



**GENESEE TRANSPORTATION COUNCIL**



**Resolution 07-7      Adopting the *Long Range Transportation Plan for the Genesee-Finger Lakes Region: 2007-2027 Update***

**WHEREAS,**

1. Title 23, Section 134 of the United States Code requires that each Metropolitan Planning Organization (MPO) prepare and update a long range transportation plan (LRTP) for its metropolitan area;
2. Title 23, Section 134 of the United States Code requires that an LRTP shall, at a minimum, identify transportation facilities that should function as an integrated system, and include a fiscally-constrained financial plan for implementing the recommendations contained in the LRTP;
3. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law on August 10, 2005 and mandated additional elements that must be incorporated into a MPO LRTP by July 1, 2007;
4. The specific elements mandated by SAFETEA-LU are further defined by the Metropolitan Transportation Planning Final Rule that was published jointly by the Federal Highway Administration and Federal Transit Administration on February 14, 2007;
5. GTC in consultation with affected stakeholders and the general public has developed the *Long Range Transportation Plan for the Genesee-Finger Lakes Region: 2007-2027 Update* in a manner that meets and exceeds the requirements of Title 23, Section 134 of the United States Code and the February 14, 2007 Metropolitan Transportation Planning Final Rule;
6. SAFETEA-LU requires the incorporation of a Congestion Management Process (CMP) into the metropolitan transportation planning process of Transportation Management Areas (TMAs);
7. The *FY 2007-2008 Unified Planning Work Program* includes Task 7710, Congestion Management Process Implementation, which has been completed and incorporated into said LRTP to meet and exceed the requirements of SAFETEA-LU for incorporating the identification of congested roadways, activities to mitigate the congestion, and measures to monitor performance into the metropolitan transportation planning process;
8. The *FY 2007-2008 Unified Planning Work Program* includes Task 5291, LRTP Non-Air Environmental Scan, which has been completed and incorporated into said LRTP to meet and exceed the requirements of SAFETEA-LU for incorporating the identification of non-traditional partners, the full scope of environmental considerations, and activities to mitigate negative non-air quality related impacts into the metropolitan transportation planning process; and
9. Said LRTP has been developed and reviewed by GTC staff and member agencies through the GTC committee process and its recommendations have been found to be consistent with the principles of sound transportation planning practices.

**NOW, THEREFORE, BE IT RESOLVED**

1. That the Genesee Transportation Council hereby adopts the *Long Range Transportation Plan for the Genesee-Finger Lakes Region: 2007-2027 Update* as the official LRTP for the Rochester TMA in accordance with Title 23, Section 134 of the United States Code and the February 14, 2007 Metropolitan Transportation Planning Final Rule;
2. That the Council hereby accepts the report, *Long Range Transportation Plan Non-Air Environmental Issue Scan*, as evidence of completion of UPWP Task 5291 by its incorporation in the official LRTP for the Rochester TMA; and
3. That the Council encourages those responsible for the development and advancement of transportation projects in the Rochester TMA to do their utmost to adhere to its principles and recommendations in carrying out their respective programs.

#### **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 21, 2007.

Date:

6/21/07

A handwritten signature in black ink that reads "Kevin B O'Buckley". The signature is written in a cursive style and is positioned above a horizontal line.

KEVIN O'BUCKLEY, Secretary  
Genesee Transportation Council

**GENESEE TRANSPORTATION COUNCIL**



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If you have questions or comments about this document, please contact the Genesee Transportation Council at CityPlace, 50 West Main Street, Suite 8112, Rochester, NY 14614-1227; telephone (585) 232-6240, fax (585) 262-3106, or via e-mail at [contactgtc@gtcmpo.org](mailto:contactgtc@gtcmpo.org).

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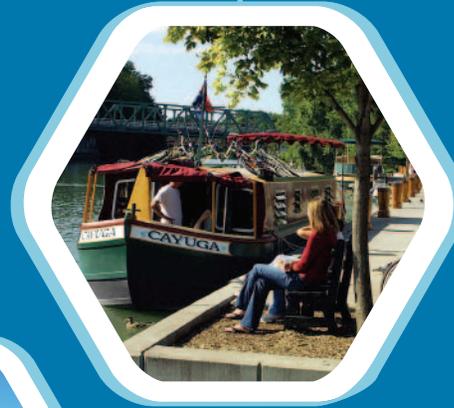
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**GENESEE TRANSPORTATION COUNCIL**



## CHAPTER I - INTRODUCTION



# INTRODUCTION



Located in western-central New York State, the nearly 4,700 square-mile Genesee-Finger Lakes Region stretches south from the shores of Lake Ontario to the low rolling hills of the Appalachian Highlands. Many striking natural features and scenic vistas lie within the nine-county region including the western Finger Lakes, the Genesee River, and Letchworth State Park, commonly known as the "Grand Canyon of the East".

Founded in 1803 and incorporated in 1834, Rochester is New York State's third largest city (2000 population: 219,773) and the internationally recognized corporate and cultural center of the region that includes the counties of Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates. The region is home to approximately 1.2 million residents and nearly 30,000 businesses with over one-half million employees.

The region is known throughout the world as a leader in the development and production of optics and imaging products and technologies. The region's preeminence in these industries began in the late 19th century with the founding of Eastman Kodak and Bausch & Lomb in Rochester and has expanded significantly as other firms throughout the region have made advances in optics and imaging (photonics) technologies and integrated them into other sectors, including biotechnology and telecommunications.

In addition to optics and imaging, the region is a major manufacturer of precision instruments, fabricated metals, and transportation equipment. More persons are employed by manufacturing and related support service firms in this region than in any other in New York State.

Agriculture is also an important component of the regional economy with the production of fruits, vegetables, and dairy products both for export and in support of the expanding food processing sector and world-class wineries in the region.

Given the region's production of high-quality goods and its close proximity to major population centers in the United States and Canada, it is not surprising that the region is a major exporter both domestically and internationally. As a national leader in export value per capita, the region exported over \$13 billion of products to more than 170 countries worldwide in 2001 - more than 40 of the 50 states.

With over 82,000 full- and part-time students, the more than 20 two- and four- year universities and colleges in the region are essential to training the future workforce, upgrading the skills of employees and those seeking work, and acting as an economic catalyst by employing over 6,000 persons. Furthermore, these institutions play a vital role alongside local industry in creating an environment of innovation that is unequaled in the nation as measured by the number of patents issued per worker.

Cultural and historical attractions abound throughout the region. The City of Rochester plays host to museums of science and art, theatrical productions, the Strong National Museum of Play, Rochester Philharmonic Orchestra, the George Eastman House and its International Museum of Photography and Film, and several festivals. From a historical standpoint, the region is renowned as the birthplace of the women's suffrage movement, center of the abolitionist movement, and for its American Indian heritage. This renowned past is preserved and celebrated in numerous venues including the Women's Rights National Historic Park, the Susan B. Anthony House, and the Ganondagan State Historical Site.

The average daily high temperature in Rochester varies from 31 degrees Fahrenheit in January to 81 degrees Fahrenheit in July, providing recreational opportunities that range from downhill skiing during the winter to water sports and fishing in the summer. In addition, the region's local and state parks offer year-round opportunities to enjoy a range of outdoor activities and the changing of the seasons.

An integral part of the region's character is its spirit of philanthropy. The legacy of giving that was established by George Eastman and other early civic leaders continues through the charitable foundations that they and their counterparts throughout the region's history have created. More significant than the largess of the more notable benefactors is the level of giving by residents of more modest incomes, as evidenced by Rochester and Monroe County consistently placing among the leading areas in the nation in per capita charitable contributions.



## TRANSPORTATION'S ROLE

While topography and natural features shaped the earliest physical development of the region, it was the opening of the Erie Canal in 1825 that laid the foundation for the Genesee-Finger Lakes Region's prosperous future. The presence of such an efficient transportation route to America's frontier enabled entrepreneurial skills and talents to be combined with the natural resources necessary to fill a burgeoning nation's demand for goods and provisions.

Even though the Erie Canal eventually gave way to railroads and then highways as the primary modes of travel, it remains a prime example of the impacts that the transportation system can have on the character and development of a region.

Regardless of the form it takes in the future, the ability of the transportation system to safely and efficiently move people and goods will continue to be a major factor in determining the quality of life and economic success of the region. Accordingly, the mission of the Genesee Transportation Council is to maximize the contribution of the transportation system to the social and economic vitality of the nine-county Genesee-Finger Lakes Region.

The *Long Range Transportation Plan for the Genesee-Finger Lakes Region: 2007-2027 Update* (LRTP Update) has been developed in a manner wholly consistent with this mission and provides a 20-year perspective of existing and projected transportation system capabilities, needs, objectives, and strategies to achieve these objectives. The LRTP Update serves as the framework for guiding the planning and implementation of transportation improvements in the region.

## HOW THE LRTP UPDATE IS ORGANIZED

**Chapter 1 - Introduction** has provided an overview of why the region is a world-class community and the role that transportation has and will play in continuing this tradition.

**Chapter 2 - The Plan** provides an overview of the LRTP Update, discusses the role of the Genesee Transportation Council in transportation policy, planning, and investment decision making in the region, and describes the methodology used to develop the LRTP Update.

**Chapter 3 - The Region** highlights demographic and economic conditions (both current and projected) and identifies opportunities and issues that transportation can materially benefit, including principal themes.

**Chapter 4 - The Transportation System** discusses the current and projected characteristics of the transportation system by mode, including accomplishments since the completion of the previous LRTP in 2004.

**Chapter 5 - Recommendations** details the policies and actions for implementation to maximize the contribution of the transportation system to the social and economic vitality of the region.

**Chapter 6 - Finance and Implementation** discusses the approach for advancing the policies and actions of the LRTP Update within the fiscal constraints of reasonably available funding.

**Chapter 7 - Follow-on Activities** presents performance measures to determine the impacts of the policies and actions in improving transportation with respect to the GTC Goals and Objectives.

**GENESEE TRANSPORTATION COUNCIL**



## CHAPTER II - THE PLAN





## OVERVIEW

The purpose of the LRTP Update is to provide a 20-year perspective of existing and projected transportation system capabilities, needs, and associated objectives, as well as recommended policies and actions to meet these objectives.

As the designated Metropolitan Planning Organization (MPO) for the Genesee-Finger Lakes Region, the Genesee Transportation Council (GTC) is responsible for the development and maintenance of the LRTP for 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.

The following page presents a map of the nine-county Genesee-Finger Lakes Region, highlighting the Rochester TMA (Map 1).

Recognizing that the transportation system in the Rochester TMA both greatly influences and is influenced by the transportation system in the surrounding area, the LRTP Update discusses the system in the context of the entire nine-county region.

Neither the policies nor actions included in the LRTP Update represent funding commitments for specific projects. Rather, the policies and actions are intended to serve as a framework for future transportation planning and investment decision making.

As discussed below, implementation of the policies and actions included in the LRTP Update typically take the form of specific projects funded through the Transportation Improvement Program. Accordingly, federal funds for transportation improvements in the Rochester TMA are programmed by GTC and improvements outside the TMA are programmed by the New York State Department of Transportation (NYSDOT).

## THE GENESEE TRANSPORTATION COUNCIL

### Responsibilities

The U.S. Department of Transportation (USDOT) requires every metropolitan area with a population of over 50,000 to have a designated MPO to qualify for the receipt of federal highway and transit funds.

GTC is the designated MPO responsible for transportation policy, planning, and investment decision making in the Genesee-Finger Lakes Region.

To maintain the federally-certified planning process required by USDOT in order to receive federal transportation funding, GTC must at a minimum produce and maintain three major products:

#### 1. Long Range Transportation Plan (LRTP)

As stated earlier, this product provides a 20-year perspective of existing and projected transportation system capabilities, needs, and associated objectives, as well as recommended policies and actions to meet these objectives.

The LRTP serves as a framework for guiding federally-funded transportation planning and investment decision making. The LRTP must be updated every four years.

#### 2. Unified Planning Work Program (UPWP)

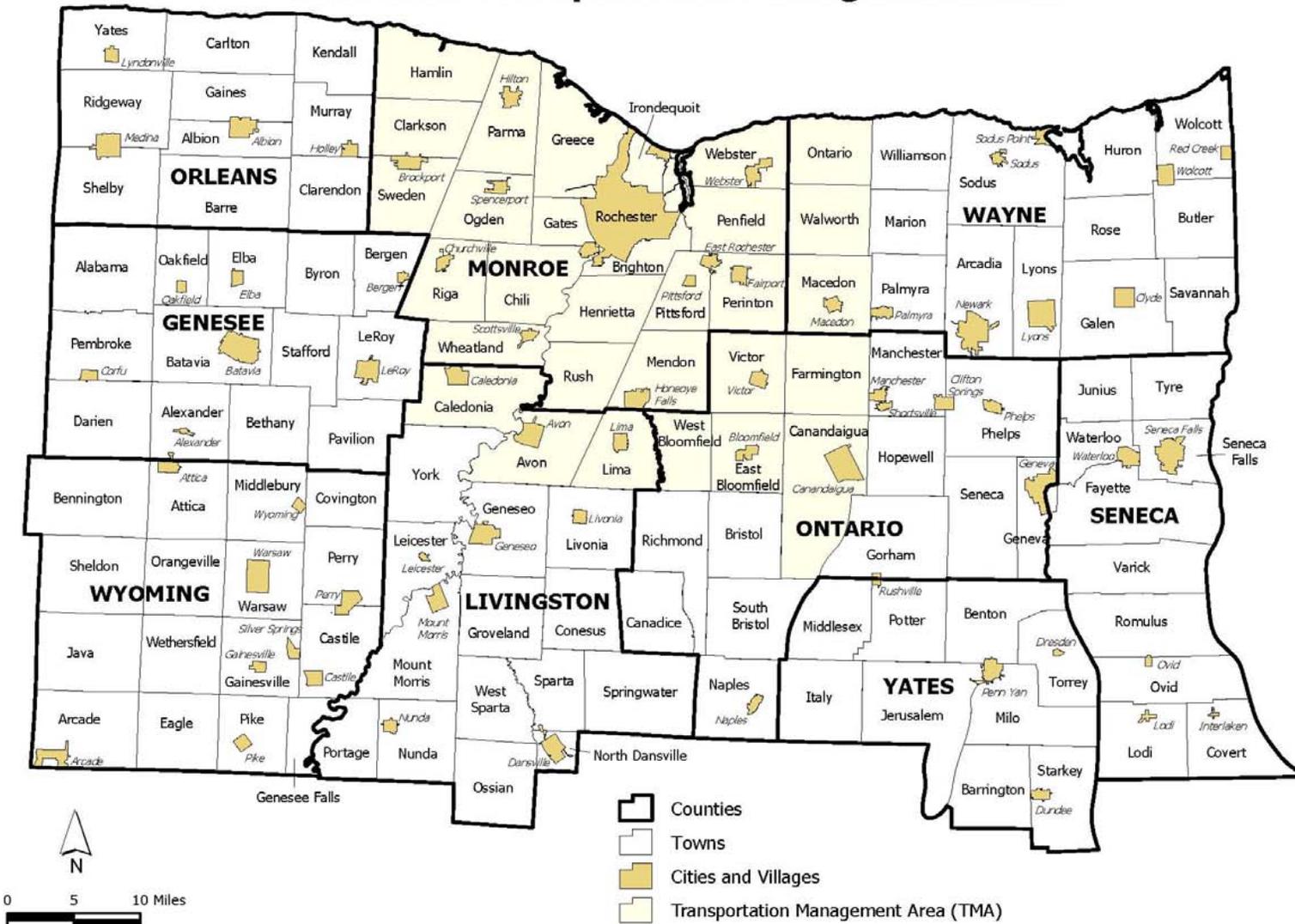
This product programs federally-funded transportation planning activities to further develop the policies and actions contained in the LRTP into concept-level projects and programs.

The UPWP allocates funding for both specific planning projects (e.g., corridor studies, strategic plans for public transportation, etc.) and on-going programmatic activities (e.g., travel demand modeling, bicycle and pedestrian planning assistance, etc.). The UPWP is updated annually.



## GTC Planning Region and Rochester Transportation Management Area

**Map 1**





### 3. Transportation Improvement Program (TIP)

This product identifies and schedules the specific transportation improvements that will receive federal transportation funding over the next five years.

Projects included in the TIP typically emerge from recommendations identified in projects and programs in the UPWP and infrastructure needs identified by member agencies. The TIP is updated every two years.

GTC and NYSDOT work cooperatively to develop the TIP. GTC is responsible for the development of the TIP within the Rochester TMA and NYSDOT has purview over projects included in the TIP that are outside the Rochester TMA.

In addition to completing these three major products, GTC also undertakes various other USDOT-mandated activities and programs. Examples include the GTC Public Participation Policy, Congestion Management Process, and air quality conformity determination requirements.

In order to more effectively meet local and regional transportation planning needs, GTC continues to develop increased proficiency in several other technical fields including, but not limited to, bicycle and pedestrian planning, travel demand modeling, and intelligent transportation systems.

All GTC activities are responsive to mandates and guidelines including, but not limited to, the Americans with Disabilities Act, Clean Air Act Amendments of 1990, Title VI of the Civil Rights Act of 1964, and environmental justice considerations.

The framework established in this LRTP Update, the selection of planning activities carried out through the UPWP, the investment decisions programmed in the TIP, and all other activities and programs conducted by GTC are wholly consistent with the GTC Goals and Objectives.

These goals and objectives reflect local and regional objectives within the context of the eight major transportation planning focus areas established by the federal Safe, Accountable, Flexible, Efficient Transportation Equity

Act: A Legacy for Users (SAFETEA-LU), enacted in 2004. The GTC Goals and Objectives are presented below in Exhibit 1.

## EXHIBIT 1 - GTC GOALS & OBJECTIVES

- 1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency**
  - A. The transportation system should support balanced community and economic development of the metropolitan area
  - B. The transportation system should be a distinguishing competitive feature of the metropolitan area relative to other areas, serving the needs of existing businesses and enhancing the region's attractiveness to new business
- 2. Increase the safety of the transportation system for motorized and non-motorized users**
  - A. Transportation designs, services, and education programs should enhance and protect life, health, and property
- 3. Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users**
  - A. The transportation system, and its associated programs and services, should support both national and personal security initiatives
- 4. Increase the accessibility and mobility options available to people and freight**
  - A. The transportation system should provide the capacity, coverage and coordination necessary to provide mobility to the region's population and commercial activities in a fashion consistent with the overall intent of Goal 1



- B. Reasonable travel alternatives should be available to all persons in the area regardless of age, physical or mental ability, and/or income

## 5. Protect and enhance the natural environment, cultural heritage and community appearance, and promote energy conservation

- A. Transportation planning and decision making should support and reinforce local land use and development objectives
- B. Transportation planning and decision making should recognize local priorities balanced with broader community goals
- C. Transportation planning and decision making should strive to address issues on a corridor level, recognizing both the multi-jurisdictional component of travel and the interrelationship between transportation and non-transportation policies and investments
- D. The transportation system should encourage the efficient use of non-renewable energy resources and the exploration of renewable alternatives
- E. Transportation planning and decision making should strive to embrace designs and processes that respect the natural environment and enhance the overall contribution of the transportation system to community livability

## 6. Promote efficient system management and operations

- A. The transportation system should be designed and managed in a fashion that minimizes lifetime maintenance and user costs
- B. Transportation investments should advance the Long Range Transportation Plan's goals and objectives in a fashion which maximizes benefits relative to costs \*
- C. Transportation and land use planning should be integrated in a fashion that optimizes the use of existing transportation and other municipal infrastructure

- D. Transportation investments should be guided by cooperative planning, design, and maintenance standards to promote system continuity and uniformity across jurisdictional boundaries

## 7. Facilitate partnerships in planning, financing, and the execution of transportation initiatives

- A. The transportation planning and decision making process should be multi-jurisdictional, fostering coordination and cooperation among local, county, state, and federal governments, concerned agencies, and the private sector
- B. The transportation planning process should be conducted in as open and visible a manner as possible, encouraging community participation and interaction between and among citizens, professional staff, and elected officials
- C. Financial and non-financial support for transportation initiatives should be provided by all levels of government and the private sector in a fashion which reflects their relative responsibilities for, and/or benefits from, the initiatives and related economic and social impacts
- D. Innovative financing/partnerships for transportation initiatives that reflect the full scope of interests impacted or served should be explored
- E. Transportation and transportation-related information resources should be developed and shared in a fashion that promotes informed public and private sector decision making
- F. Awareness should be promoted regarding the impact of individual, public, and private sector decisions on the quality of mobility and the potential impact of these decisions on others

\* Note: Benefits and costs are broadly defined, quantitative as well as qualitative, non-monetary as well as monetary, and involve non-transportation effects as well as those related to the direct provision of transportation services.



## Organizational Structure

GTC is governed by a 27-member policy committee (the GTC Board) which is supported by the Executive Committee, Planning Committee, and various other committees. Their various roles in the MPO process are discussed below:

### GTC Board

The GTC Board is the governing body of GTC. It provides direction and establishes policy with regard to the roles and responsibilities of GTC as the designated MPO for the region. The GTC Board approves all activities and work products, including the LRTP, UPWP, and TIP.

The 27 members of the GTC Board include elected officials from the nine counties of the region, the City of Rochester, and representatives of other local, regional, state, and federal agencies. GTC Board Officers are elected from among the members.

A listing of current GTC Board members is presented below in Exhibit 2.

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Exhibit 2 – **GTC BOARD MEMBERS** (AT THE TIME OF LRTP ADOPTION)

## COUNTY LEGISLATURES/BOARDS OF SUPERVISORS (9)

Genesee County - Mary Pat Hancock, Chair\*  
Livingston County\* - James Merrick, Chair  
Monroe County - Wayne Zyra, President  
Ontario County\* - Theodore Fafinski, Chair  
Orleans County - George Bower, Chair  
Seneca County - Edward Barto, Chair  
Wayne County\* - James Hoffman, Chair  
Wyoming County - A. Douglas Berwanger, Chair  
Yates County - Robert Multer, Chair

## REGIONAL AGENCIES (2)

Genesee/Finger Lakes Regional Planning Council\* - James Hoffman, Chair  
Rochester-Genesee Regional Transportation Authority\* - John G. Doyle, Jr., Chair

## OTHER LOCAL MEMBERS (9)

Monroe County Executive\* - Maggie Brooks, County Executive  
Monroe County Planning Board - Linda A. Faubel, Acting Chair  
Monroe County Supervisors' Association - Tracy Logel, President  
Monroe County At-Large - Daniel Hogan, At-Large Member  
Edward Marianetti - At-Large Member  
Mayor - City of Rochester\* - Robert Duffy, Mayor  
Rochester City Council - Lois Giess, President  
Rochester City Planning Commission - David L. Watson, Chair  
Rochester At-Large - Paul E. Haney, At-Large Member

## STATE AGENCIES (4)

Empire State Development Corporation - Daniel Gunderson, Upstate Chair  
NYS Department of Environmental Conservation - Pete Grannis, Commissioner  
NYS Department of Transportation\* - Astrid C. Glynn, Commissioner  
NYS Thruway Authority - Michael R. Fleischer, Executive Director

## FEDERAL AGENCIES (3)

Federal Aviation Administration\*\* - Phillip Brito, Manager, NYADO  
Federal Highway Administration\*\* - Robert Arnold, Division Administrator  
Federal Transit Administration\*\* - Brigid Hynes-Cherin, Regional Administrator

## COUNCIL OFFICERS:

Maggie Brooks, Chair  
Mary Pat Hancock, Vice-Chair  
Kevin O'Buckley, Secretary

\* Executive Committee Member

\*\* Non-voting member



The GTC Board meets quarterly, or as required. Each GTC Board meeting is open to the public and advertised as such through media outlets across the region. A public forum is included at the beginning of all meetings to allow for public comment on meeting agenda items before GTC Board action is taken.

## Executive Committee

The Executive Committee is a subset of the GTC Board responsible for specific decision making related to administrative, organizational, and financial issues affecting GTC and its staff.

The Executive Committee is comprised of the chairperson of the GTC Board, the lead elected officials of the Rochester TMA counties, the mayor of the City of Rochester, the chairperson of the Rochester Genesee Regional Transportation Authority (RGRTA), the chairperson of the Genesee/Finger Lakes Regional Planning Council (G/FLRPC), and the regional director of NYSDOT.

The Executive Committee meets as needed at the discretion of the GTC Board Chairperson.

## Planning Committee

The Planning Committee provides professional and technical direction to the GTC Board. With input from the various committees noted below, the Planning Committee reviews and recommends action on all activities and work products that are considered by the GTC Board.

Each member of the GTC Board appoints a representative to the Planning Committee. The Planning Committee representative is typically a transportation or planning professional.

The Planning Committee meets eight times per year during the months that GTC Board meetings are not held, or as required. Each Planning Committee meeting is open to the public and advertised as such through media outlets across the region.

A public forum is included at the beginning of all meetings to allow for public comment on meeting agenda items before Planning Committee recom-

mendations to the GTC Board are made. A second public forum is included near the end of all meetings to allow for public comment on Planning Committee recommendations prior to GTC Board action.

The other committees that support GTC in executing its responsibilities include the LRTP Development Committee, UPWP Development Committee, and TIP Development Committee, as well as the Accessible Transportation Advisory Committee.

GTC staff, in conjunction with key staff of GTC member agencies, provides professional and technical support for the execution of policies, programs, and projects established by the GTC Board, consistent with the responsibilities discussed in the preceding section.

## HOW THE LRTP UPDATE WAS DEVELOPED

The development of the LRTP Update began in July 2006 with the creation of a critical path schedule that identified and programmed the steps necessary to produce the LRTP Update. It was recognized immediately that the process employed to produce the LRTP Update would determine its success in identifying policies and actions that most effectively meet the needs of transportation system users over the next 20 years.

Accordingly, the process used to develop the LRTP Update included the following key phases:

1. Identification of opportunities and issues facing the region
2. Development of alternatives to maximize the opportunities and address the issues
3. Selection of preferred alternatives (policies and actions) for inclusion in the LRTP Update
4. Adoption of the LRTP Update by the GTC Board

The first phases combined both technical transportation planning and public involvement activities. These activities were divided into the following categories:

# THE PLAN



- \* Data and Information Analysis
- \* Review of Existing Plans and Studies
- \* Public Involvement
- \* Committee Involvement

## Development Phases

### 1. Identification of Opportunities and Issues

The identification of opportunities and issues phase was conducted in Winter 2006/2007 to determine where we, as a region, want to be over the 20-year period covered by the LRTP Update. An analysis of historical, current, and projected population, household, business establishment, and employment data was performed.

During this phase, the characteristics of the transportation system were not considered. The primary purpose of this phase was to determine what the ideal position of the region should be in 20 years with respect to:

- \* Economic Development
- \* Land Use
- \* Environment and Natural Resources
- \* Social and Human Services
- \* Parks, Recreation, and Open Space
- \* Historic Resources
- \* Safety and Security
- \* Fiscal Health

This phase was critical to assuring that the policies and actions included as recommendations in this LRTP Update are not self-serving but instead will strengthen this region's position as a world-class community when implemented over the next 20 years.

### 2. Development of Alternatives

The development of alternatives phase was conducted in Spring 2007 to identify the full range of transportation options available to the region over the next 20 years. An emphasis was placed on identifying policies and actions to guide the development of physical and operational im-

provements, new or modified services, and other strategies that responded to the opportunities and issues identified in the previous phase.

An inventory and analysis of the existing transportation system was conducted to determine how the system is used today and, if past trends continue, how it will be used in the future. Transportation improvements that were completed since the adoption of the last LRTP in December 2004 or are currently underway were identified. Included in this analysis was an assessment of the performance of the transportation system based on current and projected uses.

Once the performance of the transportation system now and in the future was determined, a review of recommendations included in transportation plans and studies completed since the last LRTP was performed. In addition, concept-level alternatives were developed to complete the identification of the full range of alternatives (along with associated costs) without regard to the fiscal constraints imposed by limited funding.

### 3. Selection of Preferred Alternatives

The selection of preferred alternatives phase was conducted in April and May 2007 to determine those alternatives that would best maximize the opportunities and address the issues facing the region over the next 20 years with respect to transportation.

The full range of transportation alternatives available to the region that was developed in the previous phase was reviewed. Given that the LRTP Update serves as a framework for future transportation planning (via the UPWP) and investment decision making (via the TIP), the selection of preferred alternatives included identifying policies and actions that would best maximize the transportation system's contribution to the social and economic vitality of the region.

In order to involve a broader range of stakeholders, GTC consulted with a number of non-traditional partners during this phase. These non-traditional partners included federal agencies such as the U.S. Department of Housing & Urban Development and the U.S. Army Corps of Engineers, New York State agencies such as the Office of Parks, Recreation, and Historic Preservation, regional agencies such as the Center for Dis-



ability Rights and the Landmark Society of Western New York, local groups such as the Keuka Lake Association and the Genesee County Soil & Water Conservation District, and a tribal government, the Tonawanda Band of Senecas.

The LRTP Update must be a fiscally constrained plan. Accordingly, reasonably available transportation revenues were projected for the 20 years covered by the LRTP Update. Based on the revenue projections, a financing strategy for advancing the preferred alternatives was developed.

#### 4. Adoption of the LRTP Update

This LRTP Update document was produced in Summer 2007 providing a record of the findings, outcomes, and decisions that resulted from the completion of the phases discussed above. The GTC Board adopted the LRTP Update at its June 2007 quarterly meeting.

### Development Activities

#### 1. Data and Information Analysis

The analyses of current and projected demographic and economic conditions as well as the characteristics of the existing and future transportation system relied heavily on data collected from federal and state sources as well as additional data developed by GTC and G/FLRPC.

Historical and current population and household data was obtained from the decennial census of population and housing produced by the U.S. Census Bureau.

Projections of population and households to the horizon year of the previous LRTP (2025) were developed by G/FLRPC based on the *Regional Population Forecasts* produced as part of the *FY 2003-2004 UPWP*.

Business establishment and employment data were obtained from the New York State Department of Labor (NYSDOL) Quarterly Census of Employment and Wages (QCEW) data set which accounts for workers employed by establishments covered under the state's Unemployment Insurance Law - approximately 97 percent of non-farm employment. In addition, the decennial

census noted above was utilized for data on the numbers of at-home workers.

Projections of manufacturing, retail, and total employment to 2027 were developed by GTC based on historical changes in the NYSDOL QCEW data.

Place of residence, place of employment, and journey-to-work data were obtained from the Census Transportation Planning Package (CTPP) produced by the USDOT Bureau of Transportation Statistics.

Information on travel characteristics were obtained from the 2001 National Household Transportation Survey (NHTS) and 1995 National Personal Transportation Survey (NPTS) add-ons for the Rochester area, provided to GTC by NYSDOT.

Vehicular crash data was obtained from the National Highway Transportation Safety Administration and the New York State Department of Motor Vehicles.

The current and historical annual average daily traffic (AADT) counts and the percentage of trucks in those counts used in the analysis of the transportation system are collected by NYSDOT.

Data on freight movements by commodity and county are derived from the TRANSearch data set, provided to GTC by NYSDOT.

Data outputs from the GTC Travel Demand Model including vehicle miles traveled and volume/capacity ratios were also incorporated in the analysis of the existing and future transportation systems that serves as the basis for the Congestion Management Process.

Ridership counts for public transportation were obtained from RGRTA and the County Area Transit System in Ontario County.

Statistics on the number of passengers using interregional facilities were obtained from the individual service providers: Greater Rochester International Airport, Amtrak, and Greyhound/Trailways.

#### 2. Review of Existing Plans and Studies



The review of existing plans and studies included the GTC *LRTP: 2005-2025*, UPWP studies (various corridor studies, strategic plans for public transportation, Priority Trails Advancement studies, etc.) approved by the GTC Board since the adoption of the last LRTP in 2004, and plans completed by member agencies and others (e.g., *Rochester 2010: The Renaissance Plan*, *Major Multimodal International Gateway Business Plan*, etc.).

In addition, NYSDOT completed the Statewide Transportation Master Plan (NYSDOT Master Plan) in November 2006. The LRTP Update has been developed in a manner consistent with the NYSDOT Master Plan.

In particular, the policies and actions recommended in the LRTP Update are meant to complement activities that NYSDOT will undertake on a statewide basis with respect to the five priority areas of the NYSDOT Master Plan:

1. Mobility and Reliability
2. Safety
3. Economic Competitiveness
4. Environmental Conditions
5. Security

In addition, consideration of these priority areas with respect to the portions of identified statewide trade (I-90, I-390, and NYS Route 63), tourism (Finger Lakes), and commuter corridors within the region have been integrated into the policies and actions recommended in the LRTP Update.

### 3. Public Involvement

The LRTP Update was developed with extensive public involvement. In total, the LRTP Update development process included nearly three months of public involvement periods that included seven public meetings, as well as specific outreach to low-income and minority populations (i.e., groups not traditionally well-represented in the transportation planning process).

Public comments on the LRTP Update were accepted during two development phases of the LRTP Update.

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 dedi-

cated e-mail address (LRTP@gtcmpo.org) was also available for submission of comments on the LRTP Update.

Public meetings were held during each of the public involvement periods. During the first round of public involvement, four meetings were held in the Rochester TMA in conjunction with the *2007-2012 TIP* public involvement process. Three meetings were held at locations across the Rochester TMA during the second round of public involvement as well.

At each public meeting, GTC staff presented findings and analysis based on the "Data and Information Analysis" and "Review of Existing Plans and Studies" development activities discussed above.

Advance notice of each series of public meetings was sent to over 40 media outlets (print, television, and radio) throughout the region.

All meetings began at 7 p.m. with the exception of the Henrietta meeting, which began at 10:00 a.m. The dates and locations of the public meetings were as follows:

#### First Round (Opportunities and Issues)

Thursday, March 15, 2007

Ogden Town Hall

Monday, March 19, 2007

Rochester Public Library

Wednesday, March 21, 2007

Perinton Community Center

Thursday, March 22, 2007

Henrietta Town Hall

#### Second Round (Preferred Alternatives)

Tuesday, May 1, 2007

Perinton Community Center

Monday, May 7, 2007

Rochester Public Library

Tuesday, May 8, 2007

Ogden Town Hall



During the development of the previous LRTP, GTC developed an environmental justice database to directly contact more than 225 organizations serving low-income and minority population groups throughout the region. This database was updated and used to inform each organization of the development of the LRTP Update.

Environmental justice builds on Title VI of the Civil Rights Act of 1964. Executive Order 12898 (1994) requires federal agencies to make achieving environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

As recipients of federal-aid dollars, MPOs are required to identify and address Title VI and environmental justice implications of their planning processes and investment decisions. GTC incorporates these considerations into all of its transportation planning activities (including the LRTP Update), recognizing that such consideration improves both the planning and decision making processes and the results of these activities.

A summary of comments received during each of the public involvement periods is separately bound in Appendix A.

#### 4. Committee Involvement

As noted above, GTC's core decision making process is built around the GTC Board making policy and providing direction with the assistance of the Planning Committee in a technical advisory capacity.

As such, informing and receiving feedback from both the GTC Board and Planning Committee with respect to tasks accomplished and upcoming work activities was a component of the LRTP Update development process.

Beginning in July 2006, GTC staff provided both the GTC Board and Planning Committee with updates on the progress, findings, and public comments received on the LRTP Update at each of their respective meetings.

As with the UPWP and TIP, a LRTP Development Committee (LDC) assisted GTC staff in developing the LRTP Update. Representatives from the Rochester TMA counties, the City of Rochester, RGRTA, G/FLRPC, and NYSDOT serve on the LDC.

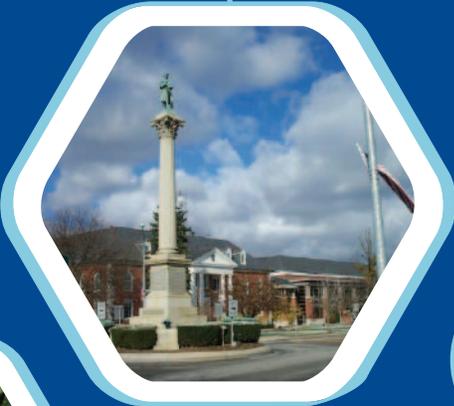
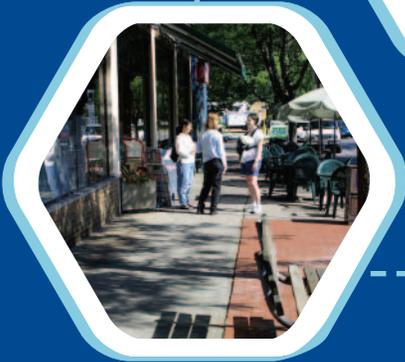
The LDC met in February 2007 to discuss the LRTP Update development process and provide feedback on a number of items that would ultimately form much of the content of this document. The LDC met in April 2007 to review the draft recommendations of the LRTP Update prior to their approval for public review. The LDC reviewed public input and recommended approval of the draft LRTP Update document to the Planning Committee and GTC Board in May 2007.

As with any plan, the development and execution of a solid development process that combines technical planning and public involvement activities is the primary determinant of community acceptance and the plan's ultimate success. The LRTP Update was created in a manner that meets these criteria.

**GENESEE TRANSPORTATION COUNCIL**



**CHAPTER III - THE REGION**





## OVERVIEW

The Genesee-Finger Lakes Region is a diverse area encompassing nearly 4,700 square miles. This diversity is evidenced by the transition from the dense, urban form of the cities and villages to the vast, open areas of the rural towns.

The economic activities that take place within the region's borders are as diverse as the physical terrain. The region's development is strongly rooted in its history of manufacturing and agriculture. While these industries remain top contributors to the regional economy, an evolution through diversification continues as a host of business support, photonics, and biotechnology-related firms continue to increase their contribution.

For the transportation system to contribute effectively to the social and economic vitality of the region, it must be responsive to not only existing socioeconomic conditions but also to reaching the desired state of the region in the future, as determined by the community.

## POPULATION

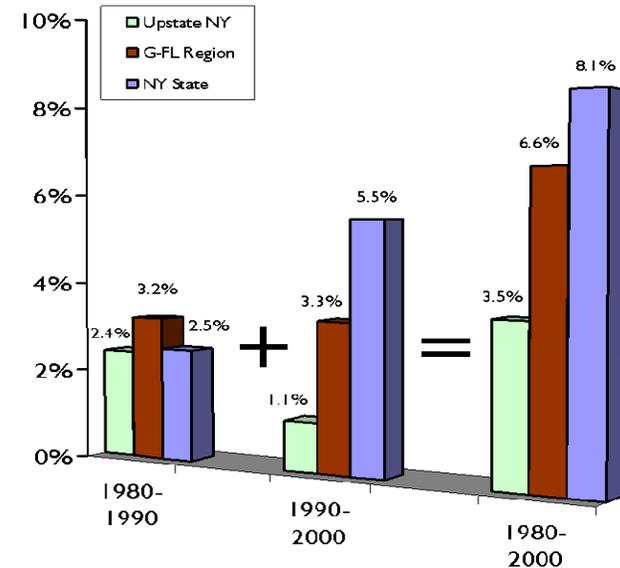
### Who We Are

Based on the 2000 U.S. Census of Population and Housing, approximately 1.2 million people reside in the nine-county Genesee-Finger Lakes Region.

This represents an increase of nearly 40,000 residents between 1990 and 2000. The region experienced a steady growth rate over the past twenty years - just above three percent over each of the two 10-year periods of 1980 to 1990 and 1990 to 2000.

Exhibit 3 presents the growth rates of the region, Upstate New York, and New York State between 1980 and 2000 in 10-year increments and over the entire 20-year period. The region's growth in population outpaced population growth in Upstate New York over both 10-year periods. While the region maintained a steady growth rate in population between 1980 and 2000, the pace of growth in Upstate New York declined by more than half between 1990 and 2000 compared to the previous 10-year period.

Exhibit 3 - POPULATION GROWTH RATE, 1980 TO 2000



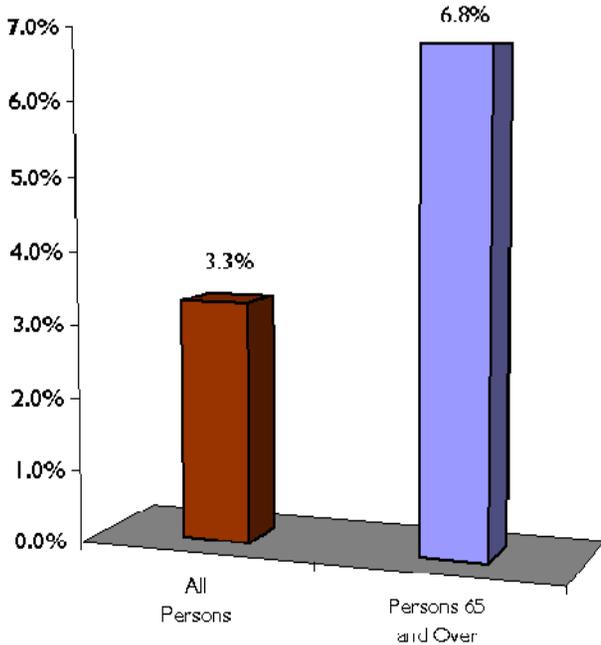
Population growth for the state as a whole was just the opposite of that in Upstate New York over the 20-year period. While population growth in the region outpaced that of the state between 1980 and 1990, the large influx of new residents in New York City and the surrounding downstate area (largely due to immigration) resulted in a growth rate for the state that exceeded the region's between 1990 and 2000.

Population growth in the region is expected to continue over the 20-year time period of the L RTP Update. However, this increase in population is forecasted to occur at a slower rate than in the past. The population of the region is projected to reach nearly 1.25 million residents in 2025. Regardless of the decreasing growth rate, the increase in population will result in more trips on the region's transportation system.

As presented in Exhibit 4, the growth rate of persons 65 years and older in the region between 1990 and 2000 was more than double that of the population as a whole. In 2000, one out of every eight residents of the region was 65 or older - consistent with Upstate New York as a whole.



Exhibit 4 - **POPULATION GROWTH RATE OF PERSONS 65 AND OVER, 1990 TO 2000**



Increases in life expectancy rates and the aging "Baby Boomer" generation will continue this trend over the period of the LRTP Update. The increasing senior segment of the Region's population will impact both the purpose of trips and the means by which they are made.

### Where We Live

More than 60 percent (735,343) of the region's 1.2 million residents lived in Monroe County in 2000. Nearly 30 percent (219,773) of these persons resided in the City of Rochester, representing a decrease of over 10,000 residents between 1990 and 2000.

The largest number of persons outside Monroe County were to the east and south in Ontario (100,224 persons), Wayne (93,765), and Livingston (64,328)

counties, combining for over 20 percent of the region's population. Exhibit 5 presents the distribution of population by county in the region in 2000.

