New York City Truck Route Management and Community Impact Reduction Study

Technical Memorandum 2
Truck Routing Analysis

March 2007

New York City Department of Transportation
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TECHNICAL MEMORANDUM 2
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1. INTRODUCTION

The movement of goods within and between the Boroughs of the City of New York is governed by a series of competing demands. On one hand, trucks need to efficiently serve commerce and industry, while at the same time their activities need not contribute to a decline in the quality of life or public safety in the City's neighborhoods.

The principal goal of this project is the reassessment of the City's truck route regulations and networks for the five Boroughs. A comparison of the locations of commercial and industrial development in relation to the designated truck routes indicated that, with minor adjustments, the existing truck route network is capable of serving the truck access needs in the City of New York. This Technical Memorandum was focused on the analysis of the truck routes and subsequent changes that would benefit all stakeholders. Major elements undertaken in the preparation of *Technical Memorandum 2* include:

- Accident data was examined to identify cluster locations of on- and off- truck route streets within the five Boroughs.
- New York City Police Department summonses issued for off-truck route violations were plotted to identify where off-truck route incidents have occurred.
- Ten case studies were conducted to assess specific traffic operational issues associated with specific types of truck generator sites.
- Public comments on problem areas were examined with the above-mentioned data to validate local concerns and formulate solutions.
- Findings of other recent freight studies were examined and compared with the problem areas and issues examined in this Technical Memorandum.

a. Purpose of *Technical Memorandum 2, Truck Routing Analysis*

This Technical Memorandum presents a comprehensive and cohesive set of recommendations that addresses the following issues:

1. Truck Routing Viability in Transitioning Neighborhoods

Since the last major review and revision of the New York City truck route network, nearly twenty-five years ago, the City has undergone some significant land use and zoning changes. The redevelopment of commercial, industrial and manufacturing districts stimulated by changes in zoning has created transitional neighborhoods with increasing residential populations and decreasing truck activity. While the truck routes are essential to serving the remaining commercial and manufacturing businesses in these areas, an ever increasing number of people who are taking up residence in these areas are concerned about their safety and quality of life being negatively impacted by conflicting truck traffic.

During off-peak hours when the businesses are closed and overall vehicle demand is reduced, efforts should be made to reduce truck traffic in these neighborhoods.. A possible recommendation is to designate streets, especially some Local Truck Routes, to be closed to trucks from the late evening to early morning hours of the day so as to help improve the quality of life in these neighborhoods. The cities of Cambridge, Massachusetts and Dallas, Texas have imposed similar time restrictions on streets used by trucks. The recommended time interval for closing the Local Truck Routes would be from 10 PM to 6 AM, which is similar to the restrictions

of the two cities cited. In order to enact such a time restriction on truck traffic it would be necessary to ensure that the commercial businesses along the route would not be unduly impacted and that the time restriction lapses before the beginning of the weekday morning peak period.

2. Physical Infrastructure Constraints on Truck Traffic

All truck traffic going to and from New York City and Long Island or New England must funnel through a limited number of bridges and tunnels. If these facilities are backed up, there are no alternative local arteries or streets. Currently many of the truck bridges, tunnels and roadways into, within, and through the City are congested throughout most of the day and into the night. Adding additional capacity to the river crossings would not by itself solve the problem.

All of the truck carrying expressways are located in densely developed areas making expansion very difficult. In addition, the increase in capacity would possibly attract commuters and other travelers from public transportation into cars, which would compete with trucks. Many of the truck route bridges, viaducts, tunnels, highways and streets were designed over 50 years ago when trucks were much smaller.

Today the standard size tractor-trailer truck is 102 inches wide, 13 feet 6 inches high and upwards to 75 feet in total length (cab and trailer). This presents a conflict for many of the truck drivers of today's standard size semi-trailer vehicle because the City of New York prohibits trucks over 55 feet in total length and 96 inches in width from traveling along almost all of the City's roadway and bridge network, including the truck route network itself. The only designated legal 53-foot trailer routes through the City of New York are from the Westchester County line to the Bronx via the Bruckner Expressway; Queens via the Throgs Neck Bridge, Clearview Expressway and Long Island Expressway; and Long Island via the Long Island Expressway. The problem is particularly acute where long-haul trucks must use the local street network to carry freight between a terminal (rail, port, air, or truck) and the appropriate expressways and interstates.

These conflicts are expected to increase dramatically through the year 2021, during which it is forecast that the total vehicular traffic on the region's roadways will increase by 17 percent, truck traffic by 21 percent and "freight trucks" by 51 percent.[1]

3. Uniqueness of New York City Truck Regulations

Most cities in the United States allow trucks on local streets unless prohibited by signage. New York City is somewhat unique in that it has a truck route policy more akin to a State Department of Transportation by regulating trucks to specific streets. New York City is also unique in that its regulations that govern the size, weight and movement of trucks on local streets are more stringent than Federal and State limits.

This has had a confusing effect on truckers, businesses and residents as to what rules and regulations apply to the local streets. Education efforts will be crucial in informing all stakeholders, including the public, about revisions to the current truck route network and regulations.

[1] Cambridge Systematics Inc. prepared for the New York Metropolitan Transportation Council. Draft Regional Freight Plan. April 2004. Page 2-9.

4. Delineation of Truck Routes

A major difficulty today is the proliferation of numerous signs along local streets that hamper the ability of truck drivers to quickly identify truck route signs or trailblazers while traversing the City streets. There is a limited amount of pole space for installing new signs adjacent to roadways and the truck routes that were signed years ago may lack signage due to theft, removal, or vandalism, causing signage to be nonexistent or illegible. Clarity and placement of existing signage also needs to be addressed. The Borough Analysis sections of this Technical Memorandum recommend sites for new signage and *Technical Memorandum 3, Truck Signage Program* specifically addresses many of the signage issues.

