2010 NYMTC
2035 Regional Transportation Plan

A Shared Vision for a Shared Future

New York Metropolitan Transportation Council

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Disclaimer

This plan was funded in part through funds from the Federal Highway Administration, the Federal Transit Administration and the U.S. Department of Transportation. The views expressed in this document are those of the New York Metropolitan Transportation Council and do not necessarily state or reflect the those of the U. S. Department of Transportation.

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Joel P. Ettinger
Executive Director

NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

COUNCIL RESOLUTION #2009-3 - COUNCIL ADOPTION OF THE 2010-2035 REGIONAL TRANSPORTATION PLAN AND RELATED PRODUCT

WHEREAS, the New York Metropolitan Transportation Council (NYMTC) is a regional council of governments which is the metropolitan planning organization for New York City, Long Island and the lower Hudson Valley; and

WHEREAS, pursuant to 23 CFR 450.322, NYMTC is responsible for the development of a Regional Transportation Plan (Plan) for the downstate New York region; and

WHEREAS, NYMTC's current 2005-2030 Plan was adopted by the Council on August 4, 2005, having addressed all federal planning requirements set forth in 23 CFR 450.322, and per Federal regulations, expires on September 30, 2009; and

WHEREAS, NYMTC has prepared a 2010-2035 Plan to address the federal planning requirements set forth in 23 CFR 450.322, and

WHEREAS, in conjunction with the 2010-2035 Plan, NYMTC has also prepared a Environmental Justice Assessment of the Planning Process; and

WHEREAS, drafts of these products have undergone public review per Federal regulations and NYMTC's *Compendium of Operations;* and

WHEREAS, NYMTC's Program, Finance, and Administration Committee, at its September 17, 2009 meeting, recommended that the 2010-2035 Plan be adopted by the Council.

NOW, THEREFORE BE IT RESOLVED, that the New York Metropolitan Transportation Council adopts the 2010-2035 Regional Transportation Plan and Environmental Justice Assessment of the planning process.

This resolution shall take effect on the twenty-fourth day of September, two thousand and nine.

ADOPTED: September 24, 2009

"I hereby certify that the above is a true copy of Council Resolution #2009-3, Council Adoption of the 2010 - 2035 Regional Transportation Plan and Related Product, and was motioned by Janet Sadik-Khan, Commissioner of the New York City Department of Transportation, and seconded by Amanda Burden, Director of the New York City Department of City Planning. This Resolution was adopted and passed unanimously."

Robert Zerrilla, Council Secretary

Chapter 1

A Shared Vision

The Regional Transportation Plan (the Plan) is an integral part of the transportation planning process in the ten-county New York Metropolitan Transportation Council (NYMTC) region. The Plan is a product of extensive coordination and collaboration among member agencies, NYMTC's partners in the public and private sectors, the general public, and other stakeholders. It lays out the region's transportation needs and desires over the years 2010 to 2035. The Plan covers major aspects of transportation from a regional perspective, including highways, streets, public transit, ridesharing and demand management, bicycles, pedestrian facilities, goods movement and special needs transportation.

The strategic transportation investments proposed in this Regional Transportation Plan are tied to a Shared Vision for sustainable growth in the NYMTC region. As shown in the figure on the next page, this vision forms the foundation of the Plan and the regional planning process, and is defined in the context of key trends and overarching issues affecting the region.

The Shared Vision in turn rests on the Shared Goals defined by NYMTC's Principal members, which focus on ten Regional Desired Growth Areas, and defines a variety of strategic transportation investments for the region. These proposed investments will support a growing and dynamic region over the next two to three decades: a region in which growth is made more sustainable through regional planning and through the operation, maintenance and strategic improvement of its extensive transportation system. A set of strategic regional policy guidelines directs how the region grows and how investments are made, and these policies help the region achieve its desired outcomes.

CHAPTER 1
A Shared Vision

i. NYMTC Overview

Every urban area in the United States of more than 50,000 residents must have a designated Metropolitan Planning Organization (MPO) in order to qualify for Federal transportation funding. Created in 1982, NYMTC is a regional council of governments which is the designated MPO for the lower Hudson Valley, Long Island and New York City.

NYMTC studies potential transportation improvements, forecasts future conditions and needs, and pools the planning resources and expertise of its member agencies to facilitate the development of a shared strategic vision for transportation and development in the region. In doing so, NYMTC fulfills Federal planning requirements and maintains the eligibility of its region for Federal funding for transportation planning and improvements.

NYMTC's Mission

- *To serve as the collaborative forum to address transportation-related issues from a regional perspective;*
- *To facilitate informed decision-making within the Council by providing sound technical analyses;*
- *To ensure the region is positioned to capture the maximum federal funds available to achieve the goals of the Regional Transportation Plan, the Transportation Improvement Program, and the Unified Planning Work Program; and*
- *To focus the collective planning activities of all Council members to achieve a shared regional vision.*

NYMTC's Members

NYMTC's nine voting members, also known as the NYMTC Principals, are:

- *The County Executives of Nassau, Putnam, Rockland, Suffolk, and Westchester Counties;*
- *The Chief Executive Officer of the Metropolitan Transportation Authority (MTA);*
- *The Director of the New York City Department of City Planning (NYCDCP);*
- *The Commissioner of the New York City Department of Transportation (NYCDOT); and*
- *The Commissioner of the New York State Department of Transportation (NYSDOT).*

In addition to the nine voting members, NYMTC's seven advisory members include:

- *The Executive Director of the Port Authority of New York & New Jersey;*
- *The Commissioner of the New York State Department of Environmental Conservation;*
- *The Executive Director of New Jersey Transit;*
- *The Executive Director of the North Jersey Transportation Planning Authority;*
- *The Division Administrator of the Federal Highway Administration;*
- *The Regional Administrator of the Federal Transit Administration; and*
- *The Regional Administrator of the US Environmental Protection Agency.*

As shown in Figure 1.1, NYMTC is comprised of:

- The Council itself, made up of the chief elected and appointed officials of the member agencies;
- The Program, Finance and Administration Committee (PFAC), which oversees the day-to-day operations of the organization;
- Three geographical Transportation Coordination Committees (TCCs), which provide sub-regional planning forums, and
- A professional staff, responsible for conducting the daily business of the organization.

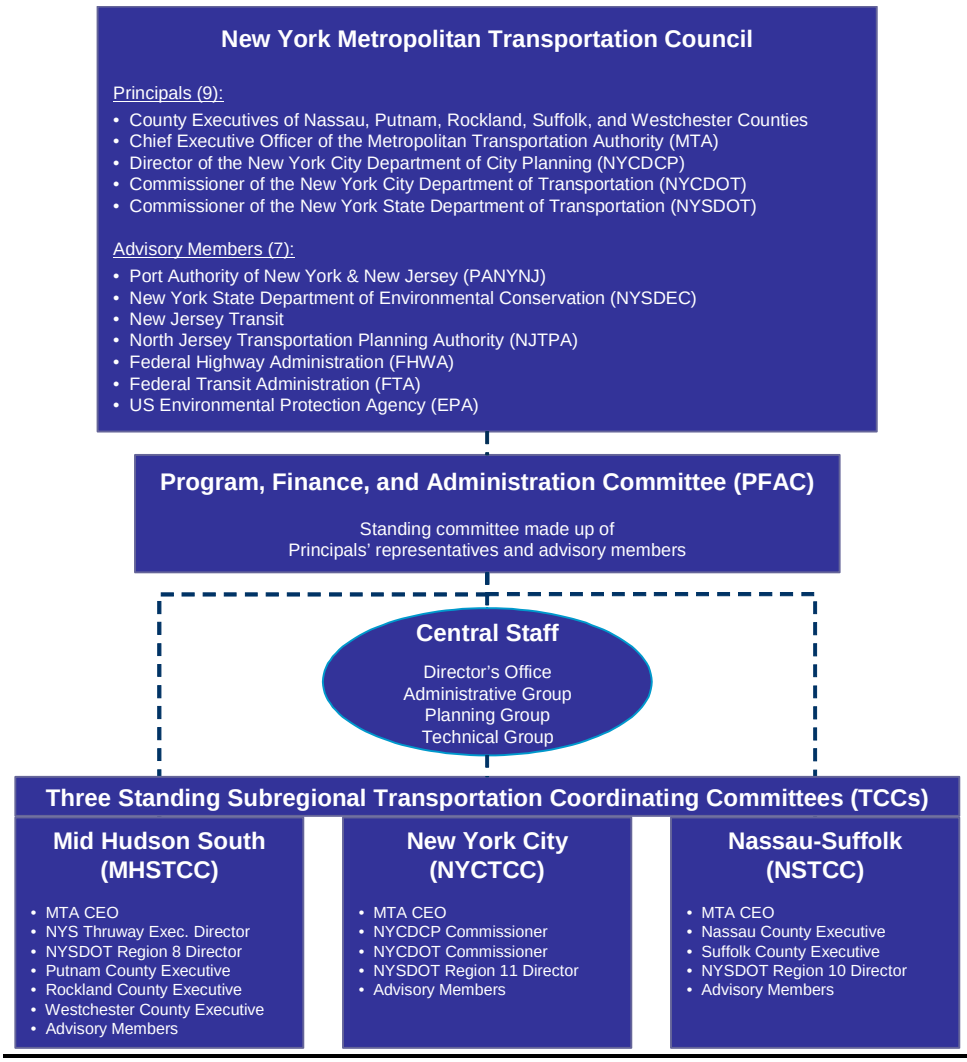


FIGURE 1.1

NYMTC Organizational Structure

Source: NYMTC

The NYMTC Region

The NYMTC region includes the five boroughs of New York City, plus Nassau, Suffolk, Westchester, Putnam, and Rockland counties. As shown in Figure 1.2, the region is often divided into three subregions to summarize demographic data and other information. The region includes an area of 2,440 square miles. The area is estimated to have a population of approximately 12.5 million people, or about 65 percent of the New York State population in 2009.

The NYMTC region has developed around a world-class urban center – New York City. This metropolis is an economic engine for the region as well as for the United States, and features a very significant business agglomeration. In 2007, the NYMTC region was home to 88 Fortune 500 company headquarters.[1] The broader tri-state metropolitan area (including northern New Jersey and southwestern Connecticut) is home to many more. The high concentration of internationally competitive firms in the region, coupled with an entrepreneurial business climate, confers additional economic opportunities that cannot be obtained in isolated locations. Thus, many global companies find incentives to operate in the NYMTC regional market, and in turn their presence spurs further economic activity.

FIGURE 1.2

NYMTC Region and Three Subregions

Source: NYMTC

According to the U.S. Census Bureau, the knowledge-based industry sectors (e.g., finance and insurance; professional, scientific, & technical services; and health care and social assistance) account for about 36 percent of total jobs in the NYMTC region. In terms of aggregate personal income in 2006, these sectors represented roughly 37 percent of the annual income generated in the NYMTC region (approximately $620 billion).[2] In addition to being a hub of the knowledge economy, the NYMTC region is one of the world's leaders in arts and culture. The region exports ideas and innovation as well as products and services.

While the economic sustainability of the region largely depends on the above-mentioned industries, the role played by transportation in facilitating the movement of people and goods, and thus in reinforcing economic development, cannot be underestimated. Despite moving enormous numbers of people each day, the regional transportation network is increasingly congested; the Texas Transportation Institute estimates traffic congestion costs the New York region more than $7 billion per year in delay and revenue losses.[3]

ii. The Metropolitan Planning Process

As required by Federal regulation, the metropolitan planning process facilitates a cooperative, regional framework for multi-modal transportation planning. As part of this process, NYMTC produces three key planning products (see Figure 1.3):

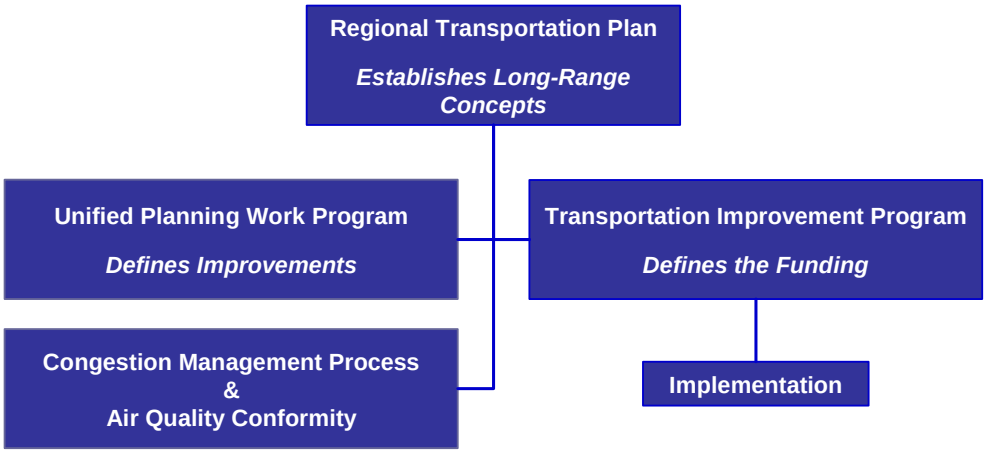
1. The **Regional Transportation Plan (RTP)**, which establishes long-range goals, objectives, and strategies, typically over a 25-year horizon;
2. The **Transportation Improvement Program (TIP)**, which defines funding for specific investments and actions over a five-year horizon; and
3. The **Unified Planning Work Program (the Work Program or UPWP)**, which determines how funding for planning activities will be spent over the course of a program year.

As showing in Figure 1.3, these products interface as the region's transportation planning process.

FIGURE 1.3

How the Planning Process Operates

Source: NYMTC



The Federal Context: Planning Factors

NYMTC is required to prepare the Plan every four years to serve as a blueprint for transportation planning and implementation over at least a 20-year period.[4] The NYMTC Plan is guided by the following "planning factors" spelled out in Federal transportation legislation that governs metropolitan transportation planning[5]:

- ***Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.***

  Chapters 2 and 3 of the Plan discuss overarching economic issues that influence transportation decision making in the region and how economic trends and forecasts are taken into consideration in the investments made by NYMTC's members.

- ***Increase the safety of the transportation system for motorized and non-motorized users.***

  Safety considerations are discussed in the context of the overall management of the transportation system in Chapter 5 of the Plan. Chapter 6 summarizes bicycle- and pedestrian-oriented, freight, and special needs projects and studies that address safety and mobility.

- ***Increase the security of the transportation system for motorized and non-motorized users.***

  Security considerations are discussed in the context of the overall management of the transportation system in Chapter 5 of the Plan. Chapter 6 summarizes bicycle- and pedestrian-oriented, freight, and special needs projects and studies that address safety and mobility.

- ***Increase accessibility and mobility of people and for freight.***

  The entire Plan is concerned with increasing accessibility and mobility for people and freight. Chapters 5 and 6 describe specific actions and investments that are planned throughout the region over the next 25 years to improve regional accessibility and mobility. Chapter 6 discusses investments and actions specifically related to transportation of freight in the NYMTC region.

- ***Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.***

  The shared vision and goals of NYMTC's members, discussed in detail later in this Chapter, reflect a holistic approach to planning that considers the interrelationships between transportation, the economy, the built and natural environment, natural resources, quality of life, and development patterns. In Chapter 3, a discussion of key trends that are expected impact the NYMTC region includes all of these interrelationships.

- ***Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.***

  In Chapter 8, an overview of the region's transportation system highlights the degree to which the system is already highly integrated and connected. However, as reflected in the list of major regional projects and studies that are planned over the next 25 years, NYMTC and its members are committed to continuous improvement in system integration and connectivity.

- ***Promote efficient system management and operation.***

  Chapter 5 on System Operations & Management discusses how NYMTC and its members plan to improve the efficiency of the region's transportation system through coordinated and focused investments.

- ***Emphasize the preservation of the existing transportation system.***

  Achieving a state of good repair is one of the primary objectives of NYMTC and its members over the span of this Plan. Chapter 5 includes a summary of specific investments planned over the next 25 years to help preserve and maintain all components of the system.

Components of the Shared Vision

As mentioned in the Chapter overview, NYMTC's Shared Vision consists of several components:

1. Five **Regional Shared Goals** that lay the foundation for the region's decision-making framework;
2. Ten **Regional Desired Growth Areas** that represent the region's consensus vision for guiding future growth and development;
3. A set of **Strategic Regional Transportation Investments**, including four Foundation improvement projects that are a first step toward improving long-term mobility in the region; and
4. A set of ten **Strategic Regional Policy Guidelines** that together will help NYMTC's member agencies and partners achieve the Regional Shared Goals.

As shown in Figure 1.4, this framework exists in the context of five overarching issues, which will be discussed in detail in Chapter 3:

- **Lifestyle and Workforce Change**
- **Economic Innovation and Technological Change**
- **Globalization and Security**
- **Energy and Climate;** and
- **Transportation Financing.**

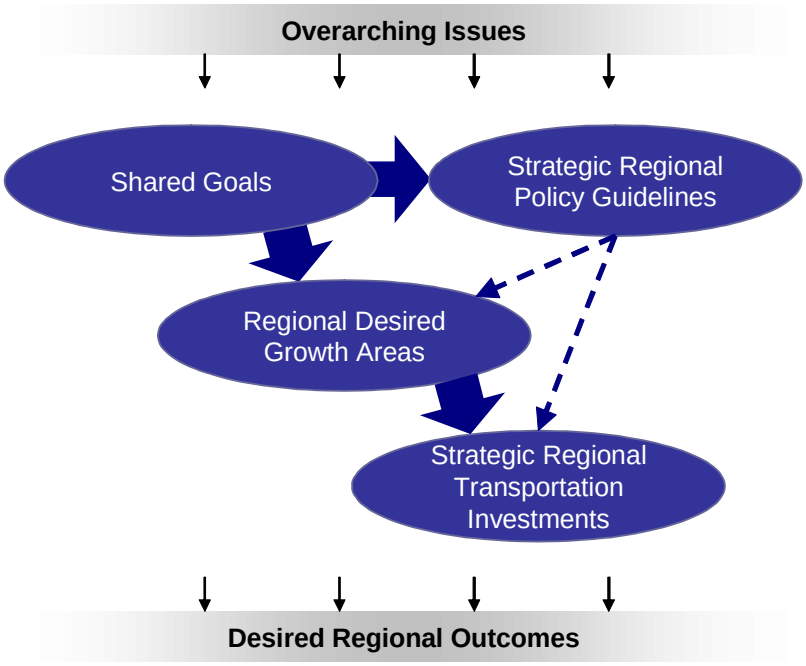


FIGURE 1.4

Components of the Region's Shared Vision

Source: NYMTC

iii. Shared Goals

NYMTC's regional shared goals are the result of a consensus-building process among its Council members: the county executives of Nassau, Putman, Rockland, Suffolk, and Westchester counties; New York City's Transportation Commissioner and Department of City Planning Director; New York State's Transportation Commissioner; and the executive directors of the Metropolitan Transportation Authority and the Port Authority of New York & New Jersey. Each of these goals is further defined in more detail below.

Goal: Enhance the regional environment

RELATED OVERARCHING ISSUES

- ✓ Economic Innovation and Technological Change
- ✓ Globalization and Security
- ✓ Lifestyle and Workforce Change
- ✓ Energy and Climate Change
- Transportation Finance

NYMTC is committed to selecting transportation projects and programs and encouraging land use policies that, in the aggregate, continuously reduce the negative impacts of transportation on the natural environment and human health.

NYMTC will continue to work in a collaborative fashion to achieve these outcomes:

- Improved air quality;
- Reduced greenhouse gas emissions;
- Improved water quality; and
- Preservation of open space, especially wetlands.

Goal: Improve the regional economy

RELATED OVERARCHING ISSUES

- ✓ Economic Innovation and Technological Change
- ✓ Globalization and Security
- ✓ Lifestyle and Workforce Change
- ✓ Energy and Climate Change
- Transportation Finance

NYMTC's members must continue to maintain and develop the regional transportation infrastructure to support the vitality, competitiveness, and sustainable growth of the entire regional economy, which, in turn, generates tax revenues and jobs.

The goal of sustainable economic growth will produce, and be supported by, these outcomes:

- A strengthened position of the region as a global and national gateway;
- Strategic distribution of growth throughout the region; and
- Improved regional mobility for people and goods.

RELATED OVERARCHING ISSUES

- ✓ Economic Innovation and Technological Change
- ✓ Globalization and Security
- ✓ Lifestyle and Workforce Change
- ✓ Energy and Climate Change
- Transportation Finance

Goal: Improve the regional quality of life

NYMTC's members must work together to coordinate regional transportation, land use and zoning so that the negative impacts of individual public and private decisions in any of those arenas are recognized and addressed in the planning process.

By addressing quality of life issues, NYMTC's members hope to achieve the following outcomes:

- Increased intra-regional mobility and accessibility for commuting, recreation and tourism;
- Mitigation of negative impacts of transportation in the design, construction, and operation of the system;
- Increased ability to safely enjoy walking, bicycling and use of public space; and
- Quality communities.

RELATED OVERARCHING ISSUES

- ✓ Economic Innovation and Technological Change
- ✓ Globalization and Security
- ✓ Lifestyle and Workforce Change
- ✓ Energy and Climate Change
- Transportation Finance

Goal: Provide convenient, flexible transportation access within the region.

NYMTC must help to provide mobility and transportation options, so that everyone can participate in society, regardless of income level, location, access to transit, age, or ability. NYMTC's members also must provide for the efficient movement of freight to, from and through the region.

NYMTC hopes to achieve the following outcomes by working towards this goal:

- A sufficient array of transportation choices;
- Expanded connections, particularly between modes and between communities;
- Increased reliability for passenger and freight trips;
- Increased transit ridership, especially on suburban bus routes; and
- Ensured safety.

Goal: Build the case for obtaining resources to implement regional investments

NYMTC's members and its region's other elected officials must think regionally about transportation needs, solutions, strategies, and investment priorities. In developing a shared regional vision, NYMTC's members hope to make the case that these investments are a shared priority and are of strategic importance to this region and to the entire nation.

Therefore, NYMTC will continue to work in a collaborative fashion to achieve these outcomes:

- Coordinated long-term planning;
- A list of prioritized projects supporting the region's shared vision;
- An increase in the use of alternative methods of financing transportation investments to supplement existing Federal and State funding sources;
- Obtain a fair share of Federal funds available for transportation, proportional to its transportation needs and economic share relative to the nation; and
- Elimination of unfunded mandates.

iv. Regional Desired Growth Areas

In addition to the region's Shared Goals, NYMTC's Council members have come to an agreement to promote ten areas where they wish to see some of the region's growth focused. These are places where transportation resources can attract residents and businesses while providing safe, sustainable and cost-effective mobility.

Land use and development, particularly if they are high-density, generate transportation demand that can met by public investment in roadway and transit infrastructure. Likewise, changes to the transportation system often stimulate development activity by creating more capacity or providing access to new land for development. Land use decisions are typically made at the local level, while major transportation decisions are made at the regional level.

Within the NYMTC region, the link between land use and transportation services is not planning theory, but rather an everyday reality. Examples of the bonds between transportation and development permeate the entire NYMTC region, from the Manhattan skyline – supported by a dense transit network – to the scores of village centers built around commuter rail stations. The concept of sustainable development in long-range planning is built on focusing growth and maximizing mobility. The current national emphasis on sustainable development emphasizes the coordination of transportation and land use. This has encouraged planning and investment across the entire NYMTC region to take maximum advantage of its transportation assets in planning for the future.

NYMTC strives to leverage the efforts of major local and regional players to work collaboratively towards complementary, sustainable development. To that end, the regional Desired Growth Areas (see Figure 1.5) represent an attempt by NYMTC's Principals to identify areas that are the region's priority for growth, to be supported by targeted investments in transportation infrastructure and services.

Combined, the ten growth areas could contain up to 90 million square feet of commercial development and 70,000 residential units. As many as 360,000 new jobs could be accommodated in these growth areas, nearly one-quarter of the total job growth forecasted by 2035 in the NYMTC region. As many as 210,000 residents could also live in these ten areas, just under 10 percent of the forecasted population growth through 2035.[6]

The remainder of the forecasted employment and population growth will occur either in other smaller scale preferred growth areas identified by NYMTC member jurisdictions as having sub-regional significance, or it will occur as "background" growth in other parts of the region. Other growth guidelines, or preferred development areas outside the desired growth areas, are discussed in the next section.

Regional Desired Growth Areas

Lower Hudson Valley:

- **Interstate 287 Corridor**
  Westchester County
- **Interstate 287 Corridor**
  Rockland County
- **Brewster Village**
  Putnam County

New York City:

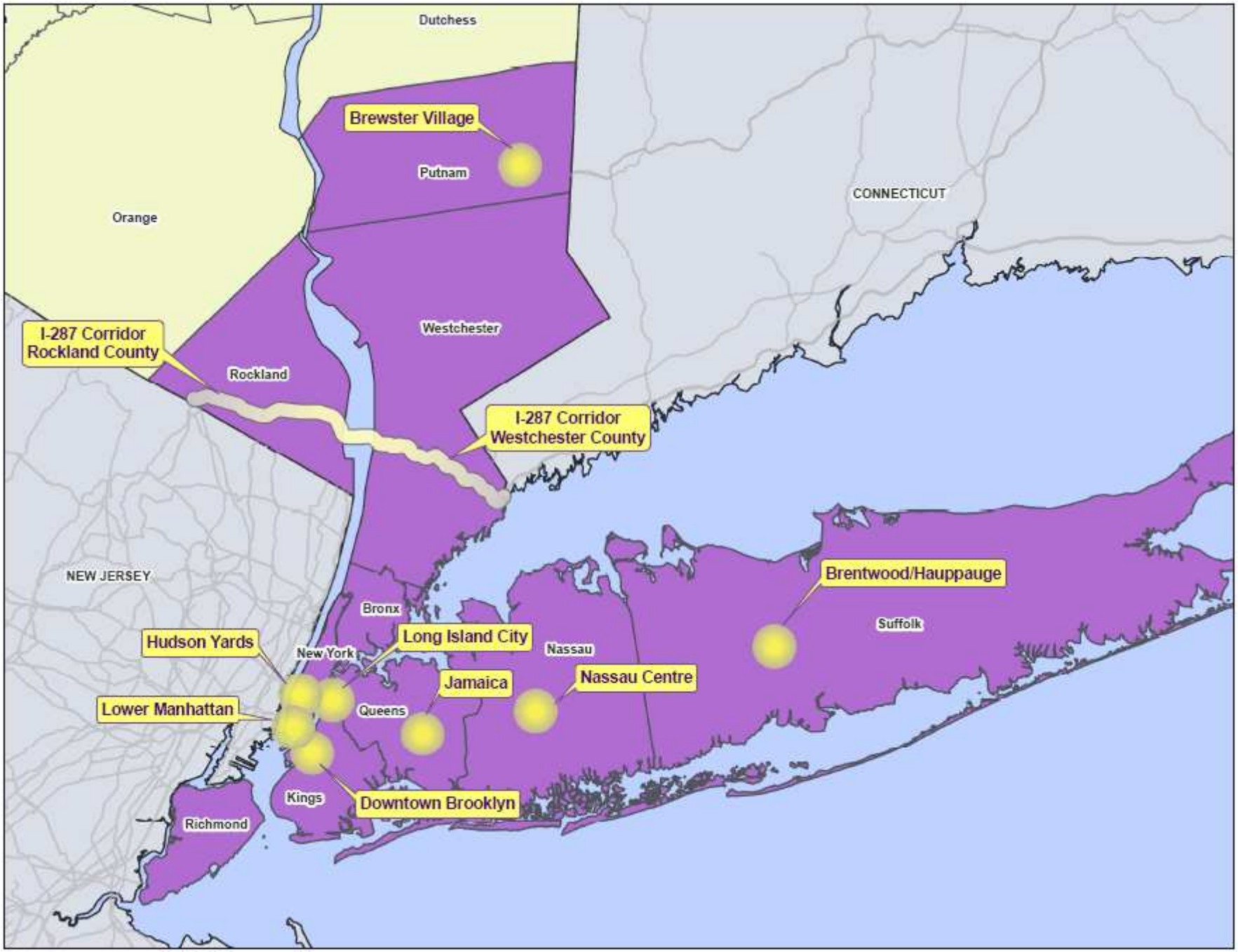
- **Hudson Yards**
- **Lower Manhattan**
- **Downtown Brooklyn**
- **Long Island City**
- **Jamaica**

Long Island:

- **Nassau Hub**
  Nassau County
- **Hauppauge/Brentwood, including the Sagtikos Regional Development Zone**
  Suffolk County

FIGURE 1.5 (facing page)
Desired Growth Areas in the NYMTC Region

Source: NYMTC


Dutchess
Brewster Village
Putnam
CONNECTICUT
Orange
Westchester
I-287 Corridor
Rockland County
Rockland
I-287 Corridor
Westchester County
NEW JERSEY
Bronx
Brentwood/Hauppauge
Suffolk
Hudson Yards
Long Island City
New York
Nassau
Jamaica
Nassau Centre
Lower Manhattan
Queens
Kings
Downtown Brooklyn
Richmond

Other Growth Guidelines

As mentioned previously, most of the regions' growth will occur outside of the regional Desired Growth Areas defined by the NYMTC Council members and will be governed by the development plans of each individual jurisdiction in NYMTC's planning area. This section presents a summary of the individual development plans of NYMTC's members that will impact this growth.

Nassau County, through its Comprehensive Plan, has identified 14 areas as "Targeted Growth Areas," as shown in Figure 1.6. These are areas with potential for downtown revitalization and brownfield redevelopment, and they may have higher-than-average minority populations. Eight of these are actively undergoing visioning initiatives, and the remainder will be underway shortly. Chief among these areas is the Nassau Hub, one of NYMTC's ten regional Desired Growth Areas and the site of a master planning initiative involving economic development, land use, environmental, and transportation elements. Other locations include City of Glen Cove Waterfront; Grumman at Bethpage; Hicksville; Mineola; New Cassel; Freeport; Elmont; West Hempstead; Baldwin; Uniondale; Hempstead Village; Roosevelt; and Long Beach.

Suffolk County's Review of Selected Growth and Development Areas has targeted five Major Growth and Development Zones, including the Route 110 Industrial-Office Corridor; the Sagtikos Regional Development Zone; the Village of Yaphank, Stony Brook High Tech Campus and Riverhead (see Figure 1.5). The County has also prioritized smart growth development policies that will encourage the formulation of local plans for growth, open space preservation, the support and creation of utility districts, and incentives for mixed-use commercial and residential options.

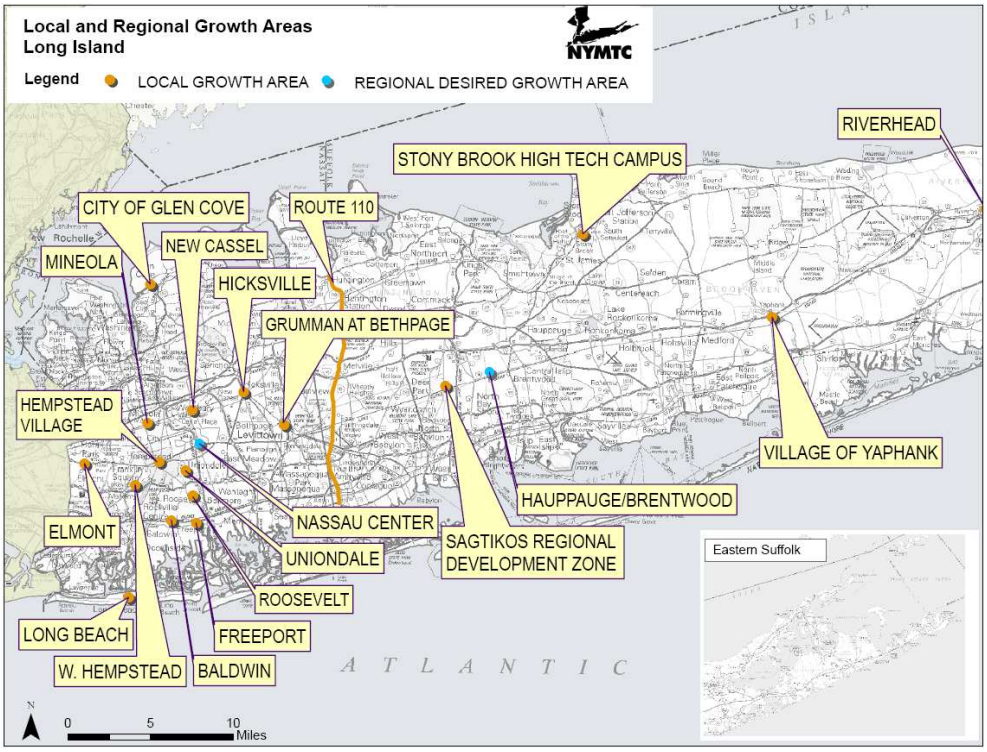


FIGURE 1.6

Areas Targeted for Growth on Long Island

Source: Nassau County Planning Commission, 2008; Suffolk County Review of Selected Growth and Development Areas, 2005; Inventory, and Smart Growth Committee Report

Rockland County's Comprehensive Plan outlines a series of goals which articulate visions for the County's future related to economic development, transportation, housing, open space and land use. The plan identifies four "Future High-Development Pressure Areas," where issues, opportunities and constraints on development have been identified. The areas, shown in the map in Figure 1.7, include the Hudson River Shoreline, Western Ramapo, Rockland Psychiatric Center, and Letchworth Village. The Plan's goals are to focus commercial and high-density residential development in existing mixed-use centers, retain existing open space and quality of life of neighborhoods outside of the centers, enhance traditional downtowns that capitalize on historic resources and positive elements of older centers, provide links among and between centers, and attract start-up businesses

Westchester County's Westchester 2025 initiative identifies 54 downtown centers and 17 corridors with planning opportunities, including the I-287 corridor, which is one of NYMTC's identified regional Desired Growth Areas (Figure 1.7). The four Major Centers include Mount Vernon, New Rochelle, White Plains and Yonkers. Seven Intermediate Centers are also described, including Mount Kisco, Peekskill, Port Chester, Ossining, Tarrytown and Yorktown Heights. Westchester County will use incentives and regulations to focus development in these areas, each with a distinctive, existing mix of uses and key facilities. Westchester 2025 does not see a need to identify new "greenfield" centers in the county, such as the construction of high density mixed-use development outside of existing centers, but sees opportunities to add elements of centers to other areas.

New York City's PlaNYC 2030 lays out sustainable development principles for the city, and identifies a number of transportation projects which are either currently underway or are being considered by various NYMTC members. The Department of City Planning has completed rezonings for many New York City neighborhoods in recent years. Figure 1.8 shows the location and extent of these rezoning initiatives that aim to strengthen regional business districts, facilitate housing production, foster mixed use development, protect neighborhood character, revitalize the waterfront and enhance public open spaces.

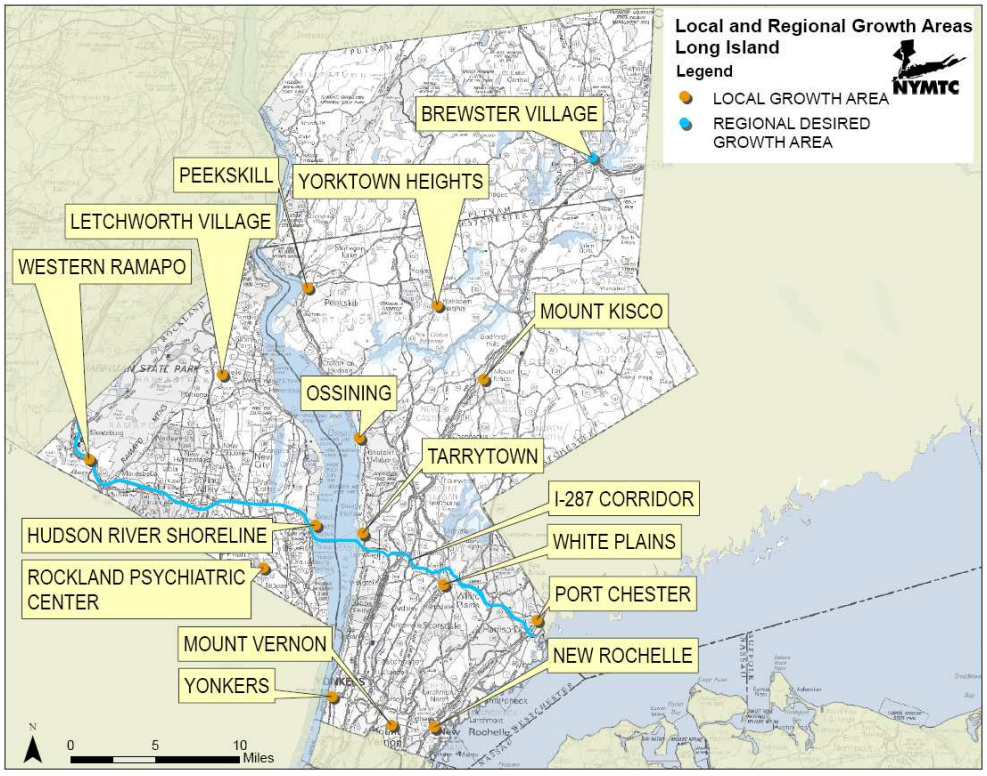


FIGURE 1.7 (This page)

Areas Targeted for Growth in the Lower Hudson Valley

Source: Westchester County "Westchester 2025", 2008; Rockland County Comprehensive Plan, Rockland County "Development Trends in Rockland County: Past, Present & Future", 2007

plaNYC 2030

On Earth Day 2007, Mayor Michael R. Bloomberg announced the release of plaNYC, a statement of long-term planning goals and objectives to ensure the sustainability of the city to the year 2030 and beyond. plaNYC focuses on six different policy areas with the intent to improve the quality of life for all residents. The six policy areas are land, water, transportation, energy, air quality and climate change. Land, transportation and air quality are all addressed in the NYMTC Regional Transportation Plan.

The goals, objectives and initiatives contained in plaNYC will guide the city's planning, maintenance, expansion and operation of its transportation network for the next 25 years and possibly beyond. The city looks forward to working with its federal, state, and regional partners to incorporate these guiding principles into the regional transportation planning process through the development of the Plan, the Transportation Improvement Program, and the Unified Planning Work Program.

The land component of plaNYC focuses on efforts to increase the supply of housing in the city, to provide more open space, and to reclaim brownfields. Housing and Open Space are two key categories in this section that relate to transportation goals outlined in the NYMTC Plan.

The transportation section of plaNYC outlines 16 key initiatives intended to maintain the city's aging infrastructure and expand and promote transit and alternative modes of transportation. In addition, there are 14 air quality initiatives, several of which have impacts on the region's transportation network and the vehicles that use it.

plaNYC: A comprehensive plan for New York City

plaNYC and progress reports on implementation are available online:

www.nyc.gov/html/planyc2030

plaNYC 2030 Initiatives Related to NYMTC RTP

Transportation

1. Increase capacity on key congested routes.
2. Provide new commuter rail access to Manhattan.
3. Expand transit access to underserved areas.
4. Improve and expand bus service.
5. Improve local commuter rail service.
6. Improve access to existing transit.
7. Address congested areas around the city.
8. Expand ferry service.
9. Promote cycling.
10. Pilot congestion pricing.
11. Manage roads more efficiently.
12. Strengthen enforcement of traffic violations.
13. Facilitate freight movements.
14. Close the MTA state-of-good-repair funding gap.
15. Close the city's road and bridge state of good repair funding gap.
16. Establish a new regional transit financing authority.

Housing

1. Pursue transit-oriented development.
2. Reclaim underutilized waterfronts.
3. Increase transit options to spur development.
4. Expand co-locations with government agencies.
5. Adapt outdated building to new uses.
6. Develop underutilized areas to knit neighborhoods together.
7. Capture the potential of transportation infrastructure investments.
8. Deck over rail yards, rail lines, and highways.
9. Develop new financing strategies.
10. Expand inclusionary zoning.
11. Encourage home ownership.
12. Preserve the existing stock of affordable housing.

Air Quality

1. Capture the air quality benefits of PlaNYC transportation plan objectives.
2. Improve fuel efficiency of private cars.
3. Reduce emissions from taxis, black cars, and for-hire vehicles.
4. Replace, retrofit and refuel diesel trucks.
5. Decrease school bus emissions.
6. Retrofit ferries and mandate the use of cleaner fuels.
7. Partner with the Port Authority to reduce emissions from port facilities.
8. Implement more efficient construction management practices.
9. Capture the air quality benefits of PlaNYC energy strategy.
10. Promote the use of cleaner burning heating fuels.
11. Capture the benefits of PlaNYC open space plan.
12. Reforest targeted areas of our parkland.
13. Increase tree plantings on lots.
14. Launch collaborative local air quality study.

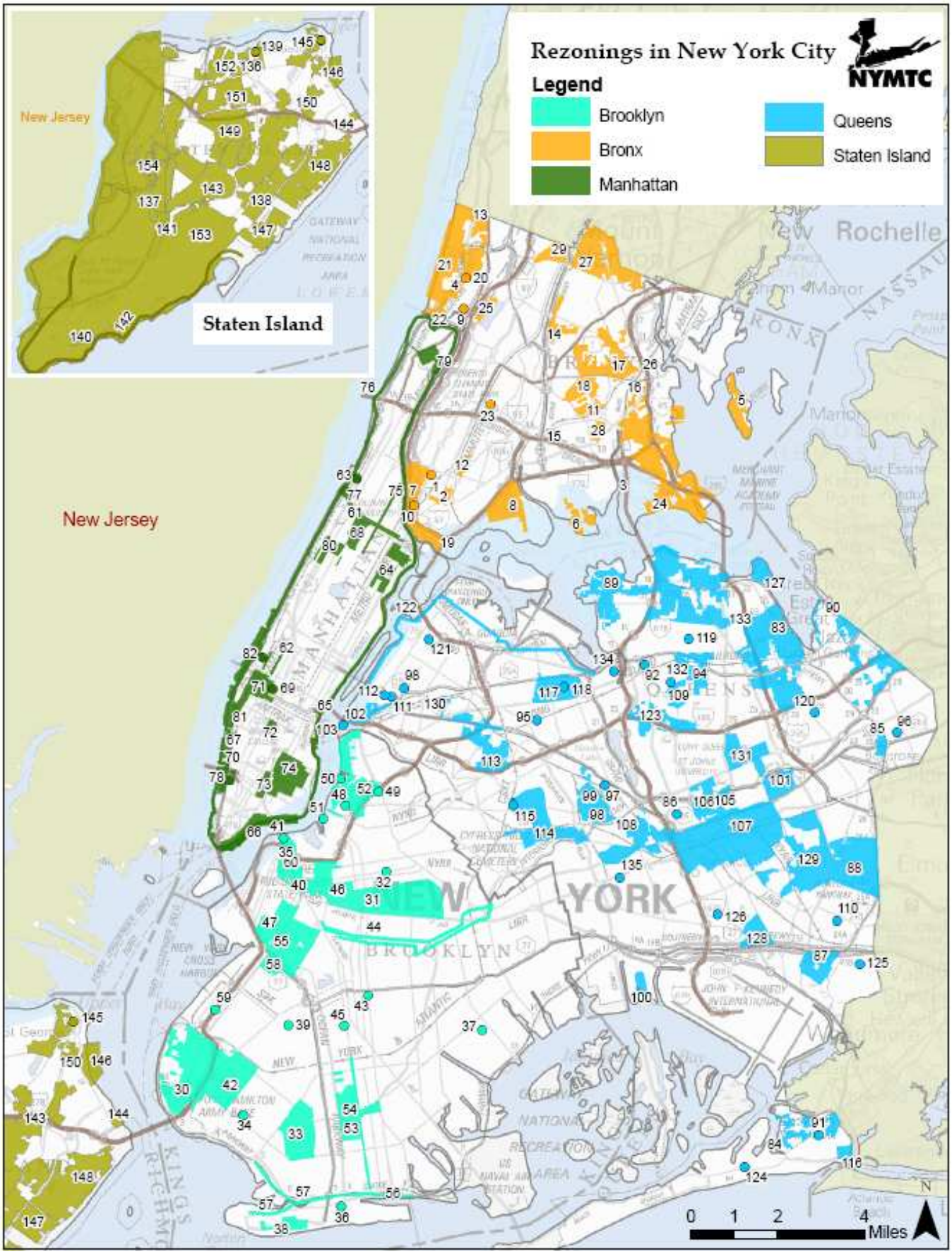
Open Space

1. Open schoolyards across the city as public playgrounds.
2. Increase options for competitive athletes.
3. Complete underdeveloped destination parks.
4. Provide more multi-purpose fields.
5. Install new lighting.
6. Create a public plaza in every community.
7. Green our underutilized street and sidewalk space.

FIGURE 1.8 (Next Page)

New York City Rezoning Initiatives

Source: New York City Department of City Planning; NYMTC


Rezonings in New York City
NYMTC
Legend
Brooklyn
Bronx
Manhattan
Queens
Staten Island
New Jersey
Staten Island
New Jersey
Rochelle
NEW YORK
BROOKLYN
0 1 2 4
Miles

Manhattan Rezoning Projects

61 - 125th Street Corridor Rezoning (Harlem)
62 - Clinton Bulk Regulations Amendment
63 - Community District 9 Rezoning Study
64 - East Harlem Rezoning
65 - East River Realty Rezoning (Former ConEd Site)
66 - East River Waterfront Plan
67 - Far West Village Rezoning
68 - Frederick Douglass Blvd (Central/South Harlem) Rezoning
69 - Garment Center Text Amendment Study
70 - Hudson Square Rezoning
71 - Hudson Yards Rezoning
72 - Ladies Mile (aka Flatiron District) Rezoning
73 - Little Italy Special District Rezoning
74 - Lower East Side/East Village Rezoning
75 - Malcolm X Blvd Streetscape Enhancement Project
76 - Manhattan Greenway Plan
77 - Manhattanville Rezoning (Columbia University)
78 - Northern Tribeca Rezoning Study
79 - Sherman Creek Rezoning
80 - Upper West Side Rezoning
81 - West Chelsea Rezoning
82 - West Clinton/11th Ave Rezoning Study

Brooklyn Rezoning

30 - Bay Ridge Rezoning
31 - Bedford-Stuyvesant I (south) Rezoning
32 - Bedford-Stuyvesant II (North) Rezoning Study
33 - Bensonhurst I Rezoning
34 - Bensonhurst II Rezoning Study
35 - Bridge Plaza Rezoning
36 - Brighton Beach Rezoning Study
37 - Canarsie Rezoning Study
38 - Coney Island Rezoning
39 - Culver El Rezoning Study
40 - Downtown Brooklyn Rezoning
41 - DUMBO Rezoning Study
42 - Dyker Heights Rezoning
43 - East Flatbush Rezoning Study
44 - Eastern Parkway Greenway Study
45 - Flatbush Rezoning Study
46 - Fort Greene/Clinton Hill Rezoning
47 - Gowanus Rezoning
48 - Grand Street Rezoning Study
49 – Greenpoint/W'burg Contextual Rezoning Study
50 - Greenpoint/Williamsburg Open Space Study
51 - R7-3 Inclusionary Housing Text Study
52 - Greenpoint/Williamsburg Rezoning
53 - Homecrest Rezoning
54 - Midwood Rezoning
55 - Park Slope Rezoning
56 - Sheepshead Bay Rezoning
57 - Shore Parkway Connector Study
58 - South Park Slope Rezoning
59 - Sunset Park Rezoning Study

Bronx Rezoning Projects

1 - 161st Street/River Avenue Rezoning Study
2 - Bronx Center/Hub Rezoning
3 - Brush Avenue Rezoning (Follow Up)
4 - Central Riverdale & Spuyten Duyvil Rezoning
5 - City Island Rezoning
6 - Harding Park/Clasons Point Rezoning
7 - Harlem River Waterfront Ped-Bike Study
8 - Hunts Point Rezoning
9 - Kingsbridge Rezoning Study
10 - Lower Concourse Rezoning Study
11 - Morris Park Rezoning
12 - Morrisania Rezoning
13 - North Riverdale Rezoning
14 - Olinville Rezoning
15 - Park Stratton Rezoning
16 - Pelham Bay Rezoning
17 - Pelham Gardens Rezoning
18 - Pelham Parkway/Indian Village Rezoning
19 - Port Morris/Bruckner Blvd Rezoning
20 - Riverdale Special Natural Area Ext. Study
21 - Riverdale-on-Hudson Rezoning
22 - Special Natural Area Text Amendment
23 - Third Avenue Corridor Rezoning Study
24 - Throgs Neck Rezoning
25 - Van Cortlandt Village Rezoning
26 - Village of Baychester Rezoning (Follow Up)
27 - Wakefield Rezoning
28 - Westchester Square Rezoning
29 - Woodlawn Rezoning

Staten Island Rezoning

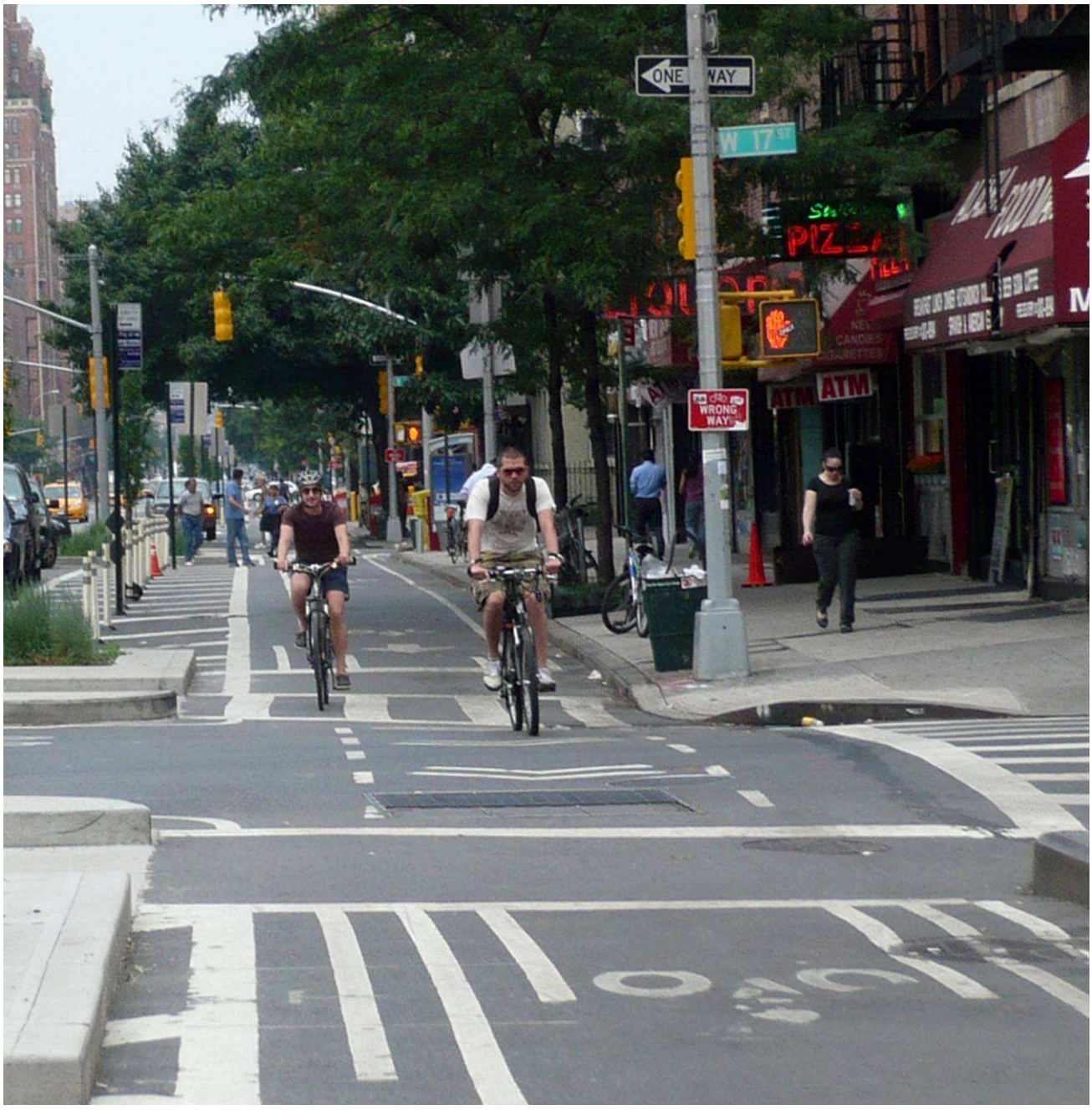
136 - Castleton Avenue Rezoning (Commercial Rule Changes & Rezone LDGM Task Force)
137 - Fresh Kills Master Plan
138 - New Dorp Lane Rezoning (Commercial Rule Changes & Rezone LDGM Task Force)
139 – N. Shore Land Use & Transportation Study
140 - Princes Bay Rezoning
141 - Richmond Ave at Arthur Kill Rd Rezoning (LDGM Task Force)
142 - South & West Shore Greenway Master Plan
143 - Special Natural Area District Text Amendment Natural Area-1
144 - Special Natural Area District Text Amendment Natural Area-3
145 - St. George Rezoning Study
146 - Stapleton Waterfront Special District
147 - Staten Island Contextual Rezoning I
148 - Staten Island Contextual Rezoning II
149 - Staten Island Contextual Rezoning III
150 - Staten Island Contextual Rezoning IV
151 - Staten Island Contextual Rezoning V
152 - Staten Island Contextual Rezoning VI
153 - Staten Island Residential Zones Text Changes (Follow Up LDGM Task Force)
154 – W.Shore Manuf. Land Use Study (w/EDC)

Queens Rezonings

83 - Bayside Rezoning
84 - Bayswater Rezoning
85 - Bellerose Rezoning
86 - Briarwood Rezoning Study
87 - Brookville Rezoning
88 - Cambria Heights Rezoning
89 - College Point Rezoning
90 - Douglaston/Little Neck Rezoning
91 - Downtown Far Rockaway Redevelopment Framework Study
92 - Downtown Flushing Municipal Parking Lot Redevelopment Study
93 - Dutch Kills Rezoning Study
94 - East Flushing Rezoning
95 - Elmhurst/Corona Rezoning Study
96 - Floral Park/Bellerose/Glen Oaks Rezoning Study (aka Northeast CD 13 Study)
97 - Forest Hills C8 Study
98 - Forest Hills South Rezoning
99 - Forest Hills/Rego Park Rezoning
100 - Hamilton Beach Rezoning
101 - Holliswood Rezoning
102 - Hunters Point Rezoning
103 - Hunters Point South Rezoning Study
104 - Jackson Ave Streetscape Plan
105 - Jamaica Hill Rezoning
106 - Jamaica Hill/Hillcrest Rezoning
107 - Jamaica Rezoning
108 - Kew Gardens/Richmond Hill Rezoning
109 - Kissena Park Rezoning
110 - Laurelton Rezoning Study
111 - LIC Links Study
112 - LIC Queens Plaza Redesign Study
113 - Maspeth/Woodside Rezoning
114 - Middle Village/Glendale I Rezoning
115 - Middle Village/Glendale II Rezoning Study
116 - Mott Creek/Far Rockaway Rezoning
117 - North Corona I Rezoning
118 - North Corona II Rezoning Study
119 - North Flushing Rezoning Study
120 - Oakland Gardens/Hollis Hills Study
121 - Old Astoria Rezoning Study
122 - Queens East River & North Shore Greenway
123 - Queensboro Hill Rezoning
124 - Rockaway Neighborhoods Zoning Study
125 - Rosedale Rezoning Study
126 - South Ozone Park Rezoning Study
127 - Special Natural Area District Text Amendment Natural Area-4
128 - Springfield Gardens Rezoning
129 - St Albans/Hollis Rezoning
130 - Sunnyside Gardens Zoning Text Amendment
131 - Utopia/Union Rezoning
132 - Waldheim/Holly Rezoning Study
133 - Whitestone Rezoning
134 - Willets Point Peninsula Redevelopment Study
135 - Woodhaven/Richmond Hill/Ozone Park Rezoning Study

CHAPTER 1

A Shared Vision



v. Regional Transportation Investments

The strategic transportation investments proposed in this Plan follow the shared vision for the NYMTC region's sustainable growth. A growing and dynamic region is envisioned over the next two decades; a region in which growth is made more sustainable through regional planning and through the operation, maintenance and strategic improvement of the extensive transportation system that supports sustainable development and accommodates overall growth.

The vision rests on the common goals described earlier in this chapter. The growth focuses on NYMTC's ten desired growth areas. The goal of the Plan is to increase the sustainability of the region's future by focusing growth to the extent possible in areas where the transportation system – both in its current form and through future improvements – can most efficiently serve that growth.

The transportation component of the shared vision recognizes that the transportation system in our region is extensive and must be maintained as well as expanded. NYMTC has identified the following key strategic regional investment areas:

- Defining and setting aside resources in the long-term to support the day-to-day operation and maintenance of the existing transportation system, and to achieve and maintain a State-of-Good-Repair;

- Completion of four foundation improvement projects to which the NYMTC members have all previously agreed: MTA New York City Transit's No. 7 subway extension; MTA New York City Transit's Second Avenue Subway; MTA Long Island Rail Road's extension to Grand Central Terminal; and NJ TRANSIT's Access to the Region's Core rail tunnel project. These projects are a first step toward improving mobility in the NYMTC region in the long-term; and

- Pursuit of new strategic transportation improvements, in addition to the foundation projects, to facilitate the optimal development of the ten desired growth areas and to respond to the overall growth anticipated throughout the region.

