NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

New York Metropolitan Transportation Council

Congestion Management Process Report

2013 Status Report

EXECUTIVE SUMMARY

ADOPTED ON SEPTEMBER 4, 2013

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What Is the Congestion Management Process (CMP)?

Since SAFETEA-LU was signed into law in 2005, metropolitan areas with populations of greater than 200,000 have been designated as Transportation Management Areas (TMAs). All TMAs were required to implement a **Congestion Management Process (CMP)** in order to provide for "safe and effective integrated management and operation of the transportation system" (23 CFR Section 450.320 and 23 CFR Section 500.105).

The CMP is required to include the following elements:

1. **Methods to monitor and evaluate performance;**
2. **Definition of congestion management objectives;**
3. **Establishment of data collection and system performance monitoring programs;**
4. **Identification and evaluation of performance and benefits of management strategies;**
5. **Identification of an implementation schedule and responsibilities; and**
6. **A process for periodic assessment of the effectiveness of implemented strategies.**

Since NYMTC's region is a TMA which does not currently attain specific National Ambient Air Quality Standards, additional federal requirements apply to the CMP, including:

- All reasonable, multimodal Transportation Demand Management (TDM)/Operations and Supply Management (OSM) strategies must be analyzed in corridors where roadway capacity increase is proposed;
- If the analysis demonstrates that the TDM/OSM strategies cannot offset the need for additional capacity, the CMP shall identify all reasonable strategies for managing the increased roadway capacity effectively;
- All TDM/OSM strategies identified in the CMP shall be incorporated into roadway capacity projects or committed to by the State and the MPO; and
- Federal funds may not be programmed in a nonattainment TMA for any roadway capacity project unless based on an approved CMP.

The CMP requirement was recently carried into the most recent Federal surface transportation authorization bill, MAP-21, which includes "Congestion Reduction" and "System Reliability" as two of the seven national performance goals for Federal highway programs. Consistent with the performance measurement and monitoring emphasis of MAP-21, there is now an even greater emphasis on integrating effective target setting, monitoring, and reporting into the CMP process.

With its 2005 CMP Status Report and the 2009 update, NYMTC met the federal requirements by developing tools and procedures for measuring congestion, identifying strategies for congestion reduction, and defining individual projects and strategies to address congestion, with associated funding, in the Transportation Improvement Program (TIP).

The overall goal of the CMP is to reduce growth of future vehicle trips, particularly during peak travel periods. Consistent with the goals of Plan 2040, the CMP is intended to:

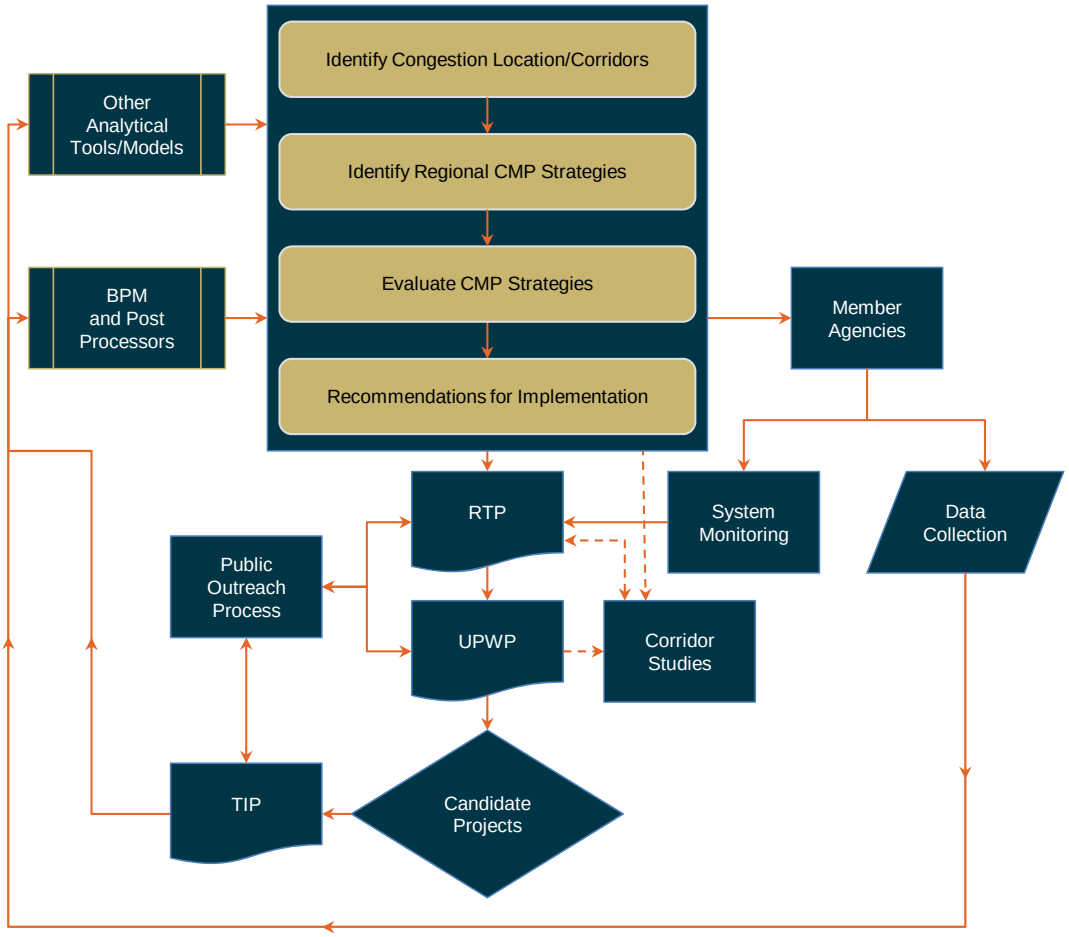
- Improve the mobility of people and goods by reducing vehicle hours of delay and person hours of delay;
- Improve the reliability and convenience of the transportation system, ensuring ease of use, acceptable travel times and reasonable costs;
- Manage the transportation system efficiently to accommodate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

In order to accomplish these goals, NYMTC's CMP has been designed to provide:

- Performance measures for measuring regional levels of delay and congestion;
- Data and procedures for measuring changes in regional traffic conditions;
- Computerized highway and transit networks that can be used for simulating regional travel patterns, for estimating regional congestion, and for displaying the results on Geographic Information System (GIS) maps;
- 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 assessing the most effective strategies through NYMTC's Unified Planning Work Program and advancing them to implementation via the Transportation Improvement Program.

The CMP has been designed to make use of the New York Best Practice Model (NYBPM), NYMTC's regional transportation demand simulation model, to develop forecasts of congestion-related performance measures, and to integrate the findings of the CMP into NYMTC's metropolitan transportation planning process. The CMP procedures closely integrate the CMP with the metropolitan transportation planning process, as illustrated in Figure 1.

Figure 1 Integration of CMP with NYMTC's Planning Process



The 2013 CMP Status Report

The 2013 CMP Status Report is organized into seven sections, followed by two appendices.