5. Stakeholders Input

Input from the public, business community and the transportation industry has been essential in the advancement of this study. The public has responded to the opportunity to comment on and identify how truck traffic impacts their local neighborhoods, and to be involved and assist the study team in formulating solutions to these issues. Business interests were encouraged to participate in identifying how truck routes affect their daily business.

The overall outreach effort took several forms, including a citywide public survey to individuals, community groups, elected officials and public organizations. Separate surveys were also given to businesses and the truck transportation industry. The surveys were developed to ensure that the project recommendations reflect and address the concerns of New York City's residential and business communities. NYCDOT has also conducted three rounds of public meetings in all five Boroughs. These meetings provided community members, community groups, and businesses with an additional forum to participate in the study. These forums were supplemented by the creation of a Citizens Advisory Committee (the general public) and a Technical Advisory Committee (agencies). Information gathered from *Technical Memorandum 5* was utilized to form the basis of the stakeholder issues which required further analysis in this Technical Memorandum.

2. METHODOLOGY AND DATA UTILIZED TO PERFORM THE TRUCK ROUTE NETWORK ANALYSIS

a. Methodology

As indicated in Section 1 of this Technical Memorandum, there are many complex issues and trade-offs that go into determining the appropriate routing of trucks within and through a city as large and complex as New York City. The information that was utilized in this Technical Memorandum consists of both existing and new sources of data and represents the best information available at the time that the data was being collected and analyzed for this study

Sections 3 through 7 of this Technical Memorandum will present the results of the citywide analysis of the truck route network. Information has been obtained from various sources including truck vehicle counts and classifications, vehicle volume to capacity ratios, accident statistics, truck summonses, existing zoning and land use data, truck trip forecasts by Traffic Analysis Zone, NYCDOT staff, members of the study Technical Advisory Committee and the general public. This data was gathered and compiled in each Borough-specific section to evaluate the viability of the existing truck route network. All of this information forms the backbone of the analysis of the existing and future New York City truck route network.

Given the data and resource limitations of this study it was not possible to look at each and every truck route, in every neighborhood, in each of the five Boroughs of New York City. Therefore, the following three-pronged approach was used to identify those areas to study:

1. Stakeholders (public, trucking and business communities) were canvassed to identify areas of concern by responding to our surveys, sending us e-mails and attending over two dozen outreach meetings that were held in each of the five Boroughs during a five-year time period from 2001 through 2006.
2. The six Borough Commissioners of the NYCDOT provided a list of truck generator “Hot Spots” in their Boroughs which they felt warranted specific attention.
3. Truck generator sites were identified and analyzed in the Case Studies. Initially, a list of 71 truck generator sites was generated through the comments received from stakeholders and NYCDOT Borough Commissioners. This list was then narrowed down to ten sites based on several criteria that were developed by the NYCDOT. These criteria included such things as: geography of locations, type of commercial use, number of complaints received, heavy volume and percentage of truck traffic, and high accident or truck summons locations. These ten sites became the basis of the Case Studies that were done to a greater level of analysis, than other areas of the City.

The remaining subsections of this chapter will explain the various types of data that were gathered to complete this study effort. These sources of data were related to the following: existing vehicle dimension and weight restrictions, land use, mobility (volume to capacity ratio), truck origin and destination forecast, accident data, truck summonses issued, NYCDOT Borough Commissioner “Hot Spot” priority area, stakeholder issues and case studies.

b. Existing Vehicle Dimension and Weight Restrictions

The traffic regulations of the City of New York contain numerous provisions governing the operation of commercial vehicles within the five Boroughs. These regulations restrict trucks to certain routes and limit the size of trucks that can use City roadways. The truck size regulations

control the length, width, height and weight of trucks traveling through the City and are summarized below. The last time that these regulations were studied and modified in a comprehensive fashion was from the time period between 1974 and 1981. Since that time, as was identified in Section 1, the nature of the freight industry with respect to trucking has evolved in ways that were unforeseen at the time, and has become reliant upon trucks to move all our goods and support our way of commerce.

Summary of existing width, height, length and weigh restrictions in New York City:

- Maximum width
  - 8 feet (except buses and fire vehicles)
- Maximum height
  - 13½ feet
- Maximum length
  - 35 feet for single unit vehicles (except buses) and 55 feet for multi-unit vehicles
- Maximum loaded weight
  - 22,400 lbs. on any one axle
  - 36,000 lbs. on any two consecutive axles less than 10 feet apart
  - 34,000 lbs. plus 1,000 lbs. per foot from center of rearmost axle for vehicles with 3 or more axles
- Maximum weight
  - 73,280 lbs.

Complementing these regulations are the New York State regulations that govern the operation of commercial vehicles on the State's expressways within the City limits and traffic regulations of the Port Authority of New York and New Jersey and the MTA – Bridges and Tunnels that cover the operation of commercial vehicles on the bridges and tunnels operated by these agencies.

In addition, there are numerous height restrictions at locations throughout the City. Most of these restrictions exist in the Bronx, Manhattan, Brooklyn and Queens, with a limited number of clearance issues in Staten Island. State law mandates that the posted clearance restrictions shall be one foot lower that the actual vertical clearances.

There are vehicle height restrictions at locations in the Bronx, Brooklyn, Manhattan and Queens, but none in Staten Island. The Vehicle Height Restriction maps identify locations where the New York City. Figures 2-1 through 2-4 show the legal vertical clearance associated with each height-restricted location, along the Local and Through Truck Route network. Those locations depicted on the map only represent a handful of the locations citywide where vertical restrictions impact truck movements. In addition, at many locations, such as Railroad trestles, both station construction and settling of the roadbed impact the actual clearances. For more detail on the existing traffic regulations related to trucks, go to *Technical Memorandum 1*, Section 2.