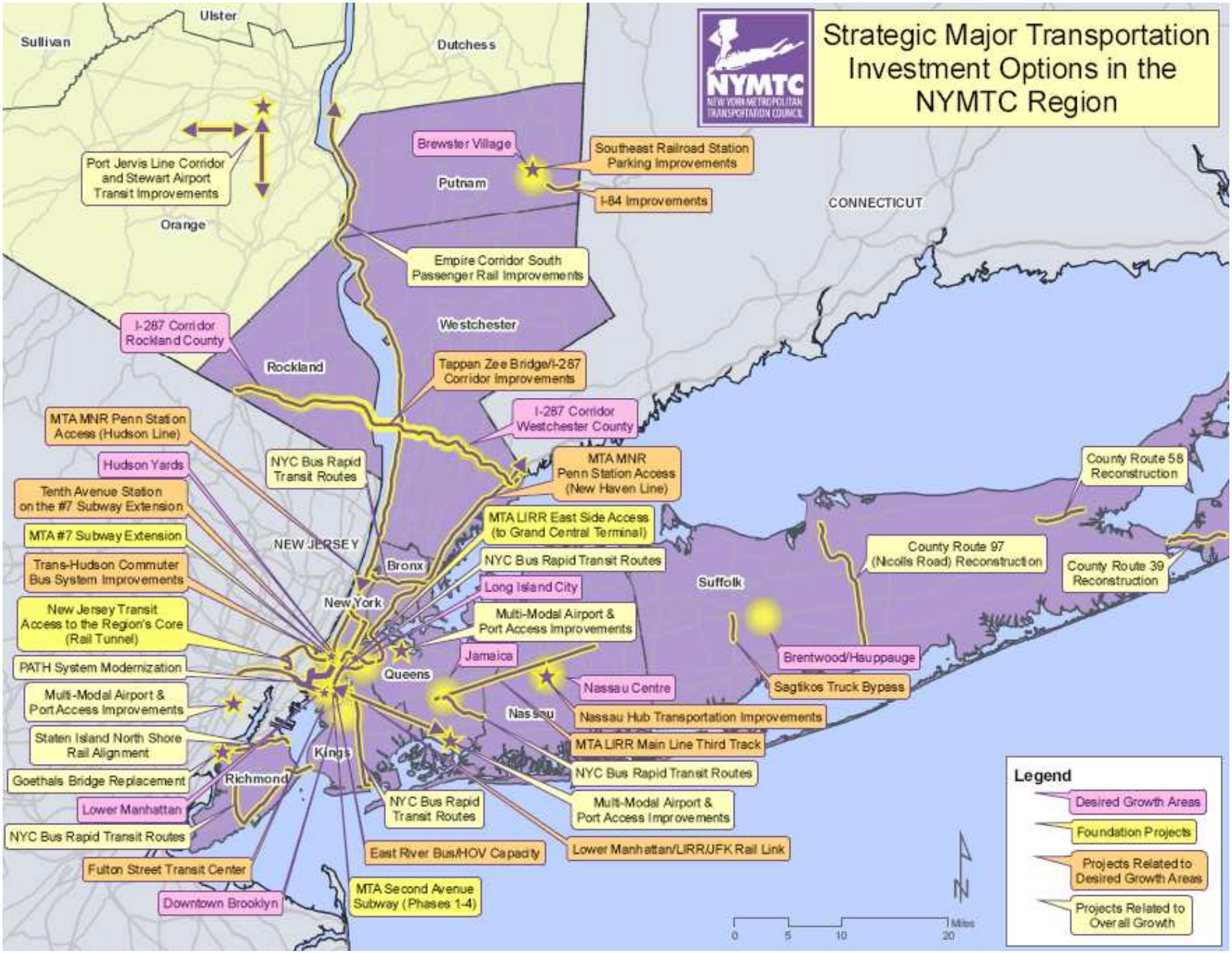
FIGURE 1.9 (Next Page)

Strategic Regional Foundation & Transportation Investments

Source: NYMTC

A list of all regional investments can be found in Chapter 6.

In addition to these three key categories, NYMTC's member agencies plan for all other types of investments in transportation infrastructure, operations and maintenance. A complete list of investments can be found in Chapter 6, and lists of all other projects are included in the Appendix.


Strategic Major Transportation Investment Options in the NYMTC Region
NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL
Ulster
Sullivan
Dutchess
Orange
Putnam
Westchester
Rockland
Bronx
New York
Queens
Kings
Richmond
Nassau
Suffolk
NEW JERSEY
CONNECTICUT
Port Jervis Line Corridor and Stewart Airport Transit Improvements
Brewster Village
Southeast Railroad Station Parking Improvements
I-84 Improvements
Empire Corridor South Passenger Rail Improvements
I-287 Corridor Rockland County
Tappan Zee Bridge/I-287 Corridor Improvements
I-287 Corridor Westchester County
MTA MNR Penn Station Access (Hudson Line)
Hudson Yards
Tenth Avenue Station on the #7 Subway Extension
MTA #7 Subway Extension
Trans-Hudson Commuter Bus System Improvements
New Jersey Transit Access to the Region's Core (Rail Tunnel)
PATH System Modernization
Multi-Modal Airport & Port Access Improvements
Staten Island North Shore Rail Alignment
Goethals Bridge Replacement
Lower Manhattan
NYC Bus Rapid Transit Routes
Fulton Street Transit Center
Downtown Brooklyn
NYC Bus Rapid Transit Routes
MTA Second Avenue Subway (Phases 1-4)
NYC Bus Rapid Transit Routes
East River Bus/HOV Capacity
MTA MNR Penn Station Access (New Haven Line)
MTA LIRR East Side Access (to Grand Central Terminal)
NYC Bus Rapid Transit Routes
Long Island City
Multi-Modal Airport & Port Access Improvements
Jamaica
Nassau Centre
Nassau Hub Transportation Improvements
MTA LIRR Main Line Third Track
NYC Bus Rapid Transit Routes
Multi-Modal Airport & Port Access Improvements
Lower Manhattan/LIRR/JFK Rail Link
County Route 58 Reconstruction
County Route 97 (Nicolls Road) Reconstruction
County Route 39 Reconstruction
Brentwood/Hauppauge
Sagtikos Truck Bypass
Legend
Desired Growth Areas
Foundation Projects
Projects Related to Desired Growth Areas
Projects Related to Overall Growth
0
5
10
20
Miles

The region's most pressing need will be finding ways to comprehensively stabilize funding for the day-to-day operations and maintenance of the transportation system and obtain sufficient Federal, State and local capital resources to achieve and maintain a State-of-Good-Repair for the system in the long-term. The second most pressing need will be to complete the four foundation projects and to identify resources to design and implement the strategic transportation improvements beyond the foundation projects.

Improvements included in the Plan vary in size, but each impacts the region's ability to grow in the future. The improvements are in various stages of development. Some have been developed through planning work, design and engineering, while others are purely conceptual. All require additional work – planning, design or engineering – before their costs can be ascertained in enough detail to begin to program funding for their implementation. Those programming decisions will be forthcoming and will be made when the investments have reached the appropriate stage of planning and design.

vi. Strategic Regional Policy Guidelines

The above-mentioned strategic regional transportation investments stem from policies which NYMTC's Council members consider particularly important to the future of transportation in the region. These policies not only drive the selection of investments, but also guide the implementation of these investments as the system is designed, operated, and maintained. The areas of focus include regional decision-making, as well as policies related to the design and operation of the system. The policies are described in greater detail below.

Regional Decision-Making

- Considering freight movement in the planning, funding, and operation of the entire transportation system
- Employing innovative strategies for funding and financing transportation improvements
- Recognizing the "megaregion" as an emerging geographical unit that is the scale at which the impacts of transportation and related policies (e.g. housing, employment and energy) should be considered
- Incorporating climate change and carbon reduction considerations into regional "green" transportation policies
- Encouraging research into new transportation policies, strategies and technologies, and removing barriers to development and deployment of new technologies
- Encouraging Transit-Oriented Development (TOD) near existing and planned transit stations and hubs

Design and Operation of the System

- Improving the management of parking demand and supply
- Providing additional transit options by implementing Bus Rapid Transit and Select Bus Service in appropriate corridors
- Designing "complete streets" that take into account the needs of all types of users and all modes of transportation
- Using Context Sensitive Solutions (CSS) in the design and implementation of transportation projects
- Supporting the development of freight and passenger services on waterways within the NYMTC region and connecting to other regions

RELATED SHARED GOALS

- Enhance the Regional Environment
- ✓ Improve the Regional Economy
- Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

Freight Planning

As noted in the regional 2004 Freight Plan, NYMTC members support a wide range of strategies and actions that include capital projects, operational improvements and policy changes. Freight policy strategies should focus on multiple transportation modes, including truck, rail and marine transport. Policies regarding freight have been targeted to remove institutional and procedural barriers to freight transportation throughout the region, facilitate the maintenance and development of freight facilities and operations and improve the sustainability of these developments by providing alternatives to shipping by truck.

Looking forward, two policies exemplify of these goals. One is to manage the share of goods moved by truck, providing alternative modes like rail and barge. As congestion increases, new strategies may encourage the use of rail and waterways to transport goods to, from and throughout the region.

RELATED SHARED GOALS

- Enhance the Regional Environment
- Improve the Regional Economy
- Improve the Regional Quality of Life
- Provide convenient, flexible transportation access within the region
- ✓ Build the case for obtaining resources to implement regional investments

Innovative Funding and Finance of Transportation Projects

Given the high cost of maintaining the region's extensive transportation infrastructure, new and sustainable ways to finance transportation operations and improvements will be of paramount importance. Likewise, financial incentives which assist in managing the transportation system are critical given forecasted growth. NYMTC members are considering the following policies:

- Generating new funding sources outside the Highway Trust Fund, including tax credit bonds, investment tax credits.
- Developing new opportunities for toll-supported highways and high-occupancy vehicle toll lanes (HOV) to supplement funding for all surface modes, including freight railroads and public transportation.
- Studying ways that motorists can be charged tolls based on VMT, vehicle type, emissions and traffic volume (at the time of travel). The charges could replace fuel taxes at State or Federal levels.
- Investigating opportunities for public-private partnerships that raise additional investment capital and advance project delivery while maintaining fair and equitable access to transportation resources.

Planning at the Scale of the Megaregions

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- ✓ Improve the Regional Economy
- Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

The concept of the "megaregion" is developing in and between cities around the world as a geographical unit that could improve how infrastructure and services are provided for and planned . Council members recognize that the NYMTC region is part of a larger geography with economic, environmental, and social interrelationships that rely heavily on seamless connections in transportation. NYMTC currently interacts regularly with neighboring planning organizations and government transportation offices to coordinate planning and project implementation. NYMTC will continue to expand and deepen the scope of this outreach, providing venues and opportunities for our members to interact with transportation leaders in neighboring regions. Through this outreach, NYMTC will play an important role in improving the way we travel and access resources.

Climate Change and Carbon Reduction

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

The growing evidence of climate change and of mandated reductions in motor vehicle emissions require the region to consider a range of policy tools for reducing the carbon footprint of the regional transportation system. Nearly 30 percent of U.S. greenhouse gases (chiefly carbon dioxide, among others) come from transportation.[7] NYMTC members are committed to the reduction of carbon-based pollutants and addressing the effects of climate change on transportation infrastructure through planning studies and research that informs the activities of its members.

NYMTC and its partners are committed to specific green transportation initiatives, including incentives for using low or zero-emissions vehicles, undertaking transportation demand management schemes to influence travel behavior and shift travel to modes with less environmental impact, and encouraging less land-intensive development patterns through focused transportation investments and coordinated land use and transportation planning.

Transportation Research and Deployment of New Technologies

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- ✓ Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region

  Build the case for obtaining resources to implement regional investments

As noted in Chapter 3, Council members actively seek to develop policies that support research in new uses of technology that will improve service. Policies are being considered that help build an efficient and robust regional Mobility Management system, spur the development and coordination of intelligent vehicles and infrastructure technologies, and share the results of the work through regular "best practices" assessments. The members recognize the importance of all types of technological applications—including advancements in communications technologies—in slowing the demands on the transportation system to ensure long-term sustainability.

Transit-Oriented Development

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- ✓ Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- ✓ Build the case for obtaining resources to implement regional investments

Manhattan is held up worldwide as an example of successful transit-oriented development. Outside the core of the region, however, transit-oriented development has been more difficult to achieve.

Development and redevelopment anchored around transit stations, or Transit-Oriented Development (TOD), is being considered by local and regional development agencies in recognition of the important links between transportation and land use. TOD is complimented by policies for Context Sensitive Solutions (CSS) that incorporate natural resource concerns into the transportation planning process (see section below).

TOD promotes long-term, environmentally sound growth of business and residential populations around existing or planned transportation infrastructure investments. The aim of TOD policies is to reduce traffic congestion and improve air quality by promoting increased transit ridership, pedestrian activity and bicycle use. In addition, goals of economic revitalization and growth of housing stock are part of an overall effort to create vibrant and safe areas around major transit nodes. The Desired Growth Areas in the NYMTC region will likely be key centers for TOD in the coming years as local, county and state resources are focused on leveraging transportation to provide accessible, safe and environmentally sustainable neighborhoods.

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

Context-Sensitive Solutions

Context Sensitive Solutions (CSS) are transportation plans and designs that integrate natural resource concerns into transportation project planning. Transportation planning practices that reduce the impacts of transportation programs on the natural environment are required by Federal transportation legislation.

CSS practices are difficult to apply on the scale of larger metropolitan areas. Urban areas must address CSS within the context of large populations and densities, built urban environments, and multiple modes of transportation among other factors. In addition to incorporating environmental concerns into all stages of planning and public outreach, NYMTC is supporting research that will identify key issues, case studies, and best practices for CSS in urban areas. The studies will investigate how CSS can be incorporated into transportation and land use planning, what kind of policies have grown out of this process, how public participation is carried out and evaluated, what kinds of obstacles exist to successfully incorporating CSS, and what kinds of decisions are finally made in terms of balancing the various needs related to parking, non-motorized traffic, safety and throughput.

RELATED SHARED GOALS

- Enhance the Regional Environment
- Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- ✓ Build the case for obtaining resources to implement regional investments

Parking Management

Parking Management encompasses many strategies that cities, neighborhoods, and businesses use in order to make more efficient use of their parking resources and balance parking supply and demand. At one extreme, minimum parking requirements can produce excess parking (which consumes land that could be used for other purposes), increases impermeable land cover, and contributes to local heat islands. At the other extreme, in areas where there is a shortage of parking and no easy way to add new capacity, fees are often set too low. The resulting shortage of parking can lead to increased congestion as vehicles circle in search of a space, and parking demand can spill over into adjacent neighborhoods. NYMTC's members have been at the forefront of developing policies to: price parking spaces so that appropriate vacancy rates can be achieved; encourage the sharing of parking among multiple uses; and ensure that the cost of parking is capitalized in rents and costs are passed along to users of the spaces to the extent possible.

While parking management policies are usually implemented by local governments or individual businesses, some policies can be coordinated regionally. NYMTC members are committed to parking management solutions that reduce the number of parking spaces required, providing a variety of economic, social and environmental benefits. When all impacts are considered, better parking management, as opposed to increasing supply, is often the best solution to parking problems. Parking management studies and projects are aimed to create cost savings for business and government, develop livable and walkable communities and support all transportation modes.

Bus Rapid Transit

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

Bus ridership in the NYMTC region is the highest in the United States, but NYMTC's members are constantly working to improve the passenger experience, expand bus ridership, make better use of the region's roadway capacity, and make more efficient use of the bus fleet.

Bus Rapid Transit (BRT) denotes bus services that offer an enhanced level of service to bus riders while improving operational efficiency. BRT employs numerous strategies such as dedicated bus lanes (which carry many more passengers per hour than regular mixed-use lanes), fewer stops and signal prioritization (improving overall trip times), advance new methods of fare payment (reducing the time needed for passengers to board), branding (to distinguish enhanced bus services from regular local services), and other design and operation strategies to make bus travel faster, more reliable and effective. Various combinations of these strategies can be used to make BRT effective and attractive to passengers in high-ridership corridors throughout the region.

Complete Streets

RELATED SHARED GOALS

- Enhance the Regional Environment
- Improve the Regional Economy
- ✓ Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

The NYMTC region has some of the most diverse and complicated travel networks in the world. The region is at the forefront of designing and operating transportation infrastructure that supports all types of travel. NYMTC members continue to develop what have been called "complete streets," streets that are open and safe for all users. Benefits include improved access to the transit system, which encourages higher transit ridership and discourages auto use.

Increasing the number of people who walk to their destinations is a primary goal of complete streets strategies. With the right infrastructure, walking can often replace auto trips, and is a component of every public transit trip. In addition, safe bicycling and pedestrian access can add to the economic potential of commercial areas. NYCDOT has seen a 50% reduction in reported crashes on 9th Avenue in Manhattan since implementing a complete street design in the fall of 2007. Overall, both walking and cycling are simple ways to get exercise, which health officials recognize as essential for maintaining good health. A complete streets strategy ensures that all users and potential users of a public right-of-way are considered in the design and operation of the facility.

RELATED SHARED GOALS

- ✓ Enhance the Regional Environment
- ✓ Improve the Regional Economy
- Improve the Regional Quality of Life
- ✓ Provide convenient, flexible transportation access within the region
- Build the case for obtaining resources to implement regional investments

America's Marine Highways

The NYMTC region encompasses one of the world's most extensive and active marine transportation systems. The region's waterways enable the movement of large volumes of passengers and freight over short, medium, and long distances. These waterways allow for connections within the NYMTC region and connect to the rest of the Eastern Seaboard as well as the rest of the world.

NYMTC is an active participant in the "America's Marine Highways" initiative being led by the U.S. Maritime Administration to make better use of America's maritime infrastructure. Marine Highways include navigable waterways in the NYMTC region, such as the Hudson River and components of the Atlantic Intracoastal Waterway linking New York Harbor to ports along the East Coast. NYMTC is working with the Port Authority of New York & New Jersey, the City of New York, the private sector, and others to develop more viable marine cargo services for passengers and freight. These services might include short-distance passenger and freight ferries to supplement and complement those already in service in the region, medium-distance bypasses to transport freight around bottlenecks like the George Washington Bridge and the Cross Bronx Expressway, and long-distance inter-regional transport of freight. Marine cargo services represent a fuel-efficient and potentially low unit-cost method for transporting freight and passengers both inside and outside the NYMTC region.

Chapter 2

A Shared Future

As planners, economists and demographers collect data and run models to project what the region will look like in the coming decades, it is apparent that the region's future during the period of this Plan will be defined by growth in population, economic activity, travel, congestion, vehicular emissions, jobs and housing needs.

This view is essentially an optimistic one, predicting a dynamic future. But it is also a challenging future which raises pointed questions about the capacity of our current infrastructure and transportation services to accommodate such dramatic growth, while simultaneously safeguarding the quality of life and health of residents, visitors and businesses. Because of this, meeting these challenges of growth in a sustainable fashion has become a focus of the region's planners, as well as its public officials.

This chapter introduces methodologies used to forecast future travel demand, based in part on population and employment trends. It includes a comparison of travel trends in the region, including regional passenger and freight travel patterns. The analysis highlights "journey to work" data compiled by the U.S. Census Bureau, travel to the Manhattan Central Business District, trends in vehicle miles traveled (a key determinant of highway congestion and emissions) and goods movement in the region.

CHAPTER 2

A Shared Future

Figure 2.1a: SocioEconomic & Travel Indicators for 10 County NYMTC Region

With Percent Change 2010 to 2035

Indicator	2010	2035
Population	12.5 Million	14.4 Million
Employment	7.0 Million	8.6 Million
Civilian Labor Force	6.2 Million	7.1 Million
Household Size (Persons per household)	2.74	2.75
Total Daily Trips	28.2 Million	31.2 Million
Daily Auto Trips	18.6 Million	19.6 Million
Daily Transit Trips	9.6 Million	11.6 Million
Daily Vehicle Miles of Travel	136.8 Million	158.4 Million
Daily Vehicle Hours of Travel	6.9 Million	8.8 Million
Travel Time to Work (In Minutes)	29.4	32.8

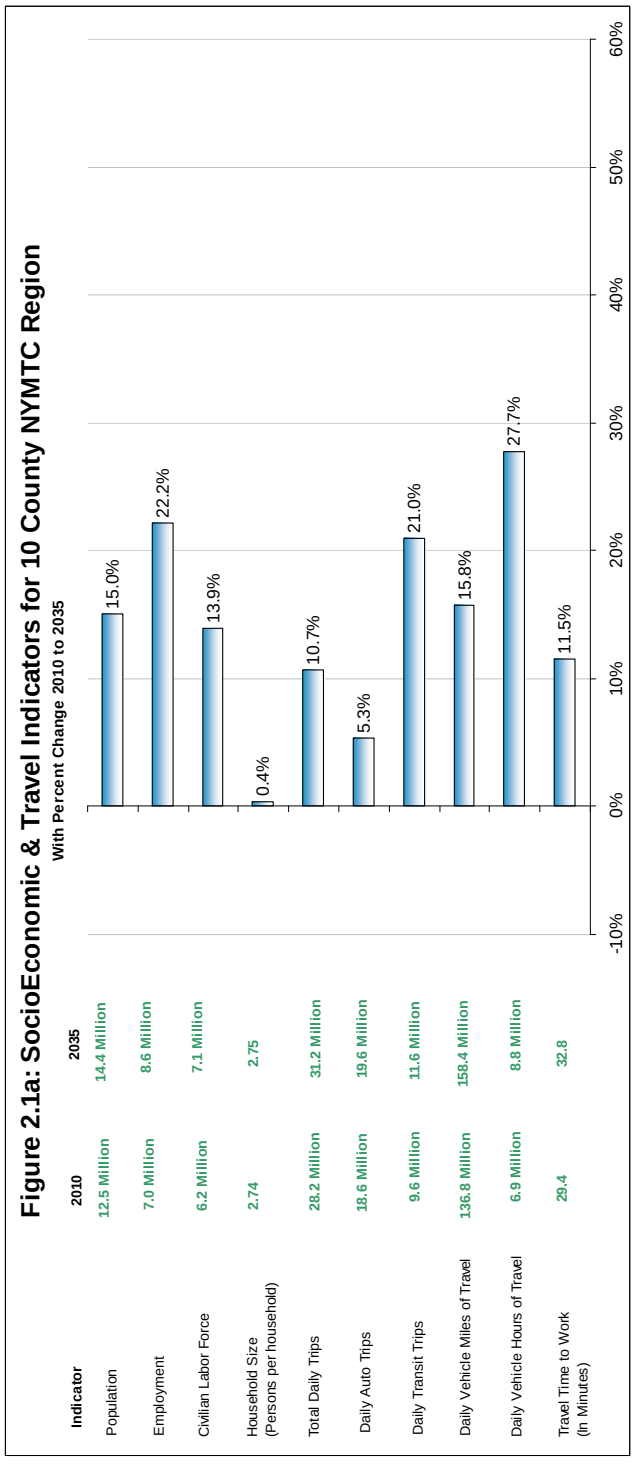


Figure 2.1b: SocioEconomic & Travel Indicators for New York City

With Percent Change 2010 to 2035

Indicator	2010	2035
Population	8.3 Million	9.6 Million
Employment	4.6 Million	5.7 Million
Civilian Labor Force	4 Million	4.6 Million
Household Size (Persons per household)	2.66	2.63
Total Daily Trips	17.0 Million	19.0 Million
Daily Auto Trips	8.5 Million	8.8 Million
Daily Transit Trips	8.5 Million	10.1 Million
Daily Vehicle Miles of Travel	52.1 Million	58.1 Million
Daily Vehicle Hours of Travel	3.6 Million	4.5 Million
Travel Time to Work (In Minutes)	27.7	31.9

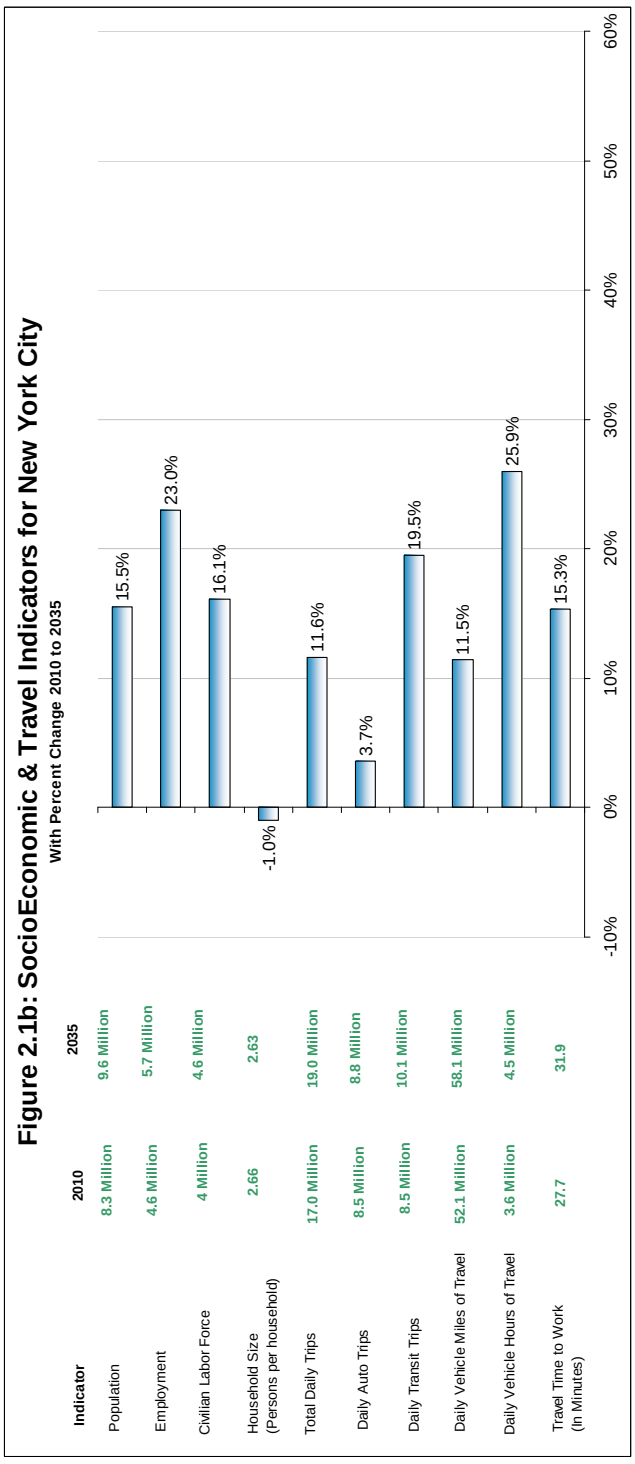


Figure 2.1c: SocioEconomic & Travel Indicators for Lower Hudson Valley

With Percent Change 2010 to 2035

Indicator	2010	2035
Population	1.36 Million	1.55 Million
Employment	0.77 Million	1 Million
Civilian Labor Force	0.75 Million	0.76 Million
Household Size (Persons per household)	2.84	2.96
Total Daily Trips	2.8 Million	3.1 Million
Daily Auto Trips	2.5 Million	2.8 Million
Daily Transit Trips	0.28 Million	0.32 Million
Daily Vehicle Miles of Travel	27.8 Million	35.3 Million
Daily Vehicle Hours of Travel	0.80 Million	1.2 Million
Travel Time to Work (In Minutes)	21.5	24.1

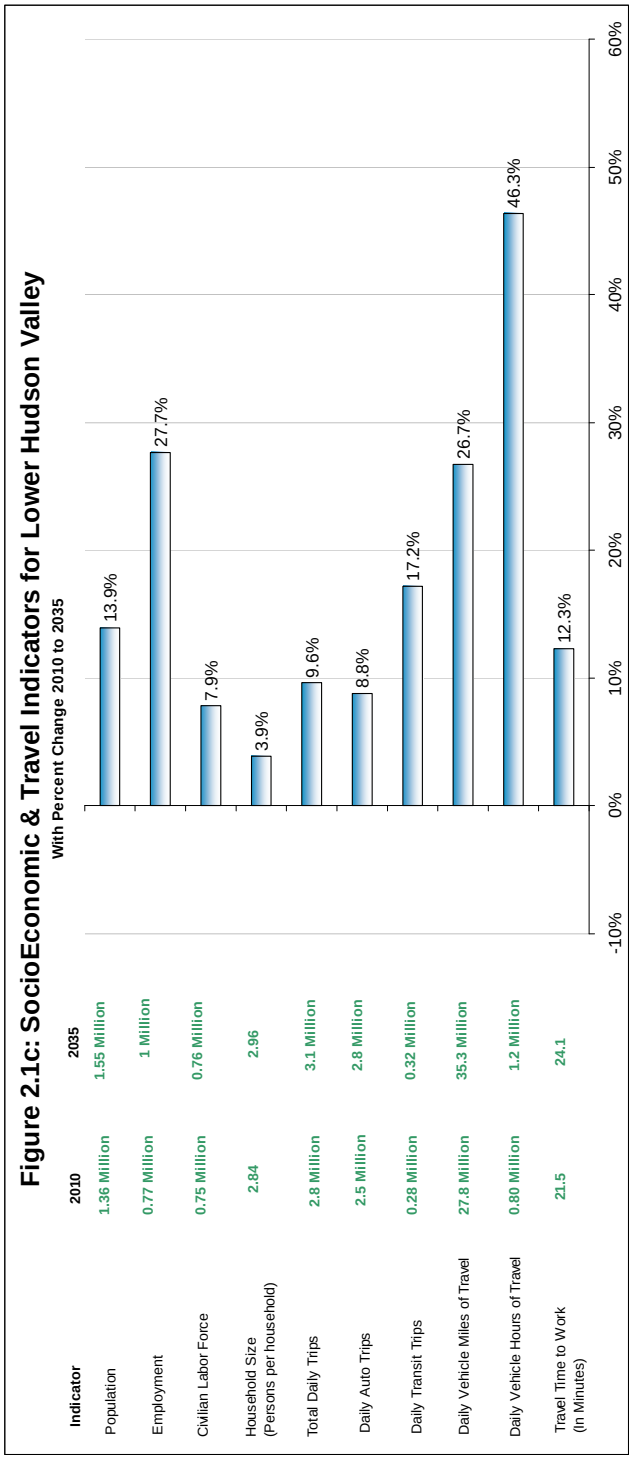


Figure 2.1d: SocioEconomic & Travel Indicators for Long Island

With Percent Change 2010 to 2035

Indicator	2010	2035
Population	2.8 Million	3.2 Million
Employment	1.6 Million	1.9 Million
Civilian Labor Force	1.5 Million	1.7 Million
Household Size (Persons per household)	2.98	3.08
Total Daily Trips	8.4 Million	9.2 Million
Daily Auto Trips	7.5 Million	8.0 Million
Daily Transit Trips	0.86 Million	1.2 Million
Daily Vehicle Miles of Travel	56.9 Million	65.0 Million
Daily Vehicle Hours of Travel	2.5 Million	3.1 Million
Travel Time to Work (In Minutes)	33.6	36.7

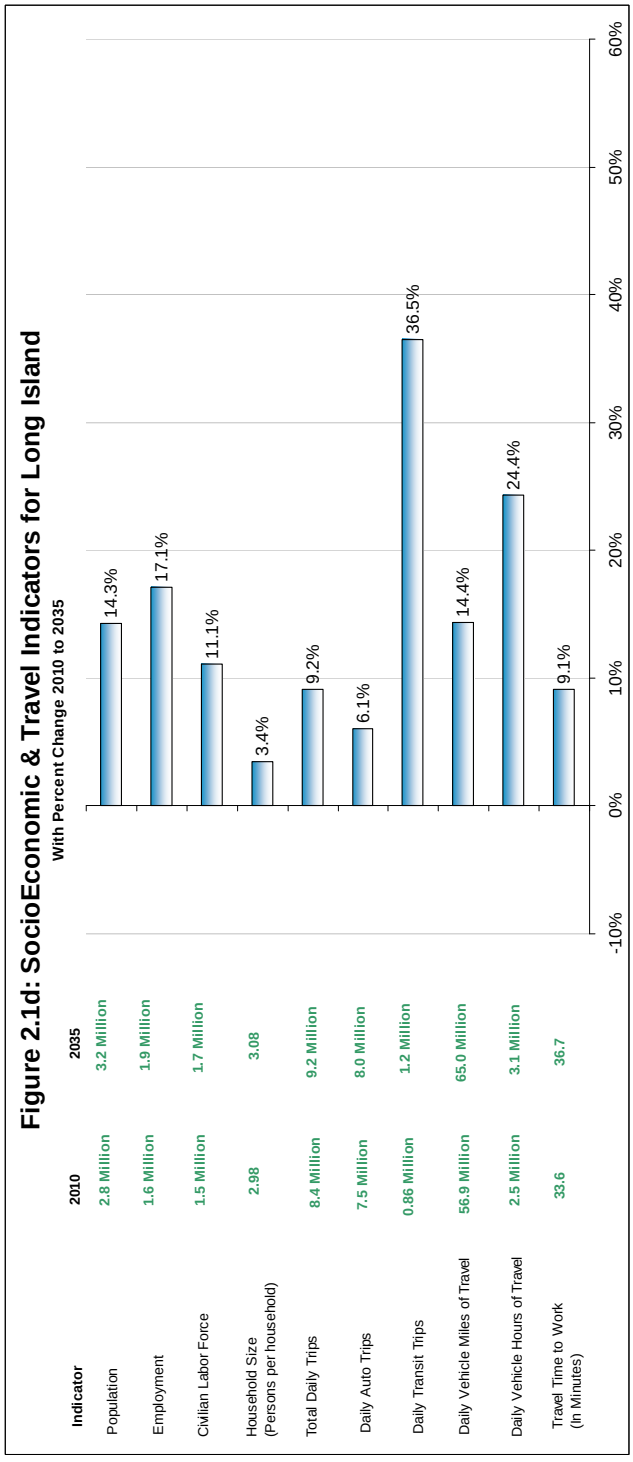


FIGURE 2.1 (Previous Pages)
Summary of Socioeconomic and Travel Indicators

Source: NYMTC

i. Socio-Economic and Demographic Forecasts

Socio-economic and demographic forecasts underlie NYMTC's entire planning process involving future travel demand. These forecasts are typically undertaken using data from the U.S. Census Bureau from the broader 28-county tri-state metropolitan region (see Figure 2.2 below), although the Plan focuses on the ten NYMTC counties. Studying trends in the 28-county region helps planners better understand the potential for growth in the region's population and economy in the future.

NYMTC uses a computer-based, mathematical model to forecast future socioeconomic and demographic growth in the region. The resulting figures are used as the basis for travel demand forecasts described in the next section. This tool is called the Best Practices Model, or BPM (see "What is the Best Practices Model?" below). The four key demographic and socioeconomic measures calculated using the BPM are:

- **Population**, which describes where people live within the region and where they begin their travel each day. By studying the current population within a region, as well as the forecasts for a definite period of time in the future, planners can study the current number of trips that are directly linked to the mobility needs of the population. These forecasts assist in decision making regarding potential transportation investments to improve mobility of the region's population;

- **Employment**, which helps describe both the end points of commute trips and the demand for the movement of various types of goods in the region. The employment trends help decision makers understand whether the region is generating or shedding jobs, influencing the number and travel demand of people in the region;

- **Labor force**, which describes of where potential workers live (which in turn determines how and when they commute from home to work); and

- **Households**, which are categorized in various ways, such as by income group, to predict how people will travel (e.g., how many cars a household owns and which modes of transport the people in that household are likely to take).

All four of these metrics are illustrated in more detail below. Details on how NYMTC employs various models and forecasting tools to derive the figures that appear in this Section can be found in Appendix 3.

About Forecasting

It is important to note that while forecasting growth is an invaluable tool for effective planning in the face of limited resources, it is not a crystal ball or the only possible outcome for future demographics and socio-economic changes.

NYMTC updates its model forecast figures regularly, providing a consistent basis upon which to prepare studies and other planning activities in the region.

The forecasts in this chapter organize data at the regional level, representing the 10-county NYMTC area, and in some cases individual counties or boroughs. Where appropriate, data is also summarized at a subregional level, including:

- The lower Hudson Valley region, consisting of Putnam, Rockland, and Westchester counties.
- New York City, including all five boroughs (counties): The Bronx, Queens, Manhattan (New York), Brooklyn (Kings), and Staten Island (Richmond); and
- Long Island, consisting of Nassau and Suffolk counties.

It is important to note that all data presented in this section represent baseline forecasts, meaning only transportation projects with funding commitments are assumed to be built. The distinction between a "build" forecast (including all funded and planned projects) and a baseline forecast is described in more detail in Appendix 3.

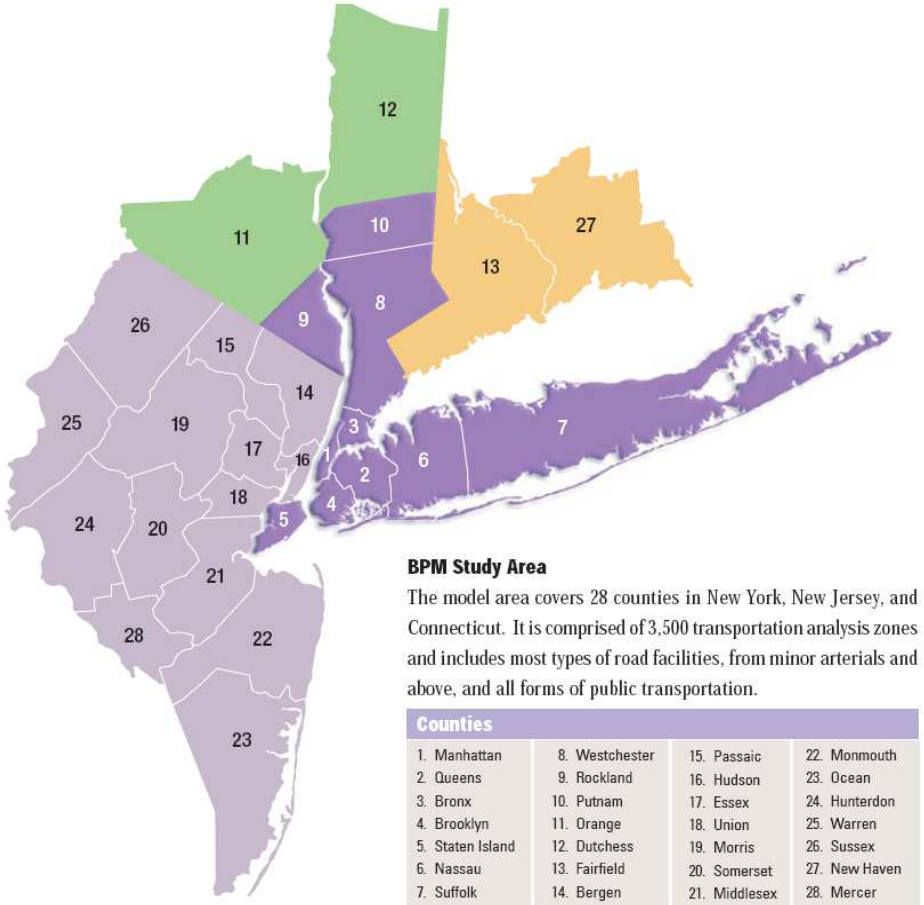


FIGURE 2.2

NYMTC Best Practices Model (BPM) Study Area

Source: NYMTC Best Practices Model Newsletter

Note: In addition to the 28 counties included in the Best Practices Model, NYMTC produces socio-economic and demographic forecasts for a 31-county region including three additional counties: Sullivan and Ulster Counties in New York and Litchfield County in Connecticut

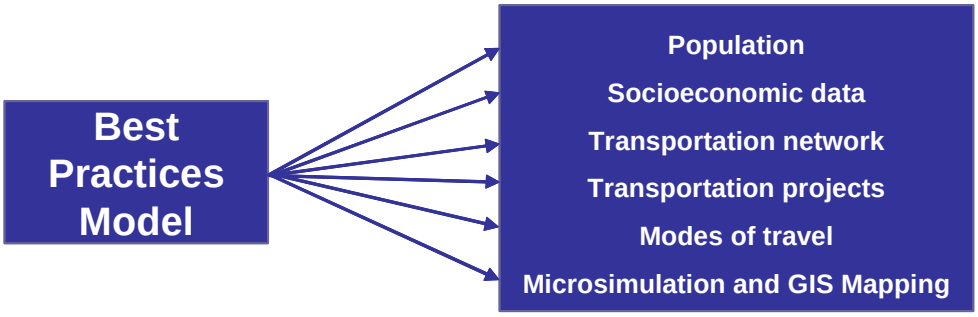
What is the Best Practices Model?

The Best Practices Model (BPM) is NYMTC's in-house methodology for forecasting changes in future travel patterns. It responds to projected changes in socioeconomic conditions and to planned changes in the transportation system in the region. It provides decision-makers and planners in the NYMTC region with a valuable tool for long range planning of the region's transportation improvements. It helps simulate and visualize future travel patterns including where people travel; how they travel (car, subway, bus or commuter rail); preferred routes (highways or local roads) and their trip times. The process requires significant human and technological resources; the model is reconfigured and updated every six months to incorporate the latest information and trends. The results are reviewed and approved by NYMTC's Program, Finance and Administration Committee.

FIGURE 2.3

Components of the NYMTC Best Practices Model

Source: NYMTC



Some of the salient features of the BPM are:

- *The model uses the innovative concept of "journeys" (multiple trip segments) rather than conventional "trips" to identify travel patterns in the region.*
- *The model simulates travel patterns rather than relying on average rates of travel associated with various types of development.*
- *The model is available for local planners to use on a variety of transportation software; the transit and highway components are based on a geographic information system (GIS) for providing a realistic and accurate representation of the highway and transit network.*
- *The highway and the transit networks are very complex, using data from various transit agencies and operators such as NYSDOT, NYCDOT, MTA and New Jersey Transit.*
- *The BPM uses two primary model types to forecast journeys and destinations: a "household, auto ownership and journey-frequency model" and a "mode destination stop choice model."*

Additional details about the Best Practices Model can be found in Appendix 3.

Population

Population in the ten-county NYMTC region is expected to increase by 15 percent from 12.6 million people in 2010 to about 14.4 million by 2035, a growth rate of approximately 0.5 percent annually.

The New York City subregion is forecasted to grow by approximately 15 percent, from 8.3 million to 9.6 million between 2010 and 2035. The population of Nassau and Suffolk counties on Long Island is expected to grow by 14 percent through 2035, while the lower Hudson Valley region is expected to grow by 14 percent through 2035. The map in Figure 2.4 summarizes population growth forecasts for each subregion.

FIGURE 2.4 (Right)

Forecast Population Growth in the NYMTC Region, 2010-2035

Source: NYMTC

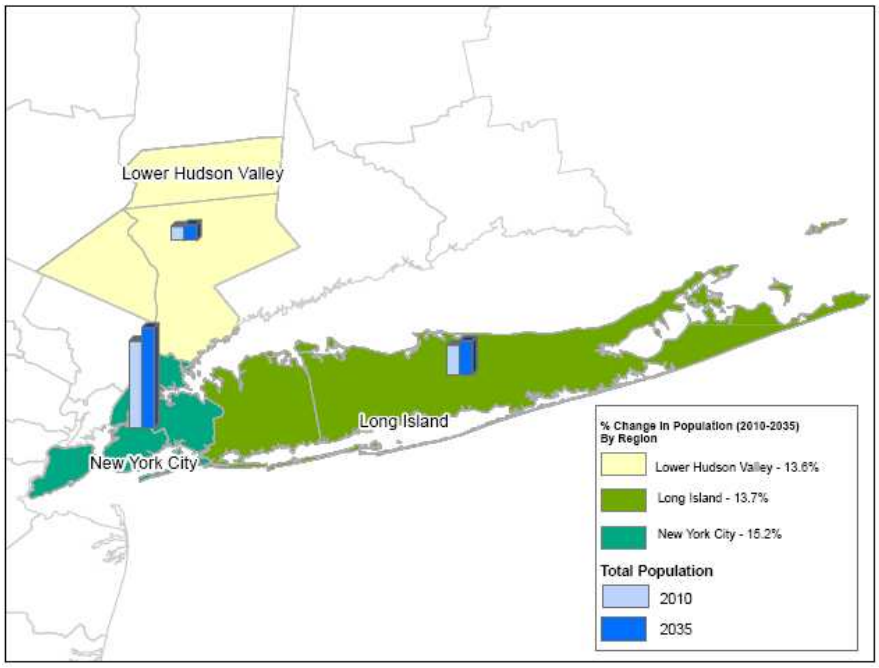


TABLE 2.1 (below)

Population Forecasts by County and Subregion (in 1,000s)

Source: NYMTC

	1970	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
Bronx	1,471.7	1,169.0	1,203.8	1,332.7	1,364.6	1,372.3	1,382.2	1,414.9	1,449.6	1,488.7	1,528.0
Brooklyn	2,602.0	2,231.0	2,300.7	2,465.3	2,511.4	2,525.2	2,534.2	2,609.5	2,693.7	2,777.8	2,860.3
New York	1,539.2	1,428.3	1,487.5	1,537.2	1,606.3	1,662.9	1,690.5	1,742.6	1,777.7	1,820.0	1,884.7
Queens	1,986.5	1,891.3	1,951.6	2,229.4	2,256.6	2,278.8	2,297.0	2,370.1	2,461.8	2,585.3	2,752.3
Staten Island	295.5	352.0	379.0	443.7	475.0	481.1	487.5	508.9	527.8	545.9	560.5
NYC	7,894.9	7,071.6	7,322.6	8,008.3	8,213.8	8,320.4	8,391.4	8,645.9	8,910.7	9,217.7	9,585.8
Nassau	1,428.1	1,321.6	1,287.4	1,334.5	1,331.6	1,339.9	1,349.1	1,358.0	1,399.1	1,446.7	1,485.4
Suffolk	1,124.9	1,284.2	1,321.8	1,419.4	1,472.1	1,530.3	1,562.0	1,604.4	1,646.7	1,710.5	1,778.7
LI	2,553.0	2,605.8	2,609.2	2,753.9	2,803.7	2,870.3	2,911.1	2,962.5	3,045.8	3,157.2	3,264.2
Putnam	56.7	77.2	83.9	95.7	100.5	102.8	105.5	110.6	116.1	120.7	125.0
Rockland	229.9	259.5	265.5	286.8	294.6	299.1	308.2	317.2	326.6	333.5	340.0
Westchester	894.1	866.6	874.9	923.5	947.7	961.5	987	1,019.4	1,045.8	1,065.3	1,083.2
LHV	1,180.7	1,203.3	1,224.3	1,306.0	1,342.9	1,363.4	1,400.7	1,447.2	1,488.5	1,519.5	1,548.2
REGION	11,628.6	10,880.7	11,156.1	12,068.1	12,360.4	12,554.1	12,703.2	13,055.6	13,445.0	13,894.4	14,398.3

Employment

The number of jobs in the ten-county NYMTC region is expected to increase by 20 percent, or about 1.5 million, from 2010 to 2035, compared to a historical increase of 1.3 million jobs over the 25-year period from 1980 to 2005. Higher proportions of employment gains are projected to occur in New York City -- specifically in Staten Island, Brooklyn, and the Bronx -- as well as in Putnam, Rockland and Westchester counties in the lower Hudson Valley. Overall the lower Hudson Valley subregion is projected to have the greatest proportional employment growth, 26 percent through 2035. Figure 2.5 summarizes employment growth forecasts for each subregion.

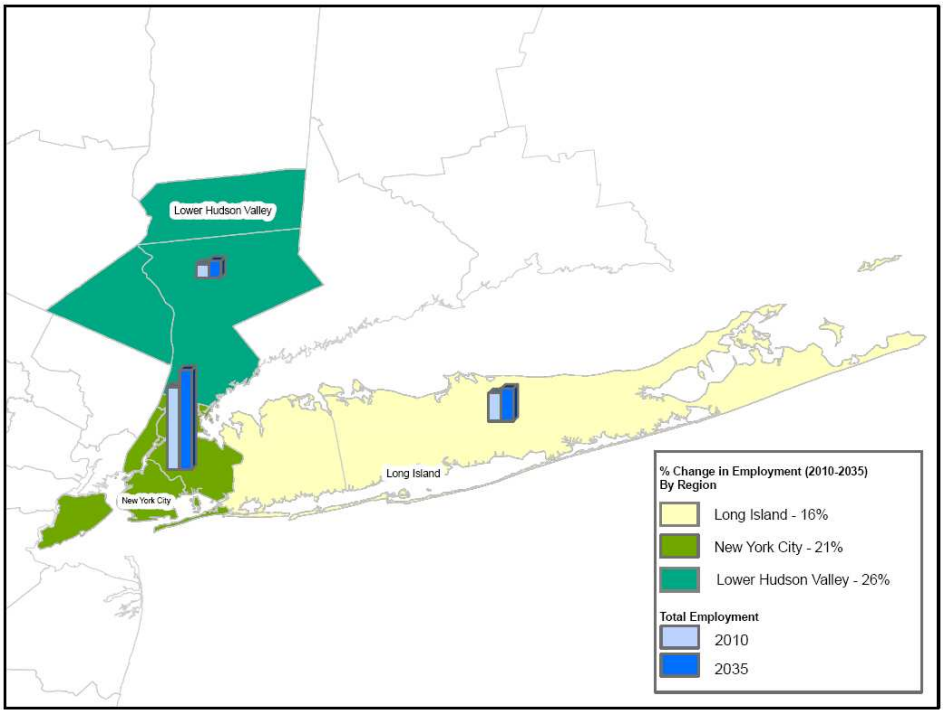


FIGURE 2.5 (left)

Forecast Employment Growth in the NYMTC Region, 2010-2035

Source: NYMTC

TABLE 2.2 (below)

Employment Forecasts by County and Subregion, in 1,000s

Source: NYMTC

	1970	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
Bronx	251.3	216.9	237.8	269.4	306.1	342.1	367.6	388.9	408.8	425.8	442.3
Brooklyn	631.9	516.4	504.5	584.6	605.4	707.7	760.3	809.3	855.2	896.1	936.7
New York	2,550.3	2,277.5	2,565.1	2,682.2	2,680.7	2,824.2	2,885.1	2,948.0	3,069.7	3,171.5	3,288.7
Queens	586.0	536.7	567.3	624.1	646.1	724.4	751.2	776.7	806.6	831.5	858.2
Staten Island	47.1	66.4	91.6	116.9	122.6	149.3	164.5	177.8	192.0	205.1	218.4
NYC	4,066.5	3,614.0	3,966.1	4,277.3	4,360.9	4,747.8	4,928.8	5,100.7	5,332.4	5,530.0	5,744.3
Nassau	575.2	661.0	716.8	743.2	765.5	800.8	813.7	823.5	833.9	849.9	869.9
Suffolk	287.4	432.2	613.0	714.1	782.6	836.0	874.2	904.3	945.3	984.3	1,026.7
LI	862.6	1,093.2	1,329.8	1,457.5	1,548.0	1,636.9	1,687.9	1,727.8	1,779.3	1,834.3	1,896.7
Putnam	11.7	17.0	26.3	31.5	34.6	40.7	43.1	45.3	47.2	48.8	50.3
Rockland	73.1	98.1	122.7	134.5	145.0	157.4	167.1	175.9	184.3	191.9	199.4
Westchester	363.2	419.5	483.6	520.4	561.8	588.3	620.9	650.3	683.3	712.7	743.0
LHV	448.0	534.6	632.6	686.4	741.4	786.4	831.1	871.5	914.8	953.4	992.7
REGION	5,377.2	5,241.8	5,928.5	6,421.3	6,650.3	7,171.0	7,447.7	7,700.0	8,026.4	8,317.6	8,633.6

Labor Force

The number of eligible workers in the NYMTC region is projected to increase at a slower rate than the number of jobs, growing from 6.3 million to 7.1 million workers between 2010 and 2035, or 13 percent. The largest percentage growth in labor during this period is expected in New York City, at about 14 percent. While the growth rate in the labor force is consistent between New York City and Long Island, the growth rate of workers in the lower Hudson Valley counties is expected to decrease after 2025.

FIGURE 2.6 (right)

Absolute Labor Force Growth in the NYMTC Region, 2005-2035

Source: NYMTC

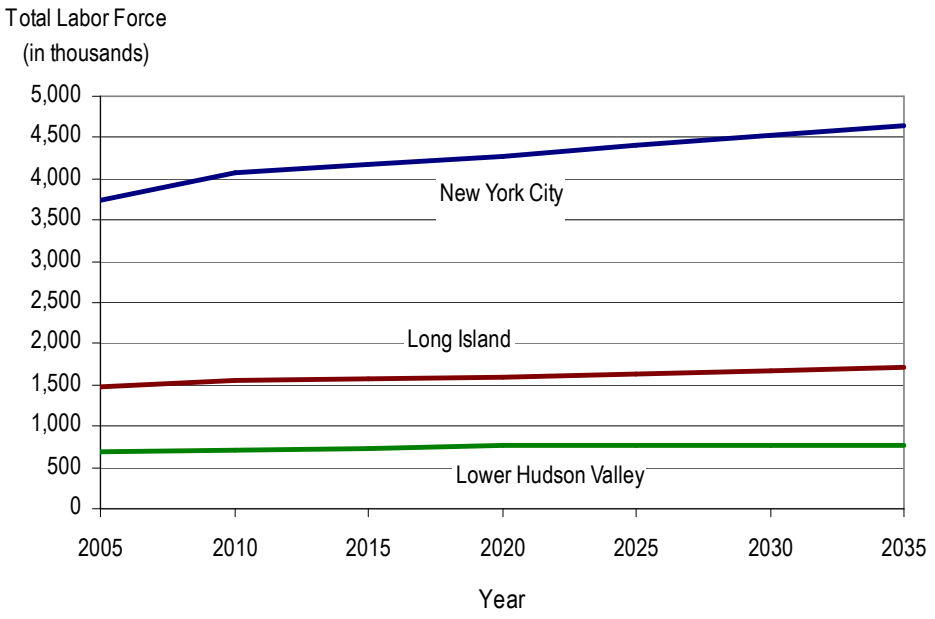


TABLE 2.3 (below)

Labor Force Forecasts by County and Subregion (in 1,000s)

Source: NYMTC

	1970	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
Bronx	552.4	443.9	501.7	486.6	503.6	622.9	644.0	665.5	687.4	701.1	715.5
Brooklyn	1,012.4	902.3	1,036.0	1,042.6	1,052.7	1,213.8	1,252.6	1,294.0	1,350.6	1,376.9	1,397.3
New York	741.7	754.1	837.2	855.3	875.3	877.3	878.6	880.4	898.3	919.8	939.7
Queens	908.9	907.4	1,015.7	1,064.3	1,074.6	1,117.5	1,142.6	1,163.1	1,204.9	1,250.1	1,320.4
Staten Island	115.3	153.6	189.2	217.2	227.8	246.7	261.4	269.3	276.2	278.5	281.7
NYC	3,330.7	3,161.3	3,579.8	3,666.0	3,734.0	4,078.2	4,179.1	4,272.3	4,417.4	4,526.4	4,654.5
Nassau	585.5	654.8	690.1	677.9	694.6	715.3	724.8	722.1	737.3	750.5	762.3
Suffolk	403.2	573.8	698.7	735.9	779.4	834.6	855.7	878.5	894.2	915.6	943.0
LI	988.7	1,228.6	1,388.8	1,413.8	1,474.0	1,549.9	1,580.6	1,600.6	1,631.5	1,666.1	1,705.3
Putnam	20.7	35.9	46.9	52.4	56.2	57.3	59.1	61.8	63.9	64.5	65.5
Rockland	86.6	125.0	141.0	145.3	152.3	152.9	160.0	165.8	169.8	168.7	169.0
Westchester	383.1	433.7	467.8	465.3	485	498.4	517.2	535.5	540.7	532.2	526.5
LHV	490.4	594.6	655.7	663.0	693.5	708.7	736.3	763.2	774.4	765.3	761.0
REGION	4,809.8	4,984.5	5,624.3	5,742.8	5,901.5	6,336.8	6,496.0	6,636.0	6,823.3	6,957.8	7,120.8

Number and Size of Households

The number of households in the NYMTC region is projected to increase at generally the same rate as population, while household size is expected to remain steady or show a decline across the entire region, consistent with past trends in the United States. The ten-county region can expect average household size to vary between 2.74 and 2.76 during this period. While New York City shows no change (or a very small decrease) in average household size between 2010 and 2035, the lower Hudson Valley and Long Island subregions show a distinct increase of 3.9 percent and 3.4 percent, respectively, in the average household size.

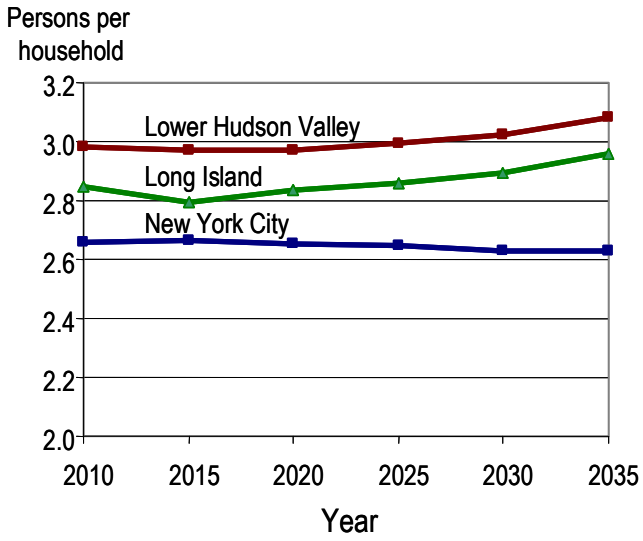


FIGURE 2.7 (left)

Change in Persons Per Household in the NYMTC Region, 2010-2035

Source: NYMTC

TABLE 2.4 (below)

Total Households Forecasts by County and Subregion

Source: NYMTC

	1970	1980	1990	2000	2005	2010	2015	2020	2025	2030	2035
Bronx	497.2	429.3	424.1	463.2	468.2	474.7	482.0	503.8	520.9	544.8	562.4
Kings	876.1	828.3	828.2	880.7	882.2	893.0	904.6	944.6	980.3	1,021.3	1,047.2
New York	687.3	704.5	716.4	738.6	731.4	745.9	741.3	759.0	779.8	806.0	842.6
Queens	690.1	711.9	720.1	782.7	782.5	780.4	777.9	800.6	821.6	860.2	911.5
Richmond	86.2	114.6	130.5	156.3	161.9	165.1	168.9	179.1	186.8	192.8	197.3
NEW YORK CITY	**2,836.9**	**2,788.5**	**2,819.4**	**3,021.6**	**3,026.2**	**3,059.1**	**3,074.7**	**3,187.1**	**3,289.4**	**3,425.1**	**3,561.1**
Nassau	401.0	423.4	431.5	447.4	437.1	441.6	444.1	444.5	453.3	463.0	464.6
Suffolk	295.6	385.7	424.7	469.3	484.1	503.1	518.3	533.8	544.3	561.4	573.6
LONG ISLAND	**696.6**	**809.1**	**856.2**	**916.7**	**921.2**	**944.7**	**962.4**	**978.3**	**997.7**	**1,024.3**	**1,038.3**
Putnam	16.0	24.4	28.1	32.7	34.5	36.0	37.6	39.9	42.0	43.5	44.8
Rockland	60.4	77.9	84.9	92.7	92.9	94.5	106.5	101.4	104.2	105.4	104.9
Westchester	282.6	307.5	320.0	337.1	333.2	335.0	343.0	354.4	360.3	361.6	359.4
MID HUDSON	**359.0**	**409.8**	**433.0**	**462.5**	**460.6**	**465.5**	**487.0**	**495.8**	**506.5**	**510.6**	**509.2**
REGION	2.93	2.66	2.65	2.68	2.74	2.75	2.74	2.74	2.74	2.74	2.76

ii. Travel Demand Forecasts for Passengers and Freight[1]

The impact of socio-economic and demographic forecasts described above is substantial and will likely result in significant changes to the characteristics and frequency of travel in the region. As described above and in more detail in Appendix 3, these socio-economic and demographic forecasts are key inputs to the Best Practices Model that is used to generate forecasts of passenger and freight travel demand.

