TECHNICAL MEMO

NYMTC Regional Freight Plan Update 2015-2040 Interim Plan

Task 2.1.1
Highway Network and Infrastructure

NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL

REVISED, JANUARY 2014

technical memorandum

Task 2.1.1 Technical Memorandum

Highway Network and Infrastructure

Revised, January 30, 2014

Table of Contents

List of Tables

List of Figures

1.0 Introduction

Freight in the 10-county NYMTC region is carried predominantly by truck, as pointed out in the 2004 *NYMTC Regional Freight Plan*, and confirmed in the Draft Commodity Flow Analysis prepared for the NYMTC Regional Freight Plan Update 2015-2040 Interim Plan. While nationally in the year 2010 (according to USDOT's Freight Analysis Framework, version 3.4 database), about 30 percent of freight tonnage in the United States was carried by modes other than truck (predominantly waterborne and rail), less than 15 percent of freight tonnage in the NYMTC region is carried by modes other than truck, including rail, air, and waterborne modes. The relatively low rail mode share can be attributed in part to limited freight rail connections, especially to geographic Long Island, and over a century of development of rail terminals in northern New Jersey designed to serve New York City and Long Island using rail-to-barge carfloats. By the middle of the 20th Century, trucking became a faster and cheaper mode of shipping goods across the region's waterways.

Consequently, the highway system in the region is crucial to the efficient movement of freight into, out of, through, and within the region. Further, the efficient operation in the face of chronic congestion in many parts of the network and maintenance of a state of good repair on this network is vital to the region's economy. The fact that there are many limited-access highways in the region barred to trucks or with size and weight limits more restrictive than federal standards, makes freight access to, and travel within, the region even more difficult.

This memorandum identifies (to the best extent possible using available data):

- The Strategic Freight Highways carrying the highest volumes of truck traffic into, out of, and within the Region, and providing linkages to key freight-generating and freight-handling facilities throughout the Region,
- The existing conditions on the Strategic Freight Highways, with regard to:
    - Volume of truck traffic on these roadways,
    - The levels of congestion on these roadways which impede the efficient movement of trucks within and through the region,
    - The current condition of pavement and bridges on these roadways; and
- Key capacity, physical constraints, system redundancy, and regulatory issues and challenges.

2.0 NYMTC Freight Highway Network

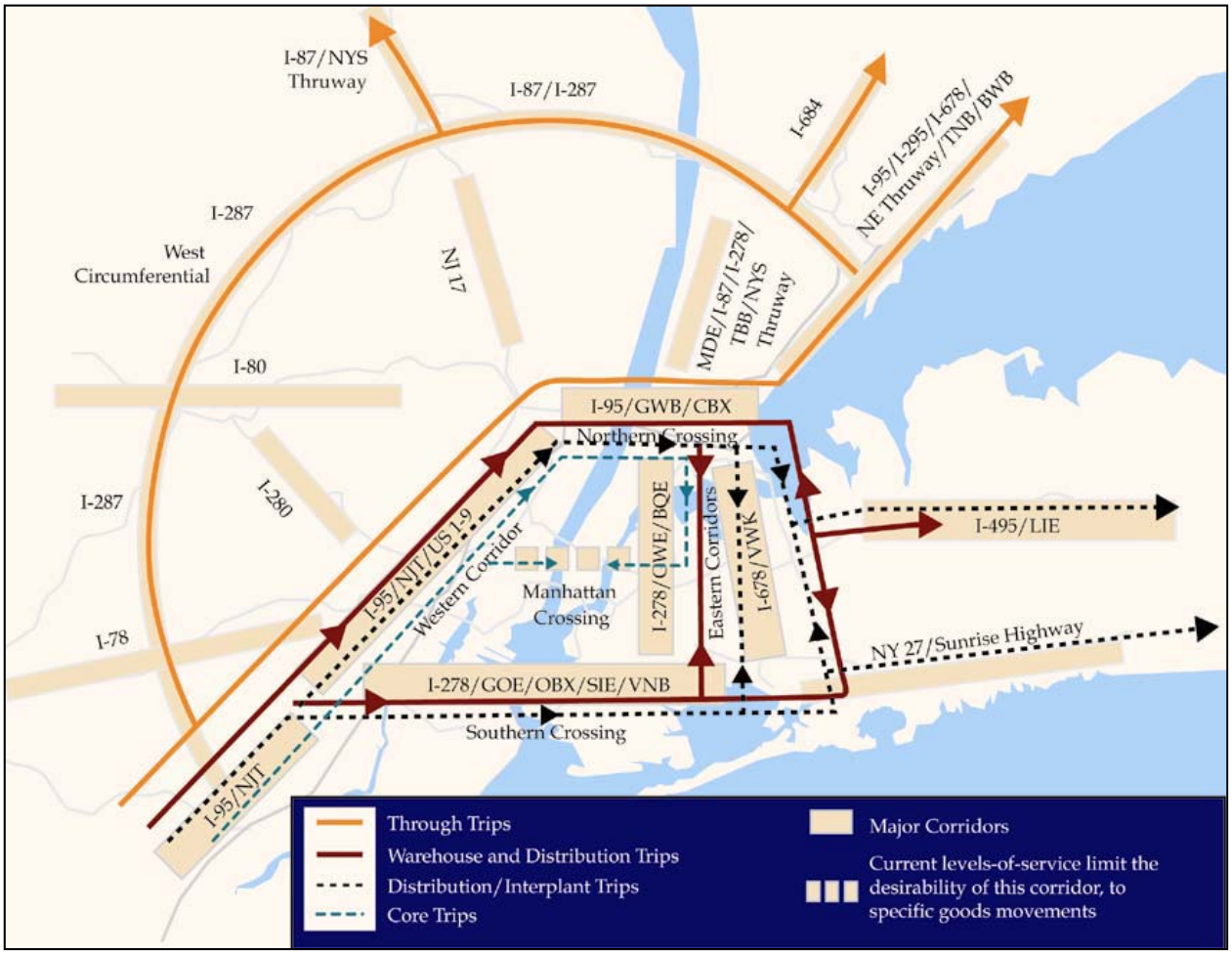
2.1 NYMTC's Core Freight Network

In 2007, the NYMTC Region's freight network moved 405 million tons of the goods needed to keep the country's largest regional economic powerhouse running. With trucks carrying 91 percent[1] of all freight in the region, congestion and physical barriers on the region's highway system represent a major obstacle to the efficient movement of freight. Given the physical and operational constraints in the region's rail corridors and market characteristics, significantly greater freight movement by rail is not currently a viable alternative to roadway transport. The greatest number of freight trips on the highway system occurs around the region's core freight network as displayed in Figure 2.1, which schematically shows freight corridors in the region by trip purpose as follows:

- Core trips,
- Distribution and Warehouse trips,
- Interplant/Distribution trips, and
- Through trips.

[1] NYMTC, "Task 2.2.1 Draft Commodity Flow Analysis," Regional Freight Plan Update 2015-2040 Interim Plan, Revised, January 17, 2014.

Figure 2.1 NYMTC's Core Network



Source: NYMTC Regional Freight Plan, 2004

The five corridors described below serve as the primary routes into, out of, and through the NYMTC Region. The trip purposes described were determined based upon a select link analysis, in which the TRANSEARCH commodity flow database was assigned to the NYMTC Best Practices Model (BPM) highway network. The prevalence of through traffic, origin-destination traffic, and the specific types of commodities assigned to each of these corridors provided an indication of the types of freight trips that are likely to use the highways that compose each corridor.

- The Northern Crossing corridor (I-95), consisting of the George Washington Bridge, Cross Bronx Expressway, and Major Deegan Expressway. The Northern Crossing is a major east-west freight corridor in the region and provides access for core trips within the region and through trips traveling from locations south and west of the NYMTC region to New England in the north. Additionally, the Northern Crossing

is a critical gateway for secondary traffic, a commodity group consisting of consumer products moving to or from a warehouse or distribution center, much of which originates in New Jersey. The Northern Crossing (as shown in Figure 2.2).

- The Southern Crossing corridor (I-278), consisting of the Goethals Bridge, Outerbridge Crossing, Staten Island Expressway, and Verrazano Narrows Bridge. The Southern Crossing is the other major east-west freight crossing that parallels the Northern Crossing. Primarily, Southern Crossing freight activity consists of warehousing, distribution, and interplant trips within the NYMTC region. Additionally, it is the primary gateway to destinations in Staten Island and Brooklyn.
- The Eastern (I-278) Corridor, consisting of the Gowanus and Brooklyn/Queens Expressways (I-278) and the Van Wyck and Clearview Expressways (I-678), north-south connections between the Northern and Southern Crossings. Interstate 678 provides direct access to JFK International Airport. Freight trips using the Eastern Corridor primarily consist of regional warehouse and distribution and interplant trips.
- The Western (I-95) Corridor, consisting of the New Jersey Turnpike and US 1-9, is the major north-south freight spine that services the region. The Western Corridor services all four freight trip purposes and is a major conduit to feeding the Northern and Southern Crossings. With direct links to major interstate freight corridors, such as I-287, I-78, I-280, and I-80, and Port Elizabeth and Port Newark, the Western Corridor is a major freight asset that distributes commerce throughout and beyond the NYMTC region.
- The Circumferential (I-287) Corridor, consisting of Interstate 287 between I-95 near Rye, NY and the New Jersey Turnpike in Woodbridge Township, NJ, provides a route around the urban core of the region for through traffic, and facilitates access for inbound and outbound trips to or from Upstate New York via the New York State Thruway or to points west and south via Interstates 80 and 78.

2.1.1 Identification of Strategic Freight Highways

A subset of the Region's highway network, identified as "Strategic Freight Highways," is of particular importance to freight. Strategic Freight Highways are highways that serve as major freight gateways into and out of the Region, connect the Region to major freight-generating facilities such as seaports and rail intermodal terminals in New Jersey, and connect major industrial clusters to the Interstate Highway System. In addition, several strategic routes in New York City were used to convey equipment and supplies to assist in the relief and recovery effort in the aftermath of Superstorm Sandy in 2012.

The Strategic Freight Highway network therefore consists of the components of the five corridors described previously, links to freight-generating facilities such

as manufacturing and resource-extraction facilities, links to freight-handling facilities such as intermodal terminals and warehouses/distribution centers, and routes that can accommodate large and heavy loads to support emergency response. Components of the Strategic Freight Highway network include four classifications of highways, which are described in detail below:

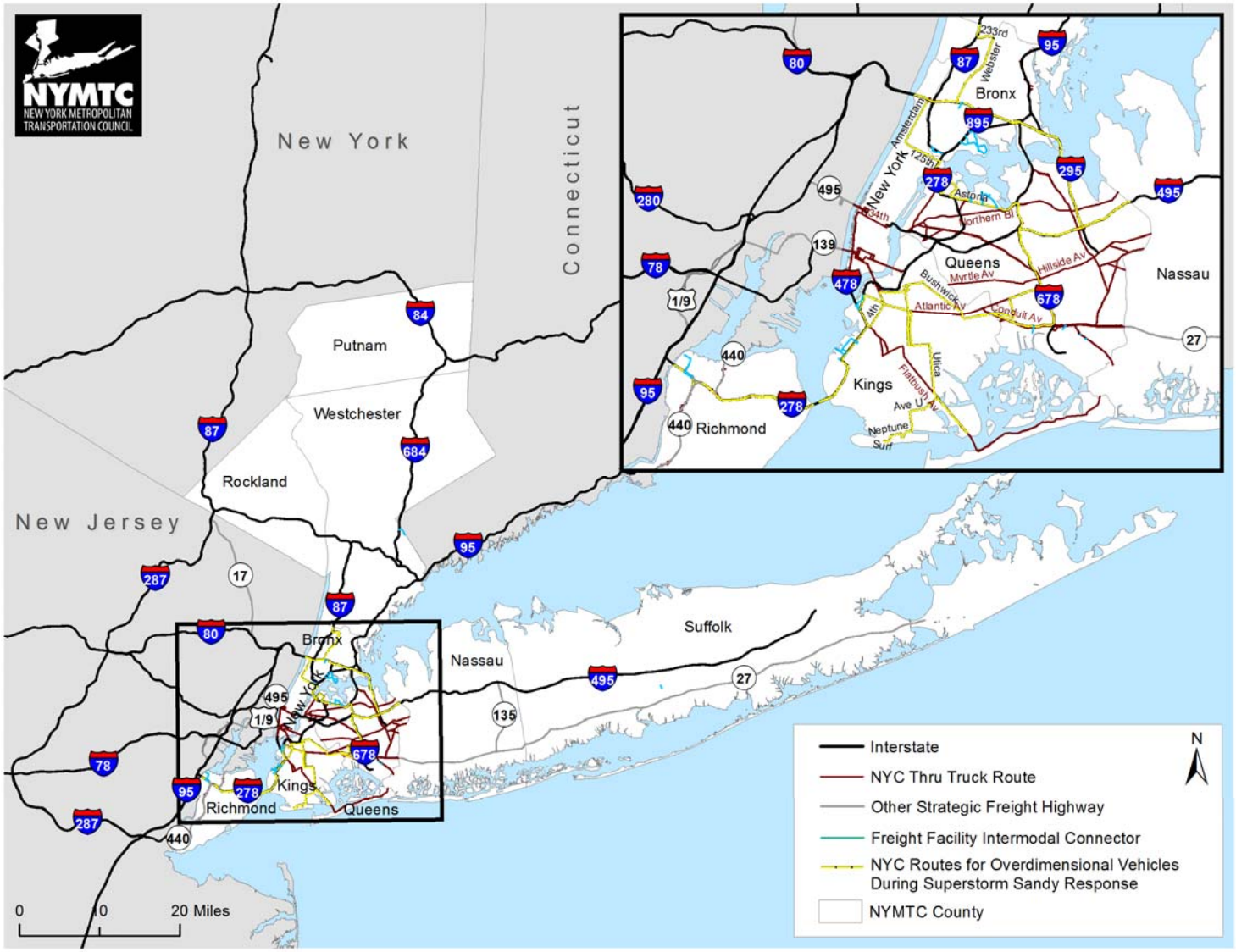
1. The Interstate Highway System in and surrounding the NYMTC Region serves as the primary gateway through which trucks enter and exit the Region, and complete inter-county trips within the Region;
2. Other Strategic Freight Highways. State highways throughout the NYMTC Region, which carry Interstate-type levels of truck traffic, and state highways outside the NYMTC Region that provide connections to key freight facilities, such as:
    a. Hudson River crossings into Manhattan;
    b. Port Newark/Port Elizabeth in New Jersey;
    c. Newark Liberty International Airport in New Jersey;
    d. Rail intermodal yards, including Croxton, Little Ferry, North Bergen, and South Kearny in New Jersey.
3. The New York City Through Truck Route System[2] as designated by the New York City Department of Transportation, which are allowable routes for inter-county truck trips (note that Interstate Highways within New York City are part of this system); and
4. Designated Intermodal Connectors serving freight facilities, such as those connecting the industrial portions of the South Brooklyn waterfront to Interstate 278.
5. Overdimensional Emergency Response Routes, which were used to help with relief efforts, including movement of generators and other equipment, delivery of food and supplies, and debris removal.

Figure 2.2 illustrates the Strategic Freight Highway network within and surrounding the NYMTC Region.

[2] New York City's comprehensive Truck Route Network is published in a map format making it easier for drivers to locate specific streets and intersections. The map also contains helpful information on truck route signage, weight limits and dimensions; overweight/over dimensional permitting and truck related violations as well as City, regional and state truck-related resources. Accessed at

http://www.nyc.gov/html/dot/downloads/pdf/2011_truck_route_map.pdf.