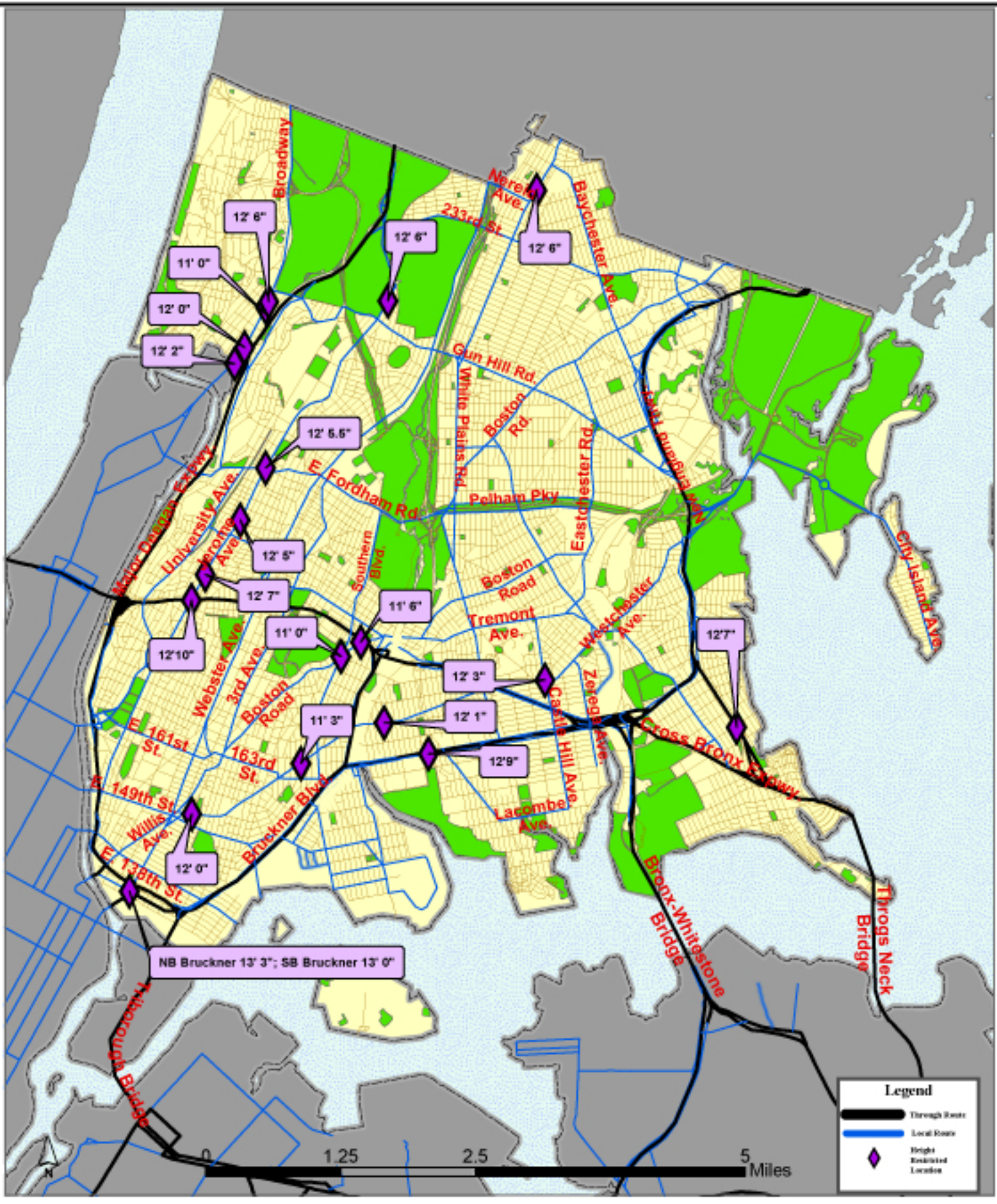

Figure 2-1
The Bronx Vehicle Height Restrictions

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Figure 2-2
Brooklyn Vehicle Height Restrictions

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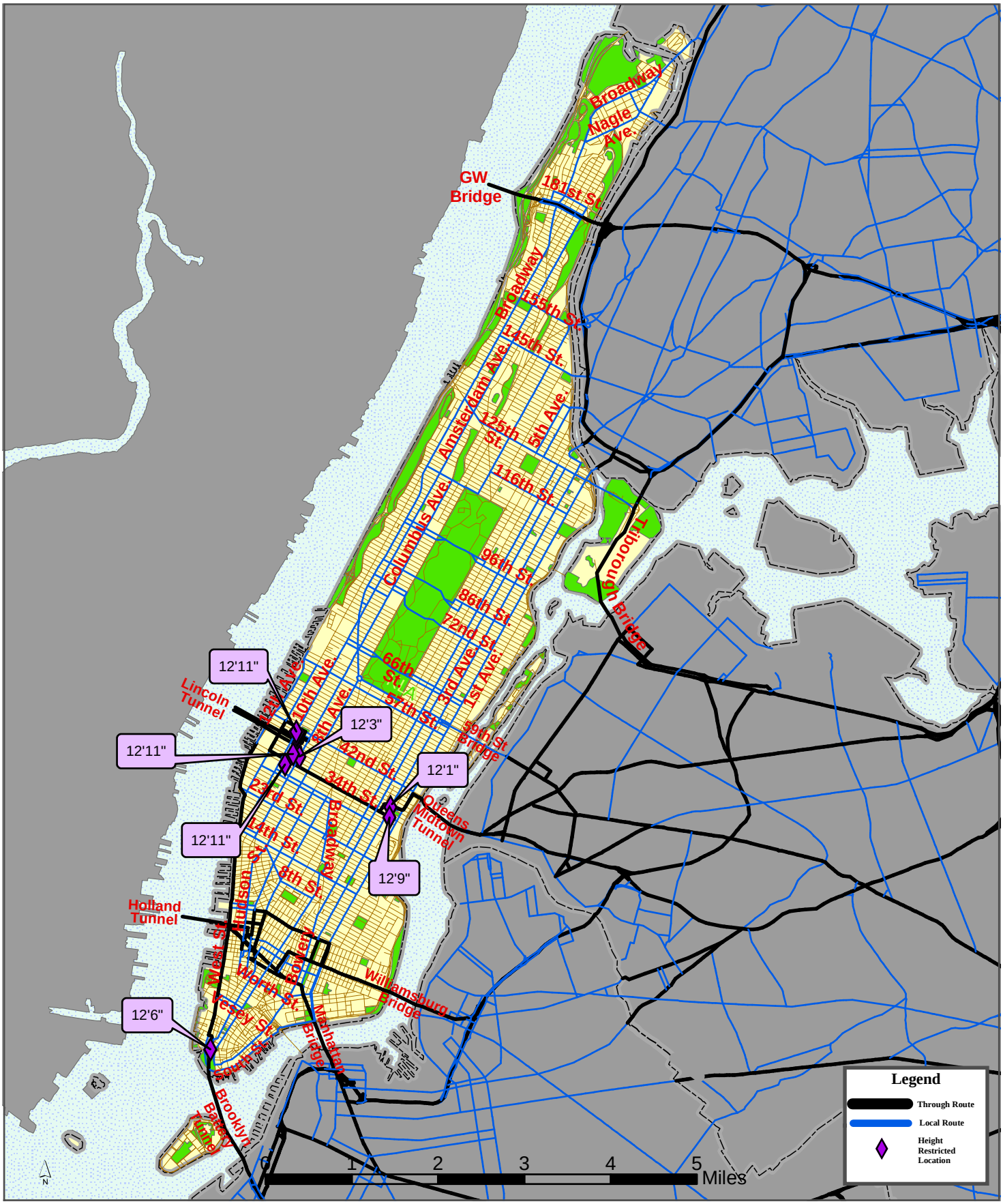