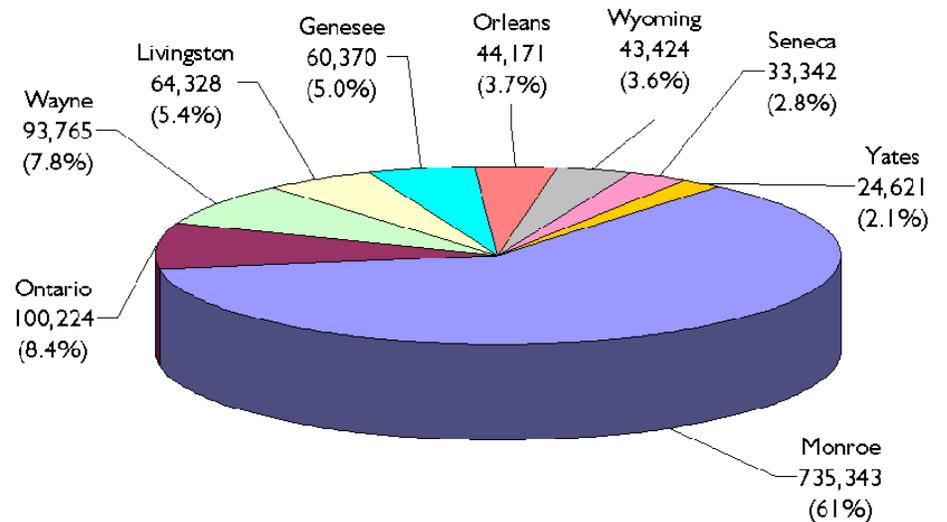
While Genesee and Seneca counties are forecasted to experience very slight decreases in population (less than 1.5 percent each), the distribution of population within the region by county in 2027 is projected to be nearly identical as it is today.

The distribution of population within the region is expected to remain fairly constant but the trend in the number of households increasing at a greater rate than residents means that trips are originating from a greater number of locations.

Between 1990 and 2000, the number of persons in the region increased 3.3 percent. During the same period, the number of households grew by 6.0 percent, with most of the growth in one-person households. Two-person households also increased and three or more-person households declined.

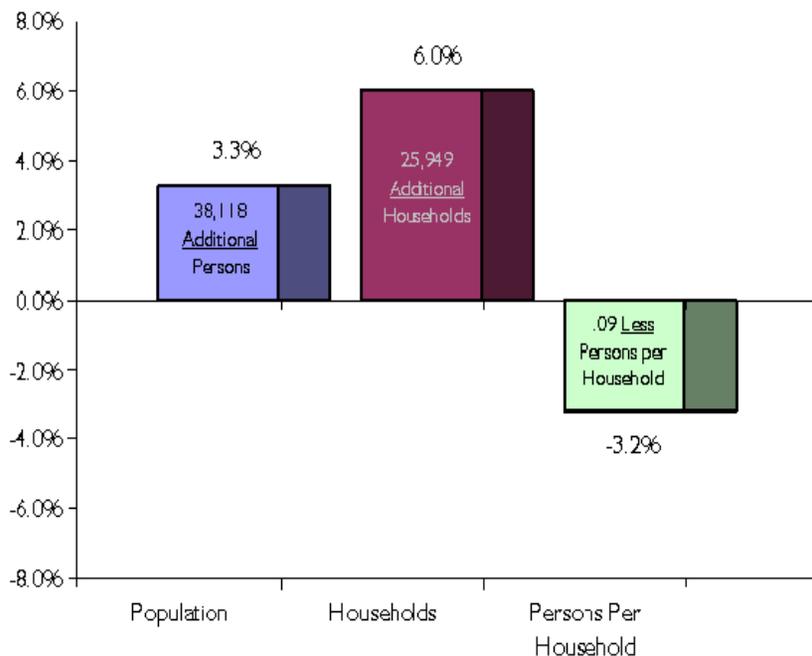
The result was a decrease of .09 persons per household (-3.2 percent) across the region in 2000 compared with 1990. Exhibit 6 presents the rates of change in number of persons, households, and persons per household.

Exhibit 5 - **POPULATION BY COUNTY, 2000**





**Exhibit 6 - HOUSEHOLDS & PERSONS PER HOUSEHOLD GROWTH RATE, 1990 TO 2000**



## EMPLOYMENT

### What We Do

Based on 2005 NYS Department of Labor QCEW data, more than 28,000 establishments employing over one-half million workers are located in the region. Workers employed in the region earned in excess of \$20 billion in wages in 2005.

Over 80 percent of the workers in the region are employed by private businesses. In 2001, these establishments produced goods and services worth approximately \$50 billion - more than 12 of the 50 states.

Along with the rest of New York State and the majority of states in the Northeast and Midwest, manufacturing-related employment has and continues to decline as the industry continues its transition to higher value-added products. More than 10,000 manufacturing jobs in the region were lost between 2002 and 2005. Still, manufacturing firms employ more than 15 percent of all workers in the Genesee-Finger Lakes Region - a larger percentage than any other region in New York State.

For the most part, the regional economy has been able to absorb the significant decreases in manufacturing employment through increases in business-support and information services, health care, wholesale trade, and technology-related job opportunities. In 2002, the regional economy was in the midst of a recession that reduced employment by roughly 20,000 jobs from its 2000 peak. The regional economy has since begun to improve, adding nearly 4,000 jobs between 2002 and 2005.

In addition to manufacturing, services, and high technology, agriculture and related agribusiness activity remain major components of the economy. In spite of the decrease in manufacturing employment and the change in the type of goods produced in the region, the amount of goods (as measured by volume) from regional firms is expected to grow as a result of continued increases in productivity and consumer demand for regional products not only in the region but across the nation and around the world; a predominantly service-oriented economy is not likely in the region's future. Accordingly, the transportation system will need to safely and efficiently transport a larger volume of goods than it does at the present.

### Where We Work

As with population and households, approximately 60 percent of the region's businesses are located in Monroe County (see Exhibit 7). However, roughly 70 percent of the region's employees work for establishments located in Monroe County. This is the result of a greater proportion of larger businesses being located

# THE REGION



in Monroe County. Based on an analysis of traffic counts, bus ridership, and congestion, GTC identified the primary commuter movements in the Rochester TMA (see Map 2). Multiple transportation facilities, including bus routes, service these commuter movements. For instance, the “Central North-South Corridor” is comprised of seven surface streets and six RTS bus routes.

Another trend that is expected to continue is the increasing influence of smaller employers. The average size of a business in the region has decreased from 21 workers in 2000 to 19 workers in 2005. This exemplifies the diversification of the region’s economy away from large manufacturers to smaller technology and service firms.

As presented in Exhibit 8, the number of at-home workers increased by just over 2,000 between 1990 and 2000. In terms of work-related commuting,

the number of at-home workers has and will continue to have minimal impact. Even at-home workers make trips - particularly, sales and service professionals - and many of these may occur at morning and evening peak travel periods.

The vast majority of workers in the region use personal automobiles to travel to work, either driving alone or carpooling (81.5 percent and 9.3 percent, respectively). Nearly four percent of workers biked or walked to work and approximately two percent used public transportation.

Between 1990 and 2000, the number of workers driving alone increased while all other means of transportation to work decreased. Exhibit 9 presents the means of transportation to work by employees residing in the region in 2000.

Exhibit 7 - NUMBER OF BUSINESSES, 1990 TO 2000

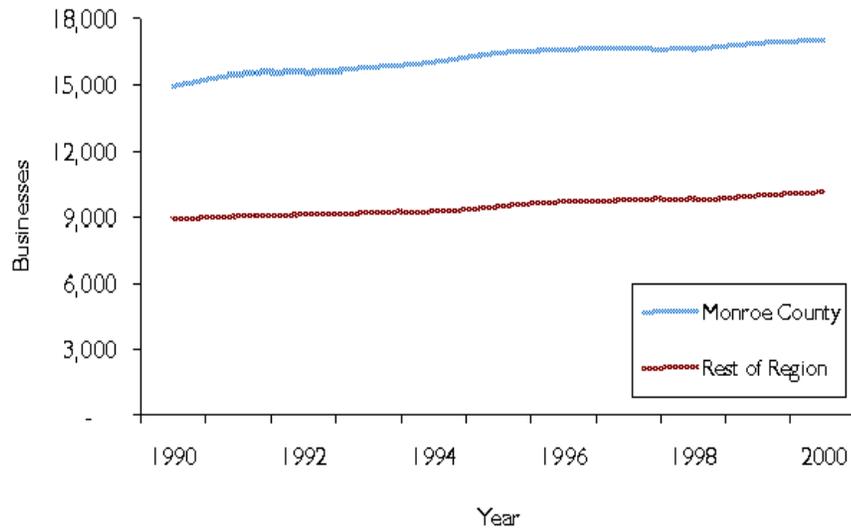
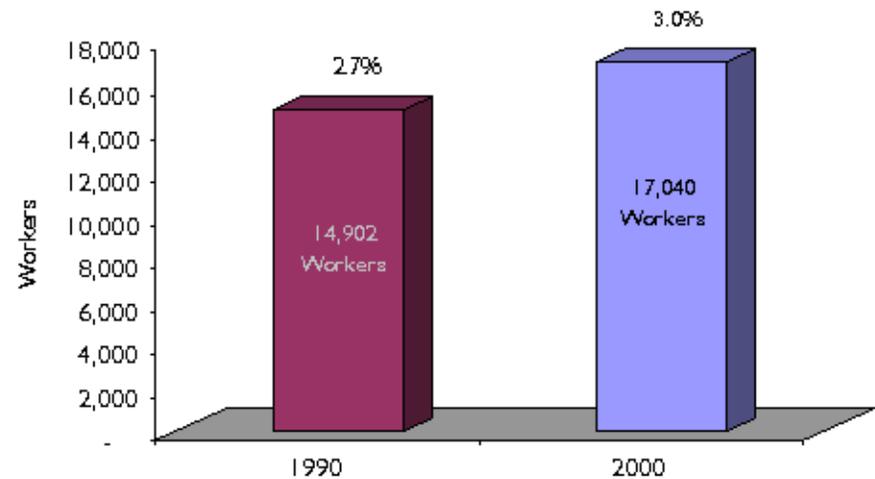


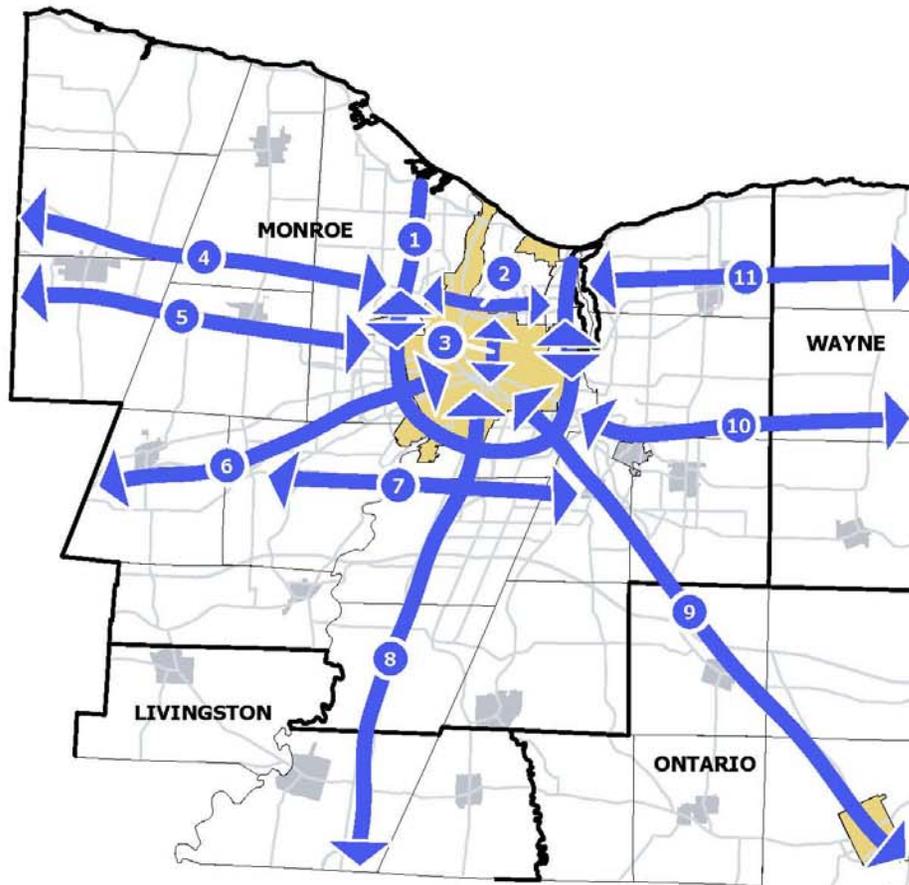
Exhibit 8 - AT HOME WORKERS, 1990 TO 2000





### Commuter Corridors, 2007

**Map 2**



- 1 "Outer Loop"
- 2 Rt. 104 Corridor (within "Outer Loop")
- 3 Central North-South Corridor (Irondequoit to Downtown)
- 4 Rt. 104 Corridor (West)
- 5 Rt. 31/531 Corridor (West)
- 6 I-490 Corridor (West)
- 7 Rt. 252 Corridor
- 8 I-390 Corridor (South)
- 9 I-490/Rt. 332 Corridor (Southeast)
- 10 Rt. 441/Rt. 31 Corridor (East)
- 11 Rt. 104 Corridor (East)

**Note:**  
 These corridors represent the movements made by commuters and are each comprised of multiple facilities, including transit routes.

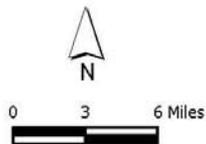
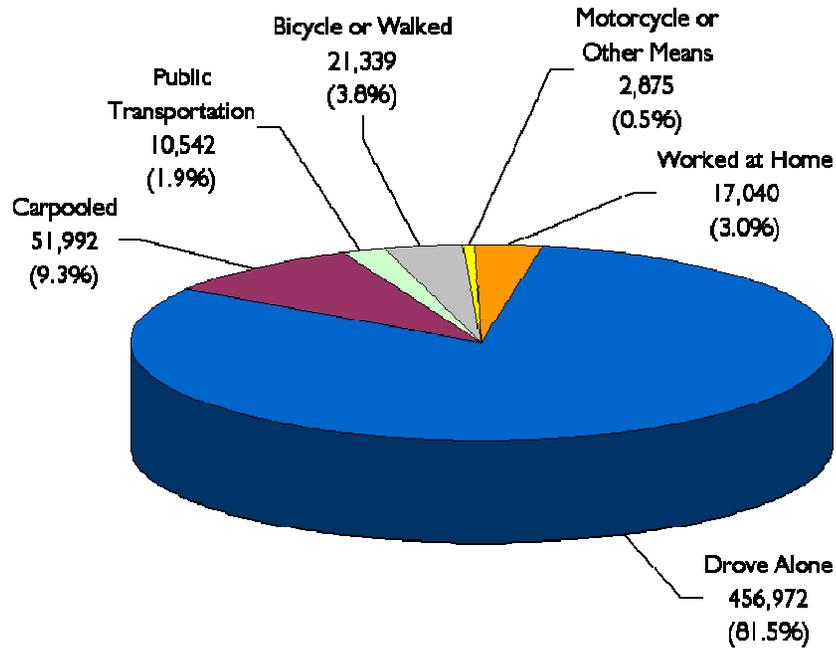




Exhibit 9 - MEANS OF TRANSPORTATION TO WORK, 2000



## TRAVEL CHARACTERISTICS

The traditional focus of transportation planning has been on work trips made in the morning and evening peak (i.e., “rush”) hours. While these types of trips may be important to an individual because they are closely related to his or her ability to earn a living, work trips represent only 22 percent of all weekday trips. Significantly more trips are made during the week for other purposes including family, personal business, and social and recreational purposes. If the weekend and weekdays are combined, work-related trips account for only 17 percent of all trips we make (see Exhibit 10).

While the peak periods may be the times of day at which certain segments of the transportation system are in maximum use, these periods do not reflect the times when the majority of trips are actually being made. Nearly 50 percent of all weekday person trips are made between the morning and evening peak hours (i.e., between 9:00 AM and 4:00 PM). Accordingly, the off-peak

and non-work related components of travel in the region merit greater focus than they have traditionally been given (see Exhibit 11).

In addition, we travel almost as much on weekends as we travel during the week. During the week, we make about 3.96 trips per person per day, compared to 3.78 trips per person per day on weekends.

Privately-operated vehicles serve the vast majority (83 percent) of weekday non-work related person trips in the Rochester area. However, this is noticeably less than the 93 percent of weekday work-related person trips that are served by privately-operated vehicles. Conversely, there are significantly more weekday non-work-related person trips that are served by walking (8.1 percent) as opposed to work-related person trips (2.2 percent).

The higher percentage of non-work related walking trips might be due to the fact that the trip length of family and personal business-related trips on average is much shorter than the trip length of work-related trips (5.7 miles vs. 9.4 miles respectively), and these types of trips can be less time-sensitive.

Exhibit 10 - AVERAGE DAILY PERSON TRIPS BY TRIP PURPOSE, 2004

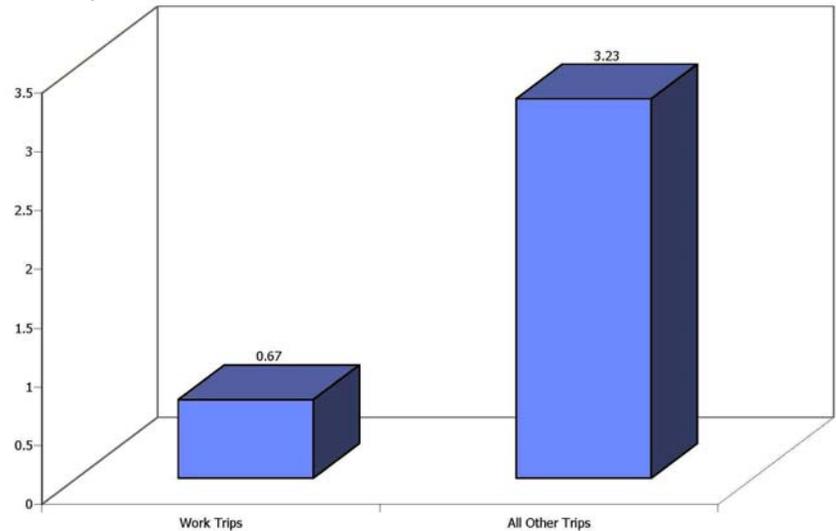
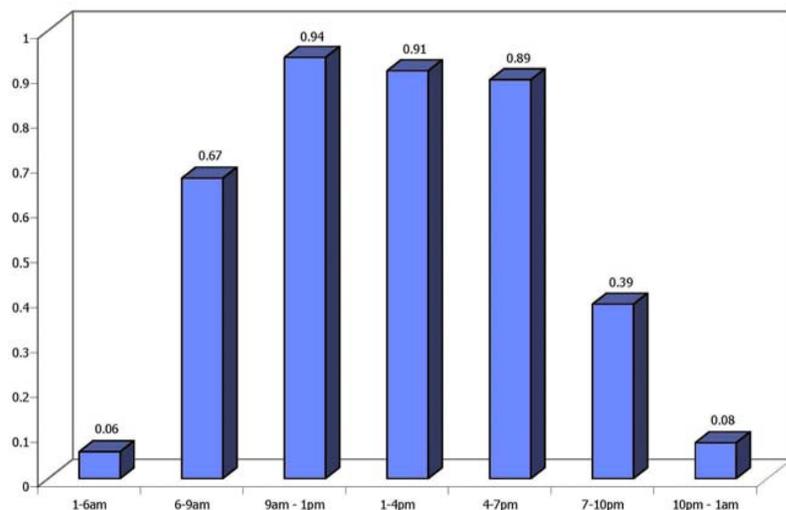




Exhibit 11 - **AVERAGE WEEKDAY PERSON TRIPS BY TIME OF DAY, 2004**



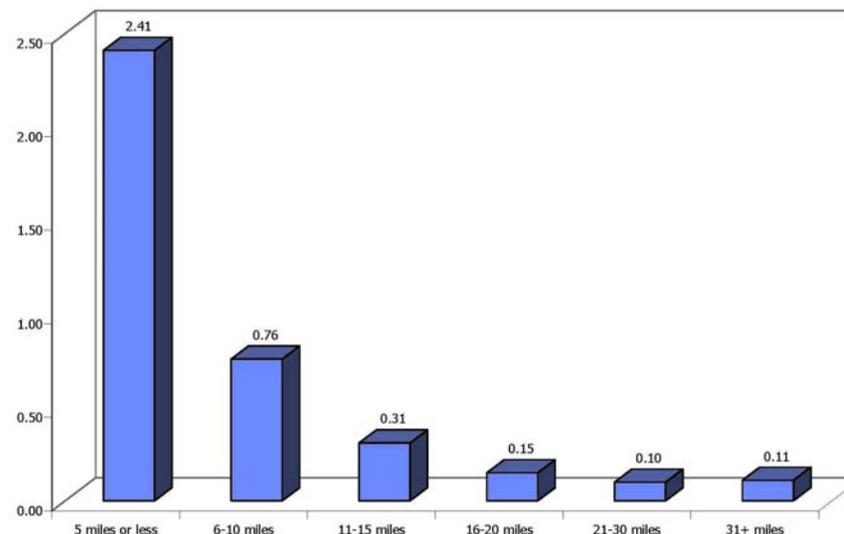
Nearly two-thirds (63 percent) of all person trips are less than five miles in length (see Exhibit 12). Of these short trips, 83 percent are served by privately-operated vehicles while 11 percent are walking trips. Both the percentage of trips that are less than five miles in length as well as the share of those trips made by walking have increased in recent years. Whereas bicycling currently accounts for less than one percent of all trips made, the number of trips by bicycle has also increased approximately eight percent since 1995.

While more than half (58 percent) of all households in the region have access to two or more vehicles, seven percent of all households in the Rochester area are zero-vehicle households. The vast majority of these zero-vehicle households are concentrated in the City of Rochester; however, even in suburban and rural areas throughout the region, zero-vehicle ownership ranges from 6 to 10 percent of all households (see Map 3 on the following page).

Current trip lengths, both in terms of miles and minutes, indicate that there is a large market of potential walkers and bicyclists that are cur-

rently driving. If safe, convenient and comfortable accommodations are in place, ideally linked with efficient public transportation services, it is possible that non-motorized transportation can have a much larger presence in the region's transportation system.

Exhibit 12 - **AVERAGE DAILY PERSON TRIPS BY TRIP LENGTH, 2004**



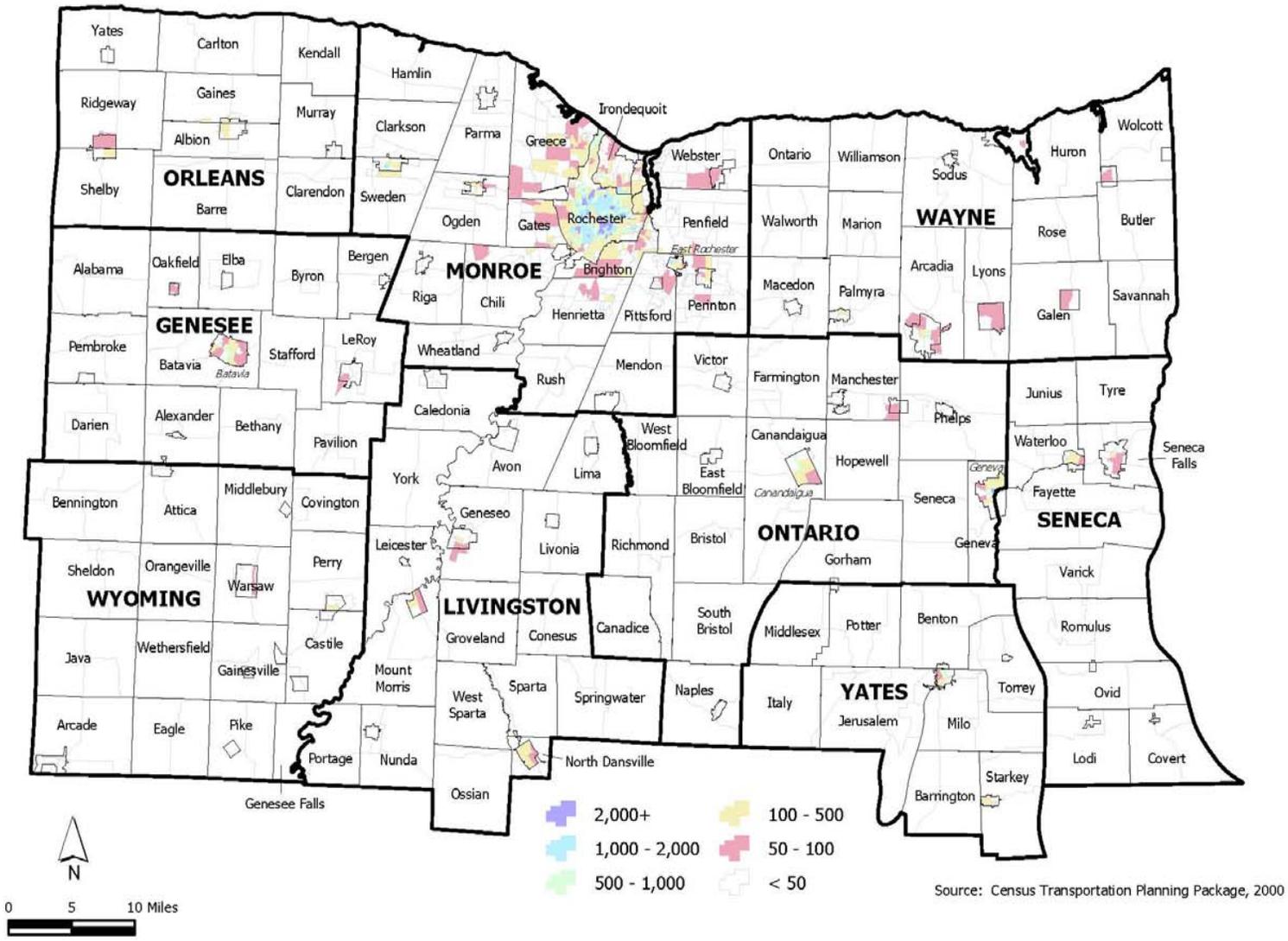
## SAFETY

The financial loss of traffic crashes in the U.S. is estimated to be more than \$230 billion annually. Beyond their fiscal impact is the tremendous human toll that traffic crashes take. Across the nation, someone is killed in a traffic crash every 13 minutes; someone is injured every nine seconds. Nationally, the number of traffic fatalities increased three percent between 2001 and 2005. These troubling trends have prompted an increased national focus on traveler safety. FHWA's goal is to lower the rate of fatalities from 1.5 per one million vehicle miles traveled (VMT) to 1.0 per one million VMT. New York State's goal is to lower the rate of fatalities from 1.0 to 0.9 per one million VMT.



### Zero Vehicle Households per Square Mile, 2000

*Map 3*

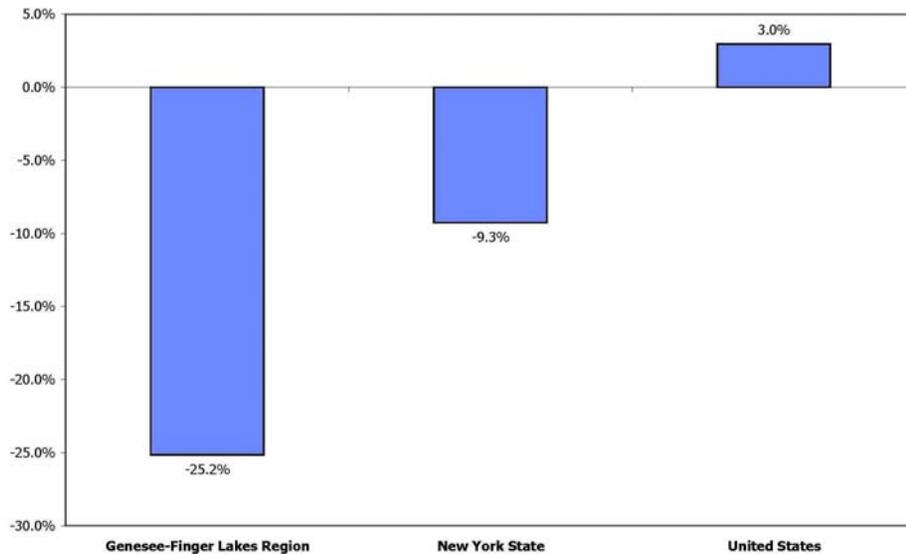


# THE REGION



Safety has always been a primary consideration in the transportation planning process in the Genesee-Finger Lakes Region. The total number of fatal and personal injury crashes in the region declined by 7.3 percent between 2001 and 2005. During that same period, the number of fatalities resulting from these crashes declined 25.2 percent, as opposed to a 9.3 percent decrease in New York State and a 3.0 percent increase nationally (see Exhibit 13). Fatalities to bicyclists and pedestrians in the region declined 26.3 percent between 2001 and 2005, compared to a 6.3 percent decrease state-wide and a 0.6 percent increase nationally.

Exhibit 13 - **PERCENT CHANGE IN MOTOR VEHICLE TRAFFIC CRASH FATALITIES, 2001 TO 2005**



While the data suggest that both the Genesee-Finger Lakes Region and New York State as a whole are making great strides at improving highway safety, other figures suggest that there are specific areas for this region to focus on. Drunk driving is a major safety issue on the region's roads. There were

more than 50 alcohol-related fatalities in the Genesee-Finger Lakes Region in 2005, nearly half of the total number of fatalities.

Motorcycle safety is another key concern for the region. There were 21 percent more registered motorcycles in the region in 2006 than just five years earlier. Fifteen people were killed in crashes involving motorcycles in the region in 2005; a fatality rate approximately four times that for all vehicles in the region. It is important to ensure that New York State's Motorcycle Safety Program, which offers rider instruction and field training at a number of locations across the state, is well-publicized and accessible to area residents.

The 2007 Highway Safety Strategic Plan (HSSP) for New York State sets forth the goals and objectives for safety on roadways throughout the state. The LRTP Update is supportive of and consistent with the findings of the HSSP.

## SECURITY

While related to safety, security deserves separate emphasis. In the post-9/11 world, transportation plays an ever-increasing role in homeland and personal security efforts. The Genesee-Finger Lakes Region is fortunate to not be a disaster-prone area. Dangerous natural events such as hurricanes, earthquakes, tornadoes, and severe flooding are rare locally. Also, acts of terrorism are less likely to occur in this region than in other areas because there are fewer critical facilities and cultural landmarks that might attract such events.

Still, this region has the potential to experience significant weather-related events such as blizzards, ice storms, and minor floods that may impact the transportation system. This region is also home to power plants, dams, and major manufacturing facilities that could be targets of a terrorist event that would put the security of residents at risk. The transportation system must be able to respond to such security-related needs. The LRTP Update is supportive of and consistent with regional emergency management and evacuation plans as well as the Security and Safety Plan for Public Transportation, developed by RGRTA.



## PRINCIPAL THEMES

Based on the analysis of existing and projected demographic and economic conditions and comments received during the development of the *LRTP: 2005-2025*, six principal themes emerged with respect to the opportunities and issues facing the region in which transportation can play a role. These principal themes remain relevant in this LRTP Update.

### Creating Jobs

Throughout the public involvement periods it became evident that the primary concern of the region's residents was economic development and the associated creation of employment opportunities for them and their children.

Projections of future employment align with those of population - the number of jobs in the region will continue to increase but at a slower rate than in the past. Given that job growth in the region has lagged that of the nation and the rest of New York State, the forecasted increases are not satisfactory for a community with the quality of life that this region offers.

Of particular importance is the loss of younger workers to other areas - referred to as the "Brain Drain". There is a perception that job creation is hindered because employers do not feel there is an adequate supply of labor. Improved retention of younger workers may solve this dilemma.

Public comments suggested that the retention of younger workers would be improved by increasing their awareness of and connections to regional attractions and social opportunities.

### Enhancing Community Character

Transportation facilities are integral to community character. As gateways, transportation facilities announce to residents (current and past) that they have returned home while providing an important first impression to visitors.

Given the importance of transportation facilities to the historical development of the region (most notably, the Erie Canal), the current and future

transportation system has an immediate impact on the perception and reputation of our community to visitors and residents alike.

Public comments suggested that improving the appearance of our gateways - highways and bridges leading into and out of the region as well as interregional transportation facilities - is essential to creating a positive impression of our region.

### Improving Mobility for the Physically Challenged

The ability to access employment, social, and recreational opportunities can be difficult for the physically challenged. The quality of life of these individuals is directly related to their independence in performing day-to-day activities. The transportation system is a major determinant of the independence of these individuals.

The aging population of the region will place an increased emphasis on the need of individuals with physical disabilities to have adequate mobility options.

Public comments suggested that components of the transportation system beyond public transportation services must be responsive to the needs of physically challenged individuals.

### Accessing Medical Services

The ability to access needed medical services, both emergency- and non-emergency-related, varies greatly across the region. Residents of Monroe County and surrounding areas have multiple health care facilities within a closer proximity than their rural counterparts.

The consolidation, and subsequent closings, of hospitals and health care facilities along with the emergence of new technologies has changed the nature of access to medical services within the region.

At present, a variety of transportation means are currently used to access medical services: private vehicles, public transportation (including paratransit), taxi services, specialized medical transportation services, public and



private human service agency transportation programs, volunteer services, and Medicaid transportation programs.

Public comments suggested that transportation's role in accessing medical services in the near future and over the 20-year period covered by the LRTP Update will need to quickly adapt to changes in the provision of medical services.

### Integrating Environmental Considerations

Ground-level ozone is created when volatile organic compounds and nitrogen oxides combine with sunlight, and can have serious adverse health consequences. The majority of ground-level ozone in the region is created by sources outside its borders.

The region has taken measures to ensure that its transportation decision making does not exacerbate air quality problems in areas downwind. These measures resulted in the region having no exceedances of the National Ambient Air Quality Standard (NAAQS) for ground-level ozone in 2004, 2005, or 2006.

As a result, the NYS Department of Environmental Conservation petitioned the U.S. Environmental Protection Agency in April 2007 to remove the Rochester Metropolitan Statistical Area's designation of being in nonattainment of the ground-level ozone NAAQS.

While environmental considerations in transportation planning have historically been related to air quality, GTC commissioned the Genesee/Finger Lakes Regional Planning Council (G/FLRPC) to conduct the *Long Range Transportation Plan Non-Air Environmental Scan*.

G/FLRPC identified strategies that transportation agencies could take to mitigate their impacts in the following non-air resource areas:

1. Nonpoint Source Water Pollution
2. Terrestrial Habitat Modification
3. Open Space Modification
4. Historical/Cultural Modification
5. Noise Pollution
6. Light Pollution

### 7. Thermal Pollution/Urban Heat Island Effect

The *Long Range Transportation Plan Non-Air Environmental Scan* is incorporated into the LRTP Update as Appendix B, which is separately bound.

Given the importance of natural resources, transportation improvements must balance the needs of economic development with environmental protection in a manner consistent with federal and state requirements.

### Balancing Regional Objectives and Local Priorities

As the designated MPO for the region, GTC is charged with ensuring that the transportation system is responsive to the needs of each individual community and the region as an integrated network of communities.

The policies and actions contained in the LRTP Update strive to balance regional objectives with local priorities in a manner that respects the decisions made at both levels. Of particular relevance is the impact that transportation and land use decisions have on each other. While land use decisions are made at the local level, many major transportation investment decisions are made at the regional level through GTC.

The public comments received acknowledged the periodic difficulties in coordinating the decisions made at the local and regional levels with respect to land use and transportation planning and investment.

The LRTP Update must provide a framework for ensuring that the transportation system allows for the parts and the whole to simultaneously thrive socially and economically.

During the development of the LRTP Update, additional emerging themes were identified as having a significant effect on the region's transportation system.

### Incorporating a Broader View of Travel

The traditional focus of transportation planning and associated investment has been to identify and address issues impacting work-related commuting and the movement of freight. However, as noted above, the majority of



trips are taken for non-work related purposes outside of the morning and evening peak hours and over half of these trips are five miles or less.

While access to employment and the efficient movement of goods are critical to the region's economy, improvements to the transportation system and its operations for non-work-related activities are also important. Further development of safe and convenient accommodations for non-motorists can also offer the opportunity for transportation to positively impact public health by providing alternatives to traveling in vehicles.

Public comments suggested that improvements to the transportation system should more fully incorporate the needs of trips taken to access shopping, dining, recreational, and other social activities that constitute both a large amount of economic activity and major determinants of quality of life.

### **Managing Unprecedented Increases in Materials Costs**

The rapid development of transportation systems in China, India, and other emerging nations to meet growing global economic demand has resulted in record increases in the price of materials in the United States, most notably steel, crude oil, and asphalt.

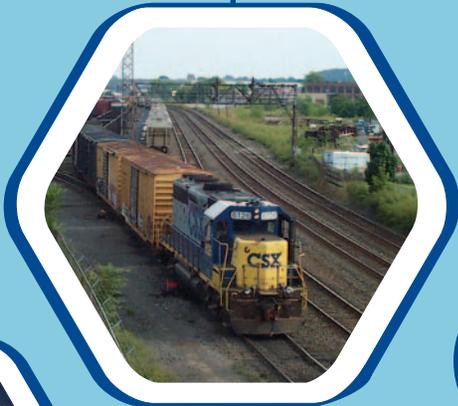
Since the *LRTP: 2005-2025* was adopted, increases in highway and street construction costs (including both materials and labor) have significantly outpaced general inflation, as measured by the Consumer Price Index.

Escalating costs in materials prices coupled with limited revenues have and will continue to compromise transportation providers' ability to maintain their existing infrastructure and services, as well as severely limit opportunities to make even minimal improvements.

**GENESEE TRANSPORTATION COUNCIL**



**CHAPTER IV - THE TRANSPORTATION SYSTEM**





## OVERVIEW

The transportation system is a major determinant of quality of life and economic development in every community. The ability to safely and efficiently move people and goods is essential to the social and economic prosperity of the Genesee-Finger Lakes Region.

The transportation system in the region can be categorized by the following five modes:

- \* Highway & Bridge
- \* Public Transportation
- \* Bicycle & Pedestrian
- \* Goods Movement
- \* Interregional Travel

The transportation system will perform best when these modes are integrated to the greatest extent possible to create synergies among their respective functions, recognizing funding limitations.

## HIGHWAYS & BRIDGES

The highways and bridges of the region account for the vast majority of physical infrastructure and carry nearly all trips. Over 12,000 centerline miles of State and local highways and bridges traverse the region as presented in Map 4.

The vehicle miles traveled on highways and bridges in the Rochester TMA total approximately 23 million daily. Annual daily traffic volumes are highest on the Interstates (I-90, I-490, I-390, and I-590) and on select NYS and Monroe County routes. Map 5 presents the annual average daily traffic volumes on the region's State highway and bridge network.

## Congestion Management Process

An important aspect of the highway and bridge network is its ability to carry traffic efficiently, minimizing delay due to congestion. As the number of vehicles attempting to travel on a highway (volume) approaches the maximum number the highway can accommodate (capacity), conges-

tion worsens. The ratio of volume-to-capacity is commonly used as a measure of congestion.

In order to better manage congestion in large urban areas, the Federal government requires each TMA to maintain a Congestion Management Process (CMP) and use it to inform transportation planning and investment decision making through the MPO process. According to USDOT, a CMP should include methods to monitor and evaluate transportation system performance, identify alternative congestion mitigation actions, assess and implement cost-effective congestion mitigation actions, and evaluate the effectiveness of the implemented actions. GTC, as the designated MPO for the Genesee-Finger Lakes Region that includes the Rochester TMA, is charged with the development and implementation of the CMP.

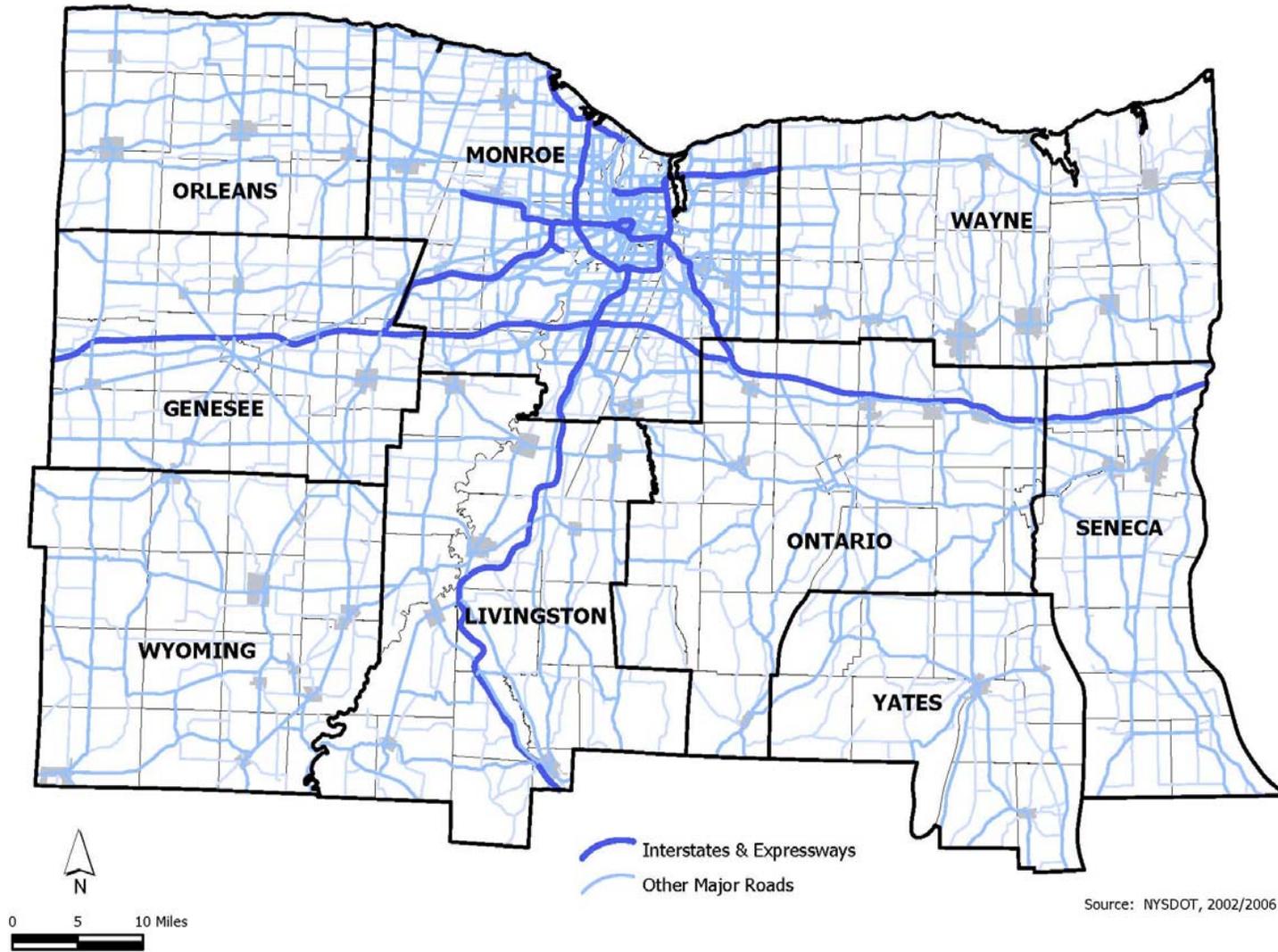
Per standard planning practice, highway sections with a volume-to-capacity ratio of 0.9 (90 percent of capacity) or higher are typically considered to have high levels of congestion and result in excess delay. However, most of the congestion in the region is due to unpredictable, non-recurring events such as crashes and weather. To account for this, GTC identified highway segments classified as High Accident Locations that have a volume-to-capacity ratio of 0.7 to 0.9 as roadways that are prone to non-recurring congestion.