1. An introduction to the report
2. A description of the characteristics of the transportation system in the NYMTC region.
3. A description of the relationship between federal regulations and elements of NYMTC's planning and programming process, including the CMP.
4. The detailed methodology used for the CMP analysis, including tools used for analyzing congestion, selected performance measures, types of analysis performed, and reporting periods and scenarios are described.
5. The results of the CMP analysis provided at the regional level.
6. The results of the CMP analysis provided at the county level.
7. Congestion management strategies used by NYMTC.

Appendix A contains a toolbox of strategies for mitigating congestion, while Appendix B contains a worksheet summarizing the characteristics of the most congested corridors in each county or borough in the region.

How Is Congestion Measured?

Performance measures are used in NYMTC's CMP to assess the effectiveness and efficiency of the roadway system. Several performance measures are considered in order to quantify the level of congestion. These performance measures are:

- *Demand-to-Capacity* (D/C) *ratio*, a measure that reflects the level of mobility and the quality of travel of a roadway or a section of a roadway. The D/C ratio compares the roadway capacity with the estimated trip demand generated directly from the travel demand models.
- *Vehicle Hours of Delay* (VHD), the sum total of delay experienced by all vehicles on the network. Delay is defined as the difference between estimated actual travel speed and free flow travel speed, and is therefore a measure that is readily understood by the traveling public.
- *Person Hours of Delay* (PHD), calculated by multiplying VHD by the average vehicle occupancy rate.
- *Average Travel Speed* (ATS), the calculation for a weighted average of speed.
- *Lane Miles of Congestion,* the road space that functions at less than free-flow speeds during the peak, and compares actual roadway volume with maximum acceptable volume for the roadway. It reflects the mobility of roadway or section of roadway, indicating the proportion that is congested.
- *Travel Time Index* (TTI), the ratio of peak-period travel time to free-flow travel time. The TTI expresses the average amount of extra time it takes to travel in the peak relative to free flow travel.
- *Vehicle Miles Traveled* (VMT) the sum of distances traveled by all motor vehicles in a specified region.
- *Accessibility*, collective performance of land use and transportation systems and determines how well that complex system serves its residents.
- *Reliability* the travel time coefficient of variance for each link, by time period, for one day. Reliability is calculated as the average standard deviation of travel time, on links of each road group (freeways, arterials, and local streets), within a county.

CONGESTION IN NYMTC'S PEER REGIONS

The NYMTC planning area is second only to the greater Los Angeles region (Los Angeles, Long Beach, Santa Ana) in terms of total population, but far exceeds the population density of any other metropolitan region in the country. Among the large peer regions shown in Table 5.1, the NYMTC planning area has the third lowest daily VMT per capita due mainly to high population density and high proportion of transit use.

Table 1 Comparison of Daily VMT per Capita and Travel Time Index

Metropolitan Area	2011 Population (million)	2011 Daily VMT/Capita (Freeway + Arterial)	2011 Travel Time Index
NYMTC Planning Area	12.4	15.7 (2014)	1.3 (2014)
Chicago	8.6	13.3	1.25
Philadelphia	5.4	14.9	1.26
Baltimore	2.5	17.9	1.23
Boston	4.3	17.9	1.28
Seattle	3.3	18.6	1.26
Los Angeles, Long Beach, Santa Ana	13.2	19.3	1.37
Washington D.C.	4.6	19.5	1.32
San Francisco Bay Area	4.1	20.1	1.22
Dallas-Fort Worth	5.3	20.3	1.26
Atlanta	4.4	21.3	1.24
Houston	4.1	23.1	1.26

Source: Texas A&M Transportation Institute, *2012 Urban Mobility Report* (all regions except NYMTC).

NYMTC's peer regions evaluate mobility and congestion performance measures as part of their federally required CMPs; however, comparative performance measurement across regions is difficult given the many different measures and methodologies used to evaluate congestion. As a result, data from the Texas A&M Transportation Institute's Urban Mobility Report, an annual publication that assesses congestion in 101 urban areas across the country, was reviewed to provide a comparison of congestion to New York. Because congestion in the urban mobility report is estimated based on nationally available data, the comparison does not take into account any unique features of New York that do not show up in these data. Also, because the Urban Mobility report is calculated for metropolitan statistical areas (MSAs), the comparisons shown here include northern New Jersey and southwestern Connecticut.

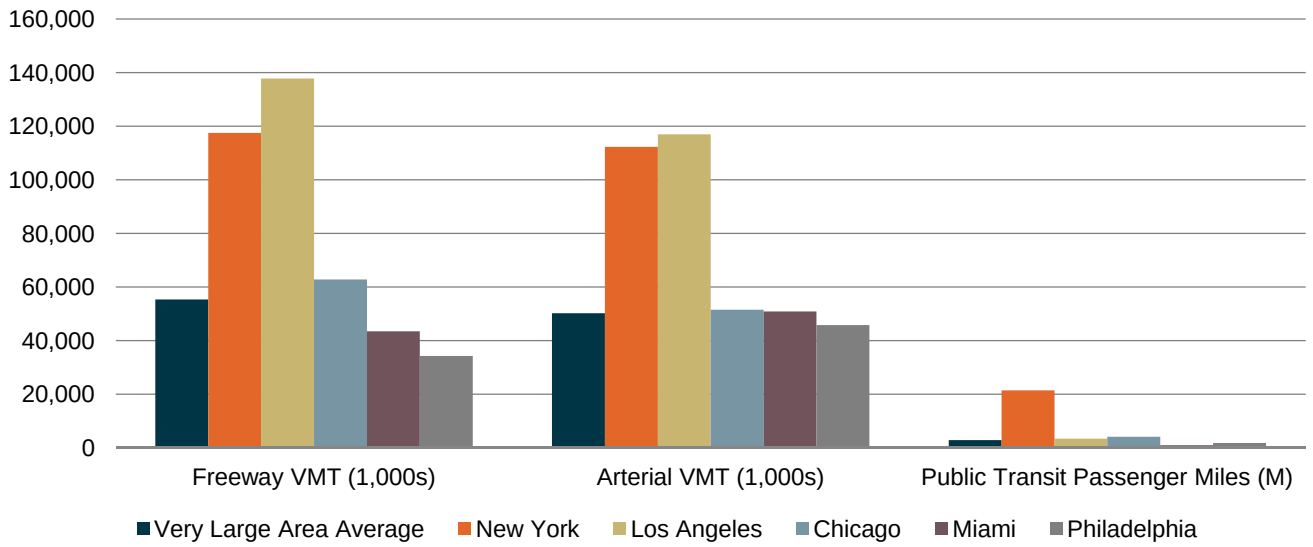
The comparisons are illuminating. The Urban Mobility Report provides estimates of travel, several metrics of overall congestion, plus specific analyses of the impacts of system operations and public transportation on congestion.

For the purposes of this analysis, we compared the New York metro area to other metropolitan areas in the 'very large' category, which includes MSAs with over 3 million residents. In 2011, there were 15 metro areas with over 3 million residents. All comparisons are for 2011.

