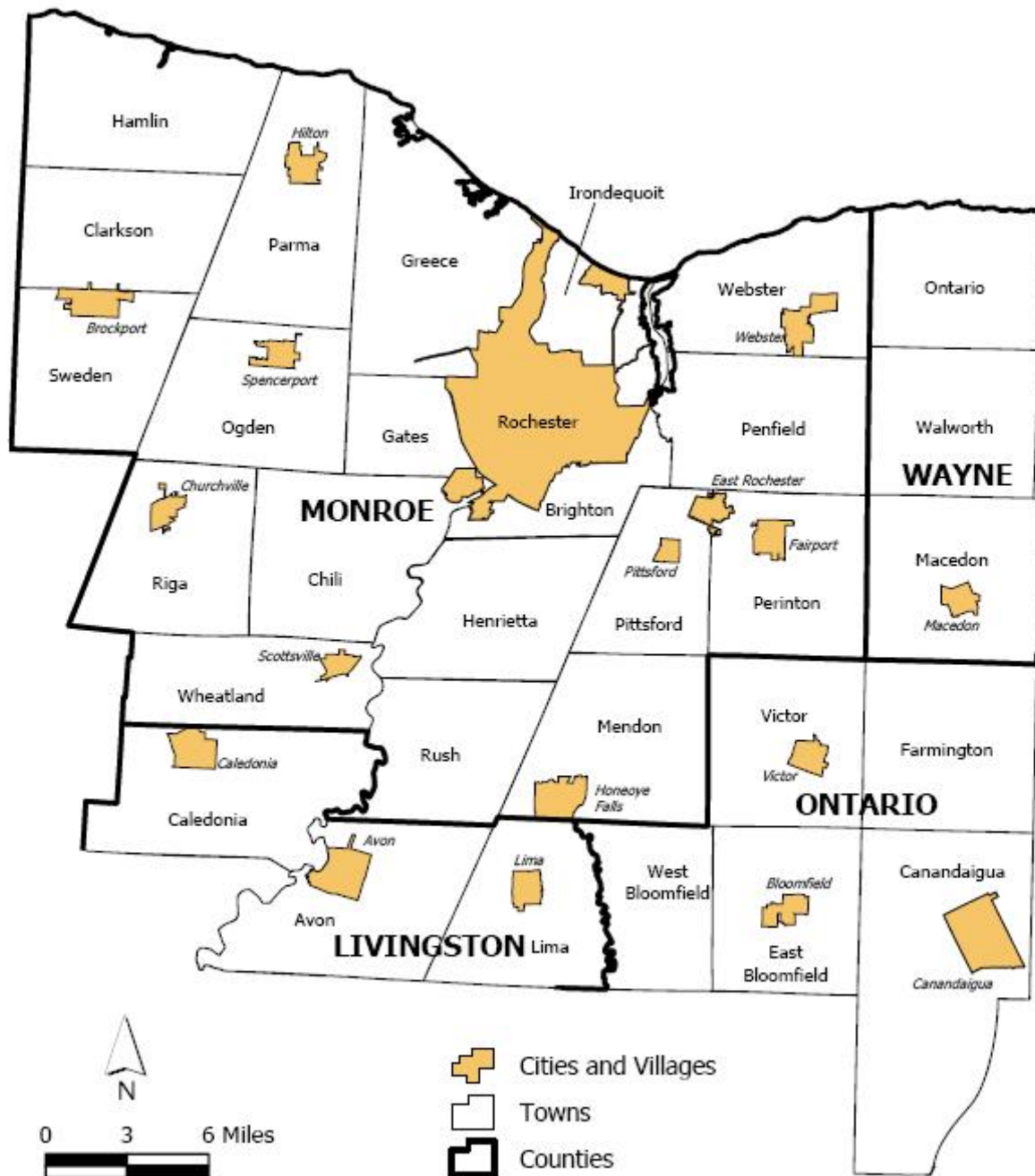
A 2006-07 enhancement further improved the accuracy of the Model and included two major components: 1.) the addition of a Mode Choice module, involving a migration from a vehicle-based model to a person-based model to facilitate the incorporation of non-motorized (i.e., walking or bicycling) and transit trips; and 2.) the addition of an AM peak hour component to complement the existing PM peak hour component to support improved time-of-day analysis.

The primary use of the Model has been the determination of expected changes in travel patterns and roadway performance measures for alternative land use scenarios (future years, new developments, etc.) and/or altered highway networks (new or closed roadways). In addition to this, the model is used to analyze the pollutant emission and energy impacts of transportation alternatives (to respond to air quality conformity requirements¹ and the New York State Energy Plan).

The Model covers all of Monroe County and the adjacent developed areas of Livingston, Ontario, and Wayne counties – an area known as the Rochester Transportation Management Area (TMA). (See Figure 1)

¹ The six county Rochester Metropolitan Statistical Area was classified as a basic non-attainment area for the 1997 8-hour ozone National Ambient Air Quality Standard in April 2004.

Figure 1: Rochester Transportation Management Area (TMA) Map

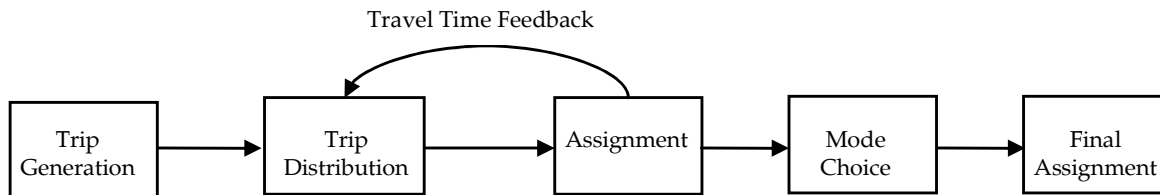


2.1 – Model Structure

The Model is based on a four-step modeling process: trip generation, trip distribution, mode choice, and trip assignment. In the trip generation step, the model uses socio-economic and land use data to calculate the number of person trip ends at the TAZ level. In the trip distribution step, the person trip ends are paired into origins and destinations. In the mode choice step, the person trips are split into each respective mode (personal automobile, public transportation, and walk/bike). In the trip assignment step the Model assigns these trips to the highway network as it is represented in the model.

The Model has an important feedback loop as part of the four-step process (See Figure 2). Travel time between TAZs is an important determinant of how trips are distributed. In order for the trip distribution step to reflect travel times that are representative of congested conditions, outputs from the trip assignment step are fed back into the trip distribution step. The trip distribution and assignment steps are iterated to reach a convergent solution.

Figure 2: Model Structure



2.2 - TAZ System

The area covered by the Model is divided into 584 transportation analysis zones (See Figure 3). TAZs 1 through 530 are internal TAZs, representing areas within the TMA with unique travel characteristics (based on socio-economic homogeneity). TAZs 531 through 550 are “spare” internal TAZs, intended to facilitate the development of alternative scenarios. TAZs 551 through 584 are external TAZs, representing the areas outside of the model area. The internal TAZs were developed to correspond to census tract and block group boundaries (to allow for easier incorporation of census data into the Model).

Figure 3: TAZ Locations

| TAZs | Town | TAZs | Town |
|------------------------------|------------------------|-------------------------|-------------------------|
| 1-96,328,329,338-350,508-514 | City of Rochester | 309,310,475,525 | Town of Ontario |
| 97-116,351-359 | Town of Irondequoit | 311,312,501,502 | Town of Walworth |
| 117-132,360-366,507,515,516 | Town of Webster | 313,314,476,499,500 | Town of Macedon |
| 133-152,367-373,517 | Town of Penfield | | |
| 153-171,330,374-381 | Town of Perinton | 315,316,477,478,526,527 | Town of Farmington |
| 172,173,382,383 | Town of East Rochester | 317,318,479-481 | City of Canandaigua |
| 174-185,331,384-393 | Town of Pittsford | 319,482,483,495-498,528 | Town of Canandaigua |
| 186-203,332,394-406 | Town of Brighton | 320,529 | Town of East Bloomfield |
| 204-216,333-336,407-429 | Town of Henrietta | 321,322,484-494 | Town of Victor |
| 217-224,430-437,518,519 | Town of Chili | 323 | Town of West Bloomfield |
| 225-240,438-444 | Town of Gates | | |
| 241-270,337,445-462 | Town of Greece | 324 | Town of Lima |
| 271-274 | Town of Mendon | 325,326 | Town of Avon |
| 275-278 | Town of Rush | 327,530 | Town of Caledonia |
| 279-282 | Town of Wheatland | | |
| 283-285 | Town of Riga | 531-550 | Spare TAZs |
| 286-291,463-467,520-522 | Town of Ogden | 551-584 | External TAZs |
| 292-297,468,469,523,524 | Town of Parma | | |
| 298-302,470-473,503-506 | Town of Sweden | | |
| 303-305,474 | Town of Clarkson | | |
| 306-308 | Town of Hamlin | | |

2.3 - Model Highway Network

The highway network in the Model includes all principal arterial (interstate, expressway, and other), minor arterial, and collector roadways. Interstates and expressways are coded as one-way pairs. The Model includes a limited number of local roads – most local roads are represented and accounted for in the Model by centroid connectors that link TAZ centroids to the rest of the Model’s roadway network. Nodes in the network represent TAZ centroid loading points, intersections, and ramp connections. The Model contains 5,115 links and 3,387 nodes.

TransCAD uses roadway and intersection (link and node) characteristics to create a transportation network file. The network is used in the trip distribution and trip assignment steps.

Links in the network have the following data associated with them:

1. Number of through travel lanes
2. Design speed (observed speed on Principal Arterials², posted speed on all other roadway types)
3. Length
4. Directionality (one-way or two-way)
5. Capacity
6. Class
 1. Rural Principal Arterial (Interstate)
 2. Rural Principal Arterial (Other)
 3. Rural Minor Arterial
 4. Rural Major Collector
 5. Rural Minor Collector
 6. Rural Local
 7. Urban Principal Arterial (Interstate)
 8. Urban Principal Arterial (Expressway)
 9. Urban Principal Arterial (Other)
 10. Urban Minor Arterial
 11. Urban Collector
 12. Urban Local
 13. Ramp
 14. Internal TAZ Loading Link
 15. External TAZ Loading Link
7. Area
 1. Central Business District (CBD)
 2. Urban (City of Rochester)
 3. Suburban (remainder of the urbanized area)
 4. Rural
 5. External

The Class and Area data are used when assigning per lane mid-block capacities to each of the links in the Model. The Area data is used to distinguish the characteristics of the roadways in the five area types (e.g., the number of side streets, curb cuts, turning lanes, and provision of on-street parking) – the different characteristics are reflected in the link capacities assigned to classes of roadways (See Table 1).

² See section 10.1b for an explanation of observed speeds used in the model.

Table 1: Link Capacity (capacity per lane per hour)

| Class | Area | | | |
|--|----------|------------------|--------------------|--------------------|
| | 1 CBD | 2 Urban | 3 Suburb. | 4,5 Rural, Ext. |
| 1 Rural Principal Arterial (Interstate) | -- | -- | -- | 1,800 |
| 2 Rural Principal Arterial (Other) | -- | -- | -- | 1,100 |
| 6 Rural Minor Arterial | -- | -- | -- | 1,000 |
| 7 Rural Major Collector | -- | -- | -- | 1,000 |
| 8 Rural Minor Collector | -- | -- | -- | 1,000 |
| 9 Rural Local | -- | -- | -- | 800 |
| 11 Urban Principal Arterial (Interstate) | 1,800 | 1,800 | 1,800 | -- |
| 12 Urban Principal Arterial (Expressway) | 1,800 | 1,800 | 1,800 | -- |
| 14 Urban Principal Arterial (Other) | 800 | 1,000 | 1,000 | -- |
| 16 Urban Minor Arterial | 800 | 900 ¹ | 1,000 ² | -- |
| 17 Urban Collector | 700 | 800 | 900 | -- |
| 19 Urban Local | 700 | 700 | 800 | -- |
| 21 Ramp | 1,000 | 1,200 | 1,200 | 1,200 |

Notes:

- 1) Change to 1,000 for links with center turn lane or median
- 2) Change to 900 for links without a center turn lane

The Model also incorporates turn prohibitions. A turn penalty file contains information on prohibited turning movements and blocks vehicles from making such turns during trip distribution and trip assignment. Most of the turn prohibitions are found in the Rochester Central Business District. Some movements through centroid nodes are also prohibited (to eliminate the use of centroid connectors as "short cuts").