NYMTC forecasts travel for people and goods over the same tri-state metropolitan region as the socio-economic and demographic forecasts. The resulting trends in average travel times, regional travel between counties, and mode choice aggregated by region, counties, and the New York City "Hub" region (Lower Manhattan and Midtown Manhattan) are described below.

Baseline forecasts (assuming only projects with funding commitments, but not other planned projects included in the RTP) have been produced for 2010 and 2035 travel based on model inputs. The results of these forecasts are presented in the following sections. Chapter 3 presents an overview of passenger and freight travel trends, as well as a discussion of other overarching issues affecting travel forecasts and transportation needs in the NYMTC region over the next 30 years.

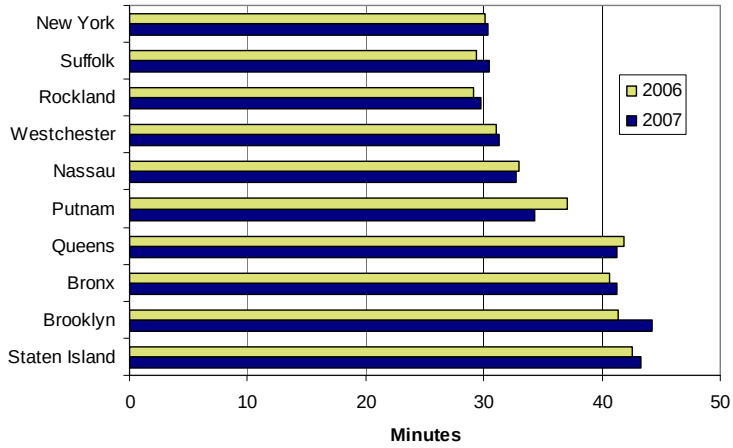
Travel Time, Destination and Mode Forecasts

Travel Time. The mean travel times to work increased across all the NYMTC counties except Nassau, Putnam and Queens counties between 2006 and 2007. While Brooklyn (Kings County) saw the largest increase (6.8 percent) in travel times to work, Putnam County saw the largest decrease (7.5 percent). New York, Westchester and Nassau experienced very little change in the mean travel times. The figure below shows the mean travel times for all the NYMTC counties. Due to a change in the way data are tabulated in 2006, the only years available for direct comparison are 2006 and 2007.

FIGURE 2.9

Mean Travel Time for All Trips in NYMTC Region, 2006 and 2007

Source: NYMTC



Inter- and Intra-County Travel. The majority of travel in the NYMTC region consists of travel within counties– and the number of these trips is expected to grow over the next 25 years. In every county and borough throughout the region, the number of local, intra-county transit trips is expected to grow faster than the number of local auto trips in percentage terms (see Table 2.5 below). However, as shown on Tables 2.6 and 2.7, with the exception of Manhattan, automobiles are the mode of choice for the majority of vehicular passenger trips within each county and borough, and will remain the dominant mode for local trips in the 2030 forecast year. Automobiles also are the predominant mode choice for trips between counties and subregions, as shown in Figures 2.10 and 2.11, with the exception of commute trips to Manhattan.

From 2010 to 2035, total transit trips are expected to increase 20 percent regionwide on average. According to forecasts, the share of all trips by transit (commute trips and non-commute trips) is expected to either grow or remain constant from 2010 to 2035 within in every county and between every county pair. An exception to this trend is trips within, to, and from Putnam County, where there is less transit service and the absolute number of transit trips is relatively small.

Substantial increases in transit ridership are expected in Queens and Staten Island, both of which currently are relatively underserved by transit compared to their populations. The use of transit for both local trips and intra-county trips is expected to increase the most for the five boroughs of New York City as well as rapidly-urbanizing Nassau County.

Intra-county automobile trips in Putnam County and Staten Island are forecast to increase approximately 20 and 17 percent, respectively, the largest such increases in the region. In New York City boroughs except Staten Island, motorized trips are expected to increase less than 5 percent, with the Bronx expected to experience a slight decrease in auto trips.

TABLE 2.5

Forecast Change in Number of Intracounty Trips by Mode, 2010 to 2035

Source: NYMTC

County	Automobile	Transit
Bronx	-3%	21%
Brooklyn	5%	20%
Manhattan	3%	14%
Queens	3%	24%
Staten Island	17%	34%
Putnam	20%	41%
Rockland	12%	29%
Westchester	10%	31%
Nassau	-1%	24%
Suffolk	11%	30%

CHAPTER 2

A Shared Future

TABLE 2.6

Daily County-to-County Trips by Auto, 2010 and 2035

Source: NYMTC

Note: Shaded cells indicate number of trips within each county/borough

2010: AUTO

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Putnam	Rockland	Westchester	Nassau	Suffolk
Bronx	768,162	8,725	132,375	21,022	908	878	1,831	149,461	5,862	1,297
Brooklyn	8,668	1,475,150	158,725	133,233	52,978	165	395	3,233	73,461	28,891
Manhattan	131,695	157,443	1,424,080	200,525	13,505	1,282	4,854	36,325	26,109	9,426
Queens	20,447	132,731	199,850	1,397,525	4,000	311	757	8,712	227,566	48,569
Staten Island	1,062	54,297	12,814	3,773	742,252	28	96	327	1,171	911
Putnam	1,037	265	1,249	299	12	175,129	233	35,371	48	49
Rockland	1,729	604	4,856	821	87	224	631,912	27,541	186	395
Westchester	150,256	3,843	35,778	8,145	264	35,393	27,279	1,172,216	1,718	643
Nassau	5,654	72,677	26,629	225,713	1,171	95	303	1,848	2,655,318	174,563
Suffolk	1,522	27,686	9,791	48,673	1,160	39	186	489	175,136	3,672,947

2035: AUTO

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Putnam	Rockland	Westchester	Nassau	Suffolk
Bronx	746,382	8,198	134,930	16,583	785	564	1,628	149,786	5,880	4,635
Brooklyn	8,289	1,548,245	164,289	142,666	51,505	156	586	3,110	75,308	37,570
Manhattan	134,338	162,460	1,463,854	203,112	12,542	662	2,747	26,387	27,558	17,617
Queens	16,356	142,110	201,971	1,434,493	5,500	261	839	7,514	221,222	55,592
Staten Island	1,036	52,233	12,275	5,252	867,678	33	71	242	2,911	2,708
Putnam	633	230	586	289	7	210,804	320	40,826	188	109
Rockland	1,486	718	2,595	892	47	324	706,384	26,817	629	741
Westchester	150,538	3,556	25,134	7,273	122	41,064	26,650	1,293,428	4,165	2,574
Nassau	5,864	75,038	29,304	219,456	3,171	225	661	4,002	2,636,511	170,721
Suffolk	5,005	36,680	18,661	55,721	3,013	110	666	2,320	171,439	4,085,921

TABLE 2.7

Daily County-to-County Trips by Transit, 2010 and 2035

Source: NYMTC

Note: Shaded cells indicate number of trips within each county/borough

2010: TRANSIT

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Putnam	Rockland	Westchester	Nassau	Suffolk
Bronx	556,315	10,248	197,801	15,546	581	42	39	19,464	1,307	304
Brooklyn	9,606	1,136,940	515,106	67,808	13,965	22	29	712	13,408	6,816
Manhattan	197,590	511,467	2,778,938	569,452	16,700	1,567	1,882	38,477	43,618	18,119
Queens	14,614	68,121	571,774	634,628	1,167	67	26	1,355	33,981	8,119
Staten Island	567	14,607	16,102	1,276	176,478	2	2	33	198	227
Putnam	43	17	1,591	82	3	258	0	166	3	0
Rockland	58	32	1,852	13	4	0	21,881	706	2	2
Westchester	19,448	757	38,872	1,040	50	139	695	124,022	48	8
Nassau	1,495	13,790	43,626	34,539	161	1	3	50	373,813	13,875
Suffolk	336	6,885	18,171	8,110	194	0	0	7	14,030	201,427

2035: TRANSIT

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Putnam	Rockland	Westchester	Nassau	Suffolk
Bronx	675,713	13,013	233,669	18,728	845	23	104	24,899	2,218	1,412
Brooklyn	12,345	1,367,211	573,563	85,090	20,935	33	68	1,043	20,196	13,292
Manhattan	233,319	570,136	3,168,622	719,738	17,914	625	1,253	33,941	67,270	34,782
Queens	18,084	85,209	722,032	783,936	2,716	59	55	1,520	45,066	15,058
Staten Island	820	21,604	17,091	2,906	237,117	1	6	44	585	780
Putnam	31	33	661	55	0	364	1	218	15	12
Rockland	132	79	1,178	67	4	2	28,126	1,065	22	36
Westchester	24,889	1,093	34,290	1,336	40	153	1,074	163,083	310	267
Nassau	2,397	20,548	67,432	45,627	527	17	19	284	464,142	19,652
Suffolk	1,364	13,329	34,861	15,179	737	7	30	203	19,580	262,018

(Next Two Pages)

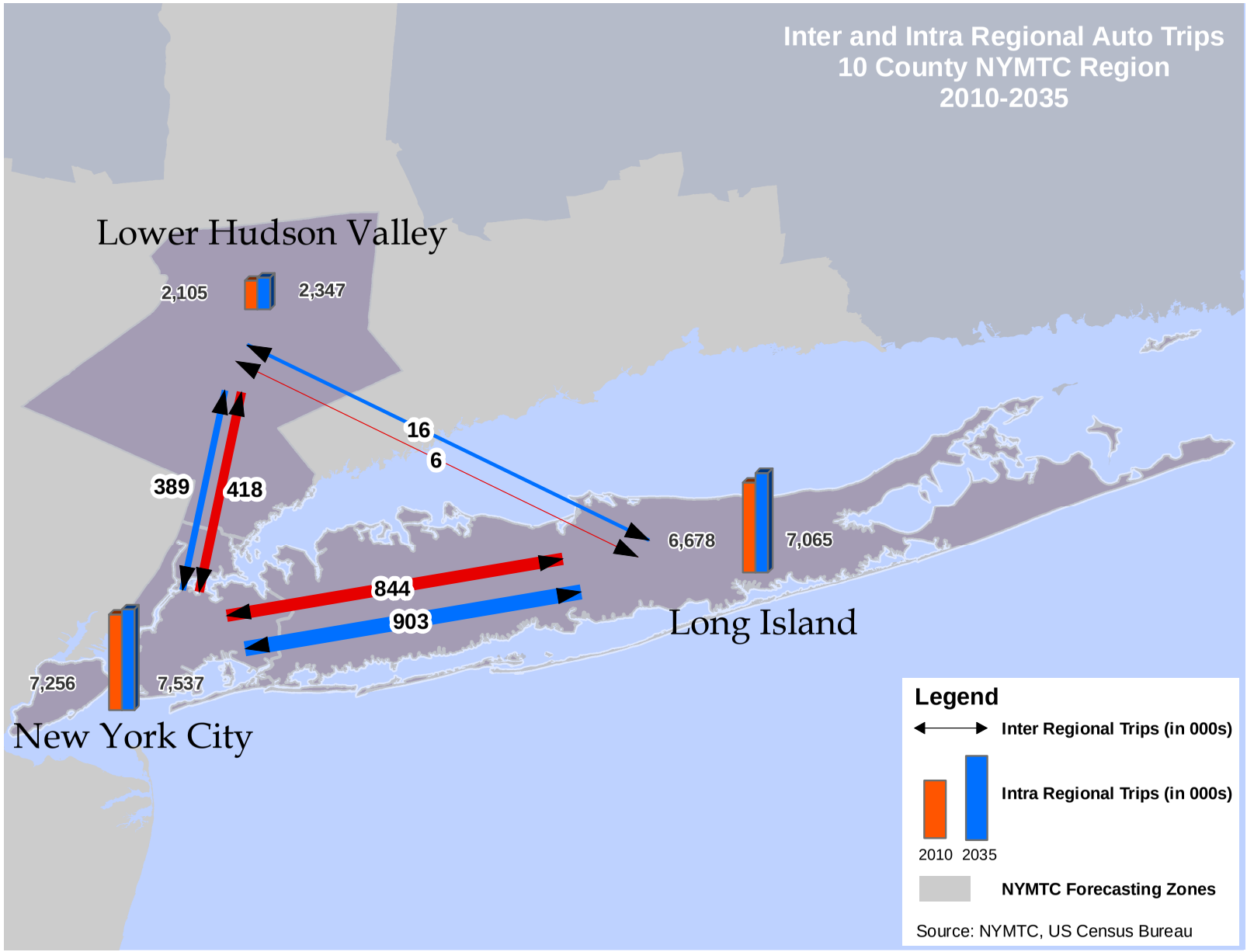
FIGURE 2.10

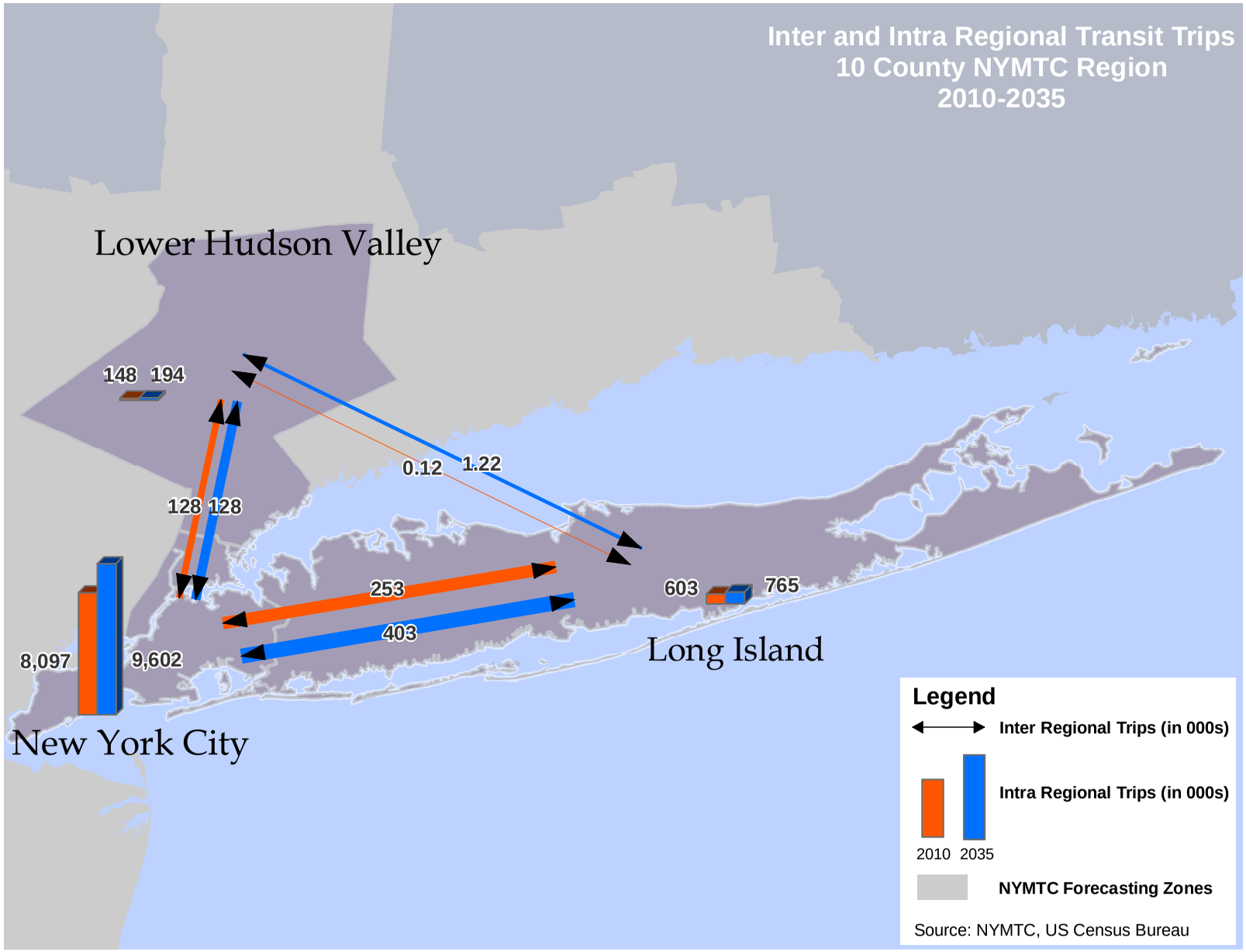
Inter- and Intra-Regional Travel Trends: Automobile Trips

FIGURE 2.11

Inter- and Intra-Regional Travel Trends: Transit Trips

Source: NYMTC


Inter and Intra Regional Auto Trips
10 County NYMTC Region
2010-2035
Lower Hudson Valley
2,105
2,347
16
6
389
418
6,678
7,065
844
903
Long Island
7,256
7,537
New York City
Legend
Inter Regional Trips (in 000s)
Intra Regional Trips (in 000s)
2010
2035
NYMTC Forecasting Zones
Source: NYMTC, US Census Bureau


Inter and Intra Regional Transit Trips
10 County NYMTC Region
2010-2035
Lower Hudson Valley
148
194
0.12
1.22
128
128
253
403
603
765
8,097
9,602
Long Island
New York City
Legend
Inter Regional Trips (in 000s)
Intra Regional Trips (in 000s)
2010
2035
NYMTC Forecasting Zones
Source: NYMTC, US Census Bureau

Vehicle Miles Traveled and Vehicle Hours Traveled Forecasts[2]

Vehicle Miles Traveled (VMT). VMT is a measure commonly used to describe the extent of automobile use on a daily or an annual basis and is an indicator of changes in travel demand across the region.

As suggested in the previous section, a growing population and number of jobs can be key drivers in pushing up VMT, as more people make more trips. In the NYMTC region, VMT is expected to rise by about two-thirds of one percent annually from 2010 to 2035, or about 16 percent overall. The Lower Hudson Valley is expected to have the highest increase in VMT at nearly 27% over 25 years, with Putnam County forecasted to see a 48% increase. Long Island growth in VMT is modest and similar to New York City. Staten Island is an exception of driving increase in New York City, with VMT forecasted to increase over 23% in 25 years.

County	2010	2035
Bronx	7,859,875	8,653,724
Brooklyn	11,570,349	12,849,966
Manhattan	9,498,994	10,109,532
Queens	18,513,894	20,722,671
Staten Island	4,662,784	5,744,129
New York City Total	52,105,896	58,080,022
Nassau	25,208,843	27,890,206
Suffolk	31,661,970	37,145,115
Long Island Total	56,870,813	65,035,322
Putnam	2,952,745	4,366,046
Rockland	6,445,057	8,156,717
Westchester	18,428,309	22,730,150
Lower Hudson Valley Total	27,826,110	35,252,912
NYMTC Region	**136,802,819**	**158,368,257**

TABLE 2.8

Daily Vehicles Miles Traveled by County, 2010 and 2035

Source: NYMTC

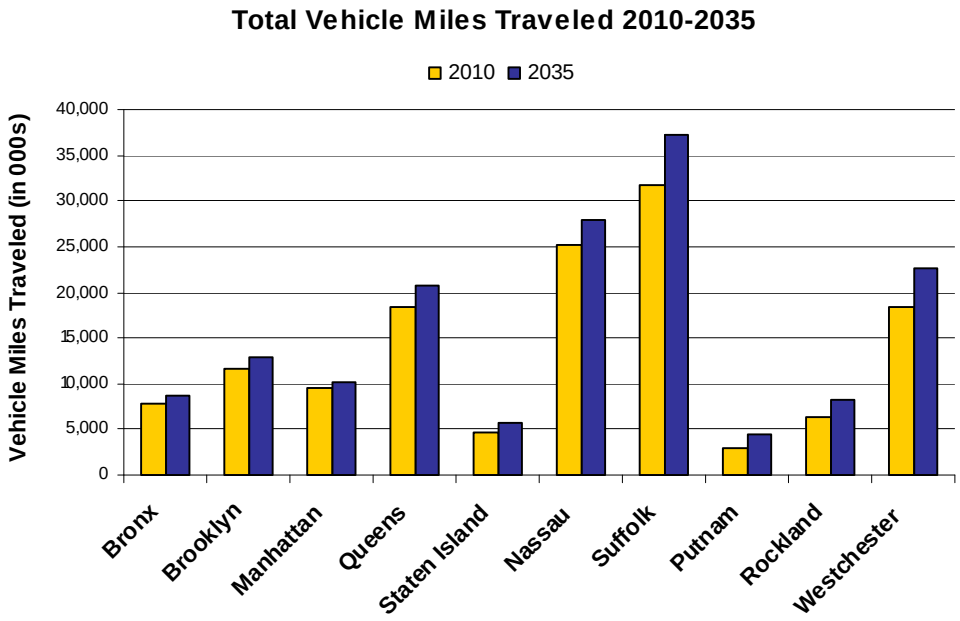


FIGURE 2.12

Daily Vehicles Miles Traveled by County, 2010 and 2035

Source: NYMTC

Vehicle Hours Traveled (VHT). VHT or Vehicle Hours Traveled reflects the efficiency of travel, primarily in terms of the average speed of travel when compared with VMT. As a corollary measure, VMT divided by VHT produces an overall transportation-system-average vehicle speed for non-transit vehicles regionwide.

In the NYMTC region, VHT is expected to rise by about 1.1 percent annually, or 27.7 percent by 2035. As with VMT, the Lower Hudson Valley and Staten Island in New York City should see the greatest increases, with a nearly 70% increase in Putnam County and an increase of over 55% in Staten Island. VHT in the rest of New York City and in Long Island is expected to increase by about 20%, or 1% annually.

County	2010	2035
Bronx	350,531	450,453
Brooklyn	865,192	1,057,062
Manhattan	1,040,145	1,229,548
Queens	1,064,589	1,372,038
Staten Island	230,367	362,937
New York City Total	3,550,825	4,472,039
Nassau	1,267,739	1,551,299
Suffolk	1,255,719	1,586,714
Nassau/Suffolk Total	2,523,458	3,138,013
Putnam	64,562	109,630
Rockland	191,655	282,101
Westchester	545,103	780,766
Lower Hudson Valley Total	801,321	1,172,496
NYMTC Region	**6,875,603**	**8,782,547**

TABLE 2.9

Daily Vehicles Hours Traveled by County, 2010 and 2035

Source: NYMTC

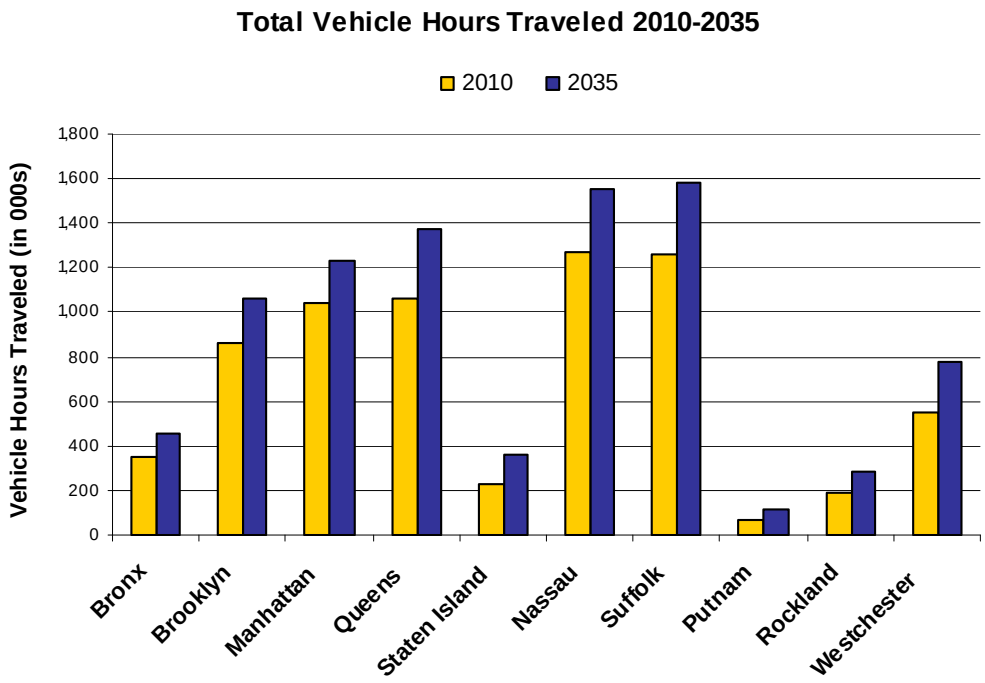


FIGURE 2.13

Daily Vehicles Hours Traveled by County, 2010 and 2035

Source: NYMTC

Freight

Volume of Freight. Economic growth is expected to spur higher freight volume growth in the 10-county NYMTC planning area, which already experiences the highest volume of total freight movement of any metropolitan area in the nation. Regional freight is expected to grow from 434 million annual tons in 2004 to 804 million annual tons in 2030, an 85 percent increase.[3] Nationally, it is anticipated that the volume of freight movement will grow 75 percent from 2007 and 2030, from 21,225 million tons estimated in 2007, to 37,210 forecasted in 2030.[4]

Freight Modes. The primary transportation modes by which freight are moved are expected to change little over the next two decades, as shown in figures 3.0 and 3.1. This forecast is based solely on economic changes and assumes nothing is done to divert volumes from mode to mode. Highway-based modes are expected to continue to dominate other modes. Trucks carry almost 90 percent of regional freight (when measured in tons), while rail and air each carry less than one percent. However, because of the significant increase in freight volume, each mode's relative volume also is expected to increase. A comparison of regional and national modes reveals that the NYMTC region may be skewed to trucks and less to rail than the national average.

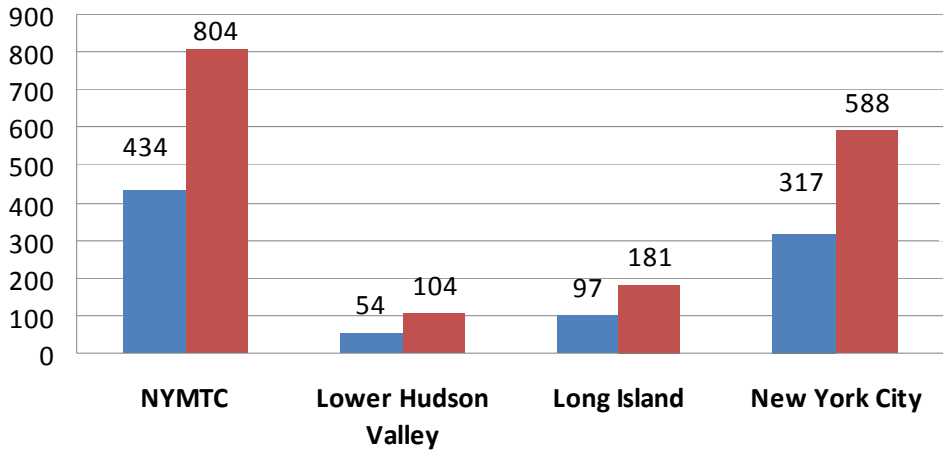


FIGURE 2.14

Freight volume in the NYMTC Region and three subregions, 2004 to 2030, in millions of tons

2004

2030

Source: NYMTC

Note: NYMTC freight forecasts are available only to 2030, in contrast to the analysis in preceding sections, where data to the 2035 horizon year of this plan were presented.

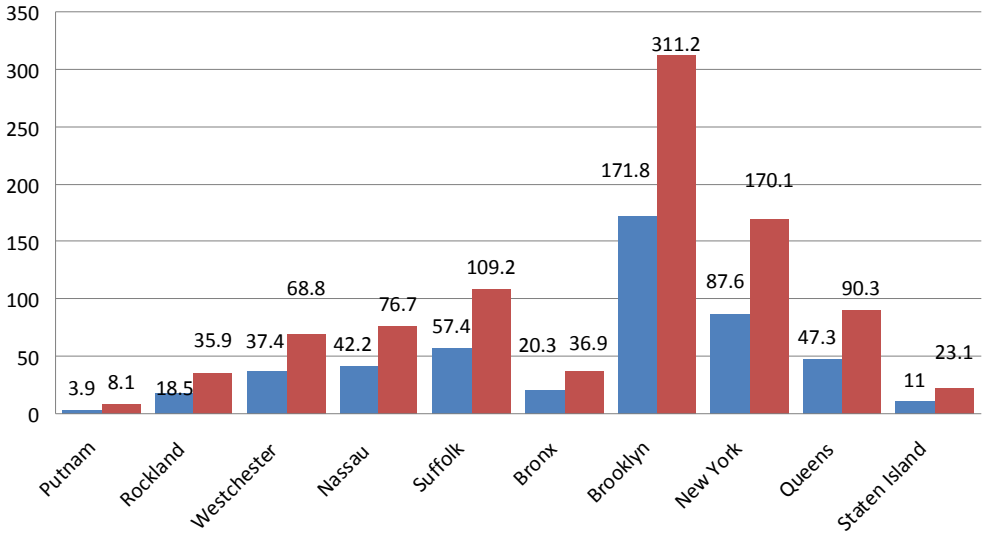


FIGURE 2.15

Freight moved by county in the NYMTC Region, 2004 to 2030, in millions of tons

2004

2030

Source: Global Insight 2004 TRANSEARCH database for NYMTC region, obtained by NYSDOT forecast by DRI-WEFA, Inc.

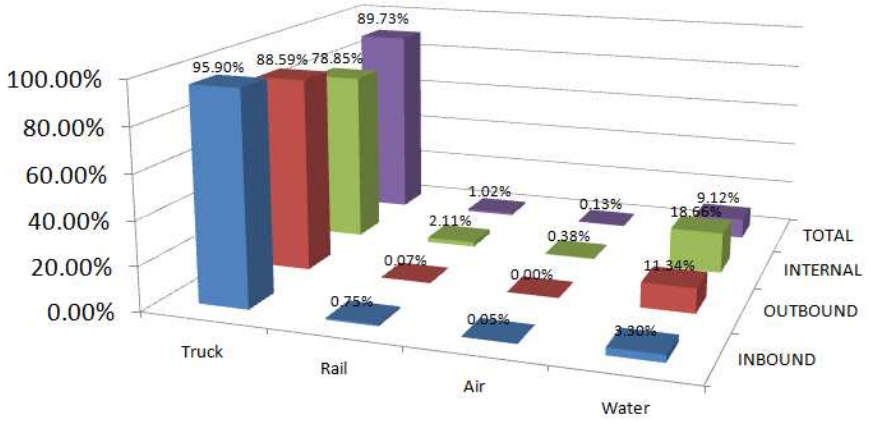


FIGURE 2.16

NYMTC 2030 Regional Freight Mode Share by Type (Percent)

Source: Rudin Center for Transportation Policy and Management at New York University, "Feasibility of Freight Villages in the NYMTC Region Study," 2009

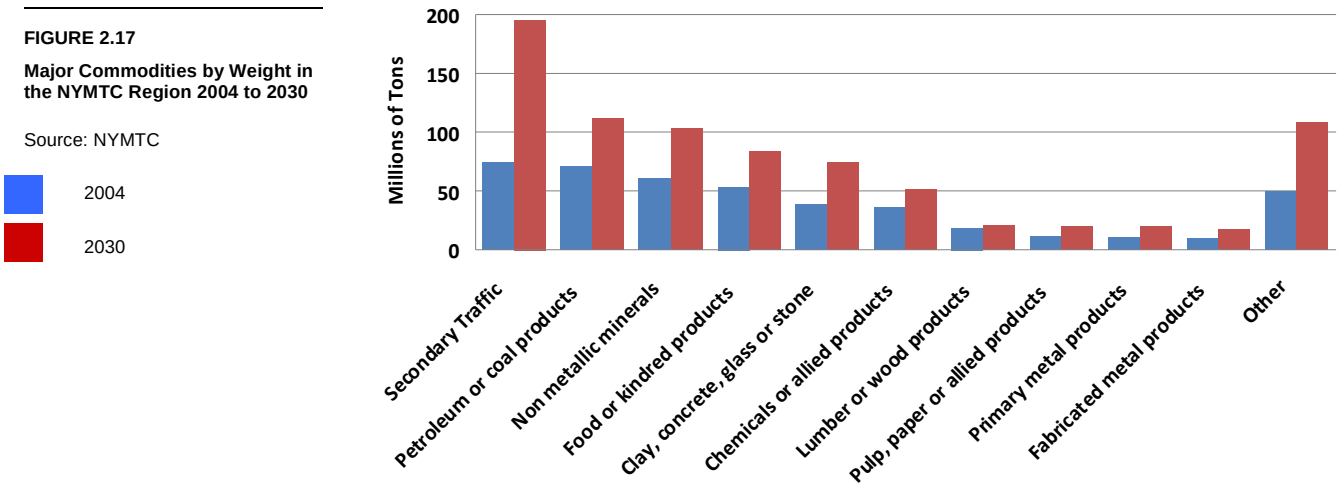
Commodity Types. Growth is expected across the commodity spectrum. Not unexpectedly, four of the top five commodity groups represent the kinds of materials that fulfill basic needs such as fuel, food, and building materials. One of the fastest growing groups is "Secondary Traffic," which consists of commodities that move between warehouses and distribution centers, often in 20-foot, 40-foot, or 53-foot intermodal shipping containers that can be transferred easily between ships, trains, and trucks.

Three of the 10 commodities – "petroleum or coal products," "pulp paper or allied products," and "lumber and wood products" – traditionally travel by modes other than truck, such as rail, barge, or pipeline. Another three of the top 10 commodities – "food or kindred products," "chemicals or allied products, and "primary metal products" – could be attracted to either rail or marine modes if they are shipped in sufficient quantities over long enough distances. Only two of the top 10 commodities – "secondary traffic" and "clay, concrete, glass and stone products" – are considered truck-dependent because of the need for "just-in-time" delivery, local availability, and high sensitivity to transportation costs.

FIGURE 2.17

Major Commodities by Weight in the NYMTC Region 2004 to 2030

Source: NYMTC




EAST
59
ROCKLAND
35A
COUNTY
WEST
59
TO
TO
TO
INTERSTATE
87
NEW YORK
THRUWAY
INTERSTATE
287

Chapter 3

Key Trends

The vision, guiding principles, and goals of the 2010-2035 Regional Transportation Plan are defined within the context of several Overarching Issues and trends which will likely influence transportation planning and policy-making in the long-term.

These external factors or conditions are expected to impact either the provision of, or demand for, transportation over the course of the next 25 years.

This chapter explores key travel trends in the NYMTC region discusses in detail each of the Overarching Issues, their potential impacts on the region's transportation system, and the ways in which the issues may affect the implementation of the Shared Goals.

i. Travel Trends

Any trip made by either passengers or commodities in the NYMTC region is likely to use more than one mode of transportation. Particularly in the core of the region, New York City, transit carries a larger share of passengers than any other transportation mode. Vehicle ownership rates are higher in the lower Hudson Valley and on Long Island than other parts of the region - a fact which is reflected in the way people travel in each region respectively.

The U.S. Census Bureau collects detailed data regarding how people travel to work through the decennial Census and the annual American Community Survey. Although a trip to work is just one of the many types of trips people may make on a given day, the ability to compare so-called "journey-to-work" data over a period of time is important in our analysis of travel trends due to the volume of "rush-hour" traffic that puts great strain on infrastructure. Other data is available from private industry firms, federal transportation administrations, and the State of New York.

Overview of Passenger Travel Trends

Every day, the region's transportation network supports approximately 3.1 million people by bus, 4.6 million on rail rapid transit, 128,500 on ferries, 150,000 on airlines, and over 200 million vehicle miles driven on the region's roads.

Between 2000 and 2006, the total number of journey to work trips increased by 13.6 percent throughout the entire region[1]. Public transit saw a 19.5 percent increase in passenger trips between 2000 and 2006. Single occupant vehicle work trips increased by 11.5 percent from 2000 to 2006 in New York City. During the same period, public transportation trips to and from work increased by 21.7 percent. On Long Island, the number of single occupancy vehicle trips increased by 5.0 percent, and in the lower Hudson Valley these trips decreased by 0.3 percent.

MTA subways, buses and railroads alone account for the equivalent of about one in every three users of mass transit in the United States and two-thirds of the nation's rail riders. Metro-North and Long Island Rail Road have the most used commuter rail system in the nation, averaging over 620,000 riders every weekday. The New York City subway provides over eight million unlinked passenger trips on a typical weekday, and nearly 3.4 million trips are taken with all bus services across the entire NYMTC region.

TABLE 3.1

Total Daily Passenger Trips by Transit in the NYMTC Region

Source: National Transit Database, 2007; "Daily Trips" are typical weekday unlinked passenger trips.

Transit Mode	Total Daily Trips in NYMCT Region (all purposes)
Rapid Transit (Subway)	8,008,839
Bus	3,380,205
Commuter Rail	622,092
Ferry	87,527
Demand Responsive Transit Services	14,970

Motorized vehicles are not the only types of transportation seeing significant use. Over 7.5 million walking trips are made in NYC each day, accounting for about one-third all trips there. The absolute number of people walking to work in the region grew nearly 30 percent between 2000 and 2006, the fastest rate of growth of any mode. In addition, the number of people commuting by bicycle in New York City has increased 116 percent from 2000 to 2008, with a 35 percent increase from 2007 to 2008. Another energy saving mode, carpooling, declined over 11.5 percent from 2000 to 2006.

The region's three major airports are among the busiest in the nation, with an estimated 47.7 million passengers at John F. Kennedy (JFK) International Airport alone in 2007. An estimated 25.3 million passengers used LaGuardia Airport in the same year. Combined with Newark Liberty International Airport in New Jersey, the number of annual passengers handled by the "big three" New York City area airports is second only to London in the United Kingdom.

As the data show, the steady growth in regional population and jobs puts pressure on the transportation system. The total number of vehicle trips has been increasing, as are travel times to work. Both roads and transit are congested, and traffic from the main highway routes is overflowing into once-quiet local roads. Some reasons typically understood to influence these trends also apply to our region:

- The suburbs and exurbs continue to be attractive to many residents, while land prices and amenities encourage long commutes in order to have access to affordable housing prices.
- Baby-boomers continue to make up a sizeable and mobile share of the workforce. Smaller fluctuations in the relative populations of younger age cohorts should be watched closely for the implications on labor force and population growth.
- Household sizes have leveled after declining since the 1970s, leading to steady or increasing numbers of travelers and trips.
- Older adults are more active than previous generations, continuing to remain active in their communities longer, either at work or in retirement.

Some trends in work and demographics may affect traffic and ridership. One is an increase the number of people working from home, which lowers strain on the transportation system especially during rush hours. Second, spikes in energy prices in 2008 led to less driving and to calls for more efficient vehicles and public transit systems. Price increases, combined with efforts to create sustainable, transit-oriented development, support the development of regional centers, which might increase efficiencies in the travel network.

CHAPTER 3

Key Trends

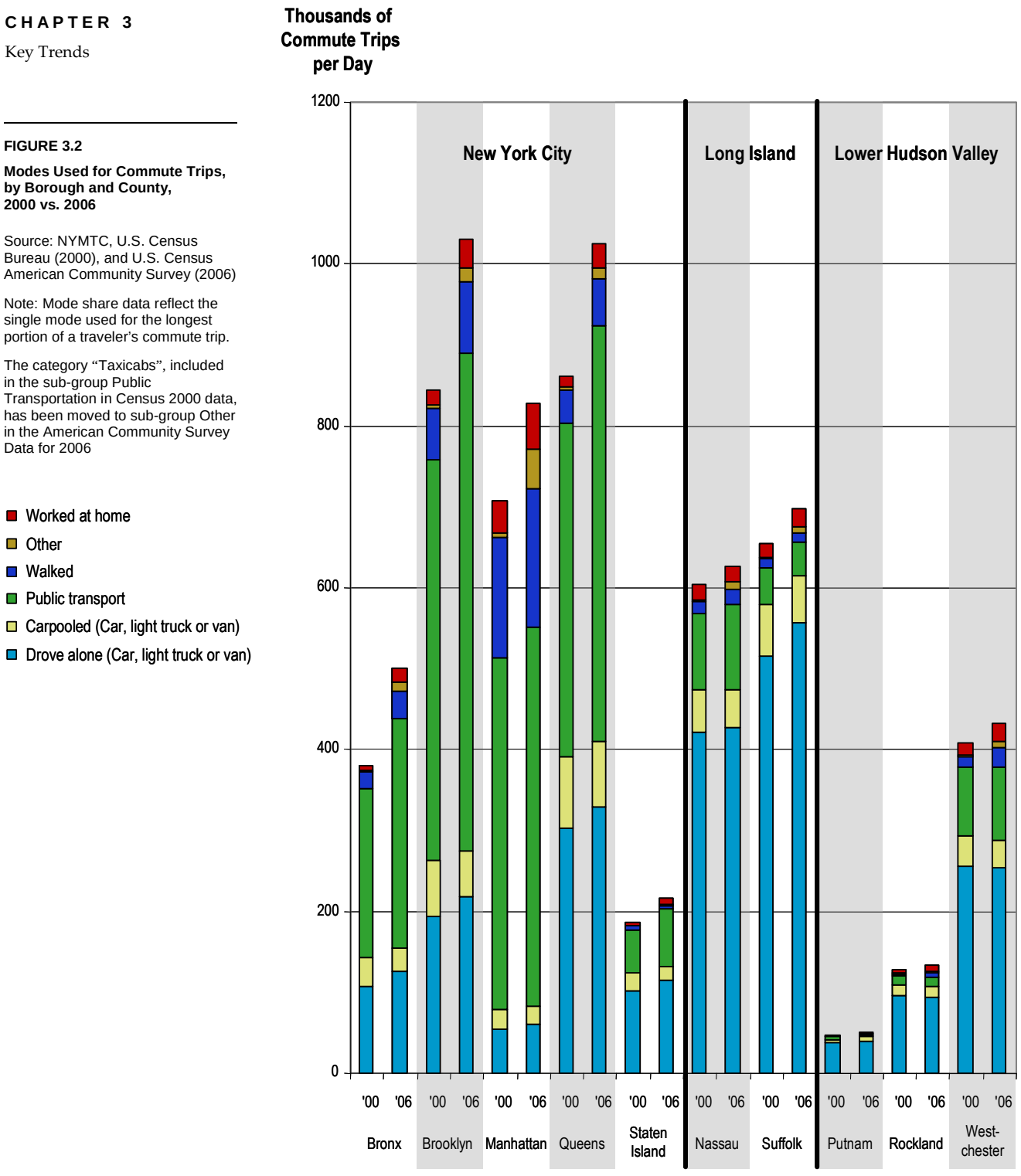
FIGURE 3.2

Modes Used for Commute Trips, by Borough and County, 2000 vs. 2006

Source: NYMTC, U.S. Census Bureau (2000), and U.S. Census American Community Survey (2006)

Note: Mode share data reflect the single mode used for the longest portion of a traveler's commute trip.

The category "Taxicabs", included in the sub-group Public Transportation in Census 2000 data, has been moved to sub-group Other in the American Community Survey Data for 2006



The Region's "Hub": Manhattan Central Business Districts

The New York City Central Business District, or "Hub,", includes Midtown- and Lower Manhattan. It is bordered by 60th Street on the north and Battery Park on the south. It makes up an area of approximately 8.6 square miles and is home to 2.5 percent of the NYMTC region's residents.

Travel patterns to the two sections of the Manhattan Central Business District (Midtown- and Lower-Manhattan) are also are significant because of the unique and important role the "Hub" plays in the economy of the region, New York State, and the entire U.S.

On a typical fall business day in 2007, approximately 3.7 million people entered the Manhattan Central Business District. Nearly 40 percent of these people (1.4 million) arrived in the morning rush hours. Of the people entering the Hub during the morning rush in 2007, 45.6 percent used public transportation, down from 49.4 percent in 2000.

The biggest increase in Hub-bound travel over the past seven years has been on buses. In 2007, 63,000 more passengers arrived by bus than in 2000, a 27 percent increase. New York City subway and Port Authority Trans-Hudson (PATH) ridership increased by 87,000 passengers, or 4.4 percent. Commuter and intercity rail services also experienced steady ridership increases over this period, reaching 305,000 in 2007, or 8.1 percent of all passengers entering the Hub.

Overview of Goods Movement Trends

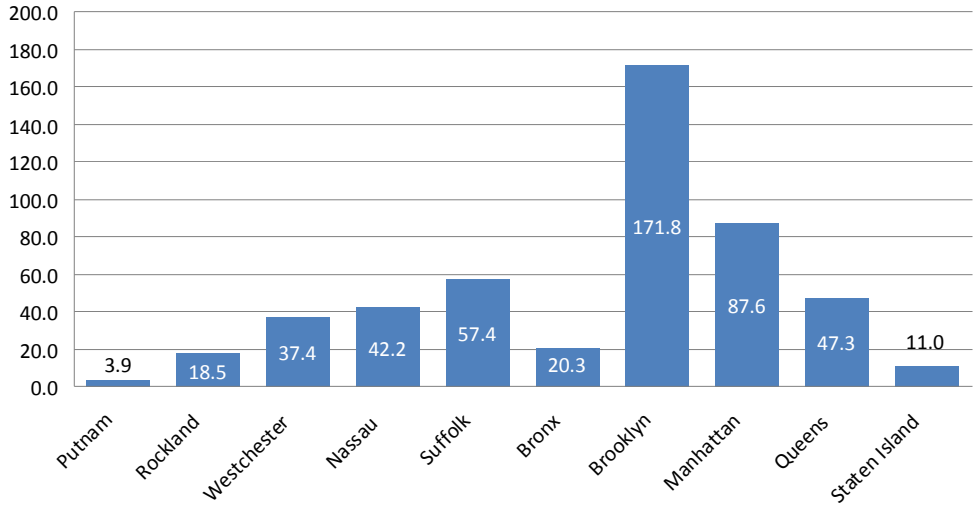
As population grows, so does the need for all types of commodities to sustain people and the economy. Freight movements have been increasing to match the growing need for goods and materials used, produced, and discarded in the region. Long-term economic growth is expected to continue, increasing the volume of freight moved in the region.

Between 1999 and 2003, the value of merchandise trade through the Port of New York and New Jersey increased by 40 percent—a 42 percent increase for imports and a 36 percent increase for exports. During the same period, tonnage increased by 27 percent. In 2007, 3.9 million twenty-foot equivalent units (TEUs) were handled by the Port, a 124 percent increase from 1.4 million TEUs in 1997. Nearly 40 percent of cargo is liquid bulk material, 27 percent is handled in shipping containers, 22 percent is crude oil, with the remainder made up of automobiles, dry bulk goods and general cargo.[2]

FIGURE 3.3

2004 NYMTC Total Tons Moved by County (millions of tons)

Source: NYMTC



The majority of freight traffic is transported by truck. One study estimated that between 85 and 95 percent of all commodities leaving area Port terminals are transported by truck, as opposed to rail or barge services.[3] Roughly 48 percent of trucks leaving the Port are destined for locations east of the Hudson River.[4] Access from the west side of the Hudson to markets on the east side relies on a limited number of bridges and tunnels: the Bayonne and Goethals Bridges, and Outerbridge Crossing to the south (all of which feed into the Verrazano Narrows Bridge); the George Washington and Tappan Zee Bridges to the north; and, in the middle, the Lincoln and Holland tunnels. (Trucks are currently restricted from passing through the Holland Tunnel.) In addition to the freight-related congestion on local roads used to access port facilities and major freight destinations, the Brooklyn-Queens Expressway, Long Island Expressway, Cross Bronx Expressway and the New Jersey Turnpike are also heavily congested with passenger traffic, restricting efficiencies of freight travel on the region's highways and on highways leading to and from the region.

Approximately 20 percent of freight traffic in the region (measured by weight) travels via waterways. Port facilities in New York Harbor handle the second largest amount of freight traffic after those in the combined port of Los Angeles and Long Beach, California.[5] The Port brought in over $101 billion dollars of international freight in 2003, representing about 13 percent of the value of U.S. international waterborne freight shipments. Over six percent of all U.S. international waterborne tonnage (78 million tons) moved through this port in 2003. Imports accounted for the majority of both tonnage and value of the freight handled by the port, with 89 percent and 76 percent shares, respectively.[6]

About one percent of all freight is carried by rail in the region. The region has about 1,250 acres of freight rail facilities handling 246,000 carloads annually. NYMTC studies show that even without major new facilities, there will be a nearly 75 percent increase in rail carload traffic, from approximately 1.8 million carload tons in 1998 to 3.1 million tons in 2025.

Although less than one-half of one percent of the NYMTC regions' freight traffic (measured by weight) is carried by air cargo, JFK Airport is the second busiest air cargo port in the United States after Los Angeles in terms of value. The value of freight moved by air cargo can be more meaningful than the weight. In 2003, 21 percent of all air freight value and 11 percent of air freight tonnage entered the United States through JFK Airport, representing nearly $112 billion in trade.[7]

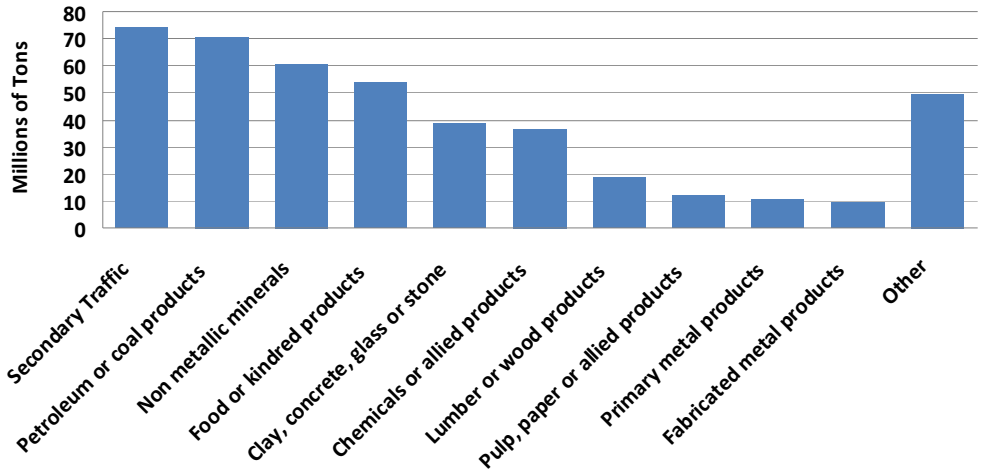


FIGURE 3.4

2004 Major Commodities in the NYMTC Region (millions of tons)

Source: NYMTC

Goods movement in the NYMTC region is forecasted to rise in the coming decades to meet the nation's demand for imports and business demand for export services. While NYMTC does not forecast freight movement, recent studies have given consistent forecast results. By 2040, according to regional independent forecasts, the NY/NJ Port alone can expect to ship between 14.1 and 17.8 million shipping containers (as measured in twenty-foot equivalent units, or TEUs), including imports and exports, both loaded and empty. The forecasts predict a 51.6 to nearly 115 percent increase in freight movement by the year 2040.

ii. Overarching Issues

A variety of overarching issues—including changes in people's lifestyles and the makeup of the workforce; economic innovation and technology-driven changes; globalization and accompanying security issues; energy and climate change; and finance—are all intertwined with demand for passenger travel and goods movement. This section explores the key trends associated with each of these Overarching Issues and discusses their potential impact on the region's transportation system and on implementation of the Shared Goals.

a. Lifestyle and Workforce Change

A number of demographic and socioeconomic trends influence people's lifestyle choices and their demand for transportation access, service, and modal selection. Such trends also will affect the way in which NYMTC achieves its Shared Goals. Perhaps the most significant demographic trend in the region is the aging of its population. Other trends related to types and locations of jobs, as well as population changes across the region, will also have an impact.

Population Trends in the NYMTC Region

In 2000, the population of the 10-county NYMTC region was 12,068,148, up 8.2 percent (~912,090) from the 1990 census (an annualized growth rate of 0.78 percent).[8] While overall growth in the region was lower than the national average (13.2 percent) for the same decade, growth within the counties varied significantly, ranging from Manhattan, with an increase of only 3.3 percent, to Staten Island, which saw an increase of 17.1 percent (Figure 3.5).[9] Queens added the most residents in terms of actual numbers (nearly 278,000), resulting in a growth rate of 14.2 percent during this decade.[10]

Of note, population growth rates seem to have slowed since the 2000 Census, declining nationally from 13.2 percent between 1990 and 2000 (an annualized growth rate of 1.24 percent), to approximately 6.4 percent between 2000 and 2006 (an annualized growth rate of 1.04 percent).[11] The NYMTC region appears to be following a similar pattern, with the current growth rate between 2000 and 2006 at only 2.4 percent, or an annualized growth rate of 0.39 percent (Figure 3.6).[12]

Perhaps of even greater interest is the fact that while some counties in the region are experiencing population growth, others are experiencing a decline. Between 2000 and 2006, Richmond and Putnam counties continued to exhibit strong population gains. However, Nassau County's growth during this period not only slowed – it was negative, as the county lost population. Similarly, Queens County's growth was significantly lower than in the previous ten years. On the other hand, Manhattan's (New York County) population grew more quickly than previously. Such differences may influence decisions on future transportation policies and investments.

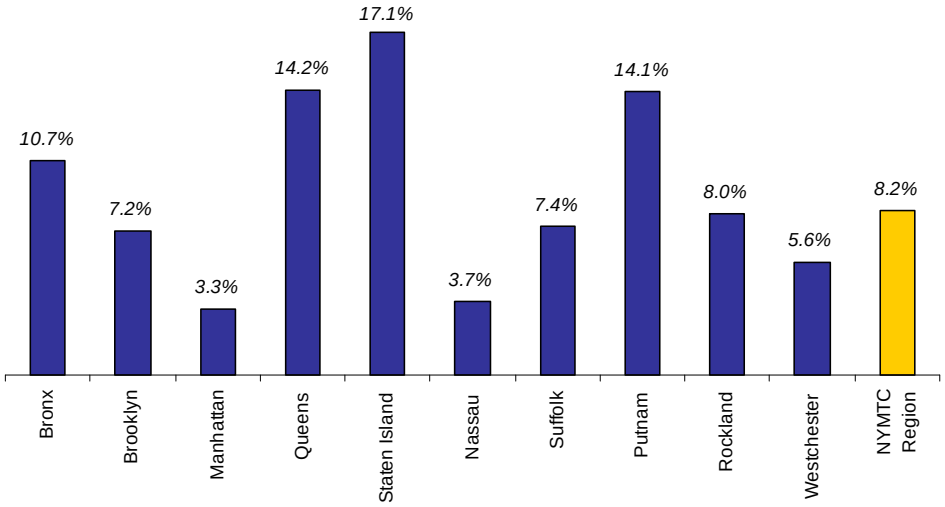


FIGURE 3.5

1990-2000 Population Growth Rates by County

Source: U.S. Census Bureau, 1990 and 2000 Census, Summary File 1.

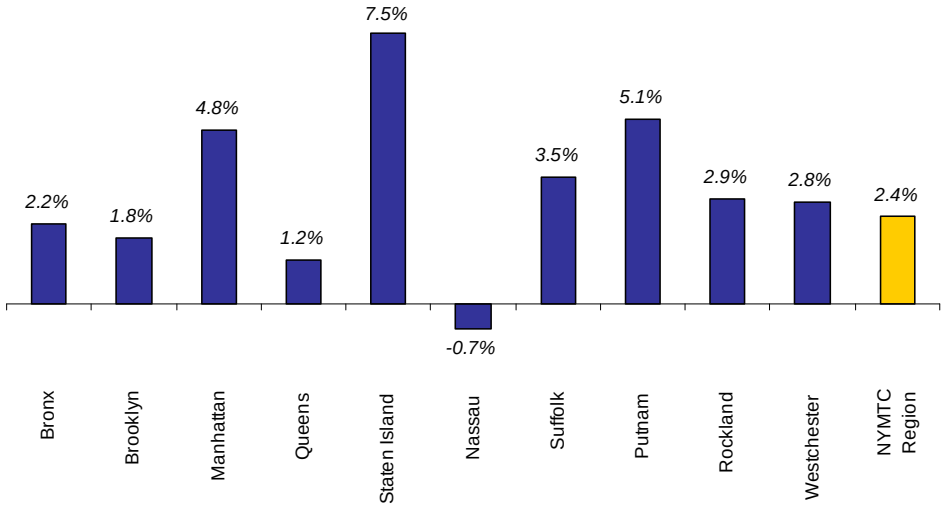


FIGURE 3.6

2000-2006 Population Growth Rates by County

Source: U.S. Census Bureau, 2000 Census, Summary File 1; 2006 American Community Survey.

The Aging Population and Mobility

Perhaps the most significant demographic change in the region is the aging of the population. The provision of appropriate modes of transportation needs to be carefully considered, particularly for older adults. While the NYMTC region has the most extensive public transportation network and demand-responsive services in the United States, some of those needing service remain beyond the reach of this network, and cost may be a barrier to expanding these services.

From 1996 to 2006, the regional rate of growth for the number of people over 85 years old was 35 percent, while the rate of growth for those between 80 and 84 years old was 22 percent.[13] Although the actual number of those in the upper age brackets remains relatively low compared with the rest of the population, the aging of the baby boomer generation (currently aged 45 to 64 years old) will likely swell the ranks of the older adult age brackets (those 65 and older). For example, nationally the number of individuals aged 45 to 64 grew 20 percent between 1990 and 2006 as the baby boomer generation reached this age bracket, but the growth rate for the same generation in the NYMTC region was 36 percent.[14] When the NYMTC trends are broken down by finer age brackets, the proportion of people between 55 and 59 years old showed the most dramatic increase – 40 percent – during the same time period.[15]

Aging often implies reduced mobility and changes in mobility needs. As individuals grow older, they are more likely to encounter disabilities and frailties that make walking to and from transit stations, up and down stairways, and operating a motor vehicle more difficult.[16] Older adults often eventually find themselves unable to drive and in need of alternative transportation modes, be it traditional public transit or demand-responsive transit services. An aging population also requires more specialized pedestrian facilities such as curb extensions and pedestrian islands to compensate for slower walking speeds when crossing streets. However, a recent national survey of the population over 50 years of age indicated that 40 percent did not find adequate sidewalks in their neighborhoods, while roughly half of those polled were concerned about not being able to safely cross streets.[17] In fact, 40 percent of pedestrian fatalities in the United States involve this age group.[18]

Photo courtesy of MTA Long Island Railroad.