Travel Estimates

In terms of total travel, only Los Angeles metro area exceeds the volume of travel experienced in New York and no other metro area comes close. The New York metro area has over 10 times the amount of public transit utilization as the average and more than 5 times the next closest, Chicago. Figure 5.1 presents the travel on freeways, arterials, and public transportation for the average of the very large areas and the top 5 travel markets.

Figure 2. Travel Volumes in New York and Comparable Metro Areas



Note: Very Large Area refers to a metropolitan statistical area with over three million residents.

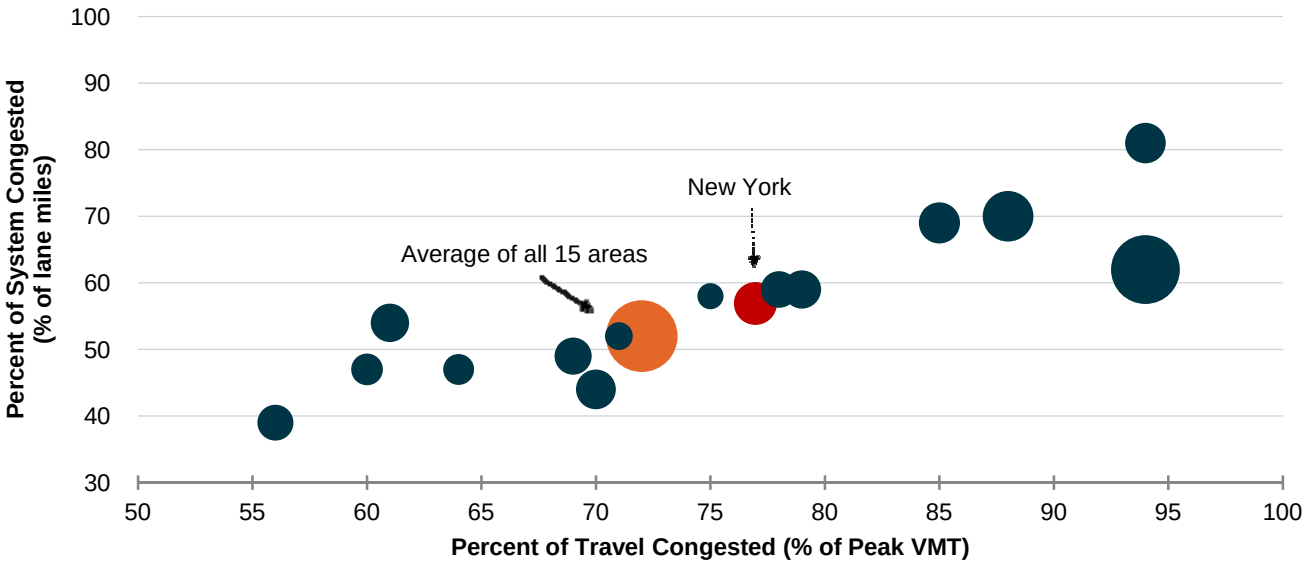
System Congestion

Figure 3 presents three indicators of total congestion for the 15 very large metropolitan areas:

- The percent of travel that is in congested conditions (x-axis);
- The percent of the system that is congested (y-axis); and
- Total delay (bubbles are sized based on total delay).

New York is shown in red and the average of all 15 areas is shown in orange. By percent of travel or system, New York is not the most congested area. However, because of the amount of travel, New York travelers experience the most delay (over 500 million hours per year), with only travelers in Los Angeles experiencing anything close to the level of delay.

Figure 3 Measures of Systemwide Congestion



Note: Bubbles are sized to total delay. New York is shown in red and the average of all 15 areas is shown in orange.

While total congestion is relevant for the overall economic and social impact that it has, travel time measured on a per person basis controls for the size and scale of the region. On a per person basis, commuters in the New York metropolitan region experience the fourth highest level of travel time per year according to the Urban Mobility Report data, with Washington, D.C., Los Angeles, and San Francisco metropolitan areas exceeding New York levels (Figure 4).

The extensive public transportation system in the New York metropolitan region is illustrated by the comparison of travel time index (TTI) and planning time index (PTI) (Figure 5). Where TTI is the ratio of travel time in the peak period to travel time at free-flow conditions. A Travel Time Index of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak period. The Planning Time Index is the ratio of travel time on the worst day of the month to travel time at free-flow conditions. A Planning Time Index of 1.80 indicates a traveler should plan for 36 minutes for a trip that takes 20 minutes in free-flow conditions (20 minutes x 1.80 = 36 minutes). The Planning Time Index is only computed for freeways only; it does not include arterial roadways. When a PTI is followed by a number, the number indicates a percentage of on-time arrival. PTI80, translates to the additional time required to ensure an on-time arrival 80 percent or 4 out of 5 times.

