

Appendix A: Service Needs Assessment Methodology

MTA New York City Transit
New York City Department of Transportation
April 2009

Data Sources and Analysis

To identify unmet transit service needs the study team drew on data from the following sources:

- **Demographic data:** the study team mapped population density, employment, zero car households, and other indicators using data from the 2007 American Community Survey and the 2000 U.S. Census.
- **Ridership data:** the study team examined NYCT bus and subway ridership data, including: the highest volume bus to subway transfer points, the busiest bus routes, and subway links that are at or above 95 percent of NYCT loading guidelines during the peak hour.
- **Trip origin and destination data:** the study team examined data generated by the MetroCard system on trip origins and destinations, as well as NYCT's transit forecasting model.

The study team then focused on four types of transit needs:

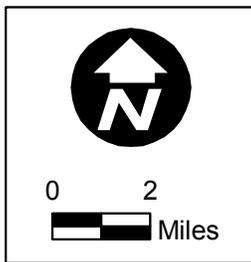
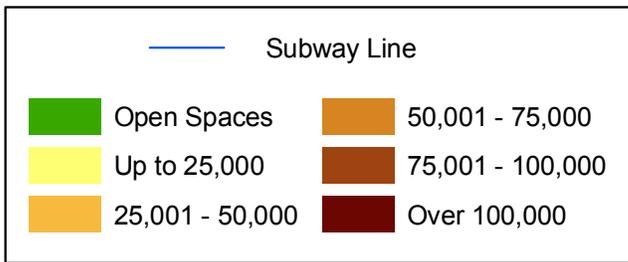
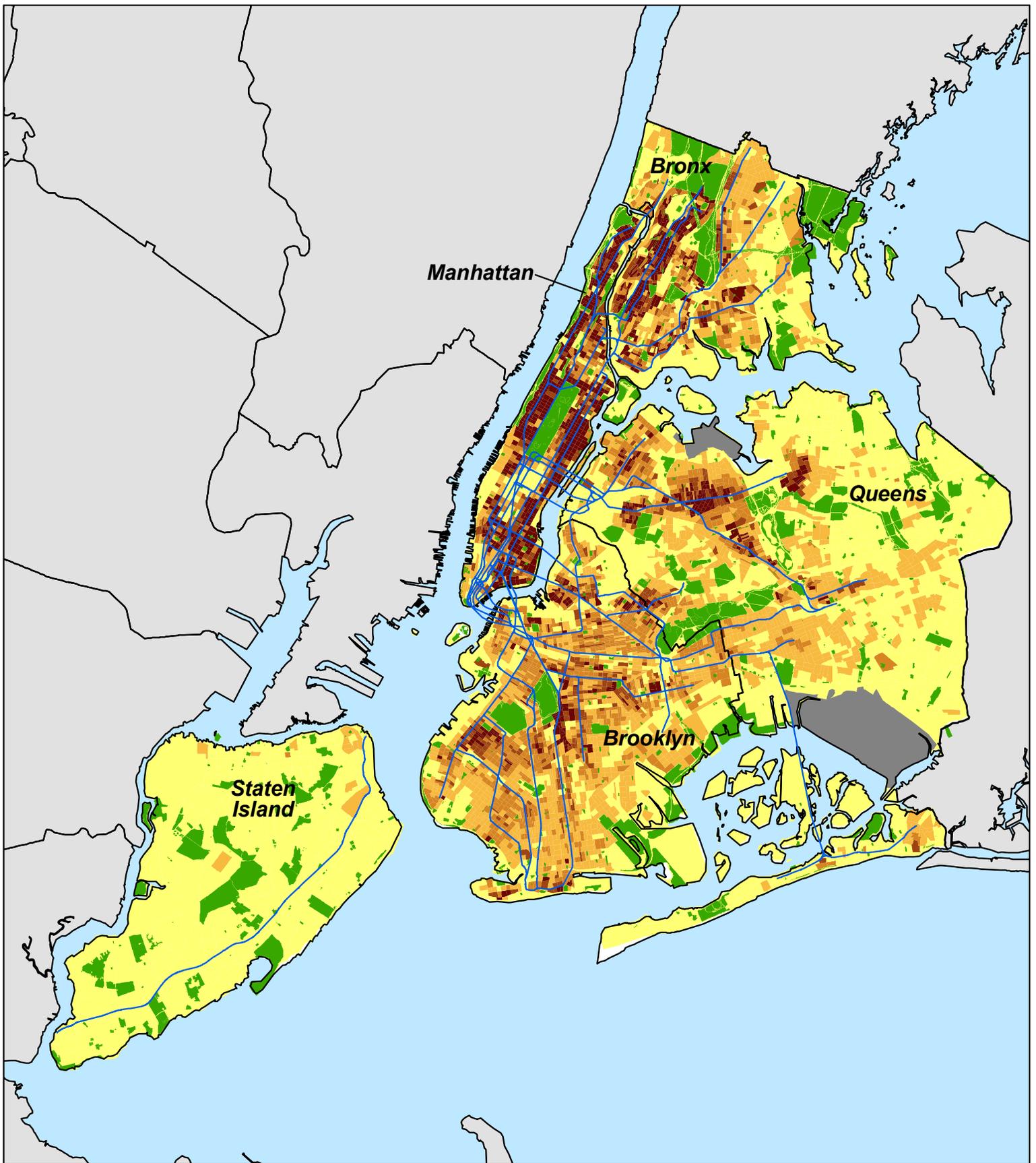
1. Underserved areas