Figure 2.2 Strategic Freight Highway Network, NYMTC Region and Surrounding Areas



Interstate Highway System

I -95, I-87, I -78, I-278, I-295, I-495, and I-678 are the interstate highway facilities that connect the region to the rest of the nation. The following summarizes the functional operation of the interstate and other strategic highway facilities within the NYMTC region.

I-87 connects The Bronx to the Robert F. Kennedy (formerly Triborough) Bridge in New York City and extends north to the Canadian border. The portion of I-87 from the New York City line to Albany is part of the New York State Thruway mainline. I-87 is the primary interstate highway connection between the NYMTC Region and points north. Along its route within the Region, I-87 runs concurrently with I-287 between White Plains in Westchester County and Suffern in Rockland County.

I-95 extends from the Canadian border at Houlton, Maine to South Florida. Within the NYMTC Region, I-95 extends from the Connecticut state line at Port Chester in Westchester County to the George Washington Bridge as it crosses the Hudson River. It passes through New York City on the Trans-Manhattan and Cross Bronx Expressways. The portion of I-95 from the Connecticut state line to the Pelham Parkway in the Bronx is known as the New England Thruway. I-95 is the NYMTC Region's primary connection to points in southern New England, to New Jersey, and points south and west.

I-78 connects Port Newark, Port Elizabeth, and Newark International Airport in New Jersey to Lower Manhattan, crossing the Hudson River from New Jersey via the Holland Tunnel and ends at the tunnel plaza in Lower Manhattan.

I-278 connects New Jersey to New York by way of the Goethals Bridge over the Arthur Kill at Staten Island. It passes through four of the five boroughs of New York City, and briefly enters the fifth, Manhattan, while crossing the Robert F. Kennedy (RFK) (formerly Triborough) Bridge. Segments of I-278 include the Staten Island Expressway in Richmond County, Verrazano-Narrows Bridge between Richmond and Kings counties, Gowanus Expressway in Kings County, Brooklyn-Queens Expressway in Kings and Queens counties, RFK Bridge between Queens, New York, and Bronx counties, and Bruckner Expressway in Bronx County. Major freight generating facilities located in proximity to I-278 include the New York Container Terminal, 65th Street Yard, Brooklyn Army Terminal, South Brooklyn Marine Terminal, Red Hook Container Terminal, Brooklyn Navy Yard, industrial clusters along Newtown and Bushwick creeks, and the Hunts Point Food Distribution Center, consisting of the Hunts Point Cooperative Market and Fulton Fish Market at Hunts Point.

I-287 crosses the New Jersey border into New York near Suffern and heads southeast across Rockland and Westchester counties to I-95 in Rye. Most of I-287 in Rockland County overlaps with I-87 and all of I-287 east of Suffern is part of

the New York State Thruway system. I-287 passes within proximity of several commercial clusters in Westchester and Rockland counties, and municipal solid waste transfer stations and a quarry in Rockland County.

I-295 runs from the Bruckner Interchange in the Bronx to the Grand Central Parkway in Queens. It crosses the East River by way of the tolled Throgs Neck Bridge and connects Long Island to the Bronx. As the easternmost connection off of Long Island and due to its proximity to both the Cross Bronx Expressway and the New England Thruway, it is the preferred route from Long Island to New Jersey and upstate New York via the George Washington Bridge, and Connecticut and other points north and east via I-95.

I-495 extends across Long Island from the western portal of the Queens Midtown Tunnel in New York County to Riverhead, Suffolk County. The portion of I-495 in Nassau and Suffolk counties is known as the Long Island Expressway (LIE). The section of the route west of the Nassau–Queens county line is also named the Queens–Midtown Expressway west of Queens Boulevard and the Horace Harding Expressway east of Queens Boulevard.

I-678 runs within Queens and Bronx counties. It connects the John F. Kennedy International Airport to Interstate 95 via the Van Wyck Expressway, Bronx-Whitestone Bridge, and Hutchinson Expressway. I-678 also interchanges with NY Route 27, Interstate 495 (Long Island Expressway), and I-295.

Other Strategic Freight Highways

Other Strategic Freight Highways are state highways that are significant freight carriers in the region, as well as providing connections to the interstate system. Among them are NY 27, NY 135, NY 440, US 1, NJ 17, NJ 139, and NJ 495.

NY 27 is an east–west state highway extending from I-278 in Brooklyn to Montauk Point State Park in Suffolk County. The segments of NY 27 that carry the highest truck volumes stretch from Linden Boulevard in Kings County to the eastern terminus of Sunrise Highway in the Town of Southampton, Suffolk County. NY 27 acts as the primary east–west highway on southern Long Island, and links JFK Airport and numerous commercial districts in the South Shore of Long Island to suppliers and distribution centers in other parts of the Region and beyond. NY 27 interchanges with Interstate 678 in Queens County and NY 135 in North Wantagh, Nassau County.

NY 135, also known as the Seaford-Oyster Bay Expressway, is a north-south highway in the eastern portion of Nassau County. The NY 135 route designation extends from its interchange with NY 25 (Jericho Turnpike) in Syosset, to its interchange with Merrick Road in Seaford. For freight, NY 135 provides an important link between NY 27 on Long Island's South Shore, and the Long Island Expressway, and therefore this segment of NY 135 is included in the Strategic Freight Highways network.

NY 440 traverses Richmond County (Staten Island) via the Martin Luther King, Jr. Expressway, the West Shore Expressway, and the segment of the Staten Island Expressway between the Martin Luther King, Jr. Expressway and West Shore Expressway. NY 440 connects Staten Island to New Jersey via the Bayonne Bridge and the Outerbridge Crossing. NY 440 is the only major north-south route on Staten Island that is designated as a through truck route by NYCDOT. NY 440 also provides connections to New Jersey and, via the Staten Island Expressway and Verrazano-Narrows Bridge, to the rest of the NYMTC Region for Staten Island shippers and receivers.

US-1 extends from the George Washington Bridge in Manhattan to the Connecticut state line at Port Chester. It closely parallels I-95 and serves as a major truck route. To the south, in New Jersey, US 1 and US 9 become concurrent upon merging in Woodbridge Township and continue through developed areas, interchanging with Route 35. US 1/9 passes through Rahway and Linden, interchanging with I-278 in Linden. The road continues into urban Elizabeth turning into a freeway prior to meeting Route 81 near Newark Liberty International Airport. US 1/9 continues along the west end of the airport into Newark, Essex County, reaching the Newark Airport Interchange with I-78, US 22, and Route 21.

NJ 139 is a 2.5-mile highway connecting US 1/9 in Jersey City to the Holland Tunnel. Although vehicles with more than three axles and tractor-trailer combination vehicles are prohibited from using the Holland Tunnel, this route is an important connection for commercial vans and small box trucks traveling into and out of New York City.

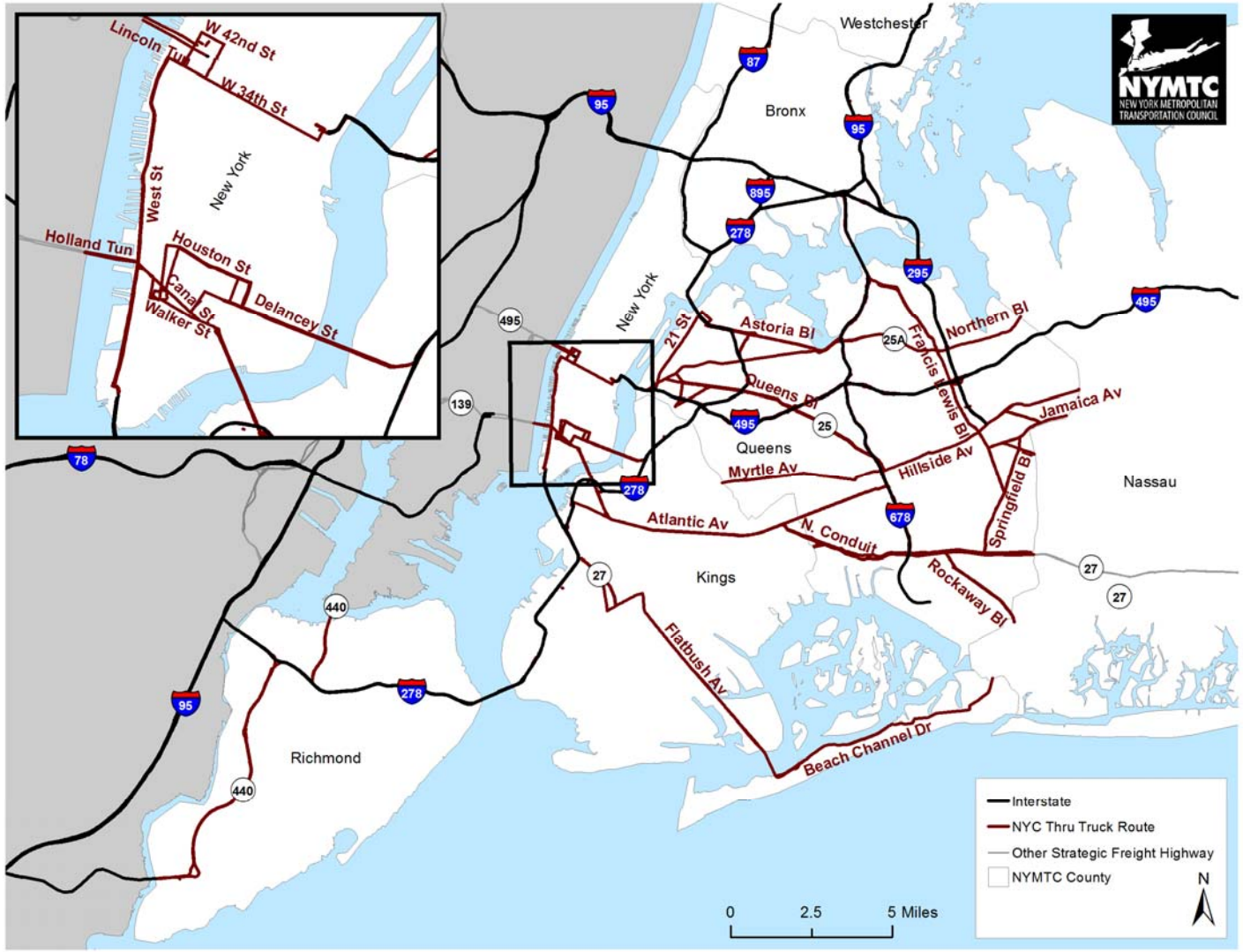
NJ 495 is a 3.5-mile limited-access highway connecting the New Jersey Turnpike and US 1/9 and NJ 3 in Secaucus and North Bergen, respectively, to the Lincoln Tunnel.

NJ 17 forms the significant part of a major route from the George Washington Bridge, Lincoln Tunnel and other northeast New Jersey points to the New York State Thruway at Suffern in Rockland County. NJ 17 is an attractive route for many truck trips that travel between major freight hubs in Northern New Jersey and Upstate New York because it is a shorter distance than all-interstate alternatives. NJ 17 interchanges with NJ 3 in East Rutherford, Interstate 80 in Lodi, and Interstate 287 in Mahwah, near the Interstate 87/Interstate 287 interchange in Suffern.

New York City Through Truck Routes

The New York City Truck Route Network, as shown in Figure 2.3, is a set of roads that commercial vehicles must use in New York City. This network is comprised of two distinct classes of roadways, Local Truck Routes and Through Truck Routes. Local Truck Routes are to be used only by trucks making a delivery or pickup in the borough in which the specific Local Truck Route is located. For example, a commercial vehicle operator may only use Bruckner Boulevard (a Local Truck Route in The Bronx) if his or her origin or destination is located in The Bronx. Through Truck Routes may be used to travel through a borough to reach an origin or destination in another borough or outside New York City. For example, a commercial vehicle operator traveling from Staten Island to Queens may use Interstate 278 and Atlantic Avenue (Through Truck Routes in Brooklyn) for part of the journey.

Figure 2.3 New York City Through Truck Routes



Freight Facility Intermodal Connectors

National Highway System (NHS) Intermodal Connectors[3] are public roads that lead to major freight or passenger intermodal terminals, including truck/rail intermodal terminals, ports, airports, and transit stations. Intermodal Connectors are designated by U.S. DOT, with the cooperation of each state DOT. For the purpose of the NYMTC Regional Freight Plan Update 2015-2040 Interim Plan, the Intermodal Connectors that connect freight intermodal facilities, including truck-rail transfer or transload facilities, maritime ports, industrial parks, and airports, are included in the regional strategic freight highway network. These freight facility Intermodal Connectors are listed in Table 2.1. Although they account for less than 1 percent of NHS mileage, intermodal connectors are key conduits for the timely and reliable delivery of goods. As a result, maintaining the condition and overall performance of intermodal connectors are critical to the movement of goods throughout the region. There are nine facilities located within the NYMTC region. Additionally, since intermodal connectors are critical freight infrastructure assets and are part of thenational highway system, they are eligible for strategic freight funding.

[3]http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/newyork.cfm

Table 2.1: NYMTC Freight Facility Intermodal Connectors

Freight Facility Intermodal Connectors	County	Related Intermodal Facility
Brown Pl from Entrance to E. 132nd St to Alexander Ave. to E. 135th St. to I-87	Bronx	Harlem River Intermodal Yard
Brown Pl (entrance to E 134th St.), E. 134th St. (Brown Pl. to I-87 SB)	Bronx	Harlem River Intermodal Yard
Third Ave From Cross Bronx Expressway Service Rd to E 175th St. To 3rd Ave (between East 175th Street to East 172nd Street)	Bronx	Bathgate Industrial Park
EB Gowanus Expwy to 3rd Ave to 53rd St to 1st Ave to 58th St to BAT Main Entrance	Kings	65th Street Rail Yard
EB Gowanus Expwy to 38th St to 4th Ave to 39th St to 1st Ave to 58th St to BAT Main Entrance	Kings	65th Street Rail Yard
WB Gowanus Expwy to 39th St to 1st Ave to 58th St to BAT Main Entrance	Kings	65th Street Rail Yard
BAT Main Entrance to 58th St to 3rd Ave to EB/WB BQE	Kings	65th Street Rail Yard
EB Gowanus Expwy to 38th St to 4th Ave to 39th St to Main Gate	Kings	South Brooklyn Marine Terminal
WB Gowanus Expwy to 39th St to Main Gate	Kings	South Brooklyn Marine Terminal
Main Gate to 39th St to 3rd Ave to EB/WB BQE	Kings	South Brooklyn Marine Terminal
EB Gowanus Expwy to 38th St to 4th Ave to 39th St to 1st Ave to 50th St	Kings	51st Street Rail Yard
WB Gowanus Expwy to 39th St to 1st Ave to 50th St	Kings	51st Street Rail Yard
50th St to 1st Ave to 39th St to 3rd Ave to EB/WB BQE	Kings	51st Street Rail Yard
50th St to 1st Ave to 58th St to 3rd Ave to EB/WB BQE	Kings	51st Street Rail Yard
EB/WB BQE to Atlantic Ave to Columbia St to DeGraw to Van Brunt to Summit to Imlay (at Bowne)	Kings	Red Hook Container Terminal
EB BQE to Hamilton Ave to 1) Summit to Imlay (at Bowne) or 2) to Van Brunt to DeGraw to Columbia to Atlantic	Kings	Red Hook Container Terminal
Imlay (at Bowne) to Summit to Van Brunt to DeGraw to Columbia to Atlantic Ave to EB/WB BQE	Kings	Red Hook Container Terminal
Atlantic Ave to Columbia to DeGraw to Van Brunt to Hamilton to EB/WB BQE	Kings	Red Hook Container Terminal
Imlay (at Bowne) to Summit to Hamilton Ave to EB/WB BQE	Kings	Red Hook Container Terminal
Market Loop to Hunts Point Ave. to Randall Ave. to Leggett Ave. to Bruckner Blvd EB to Triborough Bridge. Also, Leggett Ave. to Bruckner Blvd. WB to Major Deegan Expressway (I-87)	Bronx	Hunts Point Market Truck Terminal
Tiffany St. at Randall to Garrison Ave. to Barretto St. to Bruckner Blvd. WB to Whitlock Ave. Also, Tiffany St. to Bruckner EB to Bruckner Expressway	Bronx	Hunts Point Market Truck Terminal
Halleck St to Edgewater Rd. to Bruckner Blvd EB to Bruckner Expressway. Also, Garrison Ave. to Hunts Point Ave. to Bruckner Expressway	Bronx	Hunts Point Market Truck Terminal
Guy Brewer Blvd. (Entrance to Rockaway Blvd)	Queens	John F. Kennedy International Airport
Farmers Blvd. (Entrance to Rockaway Blvd.)	Queens	John F. Kennedy International Airport
150th St. (Entrance to N. Conduit Ave.)	Queens	John F. Kennedy International Airport
Lefferts Blvd. (Entrance to N. Conduit Ave.)	Queens	John F. Kennedy International Airport
23rd Ave. (Entrance to Ditmars) Ditmars Blvd. (94th St. to Astoria Blvd.)	Queens	LaGuardia Airport
94th St. (Entrance to Astoria Blvd.)	Queens	LaGuardia Airport
82nd St. (Marine Terminal Dr. to Astoria Blvd)	Queens	LaGuardia Airport
Entrance on Richmond Terrace to Western Ave. to Goethals Rd. to Forest Ave. to Staten Island Expressway	Richmond	New York Container Terminal
Entrance on Richmond Terrace to Western Ave. to Gulf Ave to Staten Island Expressway EB and West Shore Expressway SB. Also Forest Ave at Gulf Ave. to N. Goethals Rd. to Staten Island Expressway W B	Richmond	New York Container Terminal
MacArthur Memorial Hwy (Entrance to NY 454)	Suffolk	MacArthur Airport
Sills Road (Interstate 495 to Brookhaven Rail Terminal)	Suffolk	Brookhaven Rail Terminal
County Road 135 (I-684 to Entrance)	West-chester	Westchester County Airport