Map 6 presents the current (2007) congested roadways and associated bridges in the Rochester TMA. Map 7 presents the forecast (2027) congested roadways and associated bridges in the Rochester TMA. The volume-to-capacity ratios were derived from the GTC Travel Demand Model for the evening peak hour both in the current year and in 2027 if no corrective actions are taken. Without corrective actions, the GTC Travel Demand Model predicts a gradual worsening of the congestion that currently occurs, especially along the interstate highways and principal arterial roads that pass through and surround the City of Rochester, as well as the roads that carry traffic to those areas forecasted to experience the most population and employment growth.



### Highway & Bridge Network, 2007

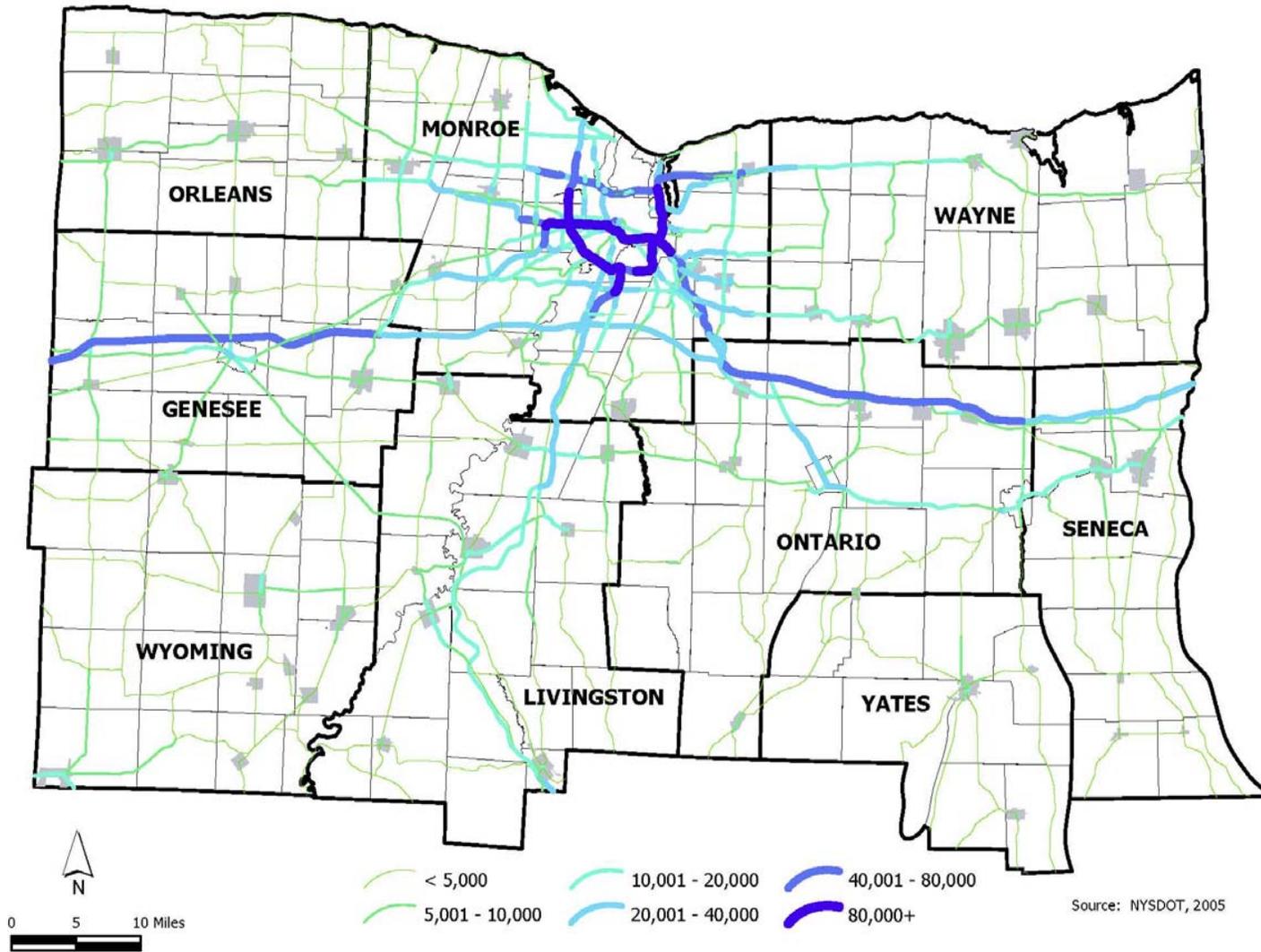
Map 4





## Annual Average Daily Traffic, 2004

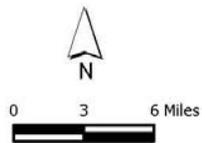
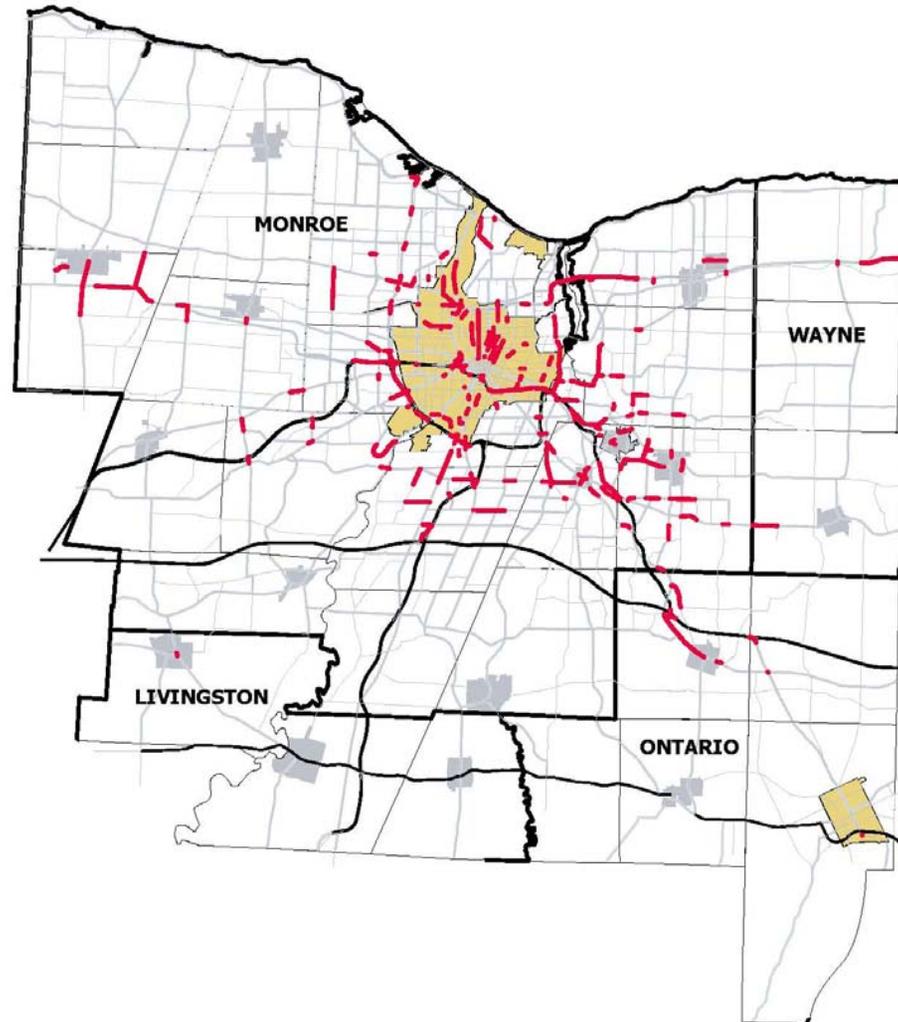
*Map 5*





### Congested Roadways, 2007

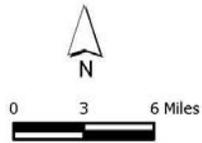
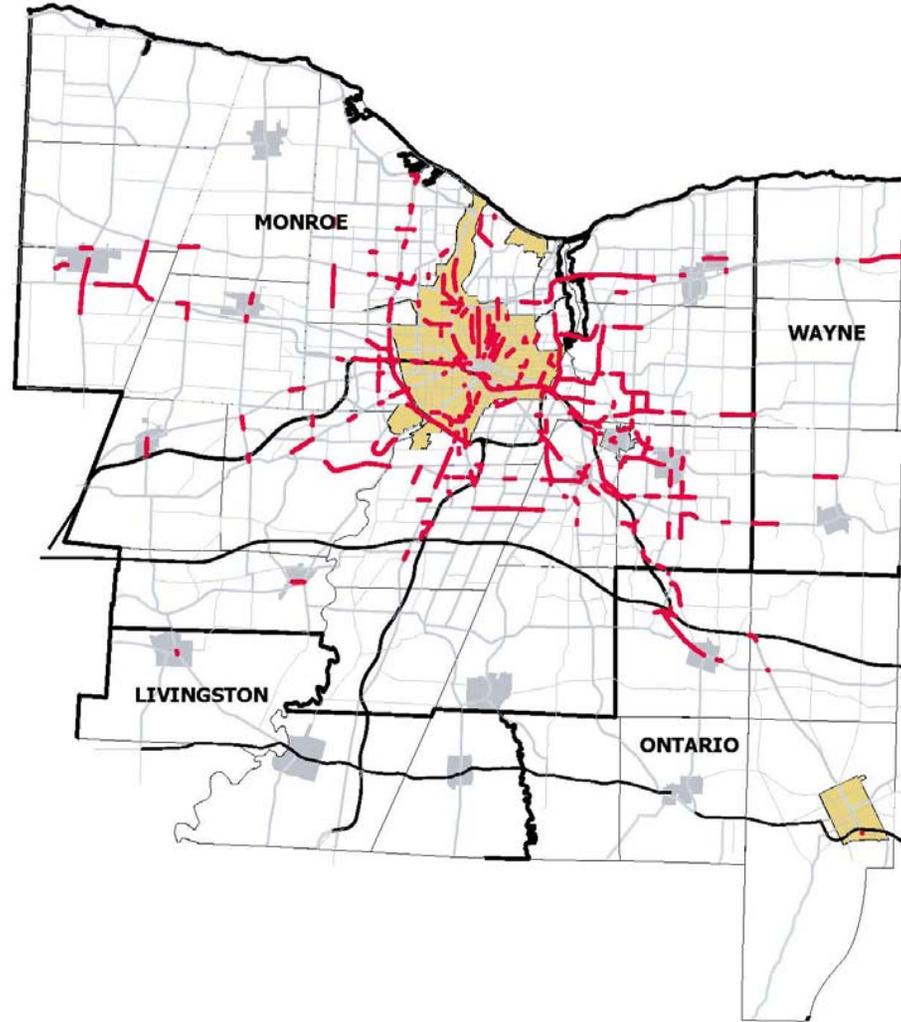
*Map 6*





### Congested Roadways, 2027

*Map 7*





The CMP provides information on transportation system performance and allows for the assessment of strategies intended to alleviate congestion and enhance the mobility of people and goods. In order to add physical capacity to a roadway in the Rochester TMA, that roadway must be identified as congested in the CMP and the responsible agency must demonstrate that it has examined all other congestion mitigation strategies. These strategies include physical operational improvements, Intelligent Transportation Systems (ITS), and Transportation Demand Management (TDM) approaches, and are summarized in Exhibit 14 along with a more detailed explanation of each in Appendix C, which is separately bound.

Data from the GTC Travel Demand Model and CMP are considered during the identification and selection of transportation projects to be studied or implemented by GTC or its member agencies through the UPWP and TIP.

## Accomplishments

The region has historically committed over 90 percent of its federal transportation funds to the preservation and maintenance of existing highways and bridges. Importantly, GTC established a mechanism for funding highway and bridge preventive maintenance projects with federal formula transportation funds during the development of the *2007-2012 TIP*.

Examples of recent highway maintenance and rehabilitation projects include:

- Stone Road in the Town of Greece
- North Street in the City of Canandaigua
- Jefferson Road (NYS Route 252) in the Town of Henrietta
- Union Street (NYS Route 31) in the Village of Newark
- Center Street (NYS Route 31) in the Village of Medina

Examples of recent bridge maintenance and rehabilitation projects include:

- Washington Street Liftbridge in the Town of Ogden
- CR 143 (Ridge Road) Bridge in the Town of Huron
- Fargo Road Bridge in the Town of Darien
- Ingersoll Street Liftbridge in the Village of Albion
- NYS Route 54 Bridge in the Town of Barrington
- Old Browncroft Boulevard Bridge in the Town of Penfield

## Exhibit 14 – SUMMARY OF CONGESTION MITIGATION STRATEGIES

<b>Supply-Driven Strategies</b>	
Urban Expressways - Design	Urban Expressways - Operations
<ul style="list-style-type: none"> <li>• High Occupancy Vehicle (HOV) Facilities</li> <li>• Park and Ride Facilities</li> <li>• Providing Additional Lanes Without Widening</li> </ul>	<ul style="list-style-type: none"> <li>• Highway Information Systems</li> <li>• Highway Pricing Strategies</li> <li>• Incident Management</li> <li>• Ramp Metering</li> </ul>
Arterials and Local Streets - Design	Arterials and Local Streets - Operations
<ul style="list-style-type: none"> <li>• Arterial Access Management</li> <li>• Intersection Improvements</li> <li>• One-Way Streets</li> <li>• Reversible Traffic Lanes</li> <li>• Traffic Calming and Street Space Management</li> <li>• Super Street Arterials</li> </ul>	<ul style="list-style-type: none"> <li>• Arterial Surveillance and Management</li> <li>• Bicycle and Pedestrian Networks</li> <li>• Computerized/Interconnected Signal Systems</li> <li>• Enforcement</li> <li>• Freight Movement Management</li> <li>• HOV Facilities on Arterials</li> </ul>
Public Transportation	<ul style="list-style-type: none"> <li>• Improved Traffic Control Devices</li> <li>• Parking Management</li> <li>• Traffic Signal Improvements</li> <li>• Turn Prohibitions</li> </ul>
<ul style="list-style-type: none"> <li>• Fare Structures</li> <li>• Joint Development</li> <li>• System/Service Expansion: Rail and Fixed Guideway Transit Facilities</li> <li>• System/Service Operational Improvements: Fixed Route and Express Buses</li> <li>• System/Service Operational Improvements: Paratransit Services</li> <li>• Transit Supportive Development</li> </ul>	
<b>Demand-Driven Strategies</b>	
<ul style="list-style-type: none"> <li>• Alternative Hours to Travel</li> <li>• Alternative Modes of Transport</li> <li>• Alternative Workplace Locations</li> <li>• Auto-Restricted Zones</li> <li>• Complementary Support Measures</li> <li>• Congestion Pricing</li> <li>• Growth Management</li> </ul>	<ul style="list-style-type: none"> <li>• Negotiated Demand Management Agreements</li> <li>• Parking Management</li> <li>• Urban Design</li> <li>• Regional Multi-Modal Traveler Information Systems</li> <li>• Trip Reduction Ordinances</li> </ul>

A number of major highway reconstruction projects were begun and/or completed since the adoption of the last LRTP in December 2004. Notable among these are:

# THE TRANSPORTATION SYSTEM



- Five intersections along Pittsford-Palmyra Road (NYS Route 31) between Turk Hill Road and Aldrich Road in the Town of Perinton are being reconstructed to improve traffic flow, reduce delay, and increase safety.
- West Ridge Road (NYS Route 104) between North Greece Road and I-390 in the Town of Greece is being reconstructed, including three travel lanes in each direction with dedicated right turn lanes and a raised median, new and rebuilt sidewalks, and a coordinated traffic signal system.
- Elmwood Avenue between Hollywood Avenue and Clover Street was reconstructed, including new pavement, utilities, sidewalks, landscaping, and lighting.
- Atlantic Avenue between Culver Road and North Winton Road in the City of Rochester was reconstructed.
- Main Street (NYS Route 36) and State and Chapel Streets (NYS Route 408) in the Village of Mount Morris were reconstructed, including new pavement, sidewalks, and context sensitive features.

There were a number of major bridge reconstruction / replacement projects that were begun and/or completed in the region since the adoption of the last LRTP in December 2004. Notable among these are:

- The I-490 Troup-Howell Bridge over the Genesee River in the City of Rochester - the most heavily traveled section of roadway in the region - was replaced with the Frederick Douglass-Susan B. Anthony Memorial Bridge, a signature 433-foot long, 70-foot tall three-member pure steel-arch bridge. Numerous aesthetic amenities including lighted pylons, decorative signage, landscaping, and new walkways along the river beneath are included.
- The Ontario Central Railroad Bridge over Route 21 in the Village of Manchester is being removed and replaced with an at-grade railroad crossing, new shoulders, sidewalks, and landscaping.
- The Hamlin-Parma Townline Road Bridge over Brush Creek in the Town of Hamlin was replaced with a new structure.
- The Ballantyne Road (NYS Route 252) Bridge over the Genesee River in the Towns of Chili and Henrietta was replaced with an eight-lane span, Scottsville (NYS Route 383) Road and River Road were realigned to improve traffic flow on NYS Route 252, and environmental improvements were made.

The City of Rochester is developing the City of Rochester Vehicle Fleet Alternative Fuels Systems Study to determine if the City should convert any of its vehicle fleet to alternative fuels and, if so, which fuels should be used and how should the conversion be implemented. The findings of this study will be transferable to other municipal fleets in the region. In addition, Monroe County, the City of Rochester, and the Rochester City School District are beginning development of alternative fueling stations ("Green Stations") for use by public fleets.

The deployment of Intelligent Transportation System (ITS) technologies has emerged as an integral part of transportation improvements in the region. ITS employs communications and information technologies to better manage and improve the performance of the transportation system. ITS is discussed here because the majority of existing and planned components are intended to improve the operation of the highway and bridge network. ITS plays a major role in public transportation and goods movement as well.

A number of ITS components have been deployed, maintained, or expanded since the adoption of the last LRTP in December 2004, including:

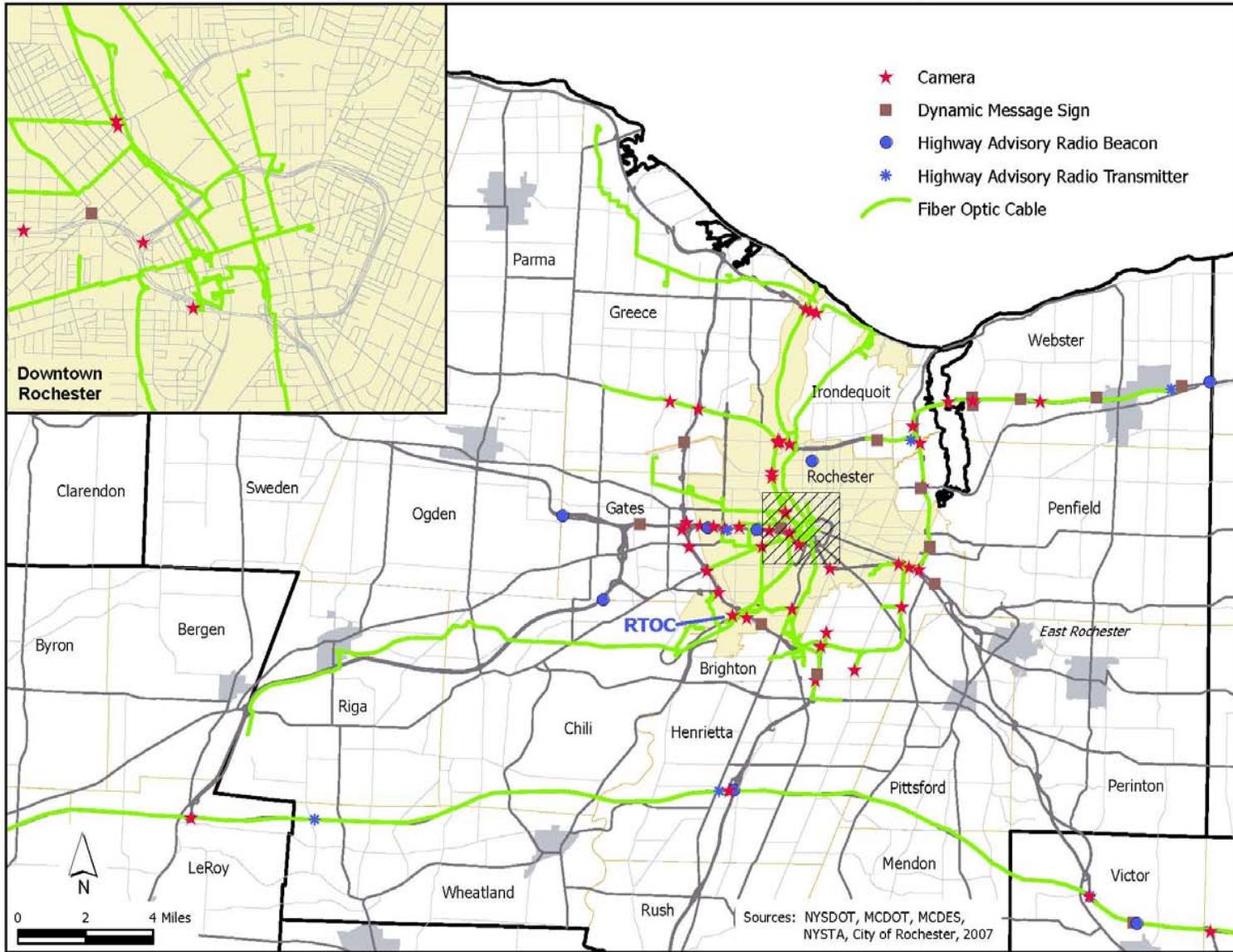
- Ongoing support for the Regional Traffic Operations Center (RTOC), the backbone of the region's growing ITS capabilities, including commitment to expand its coverage to 24 hours a day year-round.
- The deployment of dynamic message signs (DMS), closed circuit television (CCTV) cameras, fiber optics, and highway advisory radio (HAR) components on area roadways, including, but not limited to, I-90, I-390, I-490, I-590, NYS Route 104, Lake Avenue, and Brighton-Henrietta Townline Road.
- Expansion of the Highway Emergency Local Patrol (HELP) program coverage area.

Map 8 and Map 9 present the existing and planned ITS network in the Rochester area: Map 8 shows the location of deployed ITS components in 2007 and Map 9 shows where additional ITS components are planned for deployment by 2017.



Existing ITS Network in the Rochester Area, 2007

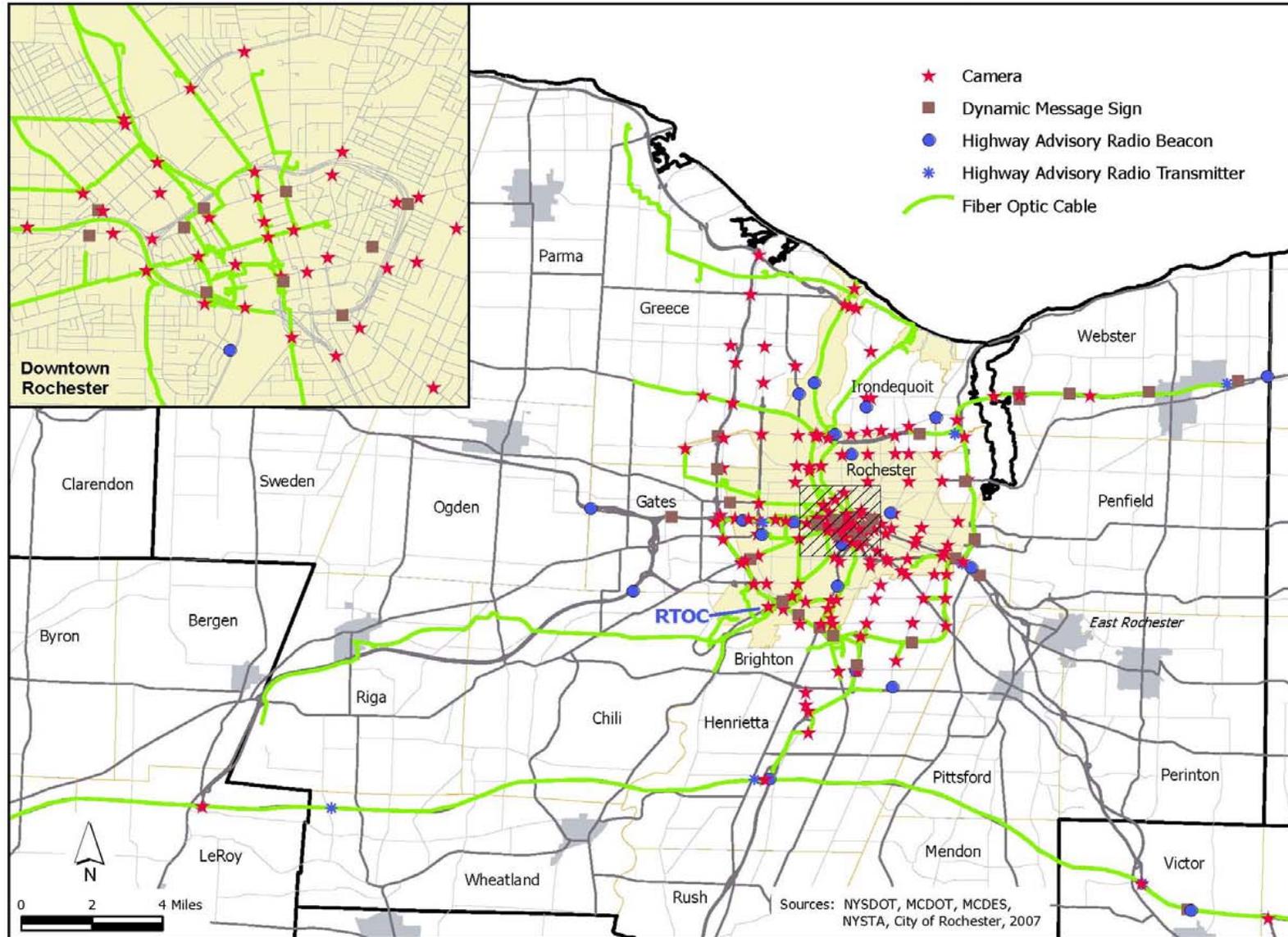
Map 8





## Planned ITS Network in the Rochester Area, 2017

*Map 9*





## PUBLIC TRANSPORTATION

The provision of public transportation service is an important component of the transportation system in urban, suburban, and rural areas. Public transportation offers:

- Improved access to employment and needed services for individuals without a private automobile
- Expanded mobility options for the physically challenged
- Delayed deterioration of the region's highway and bridge network
- Positive contributions to air quality

Public transportation service is currently available in eight of the nine counties in the region. Combined, public transportation services throughout the region provide nearly 15 million trips covering 50 million passenger miles annually.

The current number of trips by public transportation represents an increase of roughly one percent over the last five years.

In Monroe County, RGRTA provides public transportation service through its Regional Transit Service, Inc. (RTS) subsidiary. In addition to RTS, several other RGRTA subsidiaries provide fixed-route and/or demand-responsive public transportation service outside Monroe County:

- Batavia Bus Service, Inc. (B-Line or BBS) serves Genesee County
- Livingston Area Transportation Service, Inc. (LATS) serves Livingston County
- Orleans Transit Service, Inc. (OTS) serves Orleans County
- Seneca Transit Service, Inc. (STS) serves Seneca County
- Wayne Area Transportation Service, Inc. (WATS) serves Wayne County
- Wyoming Transportation Service, Inc. (WYTS) serves Wyoming County

Ontario County operates the County Area Transit System (CATS) which provides fixed-route public transportation service to residents of Ontario County. Weekday demand-responsive service is provided in areas not served by the fixed route system.

The RTS fleet includes over 200 vehicles and provides over 90 percent of all public transportation trips in the region. All RTS buses, and an increasing

number of rural county buses, are equipped with bicycle racks.

Paratransit services are available to individuals with developmental and/or physical disabilities throughout the region with the majority of these trips provided in Monroe County by Lift Line, Inc. a subsidiary of RGRTA. Nearly 200,000 people used Lift Line services in 2006, an increase of roughly 70 percent since 2001.

Map 10 presents the current routes of the eight public transportation service providers operating in the region.

## Accomplishments

The transit center component of Renaissance Square, a downtown transit center combined with a performing arts complex and the Monroe Community College downtown campus, has been allocated more than \$100 million in federal transportation funds. Renaissance Square will integrate main street revitalization in downtown Rochester with improved public transportation to the largest employment center in the region. Groundbreaking for this project is expected to take place in late 2007.

RTS replaced nearly 60 buses since the adoption of the last LRTP in December 2004. As a result of this aggressive replacement schedule, all RTS buses are now accessible to the disabled. The average age of the RTS fleet is now under seven years, well below the federal retirement age of 12 years for most vehicles. Lowering the average age of the fleet allows RGRTA to allocate fewer funds for preventive maintenance and more for operations.

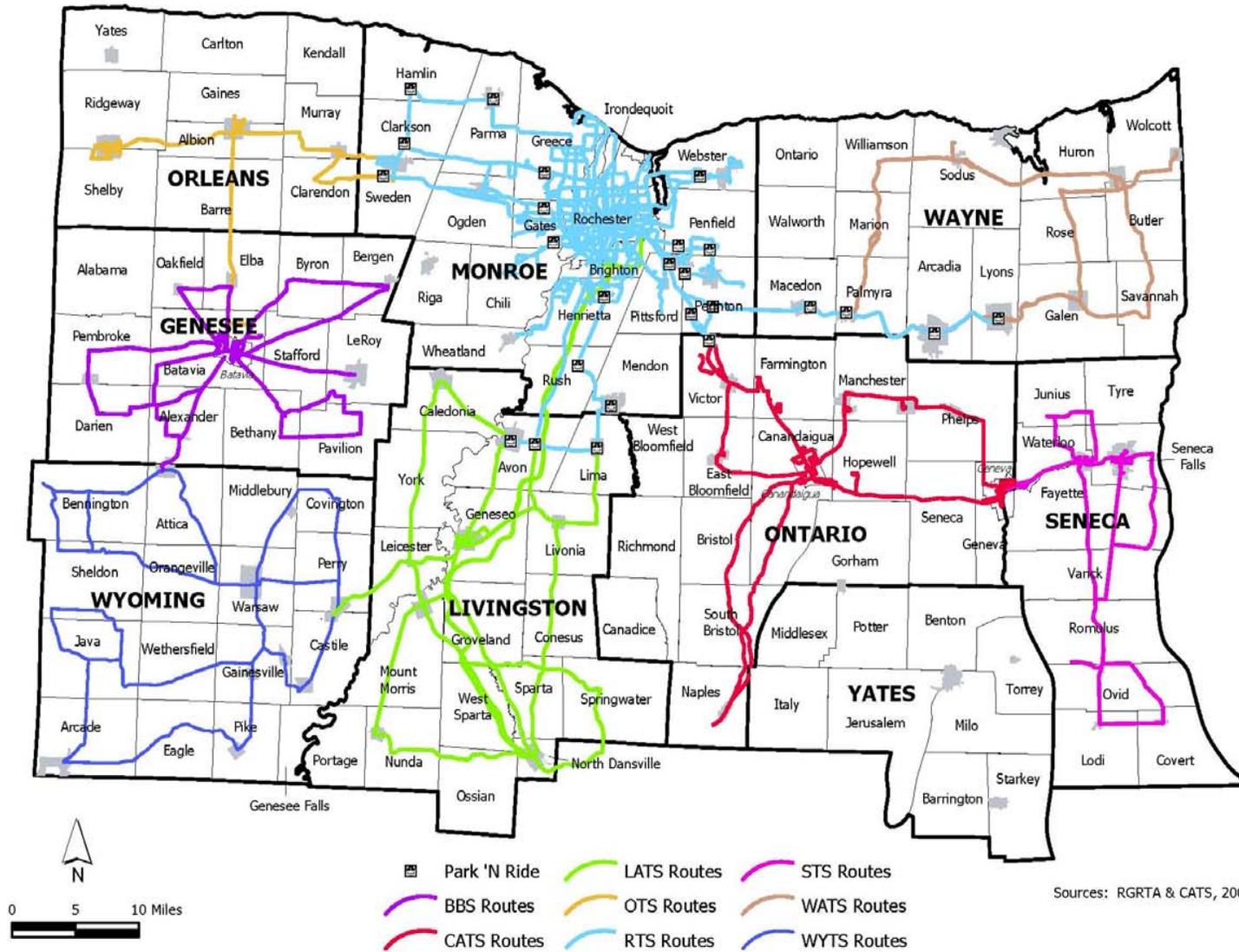
RTS added a new line of quiet and comfortable suburban coach buses to its fleet. These new buses have been credited with increasing ridership on Park & Ride routes. RTS also purchased diesel-electric hybrid buses which represent a significant improvement to air quality. RGRTA also continued its program of replacing Lift Line paratransit buses, replacing 29 vehicles with more flexible and efficient models.

RTS has restructured a number of routes to improve efficiency. A new simplified fare structure was implemented in 2006 which eliminated fare zones and instituted a number of new fare media and payment options.



## Public Transportation Routes, 2007

*Map 10*





RGRTA is taking advantage of emerging technologies to improve safety, efficiency, and customer service. Kiosks and online fare purchasing and trip planning were recently implemented and, in the coming years, the Technology Initiatives for Driving Excellence (TIDE) program will deploy a number of technologies to improve customer service, such as "next-bus" traveler information displays at major bus stops.

To complement the strategic plans for public transportation completed in seven of the eight rural counties of the region prior to development of the previous LRTP, a strategic plan for public transportation service was begun in Yates County.

## BICYCLE & PEDESTRIAN

Bicycle and pedestrian facilities are key elements of the regional transportation system. From increasingly walkable cities, villages, and towns to an interconnected network of multi-use trails, walking and bicycling as reasonable travel alternatives are quickly becoming distinguishing features of the Genesee-Finger Lakes Region.

Whether used for transportation or recreation, bicycle and pedestrian activity offers the potential for:

- Improved transportation choice
- Reduced congestion and more efficient use of the transportation system
- Healthier citizens and decreased community health care costs
- Increased attractiveness to existing and potential residents, employers and visitors
- Improved air quality and more efficient use of limited energy resources

The highway and bridge network doubles as the main component of the bicycle and pedestrian network. In addition, there are approximately 350 miles of existing multi-use trails and approximately 80 miles currently under development in the region.

These multi-use trails have the potential to increase the viability of bicycling and walking as an attractive alternative to motorized transport by serving as an expressway for non-motorized users of the transportation system - provided that convenient access to and from the highway and bridge network is provided.

Map 11 on the following page presents the existing, under development, and planned multi-use trails in the region.

## Accomplishments

New or reconstructed sidewalks and wider shoulders and travel lanes suitable for bicyclists were constructed as part of many highway and bridge projects. These constitute a large portion of the improvements made to the bicycle and pedestrian network.

Notable trail extensions and additions include:

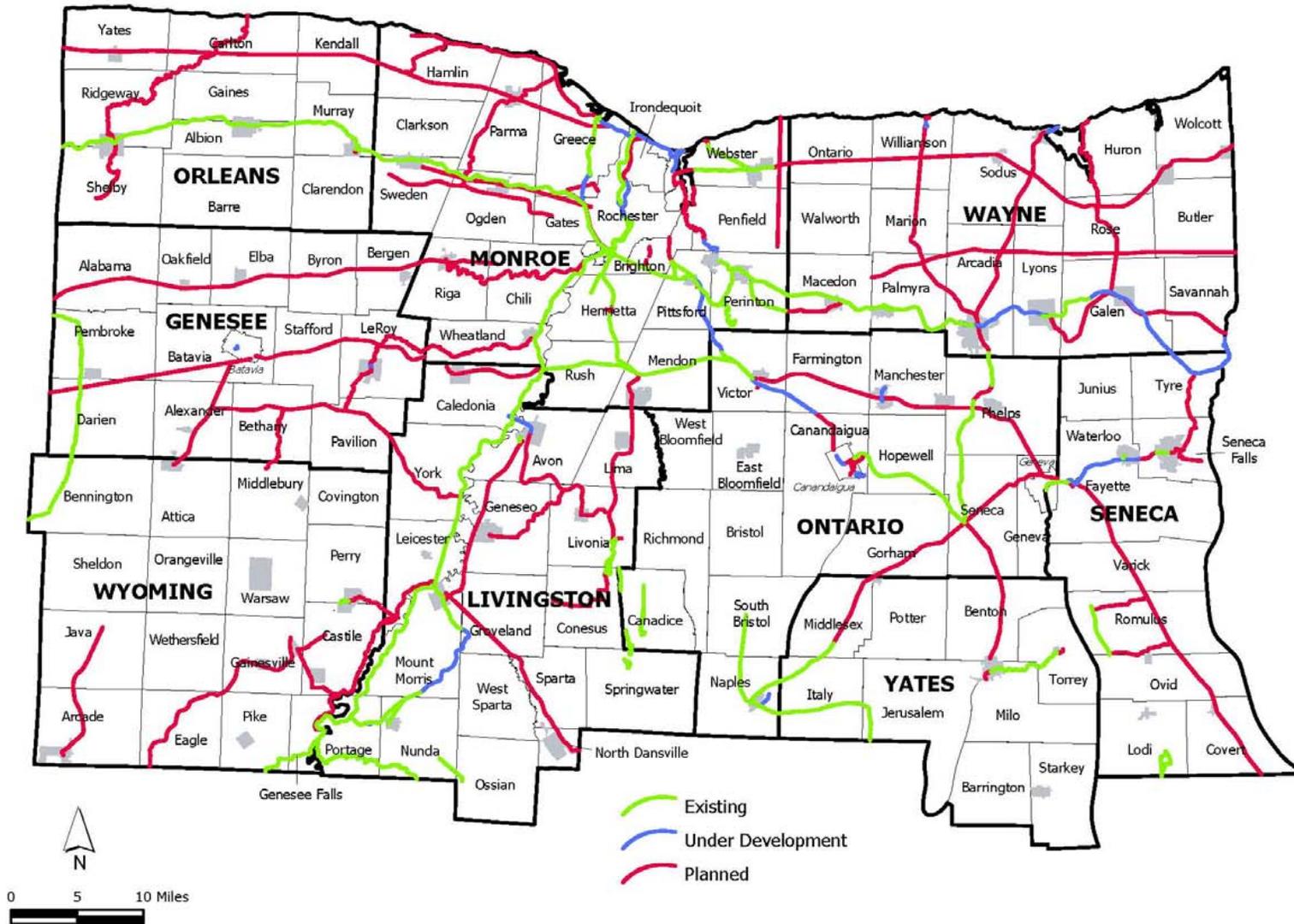
- Genesee Riverway Trail - two miles of new trail between Turning Point Park and the O'Rorke Bridge, including a new bridge over the Genesee River turning basin, was completed in 2006, RG&E is currently constructing a pedestrian bridge at its Lower Falls Dam that will be a key link in the Riverway Trail, and the City of Rochester is advancing a number of neighborhood connector trails providing improved access to the main trail.
- Erie Canalway Heritage Trail - construction of 13.8 miles of new trail between the Villages of Newark and Clyde is underway and rehabilitation of 8.5 miles of trail between Long Pond Road (Town of Greece) and Clover Street (Town of Pittsford) was completed in 2006.
- Lake Ontario State Parkway Trail - construction of a three-mile segment of new trail connecting the Genesee Riverway Trail and Port of Rochester with the Route 390 Trail in the Town of Greece is currently under design with construction scheduled in 2008.

Additional investment is planned and/or underway on a number of other trail facilities in the region including, but not limited to, the Route 390 Trail in the Town of Greece, the Auburn Trail in the Town of Victor, the Butterhole-Seneca Park Rail Trail in the City of Rochester, the Erie-Attica Railroad Bridge & Trail in the Village of Avon, and the Canandaigua Downtown Rail-with-Trail in the City of Canandaigua.



## Multi-Use Trails Network, 2007

*Map 11*





## GOODS MOVEMENT

The economic growth and vitality of the region is dependent on the efficient movement of goods into, out of, within, and through the region. The relative ease of getting products to market and receiving necessary inputs is a key consideration of goods-producing businesses when looking to continue, expand, or relocate operations. Despite the region's decline in manufacturing, the ability to transport goods produced locally to other markets remains vital. The region's important agricultural economy is also highly dependent on the transportation system.

To ensure the economic success of the region, the goods movement network needs to be a distinguishing competitive feature of the transportation system relative to other metropolitan areas within New York State, across the nation, and around the globe. Map 12 presents the region's primary, secondary, and collector trade corridors which were identified by examining truck traffic and rail service as well as current and expected future locations for manufacturing and distribution facilities. The primary regional trade corridors are the major thoroughfares for moving trade between this region and other major economic centers. The secondary regional trade corridors are highly important trade routes that feed into the primary regional corridors. The collector trade corridors are important on a sub-regional scale and feed into the primary and secondary trade corridors. These corridors reflect existing conditions, not necessarily where trade corridors should be promoted in the future.

The majority of inbound (75.9 percent) and outbound (87.5 percent) tonnage to and from the region originates and terminates within the Northeast U.S. Map 13 and Map 14 present the inbound and outbound tonnage of goods moving into and out of the region by U.S. and Canadian economic area.

### Truck Service

Since the development of the interstate highway system, trucks have handled the vast majority of goods moving into, out of, within, and through the region, constituting the fastest growing component of travel on the region's highways and bridges.

The continuing increase in freight transport by truck coupled with the North American Free Trade Agreement (NAFTA) and the region's close proximity to

the Canadian border have resulted in measurable impacts to the highway and bridge network.

According to freight movement data for 2001, trucks handled 91 percent of all inbound traffic to the region and 99 percent of all outbound traffic, totaling 57 million tons of transported goods. The distinct competitive advantage that trucks offer in terms of flexibility for short hauls indicates that these trends will continue over the period covered by the LRTP Update.

Map 15 presents roadways with significant truck traffic as defined by facilities with average daily truck traffic that is more than 20 percent above the regional average. As expected, these roadways include interstates, major east-west routes, and the Route 63 corridor.