Figure 2-3
Manhattan Vehicle Height Restrictions

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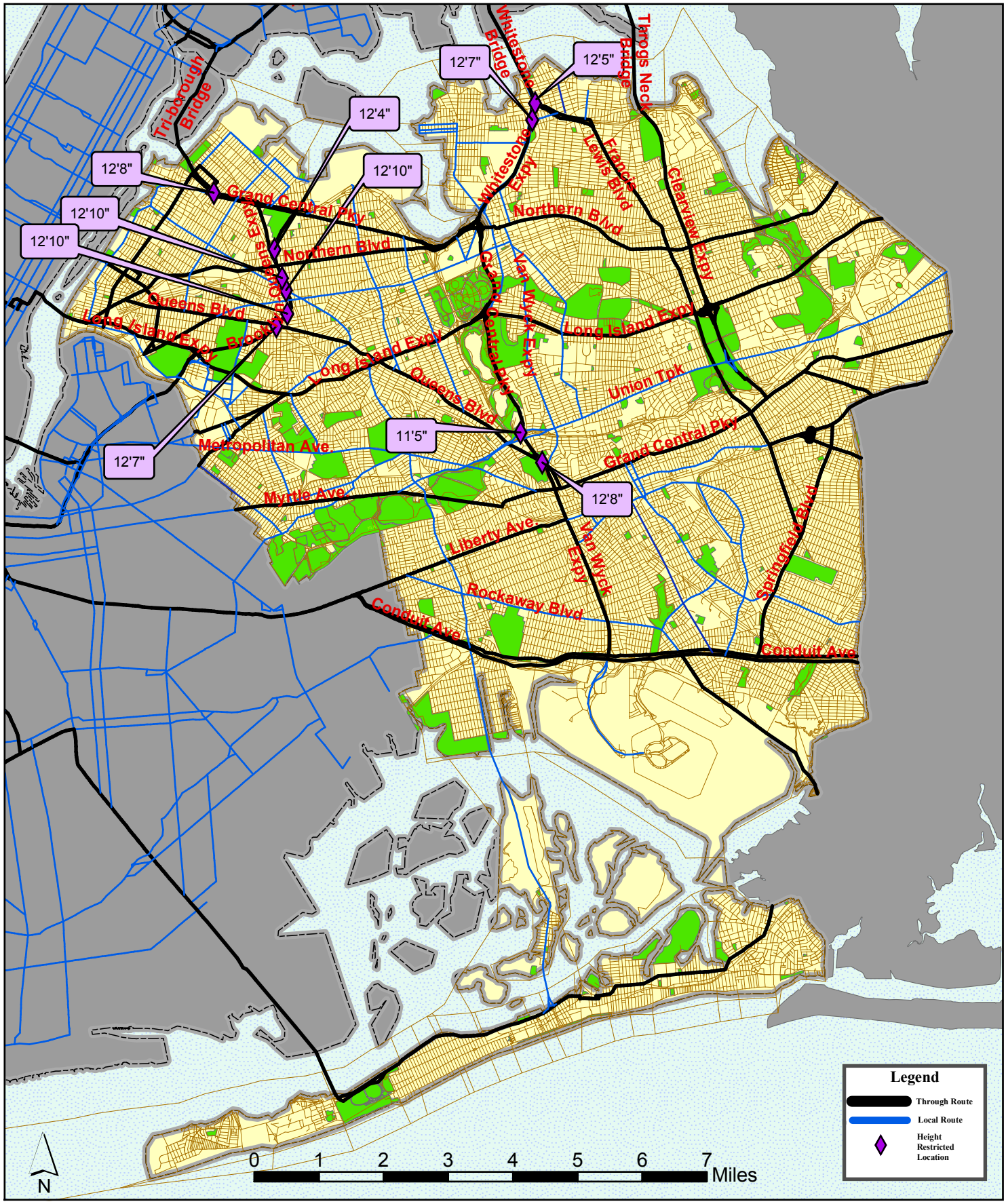