2.4 – Model Time Period

The Model is intended to capture an average 24-hour day of traffic in the TMA. A mid-week day (Tuesday, Wednesday, and Thursday) in the month of September was chosen as the "average" day. September was chosen because it is a time of the year when elementary and secondary schools as well as colleges and universities are in session and there is still some seasonal (summer) traffic.

3 – Trip Generation

The trip generation module estimates person trips produced in and attracted to each Transportation Analysis Zone (TAZ) in the Model. The estimates of person trips result from multiplying the land use data for each TAZ (employment by type and number of households stratified by vehicle ownership levels) by regional trip generation coefficients (rates at which different levels of land use activity generate trips).

To allow for easy modification of trip generation data, equations, and parameters and the extraction of useful information (such as the balancing rate between productions and attractions), the trip generation calculations are implemented within TransCAD.

3.1 – Land Use (Socio-economic) Data

The Model uses three basic types of socio-economic data: households, vehicle ownership, and employment. These are further stratified into the land use categories listed below:

- LU1 – Number of households of size 1, with zero vehicles
- LU2 – Number of households of size 1, with one vehicle
- LU3 – Number of households of size 1, with two vehicles
- LU4 – Number of households of size 1, with three or more vehicles
- LU5 – Number of households of size 2, with zero vehicles
- LU6 – Number of households of size 2, with one vehicle
- LU7 – Number of households of size 2, with two vehicles
- LU8 – Number of households of size 2, with three or more vehicles
- LU9 – Number of households of size 3, with zero vehicles
- LU10 – Number of households of size 3, with one vehicle
- LU11 – Number of households of size 3, with two vehicles
- LU12 – Number of households of size 3, with three or more vehicles
- LU13 – Number of households of size 4 or more, with zero vehicles
- LU14 – Number of households of size 4 or more, with one vehicle
- LU15 – Number of households of size 4 or more, with two vehicles
- LU16 – Number of households of size 4 or more, with three or more vehicles

- LU17 – Retail employment
- LU18 – Manufacturing employment
- LU19 – Education, Health, & Social Services employment
- LU20 – Other employment

Socio-economic data for the Model and for future year models were developed by the Genesee/Finger Lakes Regional Planning Council and GTC staff. (See Appendix A for descriptions of the projection methodologies.)

3.2 – Trip Types

Four main trip types are used in the Model (to permit distinction between the trip length characteristics of the different types of trips that people make). The four trip types are:

- Trip Type 1 – Home-based work (HBW)
- Trip Type 2 – Home-based other (HBO)
- Trip Type 3 – Non-home-based (NHB)
- Trip Type 4 – Commercial (COMM)

Trip ends are categorized as “productions” and “attractions”. Production ends occur at the trip maker’s residence, so productions are based on the number and type of housing units within a TAZ. For NHB trips where a residence is not on either end of the trip, productions are calculated based on statistical estimates derived from survey data.

Attraction ends include workplaces, shops, other residences, and schools. The total number of attractions for each trip type is set equal to the total number of productions. It is common practice in travel demand modeling to balance attractions to productions. The rationale is that productions are

more fundamental than attractions – more housing will produce more trips, but more retail space, for example, may simply draw customers away from other retail space.

Productions and attractions are not the same as origins and destinations. For a home-to-work trip, the home location is the origin and production and the work location is the destination and attraction. For a work-to-home trip, however, the home location is the destination and the production and the work location is the origin and attraction.

3.3 – Data Sources and Parameter Estimation

Daily trip production and attraction rates were developed using a combination of sources including the 1993 GTC Household Travel Survey, the 2001 National Household Travel Survey (NHTS), the ITE Trip Generation Manual (supplemented with traffic count studies), FHWA’s Quick Response Freight Manual, and comparison to other models.

3.4 – Trip Production and Attraction Rates

Trip production rates for HBW, HBO, and NHB are stratified along two key predictors of trip making: household size and auto ownership. The rates are estimated based on the 2001 NHTS and comparison to other models. Because NHB trips do not occur in the home TAZ, NHB production rates are used only to compute total NHB trips and scale attractions to ensure that the number of NHB trips is a function of the characteristics of the population. COMM trip origins and destinations are set equal to attractions so that COMM trips in and out of a TAZ are equal.

Trip Attraction rates for HBW, HBO, and NHB trip purposes were developed based on the GTC Household Travel Survey and COMM trip rates came from FHWA’s Quick Response Freight Manual. The resulting estimated model coefficients were then calibrated so that trip attractions by purpose would be consistent with trip productions and proportionate to ITE trip generation rates by land-use type. The final rates are shown in Figures 4 and 5 on the following page.

Figure 4: HBW, HBO and NHB Trip Production Rates (person trips per day)

| | | HBW | | | |
|---------|---|------------|------|------|------|
| | | # Vehicles | | | |
| | | 0 | 1 | 2 | 3 |
| HH Size | 1 | 0.20 | 0.74 | 1.19 | 1.07 |
| | 2 | 0.96 | 0.96 | 1.42 | 1.77 |
| | 3 | 1.09 | 1.09 | 1.55 | 2.18 |
| | 4 | 1.18 | 1.18 | 1.64 | 2.47 |

| | | HBO | | | |
|---------|---|------------|------|------|------|
| | | # Vehicles | | | |
| | | 0 | 1 | 2 | 3 |
| HH Size | 1 | 0.79 | 2.20 | 2.20 | 2.12 |
| | 2 | 2.51 | 4.39 | 4.39 | 4.23 |
| | 3 | 5.16 | 6.59 | 6.59 | 6.35 |
| | 4 | 8.73 | 8.78 | 8.78 | 8.47 |

| | | NHB | | | |
|---------|---|------------|------|------|------|
| | | # Vehicles | | | |
| | | 0 | 1 | 2 | 3 |
| HH Size | 1 | 0.68 | 1.58 | 0.75 | 1.15 |
| | 2 | 1.06 | 2.16 | 2.40 | 2.63 |
| | 3 | 1.44 | 2.50 | 3.37 | 4.12 |
| | 4 | 1.82 | 2.74 | 4.06 | 5.61 |

Figure 5: HBW, HBO, NHB and COMM Trip Attraction Models (person trips per day)

$$HBW\ Attrs = .98 * TOTEMP$$

$$HBO\ Attrs = 8.88 * RETEMP + .09 * MANU + 3.26 * EDUC + .78 * OTHER + .17 * TOTHH$$

$$NHB\ Attrs = 4.61 * RETEMP + .04 * MANU + 1.70 * EDUC + .41 * OTHER + .09 * TOTHH$$

$$COMM\ Attrs = 1.20 * RETEMP + 1.40 * MANU + .50 * EDUC + .50 * OTHER + .50 * TOTHH$$

Where,

- TOTEMP: total employment
- RETEMP: retail employment
- MANU: manufacturing employment
- EDUC: education employment
- OTHER: other employment
- TOTHH: total households

3.5 – External Trips

Trips can be categorized by whether the origins and destinations are within or outside of the 530 internal TAZs. External trips can be internal-to-external (IX), external-to-internal (XI), or external-to-external (XX). The trip generation module cannot estimate the number of internal-to-external and external-to-internal trips (this would require land use data for all areas outside of the Model region). Rather, the number of these trips is based on traffic counts taken at selected roadways at the boundary of the Model region (See Table 2 and Figure 6).

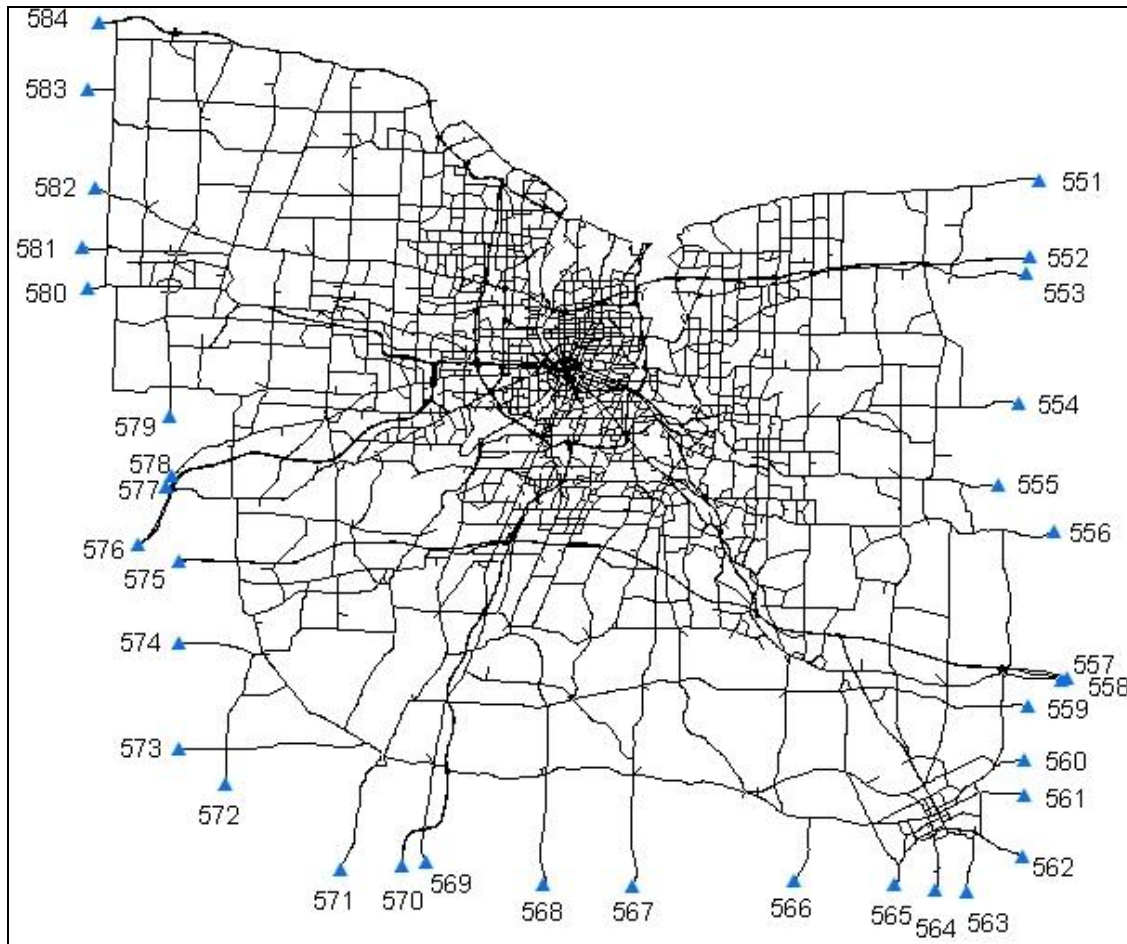
Table 2: Roadways associated with External Zones

| External TAZ | Location | External TAZ | Location |
|---------------------|----------------------|---------------------|-------------------------|
| 551 | Lake Rd | 568 | Plank Rd |
| 552 | NYS Route 104 | 569 | Lakeville Rd |
| 553 | Ridge Rd | 570 | I-390 |
| 554 | Walworth Marion Rd | 571 | Avon Geneseo Rd |
| 555 | Macedon Center Rd | 572 | Main St |
| 556 | NYS Route 31 | 573 | Telephone Rd |
| 557 | I-90 | 574 | Caledonia LeRoy Rd |
| 558 | Victor Manchester Rd | 575 | I-90 |
| 559 | Shortsville Rd | 576 | I-490 |
| 560 | NYS Route 488 | 577 | NYS Route 33A |
| 561 | County Road 4 | 578 | E Buffalo Rd |
| 562 | Eastern Blvd | 579 | Lake Rd |
| 563 | E Lake Rd | 580 | 4th Section Rd |
| 564 | W Lake Dr | 581 | Brockport Holley Rd |
| 565 | NYS Route 21 | 582 | W Ridge Rd |
| 566 | NYS Route 64 | 583 | Roosevelt Hwy |
| 567 | County Road 37 | 584 | Lake Ontario State Pkwy |

In the Model, the total number of external trips is set to match traffic count data at the external stations with internal trip ends being proportionate to internal land use. We assume based on external survey data collected in other regions that XX trips represent 7 percent of all external trips- the remaining 93 percent is split among IX and XI trips. We then assume that the IX and XI trips will be 27 percent internal-to-external (IX) and 73 percent external-to-internal (XI) - this assumption was developed by analyzing the directional split of 2005 peak hour traffic counts.