### Rail Service

The transport of freight in the region via railroads continues to decline. Two Class 1 (annual revenues in excess of \$250 million) railroads, CSX and Norfolk Southern, and ten Class 3 or "shortline" (annual revenues less than \$20 million) railroads operate in the region as displayed in Map 16.

Less than 10 percent of the total tonnage imported to the region in 2001 arrived by rail. More than half of this 2 million tons was coal shipped from mines south of New York State. At the same time, less than one percent of the total tonnage produced by firms in the region was shipped out via rail. Much of this decline is the result of shifting logistics and management practices including, but not limited to, just-in-time delivery requirements.

### Air Cargo

According to the Federal Aviation Administration, more than 272,000 tons of freight were shipped through facilities at the Greater Rochester International Airport (GRIA) in 2005. This was a 31 percent increase over the amount of tonnage transported through GRIA in 2001.

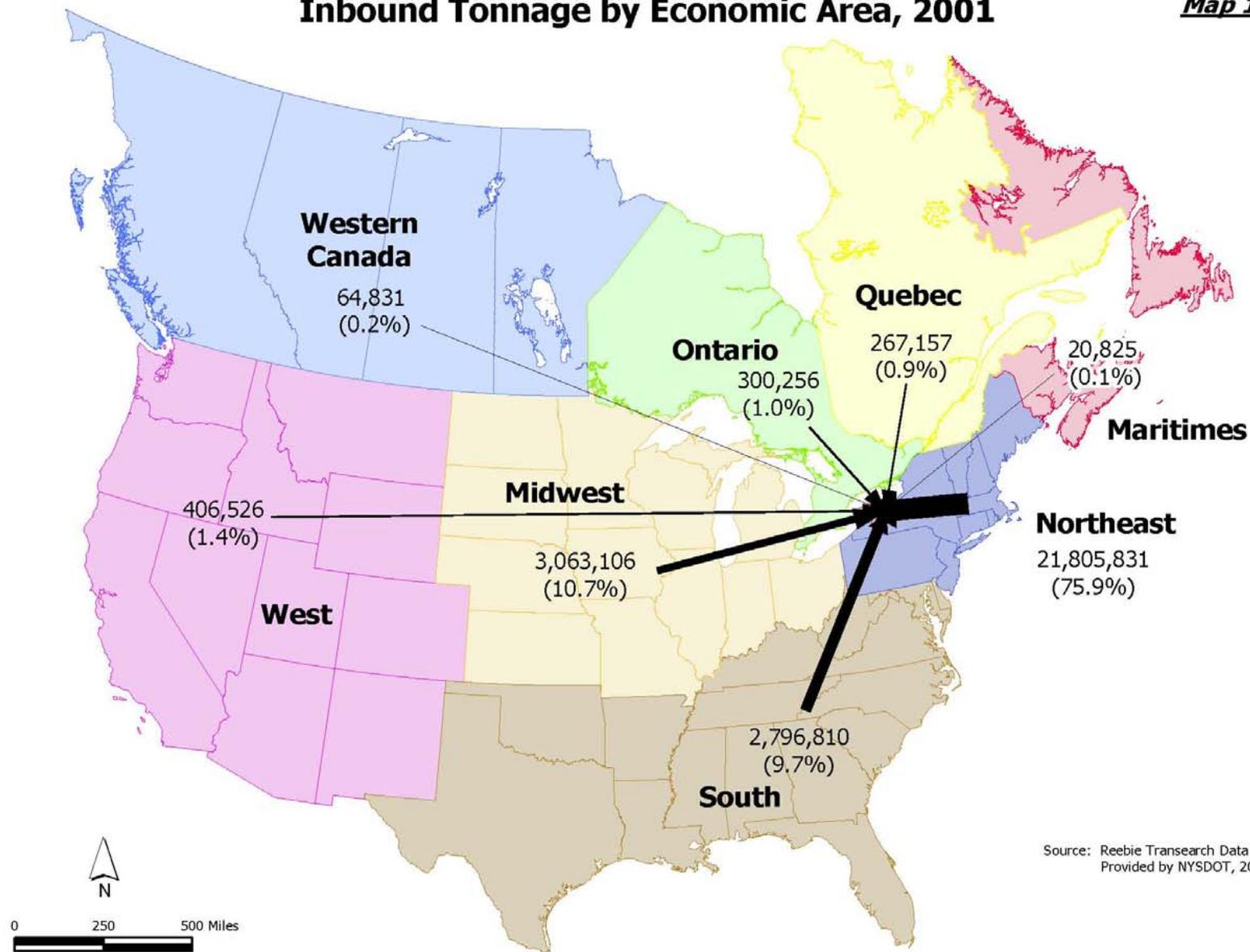
GRIA has been the largest air cargo airport in upstate New York every year since 2001. While the tonnage shipped through GRIA will in all likelihood never compete with that transported by truck, the value of goods moving through GRIA will gain a greater share of the regional total in the future.





**Inbound Tonnage by Economic Area, 2001**

**Map 13**

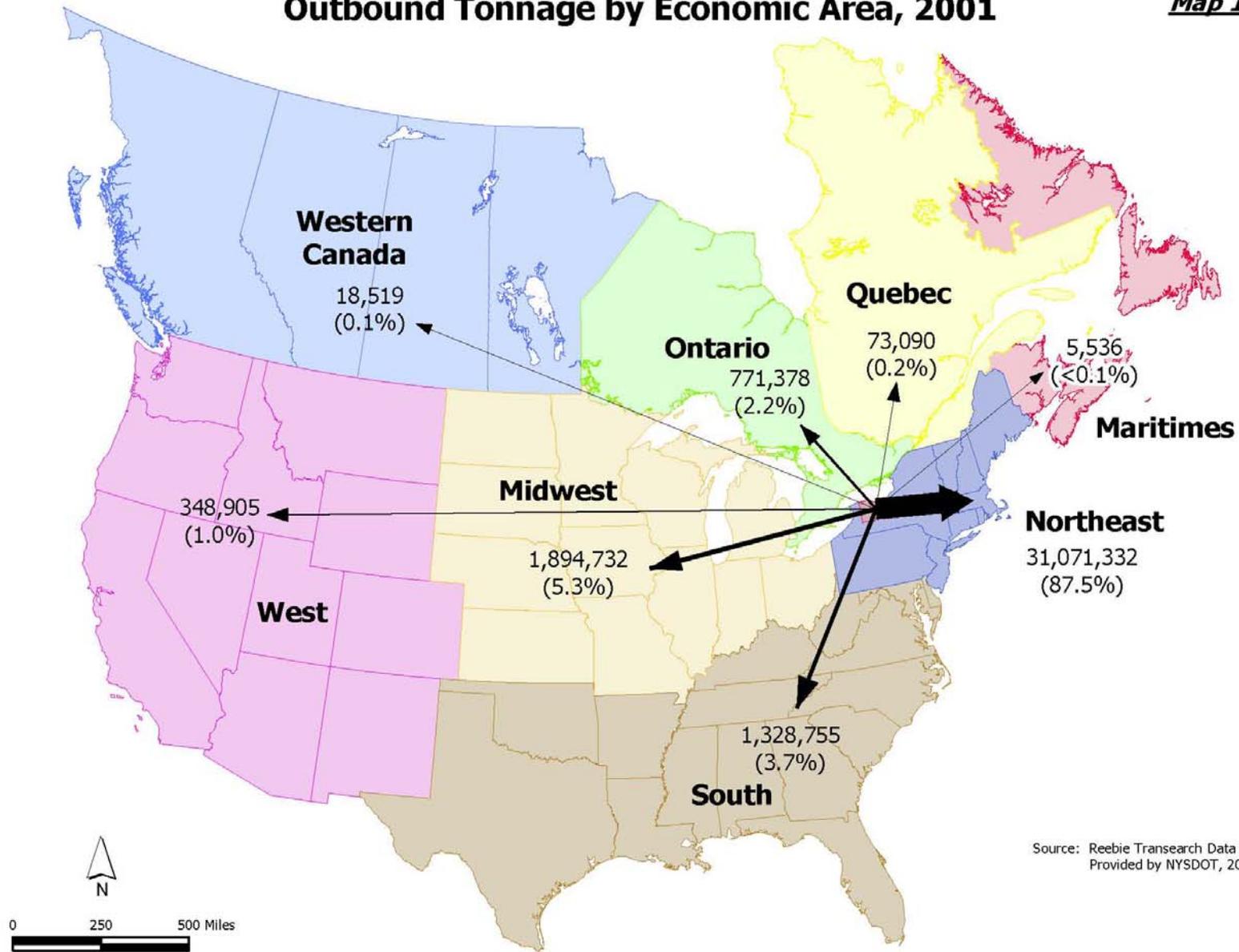


Source: Reebie Transearch Data Set  
 Provided by NYSDOT, 2001



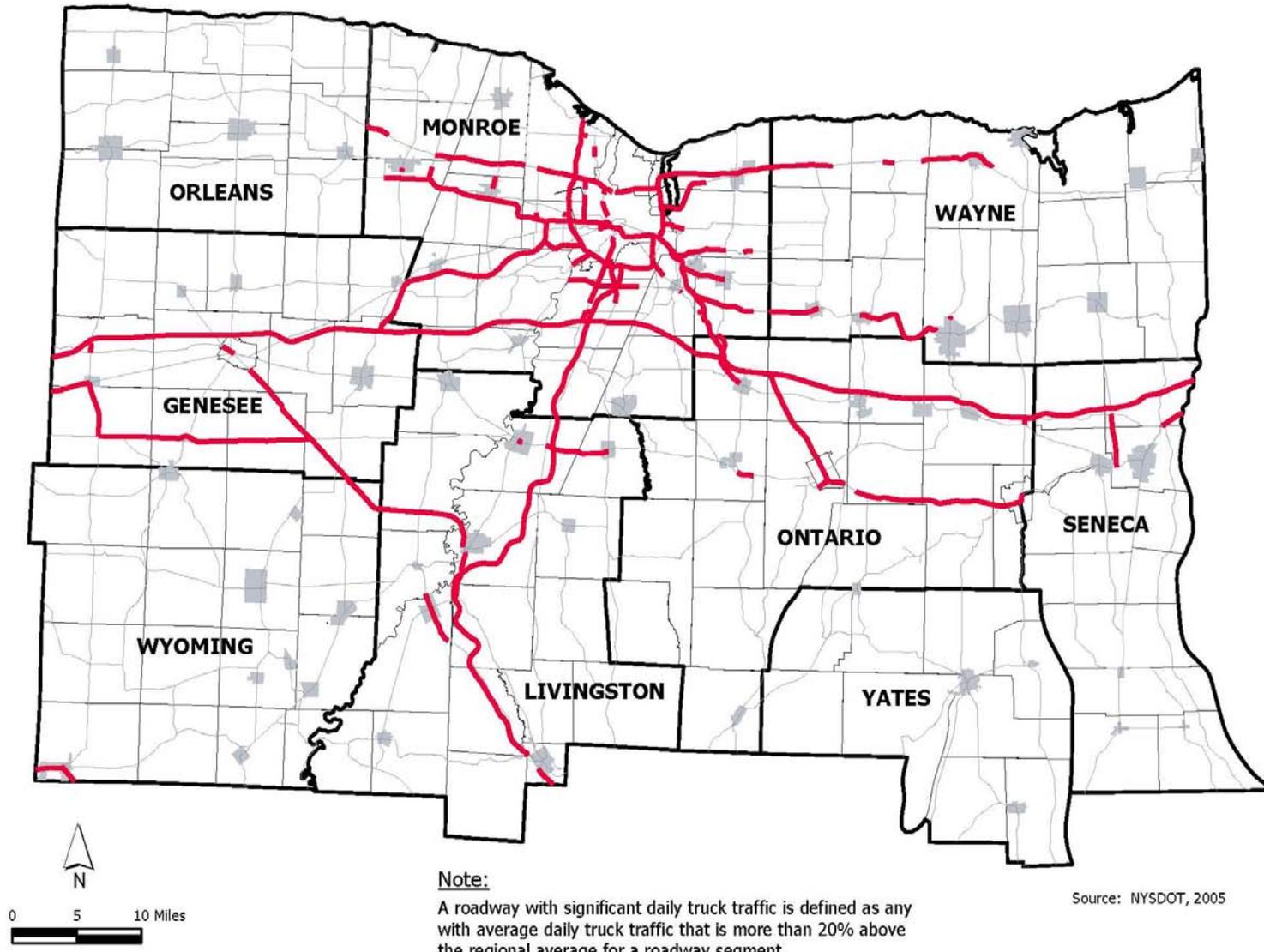
## Outbound Tonnage by Economic Area, 2001

*Map 14*





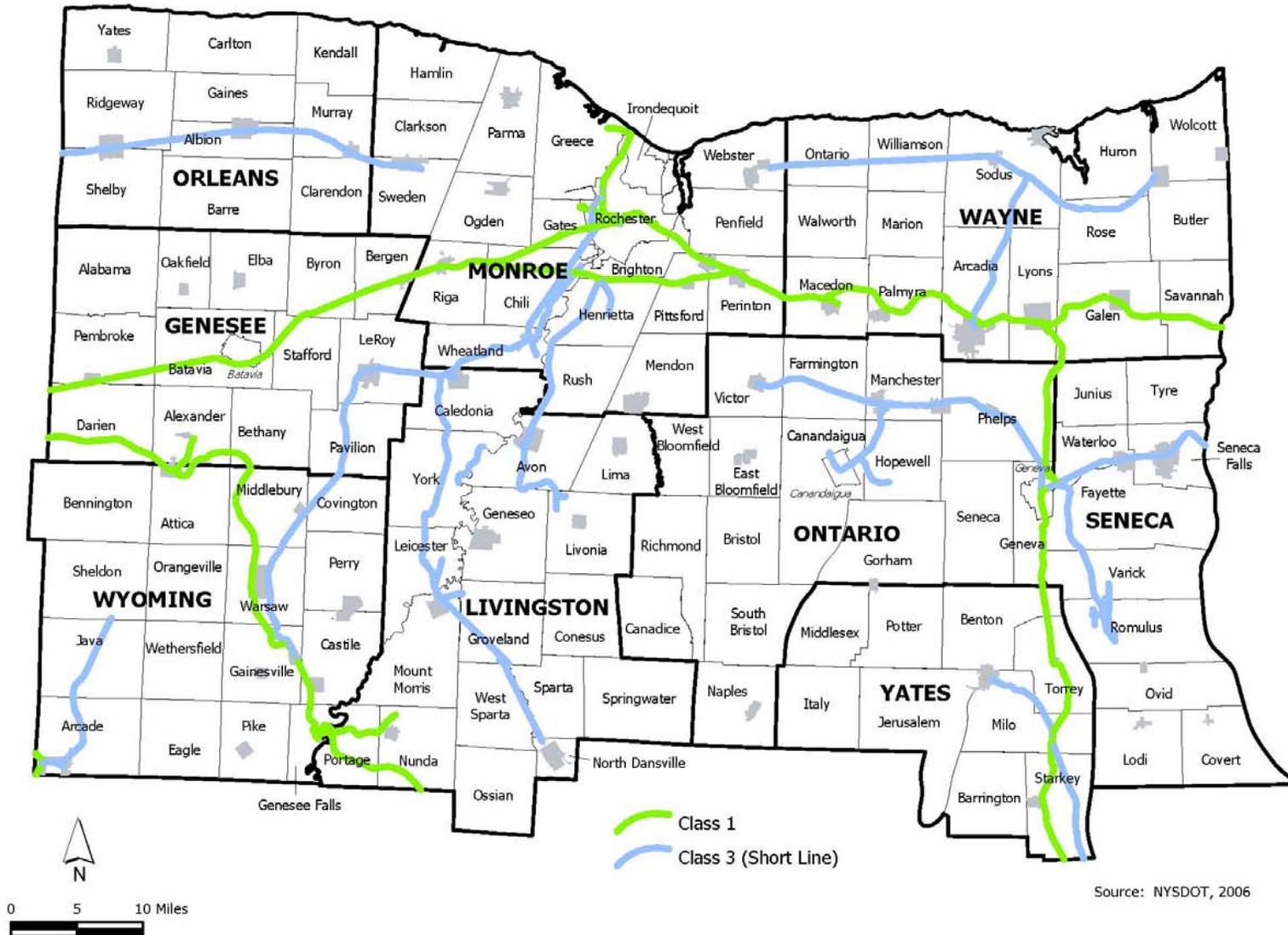
**State Roadways with Significant Daily Truck Traffic, 2004** *Map 15*





## Active Class 1 & Class 3 Railroads, 2006

*Map 16*





As the regional economy continues to transition itself to higher value-added production industries, the requirements placed on GRIA's air cargo capabilities will increase, as will the ability of trucks and other vehicles to access freight facilities at the airport.

## Water Transport

The Port of Rochester at the mouth of the Genesee River handles the only significant waterborne freight movement in the region. Inbound shipments of cement to be distributed throughout the state are regularly received here. The viability of the Port of Rochester is dependent on regular dredging of the Genesee River to ensure that there is adequate depth to handle large freight vessels.

Increasing the amount of goods transported along the Erie Canal has been raised by members of the community. Commercial activity along the Erie Canal is limited by varying controlling depths along the 524-mile long waterway. The New York State Canal Corporation, a subsidiary of the New York State Thruway Authority, is responsible for the maintenance and operation of the Erie Canal as well as entitling the transport of goods along it.

## Accomplishments

The highway and bridge network provides the primary infrastructure for the region's goods movement network. The further consideration of trucks and associated safety and efficiency issues will need to increase as future planning and improvements to the highway and bridge network are advanced.

Recent examples of planning studies conducted or underway with respect to goods movement include:

- *Airport Corridor Major Investment Study* - Monroe County conducted a study to assess current and forecasted mobility needs along roads leading and providing access to GRIA. The study recommended extending Jetview Drive and adding auxiliary lanes along Brooks Avenue and other roadways to increase through-flow of vehicles. The study was completed in April 2002.

- *Palmyra Route 21 Truck Traffic Study* – Wayne County is advancing a study to assess the impact of truck traffic on the Town and Village of Palmyra along Route 21.
- *Route 63 Corridor Study* - NYSDOT is finalizing a study which identifies strategies to improve the safety and efficiency of the NYS Route 63 corridor (including portions of NYS Routes 20 and 77) in Genesee, Livingston, and Wyoming counties. The corridor is heavily traveled by eastbound trucks as a shorter, faster, and less expensive alternative to I-90 for accessing I-390 .
- *Transportation & Industrial Access* – GTC staff are finalizing a study which identifies concept-level improvements to enhance the marketability of industrial parks and sites in each of the counties in the region and the City of Rochester.
- *Intermodal Freight Terminal Study* - RGRTA conducted a study to determine the feasibility of developing an intermodal freight facility in the Rochester area. The study recommended developing an intermodal terminal combining rail and truck service to serve as an inland distribution facility for the Port of New York/New Jersey. The study was completed in October 2001.

Currently, no traditional intermodal freight facility with the ability to handle significant volumes of freight from various modes at a single location exists in the region. The development of a tri-modal freight facility in the vicinity of GRIA near now-vacant Rochester and Southern Railroad yards in the Town of Chili has been and continues to be discussed.

- *Regional Goods Movement Strategy* – Funding has been allocated through the UPWP for GTC staff to undertake a comprehensive (i.e., truck, rail, air, and water) goods movement plan that will position the regional transportation network as a distinguishing factor in retaining and attracting both traditional and emerging-technology manufacturing firms as well as enhancing the viability of agriculture.



## INTERREGIONAL TRAVEL

Interregional travel facilities provide opportunities for travel into and out of the region. Regions that are easily accessible by a variety of modes are generally considered more attractive places to live and to visit as well as to do business. Multiple modes of interregional travel currently provide service to the region, offering convenience to residents and visitors alike. The interregional travel facilities in the region are presented in Map 17.

### Via Air

There are 23 Public Use airports in the region. The Greater Rochester International Airport (GRIA) is the Primary Commercial Service airport for the region. A Primary Commercial Service airport provides regularly scheduled passenger and freight service and serves more than 10,000 enplanements annually.

GRIA served nearly three million passengers in 2005, the most in the airport's nearly 80-year history. Passenger growth at GRIA between 2000 and 2005 was the highest among major Upstate New York airports at nearly 20 percent. Estimates for 2006 indicate continued increases above the record levels experienced in 2005.

There are currently nine commercial air carriers providing nearly 90 daily round trip flights to 23 destinations from GRIA. The carriers and their respective destinations are as follows:

- Air Canada (Toronto)
- AirTran Airways (Atlanta, Baltimore/Washington, Fort Lauderdale (seasonal), Las Vegas (beginning August 2007), Orlando, and Tampa)
- American Airlines (Chicago - O'Hare and Dallas/Ft. Worth)
- Continental (Cleveland and Newark)
- Delta (Atlanta, Cincinnati, New York – JFK, and Orlando (seasonal))
- JetBlue (New York - JFK)
- Northwest Airlines (Detroit and Minneapolis/St. Paul)
- United (Chicago - O'Hare and Washington - Dulles)
- USAirways (Boston, Charlotte, Hartford, New York - LaGuardia, Philadelphia, Pittsburgh, and Washington - Reagan)

There are 10 General Aviation airports in the region. General Aviation refers to all civil aircraft that are not classified as air carrier, commuter, or

military. Of these General Aviation airports, five are classified as Reliever airports and five are classified as Other.

A Reliever airport pulls private aircraft away from the Commercial Service airports, such as Greater Rochester, Buffalo Niagara, or Syracuse Hancock international airports, to reduce air traffic delays and increase the safety of air travel in the region.

Improvements are being made to the many General Aviation airports in the region. Genesee County recently completed an expansion of their airport and the Ontario County Industrial Development Agency is in the process of a similar expansion in Canandaigua that would extend the current runway to allow service by corporate jets.

GRIA and the 10 General Aviation airports are State Aviation System Plan (SASP) airports, making them eligible for federal-aid

### Via Rail

Amtrak service in the region is provided at the Central Avenue station in downtown Rochester. Nine trains per day - four westbound and five eastbound - serve Rochester. Ridership at the Rochester station was 78,750 in 2006, a decrease of nearly 40 percent since 2000. Recent declines in Amtrak ridership in Rochester may be attributed to reduced air fares between Rochester and New York City.

The status of Amtrak as the national passenger rail provider remains unclear. A significant infusion of funds is required for Amtrak to remain competitive and expand service. Planned high-speed rail improvements for the Empire Corridor linking Buffalo and Rochester with Albany and New York City are in question due to the current uncertainty surrounding Amtrak. GTC remains supportive of efforts to bring high-speed rail to the Empire Corridor.

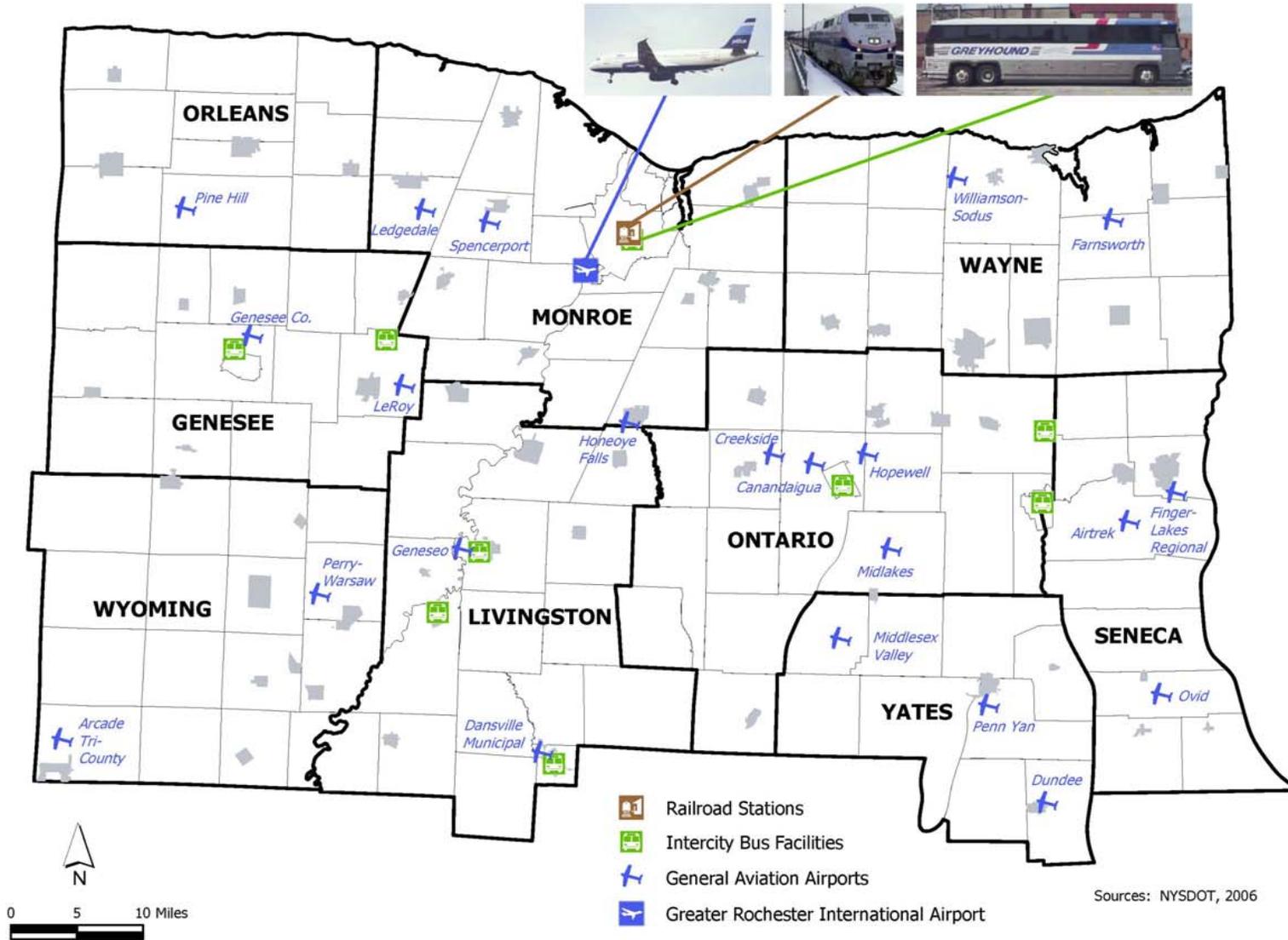
### Via Bus

Intercity bus service in the region is provided by Greyhound Lines and New York Trailways. The central transfer point for intercity buses in the region is the terminal at Midtown Plaza. Greyhound and/or Trailways



# Interregional Transportation Facilities, 2007

Map 17



# THE TRANSPORTATION SYSTEM



make stops at eight additional locations throughout the region. Current connections between intercity and intracity (public transportation) buses allows for convenient transfer between the two modes at Midtown Plaza. The opening of Renaissance Square in 2010 (estimated) will enhance convenience by providing a single point for all bus transfers in downtown Rochester.

## Via Water

The Spirit of Ontario fast ferry across Lake Ontario between the Port of Rochester and Toronto, Ontario began service in June 2004. Service temporarily stopped in September 2004, but was restarted by the City of Rochester in June 2005. The ferry service ceased permanently in October 2005 and the ship was sold to foreign interests in March 2007. During its nearly two seasons of service, the Spirit of Ontario carried more than 200,000 passengers.

## Accomplishments

Extensive physical improvements are continuing at GRIA. A new six-lane centralized security checkpoint opened in February 2005 to enhance the safety of the airport and its airlines for travelers and employees. Airfield improvements including new taxiways, reconstructed runways, and rehabilitated or reconstructed internal roadways are either complete, under construction, or planned.

A key consideration when flying into and out of a region is the cost. GRIA had some of the highest air fares in the nation in 1998. Since that time, fares have been cut substantially, due in large part to the presence of low-fare carriers, notably AirTran and JetBlue. Airfares to and from GRIA fell 33 percent between 1999 and 2004.

GTC completed the *Rochester Amtrak Station Revitalization Study* in March 2002. The purpose of the study was to position the greater Rochester area for the arrival of high-speed rail through the functional and aesthetic redesign of the station. Strategies were identified to ensure its full integration with downtown Rochester and the regional transportation system.

The study calls for the construction of a new station to be built just west of the existing station as well as the installation of high-level platforms, new passenger rail tracks to the north and south of the existing tracks, and a pedestrian bridge connecting the new station with the new tracks.

In addition, a new Amtrak station is planned in Lyons. This new station will improve access to passenger rail in the region and may act as a catalyst for economic development in Wayne County.

The cessation of ferry service between Rochester and Toronto via the Spirit of Ontario represents the most significant change in interregional travel since the last LRTP was adopted in December 2004.

**CHAPTER V - RECOMMENDATIONS**



# RECOMMENDATIONS



## OVERVIEW

The recommendations are classified into four categories: Preservation & Maintenance, Operations & Management, Expansion, and Land Use:

- Preservation & Maintenance – recommendations that preserve and/or maintain existing infrastructure, equipment, etc.
- Operations & Management – recommendations that provide for more efficient use of existing infrastructure, delivery of services, etc.
- Expansion – recommendations that increase physical structures, provide services to new areas, etc.

Land Use – recommendations that acknowledge the strong connections between the built environment and the transportation system

Please note that the Operations & Management category does not include recommendations necessary for the maintenance or use of infrastructure or the provision of services. Rather, the Operations & Management category includes recommendations for capital projects that *improve* the ability to use the infrastructure or *more efficiently* provide services.

The recommendations for each mode (excluding Land Use) are divided into two types, policies and actions:

- Policies – programmatic strategies to achieve the GTC Goals and Objectives

Actions – specific initiatives that GTC, member agencies, and others can undertake to develop and implement specific projects to meet the policies

Neither the policies nor actions included in the recommendations represent funding commitments for specific projects. Rather, they are intended to serve as a framework for future transportation planning and investment decision-making as determined through the Unified Planning Work Program and Transportation Improvement Program, respectively.

The draft recommendations are further organized by the following modes of transportation:

- Highway & Bridge
- Public Transportation
- Bicycle & Pedestrian
- Multi-Modal
- Goods Movement
- Interregional Travel

These recommendations are consistent with the principal themes of the LRTP Update, as well as the mission and Goals and Objectives of GTC.

## PRESERVATION & MAINTENANCE

### Highway & Bridge

The region has an extensive highway and bridge network. It is critical to preserve and maintain existing roadways and bridges to promote safety and security, increase efficiency and reliability, and minimize lifetime costs. As a region, we must identify the most important existing highway and bridge deficiencies and address them in a cost-effective manner. The funding of highway and bridge preventive maintenance in the *2007-2012 TIP* is a significant step toward improved asset management and should be continued in the future.

Tourism is an increasingly important aspect of the region's economy. Like many sectors of the economy, tourism is greatly impacted by the transportation system. Consequently, the maintenance and overall attractiveness of "gateway" roads and bridges as well as key tourism corridors should be emphasized.

Truck traffic is another important area in which transportation infrastructure plays a sizeable role in economic development. Trucks, however, do accelerate the deterioration of roads. Appropriate resources should be devoted to enforcing truck weight regulations on the region's roadways.



## Public Transportation

Use of public transportation is increasing in the region. Currently, there are transit services in eight of the nine counties in the region, the most recent addition being Seneca Transit Service in September 2004.

Ridership on the region's transit service providers has generally held steady or increased over the last five years. The average fleet age for RTS, the region's largest transit provider, is less than seven years. Numerous routes have been added and/or restructured while underperforming routes have been cut. A simplified fare structure and new fare payment options have been introduced and additional ITS enhancements are planned. These improvements are necessary to attract additional discretionary riders.

In order to ensure that public transportation service in the region is of the highest quality, it is imperative that these services receive the financial support necessary to meet the needs of current and future users. Providing continued funding for preventive maintenance activities on public transportation vehicles will guarantee that users have a safe and comfortable experience. Stable funding mechanisms for public transportation improvements including, but not limited to, increases in Statewide Transit Operating Assistance, will allow the region's transit service providers to enhance their existing services and attract new riders.

## Bicycle & Pedestrian

Bicycle and pedestrian facilities are a growing component of the region's transportation system. They offer quality of life improvements and provide an alternative to the automobile for some trips. Too often, however, these facilities are not given proper attention in regards to maintenance and preservation. All bicycle and pedestrian facilities should be preserved and maintained in a manner that promotes safety and efficiency, and minimizes lifetime costs. Increased monitoring of use and condition is an important consideration.

## Multi-Modal

Safety and security of the transportation system is a key component of the region's transportation investment decision making. Regardless of mode, proper maintenance of safety and security-related features such as signage, lighting, rail crossing gates, and passenger facilities is of paramount importance.

## Goods Movement

The movement of goods into, out of, and through the region is a major function of the transportation system. Truck traffic is growing and is expected to continue to do so for the foreseeable future. As a result, it is important that goods movement considerations are fully incorporated into all future transportation planning studies and highway and bridge reconstruction projects.

## Interregional Travel

The ability to quickly and easily travel into and out of the region is important to the regional economy. Recent efforts have resulted in lower air fares and improved security at the Greater Rochester International Airport (GRIA). Development of the transit center component of Renaissance Square will improve Greyhound and Trailways intercity bus facilities.

Advancing recommendations of the *Rochester Amtrak Station Revitalization Study* that lead to the reconstruction of the station on the existing site will facilitate improved operations for intercity rail in the region and may provide an economic spark for the north end of downtown Rochester.

# RECOMMENDATIONS



## PRESERVATION & MAINTENANCE

POLICIES	Preserve and maintain existing roadways, bridges, and bicycle and pedestrian facilities in a manner that promotes safety and security, increases efficiency and reliability, and minimizes lifetime costs.	
	Ensure that "gateway" roads and bridges leading into/out of the region as well as those along tourist corridors are well maintained and attractive.	
	Preserve and maintain existing roadway, bridge, and rail infrastructure in a manner that supports the reliable movement of goods and ensures the safety of other motorized and non-motorized users of the transportation system.	
	Ensure that a variety of convenient and reliable interregional transportation options are available to residents of and visitors to the region.	
ACTIONS	<b>HIGHWAY &amp; BRIDGE</b>	
	P.1.	Continue pavement condition monitoring and traffic count collection activities to identify current and future highway preservation investment needs.
	P.2.	Advance preservation and maintenance recommendations identified in corridor, major investment, access management, and other planning studies conducted by GTC and member agencies, as determined through the TIP development process.
	P.3.	Identify "gateway" roads and bridges and develop maintenance plans that ensure these areas reflect positively on the region.
	P.4.	Maintain all Federal-aid roads at a "fair" or better pavement condition, with an emphasis on key trade, tourism, and commuter corridors.
	P.5.	Identify the resources necessary to reduce premature deterioration of highways and bridges through increased enforcement of truck weight regulations.
	P.6.	Continue fiscal practices that allocate funding for highway and bridge preventive maintenance activities.
	<b>PUBLIC TRANSPORTATION</b>	
	P.7.	Maintain the average fleet age of all public transportation operators in the region at or below FTA standards.
	P.8.	Continue fiscal practices that allocate funding for preventive maintenance activities on public transportation vehicles.
P.9.	Create stable funding mechanisms (including, but not limited to, increases in Statewide Transit Operating Assistance funds) for improvements to existing public transportation services in the region.	

# RECOMMENDATIONS



<b>PRESERVATION &amp; MAINTENANCE (cont.)</b>	
ACTIONS (cont.)	<b>BICYCLE &amp; PEDESTRIAN</b>
	P.10. Conduct seasonal traffic count collection and surface condition monitoring on the region's multi-use trails to identify current and future trail preservation investment needs.
	P.11. Advance preservation and maintenance recommendations identified in the Regional Trails Initiative, Priority Trails Advancement program, and other bicycle and pedestrian planning studies conducted by GTC and member agencies, as determined through the TIP development process.
	P.12. Complete the Pedestrian Facilities Inventory, a comprehensive GIS database of sidewalks and other related pedestrian infrastructure in the Rochester TMA.
	<b>MULTI-MODAL</b>
	P.13. Maintain the safety and security-related features of all highways, bridges, public transportation, bicycle, and pedestrian facilities including, but not limited to, signage, lighting, striping, guiderails, rail crossing gates, passenger/maintenance facilities, and pavement markings.
	<b>GOODS MOVEMENT</b>
P.14. Encourage member agencies to increase integration of goods movement considerations into preliminary engineering and design	
<b>INTERREGIONAL TRAVEL</b>	
P.15. Reconstruct the Rochester Amtrak Station at its current Central Avenue site as recommended in the Rochester Amtrak Station Revitalization Study. (Not eligible for Federal formula transportation funds)	

# RECOMMENDATIONS



## OPERATIONS & MANAGEMENT

### Highway & Bridge

Improving the performance of the region's transportation system with limited capital investment in physical capacity projects has emerged as a viable option for regions across the nation. The Genesee-Finger Lakes Region is no exception. The deployment of Intelligent Transportation Systems (ITS), Transportation System Management & Operations (TSMO), and Transportation Demand Management (TDM) activities are cost-effective alternatives to adding capacity to the highway and bridge network.

ITS and related technologies and strategies should be integrated into all future transportation planning efforts as well as the design of major reconstruction and rehabilitation projects. The region should continue to financially support the expansion of ITS and TSMO efforts to continually improve the efficiency of the highway and bridge network. Continued expansion of surveillance, detection, and information collection/dissemination through the use of fiber optic communications, CCTV cameras, vehicle detection, Highway Advisory Radio (HAR), and Dynamic Message Signs (DMS) is encouraged.

Operational improvements are not limited to advanced technologies. Intersection improvements including, but not limited to, the addition of turn lanes or simple re-striping of a roadway are also operational improvements and can provide significantly enhanced safety and efficiency.

### Public Transportation

The nation, and indeed the region, is in the midst of the largest demographic shift in recent history. The population is aging at an increasing rate as the "Baby Boomers" reach their sixties. The elderly and persons with disabilities need access to basic services and want to actively participate in the community. The region must ensure that public transportation services are aging-friendly, meeting the needs of the increasing senior population and of disabled residents.

Any improvements made should be accompanied by increased marketing to make potential customers aware of the services available to them, especially in suburban and rural areas. Most importantly, facilities must be made accessible to all users at all times. Inclement weather should not preclude a user from having access to public transportation. Transit providers, municipalities, and private landowners should work cooperatively to ensure that transit stops are safe and accessible.

Air quality is an important consideration in the region and one that public transportation can have a positive impact on. Reducing the emissions from the existing bus fleet through replacing or retrofitting existing buses with cleaner-running buses and filtering apparatus will have an impact on emissions levels.

The Coordinated Public Transit-Human Services Transportation Plan that is currently under development will outline how public transportation service providers, social service agencies, school districts, and other transportation providers can most efficiently and effectively work together to improve mobility for individuals with special transportation needs throughout the region. Findings of this plan should be advanced in a cost-effective and timely manner.

### Bicycle & Pedestrian

In order to maximize the use of the region's growing bicycle and pedestrian network, it must be safe, efficient, and accessible to all users. Installation of ADA-accessible pedestrian treatments is required when reconstructing facilities. Where they do not currently exist, ADA-accessible treatments should be installed. A regional bicycle parking program should be organized to ensure adequate storage for bicycles at activity and employment centers across the region. Pedestrian safety improvements at the region's at-grade railroad crossings should be identified, especially at high-traffic crossings.

### Multi-Modal

Traffic calming measures which slow vehicular traffic should be adopted, where appropriate, to improve the bicycle and pedestrian environment. To support the growing tourist economy, promotional and way-finding



signage along tourist corridors, on multi-use trails, and at high-volume bus stops in the region should be improved and expanded. All new transit buses in the region should be equipped to handle bicycles.

To improve air quality and reduce oil dependency, the regional alternative fuels infrastructure should continue to be developed. Expanded use of alternative fuel, hybrid, retrofitted, and/or smaller vehicles in the region's public fleets will support this effort.

## Goods Movement

Enhancing the safety and efficiency of the region's goods movement system benefits all users of the transportation network. Overhead clearance issues that impede trucks should be mitigated appropriately to ensure a decrease in incident-based delay. Where the mixing of trucks with local traffic is causing significant problems, alternatives should be sought out and implemented. For instance, reassigning Route 54 in the Village of Penn Yan could alleviate truck traffic conflicts on busy village streets. The findings of the Route 63 Corridor Study should be advanced in a timely manner to mitigate the issues associated with truck traffic in that area.

The safety of railroads, especially at-grade railroad crossings, has become an important regional issue. Enhanced inspection of the region's railroad infrastructure will improve the safety and reliability of the rail component of the region's goods movement network. All hazardous and/or high-traffic at-grade rail crossings in the region should be analyzed and mitigated appropriately. Overhead clearance is also an issue for railroads. Removal of these obstructions could allow for double-stacked rail cars, which would shorten trainsets running through the region.

The traffic being carried on Class 1 railroads and the speeds at which they operate can pose safety and noise issues for the communities they are located in. The fencing and/or buffering of Class 1 rail lines in developed areas should be investigated.

Transportation plays a major role in the attractiveness of industrial parks and facilities. Access to these sites is crucial to business attraction and retention. Brownfield sites face numerous difficulties and transportation should not hinder their redevelopment. Safe and efficient access to agri-

cultural areas and related establishments by trucks and large equipment is also vital to the regional economy.

The Regional Goods Movement Strategy will be initiated and its recommendations should be implemented as appropriate.

## Interregional Travel

Improving the efficiency of transportation into and out of the region will have both economic and transportation benefits. If the experience of traveling into and out of the region is enjoyable, a traveler is more likely to use the system again.

The provision of adequate way-finding signage at the region's interregional transportation facilities as well as to key traveler destinations (e.g., museums, parks, shopping, etc.) is a relatively simple yet effective way to improve operations. Adequate parking space for both cars and bicycles, as well as regularly-scheduled public transportation service, must be provided at interregional travel facilities.

# RECOMMENDATIONS



## OPERATIONS & MANAGEMENT

	Identify and address key highway, bridge, and bicycle and pedestrian safety, security, reliability, and efficiency needs.
	Utilize the GTC Congestion Management Process (CMP) to identify corridors where operational improvements can enhance safety and efficiency.
	Support transportation system operational improvements that are responsive to safety, air quality, energy efficiency, and quality of life concerns.
	Increase the use of Intelligent Transportation Systems (ITS), Transportation System Management and Operations (TSMO), and Transportation Demand Management (TDM) applications to enhance the safety, efficiency, and reliability of the transportation network and associated services.
	Ensure that regional attractions are easy to find by both residents and visitors alike.
	Ensure that existing public transportation services are provided in a convenient and safe fashion, offering an attractive alternative to the single-occupant vehicle.
POLICIES	Ensure that public transportation services meet the needs of the disabled and the increasing senior population.
	Increase awareness of existing public transportation services among specific customer groups within the region to better serve their mobility needs in a cost-effective manner.
	Ensure that public transportation facilities are accessible to all users at all times, with special attention paid during the winter months and other periods of inclement weather.
	Increase the safety, efficiency, and accessibility of the region's bicycle and pedestrian network.
	Work with public and private entities to increase the safety and efficiency of the region's goods movement system across all modes.
	Address significant transportation issues that may negatively impact industrial parks and sites (including brownfields).
	Support improvements that promote the stability and enable the growth of agriculture and agribusiness.