Sources: USDOT; NYMTC

Freight Facility Intermodal Connectors in Bronx County
In Bronx County, Intermodal Connectors provide access to three clusters of freight facilities in different sections of the County—Harlem River Yard, Hunts Point Food Distribution Center, and Bathgate Industrial Park. The Intermodal Connectors adjacent to Harlem River Yard connect that facility to Interstate 87. The network of Intermodal Connectors in Hunts Point connects the produce and fish markets to Bruckner Boulevard and Interstate 278. Bathgate Industrial Park is connected to Interstate 95 via 3rd Avenue and 175th Street. The freight facility Intermodal Connectors are illustrated in Figure 2.4.

Freight Facility Intermodal Connectors in Kings County
Figure 2.5 illustrates the Freight Facility Intermodal Connectors located in Kings County. These connectors serve Red Hook Container Terminal, South Brooklyn Marine Terminal, Brooklyn Army Terminal, and 65th Street Yard. The Intermodal Connectors in this area link the entrances of each facility to Interstate 278, the Brooklyn-Queens Expressway.

Freight Facility Intermodal Connectors in Queens County
In Queens County, designated Intermodal Connectors provide truck access to two freight-generating facilities, John F. Kennedy International Airport, and LaGuardia International Airport. The Intermodal Connectors in the vicinity of JFK Airport, shown in Figure 2.6, are generally short (less than 0.2 mile) links between various airport entrances and North Conduit Avenue or Rockaway Boulevard. The Intermodal Connectors serving LaGuardia Airport, shown in Figure 2.7, link the facility to Astoria Boulevard.

Freight Facility Intermodal Connectors in Richmond County
In Richmond County, designated Intermodal Connectors that serve freight facilities include access routes between the Howland Hook Marine Terminal/Arlington Yard and Interstate 278, the Staten Island Expressway and Goethals Bridge. These Intermodal Connectors are illustrated in Figure 2.8.

Freight Facility Intermodal Connectors in Suffolk County
Designated Intermodal Connectors serve two freight-generating facility in Suffolk County. MacArthur Memorial Boulevard is the designated connection between the MacArthur Long Island Airport and New York State Route 454, Veterans Memorial Highway in the Town of Islip. Sills Road is the designated connector between Brookhaven Rail Terminal and Interstate 495 in the Town of Brookhaven. Figure 2.9 illustrates this Intermodal Connectors on a map of the airport, rail terminal, and vicinity.

Freight Facility Intermodal Connectors in Westchester County
Airport Road, County Route 135, is an Intermodal Connector, located in the towns of North Castle and Rye Brook, which links Westchester County Airport to Interstate 684. Figure 2.10 illustrates this Intermodal Connector on a map of the airport and its vicinity.

Figure 2.4 Freight Facility Intermodal Connectors, Bronx County

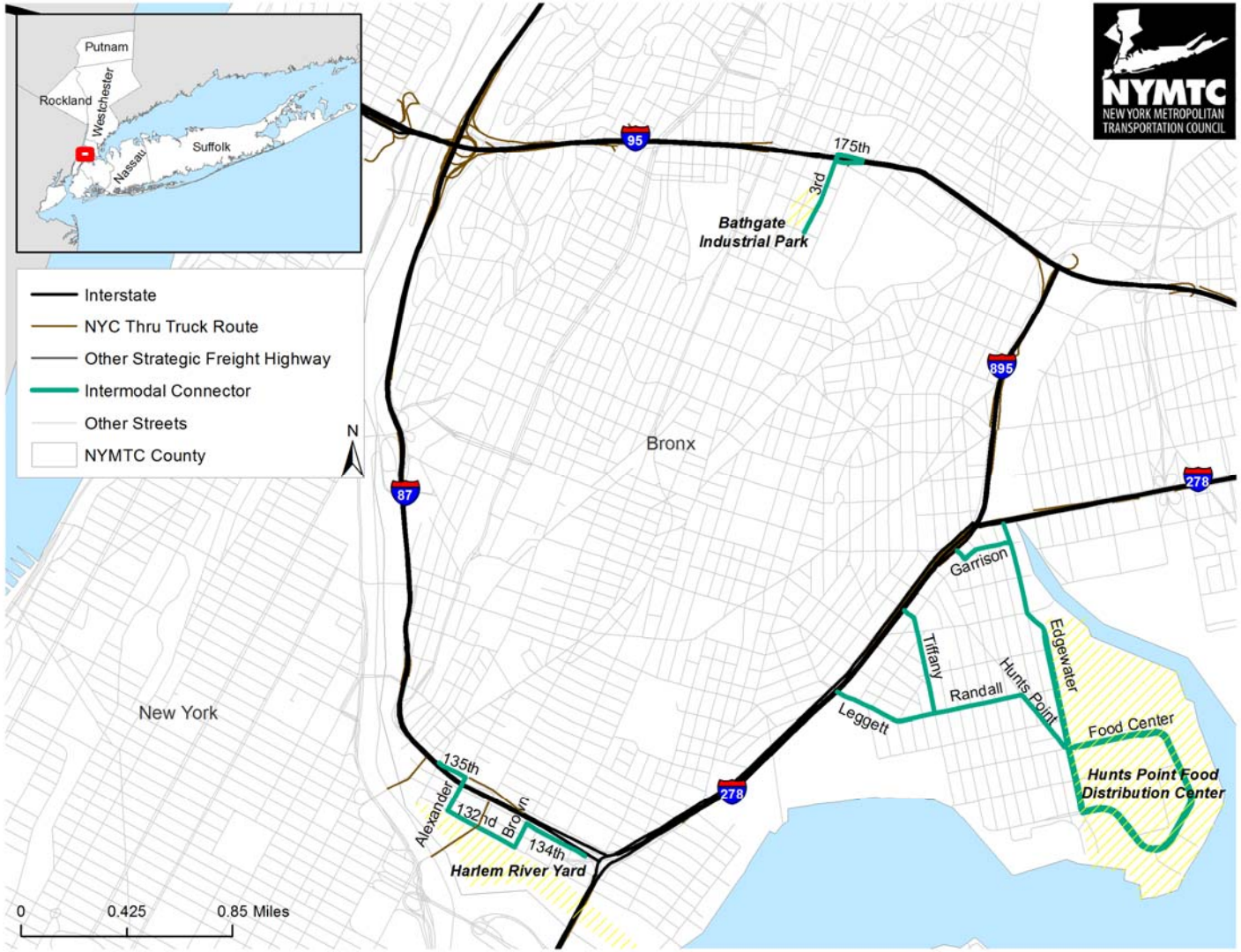


Figure 2.5 Freight Facility Intermodal Connectors, Kings County

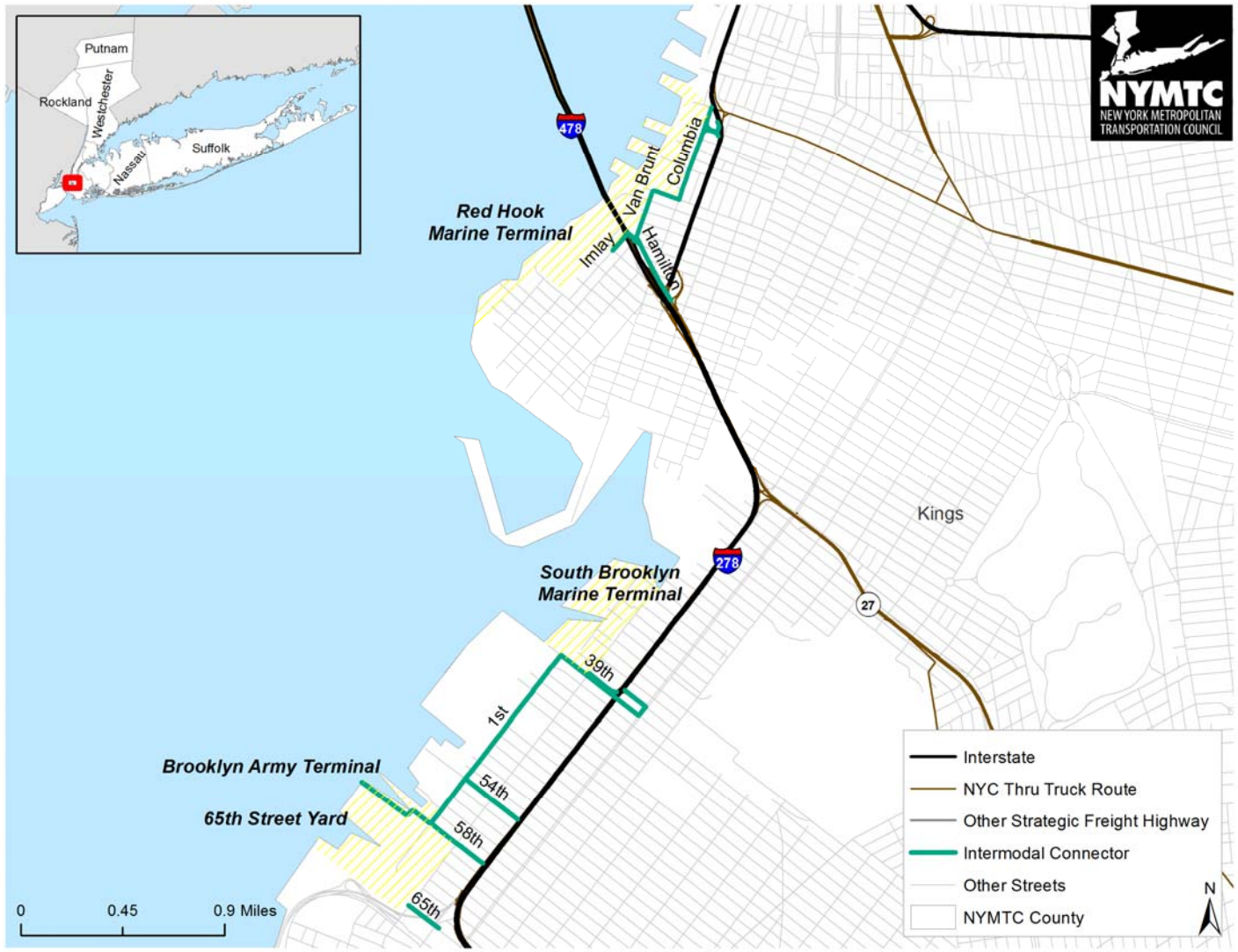


Figure 2.6 Freight Facility Intermodal Connectors, Queens County (JFK Airport)

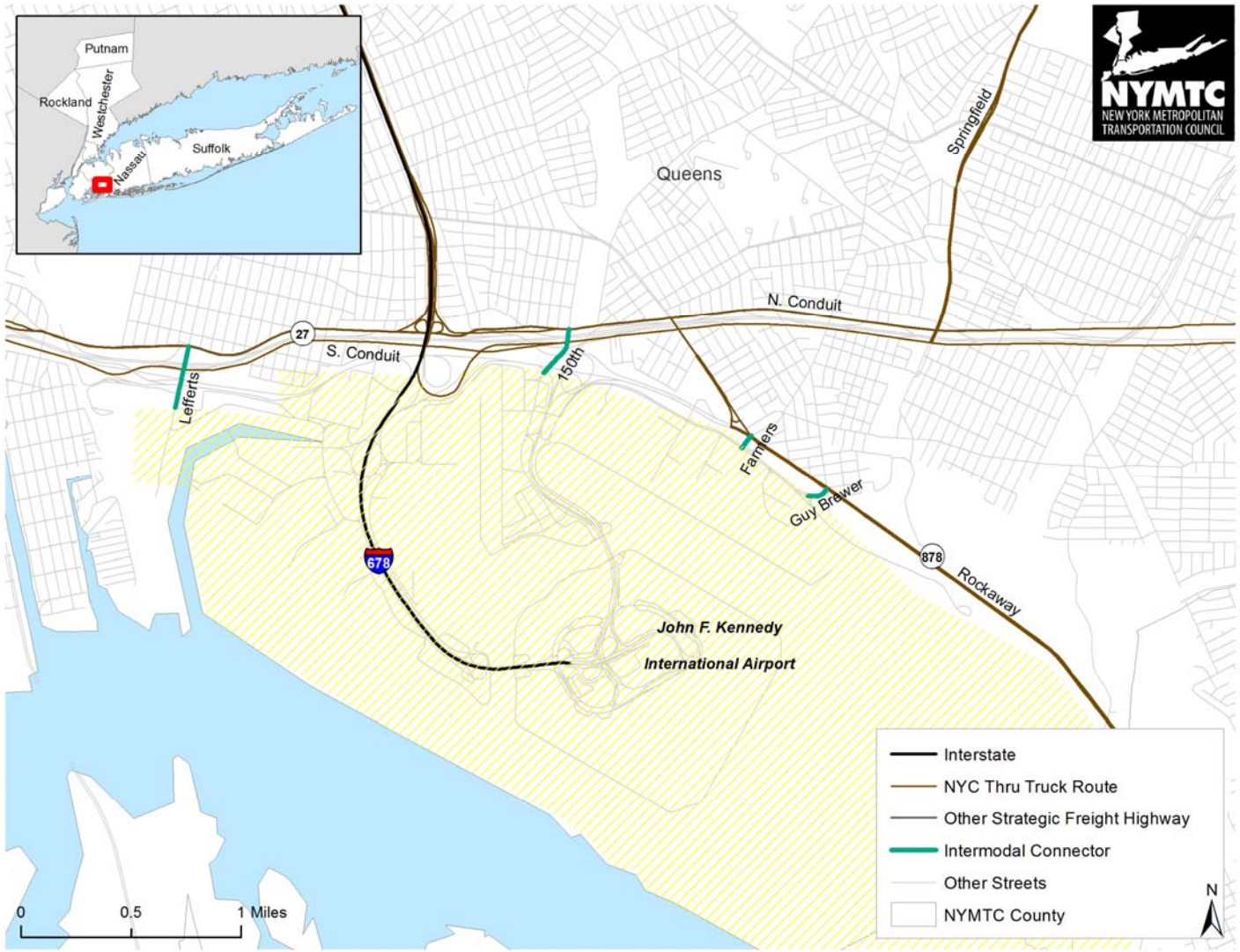


Figure 2.7 Freight Facility Intermodal Connectors, Queens County (LaGuardia Airport)