Figure 2-4
Queens Vehicle Height Restrictions

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c. Land Use

Land use data obtained from the NYCDOT and New York City Department of City Planning was utilized to produce land use graphics for the Borough routing analysis sections of this Technical Memorandum (Sections 3 – 7). Since the last time the truck route network was revised twenty-five to thirty years ago, a number of neighborhoods have undergone or are in the process of transitioning from industrial, manufacturing and commercial uses to residential and mixed-uses. It was necessary to compile a set of maps for each Borough to verify the validity of the truck route network given some of the changes in the neighborhoods. In general, the land use maps were used as a tool to better enable us to identify those areas in the City of New York where conflicting land uses such as residential, open space, and public facilities (schools, hospitals, public housing, etc.) exist in close proximity to a Local Truck Route network.

d. Mobility

The New York Metropolitan Transportation Council's (NYMTC) Best Practices Model (BPM) was used, as part of the *Regional Freight Plan*, to forecast truck activity within the City of New York. NYMTC has developed the BPM in response to the Federal Requirements of the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act (CAA) of the 1990s. This model predicts changes in the future travel patterns in response to changes in the land use, demographic profiles and transportation systems in the region. The BPM study area includes 28 counties in New York, New Jersey, and Connecticut.

Information obtained from the NYMTC BPM was utilized to depict the 2025 volume to capacity ratio forecast of each of the five Boroughs of New York City. The volume to capacity ratio (v/c) is the ratio of demand flow rate to capacity for a traffic facility, expressed as volume. As the v/c ratio approaches 1.0 (volume approaches capacity) travel speeds decrease, travel times become longer and less reliable, and the performance of the transportation network decreases. For example, a v/c ratio of 0.8 indicates that a traffic facility is operating at 80 percent of its capacity. Ideally, in evaluating the performance of a roadway, v/c ratios should be considered together with the letter grade system, which is more of a qualitative assessment based heavily on speeds and travel time. While some new traffic level of service data was collected at specific truck generator sites as part of this study, a complete level of service data collection effort was not feasible to undertake for the entire truck route network. The v/c ratio information that was utilized in this effort is from the morning peak hour period of 2025. The following is a description of the various v/c ratio categories:

- v/c ratio greater than 1.0 = severe traffic congestion
- v//c ratio of 0.75 to 1.0 = heavy traffic congestion
- v/c ratio of less than 0.75 = acceptable traffic congestion

e. Origin and Destination Forecast

Redevelopment of the old commercial/manufacturing areas has resulted in many mixed-use areas in the City that include residential uses along truck route corridors that still serve commercial/industrial customers. While the remaining commercial/manufacturing uses may be less intrusive on the environment, the truck traffic involved with delivering materials and picking up final products present public safety and quality of life concerns for local area residents. Rather than review how the truck route network has served truck trip destinations in the past,

this route analysis focused on evaluating how the existing truck route network will be able to meet the future truck origin/destination needs of the City of New York through the year 2025.

Data from the NYMTC *Regional Freight Plan* was used to generate the major truck origin and destination locations within New York City. The major truck origin and destination locations were derived from total truck trips during the four-hour AM peak period for future year 2025. The AM peak period was chosen because it represents a worst-case future traffic scenario. Origins and destinations of all truck trips were added together to produce total truck trip ends within the five Boroughs. The total truck trip ends were then allocated to the Transportation Analysis Zone (TAZ) structure of the NYMTC BPM to illustrate a geographical representation of the truck trip ends. From this procedure, thematic maps that show the total truck trip ends by TAZ were created to show areas of each Borough that produce a significant amount of truck traffic and are included in all of the Borough analysis chapters that follow.

The City's truck route network was overlaid on the truck trip end thematic maps for the Boroughs to compare the truck route network to areas of the City that generate a substantial amount of truck traffic. Comparing the truck route network to the truck trip end destinations helped to determine if the current truck route network would adequately serve areas of the five Boroughs that are anticipated to generate a high volume of truck traffic. Furthermore, areas of the City that do not generate significant truck traffic, which are usually residential areas, should have fewer connections to the truck route network. Comparing the truck route network to the truck trip ends resulted in the development of truck routing recommendations.

The BPM data shows the destinations of truck trips in each Borough. However, since the completion of the BPM, several major traffic policy changes have been implemented that restrict truck movements and routings between and through the Boroughs.

1. MTA Bridges and Tunnels has a total restriction on trucks over 40 tons from using the Bronx-Whitestone Bridge;
2. MTA Bridges and Tunnels has imposed a partial restriction of trucks over 40 tons from using the Throgs Neck Bridge. These commercial vehicles can use the bridge between 11 PM and 5 AM;
3. PANYNJ prohibits all trucks from using the Holland Tunnel into Manhattan and only trucks with two or three axels are permitted to use the tunnel to leave Manhattan;
4. PANYNJ also restricts all trucks to the upper level of the George Washington Bridge; and,
5. NYCDOT prohibits trucks from using the Williamsburg Bridge.

These restrictions severely limit routing options for commercial traffic in the City. As a result, the Triborough Bridge is the only truck route between the Bronx and Queens between 5 AM and 11 PM for trucks exceeding 40 tons. Similarly, the Lincoln Tunnel becomes the primary truck route for commercial vehicles destined to points in Lower Manhattan including the Canal Street area. The BPM does not account for these changes to the truck network restrictions, since the model was completed several years ago, before the implementation of these truck restrictions.

f. Accident Data

Three-Year (1999-2001) Accident Data

Truck accident data were provided for the 36-month period (1999 – 2001)[2] to identify the number of accidents in the City that involved trucks. During this period there were 15,866 accidents involving trucks that were reported at 8,182 intersections throughout the City. This data is for the entire roadway network. Table 2-1 provides a breakdown by Borough of these accidents.

Table 2-1: Truck Accident Summary by Borough for the Period 1999-2001

Borough	Accidents	% of Total
Brooklyn	5,356	33.8
Manhattan	4,489	28.3
Queens	3,609	22.7
Bronx	1,934	12.2
Staten Island	478	3.0
Total	*15,866*	*100.0*

Brooklyn had the highest number of total accidents (33.8%) and Staten Island the fewest (3%). The three Boroughs of Brooklyn, Manhattan, and Queens accounted for 85% of the total truck accidents during that 36-month time frame.