<b>OPERATIONS &amp; MANAGEMENT (cont.)</b>	
	<b>HIGHWAY &amp; BRIDGE</b>
ACTIONS	O.1. Advance intersection improvement recommendations (including, but not limited to, reconfigurations) identified in corridor, major investment, access management, and other planning studies conducted by GTC and member agencies, as determined through the TIP development process.
	O.2. More fully incorporate ITS applications into future planning studies conducted by or on behalf of GTC (examples include advanced traveler information systems, road weather information systems, expressway incident management, traffic signal coordination, advanced parking management systems, etc.).
	O.3. Encourage member agencies to increase integration of ITS infrastructure into preliminary engineering and design phases of major reconstruction projects.
	O.4. Implement planned ITS improvements including, but not limited to, CCTV cameras, vehicle detection, highway advisory radio systems, etc.
	O.5. Continue fiscal practices that place an emphasis on ITS and TSMO activities.
	O.6. Enhance the coordination of ITS technologies located along the region's expressways, arterials, and the NYS Thruway.
	O.7. Expand the use of ITS technologies in work zones to improve the safety of workers and travelers.
	O.8. Explore the expanded use of TDM strategies as a cost-effective alternative to capital infrastructure improvements (examples include carpooling, car sharing, parking strategies, alternative work schedules, telecommuting, etc.).
	O.9. Complete the Diversion Route Planning Initiative and implement its recommendations, as determined through the TIP development process.
	<b>PUBLIC TRANSPORTATION</b>
O.10. Continually assess existing public transportation services relevant to current and projected needs, demand, and market potential and determine the necessary route structure and fleet requirements.	
O.11. Consider the locations of senior living communities and other areas where a high percentage of seniors reside when assessing route structures and schedules.	
O.12. Implement and provide support for the RGRTA Technology Initiatives for Driving Excellence (TIDE) program.	
O.13. Conduct targeted marketing of existing and new public transportation services to seniors, rural residents/businesses, and college students.	
O.14. Encourage transit providers, counties, and municipalities to work cooperatively to maintain accessibility to public transportation facilities during service hours.	
O.15. Identify cost-effective methods for improving access to employment and non-emergency medical services as recommended through the Coordinated Public Transit-Human Services Transportation Plan.	

# RECOMMENDATIONS



## OPERATIONS & MANAGEMENT (cont.)

BICYCLE & PEDESTRIAN	
ACTIONS (cont.)	O.16. Institute a regional program to prioritize the retrofit and/or new installation of ADA-accessible treatments in the pedestrian network.
	O.17. Establish a centralized bicycle parking program to support the purchase and proper installation of quality bicycle parking at public and private locations throughout the region.
	O.18. Identify and support pedestrian safety improvements at accident-prone rail crossing locations in the region.
	O.19. Install count-down pedestrian signals at key intersections (i.e., those experiencing significant vehicular and pedestrian traffic volumes) throughout the region, and consider installation at other select locations.
	O.20. Encourage bicycling and walking as healthy and viable means of transportation for both work and non-work-related trips.
MULTI-MODAL	
	O.21. Improve and/or install promotional and way-finding signage along the region's Statewide Tourism Corridors, on multi-use trails, at trailheads, and at high-volume bus stops in the region.
	O.22. Implement traffic calming measures, where appropriate, to improve the bicycling and walking environment.
	O.23. Ensure that all public buses (non-paratransit) in the region can accommodate bicycles.
	O.24. Encourage the expanded use of alternative fuel, hybrid, retrofitted, and/or smaller vehicles in public fleets to reduce emissions and increase energy efficiency.
	O.25. Continue development of the regional alternative fuels infrastructure to decrease oil dependency and improve air quality.
	O.26. Provide technical and financial support to the regional Safe Routes to School program to provide safe and healthy connections between school and home.
	O.27. Complete the Greater Rochester ITS Strategic Plan Update and implement its recommendations, as determined through the TIP development process.



## OPERATIONS & MANAGEMENT (cont.)

OPERATIONS & MANAGEMENT (cont.)	
	<b>GOODS MOVEMENT</b>
	O.28. Address safety issues related to the presence of trucks and slow-moving vehicles, most notably farm vehicles on rural roadways.
	O.29. Identify locations of low overhead bridge clearance for trucks and develop appropriate mitigation strategies.
	O.30. Reduce the number of hazardous and/or high traffic at-grade rail crossings on Class 1 railroads in the region.
	O.31. Identify and improve locations of low overhead bridge clearance to allow for double-stacked rail cars, shortening train-sets on Class 1 railroads in the region.
	O.32. Work with the Class 1 railroads to identify ways to improve safety and reliability on and along railroads in the region, including enhanced inspection.
ACTIONS (cont.)	O.33. Implement goods movement operational improvements which ensure that negative impacts of truck traffic on local communities are minimized, as appropriate.
	O.34. Identify and implement operational improvements that support agriculture and agribusiness, including "Farm to Fork" initiatives.
	O.35. Complete a Regional Goods Movement Strategy and advance its recommendations, as determined through the TIP development process.
	<b>INTERREGIONAL TRAVEL</b>
	O.36. Provide adequate way-finding signage at interregional travel facilities in the region.
	O.37. Provide sufficient parking at interregional travel facilities in the region.
	O.38. Establish connections between interregional travel facilities and rural public transportation services.

# RECOMMENDATIONS



## EXPANSION

### Highway & Bridge

Expanding the capacity of the region's roadway network should be limited. As a nonattainment area for ground-level ozone, new travel lanes and/or facilities that increase capacity cannot be added to the transportation system unless a need has been identified through the GTC Congestion Management Process (CMP). Correspondingly, the update to the GTC CMP is incorporated into this Plan.

Capacity expansion projects that have been identified by the GTC CMP and supported by Corridor or Major Investment Studies should be advanced in a manner that maximizes their contribution to the economic growth and vitality of the region. Additional analysis will be needed to justify capacity improvements. Projects will be selected for implementation through the TIP development process.

### Public Transportation

The development of new or expanded public transportation services should be undertaken so as to maximize their contribution to the region's economic growth and vitality. Access to employment opportunities and health care providers must be a key consideration when adding new or extending existing transit routes. Establishment of new transit services such as tourism circulators and express bus service should be investigated.

Construction of the transit component of Renaissance Square will provide improved conditions for riders transferring downtown as well as significant economic development benefits to the region. The planned establishment of satellite transit centers should improve the attractiveness of public transportation to commuters as well as provide new community focal points. The CATS Hopewell facility should improve the efficiency and reliability of public transportation service in Ontario County. GTC will provide support, as needed, to these projects as they proceed to construction.

The region should continue to advance the recommendations of recently-completed public transportation-related plans and studies such as the ru-

ral county strategic plans for public transportation and the *Strategic Plan for Access to Non-Emergency Medical Services*.

### Bicycle & Pedestrian

The bicycle and pedestrian network in the region should continue to be expanded in a manner that maximizes its contribution to the economic growth and vitality of the region. Safety, connectivity, and accessibility are key considerations. For transportation purposes, a multi-use trail is only as good as the places it can provide access to. Therefore, it is imperative that connectivity deficiencies of the existing multi-use trail network are alleviated. The same holds true for sidewalks, crosswalks, bicycle lanes, and other bicycle and pedestrian facilities.

New, improved, or extended multi-use trails should be advanced based on the recommendations of the Regional Trails Initiative and further planning studies (i.e., Priority Trails Advancement plans). Development of a regional "Safe Routes to School" program will encourage an increase in bicycle and pedestrian travel to primary and secondary schools.

### Multi-Modal

All highway and bridge reconstruction and expansion projects should be developed as "Complete Streets" incorporating bicycle, pedestrian, and public transportation facilities, as appropriate.

### Goods Movement

Existing goods movement facilities should be expanded and new facilities constructed to meet the needs of the changing economy. Projects should be advanced in a manner that maximizes their contribution to the economic growth and vitality of the region.

An emerging goods movement need in the region is the development of a multi-modal freight facility, possibly near the Greater Rochester International Airport. This facility could serve existing business and spur the development of new businesses, creating jobs and improving the region's goods movement capabilities.



A waterborne freight facility on Lake Ontario in Monroe, Orleans, or Wayne counties is another facility worthy of study. Currently, the Port of Rochester handles one freighter carrying cement shipments. The establishment of a full-scale port facility could lead to additional economic growth and goods movement capabilities.

Another potential goods movement investment to examine is the conversion of certain abandoned rail corridors for use exclusively by trucks. These corridors could provide access to existing industrial areas, removing truck traffic from local roads and improving freight travel times.

## Interregional Travel

New or expanded facilities that will increase travel options for residents and visitors alike should be pursued. Transfers between the region's interregional transportation facilities (e.g., GRIA, Renaissance Square, and the Amtrak Station) should be facilitated, possibly through the introduction of a shuttle service.

Construction of a new Amtrak station in Lyons will provide improved access to interregional travel for residents in the eastern portion of the region. Efforts to add high-speed rail service on the Empire Corridor between Buffalo and New York City should be supported. Additional improvements and expansions at GRIA identified in their upcoming Master Plan update should also be supported.

# RECOMMENDATIONS



EXPANSION	
POLICIES	Increase capacity through new traffic lanes/facilities only when a need has been identified in the GTC Congestion Management Process (CMP) and other alternatives have been exhausted.
	Continue the development of new and expanded public transportation facilities to increase the marketability and attractiveness of these services as an alternative to single-occupancy vehicles, particularly in suburban areas.
	Increase accessibility to employment opportunities and medical services for persons without access to a private automobile.
	Improve the mobility of students at colleges and universities in the region to increase the likelihood of retention upon graduation.
	Increase the size and scope of the region's bicycle and pedestrian network through the development of new and expanded facilities.
	Develop new goods movement facilities and expand existing ones to meet the changing needs of the regional economy.
	Develop new interregional travel facilities and expand existing ones to increase interregional travel options.
<b>HIGHWAY &amp; BRIDGE</b>	
E.1.	Monitor the performance of the transportation system as it relates to the GTC CMP.
E.2.	Advance recommendations for new traffic lanes/facilities identified in corridor studies and major investment studies that are consistent with the GTC CMP, as determined through the TIP development process.
<b>PUBLIC TRANSPORTATION</b>	
E.3.	Provide support as needed to Main & Clinton Local Development Corporation for the development of Renaissance Square.
E.4.	Provide support as needed to Ontario County Area Transit System (CATS) for the development of the CATS Hopewell facility.
E.5.	Advance the recommendations of the rural county strategic plans for public transportation, as appropriate.
E.6.	Advance the recommendations of the Strategic Plan for Access to Non-Emergency Medical Services, as appropriate.
E.7.	Explore partnerships with the not-for-profit sector to provide services that complement and expand on existing ADA-prescribed para-transit services for persons with disabilities.
E.8.	Explore the establishment of circulator services linking proximate tourist and entertainment destinations within the region.
E.9.	Investigate the feasibility of providing express bus service in the region using traffic signal priority for transit vehicles.
ACTIONS	



EXPANSION (cont.)	
ACTIONS (cont.)	<b>PUBLIC TRANSPORTATION (cont.)</b>
	E.10. Assess the potential of high-capacity transit corridors in the region to determine the viability of implementing cost-effective fixed guideway public transportation services in coordination with associated transit oriented development.
	<b>BICYCLE &amp; PEDESTRIAN</b>
	E.11. Advance trail expansion recommendations as identified in the Regional Trails Initiative, Priority Trails Advancement program, and other planning studies conducted by GTC and member agencies, as determined through the TIP development process.
	E.12. Improve the connectivity of the region's bicycle and pedestrian network through the development of new trails, sidewalks, bicycle lanes, wide curb lanes, curb offsets, and/or paved shoulders that meet or exceed the minimum requirements of the agency responsible for the roadway.
	E.13. Establish a regional and local "Signed Shared Roadway" system of bicycle routes that link key destinations/generators of bicycle trips.
	<b>MULTI-MODAL</b>
	E.14. Develop "Complete Streets" that incorporate bicycle and pedestrian facilities as part of all highway and bridge reconstruction and expansion projects, as appropriate.
	<b>GOODS MOVEMENT</b>
	E.15. Support the development of a freight terminal combining truck, air, and/or rail capabilities to serve as a potential inland port distribution center.
	E.16. Explore the development of a waterborne freight facility on Lake Ontario in Monroe, Orleans, or Wayne counties.
	E.17. Expand and/or update rest areas to meet NYSDOT policies, provide additional space for trucks, and include other improvements such as truck stop electrification.
	E.18. Advance goods movement capital recommendations identified in corridor, major investment, access management, and other planning studies conducted by GTC and member agencies, as determined through the TIP development process.
	E.19. Investigate the potential for truck-only roadways using existing and abandoned rights-of-way.

# RECOMMENDATIONS



EXPANSION (cont.)	
	<b>INTERREGIONAL TRAVEL</b>
ACTIONS (cont.)	E.20. Enable connections between Renaissance Square and other interregional travel facilities throughout the region.
	E.21. Construct a new Amtrak station in Lyons. (Not eligible for Federal formula transportation funds)
	E.22. Support efforts to establish double-tracked, high-speed rail service on the Empire Corridor between Buffalo and New York City. (Not eligible for Federal formula transportation funds)
	E.23. Provide assistance as needed to the Greater Rochester International Airport in the development of their Master Plan update.
	E.24. Improve access to the Erie Canal and other major waterways in the region.
	E.25. Provide support as needed to assess transportation needs at the Port of Rochester.



## LAND USE

There is a strong connection between land use and transportation. Transportation facilities determine what land uses can be supported and land uses determine what transportation facilities are needed. Planning for either should not be done in isolation, but rather in a cooperative and complementary manner. Regional transportation needs and local land use and development objectives must be balanced with respect to transportation planning and investment decision making.

Local communities should be encouraged to pursue infill development, with attention paid to the redevelopment of brownfields, whenever possible. With established infrastructure already in place, infill development and redevelopment is an efficient use of this region's physical resources.

Preservation of existing active and abandoned rights-of-way for future transportation use is strongly recommended. These rights-of-way often pass through desirable locations and would be highly difficult and expensive to restore once they are fragmented.

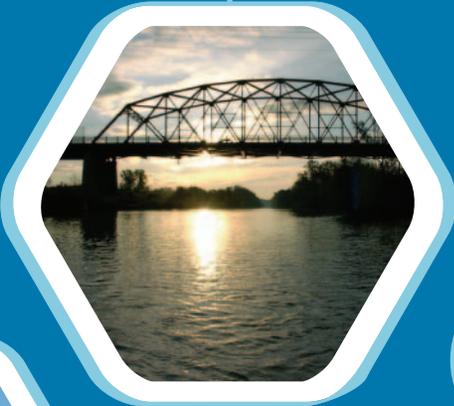
All transportation projects advanced in the region should be done in a manner that enhances and protects community character. Accordingly, context sensitive design principles should be incorporated into the design of transportation projects, as appropriate. In addition, Main Street planning activities should be continued to help ensure that the region's cities, villages, and hamlets are suitably planned for.

# RECOMMENDATIONS



LAND USE	
	Encourage infill development and redevelopment of areas (including brownfields) with existing transportation infrastructure.
	Encourage land use practices that incorporate consideration of the transportation system early in the development process.
	Ensure that transportation planning and investment decision making balances local land use and development objectives with regional transportation needs.
	Continue to provide technical planning assistance to member agencies and municipalities.
	Preserve existing rights-of-way for possible future transportation uses.
POLICIES	
	Expand the distribution of GTC instructional materials including, but not limited to, the How-To Guidebook for Rural Transportation Plans, Access Management Video and Guide, and various bicycle and pedestrian safety fact sheets.
	Continue funding for land use related planning activities (e.g., Land Use Monitoring, Optimizing Transportation Infrastructure Through Effective Land Use, Cluster Development Enhancement Project Feasibility Study, etc.) in the Unified Planning Work Program.
	Encourage the inclusion of transportation components in local comprehensive plans.
	Further incorporate context sensitive design principles into highway reconstruction projects.
	Work with member agencies to expand "Main Street" planning activities.
	Develop model transit-supportive zoning language for use by municipalities served by fixed-route transit service.

**CHAPTER VI - FINANCE AND IMPLEMENTATION**





## OVERVIEW

Given the important role that transportation plays in determining the quality of life and economic success of the region, it is important that the policies and actions of the LRTP Update be advanced.

A major component of insuring that the recommendations of the LRTP Update are advanced is the development of a finance plan to allocate reasonably expected revenues.

### Anticipated Revenue Projections

Title 23 of the U.S. Code of Federal Regulations governing MPOs requires the LRTP to "include a financial plan that demonstrates the consistency of proposed transportation investments with already available and projected sources of revenue." The requirement further states that "the estimated revenue by existing revenue source (local, state, federal, and private) available for transportation projects shall be determined..." and "all cost and revenue projections shall be based on the data reflecting the existing situation and historical trends."

The passage of SAFETEA-LU resulted in a significant increase in federal funding for transportation across the nation. Projections of future anticipated federal formula funds were developed based on the amounts authorized in SAFETEA-LU as the defined "existing situation" referenced in Title 23 with respect to anticipated federal revenues.

These projections represent a conservative amount of federal formula funding that can be reasonably expected over the next 20 years based on past funding levels. In addition, State Dedicated Funds (SDF) were incorporated into the analysis based on historical trends. Combined, federal formula funds and SDF (including the amount used to match federal formula funds) comprise the vast majority of revenues available to maintain and operate the federal-aid transportation system in the region.

Non-federal transit revenues were not included in the analysis other than for matching federal funds. Given that FTA funds can only be used for capital expenses (with limited exceptions), non-federal monies above

those needed to match federal funds are anticipated to be used for operating expenses.

### How the projections were developed

GTC analyzed the *2005-2010 TIP*, as originally adopted, and the estimates of federal formula funds used to develop the *2007-2012 TIP* to serve as the basis for developing the projections. The percent change of federal formula funds to New York State between TEA-21 and SAFETEA-LU was determined and a minimal graduated reduction in this amount of change was applied to the anticipated amounts to the region in future reauthorizations to account for New York's slower rate of population growth than other states. The revenue projections by federal formula fund source were then aggregated to reflect anticipated year of expenditure dollars.

In addition, there are projects in the TIP that utilize federal discretionary funds, however, GTC staff did not include these funds in the projections because they cannot be reasonably expected to recur at past levels on a consistent basis in the future. For those projects that include both formula and discretionary federal funds, only the formula funds were included in the development of the projections of future anticipated federal formula funds. Any funds received through discretionary programs will have a positive impact on revenue to the region, but cannot be considered anticipated revenues for the purposes of the LRTP Update.

Because the receipt of most federal funds for transportation investments require a minimum 20 percent non-federal match, this minimum was used to determine the non-federal amount of funding to ensure that the anticipated revenue projections would be conservative and therefore "reasonable". This 20 percent match was subtracted from the projections of SDF and the remainder is considered non-federal funds available for maintenance and operation of the federal-aid system.

None of the TIPs developed by GTC have included any private sources of matching funds. Accordingly, no private funds are projected to be available during the 20 years covered by the LRTP Update.



## How the TIP-eligible costs were developed

The TIP-eligible costs were developed through methodologies similar for each category but unique for each mode. The TIP-eligible costs are a conservative estimate of the total transportation needs of the region. A synopsis of the methodologies used to develop the TIP-eligible costs follows:

- \* Preservation - primarily TIP proposals (funded and unfunded) with adjustments made in Bicycle & Pedestrian for costs associated with preserving and maintaining an increased number of multi-use trails as more are developed over the 20-year period covered by the LRTP Update
- \* Operation - a combination of TIP proposals (funded and unfunded) and estimated costs provided as part of the recommendations included in the plan, study, or report from which they were taken
- \* Expansion - primarily estimated costs provided as part of the recommendations included in the plan, study, or report from which the recommendation was taken

A reasonableness check was performed on the TIP-eligible costs developed for the proposed recommendations based on *New York State Metropolitan Planning Organizations Long-Term Funding Needs Study* (August 2003) and the previous LRTP (December 2004), indicating that the TIP-eligible costs developed for the LRTP Update are a reasonable measure of the alternatives needed to meet the region's minimum transportation needs.

In some instances, a specific proposed recommendation had a cost assigned to it that is not included in the TIP-eligible cost for that category. An example is the Amtrak Station improvements (Action P.15.). The costs associated with these types of recommendations are not considered TIP-eligible and are noted as such.

Per FHWA and FTA guidance, a four percent annual inflation rate was applied to the current year costs to reflect year of expenditure dollars for 2007 and beyond – for both highway and transit improvements. This inflation rate was compared to the most recent (April 2007) American Road and Transportation Builders Association Highway Construction

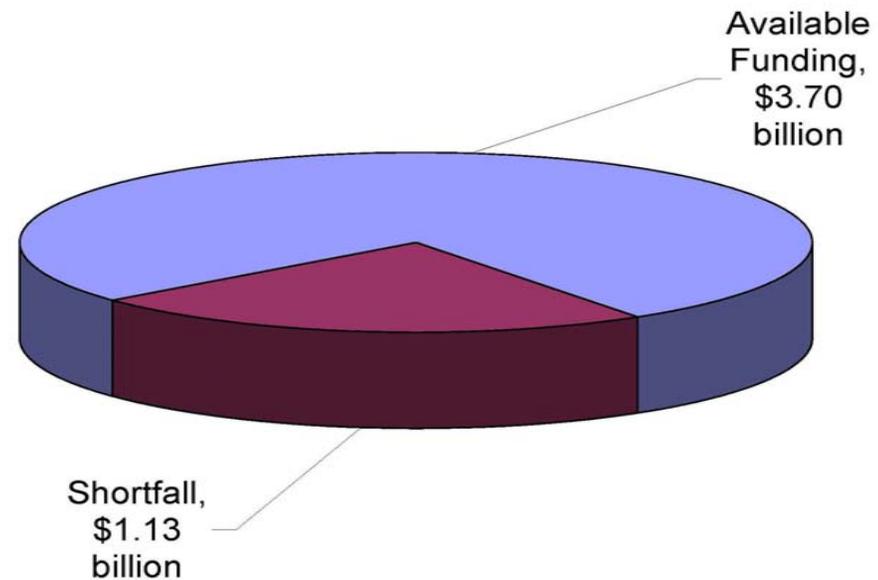
Producer Prices, which also calculated long-term trend growth at four percent per year.

## THE SHORTFALL

While TIP-eligible funding costs for transportation needs across all modes (as represented by the policies and actions included in the LRTP Update) amount to approximately \$4.82 billion in escalated dollars through 2027, GTC can reasonably anticipate approximately \$3.70 billion in federal formula fund revenues to be available for funding the proposed recommendations.

As presented in Exhibit 15, the shortfall is the difference between the costs of the policies and actions and the anticipated revenue projections and conservatively totals approximately \$1.13 billion (or 23.4 percent) over the 20 years covered by the LRTP.

Exhibit 15 - **FUNDING SHORTFALL**

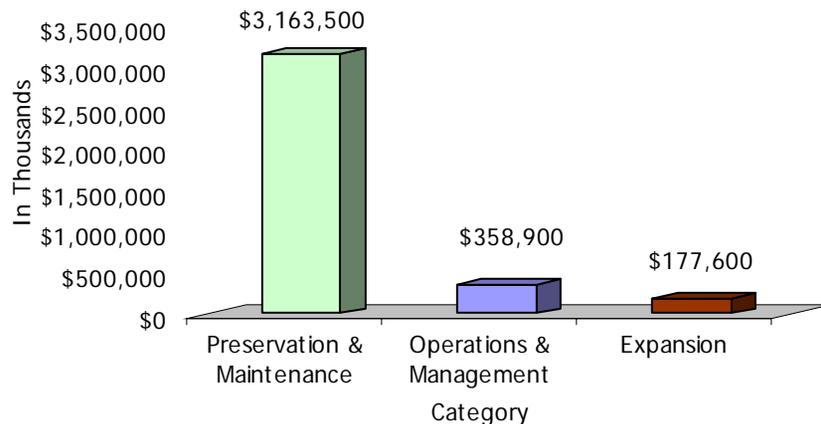




## Allocation of Revenue Projections

The projected funding for the duration of the plan - \$3.70 billion in future year or escalated dollars - is allocated to modes and categories at the same levels that it is in the *2007-2012 TIP*. This is representative as it accounts for the region's increased emphasis on management and operations of the existing system with expansion primarily limited to the public transportation, bicycle, and pedestrian networks. Exhibit 16 presents the projected funding allocations to the categories using these past distribution levels.

Exhibit 16 - **FUNDING ALLOCATION BY CATEGORY**



## STATE ENERGY PLAN

Pursuant to the New York State Energy Plan, GTC staff undertook an analysis of the impact of the *2007-2012 TIP* on the emission of five pollutants and on energy usage. The results of this analysis were used to project emissions and energy use over the period covered by this LRTP Update. Emissions analysis was done for the following pollutants:

1. Volatile Organic Compounds (VOC)
2. Nitrogen Oxides (NOx)
3. Carbon Monoxide (CO)
4. Greenhouse gas - Carbon Dioxide (CO<sub>2</sub>)
5. Particulate Matter (PM)

Energy usage was calculated for two "types" of energy:

1. Direct Energy - the energy consumed by vehicles using a transportation facility
2. Indirect Energy - the energy consumed to construct a transportation facility

## Analysis Methodology

The analysis was based on guidance received from NYSDOT Environmental Analysis Bureau. The analysis was done for the Rochester TMA, the area covered by the GTC Travel Demand Model.

Projections of emissions and energy use for the LRTP Update were based on the assumption that future TIPs developed during the period covered by this LRTP Update will have similar mixes of projects to those found in the *2007-2012 TIP* because the allocation of funding by category will be essentially the same.

GTC staff updated the future year (2027) GTC Travel Demand Model to include all of the "model-able" regionally significant projects in the *2005-2010 TIP* (this became the "No-Build" scenario for the analysis). The model-able projects that are new to the *2007-2012 TIP* were then added to the No-Build scenario (thereby creating the "Build" scenario for the analysis). A comparison of the output from the two model scenarios shows the impact of the projects new to the *2007-2012 TIP*.

VOC, NOx, and CO were analyzed by applying Emission Factors (i.e., grams emitted, per mile, of each pollutant based on vehicle speed and roadway functional classification) to the output from the two model scenarios.



Direct energy was calculated by applying Fuel Consumption Rates (i.e., gallons of fuel used, for three vehicle classes, based on speed) to the output from the two model scenarios. Indirect energy was calculated by applying Construction Energy Factors (i.e., energy consumed, per lane-mile, for specific types of roadway and bridge improvements) to the output from the Build scenario.

Direct and indirect greenhouse gas (CO<sub>2</sub>) emissions were calculated based on the results of the direct and indirect energy calculations. Direct greenhouse gas emissions were calculated by multiplying the total direct energy impacts (by vehicle class) for each of the two model scenarios by Carbon Emission Coefficients (i.e., carbon emitted during fuel consumption, for gasoline and diesel fuels). Indirect greenhouse gas emissions were calculated by multiplying the total indirect energy impact of the Build scenario by the Carbon Emission Coefficient for diesel fuel.

Particulate matter emissions (i.e., PM-2.5 and PM-10; the number specifies the maximum size, in microns, of the particles) were analyzed qualitatively. This analysis consisted of a consideration of the potential impacts of project types (e.g., transit replacement and roadway reconstruction projects) from the TIP on the emission of particulate matter.

Qualitative analysis was also undertaken for those projects new to the *2007-2012 TIP* that were not model-able. This analysis consisted of a consideration of the potential impacts of these projects on emission levels and energy usage.

The impact of carpooling on travel in the TMA was determined by estimating the number of work trip-related carpool passengers and calculating how many vehicle miles of travel would be added to the TMA roadways if each of these carpool passengers drove their own car.

## Analysis Results

The results of the quantitative analyses demonstrate that the projects new to the *2007-2012 TIP* will decrease the emissions of VOC, NO<sub>x</sub>, CO, CO<sub>2</sub>, and the amount of direct energy consumed, albeit by small amounts. It is expected that the projects in the TIPs to be developed during the period covered by the LRTP Update will continue to decrease the emissions of VOC, NO<sub>x</sub>, CO, CO<sub>2</sub>, and the amount of direct energy consumed by small amounts.

The qualitative analyses suggest that the Public Transportation, Bicycle & Pedestrian, Intelligent Transportation Systems, and Other projects new to the *2007-2012 TIP* will bring about additional decreases in emissions and direct energy usage. A second qualitative analysis suggests that the projects new to the *2007-2012 TIP* should result in a decrease in transit-based particulate matter emissions, no increase in these emissions related to highway vehicle miles of travel, and minimal construction-related particulate matter emissions.

Finally, continued funding of the region's Rideshare program, which supports carpooling efforts, should help reduce the number of automobile trips (and the emissions and direct energy consumption associated with these trips).

Exhibit 17 on the next page presents the projected changes in emissions and energy usage resulting from the implementation of the LRTP Update (i.e., build versus no-build).

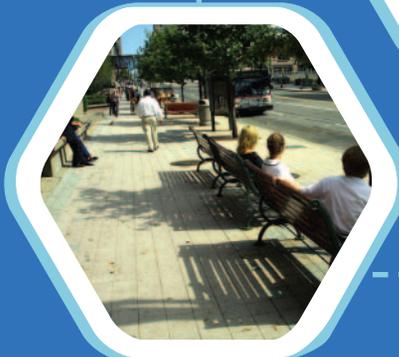


Exhibit 17 - Projected Daily Emissions and Energy Use Changes Resulting from the LRTP

Scenario	Air Pollution Emissions			Energy		Greenhouse Gas (CO <sub>2</sub> ) Emissions	
	VOC (grams)	NOx (grams)	CO (grams)	Direct (BTUs)	Indirect * (BTUs)	Direct (tons)	Indirect * (tons)
Change	-3,170.46	-4,223.81	-189,056.36	-74,124,412.27	383,371,600,000	-1.57	8,344.10
% Change	-0.057%	-0.075%	-0.079%	-0.046%	--	-0.046%	--

\* The intent of the indirect energy and greenhouse gas calculations was to measure the impact of the construction of the projects new to the 2007-2012 TIP. The indirect energy used in the 2027 No-Build scenario is zero (as is the greenhouse gas emissions arising from the indirect energy used); therefore it is not possible to compute the percentage difference between the two scenarios.

## CHAPTER VII - FOLLOW-ON ACTIVITIES





## OVERVIEW

As stated earlier, the LRTP is updated at least every four years. The next LRTP update is expected to be adopted in June 2011. In the interim, the performance of the transportation system will be monitored to measure the amount of change, if any, the policies and actions of the LRTP Update have on its performance. In addition, federal regulations require performance measurement as part of a CMP.

## Performance Measures

Performance measures have been developed that address the basic concerns of users of the transportation system (accessibility, mobility, safety) and the existing and emerging priorities of GTC, NYSDOT, and USDOT (efficiency, emissions, freight movement, and environmental justice) among others.

The performance measures were chosen based on their universality and the reasonableness of the efforts needed to obtain and collect the required data. Cost effectiveness and timeliness were also key considerations. Combined, these performance measures will provide GTC and its member agencies with a means to assess whether or not the policies and actions of the LRTP Update and CMP are better meeting the GTC Goals and Objectives on a system-wide basis.

All of the performance measures will be evaluated through the comparison of conditions in future years versus the base year (2005).

The performance measures are:

### Average travel time

Extent of measure: corridor

Measure of: mobility, congestion

CMP Measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge
- Public Transportation

## Data source(s)

- GTC Travel Time Data Collection Program
- NYSDOT Vehicle Detectors
- GTC Travel Demand Model

## Average travel time to work

Extent of measure: system-wide

Measure of: mobility

CMP Measure (yes/no): no

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge
- Public Transportation
- Bicycle & Pedestrian

## Data source(s)

- U.S. Census
- GTC Travel Demand Model

## Average travel time on major roads with above average truck traffic

Extent of measure: corridor

Measure of: freight mobility

CMP measure (yes/no): no

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

# FOLLOW-ON ACTIVITIES



## Modes

- Goods Movement

## Data source(s)

- U.S. Census
- GTC Travel Demand Model

## Average travel speed

Extent of measure: corridor

Measure of: mobility, congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge

## Data Source

- GTC Travel Time Data Collection Program
- NYSDOT Vehicle Detectors
- GTC Travel Demand Model

## Minutes of excess delay per trip

Extent of measure: system-wide

Measure of: mobility, congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge

- Goods Movement

## Data source(s)

- GTC Travel Demand Model

Note: complements the above average travel time measures by identifying areas that contribute to congestion

## Volume/capacity ratio (level of service)

Extent of measure: corridor and system-wide

Measure of: mobility, congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
2. Increase Safety
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge

## Data source(s)

- GTC Travel Demand Model

## Percent of travel time in congested conditions

Extent of measure: system-wide

Measure of: mobility, congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

## Modes

- Highway & Bridge
- Goods Movement

# FOLLOW-ON ACTIVITIES



Data Source(s)

- GTC Travel Demand Model

## Passengers per seat on transit buses (transit load factor)

Extent of measure: corridor and system-wide

Measure of: mobility, transit congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

Modes

- Public Transportation

Data Source(s)

- RGRTA
- CATS

## Variance in travel time (reliability)

Extent of measure: corridor and system-wide

Measure of: mobility, non-recurring congestion

CMP measure (yes/no): yes

GTC Goals addressed

1. Support Economic Vitality
2. Increase Safety
4. Increase Accessibility and Mobility
6. Promote Efficiency

Modes

- Highway & Bridge
- Public Transportation
- Goods Movement

Data Source(s)

- GTC Travel Time Data Collection Program

## Accident rate

Extent of measure: system-wide

Measure of: safety

CMP measure (yes/no): no

GTC Goals addressed

2. Increase Safety
6. Promote Efficiency

Modes

- Highway & Bridge
- Bicycle & Pedestrian

Data source(s)

- NYSDOT
- NYS Dept. of Motor Vehicles
- County Sheriffs
- Municipal Police

## Emission levels

Extent of measure: system-wide

Measure of: environmental protection

CMP measure (yes/no): no

GTC Goal addressed

5. Protect Community Character and Conserve Energy

Modes

- Highway & Bridge
- Public Transportation
- Goods Movement (based on fleet mix)

Data source(s)

- GTC Travel Demand Model and associated emissions post-processor



## Percent of federal-aid roadways with pavement conditions rated "fair" or better

Extent of measure: system-wide

Measure of: system preservation, mobility

CMP measure (yes/no): no

GTC Goals addressed

1. Support Economic Vitality
2. Increase Safety
4. Increase Accessibility and Mobility
6. Promote Efficiency

Modes

- Highway & Bridge
- Public Transportation
- Goods Movement
- Bicycle & Pedestrian

Data source(s)

- GTC
- Monroe County
- City of Rochester
- NYSDOT

## Percent of low-income persons within one-quarter mile of fixed route transit service

Extent of measure: system-wide

Measure of: accessibility (defined as ability of persons to reach destinations)

CMP measure (yes/no): no

GTC Goal addressed:

1. Support Economic Vitality
4. Increase Accessibility and Mobility
6. Promote Efficiency

Modes

- Public Transportation

Data source(s)

- GTC GIS data
- U.S. Census

## Energy Usage

Extent of measure: system-wide

Measure of: environmental protection

CMP measure (yes/no): no

GTC Goal addressed

5. Protect Community Character and Conserve Energy

Modes

- Highway & Bridge
- Public Transportation
- Goods Movement

Data source(s)

- GTC Travel Demand Model and associated emissions post-processor

## User Cost per Mile per Trip

Extent of measure: system-wide

Measure of: operational efficiency

CMP measure (yes/no): no

GTC Goal addressed

6. Promote Efficiency

Modes

- Highway & Bridge
- Public Transportation

Data source(s)

- GTC Travel Demand Model
- GTC TIP



**GENESEE TRANSPORTATION COUNCIL**



# Long Range Transportation Plan for the Genesee-Finger Lakes Region 2007-2027 Update



## APPENDICES



**Appendix A**  
**Summaries of Public Comments Received**



## Summaries of Public Comments Received

This appendix provides summaries of the public comments received during the development of the LRTP Update. Individual written comments received during the public review periods are available for review by contacting GTC.

### Opportunities and Issues

#### Summary of Public Comments

Four public meetings were held throughout the Genesee-Finger Lakes Region between March 15 and March 22, 2007 to introduce the LRTP Update and gather input on the opportunities and issues facing the region.

The following represents a summary of the comments received from the participants at the four public meetings and others who provided written statements by April 6, 2007. The comments are categorized into seven topic areas.

The unique identifier (e.g., PT-2) assigned to each opportunity/issue is used for reference purposes only. No priority has been assigned to any individual opportunity/issue.

#### Public Transportation

- PT-1. Suggested development of light rail transit system using abandoned railroad rights-of-way in region
- PT-2. Suggested additional funding be allocated to the Renaissance Square project
- PT-3. Expressed need for additional investment in public transportation with the following reasons cited:
  - a. Need for expanded bus fleet
  - b. Need for more frequent service
  - c. Need for lower fares
- PT-4. Expressed need for improved informational signage at bus stops
- PT-5. Expressed concern regarding elimination of Lift Line service in western suburbs
- PT-6. Suggested that paratransit service be improved across the region

#### Bicycle & Pedestrian

- BP-1. Expressed concern about the unsafe condition of on-street bicycle facilities
- BP-2. Suggested that all roadway construction projects be required to enhance green space and include pedestrian amenities
- BP-3. Suggested that multi-use trails in the region be better connected
- BP-4. Suggested that local bicycling and trails groups be better promoted
- BP-5. Expressed need for bicycle lockers at the Greater Rochester International Airport for employees and travelers

### Interregional Travel

- IR-1. Expressed the need for a reconstructed Rochester Amtrak Station
- IR-2. Expressed need for construction of an Amtrak Station in Lyons
- IR-3. Expressed concern regarding accessibility at interregional travel facilities

### Goods Movement

- GM-1. Suggested development of an intermodal freight facility in Rochester
- GM-2. Suggested that waterborne freight facilities be developed in the region

### Safety

- S-1. Expressed concern regarding the safety of railroads in the region
- S-2. Expressed need for guardrails on I-590 near Edgewood Ave overpass
- S-3. Expressed concern regarding unsafe conditions on the Erie Canalway Trail between Long Pond Road and the Greater Rochester International Airport
- S-4. Expressed concern about the unsafe condition of on-street bicycle facilities

### Air Quality and Energy Efficiency

- AQ-1. Encouraged RGRTA to use funding to purchase alternative fuel buses rather than diesel
- AQ-2. Suggested that funding be given to electrify truck stops to improve air quality
- AQ-3. Suggested that additional incentives be developed to encourage carpooling in the area
- AQ-4. Encouraged RGRTA to work with employers to provide incentives for employees to use transit

### Other

- OTH-1. Opposed to funding renovations to the Inner Loop
- OTH-2. Suggested removal of the abandoned Hojack Railroad Swing Bridge at the Port of Rochester
- OTH-3. Suggested removal of the abandoned Hojack Railroad bridge over Lake Road in the Town of Webster
- OTH-4. Suggested reconstruction of the Irondequoit Bay Outlet Swing Bridge for year-round vehicular use
- OTH-5. Expressed support for a planning study on Route 104 in the Town of Ontario
- OTH-6. Suggested that intersection improvements be made at congested locations in the region
- OTH-7. Expressed concern regarding NYSDOT's lack of responsiveness to inquiries by local municipalities

OTH-8. Suggested that non-air environmental considerations include the built environment/ historic resources

## **Recommendations**

### Summary of Public Comments

Three public meetings were held throughout the Genesee-Finger Lakes Region between May 1 and May 8, 2007 to seek input on the draft recommendations (policies and actions) developed by GTC for inclusion in the LRTP Update.

The following represents a summary of the comments received from the participants at the three public meetings and others who provided written statements by May 18, 2007. The comments are organized by the categories (i.e., Preservation & Maintenance, Operations & Management, Expansion, Land Use.) which comprise the Recommendations section of the LRTP Update.

The unique identifier (e.g., OM.3.) assigned to each comment is used for reference purposes only. The comments are presented in order of quantity received (number in parentheses); no priority has been assigned to any individual comment.

### Preservation & Maintenance

- PM.1. Expressed support for preserving and maintaining bicycle and pedestrian facilities, specifically sidewalks and shoulders, to ensure accessibility for the disabled. (1)
- PM.2. Suggested incorporating the preservation of rights-of-way into a Preservation & Maintenance Policy. (1)
- PM.3. An aspect of lighting is energy usage; support implementing a "dark skies program" to decrease light pollution and energy use. (1)
- PM.4. Expressed concern about the maintenance of public transportation vehicles (both fixed route and paratransit), particularly wheelchair lifts and ramps. (1)
- PM.5. Expressed the need for improved education and increased enforcement of traffic laws relating to automobiles and non-motorized transportation. (1)
- PM.6. Suggested that the findings of the Pedestrian Facilities Inventory be made available to the public upon completion. (1)

### Operations & Management

- OM.1. Suggested that the transportation system must support the ability to commute to work or school by bicycle. (1)
- OM.2. Expressed support for the continued use of roundabouts as part of intersection improvements to improve safety and keep traffic moving. (1)
- OM.3. Suggested that, with respect to the unprecedented increases in materials costs used in transportation projects, light rail transit does not have as much follow-on

- maintenance costs as roads and bridges. A light rail transit system may operate at a loss; however, the long-term savings on maintenance may offset that. (1)
- OM.4. Encouraged agencies to lower capacity on area roadways to increase demand for public transportation and decrease maintenance costs. (1)
  - OM.5. Expressed the need to pay close attention to CO<sub>2</sub> emissions as it may become a federal requirement in the future. (1)
  - OM.6. Suggested that our region's recent clean air could be the result of cyclical weather patterns and that poor air quality could return as soon as this year. (1)
  - OM.7. Suggested that community review boards be put in place to provide input on public transportation service in rural areas. (1)
  - OM.8. Suggested that the Greater Rochester International Airport become more accessible to the hearing impaired, including electronic message boards. (1)
  - OM.9. Expressed the need for the re-establishment of paratransit service in southwestern Monroe County. (1)

#### Expansion

- E.1. Expressed support for establishing light rail transit service in the Rochester area. (2)
- E.2. Suggested that new traffic lanes should be the last resort; increasing roadway capacity leads to development of existing farmland which negatively impacts the agriculture industry (1)
- E.3. Suggested that designs for the reconstruction of the Rochester Amtrak Station and construction of the new Lyons Amtrak Station incorporate full accessibility. (1)

#### Land Use

- LU.1. Expressed support for preserving railroad rights-of-way (active and abandoned) for future transportation use. (2)

## **Appendix B**

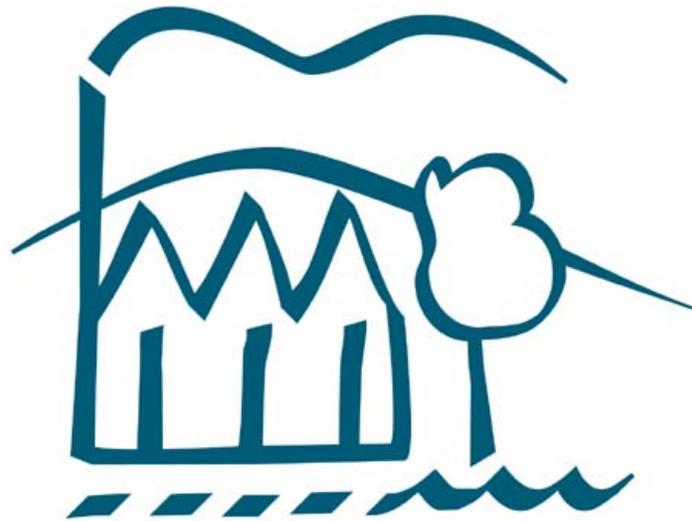
# **Long Range Transportation Plan Non-Air Environmental Issues Scan**



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# Long Range Transportation Plan Non-Air Environmental Issue Scan

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**GENESEE/FINGER LAKES**  
Regional Planning Council

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*Commissioned by the Genesee Transportation Council*

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February 2007

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## Acknowledgements

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# Long Range Transportation Plan Non-Air Environmental Issue Scan

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*Commissioned by the Genesee Transportation Council*

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February 2007



## Genesee/Finger Lakes Regional Planning Council

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GENESEE/FINGER LAKES  
Regional Planning Council

### Mission Statement

The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) will identify, define, and inform its member counties of issues and opportunities critical to the physical, economic, and social health of the region. G/FLRPC provides forums for discussion, debate, and consensus building, and develops and implements a focused action plan with clearly defined outcomes, which include programs, personnel, and funding.