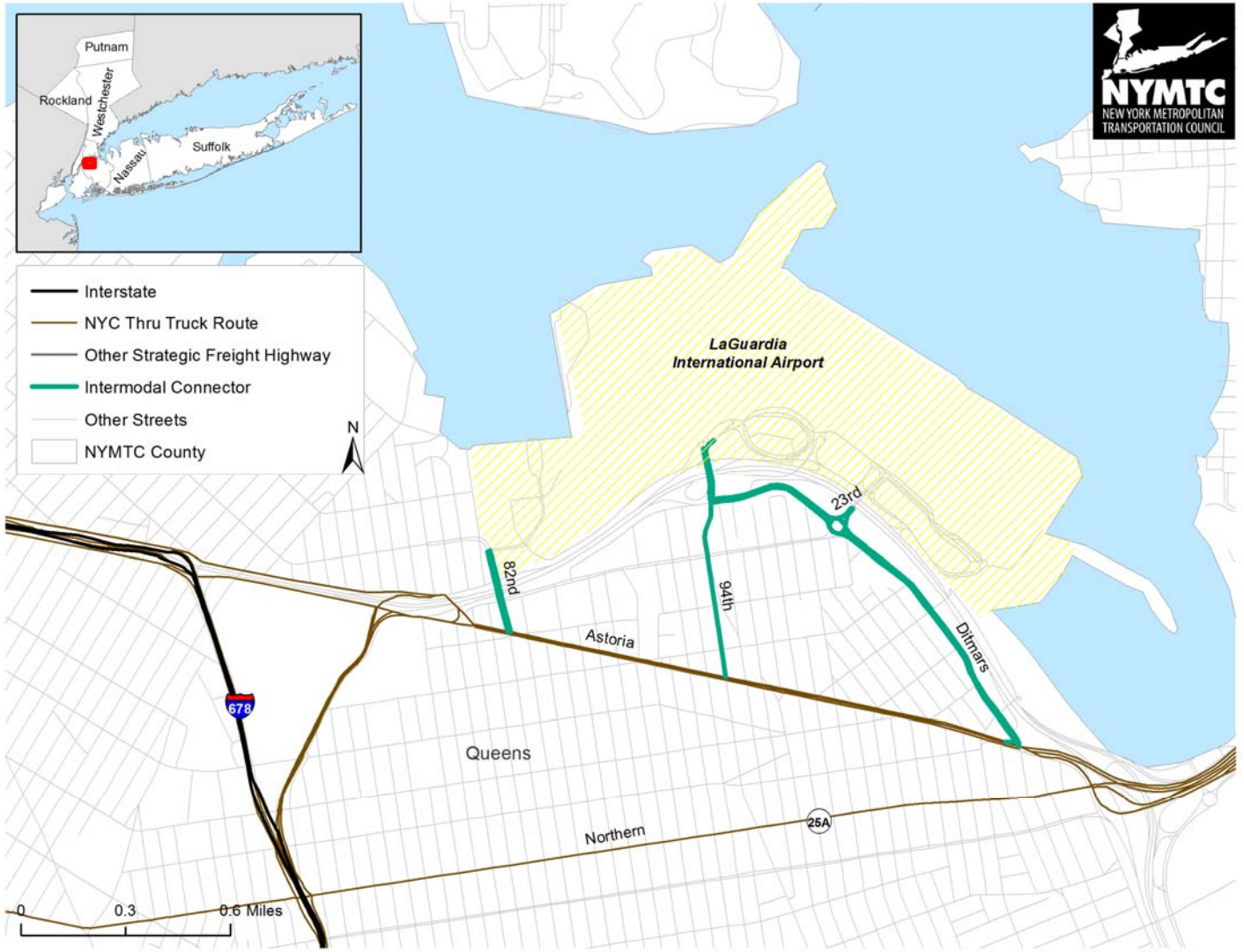


Figure 2.8 Freight Facility Intermodal Connectors, Richmond County

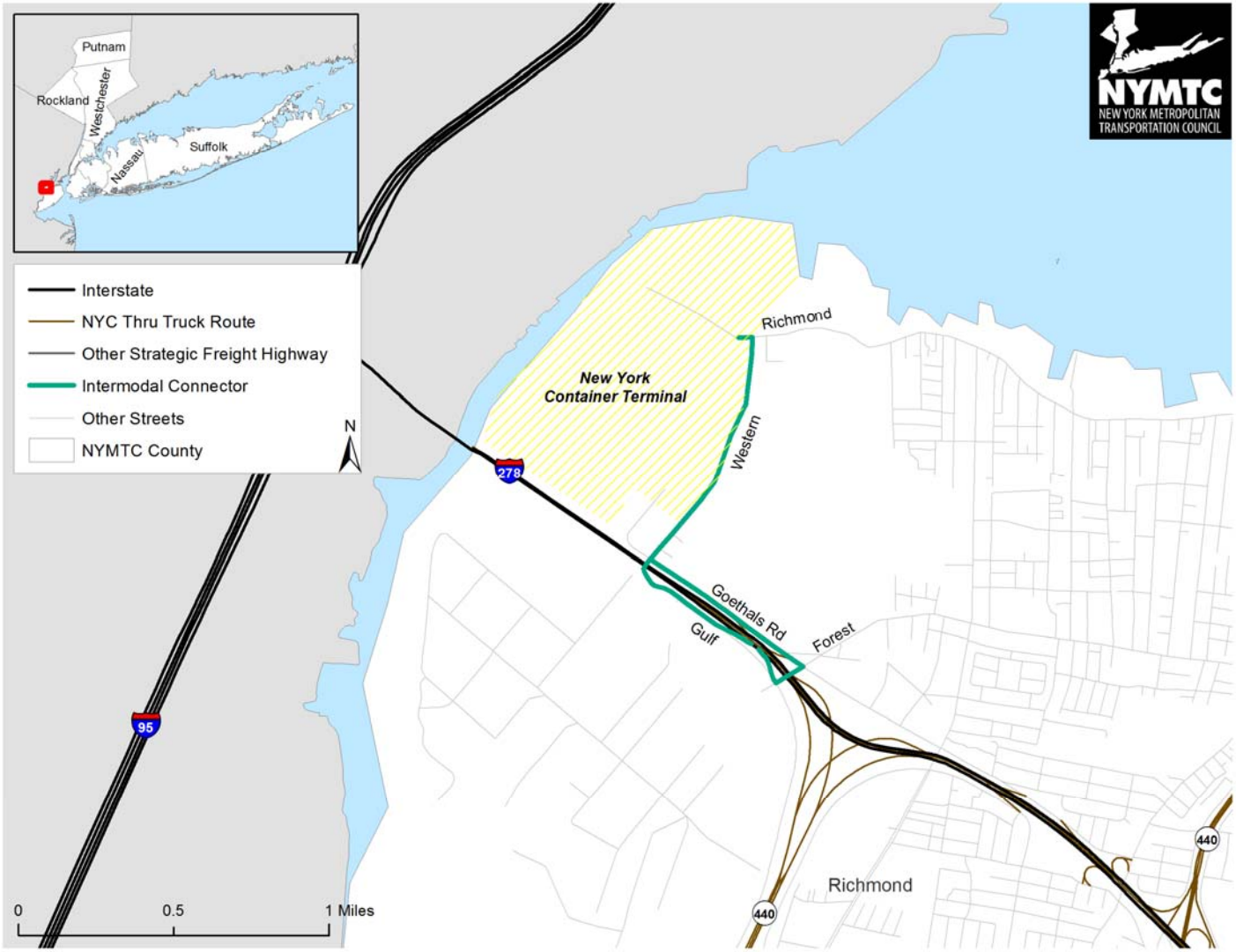


Figure 2.9 Freight Facility Intermodal Connectors, Suffolk County

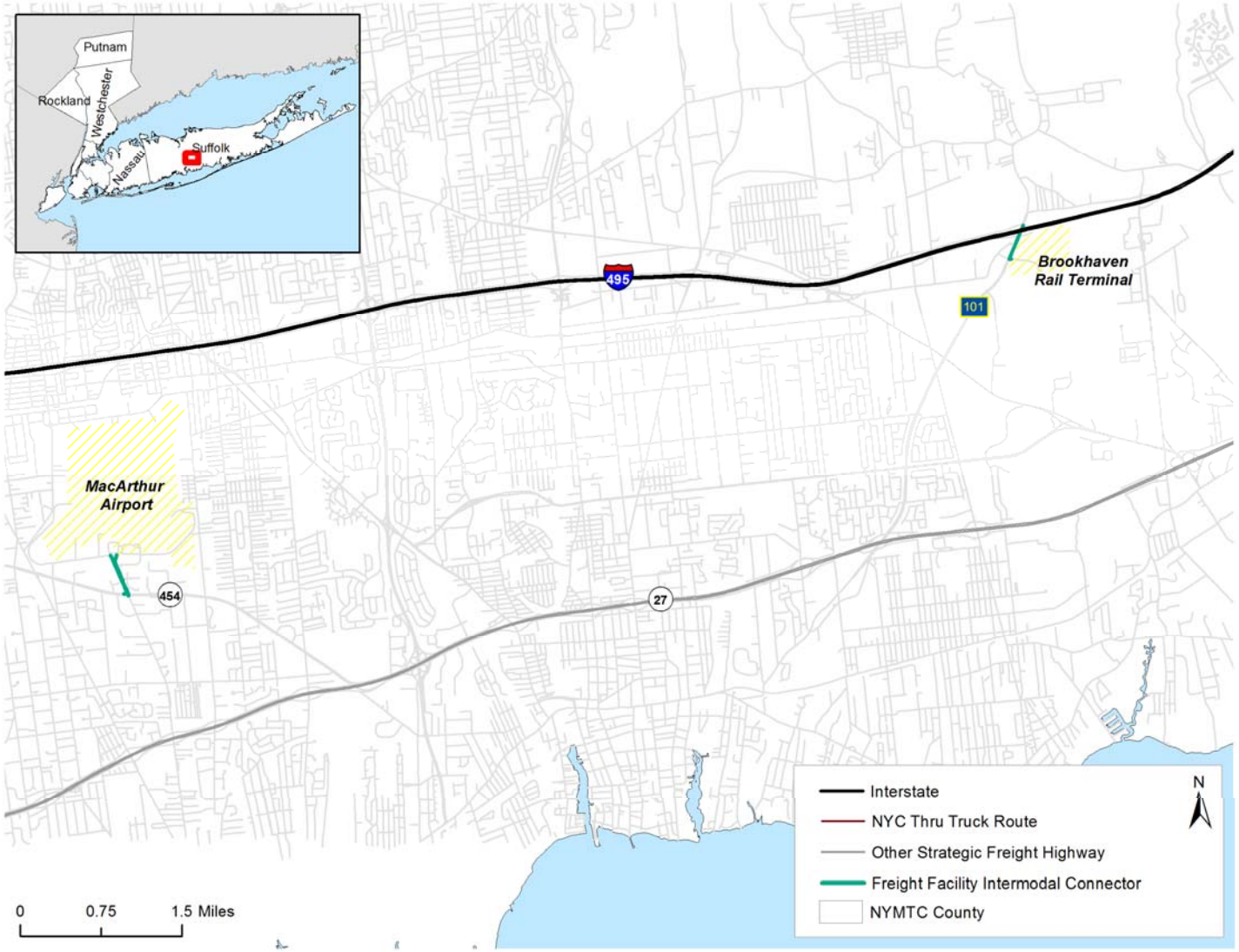
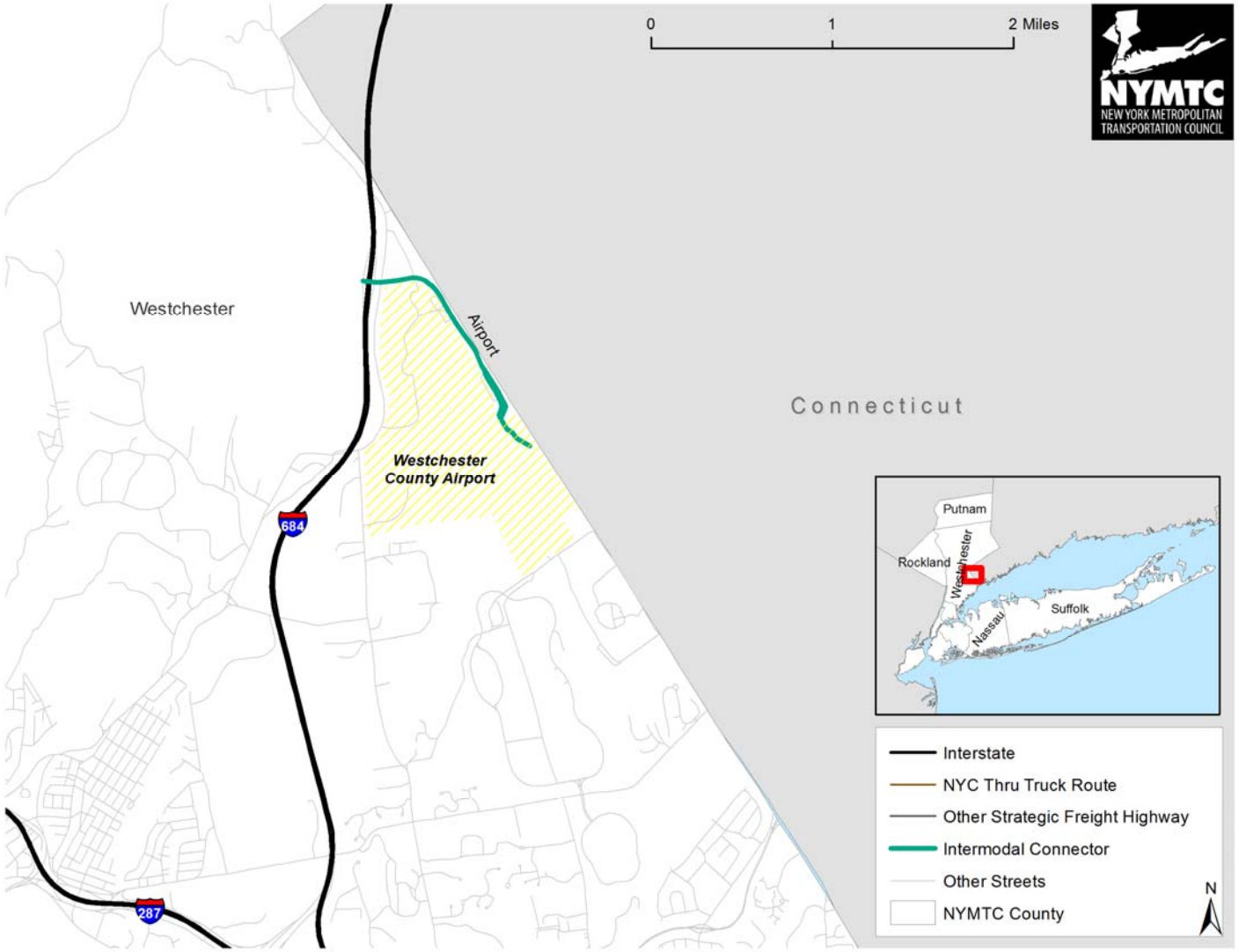


Figure 2.10


0
1
2 Miles
NYMTC
NEW YORK METROPOLITAN TRANSPORTATION COUNCIL
Westchester
Airport
Connecticut
Westchester County Airport
684
287
Putnam
Rockland
Westchester
Nassau
Suffolk
Interstate
NYC Thru Truck Route
Other Strategic Freight Highway
Intermodal Connector
Other Streets
NYMTC County
N

NYCDOT-Prescribed Routes for Overdimensional Loads During Superstorm Sandy Recovery

In the aftermath of Superstorm Sandy in 2012, emergency equipment and supplies needed to be delivered to Federal Emergency Management Agency (FEMA) staging areas located at Floyd Bennett Field in Brooklyn and at Citi Field in Queens, and to some of the waterfront communities hardest hit by the storm. Many of the loads included transportation equipment, generators, and other oversize and/or overweight objects weighing as much as 120,000 pounds, that are incapable of traveling on most roads in the region. Transportation agencies such as NYSDOT, NYCDOT, and PANYNJ, had to work closely with FEMA and other relief effort coordinators and individual truck drivers to be sure trucks used the limited number of appropriate routes capable of handling the loads. Due to the limitations of the infrastructure in New York City, NYCDOT worked closely with truck drivers traveling into or through New York City, communicating via email and text messaging, to direct them to routes that include roads and bridges capable of accommodating large and/or heavy loads. The maintenance of these routes as a lifeline for the region in the event of emergency is critical.