IX trip generation rates vary by location. Residents of municipalities that are closer to the Model boundary generate more IX trips as a percent of the residents' overall trip-making. The internal ends of XI trips are estimated based on employment in each TAZ and the distance from the external station. Though proportional to TAZ-level employment, XI trip ends are scaled to the external traffic counts and distributed using a gravity model.

Figure 6: TAZ Map Showing External Zones



XX trips are estimated based on data from the New York State Thruway Authority and local knowledge and are added directly into the vehicle trip table at the beginning of the trip assignment module. The Model area has relatively few XX trips except for those on the New York State Thruway (I-90). The 1998 XX through trip data was adjusted to reflect the background growth in traffic volumes observed by automatic traffic recorders throughout the region (approximately one percent). XX trips for the future year models were developed by applying this annual background growth rate of one percent per year; however, this rate is adjustable within the Model setup menu. Estimates of the total number of trips by trip purpose are provided in Table 3.

Table 3: Estimated Person Trips by Trip Purpose, 2005

| Trip Purpose | Number of Trips | Percent of Total |
|------------------------|------------------|------------------|
| Home-Based-Work (HBW) | 418,605 | 11.37% |
| Home-Based-Other (HBO) | 1,651,632 | 44.86% |
| Non-Home-Based (NHB) | 869,831 | 23.62% |
| Commercial (COMM) | 502,621 | 13.65% |
| Internal-External (IX) | 55,888 | 1.52% |
| External-Internal (XI) | 167,664 | 4.55% |
| External-External (XX) | 15,649 | 0.43% |
| Total | 3,681,890 | 100% |

4 – Trip Distribution

Trip distribution is the pairing of origins and destinations to form complete trips. Pairing is done separately within each trip type. For example, Home-based-work (HBW) productions from residences are paired with HBW attractions at work places.

4.1 – Gravity Model

The trip distribution module of the Model uses a doubly constrained gravity model³ to distribute trip origins and destinations. In a doubly constrained gravity model an iterative process is used that alternatively balances to productions and then balances to attractions. The iterative process is considered complete when either a convergence criterion is met (error of 0.01) or the maximum number of iterations (30) is reached. The gravity model is applied separately for each of the trip types.

Figure 7: Doubly Constrained Gravity Model Equations

$$T_{ij} = P_i * \frac{A_j * f(d_{ij})}{\sum_{\text{all zones } z} A_z * f^*(d_{iz})} \quad (\text{Constrained to Productions})$$

$$T_{ij} = A_j * \frac{P_i * f(d_{ij})}{\sum_{\text{all zones } z} P_z * f^*(d_{iz})} \quad (\text{Constrained to Attractions})$$

Where: T_{ij} = the forecast flow produced by zone i and attracted to zone j
 P_i = the forecast number of trips produced by zone i
 A_j = the forecast number of trips attracted to zone j
 d_{ij} = the impedance between zone i and zone j

The inputs to the trip distribution module are the origin-destination table output from the trip generation module (which shows the total origins and destinations to and from each TAZ) and an impedance matrix. The impedance matrix includes auto travel times between zones, intrazonal times, and terminal times. Travel time is derived from the previous trip assignment run (i.e., the times represent congested conditions). Intrazonal time represents the average time it takes to travel between origins and destinations within the same TAZ and is calculated as a function of the travel times of directly adjacent TAZs. Terminal time represents access time (the time needed to travel – walk, park, etc. – between the vehicle and the origin or destination points). Terminal time is set to two minutes for TAZs within the Rochester Central Business District and 1.5 minutes for TAZs outside of this area.

Friction factor equations are applied to the impedance matrix to create a friction factor matrix for each trip type.

³ The underlying assumption of the gravity model is that trip interchanges between TAZs is directly proportional to the relative attraction of each TAZ (based on the land use – household and employment – data for each TAZ) and inversely proportional to the distance between TAZs.

Figure 8: Friction Factor Equation

$$f(d_{ij}) = \frac{a}{d_{ij}^b * e^{c(d_{ij})}}$$

Where: $f(d_{ij})$ = the friction factor between zone i and zone j
 d_{ij} = the impedance between zone i and zone j
 a, b, c = constants derived for each trip type to replicate survey data

4.2 – Data Sources and Parameter Estimation

The trip distribution friction factor parameters for HBW, HBO, and NHB trips were estimated using trip length frequency distributions from the GTC Household Travel Survey. The average trip lengths and trip length distributions calculated in the trip distribution module were compared to 2000 Census journey-to-work data and 2001 NHTS data. Given that the number of persons residing in the TMA has not been projected to have grown significantly nor changed significantly in its geographic distribution since 2000, the parameter estimation using the associated data sources is still considered accurate. The trip distribution parameters for COMM trips were taken from the Quick Response Freight Manual and the parameters for IX/XI trips were assumed to be the same as internal NHB trips.

5 – Time of Day Distribution

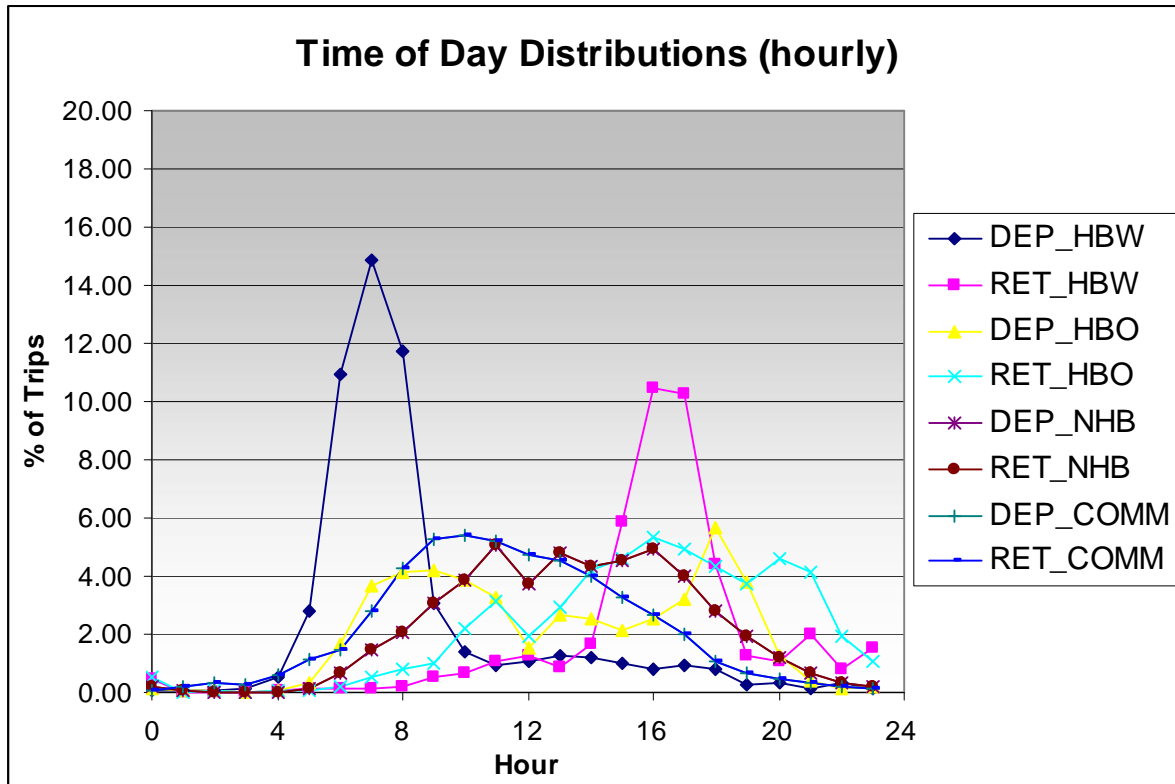
The trip generation, trip distribution, and mode split models estimate *daily* trips. The traffic assignment model then assigns traffic by hour. The estimate of trips by time of day comes from the GTC Household Travel Survey and is presented below. For home-based trips, the time-of-day (diurnal) distribution is unique by direction (e.g. home-to-work vs. work-to-home), but for NHB and COMM trips the directionality of the trip matrix does not vary by time of day.

Average Trip Distances (miles) by trip type for 2005 are as follows:

| | |
|-------------------------|-------|
| Home-Based-Work (HBW): | 8.22 |
| Home-Based-Other (HBO): | 6.14 |
| Non-Home-Based (NHB): | 5.72 |
| Commercial (COMM): | 9.61 |
| Internal-External (IX): | 15.98 |
| External-Internal (XI): | 21.10 |
| External-External (XX): | 38.66 |

Figure 9 on the following page illustrates trip distribution by trip type and time of day (DEP = Departing trip; RET = Return trip)

Figure 9: Diurnal (Time of Day) Distributions by Trip Purpose

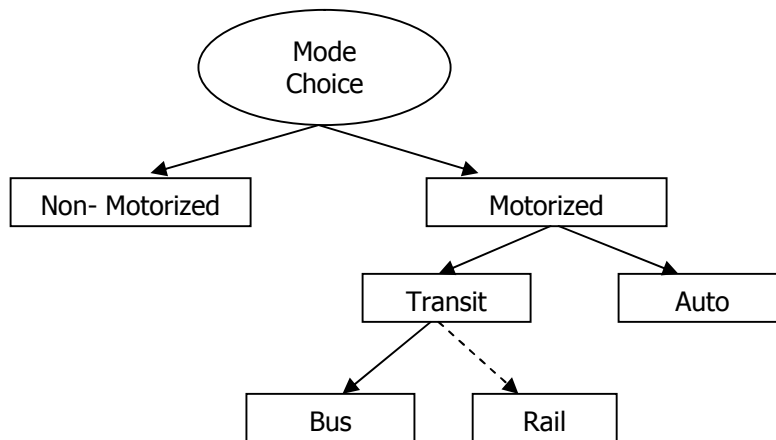


6 – Mode Split

The mode choice model estimates the fraction of person-trips between each origin and destination that use public transit versus private auto. Private auto trips are then converted to vehicle trips using an auto occupancy factor and the resulting auto vehicle-trips are loaded onto the highway network.

The split of person-trips among modes is estimated using a logit model where the share of trips using a particular mode is dependent upon the relative attractiveness of that mode. The attractiveness of each mode is a function of its characteristics (travel time, cost/access, and traveler-specific variables) and preferences of different travelers. A “multinomial” logit model allows comparisons among more than two alternative modes, and a “nested” logit model allows for differential competition among modes. Therefore, a nested multinomial logit-form mode choice model is used to estimate the split among auto trips, non-motorized trips (walk/bike), bus trips, and rail trips, and there is a separate mode choice model for work and non-work trips. The rail mode is not included since there currently is no rail in the GTC region, though the model functionality is in place.

Figure 10: Mode Choice Model Nesting Structure



6.1 – Data Sources and Parameter Estimation

The GTC mode choice model is asserted based on professional expertise and established mode choice model configurations used in dozens of other U.S. cities. Route-level transit ridership counts in the Rochester TMA were used to calibrate the mode choice model. The parameters are consistent with Federal Transit Administration (FTA) guidance regarding the magnitude of the values and the implied values of time, and are appropriate representations of mode choice behavior.

7 - Trip Assignment

The trip assignment module assigns the vehicle trips calculated in the trip distribution module to the Model's highway network (see Section 2.3 for a description of the Model network). The trips are assigned to the network based on a user equilibrium model, which uses an iterative process to achieve a convergent solution in which no travelers can improve their travel times by switching to another route.

At the end of the trip assignment step, the links in the network are automatically updated with calculated congested speed data, as well as directional volumes and minutes of delay (See Section 7.2 for delay calculations).