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**Appendix A: Acronyms Used in Report**



### Report Overview

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The following report lists each primary non-air environmental issue category and any applicable sub-categories. For each category and sub-category, an Issue Description is included in order to provide the reader with a clear understanding of the issue's definition and context as it relates to this project. Along with issue descriptions, each category includes lists of the following items:

- Applicable *Federal and state legislative mandates*;
- Key *partners for consultation*, split by Federal, state and independent categories; and
- Useful *inventories and resources*.

Each primary non-air environmental issue is listed in order of priority; that is, the first issue (nonpoint source water pollution) is considered to present the greatest threat to the health of the environment.

Environmental mitigation activities related to each issue are identified below each issue description. Tables contain strategic policies, programs, actions and activities that, over time, will serve to avoid, minimize, rectify, reduce, or compensate for the impacts to or disruption of elements of the human and natural environment associated with the implementation of a long-range transportation plan.

#### ***Primary Non-Air Environmental Issues***

A total of seven primary non-air environmental issue categories have been identified. Together, these categories cover the range of non-air environmental issues that can be associated with the implementation of a long-range transportation plan. These categories are prioritized as follows ("1" being the highest priority):

1. Nonpoint Source Water Pollution
2. Terrestrial Habitat Modification
3. Open Space Modification
4. Historical/Cultural Modification
5. Noise Pollution
6. Light Pollution
7. Thermal Pollution/Urban Heat Island Effect

#### **Update and Maintenance Schedule for Inventories and Resources**

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Environmental issues and inventories identified within this scan should undergo regular review in order to accommodate new developments in best management practices as well as significant changes in Federal and state mandates. Review of best management practices across the primary categories identified above can generally occur in conjunction with routine LRTP updates and revisions, notwithstanding significant new developments in or alterations to Federal and state mandates.

### Issue 1: Nonpoint Source (NPS) Water Pollution

#### Issue Description

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Water is necessary for the health and function of all forms of life. The impairment of this resource can result in significant health impacts to a wide variety of organisms, including insects, fish, animals, flora and humans. Furthermore, the impairment of water resources can have a negative impact on the quality of life within natural and human communities, degrading the aesthetic value of lakes and streams as well as ancillary benefits such as recreation. When the cost and complexity of cleanup and treatment measures are taken into account, prevention of water resource degradation presents a far more efficient and cost effective method of maintaining the integrity of the resource.

Nonpoint source (NPS) water pollution is considered to be the most significant threat posed to the natural environment identified within this non-air environmental issue scan. Nonpoint sources of water pollution emanate from diffuse and variable sources. They are primarily conveyed to surface and ground water resources over impervious surfaces, such as pavement, and through appurtenances, such as storm water drainage systems. The implementation of a long-range transportation plan (LRTP) can therefore result in the generation of significant quantities of NPS pollution unless reliable mitigation measures are given serious consideration.

NPS water pollution is created through a variety of transportation system construction, maintenance and operation activities. This environmental issue has therefore been grouped into two subcategories: (1) *Stormwater Runoff from Roads, Highways and Bridges* and (2) *Hydromodification and Habitat Modification*.<sup>1</sup>

#### ***1. Stormwater Runoff from Construction of Roads, Highways and Bridges***

This subcategory refers to environmental issues associated with the construction of roads, highways and bridges, maintenance of such facilities, and anticipated impacts resulting from routine facility use and operation. The two specific types of NPS pollution that can be expected to result from road, highway and bridge use and construction include *storm water runoff* and *erosion/sedimentation*. Storm water runoff is a direct result of the impervious nature of the materials used for the construction of transportation facilities. As described by the USEPA:

Storm water discharges are generated by precipitation and runoff from land, pavements, building rooftops and other surfaces. Storm water runoff accumulates pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across land. Heavy precipitation or snowmelt can also cause sewer overflows which, in turn, may lead to contamination of water sources with untreated human and industrial waste, toxic materials, and other debris.<sup>2</sup>

Stormwater runoff can come in many forms and result from a variety of different actions. Road deicing materials are often a major component of storm water runoff and are a necessary component of cold-weather road and bridge operational maintenance. Other nonpoint source materials (metals, oils, grease,

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<sup>1</sup> Major NPS categories as identified by the USEPA. Accessed 2/2/07 at <http://www.epa.gov/owow/nps/categories.html>

<sup>2</sup> US EPA. Primary EPA Topics: Stormwater. Accessed 2/2/07 at <http://www.epa.gov/ebtpages/watestormwater.html>.

etc.) can accumulate upon impervious surfaces from passing vehicles and impact local surface and ground water when storm and thaw events occur, flushing these pollutants into area water bodies. Impervious surfaces can also have an adverse effect on the natural function of rivers and streams. When storm water is collected and transported across impervious surfaces, its velocity and volume increases. These sudden surges of water – which would otherwise be diminished if allowed to percolate into the ground – increase the likelihood of stream bank erosion and sedimentation.

The construction of new facilities can also result in significant land erosion and water body sedimentation when proper stabilization techniques are not put in place at exposed construction sites. When vegetative cover is disturbed and/or removed for construction, underlying sediment becomes unstable and can be easily eroded and carried into streams, rivers, lakes and ponds. With this sediment come attached nutrients such as phosphorous and nitrogen as well as any associated contaminants or debris that may be on or near the construction site. The gradual accumulation of these contaminants and materials in water bodies can result in a variety of negative impacts, including eutrophication (i.e. algae blooms), decreased oxygen levels, organism death or impairment (such as fish kills), and water body use impairment (such as aesthetic degradation, foul odor or taste and/or a decline in recreational enjoyment).

### ***2. Hydromodification and Habitat Modification***

This subcategory refers to the disturbance that the presence of a transportation facility creates within the environment. Bridges, culverts, road ditching and road embankments all require the surrounding natural environment to be altered during their installation. As explained by the USEPA:

Hydromodification is one of the leading sources of impairment in streams, lakes, estuaries, aquifers, and other water bodies in the United States. [The] major types of hydromodification activities...change a water body's physical structure as well as its natural function. These changes can cause problems such as changes in flow, increased sedimentation, higher water temperature, lower dissolved oxygen, degradation of aquatic habitat structure, loss of fish and other aquatic populations, and decreased water quality. It is important to properly manage hydromodification activities to reduce nonpoint source pollution in surface and ground water.<sup>3</sup>

Once these facilities are installed, their presence can generally be assumed to be permanent or semi-permanent in nature, often causing an alteration to the local natural habitat, or *habitat modification*. Habitat modification refers to the permanent or temporary alteration of the aquatic or terrestrial environment. In the context of NPS water pollution, habitat modification refers specifically to aquatic impacts associated with new transportation facilities; terrestrial impacts are discussed in the following section under *Issue #2: Habitat Modification*.

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<sup>3</sup> USEPA. "National Management Measures to Control Nonpoint Source Pollution from Hydromodification." Accessed 2/2/07 at <http://www.epa.gov/owow/nps/hydromod/index.htm>.

### Federal and State Mandates

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**Clean Water Act Compliance, §402: Implementation of Phase II Stormwater Rules and Regulations.** EPA has granted NYSDEC the authority to implement this law through its State Pollution Discharge Elimination System (SPDES). Construction site operators statewide are required to conform to GP-02-01: SPDES General Permit for Stormwater Discharges from Construction Activity. Operators disturbing one acre or more of land must obtain permit coverage for their operation according to the following requirements:

- File a Notice of Intent (NOI) with NYSDEC before starting
- Prepare a Storm water Pollution Prevention Plan (SWPPP)
- Follow state technical guidance
- Control all wastes generated on-site

The NOI and SWPPP must be submitted to the local governing body and a copy must be made available to the public on-site.

Point source discharges are regulated through *GP-02-02: SPDES General Permit for Stormwater Discharges from Regulated Municipal Separated Storm Sewer Systems (MS4s)*.

**Clean Water Act Compliance, §404: Corps of Engineers §404 Permits.** A §404 permit is required for most discharges of dredged or fill material into US waters, including adjacent interstate and isolated wetlands. Regulated activities include placement of pilings as fill and side-casting associated with ditching, draining and excavating activities.

**Safe Drinking Water Act:** There can be no Federal assistance or participation in any project which the EPA Administrator has determined has the potential to contaminate sole source aquifers.

**River and Harbor Act of 1899 (33 U.S.C. 403), US Army Corps of Engineers:** §10 requires a permit to place a structure in navigable water of the US; §13 was modified by the Federal Water Pollution Control Act which established NPDES Permits.

**Floodplain Management, Executive Order 11988, 1977:** Basis for assessment of flood hazards which may be related to highway improvements. Combines the need to protect lives and property with the need to restore and preserve natural and beneficial floodplain values.

**Impounding, Diverting or Controlling of Waters (16 U.S.C 662(a)):** Requires consultation with FWS on any federal action that involves a surface area of 10 acres or more of modification to a stream or body of water.

**Essential Fish Habitat, 1996 (16 U.S.C. 1801):** 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act mandate that Federal Agencies identify and protect important marine and anadromous fish habitat.

**Article 15 of the NYS Environmental Conservation Law: Water Resources:** Title 5 of this law provides for the protection of the bed and banks of streams; DEC coordination is required to disturb

## L RTP Non-Air Environmental Scan

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streambeds classified as AA, AA(T), A, A(T), B, B(T), C(T). Title 27 of this law provides certain protections for waterways designated as “wild, scenic and recreational rivers.” Outside the Adirondack Park, a DEC permit may be required for certain activities or projects located within certain distances of designated waterways, unless project is for maintenance or in-kind replacements of existing structures.

### Partners for Consultation

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#### *Federal entities:*

U.S. Department of Transportation (USDOT)	<a href="http://www.dot.gov">www.dot.gov</a>
Research and Innovative Technology Administration (RITA)	<a href="http://www.rita.dot.gov">www.rita.dot.gov</a>
Federal Highway Administration (FHWA)	<a href="http://www.fhwa.dot.gov">www.fhwa.dot.gov</a>
Turner-Fairbank Highway Research Center (TFHRC)	<a href="http://www.tfhrc.gov">www.tfhrc.gov</a>
Federal Railroad Administration (FRA)	<a href="http://www.fra.dot.gov">www.fra.dot.gov</a>
Federal Transit Administration (FTA)	<a href="http://www.fta.dot.gov">www.fta.dot.gov</a>
National Highway Traffic Safety Administration (NHTSA)	<a href="http://www.nhtsa.dot.gov">www.nhtsa.dot.gov</a>
Pipeline and Hazardous Materials Safety Administration (PHMSA)	<a href="http://www.phmsa.dot.gov">www.phmsa.dot.gov</a>
U.S. Environmental Protection Agency (EPA)	<a href="http://www.epa.gov">www.epa.gov</a>
U.S. Army Corps of Engineers (USACE)	<a href="http://www.usace.army.mil">www.usace.army.mil</a>

#### *New York State entities:*

New York State Department of Environmental Conservation (NYSDEC)	<a href="http://www.dec.state.ny.us">www.dec.state.ny.us</a>
New York State Department of Transportation (NYSDOT)	<a href="http://www.nysdot.gov">www.nysdot.gov</a>

#### *Independent Organizations:*

Transportation Research Board of the National Academies (TRB)	<a href="http://www.trb.org">www.trb.org</a>
American Association of State Highway and Transportation Officials	<a href="http://www.transportation.org">www.transportation.org</a>
AASHTO Center for Environmental Excellence	<a href="http://www.environment.transportation.org">www.environment.transportation.org</a>

### Inventories and Resources:

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#### *Publications:*

- EPA. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. EPA Publication No. 840-B-92-002 (January 1993). Last access: February 20, 2007.  
<http://www.epa.gov/nps/MMGI/>

**Description:** This is a comprehensive technical document on methods to abate and control nonpoint pollution in coastal areas. [The document is] primarily intended for State and local watershed project staff. Report includes chapters and fact sheets dedicated to subjects including: management measures for urban areas; management measures for hydromodification; and management measures for wetlands, riparian areas and vegetated treatment systems.

EPA. National Management Measures to Control Nonpoint Source Pollution from Urban Areas. 2005. EPA Publication No. 841-B-05-004 (November 2005). Last access: September 11, 2006  
<http://www.epa.gov/nps/urbanmm/>

**Description:** This guidance helps citizens and municipalities in urban areas protect bodies of water from polluted runoff that can result from everyday activities. These scientifically sound techniques are the best practices known today. The guidance will also help states to implement their nonpoint source control programs and municipalities to implement their Phase II Storm Water Permit Programs. Report includes chapters dedicated to subjects including: watershed assessment and protection; site development; new development and runoff treatment; bridges and highways; construction site erosion, sediment, and chemical control; pollution prevention; retrofitting systems for existing development; and operation and maintenance guidelines.

Finger Lakes/Lake Ontario Watershed Protection Alliance. Highway Superintendent Road and Water Quality Handbook, 2<sup>nd</sup> Ed. 1996.

**Description:** The Highway Superintendents Road and Water Quality Handbook was a multi-agency project designed to assist local Highway Superintendents in the permit process associated with activities that may impact local and regional water quality. Although road and right-of-way maintenance is the primary source of water quality problems on only a few waterbodies in NYS, numerous waterbodies are impacted by these activities as secondary sources of pollution. Becoming familiar with the permitting processes and technical information concerning water-related impacts associated with roadway construction and maintenance should help reduce uncertainties and frustrations encountered by local highway superintendents. Incorporating best management practices should also serve to hasten the permit application process and serve to minimize the impacts of roadway activities on local water resources. The manual is broken down into three sections: *Sec. I: The Permitting Process*; *Sec. II: Technical Information*; and *Sec. III: Where to go for Assistance*.

Michigan Department of Transportation. The Use of Selected Deicing Materials on Michigan Roads: Environmental and Economic Impacts. 1993. Last access: September 27, 2006.  
[http://www.michigan.gov/mdot/0,1607,7-151-9622\\_11045-57246--,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9622_11045-57246--,00.html)

**Description:** This report analyzes the performance, environmental effects, and economic costs of seven deicing materials: sodium chloride (road salt), CMA (calcium magnesium acetate), CMS-B (a patented product, Motech, containing principally potassium chloride), CG-90 Surface Saver (a patented corrosion-inhibiting salt), calcium chloride, Verglimit (a patented concrete road surface containing calcium chloride pellets), and sand (an abrasive). The data for the analysis of deicer performance are derived from current literature.

NYSDEC Division of Water. New York State Standards and Specifications for Erosion and Sediment Control. 2005. Last access: February 20, 2007.  
<http://www.dec.state.ny.us/website/dow/toolbox/escstandards/index.html>

**Description:** The purpose of this document is to protect water quality due to construction activity and reduce sediment damage and associated maintenance costs of road ditches, storm sewers, streams, lakes, and flood control structures. It is distributed by the Empire State Chapter of the Soil and Water Conservation Society and

also available on the New York State Department of Environmental Conservation stormwater web site. This manual should be used by site developers in preparing their erosion and sediment control plans, and by local municipalities in preparing and implementing their soil erosion and sediment control programs, reviewing proposed site development plans, establishing or encouraging uniformity through standards in applying erosion control techniques, and helping developers, private engineers, and planners make maximum use of potential development sites by proper management of their natural resources.

### *Useful Websites:*

**FHWA, Turner-Fairbank Highway Research Center “Hydraulics and Hydrology Research Webpage”** Last access: October 4, 2006.

**<http://www.tfhrc.gov/structur/hydrlics/index.htm>**

**Description:** Provides research, technical support and advice regarding hydromodification and hydrology related to transportation facilities.

**USEPA Section 319 Nonpoint Source Success Stories Website.** Last access: February 20, 2007.

**<http://www.epa.gov/owow/nps/Success319/>**

**Description:** The *Section 319 Nonpoint Source Success Stories Website* features projects receiving grant funds from the section 319 program that have achieved documented water quality improvements. Water quality improvements are demonstrated through the achievement of water quality standards for one or more pollutants/uses; nonpoint source total maximum daily load allocations (and removal from the state's section 303(d) list of impaired waters); measurable, in-stream reduction in a pollutant; or improvement in a parameter that indicates stream health (e.g., increases in fish or macroinvertebrate counts). Stories also demonstrate innovative strategies used to reduce nonpoint source pollution, the growth of partnerships, and diversity of funding sources.

**NYSDEC Stormwater Information Webpage.** Last access: February 20, 2007.

**<http://www.dec.state.ny.us/website/dow/mainpage.htm>**

**Description:** The NYSDEC Stormwater Information Webpage was designed to provide NYS contractors, municipalities, and other entities with a comprehensive array of data pertaining to permitting process, key documents, timelines, and other important facts associated with Phase II Stormwater implementation.

*NPS Water Pollution: Stormwater Runoff from Construction, Operation, and Maintenance of Roads, Highways and Bridges*

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Stormwater Runoff from the Construction, Operation and Maintenance of Roads, Highways and Bridges	<p><b>Clean Water Act Compliance, §402: Implementation of Phase II Stormwater Rules and Regulations.</b> Construction site operators statewide are required to conform to GP-02-01: SPDES General Permit for Stormwater Discharges from Construction Activity. Operators disturbing one acre or more of land must obtain permit coverage for their operation according to the following requirements:</p>	<ul style="list-style-type: none"> <li>• SWPPPs must be prepared by a licensed professional (Certified Landscape Architect, Professional Engineer (PE), or Certified Professional in Erosion and Sediment Control (CPESC)</li> <li>• When properly prepared, SWPPPs offer the most comprehensive level of protection from sedimentation occurring off-site</li> <li>• Standards are national in scope, as stipulated under the Federal Clean Water Act 1987 Amendments</li> </ul>	<ul style="list-style-type: none"> <li>• Regulations are complex</li> <li>• Procedures are not always enforced in a uniform manner between counties</li> <li>• Due to the complexity of the regulations and the dearth of private contractors working in the field, end results of regulation implementation can vary significantly</li> </ul>
	<p><b>Stormwater Retrofitting</b> is an innovative approach to updating outmoded stormwater transmission systems. They can reduce pollutants, restore habitats, and stabilize stream morphology. Different types of retrofitting solutions can be developed depending on the location, local geography and volume of stormwater anticipated. Types of retrofit approaches include:</p> <ul style="list-style-type: none"> <li>• The overall <b>reduction or elimination of paved surfaces</b>;</li> <li>• Use of <b>pervious pavement materials</b>, which allow stormwater infiltration;</li> <li>• <b>Vegetative swales or rain gardens</b>, which convey stormwater and provide temporary storage for eventual infiltration;</li> <li>• <b>Detention/retention areas</b>, which provide either temporary or semi-permanent storage for storm water for eventual infiltration;</li> </ul>	<ul style="list-style-type: none"> <li>• Replaces inadequate structures</li> <li>• Reduces pollutants entering water bodies</li> <li>• Reduces downstream volumes of stormwater, thereby reducing the potential for localized flooding and property damage</li> <li>• Potential to reduce stormwater volumes to local sewage treatment plants and the associated treatment costs</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for high initial construction costs</li> <li>• Developed areas are generally devoid of extra space, making retrofitted facility siting difficult</li> <li>• Facilities require routine maintenance and upkeep in order to ensure proper operation</li> <li>• Large stormwater surges can inundate retrofits and bypass the facility</li> </ul>

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<ul style="list-style-type: none"> <li>• <b>Constructed wetlands</b>, which can treat stormwater, slow its velocity, and provide natural habitat;</li> <li>• <b>Infiltration trenches/basins</b> which can convey large volumes of water while allowing moderate infiltration; and</li> <li>• <b>Sand filters</b>, which trap harmful pollutants.</li> </ul>	<ul style="list-style-type: none"> <li>• Stabilizes stream morphology by decreasing overall volume of storm water surges during rain/thaw events</li> <li>• Restores natural habitats</li> <li>• Vegetated areas and rain gardens can provide an aesthetically pleasing appearance in urban settings</li> </ul>	<ul style="list-style-type: none"> <li>• Areas such as retention ponds incorporate standing water, posing a health and safety risk to the public</li> </ul>
	<p><b>Road Deicing Best Management Practices: Alternative Spreading Considerations</b> can limit the amount of deicing materials used on roads and highways or offer alternatives to their use.</p> <p>“<b>Smart Salting</b>” is a concept that raises awareness among operators and the public of the impacts associated with over-application of road deicing materials. Application rates, the location of streams and wetlands, and other relevant factors are considered. This enables highway departments to apply modest amounts of salt and avoid over-salting, particularly in environmentally sensitive locations. Public outreach efforts (signage, media, etc.) alert the public to the issue and need to drive with caution.</p>	<ul style="list-style-type: none"> <li>• Prevents over-salting in environmentally sensitive areas and associated salinization of waterways</li> <li>• Decreases costs associated with salting due to a decrease in product and equipment use</li> <li>• Decreases costs associated with spring clean-up and repairs (potholes, storm sewer maintenance, street sweeping, ditch cleaning)</li> </ul>	<ul style="list-style-type: none"> <li>• A commitment of resources for training and implementation is necessary</li> <li>• Locations must be identified which are most suitable for smart salting implementation</li> <li>• Commitment of education and outreach required in order to prepare the public for policy change</li> <li>• Possible road safety concerns</li> </ul>
	<p><b>Road Deicing Best Management Practices: Storage Area Considerations</b></p> <p><b>Covering and stabilization of salt piles.</b> Best management practices in storage of salt include locating areas outside of floodplains; designing storage facilities to prevent seepage of salt into the ground or onto the vehicle lot and neighboring waterways; designing facilities large enough so that vehicles can be loaded entirely within the covered area; and equipping storage facilities with drainage and collection devices that prevent losses from storm or melt water.</p>	<ul style="list-style-type: none"> <li>• Environmental benefits</li> <li>• Decreases operational costs by preventing salt loss/seepage during wet weather events</li> <li>• Facilities provide a convenient and effective loading area for highway staff</li> </ul>	<ul style="list-style-type: none"> <li>• Construction costs</li> <li>• Can be difficult to locate if space is limited</li> </ul>

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		Benefits	Impacts
	<p><b>Road Deicing Best Management Practices: Alternative Deicing Materials:</b> Alternatives to traditional rock salt have been developed in an effort to provide highway departments with flexible and environmentally-friendly approaches to road deicing.</p> <p><b>Calcium Magnesium Acetate (CMA)</b> has a deicing range that is very close to salt. It is harmless to humans, plants, and animals; non-corrosive to metals; and nondestructive to concrete and other highway materials. Its main ingredient, dolomitic lime, is readily available throughout the country, making distribution feasible. The compound sticks to the highway longer than salt, thereby prolonging its lifespan on the roadway. Overall, CMA is considered to be less harmful to the environment than salt. It is known to be less toxic to fish and plants; it is, however, more deleterious to certain types of plankton.</p> <p><b>Verglimit</b> (a proprietary product) consists of calcium chloride flakes encapsulated in linseed oil which are blended into the plant-mixed bituminous wearing surface. It essentially lengthens the response time and/or eliminates the need for added deicing maintenance.</p>	<ul style="list-style-type: none"> <li>• Lengthens response time</li> <li>• Eliminates need for extra maintenance</li> <li>• Works well on bridges, ramps, and steep grades</li> <li>• Less corrosive than salt</li> <li>• Initial studies indicate that it is less harmful to the environment than salt</li> </ul>	<ul style="list-style-type: none"> <li>• Does not work as well as salt at lower temperatures (below 23 degrees F)</li> <li>• Sticks to spreading equipment, requiring stop-and-go maintenance</li> <li>• More persistent in the environment</li> <li>• May decrease oxygen levels in water</li> <li>• Does not require storage considerations that salt does</li> <li>• Higher costs than salt</li> </ul>
		<ul style="list-style-type: none"> <li>• Effective in known hazard areas that are prone to icing</li> <li>• Decreases the need for quick responses during freezing events</li> <li>• Little environmental threat</li> <li>• Less corrosive than road salt</li> </ul>	<ul style="list-style-type: none"> <li>• High cost relative to salt</li> <li>• Application is limited to specific areas, such as bridge decks, ramps, shaded areas, and steep grades</li> <li>• Compaction and cracking problems</li> <li>• Maximum traffic volume of 5,000 vehicles per day</li> </ul>

*NPS Water Pollution: Hydro-Modification and Habitat Modification: Bridges*

There are several best management practices in bridge design that can mitigate hydro- and habitat modification from bridges. These include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Hydro – modification/Habitat Modification – <i>Bridges</i>	<b>Incorporating best management practices into general bridge construction, maintenance and demolition considerations</b> , which include guidelines for painting and enclosures for repairs that can trap harmful materials before entering the environment.	<ul style="list-style-type: none"> <li>• Incremental addition of BMPs can gradually reduce environmental impacts</li> <li>• Can be voluntary</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with training and implementation of BMPs</li> </ul>
	<b>Bridge design and construction alternatives</b> , which incorporate longer bridge spans, alternative materials that are less likely to degrade the surrounding environment, or designs that avoid environmentally sensitive areas altogether.	<ul style="list-style-type: none"> <li>• Natural channels can be maintained; environmentally sensitive areas can be protected</li> <li>• Additional benefits include added protection from flooding hazards</li> <li>• Greater likelihood of species passage underneath</li> </ul>	<ul style="list-style-type: none"> <li>• Additional length or materials will increase construction costs</li> <li>• Designs can be complex, also adding to costs</li> <li>• No design can provide 100% assurance that occurrences of environmental degradation will be eliminated</li> </ul>
	<b>Scupper drains</b> are an example of a best management practice in design, which allow storm water to drain out of bridges into areas where it can be treated;	<ul style="list-style-type: none"> <li>• Scupper drains effectively protect water resources from various harmful materials deposited on roadways</li> <li>• Stormwater can be routed away from direct drainage into a waterway</li> <li>• Stormwater can also be treated once on land</li> <li>• Retrofitting existing bridges with scupper drains is feasible</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of retrofits on existing bridges may be considerable</li> <li>• Maintenance is required in order to assume proper drain function</li> <li>• If treatment facilities are part of the design, additional space may be necessary</li> </ul>

**NPS Water Pollution: Hydro-Modification and Habitat Modification: Culverts**

Key design consideration for culverts is to permit water, sediment and debris transport through the crossing by maintaining natural channel dimensions and slope through the structure, and considering flow through the entire riparian area. Incorporating alternative designs will very likely increase the complexity and costs of the project. Comprehensive analysis of the construction site, stream dynamics, and design alternatives can result in amenable solutions, however. Design considerations and alternatives include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Hydro – modification/Habitat Modification – Culverts	<b>Box culverts</b> , which are usually square or rectangular reinforced concrete structures with single or multiple openings; research indicates that a pre-cast inlet with the optimum bevel is the best performer when the inlet was submerged because the streamlined curve of the bevel provides a better path for the water flow.	<ul style="list-style-type: none"> <li>• Culvert has minimal impact on natural stream flow</li> </ul>	<ul style="list-style-type: none"> <li>• Cost associated with design and implementation</li> </ul>
	<b>No-slope designs</b> , which are useful for new as well as replacement culverts due to their simple installations, low to moderate channel gradient, and suitability for species passage.	<ul style="list-style-type: none"> <li>• Works as new, retrofit, or replacement culvert</li> <li>• Simple installation</li> <li>• Works for variety of species</li> </ul>	<ul style="list-style-type: none"> <li>• Only works for low to moderate gradients</li> <li>• May be costly</li> </ul>
	<b>Stream simulation designs</b> , which mimic natural channel flow; i.e. sediment transport, fish passage, and flood and debris conveyance function as they would in the natural channel. These can be used for new and replacement installations, complex installations with higher gradients and lengths, narrow stream valleys, and locations where all fish species require passage.	<ul style="list-style-type: none"> <li>• Comprehensive approach to stream mitigation</li> <li>• Functions as natural channel would</li> <li>• Can be used for a variety of new and replacement installations</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with design and installation</li> </ul>
	<b>Fishways and fishrocks</b> , which are used to slow water velocity in a steepened streambed and to create small fish resting areas. This technique involves placing “rocks” in the form of wet concrete or some other material that is secured to the existing streambed and culvert bottom.	<ul style="list-style-type: none"> <li>• Allows fish to climb gradient</li> <li>• Creates resting areas for fish</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of construction</li> </ul>

**NPS Water Pollution: Hydro-Modification and Habitat Modification: Ditching and Embankments**

Increased awareness of the negative impacts that erosion and sedimentation can have on waterways has led state and local highway departments to research best management practices in roadside ditch and slope designs. Most solutions are relatively simple and cost effective. These include:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		Benefits	Impacts
Hydro – modification/Habitat Modification – Ditching and Embankments	<p><b>Ditch shape designs:</b> Ditch shape designs should consider the proximity to receiving water bodies and the potential for erosion in the general vicinity. Vegetation above embankments should be maintained to avoid erosion. The ditch should be able to handle peak flows. Maintenance should occur during seasonally dry conditions, or immediately after any soil disturbance. Ditches should be cleaned and reshaped as needed. Constructing ditches in these shapes is simple and would not necessarily add time.</p>	<ul style="list-style-type: none"> <li>• Long-term maintenance costs can decrease</li> <li>• Straight-forward designs</li> <li>• Little time required</li> </ul>	<ul style="list-style-type: none"> <li>• Short-term design and maintenance costs may increase</li> <li>• Education and outreach to highway staff regarding proper designs and benefits of alternative designs and approaches</li> <li>• The best shape may not be best for project</li> </ul>
	<p><b>Selection of lining materials:</b> Concrete, stone bottom and sides, fabric, stone bottom/grassed sides, and vegetated swales are less prone to erosion and decrease waterway sedimentation. Weeds and tall grass, mowed grass, stone bottom/grassed sides, earth bottom/grassed sides, and stone bottom and sides have a higher ability to slow water velocity.</p>	<ul style="list-style-type: none"> <li>• Long-term maintenance can decrease due to increased stability</li> <li>• Vegetated areas provide aesthetic and environmental benefits</li> <li>• Areas will become less prone to erosion due to a reduction in water velocity</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of materials: geo-textiles in particular can be expensive</li> <li>• Knowledge of proper installation and/or construction methods is required</li> <li>• Solutions are often site-specific: site designs and material selection are likely to vary significantly based on slope, soil type, soil stability and other site characteristics</li> </ul>
	<p><b>Slope considerations</b> refer to materials and approaches to the design of roadside slopes. The key considerations are stability, safety, and maintenance. Slopes can be stabilized with geo-textiles or other reinforcements such as reinforcing bars. Retaining walls may be needed at the toe of slopes. Signs and guardrails help warn people</p>	<ul style="list-style-type: none"> <li>• Proper slope design can reduce area erosion</li> <li>• Maintenance can be decreased</li> <li>• Improved safety for motorists</li> </ul>	<ul style="list-style-type: none"> <li>• Materials may be costly</li> <li>• Construction may be time-consuming</li> <li>• Costs associated with design are likely to be high</li> </ul>

## L RTP Non-Air Environmental Scan

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Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	about steeply sloped embankments. Rip rap, vegetation, and fabrics can reduce erosion and ease maintenance.		

### Issue 2: Terrestrial Habitat Modification

#### Issue Description

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Terrestrial habitat modification refers to the modification (i.e. destruction, displacement, or impairment) of natural vegetative, animal or insect communities or the resources necessary for their survival. A variety of transportation system construction, maintenance and operation activities can result in significant terrestrial habitat modification. The types of habitat modification that are likely to occur can be grouped into two primary categories: *habitat loss and/or landscape fragmentation* and *mortality or injury* resulting from vehicle collisions.

#### ***1. Habitat Loss and/or Landscape Fragmentation***

This category refers to the loss of habitat that may occur as new transportation facilities are created. All variety of insects and animals require a basic habitat that they depend on for their survival. Within this area exists the means for their sustenance, shelter and socialization. The construction of new facilities can either destroy an organism's habitat entirely or significantly impair it in a manner that decreases the organism's chances of survival.

Landscape fragmentation refers to the cumulative impacts that transportation facilities can have on habitat. The construction of basic transportation facilities has the potential to induce the growth of new supportive facilities over time. As such, areas of contiguous natural habitat are gradually intersected, reducing large, undivided areas into smaller patches of land. This phenomenon can have a negative impact on an organism's ability to survive over a prolonged period of time. As a species' habitat is slowly reduced, competition for scarce resources (food, shelter, etc.) will increase. All types of birds, reptiles, insects and vegetative organisms can be negatively impacted to various degrees by landscape fragmentation.

#### ***2. Species Mortality or Injury of Deer and/or Threatened or Endangered Species***

Mortality or injury resulting from vehicle collisions is likely to occur as new transportation facilities are created that neglect to take organisms' migratory capabilities, preferences and patterns into account. Impacts with large animals – such as deer – can put individuals at significant risk due to losses associated with property damage, personal injury or death. Impacts with other species that may be endangered or threatened should also be given serious consideration as new transportation facilities are constructed. Retrofitting existing facilities in areas where such species are found to exist should also be given serious consideration.

#### Federal and State Mandates

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**Federal Highway Administration Wetland Policy, 1977 (23 CFR 777, Mitigation of Impacts to Wetlands and Natural Habitat):** It is the FHWA's policy to prepare a formal wetland finding prior to the approval of any project involving new construction in wetlands and classified as an EIS or a Finding of No Significant Impact (FONSI).

**Protection of Wetlands, Executive Order, 11990, 1977:** Directs federal agencies to avoid unnecessary alteration or destruction of wetlands, and requires implementation of actions to minimize the loss or degradation of wetlands affected by a project that received federal funding.

**Endangered Species Act, 1973 (50 CFR 402), Fish and Wildlife Service, Department of the Interior, National Marine Fisheries Service, Department of Commerce:** Protects nationally designated threatened and endangered species.

**Fish and Wildlife Coordination Act, 1958 (U.S.C. 661-667):** Ensures that wildlife conservation will receive equal consideration.

**National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd), U.S. Fish and Wildlife Service (FWS):** Provides protection of wildlife refuges and ranges, game ranges, wildlife management areas, or waterfowl production areas as administered by the Secretary of the Interior through the U.S. Fish and Wildlife Service.

**Environmentally Beneficial Landscaping, Executive Memorandum, 1994:** Environmentally beneficial landscaping entails utilizing techniques that complement and enhance the local environment and seek to minimize the adverse effect that the landscaping has on it. In particular, this means using regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.

**Migratory Bird Treaty Act, 1918 (16 U.S.C. 703-712):** Generally prohibits the taking, possession, transportation, sale, purchase, barter, importation, exportation, and banding or marking of migratory birds, and the taking of nests or eggs, except for scientific purposes.

**NYS Freshwater Wetlands Act, Article 24 of the NYS Environmental Conservation Law:** A permit is required for most activities that will alter freshwater wetlands or adjacent areas. The approximate boundary of all wetlands within jurisdiction are shown on official NYS Freshwater Wetlands Maps maintained by NYSDEC

**NYS Tidal Wetlands Act, Article 25 of the Environmental Conservation Law:** A permit is required from the NYSDEC for almost any activity that will alter tidal wetlands or adjacent areas. The approximate boundaries of all tidal wetlands within agency jurisdiction are shown on official NYSDEC maps.

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### Partners for Consultation

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#### *Federal entities:*

U.S. Department of Transportation (USDOT)  
Federal Highway Administration (FHWA)  
U.S. Environmental Protection Agency (EPA)

[www.dot.gov](http://www.dot.gov)  
[www.fhwa.dot.gov](http://www.fhwa.dot.gov)  
[www.epa.gov](http://www.epa.gov)

#### *New York State entities:*

New York State Department of Environmental Conservation (NYSDEC)

[www.dec.state.ny.us](http://www.dec.state.ny.us)

#### *Independent Organizations:*

Transportation Research Board of the National Academies (TRB)  
American Association of State Highway and Transportation Officials

[www.trb.org](http://www.trb.org)  
[www.transportation.org](http://www.transportation.org)

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Inventories and Resources

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*Publications:*

EPA. Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters. EPA Publication No. 840-B-92-002 (January 1993). Last access: February 20, 2007.  
<http://www.epa.gov/nps/MMGI/>

**Description:** This is a comprehensive technical document on methods to abate and control nonpoint pollution in coastal areas. [The document is] primarily intended for State and local watershed project staff. Report includes chapters and fact sheets dedicated to subjects including: management measures for wetlands, riparian areas and vegetated treatment systems.

FHWA. Critter Crossings: Linking Habitats and Reducing Roadkill. 2000. An electronic version of Publication No: FHWA-EP-004. Last access: February 20, 2007.  
<http://www.fhwa.dot.gov/environment/wildlifecrossings/main.htm>

**Description:** The website describes transportation's impacts on wildlife and highlights exemplary projects and processes that are helping to reduce these impacts. The website includes illustrated chapters on subjects pertaining to: tortoise underpasses; tunnels for small burrowing animals and reptiles; tools to assess wildlife linkage areas; fish passages; passages for large mammals; and other related assessment tools and websites.

Transportation Research Board. Guidance for Estimating the Indirect Effects of Proposed Transportation Projects. 1998. Last access: September 15, 2006.  
[http://trb.org/news/blurb\\_detail.asp?id=3004](http://trb.org/news/blurb_detail.asp?id=3004)

**Description:** TRB's National Cooperative Highway Research Program (NCHRP) Web Document 43: Guidance for Estimating the Indirect Effects of Proposed Transportation Projects is an instructional course based on research conducted for National Cooperative Highway Research Program Project 25-10: Guidance for Estimating the Indirect Effects of Proposed Transportation Projects. The course consists of a PowerPoint presentation and support materials.

Transportation Research Board, National Cooperative Highway Research Program. Interaction Between Roadways and Wildlife Ecology: A Synthesis of Highway Practice. 2002. Last access: February 20, 2007. [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_syn\\_305.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_305.pdf)

**Description:** This synthesis report will be of interest to state department of transportation (DOT) staff involved in the development, operation, and maintenance of roadways and how they can effect wildlife and ecological systems across the country. Roadway development choices made in response to population growth can affect many, if not all, forms of wildlife. Such effects include loss of wildlife habitat, fragmentation, mortality, and

increased competition. The synthesis reviews and discusses regulatory context (laws, regulations, policies, and guidance); transportation planning and development processes; the types of effects, including habitat loss, fragmentation, and chemical and physical impacts; the scale and assessment of effects; analytical tools, including motorist safety studies and wildlife surveys; conservation measures and mitigation; maintenance (culverts and habitat restoration); and funding sources and deficiencies.

### *Useful Websites:*

FHWA. Keeping it Simple: Easy Ways to Help Wildlife Along Roads. Last access: February 20, 2007. <http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm?fuseaction=home>.

**Description:** This website highlights more than 100 simple, successful activities from all 50 states and from FHWA's Western Federal Lands Division. All these activities are "easy." Most are low- or no-cost. All benefit fish and wildlife or their habitat. Categories include mitigations measures organized in sections dedicated to roads, bridges, waterways, wetlands, and upland areas.

International Conference on Ecology & Transportation: Conference proceedings for the years 2001, 2003 and 2005. <http://www.icoet.net/index.asp>

**Description:** Conducted every two years, ICOET is designed to address the broad range of ecological issues related to surface transportation development, providing the most current research information and best practices in the areas of wildlife, fisheries, wetlands, water quality, overall ecosystems management, and related policy issues. ICOET is a multi-disciplinary, inter-agency supported event, administered by the Center for Transportation and the Environment.

Texas Transportation Institute. Deer Vehicle Crash Information Clearinghouse. Last access: February 20, 2007. <http://www.deercrash.com/>

**Description:** This website includes: detailed deer-vehicle crash statistics at regional, state and national levels; a "countermeasures toolbox" detailing deer-vehicle mitigation activities and approaches; and links to relevant partners and resources.

**Habitat Modification: Habitat Loss and/or Landscape Fragmentation**

The following considerations should be made regarding mitigation of the loss of environmentally sensitive habitats:

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Habitat Modification: Habitat Loss and/or Landscape Fragmentation	<b>Alternative facility site considerations</b> for wetland areas and other environmentally-sensitive areas should be a priority. The most sensitive areas are often irreplaceable and provide ecological benefits that are difficult to quantify. Destruction, relocation or alteration of sensitive habitats should be a choice if no other feasible alternatives exist.	<ul style="list-style-type: none"> <li>• Maintenance of the integrity of natural areas</li> <li>• Species protection</li> <li>• Aesthetic benefits of open space preservation</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with land acquisition and alternative site planning</li> </ul>
	<b>Land and/or wetland banking</b> is a process whereby entities set aside lands in anticipation of growth and development. In instances where destruction of the resource is unavoidable, lands that have been set aside can be used to offset losses.	<ul style="list-style-type: none"> <li>• Replaces impacted or destroyed lands with lands of equal or greater value</li> <li>• Provides developers with a method of ensuring compliance with Federal and state mandates</li> </ul>	<ul style="list-style-type: none"> <li>• Original natural resource is permanently altered</li> <li>• Mitigation costs are generally high</li> <li>• Difficulty reproducing the natural conditions of original resource</li> </ul>
	<b>Vegetative buffer zones</b> between transportation facilities and adjacent areas of sensitive habitat should be promoted.	<ul style="list-style-type: none"> <li>• Maintenance of the integrity of natural areas</li> <li>• Species protection</li> <li>• Aesthetic benefits of open space preservation</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with the design of feasible landscaping and approaches</li> </ul>
	<b>Encourage use of indigenous plants</b> within buffer zones in an effort to maintain the integrity of the surrounding natural habitat.	<ul style="list-style-type: none"> <li>• Maintenance of the integrity of natural areas</li> <li>• Species protection</li> <li>• Enhancement of ecological integrity</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with materials and necessary professional consultation</li> </ul>

*Habitat Modification: Species Mortality or Injury – Deer*

**Deer collisions** present the most significant risk due to their potential to inflict losses including property damage, personal injury or death and should therefore be given the most consideration and priority.