Employment Trends

Over two million jobs in the NYMTC region are located in Manhattan, while Suffolk County, Nassau County, Queens, and Brooklyn collectively employ a comparable number of workers (Table 3.1). However, between 2000 and 2005, the region's overall job growth was stagnant. Indeed, the latest data shows that the region actually lost 1,341 jobs lost in this period (a slight decline of 0.03 percent), even as the nation's job growth grew 2 percent during the same period.[19]

As with population, there are significant differences at the county level. Manhattan lost over 80,000 jobs between 2000 and 2005 (a 4 percent decrease), while Brooklyn gained the most jobs (37,802), followed by Suffolk County (32,918). Putnam County experienced the fastest growing employment rate, with a 14.6 percent increase, or an additional 2,795 jobs between 2000 and 2005. As individuals increasingly need to travel to and from new and/or different destinations, diverse demands will be placed on different parts of the transportation network and investments may be needed in new and different areas.

County	2000	2005	Change in Number of Jobs	Percent Change
Bronx	206,372	218,648	12,276	5.9%
Brooklyn	431,792	469,594	37,802	8.8%
Manhattan	2,080,875	1,997,175	-83,700	-4.0%
Queens	475,670	473,593	-2,077	-0.4%
Staten Island	84,673	87,363	2,690	3.2%
Nassau	562,350	561,847	-503	-0.1%
Suffolk	522,800	555,718	32,918	6.3%
Putnam	19,097	21,892	2,795	14.6%
Rockland	100,520	104,581	4,061	4.0%
Westchester	392,739	385,136	-7,603	-1.9%
All ten counties	**4,876,888**	**4,875,547**	**-1,341**	**0.0%**

TABLE 3.1

Employment Growth by County, 2000 to 2005

Source: U.S. Census Bureau, County Business Patterns, 2000-2005, http://www.census.gov/epcd/cbp/download/cbpdownload.html.

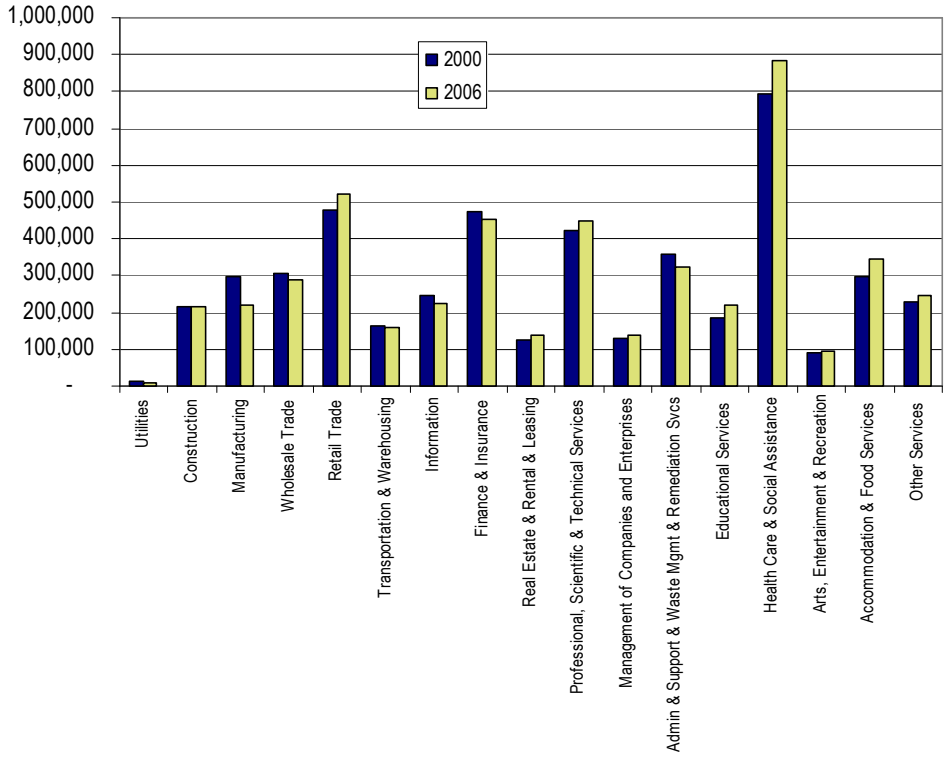
A number of employment trends are expected to influence the region during the next few decades. First, manufacturing continues to decline both in the nation and the region. Historically the engine of economic development in industrialized countries, manufacturing industries are increasingly moving away from the region as the costs of doing business (including but not limited to labor costs) rise.[20] Although some of these industries may have relocated within the region, many have moved to other parts of the United States or abroad. Indeed, while manufacturing jobs in the United States as a whole declined by 17 percent between 2000 and 2005, the NYMTC region lost close to 30 percent of its manufacturing base, with a decline from 297,099 to 229,159 jobs (see Figure 3.7).

Second, the availability of state-of-the-art information and communication technology and ever-increasing globalization has increased "offshoring" of highly standardized information technology-enabled back-office jobs (e.g., telephone or online-based customer service) to other countries, especially to India, where many people speak English fluently.[21] Thus, the rate of growth of the information industry in the United States has declined by 4 percent between 2000 and 2005. According to a study by Atkinson and Wial, the New York Metropolitan Area (including Northern New Jersey) is expected to lose between 2.1 and 2.5 percent of these types of jobs to foreign competition by 2015.[22]

FIGURE 3.7

Job Growth by Major Industry in the NYMTC Region , 2000 to 2006

Source: U.S. Census Bureau, County Business Patterns, 2000-2006, http://www.census.gov/epcd/cbp/download/cbpdownload.html



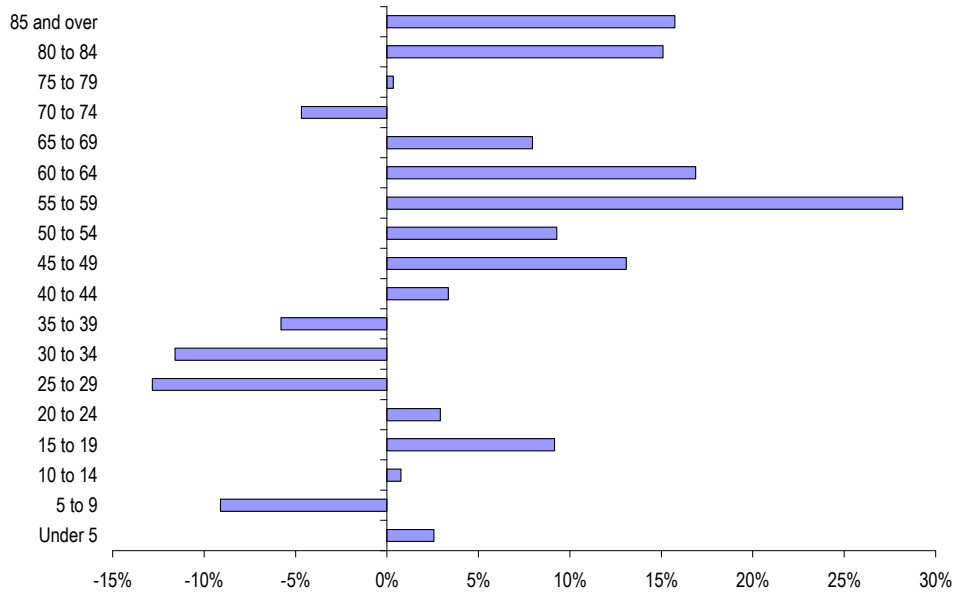


FIGURE 3.8

Change in Population by Age Groups in the NYMTC Region, 2000 to 2006

Source: U.S. Census Bureau, 2000 Census; 2006 American Community Survey.

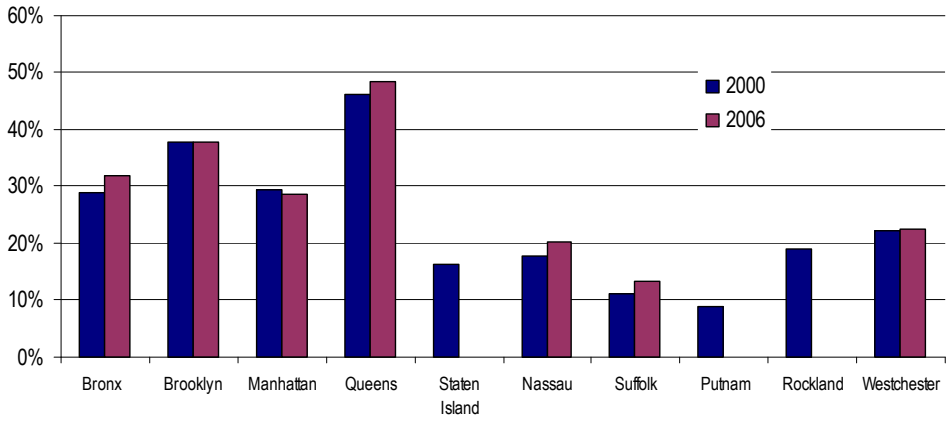
Third, high-skill and knowledge-based jobs have also been decreasing in the NYMTC region. Roughly 5 percent of the jobs in the Finance and Insurance sector, the third largest job generator in the region, were lost between 2000 and 2005 (Figure 3.7). By contrast, there was an almost 8 percent job increase in this sector in the nation as a whole.[23] The decrease was steepest in Manhattan where 12 percent of the Finance and Insurance jobs were lost during this period.[24] Some of these jobs moved to other counties in the region (notably Brooklyn and the Bronx), but the recent economic downturn is likely to further this decline in the coming years.

Shifts in the Labor Force. As mentioned earlier, the population of the NYMTC region is aging. Of concern for the labor force, the growth in the number of older adults is being accompanied by slower or negative growth rates in the lower age brackets (Figure 3.8). As a result, not only is the number of older adults growing as aging baby boomers swell the ranks, but older adults represent an increasingly larger share of the overall population. This imbalance may have serious implications for the labor force that supports the region's economy.

FIGURE 3.9

Percentage of Population that is Foreign Born by County

Source: US Census Bureau, 2000 Census; 2006 American Community Survey. Note: 2006 information for Putnam and Rockland Counties and Staten Island is not available



Foreign-born workers offer one means for bridging this gap. According to the 2000 Census, the overall foreign-born population already represents about 29 percent of the total 10-county population (Figure 3.9). Between 2000 and 2006, the proportion of foreign-born residents increased in all the NYMTC counties except Manhattan (where their share decreased slightly). The participation of foreign-born residents in the workforce is not insignificant. According to the New York City Economic Development Corporation, 36 percent of New York City's workforce in 2004 consisted of foreign-born residents (notably from Mexico, China and Ecuador).[25] These workers also help sustain the region's economy, and may become even more valuable if it turns out that the region cannot attract highly skilled U.S.-born graduates for four strategic sectors: finance and insurance; information technology; professional, scientific and technical services; and health care and social assistance. These four sectors alone account for roughly 36 percent of the jobs in the NYMTC region.[26]

Commuting Patterns

Changes in demographic and socioeconomic trends can influence commuting patterns, and therefore, the demand for transportation. Areas with new employment centers and more residents may find the need for increased transit and highway capacity, while areas that are currently at or over capacity may find themselves with less transportation demand as jobs and people move elsewhere.

The 2000 Census provides a snapshot of current commuting patterns (Table 3.2). For the five boroughs of New York City, more than 70 percent of workers commuted within their home county, or to Manhattan. Eighty-four percent of Manhattan-resident workers commuted within Manhattan. Putnam County was the only county where the majority of residents worked elsewhere, with 42 percent of workers commuting to Westchester County, and 9 percent commuting to Manhattan.

In addition to workers from within the region, a number of residents from beyond the NYMTC region commute to New York City each day. For example, roughly 7 percent of New Jersey workers and over 6 percent of workers in Fairfield County, CT, are employed in New York City. In addition, more people are commuting longer distances than in previous decades, and the number of "extreme commutes" (people commuting over 1.5 hours each way) increased by 37 percent from 1990 to 2000.[27]

TABLE 3.2

Top Work Locations by Residence

Source: U.S. Census Bureau, 2000 County Business Patterns

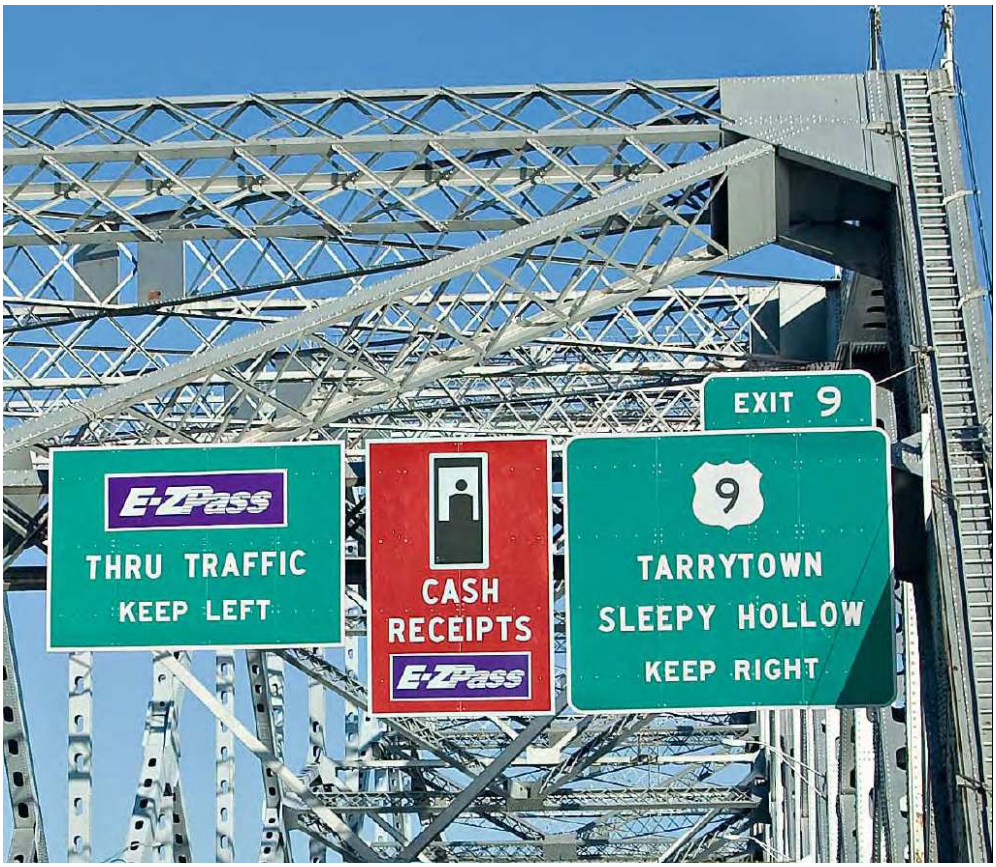
Residence	Work Location	Share of Total Workers
Bronx	Bronx	41%
	New York	39%
Brooklyn	Brooklyn	48%
	New York	38%
New York	New York	84%
	Brooklyn	3%
Queens	Queens	40%
	New York	37%
Staten Island	Staten Island	45%
	New York	28%
Nassau	Nassau	58%
	New York	15%
Suffolk	Suffolk	73%
	New York	14%
Putnam	Putnam	42%
	New York	29%
Rockland	Rockland	55%
	New York	13%
Westchester	Westchester	63%
	New York	19%

b. Economic Innovation and Technology Change

Innovation is defined as "the introduction of a new product, process, method or system into the economy," which leads to a dramatic increase in productivity.[28] While employment and population growth have been slow in the NYMTC region, economic output (measured as per capita output) has continued to rise, indicating an increase in productivity. The region's strong economy is a result of its comparative advantage in having a highly-skilled workforce and several knowledge-based sectors.

However, knowledge-based economies require efficient transportation systems to ensure the seamless movement of people and goods. Chronic severe congestion on roadways, on transit and rail, and in the air, can undermine the region's continuous economic success, thus making it difficult to fully realize the Shared Goals of "*Improve the Regional Economy"* and "*Improve the Regional Quality of Life*."

Technological innovations and the expansion of information and transportation technologies may lead to changes in travel patterns (e.g., increase in telecommuting and e-shopping) that could help relieve congestion. While it is not clear whether these new patterns will increase or decrease overall traffic on roadways, this is an important trend to consider when addressing the Shared Goals of "*Improve the Regional Quality of Life"* and *"Enhance the Regional Environment."*



The NYMTC Region's Innovation Economy

The Strength of the Regional Economy. Gross Domestic Product (GDP), the sum of the market values of all goods and services produced in a nation or a region, is often used as an indicator of the strength of an economy.[29] As an economy expands, GDP increases, and more economic activities and opportunities emerge that can then support additional investment activities.[30] In this sense, GDP can be used as a proxy for the potential of the NYMTC region to attract and maintain investment. In 2005, the New York metropolitan area, including northern New Jersey, had a $0.98 trillion GDP, roughly 10 percent of the GDP of the United States.[31] (If it were an independent nation, the New York metropolitan area would rank as the 15th largest economy in the world.[32]) By comparison, the next largest economic center in the United States, the Los Angeles-Long Beach-Santa Ana metropolitan area, has a GDP of approximately $0.58 trillion.[33] With its relatively high GDP, the NYMTC region offers opportunities for further investments and entrepreneurial activities, which are in turn needed to spur economic innovation.

Concentration of Global and National Businesses. In addition to the strength of its economy, the NYMTC region has developed around a world-class urban center – New York City. This metropolis is an economic engine for the region as well as for the United States, and features a very significant business agglomeration. In 2007, it was home to 22 Fortune Global 500 company headquarters (Figure 3.10). The high concentration of internationally competitive firms within New York City, together with the city's apparent entrepreneurial setting, confers additional economic opportunities through synergies that cannot be obtained in isolated locations. Thus, many global companies find incentives to operate in markets in the New York City area, and in turn they spur further economic activities. Only two other cities in the world had more Fortune Global 500 company headquarters than New York City in 2007; Tokyo had 50 headquarters and Paris had 26.[34] Houston, TX, the only other U.S. city that made the top-ten list, had only 7 headquarters.[35]

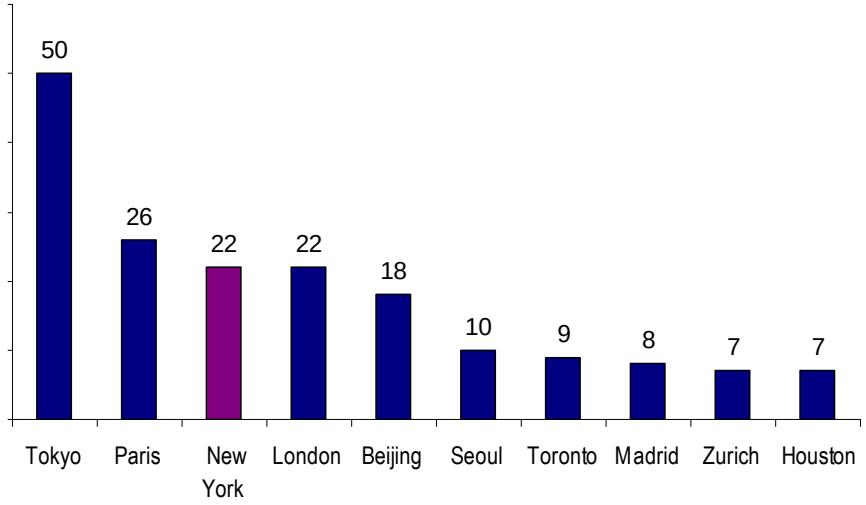


FIGURE 3.10

Number of Fortune Global 500 Companies by City, 2007

Source: Fortune Global 500, http://money.cnn.com/magazines/fortune/global500/2007/cities, (Accessed June 6, 2008).

At the national level, no city competes with New York City in terms of the size of its economy and business density. While there has been some fluctuation, New York City dominates other large U.S. cities in terms of the number of national Fortune 500 companies. In 2007, New York City was home to 45 Fortune 500 companies, while the distant second, Houston, TX, had only 22.[36]

Strong Knowledge-Based Economy. It has been argued that New York City has enjoyed dramatic growth in economic output over the past 45 years through increases in labor productivity and per capita output, rather than gains in real employment and population growth.[37] This economic vitality is linked to clusters of technology and/or knowledge-based industries that attract workers commuting to high-income jobs (often requiring face-to-face interactions) in New York City and using a variety of transportation modes.[38] While jobs in many industries have been lost to other countries, industries that are relatively intensive in their use of technology and/or human capital inputs tend to concentrate in large cities and are less affected by job offshoring.[39]

These industries account for a large portion of the regional economy. Of the 22 Fortune Global 500 companies based in New York City (Figure 2.6), 19 of them are knowledge-based companies specializing in finance, insurance, information and communication technology, and research and development (e.g., consulting and pharmaceutical companies).[40] Together, they produced total revenues of $1.2 trillion in 2007.[41] Indeed, the 2005 County Business Pattern of the U.S. Census Bureau shows that the share of knowledge-based industry sectors (e.g., finance and insurance; professional, scientific, and technical services; and health care and social assistance) accounts for about 36 percent of total jobs in the NYMTC region.[42] In terms of aggregate personal income in 2006, these sectors represented roughly 50 percent ($188 billion) of the total income of individuals generated in New York City ($383 billion) and 37 percent of the income generated in the NYMTC region ($620 billion).[43]

While the economic sustainability of the region largely depends on the above-mentioned industries, the role played by transportation in facilitating the free movement of people and goods, and thus in reinforcing economic development, cannot be underestimated. However, the regional transportation network is increasingly congested; gridlock has been estimated to cost New York City up to $13 billion per year in annual costs and revenue losses.[44]

Given the current crisis in the financial markets (as a result of the mortgage market collapse and instability of oil prices and supply) and the slowing economy, efforts to mitigate traffic congestion and increase mobility throughout the system gain increased relevance as the region seeks to remain competitive. Looking forward, as the region recovers from the current economic downturn, it will have an opportunity to address these challenges in ways that are more productive and sustainable.[45] The following sections describe various transportation and information technology innovations that could enhance the regional transportation network by increasing its efficiency and reducing overall congestion.

Transportation Technology Innovation

Historically, technological innovations in the transportation sector have stimulated economic development and urban expansion. The introduction of new transportation technologies over the past two centuries (starting with steam boats, then streetcars and railroads, and ending with airplanes, automobiles and trucks), has increased mobility by moving people and goods progressively faster, more cheaply and more reliably between distant geographic locations than older modes. Increased mobility has made it easier to spread innovation from one sector to another. In turn, this has boosted economic productivity.[46] For example, at the beginning of the 20th Century, the introduction of motorized vehicles (automobiles and trucks) coupled with massive highway construction in the mid-1900s provided even more mobility to business and people, and urban expansion and suburbanization gained momentum.[47]

Just as transportation technologies transformed passenger travel, innovations in freight transportation came with the introduction of containers in the 1950s. Indeed, containers revolutionized intermodal shipping; as "containerization efficiently linked trucks, double-stack trains, and container ships," that significantly reduced "transport costs, cargo pilferage, and damage."[48] These innovations have opened new markets and allowed residents of metropolitan areas to increase their connectivity with the rest of the world. For example, shorter freight transit times now allow consumers in the NYMTC region to purchase perishable products from other continents.

However, the dramatic increase in travel demand has exceeded the capacity of transportation networks, resulting in chronic traffic congestion. While highway travel demand, measured by vehicle miles traveled (VMT), doubled between 1980 and 2005 (from 1.5 trillion to 3 trillion miles), this growth was accompanied by an only 6 percent increase in lane miles.[49] The mismatch of demand and capacity is particularly felt in large urban areas. Indeed, in 2005, the daily cost of traffic congestion in the NYMTC region was estimated to be $26 million, a figure expected to grow to $30.6 million by 2030.[50]

With increasing congestion and pollution as a result of increased mobility, urban expansion, and suburbanization, coupled with the inability to provide more road capacity within urban areas, many planners and policy makers have begun to shift from supply-side transportation policies (building our way out) to transportation management strategies.[51] Within this context, Intelligent Transportation Systems (ITS), which utilize a variety of communications and detection technologies, have gained support as a means for potentially mitigating congestion and improving safety, as they help make operations and management of the system more efficient.

Intelligent Transportation Systems and Traffic Congestion. Research and development of ITS gained momentum in the 1990s. The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 provided the thrust for a transportation policy shift from supply to demand management as well as more authority to metropolitan planning organizations (MPOs). According to the Research and Innovative Technology Administration (RITA) of the United States Department of Transportation (USDOT), ITS systems are classified into two broad areas: Intelligent Infrastructure and Intelligent Vehicles and again, those two systems are further divided into sub-systems depending on types of infrastructure and primary purposes of the systems.[52] While the specific objectives of a ITS would differ by subsystems, in general, ITS is considered to improve traffic safety and mobility that would result in gains in overall economic productivity.[53]

In the NYMTC region, a variety of agencies have deployed various types of ITS, including portable and fixed variable message systems, closed circuit TVs, highway advisory radio, integrated incident management systems, and electronic payment systems (E-Z Pass), among others.[54] According to a report by the Federal Highway Administration that evaluated ITS systems in the United States, the benefits from deploying ITS systems include congestion reduction, increased customer satisfaction, monetary benefits, increased productivity, and reduced safety risks.[55] A report found that the use of electronic toll collection (ETC) on the Tappan Zee Bridge increased the mobility of people by reducing the queues waiting to pay tolls at manual booths; while before only 400-450 vehicles could be handled in an hour, ETC could process up to 1,000 vehicles per hour.[56] This case study illustrates the positive impact that ITS technologies may have on transportation congestion in the region.

ITS and Supply Chain Management. Applications of ITS for goods movement have played an important role in revolutionizing supply chain management strategies. Together with widespread uses of containers, the application of the Commercial Vehicle Operations System has further decreased the costs of goods movement by enabling shippers, carriers, and receivers to monitor the distribution of goods by using advanced communication technologies such as GPS, satellite communication, the Internet, and other wireless systems.

Integration of ITS Systems. One of the visions for the deployment of ITS has been to integrate surface transportation infrastructure technologies with vehicles.[57] Two particular efforts being led by the federal government aim to achieve this integration:

- Integrated Corridor Management (ICM). Begun in May 2006 by USDOT, the *"National Strategy to Reduce Congestion on America's Transportation Network,"* initiative seeks to reduce surface transportation congestion.[58] ICM focuses on integrating the different management systems of various transportation infrastructures such as highways, arterials, rail, and bus rather than treating them individually. Real-time travel information will be shared among various networks, jurisdictions, and modes, and this will "optimize the use of existing infrastructure and leverage underutilized capacity on the nation's urban corridors."[59] Expected to be completed by 2011, this initiative will result in reductions in travel time, fuel consumption and emissions by diverting traffic from congested roadways to alternative routes.[60] It is expected that real-time travel information will be valuable for transit systems as well.[61]
- Vehicle Infrastructure Integration (VII). VII is a collaborative initiative by USDOT, state governments, and the automobile industry that seeks to reduce vehicle crashes and to increase travel reliability.[62] The focus of the initiative is the development of intelligent vehicles and infrastructure systems that can interface with each other in real time, using "dedicated short-range wireless bandwidth to support vehicle-to-vehicle and vehicle-to-infrastructure communication."[63] With the coordinated deployment of technologies by automobile manufacturers, intelligent vehicles can also function as "data collectors" so that vehicles can "anonymously transmit traffic and road condition information to other vehicles and transportation agencies."[64] Currently, this effort has been in research and pilot testing stages. The first phase, Operational Testing and Demonstration, was conducted and the first field test took place during the Intelligent Transportation Systems World Congress in New York City from November 16 - 18, 2008.[65]

Congestion Reduction and Management Technologies. The technologies below can assist in the management of traffic congestion by either reducing overall travel demand or by allowing for more efficient use of existing and planned transportation capacity.

- **Geographic positioning systems (GPS)**, which provide accurate location coordinates to guide navigation of all forms of transportation, have been widely adopted by transportation fleet operators and the general public. Each successive generation of GPS devices is smaller and has increased accuracy. In NYMTC's transportation network, GPS technology can provide enhanced personal navigation and quicker emergency response. GPS in the future may also aid in collecting travel behavior data that could be used in developing models for planning and operations of the transportation system. Reliable real-time information about travel times, speeds, and costs (e.g., tolls and parking fees) can enable personalized information and route guidance.
- **Adaptive ramp metering** can enable efficient traffic flow by controlling the number and frequency of vehicles entering the freeway system through on-ramp signals. Benefits include travel time savings; improved safety; effective use of capacity; reduced travel time variability; and air quality improvements owing to smoother traffic flow. Broadly, adaptive ramp metering algorithms can be divided into three categories: local ramp metering, system-wide coordinated ramp metering and a combination of the two.
- A **Radio-Frequency Identification (RFID) tag** is an electronic chip that can be applied to any object for the purpose of identification using low-power, short-distance radio waves. RFID tags can be classified as passive (only read data) or active (read and write data). E-ZPass--a type of RFID tag--has been extensively used in the NYMTC region for the past 15 years, and logistics firms have been widely adopting RFID technology to track shipping containers and trucks, boxes within the containers, products on retail store shelves, and even individual parts and components within those products. Emerging applications of RFID tags include identification of authorized employees at seaport and airport gates and payment of transit fares at turnstiles and bus fareboxes.
- **Communication, conferencing, and collaborative management tools** encourage telecommuting that may substitute for work trips and present entertainment opportunities that may significantly affect non-work travel patterns. Communication technologies include e-mail and instant messaging. Conferencing technologies include webinars, web conferencing, and video conferencing. Collaborative management tools include shared electronic calendars, project management, knowledge management systems, prediction markets, and desktop sharing services such as concurrent versions system

(CVS). All of these technologies are currently at use in the NYMTC region and provide an important tool in travel demand management (TDM) and air quality initiatives.

Safety and Security Technologies

- **Vehicle Infrastructure Integration (VII),** described in the previous section, involves interaction and combination of a variety of transportation technologies, including automated vehicle technologies and vehicle-to-vehicle communications systems that provide communication between vehicles on a roadway to inform travelers of obstructions, congestion or other vehicle activities ahead of the driver. There are hundreds of technologies and variations, related to five general categories including collision avoidance, public safety, roadway characteristic alert (sign extension), vehicle diagnostics & maintenance and other vehicle information. A key component is Dedicated Short Range Communications, which provides wireless data transfer at high rates and greater distances than standard wireless devices. Uses in NYMTC's transportation network include congestion management, tolling, adaptive drive-train management, navigation, point of interest notification, and fleet scheduling.
- **Machine vision** involves the digitization, manipulation, and analysis of images, usually within a computer. Machine vision has been applied in the NYMTC region to identify when a vehicle is waiting at a signalized intersection, triggering a green light, or, alternatively, skipping the green light when no vehicle is present. Broader applications of machine vision for traffic monitoring, navigation, and transport safety are being tested and applied in the NYMTC region.
- **Micro-Electro-Mechanical Systems (MEMS) and "nanosensors"** describe the integration of mechanical elements, sensors, actuators, and electronics through microfabrication technology. MEMS and nanosensors respond to mechanical, thermal, biological, chemical, optical, and magnetic conditions to monitor the condition of physical infrastructure (for example to measure temperature, crack width, corrosion, and chemical changes in concrete), measure pollution levels, remotely detect bio-terror agents, detect crashes (for example to deploy airbags), control vehicles, and facilitate other types of data collection.

Energy and Environment Technologies

- **Natural Gas and Propane** power more than 5 million vehicles on the road worldwide. Both require specialized fueling station infrastructure. Propane and natural gas have several advantages over petroleum products including suitability for spark-ignited internal combustion engines, safer storage, and less threat than petroleum to soil, surface water, or groundwater.

- **Biogas, biodiesel, and ethanol** are flexible forms of renewable energy that can produce heat, electricity and serve as vehicle fuels. Biogas is the gaseous product of the decomposition of organic matter, and it is produced naturally in landfills, and from the processing of animal waste, sewage, crop waste, and cellulosic and non-cellulosic crops. In the NYMTC region biogas could be captured from regional waste streams and would require little land area for conversion. Ethanol is a transportation fuel primarily made from vegetable crops such as corn, sugar beets, sugar cane, and cellulosic materials such as trees and grasses. Ethanol requires larger land areas to grow vegetable crops, and the production of ethanol can compete with production of crops for food.

- **Electric-driven (EV) and Hybrid Electric Vehicles (HEV)** are propelled fully or partially by electric motors powered by rechargeable battery packs. Recharging of EVs is available from standard electricity sources. HEVs combine an internal combustion engine with the electric motor. They also convert energy from coasting and braking into electricity, which is stored in batteries that power the bus. Some HEVs automatically shut off the electric engine when the vehicle comes to a stop and restart it when the accelerator is pressed, increasing fuel efficiency. In addition to private use, hybrid-electric buses are currently operating in New York City Transit, Westchester County, and Rockland County in the NYMTC Region. Hybrid electric buses have been shown to have greater fuel efficiency than standard diesel buses, resulting in lower tailpipe emissions, reduced reliance on petroleum products, and may require less maintenance and operating costs than conventional diesel engines.

Impacts of Transportation-Related Technology Advances

Some of the technological advancements mentioned earlier in this chapter may bring about changes in travel patterns such as increased telecommuting, and e-shopping, among others. Of importance, such behavioral changes may create new demands that would not otherwise exist. The following paragraphs provide further discussion of this point.

- **Telecommuting**. The ubiquitous availability of wireless communication devices (e.g. cell phones and Internet) and high-capacity personal computing devices (e.g., notebook computers) is expected to increase the share of people who work at home.[66] According to the Census Bureau, the number of people working at home in the NYMTC region has been increasing in recent years, rising roughly 30 percent between 2000 (149,334) and 2006 (213,045).[67] During the prior decade (1990-2000), there had only been a 21 percent increase in the share of the work-at-home population. Thus, a 30 percent increase in only 6 years can be considered a very steep change, and an important trend.[68] While this share still represents only 3.9 percent of the total population in the region (3 percent in 2000), higher gasoline prices, peak-time congestion throughout the region, and the greater availability of high-speed internet and other network systems may increase the number of people working at home in the near future. Indeed, as fuel prices soared in late spring 2008, several communities encouraged people to move to 4-day work weeks and stay at home on additional days.[69] Importantly, however, the ramifications of such policies and shifts on the transportation system are not clear. While commuting trips to jobs might be reduced, some individuals who might have used public transportation to commute to their work location might now be more inclined to use a car to run errands while working at home.[70]

- **E-commerce**. Information and communication technologies have helped businesses to move toward just-in-time logistics and the paradigm has shifted from push- to pull-logistics. However, such innovations have also influenced people's shopping behavior. In a pull-logistics system, customers can communicate directly with distributors, manufacturers, and/or suppliers. "Fulfillment of e-commerce and mail orders depends on door-to-door transportation of parcel and express packages directly to the customer, increasing demand for small shipments that would otherwise get picked up at a store by the customer."[71]

c. Globalization and Security

Globalization is a process that intensifies "social relations" worldwide.[72] Such a process has been made possible by technological advances, which have reduced time and space barriers in moving information, people, and goods. From both the transportation and economic perspectives, "globalization underlies higher levels of integration between different production and distribution systems."[73] This integration has brought ever-increasing international trade, and the development of a global supply chain, creating an interconnected global society. However, such openness and greater connectivity may increase the vulnerability of the global network to non-recurring events such as natural disasters and terrorist attacks.

In the NYMTC region, ensuring a redundant, resilient, and robust system is a daunting task. With respect to freight, the NYMTC region is very much reliant on trucks, and therefore, roadways, bridges, and tunnels. Many of these are already at or over capacity, outdated, dilapidated, and/or prone to flooding. Complicating the situation further, most of the warehousing is separated from the key regional markets by the Hudson River and only a small number of bridge and tunnel crossings exits. With relatively little redundancy, robustness and resiliency become more important.

For passengers, the highway issues are similar. There is at least some redundancy in the form of commuter rail, subway, and even ferry options. Nevertheless, as the region has seen in years past, these systems are not always as robust as one would like, and redundancy remains a challenge at several critical junctures.

Globalization Trends Affecting Trade

Economic integration at the global scale has accelerated since the 1980s, resulting in an interdependent supply chain of production, distribution, and consumption that extends beyond national boundaries.[74] As a result, international, national and inter-regional trade has increased at a dramatic pace. For example, according to the World Trade Organization, the total value of international merchandise trade grew from $6 trillion in 2002 to $14 trillion in 2007.[75]

U.S. International Trade. As the biggest world market, the United States has been at the center of international trade for many years. Between 1948 and 2007, the total value of U.S. trade (exports and imports together) with other countries increased nearly 150 times, from $20 billion in 1948 to over $3 trillion in 2007.[76] While both exports and imports rose, the share of imports in U.S. total trade has increased significantly, exceeding 50 percent of total U.S. trade in 1968, and rising to roughly 64 percent of total U.S. trade in 2007.[77]

The NYMTC Region's International Trade. The global trade trend is also reflected in intense activity in the region's marine and air trade gateways.

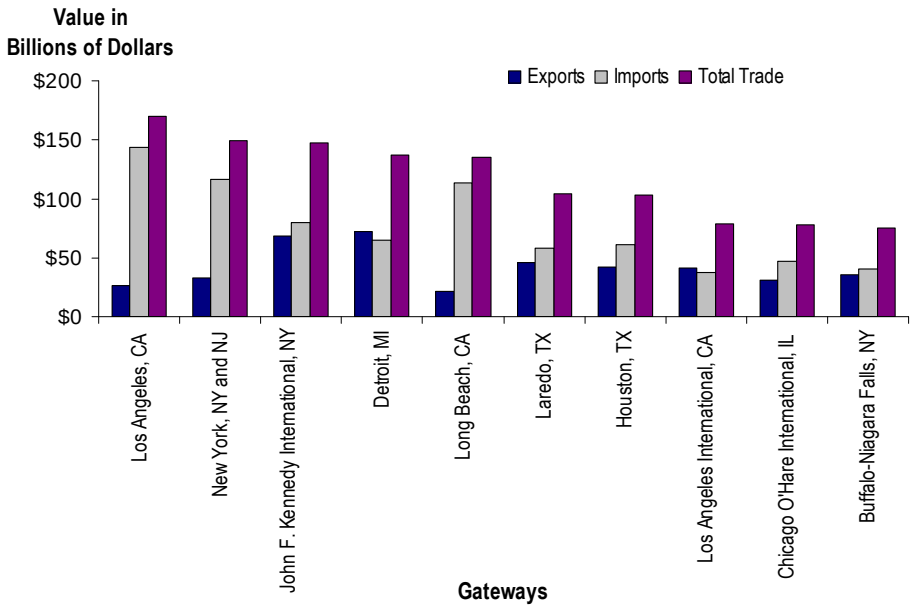


FIGURE 3.11

Top 10 U.S. Foreign Trade Gateways by Value of Shipments in 2006

Source: U.S. Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics (Washington, DC: USDOT, 2007), Table 1-47: Top U.S. Foreign Trade Freight Gateways by Value of Shipments

In particular, the Port of New York and New Jersey, and John F. Kennedy (JFK) International Airport are major hubs of freight activity in the NYMTC region. In terms of total value, JFK processed close to $135 billion in trade in 2005 and the airport has been the number one U.S. international gateway by value for all but one year between 1999 and 2005, the exception being 2003 when the marine Port of Los Angeles took the number one spot.[78] The value of international shipments entering via JFK in 2006 grew by 10 percent from 2005 ($134.9 billion in 2005 to $147.8 billion in 2006).

In 2006, the total value of international trade through the Port was $149.3 billion, a 15 percent increase from 2005.[79] The Port is second only to the combined Port of Los Angeles and Long Beach in terms of value of international shipments (Figure 3.11), and ranks in the top 50 in the world.[80]

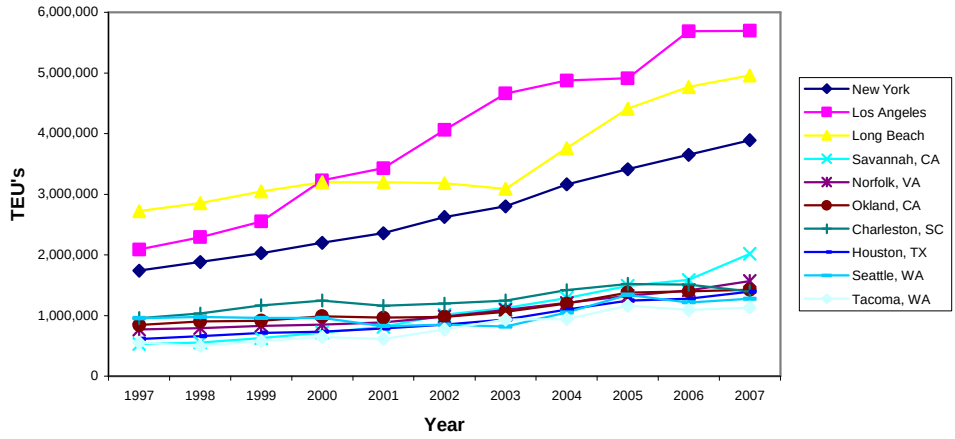


FIGURE 3.12

Top 10 U.S. Foreign Container Trade by Port: 1997 to 2007, Expressed in Twenty-Foot Equivalent Units (TEUs)

Source: The United States Department of Transportation, Maritime Administration, "U.S. Waterborne Foreign Container Trade by U.S. Custom Ports, 1997 – 2007 (Washington, DC: USDOT, 2008), http://marad.dot.gov/MARAD_statistics/ (Accessed June 12, 2008).

Trends in the Global Supply Chain

A supply chain is a dynamic network that consists of nodes (origins and destinations such as producers, consumers, distribution centers, etc.) and links (where information and transportation play a role).[81] The advancement of a sophisticated supply chain has been a driver of increasing international trade. The following are some noticeable trends that will continue in the coming years.

Just-in-time Logistics. In an effort to increase productivity by reducing logistics costs, retailers and manufacturers have adopted just-in-time (JIT) logistics systems. In JIT systems, the amount of inventory kept in stores or warehouses is minimized. Instead, businesses use advanced technologies, such as bar codes and radio frequency identification (RFID), to update inventories of retail stores, warehouses, distribution centers, manufacturing facilities and other relevant facilities in real time; as a result, commodities are restocked as frequently as possible.[82] Consequently, shipment size and weight decrease as the frequencies of deliveries increase. As described in Section 3, the paradigm of freight movement has shifted from manufacturer- or supplier-led shipments (push logistics) of mass-produced items to consumer-driven shipments (pull logistics). This leads to an increasing number of delivery trips on the already clogged transportation network.

Post-Panamax Ships. Since the 1980s, bigger and deeper ocean vessels – the Post-Panamax (so-named because they cannot pass through the Panama Canal) – have become popular.[83] Such vessels can carry more than 4,000 TEUs and require channel depths of more than 50 feet.[84] The availability of larger ships, coupled with the advancement of just-in-time operations, has changed transloading strategies.

Supply Chain Security. As mentioned earlier, globalization has increased integration of production and consumption. This has led to the development of a sophisticated supply chain network where a variety of actors in many countries are interconnected to each other. A failure of one or more nodes and/or links in the global supply chain by non-recurring events such as "natural disasters, industrial or labor disputes, terrorism, and war," can disrupt the entire supply chain network, stopping the flow of people and goods.[85] Thus, effective management of supply chain security is critical for the regional and national economy.

d. Energy and Climate

As currently structured, the energy sector in the United States is intrinsically tied to the combustion of fossil fuels and related emissions of carbon dioxide (CO_2).[86] Concerns over climate change, a phenomenon partly induced by human activity, have led to the re-evaluation of the present configuration of energy use. Higher energy prices in recent years and volatile oil prices have created further incentives to reduce fossil fuel consumption, through efficiency and conservation measures and/or the use of alternative energy sources. These measures address both energy and climate change concerns and have implications for the Shared Goals: *Enhance the Regional Environment; Improve the Regional Quality of Life;* and *Provide Convenient, Flexible Transportation Access within the Region.*

Energy Prices and Transportation Demand

Gasoline Prices. The United States is now the leading consumer of oil in the world. Between 2002 and 2006, approximately 20.6 million barrels of oil per day were consumed, on average in the United States, followed by China (7.6 million) and Japan (5.2 million).[87] The importance of oil to the U.S. economy cannot be overemphasized; the increase in oil prices internationally and domestically over the past several years has hit the U.S. economy hard, resulting in higher consumer prices, a depressed consumption rate, and an upward inflationary trend, as well as financial instability throughout various sectors of the economy.

Much of this demand for petroleum stems from the transportation sector, which consumes approximately two-thirds of the total oil sold in the United States, with motor vehicles alone responsible for over 40 percent of U.S. oil consumption.[88] Indeed, Americans' demand for personal mobility increased highway fuel consumption by 62 percent between 1973 and 2005.[89]

However, until late 2008, oil prices had been rising dramatically. The average gasoline price in the United States increased 100 percent between 2003 and 2007, greater than the price increases during the oil shock of the late 1970s and early 1980s.[90] Closer to home, in the State of New York, the average gasoline price per gallon has risen by 102 percent since 2004, to $4.29 per gallon in June of 2008 (from $2.13 in May of 2004 when the average gasoline price exceeded $2 for the first time in New York).[91]

Gasoline Price Fluctuation and Mode Choice under Economic Downturn. It is difficult to estimate how changing gasoline prices will affect people's travel behavior, because travel demand is a function of a variety of factors including energy prices, land use patterns, traffic-related regulations, availability of alternative transportation modes, income, and others. One study found that price elasticity would not be significant in the short run.[92] Further, a time series analysis revealed that drivers have become less and less responsive to price increases over time.[93] On the other hand, a report in Great Britain suggested that higher gas prices in the long run (five years or more) may lead to greater price elasticity and behavioral changes in travel.[94]

Many factors influence consumers reaction to gas prices. For example, the decreasing elasticity may be linked to improvements in vehicle fuel economy and income levels, which has made driving relatively cheaper. Increased suburbanization over the past 50 years, coupled with a lack of alternative transportation modes, leaves the automobile as the only viable travel mode in many cases. Finally, consumers' expectations that prices will drop again, or that higher prices were temporary, may have limited the response to higher gas prices.

The Carbon Footprint, GHG, and the Role of Transportation

There is widespread recognition in the scientific community that human activities – primarily the combustion of fossil fuel and deforestation – are changing global climate patterns.[95] Yet, despite warnings of potentially serious consequences, the "carbon footprint" (amount of carbon emissions attributed to an individual or group) of the United States continues to grow. The reasons for this situation are summarized in a report by the Metropolitan Policy Program at the Brookings Institution: "with a growing population and an expanding economy, America's settlement area is widening, and as it does, Americans are driving more, building more, consuming more energy, and emitting more carbon." This report also warns that "rising energy prices, growing dependence on imported fuels, and accelerating global climate change make the nation's growth patterns unsustainable."[96]

Key factors in understanding the carbon footprint of a region include access to and availability of public transit, population density, prices (i.e., gasoline, electricity), the carbon intensity of electricity generation and weather patterns.

Potential Impacts of Climate Change on the Transportation Sector

The transportation sector in the New York Metropolitan Area, which is vital to the regional economy and quality of life, is particularly exposed to climate variability, floods, sea level surges and land subsidence. Increased incidence of high winds and flooding could disrupt major thoroughfares, tunnels, and transit services.

e. Transportation Financing

The scope and reliability of transportation financing is an overarching issue which will impact the region's transportation system over the period of the Plan. The Plan offers a long-range financial assessment in Chapter 7.

Chapter 4

The Transportation System

On a typical weekday the region's multimodal transportation network handles millions of passenger trips and thousands of tons of freight shipments. The NYMTC region has one of the most complex, interconnected, and far reaching regional transportation systems in the world, encompassing:

- Nearly 480 route miles of commuter rail and 225 route miles of subway lines, plus hundreds of miles of local, express, commuter and intercity bus routes and an aerial tramway;
- An extensive network of passenger hubs, such as bus terminals and transfer facilities, ferry landings, and train stations where people transfer between modes of transport, including one of the most successful rail-to-airport links in the country;
- More than 1,100 miles of bicycle facilities, ranging from shared-use bike trails to on-road bike lanes, and pedestrian sidewalks, trails, and paths;
- More than 49,000 lane miles of roads, streets and highways, including more than 30 major bridges over navigable waterways, four major underwater vehicular tunnels, and special lanes for High Occupancy Vehicles (HOVs) and buses;
- Four commercial service airports, plus general aviation and heliport facilities;
- Major deepwater seaport facilities owned and operated by a mix of public and private sector entities, plus an extensive network of marine cargo support infrastructure and services;
- An extensive network of inland waterways supporting barge and ferry services;
- More than 400 route miles of freight rail, some of which is shared with commuter rail services;
- A widespread network of freight hubs, including rail transfer facilities, rail yards, and truck-oriented warehouse and distribution centers; and
- Supporting infrastructure like rail yards and highway maintenance facilities, highway rest areas, parking lots and garages, bus depots and transit storage yards, bicycle parking areas, toll plazas, signage, signals, electronics, and other equipment.

i. Public Transportation

Public transportation in the NYMTC region is provided through a diverse set of county and municipal governments, public authorities, private operators, and the States of New York, New Jersey, and Connecticut. Over the past two to three decades, great strides have been made in bringing these systems to a state-of-good-repair and in improving service levels, reliability and system connectivity.

Metropolitan Transportation Authority. The major provider of public transportation service in the region is the Metropolitan Transportation Authority (MTA). The MTA operates commuter rail systems on Long Island and in the lower Hudson Valley, a subway system and bus services in New York City, bus services in Nassau County and into western Suffolk County and Queens, and paratransit service. MTA subways, buses, and railroads serve 2.6 billion passenger trips each year – the equivalent of about one in every three users of mass transit in the United States and two-thirds of the nation's rail users.

MTA Long Island Rail Road serves 124 stations on its system and operates 11 lines along 594 miles of track. It is the most heavily-patronized commuter rail system in the nation, with an average 302,583 riders every weekday. MTA Metro-North Railroad serves the lower Hudson Valley and southwestern Connecticut. Metro-North serves 120 stations on its system and operates six lines along 774 miles of track. It is the third largest commuter rail system in the country and the largest system in terms of track miles.

MTA New York City Transit operates the New York City subway system in each of the City's five boroughs. The subway system includes 660 miles of track, 468 stations and 27 lines. In addition, a single-line rapid transit system is operated on Staten Island with 22 stations and 29 miles of track. The New York City Transit subway and bus system is among the largest and most heavily patronized subway systems in the world, with an average of 7.5 million passengers each weekday.

MTA New York City Transit, MTA Long Island Bus, and MTA Bus together operate 378 local and express bus routes in New York City and in Nassau County on Long Island. MTA New York City Bus operates local and express services in New York City. With 243 bus lines, 4,500 buses and average weekday ridership of 2.4 million passengers in 2007, MTA New York City Bus is one of the largest bus systems in the country. MTA Long Island Bus operates local routes in Nassau County, western Suffolk County, and eastern Queens. It operates 54 bus routes, has a fleet of 416 buses and an average weekday ridership of 108,000 in 2007. MTA Bus operates routes formerly run by private bus companies in New York City. It operates 81 routes and a fleet of 1,354 buses.

Independent Transit Services. Apart from the MTA, independent transit services operate in New York City and several of the suburban counties in the NYMTC region. These services include the following:

- In addition to the Staten Island Ferry, discussed below, New York City Department of Transportation operates the Roosevelt Island Tram from 59th Street in Manhattan to Roosevelt Island.
- Suffolk County Transit provides service on a total of 53 bus routes in Suffolk County and western portions of Nassau County on Long Island and is operated by the county through a public-private partnership. In 2007, the county had 162 buses in fixed-route service and 99 vans operating demand responsive routes. Huntington Area Rapid Transit (HART) serves the Town of Huntington in Suffolk County. HART is operated by the Town and features six routes, 22 buses operating fixed routes and six vans operating paratransit service.
- Long Beach Bus serves the City of Long Beach in Nassau County. It is operated by the city and includes four routes. In 2007, the city had 11 fixed-route buses and four paratransit vans.
- The Westchester County Bee-Line System provides service in Westchester County and the northern portion of the Bronx, on more than 64 bus routes. In 2007, the Bee-Line has a total fleet of 418 buses and 60 vans. The Bee-Line is operated by the county through a public-private partnership.
- Putnam Area Regional Transit (PART) serves Putnam County. Operated by Putnam County through a public-private partnership, PART operates four local routes with a total fleet of 21 buses and seven vans.
- Transport of Rockland (TOR) serves Rockland County with eleven local bus routes operated with 66 vehicles, as well as the Tappan ZEExpress (TZx) with four express bus routes and 21 vehicles. The county operates TOR through a public-private partnership. Other local bus service in Rockland County is operated by Coach USA, Clarkstown Mini-Trans and Spring Valley Jitney, along with privately-operated commuter bus services from the county to New York City.

Paratransit Services. Paratransit services provide public transportation to eligible riders whose disabilities make them unable to access fixed-route services. These services use smaller vehicles to provide door-to-door or curb-to-curb service within the agency's service area. In the NYMTC region, all services are compliant with transit regulations under the Americans with Disabilities Act and serve only customers who qualify under this Act. Each of the service providers mentioned above operate paratransit services in their service areas.

Ferry Services. Ferry services in the NYMTC region serve commuters to and from Manhattan, as well as interregional trips across the Long Island Sound and New York Harbor. The most heavily used ferry service is the Staten Island Ferry, operated by New York City. Operating 24 hours a day, the Staten Island Ferry runs between the northern tip of Staten Island and lower Manhattan. The Staten Island Ferry has an average daily ridership of 65,000.

New York Water Taxi provides service linking Lower Manhattan with Haverstraw in Rockland County and Yonkers in Westchester County; Sunset Park in Brooklyn; Red Hook in Brooklyn; the Fulton Landing in Brooklyn; Schaefer Landing in Brooklyn, and Hunters Point in Queens. New York Waterway operates out of three terminals in Manhattan, at West 39th Street in Midtown Manhattan, the World Financial Center, and Pier 11/Wall Street in Lower Manhattan. From these terminals, New York Waterway serves eight destinations in Hudson County and one in Bergen County, New Jersey. Both New York Waterway and Sea Streak operate services from Manhattan to Monmouth County, New Jersey. New York Waterway and Sea Streak also provide services to Yankee Stadium and Citi Field, respectively, during baseball season. The Haverstraw-Ossining Ferry service across the Hudson River is operated by New York Waterway, under contract to the MTA.

Across Long Island Sound, ferries connect Bridgeport, Connecticut to Port Jefferson in Nassau County (vehicles and passengers); New London, Connecticut to Orient Point in Suffolk County (vehicles and passengers); New London, Connecticut to Fishers Island in Suffolk County (vehicles and passengers); and, seasonally, New London, Connecticut to Montauk in Suffolk County (passengers only).

Two separate ferries in Suffolk County connect Shelter Island to the north and south forks of Long Island, and numerous passenger ferries link Fire Island to the South Shore of Long Island in Suffolk County.

Taxis and Livery Vehicles. Taxis and livery vehicles are an important part of the region's transportation system, both in Manhattan where they are a primary mode of transportation for many trips, and in outlying areas where they provide important links to and from train stations and offer mobility to an aging population. New York City is providing incentives to taxi fleet operators and drivers to convert the fleet to hybrid vehicles.

Other Public Transportation Services. Other services operate largely outside the NYMTC region but provide service to the region as a destination. These services are operated or managed (or both) by NJ TRANSIT, the Port Authority of New York & New Jersey, Connecticut Transit, the New York State Department of Transportation, Amtrak, and private bus companies.

- **NJ TRANSIT** operates 11 commuter rail lines with 536 miles of rail track, three light rail services and 247 bus lines, with trains and buses entering multimodal stations in Manhattan.
- In addition to operating airports, bridges and port facilities in the region, the **Port Authority of New York & New Jersey** operates the PATH rapid transit system, a 24-hour service with six stops in Manhattan and stops in Hoboken, Jersey City and Newark, New Jersey. The Port Authority also operates the JFK AirTrain, one of the most successful dedicated airport transit systems in the U.S. JFK AirTrain runs to all airport terminals and also serves Jamaica Station (with connections to Long Island Rail Road and MTA New York City Transit subways and buses) and Howard Beach Station (with connections to New York City Transit).
- Inter-regional bus services such as the **I-BUS** between the City of White Plains in Westchester County and Stamford, Connecticut; the **Orange-Westchester Link (OWL)** between Orange and Westchester Counties, and other services operated by private operators and subsidized by the Connecticut and New York State Departments of Transportation, link residential and employment centers within the NYMTC region and in surrounding regions.
- **Intercity bus and jitney services**, including hourly services to destinations throughout the Northeast and the Mid-Atlantic and regular services to other cities throughout the U.S., depart from the Port Authority Bus Terminal, the George Washington Bus Terminal, streets around Penn Station, and various neighborhoods throughout the region that are connected by ethnic, religious, or national ties, notably Chinatown in Manhattan, Flushing in Queens, and Williamsburg in Brooklyn.
- **Amtrak** connects the NYMTC region to intercity locations with stops in Croton-Harmon, Yonkers, New Rochelle, and New York Penn Station in midtown Manhattan. The Northeast Corridor line runs from Boston to Washington D.C. and is the most heavily patronized line in the Amtrak network, stopping in New Rochelle and at New York Penn Station. The Empire Corridor, running north from New York City to Albany, handles trains to points north and west.

ii. Pedestrian and Bicycle Facilities

More than 1,100 miles of bicycle routes and thousands of miles of sidewalks and pedestrian paths currently exist or are under construction in the region.

New York City has nearly 6,000 miles of streets with 13,000 miles of sidewalks, and has recently invested in new curb cuts and walk signals. The City has marked or constructed over 460 miles of bicycle lanes and paths since 1997, including 160 miles of bicycle paths, since the 2007 release of plaNYC, New York City's long range plan. The lower Hudson Valley has over 140 miles of off-road paths for walking and bicycling, as well as sidewalks and other bicycle routes. Additional routes have been planned for each lower Hudson Valley county, creating valuable links between population centers, commercial and recreational facilities, and existing bicycle and pedestrian routes in the region. On Long Island there are currently 58 miles of shared use paths for walking and bicycling. Also, Long Island has 337 miles of on-road bicycling routes which include 145 miles of designated bike lanes. In addition, 90 miles of shared use path facilities for pedestrians and bicycles are proposed, in planning or design, and nearly 1,000 additional miles of on-road bikeways are envisioned.

iii. Roadways

Fourteen Interstate Highways serve the region, linking to major cities in all directions. In particular, I-95 connects the region to the rest of the Eastern Seaboard; I-80 and I-78 connect New York to the Midwest; I-84 and the future I-86 connect the NYMTC region to New York's Southern Tier and northern Pennsylvania; and I-87 (the New York State Thruway) reaches north to upstate New York and Canada. These major highways are vital to the region's economy, providing access to both raw material producers and finished goods suppliers across the nation. Interstate highways also link the NYMTC region to foreign trading partners in Canada, Mexico, and the Pacific Rim (via West Coast ports).