7.1 – Data Sources

The network data from the 1998 Model was initially converted from TModel to TransCAD by the Caliper Corporation. The resultant geographic file (as it is called in TransCAD) was conflated to line up with TMA streets (as shown in NYSDOT's most recent roads shapefiles). All links and nodes were checked to ensure correct coding (e.g., roadway type, capacity) and to ensure that roadway improvements completed between 2002 and 2005 were included. Finally, one-way designations, turn prohibitions, and traffic count data (for selected links) were added to the geographic file.

7.2 – Parameter Estimation

The trip assignment module uses a multi-path user equilibrium process that determines “shortest” routes between pairs of TAZs based on an iterative process (that achieves a convergent solution in which no travelers can improve their travel times by shifting routes). The “travel time” between TAZs involves a combination of parameters: distance traveled, speed (congested and free-flow), and delays at turning locations.

The critical proxy for delay on a link is the ratio of volume to capacity (v/c). As a link’s v/c ratio approaches 1.0 (as the volume on the link approaches the maximum capacity of the link), delay becomes more severe. The delays attributed to v/c ratios are based on the Bureau of Public Roads delay equation. Two equations are used to calculate v/c-related delay:

Expressways

$$\text{Adjusted travel time} = \text{Base (free flow) Travel Time} * (1 + 0.15 * (v/c)^8)$$

All non-expressway roads

$$\text{Adjusted travel time} = \text{Base (free flow) Travel Time} * (1 + 0.15 * (v/c)^4)$$

8 – Model Calibration

Validation and calibration was performed throughout the construction of the Model. During all steps of the Model (trip generation, trip distribution, mode choice, and trip assignment) the results were compared against known conditions (data from the Census Transportation Planning Package, Census of Population & Housing, traffic counts from NYSDOT, transit ridership counts, surveys, etc.). Traffic count data was obtained for approximately 9.2 percent of the links in the Model network (631 counts out of 6,895 one-way links). Individual link errors were calculated by subtracting the Model volume from the adjusted traffic count for each link with a count.

A model is considered calibrated when the model-generated road volumes reasonably represent real-world traffic volumes. The Federal Highway Administration (FHWA) has developed guidelines for calibration standards⁴. A comparison between the FHWA guidelines and the calibrated Model is shown below in Tables 4 and 5 for the AM and PM peak hours. All of the model’s measures of performance exceed the FHWA guidelines.

⁴ Ismart, Dane. Calibration and Adjustment of Planning Models. U.S. Department of Transportation, Federal Highway Administration Publication FHWA-ED-90-015. Washington, DC, December 1990.

Table 4: AM Peak Hour Calibration of the Model

| | FHWA Guideline | Model |
|---|----------------|-------|
| Correlation Coefficient | 0.880 | 0.96 |
| Percent Error Region-Wide | 5% | 1.0% |
| Sum of Differences By Functional Class | | |
| Freeways | 7% | -2.8% |
| Principal Arterials | 10% | 3.8% |
| Minor Arterials | 15% | 8.2% |
| Collectors | 25% | 2.6% |

Table 5: PM Peak Hour Calibration of the Model

| | FHWA Guideline | Model |
|---|----------------|-------|
| Correlation Coefficient | 0.88 | 0.97 |
| Percent Error Region-Wide | 5% | 0.0% |
| Sum of Differences By Functional Class | | |
| Freeways | 7% | 3.9% |
| Principal Arterials | 10% | -7.3% |
| Minor Arterials | 15% | -4.3% |
| Collectors | 25% | 1.8% |

9 – Future Year Models

Future year models will be prepared for the years 2014, 2020 and 2027. 2027 is the horizon year for the GTC Long Range Transportation Plan (LRTP). 2012, 2020, and 2027 were the analysis years for the air quality conformity determination prepared for the 2007-2012 Transportation Improvement Program (TIP). Additional model years can be developed for the interim years needed for subsequent TIPs and the next LRTP.

The highway networks for the future year models reflect projects contained in the TIPs prepared since 2005 (the 2005-2010 TIP and the 2007-2012 TIP). The estimated completion date of the individual projects determines which future year model(s) the projects are entered into.

Forecasts of households by number of vehicles and employment (land use) data were prepared for each of the future years, as described in section 3.1.

The trip rates used in the Model are used in the future year models. An argument could be made for either lowering (to reflect, for example, the influence of people working/shopping from home) or raising (to reflect, for example, the influence of people driving more) the trip rates, but it was determined that impacts on trip rates would be minimal. It was also felt that if people do drive more, it is likely that much of the additional mileage will be spread out to off-peak times and therefore will not dramatically affect the peak-hour periods that are modeled. The preliminary origin-destination files calculated by applying the trip rates to the future year land use data are combined with updated external link data to produce the final origin-destination files used in the trip distribution module of each future year model.

10 – NYSDOT Minimum Requirements and Suggested Best Practices

10.1 – Minimum Requirements

This section describes how the Model meets the “minimum requirements” listed in the January 7, 2005 letter from NYSDOT ESB.

10.1a – VMT Estimation

GTC estimates base year (2005) vehicle miles of travel (VMT) through its travel demand model. Estimates of future year VMT are derived from travel demand models which incorporate population and employment projections and (through the inclusion of projects programmed in Transportation Improvement Programs) the transportation policies of GTC.

The Model covers a 24-hour day including AM and PM peak hours. As the Model area is within a part of the GTC region that has been designated an ozone non-attainment area, the daily (24-hour) VMT is then seasonally adjusted to provide an estimate of typical daily summer traffic. The seasonal adjustment factors used are calculated based on average summer factors taken from NYSDOT’s Work Week Seasonal Adjustment Factor Tables utilizing Continuous Count Site Data over the past twenty years. Factor Group 30, representing urban traffic patterns minimally affected by the seasons, is used for all roadway classes within the Rochester Urbanized Area.

In order to factor the daily VMT from the Model which is calibrated to represent a mid-week day in September, the average of the summer month factors (June, July, and August) is divided by the September factor. Thus, a factor is derived to factor from the daily modeled VMT of September to typical daily summer traffic.

Note: all VMT and travel speed factoring is done on a link-by-link basis and then summed to arrive at system-wide totals or averages.

Total 2007 Estimated Daily VMT for the Rochester Urbanized Area from the Model is slightly more than the Highway Performance Monitoring System (HPMS) Daily VMT Estimate for 2007 (16,996,781 VMT and 16,742,000 VMT respectively – a difference of 1.5 percent). The percentage shares of VMT by roadway classification (Model versus HPMS) are as follows:

Rochester, NY Urbanized Area (2000)
Percent of total VMT on each class of roadway

| Roadway Class | Model (2007) | | HPMS (2007) | |
|------------------------------|--------------|-------|-------------|-------|
| Interstate | 4,720,765 | 27.8% | 3,860,000 | 23.1% |
| Other Freeways & Expressways | 2,706,542 | 15.9% | 2,138,000 | 12.8% |
| Other Principal Arterial | 1,579,851 | 9.3% | 1,865,000 | 11.1% |
| Minor Arterial | 4,785,363 | 28.2% | 5,038,000 | 30.1% |
| Collector | 1,499,346 | 8.8% | 1,642,000 | 9.8% |
| Local | 1,704,913 | 10.0% | 2,199,000 | 13.1% |

In light of the close proximity of the overall Model VMT to the HPMS VMT estimates, GTC staff concluded that it was not necessary to use any adjustment factors to increase VMT on local roads or include any off-model VMT in the analysis.

10.1b – Travel Speed Estimation

Travel speeds are estimated for each hour of the day within the Model. Off-peak hour speeds are comparable to posted speed limits reflecting free-flow travel⁵. Peak hour speeds are in many cases less than free-flow speeds reflecting greater traffic volumes. Speeds on the TAZ links (assumed to reflect speed on the local roads the links represent) run mostly at or near the free-flow speed.

GTC's Travel Time Data Collection Program inventoried speeds on Principal Arterials at peak and non-peak hours of the day in order to identify areas of congestion and monitor transportation system performance in support of the Congestion Management Process (CMP). The data collected was used to check speed estimates from the Model against real-world data, and in some cases to refine Model free flow speeds to more accurately reflect actual travel conditions.

The table below compares the Model speed limits on all links in the Rochester Urbanized Area to the average congested speeds on all links during the AM and PM peak hours.

Rochester, NY Urbanized Area (2000)

Average 2005 AM & PM peak hour speeds for each Model speed limit

| Model Speed | # of Links | Average AM Peak Hour Speed | Average PM Peak Hour Speed |
|-------------|------------|----------------------------|----------------------------|
| 30 | 1,045 | 27.85 | 27.19 |
| 35 | 1,145 | 33.12 | 32.49 |
| 40 | 745 | 36.49 | 35.50 |
| 45 | 222 | 40.87 | 39.72 |
| 50 | 112 | 45.87 | 44.86 |
| 55 | 105 | 48.46 | 47.16 |
| 60 | 109 | 53.91 | 52.66 |
| 65 | 148 | 56.92 | 54.73 |
| 70 | 39 | 63.23 | 61.86 |

10.2 - Suggested Good Practice

This section describes how the Model responds to the "suggested good practices/network demand model criteria" listed in the January 7, 2005 letter from NYSDOT EAB.

10.2a – Validation against Observed Counts

As noted in section 8.0, the 2005 Model was calibrated to ground counts that covered approximately 9.2 percent of the links in the Model. As shown in Tables 4 and 5 (pg. 16), the correlation coefficient, percent error system-wide, and sums of differences by roadway class all exceed the guidelines published by FHWA.

As noted in section 10.1a of this Appendix, total Model VMT in the Rochester Urbanized Area is 1.5 percent above the HPMS estimate for 2007.

⁵ Congestion levels in the TMA during the off-peak periods are such (based on local observations and professional judgment) that, on average, vehicles can travel at or above the posted speed limits

10.2b – Latest Planning Assumptions

As noted in section 3.1, the land use (household and employment) data used in the base year model was updated to reflect 2005 conditions and projected for the future model years. The 2005 data was based on data from the 2000 Census, the 2000 Census Transportation Planning Package, and on 2005 data from the New York State Department of Labor. The methodologies used in the projection of the household and employment estimates are discussed in Appendix A.

10.2c – Land Use Development Scenarios

Population and employment growth in the Model area is occurring at low but steady rates. The distribution of employment and residences in the future year models takes this into consideration and also takes into account professional judgment about “likely” future changes. GTC commissions annual Land Use Monitoring Reports from Monroe County and the G/FLRPC that provide information on building permit activity within the Model area and the remainder of the GTC region. These reports provide data that assist in the development of new or revised projections and against which past projections can be checked.

The amount of “excess” roadway capacity in the Model area (capacity not currently required to handle traffic volumes at reasonable levels of congestion) is seen as sufficient (with the implementation of TIP projects to improve traffic flow at congestion “hot spots”) to reasonably accommodate a wide variety of land development scenarios.

10.2d – Assignment Methodology

As noted in section 7.0, the Model employs a capacity-sensitive assignment methodology (user equilibrium) which uses an iterative process to achieve a convergent solution in which no travelers can improve their travel times by switching to another route.

This differs from the adjusted incremental loading method used in the 1998 Model in that all trips are loaded onto the network at once rather than in increments. In the adjusted incremental loading method, trips were assigned and loaded onto the network in five increments using travel times adjusted by the delays that are calculated based on the previous loading(s).

Sections 10.1a and 10.1b of this Appendix note how the volumes from the Model are factored up to account for seasonal volume increases.

10.2e – Travel Impedances

As noted in section 4.1, the Model includes an impedance matrix (reflecting travel times between zones, intrazonal times, and terminal times). A friction factor matrix is derived from the impedance matrix. The friction factors are used in the doubly constrained gravity model. Congested travel times from trip assignment are iterated back to trip distribution in a feedback loop (in a series of three iterations).

10.2f – Model Sensitivity

As noted previously, the Model includes a mode choice step in which trips are split among auto, non-motorized, and transit trips as well as work and non-work trips. Travel choice in the Model is limited to the selection of shortest paths in the trip assignment step. This step uses travel time and trip

distance as impedance variables. Monetary cost is not explicitly considered, though parking cost is an element of the terminal time associated with each centroid. The Model has proven to be reasonably sensitive to changes in travel times (changes to link characteristics – speeds, capacities, number of lanes, etc. – have a direct impact on the selection of shortest paths and the volumes assigned to links).