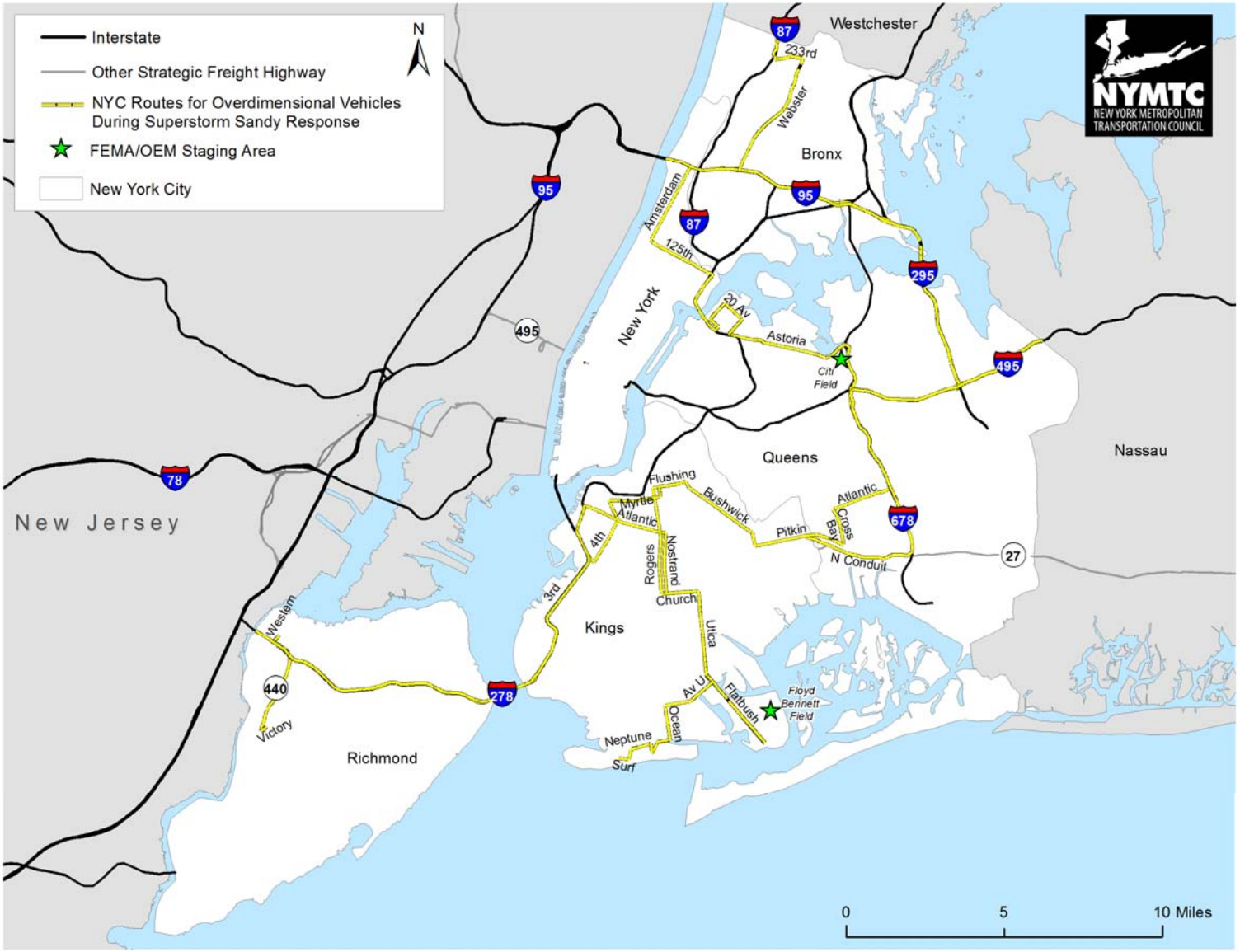
The key routes used to help move oversized and overweight loads to Federal Emergency Management Agency (FEMA) sites in Brooklyn at Floyd Bennett Field and in Queens at Citi Field, as well as access between points outside New York City are listed in Table 2.2 and mapped in Figure 2.11.

Table 2.2 NYCDOT-Prescribed Routes for Overdimensional Loads During Superstorm Sandy Recovery

Origin	Destination	Route Directions
Goethals Bridge	Floyd Bennett Field, Brooklyn	Goethals Bridge, to Staten Island Expressway, to Verrazano-Narrows Bridge, to Gowanus/B.Q.E., to Atlantic Ave., to Nostrand Ave., to Church Ave., to Utica Ave., to Flatbush Ave. and Marine Parkway Bridge.
George Washington Bridge	Eastern Long Island (via I-495)	George Washington Bridge, to I-95/Cross Bronx Expressway, to I-295 and Throgs Neck Bridge, to I-495, Long Island Expressway to Nassau County line.
Eastern Long Island (via I-495)	George Washington Bridge via RFK Bridge	I-495 to College Point Ave., to I-678, to Astoria Blvd. North (Exit 13), to Steinway, to 20th Ave., to 21st St., to 24th Ave., to 29th St., to I-278, to RFK Bridge., to Manhattan-125th St., to Amsterdam Ave., to W. 179th St., to I-95, to George Washington Bridge.
Goethals Bridge	Travis section of Victory Blvd., Staten Island	Goethals Bridge to I-278, to Route 440, to Victory Blvd. exit (Do not use Victory Blvd exit near College of Staten Island).
Goethals Bridge	New York Container Terminal	Goethals Bridge to I-278, to Gulf Ave., to Forest Ave., to Goethals Road North, to Western Ave.
New York Container Terminal	Goethals Bridge	Western Ave. to Gulf Ave., to Goethals Road North, to I-278, to Goethals Bridge.
Goethals Bridge	Eastern Long Island (via I-495)	Goethals Bridge to I-278, to Verrazano-Narrows Bridge, to Gowanus/B.Q.E., to Atlantic Ave., to Bedford Ave., to Flushing Ave., to Bushwick Ave., to Granville Payne, to Pitkin Ave., to Cross Bay Blvd., to Woodhaven, to Atlantic Ave., to I-678 Service Road Southbound, Turnaround at Liberty Ave., I-678 northbound, to I-495 eastbound.
Eastern Long Island (via I-495)	Goethals Bridge	I-495 to College Point Ave., to I-678 south, to North Conduit Ave., to Pitkin Ave., to Granville Payne, to Bushwick Ave., to Flushing Ave., to Nostrand Ave. to Myrtle Ave. to Flatbush Ave. to 4th Ave. to Prospect Ave. to Hamilton Ave. (do not cross drawbridge!), turnaround at 2nd Ave. to Fort Hamilton Pkwy to 3rd Ave to I-278 to Verrazano-Narrows Bridge to I-278 to Goethals Bridge.
Goethals Bridge	Coney Island, Brooklyn (avoiding Cropsey Ave. over Stillwell Creek)	Goethals Bridge to I-278, to Verrazano-Narrows Bridge, to Gowanus/B.Q.E., to Atlantic Ave., to Nostrand Ave., to Church Ave., to Utica Ave., to Flatbush Ave., to Ave. U, to Ocean Ave., to Emmons Ave., to Brighton 11th St., to Brighton Beach Ave., to Coney Island Ave., to Neptune Ave., to W. 5th St., to Surf Ave.
Coney Island, Brooklyn	Goethals Bridge	Surf Ave. to W. 5th St., to Neptune Ave., to Coney Island Ave., to Brighton Beach Ave., to Brighton 11th St., to Emmons Ave., to Ocean Ave., to Ave. U, to Flatbush Ave., to Utica Ave., to Church Ave., to Rogers Ave., to Bedford Ave., to Myrtle Ave., to Flatbush Ave., to 4th Ave., Prospect Ave., to Hamilton Ave. (do not cross drawbridge!), turnaround at 2nd Ave., to Hamilton Ave., to 3rd Ave., to I-278, to Verrazano-Narrows Bridge, to I-278, to Goethals Bridge.
Westchester County	Eastern Long Island (via I-495)	I-87 to Exit 13 (East 233rd St.), to Webster Ave., to I-95 (south), to Exit 2A, turnaround at Jerome Ave., to Northbound I-95, to I-295, to I-495, to Nassau County line.
Eastern Long Island (via I-495)	Westchester County	I-495 to I-295, to I-95 South, to Exit 2A, turnaround at Jerome Ave., to I-95 North, to Exit 2B, to Webster Ave., to East 233rd St., to I-87 North.

Source: New York City Department of Transportation

Figure 2.11 NYCDOT-Prescribed Routes for Overdimensional Loads During Superstorm Sandy Recovery



Source: Cambridge Systematics, using information from New York City Department of Transportation

2.2 NETWORK EXISTING CONDITIONS

The Strategic Freight Highway Network moves tens of thousands of trucks and hundreds of thousands of automobiles into, out of, through, and within the NYMTC Region every day. The high traffic volumes, combined with the age of much of the Region's highway infrastructure, contribute to congestion, pavement and bridge deterioration, insufficient truck rest area capacity, and increase exposure of trucks and automobiles to crashes. The analysis of existing conditions of the Strategic Freight Highway Network consists of collecting data and mapping truck traffic volumes, using NYMTC's Best Practices Model (BPM) to estimate congestion, mapping NYSDOT data on pavement and bridge conditions, re-visiting the findings of NYMTC's Multi-State Truck Rest Stop Inventory and Assessment study, and mapping truck-involved crash data. The objective of this analysis is to identify physical deficiencies in the Strategic Freight Highway Network that impact safe and efficient goods movement, and will be considered as potential recommended improvements in later tasks of the NYMTC Regional Freight Plan Update.

2.2.1 Traffic Volume

Figure 2.11 highlights the Average Weekday Daily Truck Traffic (AWDTT), at various locations on the strategic freight highway network in the NYMTC region and neighboring areas. These volumes come from three sources:

1. New York and Connecticut volumes were derived from NYMTC's 2012 Best Practices Model (BPM) series H loaded networks[4].
2. New Jersey volumes (other than the NJ Turnpike) were derived from an average of 2009 through 2011 weigh-in-motion (WIM) classification count data.
3. New Jersey Turnpike volumes were taken from the 2012 New Jersey Congestion Management System database.

The capacity and performance analysis of the Freight Analysis Framework (FAF[3])[5] looks at the capacity deficiencies of the freight transportation highway network based on the supply (highway capacity) and demand of

[4] The NYMTC Best Practices Model (BPM), Series H includes a 2012 base-year network and traffic assignment, and 2040 "build scenario" network, loaded with a traffic assignment developed utilizing the 2040 NYMTC socioeconomic forecast approved in September 2011. The Series H scenario was used in NYMTC's Conformity Determination model runs conducted in January 2012 and approved in July 2012.

[5] USDOT, Federal Highway Administration, "Freight Analysis Framework 3 (FAF3) Freight Traffic Analysis," available from: http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/chap5.htm

freight (truck traffic). Three AWDTT volume groupings are used for classification purposes:

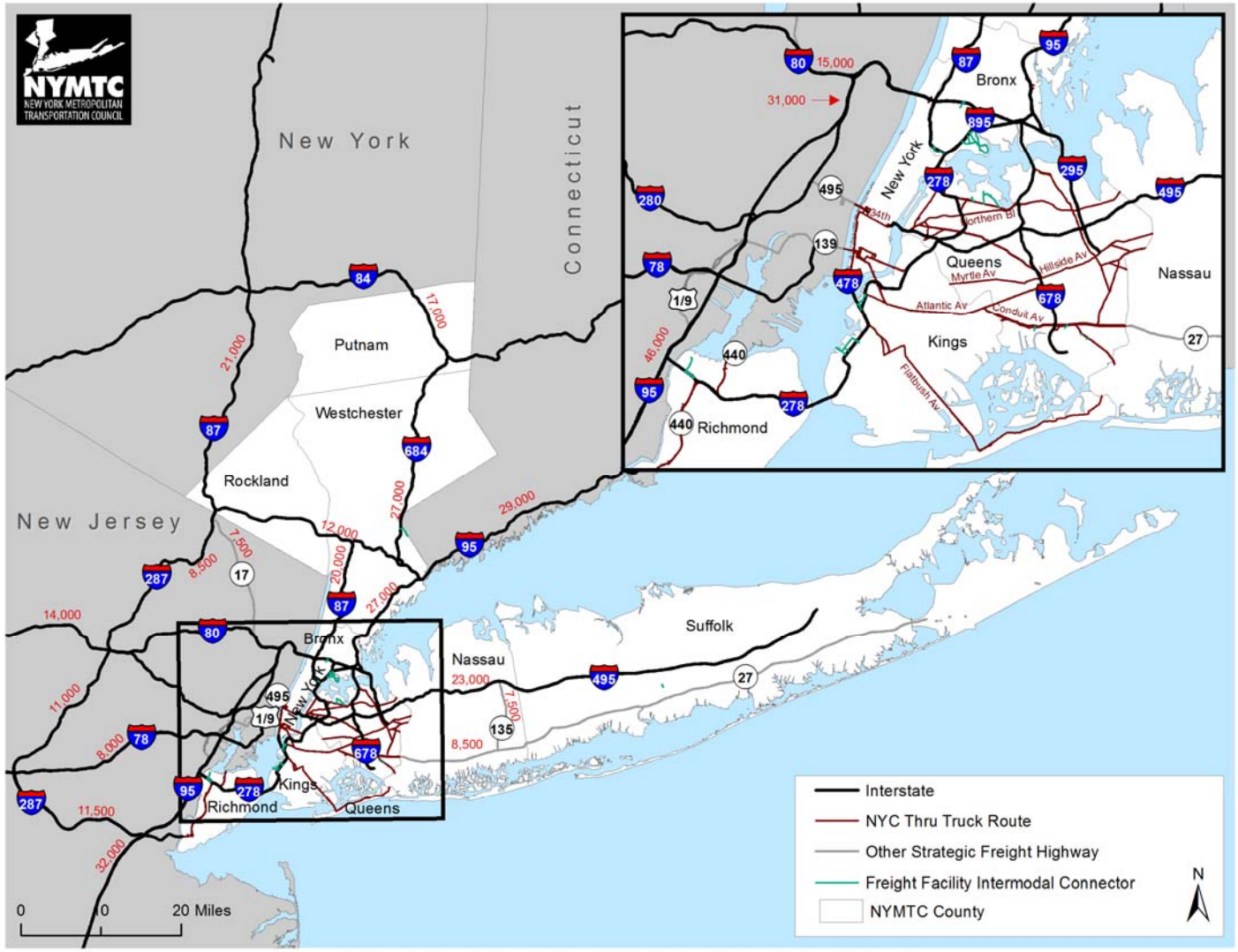
- Light Truck Traffic – 0 to 5,000 AWDTT,
- Moderate Truck Traffic – 5,000 to 10,000 AWDTT, and
- Heavy Truck Traffic – greater than 10,000 AWDTT.