Figure 4 Per Capita Travel Time

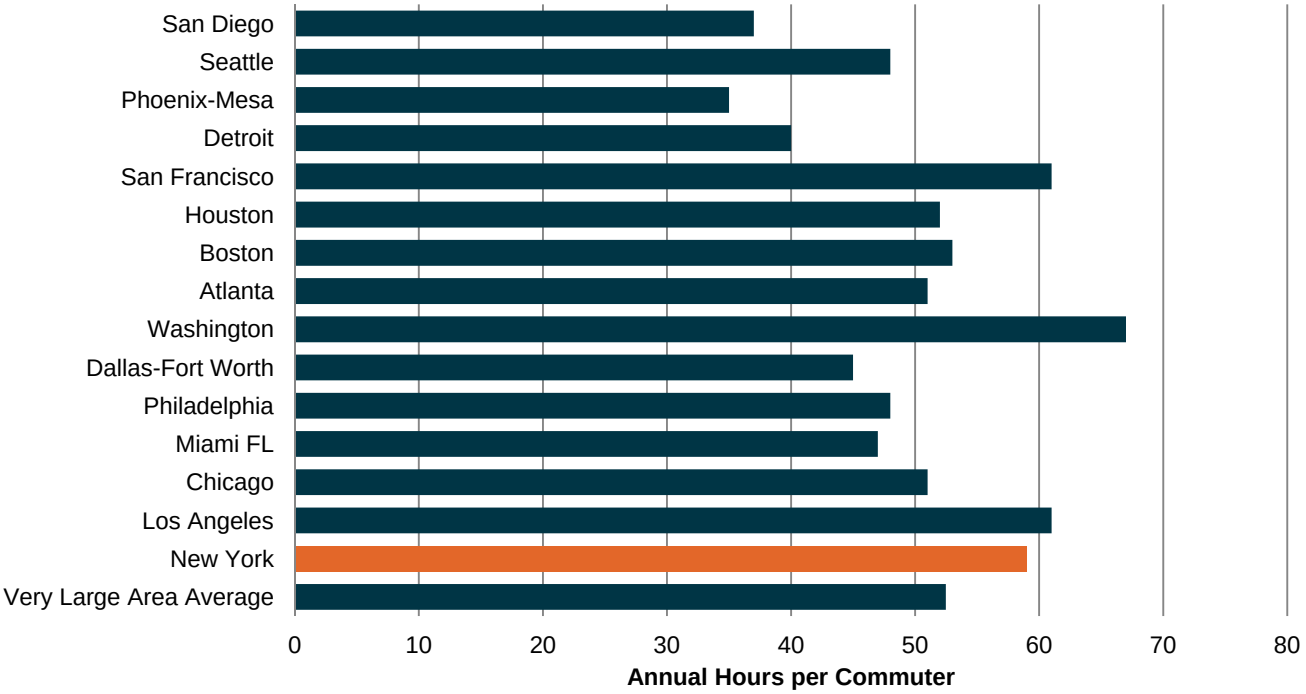
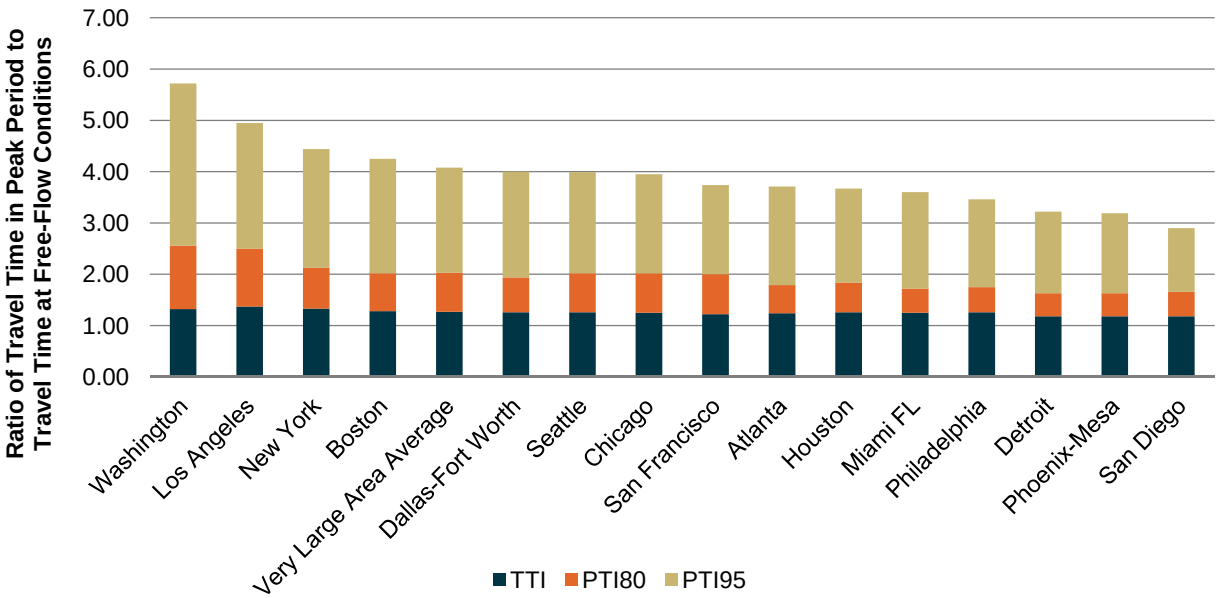


Figure 5 Comparison of Travel Time Indices Across U.S. Cities



Note: TTI is the ratio of travel time in the peak period to travel time at free-flow conditions. PTI is the ratio of travel time on the worst day of the month to travel time at free-flow conditions;

PTI80 translates to the additional time required to ensure an on-time arrival 80 percent or 4 out of 5 times. PTI95 translates to the additional time required to ensure an on-time arrival 95 percent.

DETAILED CONGESTION ANALYSIS

Three types of analyses were performed to forecast traffic congestion within the NYMTC planning area for the 2013 CMP Status Report:

The **regional-level** analysis was performed to assess traffic congestion and the performance of the transportation system on a regional scale. The CMP regional analysis allows a means for assessing the effectiveness of planned transportation improvements in addressing future traffic congestion.

The **county-level** analysis is a subset of the regional analysis, focusing on congestion and system performance in each county and facility group in NYMTC's planning area.

The **hot spot** analysis identifies bottleneck locations and congested areas within each of the 10 counties in the NYMTC region. A bottleneck is defined as a specific location that causes localized, point-source congestion on the regional transportation system. A bottleneck hot spot typically occurs due to physical capacity constraints or other characteristics that affect traffic flow, such as traffic control devices and weaving movements. The congested area is defined as an area consisting of a set of congested links in proximity or in sequence. Two criteria were used to identify the congested areas within each county, including:

- Demand-to-Capacity (D/C) ratios (greater than 0.8) as an initial screening process; and
- Visual inspection of corridors or areas that experience congestion defined by high D/C ratios.

Examples of other possible link scoring components could include severity, based on link average speed estimated by the post processor; and extent, the distance of an individual link.

Summary of Performance Measures

Tables 2 and 3 provide regional performance measures in the NYMTC planning area, by county, for the years 2014 and 2040. Table 4 provides a percentage difference of the two. The first two tables provide estimates by county and time period.

Lane miles of congestion appear to be consistently higher in the AM peak compared to the PM peak, across counties. This could be an indication of a sharp peak in the AM (e.g., significant traffic volumes in a single hour) compared to the PM, when volumes are spread more evenly across several hours. TTI estimates reflect the same pattern. The 2012 Urban Mobility Report provides some guidance for interpreting the values of the TTI. In the case of Very Large urban areas (greater than three million residents), the minimum TTI value for a portion of an hour to be considered congested is 1.12. The average commuter suffered 6 hours of congested road conditions on the average weekday. Queens has amongst the highest vehicle and highway person hours of delay, followed by Manhattan and Brooklyn. Queens' high estimate for LMC is likely due to several very congested roadways that pass through the borough, including the LIE, the BQE, the Van Wyck Expressway, and the Grand Central Parkway. However, the Long Island counties exhibit the highest levels of VMT.

Across counties, VHD per one thousand miles traveled increase marginally between 2014 and 2040, as does daily person hours of delay per capita. Putnam County, however, is forecast to double both measures between 2014 and 2040, likely a result of the large growth compared to the relatively small base.

Figures 6 through 8 represent modeled VHD, PHD, and VMT, at a county level, for years 2014 and 2040.

Table 2 2014 Regional Performance Measures

	LMC		TTI (Weighted by VMT)		VHD	VMT	PHD	Vehicle Hours of Delay per 1,000 Miles	Daily Person Hours of Delay per Capita	Daily VMT/ Capita
Facility Type	AM	PM	AM	PM	Daily	Daily	Daily	Daily	Daily	Daily
New York City Boroughs										
Bronx	360	60	1.4	1.1	219,060	10,636,250	324,210	20.6	0.23	7.63
Brooklyn	810	470	1.5	1.3	732,080	14,960,260	1,083,480	48.9	0.4	5.9
Manhattan	530	440	1.9	1.3	875,580	9,470,560	1,295,850	92.5	0.8	5.9
Queens	1,320	320	1.7	1.1	1,264,240	26,356,540	1,871,070	48.0	0.8	11.6
Staten Island	60	20	1.1	1.0	61,550	5,581,650	91,100	11.0	0.2	11.7
Suburban Counties										
Nassau	580	330	1.2	1.1	510,440	32,784,990	893,280	15.6	0.7	24.3
Suffolk	140	320	1.1	1.1	251,060	39,731,990	439,350	6.3	0.3	26.0
Putnam	60	20	1.0	1.0	23,290	6,026,010	33,530	3.9	0.3	58.3
Rockland	80	20	1.2	1.0	258,290	8,067,290	371,930	32.0	1.2	25.4
Westchester	190	150	1.1	1.1	200,080	23,328,850	288,120	8.6	0.3	24.1
Region										
NYMTC Planning Area	4,130	2,140	1.3	1.10	4,395,660	176,944,390	6,691,910	24.8	0.6	15.7

D/C = Demand to Capacity; LMC = Lane Miles of Congestion; TTI = Travel Time Index; ATS = Average Travel Speed; VHD = Vehicle Hours of Delay; PHD = Person Hours of Delay; VMT = Vehicle Miles Traveled

Note: D/C = average Demand to Capacity for the particular facility type and period. The “0.8<=DC<=1” and “D/C>1” are the percent of travel that occurs in various conditions (somewhat congested and very congested).