Appendix A – Land Use Projection Methodologies

Socio-economic data for the 2005 Model and for future year models were developed by the GTC staff with assistance from the Genesee/Finger Lakes Regional Planning Council (G/FLRPC). The projections were developed in March 2008.

The methodology employed in the projection of household data is as follows:

1. Started with Population, Group Quarters Population, and Household Size data from the 2000 Census Summary File 1 (SF1) [Table P1 – Total Population, Table P37 – Group Quarters Population by Group Quarters Type, Table H13 – Household Size]. This data was obtained at the Census Block-level, with geographic identifiers to locate each Block within the appropriate County and Transportation Analysis Zone (TAZ). Also started with TAZ-level Household Size data from the 2000 Census Transportation Planning Package (CTPP) [Table 1-063 – Household Size by Vehicles Available, All Households].
2. To disaggregate the demographic data for newly created TAZs identified during the TAZ review process, the TAZ identifier for Census Blocks identified as being part of a new TAZ were modified to reflect the new TAZ number. The Block-level data was then summarized based on the TAZ identifiers – resulting in projections of Population, Group Quarters Population, and Household Size for each of the 530 TAZs.
3. To project TAZ-level Population and Households for 2010, 2020, 2030, and 2040, the *Population and Household Projections* developed by the Genesee/Finger Lakes Regional Planning Council (G/FLRPC) to support the development of the *LRTP: 2005-2025* (March 2005) were used. These projections were also compared to county-level projections prepared by Global Insight in 2005, which were provided by the New York State Department of Transportation. Based on this comparison, the 2030 G/FLRPC projections for each of the Rochester Transportation Management Area (TMA) counties including Livingston, Monroe, Ontario, and Wayne, were found to be within an acceptable margin of the Global Insight projections (Total Population: 2.2%, Total Households: 1.2%) and an appropriate source of data for these demographic projections.

The G/FLRPC projections included Town/City-level projections for both total Population and total Households. Using these Town/City-level projections as control totals, TAZ-level projections were developed by taking the Population/Households total for each TAZ in 2000 as a proportion of the appropriate Town/City total for 2000 and applying that proportion for each projection year – resulting in projections of Population and Households for each of the 530 TAZs.

Note: The methodology in Step 3 held the TAZ-level distribution within each Town/City - as was established by the 2000 Census Block data - constant for all projection years.

4. To project TAZ-level Group Quarters Population for 2010, 2020, 2030, and 2040, the ratio of Group Quarters Population as compared to total Population was applied to the total Population for each projection year – resulting in projections of Group Quarters Population for each of the 530 TAZs (see example below, where GQ refers to Group Quarters Population).

$$2010 \text{ GQ} = 2010 \text{ Population} * (2000 \text{ GQ} / 2000 \text{ Population})$$

Note: The methodology in Step 4 held the Group Quarters Population distribution within each TAZ - as was established by the 2000 Census SF1 data - constant for all projection years

(i.e. – for a given TAZ, if 10% of the Population resides in Group Quarters in 2000, 10% would also reside in Group Quarters in 2010, 2020, etc.).

5. For the purposes of the GTC Travel Demand Model, additional intermediate year projections of Group Quarters Population have been derived for 2005, 2007, 2015, 2025, and 2027. These intermediate year projections were calculated by adding a fraction of the change between the adjacent year projections, to the earlier of the projection years (i.e., straight-line interpolation) – this fraction was equal to one-tenth (1/10) for each year beyond the earlier of the two adjacent projection years. In the case of 2005, this required adding 5/10 (or 1/2) of the change between 2000 and 2010 to the 2000 total, whereas for 2027 the change added to the 2020 total was 7/10 (see examples below for GQ Population).

$$2005 \text{ GQ} = 2000 \text{ GQ} + (0.5 * (2010 \text{ GQ} - 2000 \text{ GQ}))$$

$$2027 \text{ GQ} = 2020 \text{ GQ} + (0.7 * (2030 \text{ GQ} - 2020 \text{ GQ}))$$

6. Using the 2000 CTPP data for Household Size (Table 1-063) referenced above, Households by Size and Number of Vehicles Available was developed for each TAZ. Due to discrepancies between TAZ-level total Households per SF1 as compared to total Households per the CTPP, table 1-063 from CTPP could not be used directly. Instead, table 1-063 was used to calculate the number of Households of each type (1-person with 0-vehicles, 1-person with 1-vehicle, etc.) based on the number of total Households per the SF1 data, which is the more accurate of the two datasets (this process maintained the Household type distribution within each TAZ). To accomplish this, the ratio of Households by type (1-person with 0-vehicles, 1-person with 1-vehicle, etc.) to the total number of Households per CTPP was applied to the total number of Households from SF1 – resulting in revised TAZ-level Households by Size and Number of Vehicles Available for 2000.
7. To finalize the TAZ-level Household data by Size and Number of Vehicles Available for 2000, minor adjustments were made to seven TAZs identified as having Households per the SF1 data (Table H13), but that did not have any households per the CTPP data (Table 1-063). These discrepancies are a result of using the less accurate CTPP data – which is based on the 1 in 6 household census long form survey. If left unadjusted, these discrepancies would misrepresent the characteristics of these TAZs.
8. To project TAZ-level Households by Size and Number of Vehicles Available for 2010, 2020, 2030, and 2040, the ratio of Households by type (1-person with 0-vehicles, 1-person with 1-vehicle, etc.) to the total number of Households was applied to the total number of Households in each of the projection years derived in Step 3 (see example below) – resulting in projections of Households by Size and Number of Vehicles Available for each of the 507 TAZs for which CTPP data was available.

$$2010 \text{ 1-person HH w/1 Veh.} =$$

$$2010 \text{ Total HH} * (2000 \text{ 1-person HH w/1 Veh.} / 2000 \text{ Total HH})$$

Note: The methodology in Step 8 held the Household distribution within each TAZ - as was established by the 2000 CTPP data - constant for all projection years (i.e. – for a given TAZ, if 2-person Households with 2 Vehicles comprise 20% of the total Households in 2000, they would then also comprise 20% of total Households in 2010, 2020, etc.).

9. For the purposes of the GTC Travel Demand Model, additional intermediate year projections of Households by Size and Number of Vehicles Available have been derived for 2005, 2007, 2015,

2025, and 2027. The methodology for calculating these intermediate year projections is described in Step 5 above.

10. Lastly, to distribute the total number of Households within each newly created TAZ (TAZ 508 – TAZ 530, for which CTPP data was not available) amongst the various Household types, the same ratio of households of each type to the total number of Households was applied as was present in the TAZ from which the new TAZ was split (example: for new TAZ 508, if 2-person Households with 2 Vehicles comprise 20% of the total Households in the TAZ from which TAZ 508 was split (TAZ 7), they would then also comprise 20% of total Households in the new TAZ 508).

The methodology employed in the projection of employment data is as follows:

1. Started with 2005 Employment by Category for each of the 530 TAZs, as developed for inclusion as the Base Year employment for the enhanced GTC Travel Demand Model (the model). Also started with county-level employment projections prepared by Global Insight in 2005, which were provided by the New York State Department of Transportation (NYSDOT).
2. Summed the county-level occupational data from the 2005 Global Insight projections into the four categories used in the model:
 - Retail
 - Manufacturing
 - Education, Health & Social Services
 - Other

For consistency with the 2005 Base Year Employment which is based on New York State Department of Labor (NYSDOL) - Quarterly Census of Employment and Wages (QCEW) data, the "Self-Employed" category was removed from the Global Insight projections.

3. The change in employment between the 2005 and 2030 Global Insight projections was calculated as a percentage for each of the four model employment categories (as well as for total employment) within each of the Rochester TMA counties (Livingston, Monroe, Ontario, and Wayne). These percentages represent the projected rate of growth/decline occurring within each county (by employment category).
4. To calculate preliminary county-level employment for 2030, the 2005 Base Year Employment within each county (by occupational category) was multiplied by the corresponding growth/decline rate as calculated in Step 3 above (see example below for Retail employment) – resulting in preliminary 2030 Employment by Occupation for each of the Rochester TMA counties.

$$2030 \text{ Retail} = 2005 \text{ Retail} + (2005 \text{ Retail} * \text{Retail Growth/Decline Rate})$$

5. The resulting 2030 employment (by category) from Step 4 above was adjusted in order to rectify the SUM of the four model employment categories to the county-level total employment projection, which were used as control totals. To do this, the resulting employment within each category was constrained by multiplying the unadjusted total (within each category) by the ratio of the county-level adjusted total (control total) divided by the county-level unadjusted total (see example below for Retail employment). The result of this step is adjusted county-level growth/decline rates and employment totals for each of the four model employment categories.

$$2030 \text{ Adjusted Retail} = (2030 \text{ Unadjusted Retail} * (2030 \text{ Adjusted Total} / 2030 \text{ Unadjusted Total}))$$

6. To calculate TAZ-level employment for 2030, the 2005 Base Year Employment within each TAZ (by category) was multiplied by the corresponding adjusted growth/decline rate as calculated in Step 5 above (see example below for Retail employment) – resulting in preliminary 2030 Employment by Category for each of the 530 TAZs.

$$2030 \text{ Retail} = 2005 \text{ Retail} + (2005 \text{ Retail} * \text{Adjusted Retail Growth/Decline Rate})$$

7. To account for variations in the growth/decline as compared to the county-wide rates, TAZ-specific adjustments were identified for each employment category to reflect locations (TAZs) where higher or lower than average change is anticipated within the Rochester TMA. These adjustments were based on GTC staff knowledge of development trends and specific proposed projects or announced staffing changes.

Note: In some cases, these adjustments reflect known changes in employment levels. However, in most cases these adjustments were derived more generally (i.e., based on projections of development trends and rough estimates of the number of employees at proposed new developments).

TAZ-level employment (by category) for these adjusted TAZs was calculated using the same methodology as described in Step 6 above, with the adjusted (TAZ-specific) growth/decline rate replacing the county-wide growth/decline rate – resulting in revised TAZ-level Employment by Category for each of the 530 TAZs.

8. Lastly, for the purposes of the GTC Travel Demand Model and Long-Range Planning, additional intermediate year projections of Employment by Occupation have been derived. These intermediate year projections were calculated by adding a fraction of the change between the 2005 and 2030 projections, to the 2005 projection (i.e., straight-line interpolation) – this fraction was equal to one twenty-fifth (1/25) for each year beyond 2005. For example, a 2008 projection required adding 3/25 (0.12) of the change between 2005 and 2030 to the 2005 total, whereas for 2027 the change added to the 2005 total was 22/25 (see examples below).

$$2008 \text{ Emp.} = 2005 \text{ Emp.} + (0.12 * (2030 \text{ Emp.} - 2005 \text{ Emp.}))$$

$$2027 \text{ Emp.} = 2005 \text{ Emp.} + (0.88 * (2030 \text{ Emp.} - 2005 \text{ Emp.}))$$

Appendix C

TMA Emissions Analysis Details

2002

| Roadway Class * | Vehicle Miles of Travel (daily) ** | Average Speed (daily) | VOC Emissions (kg/day) | NOx Emissions (kg/day) |
|--------------------------|------------------------------------|-----------------------|------------------------|------------------------|
| Rural Local | 146,480.8 | 43.5 | 180.8 | 275.9 |
| Rural Minor Collector | 501,178.3 | 45.9 | 606.7 | 959.6 |
| Rural Major Collector | 513,233.0 | 43.8 | 628.2 | 973.1 |
| Rural Minor Arterial | 791,800.5 | 47.1 | 959.6 | 1,790.4 |
| Rural Principal Arterial | 354,780.3 | 42.5 | 444.9 | 774.2 |
| Rural Expressway | 804,646.3 | 52.2 | 966.3 | 2,601.6 |
| Urban Local | 627,202.6 | 31.8 | 836.2 | 942.7 |
| Urban Collector | 1,705,840.3 | 34.1 | 2,209.0 | 2,562.1 |
| Urban Minor Arterial | 5,340,900.9 | 33.7 | 6,992.5 | 8,864.5 |
| Urban Principal Arterial | 1,746,594.6 | 31.8 | 2,337.4 | 2,922.7 |
| Urban Expressway | 5,856,900.0 | 50.4 | 6,919.5 | 11,138.1 |
| Ramp | 482,728.6 | 34.7 | 636.2 | 848.4 |
| TAZ Connector | 1,342,809.5 | 30.0 | 1,817.1 | 2,007.3 |
| Total | 20,215,095.7 | -- | 25,534.3 | 36,660.6 |