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<b>Public Information and Education.</b> Many collisions are often random and may be unavoidable altogether. Public awareness as to the problem of and hazards associated with deer collisions can work well as part of a comprehensive mitigation program.	<ul style="list-style-type: none"> <li>• Cost effective</li> <li>• Capability of reaching a wide audience</li> </ul>	<ul style="list-style-type: none"> <li>• Will not eliminate the problem altogether</li> <li>• Costs associated with reaching a wide audience</li> </ul>
	<b>Speed Limit Reduction</b> in known high-frequency collision areas can provide the driver with extra time and distance to react to deer. There is a documented connection between the reduction of speed limit and the reduction of deer-vehicle crashes. Drivers, however, do not always follow posted speed limits. Roads with higher speed limits often already have better design features that increase visibility for the driver.	<ul style="list-style-type: none"> <li>• Practical approach to decreasing collisions</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty assuring enforcement and compliance</li> </ul>
	<b>Roadway Maintenance, Design, and Planning Policies:</b> Various road designs can decrease collisions by improving driver awareness and sight lines. Four-lane roads have fewer crashes than two-lane roads due to visibility and room for evasive maneuvers.	<ul style="list-style-type: none"> <li>• Long-term approach to overall reduction in impacts in known high-impact areas</li> </ul>	<ul style="list-style-type: none"> <li>• Not feasible in all locations, particularly rural areas</li> <li>• Costs associated with research, design and construction implementation</li> </ul>
	<b>Deer Crossing Signs and Technologies,</b> which can alert drivers to hazards caused by animals when and where they are observed to gather in numbers or with frequency.	<ul style="list-style-type: none"> <li>• Innovative solution within high-impact areas</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with research and installation</li> <li>• Identifying appropriate sites can be difficult</li> <li>• If used too frequently, may decrease drive awareness due to complacency</li> <li>• Research regarding effectiveness inconclusive</li> </ul>

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Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<b>Roadside Vegetation Management</b> involves controlling vegetation near roadsides that either attract deer (for feeding) or obscure deer from passing motorists.	<ul style="list-style-type: none"> <li>• Long term solution within areas experiencing a high frequency of impacts</li> <li>• Increase in overall safety and visibility for drivers</li> <li>• Part of an overall roadside vegetation strategy, which should include a variety of environmental considerations</li> </ul>	<ul style="list-style-type: none"> <li>• No conclusive research proving that this method is an effective means of preventing collisions.</li> </ul>
	<b>Roadside Reflectors and Mirrors</b> (Swareflex Wildlife Reflector (a proprietary product)) which work in conjunction with passing automobile headlights. The reflection of light may frighten, distract, or freeze deer enough so that they will not cross the road. Such reflectors are currently being tested along high-frequency collision areas of the NYS Thruway (Rt. 90 near Lancaster).	<ul style="list-style-type: none"> <li>• Innovative solution within high-impact areas</li> </ul>	<ul style="list-style-type: none"> <li>• Current research regarding effectiveness is inconclusive</li> <li>• Technology requires frequent maintenance in order to assure proper function (particularly in the winter time)</li> <li>•</li> </ul>
	<b>Deicing Salt Alternatives.</b> Deer are attracted to salt. Using alternative deicing materials in known high-frequency collision areas can decrease deer's desire to congregate near areas with salt.	<ul style="list-style-type: none"> <li>• Temporary solution within areas experiencing a high frequency of impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Use of alternatives may contradict or otherwise complicate a department's overall deicing strategy</li> <li>• Costs associated with materials</li> </ul>
	<b>Repellants</b> , which can make food that otherwise has an attractive taste or smell offensive to deer. When placed near a road, this may cause them to avoid the road. Only specific types of repellents have been shown to be effective.	<ul style="list-style-type: none"> <li>• Temporary solution within areas experiencing a high frequency of impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with product purchase, application and monitoring the effectiveness</li> <li>• Can simply cause deer to migrate to other areas, transferring the hazard</li> </ul>

## L RTP Non-Air Environmental Scan

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<p><b>Exclusionary Fencing</b> physically separates animals and vehicles. Research shows that this method is highly effective in reducing crashes in known high-frequency collision areas. This method does, however, adversely impact necessary animal movement patterns.</p>	<ul style="list-style-type: none"> <li>• Permanent solution in known high-impact areas</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with design and construction</li> <li>• Deer are very likely to be capable of surpassing the barrier</li> <li>• Can simply cause deer to migrate to other areas, transferring the hazard</li> <li>• Devices often need to be combined with other barriers to be effective</li> </ul>

### *Habitat Modification: Species Mortality or Injury – Threatened or Endangered Species*

There are several effective methods that can be used to reduce mortality or injury to threatened or endangered species that should be given serious consideration and priority during transportation facility construction.

Environmental Issue	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
<p><b>Habitat Modification: Species Mortality and Injury – Threatened or Endangered Species</b></p>	<p><b>Signage, Education and Outreach</b> to inform motorists that threatened or endangered species are likely to exist in the area and due diligence should be used</p>	<ul style="list-style-type: none"> <li>• Cost effective</li> <li>• Capability of reaching a wide audience</li> </ul>	<ul style="list-style-type: none"> <li>• Will not eliminate the problem altogether</li> <li>• Costs associated with reaching a wide audience</li> </ul>
	<p><b>Wildlife Crossing Structures and barriers</b>, including amphibian and reptile walls and culvert systems. These are designed to channel species into safe crossing areas (typically a culvert or tunnel). Crossing structures are typically designed to accommodate specific species. Animal Barriers prevent burrowing animals from crossing the highway through a fencing system that is placed partially underground, rising above the ground. Such animals are not able to burrow under the barrier and cross the road. Animals can be channeled to an appropriate crossing point or area if necessary.</p>	<ul style="list-style-type: none"> <li>• Innovative solution proven to be effective with various species within known high-frequency collision areas</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with design and construction</li> <li>• Structures often must be customized to accommodate an individual species</li> </ul>

### Issue 3: Open Space Modification

#### Issue Description

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Open space modification refers to negative impacts to local and regional open space resources due to the construction of new facilities. Open space resources include public and private lands such as grasslands, parks, or forests that are devoid of infrastructure, roads and permanent structures. Open space also includes land that is either actively used for agricultural production or grazing as well as fallow agricultural lands that are not presently used for such purposes. Specific benefits provided by open spaces include agricultural and timber production, air and water purification, recreational enjoyment and aesthetics.

This issue shares many similar attributes with *Issue 2: Habitat Loss*. The primary distinction here, however, is the destruction or impairment of open space resource characteristics that are enjoyed specifically by human communities. The enjoyment provided by scenic vistas or the utilitarian function and food security provided by agricultural areas are notable examples. As with habitat loss, the construction of new transportation facilities is likely to induce the growth of other supportive facilities, resulting in the loss of open space resources, gradually impairing or diminishing their value over time.

#### ***1. Preservation, Conservation and Adaptive Reuse***

The preservation and conservation of open space resources is the surest way to safeguard their benefits. Outright purchase of resources and/or the protection of their current uses from various types of development are among the options available to the public and municipalities. Adaptive reuse of abandoned or underutilized developed spaces can further act to decrease the demand for open spaces.

#### ***2. Growth Management and Compact Development***

Growth management refers to policies or procedures that can be used to provide for the sustainable growth of communities. The primary goal of growth management techniques is to ensure that adequate services (i.e. infrastructure, housing, etc.) are available to meet the demand created by new growth. Compact development refers to practices in community development that increase density, thereby reducing the overall need for new facilities. Furthermore, the close proximity of services available within compact developments reduces personal dependence on the automobile. When these two concepts are successfully applied to community development, an overall reduction in the need for and demand of open spaces may result.

#### Federal and State Mandates

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***Environmentally Beneficial Landscaping, Executive Memorandum, 1994:*** Environmentally beneficial landscaping entails utilizing techniques that complement and enhance the local environment and seek to minimize the adverse effect that the landscaping has on it. In particular, this means using regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.

**Federal Highway Administration Wetland Policy, 1977 (23 CFR 777, Mitigation of Impacts to Wetlands and Natural Habitat):** It is the FHWA's policy to prepare a formal wetland finding prior to

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the approval of any project involving new construction in wetlands and classified as an EIS or a Finding of No Significant Impact (FONSI).

**Land and Water Conservation Fund Act of 1965 (LAW-CON) (16 U.S.C. 460I-4 et seq.):** Section 6(f): Requires that recreation land purchased or improved under the LAWCON Act cannot be used unless replacement land of equal value, use, and size can be supplied.

**Protection of Wetlands, Executive Order, 11990, 1977:** Directs federal agencies to avoid unnecessary alteration or destruction of wetlands, and requires implementation of actions to minimize the loss or degradation of wetlands affected by a project that received federal funding.

**NYS Freshwater Wetlands Act, Article 24 of the NYS Environmental Conservation Law:** A permit is required for most activities that will alter freshwater wetlands or adjacent areas. The approximate boundary of all wetlands within jurisdiction are shown on official NYS Freshwater Wetlands Maps maintained by NYSDEC

**NYS Tidal Wetlands Act, Article 25 of the Environmental Conservation Law:** A permit is required from the NYSDEC for almost any activity that will alter tidal wetlands or adjacent areas. The approximate boundaries of all tidal wetlands within agency jurisdiction are shown on official DEC maps.

### Partners for Consultation

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#### *Federal entities:*

U.S. Department of Transportation (USDOT)	<a href="http://www.dot.gov">www.dot.gov</a>
U.S. Environmental Protection Agency (EPA)	<a href="http://www.epa.gov">www.epa.gov</a>
Federal Highway Administration (FHWA)	<a href="http://www.fhwa.dot.gov">www.fhwa.dot.gov</a>
US Department of Housing and Urban Development	<a href="http://www.hud.gov">www.hud.gov</a>

#### *New York State entities:*

New York State Department of Environmental Conservation (NYSDEC)	<a href="http://www.dec.state.ny.us">www.dec.state.ny.us</a>
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#### *Independent Organizations:*

American Association of State Highway and Transportation Officials	<a href="http://www.transportation.org">www.transportation.org</a>
AASHTO Center for Environmental Excellence	<a href="http://www.environment.transportation.org">www.environment.transportation.org</a>
American Planning Association	<a href="http://www.planning.org">www.planning.org</a>
Brookings Institution on Urban and Metropolitan Policy	<a href="http://www.brook.edu/metro">http://www.brook.edu/metro</a>
Congress for New Urbanism	<a href="http://www.cnu.org">www.cnu.org</a>
Smart Growth Network	<a href="http://www.smartgrowth.org">www.smartgrowth.org</a>

### Inventories and Resources

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#### *Publications:*

American Planning Association. "How Cities Use Parks for...". 2003. Last access: September 18, 2006  
<http://www.planning.org/cpf/briefingpapers.htm>

**Description:** The APA City Parks Forum is dedicated to providing information on how healthy parks are fundamental to many aspects of community prosperity. This briefing series includes ten pieces: one pertains specifically to how city parks can be used for green infrastructure; another pertains specifically to smart growth.

Belzer, Dena and Autler, Gerald. "Transit Oriented Development: Moving from Rhetoric to Reality." The Brookings Institution on Urban and Metropolitan Policy. 2002. Last access: September 29, 2006. <http://www.brookings.edu/es/urban/publications/belzertod.pdf>

**Description:** Discusses three modern trends in American land use: new investment in America's downtown areas, suburban growth and maturation of suburban communities, and transit oriented development. At the convergence of these three trends is the realization that a substantial market exists for a new form of walkable, mixed-use urban development around these new rail or rapid bus stations and transit stops.

EPA. Community Culture and the Environment: A Guide to Understanding a Sense of Place. 2002. Last access: October 6, 2006. <http://www.epa.gov/ecocommunity/pdf/ccecomplete.pdf>

**Description:** The Environmental Protection Agency (EPA) has compiled this technical document of tools and methods for understanding the human dimension of environmental protection. It is designed to provide leaders in the environmental field a means for better understanding community values and processes as they relate to environmental issues, thus resulting in more effective partnerships and approaches to solving environmental problems. The tools are intended to assist communities in meeting or exceeding current environmental protection standards.

EPA. Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies. 2006. Last access: February 20, 2007.  
[http://www.epa.gov/dced/pdf/growing\\_water\\_use\\_efficiency.pdf](http://www.epa.gov/dced/pdf/growing_water_use_efficiency.pdf)

**Description:** Land use decisions are often driven by the availability of infrastructure, specifically water and sewer. This resource provides information on policies and approaches that pertain to alternative development patterns, demand for water, and infrastructure provision.

EPA. Using Smart Growth Techniques as Stormwater Best management Practices. 2005. Last access: October 6, 2006. [http://www.epa.gov/dced/pdf/sg\\_stormwater\\_BMP.pdf](http://www.epa.gov/dced/pdf/sg_stormwater_BMP.pdf)

**Description:** Examples of smart growth techniques and approaches covered in this publication include: regional planning; infill development; redevelopment policies; special development districts (e.g., transit oriented development and brownfields redevelopment); tree and canopy programs; parking policies to reduce the number of spaces needed or the footprint of the lot; “Fix It First” infrastructure policies; smart growth street designs; and stormwater utilities.

Office of the New York State Comptroller: Division of Local Government Services and Economic Development. Smart Growth in New York State: A Discussion paper. 2004. Last access February 20, 2007. [http://www.osc.state.ny.us/localgov/pubs/research/smart\\_growth.pdf](http://www.osc.state.ny.us/localgov/pubs/research/smart_growth.pdf)

**Description:** The report is intended to help stimulate a vigorous debate on smart growth in New York State by providing a general background and helping to define major issues.

Pendall, Rolf; Martin, Jonathan; and Fulton, William. Holding the Line: Urban Containment in the United States. 2002. The Brookings Institution Center on Urban and Metropolitan Policy. Last access: September 29, 2006. <http://www.brookings.edu/es/urban/publications/pendallfultoncontainment.pdf>

**Description:** Policies designed to deliberately control the spread of urban areas are increasing in popularity throughout the United States. Several states, and many local governments in the west, are adopting urban growth boundaries and other containment measures in their land-use planning laws and legislation. Whatever the primary purpose, it is clear that the precise impacts of containment policies are not well understood. This paper reviews the research on urban containment generally, and also examines the experience of such policies in particular metropolitan areas. It discusses some lessons learned and raises relevant research questions for practitioners as well as policymakers at the state and local level.

Smart Growth Network. “Getting to Smart Growth: 100 Policies for Implementation.” 2003. Last access: October 2, 2006. <http://www.smartgrowth.org/pdf/gettosg.pdf>

Smart Growth Network. “Getting to Smart Growth II: 100 More Policies for Implementation.” 2003. Last access: October 2, 2006. <http://www.smartgrowth.org/pdf/gettosg2.pdf>

**Description:** Getting to Smart Growth Vol’s I and II serve as a road map for states and communities that have recognized the need for smart growth but are unclear on how to achieve it. Each volume provides 10 policy options to achieve each of the 10 Smart Growth Principles. These policies are supported with “Practice Tips” which offer additional resources or brief case studies of communities that have applied the approach to achieve smart growth. Features of the Volume II include: a list of 100 policies for implementation; case studies and examples in each chapter; and an appendix listing funding resources for smart growth projects.

US Department of Housing and Urban Development. “Redeveloping Brownfields: How States and Localities Use CDBG Funds.” 1998. Last access: September 18, 2006. <http://www.huduser.org/publications/econdev/redevelo.html>

**Description:** Brownfield redevelopment is recognized as a tool to reuse developed urban spaces as an alternative to developing green spaces. In this publication, researchers recommend that HUD "maintain and highlight the availability and flexibility of CDBG funds for brownfields redevelopment" without displacing or earmarking existing CDBG funding. Sponsored by HUD's Office of Policy Development and Research, the study surveys States and urban areas that receive CDBG funds about their awareness, involvement, and technical assistance needs in this area.

*Open Space Modification: Preservation, Conservation and Adaptive Reuse*

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Open Space Modification: Preservation, Conservation and Adaptive Reuse	<b>Outright purchase</b> of environmentally sensitive lands for permanent protection or management, set aside for the public good.	<ul style="list-style-type: none"> <li>• Permanent protection of open space resources</li> </ul>	<ul style="list-style-type: none"> <li>• High costs associated with purchase</li> <li>• Purchase negotiations are often complex</li> <li>• Management and stewardship considerations can be equally complex</li> <li>• Site selection and resource allocation are difficult choices that require public dialogue and input</li> </ul>
	<b>Land and/or wetland banking</b> is a process whereby entities set aside lands in anticipation of growth and development. In instances where destruction of the resource is unavoidable, lands that have been set aside can be used to offset losses.	<ul style="list-style-type: none"> <li>• Replaces impacted or destroyed lands with lands of equal or greater value</li> <li>• Provides developers with a method of ensuring compliance with Federal and state mandates</li> </ul>	<ul style="list-style-type: none"> <li>• Original natural resource is permanently altered</li> <li>• Mitigation costs are generally high</li> <li>• Difficulty reproducing the natural conditions of original resource</li> </ul>
	<b>Purchase/Transfer of Development Rights</b> programs allow landowners to sever development rights from properties in designated low-density areas, and sell them to purchasers who want to increase the density of development. TDR programs provide advantages to local governments that want to control land use but also compensate landowners for restrictions on the development potential of their properties.	<ul style="list-style-type: none"> <li>• Innovative solution that allows development to occur while simultaneously preserving open space or environmentally sensitive lands</li> <li>• TDR programs can be easier to implement than typical zoning.</li> <li>• TDR programs are also more permanent than traditional zoning regulations.</li> </ul>	<ul style="list-style-type: none"> <li>• Complexity and expense associated with negotiating TDRs or PDRs</li> <li>• Difficulty quantifying and comparing the costs and anticipated benefits associated with PDRs and TDRs – actual benefits realized by the public may not be equal to costs invested</li> </ul>

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Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<b>Redevelopment of Brownfields/Grayfields</b> conserve space by reusing an inefficient land use. Grayfields and brownfields are located in places with existing infrastructure and access to roads and public transportation. These are located in areas with high concentrations of people, reducing or eliminating the need for new roads.	<ul style="list-style-type: none"> <li>• Reduction of the need for development on green spaces</li> <li>• Reinvestment in declining neighborhoods or urban areas</li> <li>• Increase in tax base for communities</li> <li>• Reduction in the need for new infrastructure to new facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Complexity associated with negotiating reuse of areas</li> <li>• Costs associated with necessary environmental mitigation of toxic hazards</li> </ul>
	<b>Cost of Community Services Studies (i.e., to encourage agricultural conservation)</b> can demonstrate to local policy makers that development often requires more in municipal services than the tax revenue it produces. Agricultural land and open space, by comparison, often brings in more tax revenue than it costs to service. These studies can help guide local decisions on development in infrastructure provision.	<ul style="list-style-type: none"> <li>• Helps land owners, community members and local officials make informed decisions regarding open space preservation</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with conducting study</li> </ul>

### *Open Space Modification: Growth Management and Compact Development*

**Growth Management Techniques** comprise a variety of regulatory and voluntary approaches to concentrating development in existing developed areas. Less new infrastructure is needed, specifically new roads.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Open Space Modification: Growth Management and Compact Development	<b>Traditional Neighborhood Design</b> is based on a more compact form of development, similar to how communities were built prior to WWII. This differs from the currently dominant pattern of diffuse development that has different uses widely separated.	<ul style="list-style-type: none"> <li>• Compact development requires less infrastructure per capita</li> <li>• Dense, mixed-use neighborhoods decrease the need to travel by car</li> <li>• Using different parking techniques, such as shared</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to mandate</li> <li>• Relies on the assumption that such designs are desired by the public</li> </ul>

L RTP Non-Air Environmental Scan

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
		parking and on-street parking, can reduce the amount of surface parking lots.	
	<b>Transit Supportive Development</b> is a type of traditional neighborhood design that provides more connections via transit with destinations across the region, reducing the need for more roads and parking lots.	<ul style="list-style-type: none"> <li>• Decreases the need for individuals to travel by automobile</li> <li>• Provides marginalized citizens (poor, elderly, disabled) with increased mobility and housing options</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with site planning and design, which can be complex</li> </ul>
	<b>Balanced Transportation (walking, bicycling):</b> Encouraging forms of transportation other than the currently dominant mode (private vehicles) reduces the need for, and capacity of, roads and parking lots. Creating a balanced transportation system that encourages modes such as walking, biking, and public transit can lower the impact of transportation infrastructure on open space.	<ul style="list-style-type: none"> <li>• Health benefits associated with walking and bicycling</li> <li>• Decreased traffic congestion when a critical mass of users results</li> </ul>	<ul style="list-style-type: none"> <li>• Need for facility planning, management and construction of pedestrian and bicycling facilities</li> <li>• Winter travel is not desirable for the majority of citizens</li> </ul>

## Issue 4: Historical/Cultural Modification

### Issue Description

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Poorly conceived transportation projects have the ability to damage and even destroy important parts of the nation's heritage. Historical/cultural modification, therefore, refers to the alteration of features, spaces, and spatial relationships of historically and culturally significant buildings, landscapes, and sites. As outlined below, considerable legislation is in place at the federal and state levels to protect these places and many programs exist at the local level for preserving community heritage. Knowledge of and adherence to these mandates are therefore the most important best management practices relating to the preservation of these features.

Historical and cultural modification can be divided into three primary categories:

- Archaeological Sites, Historical Structures, and Significant Landmarks
- Cultural Heritage Sites and/or Places of Unique Interest
- Neighborhood Modification

#### ***1. Archaeological Sites, Historical Structures, and Significant Landmarks***

Federal and state agencies need to expand and focus efforts to consult with concerned parties when deciding what resources are important and to whom they matter. This is particularly true when it comes to representatives of the communities in which resources are located. Public disclosure and consultation is required by law when Federal and state agencies are considering various undertakings, but many agencies view these requirements as time-consuming hindrances rather than opportunities for creative problem-solving. While Federal and state agencies must consult with a wide range of stakeholders when they make major land-use decisions, a number of agencies could make major improvements in the way they identify stakeholders and seek their views in planning and decision-making.

Understanding requires effective communication. Federal and state agencies need to develop mechanisms to better inform and engage communities and business groups, such as those involved with heritage tourism, in decisions about resource protection and access. They also need to develop better means for addressing the concerns and interests of groups who have a special affinity with particular historic and cultural resources, such as Indian tribes and other Native Americans.

#### ***2. Neighborhood Modification***

This category refers to the disruptive effects that new transportation facilities can have on a neighborhood (in particular, new railways and highways). The construction of new transportation facilities of this type can have a dramatic and deleterious impact on surrounding neighborhoods, particularly in more densely settled areas. Community consistency and cohesiveness can be agitated or severed by new infrastructure; attempting to mitigate these harmful impacts can prove to be difficult and costly.

Transportation planning agencies must take into account the structure and community connectivity of the places where new or expanded transportation corridors are proposed. Much in the way that environmental laws discourage the bisection of sensitive areas, these same laws and processes should strongly discourage the bisection of human habitat (i.e. neighborhoods and communities). Transportation corridors should be routed around identifiable neighborhoods and communities, so as not to divide them. Where divisions have already occurred, enhancements to these corridors should seek to correct past

errors. The divisive transportation corridor should be removed and rerouted, or redesigned to be less of a barrier. For example, a high speed highway with infrequent crossings can be redesigned into a lower-speed boulevard with more frequent crossing opportunities.

### ***3. Cultural Heritage Sites and/or Places of Unique Interest***

Heritage tourism presents transportation facility planners with an alternative for protecting cultural heritage sites and/or places of unique interest which are *not* officially designated as registered landmarks. The existing transportation system can be utilized to create new linkages and promote transportation improvements that enhance safety and ease of use for pedestrians, bicyclists, boaters, and users of mass transit.

Partnerships among Federal, State, local, tribal, and private sector entities lead to the most successful heritage tourism efforts and leverage substantial additional financial and technical support. However, overcoming institutional barriers to creating partnerships, balancing resource protection with the economic and educational benefits of increased tourism, and balancing public access with security concerns are some challenges. A close working relationship with the local community is essential. The community may or may not want the economic stimulus of increased tourism. Issues include increased trash, traffic, vandalism, theft, and invasion of privacy. Citizens and local communities need a central information resource for getting information from the various agencies involved. Agencies need to share relevant information with each other.

## Federal and State Mandates

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**Archeological and Historic Preservation Act (AHPA) (1974):** Greatly expanded the number and range of Federal agencies that had to take archeological resources into account when executing, funding, or licensing projects.

**Archaeological Resources Protection Act (ARPA) (1979):** Protects public archeological sites before Federal authorities can issue a permit to excavate or remove any archeological resource on Federal or Indian lands.

**Department of Transportation Act (1966) (Section 4f):** Prohibits federal approval or funding of transportation projects that require use of any historic site unless: (1.) there is “no feasible and prudent alternative to the project,” and (2.) the project includes “all possible planning to minimize harm.”

***Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Executive Order 12898, 1994:*** Requires that federal actions consider disproportionate impacts to low-income and minority groups.

**Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601-4639):** Provides for the fair and equitable treatment of persons displaced from their homes, farms, or businesses by federal or federally assisted projects.

**National Environmental Policy Act (NEPA) (1969):** Authorizes State Environmental Quality Review Act (SEQRA) (see below).

**National Historic Preservation Act (1966) (Section 106):** Authorizes the identification of registered properties and properties determined “eligible” for the National Register of Historic Places. Landmark properties are eligible to receive a measure of protection from the effects of federal and/or state agency sponsored, licensed, or assisted projects through a notice, review, and consultation process. Identification of archaeologically and historically-sensitive areas: A field check or survey and documentation determine whether an “eligible” site is indeed “significant” for listing on the National Register.

**New York State Historic Preservation Act (1980) (Section 14.09):** State agencies must consult with SHPO if it appears that any projects being planned may or will cause any change, beneficial or adverse, in the quality of any property that is listed on the National Register of Historic Places or is listed or eligible to be listed on the State Register. Identification of archaeologically and historically-sensitive areas can be done using the New York State Historic Preservation Office Online Resource (SPHINX, “Document Imaging for National Register,” and “GIS for Archaeology and National Register”). A field check or survey and documentation determine whether an “eligible” site is indeed “significant” for listing on the National Register.

***Protection and Enhancement of the Cultural Environment, Executive Order 11593, Section 1(3), 1971:*** Requires that federal agencies, in consultation with the Council, establish procedures regarding the preservation and enhancement of non-federally owned historic and cultural properties in the execution of their plans and programs.

**State Environmental Quality Review Act (SEQRA), 6NYCRR Part 617 of the New York State Environmental Conservation Law:** Establishes a set of uniform regulations by which all state, county and local governmental agencies must incorporate consideration of environmental impacts into their planning, review and decision-making processes. If an action may have a significant adverse impact, agencies must prepare or request an Environmental Impact Statement (EIS).

### Partners for Consultation

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#### ***Federal Entities:***

Advisory Council on Historic Preservation (ACHP)	<a href="http://www.achp.gov">www.achp.gov</a>
U.S. Department of the Interior, National Park Service (NPS)	<a href="http://www.nps.gov">www.nps.gov</a>
U.S. Department of Transportation (DOT)	<a href="http://www.dot.gov">www.dot.gov</a>
U.S. Environmental Protection Agency (EPA)	<a href="http://www.epa.gov">www.epa.gov</a>

#### ***State Entities:***

New York State Council on the Arts	<a href="http://www.nysca.org/public/home.cfm">www.nysca.org/public/home.cfm</a>
New York State Department of Environmental Conservation (NYSDEC)	<a href="http://www.dec.state.ny.us">www.dec.state.ny.us</a>
New York State Department of Transportation (NYSDOT)	<a href="http://www.nysdot.gov">www.nysdot.gov</a>
New York State Office of Parks, Recreation & Historic Preservation, State Historic Preservation Office (SHPO)	<a href="http://www.nysparks.state.ny.us/shpo">www.nysparks.state.ny.us/shpo</a>

#### ***Independent Organizations:***

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American Cultural Resource Association	<a href="http://www.acra-crm.org">www.acra-crm.org</a>
Archaeological Institute of America	<a href="http://www.archaeological.org/">www.archaeological.org/</a>
Citizen's Environmental Coalition	<a href="http://www.cectoxic.org">www.cectoxic.org</a>
Context Sensitive Solutions	<a href="http://www.contextsensitivesolutions.org">www.contextsensitivesolutions.org</a>
National Association of Tribal Historic Preservation Officers (NATPO)	<a href="http://www.nathpo.org">www.nathpo.org</a>
National Conference of State Historic Preservation Officers (SHPO)	<a href="http://www.ncshpo.org">www.ncshpo.org</a>
National Trust for Historic Preservation (NTHP)	<a href="http://www.nationaltrust.org">www.nationaltrust.org</a>
Preservation Action	<a href="http://www.preservationaction.org">www.preservationaction.org</a>
Preservation Easement Trust, Inc.	<a href="http://www.preservationeasement.org/home">www.preservationeasement.org/home</a>
Preservation League of New York State	<a href="http://www.preservenys.org">www.preservenys.org</a>
Register of Professional Archaeologists	<a href="http://www.rpanet.org">www.rpanet.org</a>
Society of Architectural Historians	<a href="http://www.sah.org">www.sah.org</a>
Society of American Archaeology	<a href="http://www.saa.org">www.saa.org</a>
Society for Historical Archaeology	<a href="http://www.sha.org">www.sha.org</a>

### ***Regional Entities:***

The Arts & Cultural Council of Greater Rochester	<a href="http://www.artsrochester.org">www.artsrochester.org</a>
Landmark Society of Western New York	<a href="http://www.landmarksociety.org">www.landmarksociety.org</a>

## Inventories and Resources

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FHWA. [Flexibility in Highway Design](#). 1997. Last access: February 21, 2007.

<http://www.fhwa.dot.gov/environment/flex/index.htm>

**Description:** When faced with extreme social, economic, or environmental consequences, it is sometimes necessary for designers to look beyond the "givens" of a highway project and consider other options. The design exception process is one such alternative. In other cases, it may be possible to reevaluate planning decisions or rethink the appropriate design. This Guide illustrates the flexibility already available to designers within adopted State standards. These standards, often based on the AASHTO Green Book, allow designers to tailor their designs to the particular situations encountered in each highway project. Often, these standards alone provide enough flexibility to achieve a harmonious design that both meets the objectives of the project and is sensitive to the surrounding environment.

FHWA. [A Guide to Achieving Flexibility in Highway Design](#). 2004.

**Description:** 2004 update of [Flexibility in Highway Design](#). Selected excerpts available at:  
<http://www.contextsensitivesolutions.org/content/reading/guide-for-achieving-flexibility/>

FHWA, National Scenic Byways Program. [Online Forums](#). Last access: February 21, 2007.

<http://www.bywaysonline.org/forums/index.html>

**Description:** These online forums provide readers with an opportunity to learn about and discuss various scenic byway topics.

National Trust for Historic Preservation and Federal Highway Administration. Building on the Past, Traveling to the Future: A preservation's Guide to the Federal Transportation Enhancement Provision. 2<sup>nd</sup> Ed. Last access February 21, 2007.  
[http://www.nationaltrust.org/help/downloads/Building\\_on\\_the\\_Past.pdf](http://www.nationaltrust.org/help/downloads/Building_on_the_Past.pdf)

**Description:** Transportation enhancement funds and historic preservation projects. Examples cited from throughout the US.

Mead & Hunt, Prepared for New York State Department of Transportation. Contextual Study of New York State's Pre-1961 Bridges. 1999. Last access: February 21, 2007.  
<https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/bridgescontextuastudy-99.pdf>

**Description:** The contextual study establishes a framework for understanding the historic and engineering significance of New York's bridges. The study includes an overview of national trends in bridge engineering, the history of bridge design and construction in New York State, and the development of New York's transportation networks.

Mead & Hunt, Prepared for New York State Department of Transportation. and Federal Highway Administration. Historic Bridge Management Plan. Last assess: February 21, 2007.  
<https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/historicbridgemanagementplan.pdf>

**Description:** The Historic Bridge Management Plan presents practices and recommendations consistent with the needs of transportation and preservation that NYSDOT and other bridge owners can apply to their historic bridges.

National Trust for Historic Preservation. Legal Tools for Fighting Freeways and Saving Historic Roads. 2000. Last access: February 21, 2007.  
[http://www.nationaltrust.org/issues/transportation/legal\\_tools.pdf](http://www.nationaltrust.org/issues/transportation/legal_tools.pdf)

**Description:** This report summarizes the law and provides excellent examples of how reviews can help protect America's heritage.

National Trust for Historic Preservation. The Returning City: Historic Preservation and Transit and the Age of Civic Revival, Part 1. Last access: February 21, 2007.  
[http://www.nationaltrust.org/issues/transportation/returning\\_city\\_1.pdf](http://www.nationaltrust.org/issues/transportation/returning_city_1.pdf)

National Trust for Historic Preservation. The Returning City: Historic Preservation and Transit and the Age of Civic Revival, Part 2. Last access: February 21, 2007.  
[http://www.nationaltrust.org/issues/transportation/returning\\_city\\_2.pdf](http://www.nationaltrust.org/issues/transportation/returning_city_2.pdf)

**Description:** This study illustrates how many different places can benefit by connecting historic preservation and transit. The report also examines the historic neighborhoods immediately adjacent to downtown in cities like San Francisco, Cleveland, and Chicago, highlighting methods that support rather than undermine community preservation and transit-oriented development.

New York State Department of Transportation. Transportation Enhancement Guidebook. 2006. Last access: February 21, 2007.

**<https://www.nysdot.gov/portal/page/portal/programs/tep/2006guidebook.pdf>**

**Description:** This guidebook is designed to give sponsors and applicants a general understanding of the Transportation Enhancements Program, how the New York State Department of Transportation (NYSDOT) intends to administer this federal program, and how prospective applicants and sponsors can participate.

**Historical/Cultural Modification: Archeological Sites, Historic Structures and Significant Landmarks**

Public disclosure and consultation is required by law when Federal and state agencies are considering various undertakings, but many agencies view these requirements as time-consuming hindrances rather than opportunities for creative problem-solving. While Federal and state agencies must consult with a wide range of stakeholders when they make major land-use decisions, a number of agencies could make major improvements in the way they identify stakeholders and seek their views in planning and decision-making.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
<p>Historical/Cultural Modification: Archeological Sites, Historic Structures and Significant Landmarks</p>	<p><b>Strict Adherence to current Federal and state mandates:</b> If funded adequately, federal and state review processes have a wide array of effective tools that can be used to conduct archeological investigations, reports, and other kinds of activities to mitigate the impacts of projects on important archeological sites.</p>	<ul style="list-style-type: none"> <li>• Designates historic properties based on uniform national criteria and procedures</li> <li>• Sets boundaries for historic districts based on the actual distribution pattern of intact historic properties in the area.</li> <li>• Provides recognition by the federal government that an area has historical or archeological significance.</li> <li>• Requires the effects of federally assisted work projects (actions) on historic properties be considered prior to the commencement of work. Makes available federal tax incentives for qualified rehabilitation projects. Requires conformance to the Secretary of the Interior's Standards for Rehabilitation (36 CFR 67).</li> <li>• Makes a property eligible for HPF pre-development planning grants (such as plans and</li> </ul>	<ul style="list-style-type: none"> <li>• Laws apply only to sites officially recognized as landmarks</li> <li>• Limits growth, or regulates where growth takes place. Growth must be separately addressed through local zoning ordinances and preservation planning</li> </ul>

L RTP Non-Air Environmental Scan

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
		specs) and also "bricks and mortar" repair grants, if selected by SHPO for grant assistance. Work projects require conformance to the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 CFR 68).	

**Historical/Cultural Modification: Neighborhood Modification**

Neighborhood modification refers to the disruptive effects that new transportation facilities can have on a neighborhood (in particular, new railways and highways). The construction of new transportation facilities of this type can have a dramatic and deleterious impact on surrounding neighborhoods, particularly in more densely settled areas. Community consistency and cohesiveness can be agitated or severed by new infrastructure; attempting to mitigate these harmful impacts can prove to be difficult and costly.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Historical/Cultural Modification: Neighborhood Modification	<b>Strict Adherence to current Federal and state mandates:</b> If funded adequately, federal and state review processes have a wide array of effective tools that can be used to protect neighborhoods and the people that live in them. Environmental justice	<ul style="list-style-type: none"> <li>Provides neighborhoods with a level of protection from serious deleterious impacts from new transportation facilities</li> <li>Provides a level of protection for marginalized populations</li> </ul>	<ul style="list-style-type: none"> <li>Project planning and design process is likely to be expensive</li> </ul>

**Historical/Cultural Modification: Cultural Heritage Sites and/or Places of Unique Interest**

Heritage tourism presents transportation facility planners with an alternative for protecting cultural heritage sites and/or places of unique interest which are not officially designated as registered landmarks. The existing transportation system can be utilized to create new linkages and promote transportation improvements that enhance safety and ease of use for pedestrians, bicyclists, boaters, and users of mass transit.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Historical/Cultural Modification: Cultural Heritage Sites and/or Places of Unique Interest	Individual Best Management Practices within Heritage Tourism Sites include (but are not limited to): <ul style="list-style-type: none"> <li>• <b>Increasing public access</b> through acquisition of scenic easements and scenic and historic sites</li> <li>• <b>Alternative modes of access</b> and improved access to existing recreational areas</li> <li>• Providing <b>attractive and accessible parking</b></li> <li>• <b>Signage:</b> roadside way finding signs, safety signs, logo signs, and identification signs for trail destinations</li> <li>• <b>Interpretive exhibits</b> for scenic overlooks, rest areas, historical sites, waterfront areas and recreational sites</li> <li>• <b>Historic Highway Programs</b> (including the provision of tourist and welcome-center facilities)</li> <li>• <b>Creation or enhancement of pedestrian and bicycle facilities:</b> new bicycle lanes, sidewalk improvements, safer pedestrian crossings, landscaping and other scenic beautification, handicapped improvements, and traffic calming measures</li> </ul>	<ul style="list-style-type: none"> <li>• Conscientious designs can have many added benefits, including increased tourism and an improved quality of life for local residents</li> <li>• Partnerships can leverage additional technical and financial support</li> <li>• Community values and interests will be built into new designs, adding significant value to them</li> </ul>	<ul style="list-style-type: none"> <li>• Cost would increase significantly</li> <li>• Complexity of developing and interpreting areas could be expected to be high</li> <li>• Consequences of increased tourism</li> </ul>

## Issue 5: Noise Pollution

### Issue Description

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The dominant form of noise pollution results from transportation sources, principally motor vehicles. Noise pollution is defined as displeasing human- or machine-created sound that disrupts the environment (or environmental noise). It encompasses roadway noise, aircraft noise, industrial noise, as well as high-intensity sonar. Noise pollution associated with LRTP implementation can be divided into two primary categories:

#### ***1. Noise Pollution from Transportation Facilities***

This category includes excessive sounds emanating from facilities such as railway stations, airports, or from automobile traffic along highways.

#### ***2. Noise Pollution from Construction of Transportation Facilities***

This category refers to the noise pollution that can be expected to occur during the construction and maintenance of transportation facilities. This type of noise pollution is generally assumed to be temporary in duration.

### Federal and State Mandates

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**FHWA Procedures for Abatement of Highway Traffic Noise and Construction Noise, 1997 (Federal Aid Policy Guide, Part 772):** *Establishes a set of policies and procedures related to traffic noise that is to be applied to federal-aid projects. Although this is a Federal requirement, the absence of an applicable State regulation has led to the practice of applying it to 100% state funded projects. This has been incorporated in the Noise Analysis Policy of NYS DOT.*

### Partners for Consultation

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#### ***Federal Entities:***

U.S. Environmental Protection Agency (EPA)  
U.S. Department of Transportation (DOT)

[www.epa.gov](http://www.epa.gov)  
[www.dot.gov](http://www.dot.gov)

#### ***State Entities:***

New York State Department of Environmental Conservation (NYSDEC)  
New York State Department of Transportation (NYS DOT)  
Citizen's Environmental Coalition

[www.dec.state.ny.us](http://www.dec.state.ny.us)  
[www.nysdot.gov](http://www.nysdot.gov)  
[www.cectoxic.org](http://www.cectoxic.org)

#### ***Independent Organizations:***

Acoustical Society of America (ASA)  
American Academy of Audiology  
American Tinnitus Association  
Better Hearing Institute

[asa.aip.org](http://asa.aip.org)  
[www.audiology.org](http://www.audiology.org)  
[www.ata.org](http://www.ata.org)  
[www.betterhearing.org](http://www.betterhearing.org)

## L RTP Non-Air Environmental Scan

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Institute of Noise Control Engineering	<a href="http://www.inceusa.org">www.inceusa.org</a>
International Committee on Biological Effects of Noise	<a href="http://www.icben.org">www.icben.org</a>
Laborer's Health and Safety Fund of North America: Construction Noise Control Partnership	<a href="http://www.lhsfna.org">www.lhsfna.org</a>
League for the Hard of Hearing	<a href="http://www.lhh.org">www.lhh.org</a>
National Hearing Conservation Association	<a href="http://www.hearingconservation.org">www.hearingconservation.org</a>
National Organization to Insure a Sound-Controlled Environment (NOISE)	<a href="http://www.aviation-noise.org/index.htm">www.aviation-noise.org/index.htm</a>
Noise-Free America	<a href="http://www.noisefree.org">www.noisefree.org</a>
NoiseOFF: The Citizens Coalition Against Noise Pollution	<a href="http://www.noiseoff.org">www.noiseoff.org</a>
Right to Quiet Society for Soundscape Awareness and Protection	<a href="http://www.quiet.org">www.quiet.org</a>
Self Help For the Hard Of Hearing (SHHH)	<a href="http://www.shhh.org">www.shhh.org</a>
U.S.-Citizens Aviation Watch (US-CAW)	<a href="http://www.us-caw.org">www.us-caw.org</a>
World Forum for Acoustic Ecology (WFAE)	<a href="http://interact.uoregon.edu/MediaLit/WFAE/home/index.html">interact.uoregon.edu/MediaLit/WFAE/home/index.html</a>

### *Regional Organizations:*

Rochester Soundscape Society	<a href="http://groups.yahoo.com/group/rochestersoundscapesociety">groups.yahoo.com/group/rochestersoundscapesociety</a>
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## Inventories and Resources

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### *Publications:*

FHWA. The Audible Landscape: A Manual for Highway Noise. 1976. Last access: September 29, 2006.  
<http://www.fhwa.dot.gov/environment/audible/index.htm>

**Description:** This comprehensive manual covers all major mitigation measures associated with noise pollution. Administrative techniques, such as zoning, special development concepts and other legal controls are described in detail. Municipal ownership approaches are described, such as conservation easements and other land acquisition policies. Financial incentives and other municipal services are also detailed, along with implementation strategies and resources for further study.