Preliminary Screen

The study team endeavored to identify areas that are underserved by the existing subway network and that are promising markets for BRT services. The market potential for BRT was determined by evaluating factors associated with high rapid transit ridership: (1) residential density, (2) employment density, and (3) the proportion of zero car households. The study team mapped and analyzed the following data:

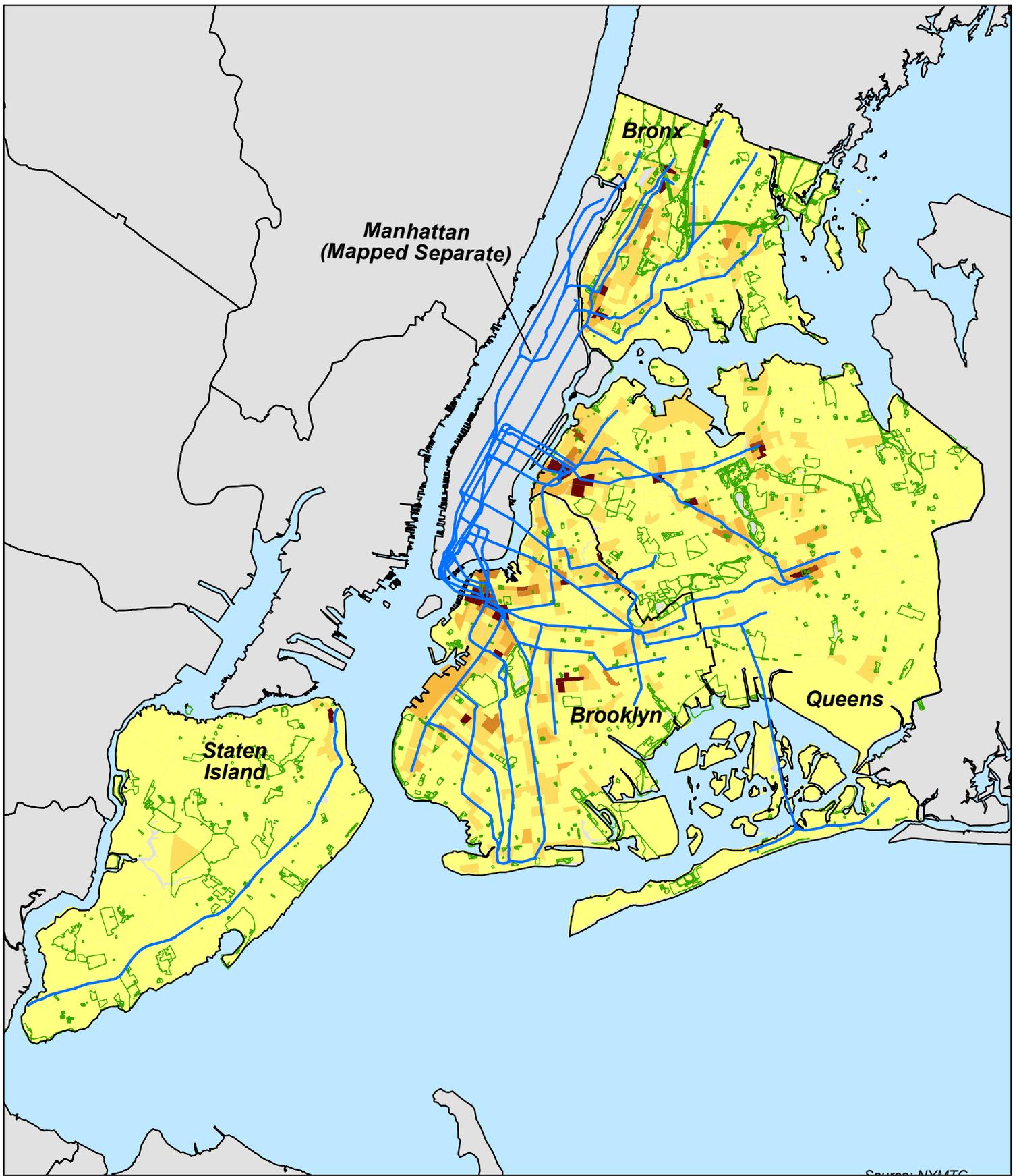
- Population density per square mile, source: 2000 U.S. Census
- Employment density per square mile, source: 2005 New York Metropolitan Transportation Council (NYMTC)
- Proportion of zero vehicle households, source: 2000 U.S. Census

These maps are presented in the pages that follow.