* As coded in the GTC Travel Demand Model

** Seasonally adjusted to represent a typical summer day

2015

| Roadway Class * | Vehicle Miles of Travel (daily) ** | Average Speed (daily) | VOC Emissions (kg/day) | NOx Emissions (kg/day) |
|--------------------------|------------------------------------|-----------------------|------------------------|------------------------|
| Rural Local | 151,113.3 | 43.4 | 52.3 | 67.8 |
| Rural Minor Collector | 516,942.7 | 45.8 | 175.3 | 236.8 |
| Rural Major Collector | 518,268.3 | 43.1 | 178.6 | 234.4 |
| Rural Minor Arterial | 722,407.4 | 47.3 | 255.1 | 404.7 |
| Rural Principal Arterial | 385,924.3 | 42.1 | 140.7 | 206.4 |
| Rural Expressway | 991,692.3 | 64.8 | 357.0 | 992.7 |
| Urban Local | 640,521.9 | 31.6 | 233.4 | 214.1 |
| Urban Collector | 1,737,200.5 | 34.0 | 613.9 | 581.8 |
| Urban Minor Arterial | 5,215,858.0 | 33.5 | 1,901.3 | 1,988.0 |
| Urban Principal Arterial | 1,784,439.2 | 31.7 | 661.4 | 685.9 |
| Urban Expressway | 7,252,803.6 | 55.4 | 2,374.6 | 3,465.1 |
| Ramp | 587,185.1 | 34.5 | 219.0 | 241.5 |
| TAZ Connector | 1,415,788.3 | 30.0 | 523.8 | 469.7 |
| Total | 21,920,144.9 | -- | 7,686.4 | 9,788.9 |

* As coded in the GTC Travel Demand Model

** Seasonally adjusted to represent a typical summer day

2025

| Roadway Class * | Vehicle Miles of Travel (daily) ** | Average Speed (daily) | VOC Emissions (kg/day) | NOx Emissions (kg/day) |
|--------------------------|------------------------------------|-----------------------|------------------------|------------------------|
| Rural Local | 158,302.5 | 43.3 | 30.6 | 32.8 |
| Rural Minor Collector | 543,602.4 | 45.7 | 102.5 | 114.6 |
| Rural Major Collector | 546,060.2 | 42.9 | 104.9 | 113.7 |
| Rural Minor Arterial | 736,851.1 | 47.2 | 140.4 | 182.8 |
| Rural Principal Arterial | 409,191.0 | 41.8 | 82.1 | 97.4 |
| Rural Expressway | 998,168.9 | 64.8 | 189.7 | 384.4 |
| Urban Local | 661,893.7 | 31.6 | 141.5 | 111.1 |
| Urban Collector | 1,795,373.5 | 33.9 | 368.7 | 300.4 |
| Urban Minor Arterial | 5,351,429.3 | 33.4 | 1,129.0 | 977.0 |
| Urban Principal Arterial | 1,823,525.6 | 31.5 | 393.6 | 337.3 |
| Urban Expressway | 7,418,181.4 | 55.2 | 1,344.4 | 1,584.4 |
| Ramp | 594,540.8 | 34.4 | 129.8 | 113.2 |
| TAZ Connector | 1,450,692.5 | 30.0 | 318.1 | 245.8 |
| Total | 22,487,812.9 | -- | 4,475.3 | 4,594.9 |

* As coded in the GTC Travel Demand Model

** Seasonally adjusted to represent a typical summer day

2035

| Roadway Class * | Vehicle Miles of Travel (daily) ** | Average Speed (daily) | VOC Emissions (kg/day) | NOx Emissions (kg/day) |
|--------------------------|------------------------------------|-----------------------|------------------------|------------------------|
| Rural Local | 167,785.1 | 43.2 | 31.0 | 25.0 |
| Rural Minor Collector | 569,503.8 | 45.7 | 103.0 | 85.7 |
| Rural Major Collector | 576,247.8 | 42.7 | 106.0 | 86.2 |
| Rural Minor Arterial | 757,867.2 | 47.1 | 140.1 | 121.3 |
| Rural Principal Arterial | 434,360.8 | 41.5 | 84.8 | 67.5 |
| Rural Expressway | 1,003,708.6 | 64.8 | 180.7 | 212.2 |
| Urban Local | 681,181.0 | 31.5 | 142.3 | 94.7 |
| Urban Collector | 1,856,419.7 | 33.9 | 371.6 | 257.0 |
| Urban Minor Arterial | 5,520,380.9 | 33.2 | 1,115.1 | 782.1 |
| Urban Principal Arterial | 1,865,388.3 | 31.3 | 385.2 | 267.8 |
| Urban Expressway | 7,571,847.3 | 55.0 | 1,314.4 | 1,166.1 |
| Ramp | 602,979.9 | 34.4 | 125.9 | 84.5 |
| TAZ Connector | 1,485,739.7 | 30.0 | 310.8 | 207.2 |
| Total | 23,093,410.1 | -- | 4,410.9 | 3,457.3 |

* As coded in the GTC Travel Demand Model

** Seasonally adjusted to represent a typical summer day

Appendix D

Rochester Nonattainment Area Outside of the TMA
Emissions Estimation Methodology

Rochester Nonattainment Area Outside of the TMA (Donut Area) Emissions Estimation Methodology

The Rochester Nonattainment Area for ground-level ozone consists of Genesee, Livingston, Monroe, Ontario, Orleans, and Wayne Counties. All of Monroe County and portions of Livingston, Ontario, and Wayne Counties are in the Rochester Transportation Management Area (TMA). Emission estimation within the Rochester TMA was conducted by GTC staff and the methodology utilized is documented in Appendix B.

In order for the entire nonattainment area to pass the build less than 2002 test, emissions for the portion of the nonattainment area outside the Rochester TMA (i.e. the "donut area"), consisting of Genesee and Orleans Counties, and portions of Livingston, Ontario, and Wayne Counties needed to be estimated as well. To perform a regional emissions analysis for the donut portion of the Rochester nonattainment area, NYSDOT staff, in association with GTC, utilized the following methodology:

1. Highway Performance Monitoring System (HPMS)-based estimates of county-wide VMT from NYSDOT were utilized as base VMT for the donut area counties.
2. A seasonal adjustment factor of 1.16 was applied to the rural interstates and expressways and an adjustment of 1.12 was applied to all other facilities (1.12 and 1.16 are the seasonal adjustments for Factor Group 30 and 40 facilities, respectively).
3. Straight line interpolation (between the 2007 HPMS-based DVMT value and the 2035 projected value from historical regression) was used to calculate daily VMT (DVMT) for analysis years 2015, 2025, and 2035.
4. The previously reported HPMS-based DVMT inventory for 2002 was used for the 2002 base year analysis. The functional class (FC) shares for the original 2002 inventory were based on 1990 Census Urbanized Area Boundaries. To ensure consistency with GTC's travel demand model results, the FC shares of the 2002 DVMT for the donut area counties was reapportioned by FC consistent with the functional class shares based on the 2000 Census Urbanized Area Boundaries.
5. Modeled DVMT from the GTC Travel Demand Model for the TMA portions of Livingston, Ontario, and Wayne Counties was subtracted from the DVMT calculations in Steps 3 and 4.
6. Since the donut area has no travel demand model speed estimates, speeds used in the New York State Implementation Plan for Air Quality for each HPMS functional class in the non-urbanized portion of New York State were utilized in the emissions analysis.
7. To estimate regional emissions for the conformity analysis, NYSDOT's MOBILE 6.2 emission factor tables dated April 2008 were applied to the DVMT and average daily speeds for each functional class to estimate VOC and NOx emissions.

8. A small off-model project emissions benefit was applied to the donut area "Build" scenario results for analysis years 2015, 2025, and 2035 to capture the effect of one non-exempt traffic signalization project in the donut area.
9. The estimated "build" condition emissions from the donut area were combined with GTC's TMA "build condition" emissions estimates for the 2002, 2015, 2025, and 2035 analysis year scenarios.

Appendix E

Rochester Nonattainment Area Outside of the TMA
Emissions Analysis Summary and Details

Rochester Donut Area Emissions Analysis Summary

| | VOC | NOX |
|------------------------------------|--------|--------|
| 2002 Base Year Total kg/day | 14,354 | 24,914 |

| | VOC | NOX |
|--|-------|-------|
| 2015 No-Build Total kg/day | 4,873 | 7,265 |
| Minus off-model adjustment kg/day | 3 | 1 |
| 2015 Build Total kg/day | 4,870 | 7,264 |

| | VOC | NOX |
|--|-------|-------|
| 2025 No-Build Total kg/day | 3,084 | 3,674 |
| Minus off-model adjustment kg/day | 3 | 1 |
| 2025 Build Total kg/day | 3,081 | 3,673 |

| | VOC | NOX |
|--|-------|-------|
| 2035 No-Build Total kg/day | 3,380 | 2,758 |
| Minus off-model adjustment kg/day | 3 | 1 |
| 2035 Build Total kg/day | 3,377 | 2,766 |

Rochester Non-TMA Area Emissions - April 22, 2011

ANALYSIS YEAR - 2002

| | FC | Avg Speed | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
|----|-------|-----------|------------|----------|----------|---------|---------------------|---------------------|-----------------------------------|-------------------|-------------------|----------------------|----------------------|----------------|
| 1 | R_INT | 55.7 | 2,075,643 | 1.19 | 3.4 | 34.23 | 0.075 | 0.096 | 2,470,016 | 7,057,188 | 71,049,275 | 155,673 | 199,262 | |
| 2 | R_PA | 53.0 | 1,247,221 | 1.19 | 2.36 | 34.63 | 0.054 | 0.072 | 1,484,193 | 2,943,442 | 43,191,267 | 67,350 | 89,800 | |
| 6 | R_MNA | 45.5 | 1,552,191 | 1.24 | 2.20 | 33.14 | 0.054 | 0.072 | 1,924,716 | 3,414,820 | 51,439,601 | 83,818 | 111,758 | |
| 7 | R_MJC | 43.2 | 677,461 | 1.24 | 1.88 | 33.22 | 0.043 | 0.060 | 840,051 | 1,273,626 | 22,505,249 | 29,131 | 40,648 | |
| 8 | R_MNC | 36.3 | 2,828,974 | 1.30 | 1.83 | 32.05 | 0.043 | 0.060 | 3,677,666 | 5,177,022 | 90,668,617 | 121,646 | 169,738 | |
| 9 | R_LCL | 34.5 | 1,166,233 | 1.32 | 1.82 | 31.85 | 0.043 | 0.060 | 1,539,428 | 2,122,545 | 37,144,532 | 50,148 | 69,974 | |
| 11 | U_INT | 53.6 | 68,632 | 1.18 | 1.98 | 35.53 | 0.038 | 0.054 | 80,986 | 135,892 | 2,438,510 | 2,608 | 3,706 | |
| 12 | U_EXP | 51.0 | 77,935 | 1.19 | 1.94 | 35.00 | 0.038 | 0.054 | 92,743 | 151,194 | 2,727,726 | 2,962 | 4,208 | |
| 14 | U_PA | 32.1 | 507,856 | 1.35 | 1.67 | 32.13 | 0.036 | 0.052 | 685,606 | 848,120 | 16,317,428 | 18,283 | 26,409 | |
| 16 | U_MNA | 30.7 | 570,191 | 1.37 | 1.68 | 32.13 | 0.036 | 0.052 | 781,162 | 957,922 | 18,320,251 | 20,527 | 29,650 | |
| 17 | U_MJC | 24.4 | 359,117 | 1.48 | 1.59 | 32.99 | 0.029 | 0.044 | 531,493 | 570,996 | 11,847,269 | 10,414 | 15,801 | |
| 19 | U_LCL | 23.3 | 162,550 | 1.51 | 1.61 | 33.25 | 0.029 | 0.044 | 245,451 | 261,706 | 5,404,790 | 4,714 | 7,152 | |
| | ALL | | 11,294,006 | | | | | | 2002 Base Year Total g/day | 14,353,512 | 24,914,472 | 373,054,512 | 567,274 | 768,106 |