On a regional scale, these Interstate highways combine with 14 expressways and 36 parkways to support regional automobile and truck travel, including commuter trips by car and bus, shopping and recreational trips, business-related trips, and distribution of freight and consumer goods by trucks and delivery vans. High Occupancy Vehicle (HOV) lanes offer carpoolers thousands of hours of travel time savings and help improving regional air quality. A comprehensive local street network serves as the final link in long-distance and regional trips, while supporting local travel by buses, trucks, bicycles, taxis and private automobiles.

The region's roads, highways, bridges, and tunnels are operated by a number of government agencies, including the New York City Department of Transportation, the New York State Department of Transportation, the New York State Thruway Authority, the Port Authority of New York & New Jersey, the Metropolitan Transportation Authority, the New York State Bridge Authority, and local municipalities throughout the region.

iv. Airports

Commercial air travel is available at four airports within the NYMTC region -- John F. Kennedy (JFK) International Airport and LaGuardia Airport, both in New York City and both operated by the Port Authority of New York & New Jersey; Westchester County Airport near White Plains, operated by Westchester County; and Long Island MacArthur Airport in Suffolk County, operated by the Town of Islip. Smaller general aviation airports also serve the NYMTC region, such as Republic Airport, Brookhaven Airport, and Spadaro Airport in Suffolk County on Long Island, all three of which are designated as general aviation reliever airports by the Federal Aviation Administration. Other major airports serving the NYMTC region include Newark-Liberty International Airport in New Jersey and Stewart International Airport near Newburgh in Orange County. Taken together, these airports are among the busiest in the nation.

Air freight facilities are available to private carriers at each of the major airports mentioned above. Both FedEx and UPS operated small parcel hubs at Newark-Liberty airport, but JFK maintains its prominence as one of the nation's largest air cargo facilities by volume. As one of the busiest regions in the world for goods transport by air, the airports provide intermodal freight facilities to handle and transfer goods to and from other cities, and to local distribution centers, warehouses, and customers.

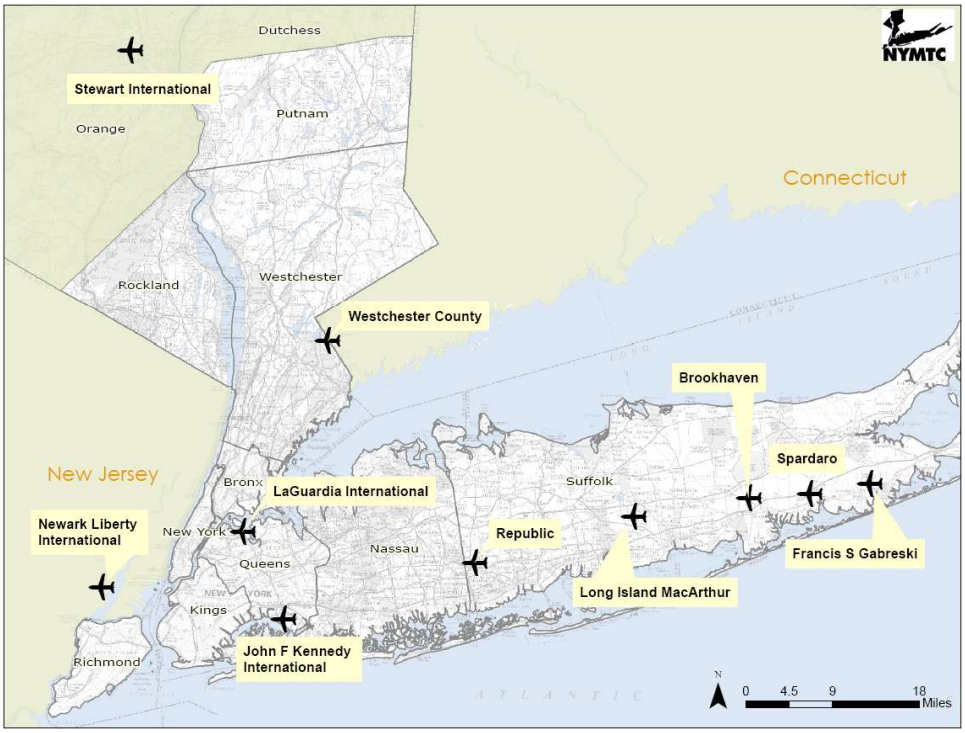


FIGURE 4.1

Airports Serving the NYMTC Region

Source: NYMTC

v. Seaports and Waterways

New York Harbor and its tributaries are home to one of the largest concentrations of public and private marine terminal facilities in the United States. These facilities serve containerized cargo, petroleum and chemicals, automobiles, and other critical commodities, as well as passengers utilizing the region's extensive ferry networks. Within this larger Port of New York/New Jersey (PONYNJ) district – which includes facilities in New York City, New York State, and Northern New Jersey –the Port Authority of New York & New Jersey (PANYNJ) and the City of New York are the main public facility operators, with private companies offering port services related to crude oil transport and passenger cruises.

In New York City, there are three major publicly-owned port facilities, including the Howland Hook Marine Terminal (including the New York Container Terminal and Port Ivory railyard), the Brooklyn-Port Authority Marine Terminal (including the Red Hook Container Terminal, Brooklyn Piers, and Brooklyn Cruise Terminal), and the South Brooklyn Marine Terminal. Hempstead in Nassau County and Port Jefferson in Suffolk County also handle significant volumes of freight, while several passenger ferry terminals mentioned above accommodate passenger traffic.

Facilities outside the NYMTC region include the large terminals at Port Newark/Elizabeth as well as smaller niche and reliever ports at Port Jersey and The Peninsula at Bayonne Harbor in northern New Jersey; and the Ports of Stamford, Bridgeport, New Haven, and New London on Long Island Sound in Connecticut. In addition to these publicly-operated marine cargo terminals, a large number of private terminals operate along the waterfront in the region.

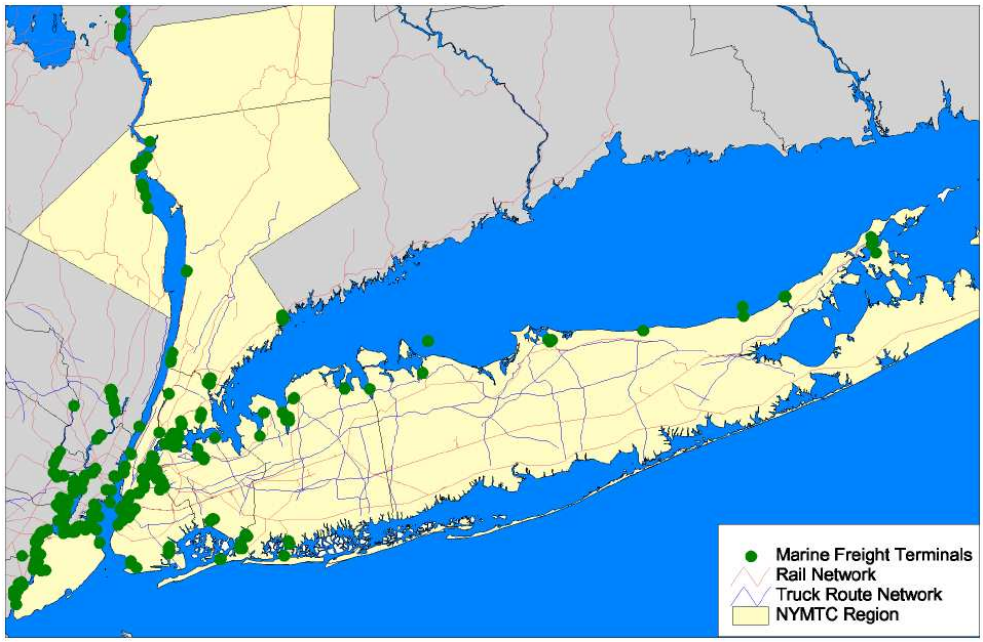


FIGURE4. 2

Location of Wharves and Docks in the NYMTC Region

Source: NYMTC Freight Plan 2001

vii. Rail Freight Services

The rail freight infrastructure is constrained by four factors: the dominance of passenger trains; the lack of major rail freight crossings south of Albany; vertical/lateral clearance restrictions that limit the use of modern rail equipment; and limited land availability for major yards and warehousing facilities. As a result, only about one percent of goods (in tons) shipped in the NYMTC region travel by rail. Nationally, rail accounts for approximately 16 percent, in tons, of overall movement of goods. Even accounting for the much higher rail mode share in the New Jersey part of the region than in the NYMTC part (about nine percent versus one percent), the New York/northern New Jersey region as a whole has a lower rail mode share than 23 of the 25 largest urban areas in the country. In the past half-century, railroad companies have been relatively undercapitalized, and hence unable to fully meet their own capital needs, particularly in the northeast. However, rail has significant efficiency and environmental benefits relative to truck transport.


UPPER ROADWAY
HOV2+ & BUSES ONLY
MON-FRI 6AM-10AM
35
STAY IN LANE

Chapter 5

Transportation System Operations and Management

This plan forecasts that the ten-county NYMTC region will add two million more residents by 2035, one million in the five boroughs of New York City alone. The population of the broader tri-state metropolitan area is expected to increase by four million. Population increases, coupled with a growing economy, will translate into higher levels of passenger and freight congestion on an already overburdened transportation system.

NYMTC's members are planning large regional transportation investments to add transportation capacity to serve a vibrant, growing region. At the same time, targeted investments in the system's operation and management can improve the efficiency of existing transportation facilities in ways that relieve vehicular congestion and maximize safety, security and mobility. This chapter introduces projects and initiatives planned over the next 25 years to improve operations and management of the region's transportation system.

i. State-of-Good-Repair

The NYMTC region enjoys the advantage of an extensive system of transportation facilities and services. The existing transportation system – although it must be improved – is still critical as it is to the region's future and to its vision for that future. NYMTC must fully protect the region's past investments in this system, and support future investment, by ensuring its day-to-day operations and maintenance and by achieving and maintaining a State-of-Good-Repair for all transportation facilities and equipment in our region.

NYMTC's member agencies have made great strides in bringing the multimodal transportation system up to a State-of-Good-Repair. Still, continuous investment is needed to maintain the system in the future. NYMTC's shared vision includes a commitment to expand resources in the long-term to support the day-to-day operation and maintenance of the existing transportation system and to fully achieve a State-of-Good-Repair.

As listed in the maps and lists of RTP projects in Appendices 1 and 2, State-of-Good-Repair projects collectively make up the single largest category of investments in the Plan. Over the next 25 years, over $290 billion will be needed to maintain State-of-Good-Repair through replacement and refurbishment of equipment and facilities. Additionally, over $661 billion will be needed to maintain and operate the regional transportation system.

ii. Congestion Management Process

Roadway investments to increase capacity for freight trucks and automobiles on the transportation network – beyond State-of-Good-Repair – are guided by NYMTC's Congestion Management Process (CMP). The CMP is a systematic planning approach that identifies where, when, and to what extent automobile and truck congestion occurs. The CMP also provides a toolbox of strategies to address vehicular congestion as part of the regional transportation planning process, and it also provides system performance information to track and forecast levels of vehicular congestion.

NYMTC has updated its CMP in conjunction with the development of this Plan. Appendix 1 contains maps for each county and borough in the region showing the extent of congestion anticipated in the 2035 horizon year of the Plan. The full CMP Status Report also summaries of congestion for the 2009 base year and provides a regional overview of congestion in the 10-county NYMTC region. The congestion analysis helps NYMTC member agencies determine where future roadway investments may be necessary to relieve congestion.

For purposes of comparison, maps in Appendix 1 of the Plan show projects proposed as part of this RTP update overlaid on roadway segments where congestion is anticipated in 2035. However, the roadway-oriented CMP is only one part of a broader, multimodal planning process, which is described in more detail in Chapter 8 of this Plan. Detailed information on the CMP and its role in transportation planning can be found in the latest update of the Congestion Management Process Status Report, available from NYMTC or at www.nymtc.org.

iii. Transportation Demand Management and Transportation Systems Management

Transportation Demand Management and Transportation Systems Management are families of strategies that increase the efficiency of the transportation system. While many of the strategies are enhanced by Intelligent Transportation Systems (ITS) technologies, many successful transportation management programs are built on policy frameworks that align a variety of resources to prioritize and optimize the transportation network. These core activities are described below.

Transportation Demand Management

Transportation Demand Management (TDM) is a term that describes a broad range of programs and initiatives that are intended to improve multimodal mobility, reduce traffic congestion, particularly during peak travel periods, and improve air quality by encouraging the use of carpooling, mass transit and other alternatives to driving alone.

In the NYMTC region, the New York Metropolitan Area Regional Commuter Choice Program delivers integrated and coordinated alternatives to driving alone to work. The program, sponsored by New York State DOT with the participation of NYMTC's member agencies, supports commuter assistance services, coordination of online rideshare matching services and coordination of human service mobility management programs. Through a combination of marketing and outreach, the program focuses on:

- Increasing awareness among commuters and businesses about alternatives to single-occupant vehicle commutes;
- Developing public/private partnerships and promoting the use of incentives such as tax benefits to maximize carpooling and vanpooling opportunities in key transportation corridors;
- Promoting the use transit, biking, and walking as alternatives to driving;
- Publicizing air quality action days (formerly known as "ozone action days");
- Encouraging the adoption of flexible work hours by businesses throughout the region to reduce peak-period commuting; and
- Encouraging the spread of telecommuting and teleworking as alternatives to a daily commute.

NYMTC and the state DOTs and MPOs in New Jersey and Connecticut provide coordination, funding and research to align these programs with available resources and plan for future needs. Organizations in each of the three NYMTC subregions, including MetroPool in the lower Hudson Valley, CommuterLink in New York City, and Long Island Transportation Management, Inc. (LITM), manage TDM services on behalf of the New York State DOT (and Connecticut DOT in the case of MetroPool) through state-funded contracts.

TDM and Commuter Choice is not so much about alternative commute modes (supply side) as it is about providing information and support to commuters and travelers to encourage them to choose other commute modes or alternative arrangements to driving alone (demand side). TDM strategies do not work in isolation. Rather, they work as part of a systematic approach to furthering the region's mobility goals. One strategy or program is often dependent on successful implementation of related strategies to provide the necessary support. New York State DOT is conducting an evaluation of the effectiveness of state-funded TDM strategies and plans to make adjustments to strategies as appropriate to ensure the goals of the TDM program are being met.

Examples of specific TDM strategies include the following:

- ***Telecommuting.*** Telecommuting refers to the practice of working from home one or more days per week instead of commuting to an office. With the advance of communications technologies such virtual face-to-face meetings via web conferencing and more secure, reliable remote access to company data and e-mail, telecommuting has become a viable alternative to working all five days in an office. Regional and statewide TDM initiatives are providing incentives to encourage growth of telecommuting, including the use of public-private partnerships to educate firms and their employees and implement telecommuting policies for appropriate staff.
- ***Rideshare Programs.*** Rideshare programs include both carpool and vanpool opportunities. New York State DOT and its regional partners are promoting incentives for both commuters and employers to expand the use of ridesharing. For example, they are publicizing rideshare-related tax benefits to corporations and individual commuters. Ridesharing is also benefiting from the spread of web-based ride-matching software that facilitates connections between drivers and potential passengers. One example of a web-based ride matching service, Nu-Ride, operates nationwide and presents an opportunity for expanded incentive-based ridesharing throughout the NYMTC region, as well as for trips between the NYMTC region and other neighboring regions. In partnership with counties and local municipalities, Nu-Ride is expanding its reach to older adults and other transportation-disadvantaged or mobility-impaired populations.

- ***Employer Shuttles.*** Employer shuttles (employer-sponsored vanpools) offer employees transportation options where parking is limited or traffic is congested. Shuttles often improve an employer's access to new employees and help retain existing workers by making their commutes more convenient. While no official list is available of employer shuttles, these services exist around the state and have been especially popular to access the New York City Central Business District. Another example includes the many shuttle services from the White Plains train station to the office parks in the Tarrytown Road/Route 119/Westchester Avenue corridor. NYMTC and its partners are working to reduce the regulatory and financial burden associated with operating vanpools (e.g., insurance requirements).
- ***Guaranteed Ride Home.*** TDM service providers offer "Guaranteed Ride Home" vouchers to allow people who carpool to travel home mid-day in case of an emergency. Transit service providers regionwide also partner with taxi companies and shuttles throughout the region to provide riders with vouchers that can be used to pay for a guaranteed ride home in the event that a transit service is not available during mid-day or off-peak hours.
- ***Parking Management.*** There are many examples of parking management techniques in use throughout the region. Many municipalities impose time restrictions for on-street parking spaces, ban overnight on-street parking, require parking permits for certain neighborhoods or train station parking lots, or restrict daytime parking on alternate sides of the street on alternating days. These supply-side management strategies are focused on limiting available parking, but they do not directly impact demand for parking.

  A number of recent studies have suggested that increasing the cost of parking, either directly or through increased taxation, could effectively reduce demand for parking in congested areas throughout the region. Since parking availability and cost are among the primary determinants of whether a person will drive to a destination (versus walking, biking or using transit, or not making the trip at all), parking management strategies may be an effective way to reduce vehicle miles traveled in the region.

  New York City Department of Transportation is planning to test a variable parking pricing pilot program in a diverse set of locations throughout New York City. The program will increase the cost of parking for both noncommercial and commercial vehicles with complementary mitigation measures that ensure equity and mobility for all users and modes, with a goal of making the best use of the curb space for the overall efficient functioning of the street.

- ***Park and Ride (Public Transportation.*** Park and Ride facilities encourage the use of public transportation over single-occupant vehicles by offering potential transit customers the chance to access trains, buses, informal carpools, and organized van pools by driving to a central location. Park and Ride programs and facilities are located throughout the region. They may be owned or operated by the state, a county or municipality. The Metropolitan Transportation Authority is working with New York State DOT, counties, and local municipalities to improve access via non-motorized transportation modes to Park and Ride facilities and encourage transit-oriented development near facilities that currently or could one day function as regional transit hubs.
- ***Transit and Paratransit Services.*** TDM programs in the NYMTC region fund local circulator buses and vans that serve residential areas and dense concentrations of employment near Metro-North and Long Island Rail Road stations; reverse commute shuttles that primarily offer low-income or otherwise disadvantaged populations access to jobs not easily accessible by transit; and express bus services from outlying areas to Manhattan, White Plains, and other employment centers. These specific services are implemented in coordination with transit system enhancements and expansion projects throughout the region, as described in Chapter 6, "System Improvements and Actions."
- ***Bicycle and Pedestrian Enhancements.*** TDM grants are used to make improvements to bicycle and pedestrian facilities that reduce vehicular traffic congestion and facilitate access to intermodal mass transit stations and regional park and ride areas. Chapter 6, "System Improvements and Actions," describes bicycle and pedestrian projects and strategies planned throughout the region over the course of the next 25 years, to be funded through TDM programs and other funding sources.

Clean Air NY.

Sponsored by the New York State Department of Transportation, Clean Air NY (www.cleanairny.org) is a program that seeks to improve air quality in the New York metro area. Clean Air NY includes individuals and organizations working to improve the health and quality of life in the region. Marketing efforts by Clean Air NY encourage New Yorkers to make smart travel choices part of their daily routine—choices that will lead to less driving and air pollution. Clean Air NY works in collaboration with CommuterLink, Inc., Long Island Transportation Management, Inc. and MetroPool, Inc. in support of regionwide air-quality efforts.

Transportation Systems Management

Transportation Systems Management (TSM) includes strategies designed to improve traffic flow while increasing the efficiency, safety, and capacity of existing transportation systems. The strategies are often low cost and can be implemented quickly. Examples of TSM strategies that will be expanded over the horizon of this RTP include real-time traveler information, coordinated incident response, work zone management, .[1]

- ***Traveler Information.*** 511 New York (511NY) is a comprehensive traffic and travel information source available via phone (dial 511) or on the web at www.511ny.org. 511NY services meet the specialized needs of commuters, long-distance and through-travelers, tourists and commercial vehicle operators. The program covers transportation services throughout New York State, relying on 18 reporting agencies to provide the latest information on public transportation, service disruption notices and fare changes In addition to the 511NY online and phone information system, Transportation Management Center operators can alert motorists to highway incidents and suggest alternative routes using roadside information systems. 511NY is one of the best single portals for details on rideshare services in the region as well as the only all-encompassing source for bicycle trail information. It currently includes 50 operators' schedules, including Amtrak and intercity bus, and is being built out to include all 80 fixed route operators that service customers in New York.

  Looking ahead, 511NY is focusing on developing travel information content for mobile devices—such as smart phones and in-vehicle navigation devices—as well as new partnerships with private sector providers. It could be available in a controlled and reliable fashion to vendors for development of shared applications associated with 511NY, creating a network of consistent travel information. NYMTC and New York State DOT also are closely coordinating with other states and MPOs to provide more integrated cross-jurisdictional information to travelers and freight transportation providers whose trips cross state and MPO boundaries. The I-95 Corridor Coalition's multi-state Information Systems Network is one example of an effort to coordinate across jurisdictional boundaries.

- ***Coordinated Incident Response.*** Studies have shown that up to 60 percent of congestion is caused by non-recurring events such as accidents and disabled vehicles. For every minute that a travel lane is blocked, it creates 4 to 5 minutes of traffic back-ups that will only begin to dissipate after the lane is reopened. Even when an incident occurs and is located on the shoulder, the capacity for that roadway is reduced. The New York State DOT and the New York State Police have teamed with NYMTC member agencies in support of the Highway Emergency Local Patrol (HELP) initiative. HELP enlists a combination of DOT vehicles and private contractors to patrol roadways in search of breakdowns and incidents and in response to incidents reported by third parties or various traffic monitoring programs. HELP keeps traffic moving by reducing traffic disruptions on the major highways. NYMTC and its member agencies will continue to support expansion and monitoring of the HELP program to ensure it covers the entire region and effectively reduces system delay.
- ***Work Zone Management.*** Highway work zones can cause delays that have regionwide impacts over multiple years of construction. Work zone management techniques, such as improving alternative routes of travel and advertising them, providing temporary facilities to absorb demand for travel during facility closures, staging work to occur in off-peak hours, and providing police officer control are ways to reduce the impact of construction on roadway operations. Many of the TDM strategies mentioned above can be used in coordination with work zone management techniques to reduce short-term, and perhaps long-term, demand for travel in the work zone. Proper signage, safety devices, and lighting are necessary to ensure safety of all roadway users and construction workers. The 511NY initiative described above is a source of information for roadway and transit users about road work and transit disruptions due to construction.

- ***Access Management.*** Access management strategies help limit the number of access points to a roadway to promote improved vehicular flow and improved safety for non-motorized users. By reducing curb cuts on a roadway, there are fewer conflict points between vehicles and pedestrians, and fewer points at which through traffic must slow for turning or merging vehicles. The extent of access management is highly context-sensitive and ranges from full access control with interchanges and overpasses, which is required on Interstate Highways, to highly accessible arterials in suburban business districts and residential areas. Over the long term, access to a roadway can be changed through regulations that restrict placement and number of driveways or through outright purchase of access rights from adjacent property owners.

- ***Congestion Pricing.*** Congestion pricing is a way of using market-based incentives to reduce traffic congestion by shifting purely discretionary peak period travel to other transportation modes or to off-peak periods. By removing a fraction (even as small as 5 percent) of the vehicles from a congested roadway, pricing can enable the system to flow much more efficiently, allowing more cars to move through the same physical space. Similar variable charges have been successfully utilized in other industries—for example, airline tickets, cell phone rates, and electricity rates. There is a consensus among economists that congestion pricing represents the single most viable and sustainable approach to reducing traffic congestion.

  A form of congestion pricing is already in place on bridges and tunnels operated by the Port Authority of New York & New Jersey, where peak period E-ZPass users pay $2 more than off-peak users (cash tolls are set at a higher rate than all E-ZPass tolls at all times). The Port Authority and New York State DOT are exploring the possibility of using another form of pricing to enable private vehicles to use High-Occupancy Vehicle (HOV) lanes and bus lanes for a fee during peak periods. Additional congestion pricing applications are being explored by the Port Authority as well as MTA, New York State DOT, the New York State Thruway Authority, and New York City.

Intelligent Transportation Systems. Many TSM strategies fall in to a broad category of technology-based solutions known as Intelligent Transportation Systems (ITS). ITS includes any approach that applies data gathering, data processing and data communications in the transportation network – for operators and for users – to create enhanced monitoring, control, security, convenience and route planning. Employing new ITS technologies is key to increasing the effective capacity of the region's transportation infrastructure, and as a major component of the NYMTC Principals' Shared Vision, deployment of ITS solutions is a major component of this Plan.

Examples of the many ITS-based TSM strategies include signal timing and coordination, ramp metering, managed use lanes, and next-generation freight movement.

- ***Signal Timing and Coordination.*** Coordinated signal timing can manage the flow of roadway vehicles by adjusting the speed at which they are able to travel through segments of the roadways. Signal timing can also reduce congestion and air pollution by reducing redundant stops after traffic has been controlled at optimal speeds. One form of signal timing can give priority to transit vehicles at congested intersections. Transit Signal Priority has been implemented at several intersections along Fordham Road and Pelham Parkway in the Bronx in conjunction with the introduction of Select Bus Service, and is being explored for other planned Bus Rapid Transit corridors in other New York City boroughs as well as in Westchester and Nassau counties. Signal timing studies are conducted primarily by county governments with input from New York State DOT, and enacted by the agency or office with jurisdiction over the signals.
- ***Ramp Metering.*** Ramp metering allows consistent traffic flow into a highway by placing a traffic signal on the entrance ramp that adjusts the speed at which cars enter the highway. With ramp meters installed, entering cars merge in a more spaced, controlled manner, reducing congestion and increasing highway safety. Therefore they merge easier with less disruption to mainline traffic. Ramp metering equipment may include vehicle detectors to control the signal and provide real-time highway information.

- ***Managed Use Lanes.*** The New York State Department of Transportation (DOT) has begun to examine a broad range of strategies to improve mobility on selected roadways in New York City. This program, known as the Managed Use Lanes (MUL) Study, is a proactive approach to applying modern technology and information and management systems on existing or new lanes of a roadway to optimize safe and efficient movement of traffic in response to real-time conditions. This strategy encompasses a range of actions, with three principal elements: eligibility, access control and pricing. Eligibility refers to the restriction of certain vehicles and vehicle types from accessing a given facility, which is most often based on occupancy or vehicle type. Access control is accomplished by physically separating a managed use lane facility from other facilities via barrier. Pricing refers to the use of price controls for the purposes of controlling volumes and generating revenue on managed use lanes facilities.

- ***Freight ITS Applications.*** Passenger-oriented ITS applications have in many ways lagged behind freight applications due to the private-sector's support for and early adoption of technology in freight movement and logistics. Freight firms have long used technology to track movements of containers, individual boxes, and in some cases individual items of value. Trucking companies were among the earliest users of GPS systems to assist drivers in wayfinding, and today on-board computers can diagnose maintenance issues, track truck movements, and communicate problems to centralized dispatching centers. Freight transportation providers and large users of freight services are now pushing the next generation of technologies to enable commercial vehicles to communicate with roadway infrastructure. New York State DOT and NYMTC are partnering with the Federal Highway Administration and the I-95 Corridor Coalition to advance Commercial Vehicle Infrastructure Integration technologies that may assist in expediting or even eliminating the need for roadside truck inspections and enabling advanced cruise control in truck-only lanes.

ITS Integration Strategy An important aspect of continuing the development of regional ITS capabilities is the exchange of information between the operators of the regional transportation system. NYMTC's ITS Integration Strategy is a guide for regional coordination of the ITS network in the region's transportation system. The Integration Strategy is supported by a Regional ITS Architecture and the development of shared ITS Standards.

The strategy guides planning for ITS systems through a cooperative effort to consider all modes of transportation and all roads in the region. While the strategy is comprehensive, it places a particular focus on transportation elements likely to be implemented in the next 10 years. It covers the broad spectrum of Intelligent Transportation Systems, including Traffic Management, Transit Management, Traveler Information, Maintenance and Construction, Emergency Management and Archived Data Management over this time horizon.

The ITS Integration Strategy serves as the region's ITS action plan, reflecting the region's ITS needs and its strategy for satisfying those needs. As ITS projects are implemented, as new priorities and strategies emerge through changes in regional transportation plans and policies, and as new user functions and needs are identified, the strategy will be revisited so that it continues to accurately reflect the region's goals and plans.

Regional ITS Architecture. The ITS architecture defines the functions that are required for ITS and the information and data flows that connect functions into an integrated system. The U.S. National ITS Architecture provides a common framework for planning, defining and integrating intelligent transportation systems. The *New York City Sub Regional Architecture* was completed in 2005 as a result of the requirements set forth by the USDOT[2] on regional ITS architectures. The *New York City Sub Regional ITS Architecture* is a roadmap for transportation systems integration in the five boroughs of New York City over the next 10 to 15 years. A steering committee was created in order to address these requirements with the MTA, New York City DOT, PANYNJ and New York State DOT Region 11.

The NYMTC region also has two other regional ITS architectures in placed, one in the lower Hudson Valley (*New York State Region 8 Regional Architecture*) and other in the Long Island (*New York State Region 10 Regional Architecture*).

The Regional ITS Architectures identify opportunities for making ITS investments that will support regional needs and goals in a more cost-effective fashion by identifying the urgency of particular projects, how the projects satisfy regional goals and strategies and the most cost-effective sequencing of projects. However, the Regional ITS Architectures must also be maintained and updated regularly to accurately reflect the region's existing ITS capabilities, projects, plans and policies and map the next steps in the deployment of the regional transportation network.

Both the ITS Integration Strategy and the Regional ITS Architectures provide information for updating this Plan and the Transportation Improvement Program (TIP), providing a guideline to ensure that high priority projects are included and that near-term regional goals are satisfied. The Regional ITS Architectures are also being used by stakeholders in support of their individual and collective ITS programs and in developing their ITS projects to support regional goals and agency needs.

Both documents will continue to be updated and maintained by the region as part of the region's transportation planning process in order to ensure ITS projects are planned and deployed in an efficient manner to effectively support the region's overall transportation goals and plans.

ITS Standards. An important benefit of the ITS Integration Strategy and Regional ITS Architecture is their support for the use of ITS standards and the identification of what ITS standards are applicable to in the region. ITS standards establish a common way devices connect and communicate, allowing transportation agencies to implement systems that cost-effectively exchange pertinent data and accommodate equipment interoperability, system replacement/upgrades, and system expansion. ITS standards contribute to a safer and more efficient transportation system by providing products that function reliably throughout the region, facilitate regional interoperability and promote an innovative and competitive market for transportation products and services.

Coordinating with ITS Activities outside the NYMTC Region

NYMTC's members are actively involved in efforts to foster greater coordination in ITS activities across jurisdictional boundaries and development of cross-jurisdictional standards for deployment of ITS technologies. Agencies such as the Port Authority of New York & New Jersey, which are by definition cross-jurisdictional, and groups like the I-95 Corridor Coalition help provide a forum for MPOs, states, and other organizations to share information on emerging transportation technologies and lessons learned in the deployment of ITS technologies.

Both E-ZPass and 511 traveler information systems, mentioned above, are part of broader regional and corridor-level efforts to standardize toll collection and dissemination of traveler information nationwide. New York State DOT and NYMTC member agencies are engaged in discussions to:

- *Coordinate development of active traffic management strategies and protocols;*
- *Coordinate incident management and special events management across state lines to more effectively reroute traffic over longer distances;*
- *Provide better information on downstream roadway conditions in inclement weather;*
- *Provide truckers with better information on availability of off-highway short-term and overnight parking to reduce the incidence of shoulder parking; and*
- *Coordinate the development of vehicle-infrastructure integration (VII) technologies and standards and deployment of VII nationwide.*

While the first four activities listed above can be accomplished in a relatively short time frame, VII technology development and deployment would occur over a longer time frame, as described in Chapter 2.

v. Safety and Security

Promoting a safe and secure transportation system continues to be an integral part of the NYMTC transportation planning process. NYMTC and its members agencies not only seek to fulfill the Federal safety requirements as contained in the current legislation, but also constantly work on ensuring that the highway infrastructure and the transit system serve the public without endangering users. In SAFETEA-LU, the current Federal surface transportation legislation, safety and security were newly designated as stand-alone planning factors (see Chapter 1 for more on Federal planning factors).

This section provides an overview of ongoing efforts to protect users from the risks involved in moving passengers and goods throughout the NYMTC region. The first section on Regional Transportation Safety discusses efforts to maintain the safe operation of transportation infrastructure. The second section on Regional Transportation Security describes strategies to secure infrastructure and operations from interference and prepare for coordinated emergency response.

Regional Transportation Safety

The 2005 Federal transportation legislation opened a new era with regards to highway safety. There was an increase in funding through the Highway Safety Improvement Program (HSIP) and requirements for the development of Strategic Highway Safety Plans (SHSPs) that address the critical "4 E's" of highway safety (engineering, enforcement, education, and emergency medical services). The state-wide plan is an important step toward encouraging stakeholders to take a multidisciplinary and multi-agency look at highway safety problems and solutions on all public roads, and to share resources to implement countermeasures that will be effective in terms of reducing deaths and serious injuries. Through the process of developing an SHSP, the state analyzes safety data and establishes strategies to address these problems with a comprehensive set of actions incorporating the "4 E's" of safety. The HSIP emphasizes a data-driven, strategic approach to improving highway safety that focuses on results. An annual report describes locations with the most severe safety needs.

NYMTC established the Safety Advisory Working Group to assist with the implementation of the Principals' shared safety-related goals and implementation of Federal requirements. This working group provides a forum to facilitate interagency discussion, exchange information, address safety and advise its members on issues dealing with transportation safety. It is also tasked with enhancing and expanding safety planning in all elements of NYMTC's metropolitan transportation planning process, including NYMTC's plans, programs, and activities.

NYMTC will continue to support these safety planning efforts. Additionally, most projects in the Transportation Improvement Program (TIP) address safety. Typically, agencies will work with New York State DOT to advance capital projects through their area or their Traffic Safety Board on enforcement and educational issues and NYMTC will continue to coordinate regional efforts. The sections below describe strategies and programmatic efforts that will guide NYMTC over the next 30 years to provide transportation investments that prioritize safety for travel in the region.

FIGURE 5.1

Crashes & Accidents in the NYMTC 10-County Region 2004-2006

Factors	2004	2005	2006	2004-2005 % Change	2005-2006 % Change
MOTOR VEHICLE CRASHES					
Total Number Of Motor Vehicle Crashes	150,025	143,374	165,574	-4.4	15.5
Crashes Resulting In Fatality	730	716	684	-1.9	-4.5
Crashes Resulting In Injury	106,218	99,540	95,573	-6.3	-4.0
Crashes Resulting In Property Damage	43,077	43,118	69,317	0.1	60.8
Vehicles Involved In All Types Of Crashes	285,287	271,162	312,861	-5.0	15.4
Vehicles Involved In Crashes Resulting In Fatality	1,101	1,121	1,043	1.8	-7.0
Vehicles Involved In Crashes Resulting In Injury	201,049	187,143	179,433	-6.9	-4.1
Vehicles Involved In Crashes Resulting In Property Damage	83,137	82,898	132,385	-0.3	59.7
Drivers in Motor Vehicle Crashes	250,263	237,217	272,496	-5.2	14.9
Vehicular/Pedestrian Crashes	12,962	12,954	12,972	-0.1	0.1
Pedestrian Fatalities In Vehicular/Pedestrian Crashes	255	251	237	-1.6	-5.6
Total Bicyclists Killed Or Injured	4,229	4,188	4,014	-1.0	-4.2
Bicyclist Fatalities In Vehicular/Bicycle Crashes	26	37	27	42.3	-27.0
TRANSIT ACCIDENTS					
Total	82	77	79	-6.1	2.6
Fatalities	14	15	20	7.1	33.3
Injuries	485	245	280	-49.5	14.3
Ratio Per Million Riders	0.029	0.026	0.026	-10.3	0.0
Ratio Per Million Vehicle Miles Traveled	0.141	0.132	0.139	-6.4	5.3

Source: New York State Department of Motor Vehicles; New York State Public Transportation Safety Board

Recommendations for Improving Roadway Safety

Strategic Highway Safety Plan - The SHSP is the New York State plan that establishes highway safety goal areas. NYMTC is working with other New York State stakeholders towards their portion of the statewide goals and efforts promulgated within the SHSP. Major goals currently focus on seven goal areas: driver behavior; pedestrians; large trucks; motorcycles; highways; emergency medical services; and traffic safety information systems Key opportunities for NYMTC and other MPOs to further the goals include improving analysis tools to capture crash performance data, analyzing the effectiveness of targeted intersection improvements and improving collaboration between regional EMS systems and municipal highway traffic safety planning organizations.

Partnerships – There are many NYMTC partners in addressing the "4 E's" of safety discussed in previous paragraphs. Traffic Safety Boards have education and enforcement connections while state agencies focus on statewide issues. NYMTC and its members will continue to foster relationships with organizations such as regional EMS systems so that safety efforts can be complimentary building on each other.

Data Driven Approach - NYMTC's safety investments should be based on Federal guidance. Federal transportation legislation (SAFETEA-LU) emphasizes a data driven approach to safety through gathering and analyzing data and investing safety funds to address those needs. The Highway Safety Improvement Program funds are specific in directing those funds as the data suggests. The Five Percent Report identifies the most severe problematic locations that should be addressed.

Data - In support of the data driven approach, NYMTC will continue to support the state's ongoing efforts to collect timely and accurate (electronic) data. Besides accuracy, the goal includes real-time data transmission. The cooperation of police agencies is key in accurately gathering accident information electronically. Additionally, local governments need traffic volume information on their roads to allow for the computation of accident rates to identify statistically significant safety locations. There is a need to develop average accident rates by facility type for local roads. NYMTC and its members will facilitate data collection towards this effort.

Access to Data – The member agencies would then need access to this data. Current efforts to access data are time consuming with several hurdles. The New York State Association of MPOs (NYSMPO) Safety Working Group, through New York State DOT, has been progressing the roll out ALIS (Accident Location Information System) for MPO use. ALIS is a web-based system that visually displays a crash data query in a GIS format. As initial test users view ALIS as a powerful tool for safety analysis, NYMTC will continue to support the roll out of ALIS and ensure member agency access as well as training.

A Road Safety Audit (RSA)—the NYSMPO Safety Working Group "Safety Assessment" process—is a proactive, low cost safety tools to assist agencies in addressing problematic locations. This concept falls under many different names and some agencies have a similar process to some extent. The idea is to have an independent multi-disciplinary audit team examine a site and offer solutions. It emphasizes a connection between the transportation planning process, multimodal considerations, enforcement activities, safety education, and engineering solutions. NYMTC agencies will consider this tool in systematically addressing safety.

Special Areas to Focus Roadway Safety Efforts

Pedestrians – NYMTC's Safety Advisory Working Group determined that pedestrian safety was the leading topic of concern among the member agencies and therefore selected it as the first topic to be studied. The study, *Pedestrian Safety in the NYMTC Region*, identifies the pedestrian safety issues and recommended measures to improve pedestrian safety in the region. The study shows a disproportionate number of the pedestrian crashes occur in the NYMTC region. While only 64 percent of the state residents live in the NYMTC region, 86 percent of pedestrian injuries and 76 percent of pedestrian fatalities occurred in the region. The higher incidence of pedestrian injuries and fatalities is probably due to higher rates of walking in the more densely populated environment. Although many people may associate walking with New York City, every community has its central business district or "Main Street." Walking is the most basic form of transportation. Therefore, NYMTC has planned and approved for funding many pedestrian safety projects in consideration of the study's recommendations, and in support of the Principals' Shared Goals. Specific pedestrian safety projects are listed on the maps and lists of RTP projects in Appendices 1 and 2.

In addition, NYMTC plans to create a forum to bring the latest safety measures to the member agencies that will improve pedestrian safety, as recommended in the study. The goal is to work with stakeholders to build pedestrian-safe environments, including the sponsorship of training workshops on popular programs such as Walkable Communities, Safe Routes to School, Designing Streets for Pedestrians Safety, and Road Safety Audits. NYMTC recognizes that community-based workshops have been particularly effective in bringing together stakeholders around common issues. Each agency should appoint Pedestrian-Bicycle Coordinators and identify specific staff as needed to assist with pedestrian and bicycle safety issues.

School Programs – Safe Routes to School is a Federally-funded program administered by New York State DOT for projects related to providing a safe environment for children to walk or cycle to school throughout the state. Some agencies have proactively studied their "priority schools" through these programs and created recommendations for safety improvements. Additionally, several model programs teach children about bicycle and

pedestrian safety (Safety Town and Safety City). NYMTC will continue to pursue this focus area.

Older Adult Programs - As the older adult population grows, an emerging focus area has been providing safe mobility for older adults. The key components to safety and mobility would be to eliminate "barriers" to pedestrian activity and to prioritize a list of short- and long-term and pro-pedestrian safety improvements. NYMTC will continue to focus on this emerging area.

Bicycle Programs – There is potential overlap between some bicycle and pedestrian issues in this safety section and those in the Bicycle/Pedestrian Element of this RTP. However, one safety issue is immigrant cyclists which are a high risk group who may rely on cycling as a primary means of transportation.

Highway Programs – Safety studies have identified roadway departures and intersection operations as two of the highest-frequency types of incidents. Another area to address in the NYMTC region is substandard roadway characteristics. NYMTC agencies are investigating intersections and roadway segments with statistically significant higher than normal accident rates. The PILs (Priority Investigation Locations) will then be studied by in-house safety investigators and/or consultant engineers to determine the cause of the safety problem and what can be done to mitigate it. The results of these highway safety investigations will be used to initiate safety improvements (improved signage, minor paving, sight distance improvements, guiderail, improve pavement markings, adding countdown pedestrian heads, changed signal timing, etc.) or included in larger-scale capital projects. Safety investigations will also done based upon perceived safety concerns identified by the public and elected officials.

In addition to specific areas noted above NYMTC will pursue system-wide safety upgrades. As technology produces products that can enhance safety, those system-wide improvements will be incorporated into the transportation network. One program is “SKARP – Skid Accident Reduction Program” which targets improving the frictional properties of the road surface. Annually, the roadway sections with high numbers of wet weather accidents are identified and then tested for skid resistance. Those with low skid resistance are then programmed for resurfacing by micro-surfacing or overlay. This improves skid resistance and usually greatly reduces wet weather accidents. Another system-wide safety upgrade is described as “Signals” and entails installing new controllers to allow for more sophisticated operations of signalized intersections, while also installing traffic lights with increased visibility. Signage with the new retro-reflectivity standard will help with the visibility of the directional signs on the transportation network.

Driver Behavior - There are three areas of driver’s behavior to focus on: Impaired Driving, Speeding and Other Aggressive Driving Behaviors, and Occupant Protection. Most of the initiatives in this area are addressed through either education and/or enforcement. This is an area well covered by the

Traffic Safety Boards within the NYMTC membership. One prominent program to address impaired driving is the STOP-DWI program which is a comprehensive program consisting of five countermeasure areas: education/ public information; enforcement; court-related; rehabilitation; and probation.

Several programs address aggressive driving behavior and occupant protection, including Selective Traffic Enforcement Program, Buckle Up New York, and Child Passenger Safety. Selective Traffic Enforcement Program (STEP) encourages jurisdictions to use local data to determine problem areas and to develop enforcement countermeasure to reduce crashes, injuries and fatalities. Buckle Up New York (BUNY) grants are for seat belt enforcement and compliance. Child Passenger Safety grants support child passenger fitting stations, training and child restraint education. NYMTC will continue to monitor for new trends and participate in emerging focus areas.

Inattention/Distractions – There is a continuing need to better train drivers, bicyclists, and pedestrians. Statistically, Inattention/Distraction is the top contributing human factor in crashes for the NYMTC area. Cell phone and I-pod abuse is on the rise by all roadway users. Bicyclists regularly drive through red lights – they are operating a vehicle. Pedestrians also cross at dangerous locations and don't pay attention to traffic signals. Along with the inattention is that drivers need a better understanding of the law with regards to yielding to pedestrians in crosswalks. NYMTC agencies will work with their Traffic Safety Boards, who have educational programs in place, to address these items.

Intermodal Connectivity – The safe connection between modes also needs to be considered. An isolated bus stop sign on a suburban road does not promote transit. Subway-sidewalk interface, parking lots to commuter rail stations, or sidewalks from bus stops to trip generators (development or malls) are several examples of those connections.

Safe Routes to Transit is a NYC initiative to improve pedestrian and motor vehicle movement around subway entrances and bus stops to make accessing mass transit easier and more convenient. The three programs under the Safe Routes to Transit initiative are Bus Stops under the Els, Subway- Sidewalk Interface and Sidewalks to Buses.

Other Areas of Attention – Other areas of note are Motor Carrier Safety (Large Trucks) and Emergency Medical Vehicles. These topics are addressed locally and at the NYSMPO Safety Working Group level, as emerging statewide issues.

Transit Safety Programs: Metropolitan Transportation Authority

Operating Programs to Reduce Customer and Employee Injuries - All MTA agencies have on-going operating programs to reduce customer and employee injuries and have achieved a 64 percent reduction in the rate of employee injuries between 1996 and 2008, and approximately one-third fewer customer injuries

over the same time period. This effort involves customer awareness and education, as well as station maintenance programs, employee training, requiring proper use of personal protective equipment (PPE) by employees, safety audits, and other specialized measures.

MTA's Capital Plan – The Capital Plan includes a multitude of projects that improve customer and employee safety. From addressing the gap between rail station platforms and car doors, to removing asbestos from employee facilities, MTA spends millions of dollars every year on safety-related improvements. In addition, MTA has on-going operating programs to improve system safety.

Fire Protection - NYC Transit is engaged in a robust program to replace older fan plants to ensure ventilation in subway tunnels. This effort is coupled with operating strategies to prevent fires, thereby reducing risks to employees and customers in the subway system. The Fire Protection System at MTA Bus Company's JFK Depot is being brought into a State-of-Good-Repair. LIRR has fire and life safety projects underway in tunnels. MTA Bus employee locations are being outfitted with fire alarms and sprinklers to reduce the risk of fire-related injury and damage at these locations.

Signals and Communications - Subway signals are being replaced with more modern, safer signals, which will also contribute to the safety of the subway system. LIRR and MNR are working to improve radio coverage in their operating territories as well.

Tunnel Lighting - Tunnel lighting is being replaced and improved, with 48 miles of lighting being replaced to date.

Train Door-Platform Gap - Long Island Rail Road is equipping its M-7 fleet with threshold plates to enhance gap safety as customers enter and exit trains. In conjunction with this, platform edges at Pennsylvania Station are being modified to accommodate the new threshold plates.

Railroad Grade Crossings – Every railroad grade crossing is rated by the Federal Railroad Administration regarding its safety potential. Each New York State DOT Region has a program to improve its railroad crossings in cooperation with its commuter and freight railroads. NYMTC needs to ensure that the rail funding flows for these safety projects.

Transit Safety Programs: Other Public Transportation Operators

All of the suburban transit operators in the NYMTC region have safety plans that address equipment and maintenance procedures, personnel safety training programs, accident reporting systems and passenger safety practices. These operators include Westchester County's Bee-Line System, Transport of Rockland, Putnam Area Rapid Transportation, City of Long Beach in Nassau County and Suffolk County Transit, including Huntington Area Rapid Transit.

Regional Transportation Security

Securing transportation systems in the New York City metropolitan area continues to be a primary concern for each of NYMTC's member agencies. Security is also a priority for state and Federal transportation agencies involved in the region. NYMTC member agencies aim to continue their involvement in planning and implementing security procedures and infrastructure in addition to the ongoing education of staff involved in operations, maintenance and planning of transportation systems. NYMTC's involvement in these activities is described below at Federal, state and regional levels.

Federal Level - At the Federal level the U.S. Department of Homeland Security (DHS) is an overarching agency whose responsibilities include critical infrastructure protection, emergency preparedness and response. The provision of transportation security rests with the Transportation Security Administration whose mission is to protect the nation's transportation systems to ensure freedom of movement for people and commerce. Among the other agencies operating under DHS is the Federal Emergency Management Agency (FEMA) which is responsible for coordinating efforts with state and local governments to manage all hazards including natural disasters and terrorist-related emergencies and other man-made disasters. It should also be noted that each administration within the U.S. Department of Transportation is involved with different aspects of transportation security.

State Level - New York State Executive Law, Article 2B, enacted in 1978, created the Disaster Preparedness Commission (DPC) and required the development of a statewide Emergency Management Plan. The DPC comprised of the commissioners, directors or chairpersons of 23 state agencies and one volunteer organization – the American Red Cross. The responsibilities of the Commission include: the preparation of state disaster plans; the direction of state disaster operations and coordination with local government operations; and the coordination of Federal, state, and local recovery efforts. The New York State Emergency Management Office (SEMO) provides administrative and program support to the DPC and as such plans and coordinates the responses of the state in times of emergency or disaster. The New York State Office of Homeland Security was created after the September 11, 2001 terrorist attack and by law coordinates the policies, protocols and counter-terrorism strategies for New York State governmental agencies.

Regional Level - Security planning for the NYMTC region and for the region-wide transportation system is the responsibility of many agencies and institutions. Since security depends on extensive communication and coordination, planning and execution (of security measures) are interrelated and responsibilities overlap in some instances. NYMTC members are involved in ongoing and coordinated efforts to protect the overall transportation system and respond as required to unforeseen natural events and disasters.

At the regional and local level disaster preparedness and emergency response planning is led by county, municipal and local governments who are responsible for developing their own Emergency Management plans for their respective areas. In New York City, emergency and disaster preparedness planning is coordinated through the Office of Emergency Management. All NYMTC members have Emergency Management plans which were developed through substantial coordination with each other and in many instances with jurisdictions outside of the NYMTC area. Working groups consisting of representatives of various entities and government agencies are an integral part of the ongoing disaster preparedness and emergency response planning for the NYMTC area.

In terms of implementation, NYMTC members support, design and fund projects and programs that address security issues and enhance secure passenger and goods movement.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Chapter 6

System Improvements and Actions

The previous chapters of the Regional Transportation Plan describe the needs and expected growth in one of the largest metropolitan areas in the country. They outline a vision and the overarching investment strategies developed by NYMTC member agencies in consultation with a broad network of government agencies, residents, business owners and various special interests. This chapter presents specific steps that NYMTC's members have collectively agreed to take to support their commitment to continuing, comprehensive, and cooperative transportation networks within and connecting to the New York Metropolitan area.

The 2010-2035 NYMTC Regional Transportation Plan contains an array of projects, strategies, and initiatives covering all types of transportation modes. The timeframes for these projects play out over the 25-year span of this Plan, from major investments in Desired Growth Areas that will take decades to complete, to neighborhood-level investments and planning studies already under way. In addition to major transit and highway projects, this chapter describes investments in the region's bicycle and pedestrian network, the freight transportation system, and transportation for users with special mobility needs.

i. Regional Transportation Investments

NYMTC's members are committed to a vision of investing in long-term goals for a healthy and vibrant environment, economy, quality of life and a variety of choices in transportation.

The RTP is a key component of the overall process for moving transportation projects, programs and initiatives from concept to implementation. As required by Federal law, the RTP contains two distinct lists of short- and long-range strategies and actions:

a. A list of **"fiscally-constrained"** projects for which funding has been identified over the next 25 years. (It should be noted that the first five years of the RTP's "fiscally-constrained" project list consists of projects and programs that already have funding commitments from a combination of Federal, state, and local partners. These projects appear in the Transportation Improvement Program [TIP], a separate document, and therefore are not repeated in the Regional Transportation Plan.)

b. A **"vision"** element that lists those projects, proposals, and studies that are priorities for the region but do not yet have an identified source of funding.

Appendix 1 contains the full list of fiscally-constrained projects as well as the vision element of the RTP.

Steps in a Major Project's Development

A typical transportation project, program or initiative is conceived through a study funded either by NYMTC staff or by one of its member agencies. Capital projects that involve enhancements to or expansions of the region's transportation system typically move through a series of studies that progressively screen alternatives and determine the likely environmental, social, and community impacts of each alternative. The development process for major projects is outlined in the NYMTC's Major Projects Procedures which were adopted in June 2008 and are consistent with state and Federal laws and regulations. NYMTC members also continue to follow the major investment procedures which were adopted in February 1995.

During the screening process, more loosely-defined project descriptions and even the studies themselves may appear in the vision element of the RTP, but by the time a specific project is identified, a cost estimate is prepared, and potential funding sources have been identified, NYMTC's members will likely have achieved consensus that the project should be added to the fiscally-constrained portion of the RTP. State-of-Good-Repair/Normal Replacement projects, maintenance projects, and operational activities also are added to the fiscally-constrained portion of the RTP, and eventually to the TIP, through NYMTC's consensus-driven process involving all member agencies.

It should be noted that both the fiscally-constrained and vision elements of the RTP contain much more than capital projects. The RTP lists safety projects, preservation projects, maintenance activities, operational activities, and other initiatives that are identified by NYMTC's member agencies.

The transportation investments planned by member agencies throughout the region can be organized into four broad categories that reflect the broader process for bringing a project from concept to implementation:

a. The region's **Transportation Improvement Program, or TIP**, lists specific investments and actions over a five-year horizon, and includes only those projects for which funding has been identified. Down payments on the region's four Foundation Projects are in the TIP.

b. Discussed in Chapter 1, NYMTC's members have identified a set of longer-term **Strategic Regional Transportation Investments** tied to the shared vision for the region's sustainable growth. Many of the Strategic Regional Transportation Investments in fact comprise multiple projects, studies, and initiatives that are listed and mapped in Appendices 1 and 2.

c. Several major projects in the region are not yet well-defined or are in earlier stages of the planning and development process. A list of representative **Major Investment Studies, Environmental Impact Statements, and Environmental Assessments** are described in the third category.

d. Finally, NYMTC and its members are continuously identifying more general transportation issues and needs that eventually will lead to specific concepts, investment options, and implementable projects. Multidisciplinary regional and local **conceptual planning studies** often investigate a variety of interrelated issues, including environmental stewardship and sustainability, land use and economic development, and public health and social issues that are linked to transportation.

Transportation Improvement Program (TIP)

The TIP documents the Federally-funded transportation improvements that will strengthen and enhance the region's transportation. The TIP is a list of agreed-upon and prioritized transportation improvements over a five year period, along with the anticipated schedules and costs for each. The TIP is linked to the same Integrated Financial Assessment described in Chapter 7 but are not included in the list of long range projects in Appendices 1 and 2.

As the TIP represents the first five years of the Regional Transportation Plan, it is consistent with the goals, objectives and policies of the Plan. Like the Plan, the TIP complies with all federal laws including the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the National Environmental Policy Act (NEPA) and subsequent Clean Air Amendments. Additionally, the TIP is incorporated into New York's State Transportation Improvement Program to ensure continued Federal funding. NYMTC's TIP also includes programs that are not Federally-funded to acknowledge the full spectrum of transportation requirements and improvement activities taking place in the region.

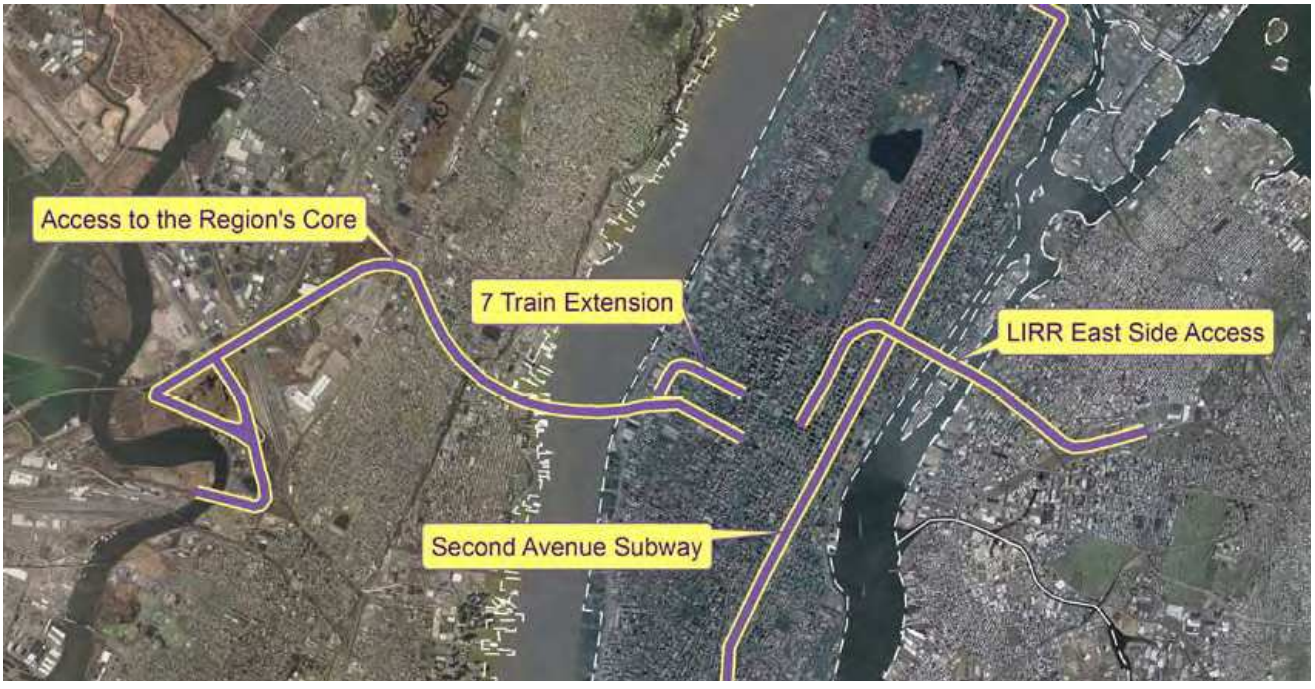
Down payments on the four Foundation Projects in Chapter 1 are included in the TIP. These four key transportation improvements address future access to and mobility within the core of the region, Manhattan's midtown and downtown central business districts. This area includes two of the ten Desired Growth Areas: Hudson Yards and lower Manhattan. By themselves, these areas can accommodate 40 million square feet of commercial space and nearly 24,000 residential units, or nearly 45 percent of the commercial space and 35 percent of the residential units of all ten desired growth areas combined.