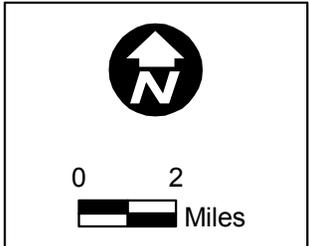
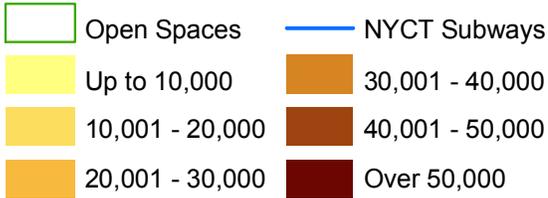


**Population Density per Square Mile
By Block Group**

Source: 2000 U.S. Census

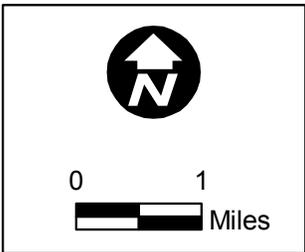
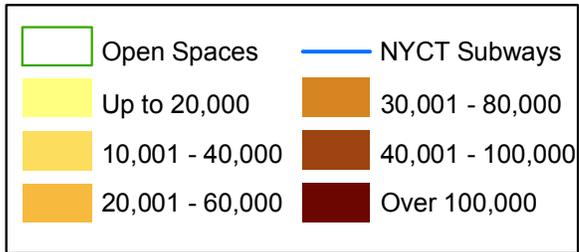
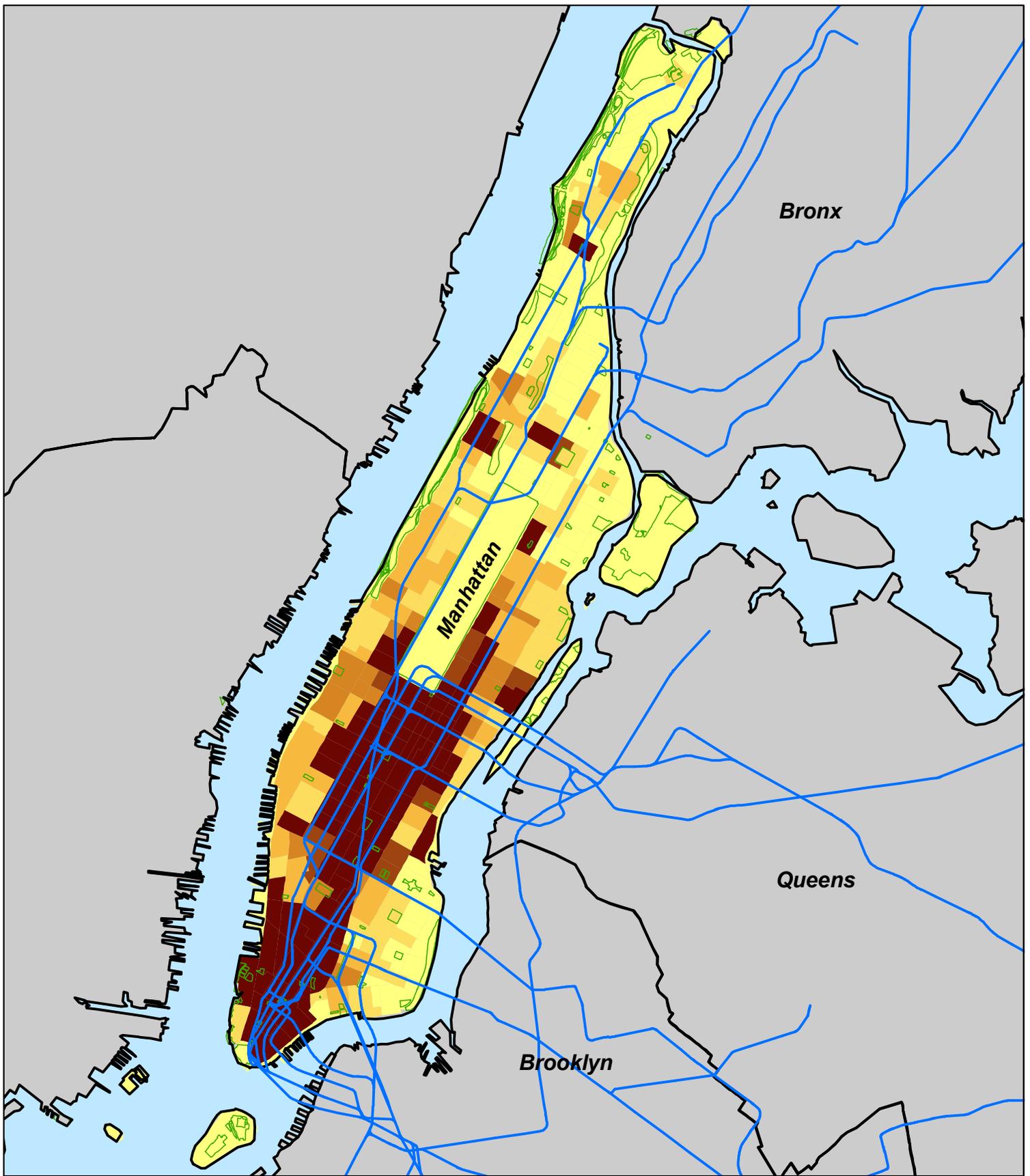