Table 3 2040 Regional Performance Measures

	LMC		TTI (Weighted by VMT)		VHD	VMT	PHD	Vehicle Hours of Delay per 1,000 Miles	Daily Person Hours of Delay per Capita	Daily VMT/ Capita
Facility Type	**AM**	**PM**	**AM**	**PM**	**Daily**	**Daily**	**Daily**	**Daily**	**Daily**	**Daily**
New York City Boroughs										
Bronx	414	84	1.4	1.1	281,219	11,397,786	416,203.8	24.7	0.3	7.6
Brooklyn	1,006	536	1.7	1.3	959,497	16,225,594	1,420,056	59.1	0.5	5.8
Manhattan	594	587	2.1	1.4	1,164,879	10,702,575	1,724,021	108.8	0.9	5.8
Queens	1,498	393	1.8	1.1	1,670,197	28,011,559	2,471,892	59.6	0.9	10.6
Staten Island	91	54	1.1	1.1	126,574	6,319,429	187,330	20.0	0.3	11.4
Suburban Counties										
Nassau	747	441	1.2	1.1	697,930	34,553,560	1,221,378	20.2	0.8	22.7
Suffolk	255	460	1.1	1.1	374,847	45,453,222	655,982	8.2	0.4	25.4
Putnam	167	34	1.1	1.0	67,415	8,198,783	97,078	8.2	0.7	62.1
Rockland	195	68	1.3	1.1	454,119	10,055,092	653,931	45.2	1.8	27.7
Westchester	331	363	1.1	1.1	317,228	27,840,339	456,809	11.4	0.4	24.6
Region										
NYMTC Region	5,299	3,021	1.3	1.12	6,113,906	198,757,939	9,304,681	30.8	0.7	15.9

D/C = Demand to Capacity; LMC = Lane Miles of Congestion; TTI = Travel Time Index; ATS = Average Travel Speed; VHD = Vehicle Hours of Delay; PHD = Person Hours of Delay; VMT = Vehicle Miles Traveled

Note: D/C = average Demand to Capacity for the particular facility type and period. The “0.8<=DC<=1” and “D/C>1” are the percent of travel that occurs in various conditions (somewhat congested and very congested).

Table 4 Percentage Difference between 2040 and 2014 Regional Performance Measures

	LMC		TTI (Weighted by VMT)		VHD	VMT	PHD	Vehicle Hours of Delay per 1,000 Miles	Daily Person Hours of Delay per Capita	Daily VMT/ Capita
Facility Type	**AM**	**PM**	**AM**	**PM**	**Daily**	**Daily**	**Daily**	**Daily**	**Daily**	**Daily**
New York City Boroughs										
Bronx	13.9%	33.3%	4.4%	0.7%	28.4%	7.2%	28.4%	19.8%	18.9%	-0.7%
Brooklyn	24.7%	14.9%	7.1%	3.0%	31.1%	8.5%	31.1%	20.8%	18.1%	-2.2%
Manhattan	11.3%	34.1%	11.1%	2.5%	33.0%	13.0%	33.0%	17.7%	16.1%	-1.3%
Queens	13.6%	21.9%	6.9%	2.0%	32.1%	6.3%	32.1%	24.3%	13.7%	-8.5%
Staten Island	50.0%	150.0%	2.7%	3.0%	105.6%	13.2%	105.6%	81.6%	77.9%	-2.0%
Suburban Counties										
Nassau	29.3%	33.3%	3.8%	2.9%	36.7%	5.4%	36.7%	29.7%	21.1%	-6.6%
Suffolk	85.7%	43.8%	1.0%	0.7%	49.3%	14.4%	49.3%	30.5%	27.7%	-2.2%
Putnam	183.3%	50.0%	6.0%	0.4%	189.5%	36.1%	189.5%	112.8%	126.8%	6.6%
Rockland	150.0%	250.0%	7.9%	1.7%	75.8%	24.6%	75.8%	41.1%	53.8%	9.1%
Westchester	73.7%	140.0%	2.6%	2.7%	58.6%	19.3%	58.5%	32.9%	35.2%	1.7%
Region										
NYMTC Region	28.3%	41.1%	4.4%	1.8%	39.1%	12.3%	39.0%	23.8%	25.5%	1.4%

D/C = Demand to Capacity; LMC = Lane Miles of Congestion; TTI = Travel Time Index; ATS = Average Travel Speed; VHD = Vehicle Hours of Delay; PHD = Person Hours of Delay; VMT = Vehicle Miles Traveled

Note: D/C = average Demand to Capacity for the particular facility type and period. The “0.8<=DC<=1” and “D/C>1” are the percent of travel that occurs in various conditions (somewhat congested and very congested).