Four of the Strategic Regional Investments described below have started construction. Given the importance of these foundation transportation projects to the region as a whole and to the Council members' vision for the future growth of the region, NYMTC remains absolutely committed to securing all necessary funding for these projects and seeing them through to their ultimate completion.

In addition to the four Foundation Projects, the TIP contains hundreds of projects throughout the region. The complete document and list of projects is available on NYMTC's website and by contacting NYMTC.

The Four Foundation Projects

- ***MTA New York City Transit's Second Avenue Subway.*** *The Second Avenue Subway project will ultimately include a two-track line along Second Avenue from 125th Street to the Financial District in Lower Manhattan. It will also include a connection from Second Avenue through the 63rd Street tunnel to existing tracks for service to west Midtown and Brooklyn. Sixteen new ADA accessible stations will be constructed.*
- ***MTA Long Island Rail Road Access to the East Side of Manhattan.*** *The East Side Access project will connect the Long Island Rail Road's Main and Port Washington lines in Queens to a new terminal beneath Grand Central Terminal in Manhattan. The new connection will increase the Long Island Rail Road's capacity into Manhattan, dramatically shorten travel time for Long Island and eastern Queens commuters traveling to the east side of Manhattan.*
- ***MTA New York City Transit's No. 7 Subway Extension to the West Side of Manhattan.*** *The No. 7 Subway project will construct an extension of the existing subway line to serve the Hudson Yards desired growth area on the far west side of midtown Manhattan, in conjunction with the adoption of zoning map and text amendments to the New York City Zoning Resolution and related land use actions to permit the development of the Hudson Yards as a mixed-use community.*
- ***New Jersey Transit's Access to the Region's Core Project.*** *The Access to the Region's Core project will construct two single track railroad tunnels under the Hudson River, connecting New Jersey and midtown Manhattan. These new tunnels will add transportation capacity to the existing two-track railroad tunnels under the Hudson River, the North River Tunnels, used by Amtrak and New Jersey Transit that are already operating near full capacity.*



Strategic Regional Transportation Investments

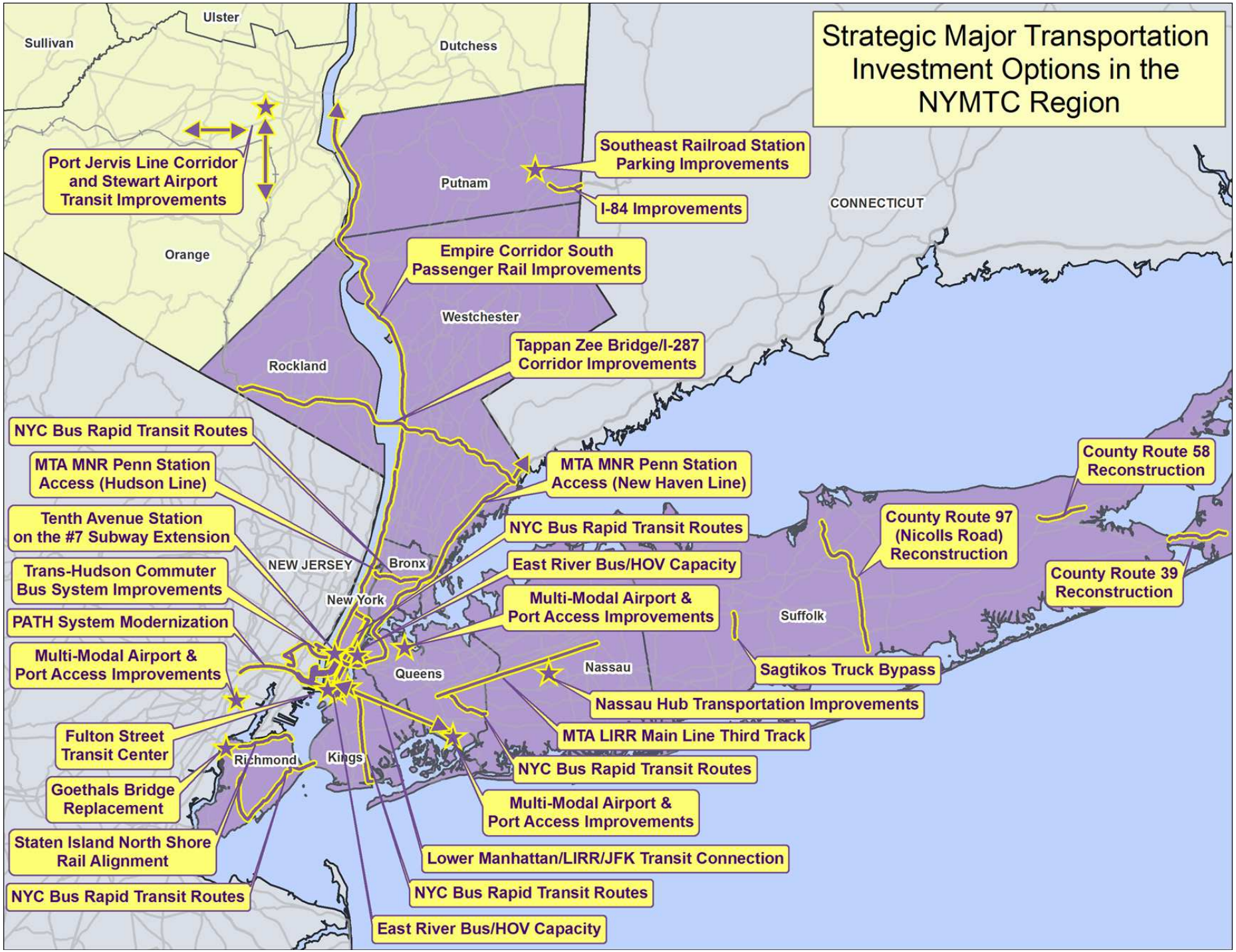
NYMTC's members have agreed on the need to improve the region's transportation system with investments to accommodate the growth that is anticipated in the region and to achieve the full development potential of the ten desired growth areas mentioned in Chapter 1. NYMTC plans to move beyond the down payment on the four Foundation Projects and begin to implement a set of strategic regional investments.

The strategic improvements that have been identified and agreed upon by NYMTC's members are varied; some are large and some small. All impact the region's ability to grow in the future. If certain major projects are not implemented, NYMTC's members could incur significant additional operating and maintenance costs, which would be part of the regional State-of-Good-Repair and Normal Replacement costs discussed in Chapter 7.

As shown in the following table, the improvements are in various stages. Some have been developed through planning work, design and engineering, while others are purely conceptual. All require additional work— planning, design or engineering—before their costs can be ascertained in sufficient detail to begin to program funding for their implementation (costs shown in the table represent the highest cost alternative currently under study). Those programming decisions will be made when the investments have reached the appropriate stage of planning and design.

The timeframes associated with various milestones in the development of these projects are also represented in the table, but it is important to note that these long-term investment options are somewhat fluid and may change over time as planning work proceeds, specific alternatives are chosen and conditions change. These improvements represent the region's best strategic view of the development needs of the transportation system over the next two decades.

The maps and lists of projects in Appendices 1 and 2 include several components of the Strategic Regional Transportation Investments listed in the following table, including preliminary studies, development of Environmental Impact Statements, and in some cases construction of one or more segments or elements of projects. For example, the list of projects in each of the five New York City boroughs includes one Phase I Bus Rapid Transit project and several studies of additional Bus Rapid Transit routes that together comprise the investment labeled "Instituting Bus Rapid Transit routes in New York City" in the table below.


Strategic Major Transportation Investment Options in the NYMTC Region
Ulster
Sullivan
Dutchess
Putnam
Orange
Westchester
Rockland
CONNECTICUT
NEW JERSEY
Bronx
New York
Queens
Kings
Richmond
Nassau
Suffolk
Port Jervis Line Corridor and Stewart Airport Transit Improvements
Southeast Railroad Station Parking Improvements
I-84 Improvements
Empire Corridor South Passenger Rail Improvements
Tappan Zee Bridge/I-287 Corridor Improvements
NYC Bus Rapid Transit Routes
MTA MNR Penn Station Access (Hudson Line)
Tenth Avenue Station on the #7 Subway Extension
Trans-Hudson Commuter Bus System Improvements
PATH System Modernization
Multi-Modal Airport & Port Access Improvements
Fulton Street Transit Center
Goethals Bridge Replacement
Staten Island North Shore Rail Alignment
NYC Bus Rapid Transit Routes
MTA MNR Penn Station Access (New Haven Line)
NYC Bus Rapid Transit Routes
East River Bus/HOV Capacity
Multi-Modal Airport & Port Access Improvements
Lower Manhattan/LIRR/JFK Transit Connection
NYC Bus Rapid Transit Routes
East River Bus/HOV Capacity
County Route 58 Reconstruction
County Route 97 (Nicolls Road) Reconstruction
County Route 39 Reconstruction
Sagtikos Truck Bypass
Nassau Hub Transportation Improvements
MTA LIRR Main Line Third Track
NYC Bus Rapid Transit Routes
Multi-Modal Airport & Port Access Improvements

Strategic Regional Investment Options
Category A: Design Completed or Underway

Proposed Investment	High Cost Estimate (Millions)	Area	Issue(s) Addressed	Planning and EIS	Adoption of Preferred Alternative	Design	Construct and Implement
Completing MTA New York City Transit's Fulton Street Transit Center in lower Manhattan in New York City	$1,400	NYC	Desired Growth Area: Lower Manhattan	Completed	Completed	Complete	Underway
Enhancing subway capacity in the borough of Queens in New York City through MTA New York City Transit's Communications-Based Train Control system	$1,425	NYC	Desired Growth Areas - Jamaica and Long Island City, Queens	Completed	N/A	Underway	2009-2014 for Flushing Line and Culver test track; 2015 or later for remaining improvements
Expanding MTA New York City Transit's subway and bus fleets, depots and stations; and instituting a program of sustainability investments	$50	NYC	Overall Growth	Underway	N/A	Underway	2009-2014
Instituting Bus Rapid Transit routes in New York City	$1,225	NYC	Overall Growth	On-going	On-going	On-going	2009-2014 for first five routes; 2015 or later for remaining; recommendation of multi-agency study
Modernizing the Port Authority Trans-Hudson (PATH) rail system between New Jersey and Manhattan	$3,300	NYC	Overall Growth	Underway	N/A	On-going	2009-2014

CHAPTER 6

System Improvements and Actions

Strategic Regional Investment Options
Category B: Project Planning and/or Environmental Assessment Underway

Proposed Investment	High Cost Estimate (Millions)	Area	Issue(s) Addressed	Planning and EIS	Adoption of Preferred Alternative	Design	Construct and Implement
Increasing bus & high-occupancy-vehicle capacity on East River crossings between Manhattan, Brooklyn and Queens in New York City	$46	NYC	Desired Growth Areas - all New York City areas	Underway	2009-2014	2009-2014	2009-2014
Enhancing parking capacity and constructing a pedestrian bridge at the Southeast Railroad Station in Putnam County	$75	LHV	Desired Growth Area - Brewster Village in Putnam County	Underway	2009-2014	2009-2014	2009-2014
Instituting congestion mitigation measures in Manhattan	$236	NYC	Overall Growth	Underway	2009-2014	2009-2014	2009-2014
Instituting all-electronic toll collection on Port Authority roadways and crossings	TBD	NYC	Overall Growth	Underway	N/A	2009-2014	2009-2014
Increasing capacity on MTA LIRR Main Line by constructing a third track and related infrastructure improvements including hub development	$2,190	LI	Desired Growth Areas Nassau Centre and Suffolk Co.	Underway	2010-2014	2015-2019	2020-2024 and 2025-2029
Extending MTA Metro-North Railroad's Hudson and New Haven lines to Pennsylvania Station on Manhattan's west side	$1,200	NYC, LHV	Desired Growth Area - Hudson Yards, Manhattan	Underway	2009-2014	2009-2014	2009-2014
Replacing the Goethals Bridge between New Jersey and the borough of Staten Island	$1,129	NYC	Overall Growth	Underway	2009-2014	2009-2014	2015 or later

Strategic Regional Investment Options
Category B: Project Planning and/or Environmental Assessment Underway (continued)

Proposed Investment	High Cost Estimate (Millions)	Area	Issue(s) Addressed	Planning and EIS	Adoption of Preferred Alternative	Design	Construct and Implement
Implementing transportation improvements at the Nassau Hub in Nassau County	$8,105	LI	Desired Growth Area - Nassau Centre, Nassau County	Underway	2009-2014	2009-2014	2015 or later
Constructing a replacement for the Tappan Zee Bridge and commuter rail and bus-rapid transit systems in the Interstate 287 Corridor in Westchester and Rockland counties	$16,000	LHV	Desired Growth Area - Interstate 287 in Rockland and Westchester counties	Underway	2009-2014	2009-2014	2015 or later
Improving commuter bus travel and frequency through bridge and tunnel crossings of the Hudson River between New Jersey and Manhattan	$952	NYC	Desired Growth Areas - all New York City areas	Underway	2009-2014	2009-2014	2015 or later
Improvements on the Port Jervis Line that include a second track between Sloatsburg and Salisbury Mills Stations, signal improvements, additional passing sidings west of Salisbury Mills and equipment. Include new train storage yard midway along the Port Jervis Line.	$500	LHV	Desired Growth Areas – Orange County, Rockland County, NYC	2010-2014	2010-2014	2010-2014	2015 or later

CHAPTER 6

System Improvements and Actions

Strategic Regional Investment Options

Category C: Project Planning and/or Environmental Assessment to Begin in First 5 Years

Proposed Investment	High Cost Estimate (Millions)	Area	Issue(s) Addressed	Planning and EIS	Adoption of Preferred Alternative	Design	Construct and Implement
Improving inter-city rail service in the Empire Corridor	$35	NYC, LHV	Overall Growth	2009-2014	2009-2014	2009-2014	2009-2014
Constructing a Tenth Avenue Station on MTA New York City Transit's #7 subway extension to the far west side of Manhattan	$636	NYC	Desired Growth Area - Hudson Yards, Manhattan	2009-2014	2009-2014	2009-2014	2015 or later
Constructing a truck bypass for the Sagtikos Parkway in Suffolk County	$230	LI	Desired Growth Area Brentwood/ Hauppauge, Suffolk County	2009-2014	2009-2014	2009-2014	2015 or later
Reconstructing Route 39 and Route 58 in Suffolk County	$144	LI	Overall Growth	2009-2014	2009-2014	2009-2014	2015 or later
Providing transit service in the right-of-way of the former North Shore branch of the Staten Island Railway	$350	NYC	Overall Growth	2009-2014	2009-2014	2009-2014	2015 or later
Improving capacity on I-84 between the Connecticut State Line and I-684 in Putnam County	$66	LHV	Desired Growth Area - Brewster Village in Putnam County	2009-2014	2009-2014	2015 or later	2015 or later
Enhancing transit connections between Lower Manhattan and the MTA Long Island Rail Road system and JFK International Airport	$9,000	NYC	Desired Growth Area - Lower Manhattan	2009-2014	2009-2014	2015 or later	2015 or later

Strategic Regional Investment Options
Category D: Project Development Throughout the Planning Period

Proposed Investment	High Cost Estimate (Millions)	Area	Issue(s) Addressed	Planning and EIS	Adoption of Preferred Alternative	Design	Construct and Implement
Undertaking a long-term program of transit and ferry service enhancements and transit station access	$3,010	Region wide	Overall Growth	On-going through 2030	On-going through 2030	On-going through 2030	On-going through 2030
Implementing the Pedestrian-Bicycle Element of the NYMTC Regional Transportation Plan	$1,862	Region wide	Overall Growth	On-going through 2030	On-going through 2030	On-going through 2030	On-going through 2030
Improving multi-modal access to the region's port facilities and airports	TBD	Region wide	Overall Growth	On-going through 2030	On-going through 2030	On-going through 2030	On-going through 2030
Improving the region's multi-modal goods movement and distribution system	$5,000	Region wide	Overall Growth	On-going through 2030	On-going through 2030	On-going through 2030	On-going through 2030
Expanding the use of clean fuels in the transportation sector through specific projects and programs sponsored by individual counties	$695	Region wide	Overall Growth	On-going through 2030	On-going through 2030	On-going through 2030	On-going through 2030

Major Studies and Environmental Reviews

Before money is committed and construction begins, every proposed project goes through a number of steps that evaluate a number of alternative solutions to a given challenge faced by the town, city or by the entire region. These Major Investment Studies (MIS) and Environmental Impact Studies (or Environmental Assessments) invite important participation by local residents, business owners, political representatives and experts in fields from economics to aquatic biology. Examples of these project studies are provided below. More information can be found by contacting the managing member agency.

Cross Harbor Freight Movement Project. In May 2000 a Major Investment Study was completed by the New York City Economic Development Corporation and examined alternatives for improving freight movement across the New York harbor. This led to the completion of a Draft Environmental Impact Study in April 2004 which analyzed various alternatives including the construction of a tunnel dedicated to rail freight. In the Federal transportation bill of 2005 – SAFETEA-LU, the Cross Harbor Rail Freight Tunnel project received $100 million in funding.

In 2007, the Port Authority of New York & New Jersey, with support from the New York State, New Jersey, and New York City Departments of Transportation, restarted the Cross Harbor Freight Movement Project with a view of completing the Environmental Impact Statement (EIS) for the project, including updated market data, a full public review project that includes a thorough dialogue with communities throughout the region. The Port Authority also proposed to make a set of interim investments totaling $80 million to improve freight movement in the region while a more comprehensive solution is identified. These investments included the purchase of the New York & New Jersey Rail Road and clearance improvements along freight lines in New York.

The EIS is anticipated to take 18 months, including a full public review process with meetings throughout the region. The centerpiece of the project is the construction of the Cross Harbor Rail Freight Tunnel, which would be built under New York Harbor, to link the nation's rail system ending in New Jersey, with existing rail lines east of the Hudson.

Kosciuszko Bridge EIS. In 1995, NYSDOT initiated the Kosciuszko Bridge Traffic Operations Study to consider alternatives to rehabilitate the bridge, with and without the construction of a new adjacent bridge. The study found that from a structural standpoint the bridge could be rehabilitated in thirds by closing two lanes at a time. However, the local street network was incapable of handling the diverted traffic. It also found that without any additional capacity, operating conditions on the existing bridge would continue to deteriorate, resulting in severe congestion on the highway and several ramps. Upon its review of the potential impacts of the proposed project, FHWA and NYSDOT concluded that it was appropriate to prepare a DEIS to identify and evaluate the transportation, social, economic, and environmental impacts of possible solutions. The DEIS was completed in March 2007, followed by the FEIS which was issued in December 2008.

The locally preferred alternative will replace the existing bridge by building a new permanent, parallel bridge on the eastbound (Queens-bound) side of the existing bridge. The new bridge would be built at a lower elevation to allow for reduced grades. When completed, the new bridge would include auxiliary lanes in both directions, carrying five lanes of eastbound traffic and four lanes of westbound traffic, and it would have standard lane widths and shoulders. The new bridge would also include a bikeway/walkway on the north side of the bridge. Construction is expected to begin in Fall of 2013, with completion by Spring of 2019.

Goethals Bridge Replacement Project. The Goethals Bridge provides a critical connection both for local Staten Island-New Jersey access and as part of the I-278 interstate highway corridor. The bridge is among the six bistate crossings operated by the Port Authority of New York & New Jersey. Though safe, the Goethals Bridge is functionally obsolete. It provides a total of four substandard-width traffic lanes, no shoulders, and other deficiencies. The agency has proposed construction of a replacement Goethals Bridge in the same general alignment that would provide a total of six lanes, full shoulder lanes, a bicycle-pedestrian facility, and capability to support managed-use lane operations. The proposed design incorporates seismic and security safeguards, and does not preclude the addition of a transit facility as a future project. This proposed investment currently is undergoing a Federal Environmental Impact Review. The US Coast Guard as lead Federal agency released the Draft Environmental Impact Statement in late May 2009 and scheduled hearings for early July 2009.

Managed-Use Lane Study. The New York State Department of Transportation (NYSDOT) is currently working with the City of New York Department of Transportation, Metropolitan Transportation Authority, New York Metropolitan Transportation Council, and other regional entities to evaluate the efficiency, effectiveness, and feasibility of managed use lanes. This project is providing key expertise to NYSDOT in the application of transit-centric (Bus Rapid Transit, Bus On Shoulders), pricing-centric (HOT lanes, Express Toll Lanes), and efficiency-centric (Active Traffic Management) managed use lanes. This study will investigate mobility improvement for people and goods, decreasing congestion, improving the environment, promoting smarter energy consumption, supporting regional economic growth, minimizing travel costs (in time & dollars) and improving emergency routing and access.

Gowanus Expressway. The Gowanus Expressway is a major gateway to southern New York City and a principal part of the city's highway system. It runs from the Verrazano-Narrows Bridge to the Brooklyn-Battery Tunnel/Brooklyn-Queens Expressway Interchange, with connections to the Shore Parkway (part of the Belt Parkway) and the Prospect Expressway along the way. The Gowanus, part of Interstate 278, is the only interstate highway in Brooklyn. It carries about 200,000 vehicles a day. Both the steel structure and riding surface of the expressway have deteriorated, and continual emergency repairs are necessary to maintain safe traffic operations. The New York State Department of Transportation (NYSDOT) and the Federal Highway Administration (FHWA) are proposing to rehabilitate or replace the Gowanus Expressway.

NYSDOT and FHWA are preparing a Draft Environmental Impact Statement, or DEIS, to examine the project's potential impacts to the environment. Several project alternatives are being explored within this process: the No Build/Maintenance, Relief Viaduct, Rehabilitation, and Tunnel Alternative. Working closely with community-based groups, NYSDOT conducted a screening process to select a tunnel alternative for analysis within the DEIS. The alternative that will be studied in the DEIS places the expressway underground, along the Brooklyn bulkhead.

Bruckner-Sheridan Interchange. The NYSDOT is progressing a Preliminary Design/Environmental Impact Statement to improve the interchange between the Bruckner Expressway (Interstate 278) and the Sheridan Expressway (Interstate 895). The scope of the project also includes improvements to commercial access to the Hunts Point Peninsula in the southern quadrant of the Bronx.

Bus Rapid Transit: Central Avenue – Westchester County. The Central Avenue corridor serves Westchester County between White Plains and Yonkers, and links Westchester to New York City. It is a 14.4 mile long corridor and major destinations include: Downtown White Plains, Westchester County Center, shopping areas along Central Avenue, Cross County Shopping Center, Yonkers Raceway, New York City Subway and other Bee-Line routes.

The objective of the Central Avenue Bus Rapid Transit (BRT) Assessment is to identify components of Bus Rapid Transit for the Central Avenue Corridor that will: reduce travel times; attract new riders; improve mobility in the corridor; create an integrated and customer friendly transit service; and improve operating efficiency. The BRT concepts being considered for Central Avenue include: limited stop operation; intelligent transportation systems; preferential lane treatments; attractive stations with customer amenities; access to stations; stylized vehicles with low-floor boarding; faster fare collection; brand identity; and aligning with transit-oriented land development.

The final report was completed in summer 2009. Implementation of transit signal priority, exclusive bus lanes and working with communities on promoting land use changes is in progress.

Select Bus Service: New York City. Select Bus Service is the brand name for New York City's Bus Rapid Transit (BRT) services. Primary features include: proof-of-payment fare collection; transit signal priority, and expanded bus lanes. The first Select Bus Service was launched on June 29, 2008 on the Fordham Road-Pelham Parkway Bx12 corridor in the Bronx. The capital costs for this project was approximately $10.5 million for an 8.5 mile corridor and the increase in annual operating costs is approximately $6 million. This includes additional service and new staff for maintaining fare collection equipment and enforcement.

Following success of the Bronx service, select bus lanes treatments were applied to 34th Street in Manhattan. These include extended bus stops between 1st and 11th Avenues, enhanced-visibility bus lanes, and left turn signal priority. These actions are precursors to a longer term bus lane plan for this corridor.

Future plans include additional BRT routes and the deployment of state-of-the-art bus priority improvements. Immediate considerations include bus priority on Fifth Avenue and Madison Avenue, additional Select Bus Service on Nostrand Avenue and Rogers Avenue in Brooklyn, Select Bus Service on First Avenue and Second Avenue in Manhattan, and "transitway" treatments on Hylan Boulevard in Staten Island.

Conceptual Planning Studies

Conceptual planning studies are multidisciplinary and consider broad-based community issues including transportation, land use, economic development, environment, and social justice. This category includes comprehensive plans that may be required by county governments. Some local municipalities and other communities may also complete comprehensive planning processes that inform the development of transportation projects in the NYMTC region.

Lower Hudson Valley

Metro-North West of Hudson Study. The Hudson Valley sustains a vibrant economy that is one of the strongest of any region in New York State. The West of Hudson Regional Transit Access Study was designed to consider how to maximize the benefits of the area's strong population growth, high transit use and airport infrastructure by coordinating all types of infrastructure and development. The Study has identified the following goals:

a. Improve commuter transit access and mobility between Central Orange County and New York City;

b. Provide transit options for access to and from Stewart International Airport and the surrounding regions;

c. Contribute to the attainment of regional and local environmental goals;

d. Support smart residential and economic growth; and

e. Improve the efficiency, convenience, and integration of transportation services.

Westchester 2025. Westchester 2025 is an initiative of the Westchester County Planning Department to update the county's comprehensive land use plan which was last issued in 1996, titled "Patterns for Westchester, the Land and the People." Westchester 2025 aims to develop a regional vision for the county and its 45 municipalities through an interactive, web based approach. Extensive public involvement and outreach are integral components of the development process. Westchester 2025 strengthens the link between land use, transportation and environmental sustainability. The website features include:

- Overviews of each municipality, 54 downtown centers and 17 corridors with planning opportunities;

- Descriptions of character areas, such as vertical downtown, walkable hamlet and countryside residential, with suggestions on how to protect and enhance these areas; and

- Population, housing, transit and other relevant data.

Long Island

Long Island Sustainability Plan. The goal of Long Island 2035 is to develop public consensus for where Long Islanders will live and work, what transportation systems are needed to support them, and the institutional actions required to ensure a prosperous, equitable and environmentally sustainable Long Island. The project will incorporate the results of numerous community visioning and multi-jurisdictional projects, such as the Sustainable East End Development Strategies, to encourage cooperative efforts throughout the Island. Issues to be studied include: declining economic development; shortage of employment leading to upward mobility; aging and inadequate physical infrastructure; high energy costs; heavy local tax burdens; efficacy of our K through 12 education system; lack of affordable housing; an inadequate public transportation system; declining amount of open space; threats to the potable water supply; surface water and air quality; global climate change; and geographical segregation of the population by age, income and race.

Long Island Accessibility Study. NYMTC, on behalf of its member agencies on Long Island, undertook the development of a definition of "adequate access to transportation" for Long Island to guide public policy decisions, and the formulation of guidelines to inform policy makers as they make decisions about transportation improvements in the future. Based on extensive research and outreach efforts to representatives of stakeholder groups and the public, key guidelines and suggestions were developed on the roles for public entities and partner organizations from other sectors in the provision of transportation services and facilities for those who live and work on Long Island. The guidelines identified were:

a. Providing mandated transportation services

b. Managing transportation rights-of-way and services

c. Maintaining, modernizing, and strategically redeploying discretionary transportation services

d. Regulating land uses in a manner that is compatible with the transportation rights-of-way and services

e. Providing information to optimize transportation and location decisions for travelers, developers, and employers

f. Planning and delivering transportation services in a coordinated manner, and enhancing those services via technology

g. Encouraging the use of private resources to further expand access

Full descriptions of these guidelines are available from the study's report found on NYMTC's website:

http://www.nymtc.org/project/LIS_access/documents/Final_whtpaper.pdf

New York City

PlaNYC. As mentioned in Chapter 1 of the Plan, New York City's PlaNYC 2030 lays out sustainable development principles to guide future development, detailing visions and projects for housing, land use, transportation, air and water. Initiatives focus on strengthening regional business districts, facilitating housing production, fostering mixed use development, protecting neighborhood character, revitalizing the waterfront and enhancing public spaces.

South Brooklyn Transportation Study. The Southern Brooklyn Transportation Investment Study (SBTIS) was an area-wide, multimodal transportation planning study undertaken to address transportation issues in the southern half of the Borough of Brooklyn, New York City. The purpose of the study was to assess current and future travel conditions and deficiencies and develop multimodal transportation improvement alternatives that address the movement of people and goods within and through the study area. Recommendations resulting from the study are:

a. Bus Priority Measures – priority measures to improve existing bus service along four corridors

b. Passenger Ferry Service – express and local service with five new landings to access Downtown Brooklyn and Manhattan

c. Grade Separation at Flatbush Avenue and Avenue U – roadway grade separation for Flatbush Avenue through traffic to avoid the congested intersection

d. JFK Airport Truck Freight Ferry – freight ferry service to the Bronx, Manhattan, northern New Jersey and Connecticut

e. Subway Improvements – improved service, service extensions, pedestrian connections and subway construction

f. Downtown Brooklyn Regional Bus Terminal – terminal for regional and, possibly, intercity routes

g. Bus Rapid Transit – BRT services along six corridors, including the four corridors proposed for bus priority measures

h. Non-motorized Modes – recommendations covering bicycling and walking modes of travel

ii. Pedestrian and Bicycle Network Improvements

Each NYMTC sub-area has developed its own pedestrian and bicycle plans to guide future investments in non-motorized transportation. These networks are key to providing mobility in the region and provide transportation options that reduce greenhouse gas emissions, promote healthy activities, reduce congestion and maintain overall quality of life. For detailed information please see the pedestrian and bicycle plans in the Appendix of the 2010-2035 Regional Transportation Plan.

Lower Hudson Valley

The Mid-Hudson South Bicycle and Pedestrian Master Plan identifies locations in the three county region where it would be feasible to develop bicycle and pedestrian facilities that could serve as viable alternative means of transportation. The plan was developed through an extensive public outreach process, including public meetings, surveys, a website and a training seminar. As the plan comprises three counties, it was not possible to examine every bicycle and pedestrian facility in the region. Therefore, the plan identifies regional projects for implementation, and shows examples of bicycle and pedestrian treatments that can be applied to other facilities not specifically listed in the plan.

The Bicycle and Pedestrian Master Plan contains tables showing existing and proposed regional bicycle and pedestrian facilities and included in the projects list in the regional plan. All projects were designed to be consistent with the SAFETEA-LU principles regarding regional transportation planning. In addition, policy development and ongoing maintenance programs are included in the master plan. Some key projects and programs include:

a. The Cross Westchester-Rockland Link on Route 119-Tappan Zee Bridge
b. New York State Route 1 Bicycle Path
c. Sidewalk Maintenance and Construction
d. Hudson River Esplanade
e. County Route 80 Pedestrian Improvements
f. Putnam County Bicycle/Pedestrian Safety Education Program
g. Safe Routes to School
h. Bicycle Storage & Parking
i. Walkable Communities

Long Island

The NYMTC Nassau-Suffolk Transportation Coordinating Committee's vision for non-motorized transportation on Long Island is one that includes additional facilities and additional users of the non-motorized system. The expected result of this envisioned system is a seamless transportation environment that is safer, cleaner, more efficient, more balanced and more equitable for non-motorized travel.

The objectives of the Nassau-Suffolk Transportation Coordinating Committee are:

- To develop an integrated system or network of bicycle and pedestrian facilities for transportation and recreational purposes;
- To increase safety for bicyclists and pedestrians;
- To encourage bicycling and walking through community planning and encourage local facility investment;
- To promote bicycling and walking as alternatives to automobile travel;
- To educate the public on opportunities for bicycle and pedestrian travel in the region; and,
- To promote bicycle and pedestrian access to employment and commercial centers, downtowns, schools and transit facilities.
- To build community support for pedestrian and bicycle facilities.

The Nassau-Suffolk bicycle network currently includes:

- 58 miles of shared-use paths;
- 337 miles of on-road bike routes including 145 miles of designated bicycle lanes.

In addition the network includes:

- 70 miles of shared-use paths are planned for the state system;
- 20 miles of shared-use paths are envisioned off the state system;
- 1,000 miles envisioned for designated on-road bikeways.

New York City

The New York City Pedestrian and Bicycle Plan incorporates PlaNYC 2030's vision in promoting the development of New York City's infrastructure to keep pace with a population growth of over 1 million people by the year 2035. Some of the key elements in the planned investments include:

- Continued integration and mainstreaming of pedestrian and bicycle facilities into project development and construction, as well as land use and environmental review studies
- Promotion of expansion of sustainable modes of transportation in New York City and reaffirmation of the commitment to improving inter-mobility for pedestrian/bicycle
- Improved access and mobility for people choosing non-motorized travel
- Increased awareness of and maximize the benefits in personal safety and public health found in using non-motorized travel.
- Incorporating the link between transportation and where we choose to live and work as key elements of developing long-term pedestrian and bicycling travel alternatives.
- NYCTCC describes about $1.62 billion of needed investments for pedestrian and bicycle projects through 2035 (including all projects currently on the TIP) to maintain and improve user safety, access and education. These projects include elements of:
  - Developing downtown, multi use areas with pedestrian-scale, "Main Street" design elements
  - Dense activity centers
  - Intermodal connections
  - Programs that improve mobility specifically for key populations like children, people with disabilities, and older adults
  - Streets as public places

iii. Freight Improvements

NYMTC agencies and partners play a significant role in the planning, construction and operation of freight facilities even though the infrastructure involved in the movement of goods in the NYMTC region is mostly privately owned and operated. For example, the public sector owns and maintains the right of way (roads) crucial to shipping, and the private sector owns and operates the vehicles.

Freight transportation in the region supports a huge economy. For example, between 1999 and 2003, the value of merchandise trade through the Port of New York and New Jersey increased by 40 percent—a 42 percent increase for imports and a 36 percent increase for exports. During the same period, tonnage increased by 27 percent. Nearly 589,000 automobiles and other vehicles were imported and exported through the Port in 2002, a 7 percent increase over 2001 figures. Nearly 40 percent of cargo is liquid bulk material, 27 percent is handled in shipping containers, and 22 percent is crude oil, with the remainder made up of automobiles, dry bulk goods and general cargo.[1]

The majority of freight traffic – 72.8 percent in the NYMTC region and 67.3 percent in New York City – is transported by truck. Approximately 20 percent of freight traffic in the region travels via waterways. Port facilities in New York Harbor handle the second largest amount of freight traffic after Los Angeles.[2] The Port brought in over $101 billion dollars of international freight in 2003, representing about 13 percent of the value of U.S. international waterborne freight shipments.

Only 0.9 percent of all freight is carried by rail in the region. The region has about 1,250 acres of freight rail facilities handling 246,000 carloads annually.[3] Although less than one-half of one percent of the NYMTC regions' freight traffic is carried by air cargo, JFK Airport is the second busiest air cargo ports in the United States after Los Angeles. In 2003, 21 percent of all air freight value and 11 percent of air freight tonnage entered the United States through this facility.

Inasmuch as economic growth contributes to freight handling, growth is expected to spur higher freight volume growth in the 10-county NYMTC planning area in the next 30 years. The NYMTC region already experiences the highest volume of freight movement of any metropolitan area in the nation. Regional commodity flows are expected to grow from 434 million annual tons in 2004, to 804 million annual tons in 2030, an 85 percent increase. Growth is expected across the commodity spectrum. One of the fastest growing sectors is "Secondary Traffic," which is a group of commodities moving between warehouses and distribution centers, including goods shipped in containers.

The panoply of freight projects reflects the breadth of needs of the region. The region's infrastructure needs are great, such as deteriorated surfaces and bridge decks. Infrastructure renewal is also taking place on the rail side. Track, switches, and yards are getting attention through New York State and Port Authority of New York & New Jersey funding.

TABLE 6.2

Freight Improvements by Goals and Strategies

Source: NYMTC

Goal	Strategy	Action	Time-frame	Previous Action
1. Improve transportation of freight by reducing government regulations and restrictions	A. Improve management of truck routes	Complete NYCDOT Truck Route Management Study	Short	Implemented "Citywide Truck Route Management and Community Impact Study" recommendations
		Assess alternatives for providing greater access to national standard 53' long, 102-inch wide tractor trailers	Short	Conducting feasibility study
	B. Improve the management of commercial vehicle loading / unloading zones	Expand the commercial parking program in Manhattan and further assess	Short	Expanded program boundaries; continue to assess impacts
	C. Expand the application of ITS in commercial vehicle operations	Automate commercial vehicle permitting, credentialing and enforcement	Short	Implement program (under development) and assess impacts. Began 511 information service
		Expand Integrated Incident Management System in NYC	Short	Proceed with planned multi-agency expansion
		Provide real time traveler information to commercial vehicle operators	Short	Coordinate program development with I-95 Corridor Coalition. Coalition has received funding to implement a truck parking vacancy system.
		Continue experimentation with value pricing of toll facilities	Short	NYSDOT Region 11 Off-Peak Delivery Study

Goal	Strategy	Action	Time-frame	Previous Action
2. Improve the physical infrastructure of the transportation system for freight transport between shipping and receiving points	A. Use marine connections to enhance access to key distribution points	PIDN – Transport Port containers by barge and rail to out-of-region transshipment facilities	Short to Mid	Assess impact of early deployments (Albany) and expand as warranted
		Assess feasibility of regional truck ferries	Short	NYMTC Hunts Point Fish Market Freight Ferry Feasibility Study
	B. Use rail connections to enhance access to key distribution points	Restore service on Staten Island Railroad	Short	Rail freight service to Staten Island restored for marine terminal and Travis Branch for MSW
		Improve First Avenue rail tracks in South Brooklyn waterfront	Short	Implement as planned

Goal	Strategy	Action	Time-frame	Previous Action
3. Improve the reliability of overall movement of freight in the region by encouraging multimodal shipment	A. Reduce barriers to "East of Hudson" rail service	Provide a minimum of 17' 9" clearance; eliminate weight and clearance restrictions on plate F cars and tri-level auto carriers (19' 6"); expand to 23-foot double-stack clearance	Short to mid	Hudson Line Railroad Corridor Transportation Plan. Conduct Pilgrim Environmental Impact Study (EIS) Conduct and complete Cross Harbor EIS
		Reduce operational conflicts between passenger and freight service on railroads	Short to mid	Hudson Line Railroad Corridor Transportation Plan
	B. Evaluate the further expansion of freight yards and warehouses (freight villages)	Assess potential to develop Harlem River as intermodal yard	Short to mid	Hudson Line Railroad Corridor Transportation Plan completed
		Assess potential to develop Pilgrim State Hospital in Deer Park as a bulk and/or intermodal facility	Mid to long	Conduct Pilgrim EIS
		Assess potential to develop Phelps Dodge site and adjacent areas in Maspeth, Queens into a bulk or intermodal facility	Mid to long	Conduct and complete Cross Harbor EIS
		Assess potential to further develop existing yard at 65th Street, Brooklyn for bulk, intermodal, and/or port-related traffic	Mid to long	Cross Harbor EIS Advance Port Revitalization plans
		Conduct regional Feasibility Study to identify additional sites	Short	Feasibility of Freight Villages Study
	C. Improve Cross-Hudson Rail Service	Improve existing float bridges at Greenville, NJ	Short	Technical plans designed
		Assess Cross-Harbor Freight Tunnel	Long	Cross Harbor EIS

Goal	Strategy	Action	Time-frame	Previous Action
4. Improve the reliability and overall movement of freight in the region by expanding alternatives for trucks	A. Improve Northern Corridor Crossing	Assess improvements to the Highbridge Interchange	Long	Northern Corridor Crossing EIS
		Assess continuity of connector road system on the Cross Bronx Expressway	Long	Bronx Arterial Needs Study completed Evaluate better connection with Trans-Manhattan Expressway and George Washington Bridge Cross Bronx Expressway connector roads
		Improve Sheridan-Bruckner Interchange	Long	Environmental Impact Study
	B. Improve Southern Corridor Crossing	Assess upgrading crossing at Goethals Bridge	Long	Environmental Impact Study Conduct corridor study
		Assess completing a continuous bus and high occupancy vehicle (HOV) system on the Staten Island Expressway a	Long	HOV lane in place Conduct managed use lane study
	C. Improve Eastern Corridor (I-278)	Assess removing clearance restriction on the Brooklyn-Queens Expressway	Long	Feasibility Study Conduct managed use lane study
		Assess feasibility of off-peak truck use of Gowanus HOV lane	Short to long	Conduct demonstration project, analyze, and apply to Gowanus Reconstruction EIS; conduct manage use lane study
	D. Improve JFK Airport and Industrial Access Corridor	Assess options for improvements to the major routes in the corridor	Long	Managed use lane study S. Brooklyn Transportation Investment Study completed

iv. Special Needs Transportation

NYMTC has long supported and encouraged the coordination of human service programs. The Council maintains a Coordinated Public Transit-Human Services Plan (CPT-HSP) to continuously improve the provision of multi-modal transportation special needs services in the New York metropolitan region.* The objective of the Coordinated Public Transit-Human Services Plan ("Coordinated Plan") is to identify and prioritize coordination strategies that will improve the efficiencies of these varied and complex services. The Coordinated Plan focuses on "community transportation," which includes public transit and paratransit services, other public transportation services, human services transportation and non-emergency medical transportation services that specifically focus on older adults, persons with disabilities and persons with low income. The Coordinated Plan focuses on identifying (1) the public transportation and community transportation services that exist within the region, (2) the unmet needs of the customers, including those dependent on the services, and (3) coordination strategies to address those unmet needs, and reduces redundancies.

This Plan stems in large part from transportation legislation in SAFETEA-LU, which requires that such a plan be in place before transportation providers in the region may access programs offered by the Federal Transit Administration to fund transportation programs for the target populations.

In analyzing the unmet transportation needs for the three target populations mentioned above, the CPT-HSP through public and agencies' input identified a collection of strategies that offer potential to address service gaps, fulfill unmet needs, and reduce service duplication. Some of the major strategies are highlighted below by NYMTC subregion.

* For more information see the Coordinated Public Transit-Human Services Plan in the Appendix.

New York City

- Transit service expansion and improvements
- Taxi/Community Car Subsidy Programs
- Mobility Managers – Information Outreach, and Trip Planning
- Mobility Managers – Operational Support
- Mobility Manager Training and Support
- Travel Training
- New Vehicles

Long Island

- Transit Service Expansion and Improvements
- Mobility Manager and Mobility Manager Training/Support
- Centralized Transportation Resource Directory
- Improve Access to Fixed Route Bus Stops
- New Vehicles
- Improvements at Non-Key Rail Stations
- Job Access Strategies

Lower Hudson Valley

- Improved Coordination of Agency Services/Mobility Management
- Transit Service Expansion and Improvements
- Accessibility Improvements at Bus Stops
- Centralized Resource Directory
- Job Access Strategies
- Affordable and Accessible Taxi Service
- Travel Voucher Program
- Reverse Commute Strategies – Shuttle Services to/from Rail Stations or Bus Stops, and Vanpools

For more information regarding these strategies, projects and the human services transportation planning process, please see the Coordinated Human Services Public Transit -Human Services Plan (CPT-HSTP) summary in the Appendix or the full Plan on NYMTC's website www.nymtc.org.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Chapter 7

Financing the Plan

This Plan projects twenty-six years of transportation needs and resources, far exceeding the shorter-term horizons of the region's Transportation Improvement Program (TIP) and the capital programs of NYMTC's members. It is inevitable that these projections will differ from other planning or budgeting documents which have more tangible or immediate fiscal constraint and management requirements.

The discussions that follow compare needs and anticipated resources for State-of-Good-Repair and Normal Replacement (SOGR/NR) projects, system enhancements, and Operation and Maintenance of the transportation system. The final financial projections for this Plan include supplemental funding resources that will be required to meet projected needs over the planning period.

i. Long Range Needs

A number of methods were used in estimating the region's long term financial needs shown in Tables 7.1, 7.2 and 7.3 below. The major portion of the roadway infrastructure (roads and bridges) is under the jurisdiction of New York State Department of Transportation (NYSDOT). Estimates were derived, largely, by running the Pavement Needs Assessment Model (PNAM) and Bridge Needs Assessment Models (BNAM). For Local portions of the roadway system (including New York City), estimates were derived from relevant county/city/local municipal capital plans and programs. Needs estimates are assumed to attain similar levels of repair and maintenance and operation.

The public transportation infrastructure needs of the region are greatly influenced by the largest operator – the Metropolitan Transportation Authority (MTA). The financial assessment of MTA's infrastructure needs included financial capacity assessment data used in the Federal Transit Administration (FTA) New Starts discretionary grant applications (to FTA) for the East Side Access and Second Avenue Subway projects, with adjustments made to accommodate the 2035 horizon year. These financial assessments demonstrate MTA's ability to finance the construction and operation of these new transit lines, while supporting the balance of the system.

For public transportation systems other than the MTA (non-MTA) in the region, such as the Westchester County's Bee-Line system, Rockland County's Transport of Rockland (TOR), and Suffolk County's Suffolk County Transit (SCT), financial needs estimates were based on the inventory of system assets—as reported by the systems—to NYSDOT and FTA; the Federally-recommended service life associated with the asset; and the corresponding replacement cycles (for buses and ferries, bus and ferry facilities and major facility components, and transit-related equipment) for the asset. For all of NYMTC's members involved in public transportation operations, State-of-Good-Repair and Normal Replacement (SOGR/NR) needs include vehicle fleets and infrastructure components such as tracks, maintenance facilities, stops, stations.

Long range SOGR/NR needs for the highway system are expected to comprise about 70 percent of the capital program through 2035 (This estimate is further described in the Operating and Maintenance section). By definition, MTA's capital program estimates include the SOGR/NR portion of its needs. Similarly, needs for systems other than the MTA include SOGR/NR.

For Highway programs, operations and maintenance (O&M) is assumed to be about 30 percent of the capital program. To arrive at this estimate, currently programmed projects were studied for the period of 2008 to 2018, focusing on project worktypes that aligned with Federal Highway Administration's (FHWA's) definition of O&M. As a percentage of the whole program, O&M made up approximately 30 percent of the program for those years. Based on this snapshot, 30 percent was used to estimate the portion of the capital program that is attributable to operations and maintenance. This 30 percent estimate was applied to state and local highway programs in this projection.

Maintenance worktypes considered in the analysis included corrective highway maintenance, cyclical highway maintenance, materials purchase, appurtenances and preventive maintenance projects. These worktypes made up about 15 percent of the program. On the Operations side – travel demand management, transportation system management and safety projects made up another 15 percent of the program in the NYMTC region.

Operations and Maintenance costs are assumed to be financed "off the top," with the first call on resources. Using this approach, and given current funding eligibility requirements, this plan assumes using primarily state and local resources to fund O&M, along with a small amount of Federal aid. For purposes of this analysis, the Consolidated Highway Improvement Program (CHIPS) is not included as a specific state resource, but should be assumed to be part of the local share of capital programs.

Currently, this Plan includes major system enhancements whose preferred alternatives have been adopted into the fiscally-constrained planning process.

Year of Expenditure

Generally, 2010-2035 highway needs estimates were calculated starting with a base year needs estimate provided by member agency staff. A "year of expenditure" (YOE) inflator of four percent was applied to the base year through the balance of the plan. The four percent YOE inflator estimate is based on FHWA and FTA's general guidance.

While numerous informal measures of inflation have been studied there are no official New York State Department of Transportation (NYSDOT) long term inflation projections at this time. In this economic environment, the long-term reliability of regional inflation estimates would be questionable. NYSDOT continues to study inflation on a statewide basis. Thus, for this purpose, NYMTC is comfortable using four percent for highway projects.

Public transportation needs were determined based on projected asset replacement cycles throughout the plan. These cycles were based on an analysis of asset age and the Federally-recommended service life of the asset. A YOE inflator of four percent was applied to the base year through the balance of the plan.

CHAPTER 7

Financing the Plan

NYMTC Financial Needs Projections 2010-2035

TABLE 7.1

State-of-Good-Repair and Operations & Maintenance Needs by Mode

Source: NYMTC

	State-of-Good-Repair /Normal Replacement (SOGR/NR) (Billions YOE $)	Operations & Maintenance (O&M) (Billions YOE $)	Totals
Highways & Bridges[1]			
Mid-Hudson South TCC	$ 13.4	$ 8.8	$ 22.2
Nassau/Suffolk TCC	$ 16.4	$ 10.5	$ 26.9
New York City TCC[2]	$ 92.3	$ 44.8	$ 137.1
Subtotal Highways & Bridges	*$122.1*	*$ 64.1*	*$ 186.2*
MTA			
MTA – New York City Transit	$115.5	$270.9	$ 386.4
MTA – Long Island Rail Road (LIRR)	$ 19.1	$ 50.2	$ 69.3
MTA – Metro-North Railroad (MNR)	$ 24.3	$ 63.8	$ 88.1
MTA Bus	$ 2.6	$ 18.0	$ 20.6
MTA Long Island Bus	$ 1.4	$ 5.7	$ 7.1
Debt Service & Cash Adjustments	--	$167.9	$ 167.9
East Side Access / 2nd Ave - Operating	--	$12.7	$ 12.7
Subtotal MTA	*$162.9*	*$589.2*	*$ 752.1*
Other Transit & Ferries			
Mid-Hudson South TCC Transit[3]	$ 1.5	$ 6.3	$ 7.8
Nassau/Suffolk TCC Transit[4]	$ 0.5	$ 1.4	$ 1.9
Ferries	$ 2.8	$ 0.2	$ 3.0
Subtotal Other Transit & Ferries	*$ 4.7*	*$ 7.9*	*$ 12.7*
Total	**$289.8**	**$661.1**	**$ 951.0**

[1] Amounts are reported by officially-recognized Transportation Coordinating Council (TCC) boundaries, which correspond to the Lower Hudson Valley, Long Island, and New York City subregions, respectively, that are referenced in other chapters of the Plan.

[2] Includes needs associated with MTA Bridges and Tunnels

[3] Transport of Rockland, Bee-Line, Putnam County Transit Systems

[4] Suffolk County Transit Systems

Capital [1]	Funds Needed (Billions YOE $)
MTA East Side Access	$ 2.9
MTA 2nd Avenue Subway	$ 15.2
MTA # 7 Line	$ 1.8
MTA Other Capital Construction	$ 2.3
Subtotal MTA	*$ 22.2*
NJT Access to the Region's Core (ARC)	$ 7.6
TIP Mobility & Safety Projects[2]	$ 2.4
RTP Mobility & Safety Projects[2]	$ 3.2
Total	**$ 35.4**

TABLE 7.2
System Enhancement Needs

Source: NYMTC

[1] Other capital investments that will be included as preferred alternatives are adopted into the fiscally constrained Plan

[2] Generally, highway improvements beyond State-of-Good-Repair and Normal Replacement (SOGR/NR). See Section IV, Table 7.10 of this Chapter for details.

Need	Funds Needed (Billions YOE $)
State-of-Good-Repair and Normal Replacement (SOGR/NR)	$ 289.8
Operations and Maintenance (O&M)	$ 661.1
System Enhancements	$ 35.4
Total	**$ 986.3**

TABLE 7.3
Needs Summary

Source: NYMTC

ii. Long Range Resource Projections

Resource estimates in this document are based on April 1, 2005 New York State DOT allocation tables for transportation resources. While financing for the wide variety of project types in the NYMTC region are difficult to predict with absolute certainty, the paragraphs and Tables 7.4, 7.5 and 7.6 below explain how NYMTC will fund the transportation needs of the region over the life of this Plan. The following major assumptions are incorporated in the Plan:

- As evidenced by the last three Federal transportation acts—ISTEA, TEA-21 and SAFETEA-LU—Federal funding will continue to play a significant role in the renewal and expansion of the highway and transit infrastructure nationwide and in this region. The most recent Federal legislation, known as SAFETEA-LU, includes funding for infrastructure renewal and network expansion. Four new Federal transportation acts are assumed after the current legislation, SAFETEA-LU, ends on September 30, 2009. The first year of a fifth act is assumed for the 2035 horizon year.

- Because the region's economic vitality and quality of life are dependent on the transportation network, New York City, the surrounding suburban municipalities and counties, and New York State will continue to have a major stake in the health of the network. It is therefore assumed that state and local resources will support the transportation system in the NYMTC region through 2030 with their levels remaining approximately the same as in the recent years. For example, state and local funding represents over 60% of the programmed resources in NYMTC's current 2008-2012 TIP. Funding by New York State through current mechanisms—for example, the State Dedicated Fund and the State Transit Operating Assistance program—is therefore assumed to continue through the planning period. State Bond Acts for transportation are assumed as part of the base revenue after 2010.

- Funding will continue to be available from the MTA—the region's major transportation-related public authority—in the form of revenue bonds, pay-as-you-go funding and interest earnings. The MTA has been able to refinance bonds, cut expenses and improve fare box revenue through increased ridership and will continue to work at innovative financing to maintain its level of bonding. The MTA's value to investors and customers rests on the organization's dedication to providing safe and reliable transportation essential to the continued economic growth of the region. The MTA will also continue to generate funds from interest earnings and explore untapped resources and new finance strategies. It is therefore

assumed that MTA resources will support the transportation system in the NYMTC region through 2035 with their levels remaining approximately the same as in the recent years.

- The resource forecast assumes that capital funding for other transportation providers not accounted for (e.g., intercity bus, interstate bus) will continue. Amtrak is financed by the federal government and system revenues. It is also assumed that capital funding for other authorities not accounted for (Port Authority of New York & New Jersey, New York State Thruway Authority, others) will continue, and that these authorities are self-funded and that their capital investments are governed by their respective capital programs. These authorities have at their disposal internal revenue sources which support future capital investments to their respective facilities. In addition, a number of resources other than Federal, state and local have been used to fund transportation projects in the past and can be expected to do so in the future. An example is the use of bridge and tunnel toll revenue to support the sale of bonds for financing transportation projects.

- Many billions of dollars are spent by Federal, state and local agencies and jurisdictions to maintain and operate the region's transportation system at existing service levels. The resource forecast assumes that the region will continue to secure the funding required to meet these needs. Actual decisions regarding funding levels for operation & maintenance costs are made each year in the operating budgets for each of the transportation providers in this region. Therefore, for the purposes of this forecast, the assumption is that each jurisdiction will continue to provide the resources needed to maintain and operate their portion of the system. See Appendix 1 for a detailed breakdown.

Highways

Allocations at this point incorporate adjustments to allocations to recognize enacted apportionments from SAFETEA-LU (the Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users, enacted by Congress in 2005), and the 2005-2010 State Highway and Bridge Financing Plan. These tables include estimated allocations through 2012, thereby extending beyond SAFETEA-LU and State Finance Plan end dates. These allocations include Federal aid, State Dedicated Highway and Bridge Trust Fund allocations, as well funds from the 2005 Rebuild and Renew Bond Act.

Since April 2005, Federal, state and local resource estimates have continued to change and uncertainties continue. Allocations are revised regularly for many reasons – adjustment for actual usage, changes in Federal and state resource estimates, program and project delivery, rescissions, etc. Despite those changes, the resource estimates contained in this plan serve as a reasonable baseline to depict future trends in transportation finance for the region.

Table 7.4 shows a history of New York State's Federal aid apportionments, upon which the projections are based. Although the table shows statewide funding, those figures can be applied appropriately to the NYMTC region. A review of NYMTC allocations from 2001 through 2010 shows about 60 percent growth during those ten years. In the case of transit, the statewide trend is applicable because the NYMTC region comprises the majority of funding received in the state.

TABLE 7.4
Federal Aid Apportionment History in billions – Statewide

Source: NYMTC.

	ISTEA[1] FFY 92 – 97	TEA-21[2] FFY 98-03	SAFETEA-LU[3] FFY 2004-2009	SAFETEA-LU[3] Increase/TEA 21	SAFETEA-LU[3] Increase/ISTEA (18 years)
Highways	$5.660	$8.491	$10.066	19%	78%
Transit	$3.706	$5.027	$6.477	29%	75%

[1]ISTEA: Intermodal Surface Transportation Efficiency Act, enacted 1991
[2]TEA-21: Transportation Equity Act of the 21st Century, enacted 1998
[3]SAFETEA-LU: Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users, enacted 2005

Federal Aid – Highways. Estimates for Federal Highway and Transit aid contained in this document are conservative but realistic based on history. These conservative estimates highlight the likely gap between projected needs and resources over the next quarter century. While less conservative projections could have been used, those estimates might lead the public to assume that higher Federal (and state) funding levels will be easily attained. This plan assumes that the current instability of the Federal Highway Trust Fund will be addressed, and that a Federal highway program will continue indefinitely.

Federal aid for highways is projected at a modest growth rate of 20 percent over each of the six-year authorization periods going forward; similar to the growth from TEA-21 to SAFETEA-LU.

This approach results in a plan that begins in 2010 with about $940 million a year in Federal aid for highways and ends with a projection of nearly $1.7 billion in Federal aid for the NYMTC region in 2035.

In this Regional Transportation Plan, Federal aid for highways is not depicted in its current programmatic shares but as a whole. Certain reauthorization efforts may be aiming at redefining the existing Federal programs. Although estimates have been based on current program categories, these may be non-existent by 2035.

State Resources – Highways. Historically, in the highway program, state funding has not grown at a rate faster than Federal aid. Therefore, the 2005-2010 ratio of state to Federal funds (including bond act funds) continues– thus increasing state funds at the same rate. Upon passage of the State Rebuild and Renew Bond act, the ratio of funding across the region was approximately 60 percent Federal, and 40 percent state-funded.

Although bond acts must be voted upon by NYS citizens, for this purpose, bond act funds are assumed to be continued as part of the base revenue, after 2010. The following chart shows the growth in Federal and state highway resources over the long-range planning period.

Our approach results in a plan that begins in 2010 with about $600 million a year in state resources for highways – and ends with a projection of nearly $1.1 billion a year for the NYMTC region in 2035.

The state-funded program is assumed to be financed similar to the existing State Dedicated Highway and Bridge Trust Fund – relying on existing and new taxes, and a combination of pay-as-you go and bond funding. The next State Highway and Bridge Finance Plan (for 2011-2015) will require the identification of additional new or existing taxes and fees to finance the

program. The Governor and Legislature will likely address funding issues for the highway and transit plans concurrently, as has been the practice.

Currently, the State Dedicated Highway and Bridge Trust Fund is supported by portions of the following statewide taxes and fees:

- Motor Fuel
- Petroleum Business Tax
- Highway Use Tax
- Department of Motor Vehicle Fees
- Auto Rental Tax
- Other miscellaneous taxes and fees

The balance of those currently authorized taxes and fees are deposited in the Dedicated Mass Transportation Trust Fund, which provides a portion of the state transit resources in the NYMTC region. Portions of the petroleum business tax, as well as other regional sales and franchise taxes, and statewide franchise taxes, provide operating assistance through the Metropolitan Mass Transportation Operating Fund.