Source: NYMTC



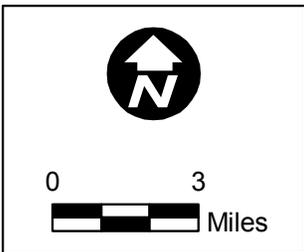
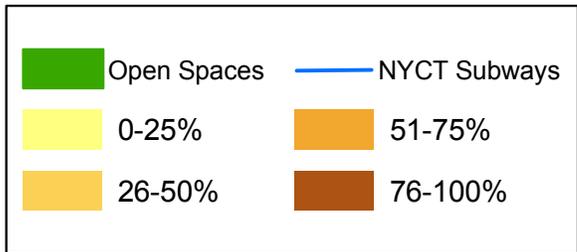
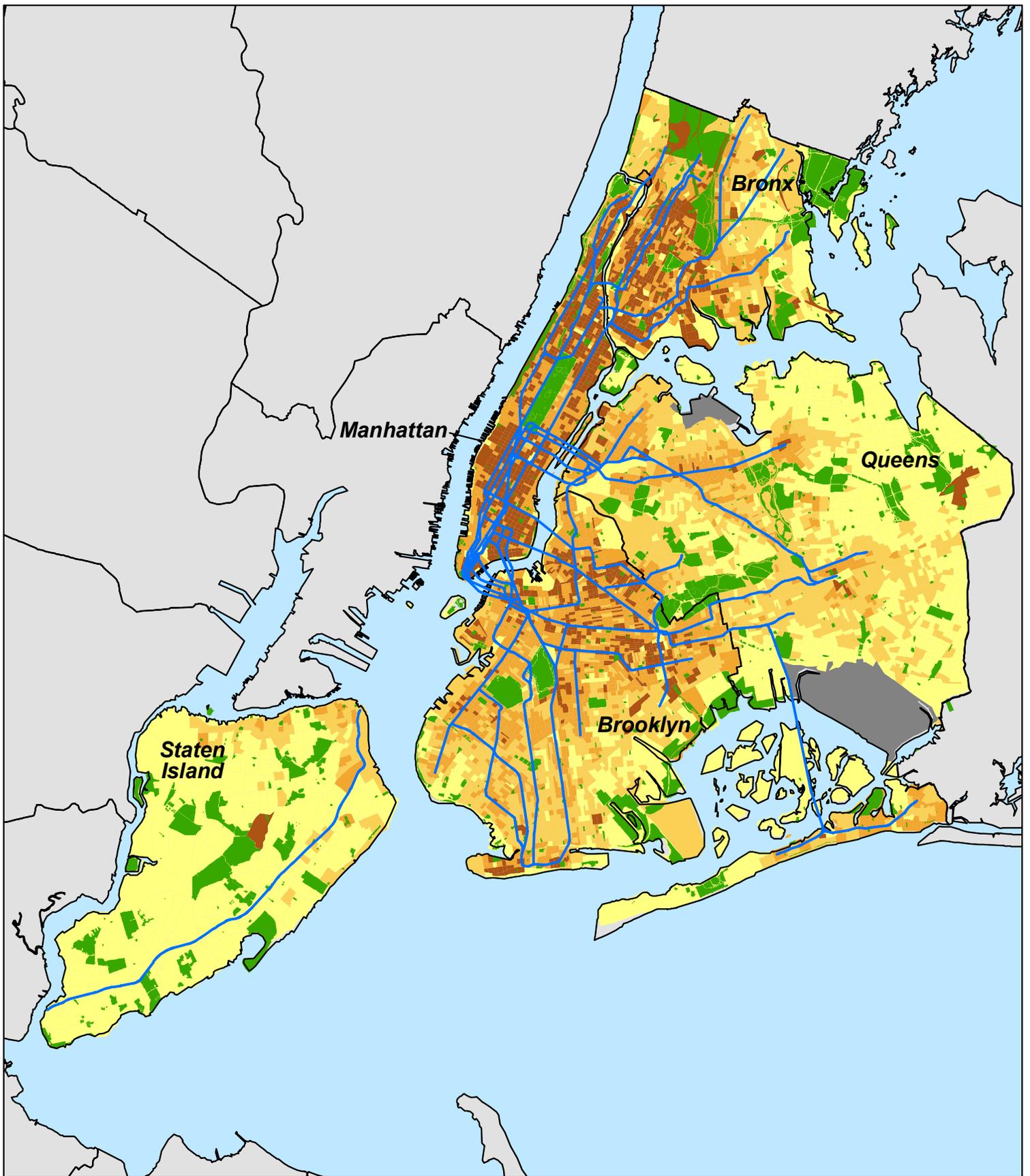
**Bronx, Brooklyn, Queens, S.I.
Employment Density per Sq Mile
By TAZ**