From a national context, in 2007, about 40% of urban NHS route miles carried more than 10,000 trucks per day. As shown in Figure 2.11, all of the NYMTC region's interstate facilities, with the exception of segments of I-278 in Queens and Bronx counties, carry heavy truck traffic volumes. The highest truck traffic volume in the New York metropolitan area is observed on the NJ Turnpike in the vicinity of Port Elizabeth and Port Newark; carrying in excess of 46,000 trucks daily. The greatest truck traffic volumes within the NYMTC region are located along I-95/New England Thruway in Bronx County with 32,000 trucks daily. Generally, non-interstate through truck segments of the highway system carry between 5,000 and 10,000 trucks daily. Truck volumes on the Manhattan Bridge, Conduit Avenue in Queens County, and the Prospect Expressway in Kings County exceed 10,000 trucks per day. The high truck volumes are indicative of the region's large population of consumers, concentration of employment, and facilities for shipping, receiving, and handling freight.

High volume truck corridors of the region illustrated in Figure 2.11 correlate with the highways highlighted in NYMTC's Core Network illustration (Figure 2.1), and the heavy reliance upon I-95 to move goods in all directions throughout the greater New York metropolitan region. A critical pinch point for the movement of goods is the segment of I-95 including the George Washington Bridge (GWB), Trans-Manhattan and Cross Bronx expressways, and CBE/Major Deegan Expressway interchange. In 2010, the Port Authority of New York and New Jersey reported carrying approximately 102.4 million vehicles across the GWB, of which 7.6 million were trucks, making the GWB one of the busiest bridges in the world.

The southern gateway of the Goethals/Verrazano Narrows Bridges serves as a connection between Staten Island, geographic Long Island and the I-95 corridor, including Newark Liberty International Airport, the port facilities of northern New Jersey, and its rail and intermodal yards and lines. According to the Metropolitan Transportation Authority, 1.9 million trucks crossed the Verrazano Narrows Bridge in 2010. These facilities are critical assets and of significant importance in the timely and efficient movement of freight within the region.

Figure 2.12 Average Weekday Daily Truck Traffic on Strategic Freight Corridors



Source: NYMTC

2.2.2 Congestion

According to the Texas Transportation Institute (TTI), the largest transportation research agency in the United States, in 2011 the New York metropolitan area ranked first in total annual delay and annual truck delay when compared to other very large urban areas. As observed in Table 2.2, the New York metropolitan region outpaced the Los Angeles metropolitan area (ranked second) by almost 8 percent in total annual delay and surpassed the Chicago metropolitan area (ranked third) by over 50 percent. Coupled with the fact that the New York region maintains the highest truck commodity value in the nation, congestion is a major detriment to productivity and is costing the region over 2.5 billion dollars in annual truck delay. High truck volumes travel along already congested corridors, which lead to decreased travel time reliability. Lack of reliability increases the cost of freight movement through increased delays and decreased productivity.

Table 2.3: Truck Commodity Value and Truck Delay by Urban Areas, 2011[6]

Urban Area	Total Annual Delay		Annual Truck Delay			Truck Commodity Value	
	(1,000 Hours)	Rank	(1,000 Hours)	Rank	Congestion Cost ($ million)	($ million)	Rank
Average: Very Large Areas (15 areas)	195,831		12,292		933	208,893	
New York-Newark, NY-NJ-CT	544,063	1	33,433	1	2,541	481,177	1
Los Angeles-Long Beach-S. Ana, CA	501,881	2	28,936	2	2,290	412,152	2
Chicago, IL-IN	271,718	3	22,818	3	1,716	362,328	3
Atlanta, GA	142,041	10	10,326	4	775	191,563	6
Dallas-Fort Worth-Arlington, TX	167,718	6	9,750	5	734	230,466	5
Miami, FL	174,612	5	9,682	6	739	155,425	9
Philadelphia, PA-NJ-DE-MD	156,027	7	9,637	7	730	175,393	7
Washington, DC-VA-MD	179,331	4	8,628	8	656	97,285	18
Houston, TX	145,832	9	8,599	9	646	233,723	4
San Francisco-Oakland, CA	155,157	8	8,442	10	643	132,539	11
Phoenix-Mesa, AZ	82,554	14	8,213	11	627	131,234	12
Boston, MA-NH-RI	136,966	11	7,372	12	561	129,308	13
Seattle, WA	100,802	13	7,154	13	546	152,596	10
Detroit, MI	106,434	12	6,266	14	475	161,391	8
San Diego, CA	72,331	16	4,123	18	314	86,817	20

Source: Texas Transportation Institute

In addition to productivity losses, congestion contributes to greenhouse gas and particulate emissions, which are linked to climate change and human health problems such as asthma and cardiovascular disease. Nationwide in 2009, trucks

[6]Texas Transportation Institute, "2012 Urban Mobility Report," available from: http://mobility.tamu.edu/ums/national-congestion-tables/

were responsible for emitting 78 percent of the carbon dioxide (CO_2) emissions attributable to freight, and 20 percent of CO_2 emissions attributable to all freight and passenger transportation modes combined.[7] Trucks are becoming more fuel efficient, and U.S. Environmental Protection Agency (EPA) standards call for a 9-23 percent reduction from model year 2010 CO_2 emissions to be achieved by model year 2017 for large truck tractors.[8] In addition, the Port Authority of New York and New Jersey, as part of its Clean Air Strategy for the Port of New York and New Jersey, engaged in an aggressive Truck Replacement Program, which encourages drayage operators to replace older, higher-emissions equipment with model year 2007 EPA-compliant tractors through grants and low-interest financing programs. These emissions-reduction strategies will likely reduce the impact of truck idling on the natural environment and human health, however highway congestion can reduce the potential benefits.

To examine congestion along the strategic freight highway system, the study team chose to use Average Annual Daily Traffic (AADT) per lane as an indicator of general congestion levels. The AADT per lane values were computed from the NYSDOT Roadway Inventory database, and are displayed by ranges in Figure 2.12. The NYMTC region's most important truck travel corridors are located on the region's most congested roadways.

There are several sections of I-95 in the region that are severely congested, most notably the section of the Cross Bronx Expressway between the Major Deegan Expressway (I-87) and the Sheridan Expressway (I-895), and along the Trans Manhattan Expressway and George Washington Bridge. Severe congestion is also indicated along the Long Island Expressway (I-495) between Glen Cove Road in Nassau County and the Brooklyn-Queens Expressway (I-278) in Queens.

Other notable locations on strategic freight highways showing severe congestion include:

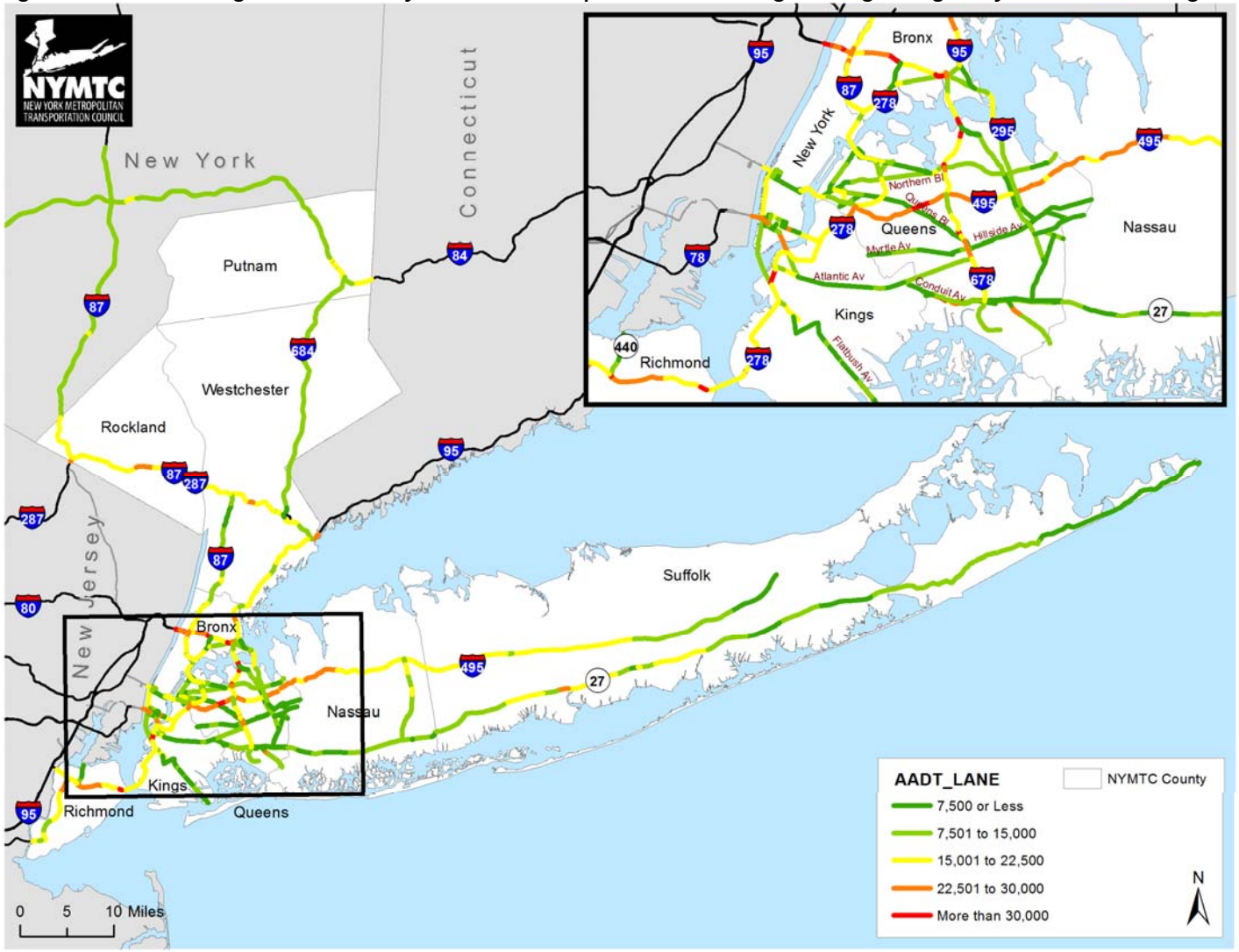
- I-87/I-287 in Rockland County between Suffern and the Tappan Zee Bridge, eastbound and westbound;
- I-287 near White Plains in Westchester County;

[7] "Freight Facts and Figures, 2011," Federal Highway Administration Freight Management and Operations, available from: http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/11factsfigures/table5_18.htm.

[8] USEPA standards call for CO_2 emissions reductions of 7-10 percent by model year 2014 and of 9-23 percent by model year 2017. The range accounts for different standards among tractor vehicle subcategories. A full list of category-specific standards is available from the USEPA website: http://www.epa.gov/otaq/climate/regs-heavy-duty.htm

- Sunrise Highway east of its interchange with the Southern State Parkway in Suffolk County;
- Several sections of I-678 (Whitestone Expressway/Van Wyck Expressway in Queens) between the Whitestone Bridge and Atlantic Avenue;
- Several sections of I-278 (Brooklyn-Queens Expressway/Gowanus Expressway/Staten Island Expressway in Queens, Brooklyn, and Staten Island) between the Long Island Expressway (I-495) in Queens and the MLK Expressway (NY-440) on Staten Island;
- The Holland Tunnel and its approaches in lower Manhattan; and
- Rockaway Boulevard/Nassau Expressway adjacent to JFK International Airport in Queens.

Figure 2.13 Average Annual Daily Truck Traffic per Lane, Strategic Freight Highways in NYMTC Region



Source: NYMTC

2.2.3 Pavement and Bridge Conditions

Roadways and bridges of the region are aging and many are in need of repair. Deteriorating pavement conditions are adding to truck operating costs and lower speeds, thereby increasing travel times. On the other hand, freight trucks themselves are a leading cause of pavement damage and attrition. Nationally, estimates of pavement damage by trucks, the largest per-mile external cost of truck use, range from about 5 to 55 cents per mile[9] depending on the weight of the truck.

Pavement Condition

Pavement condition refers to the level of distress observed on the road surface due to wear and tear resulting from years of aging, high traffic volume, heavy vehicle loads, and cycles of freezing, thawing, and heat stress. Poor pavement condition can diminish the efficiency of the Region's freight transportation system, which results in additional costs to carriers, shippers, and receivers in the form of slower travel, higher fuel costs, and increased vehicle maintenance costs.

Figure 2.13 shows the pavement condition ratings, where available, for the Strategic Freight Highways in the NYMTC region. These ratings come from the NYSDOT Roadway Inventory database and represent 2012 conditions.[10] The NYSDOT Pavement Surface Rating is based on the severity and extent of cracking on the surface of the pavement. The Surface Ratings are categorized as follows:

- Very good - No surface distress,
- Good – Surface distress beginning to show,
- Fair – Surface distress is clearly visible,
- Poor – Distress is frequent and severe, and
- Under Construction – not rated due to ongoing work.