Eighty percent of the intersections had one or two reported truck accidents during the 3-year period or less than one reported truck accident per year. Table 2-2 lists the frequency distribution of accidents.

[2] NYS Division of Motor Vehicles tabulated by NYCDOT.

Table 2-2: Frequency Distribution of Reported Truck Accidents 1999-2001

Range of the Number of Accidents	Number of Intersections	Percent of Total Intersections	Cumulative Total
31-35	2	0.02 %	0.02 %
26-30	5	0.06 %	0.08 %
21-25	9	0.11 %	0.19 %
16-20	19	0.20 %	0.39 %
11-15	56	0.68 %	1.07 %
10	27	0.33 %	1.40 %
9	24	0.29 %	1.69 %
8	43	0.53 %	2.22 %
7	64	0.78 %	3.00 %
6	113	1.38 %	4.38 %
5	176	2.15 %	6.53 %
4	343	4.19 %	10.72 %
3	686	8.38 %	19.10 %
2	1601	19.57 %	38.67 %
1	5017	61.33 %	*100 %*
TOTAL	*8182*	*100 %*	

The data was examined further to identify the top 20 and top 100 intersections with the highest number of truck accidents. This data is shown in Table 2-3.

Table 2-3: Intersections with Truck Accidents by Borough 1999-2001

Borough	Top 20[1]	Top 115[2]
Bronx	4	15
Brooklyn	5	42
Manhattan	8	37
Queens	3	21
Staten Island	0	0
Total	***20***	***115***

[1]18 or more accidents [2]10 or more accidents

As shown in Table 2-3, there were 115 intersections with 10 or more truck accidents. The top 20 accident locations involved intersections with 18 or more accidents during the 36-month period (or an average of 6 accidents / year). Manhattan had eight intersections in the top 20 and 15 in the top 115. Table 2-4 shows the citywide top 20 truck accident locations.

Table 2-4: Top 20 Truck Accident Locations Citywide from 1999 - 2001

Borough	Intersection	Truck Accidents
Bronx	Bruckner Blvd. and E 138th St.	35
Brooklyn	Flatbush Av. Ext. and Tillary St.	33
Manhattan	2nd Ave. and E. 59th St.	29
Manhattan	2nd Ave. and E. 128th St.	28
Queens	Hoyt Ave. and 31st St.	28
Bronx	Bruckner Blvd. and Tiffany St.	26
Manhattan	Broadway and Canal St.	26
Bronx	Bruckner Blvd. and Hunts Point Ave.	24
Bronx	Bruckner Blvd. and Leggett Ave.	24
Brooklyn	Metropolitan Ave. and Meeker Ave.	24
Manhattan	6th Ave. and Canal St.	24
Manhattan	Bowery and Canal St.	24
Brooklyn	Flushing Ave. and Classon Ave.	22
Manhattan	Varick St. and Canal St.	22
Brooklyn	Flatbush Ave. and Nevins St.	21
Manhattan	Hudson St. and Canal St.	21
Manhattan	10th Ave. and W. 41st St.	20
Queens	College Point Blvd. and Interstate 495 Service Rd.	20
Brooklyn	Flatbush Ave. and Caton Ave.	19
Queens	Queens Blvd. and Thomson Ave.	18

Maps of the high accident locations throughout each Borough are located in Sections 3 through 7 of this Technical Memorandum. The Boroughs of the Bronx, Brooklyn, Manhattan, and Queens have two types of accident location maps. One group of maps illustrate all locations by Borough that reported ten or more truck accidents from the three-year accident data, and a secondary map locates the top five accident locations in each Borough and provides accident totals for these locations. Since Staten Island did not have any truck accident locations represented within the top 115 accident locations citywide from the three-year accident data, one map depicting the Boroughs' top reported truck accident locations and their respective accident totals is provided.

In reviewing the data the following citywide points were noted:

- At most of the truck accident locations in the top 20 list at least one of the two cross streets is a Through Truck Route;
- Truck accidents that occurred at the top 115 intersections represented 10.4% of the total reported truck accidents citywide; and,
- The total truck accidents that occurred at the top 20 intersections represented 29.6% of the total reported truck accidents at the top 115 intersections.

Two Month (October – November 2003) NYPD Accident Data

In response to complaints from New York City residents claiming that many trucks in the City do not adhere to the designated truck routes, we requested truck accident data for the entire City from the New York Police Department (NYPD). The accident data covers a two-month period between October and November of 2003. The raw data received from the NYPD was formatted to group all accidents that occurred at a single location to the same entry in the database. This resulted in approximately two thousand truck accident locations within the City. Using the Geographical Information Systems (GIS) software, ArcMap, the intersections were located and displayed on the Truck Route maps through Geocoding. Geocoding is an ArcGIS tool used to create graphic representations of matrix datasets (i.e. address or intersection information), so relationships and patterns can be detected in association to geography. This provided a means of determining the number of accidents that occurred off the designated truck routes and the number of accidents that occurred on the designated truck routes. The results of this analysis were then used as an indication of whether the residents' claims regarding trucks being off the designated trucks could be substantiated.

Tables 2-5 and 2-6 summarize accidents and accident locations based on whether the accidents occurred on or off truck route streets for each of the five Boroughs.