Source: NYMTC, 2005



**Manhattan
Employment Density per Sq Mile
By TAZ**

Source: NYMTC, 2005



Auto Ownership
Zero Household Vehicles

Source: 2000 U.S. Census

Selection Criteria

Based on a review of this data, the study team defined underserved areas as areas: (1) with a population density over 26,000 residents per square mile and (2) located a half mile or more from a subway station. The 26,000 residents per square mile standard, which is roughly the average population density of New York City, was selected because it corresponds to neighborhoods which currently support high frequency bus service and high levels of bus ridership (i.e. bus corridors which carry over 20,000 passengers a day). The half mile distance standard was selected because it corresponds to a ten minute walk, generally accepted as the threshold for convenient access to transit. This criteria resulted in the selection of 9 underserved areas, presented in the map on the next page.

High Density Areas Underserved by the Subway

Areas beyond 1/4 mile from a subway station with greater than 26,000 residents per square mile

The Bronx

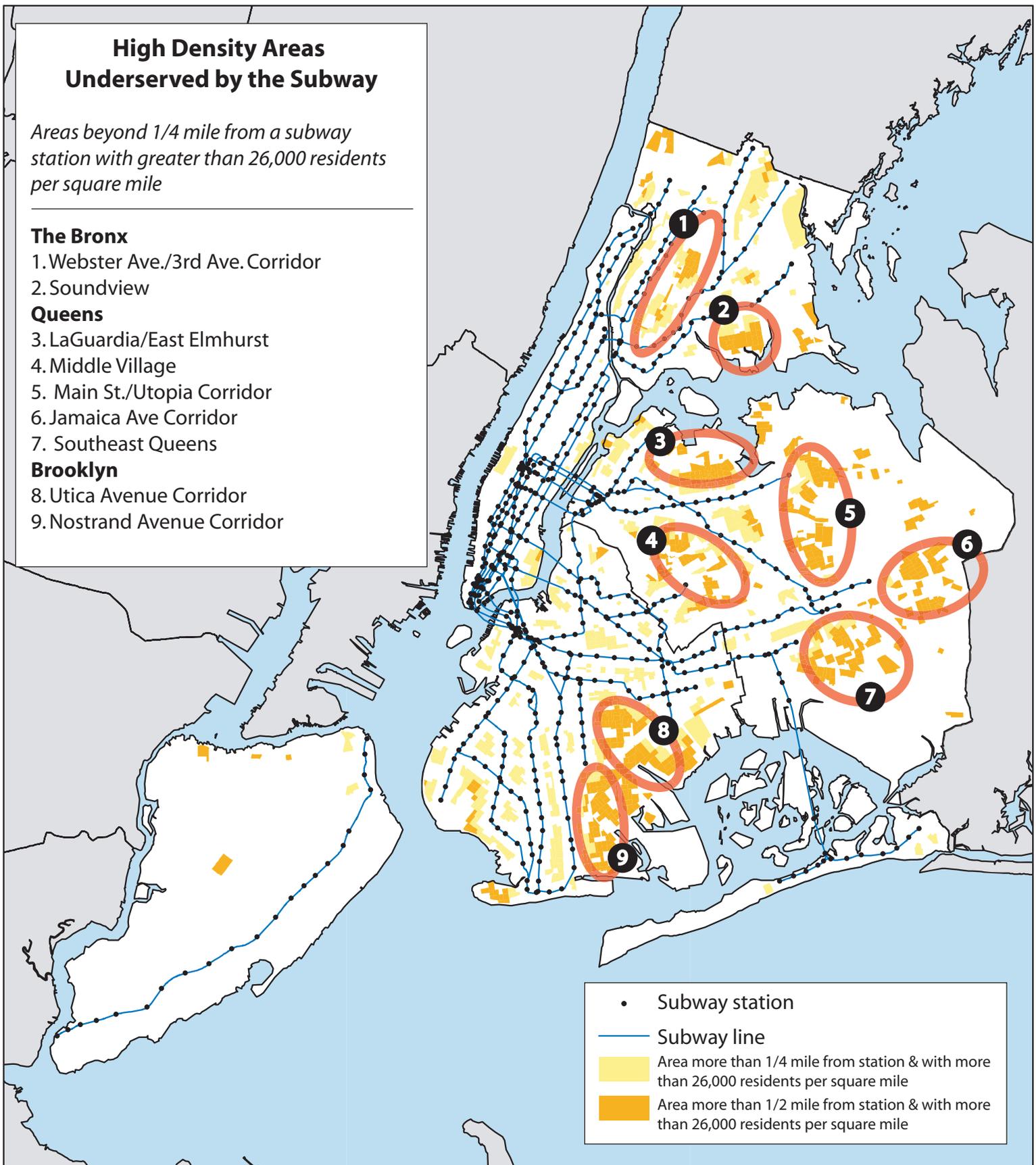
1. Webster Ave./3rd Ave. Corridor
2. Soundview

Queens

3. LaGuardia/East Elmhurst
4. Middle Village
5. Main St./Utopia Corridor
6. Jamaica Ave Corridor
7. Southeast Queens

Brooklyn

8. Utica Avenue Corridor
9. Nostrand Avenue Corridor



1a. High Volume Express Bus Corridors

Many of the underserved areas identified by the study team are served by the MTA's and the NYCT's express bus services. The study team also examined the highway network that these services use and identified high volume express bus routes that may benefit from improved priority treatments, such as a bus lane. The study team identified five high volume express bus corridors. A map of these corridors is on the next page.