Figure 6 NYMTC Planning Area Daily Vehicle Hours of Delay by County

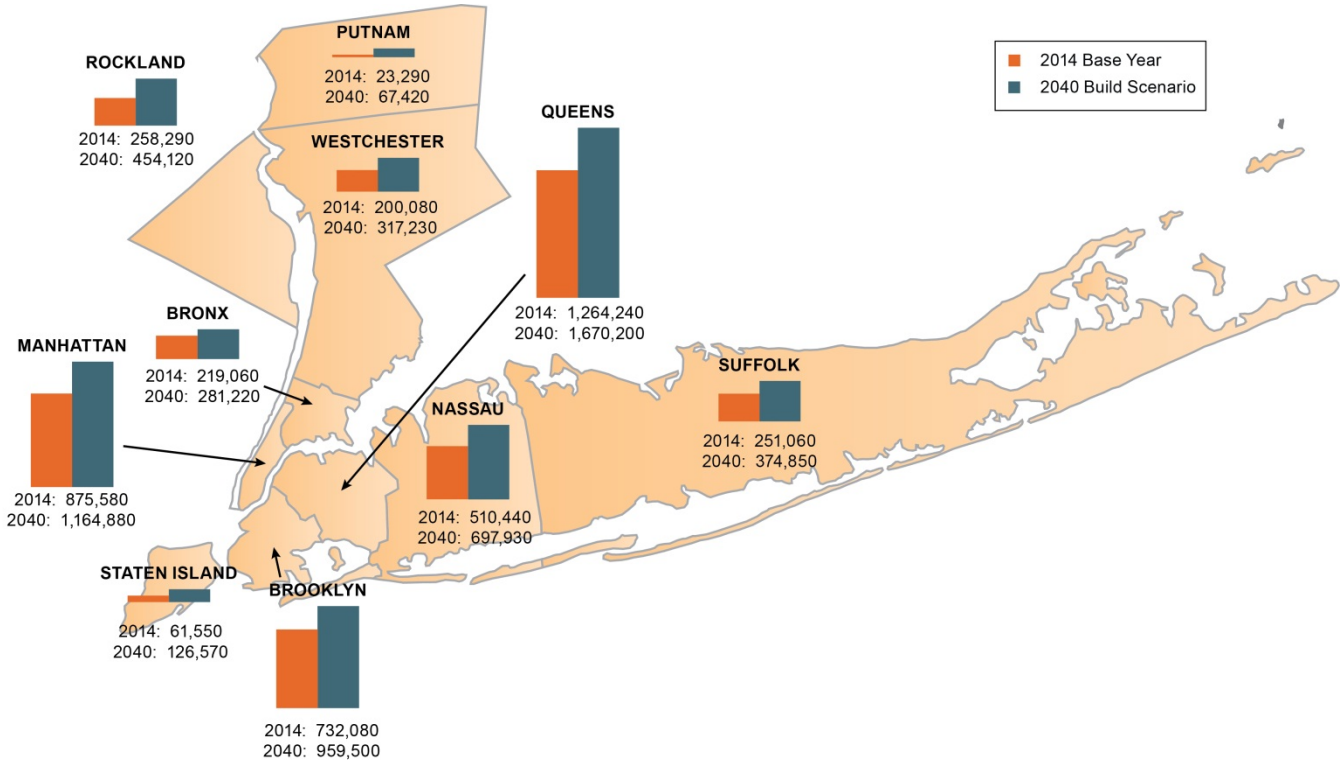


Figure 7 NYMTC Planning Area Daily Person Hours of Delay by County

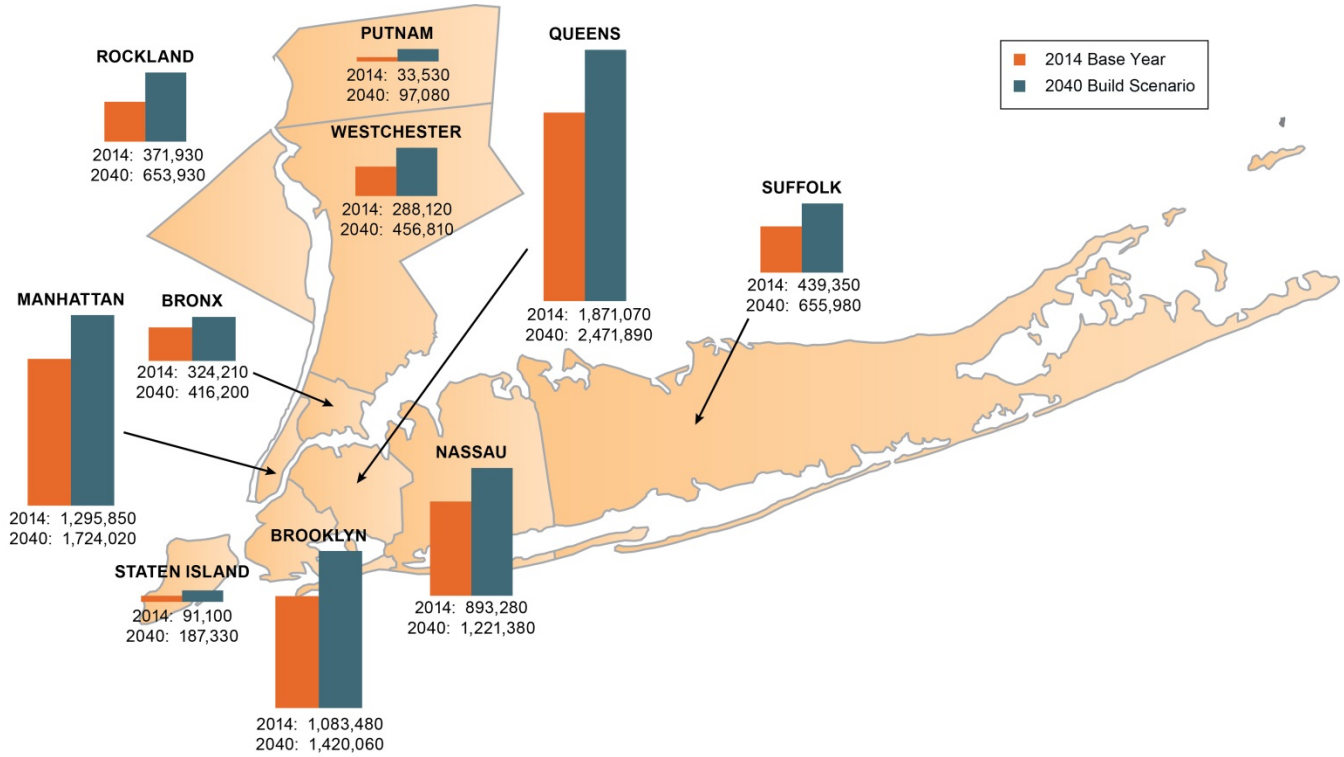
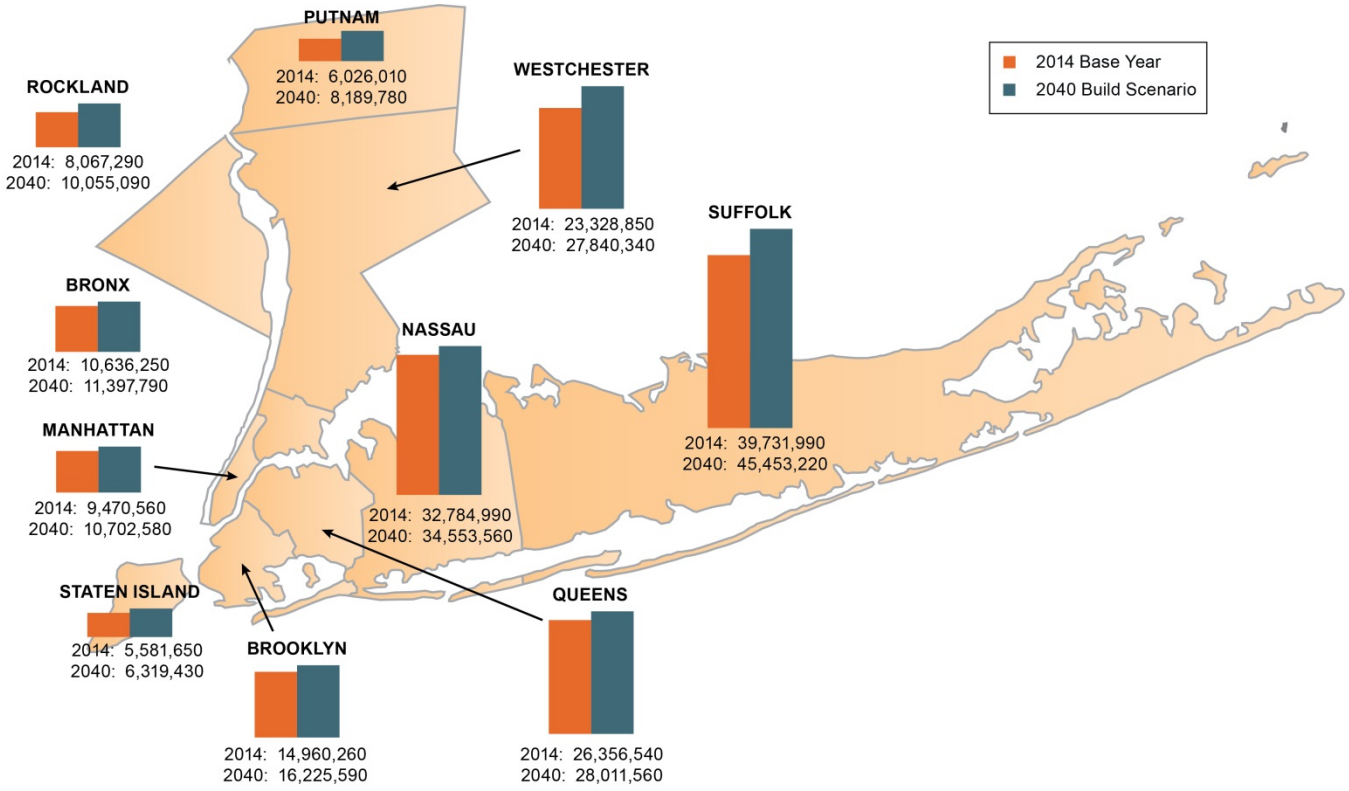