ANALYSIS YEAR - 2015

| | FC | Avg Speed | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
|----|-------|-----------|------------|----------|----------|---------|---------------------|---------------------|---|------------------|------------------|----------------------|----------------------|----------------|
| 1 | R_INT | 55.7 | 2,704,825 | 0.37 | 0.87 | 11.59 | 0.020 | 0.036 | 1,000,785 | 2,353,198 | 31,348,926 | 54,097 | 97,374 | |
| 2 | R_PA | 53.0 | 1,448,091 | 0.34 | 0.58 | 11.95 | 0.017 | 0.032 | 492,351 | 839,893 | 17,304,684 | 24,618 | 46,339 | |
| 6 | R_MNA | 44.7 | 1,792,527 | 0.36 | 0.54 | 11.43 | 0.017 | 0.032 | 645,310 | 967,964 | 20,488,581 | 30,473 | 57,361 | |
| 7 | R_MJC | 42.5 | 821,903 | 0.35 | 0.45 | 11.58 | 0.015 | 0.030 | 287,666 | 369,856 | 9,517,640 | 12,329 | 24,657 | |
| 8 | R_MNC | 36.0 | 3,390,620 | 0.37 | 0.43 | 11.21 | 0.015 | 0.030 | 1,254,529 | 1,457,967 | 38,008,851 | 50,859 | 101,719 | |
| 9 | R_LCL | 34.2 | 1,399,933 | 0.37 | 0.43 | 11.15 | 0.015 | 0.030 | 517,975 | 601,971 | 15,609,250 | 20,999 | 41,998 | |
| 11 | U_INT | 53.3 | 28,461 | 0.33 | 0.46 | 12.45 | 0.014 | 0.029 | 9,392 | 13,092 | 354,336 | 398 | 825 | |
| 12 | U_EXP | 50.7 | 92,960 | 0.33 | 0.45 | 12.28 | 0.014 | 0.029 | 30,677 | 41,832 | 1,141,549 | 1,301 | 2,696 | |
| 14 | U_PA | 31.6 | 513,190 | 0.37 | 0.39 | 11.37 | 0.014 | 0.028 | 189,880 | 200,144 | 5,834,967 | 7,185 | 14,369 | |
| 16 | U_MNA | 30.3 | 581,512 | 0.38 | 0.39 | 11.36 | 0.014 | 0.028 | 220,975 | 226,790 | 6,605,977 | 8,141 | 16,282 | |
| 17 | U_MJC | 24.0 | 388,458 | 0.41 | 0.35 | 11.68 | 0.013 | 0.027 | 159,268 | 135,960 | 4,537,191 | 5,050 | 10,488 | |
| 19 | U_LCL | 22.9 | 157,609 | 0.41 | 0.36 | 11.75 | 0.013 | 0.027 | 64,620 | 56,739 | 1,851,909 | 2,049 | 4,255 | |
| | ALL | | 13,320,089 | | | | | | 2015 No-Build Total g/day | 4,873,428 | 7,265,407 | 152,603,861 | 217,498 | 418,364 |
| | | | | | | | | | Minus off-model adjustment g/day | 3,451 | 1,480 | 21,595 | 0 | 0 |
| | | | | | | | | | 2015 Build Total g/day | 4,869,977 | 7,263,927 | 152,582,266 | 217,498 | 418,364 |

ANALYSIS YEAR - 2025

| | FC | Avg Speed | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
|----|-------|-----------|------------|----------|----------|---------|---------------------|---------------------|---|------------------|------------------|----------------------|----------------------|----------------|
| 1 | R_INT | 55.7 | 3,302,716 | 0.19 | 0.34 | 10.48 | 0.014 | 0.030 | 627,516 | 1,122,923 | 34,612,460 | 46,238 | 99,081 | |
| 2 | R_PA | 53.0 | 1,591,302 | 0.18 | 0.26 | 10.79 | 0.013 | 0.028 | 286,434 | 413,739 | 17,170,150 | 20,687 | 44,556 | |
| 6 | R_MNA | 44.7 | 1,972,371 | 0.20 | 0.24 | 10.32 | 0.013 | 0.028 | 394,474 | 473,369 | 20,354,869 | 25,641 | 55,226 | |
| 7 | R_MJC | 42.5 | 958,046 | 0.20 | 0.21 | 10.45 | 0.012 | 0.027 | 191,609 | 201,190 | 10,011,576 | 11,497 | 25,867 | |
| 8 | R_MNC | 36.0 | 3,895,789 | 0.21 | 0.20 | 10.11 | 0.012 | 0.027 | 818,116 | 779,158 | 39,386,427 | 46,749 | 105,186 | |
| 9 | R_LCL | 34.2 | 1,609,741 | 0.21 | 0.20 | 10.06 | 0.012 | 0.027 | 338,046 | 321,948 | 16,193,992 | 19,317 | 43,463 | |
| 11 | U_INT | 53.3 | 63,579 | 0.18 | 0.22 | 11.25 | 0.012 | 0.027 | 11,444 | 13,987 | 715,262 | 763 | 1,717 | |
| 12 | U_EXP | 50.7 | 106,400 | 0.18 | 0.21 | 11.10 | 0.012 | 0.027 | 19,152 | 22,344 | 1,181,040 | 1,277 | 2,873 | |
| 14 | U_PA | 31.6 | 541,545 | 0.22 | 0.19 | 10.28 | 0.012 | 0.026 | 119,140 | 102,894 | 5,567,083 | 6,499 | 14,080 | |
| 16 | U_MNA | 30.3 | 602,442 | 0.22 | 0.19 | 10.28 | 0.012 | 0.026 | 132,537 | 114,464 | 6,193,107 | 7,229 | 15,663 | |
| 17 | U_MJC | 24.0 | 424,335 | 0.24 | 0.18 | 10.56 | 0.012 | 0.026 | 101,840 | 76,380 | 4,480,981 | 5,092 | 11,033 | |
| 19 | U_LCL | 22.9 | 173,009 | 0.25 | 0.18 | 10.62 | 0.012 | 0.026 | 43,252 | 31,142 | 1,837,359 | 2,076 | 4,498 | |
| | ALL | | 15,241,275 | | | | | | | | | | | |
| | | | | | | | | | 2025 No-Build Total g/day | 3,083,561 | 3,673,537 | 157,704,306 | 193,064 | 423,245 |
| | | | | | | | | | Minus off-model adjustment g/day | 2,777 | 793 | 20,090 | 0 | 0 |
| | | | | | | | | | 2025 Build Total g/day | 3,080,784 | 3,672,744 | 157,684,216 | 193,064 | 423,245 |

ANALYSIS YEAR - 2035

| | FC | Avg Speed | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
|----|-------|-----------|------------|----------|----------|---------|---------------------|---------------------|---|------------------|------------------|----------------------|----------------------|----------------|
| 1 | R_INT | 55.7 | 3,965,879 | 0.18 | 0.19 | 10.42 | 0.013 | 0.028 | 713,858 | 753,517 | 41,324,457 | 51,556 | 111,045 | |
| 2 | R_PA | 53.0 | 1,759,089 | 0.18 | 0.17 | 10.72 | 0.012 | 0.027 | 316,636 | 299,045 | 18,857,434 | 21,109 | 47,495 | |
| 6 | R_MNA | 44.7 | 2,181,421 | 0.19 | 0.16 | 10.25 | 0.012 | 0.027 | 414,470 | 349,027 | 22,359,565 | 26,177 | 58,898 | |
| 7 | R_MJC | 42.5 | 1,116,179 | 0.19 | 0.15 | 10.38 | 0.012 | 0.026 | 212,074 | 167,427 | 11,585,935 | 13,394 | 29,021 | |
| 8 | R_MNC | 36.0 | 4,481,647 | 0.20 | 0.14 | 10.05 | 0.012 | 0.026 | 896,329 | 627,431 | 45,040,549 | 53,780 | 116,523 | |
| 9 | R_LCL | 34.2 | 1,854,356 | 0.20 | 0.14 | 10.00 | 0.012 | 0.026 | 370,871 | 259,610 | 18,543,561 | 22,252 | 48,213 | |
| 11 | U_INT | 53.3 | 105,029 | 0.17 | 0.16 | 11.19 | 0.012 | 0.026 | 17,855 | 16,805 | 1,175,274 | 1,260 | 2,731 | |
| 12 | U_EXP | 50.7 | 122,080 | 0.18 | 0.15 | 11.04 | 0.012 | 0.026 | 21,974 | 18,312 | 1,347,763 | 1,465 | 3,174 | |
| 14 | U_PA | 31.6 | 575,457 | 0.21 | 0.14 | 10.23 | 0.012 | 0.026 | 120,846 | 80,564 | 5,886,921 | 6,905 | 14,962 | |
| 16 | U_MNA | 30.3 | 627,118 | 0.22 | 0.14 | 10.22 | 0.012 | 0.026 | 137,966 | 87,797 | 6,409,150 | 7,525 | 16,305 | |
| 17 | U_MJC | 24.0 | 464,647 | 0.24 | 0.15 | 10.50 | 0.011 | 0.026 | 111,515 | 69,697 | 4,878,791 | 5,111 | 12,081 | |
| 19 | U_LCL | 22.9 | 189,061 | 0.24 | 0.15 | 10.56 | 0.011 | 0.026 | 45,375 | 28,359 | 1,996,489 | 2,080 | 4,916 | |
| | ALL | | 17,441,962 | | | | | | | | | | | |
| | | | | | | | | | 2035 No-Build Total g/day | 3,379,770 | 2,757,590 | 179,405,889 | 212,616 | 465,363 |
| | | | | | | | | | Minus off-model adjustment g/day | 2,980 | 851 | 21,535 | 0 | 0 |
| | | | | | | | | | 2035 Build Total g/day | 3,376,790 | 2,756,739 | 179,384,354 | 212,616 | 465,363 |

Geneva Signals Project, PIN 475556, Ontario County, NY: Emissions Analysis for Rochester Area Transportation/Air Quality Conformity
22-Apr-11

Year 2015 No Build

| Link | FC | Speed | Length | Sea Adj | | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ |
|--|----|-------|--------|---------|-------|----------|----------|---------|---------------------|---------------------|---------------|---------------|----------------|----------------------|----------------------|
| | | | | AADT | DVMT | | | | | | | | | | |
| West North St (Castle to N. Main) | 16 | 14.1 | 1.00 | 7,169 | 8,316 | 0.57 | 0.48 | 12.62 | 0.014 | 0.028 | 4,740 | 3,992 | 104,948 | 116 | 233 |
| North St (N. Main to Exchange) | 16 | 14.1 | 0.50 | 6,097 | 3,536 | 0.57 | 0.48 | 12.62 | 0.014 | 0.028 | 2,016 | 1,697 | 44,625 | 50 | 99 |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 14.1 | 0.75 | 5,738 | 4,992 | 0.56 | 0.42 | 12.67 | 0.013 | 0.027 | 2,796 | 2,097 | 63,250 | 65 | 135 |
| Pulteney St (Washington to Castle) | 17 | 14.1 | 0.50 | 6,917 | 4,012 | 0.56 | 0.42 | 12.67 | 0.013 | 0.027 | 2,247 | 1,685 | 50,829 | 52 | 108 |
| N. Main St (Castle to W. North St) | 16 | 14.1 | 0.75 | 5,403 | 4,701 | 0.57 | 0.48 | 12.62 | 0.014 | 0.028 | 2,679 | 2,256 | 59,324 | 66 | 132 |
| Genesee St (Castle to North St) | 17 | 14.1 | 0.50 | 5,355 | 3,106 | 0.56 | 0.42 | 12.67 | 0.013 | 0.027 | 1,739 | 1,304 | 39,351 | 40 | 84 |
| Exchange St (Castle to North St) | 16 | 14.1 | 0.75 | 9,584 | 8,338 | 0.57 | 0.48 | 12.62 | 0.014 | 0.028 | 4,752 | 4,002 | 105,222 | 117 | 233 |
| 2015 No Build Total g/day | | | | | | | | | | | 20,969 | 17,033 | 467,547 | 506 | 1,024 |