1. Major Deegan Expressway (I-87)
2. Bruckner Expressway (I-278)
3. Long Island Expressway (I-495)
4. Gowanus Expressway (I-278)
5. Staten Island Expressway (I-278)



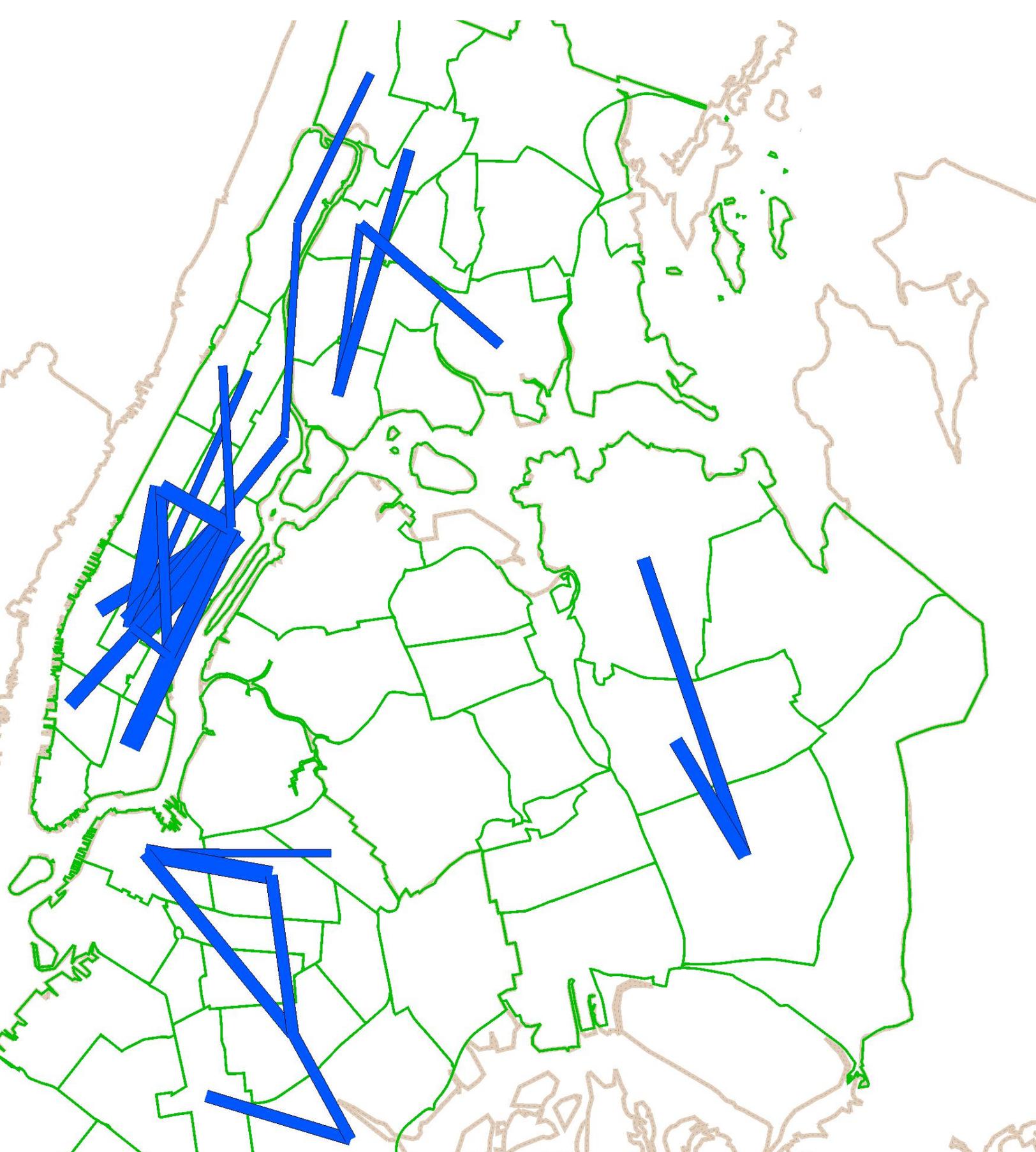
2. Difficult Trips

Preliminary Screen

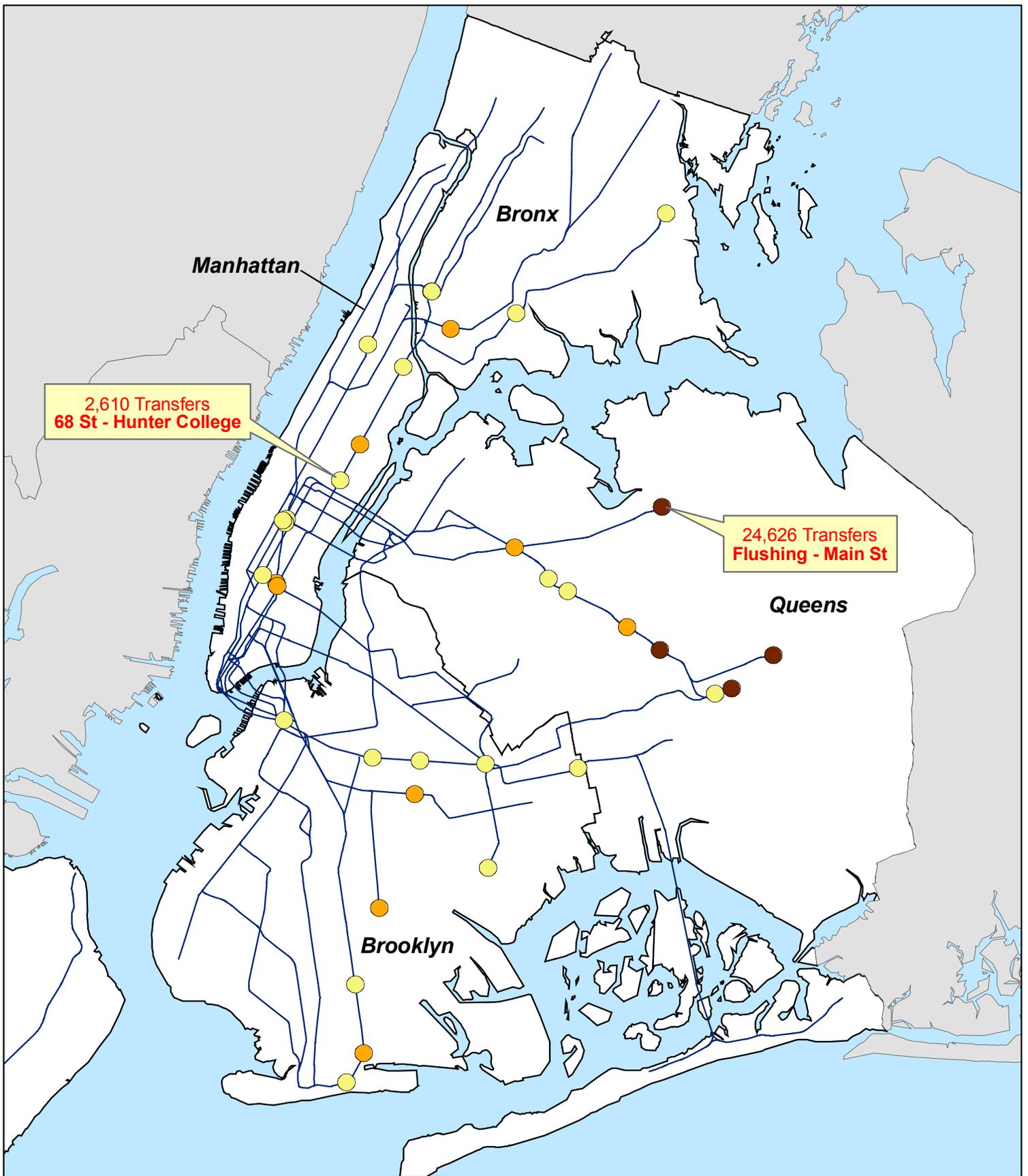
The study team endeavored to identify (1) significant transit trip flows with long travel times and slow speeds and (2) key gaps in the subway network. The market potential for BRT to address a difficult trip was determined by: (1) the number of transit riders currently making the trip, (2) the number of subway and bus connections along the trip corridor, and (3) the presence of a major trip generators along the trip corridor. The study team compiled and mapped the following data:

- Transit trips on any mode or combination of modes that are longer than 30 minutes and slower than 8 miles per hour, source: NYCT MetroCard database
- 25 highest volume bus to subway transfer points, source: NYCT
- Highest ridership bus routes, source: NYCT

These maps are presented in the pages that follow.