Figure 8 NYMTC Planning Area Daily Vehicle Miles Traveled by County



Critically Congested Roadway Corridors in 2040

Figures 9 through 11 present the top congested corridors in the three subareas of NYMTC's planning area based on the most significantly congested corridors. The methodology adopted to identify these corridors is based on four factors - importance, magnitude, intensity, and consistency of congested conditions.

Figure 9 Top Congested Corridors

New York City

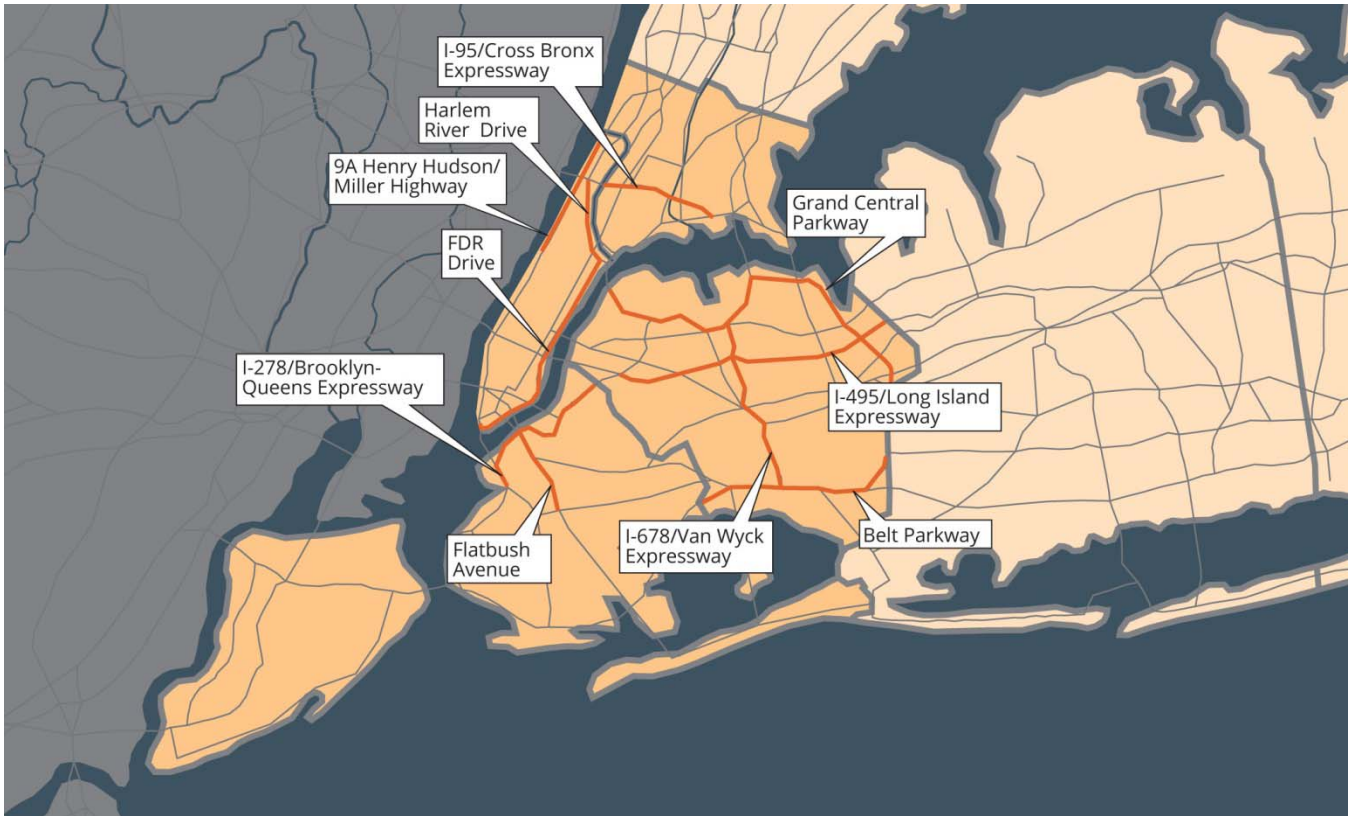
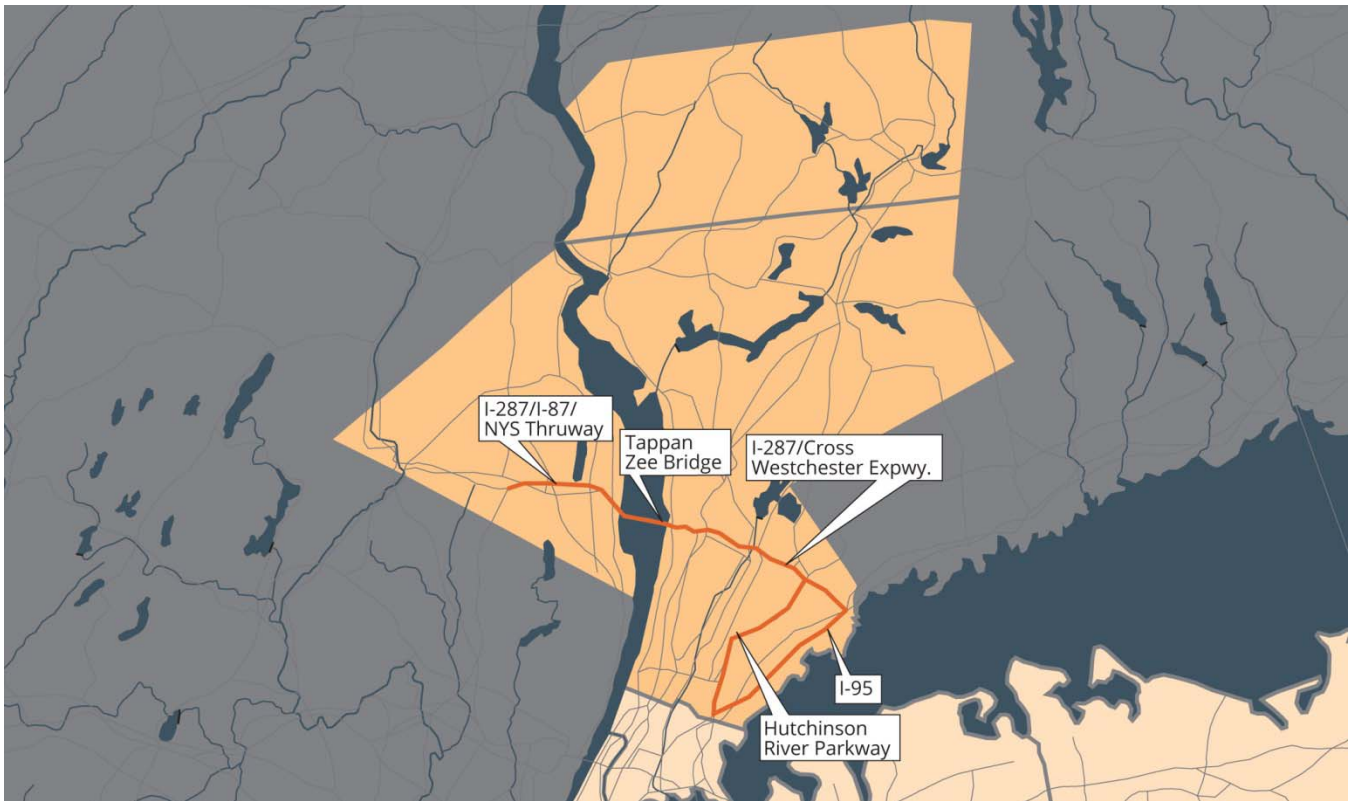