As illustrated in Figure 2.12, of the approximately 655 highway miles for which condition data are available along Strategic Freight Highways in the 10-county NYMTC Region, 14 miles are classified to be in "Poor" condition, including approximately:

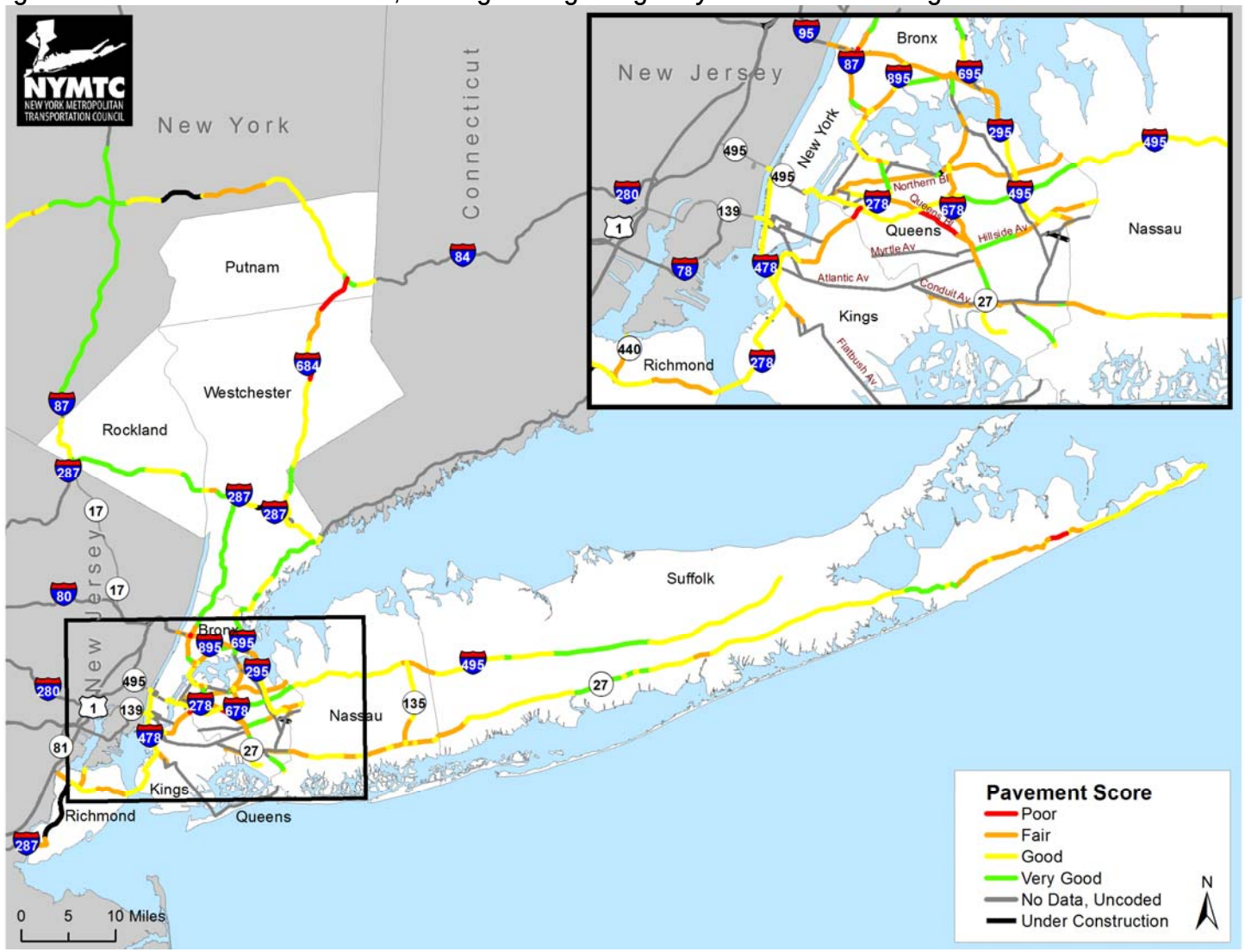
---

[9] Congressional Budget Office, Economic and Budget Issue Brief: Spending and Funding for Highways (January, 2011): http://www.cbo.gov/ftpdocs/120xx/doc12043/01-19-HighwaySpending_Brief.pdf

[10] Estimated conditions for macro-level data sources may vary from actual on-the-ground conditions on the date of publication of the data. For example, the data may not account for some recent repaving projects.

- 4.1 miles of NY Route 27, Montauk Highway, in Suffolk County;
- 3.5 miles of I-684 in Putnam County;
- 3.0 miles of I-684 in Westchester County;
- 2.3 miles of Route NY 25, Queens Boulevard, in Queens County;
- 0.6 miles of I-278 in Queens County; and
- 0.5 miles of I-87 in Bronx County.

Figure 2.14 Pavement Condition, Strategic Freight Highways in the NYMTC Region



Source: NYSDOT

Bridge Condition

The FHWA National Bridge Inventory (NBI) database provides information on bridge conditions and classifies bridges as either "structurally deficient" or "functionally obsolete." Neither condition necessarily implies lack of safety, though it could be considered a concern. "Structurally deficient" means that the condition of the bridge includes a significant defect, which often means that speed or weight limits must be put on the bridge to ensure safety. This could limit the movement of freight traffic which exceeds such weight restrictions and might lead to increased travel times and trip distances to circumvent such constraints. "Functionally obsolete" means the bridge can no longer efficiently accommodate the amount of traffic using it.

Table 2.3 lists the 46 structurally deficient bridges on Strategic Freight Highways in the NYMTC Region as identified from the NBI database for New York State, organized by county. This data represents year 2012 conditions. Nearly one-third (15 out of 46) of the structurally deficient bridges on Strategic Freight Highways are located in Queens County. The locations of the bridges listed in Table 2.3 are mapped in Figure 2.15.

By highway corridor, as shown in Figure 2.14, Interstate 87 has the greatest number of structurally deficient bridges, with 8. Interstates 278, 287, 678, and 95 are also among the top five Strategic Freight Highways by number of structurally deficient bridges. These highways are among the most heavily-traveled freight corridors in the Region.

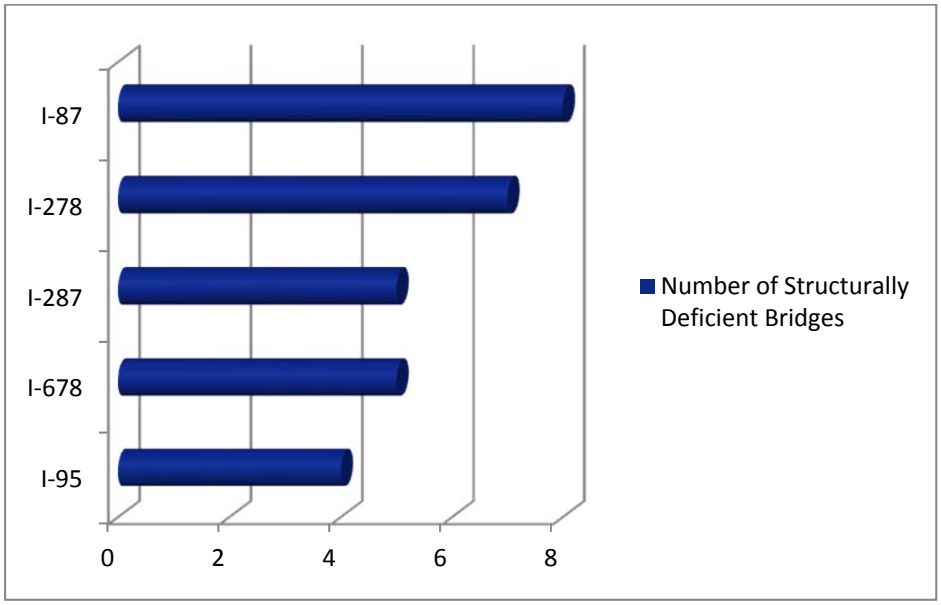
The number of structurally deficient bridges that are located on Strategic Freight Highways is of particular concern because a significant portion of the Region's freight movements travel across deteriorating and potentially unsafe bridges, compounding the wear and tear on already vulnerable infrastructure, as well as increasing delay due to speed restrictions and/or construction in order to maintain safety.

Table 2.4 Structurally Deficient Bridges on Strategic Freight Highways

County	Facility Carried	Facility Crossed	Year Built
Bronx	I-87	Alexander Ave	1960
Bronx	I-87	149th St	1954
Bronx	I-87	Abandoned Subway	1955
Bronx	I-87	Abandoned Subway	1932
Bronx	I-95, Alexander Hamilton Bridge	I-87	1962
Bronx	I-278	Bruckner Blvd	1960
Bronx	I-278	Ramp from I-278 to I-87	1938
Bronx	I-278	Amtrak/CSX/P&W Rail Line	1960
Kings	I-278	6th Av	1962
Kings	I-278	Cadman Plaza East	1948
Kings	I-278	I-278	1944
Kings	I-278, Kosciuszko Bridge	Morgan Av	1940
Kings	I-278	I-278	1944
Kings	I-278	Flushing Av	1954
Kings	Atlantic Av	NYA/LIRR Rail Line	1942
Kings	Flatbush Av	NYA/LIRR Rail Line	1908
New York	E 34th St	Park Av Tunnel	1919
Putnam	I-84 Eastbound	Dingle Rd	1967
Putnam	I-84 Westbound	Dingle Rd	1967
Putnam	I-684 Northbound	I-84	1967
Putnam	I-684 Southbound	I-84	1967
Queens	Hempstead Av	Cross Island Parkway	1935
Queens	Queens Blvd	Main St	1953
Queens	I-295, Throgs Neck Bridge	Approach Ramp	1961
Queens	I-495 Eastbound	Grand Central Pkwy	1963
Queens	I-495 Westbound	Grand Central Pkwy	1963
Queens	I-495	I-295	1960
Queens	I-678	I-495	1963
Queens	I-678	North Conduit Av	1948
Queens	I-678	Boat Basin Rd	1963
Queens	I-678	I-678	1953
Queens	I-678	Grand Central Pkwy	1953
Queens	I-678	I-678	1939
Queens	Astoria Blvd	Ramp from I-278 to Grand Central Pkwy	1942
Queens	Northern Blvd	Boat Basin Rd	1963
Queens	Sunrise Hwy Westbound	Belt Pkwy	1936
Rockland	I-87	NY Route 45	1953
Rockland	I-87	NY Route 303	1953
Rockland	I-87	Saddle River Rd	1954
Rockland	I-87	Spook Rock Rd	1953
Suffolk	I-495	NY Route 25	1972
Westchester	I-95	Kings Hwy	1954
Westchester	I-95	Webster Av	1954
Westchester	I-287	Midland Av	1958
Westchester	I-684	I-287	1969
Westchester	I-684	NY Route 22	1969

Source: USDOT National Bridge Inventory, 2012

Figure 2.15 Top 5 Strategic Freight Highways by Number of Structurally Deficient Bridges

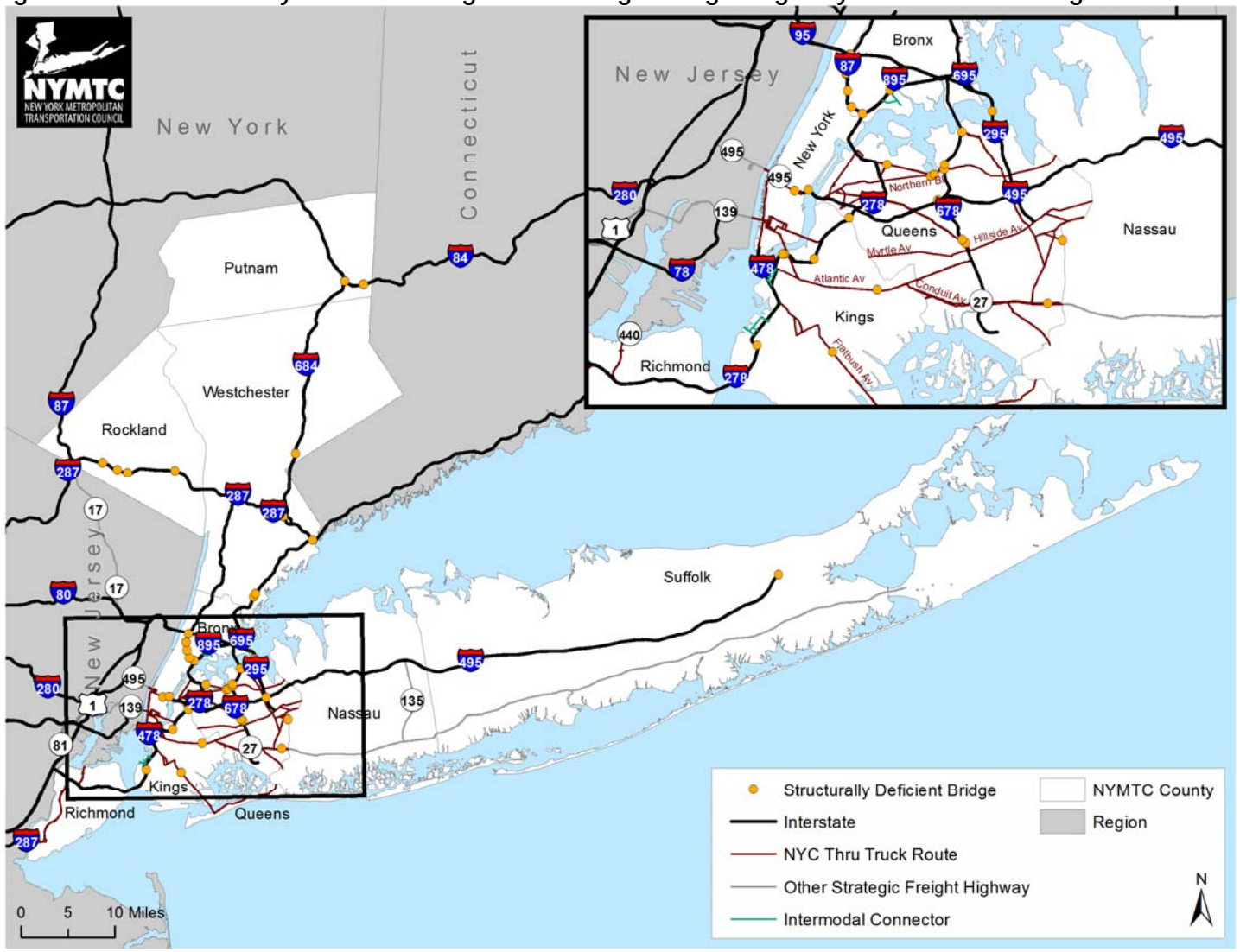


Source: Federal Highway Administration, National Bridge Inventory, 2012.

Several of the bridges listed in Table 2.3 will soon be replaced. The Alexander Hamilton Bridge, which carries I-95 over the Harlem River between upper Manhattan and the Bronx and through the Highbridge Interchange with the Major Deegan Expressway (I-87), is currently undergoing a major reconstriction. According to NYSDOT's website, this project "is the largest single-contract construction project in the history of the New York State Department of Transportation." It is scheduled to be completed by the end of 2013.

NYSDOT is also preparing to rehabilitate several bridges on the Major Deegan Expressway. Work on bridges between the Robert F. Kennedy Bridge and 138th Street is expected to begin in the spring of 2016 and to be completed in the Spring of 2018, according to NYSDOT's website. In addition, the Gowanus Expressway bridge deck over Fourth Avenue, identified as structurally deficient in the NBI database, is currently being replaced, with work scheduled to be complete in 2014.

Figure 2.16 Structurally-Deficient Bridges on Strategic Freight Highways in the NYMTC Region



Source: USDOT National Bridge Inventory, 2012

NYSDOT let a contract in the Spring of 2012 for the reconstruction of the Van Wyck Expressway (I-678) from the Kew Gardens Interchange (KGI) north to 72nd Avenue, including the replacement of the northbound VWE two-lane viaduct (identified as structurally deficient in the NBI database) with a three-lane version with shoulders. This project, scheduled for completion in early 2017, together with the reconstruction of a half-mile section of the VWE just south of the KGI (including the construction of auxiliary lanes in both directions at the KGI), is scheduled for completion in early 2016 and will greatly alleviate a major bottleneck on this highway, which is the main access route for trucks traveling to/from JFK International Airport.

NYSDOT will be replacing the Kosciuszko Bridge, which carries a 1.1-mile segment of the Brooklyn-Queens Expressway (Interstate 278) over Newtown Creek between Brooklyn and Queens in New York City. The project involves the construction of a new eastbound (or Queens-bound) structure to be built parallel to and on the eastbound side of the existing bridge, allowing all traffic to be shifted off the existing bridge and onto the new eastbound structure, the demolition of the existing bridge and the construction of a new westbound (or Brooklyn-bound) structure to be built within the footprint of the existing bridge. The new structures will be built at a lower elevation to allow for reduced roadway grades, which will significantly improve traffic flow. When completed the new structures will have standard lane and shoulder widths, and will include auxiliary lanes in both directions, carrying five (5) lanes of eastbound traffic and four (4) lanes of westbound traffic. A new bikeway/walkway will be included on the new westbound structure. Construction is expected to begin in 2013.

2.2.3 Truck Stops

Truck stop facilities are important elements in the truck network because of the physical and mental demands faced by drivers of long-haul trucks. To ensure safety on highways, the United States Department of Transportation regulates the number of daily and weekly hours which truck drivers can spend driving and working, and the minimum amount of time drivers must spend resting between driving shifts.