Year 2015 Build

| Link | FC | Speed | Length | Sea Adj | | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ |
|--|----|-------|--------|---------|-------|----------|----------|---------|---------------------|---------------------|---------------|---------------|----------------|----------------------|----------------------|
| | | | | AADT | DVMT | | | | | | | | | | |
| West North St (Castle to N. Main) | 16 | 18.3 | 1.00 | 7,169 | 8,316 | 0.48 | 0.44 | 12.02 | 0.014 | 0.028 | 3,992 | 3,659 | 99,958 | 116 | 233 |
| North St (N. Main to Exchange) | 16 | 18.3 | 0.50 | 6,097 | 3,536 | 0.48 | 0.44 | 12.02 | 0.014 | 0.028 | 1,697 | 1,556 | 42,503 | 50 | 99 |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 18.3 | 0.75 | 5,738 | 4,992 | 0.46 | 0.38 | 12.12 | 0.013 | 0.027 | 2,296 | 1,897 | 60,504 | 65 | 135 |
| Pulteney St (Washington to Castle) | 17 | 18.3 | 0.50 | 6,917 | 4,012 | 0.46 | 0.38 | 12.12 | 0.013 | 0.027 | 1,845 | 1,524 | 48,622 | 52 | 108 |
| N. Main St (Castle to W. North St) | 16 | 18.3 | 0.75 | 5,403 | 4,701 | 0.48 | 0.44 | 12.02 | 0.014 | 0.028 | 2,256 | 2,068 | 56,503 | 66 | 132 |
| Genesee St (Castle to North St) | 17 | 18.3 | 0.50 | 5,355 | 3,106 | 0.46 | 0.38 | 12.12 | 0.013 | 0.027 | 1,429 | 1,180 | 37,643 | 40 | 84 |
| Exchange St (Castle to North St) | 16 | 18.3 | 0.75 | 9,584 | 8,338 | 0.48 | 0.44 | 12.02 | 0.014 | 0.028 | 4,002 | 3,669 | 100,219 | 117 | 233 |
| 37,000 | | | | | | | | | | | 17,518 | 15,553 | 445,953 | 506 | 1,024 |

2015 NoBuild - Build Change (reduction) g/day **3,451** **1,480** **21,595** **0** **0**

Year 2025 No Build

| Link | FC | Speed | Length | Sea Adj | | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ |
|--|----|-------|--------|---------|-------|----------|----------|---------|---------------------|---------------------|---------------|--------------|----------------|----------------------|----------------------|
| | | | | AADT | DVMT | | | | | | | | | | |
| West North St (Castle to N. Main) | 16 | 14.1 | 1.00 | 7,536 | 8,741 | 0.37 | 0.24 | 11.37 | 0.012 | 0.026 | 3,234 | 2,098 | 99,388 | 105 | 227 |
| North St (N. Main to Exchange) | 16 | 14.1 | 0.50 | 6,408 | 3,717 | 0.37 | 0.24 | 11.37 | 0.012 | 0.026 | 1,375 | 892 | 42,261 | 45 | 97 |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 14.1 | 0.75 | 6,401 | 5,569 | 0.36 | 0.22 | 11.42 | 0.012 | 0.026 | 2,005 | 1,225 | 63,601 | 67 | 145 |
| Pulteney St (Washington to Castle) | 17 | 14.1 | 0.50 | 7,716 | 4,476 | 0.36 | 0.22 | 11.42 | 0.012 | 0.026 | 1,611 | 985 | 51,110 | 54 | 116 |
| N. Main St (Castle to W. North St) | 16 | 14.1 | 0.75 | 5,679 | 4,941 | 0.37 | 0.24 | 11.37 | 0.012 | 0.026 | 1,828 | 1,186 | 56,181 | 59 | 128 |
| Genesee St (Castle to North St) | 17 | 14.1 | 0.50 | 5,974 | 3,465 | 0.36 | 0.22 | 11.42 | 0.012 | 0.026 | 1,247 | 762 | 39,569 | 42 | 90 |
| Exchange St (Castle to North St) | 16 | 14.1 | 0.75 | 10,074 | 8,764 | 0.37 | 0.24 | 11.37 | 0.012 | 0.026 | 3,243 | 2,103 | 99,647 | 105 | 228 |
| 2025 No Build Total g/day | | | | | | | | | | | 14,544 | 9,251 | 451,758 | 476 | 1,031 |

Year 2025 Build

| Link | FC | Speed | Length | Sea Adj | | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ |
|--|----|-------|--------|---------|-------|----------|----------|---------|---------------------|---------------------|---------------|--------------|----------------|----------------------|----------------------|
| | | | | AADT | DVMT | | | | | | | | | | |
| West North St (Castle to N. Main) | 16 | 18.3 | 1.00 | 7,536 | 8,741 | 0.30 | 0.22 | 10.85 | 0.012 | 0.026 | 2,622 | 1,923 | 94,843 | 105 | 227 |
| North St (N. Main to Exchange) | 16 | 18.3 | 0.50 | 6,408 | 3,717 | 0.30 | 0.22 | 10.85 | 0.012 | 0.026 | 1,115 | 818 | 40,328 | 45 | 97 |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 18.3 | 0.75 | 6,401 | 5,569 | 0.29 | 0.20 | 10.94 | 0.012 | 0.026 | 1,615 | 1,114 | 60,927 | 67 | 145 |
| Pulteney St (Washington to Castle) | 17 | 18.3 | 0.50 | 7,716 | 4,476 | 0.29 | 0.20 | 10.94 | 0.012 | 0.026 | 1,298 | 895 | 48,962 | 54 | 116 |
| N. Main St (Castle to W. North St) | 16 | 18.3 | 0.75 | 5,679 | 4,941 | 0.30 | 0.22 | 10.85 | 0.012 | 0.026 | 1,482 | 1,087 | 53,612 | 59 | 128 |
| Genesee St (Castle to North St) | 17 | 18.3 | 0.50 | 5,974 | 3,465 | 0.29 | 0.20 | 10.94 | 0.012 | 0.026 | 1,005 | 693 | 37,906 | 42 | 90 |
| Exchange St (Castle to North St) | 16 | 18.3 | 0.75 | 10,074 | 8,764 | 0.30 | 0.22 | 10.85 | 0.012 | 0.026 | 2,629 | 1,928 | 95,090 | 105 | 228 |
| 39,673 | | | | | | | | | | | 11,767 | 8,458 | 431,668 | 476 | 1,031 |

2025 NoBuild - Build Change (reduction) g/day **2,777** **793** **20,090** **0** **0**

Year 2035 No Build

| Link | Sea Adj | | | | | | | | | | | | | | | |
|--|---------|-------|--------|--------|-------|----------|----------|---------|---------------------|---------------------|---------------|--------------|----------------|----------------------|----------------------|--|
| | FC | Speed | Length | AADT | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
| West North St (Castle to N. Main) | 16 | 14.1 | 1.00 | 7,921 | 9,188 | 0.36 | 0.19 | 11.31 | 0.012 | 0.026 | 3,308 | 1,746 | 103,920 | 110 | 239 | |
| North St (N. Main to Exchange) | 16 | 14.1 | 0.50 | 6,736 | 3,907 | 0.36 | 0.19 | 11.31 | 0.012 | 0.026 | 1,407 | 742 | 44,188 | 47 | 102 | |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 14.1 | 0.75 | 7,141 | 6,213 | 0.35 | 0.19 | 11.36 | 0.011 | 0.026 | 2,175 | 1,180 | 70,580 | 68 | 162 | |
| Pulteney St (Washington to Castle) | 17 | 14.1 | 0.50 | 8,608 | 4,993 | 0.35 | 0.19 | 11.36 | 0.011 | 0.026 | 1,748 | 949 | 56,720 | 55 | 130 | |
| N. Main St (Castle to W. North St) | 16 | 14.1 | 0.75 | 5,970 | 5,194 | 0.36 | 0.19 | 11.31 | 0.012 | 0.026 | 1,870 | 987 | 58,742 | 62 | 135 | |
| Genesee St (Castle to North St) | 17 | 14.1 | 0.50 | 6,665 | 3,865 | 0.35 | 0.19 | 11.36 | 0.011 | 0.026 | 1,353 | 734 | 43,912 | 43 | 101 | |
| Exchange St (Castle to North St) | 16 | 14.1 | 0.75 | 10,589 | 9,212 | 0.36 | 0.19 | 11.31 | 0.012 | 0.026 | 3,316 | 1,750 | 104,191 | 111 | 240 | |
| 2035 No Build Total g/day | | | | | | | | | | | 15,176 | 8,089 | 482,253 | 496 | 1,107 | |

Year 2035 Build

| Link | Sea Adj | | | | | | | | | | | | | | | |
|--|---------|-------|--------|--------|---------------|-------------------------------|----------|---------|---------------------|---------------------|---------------|--------------|----------------|----------------------|----------------------|--|
| | FC | Speed | Length | AADT | DVMT | EF - VOC | EF - NOx | EF - CO | EF PM ₂₅ | EF PM ₁₀ | SUM VOC | SUM NOx | SUM CO | SUM PM ₂₅ | SUM PM ₁₀ | |
| West North St (Castle to N. Main) | 16 | 18.3 | 1.00 | 7,921 | 9,188 | 0.29 | 0.17 | 10.79 | 0.012 | 0.026 | 2,665 | 1,562 | 99,142 | 110 | 239 | |
| North St (N. Main to Exchange) | 16 | 18.3 | 0.50 | 6,736 | 3,907 | 0.29 | 0.17 | 10.79 | 0.012 | 0.026 | 1,133 | 664 | 42,156 | 47 | 102 | |
| E. Castle St (Pulteney to NY 5 & US20) | 17 | 18.3 | 0.75 | 7,141 | 6,213 | 0.28 | 0.17 | 10.88 | 0.011 | 0.026 | 1,740 | 1,056 | 67,598 | 68 | 162 | |
| Pulteney St (Washington to Castle) | 17 | 18.3 | 0.50 | 8,608 | 4,993 | 0.28 | 0.17 | 10.88 | 0.011 | 0.026 | 1,398 | 849 | 54,323 | 55 | 130 | |
| N. Main St (Castle to W. North St) | 16 | 18.3 | 0.75 | 5,970 | 5,194 | 0.29 | 0.17 | 10.79 | 0.012 | 0.026 | 1,506 | 883 | 56,042 | 62 | 135 | |
| Genesee St (Castle to North St) | 17 | 18.3 | 0.50 | 6,665 | 3,865 | 0.28 | 0.17 | 10.88 | 0.011 | 0.026 | 1,082 | 657 | 42,056 | 43 | 101 | |
| Exchange St (Castle to North St) | 16 | 18.3 | 0.75 | 10,589 | 9,212 | 0.29 | 0.17 | 10.79 | 0.012 | 0.026 | 2,672 | 1,566 | 99,400 | 111 | 240 | |
| | | | | | 42,573 | 2035 Build Total g/day | | | | | 12,195 | 7,237 | 460,718 | 496 | 1,107 | |

2035 NoBuild - Build Change (reduction) g/day 2,980 851 21,535 0 0

Notes:

Emission Factors - NYSDOT Emission Factor Look Up Program based on June 2008 MOBILE6.2 emission factor tables, ICG concurred February 16, 2011

Speed Estimates: Draft CMAQ Application / Note: No speed change over time. Congestion due to signal delays, not congestion, ICG concurred April 21, 2010 No changes since initial analysis

Seasonal adjustment factor = 1.16 for urban facilities

FC = Roadway Functions Class / 14=Urban Principal Arterial 16=Urban Minor Arterial, 17=Urban Collector

Traffic growth rates: 1.1% for urban collectors, 0.5% for urban arterials

Speed unit =miles/hour

Length unit = miles

AADT=Average Annual Daily Traffic

DVMT = Daily Vehicle Miles Traveled, adjusted for summer

EF = MOBILE 6.2 Emission Factor in grams/mile