Figure 10 Top Congested Corridors
Long Island

Figure 11 Top Congested Corridors
Lower Hudson Valley



CONGESTION MANAGEMENT STRATEGIES

This section provides an overview of potential strategies for facilitating the movement of people and goods by alleviating congestion in the NYMTC planning area, consistent with the goals outlined in NYMTC's Plan 2040. As part of the CMP, Federal regulations require MPO in transportation management areas to identify potential strategies to reduce congestion and evaluate the expected effectiveness of those strategies in improving the efficiency and safety of existing and future transportation systems. Moreover, because NYMTC's planning area is part of air quality nonattainment areas designated by the Clear Air Act Amendments of 1990, the use of Federal funds for the expansion of the transportation system's capacity to move single-occupancy vehicles (SOV) is precluded unless it is documented that travel demand reduction and operational management strategies cannot fully satisfy the need for the additional capacity.

Recognizing a wide range of strategies are available to address mobility challenges, NYMTC has developed a CMP Toolbox of strategies for use in planning congestion-reduction measures around the region. The CMP Toolbox is divided into nine categories of congestion management strategies:

1. **Transportation Demand Management Strategies –** The objective of demand management strategies is to influence travel behavior for both commute and noncommute trips. Subcategories of Transportation Demand Management strategies include:

   - Alternative Commute Programs – Promotes alternatives to single-occupancy commuter travel through employer-based programs or other regional initiatives.

   - Pricing/Managed Facilities – Imposes restrictions or fees for the use of specific lanes/roadways with the common goal of reducing the amount of single-occupancy vehicles.

2. **Transportation System Management and Operations Strategies (TSM&O) –** Operational management strategies contribute to a more effective and efficient use of existing systems. Many of these operations-based strategies are supported by the use of enhanced technologies or Intelligent Transportation Systems (ITS). TSM strategies were exclusively used as solutions for improving roadway congestion. However, with a growing population in the outer boroughs of New York City that requires access to Manhattan's central business district and declining federal and state investment in the transportation network. TSM strategies are becoming increasingly applicable to improving transit capacity and efficiency, as indicated in Plan 2040. The NYMTC RTP breaks down TSM strategies into seven categories, which are individually detailed as part of the CMP Toolbox Strategies (Appendix A). The strategies include, Intelligent Transportation Systems, Traveler Information, Incident Management, Work Zone Management, Access Management, Congestion Pricing, and Active Transit and Traffic management. The toolbox further subcategorizes TSM&O strategies as follows:

   - Highway/Freeway Operations – Strategies to increase throughput and alleviate the causes of recurring and nonrecurring congestion.

   - Arterial and Local Roads Operations – Strategies to improve traffic flow through the existing network of local roads and intersections.

   - Other Operations Strategies – General operations strategies that can be applied on a regional scale.

3. **Transit Strategies –** Strategies aimed at making transit more attractive or accessible can help to reduce the number of vehicles on the road. Transit strategies commonly supplement the demand management and TSM&O strategies described above. The CMP Toolbox includes the following subcategories of transit strategies:

- Fare Strategies – Encourages additional transit use through fare policies, employer-based incentive programs, or universal farecards/payment systems.

- Operations Strategies – Includes service adjustments to better align transit service with ridership markets. Similar to traffic operations, ITS features often enhance transit operations as well.

- Capacity Strategies – Expands transit coverage and/or frequencies to make transit more accessible and attractive to use.

4. **Accessibility Strategies –** Improves access to transit facilities by both auto and nonauto travel modes.

5. **Bicycle and Pedestrian Strategies –** Strategies that promote nonmotorized travel through the provision of safer bicycle and pedestrian-oriented facilities and amenities.

6. **Access Management Strategies –** Includes policies, facilities, and design criteria that minimize the number of driveways and intersecting roads accessing a main thoroughfare.

7. **Land Use Strategies –** Policies to support/encourage mixed-use development, transit-oriented design, and incentives for high-density development.

8. **Parking Strategies –** Strategies to manage the availability and cost of parking and promote access to transit.

9. **Regulatory Strategies –** Closely tied to the strategies described above, regulatory strategies restrict vehicle movements or enforce congestion-management policies.

10. **Road Capacity Strategies –** Addresses improvements to specific bottlenecks (such as interchanges and intersections), as well as the need for more base capacity to the existing road network when all of the other congestion-reduction strategies described above cannot fully satisfy demand.

Descriptions of specific strategies within each of these nine categories are included in Appendix A of the CMP Status Report, including a qualitative assessment of congestion and mobility benefits, costs and impacts, and implementation timeframe. Also included in Appendix A are existing TSM and TDM strategies in the NY Region, as reported in Plan 2040. Additionally, NYMTC's Plan 2040 includes a number of system enhancement projects that will help to alleviate congestion in the NYMTC planning area. A list of these projects is also found in Appendix A.