Rest stops offer parking, along with general and truck-related amenities including filling stations, showers, and electrification and HVAC ports to reduce idling needs. Many of the rest stops are shared with passenger vehicles with short-term parking needs. Few truck stops in or near the NYMTC Region offer electrification infrastructure that allows truck drivers to use electronics in their cabs without idling their engines.

The NYMTC Multi-State Truck Stop Inventory and Assessment[11] provided the tri-state region with a comprehensive evaluation of existing truck stop services. It determined that truck parking supply is insufficient to meet the demands that currently exist during peak overnight hours. Parking facilities nearest to the urban core of the region are generally the most overcrowded, and are full or nearly full during most periods of the day as shown in Table 2.4.

[11] NYMTC Multi-State Truck Stop Inventory and Assessment, 2009

Table 2.5: Existing (2007) and 2030 No Build Truck Parking Capacity and Utilization by Freight Corridor

	2007			2030 No-Build		
Regional Freight Corridor	**Truck Parking Capacity**	**Peak Utilization (%)**	**Peak Demand**	**Truck Parking Capacity**	**Peak Utilization (%)**	**Peak Demand**
I-87/NYS Thruway	225	159	384	225	331	801
I-95 (CT)	208	203	147	208	419	282
I-78	267	124	342	267	232	638
NJ Turnpike	432	116	517	432	214	955
I-80	273	98	277	273	184	517
I-84/I-684	315	88	285	315	184	598
I-495/LIE	36	154	57	36	323	120
Regional Total	**1,756**	**118**	**2,009**	**1,756**	**236**	**3,911**

Source: NYMTC, Multi-State Truck Stop Inventory and Assessment, 2009.

Of 1,655 truck parking spaces monitored during this study, utilization exceeded 120 percent, on average, during peak overnight hours. A utilization rate near or over 100 percent means there are more trucks parking in the region's truck parking facilities than there are designated spaces to accommodate them. It has also been observed that highway rest areas experience spillover by trucks onto shoulders and trucks can be seen parked overnight on arterials. Overcrowded truck parking facilities result in drivers parking in unsafe locations for themselves and for the traveling public. With an anticipated increase in freight movement expected in the future, the truck parking supply will become even more insufficient to meet demand unless existing facilities are expanded or new facilities are built. One new truck stop facility is currently under construction at JFK Airport. This facility will include 50 truck parking spaces, restaurants, a convenience store, truck washing facility, dry cleaning, and quick lube/light repair services.[12]

2.2.4 Safety

The occurrence of truck-involved crashes along freight corridors compromise highway users' safety, increase the occurrence of delay and unreliability in the operation of the highway system, and contribute to increased costs of delivering goods.

[12] "JFK International Airport Plaza," Airport Plazas, LLC, available from: http://www.airportplazas.com/project-jfk.php.

During the 5-year period between 2007 and 2011, 62 truck-involved crashes resulting in fatalities occurred on the Strategic Freight Highways in the 10-county NYMTC Region. Truck drivers, drivers or passengers of other vehicles, cyclists, or pedestrians involved in these crashes are among the deceased identified in the data. Nearly one-third of those crashes, 19, occurred in Queens County, and 10 crashes occurred in each Bronx County and Nassau County. By highway corridor, I-495 contained the greatest number, with 12 fatal truck-involved crashes occurring on that highway during the five-year analysis period. Nine fatal truck-involved crashes occurred along NY Route 27 during the period. Table lists the nine Strategic Freight Highways on which more than one fatal truck-involved crash occurred between 2007 and 2011, arranged by number of truck-involved fatal crashes.[13] All truck-involved fatal crashes on Strategic Freight Highways are mapped in Figure 2.16.

Table 2.6 Top Nine Strategic Freight Highways by Number of Truck-Involved Fatal Crashes, 2007-2011

Highway	2007	2008	2009	2010	2011	Total
I-495	2	3	1	2	4	12
NY 27	1	4	0	3	1	9
I-87	3	0	1	0	1	5
I-278	0	2	0	0	2	4
I-95	1	0	2	0	1	4
Atlantic Av, Kings County	2	1	0	0	1	4
Canal St, New York County	0	1	1	0	1	3
Delancey St, New York County	0	0	0	0	2	2

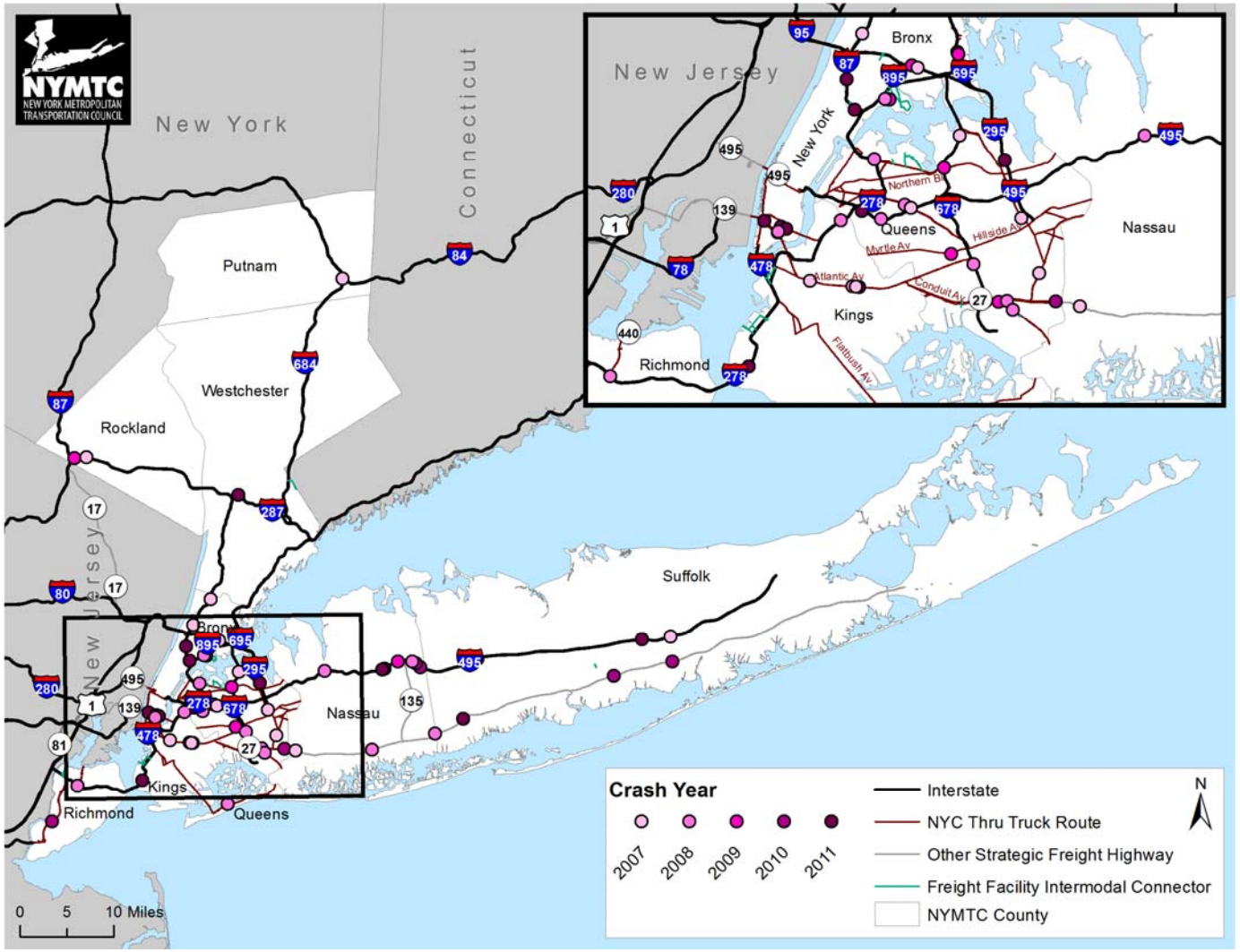
Source: National Highway Traffic Safety Administration

In addition, issues related to truck parking have amplified the need for safe freight infrastructure in the region. With the promulgation of FMCSA Hours-of-Service (HOS) Regulations for truck drivers, there is an expected increase of up to two-and-a-half times current roadway freight movements within the region, as well as rising parking and highway safety concerns. The adequacy and location of truck rest stops has come under increased scrutiny in the region. Due to the limited parking facilities and deficit of parking spaces during the night time, safety is a major concern, with regard to potential criminal activity and danger resulting from chaotic truck parking and substandard circulation patterns. Many

[13] National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS), available from: http://www.nhtsa.gov/FARS.

trucks were observed parking along highway and ramp shoulders and between fuel pumps at service plazas. Safe trucking operations avoid non-recurring delays or delays due to crashes and lead to efficient and timely delivery of freight.

Figure 2.17 Truck-Involved Fatal Crashes on Strategic Freight Highways, 2007-2011



Source: Fatality Analysis Reporting System, National Highway Traffic Safety Administration

3.0 Freight Network Challenges

3.1 CAPACITY

There are many constraints to the expansion of roadway capacity in densely populated and developed urban areas such as the NYMTC region, including obtaining additional right-of-way, environmental and community considerations, federal air-quality constraints, and a lack of funding. Due to the expected continued growth in passenger and freight traffic on roadways that are not expanding physically, facilities are going to become more congested, further impeding efficient freight logistics in the region. Chronic congestion already is evident on the region's well-known bottlenecks (such as the GWB-Cross Bronx segment and Brooklyn-Queens Expressway). This issue of capacity needs to be addressed by both relieving congestion at existing chokepoints and bottlenecks and in meeting the future challenge of a rapidly increasing demand for freight traffic in the region. The largest challenge remains taking advantage of the capacity that exists in the freight transportation system by shifting deliveries to off-peak periods, shifting divertible shipments to alternative modes, consolidating urban deliveries, and using intelligent transportation systems (ITS) technologies to manage traffic during incidents or congested periods.

3.2 PHYSICAL CHALLENGES

The freight network infrastructure in the region is aging and in need of repair in many locations. According to the NYSDOT Pavement Condition Ratings, a significant portion of the region's facilities have either poor or fair pavement condition, including facilities that form the major gateways and conduits into the region for the movement of freight. In many cases, trucks loaded beyond the legal weight limits contribute to the poor pavement and bridge conditions. Worsening physical conditions on these facilities in turn lead to longer delivery times, increased maintenance needs of trucks, congestion, and in some cases "light-loading,"[14] all of which reduce system efficiency. As Section 2.2.3 showed, the highest-volume freight corridors are also the corridors that contain the greatest concentrations of structurally deficient bridges and poor pavement condition.

[14] "Light-loading" refers to the need to load trailers or flat-bed trucks to a maximum weight that is lighter than the general maximum loaded weight because of weight-restricted bridges or other infrastructure along the route.

3.3 REDUNDANCY

There are limited alternative routes for freight movement through the region due both to physical and regulatory constraints. This limitation requires that existing facilities function continuously without failing or being constrained due to incidents, extreme weather, other emergencies. Lack of alternatives also constrains scheduling of essential reconstruction on key links. This is a strategic deficiency of the region's freight infrastructure. Trucks with 53-foot trailers, which are today's standard trailer length nationally, may only travel on the portions of I-95, I-695, I-295, and I-495 that cross the city between the Bronx-Westchester County line and Queens-Nassau County line for through movements to and from Nassau and Suffolk counties, and are not permitted to serve locations in the five NYC boroughs. This restriction on 53-foot trailers elsewhere in New York City means that there is effectively one path to and from Eastern Long Island for standard tractor-trailers. Many parkways that provide key connecting routes between interstate highways and key freight facilities prohibit most or all classes of trucks.

3.4 REGULATIONS AND SIZE/WEIGHT RESTRICTIONS

The regulation of truck size and weight in the NYMTC region presents major challenges due to the physical limitations of key truck routes, and the large - number of overlapping regulatory jurisdictions including New York City, New York State, Metropolitan Transportation Authority, New York State Thruway Authority, the Port Authority of New York and New Jersey, and the U.S. Department of Transportation.

There are two types of size and weight permits that can be issued by state agencies: non-divisible-load permits and divisible-load permits. A non-divisible load is a load that cannot be reduced in size and/or weight. For loads of this kind that exceed legal size and weight limitations, special permits are issued that authorize travel within the jurisdiction of the issuing agency. In the New York metropolitan region, all State Departments of Transportation (DOT), as well as New York City DOT and the Port Authority of New York/New Jersey are authorized to issue permits of this type. A divisible load is a load that can be reduced to a lesser size or weight without great effort or harming the load, such as gravel or asphalt. Not all agencies have authority to issue permits for this type of load. The authority to issue this type of permit is limited to those States with a Federal exemption, which was offered as a "grandfather clause" of the 1956 Federal-Aid Highway Act to states which had established maximum axle and vehicle weights in excess of the limits specified in the Act New York State possesses this Federal exemption while New Jersey and Connecticut do not. Also, New York City does not issue divisible load permits. Given this difference in size and weight regulation, truck operators are forced to make difficult decisions about their operating model, oftentimes making a choice between compliance and profitability.

Within New York City, tractor-trailer combination vehicles operating on most truck routes and interstate highways may not exceed 55 feet in total length. Trucks with 53-foot trailers, which are today's standard trailer length nationally, may only travel on the portions of I-95, I-695, I-295, and I-495 that cross the city between the Bronx-Westchester County line and Queens-Nassau County line for through movements to and from Nassau and Suffolk counties, and are not permitted to serve locations in the five NYC boroughs. This issue represents a cost to shippers and receivers in New York City who must receive shipments by smaller-than-standard tractor-trailer combinations. In practice, tractor-trailers exceeding the 55-foot limit are a frequent sight serving a range of NYC businesses despite the risk of summons.

Agency stakeholder coordination is another area of difficulty in adopting consistent size and weight regulations in the New York Metro region. In New York City alone, carriers must deal with three different agencies: New York City Department of Transportation (NYCDOT), the New York Metropolitan Transportation Authority's Bridge and Tunnel Division, and the Port Authority of New York and New Jersey (PANYNJ). Each agency is allowed to define limitations for the infrastructure under its jurisdiction. When regulations vary substantially from facility to facility, haulers are forced to make difficult decisions about their operating model, oftentimes making a choice between compliance and profitability. Haulers can decide to operate at a lower weight over both facilities and make more trips or operate at the higher weight and risk being caught and paying the associated penalties.

3.5 TRUCK MANAGEMENT AND ENFORCEMENT

The need for improved efficiency in managing truck movements and enforcing regulations is demonstrated by reported instances of bridge strikes[15], pavement and bridge damage, the use of improper or unsafe places to park while resting or while loading/unloading.[16] The region's capacity to enforce the truck route network, truck size and weight, and truck parking and loading regulations is limited by the resources available in law enforcement agencies and the development and deployment of technologies that can assist in enforcing such regulations. Examples of such technologies include electronic weigh-in-motion

[15] "Bridge Strike Mitigation in the New York City Region," Regional Bridge Strike Task Force, 2010, available from: http://www.nyc.gov/html/dot/downloads/pdf/hodge_bridgestrikemitigation_trb2010.pdf.

[16] "Multi-State Truck Stop Inventory and Assessment Study," NYMTC, 2009, available from: http://www.nymtc.org/project/freight_planning/truck_stop/TruckStop_Study.pdf

(WIM) sensors that collect vehicle weight data and camera-based sensors that monitor parking space or curbside loading-zone occupancy. Improving management of the freight highway system can be one way in which the Region's transportation agencies can protect the infrastructure and facilitate safe and efficient operations.