Local and Other Resources – Highways. For purposes of this analysis, local resources provide the balance of funding needed to fill the gap between needs and state/Federal funding at the local level. These estimates do not imply that costs are to be borne by local taxes. In the future, additional taxes at the local level could potentially be mitigated by additional state or Federal resources, or other measures to assist localities in managing property tax levels.

Estimates of resources for the New York State Thruway Authority and New York State Bridge Authority (Bear Mountain Bridge only) have been provided by those authorities. It is anticipated that tolls will continue to support those costs.

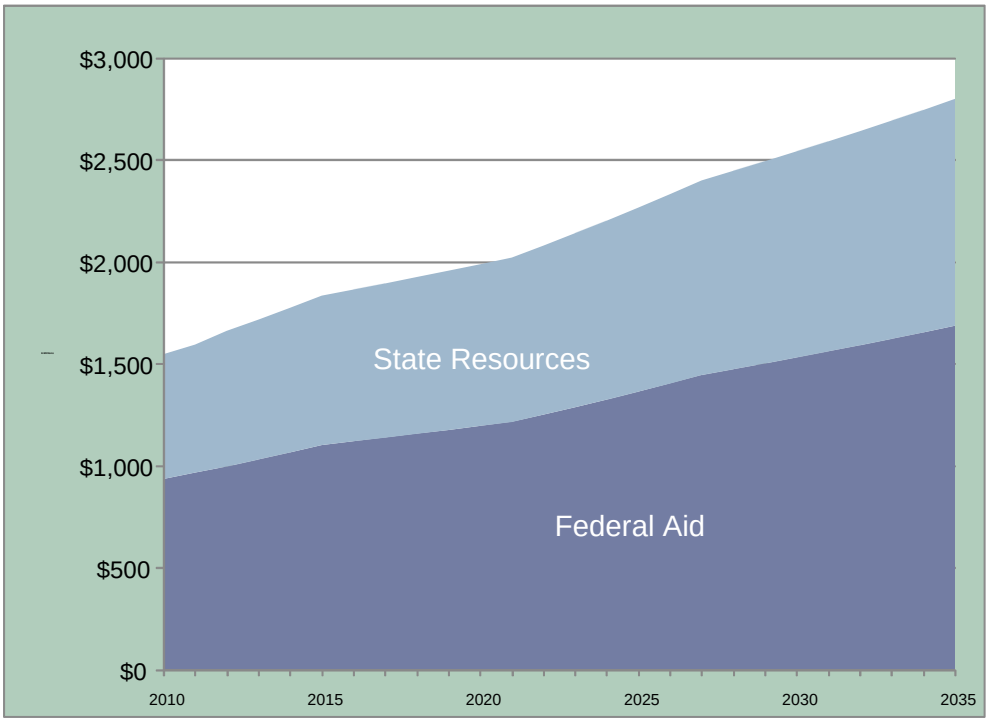


FIGURE 7.1

Federal and State Annual Highway Resources, NYMTC 2010-2035

Source: NYMTC.

Transit

Four major transportation improvement projects—Long Island Rail Road East Side Access, the Second Avenue Subway, the #7 Subway extension and the Access-to-the-Region's Core trans-Hudson rail tunnel project—have been previously adopted into the fiscally-constrained planning process by NYMTC's members and appear in the Plan as such, as well as relevant phases in the TIP.

Both the East Side Access project and the first operating segment of the Second Avenue Subway project have FTA Full Funding Grant Agreements in place as New Starts projects and both are under construction. However, the remaining phases of the Second Avenue Subway project have been adopted into the fiscally-constrained portion of the Plan. Appendix 1 of this Plan contains a listing of the fiscally-constrained projects.

The #7 Subway extension has been adopted into the Plan as a locally financed project, through tax increment financing, with no Federal participation.

Access to the Region's Core is financed federally, but not through NYMTC's planning process. The Federal funding for this project, as well as accompanying funding from the State of New Jersey, are assumed to be made available through the planning process of the North Jersey Transportation Planning Authority, NYMTC's sister metropolitan planning organization in northern New Jersey.

Given their status in the Plan, resources for all of these projects—categorized as "specialized" fund sources—are assumed from relevant Federal, state and local sources (see Table 7.2, Table 7.7 and Table 7.8). The following additional funding sources for transit are incorporated into the Long-Range resource projections:

MTA: The MTA lays out a fiscally balanced, long-term program for capital and operations. The projection estimates state, Federal, local and MTA funding levels adequate to finance program needs throughout this period. This analysis excludes debt service on both the revenue and expenditure side.

MTA's estimates provide a comprehensive funding picture that supports both its State-of-Good-Repair/Normal Replacement and system expansion needs. System expansion projects include the completion of the #7 line, the full-length Second Avenue Subway and East Side Access, described above. Operating cost estimates include the resources to operate existing and new facilities, and other assets (e.g. rolling stock).

Projected revenues grow at varying rates. Operating revenues come from fare revenues, and baseline dedicated revenues that are comprised of state aid from

state and locally imposed taxes. Growth rates range from 3.5 to 6.6 percent, and incorporate one-time increases deriving from system expansions.

On the capital side, Federal formula aid grows about 3 percent a year. FTA New Starts discretionary funding is assumed to provide funding for currently programmed and adopted projects. All other funding for SOGR/NR projects (state, local, bonds and supplemental revenues) combine to meet SOGR/NR needs which are projected to grow at a rate of about 3 percent a year across the system.

Implicit in revenue estimates is the need to increase dedicated revenues beyond existing levels. Capital and operating dedicated revenues increase from about $15.3 billion at the start of the plan, to over $32 billion annually at the end of the plan.

Federal Aid – Non- MTA. Estimates for the major categories of Federal transit aid contained in this Plan were based conservatively on 50% of the historic growth rate over the SAFETEA-LU program period, at three and a half per cent per year. This plan assumes that the solvency issues associated with the Mass Transit Account of the Highway Trust Fund will be addressed, and that a Federal transit program and the major categorical programs will continue indefinitely. For the purposes of this plan the following FTA categorical funding programs are assumed:

- Section 5307 Urbanized Area Formula
- Section 5309 Bus/Bus Facilities (Discretionary)
- Section 5309 New Start (Discretionary)
- Section 5309 Fixed Guideway Modernization
- Section 5310 Elderly Individuals/Individuals with Disabilities
- Section 5316 Job Access and Reverse Commute
- Section 5317 New Freedom

State Resources – Non- MTA. For purposes of this plan state capital and operating programs are assumed to grow by 3 percent annually. State capital programs assumed in plan include:

- Omnibus (State Match) – Provides 50 percent of the non-Federal share of FTA-aided capital projects.
- Transit SDF – Provides 100 percent state capital funds address needs that can not be met through programmed and planned Federal and local sources.
- Rebuild and Renew New York Transportation Bond Act (and assumed continuation of funding) – provides 100 percent state funds to address the incremental costs of procuring hybrid-electric buses.
- State operating funds are provided pursuant to the Statewide Mass Transportation Operating Assistance (STOA) program. The STOA program in this region benefits from a diverse tax base that includes a regional business tax surcharge, a regional sales tax share, 55 percent of the statewide PBT and 100 percent of the statewide "long lines" taxes (telecommunications and transportation business taxes).

Local and Other Resources – Non- MTA. For purposes of this analysis, local resources (per Table 7.5 below) provide the balance of funding needed to fill the gap between needs and state/Federal funding at the local level. These estimates do not imply that costs are to be borne by local taxes. In the future, additional taxes at the local level could potentially be mitigated by additional state or Federal resources, or other measures to assist localities in managing property tax levels.

TABLE 7.5

Transportation Resources by Existing Fund Source 2010-2035 (billions YOE $)

Source: NYMTC.

	Federal	State	Local	Other[1]	Total
Highways	$36.7	$34.0	$64.1	$ 38.8	$173.6
MTA	$67.0	$27.4	$28.8	$652.3	$775.5
Other Transit & Ferries	$ 2.7	$ 3.6	$ 6.4	$ 0.0	$ 12.7
NJT-ARC	$ 0.0	$ 0.0	$ 0.0	$ 7.6	$ 7.6
Total Resources	**$106.4**	**$65.0**	**$99.3**	**$698.7**	**$969.4**

[1] Other = MTA, MTA Bridges and Tunnels, Thruway & Bridge Authority resources. Also includes American Recovery & Reinvestment Act of 2009 (ARRA) funds.

Supplemental Funding Sources

As seen in Table 7.5 above, $969.5 billion in resources are forecast to be available during the period of the Plan from existing sources. This level of funding is sufficient to support the operations and day-to-day maintenance of the highway and transit systems. This level of funding will also be sufficient to support all of the State-of-Good-Repair/Normal Replacement (SOGR/NR) needs for the transit system and most, but not all, of the SOGR/NR needs for the highway system. Additional sources of revenue will need to be developed and implemented during the period of the Plan to support the balance of the highway system's SOGR/NR and to fund network expansion improvements to both the highway and transit.

Long-range forecasts of resources and needs indicate that roughly $16 billion in new funding will need to be identified during the period of the Plan to accommodate all of the system's state-of-good-repair/normal replacement needs. In addition, more than $50 billion will likely be needed to complete the strategic improvements for both the highway and transit systems identified in this Plan. New and innovative funding alternatives are currently being evaluated and implemented within NYMTC's region for planned strategic improvements such as the Interstate 287/Tappan Zee Bridge corridor and the extension of the #7 subway to the west side of Manhattan.

Development and Implementation Issues

The supplemental funding sources explored in this section fall into four broad categories: travel-based revenues, public-private financing, debt financing and special tax assessments. Each category is described in more detail below, along with long-range estimates of its potential financial yield for the region, given assumed timeframes for development and implementation.

Although it is possible for these funding sources to be implemented during the period of the Plan, the actual processes for their development and implementation are subject to individual agency budgeting and policy decisions, as well as legislative changes in municipal, county, State and Federal governments. Thus, the mechanisms for implementation of these funding sources fall outside of the metropolitan planning process for which NYMTC is the responsible body. The development of these sources is subject to political and policy decisions which fall outside of NYMTC's planning process and its direct responsibilities as a regional council.

Further, because of size, scope and functional role in the area transportation network, regionally significant transportation projects should be paid for through funding sources established by and at the state or Federal level. It should not be the responsibility of local governments to introduce and advance

supplemental funding sources for regionally significant projects. However, if and as required, local funds will be sought and acquired.

For these reasons, the inclusion of these supplemental funding sources in the Plan's long-range financial assessment cannot serve as a commitment by NYMTC or its members to their eventual implementation. Rather, they are possible sources for consideration by member agencies over the long-term.

Regionwide Funding Source

Travel-Based Revenues. Travel-based revenue sources consist of a variety of fees charged to travelers for the use or availability of various transportation services and/or facilities. Travel-based fees include transit fares, assorted types of tolls for use of roadway facilities, taxes levied on the use of fuel, taxes levied regionally to geographic areas to support transportation services or facility improvements, and parking fees and charges. Unlike general tax levies which are targeted to the transportation system, travel-based fees are paid either in proportion to actual use of the system or spatially in relation to specific services or facilities. Travel-based revenues are usually drawn from sources related to the use of transit services or sources related to vehicle use on the roadway system.

- *Existing Sources:* Various travel-based revenue sources, both transit-related and vehicle use-related, currently fund operating and capital expenses in NYMTC's planning area. The long-range financial assessment assumes these existing sources in the forecast of anticipated resources during the period of the Plan. For the purposes of the assessment, existing travel-based revenue sources are assumed to escalate to keep pace with inflation as operating costs rise over the period of the Plan.

  As of this writing, new travel-based sources have recently been enacted by the New York State Legislature, including vehicle use-related fees on car registrations, drivers' licenses, rental cars, and use of taxis.

- *Additional Sources:* The Plan identifies additional sources of travel-based revenue related to vehicle use that could be considered for development beyond those which currently exist. In the aggregate, in 2008, existing sources of vehicle use-related travel-based revenue effectively amounted to a five cent surcharge for every vehicle mile traveled, or VMT, in the NYMTC planning area. If as assumed this amount escalates at a rate similar to the 4% inflation rate used in the long-range financial assessment, the aggregate surcharge yield would essentially double over the period of the Plan.

  There are several options for vehicle use-related funding sources that can—in the aggregate—comprise an additional surcharge above and beyond that which currently exists. The most straightforward would

be the imposition of a direct surcharge for annual VMT, which would be levied at the time of the annual inspection of a registered motor vehicle. Other more indirect options could include new surcharges on fuel consumption, enhanced or expanded tolling, user "buy-in" to premium facilities such as high-occupancy vehicle lanes, parking surcharges, and weight-distance charges. All of these sources can be employed in various combinations to attain the overall surcharge.

- *Examples from Other Regions:* several of the vehicle use-related sources described above have been implemented in other regions. Specific examples include:
  - Orange County's SR-91 Express Lanes: Faced with growing congestion between Riverside and Orange counties, the Orange County Transportation Authority partnered with the private investor California Private Transportation Company to fund the construction of toll lanes along the SR-91 median. Drivers in these lanes are charged a variable fee reflecting anticipated levels of congestion.
  - Houston's I-10 QuickRide: While Houston had an extensive network of HOV lanes, mounting traffic congestion necessitated a better use of these sometimes underutilized facilities. Although allowing two-occupant vehicles for free resulted in too much congestion in the lanes, permitting two-occupant vehicles to pay a fee optimized the utilization of the lanes.
  - Oregon's Road User Fee Pilot Program: One of the best examples of VMT-based pricing in the U.S. is the Oregon pilot program which demonstrated feasibility and implementation of VMT fee. Fees were collected electronically during refueling with dual purpose of replacing the gas tax and congestion charging.
  - Austrian GO Tolls: The significant expense of road maintenance, coupled with an increasing portion of foreign freight movement through their country, motivated Austrian transportation officials to implement a "GO" distance-based tolls system for trucks, buses and motor homes.
  - Switzerland's Heavy Vehicle Fee (HVF): The motivations behind Switzerland's HVF mirror many of Austria's concerns with through traffic. However, Swiss transportation officials and residents have typically cited environmental concerns more often than fiscal concerns in supporting the implementation of the HVF.

- *Implementation Issues:* Depending on the funding source in question, implementation of additional vehicle use-related funding sources will require legislative actions at one or several levels of government—state, county and municipal—or policy changes for public authorities which currently collect tolls. The legislative and policy actions required are wide-ranging and fall outside of the planning process for which NYMTC is the responsible body. Thus, although the NYMTC planning process can highlight the need to develop additional travel-based revenue sources, their development will be dependent on a variety of legislative and policy processes.

- *Potential Yield:* The equivalent of an additional five cent surcharge on each vehicle mile traveled in the NYMTC region, established by 2020 (making provisions for a 10-year implementation phase) and held constant over the remaining years of the planning period, could yield a net of $29 billion toward the operational cost of debt service and unmet State-of-Good-Repair needs forecast for the long-term future. Such a surcharge doubles the current effective charge per VMT and equates to an additional $600 charge for a vehicle that is used to travel 12,000 miles in a given year, which is the current average usage for motor vehicles.

  The yield estimate assumes that the surcharge—or some combination of the various options—would need ten years to develop and would be in place for fifteen years during the period of the Plan. The development period is assumed in order for the needed legislative actions at one or several levels of government and/or policy changes by the public authorities who currently collect travel-based revenues to be made in whatever combination is ultimately decided. The yield estimate also assumes that one-quarter of the gross yield would be consumed by the overhead costs of administering the surcharge through either its universal form or some combination of the various options described above. Table 7.6 below includes this potential revenue source and for the purposes on this Plan is assumed to be available in the future, as described above.

TABLE 7.6

NYMTC Financial Resources Projections 2010-2035: Existing and Supplemental Fund Sources (billions YOE $)

Source: NYMTC

	Federal	State	Local	Other*	Total
Highways	$36.7	$34.0	$64.1	$ 38.8	$173.6
MTA	$67.0	$27.4	$28.8	$652.3	$775.5
Other Transit & Ferries	$ 2.7	$ 3.6	$ 6.4	$ 0.0	$ 12.6
NJT-ARC	$ 0.0	$ 0.0	$ 0.0	$ 7.6	$ 7.6
Sub-Total	*$106.4*	*$65.0*	*$99.3*	*$698.7*	*$969.4*
Potential (Travel-Based) Revenue					$29.0
Total Revenues					**$998.5**

* Other = MTA, MTA Bridges and Tunnels, Thruway & Bridge Authority resources. Also includes American Recovery & Reinvestment Act of 2009 (ARRA) funds.

Project-Specific Funding Sources

Public-Private Partnerships. Strategic transportation improvements which are currently capable of generating revenues from user fees in the long-run could potentially be implemented using public-private partnerships. Although the partnerships can take various forms, one possible arrangement is known as Design-Build-Operate-Maintain (DBOM). Under DBOM, a project's implementing agency contracts with a private entity to construct the project and then operate and maintain it for a set period of time. In this type of arrangement, the user fees act as a return on the private entity's investment in the project.

- *Implementation Issues:* Public-private partnerships are typically developed on a project-by-project basis. Thus, each partnership would be developed individually in the context of a specific transportation improvement. Each project would therefore be a separate negotiation with a potential private partner and the terms and conditions of the resulting agreement will vary between projects given their characteristics.
- *Potential Yield:* Given the individual nature of each potential public-private partnership arrangement, it is difficult to accurately forecast an aggregate yield.

Debt Financing. Mechanisms also exist to finance transportation improvements through debt. These include bonding, various Federal programs and possibly the use of an enhanced New York State Infrastructure Bank or any national infrastructure bank that may be developed through future Federal legislation. In all cases, capital is effectively loaned for the transportation improvement and must be paid back over time, along with some level of interest. Therefore, as is the case with public-private partnerships, candidate transportation improvements capable of generating revenues are specific targets for this type of financing or the improvement project must be able to receive on-going funding to pay off debt through the various funding mechanisms described above.

NYMTC's members have the capacity to issue bonds for capital expenditures that is established in the state constitution, municipal charter or enabling legislation through which the agency or municipal entity functions. These capabilities are defined specifically for each member and often are limited in terms of the types of spending to which bonding may apply or the level of debt service that the agency or entity may assume in any given period. Indeed, various bonding arrangements are assumed to provide local match to the current sources of funding that comprise the baseline forecast of anticipated resources during the period of the Plan.

Federal credit assistance is available through the Transportation Infrastructure and Finance Innovation Act (TIFIA) of 1998. TIFIA permits the Secretary of Transportation to issue secured loans, standby lines of credit and loan guarantees. The assistance allows project sponsors to borrow up to 33 percent of a project's costs at interest rates similar to US Treasury security. With this federal support, a project sponsor may be more able to leverage private capital and speed construction starts. In addition, the federal credit assistance program has flexible repayment options and allows states and municipalities to defer interest payments on Federal debt in order to meet senior debt obligations.

- *Implementation Issues:* Debt financing could be developed on a project-by-project basis. Thus, each arrangement could be developed individually in the context of a specific transportation improvement. Each project could therefore employ a different combination of bonding and the use of Federal credit given their characteristics and the capabilities of sponsoring agencies. The availability of Federal credit in the long-term assumes that appropriate legislation will be passed on an on-going basis that will make this credit available.

  Another implementation characteristic of debt financing is that it will impact agency and municipality operating budgets, which are the usual mechanisms for the payment of debt service.

- *Potential Yield:* Given the project-specific nature of each potential debt financing arrangement, it is difficult to accurately forecast an aggregate yield.

Special Tax Assessments. Tax assessments can capture value from new development for transportation improvements which make that development possible. Operationally, special tax assessment districts are the usual mechanism employed to apply a special tax or surcharge in a development area that can then be used for this purpose. These districts can take a variety of forms. For example, a tax increment district may be defined for a one time assessment targeted to a specific transportation improvement, while a transportation development district may be targeted to a more general approach in an area over a longer period of time. A specific example of an assessment district is the one currently being used to finance one of the foundation projects in our region: the extension of the #7 subway to the far west side of Manhattan. This type of financing is particularly applicable to the desired growth areas described earlier.

- *Implementation Issues:* Special tax assessments need to be arranged separately for each growth area for which the method is to be used. The usual mechanism for implementing an assessment is a taxing district established by legislation at the state, county and/or municipal level, depending on the location of the district. Once the

district is established, it does not reach its desired financial yield until all of the desired growth in the area is realized. Additionally, the level and duration of the assessment levied in a district may impact the pace and scale of the development which ultimately occurs, thus affecting the overall yield of the district. Careful calibration is often needed to optimize both the yield and the desired level of development.

- *Potential Yield:* The revenues resulting from tax increment financing could be used to directly finance related transportation improvements, as a basis for a public-private partnership, as a basis for the issuance of bonds, or to back credit drawn through loan or infrastructure bank programs.

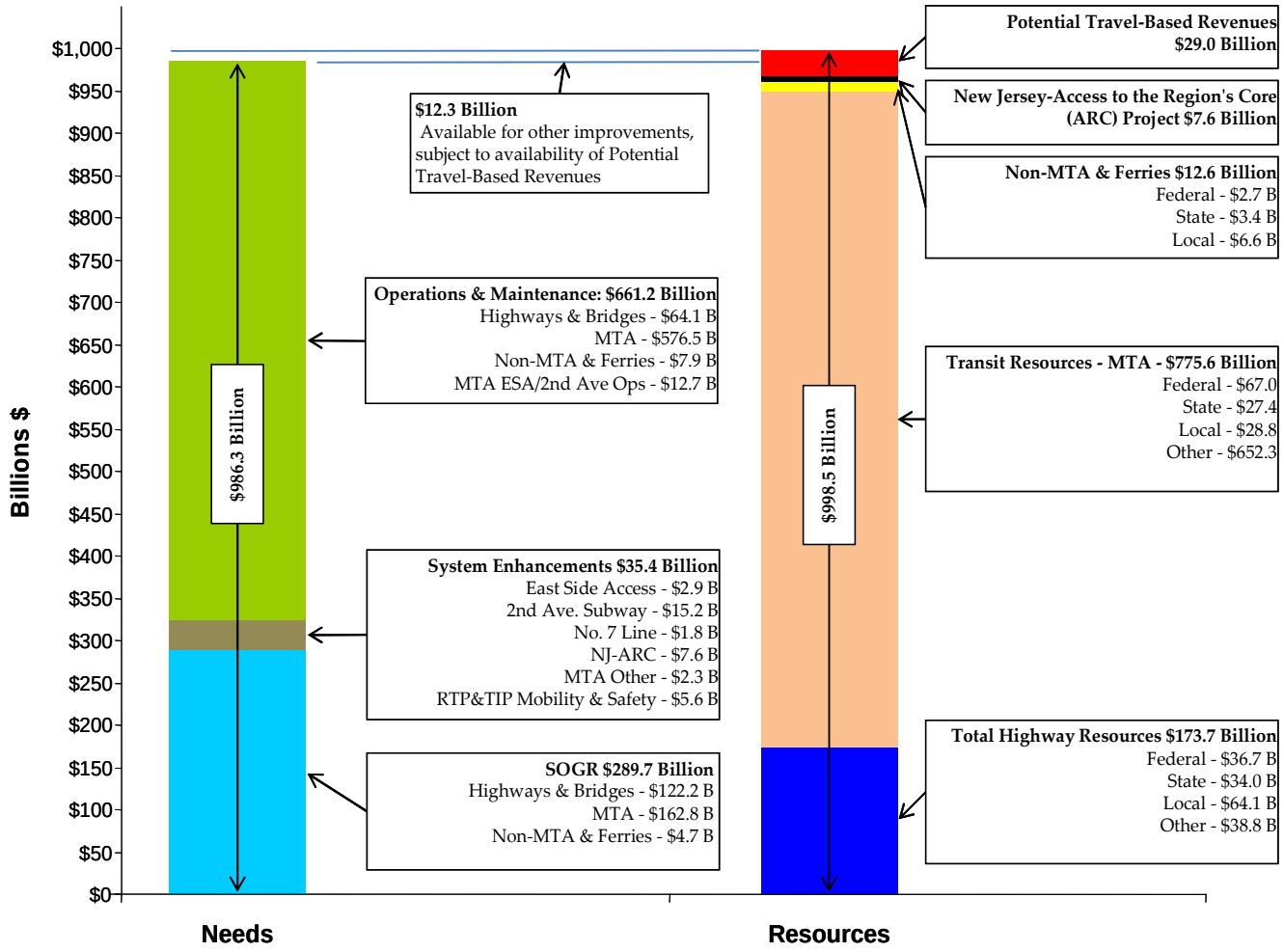
iii. RTP Financial Summary

As discussed earlier the needs of the NYMTC region are tremendous and the resources required to meet these needs over the 2010-2035 period of this Plan will be dependent on both (currently-considered) traditional and non-traditional funding sources. Figure 7.2 below summarizes the potential needs and resources for NYMTC's 2010-2035 Regional Transportation Plan.

FIGURE 7.2

2010-2035 Transportation Needs and Resources (in $Billions YOE)

Source: NYMTC



iv. Long-Range Financial Assessment

Per Section 450.324(h), Code of Federal Regulations, an assessment of financial needs and resources is required to establish the financial plan of the regional planning process an MPO undertakes. The financial analyses which appear in this section of the Plan provides a synthesis of the Plan and TIP finances, to provide an overall picture of the long-term finances of NYMTC and its region. They provide both the financial information which will meet the Federal planning requirements and descriptions of the methodologies used in development of resource and expenditure forecasts.

Planning Period

The information contained in the long-range financial assessment for NYMTC's planning process is derived from the current 2010-2035 Regional Transportation Plan (the Plan), which was adopted on September 24, 2009. Thus, the current long-range planning period for NYMTC's planning process is the twenty-five year period between 2010 and the current long-range horizon year of 2035.

Resource Forecasts

As discussed in Section ii of this chapter, forecasts of likely resources available to the NYMTC region during the long-range planning period have been developed using a number of assumptions about various funding categories and programs. The resource forecasts for the Plan have been developed using the funding assumptions stated above in concert with assumptions on future Federal transportation legislation, along with state and local funding programs. Using these assumptions and forecasting methodologies, forecasts of resources anticipated to accrue to the region have been developed for the 2010-2035 planning period. These forecasts appear in Table 7.7.

TABLE 7.7

Projected Resources for the NYMTC Region 2010-2035 (in $Billions YOE)

Source: NYMTC

Source	Forecast	Subtotal	% Total
Capital Sources			
Federal	$ 99.40		
State	$ 65.00		
Local			
MTA	$ 27.00		
Other Transit & Ferries	$ 6.40		
Highways	$ 64.10		
Subtotal		***$ 261.90***	***26.2%***
Specialized Capital Sources			
MTA ESA (FTA New Starts)	$ 2.63		
MTA SAS Phase 1 (FTA New Starts)	$ 1.25		
MTA SAS Phases 2-4 (FTA New Starts)	$ 3.22		
MTA #7 Subway Ext (Local taxing district)	$ 1.80		
NJT ARC (NJTPA Fed & NJ funds)	$ 7.60		
Nostrand Avenue BRT (FTA Small Starts)	$ 0.02		
American Recovery and Reinvestment Act of 2009 (FHWA Title I) (see note (a) below)	$ 0.57		
American Recovery and Reinvestment Act of 2009 (FTA Sections 5307, 5309, 5340) (see note (b) below)	$ 1.44		
Subtotal		***$ 18.52***	
Other Sources			
Potential Travel-Based Revenues	$ 29.00		
State/Local Roadways	$ 38.22		
Transit Systems	$ 650.88		
Sub Total		***$ 718.10***	***71.9%***
Total		**$ 998.52**	

(a) This total is composed of the following suballocations (in millions):

New York City	$ 313.89
Long Island	$ 154.19
Lower Hudson Valley	$ 99.00
TOTAL	$ 567.08

(b) This total is composed of the following suballocations (in millions):

Section 5307 and 5340 from UZA1	$ 908.10
Section 5307 and 5340 from UZA41	$ 1.38
Section 5309 Rail Modification	$ 254.82
New Starts	$ 274.28
TOTAL	$1,438.58

Projected Expenditures

As discussed in Section i of this chapter, the four Foundation Projects have been previously adopted into the fiscally-constrained planning process by NYMTC's members and appear in the Plan as such. Some phases also are in the TIP. Given their status in the Plan, expenditures for all of these projects—categorized as "other" expenditures—are assumed from relevant Federal, state and local sources (see Table 7.7). Forecasts of expenditures during the planning period appear in Table 7.8.

TABLE 7.8

Total Projected Expenditures for the NYMTC Region 2010-2035 (in $Billions YOE)

Source: NYMTC

Category	Expenditures	Subtotals
Highway/Bridges SOGR/NR		
MHSTCC Forecast	$ 13.40	
N/STCC Forecast	$ 16.40	
NYCTCC Forecast	$ 92.30	
Highway/Bridges Forecast		***$ 122.1***
Less TIP Projects	*$ 9.61*	
Less Major Projects		
Kosciuszko Bridge Replacement (Plan)	*$ 0.98*	
Goethals Bridge Replacment (Plan)	*$ 0.60*	
Highway/Bridges Forecast (undefined)	$ 114.07	
Transit SOGR/NR		
MTA-NYCT/SIRT	$ 115.50	
MTA-LIB	$ 1.40	
MTA-LIRR	$ 19.10	
MTA-MNR	$ 24.30	
MTA Bus	$ 2.60	
MHS Independent	$ 1.50	
Suffolk Independent	$ 0.50	
NYC Ferries	$ 2.80	
Transit Forecast		***$ 167.7***
Less TIP Projects	*$ 22.06*	
Transit Forecast (undefined)	$ 145.64	
Mobility/Safety Projects		
MTA ESA (total cost)	$ 2.90	
MTA SAS (total cost phases 1-4)	$ 15.20	
MTA #7 Subway Extension	$ 1.80	
MTA Other	$ 2.30	
TIP Mobility & Safety Projects *	$ 2.40	
RTP Mobility & Safety Projects *	$ 3.20	
NJT Access to the Region's Core	$ 7.60	
Nostrand Avenue BRT (total cost)	$ 0.03	
Mobility/Safety Projects Forecast		***$ 35.4***
Operating & Maintenance	$ 661.1	***$ 661.1***
Total		***$ 986.3***

* See lists in Tables 7.10 and 7.11

Long-Range Balance Sheet

The fiscal constraint of NYMTC's planning process is established in the long-term by comparing resource forecasts with projected expenditures. Drawing upon the projections presented in Tables 7.7 and 7.8 above, Table 7.9 presents the long-range balance sheet for NYMTC's planning process, providing a snapshot of the NYMTC region's anticipated financial condition during the 2010-2035 planning period. Additional detail on the breakdown of resources and expenditures can be found in Sections i and ii of this chapter.

TABLE 7.9

Long-Range Balance Sheet for the NYMTC Region (in $Billions YOE)

Source: NYMTC

Category	Resources	Expenditures	Totals
Capital Sources	$ 261.9		
Specialized Capital Sources	$ 18.5		
Operational Sources	$ 718.1		**$ 998.5**
Highways/Bridges SOGR/NR		$ 122.1	
Transit SOGR/NR		$ 167.7	
Mobility/Safety Projects		$ 35.4	
Operating & Maintenance		$ 661.1	**$ 986.3**
BALANCE			**$ 12.3**

As can be seen in Table 7.9, for the planning period, resource forecasts (which include $29 billion potential travel-based revenues projected to be available after 2020 as described on page 7-20 of this chapter) exceed projected expenditures by over $12.3 billion dollars. Thus, these forecasts establish that the projected expenditures derived from the 2010-2035 Regional Transportation Plan are in fact fiscally-constrained within the Plan's resource forecasts.

TABLE 7.10
RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Est. cost (Millions YOE $)
New York City									
Bronx									
School Safety Program (Bronx Only)	NYCDOT	X	X				X		13.68
Grand Concourse Pedestrian Safety From East 166Th St. To East Tremont (Ped. Safety)	NYCDOT			X	X	X		X	
Borough-wide Ped/Bike Improvements									241.30
Brooklyn									
Brooklyn Bridge ITS	NYCDOT	X	X				X		5.25
Ocean Parkway Safety Improvements	NYCDOT			X	X	X		X	
Traffic, Pedestrian And Safety Improvements - 5Th Avenue From 64Th To 38Th Street	NYCDOT			X	X	X		X	9.50
Atlantic Ave. Safety Improvement Corridors In Adjoining Areas In Brooklyn And Queens	NYCDOT			X	X	X		X	5.00
Traffic Simulation Toolbox	NYCDOT		X	X				X	1.15
Improvements In ITS Signal Coordination	NYCDOT			X	X	X		X	42.83
ITS Information & Traffic Management	NYCDOT	X		X	X	X	X	X	11.37
"C" Zones& Safety Studies	NYCDOT	X	X					X	1.00
Fulton Street Improvements (Fort Greene) Pedestrian And Safety	NYCDOT			X	X	X		X	
Shore Pky Critical-Strategic ITS Installation	NYSDOT				X			X	12.00
Borough-wide Ped/Bike Improvements	NYCDOT								231.20

TABLE 7.10 (Continued)
RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Est. cost (Millions YOE $)
Queens									
Traffic Signal Priority At Queens Locations (Kissena Blvd,Hillside Ave,Merrick Blvd,Sutphin Blvd,Guy Brewer Blvd	NYCDOT	X		X	X	X		X	
Belt Parkway Corridor ITS Improvement	NYSDOT				X			X	8.20
Borough-wide Ped/Bike Improvements	NYCDOT								63.82
Manhattan									
Borough-wide Ped/Bike Improvements	NYCDOT								376.60
Staten Island									
Traffic Signal Priority (Tsp)At Staten Island Locations Along Victory Blvd Expansion And Along Bay Street Expansion	NYCDOT	X		X	X	X		X	
Borough-wide Ped/Bike Improvements	NYCDOT								82.60

TABLE 7.10 (Continued)
RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Est. cost (Millions YOE $)
Multi-County									
Install Pavement Markings On Various Street Network	NYCDOT	X	X	X	X		X		11.00
Installation Of High Visibility Cross-Walks	NYCDOT	X	X	X	X		X		2.00
Congested Corridor Project-Citiwide Implementation	NYCDOT	X	X	X	X		X		10.00
SFY 13/14 Safety Block	NYSDOT	X					X		2.75
TMC Center-Operating	NYCDOT	X	X				X		5.95
Urban ITS	NYCDOT; NYSDOT	X	X	X	X		X		5.00
ITS Maintenance	NYSDOT	X	X				X		14.49
ITS Maintenance	NYSDOT		X				X		15.53
ITS Maintenance	NYSDOT		X				X		16.56
Safe Routes To School-Citiwide	NYCDOT	X	X				X		10.00
Safe Routes To School-Citiwide	NYCDOT	X	X	X	X		X		10.00
Safe Streets For Seniors	NYCDOT	X	X				X		1.80
ITS Maintenance	NYSDOT	X					X		27.18
SFY 14-15 Safety Block	NYSDOT	X	X				X		3.42
SFY 15-16 Safety Block	NYSDOT	X	X				X		3.59
SFY 16-17 Safety Block	NYSDOT	X	X				X		3.56
SFY 17-18 Safety Block	NYSDOT		X				X		3.56
Safe Routes To Schools-Construction For 94 Schools Phase I	NYCDOT		X	X				X	27.73
Safe Routes To Transit	NYCDOT		X	X					1.83
Traffic Signal Prioritization (Tsp) Citiwide Implementation	NYCDOT		X					X	15.00
GPS Based Traffic Data City Wide	NYCDOT		X					X	3.00
Installation Of Traffic Signals	NYCDOT		X	X				X	80.00
High Visibility School Crosswalk	NYCDOT		X					X	3.04
Multi-Borough Ped/Bike Improvements	NYCDOT								1199.00
							NYC Subtotal		***2581.49***

CHAPTER 7

Financing the Plan

TABLE 7.10 (Continued)

RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Estimated cost (Millions YOE $)
Lower Hudson Valley									
Putnam									
Route 9 Safety Improvements	NYSDOT		X				X		15.00
Variable Message Sign Installations	NYSDOT	X					X		10.00
Brewster Village Walklable Community Initiative	Putnam County							X	3.00
County-wide Ped/Bike improvements	Putnam County								10.03
Rockland									
Avl/Integrated Electronic Fare Collection/Its Study	RocklandCo	X	X				X		3.00
Maintain Tdm Programs	NYSDOT/ Rockland Co	X	X	X	X	X	X		7.80
Route 59 Signal Optimization Include Transit Signal Priority (TSP)	NYSDOT/ Rockland Co		X					X	
County-Wide Traffic Signal Timing Improvement	NYSDOT/ Rockland Co/ Local		X					X	
County-Wide Pedestrian Crossing Striping Improvements	NYSDOT/ Rockland Co/ Local		X					X	
Highway Signs & Retro Reflectivity Replacement	NYSDOT/ Rockland Co/ Local		X					X	
Senior Mobility Issues	NYSDOT/ Rockland Co	X	X	X	X	X		X	
County-wide Ped/Bike Improvements	NYSDOT/ Rockland Co								30.12

TABLE 7.10 (Continued)
RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Est. cost (Millions YOE $)
Westchester									
Bear Mountain Parkway Safety Improvements	NYSDOT		X				X		25.00
Construction Of County Hwy Facility/Headquarters In Spring Valley (Incl. Emc & Its)	RocklandCo	X					X		35.00
City of Peekskill ITS and Signalization Improvments	Local Municipality		x					X	
ITS and Signalization Improvments - Mount Vernon	Local Municipality							X	
ITS and Signalization Improvements - New Rochelle	Local Municipality		x					x	
ITS and Signalization Improvements -Yonkers	Local Municipality		x					X	
Comprehensive Traffic Signal Improvements	NYSDOT	X						X	10.00
Implement limited access corridors with ITS and signal enhancements	NYSDOT							X	35.70
ITS Fiber Optic Cable	NYSDOT							X	6.10
Establishment of Hudson River Yonkers-Peekskill Riverwalk	Westchester County	X	X		X				22.50
Westchester Avenue Signal Prioritization for Transit Study	Westchester County		X					X	1.00
County-wide Ped/Bike Improvements	Westchester County								42.30
					Lower Hudson Valley Subtotal				***256.55***

CHAPTER 7

Financing the Plan

TABLE 7.10 (Continued)

RTP Mobility & Safety Projects

Project	Sponsoring Agency	2010-2014	2015-2019	2020-2024	2025-2029	2030-2035	Constrained	Vision	Est. cost (Millions YOE $)
Long Island									
Nassau									
NY 135 & NY 25 To Merrick Road - ITS	NYSDOT		X				X		20.00
Suffolk									
NY 454 & NY 27 ITS	NYSDOT		X				X		20.00
NY 27 - Exits 43 & 44 - Safety/Access Improvements	NYSDOT			X				X	50.00
Multi-County									
All Parkways & LIE - Expand Travel Time (ITS) System	NYSDOT		X					X	15.00
Multi-County Ped/Bike Improvements									257.5
							LI subtotal		***362.50***
							Total Projected (Known) Costs		***$3,200.54***

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
New York City			
X027.05	NYSDOT	BRONX RIVER GREENWAY (COLGATE-EAST TREMONT)	40.850
X349.12	NYSDOT	REPLACE PED BRIDGE @ JEFFERSON BLVD OVER KWV PKWY	4.890
X500.57B	NYCDCP/NYCDOT	BICYCLE PROMOTION, PARKING, & NETWORK DEVELOPMT	13.735
X500.60	NYCDOT/DCP	MIDTOWN MANHATTAN PEDESTRIAN AND VEHICLE CIRCULATION	0.165
X500.81	NYCEDC	NORTH SHORE WATERFRONT ESPLANADE & BIKEWAY EAST	3.353
X501.00	NYCDCP/NYCDOT	INTERSECTION IMPROVEMENTS FOR PED @ HARLEM	0.000
X501.01	NYCDCP/NYCDOT	SUBWAY SIDEWALK INTERFACE IMPROVEMENTS	0.500
X501.02	NYSDOT	QUEENS PLAZA BIKE/PED IMPROVEMENT PROJECT	2.250
X501.06B	NYCDCP/NYCDOT	PEDESTRIAN NETWORK DEVELOPMENT IV	3.600
X501.20	NYCDPR	DEVELOP BIKE PATH ALONG BATTERY PARK	2.550
X501.46	NYCDPR/NYCDOT	GREENWAY NETWORK DEVELOPMENT V	0.000
X501.47	NYCEDC	THE HIGH LINE INTERMODAL PEDESTRIAN FACILITY	13.350
X501.48	NYCDCP	DOWNTOWN BROOKLYN PED.IMPROVEMENT	0.610
X501.49	NYCDPR	QUEENS EAST RIVER NORTH SHORE GREENWAY, PH. 1	2.970
X501.52	NYCDPR	REGATTA PARK/ HARLEM RIVER GREENWAY	3.700
X501.55	DSNY	TRANSPORTING NYC RECYCLABLES	0.750
X501.57	NYCEDC	HUNTS POINT TRUCK SIGNAGE	3.500
X501.59	NYSDOT	ENHANCE HELP/IIMS ON BELT SYSTEM	2.013
X501.62	NYCDOT	CONSTRUCTION OF FIBER OPTIC LINKS: BELT PARKWAY	5.625
X501.65	NYCDOT	CONSTR OF FIBER OPTIC CABLE LINKS: KOREAN WAR VETS PARKWAY	2.500
X501.66	NYSDOT	COMMUTER LIN/REGIONAL COMMUTER CHOICE	1.902
X501.69	NYCDCP	QUEENS PLAZA ROADWAY REBUILD (CONT OF X50102)	42.895
X501.76	NYCDOT	NYC NEIGHBORHOOD WALKABILITY PROJECT	2.000
X501.77	NYCDOT	NYC CONGESTED CORRIDOR REDUCTION PROGRAM II	1.800
X501.78	NYCDOT	NYC SAFE ROUTES TO SCHOOL PROGRAM	20.000

TABLE 7.11a

TIP Mobility & Safety Projects: New York City

Source: NYMTC

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
X501.81	NYCDCP/NYCDOT	INTERSECTION IMPROVEMENTS FOR PEDESTRIANS MOVEMENTS	3.174
X550.17	NYCDPR	BRONX SOUNDVIEW GREENWAY PHASE 2 (CONT. OF X550.17)	2.331
X550.43	NYCDPR	HELL GATE PATHWAY	0.340
X550.48	NYCEDC/GJDC	INTERMODAL ENHANCEMENTS JAMAICA LIRR UNDERPASS AT SUTPH	3.109
X550.50	NYCDOT	WILLIAMSBURG BUS DEPOT	1.040
X550.51	NYCDPR	SHORE PARKWAY GREENWAY (LAST SEGMENT)	1.320
X550.52	NYCDPR	LAURELTON-SOUTHERN GREENWAY (3.2 MILES)	3.130
X550.55	NYCDOT	MLK BLVD AND HALL OF FAME TERRACE STREETSCAPE ENHANCEMENTS	1.650
X550.57	NYCDPR	BRONX RIVER GREENWAY AND SHOELACE PARK GATEWAY	0.891
X550.60	NYCDPR	OWL'S HEAD GREENWAY CONNECTOR	1.409
X550.65	NYCDOT	FORDHAM PLAZA	15.376
X550.66	NYCDOT	TILLARY AND ADAMS STREET MALL ENHANCEMENT	14.430
X550.67	NYCDOT	NINTH AVE: W 15TH ST TO W 23RD ST. (GANSEVOORT TO CHELSEA)	16.700
X550.68	NYCDOT	WEST STREET GREENPOINT-BROOKLYN GREENWAY	7.915
X550.69	NYCDPR	LANDSCAPING & SCENIC BEAUTIFICATION OF THE BATTERY BIKEWAY	3.125
X550.70	NYCDPR	BX RIVER GREENWAY CONNECTION BETWEEN BIRCHALL & ALLERTON AVE	3.126
X550.71	NYCDOT/NYCEDC	HUNTERS POINT SOUTH BIKEWAY & STREETSCAPE IMPROVEMENTS	2.600
X731.05	NYSDOT	SMALL SCALE PARK AND RIDE FACILITIES AT VARIOUS LOCATIO	13.600
X731.22	NYSDOT	STATEN ISLAND EXPRESSWAY BUS LANE EXTEN (SLOSSON-VICTORY)	43.750
X756.43	NYCDOT	NYCDOT EAST RIVER INTERMODAL FERRY IMPROVEMENT PROGRAM	0.805
X758.25	NYCDOT	BRONX RIVER GREENWAY (MOUNT VERNON-SOUNDVIEW-HUNTS PT)	0.875
X760.18	NYCDPR	QUEENS WATERFRONT GREENWAY, LITTLE NECK BAY	3.016
X760.23	NYCDOT	LINCOLN CENTER ACCESS & INTERMODAL TRANSP FACILITY	17.128
X760.26	NYSDOT	PEDESTRIAN WALKWAY IN HUDSON RIVER PARK MANHATTAN	8.600
X760.46	NYCDOT	PRIVATE FLEETS DIESEL FLEET RETROFIT PROGRAM	4.188
X760.48	NYCDOT	DESIGN OF THE BROOKLYN WATERFRONT GREENWAY	0.000

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
X760.49	NYCEDC	WEST HARLEM STREETSCAPE IMPROVEMENTS PROJECT	31.000
X760.50	NYCEDC	ACCESS IMPROVEMENTS TO MANHATTAN CRUISE TERMINAL	4.000
X760.52	NYCEDC	BUSH TERMINAL PIERS OPEN SPACE PROJECT	10.000
X770.04	NYCDOT	PROGRAM TO RETROFIT HEAVY-DUTY NON ROAD FLEET VEHICLES	7.000
X770.05	NYCDOT/NYCEDC	HUNTS POINT/PORT MORRIS DIESEL EMISSIONS REDUCTION	30.344
X770.06	NYCDOT	MUNICIPAL ON-ROAD FLEET EMISSION REDUCTION	23.200
X770.08	NYSDOT	EXPANSION OF CROSS HARBOR RAIL FLOAT SERVICE	5.585
X770.14	NYCDCP/NYCDOT	BICYCLE NETWORK DEVELOPMENT	21.600
X770.15	NYCDCP/NYCDOT	PEDESTRIAN NETWORK DEVELOPMENT	5.450
X770.16	NYCDOT	NYC RETAIL CORRIDORS (PED)	7.500
X770.17	NYCDOT/NYCDPR	GREENWAY CONNECTORS AND ACCESS	12.000
X770.18	NYCDOT	GRAND CONCOURSE MULTIMODAL CORRIDOR	6.250
X770.19	NYCDOT	BKLYN WATERFRONT GREENWAY	12.764
X770.20	NYCDPR	HARLEM RIVER GREENWAY TRAIL: ROBERTO CLEMENTE PARK-UNIV HGTS	8.000
X770.21	NYCDPR	HIGH BRIDGE REHABILITATION	9.000
X770.22	NYCDPR	NEW SPRINGVILLE GREENWAY	12.000
X770.30	NYCDCP	MYRTLE AVE BICYCLE/PED PROJECT (FLATBUSH-CLASSON)	2.300
X770.31	NYCDCP	LIVONIA AVENUE PEDESTRIAN IMPROVEMENT PROJECT	2.300
X770.32	NYCDOT	BROOKLYN BRIDGE ITS	5.250
X770.36	NYCEDC	HARLEM RIVER PROMENADE PROJECT	0.375
X770.37	NYCDOT	TRAFFIC SIGNAL PRIORITY	15.000
X770.43	NYCDOT	BRONX RIVER GREENWAY	4.524
X770.56	NYCDOT	COLE LANE PLAZA AND STEP STREET (LIBRARY LANE)	2.655
X770.57	NYCDOT	TRUCK ROUTE IMPROVEMENTS IN THE MASPETH NEIGHBORHOOD	0.625
X770.58	NYCDOT	SAFE STREETS FOR SENIORS PROGRAM (NYCDOT)	2.250
X770.69	NYCDOT	NYC DEPT. OF AGING SENIOR TRANSPORTATION INVESTMENT PROGRAM	1.367
X770.70	NYSDOT	ASSOCIATION OF TRAVEL INSTRUCTION MOBILITY MANAGEMENT	0.148

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
X770.71	NYSDOT	BRONX OVERALL ECONOMIC DEVELOPMENT CORP. HUNTS POINT CLEAN	0.726
X770.72	NYCDOT	NYC JOB ACCESS SCREENING TOOL PROJECT	1.925
X770.73	NYCDOT	NYC SAFE ROUTES TO TRANSIT	1.144
X770.74	NYCDOT	NYC STREETS AND ROADWAY IMPROVEMENTS	0.658
X770.75	NYCDOT	NYC MOBILITY MANAGER	0.400
X804.11	NYSDOT	INSTALL ITS ON STATE ROUTES IN E. QUEENS	0.000
X804.19	NYSDOT	CONST OF ITS FOR STATE ROUTES IN BKLYN PH.1	0.000
X805.46	NYSDOT	HUTCHINSON RV PKWY PED BRIDGE @ EINSTEIN LOOP	4.030
X805.50	NYSDOT/NYCDOT	TRANSPORTION PLNG & COORD.FOR NYC AGENCIES	1.600
X805.72	NYSDOT	ITS OPERATIONAL SUPPORT 6	5.000
X805.73	NYSDOT	ITS OPERATIONAL SUPPORT PH7	5.000
X805.82	NYSDOT	HIGHWAY EMERGENCY LOCAL PATROL PROJECT (HELP)	5.000
X805.95	NYSDOT	ITS SYSTEM MAINT & OPS SUPPORT ON STATE ROUTE	13.415
X805.96	NYSDOT	ITS MAINTENANCE	15.180
X805.97	NYSDOT	ITS MAINTENANCE	16.765
X806.15	NYSDOT	FDR DRIVE & HHP ITS	21.400
X806.16	NYSDOT	HIGHWAY EMERGENCY LOCAL PATROL PROGRAM SFY 09-10 & SFY 10-11	5.000
X806.18	NYSDOT	INTEGRATED INCIDENT MANAGEMENT SYSTEM (CONT. X80602)	2.150
X806.20	NYSDOT	LONG ISLAND EXPWY & CLEARVIEW EXPWY ITS	22.400
X806.21	NYSDOT	GRAND CENTRAL & CROSS ISLAND PARKWAYS ITS (VWE-BORDER)	20.500
X806.22	NYSDOT	GOWANUS & PROSPECT EXPRESSWAY ITS IMPROVEMENTS	31.625
X806.37	NYSDOT	511 TRAVEL INFORMATION PROGRAM	16.350
X806.41	NYSDOT	BROOKLYN, STATEN ISLAND AND MANHATTAN ITS	6.350
X806.76	NYSDOT/NYCDOT	NYC URBAN ITS PROGRAM (FFY 2008)	0.500
X806.77	NYSDOT/NYCDOT	NYC URBAN ITS PROGRAM (FFY 2009)	0.500
X806.78	NYCDOT	NYC URBAN ITS PROGRAM (FFY 2010)	0.500
X806.79	NYSDOT/NYCDOT	NYC URBAN ITS PROGRAM (FFY 2011)	0.500
X806.80	NYSDOT/NYCDOT	NYC URBAN ITS PROGRAM (FFY 2012)	0.500
X823.01	NYSDOT	JAMAICA BAY TRANSPORTATION HUB	1.550

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
S055.29	NYSDOT	OVERHEAD INSPECTION SIGN FFY 2009/2010	4.200
X071.47	NYSDOT	SB HRD/FDR SAFETY & OPERATIONAL IMPROVEMENT	11.100
X101.07	NYSDOT	HRP SAFETY & GUIDERAIL IMPROV FR. LAFAYETTE	31.250
X110.22	NYSDOT	BRONX RV PKWY SAFETY IMPROV @ GUNHILL/MOSHOLU	1.600
X110.23	NYSDOT	BRONX ZOO ACCESS IMPROVEMENT	3.300
X501.24B	NYCDOT	WALK TO SCHOOL PROGRAM III	2.800
X550.49	NYCDOT	ROBERTO CLEMENTE PLAZA RECONSTRUCTION	2.312
X550.64	NYCDOT/NYCEDC/GJDC	STATION PLAZA, QUEENS COUNTY	3.125
X720.41	NYSDOT	N. MDE SAFETY & OPERATIONAL IMPROV @ 230TH ST	5.550
X720.42	NYSDOT	MAJOR DEEGAN EXPWY EARLY ACTION - BX TERMINAL VIADUCT	8.970
X727.03	NYSDOT	RECONFIG N/B NEW ENG RAMP @ BAYCHESTER EXIT	2.945
X730.39	NYSDOT	BRUCKNER/SHERIDAN EXPY INTERCHANG SAFETY IMPR	28.000
X731.29	NYSDOT	BQE FROM FLASHING AVE. TO SANDS ST. SAFETY & OPERATIONAL IMP	3.000
X757.17	NYCDOT	INSTALLATION OF PEDESTRIAN CROSSWALKS	0.625
X757.18	NYCDOT	PAVEMENT MARKINGS ON VARIOUS STR NETWORK	2.720
X757.19	NYCDOT	INSTALLATION OF HIGH-VISIBILITY CROSSWALKS.	0.875
X757.39	NYCDOT	INSTALLATION OF PEDESTRIAN CROSSWALKS	2.969
X757.40	NYCDOT	PAVEMENT MARKINGS ON VARIOUS STR NETWORK	15.800
X757.41	NYCDOT	INSTALLATION OF HIGH-VISIBILITY CROSSWALKS.	6.338
X757.55	NYCDOT	INSTALLATION OF HIGH-VISIBILITY CROSSWALKS.	6.694
X757.61	NYCDOT	FREIGHT ROUTE SIGNS AND MARKINGS CITYWIDE	2.880
X757.68	NYCDOT	INSTALLATION OF PEDESTRIAN CROSSWALKS	4.503
X757.69	NYCDOT	INSTALL PAVEMT MARKING ON VARIOUS STR NETWORK	11.573
X757.70	NYCDOT	INSTALLATION OF HIGH-VISIBILITY CROSSWALKS.	4.556
X757.71	NYCDOT	INSTALLATION OF PEDESTRIAN CROSSWALKS	4.500
X757.72	NYCDOT	INSTALL PAVEMT MARKING ON VARIOUS STR NETWORK	12.446
X760.11	NYCDOT	RENOVATE METROPOLITAN AVE & UNIONPORT RD CENTER ISLANDS	2.125

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
X760.12	NYCDOT	REHAB STAIRCASES OF STEP STREETS AT VARIOUS BRONX LOCATIONS	0.938
X760.27	ESDC	GOVERNORS ISLAND MARITIME FACILITIES	8.988
X760.61	NYCDOT	EMERGENCY LANE MARKINGS	3.236
X760.64	NYCDOT	MACOMBS DAM BRIDGE – SEISMIC RETROFIT	36.250
X760.74	NYCDOT	PEDESTRIAN SAFETY STUDY	0.710
X760.80	NYCDOT	EMERGENCY LANE MARKINGS	4.031
X760.84	NYCDOT	EMERGENCY LANE MARKINGS	5.123
X770.25	NYCDOT	STATEN ISLAND FERRY SECURITY	0.100
X770.26	NYCDOT	SECURITY ITEMS FOR THE STATEN ISLAND FERRY SYSTEM	0.100
X770.27	NYCDOT	SECURITY ITEMS FOR THE STATEN ISLAND FERRY SYSTEM	0.100
X770.40	NYCDOT	SAFE ROUTE TO SCHOOL PROGRAM	11.875
X770.45	NYCDOT	SCHOOL BUS DIESEL EMISSIONS REDUCTION PROJECT	7.800
X770.66	NYCDOT	SAFE ROUTE TO SCHOOL PROGRAM	8.725
X805.10	NYSDOT	HHP SAFETY IMPROVEMTS (W72 & WESTCHESTER LINE)	5.550
X805.86	NYSDOT	SAFETY IMPROVEMENTS (VARIOUS HWYS)	2.200
X805.91	NYSDOT	SIGNING IMPROVEMENTS AT VARIOUS STATE HIGHWAY	3.500
X806.53	NYSDOT	SIGNING IMPROVEMENTS ON VARIOUS STATE HIGHWAY	2.975
X806.54	NYSDOT	ENVIRONMENTAL SHIELD, QUEENS, NY FROM 64TH STREET TO 65TH	1.447
X930.01	NYSDOT	MORGAN AVENUE GRADE RAILROAD CROSSING IMPROVEMENT	0.230
X930.02	NYSDOT	METROPOLITAN AVENUE GRADE RAILROAD CROSSING IMPROVEMENT	0.280
X930.03	NYSDOT	56TH & 57TH STREET GRADE RAILROAD CROSSING IMPROVEMENT	0.450
X930.04	NYSDOT	VARRICK AVE, WOODWARD AVE & 54TH ST RR CROSSING	0.150
XM0641	NYSDOT	PURCHASE IMPACT ATTENUATORS SPARE PARTS	6.968
XM0675	NYSDOT	JOB ORDER MAINTENANCE CONTARCT	3.450
XM0831	NYSDOT	MAINTENANCE SWEEPING (REMOVE DEBRIS CITYWIDE)	6.650
XM0840	NYSDOT	PURCHASE IMPACT ATTENUATORS SPARE PARTS	1.500
XM0845	NYSDOT	REPAIR GUIDERAIL/FENCE/SIGNS ON STATE ROUTES	5.800
XM0940	NYSDOT	PURCHASE IMPACT ATTENUATORS SPARE PARTS	1.500
XM1020	NYSDOT	WHERE & WHEN EMERGENCY BRIDGE REPAIRS	6.100
XM1031	NYSDOT	MAINTENANCE SWEEPING	9.550