Table 2-5: New York City Truck Accident Locations

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Total
Total	243	555	687	379	89	1953
On Truck Routes	144	290	464	218	69	1185
Off Truck Routes	99	265	223	161	20	768
Percentage Off Truck Routes	41%	48%	32%	42%	22%	39%

Table 2-6: New York City Truck Accidents

	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Total
Total	293	640	940	422	94	2389
On Truck Routes	193	362	661	252	74	1542
Off Truck Routes	100	278	279	170	20	847
Percentage Off Truck Routes	34%	43%	30%	40%	21%	35%

The data reveals that most truck accidents and truck accident locations occur along a truck route. However, the number of accidents and accident locations occurring off-route is significant. As can be seen from the above tables, the data certainly seems to indicate that a significant number of trucks are deviating from their designated routes.

g. NYPD Truck Summonses

In order to evaluate the nature of trucking violations in the City, two sets of violation data were obtained from the New York Police Department (NYPD). The first data set listed a spectrum of violations including, but not limited to, trucking violations. Violations that could not be ascribed

to trucks were removed from the data set. The remaining data contained the number of violations in various NYPD precincts in each of five categories: over-dimension vehicles, vehicles that were over-dimension according to a size limit posted nearby, overweight vehicles, equipment violations and being off the truck route. This data covers October and November of 2003. To attain meaningful numbers, this precinct-level data was combined into Borough-wide totals.

A list of locations where highway patrol officers noted displaced and over-height vehicles on or near parkways comprised the second set of data. Data collected by officers included the date, time, and location of the violation, the trip origin and destination, where the truck entered the roadway, and the source of directions as reported by the driver. This data covers the period from January 2001 to December 2003. The log listed violations in every Borough except Staten Island. Information about the type and number of violations that came from the first set of data is provided in Sections 3 - 7.

h. NYCDOT "Hot Spot" Priority Areas

Relevant Department staff identified those areas within their respective Boroughs that were deemed trucking "hot spots". These "hot spots" were areas that were well known by the Borough Commissioner's to be priority areas in need of further analysis based on the feedback that their offices had received from various sources including: the general public, business associations, business improvement districts, police precincts, local elected officials, community groups, church groups and others. These areas were evaluated to ascertain the problems experienced and develop recommendations that would help to alleviate the Borough Commissioner's concerns.

i. Stakeholder Issues

The project team received more than one thousand public comments over the course of the study effort. Input came from all stakeholder groups, including the general public, community and civic groups, the business community and the trucking industry. Verbal and written comments were elicited through several outreach methods: community survey, online comment form, public outreach meetings, and telephone, mail and email communications. These methods are explained in detail in *Technical Memorandum 5*.

The comments received from the public are summarized in the various Borough analysis sections of this Technical Memorandum (Sections 3 to 7). In some cases field work was performed to compile the information necessary to complete the analysis.

j. Case Studies

There are numerous commercial and other sites throughout the City that generate truck activity. While examination of all the sites is beyond the scope of this project, a group of representative sites were selected to reflect the different types of truck generators found throughout the City. These sites were then analyzed to identify improvements to reduce any adverse impacts of trucks in the neighborhoods. The objective of this approach was to produce a "toolbox" of traffic engineering measures to address specific types of truck related problems in neighborhoods that include land uses that generate truck activity.

A final list of commercial activity centers was identified. This list was developed in a four-step process.

1. A citywide list of commercial activity centers was compiled based on input from the public surveys, comments received at the Borough public meetings, input from the Borough Commissioners, and field observations. The initial list contained 71 sites (Table 2-7). Several local residents mentioned some of the locations on this list. While no specific weights were assigned to the locations, those sites that were identified by multiple members of the public as "problem areas" were considered as potential higher-priority locations.

2. The sites were then sorted by Borough to establish the geographical distribution of the truck generator sites.

3. Each site was then classified as a specific type such as: waste transfer station, freight distribution center/terminal, industrial park/center or retail center. Some of the sites were categorized differently (e.g., a Verizon Operations Center in southeast Queens; an MTA Maintenance Facility in the Bronx; a bus Depot in lower Manhattan). The intent was to identify a diversified range of uses that generate truck traffic throughout the City of New York based on the premise that different uses may have different truck accessibility issues and problems. In this way, the final selection of sites could ensure that the final set of ten sites would contain each major use type.

4. The sites were reviewed with NYCDOT staff to identify a final mix of ten sites that would include each category of truck generator site with representative sites within each Borough.

To be effective, the sites were selected to provide a diversified mix of trucking related land uses (truck terminal, solid waste transfer, warehousing, etc) in different neighborhood settings to ensure that as broad a spectrum of field conditions were covered.

Table 2-7: Draft List of Truck Generator Locations

Bronx	***High Truck Activity Sites***	***Use Type***
1.	Stella Doro Biscuit Company and Bakery (W. 237th Street)	Retail / Distribution
2.	Waste Transfer Station @ 132nd & Locust	Sanitation
3.	Harlem River yards 180th to 184th Streets	Distribution
4.	160th Street & Prospect Avenue	N/A
5.	Grand Concourse & 149th Street	N/A
6.	Bathgate Industrial Park	Mixed Use
7.	Hunts Point (Bruckner Boulevard and Hunts Point Avenue)	Distribution
8.	UPS @ Brush Avenue and Senger Place	Mail
9.	NYCDOS Garage @ Gerard Avenue	Sanitation
Brooklyn	***High Truck Activity Sites***	***Use Type***
10.	US Postal Office Pacific between 3rd & 4th Avenues	Mail
11.	Fed-Ex Industrial Avenue and 3rd Avenue	Mail
12.	Brooklyn Terminal	Warehousing
13.	3rd Avenue/Industrial Park	Industrial
14.	Bush Terminal Associates	Mixed Use
15.	20th Industrial Park	Industrial
16.	East Williamsburg Industrial Park	Mixed Use
17.	Bayside Fuel Oil Company (Smith Street & 9th Street)	Commercial
18.	Sunset Industrial Park	Mixed Use
19.	Brooklyn Waterfront	Mixed Use
20.	Caton Avenue Between Coney Island Avenue and Linden Blvd.	N/A
21.	U-Haul Facility on 4th Avenue	Warehousing
22.	Red Hook	Mixed Use
23.	Brooklyn Navy Yard	Mixed Use
24.	Atlantic Center (Flatbush Avenue/Stanton Avenue)	N/A
25.	Stop and Shop	Retail
26.	Bus Depots	Transit
27.	Garbage transfer stations	Sanitation
28.	Bay Terminal Shopping Center	Retail
29.	East New York	Industrial
Manhattan	***High Truck Activity Sites***	***Use Type***
30.	117th St./Park Ave, 119th St. between 2nd and 3rd Avenues	N/A
31.	MTA Substation at 16th St. between 6th and 7th Avenues	Transit
32.	99th /1st Avenue	N/A
33.	100th/Lexington Park	N/A
34.	2nd Avenue and 126th Street	N/A
35.	Sanitation Garage at 14th Street	Sanitation
36.	Warehouses in West Village	Warehouse
37.	Taconic Investment Building between 8th & 9th Avenue	Commercial