FHWA. Highway Noise Barrier Design Handbook. Last access: September 29, 2006  
<http://www.fhwa.dot.gov/environment/noise/manual.htm>

**Description:** The objectives of this document and accompanying video and CD-ROM are to provide: (1) guidelines on how to design a highway noise barrier that fits with its surroundings and performs its intended acoustical and structural functions at reasonable life-cycle cost; and (2) a state-of-the-art reference of common concepts, designs, materials, and installation techniques for the professional highway engineer, the acoustical and design engineers and planners, and the non-professional community participant. This handbook may also be used as a guide for other applications such as noise barriers used to attenuate noise from rail lines, as well as noise from other sources which are not necessarily found in transportation.

The San Diego General Plan. Noise Element (Draft). 2006. Last access: September 18, 2006.  
<http://www.sandiego.gov/planning/genplan/pdf/generalplan/noiseelement.pdf>

**Description:** City of San Diego, CA municipal plan which provides goals and policies to guide compatible land uses and the incorporation of noise attenuation measures for new uses to protect people living and working in the city from an excessive noise environment. This purpose becomes more relevant as the city continues to grow with infill and mixed-use development consistent with the Land Use and Community Planning Element.

**Noise Pollution from Transportation Facilities: Improved Site Planning and Design for Minimizing Operation Noises**

The most effective means of mitigating the effect of noise associated from transportation systems is improved site planning and location of such facilities. Many negative effects can be overcome if planning is begun early to allow a wide variety of physical techniques. Specific planning techniques include:

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Transportation Facility Noise Pollution: Improved Site Planning and Design	<b>Noise Compatibility Land Use Control Programs</b> include local land use controls that segregate residential uses from transportation facilities that generate significant noise pollution	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty and costs associated with alternative site selection</li> </ul>
	<b>Acoustical site planning</b> , which involves incorporating buffer zones, such as green space	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs associated with consultation and additional site planning</li> </ul>
	<b>Public Noise Ordinances</b> which restrict noises generated from transportation facilities such as airports and locomotive facilities. Restrictions in departure times and adjustments in airplane take off trajectories can be incorporated in order to alleviate extreme sonic intrusion within residential areas during specific periods of time	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Training of local officials</li> <li>Complexity</li> <li>Monitoring and enforcement</li> </ul>

**Noise Pollution from Transportation Facilities: Physical Techniques for Minimizing Operation Noises**

Site planning and design are not always a feasible approach to mitigating noise pollution, particularly within areas where facilities such as highways or rail systems are already in place. High-density residential and business areas also limit the types of site planning and design options that are available. In cases such as these, physical techniques can be used to mitigate the adverse effects of noise pollution.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Transportation Facility Noise Pollution: Physical Techniques	<b>Improved highway design</b> , which incorporates techniques in the design and structure of highways and other transportation systems that can be used to reduce noise pollution	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs of planning, design and construction</li> <li>Costs associated with alternative site selection</li> </ul>
	<b>Acoustical construction</b> of pavements which can reduce the noise made from vehicle contact with the pavement	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs of materials and construction</li> </ul>

## L RTP Non-Air Environmental Scan

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	<b>Barrier construction</b> , consisting of earthen berms, walls and fences, thick plantings of trees and shrubs, and combinations thereof	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Aesthetic impacts</li> <li>Costs</li> </ul>
	<b>Acoustical architectural design</b> , which has typically been limited to public use structures such as schools and hospitals. Builders can be influenced to voluntarily implement noise insulators and/or reconfigure the placement of doors and windows in high-noise areas	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs of planning, design and construction</li> </ul>

### *Noise Pollution from Construction: Analytical and Physical Techniques for Minimizing Construction Noises*

Noise from construction can be difficult to manage and often must be tolerated. Heavy machinery, for example, which is the major source of noise in construction, is constantly moving in unpredictable patterns. Several approaches do exist, however, to help manage excessive construction noise if it is expected to exist for prolonged periods of time.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Construction Activity Noise Pollution: Analytical and physical techniques	<b>Traffic Noise Analyses</b> include work-hour limits, equipment muffler requirements, location of haul roads, elimination of “tail gate banging,” reduction of backing up due to equipment alarms, and particularly community notification and dialogue	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs associated with consultation</li> </ul>
	<b>Computerized prediction model</b> aides in estimating noise levels	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs associated with consultation</li> </ul>
	<b>Portable noise barriers</b> and special quieting devices for construction equipment	<ul style="list-style-type: none"> <li>Maintenance of quality of life</li> </ul>	<ul style="list-style-type: none"> <li>Costs associated with equipment</li> </ul>

## Issue 6: Light Pollution

### Issue Description

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Light pollution can be construed as “annoying, wasteful or harmful” light that intrudes on an otherwise natural or low light setting. Light pollution can be associated with the implementation of transportation projects and can cause obscuring of the night sky, interfere with astronomical observatories, and can be disruptive to a variety of nocturnal species. Light that is allowed to escape into the atmosphere also represents an inefficient use of electrical power.

### Federal and State Mandates

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*No known federal or state mandates apply.*

### Partners for Consultation

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#### ***Federal Entities:***

U.S. Department of Energy	<a href="http://www.energy.gov">www.energy.gov</a>
U.S. Department of Transportation (DOT)	<a href="http://www.dot.gov">www.dot.gov</a>
U.S. Environmental Protection Agency (EPA)	<a href="http://www.epa.gov">www.epa.gov</a>

#### ***State Entities:***

New York State Department of Environmental Conservation (NYSDEC)	<a href="http://www.dec.state.ny.us">www.dec.state.ny.us</a>
New York State Department of Transportation (NYSDOT)	<a href="http://www.nysdot.gov">www.nysdot.gov</a>

#### ***Independent Organizations:***

American Astronomical Society	<a href="http://www.aas.org">www.aas.org</a>
American Lighting Association	<a href="http://www.americanlightingassoc.com">www.americanlightingassoc.com</a>
Amateur Observers’ Society of New York	<a href="http://www.aosny.org">www.aosny.org</a>
Citizen’s Environmental Coalition	<a href="http://www.cectoxic.org">www.cectoxic.org</a>
Citizens for Responsible Lighting (CRL)	<a href="http://www.crlaction.org">www.crlaction.org</a>
Environmental Advocates	<a href="http://www.eany.org">www.eany.org</a>
IDA Youth Working Group	<a href="http://saveourstarryskies.homestead.com">saveourstarryskies.homestead.com</a>
Illuminating Engineering Society of North America (IESNA)	<a href="http://www.iesna.org">www.iesna.org</a>
International Association of Lighting Designers (IALD)	<a href="http://www.iald.org">www.iald.org</a>
Institute of Electrical and Electronics Engineers (IEEE)	<a href="http://www.ieee.org/portal/site">www.ieee.org/portal/site</a>
International Commission on Illumination (CIE)	<a href="http://www.cie.co.at/cie">www.cie.co.at/cie</a>
International Dark-Sky Association (IDA)	<a href="http://www.darksky.org">www.darksky.org</a>
Low Voltage Lighting Institute of the Americas	<a href="http://www.lvli.com">www.lvli.com</a>
National Dark Sky Week	<a href="http://www.ndsw.org">www.ndsw.org</a>
National Optical Astronomy Observatory	<a href="http://www.noao.edu">www.noao.edu</a>
The National Parks Conservation Association	<a href="http://www.npca.org">www.npca.org</a>
Natural Resources Defense Council	<a href="http://www.nrdc.org">www.nrdc.org</a>
The National Lighting Product Information Program	<a href="http://www.lrc.rpi.edu/programs/nlpip/index.asp">www.lrc.rpi.edu/programs/nlpip/index.asp</a>

Sierra Club  
U.S. Green Building Council

[www.sierraclub.org](http://www.sierraclub.org)  
[www.usgbc.org](http://www.usgbc.org)

### *Regional Organizations:*

The Astronomy Section of the Rochester Academy of Science

[www.rochesterastronomy.org](http://www.rochesterastronomy.org)

## Inventories and Resources

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### *Publications:*

IESNA. Lighting for Exterior Environments: An Illuminating Engineering Society of North America Recommended Practice. IESNA RP-33-99. 1999.

**Description:** A comprehensive resource addressing the basics of outdoor lighting, including: terminology; approaches for appropriate community lighting designs and standards; selection of light sources and ballasts; luminaire classification; energy conservation and maintenance issues; structure lighting; roadway/street lighting; walkway/bikeway lighting; pedestrian mall/park lighting; parking lot lighting; and other applicable subjects.

International Dark Sky Association. The Problem with Light Pollution. 1996. Last access: September 8, 2006. <http://www.darksky.org/resources/information-sheets/is001.html>

**Description:** Short position paper regarding the problems associated with light pollution.

The Institution of Lighting Engineers. Guidance Notes for the Reduction of Obtrusive Lights. 2005. Last access: Sept 11, 2006. [http://ile.org.uk/uploads/File/02\\_lightreduction.pdf](http://ile.org.uk/uploads/File/02_lightreduction.pdf)

**Description:** Comprehensive overview of the issues pertaining to light pollution and light pollution mitigation.

Rensselaer Polytechnic Institute. Lighting Answers. 2004. Last access: September 11, 2006. <http://www.lrc.rpi.edu/programs/NLPIP/publicationResults.asp?type=2>

**Description:** Twenty-one research papers can be found in the online series "Lighting Answers." Reports cover a wide range of subjects pertaining to lighting.

**Light Pollution from Transportation Facilities: Implementing IESNA (Illuminating Engineering Society of North America) Recommendations**

Lighting for the outdoor environment is different than lighting an interior space. Nuances of electric lights such as glare, luminance (quantity of light), localized needs (i.e. security vs. historic lighting), and a person’s visual acuity all play a significant role in the appropriate outdoor light selection. The IESNA puts forth general recommendations that should be seriously evaluated in order to minimize the negative impacts caused by excessive outdoor lighting and light pollution.

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
Light Pollution: Implement IESNA Recommendations	<b>Cutoff considerations</b> describe the basic way to eliminate light pollution. “Cutoff” describes the manner in which lights are mounted, the intensity and distribution of light emitted, and the degree to which light is allowed to escape into the atmosphere. The primary cutoff goals should be to address glare, light pollution into the nighttime sky, and light trespass onto neighboring properties or areas.	<ul style="list-style-type: none"> <li>• Reduction or elimination of light pollution or light trespass on neighboring properties</li> <li>• Best practices in outdoor lighting can greatly improve aesthetics of local districts and neighborhoods</li> <li>• Cost savings through increased energy efficiency can be achieved</li> </ul>	<ul style="list-style-type: none"> <li>• Costs associated with equipment are likely to be high</li> <li>• Professional consultation is highly recommended and can also inflate costs</li> </ul>
	<b>Implement community responsive design</b> , which involves a thorough review of community lighting goals, lighting themes, and a variety of options in lighting types. The ultimate goal of community responsive design is to facilitate better site planning design or to establish guidelines that clearly explain community themes, goals, and establishing a family of luminaries for different districts. Good site planning design strives to eliminate glare on roadways, reduce lighting spillover onto adjacent properties, etc. Design guidelines discuss existing conditions, efficient technologies, appropriate pole heights and spacing, current attempts to minimize light pollution, and maintenance and component life considerations.	<ul style="list-style-type: none"> <li>• Consistent approach to outdoor lighting can be established</li> <li>• Once guidelines are established, they can provide a clear framework for contractors</li> <li>• Proper implementation can increase the quality of life of residents and the overall aesthetic appearance of the community</li> <li>• Energy efficiency can be a stated goal or outcome of designs</li> </ul>	<ul style="list-style-type: none"> <li>• Requires professional consultation, which inflates costs</li> <li>• Requires community consensus</li> <li>• Conflicting goals are likely to arise</li> <li>• Difficult to enforce without legal authority, which would generally involve passing a land use ordinance</li> </ul>
	<b>Land use ordinances</b> can be drafted in order to put community guidelines into	<ul style="list-style-type: none"> <li>• Provides the legal authority to</li> </ul>	<ul style="list-style-type: none"> <li>• Local lighting laws tend to</li> </ul>

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Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		<i>Benefits</i>	<i>Impacts</i>
	law; these can work in conjunction with existing land use ordinances and zoning districts.	<p>enforce community lighting goals</p> <ul style="list-style-type: none"> <li>• Can provide a clear framework so that developers and planning boards will consider the ramifications of lighting choices more carefully</li> <li>• Well conceived ordinances can greatly improve aesthetics of districts and neighborhoods</li> <li>• Cost savings through energy efficiency can be achieved</li> </ul>	<p>be more complicated than local zoning codes and therefore require professional consultation</p> <ul style="list-style-type: none"> <li>• Room for misinterpretation or misapplication</li> <li>• Require added resources for their proper drafting, implementation and enforcement</li> <li>• Inappropriate application of ordinances can create unforeseen and negative results</li> <li>• Costs associated with mandated equipment are likely to be high</li> </ul>

## Issue 7: Thermal pollution/Urban Heat Island Effect

### Issue Description

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In this context, thermal pollution refers to the raising of localized temperatures and alteration of micro-climates in urban areas. Often referred to as the “urban heat island effect,” evening temperatures are often found to be higher in urban areas primarily due to the large percentage of land covered by paved surfaces, black asphalt in particular. These surfaces are effective at absorbing heat during the day and retaining it during evenings, creating temperatures slightly higher than would be found in the absence of paved surfaces. Furthermore, vegetated areas are more effective at reflecting or absorbing heat during the day and transferring it during the evening hours.

A USEPA fact sheet on the subject states:

In general, summertime heat islands raise air conditioning demand, air pollution levels (particularly smog), and greenhouse gas emissions. They also increase the incidence of heat-related illness and mortality...Heat islands augment this public health threat by directly increasing temperature and indirectly raising ground-level ozone concentrations.<sup>4</sup>

Alternatives to traditional patterns of sprawling development, which depend on large road networks and other impervious surface facilities, can help to mitigate the urban heat island phenomenon. Retrofitting existing facilities can also mitigate the negative effects while simultaneously improving overall aesthetics.

### Federal and State Mandates

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(No known Federal or state mandates apply)

### Partners for Consultation

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#### ***Federal Entities:***

U.S. Department of Energy  
Environmental Energy Technologies Division, Heat Island Group  
U.S. Environmental Protection Agency (EPA)

**[www.energy.gov](http://www.energy.gov)  
[eetd.lbl.gov/HeatIsland](http://eetd.lbl.gov/HeatIsland)  
[www.epa.gov](http://www.epa.gov)**

#### ***State Entities:***

*(No state entities were identified)*

#### ***Independent Organizations:***

Cool Communities  
Smart Growth Network

**[www.coolcommunities.org](http://www.coolcommunities.org)  
[www.smartgrowth.org](http://www.smartgrowth.org)**

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<sup>4</sup> EPA. [Smart Growth and Urban Heat Islands](http://www.epa.gov/heatislands/resources/pdf/smartgrowthheatislands.pdf).

<http://www.epa.gov/heatislands/resources/pdf/smartgrowthheatislands.pdf>

Inventories and Resources

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***Publications:***

EPA. The Heat Island Mitigation Strategies Guidebook. Currently unavailable: anticipated release date in 2007. [http://www.epa.gov/heatislands/resources/publications/miti\\_strat\\_guidebook.html](http://www.epa.gov/heatislands/resources/publications/miti_strat_guidebook.html)

**Description:** Guidebook will include: benefits from reducing summertime urban temperatures; background on four mitigation strategies: (1) trees and vegetation, (2) green roofs, (3) cool roofs, and (4) alternative pavement technologies; emerging opportunities to collaborate with urban planning, energy; environment programs that have related goals; and additional technical resources.

EPA. Smart Growth and Urban Heat Islands. . EPA 430-F-03-001.

<http://www.epa.gov/heatislands/resources/pdf/smartgrowthheatislands.pdf>

**Description:** Two page fact sheet on the subject.

***Useful Websites:***

U.S. Environmental Protection Agency (EPA). Heat Island Webpage. Last accessed February 20, 2007. <http://www.epa.gov/heatislands/>

**Description:** General information pertaining to the urban heat island effect, including an array of useful resources.

**Thermal Pollution (Urban Heat Island Effect) Resulting from Transportation Facilities: Guidelines for New Facilities and Retrofitting Old Facilities**

Common paving materials such as asphalt blacktop absorb heat during the daytime hours and release it during the evening, raising overall ambient temperatures. Retrofitting facilities with alternative materials can mitigate this effect

Environmental Mitigation Measure	Mitigation Activity	Mitigation Activity Considerations	
		Benefits	Impacts
Thermal Pollution: Retrofitting Facilities	<p><b>Elimination or reduction of impervious surfaces</b>, which absorb heat;</p> <p><b>Proliferation of urban forests and green spaces</b>, which constitute large green areas (made up primarily of mature tree stands) that shade road surfaces from the sun and cool surrounding areas through evapotranspiration;</p> <p><b>Use of concrete or other surfaces that have a light color</b>, which will reflect light as opposed to absorbing it; and</p> <p><b>Use of permeable surfaces</b> or porous paving materials, which allows stormwater to infiltrate the material, having a lasting cooling effect.</p>	<ul style="list-style-type: none"> <li>• Improvements work in concert with best management practices for managing storm water</li> <li>• Improvements tend to be aesthetically-pleasing</li> <li>• Likely to result in a notable improvement in local quality of life</li> </ul>	<ul style="list-style-type: none"> <li>• Solutions are interdependent – no single approach used alone will solve the problem</li> <li>• Costs associated with incorporating new materials and practices can be high</li> <li>• Locating experienced practitioners that specialize in devising comprehensive solutions for implementation can be difficult</li> <li>• Reflective materials (such as concrete) can have the adverse effect of increasing light pollution, as it would reflect the light from fixtures during the evening</li> <li>• Added consultation for retrofitting sites or improving landscaping is likely to be necessary, inflating costs</li> <li>• Costs associated with incorporating new materials and practices can be high</li> </ul>



## **Appendix C**

# **GTC Congestion Management Process Congestion Mitigation Strategies Toolbox**



## **GTC Congestion Management Process Congestion Mitigation Strategies Toolbox**

The GTC Congestion Management Process (CMP) provides a mechanism for measuring the performance of the region's transportation system. When a segment of the transportation system is not performing to the regional standard, actions will be taken to improve that segment's performance within the context of the overall system and available resources. Federal regulations require a CMP to include the identification of alternative congestion management/mitigation techniques for use in the region.

The following is a guide to congestion mitigation strategies that could be applied in this region. The techniques contained herein differ dramatically in size, scope, and purpose; however, they can all be used to potentially mitigate congestion on the region's transportation system. The strategies are categorized as supply-driven and demand-driven; then further broken-down by facility type.

### **Supply-Driven**

#### **1. Urban Freeways – Design**

##### **A. Providing Additional Lanes Without Freeway Widening**

Definition: Options for creating additional capacity on existing infrastructure such as using shoulders during peak hours (left shoulder preferred) or reducing lane widths.

Congestion Mitigation Impacts: Increased traffic capacity; increased accidents

##### **B. Park and Ride Facilities**

Definition: Location for transfer from low-occupancy (e.g., automobile, bicycle) to high-occupancy (e.g., bus, rail) modes. There are three types of park and ride facilities: remote (suburban/satellite location with express service to destination); local (on local bus route, non-express); or peripheral (CBD edge to intercept cars before entering city streets). Must be convenient, safe, and easy-to-use; and can be either exclusive or shared-use.

Congestion Mitigation Impacts: travel time savings; less parking demand at destinations; increased non-SOV mode share; reduced energy consumption and vehicle emissions

##### **C. High Occupancy Vehicle (HOV) Facilities**

Definition: Provide travel lane on highways for buses, carpools, and vanpools. Four options: exclusive in separate right-of-way; exclusive in freeway right-of-way; concurrent flow lane (in peak direction of travel, not physically separated); contraflow lane (in off-peak direction traveling in peak direction, physically separated)

Congestion Mitigation Impacts: Increase people-moving capacity on highways; decrease emissions, decrease travel times, increase transit reliability

## **2. Urban Freeways – Operations**

### **A. Incident Management**

Definition: Involves coordination of three stages: detection/verification; response/clearance; recovery/information. Approximately 80 percent of recorded incidents are vehicle disablements, approximately 10 percent are accidents, remainder includes emergency maintenance work, debris, etc.

Congestion Mitigation Impacts: Reduce the amount of incident-based delay or, non-recurring congestion

### **B. Highway Information Systems**

Definition: Communicate dynamic information regarding existing traffic conditions to travelers en-route on the transportation system. Includes technologies such as variable (dynamic) message signs, highway advisory radio (HAR), and in-vehicle systems.

Congestion Mitigation Impacts: reduce speeds of vehicles nearing queues (fewer secondary accidents); diversion to alternate routes/modes

### **C. Ramp Metering**

Definition: Involves placing a modified traffic signal at end of highway entrance ramp. Controls flow of vehicles off arterials and onto highway. Although delays are often incurred by ramp traffic, mainline capacities are protected and overall operational efficiency is improved.

Congestion Mitigation Impacts: Increases freeway capacity; discourages short freeway trips; increases volume/capacity ratio on highways; decreases accident rate

### **D. Highway Pricing Strategies**

Definition: Levy fee for driving during peak travel times or under congested conditions or surcharge for parking in congested area. Electronic toll collection eases congestion at booths.

Congestion Mitigation Impacts: Diversion, mode switch, destination switch, trip chaining

## **3. Arterials and Local Streets – Design**

### **A. Intersection Improvements**

Definition: Improve intersection operations. Eleven principals: reduce number of conflict points among vehicular movements; control relative speed of vehicles entering or leaving intersection; coordinate type of traffic control devices used with volume of traffic; select proper intersection type to serve traffic volume; high volumes may require separate turn lanes; avoid multiple and compound merging/diverging maneuvers; separate conflict points; favor heaviest and fastest flows to minimize hazard/delay; reduce area of conflict (use channelization); segregate non-homogenous flows; and design for bicycle/pedestrian access

Congestion Mitigation Impacts: Reduced accident rate; improved intersection operations; slower speeds

## B. Arterial Access Management

Definition: Control spacing, location, and design of driveways, medians/median openings, intersections, traffic signals, and freeway interchanges. Specific improvements involved include: physically restricting left turns; restricting curb cuts and direct access driveways; eliminating parking; locating intersections at no less than minimum intervals; constructing frontage roads to collect and funnel local business traffic

Congestion Mitigation Impacts: Reduction in accident rate; improved throughput; less conflict points

## C. Reversible Traffic Lanes

Definition: One or more lanes designated for one direction of travel for part of day and the other direction of travel for another part. Meant to provide an extra lane(s) for use by dominant direction of travel. Should be used if there is evidence of congestion, notably recurring congestion, as well as adequate capacity at access points. Especially effective on bridges and in tunnels.

Congestion Mitigation Impacts: Increase capacity, high efficiency, minimal capital costs

## D. Traffic Calming and Street Space Management

Definition: ITE definition: "...the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users." Focused towards lowering vehicle speeds and reducing traffic volumes, most often using physical/operational changes to streets themselves.

Congestion Mitigation Impacts: Increased transit use; decreased auto use, truck traffic, decreased bicycle/pedestrian conflicts, reduced accident rate

## E. One-Way Streets

Definition: Convert existing streets to one-way pattern. Reduces intersection delays caused by vehicle turning movement and pedestrian conflicts. Can allow lane-width adjustments that increase capacity of existing lanes or provide additional lane for transit, bicycles, etc. Permit improvements in public transit operations such as routings without turnback loops and permit turns from more than one lane at more intersections than possible with two-lane operation. May have negative (real or perceived) impact on businesses.

Congestion Mitigation Impacts: Increased speeds, capacity, less congestion on adjacent streets

## F. Super Street Arterials

Definition: Wide, multi-lane limited access roadways whose major intersections are grade separated.

Congestion Mitigation Impacts: Reduces congestion at major intersections

## 4. Arterials and Local Streets – Operations

### A. Traffic Signal Improvements

Definition: Improve the operation of traffic signals by updating signal equipment and making timing plan improvements. This technique includes interconnected signal systems, traffic signal removal/installation, and improved signal maintenance.

Congestion Mitigation Impacts: Increased throughput, improved intersection operations

### B. Improved Traffic Control Devices

Definition: There are three classes of signs: regulatory, warning, and guide/informational. These signs are meant to reduce the level of driver uncertainty that can lead to congestion and accidents. Markings include lanes, symbols, words, object markers, and delineators.

Congestion Mitigation Impacts: low cost, high benefit; reduced accident rate

### C. Parking Management

Definition: A variety of measures designed to control the availability of, and demand for, parking in a region or sub-region. The various techniques are as follows:

- a. On-Street Parking: increase or decrease the supply; change mix of short/long-term parking; institute parking restrictions (peak/off-peak, alternate, durations, prohibitions); permit programs; preference programs; loading zone regulations
- b. Off-Street Parking: increase or decrease the supply (zoning regulations, slow growth, build new); change mix of short/long-term parking; restricted/preferential parking
- c. Fringe and Corridor Parking: fringe/peripheral parking; park and rides; preferential parking
- d. Pricing: change rates (increase/decrease, free in CBD, differential); merchant shopper discounts (stamps, tokens); employer subsidies
- e. Enforcement and Adjudication: non-police enforcement personnel (ticketing, towing, booting); administrative; judicial
- f. Marketing: advertising (brochures, maps, media); convenience programs
- g. Shared parking: two or more land uses can share same parking spaces thereby devoting less land area to parking; may cause parking shortage if land uses change

Congestion Mitigation Impacts: Discourage traffic by adjusting the parking supply

### D. Computerized/Interconnected Signal Systems

Definition: Coordinate groups of signals through interconnection or time-based coordinators, systematically optimizing the signal timing parameters of pre-timed signals or the interval settings of traffic actuated signals and include advanced traffic control functions by using master computers.

Congestion Mitigation Impacts: Increased throughput, improved intersection operations

#### E. Arterial Surveillance and Management

Definition: Involves incident detection and follow-up action (e.g., service patrols, roving tow vehicles, motorist information system, real-time transit information at stops or via telephone); intersection surveillance and monitoring (e.g., loop detectors, signal systems, video monitoring); parking control/management on arterials with more enforcement.

Congestion Mitigation Impacts: Reduce effects on incident-based delay

#### F. Enforcement

Definition: To be successful, strict enforcement of these actions is needed. Includes education and outreach efforts needed to inform the public of changes to be made and their expected benefits. More enforcement officials are needed in beginning to reinforce need for behavioral changes. Law enforcement agencies should be included in the planning process.

Actions should be designed to provide for self-enforcement when possible; fines should be reasonable so as to not invoke a backlash. There could be substantial expenses involved in strict enforcement, however the benefits are typically substantial.

Congestion Mitigation Impacts: enforces mitigation actions taken, ensures impacts are felt

#### G. Turn Prohibitions

Definition: Discourage/prohibit undesirable traffic movements while facilitating high priority movements and desired traffic control schemes. Prohibitions can be all-day or peak-hour. Desirable vehicular paths should be clearly defined, safe speeds encouraged, and conflict points separated. There is concern over the real or perceived impacts on local businesses.

Congestion Mitigation Impacts: Reduction in accidents; increased intersection efficiency, throughput; decreased delay

#### H. Bicycle and Pedestrian Networks

Definition: Encourage non-motorized travel by providing continuous, connected sidewalks for pedestrians and clear, visible lanes for bicyclists. Bicycle racks/storage should be made available at transfer stations. Facilitate movement through improved bicycle/pedestrian signage. Origins and destinations should be linked with both on-street and off-street routes.

Congestion Mitigation Impacts: decreased emissions; increased non-SOV mode share

#### I. Freight Movement Management

Definition: Changes in delivery schedules, terminal location, and delivery zones could help minimize unnecessary congestion that occurs due to mixing of different vehicle types. Could involve: traffic management; improvements at shipping/receiving points; reducing operational/physical constraints; changes in business operating practices or public policy; and investment in rail. An off-peak hour system for urban goods movement is recommended.

Congestion Mitigation Impacts: effective strategy to reduce overall congestion, and improve goods movement through region

## J. HOV Facilities on Arterials

Definition: Provide an exclusive lane for high-occupancy vehicles (buses, vanpools, or carpools) on arterials. Two methods: concurrent flow lane along curb lanes using an existing lane, parking lane, or narrowing to achieve new lane; contraflow lane - one-way streets or two-way on opposite side of median or reversible center lane.

Congestion Mitigation Impacts: decreased single occupant vehicle use, increased transit use; less energy consumption/emissions; increased capacity

## 5. Public Transportation Services

Improved transit service in conjunction with other strategies such as parking management, congestion pricing and development strategies can increase vehicle occupancy and decrease congestion. There are three basic types of transit: rail/fixed guideway (including busways), bus, and paratransit.

### A. System/Service Operational Improvements – Fixed Route and Express Buses

Definition: Increase productivity and cost-effectiveness of transit lines/services. Fixed-route buses provide service on a regularly scheduled basis along a specific route with buses picking up and discharging passengers at specified locations. Express buses operate without stops or a limited number of stops and are geared towards commuters in outlying suburbs.

There are a number of operational strategies and route planning devices to improve the transit service. For instance, flexibly-routed smaller buses servicing suburban commercial and office complexes can be implemented at the area or network level (e.g., route extensions, timed transfers, network realignment, feeders into line-haul services). Can focus on route structure and reliability (e.g., point/route deviation, zonal service, route replacement/consolidation, changes in route departures, use of automatic vehicle locator (AVL) devices), or can provide improved passenger services (e.g., bus shelters, passenger information, trailblazing to stations, marketing, or consolidated fares/passes).

This is most flexible form of transit since it can be re-routed, deviated, and/or rescheduled quickly. Off-peak ridership is more sensitive to changes in service. Ridership often responds more favorably to more frequent service than decreased travel time. Important to keep transfers to a minimum, increasing transfers will lead to decreasing ridership.

Congestion Mitigation Impacts: increased transit ridership; the percentage increase or decrease in ridership is less than the corresponding increase or decrease in service changes.

### B. Fare Structures

Definition: Differentiation in fare structure can be used to enhance mobility options for target markets or to provide added incentive in specific geographic areas. One method is to differentiate by traveler type:

Demographic/socioeconomic aspects (e.g., age, income)

- a. Affiliation (e.g., employee, student)
- b. Mobility-impaired
- c. Frequency of use
- d. Payment method

- e. Time commitment of purchase (e.g., one-time, annual)

Another method is to differentiate by trip type:

- a. Specific origin/destination points
- b. Transit trip length or duration
- c. Quality of service (e.g., speed, crowding) by line or corridor
- d. Quality or price of competing service (e.g., congestion, tolls)
- e. Timing of trip
- f. Routing of trip
- g. Direction of trip
- h. Use of complementary modes
- i. Size of travel party

There are other reasons for differentiated fare structures, such as:

- a. Market building fare reductions
- b. Sales commissions for fare media distribution channels
- c. Joint promotion with other businesses or uses for payment media
- d. Two-part fare structures (e.g., time-based subscription with a use-based charge)

Fare elasticity is an important consideration. This is the ratio of percent change in transit ridership over percent change in fare. For every 1% increase/decrease in fares, ridership will increase/decrease 0.2-0.4%. Although the transit industry is increasingly embracing market-based pricing, there is concern about the equity implications of charging one individual more than another for same trip.

Congestion Mitigation Impacts: Increase transit ridership

### C. System/Service Expansion: Rail/Fixed Guideway Transit Facilities

Definition: This form of service expansion can move large numbers of persons quickly, efficiently and reliably. There are five different options presented for this strategy:

- a. Automated Guideways/Peplemovers: Circulation systems relying on automated guideway technology to provide direct service to stations. Suited for use in high-density urban sites, often as connections to high-capacity, high-speed services.
- b. Light Rail: Medium capacity (<20,000 persons/hour) service operating on either grade-separated or reserved right-of-way, mixed traffic (streetcars), or a combination. Passenger platforms can either be low or high-level. Operation is usually manual and can occur either individually or in trains and can couple/uncouple easily. Suited for service to non-residential concentrations of 35-50 million square feet and residential areas with 9 units/acre. Light rail is much less expensive than heavy rail due to its' flexibility, but has less carrying capacity.
- c. Commuter Rail: Operates between urban centers and suburbs, often using mainlines with high-speed locomotives or self-propelled cars in trains. Best suited for service in areas with more than 100 million square feet of non-residential development. Can come on-line easier and faster than other forms. Although it

may be the cheapest rail service to build, commuter rail incurs heavy operating costs. Commuter rail conflicts with freight rail and is not convenient for handling reverse commutes or mid-day/off-peak commutes.

- d. Heavy Rail: High speed (~80 mph), high capacity (>20,000 persons/hour); exclusive right-of-way with multiple car trains, sophisticated signaling, platform loading at stations; third rail power supply and high degree of automation. Best suited for high-density areas (>12 units/acre) and high level of non-residential development (>50 million square feet). This is the most expensive transit option.

Congestion Mitigation Impacts: Direct impact on congestion is number of drivers diverted to service. Relies on package of incentives/disincentives ranging from tax breaks, zoning variances, public land purchases, and parking management.

#### D. Joint Development

Definition: Includes actions meant to share costs and/or revenue associated with transit stops/stations. Such actions are typically taken in conjunction with a rail transit station.

Numerous options for joint development are available. Revenue-sharing actions include:

- a. Leases: transit agency leases parcels, development rights, or unimproved space to developers or commercial tenants
- b. Facility Connection Fees: fee to connect a project to a transit station
- c. Land Sales
- d. Benefit Assessment Districts: special districts around transit stations where landowners pay on a pro-rated basis to help finance the public facility
- e. Tax Increment Financing (TIF): the property tax base in a special district is frozen and all gains above that point are earmarked for financing a transit facility
- f. Transit Impact Fee: developers are required to make one-time contribution to account earmarked for funding transit facilities needed to accommodate growth
- g. Negotiated Payments: negotiate with landowners to pay for transit investment

Cost-sharing actions include:

- a. Voluntary Agreements: transit agencies and developers agree to reduce each others' costs through coordination
- b. Incentive-Based Agreements: public authorities grant developers a bonus in exchange for partial or full-funding of on-site public infrastructure
- c. Mandatory Programs: developers are required to finance certain actions as a precondition to receiving a building permit

Congestion Mitigation Impacts: Reduce number of trips

#### E. System/Service Operational Improvements – Paratransit Services

Definition: Differs from standard ADA-related paratransit service. In this context, paratransit services include carpools, vanpools, subscription buses, shared-ride taxis, and route deviation services. Best suited for serving highly dispersed travel in low-density areas.

Private/contracted delivery of non-traditional services is cheaper and generally more cost-effective than public delivery. Biggest barriers to successful provision of paratransit service are restrictive regulations, subsidized bus fares, and prevalence of free parking.

Congestion Mitigation Impacts: increased transit ridership

#### F. Transit-Oriented Development (TOD) / Livable Communities

Definition: Requires local governments to establish a land use planning policy that promotes transit use. It is imperative that easy and convenient access to transit facilities is provided as well as other services that are supportive of transit. Characterized as dense and mixed use within a 5-10 minute walk of a transit stop. Increases transit use to employment centers; occurs in regions with a vision of a desired settlement pattern; occurs in regions where political culture supports transit; requires high quality transit service; and requires stations with development potential.

Congestion Mitigation Impacts: increase non-SOV trips; trip generation more evenly distributed through day and week; decrease VMT

### **Demand-Driven – Transportation Demand Management (TDM)**

TDM is any action or set of actions aimed at influencing people's travel behavior in such a way that alternative mobility options are presented and/or congestion is reduced.

#### **1. Site-Specific and Area-Wide Strategies**

##### A. Alternative Modes of Transport

Definition: Encourage commuters to use modes of transportation other than the single-occupant vehicle. Ridesharing (i.e., carpool or vanpool) is one option. Ridesharing programs can be either company-sponsored, third party, or owner-operated and can be provided at four levels:

- a. regional
- b. sub-regional by government
- c. sub-regional by private employers
- d. residential

Another option is non-motorized transportation (i.e., bicycling and walking). It is important to provide an environment conducive to bicycling and walking. Bicycle lockers and/or racks should be found near destinations.

Congestion Mitigation Impacts: Decrease VMT, trips, emissions, costs, less congestion, parking demand

##### B. Alternative Hours to Travel

Definition: This strategy takes into consideration the times that the majority of commuters take to the roads to get to work. Changing those times can dramatically affect the numbers of drivers on the roads during traditional peak hours. One option here is the staggered work hour concept where groups are assigned different times to begin work. This allows workers to travel at times when traffic moves more freely and transit is less crowded.

Another choice is flextime, which allows employees to choose their own schedules within company-set guidelines. A third option is the compressed workweek, which consists of a four-day workweek in 10-hour days. This has a double impact since there is one day of

commuting eliminated and the early arrivals and late departures mean workers are traveling in the off-peak.

Congestion Mitigation Impacts: less peak hour traffic, less transit crowding, less parking pressures, decreased VMT (compressed work week)

#### C. Negotiated Demand Management Agreements

Definition: Government-mandated private sector involvement in traffic mitigation as a condition of individual development approval. In this, a municipality would set a traffic reduction goal (e.g., minimum level of ridesharing, specific number of auto trips) that can vary in degree of prescription concerning implementation. These are similar to trip reduction ordinances except negotiated demand management agreements are focused on a particular site and so do not provide area-wide consistency in trip reduction.

Congestion Mitigation Impacts: Ridesharing, transit trips increase; auto trip-making shifts to non-peak

#### D. Complementary Support Measures

Definition: TDM program effectiveness is directly related to the degree to which complementary measures are used to encourage the use of TDM actions. Such complementary support measures could include financial incentives. Defined as any action which adds or reduces the perceived cost of a particular mode will greatly influence the likelihood of it being chosen, financial incentives include:

- a. Transportation allowances
- b. Bicycle/pedestrian subsidies
- c. Carpool/vanpool subsidies
- d. Transit/transit pass subsidies
- e. Additional time off with pay

There are also assistance programs that can accomplish similar goals, such as:

- a. Commuter information centers/information booths/fairs
- b. New hire orientations
- c. Marketing
- d. Rideshare match
- e. Company-owned/leased vanpool
- f. Parking management

As mentioned previously, flexible work schedules (e.g., flextime, telecommuting, compressed workweek) will help further TDM as will rewards programs such as newsletter recognition or prize drawings and other things such as childcare centers, auto service, and assorted on-site services.

Congestion Mitigation Impacts: Unknown

#### E. Alternative Workplace Locations

Definition: Also known as telecommuting, this strategy would replace the traditional workplace with an alternative site. Telecommuting can occur either at home, at regional

worksites, or at a neighborhood telecommuting center. Implementation of such a program requires the support of top management and the human resources department.

Congestion Mitigation Impacts: Decrease trips, VMT, emissions/cold starts

#### F. Advanced Traveler Information Systems (ATIS)

Definition: These systems provide new ways to distribute expanded information to travelers for both pre-trip and en-route elements of trip making. ATIS provides multi-modal information for all system services so that travelers can make informed decisions on mode and route choice, or even whether the trip should be made.

Congestion Mitigation Impacts: Reduced travel time, increased network efficiencies

#### G. Growth Management

Definition: Growth management is the use of public policy to regulate the location, geographic pattern, density, quality, and rate of growth of development. Growth is to be limited to a level consistent with the existing capacity of infrastructure and level of service desired.

Congestion Mitigation Impacts: efficient service provision, infrastructure cost savings

#### H. Urban Design

Definition: Strategies that can enhance personal mobility include creating greater development densities, promoting mixed-use, pedestrian and transit-friendly site designs. Similar to transit-oriented development (TOD), this type of development would have much greater numbers of transit trips and bicycle/pedestrian trips than a typical auto-oriented development. Such a strategy requires modification of design guidelines. Standards should be established for transit stops, street configuration (connectivity), pedestrian connections, commercial configuration (clustering), building entries, building setbacks, mixed housing, parks, parking configuration, etc.

Congestion Mitigation Impacts: Decreased emissions, more transit trips, more non-motorized mode trips

#### I. Parking Management

Definition: Ninety five percent of all auto trips receive free parking, thus a parking management program must be implemented area-wide for it to be effective. There are two ways to view parking management; pricing and supply management. In the pricing side of parking management, there are a number of strategies available:

- a. Impose or increase fees or surcharges for single occupant vehicles or long-term parkers at public facilities
- b. Carpool/vanpool price preference
- c. Tax on parking providers
- d. Impose parking pricing mechanisms through regional regulations
- e. Tie investment in road improvements to implementation of parking management actions
- f. Remove or reduce employer-provided parking subsidies
- g. Reverse "early bird" incentives that encourage long-term commuter parking

- h. Provide preferential pricing to HOV users
- i. Develop parking regulations and pricing that reflects the true cost of providing parking

On the supply management side, there are a few strategies available as well:

- a. Parking regulations in zoning code
- b. Use of on-street controls
- c. Control amount of publicly-provided parking spaces

Congestion Mitigation Impacts: mode switch, change trip patterns

#### J. Trip Reduction Ordinances

Definition: Use the community's regulatory authority to limit trip generation from a development site. These ordinances can potentially achieve more significant trip reductions because they usually cover an entire local political subdivision rather than just an individual project. These spread the burden more equitably between existing and future development.

Congestion Mitigation Impacts: Ridesharing, transit trips increase; auto trip-making shifts to non-peak

#### K. Congestion Pricing

Definition: Charge a premium to motorists who wish to drive during peak periods or on congested facilities using tolls, entrance fees, parking charges, etc. Drivers can react to congestion pricing by either accepting it, adopting another mode, going another route, including more passengers to share the cost, or foregoing the trip. Six types of congestion pricing exist around the world:

- a. parking surcharges in congested areas
- b. point pricing at a specific location
- c. cordon pricing (vehicles are charged upon crossing a boundary)
- d. zone pricing (vehicles in a particular zone are charged a fee)
- e. pricing based on distance traveled in congested areas
- f. pricing based on time spent on congested facilities

Congestion Mitigation Impacts: mode shift, air quality

#### L. Auto-Restricted Zones

Definition: Commonly referred to as pedestrian or transit malls, these are any areas where vehicular travel is prohibited or restricted in some manner. This can be achieved through either physical barriers to auto access; parking controls; exclusive use lanes; or turn prohibitions. Three reasons to create an auto-restricted zone are to: preserve and enhance the vitality of urban centers; improve the environmental quality of urban centers; and encourage the use of non-auto modes.

Congestion Mitigation Impacts: reduce pedestrian delay and/or pedestrian congestion; increase transit usage