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
XM1040	NYSDOT	PURCHASE IMPACT ATTENUATORS SPARE PARTS	1.500
XM1045	NYSDOT	REPAIR GUIDERAIL/FENCE/SIGNS ON STATE ROUTES	5.800
XM1070	NYSDOT	STATE/CITY ROADSIDE MAINTENANCE AGREEMENT	7.200
XM1140	NYSDOT	IMPACT ATTENUATORS SPARE PARTS	1.500
XM1230	NYSDOT	CRACK SEALING AND WEED REMOVAL	0.050
XM1240	NYSDOT	IMPACT ATTENUATORS SPARE PARTS	1.500
XM1245	NYSDOT	GUIDERAIL/FENCE/SIGNS/WEED REMOVAL	0.050
XM1342	NYSDOT	SIGN AND STRUCTURE INSPECTION/REPAIR/REPLACEMENT	0.600
XM1445	NYSDOT	GUIDERAIL/FENCE/SIGNS REHABILITATION	0.050
X501.70	NYCDOT	CITYWIDE CORRIDOR CONGESTION REDUCTION	4.000
X731.23	NYSDOT	SI ITS/ATMS UPGRADE FROM GOETHALS BR TO VNB & OUTERBRIDGE TO	11.550
X757.89	NYCDOT	PED & TRAFFIC ENHANCEMENT PROJECT: GRAND CONCOURSE	13.938
X758.82	NYCDOT	OPERATIONAL SUPPORT TO TMC FACILITY	35.656
X758.88	NYCDOT	OPERATIONAL SUPPORT TO TMC FACILITY	40.375
X758.96	NYCDOT	OPERATIONAL SUPPORT TO TMC FACILITY	39.860
X760.16	NYCDOT	TRAFFIC SIGNAL RETIMING	1.375
X760.22	NYCDOT	ADVANCED SOLID-STATE TRAFFIC CONTROLLERS (ZONE 2)	2.438
X760.68	NYCDOT	OPERATIONAL SUPPORT TO TMC FACILITY	40.826
X762.00	NYCDOT	OPERATIONAL SUPPORT TO TMC FACILITY	43.175
X770.09	NYCDOT	ADVANCED SOLID-STATE TRAFFIC CONTROLLERS, MANHATTAN ZONE 1	4.190
X770.10	NYCDOT	ADVANCED SOLID-STATE TRAFFIC CONTROLLERS, MANHATTAN ZONE 3	4.190
X770.11	NYCDOT	ADVANCED SOLID-STATE TRAFFIC CONTROLLERS, MANHATTAN ZONE 4	3.700
X770.12	NYCDOT	ADVANCED SOLID-STATE TRAFFIC CONTROLLERS, MANHATTAN ZONE 5	4.230
X802.43	NYCDOT	CONST OF TOPICS 4 COMPUTERIZED TRAFFIC SIGNAL	10.937
X802.48	NYCDOT	TOPICS IV SIGNAL COMPUTERIZATION	0.000
X805.88	NYSDOT	JMTC OPERATIONAL SUPPORT	1.125
X805.93	NYSDOT	SIGNING IMPROVEMENTS AT VARIOUS STATE HIGHWAYS	3.130
		Subtotal: New York City	**$1,408.27**

TABLE 7.11b

TIP Mobility & Safety Projects: Lower Hudson Valley

Source: NYMTC

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
LOWER HUDSON VALLEY			
805528	NYSDOT	ROUTE 306 SIDEWALKS: LIME KILN ROAD TO POMONA ROAD	0.792
808804	NYSDOT	INTEGRATED 511 NY/REGIONAL BRANDING AND MARKETING	3.749
809355	NYSDOT	PIP BIKE/PED TRAILWAY STAGE 2	4.070
821671	NYSDOT	ATMS/ATIS:SAW MILL RIVER PARKWAY, FIBER OPTIC	6.050
875626	PUTNAM	MAYBROOK BIKEWAY I CONSTRUCTION.	2.950
875682	PUTNAM	MAHOPAC BRANCH TRAILWAY: RR - PUTNAM BIKEWAY	0.150
875685	NYSDOT	SUFFERN PARKING EXPANSION	0.361
875693	LOCAL	YORKTOWN PARK AND RIDE LOT	0.089
875696	PUTNAM	MAYBROOK BIKEWAY III CONSTRUCTION	0.150
875756	WESTCHESTER	SOUTH COUNTY TRAILWAY: TIBBETS BROOK PARK TO VAN CORTLANDT P	0.030
875757	NYSDOT	NEW CITY PARK & RIDE LOT-TOWN OF CLARKSTOWN	0.975
875783	PUTNAM	PUTNAM DIVISION BIKEWAY II, STAGE 2	3.500
875895	LOCAL	ROUTE 304 & NORTH MAIN STREET SIDEWALKS	0.116
875896	LOCAL	MONSEY GLEN BIKE/PED TRAIL, RAMAPO	0.990
875897	WESTCHESTER	SO. COUNTY TRAILWAY 5-YONKERS BIKE/PED TRAIL	0.250
875904	NYSDOT	STATE BIKE RT 9: ROCKLAND LAKE TR & DUNDERBU MTN	2.508
875905	PUTNAM	PUTNAM BIKEWAY II-STAGE 4: STGE 3 TO BREWSTR	3.540
875906	PUTNAM	MAHOPAC FALLS TRAILWAY:PUTNAM BKWY1-MYRTLE AV	0.170
875962	LOCAL	VALLEY ROAD SIDEWALKS: CHERRY ST - HUNTSVILLE RD	0.515
875968	LOCAL	ROUTE 59 SIDEWALKS: ROUTE 306 TO SPRING VALLEY HIGH SCHOOL	0.072
876009	LOCAL	CONSTRUCTION OF BICYCLE PATH TOWN OF BEDFORD	0.812
876022	LOCAL	CONSTRUCT SIDEWALKS ON TATE AVE. VILLAGE OF BUCHANAN	0.377
878035	PUTNAM	TOWN OF KENT REVITALIZATION PROJECT (TEP)	2.000
878039	LOCAL	ANNSVILLE CIRCLE PEDESTRIAN PATH (TEP)	1.450
878041	LOCAL	CROTON HARMON PARKING FACILITY PEDESTRIAN/BICYCLE ENHANCE	1.500
878043	LOCAL	MAIN-BROADWAY STREETSCAPE IMPROVEMENT PROJECT (TEP)	3.332
880688	NYSDOT	WESTCHESTER COUNTY COMMUTE ALTERNATIVES PROGRAM	3.875
880689	ROCKLAND	ROCKLAND COMMUTE ALTERNATIVES	1.500

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
880691	NYSDOT	TRANSPORTATION MGMT CENTER OPERATIONS	19.825
880697	PUTNAM	PUTNAM PARK & RIDE LOTS EXPANSION	1.320
880764	NYSDOT	H.E.L.P. DISPATCH SERVICES	0.400
881030	NYSDOT	OZONE ACTION DAYS MHSTCC	1.000
881033	NYSDOT	H.E.L.P. PATROLS	10.500
881034	NYSDOT	H.E.L.P MONITORING (PRIOR PIN 8T0140)	5.550
881036	NYSDOT	H.E.L.P. COMMUNICATIONS-VOICE DATA	7.000
881049	NYSDOT	H.E.L.P. SYSTEM EXPANSION-ADDITIONAL ROUTE(S)	0.180
882038	NYSDOT	METROPOOL RIDESHARING PROGRAM	5.850
882298	WESTCHESTER	TRANSCENTER CIRCULATION IMPROVEMENTS	0.729
882326	NYSDOT	ROUTE 17 - NYC ENHANCED BUS SERVICE	0.700
8RT107	NYSOPRHP	BLOCK FUNDING FOR RECREATIONAL TRAILS PROGRAM	0.050
8SB001	NYSDOT	BLOCK FUNDING FOR SCENIC BYWAY PROJECTS	0.155
8T0183	NYSDOT	FFY 07/08 TRAVEL DEMAND MANAGEMENT (TDM) PROGRAM	1.763
8T0184	NYSDOT	FFY 08/09 TRAVEL DEMAND MANAGEMENT (TDM) PROGRAM	1.387
8T0185	NYSDOT	FFY 09/10 TRAVEL DEMAND MANAGEMENT (TDM) PROGRAM	1.500
8T0186	NYSDOT	FFY 10/11 TRAVEL DEMAND MANAGEMENT (TDM) PROGRAM	1.500
8T0187	NYSDOT	FFY 11/12 TRAVEL DEMAND MANAGEMENT (TDM) PROGRAM	1.500
8T0414	NYSDOT	PIP TRAILWAY, STAGE 3: WESTERN HWY-NYS THRUWAY	7.900
8T0415	NYSDOT	PIP TRAILWAY STAGE 4: NYS THRUWAY-RTE 202	0.060
S0015	NYSBA	PHONE SYSTEM UPGRADES	0.100
801033	NYSDOT	ROUTE 9 CULVERT REPLACEMENT. TOWN OF PHILIPSTOWN	1.132
801051	LOCAL	ROUTE 9 DRAINAGE IMPROVEMENTS, PHILIPSBURG MANOR: DRAINAGE	0.165
801067	LOCAL	ROUTE 9 @ LIVINGSTON AVE TRAFFIC SIGNAL REPLACEMENT	0.070
802230	NYSDOT	ROUTE 100 @ LAKEVIEW AVE ; SAFETY ALIGNMENT WORK	0.300
810350	LOCAL	RT 9A SIDEWALKS: KINGS FERRY RD TO VA HOSPITAL	0.296
821683	NYSDOT	SAW MILL RIVER PARKWAY AT GREEN LANE RAMP AND GRADE CROSSING	0.511
839079	NYSDOT	RT 6 & 6N TRAFFIC CIRCULATION IMPROVEMENTS	1.200
839089	NYSDOT	RT 6 CULVERT & WALL REPAIRS: MERRITT-OAK ST	0.560
839098	LOCAL	ROUTE 6; WOODCREST GARDEN APARTMENTS DRIVEWAY RELOCATION	0.202

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
839099	LOCAL	RT 6 @ MOHEGAN AVENUE AND LAKELAND STREET RECONSTRUCTION.	0.468
850207	NYSDOT	RTE 303 @ ORANGEBURG RD & RTE 340 INTERSECTION IMPROVEMENT	0.200
850221	NYSDOT	ROUTE 303 AT VALLEY COTTAGE ROAD	0.660
875953	LOCAL	COLD SPRING: MAIN ST SIDEWALKS: WEST ST-CEDAR ST	0.199
875963	LOCAL	CORTLANDT: BROADWAY SIDEWALKS; 8TH ST-16TH ST	0.280
875964	ROCKLAND	WEST SHORE RIVER LINE: RR CROSSING IMPROVEMENTS	3.759
876053	WESTCHESTER	BRONX RIVER PARKWAY STREET LIGHTING, WESTCHESTER COUNTY	0.300
876054	WESTCHESTER	WESTCHESTER COUNTY SIGNAL UPGRADE OF 60 COUNTY SIGNALS	0.400
876055	WESTCHESTER	BRONX RIVER PARKWAY TRAFFIC DATA COLLECTION	0.500
876056	WESTCHESTER	RUSTIC GUIDERAIL REPLACEMENT IN WESTCHESTER COUNTY	1.100
876058	ROCKLAND	GUIDERAIL REPLACEMENT ON COUNTY FEDERAL AID ROADWAYS	1.000
876059	LOCAL	UPGRADE EXISTING TRAFFIC SIGNALS, CITY OF YONKERS	1.000
876060	LOCAL	UPGRADE OF EXISTING 170 TYPE TRAFFIC CONTROLLERS	0.143
876061	LOCAL	CRITICAL DETECTOR REPLACEMENT, CITY OF WHITE PLAINS	0.058
876084	LOCAL	CITY OF RYE SIDEWALK/PEDESTRIAN IMPROVEMENTS	0.695
880546	NYSDOT	VARIABLE MESSAGE SIGNS I-684	1.880
880889	NYSDOT	SFY 04/05 CULVERTS REHAB/REPLACEMENT	2.372
880891	NYSDOT	SFY 06/07 REGION WIDE CULVERTS PROJECT	1.320
880931	NYSDOT	SFY 08/09 SHOULDER/GUIDERAIL MAINTENANCE	3.350
880938	NYSDOT	SFY 08/09 GUIDERAIL MAINTENANCE	2.240
880939	NYSDOT	SFY 09/10 GUIDERAIL MAINTENANCE	3.320
880940	NYSDOT	SFY 10/11 SHOULDER/GUIDERAIL MAINTENANCE	2.260
880953	NYSDOT	SFY 06/07 LONG LINE PAVEMENT MARKINGS	4.400
880954	NYSDOT	SFY 09/10/11 LONG LINES PVMT MARK-EAST OF HUDSON	4.870
880955	NYSDOT	SFY 11/12/13 BIENNIAL LONG LINES PAVEMENT MARKINGS	4.430
880960	NYSDOT	SFY 07/08/09 BIENNIAL SPECIAL PAVEMENT MARKINGS	2.240
880961	NYSDOT	SFY 09/10/11 BIENNIAL SPECIAL PAVEMENT MARKINGS	2.270
880962	NYSDOT	SFY 11/12/13 BIENNIAL SPECIAL PAVEMENT MARKINGS	2.270

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
880973	NYSDOT	SFY 08/09 BRIDGE WHERE & WHEN CONTRACT	2.240
880974	NYSDOT	SFY 09/10 BRIDGE WHERE & WHEN CONTRACT	2.255
880975	NYSDOT	SFY 10/11 BRIDGE WHERE AND WHEN	2.255
880976	NYSDOT	SFY 11/12 BRIDGE WHERE & WHEN	2.255
880979	NYSDOT	SFY 07/08 HIGHWAY WHERE & WHEN	1.680
880980	NYSDOT	SFY 08/09 HIGHWAY WHERE & WHEN CONTRACT	4.415
880981	NYSDOT	SFY 09/10 HIGHWAY WHERE AND WHEN	4.415
881027	NYSDOT	SFY 05/06 SAFETY REQUIREMENTS CONTRACT	0.000
881028	NYSDOT	SFY 09/10 SAFETY REQUIREMENTS CONTRACT	1.680
881094	NYSDOT	RUSTIC GUIDERAIL REPLACMENT. ORANGE & ROCKLAND COUNTIES	14.933
893225	NYSDOT	CLEVELAND STREET METRO-NORTH GRADE CROSSING	0.125
893231	NYSDOT	MANITOU STATION ROAD METRO-NORTH GRADE CROSSING IMPROVE	0.202
893232	NYSDOT	ROARING BROOK ROAD METRO-NORTH GRADE CROSSING IMPROVE	0.139
893233	NYSDOT	DYKEMANS ROAD METRO-NORTH GRADE CROSSING IMPROVEMENT	0.139
893236	NYSDOT	JAY STREET METRO-NORTH RAILROAD GRADE CROSSING	0.110
893237	NYSDOT	COMMERCE ST MNRR GRADE CROSSING UPGRADE	0.140
893239	NYSDOT	LAKEVIEW AVENUE METRO-NORTH RAILROAD CROSSING UPGRADE PROJEC	0.140
893240	NYSDOT	STEVENS AVENUE MNRR CROSSING UPGRADE PROJECT	0.140
893241	NYSDOT	VIRGINIA ROAD METRO-NORTH RAILROAD GRADE CROSSING UPGRADE	0.140
8T0121	NYSDOT	SFY 08/09 CATCH BASINS REPAIR	0.890
8T0122	NYSDOT	SFY 2009/10 CATCH BASIN REPAIR CONTRACT	1.450
8T0134	NYSDOT	SFY 09/10/11 BIENNIAL ACCIDENT INVESTIGATION	1.000
8T0135	NYSDOT	SFY 11/12/13 BIENNIAL ACCIDENT INVESTIGATION	1.000
8T0155	NYSDOT	SFY 08/09/10 BIENNIAL HIGHWAY LIGHTING	0.687
8T0298	NYSDOT	SFY 08/09 SCHOOL ACCESS IMPROVEMENTS	3.350
8T0458	NYSDOT	SFY 11/12/13 BIENNIAL INTERSECTION SAFETY	4.872
8T0472	NYSDOT	SAFE ROUTES TO SCHOOL	3.609
8T9439	NYSDOT	ROUTE 134: RT 133-RT 9A SAFETY ALIGNMENT WORK	0.150

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
B2228	NYSTA	REPAIR OF STRUCTURAL RETAINING WALLS CONTRACT	1.800
H1048	NYSTA	NYS THRUWAY PAVEMENT STRIPING 2008	1.660
H1049	NYSTA	NEW YORK DIVISION: PAVEMENT STRIPING 2009	1.660
H1050	NYSTA	NEW YORK STATE THRUWAY - PAVEMENT STRIPING: 2010	1.660
H1077	NYSTA	SAFETY IMPROVEMENTS - MP 16 TO 29	4.125
803210	LOCAL	OLD MAMARONECK ROAD COMPUTERIZED SIGNALS	0.451
809941	NYSDOT	ATMS/ATIS: CROSS COUNTY PARKWAY	5.363
810141	NYSDOT	ATMS/ATIS: HUTCHINSON RIVER PARKWAY	5.046
810622	NYSDOT	ATMS/ATIS: SPRAIN BROOK PKWY; BRP TO I287	8.800
810623	NYSDOT	ATMS/ATIS: SPRAIN BROOK PKWY; I287 TO TSP	0.110
811356	NYSDOT	ATMS/ATIS: I684; EXIT 2 TO I84	1.038
812733	NYSDOT	ATMS/ATIS: TSP; SPRAIN BROOK PARKWAY TO ROUTE 6	5.500
821669	NYSDOT	ATMS/ATIS: SAW MILL RIVER PKWY	4.950
821670	NYSDOT	ATMS/ATIS: SAW MILL RIVER PKWY;CWE TO I-684	6.050
872967	NYSDOT	ATMS/ATIS: I-287; BLOOMINGDALE ROAD TO I-95	5.500
875892	LOCAL	PLEASANTVILLE & INGHHAM SCHOOL WARNING LIGHTS	0.150
875899	LOCAL	PELHAM RD TRAFFIC SIGNAL S: PELHAM MANOR TO MAIN ST.	1.612
875900	LOCAL	MAIN STREET & HUGUENOT STREET TRAFFIC SIGNALS	5.561
875901	LOCAL	NORTH AVENUE TRAFFIC SIGNALS	1.910
875902	LOCAL	WEBSTER AVENUE TRAFFIC SIGNALS: MAIN STREET	1.610
875967	LOCAL	TOWN OF ORANGETOWN TRAFFIC SIGNALS	0.255
875971	LOCAL	PINEBROOK BOULEVARD SIGNALS: STRATTON RD TO ALBERT LEONARD	0.241
875972	LOCAL	FIFTH AVE./POTTER AVE. SIGNALS: PINEBROOK BLVD. TO PIERCE S	0.480
875973	LOCAL	WILMOT RD SIGNALS: GRAND BLVD TO GOLDEN HORSE SHOPPING CNTR	0.122
875974	LOCAL	MILL ROAD SIGNALS: MAYFAIR ROAD TO CALIFORNIA ROAD	0.281
875975	LOCAL	PELHAM SIGNALS: LINCOLN AVENUE & WOLFS LANE/FIFTH AVENUE	0.110
875976	LOCAL	ROUTE 9 TRAFFIC SIGNALS: OPERATIONAL IMPROVEMENT ALONG RTE 9	0.045
880850	NYSDOT	SFY 07/08/09 BIENNIAL SIGN CONTRACT	2.800
880908	NYSDOT	SFY 04/05 OVERHEAD SIGN STRUCTURES	1.120
880911	NYSDOT	SFY 09/10/11 BIENNIAL SIGN CONTRACT	2.900

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
880916	NYSDOT	SFY 07/08 SIGNAL REQUIREMENTS	1.120
880917	NYSDOT	SFY 08/09 SIGNAL REQUIREMENTS CONTRACT	1.370
880918	NYSDOT	SFY 09/10 SIGNAL REQUIREMENTS CONTRACT	1.570
880924	NYSDOT	SFY 08/09 TRAFFIC SIGNAL REPLACEMENT	1.544
880925	NYSDOT	SFY 09/10 TRAFFIC SIGNAL REPLACEMENT	1.172
880926	NYSDOT	SFY 10/11 TRAFFIC SIGNAL REPLACEMENTS	1.394
881075	NYSDOT	NYSDOT TRAFFIC SIGNAL RETIMING	4.000
894005	NYSDOT	TMC PHASE-IN: SOFTWARE INTEGRATION	1.100
895009	NYSDOT	COACH BUS MARKETING AND PARKING CONTRACT	0.864
H0999	NYSTA	I-95 NORTH BOUND BARTOW AVENUE (EXIT11)-RAMP	0.981
H1007	NYSTA	NEW ROCHELLE TOLL BARRIER-RECONSTRUCTIO INCLUDING EZ PASS	2.080
H2070	NYSTA	EXIT 6A-YONKERS TOLL RECONS INCL E-Z PASS	24.800
I0096	NYSTA	NEW YORK DIVISION - 10 DMS, 13 TRANSMIT, 26TDS, AND 13 CCTV	9.000
		Subtotal: Lower Hudson Valley	**$345.58**

TABLE 7.11c

TIP Mobility & Safety Projects: Long Island

Source: NYMTC

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
LONG ISLAND			
000611	NYSDOT	OCEAN PKWY BIKEWAY: ROBERT MOSES CAUSEWAY TO WANTAGH ST PKWY	7.810
001755	NYSDOT	ROBERT MOSES CAUSEWAY LANDSIDE BIKEWAY (CAPTREE - NY27A)	0.375
003016	NYSDOT	NY454 & NY27 ITS	14.242
008804	NYSDOT	REGIONAL BRANDING COMMUTER CHOICE	1.185
022871	NYSDOT	I495 LONG ISLAND EXPRESSWAY HOV ENFORCEMENT DEMO	2.800
022874	NYSDOT	SUFFOLK COUNTY PARK & RIDE LOT SECURITY	1.250
022903	NYSDOT	I-495 LONG ISLAND EXPRESSWAY HOV ENFORCEMENT PROJECT	4.255
051723	NYSDOT	WANTAGH BIKE PATH (CEDAR CREEK PARK TO I-495 LIE)	10.910
051729	NYSDOT	WANTAGH STATE BIKEWAY RECON: (CEDAR CK PARK - OCEAN PARKWAY)	3.454
051731	NYSDOT	WANTAGH STATE PARKWAY ITS (NORTHERN ST PKWY TO MERRICK RD)	11.000
053457	NYSDOT	BETHPAGE STATE PARKWAY TO LIRR SYOSSET:BIKEWAY CONSTRUCT	6.380
075862	SUFFOLK CO.	FUEL EFFICIENT VEHICLES FOR REPLACEMENTS	0.750
075910	LOCAL	TOWN OF ISLIP WILL IMPROVE BICYCLE SAFETY	0.824
075933	SUFFOLK CO.	HYBRID ELECTRIC VEHICLES	2.000
080395	NYSDOT	LONG ISLAND COMMUTER CHOICE PROGRAM	14.700
080556	NYSDOT	INCIDENT MANAGE-HELP VEHICLES,LIE & PARKWAYS	6.000
080634	NASSAU CO.	NASSAU COUNTY COMMUTE ALTERNATIVES PROGRAM	1.000
080662	SUFFOLK CO.	CONSTRUCTION EAST-END SCENIC BY-WAY	0.000
080665	NYSDOT	ITS PERSONNEL SERVICE CONTRACT	24.500
080676	NYSDOT	CONTROL CENTER OPERATION CONTRACT	16.500
080720	NYSDOT	INFORM SYSTEM MAINTENANCE CONTRACT	7.500
080730	NYSDOT	INFORM ENGINEERING SERVICES CONTRACT	13.000
080735	NYSDOT	SIDEWALK CONSTRUCTION ON STATE HIGHWAYS	1.344
080797	NYSDOT	SETAUKET/PORT JEFF BIKE PATH PHASE 2	5.390
080800	NYSDOT	BIKEWAY/PEDESTRIAN REQUIREMENTS	1.120
080807	NYSDOT	WOODBURY PARK&RIDE LOT CONST	0.200
080814	NYSDOT	INFORM SYSTEM MAINTENANCE CONTRACT	14.000
080832	NYSDOT	TDM OUTREACH & EDUCATION PROGRAM	6.250

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
082599	MTA- LONG ISLAND BUS	ACCESS TO WORK/REVERSE COMMUTE	2.152
082627	LOCAL	EQUAL ACCESS AND MOBILITY FOR ALL-RIDERSHARING PROGRAM	0.220
082631	LOCAL	TOWN OF BROOKHAVEN ACCESS TO ALL MOBLILITY MGMT.PROGRAM	0.225
082900	LOCAL	COMMUNITY SERVICE BUS REPLACEMENT PROJECT	1.108
0T1733	NYSDOT	SIDEWALK CONSTRUCTION	1.280
0T1793	NYSDOT	BSP BIKEWAY RECONSTRUCTION	0.160
0T1796	NYSDOT	NY27 C/M PHYLLIS DR TO STATION RD	3.000
0T1902	NYSDOT	LOCAL SAFE STREETS AND TRAFFIC CALMING	2.500
0T1903	NYSDOT	LOCAL SAFE STREETS AND TRAFFIC CALMING	3.375
0T1904	NYSDOT	LOCAL SAFE STREETS AND TRAFFIC CALMING	3.375
0T1905	NYSDOT	LOCAL SAFE STREETS AND TRAFIC CALMING	3.375
0T1938	NASSAU CO.	2009 NASSAU COUNTY INCIDENT MANAGEMENT	1.800
0T1939	NASSAU CO.	2010 NASSAU COUNTY INCIDENT MANAGEMENT SYSTEM	1.800
0T1951	LOCAL	TOWN OF BROOKHAVEN TRAFFIC FLOW IMPROVEMENT	1.262
0T1953	NYSDOT	BIKEWAY/PEDESTRIAN REQUIREMENTS	1.280
0T1970	NYSDOT	BIKEWAY/PEDESTRIAN REQUIREMENTS	1.220
0T2270	SUFFOLK CO.	HYBRID ELECTRIC VEHICLES	0.000
0T2290	LOCAL	TOWN OF HEMPSTEAD PURCHASE 16 HYBRID VEHICLE	0.300
0T2293	LOCAL	FLAX POND TIDAL WETLAND CATWALK EXT.BY D.E.C	0.005
0T2294	LOCAL	DEVELOPE WALKING TRACK BY TOWN OF RIVERHEAD	0.325
0T2353	LOCAL	TOWN OF RIVERHEAD ALTERNATIVE TRANSPORTATION PATH	3.158
N60010	NASSAU CO.	LIDO BLVD TRAFFIC CALMING IMPROVEMENTS	0.700
003012	NYSDOT	NY454 DRAINAGE IMPROVEMENTS (GRUNDY AVENUE TO CHURCH STREET)	2.072
003014	NYSDOT	NY454 DRAINAGE IMPROVEMENTS (FEUERISEN AVE TO JOHNSON AVE)	7.200
003015	NYSDOT	NY454 DRAINAGE IMPROVEMENTS (JOHNSON AVE TO GRUNDY AVE)	5.960
005894	NYSDOT	NY27 AT ST LOUIS AVE: BAY SHORE DRAINAGE IMPROVEMENT	2.462
005903	NYSDOT	NY27 MEDIAN BARRIER ROBERT MOSES CAUSEWAY TO 5TH AVENUE	8.000
007708	NYSDOT	NY111 SAFETY IMPROVEMENTS (TOWNLINE ROAD TO NY347)	24.840

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
011252	NYSDOT	NY110 DRAINAGE IMPROVEMENT (HALESITE)	11.000
011334	NYSDOT	NY27A DRAINAGE IMPROVEMENT (TRUES CREEK, ISLIP)	3.833
032795	NYSDOT	NY25A DRAINAGE AT MILL POND ROAD	1.980
051732	NYSDOT	WANTAGH STATE PARKWAY LIGHTING CABLE UPGRADE (SSP TO NSP)	4.620
053466	NYSDOT	PKWY LIGHTING CABLE UPGRADE	0.300
075835	NASSAU CO.	PENINSULA BOULEVRD TRAFFIC SIGNAL HEAD	5.075
075846	LOCAL	TRAFFIC CALMING TOWN OF NORTH HEMPSTEAD	8.139
075873	LOCAL	TRAFFIC CALMING IMPROVEMENTS ON BOND STREET	0.125
075894	LOCAL	LARKFIELD ROAD SIGNAL RECONSTRUCTION	1.813
075903	LOCAL	VILLAGE OF ILSANDIA ROAD IMPROVEMENT	1.149
075907	LOCAL	THE TOWN OF BROOKHAVEN INSTALL CHICANES,BULB-OUTS. SPEED HUM	0.494
075908	LOCAL	VILLAGE OF GREAT NECK PLAZA IMPROVING PED.SAFETY	0.272
075909	LOCAL	TOWN OF BROOKHAVEN INSTALL BIKE LANE AND PED.SIGNALS	0.126
075911	LOCAL	VILLAGE OF PORT WASHINGTON NORTH WILL IMPROVING PED. SAFETY	0.369
075912	LOCAL	TOWN OF BROOKHAVEN WILL IMPROVING PED. SAFETY	0.579
075927	LOCAL	SIGN MAMAGEMENT, TOWN OF BROOKHAVEN	1.250
075941	NASSAU	BIKE AND PEDESTRIAN PATHS	2.000
075946	LOCAL	SAFE ROUTES TO SCHOOL	0.454
075959	LOCAL	SYOSSET STREETSCAPE & WALKABILITY IN TOWN OF OYSTERBAY	1.575
080432	NYSDOT	WSP RAMP IMPROVEMENTS PH 1	2.240
080434	NYSDOT	STATE PKWY SAFETY PROJECT @ VARIOUS LOCATION	5.706
080785	NYSDOT	MEDIAN BARRIER INSTALL NY27 & I495	6.050
080791	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	3.322
080798	NYSDOT	SIGN REQUIREMENTS CONTRACT	2.240
080803	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	4.950
080805	NYSDOT	PREV MAIN DRAINAGE CLEAN/REPAIR/REPLACE CONTR	0.896
080808	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.120
080818	NYSDOT	DRAINAGE REPAIR/REPLACE CONTRACT	0.867
080821	NYSDOT	HIGHWAY RUNOFF PROJECT	6.135
080833	NYSDOT	SAFETY & PAVEMENT STANDBY CONTRACT	4.600
080841	NYSDOT	OVERHEAD SIGN REPAIR CONTRACT	4.168

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
080842	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	1.815
080846	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	5.905
080851	NYSDOT	PREV MAIN DRAINAGE CLEAN/REPAIR/REPLACE CONTR	1.220
080852	NYSDOT	GUIDERAIL REHABILITATION	12.190
080859	NYSDOT	AMERICAN DISABILITY ACT COMPLIANCE BLOCK OUT	4.746
080861	NYSDOT	GUIDE SIGN REPLACEMENT	14.180
0S5529	NYSDOT	OVERHEAD SIGN STRUCTURE INSPECTION	3.000
0T1412	NYSDOT	PREV MAIN DRAINAGE CLEAN/REPAIR/REPLACE CONTR	0.000
0T1485	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	5.355
0T1486	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	0.000
0T1487	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	5.850
0T1497	NYSDOT	SAFETY & PAVEMENT STANDBY CONTRACT	0.000
0T1507	NYSDOT	SIGN REQUIREMENT CONTRACT	2.340
0T1543	NYSDOT	PRIORITY INVESTIGATION LOCATIONS CORRECTION PROJECT	5.750
0T1544	NYSDOT	SAFETY IMPROVEMENTS	3.479
0T1545	NYSDOT	SAFETY IMPROVEMENTS	0.179
0T1582	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	0.000
0T1583	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	2.400
0T1584	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	2.375
0T1585	NYSDOT	DRAINAGE BLOCK	3.050
0T1586	NYSDOT	DRAINAGE BLOCK	0.500
0T1587	NYSDOT	DRAINAGE BLOCK	0.250
0T1591	NYSDOT	NY27 MED BAR 5TH AVE TO BRENTWOOD	0.300
0T1594	NYSDOT	SAFETY BLOCK	3.550
0T1595	NYSDOT	SAFETY BLOCK	0.500
0T1596	NYSDOT	SAFETY BLOCK	0.500
0T1625	NYSDOT	EMERGENCY WHERE & WHEN	2.240
0T1626	NYSDOT	EMERGENCY WHERE & WHEN	2.400
0T1635	NYSDOT	WSP & OCEAN PKWY LIGHTING	7.700
0T1651	NYSDOT	NY25 SAFETY BLOCK	0.800
0T1652	NYSDOT	NY25 SAFETY BLOCK	0.630
0T1681	NYSDOT	PREV MAINT DRAIN CLEAN/REPAIR/REPLACE CONTR	1.200
0T1682	NYSDOT	RECHARGE BASIN RECONDITIONING CONTRACT	2.375
0T1688	NYSDOT	PREV MAINT DRAIN CLEAN/REPAIR/REPLACE CONTR	1.200
0T1689	NYSDOT	RECHARGE BASIN RECONDITION CONT	0.160
0T1696	NYSDOT	SAFETY & PAVEMENT STANDBY CONTRACT	4.600
0T1697	NYSDOT	EMERGENCY STANDBY CONTRACT	0.160

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
0T1698	NYSDOT	DURABLE PAVEMENT MARKING CONT	5.905
0T1700	NYSDOT	SIGN REQUIREMENTS CONTRACT	1.120
0T1701	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	0.250
0T1708	NYSDOT	PECONIC BAY ESTUARY DRAINAGE IMPROVEMENTS	0.450
0T1718	NYSDOT	SIDEWALK & CURB RAMPS	3.460
0T1768	NYSDOT	SIGN REQUIREMENTS CONTRACT	0.100
0T1769	NYSDOT	DURABLE PAVEMENT MARKING CONTRACT	0.500
0T1771	NYSDOT	SAFETY & PAVEMENT STANDBY CONTRACT	0.200
0T1776	NYSDOT	PM DRA CLEAN/REPAIR/REPLACE CONT	0.080
0T1916	LOCAL	SIGN MAMAGEMENT, TOWN OF BROOKHAVEN	0.000
0T1930	NASSAU CO.	2007 NASSAU COUNTY PAVEMENT MARKINGS	1.200
0T1931	NASSAU CO.	2008 NASSAU COUNTY PAVEMENET MARKINGS	1.200
0T1932	NASSAU CO.	2009 NASSAU COUNTY PAVEMENT MARKINGS	1.200
0T1933	NASSAU CO.	2010 NASSAU COUNTY PAVEMENT MARKINGS	1.189
0T1950	LOCAL	TOWN OF HEMPSTEAD SIGN MANAGEMENT	1.250
0T1962	NYSDOT	GUIDERAIL REHABILITATION	3.300
0T1963	NYSDOT	GUIDERAIL REHABILITATION	0.000
0T1965	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.120
0T1966	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.120
0T2008	NYSDOT	NASSAU JOB ORDER CONTRACT	1.120
0T2009	NYSDOT	NASSAU JOB ORDER CONTRACT	1.220
0T2010	NYSDOT	NASSAU JOB ORDER CONTRACT	1.220
0T2011	NYSDOT	NASSAU JOB ORDER CONTRACT	1.220
0T2012	NYSDOT	SUFFOLK JOB ORDER CONTRACT	1.120
0T2013	NYSDOT	SUFFOLK JOB ORDER CONTRACT	1.220
0T2014	NYSDOT	SUFFOLK JOB ORDER CONTRACT	1.220
0T2015	NYSDOT	SUFFOLK JOB ORDER CONTRACT	1.220
0T2033	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2034	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2035	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2036	NYSDOT	GUIDERAIL REHABILITATION	0.160
0T2037	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2038	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2039	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2040	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2041	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2042	NYSDOT	GUIDERAIL REHABILITATION	3.460
0T2051	NYSDOT	NASSAU JOB ORDER CONTRACT	1.220
0T2052	NYSDOT	NASSAU JOB ORDER CONTRACT	0.100

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
0T2062	NYSDOT	SUFFOLK JOB ORDER CONTRACT	1.220
0T2063	NYSDOT	SUFFOLK JOB ORDER CONTRACT	0.100
0T2073	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.220
0T2074	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.220
0T2075	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	1.220
0T2076	NYSDOT	PM CULVERT CLEAN/REPAIR/REPLACE	0.100
0T2148	LOCAL	RECONST.& DRAINAGE IMPROV.IN SOUTH OYSTER BAY	2.623
0T2157	NYSDOT	OVERHEAD SIGN REPAIR CONTRACT	0.000
0T2190	NYSDOT	SIGN STRUCTURE REPAIR	3.460
0T2204	NYSDOT	GUIDESIGN PANEL REPLACEMENT	3.460
0T2213	LOCAL	SMITHTOWN TRAFFIC SIGN UPGRADE	0.750
0T2233	NYSDOT	I495 HOV ACCESS IMPROVEMENTS, EXITS 52-60	0.566
0T2256	NASSAU CO.	OLD COUNTRY ROAD TRAFFIC SIGNAL HEAD	3.375
0T2258	NASSAU CO.	2011 NASSAU COUNTY PAVEMENT MARKING PHASE 5	1.000
0T2259	NASSAU CO.	2012 NASSAU COUNTY PAVEMNT MARKING PHASE 6	1.000
0T2295	LOCAL	EXP.& REPAIR OF EXIST.BIKE PATH HECKSCHER PK	0.675
0T2296	LOCAL	BICYCLE &PED.SAFETY PROGRAM TOWN OF RIVERHEAD	1.500
0T2312	LOCAL	HOFSTRA UNIVERSITY SAFE AND ACCOUNTABLE CAMPUS	0.955
0T2316	NYSDOT	I495 HOV ACCESS EXISTS 37-38	2.900
0T2331	LOCAL	SAFE ROUTES TO SCHOOL	0.000
0T2335	LOCAL	VILLAGE OF SOUTHAMPTON SAFE ROUTE TO SCHOOL	1.181
0T2336	LOCAL	PLANDOME ROAD SAFE ROUTE TO SCHOOL, MANHASSET	0.885
0T2350	LOCAL	RIVERHEAD SAFE ROUTE TO SCHOOL	0.535
0T2352	LOCAL	SYOSSET STREETSCAPE & WALKABILITY IN TOWN OF OYSTERBAY	0.165
0T2359	LOCAL	PED.CROSSWALK IMPV.AT INTERSECTIONS -VLG.OF NORTHPORT	0.086
0T2363	LOCAL	ABGS ELEMENTARY SCHOOL SAFETY ROUTE TO SCHOOL	0.586
0T2364	LOCAL	FULTON ELEMENTARY SCHOOL SAFETY ROUTE TO SCHOOL	0.578
0T2365	LOCAL	JACKSON ELEMENTARY SCHOOL SAFETY ROUTE TO SCHOOL	0.560
N60041	NASSAU CO.	QUAKER MEETING HOUSE ROAD DRAINAGE IMPROVEMENTS	1.000
N66302	NASSAU CO.	NASSAU CO HIGHWAY & BRIDGE REQUIREMENTS CONTRACT	0.950
SC3301	SUFFOLK CO.	SAFETY IMPROVEMENTS AT VARIOUS LOCATIONS	1.550
SC5024	SUFFOLK CO.	RECONST.OF DRAINAGE SYSTEMS ON COUNTY ROADS	0.600

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
SC5037	SUFFOLK CO.	APPLICATION & REMOVAL OF LANE MARKINGS	0.900
SC5072	SUFFOLK CO.	IMPV TO RECHARGE BASIN IN THE CR67	0.750
SC5180	SUFFOLK CO.	INSTALLATION OF GUIDE RAIL AT VARIOUS LOCATIONS	0.175
075672	SUFFOLK CO.	CLOSED LOOP SIGNAL SYSTEM	2.500
075837	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL SYSTEM UPDATE	4.200
075891	LOCAL	NY27 PEDESTRIAN STREETSCAPE, LYNBROOK	0.997
075947	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL EXPANSION PHASE 7	8.050
080429	NYSDOT	ACCESS SIGNS FREEWAY/PARKWAY	3.300
080768	NYSDOT	SIGNAL TIMING CONTRACT	1.500
080769	NYSDOT	SIGNAL TIMING CONTRACT	1.500
080811	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONTRACT	4.410
0SIP00	NYSDOT	SIGNAL IMPROVEMENT PROGRAM	3.250
0T1515	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONTRACT	3.256
0T1516	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONTRACT	3.420
0T1517	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONTRACT	3.420
0T1699	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONTRACT	3.420
0T1702	NYSDOT	TRAFFIC SIGNAL REQUIREMENTS CONT	0.120
0T1927	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL SYSTEM	0.725
0T1928	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL	0.726
0T1929	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL SYSTEM	0.725
0T1936	NASSAU CO.	2009 NASSAU COUNTY TRAFFIC SIGNAL	0.100
0T1937	NASSAU CO.	2010 NASSAU COUNTY TRAFFIC SIGNAL IMPV.	0.100
0T1941	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL EXPANSION PHASE 2	3.000
0T1942	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL EXPANSION PH 3	0.000
0T1943	NASSAU CO.	2009 NASSAU COUNTY TRAFFIC SIGNAL EXPANSION	5.250
0T1944	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNALEXPANSION PH 5	3.050
0T1945	NASSAU CO.	2008 NASSAU COUNTY LED TRAFFIC SIGNAL	0.820
0T1946	NASSAU CO.	NASSAU COUNTY LED TRAFFIC SIGNAL PHASE 2	4.300
0T2191	NYSDOT	SIGNAL RECONSTRUCTION	3.460
0T2251	SUFFOLK CO.	CLOSED LOOP SIGNAL SYSTEM	1.250
0T2252	SUFFOLK CO.	CLOSED LOOP SIGNAL SYSTEM	1.250
0T2253	SUFFOLK CO.	CLOSED LOOP SIGNAL SYSTEM	1.250
0T2260	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL EXPANSION PHASE 6	3.050

Project Identification Number	Sponsoring Agency	Project Description	5-Year Funding Amount (in Millions)
0T2261	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL IMPV.PHASE 3	0.250
0T2265	NASSAU CO.	NASSAU COUNTY TRAFFIC SIGNAL EXPANSION PHASE 7	0.000
0T2266	NASSAU CO.	OLD COUNTRY ROAD TRAFFIC SIGNAL HEAD PHASE 2	3.375
0T2275	NASSAU CO.	NASSAU COUNTY LED TRAFFIC SIGNAL PHASE 3	2.575
0T2276	NASSAU CO.	2011 NASSAU COUNTY LED TRAFFIC SIGNAL PHASE 4	3.333
0T2277	NASSAU CO.	2012 NASSAU COUNTY LED TRAFFIC SIGNAL PHASE 5	3.333
0T2354	NASSAU CO.	SIGNAL PREEMPTION FOR NASSAU HUB BUS SERVICE	0.250
SC5054	SUFFOLK CO.	TRAFFIC SIGNAL IMPV. VARIOUS COUNTY ROADS	0.200
		Subtotal: Long Island	**$641.62**

Assessment of Programmed Resources

Some of the long-range resources forecast above for the 2010-2035 planning period are programmed for use in the medium-term in the Transportation Improvement Program, or TIP. NYMTC's TIP is fully updated every two years to establish this medium-range program of transportation improvements that will draw upon projected resources. The TIP is consistent with the overall goals and objectives of the Plan and is nested within the Plan financially and programmatically. Although the TIP and Plan are revised and updated on different cycles, comparisons between their financial structures can be made.

Programming Period. The information contained in the assessment of programmed resources in NYMTC's planning process is derived from the current Transportation Improvement Program, covering Federal Fiscal Years (FFY) 2008 through 2012, which was adopted on October 29, 2007. Thus, the current planning period for programmed resources in NYMTC's planning process runs through September 30, 2012.

Anticipated Resources. The anticipated resources for the FFY 2008-2012 TIP are shown in Table 7.12 below, along with a comparison with the relative proportions of various program types projected for the long-term. The resources anticipated for the FFY 2008-2012 TIP, $42 billion, represent approximately 4.2 percent of the total resources forecast to be available for the long-range planning period.

It should be noted that the comparison of these long-range and medium-range forecasts represents a snapshot of programmatic time within the long-range planning period. The funding anticipated for the TIP represents a subset of the long-range resource forecast and thus enables the longer-range vision expressed in the Plan to be implemented partially in the near-term.

Programmed Projects. The FFY 2008-2012 TIP programs nearly $42 billion worth of transportation improvement projects of all types. The total programmed resources do not exceed the resources anticipated during the period of the TIP and are thus fiscally constrained within the TIP. Table 7.12 summarizes the types of projects programmed in the TIP.

TABLE 7.12

Types of Projects Programmed in the 2008-2012 TIP (in $billions YOE)

Source: NYMTC

Category	Amount Programmed	% of Total
State of Good Repair/Normal Replacement		
Bridges	$5.802	
Construction	$0.361	
Intersection	$0.180	
Reconstruction & Preservation	$2.601	
Transit	$22.062	
Miscellaneous	$0.662	
Subtotal	***$31.667***	***75.7%***
Mobility, Safety and Other		
Mobility	$1.120	
Traffic	$0.463	
Transit Mega-Projects	$7.790	
Safety	$0.814	
Subtotal	***$10.188***	***24.3%***
TOTAL	**$41.855**	**100.0%**

Chapter 8

Implementing the Plan

NYMTC's Regional Transportation Plan is part of a broader planning initiative involving all of NYMTC's member agencies and stakeholders in the transportation planning process. NYMTC takes into account neighboring regions in its planning process and conducts outreach activities to gather input from the public.

This section describes steps taken by NYMTC to consult with its regional partners on environmental mitigation and resource conservation, mitigate transportation's impacts on air quality, coordinate with neighboring MPOs to ensure transportation planning does not stop at NYMTC's boundaries, and involve the public in the regional transportation planning process.

CHAPTER 8

Implementing the Plan

Agencies Consulted During the Development of the RTP

NYC Department of Environmental Protection

NYC Office of Environmental Coordination

NYS Department of Agriculture

NYS Department of Environmental Conservation

NYS Department of Health

NYS Department of State

NYS Department of State, Coastal Zone Management Office

NYS Empire State Development Corporation

NYS Office of Parks, Recreation & Historic Preservation

U.S. Army Corps of Engineers

U.S. Coast Guard

U.S. Department of Agriculture and Soil and Water Conservation Districts

U.S. Environmental Protection Agency

U.S. Federal Aviation Administration

U.S. Fish and Wildlife Service

U.S. National Marine Fisheries Service

U.S. National Park Service

North Jersey Transportation Planning Authority

South Western Regional Metropolitan Planning Organization

Greater Bridgeport/Valley Metropolitan Planning Organization

Housatonic Valley Council of Elected Officials

i. Regional Consultation

NYMTC's shared regional goals include protecting and enhancing the region's environment and improving its quality of life. For NYMTC members, resource conservation and environmental mitigation are key elements of the transportation planning process.

The current Federal transportation legislation at this writing, known as SAFETEA-LU, which was signed into law in August 2005, includes requirements for consultation with state and local agencies regarding inventories of natural or historic resources and conservation plans or maps. The "New Consultations" provisions in SAFETEA-LU also require that MPOs consult with Federal, state, Tribal, wildlife and regulatory agencies on potential environmental mitigation activities and potential locations to carry out these activities. In addition, NYMTC must consult with neighboring MPOs to ensure consistency in planning across the larger metropolitan region.

NYMTC's member agencies have formal and informal relationships with many state and local agencies to address environmental, resource conservation and other issues related to transportation projects and studies in the region. Above and beyond the efforts of individual member agencies, NYMTC has formalized the consultation process, as required by SAFETEA-LU, by reaching out to the various agencies in the development of this Plan and for general participation in the transportation planning process.

A key element of the outreach to these agencies is identification of resources and conservation concerns that may impact transportation planning efforts, and identification of key goals and objectives of the agencies consulted that may relate to NYMTC's transportation planning process. A list of agencies contacted during the outreach process is contained in the sidebar.

Appendix 7 contains a detailed discussion of how NYMTC and its member agencies satisfied New Consultations requirements during the development of this Plan.

ii. Coordinating Planning Beyond NYMTC's Borders

Although NYMTC's mission is to focus on transportation planning issues within the 10 counties that make up the NYMTC region, the organization and its members must also consider changing conditions, planning activities, and investment decisions that are taking place outside the region. To that end, NYMTC has been an active participant in multiple forums that foster coordinated decision-making and sharing of information among the many agencies responsible for making decisions that affect transportation, land use, the environment and the economy.

NYMTC is part of several multi-state regions and organizations. NYMTC actively participates in the Interstate 95 (I-95) Corridor Coalition, a partnership of state departments of transportation, MPOs, public authorities and agencies, as well as organizations overseeing public safety, port, transit and rail issues from Maine to Florida, with affiliate members in Canada. NYMTC participated in the development of the recently-published *2040 Vision for the I-95 Coalition Region*, which lays out common concerns of agencies in the Corridor, ranging from real time operations to improved modal integration and the long-term viability of the system in light of energy and climate concerns. The *2040 Vision* formulates and analyzes an alternative vision of the future for the entire region – one which accommodates other key values and issues related to climate change, energy, a global economy, and quality of life, while reexamining the traditional modal mix and service options available for passenger and freight transportation in the Corridor.

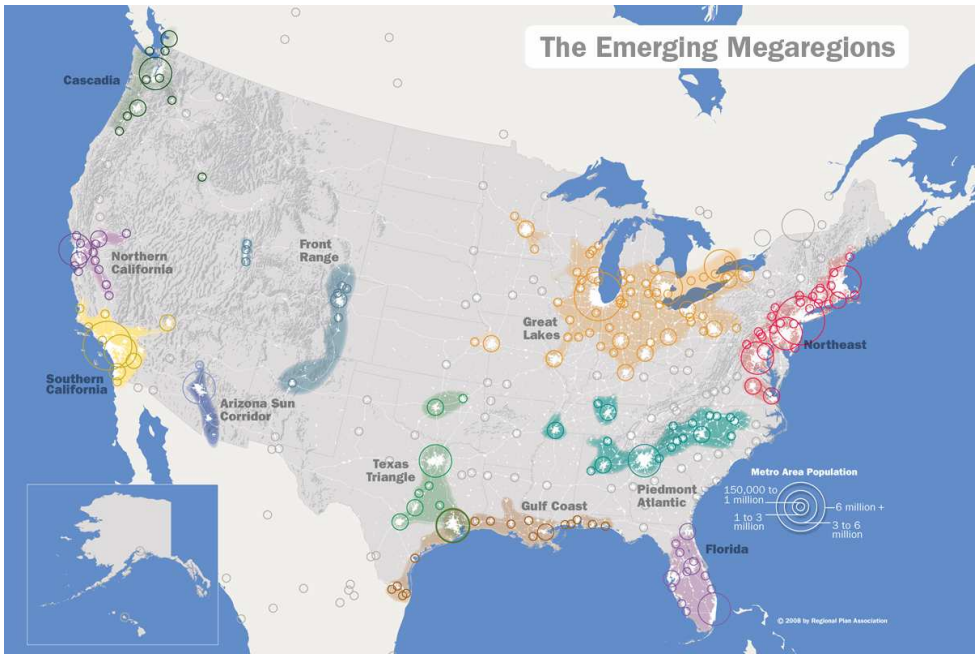


FIGURE 8.1

Megaregions in the U.S.

Source: Regional Plan Association *America 2050*

NYMTC also is at the hub of the Northeast Megaregion, an agglomeration of formerly distinct metropolitan areas from Southern Maine to Virginia. Initiatives such as America 2050, sponsored by the Regional Plan Association, have brought together various MPOs and other stakeholders in this megaregion to think about transportation and related issues on a broader scale. The map in Figure 8.1 shows the extent of the Northeast Megaregion and the locations of other megaregions around the U.S.

Closer to home, NYMTC coordinates its transportation planning activities with other MPOs in the larger tri-state New York metropolitan area. NYMTC has joined the North Jersey Transportation Planning Authority, South Western Region Metropolitan Planning Organization, the Greater Bridgeport/Valley MPO, and the Housatonic Valley Council of Elected Officials in an agreement to voluntarily coordinate planning processes (see Figure 8.2). The agreement will ensure that the work of each MPO takes into account the impacts of the plans and programs developed by the other MPOs, avoids duplication of their efforts, reflects consistency and addresses issues of mutual concern.

Figure 8.2

NYMTC and Neighboring Metropolitan Planning Organizations

Source: NYMTC

iii. Clean Air Act and Transportation Conformity

The Clean Air Act Amendments of 1990 required the United States Environmental Protection Agency to establish national ambient air quality standards for specific air pollutants and to identify geographic areas that do not attain these standards. In response, the New York State Department of Environmental Conservation developed the State Implementation Plan for Air Quality (SIP), that details how emissions - including those from transportation sources – will be reduced to levels that meet the national standards in the state's "non-attainment" areas.

Several non-attainment areas impact the NYMTC region. The New York Metropolitan eight-hour ozone non-attainment area and the New York-New Jersey-Connecticut fine particulate matter non-attainment area include all NYMTC counties except Putnam. The carbon monoxide non-attainment area—which has met national standards and was downgraded to a "maintenance area"—includes all of New York City, Nassau County, and Westchester County. A particulate matter non-attainment area is limited to the borough of Manhattan.

Transportation plans and programs in non-attainment areas are subject to a process known as transportation conformity. Under this requirement, NYMTC must quantitatively assess the air quality impacts of its plans and programs and demonstrate that changes in transportation will not cause the area to exceed motor vehicle emissions milestones set in the State Implementation Plan. Specifically, transportation projects should not cause or contribute to any new violation of the national ambient air quality standards, increase the frequency or severity of any existing air quality violations, or delay timely attainment of air quality targets.

NYMTC undertakes a regional emissions analysis when it adopts or amends the Plan or TIP. Through this analysis, NYMTC must demonstrate that the motor vehicle emissions resulting from its planned transportation improvements conform to the emissions milestones identified in the SIP. NYMTC publishes the analysis in a formal Conformity Determination, which is then reviewed by Federal oversight agencies working through an Interagency Consultation Group, which includes representatives from United States Environmental Protection Agency, Federal Highway Administration, Federal Transit Administration, New York State Department of Environmental Conservation and the Environmental Analysis Bureau of the New York State Department of Transportation. The conformity analysis is available as a standalone document from NYMTC, and can be downloaded from www.nymtc.org.

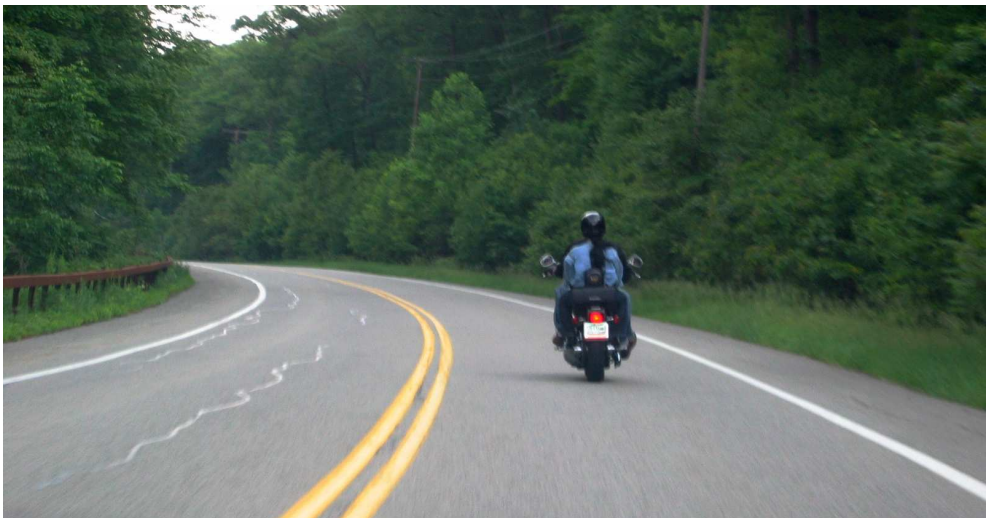
iv. Congestion Management Process

Over the past decade Federal transportation legislation has mandated the assessment and management of available roadway capacity through a Congestion Management Process (CMP) before new roadway capacity can be added to a regional plan or improvement program in designated transportation management areas. NYMTC's region is located in such an area, and NYMTC is therefore required to develop and implement a regional CMP as an integral part of its ongoing regional planning process.

NYMTC's CMP measures, reports and provides the basis for managing vehicular congestion on a region-wide basis. As defined in Federal regulation, "an effective CMP is a systematic process for managing congestion that provides information on system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local need."

The overall goal of the CMP is to reduce growth of future vehicle trips, particularly during peak travel periods. Consistent with the goals of the Plan, the CMP is intended to:

- Improve the mobility of people and goods by reducing vehicle hours of delay and person hours of delay;
- Improve the reliability and convenience of the transportation system, ensuring ease of use, acceptable travel times and reasonable costs;
- Manage the transportation system efficiently to accommodate existing and anticipated demand for movement of people and goods; and,
- Provide information on system performance and alternative strategies for alleviating congestion.



The CMP includes and provides:

- Performance measures for determining levels of delay and congestion in the region;
- A database of traffic counts and speed data for measuring changes in the regional traffic conditions;
- Geocoded computerized highway and transit networks that can be used for simulating regional travel patterns, estimating regional congestion and displaying the results in Geographic Information Systems;
- An ongoing assessment of congestion in the region that is updated every three years, with each update of NYMTC's Regional Transportation Plan;
- Forecasts of future congestion levels based upon the latest regional population and employment forecasts;
- Procedures for evaluating, at a regional level, strategies for reducing and managing congestion; and
- Procedures for incorporating the most effective strategies into NYMTC's TIP and Work Program.

NYMTC's CMP provides the opportunity to measure current and forecasted congestion, measures the effectiveness of the planned improvements on congestion and provides the first step in developing effective solutions. The CMP is an integral part of the ongoing regional planning process and will continue to develop in order to better address congestion problems in the New York metropolitan area.

v. Involving the Public in Regional Planning

Involving a diverse set of communities in a planning process across a large geographic area is key to developing and implementing transportation investments that will be the most beneficial to, and accepted by, the very people relying on those resources. Every day people in this region are acutely aware of how the transportation system is working, with valuable knowledge and insight into their needs and the needs of their communities.

NYMTC's public involvement program aims to be proactive, gathering input and ideas at early stages of the planning process for consideration as the process moves forward. Throughout the development of this Plan, but particularly at early stages of the process, NYMTC has hosted public workshops and planning sessions in each of its constituent counties and the five boroughs of New York City for the purpose of informing the development of the Plan. Through use of webcasts and an interactive website, the reach of these sessions has been amplified. Additionally, NYMTC has used its working relationships with community groups throughout its region to help spread the word about opportunities for interaction and input. All of these measures have helped increase the participation of the public in the development of this Plan.

NYMTC maintains a number of advisory working groups to act as conduits for information from the interested public on specific aspects of the transportation planning process. These groups have been established in policy areas such as freight planning, demand management and mobility, human services transportation, waterborne transportation, and pedestrian and bicycle transportation. The development of various aspects of this Plan has also been informed through the activities of these working groups.

The public involvement mechanisms that NYMTC has employed in the development of this Plan are part of a larger program of public involvement which is used throughout the metropolitan planning process. Appendix 10 contains details regarding public participation activities developed by NYMTC for the development of the RTP. This plan stems from the overall Public Involvement Plan developed by NYMTC in 2006.

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