Table 2-7: Draft List of Truck Generator Locations (continued)

	Manhattan	***High Truck Activity Sites***	***Use Type***
38.		Supermarket 11th Avenue & West 64th Street	Retail
39.		UPS @ 24th Street & 11th Avenue	Mail
40.		Tropicana	Retail
41.		Javits Center	Mixed Use
42.		UPS/Fed-Ex Terminal on 42nd & 43rd Streets on 11th Avenue	Mail
43.		US Post Office @ W. 68th St. between Broadway& Columbus Ave.	Mail
44.		UPS @ 11th Avenue between 43rd & 44th Street	Mail
45.		NY Times Building (W.43rd &W. 44th streets between 7th& 8th Aves.	Commercial
46.		Fairway (74th Street and Broadway)	Mixed Use
47.		200 Block of West 15th Street	N/A
48.		Chelsea Market on 9th Avenue	Retail
	Queens	***High Truck Activity Sites***	***Use Type***
49.		Hook Creek Industrial Park	Mixed Use
50.		JFK Airport	Mixed Use
51.		West Maspeth Industrial Park	Industrial
52.		New shopping center on 20th Street west of Whitestone Expressway	Retail
53.		10th Avenue between 152nd and 154th Street	N/A
54.		Home Depot & Plaza 48 along Northern Blvd. & 48th Street	Retail
55.		154th Street & 10th Avenue	N/A
56.		Jamaica Avenue (199th, 201st & 204th Streets)	Mixed Use
57.		Springfield Gardens	N/A
58.		Springfield Gardens near Verizon Operations Center	Service
59.		College Point Corporate Park	Mixed Used
60.		Long Island Jewish Hospital	Health Care
61.		Bus Depot 222nd Street, Queens Village	Transit
62.		Bus Depot Rockaway Boulevard	Transit
63.		Maspeth Industrial District Route LIE/BQE	N/A
64.		Maurice Avenue/Newtown Creek Industrial Area	Mixed Use
65.		Atlas Terminal (Cooper Avenue & 80th Street)	Distribution
66.		Clintonville Street & 154th Street	N/A
	Staten Island	***High Truck Activity Sites***	***Use Type***
67.		Howland Hook	Distribution
68.		Major distribution centers along Richmond Terrace	Distribution
69.		Concrete Plant at foot of Bayonne Bridge near Morningstar Road	Industrial
70.		MTA Garage Facility (off of Heberton Avenue)	Transit
71.		Hylan Plaza	Retail / Distribution

The list was reviewed with NYCDOT staff to ensure that the selected sites were diverse in terms of land use type, geographic location and the type of truck activity. Based on this review, the final ten sites, or case studies, that were identified by Borough include:

- Port Morris – Bronx (Site 2)
- East Williamsburg – Brooklyn (Site 16)
- Sunset Park – Brooklyn (Site 18)
- East New York – Brooklyn (Site 29)
- Midtown Manhattan (Sites 43 and 45)
- Springfield Gardens – Queens (Sites 57 and 58)
- College Point – Queens (Site 59)
- Maspeth Industrial Park – Queens (Site 63)
- Howland Hook – Staten Island (Site 67)
- Hylan Plaza – Staten Island (Site 71)

The case studies are models of land use throughout the City, such as big box retail, commercial and industrial. Big box and commercial sites[3] include College Point and Hylan Plaza, while industrial sites[4] include Port Morris, East Williamsburg, Maspeth and Howland Hook. Truck distribution centers include Midtown Manhattan and Springfield Gardens. The ten sites were chosen to represent different land use types throughout different areas of the city. Therefore, different categories of truck generating sites at various locations throughout the City are represented.

A description and site analysis of the ten identified sites are discussed in each of the respective Borough analysis sections that follow. The description of the site includes the current land uses and zoning within and surrounding each identified site, as well as community facilities that may be affected by truck traffic originating from and destined to the site. The description of each site is broken down by the identified study area for each site as well as the specific truck generator site within the study area, such as a conglomeration of warehouses within the study area.

A traffic analysis of each site, specific to truck traffic, was prepared and will be discussed in the following section. Traffic counts at "critical" intersections within the ten study areas were conducted to determine the truck traffic flows within each site. The "critical" intersections were chosen through field observations; intersections that have access to truck generator sites and access to local and regional truck routes. The operations analysis, discussed in the description of the case studies, determines the level of service at these intersections and determines the truck percentages of all traffic and how the truck traffic is traversing through the intersection. An analysis of the truck-related accidents and geometric constraints and other observations is included in the case studies, as well as recommendations for each case study.

[3] Big box retail involves goods deliveries by trucks of all sizes with trucks entering the site at common areas with automobile traffic and/or designated commercial delivery driveways. The sites may have on-site loading docks or accept curbside for deliveries.

[4] Industrial sites can have one or multiple industrial or warehousing tenants with a high level of truck activity. The trucks vary in size from panel vans to single unit trucks to tractor trailers varying in length from 38 to 53 feet. Goods movement to and from these sites can occur by interstate carriers and/or a tenants' own fleet of trucks.