Trips Longer Than 30 Mins, Slower Than 8mph*
— OD Pairs > 1,500
5000 3000 1000
*Includes Bus-Subway and Bus Only Trips



2,610 Transfers
68 St - Hunter College

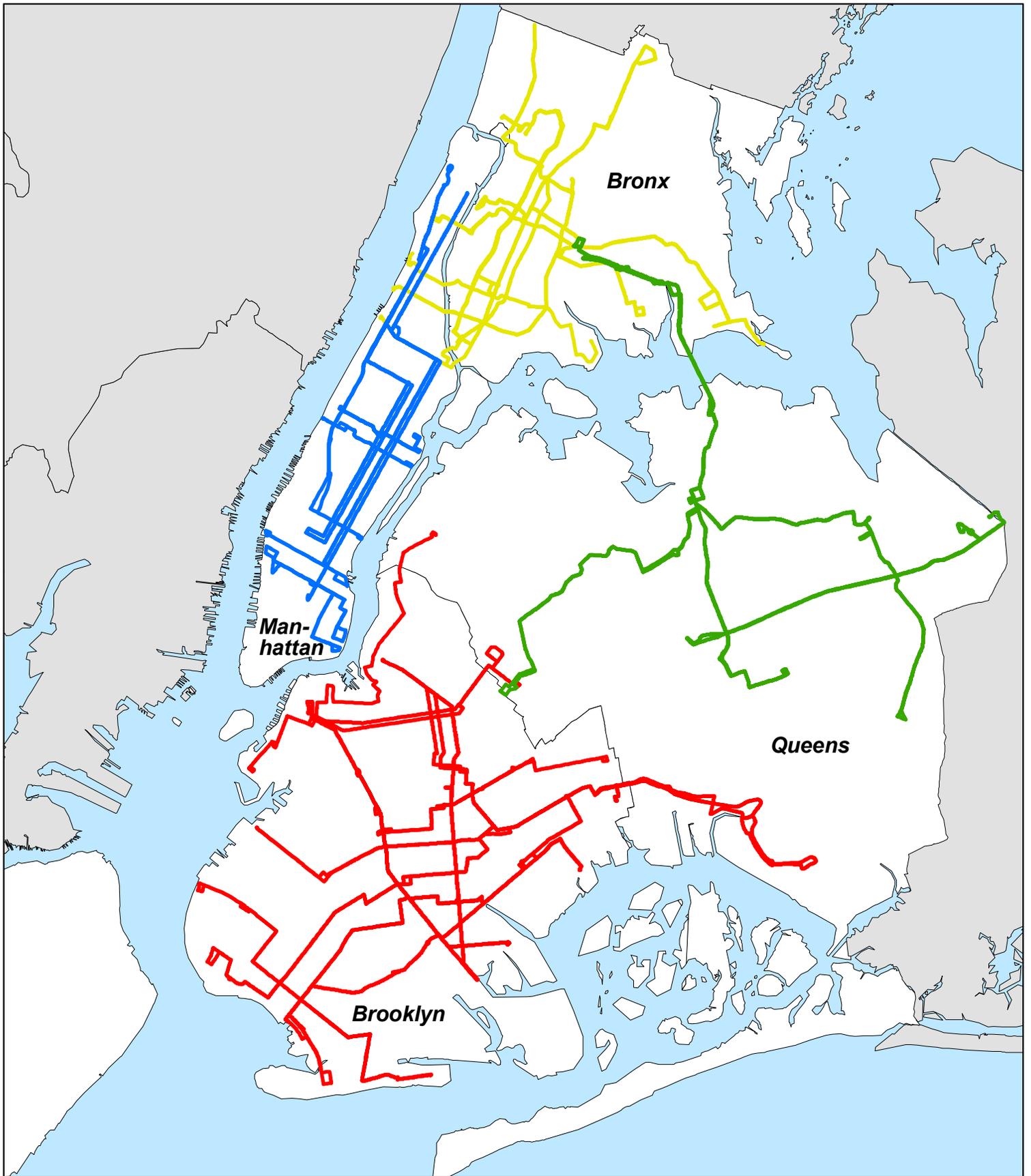
24,626 Transfers
Flushing - Main St

- 2,610 - 5,000 Transfers
- 5,001 - 10,000 Transfers
- 10,001 - 24,626 Transfers



0 2
Miles

Bus to Subway Transfers
25 Busiest Bus to Subway Transfer Locations



- Brooklyn Routes
- Bronx Routes
- Manhattan Routes
- Queens Routes



0 2
 Miles

High Volume Bus Routes

Routes with Weekday Ridership Greater than 20,000

Selection Criteria

Based on a review of this data, the study team defined difficult trips in two ways: (1) significant trip flows (more than 2,000 trips a day) on any transit mode or combination of transit modes that are longer than 30 minutes and slower than 8 miles per hour; (2) heavy ridership bus corridors (more than 20,000 trips a day) that serve gaps in the subway network, with a focus on circumferential and crosstown routes. The team identified 10 difficult trips, presented in the map on the next page.

Trips on any transit mode or combination of transit modes that are longer than 30 minutes and slower than 8 miles per hour and circumferential and crosstown bus corridors with heavy ridership.

1. 125th Street Crosstown Corridor
2. Upper West Side/Upper East Side Manhattan Crosstown Corridor
3. Midtown Manhattan Crosstown Corridor
4. 14th Street Crosstown Corridor
5. Jamaica to Flushing Corridor
6. Bushwick to Downtown Brooklyn Corridor
7. Eastern Brooklyn North-South Corridor
8. Central Brooklyn East-West Corridor
9. South Brooklyn East-West Corridor
10. Hylan Boulevard Corridor



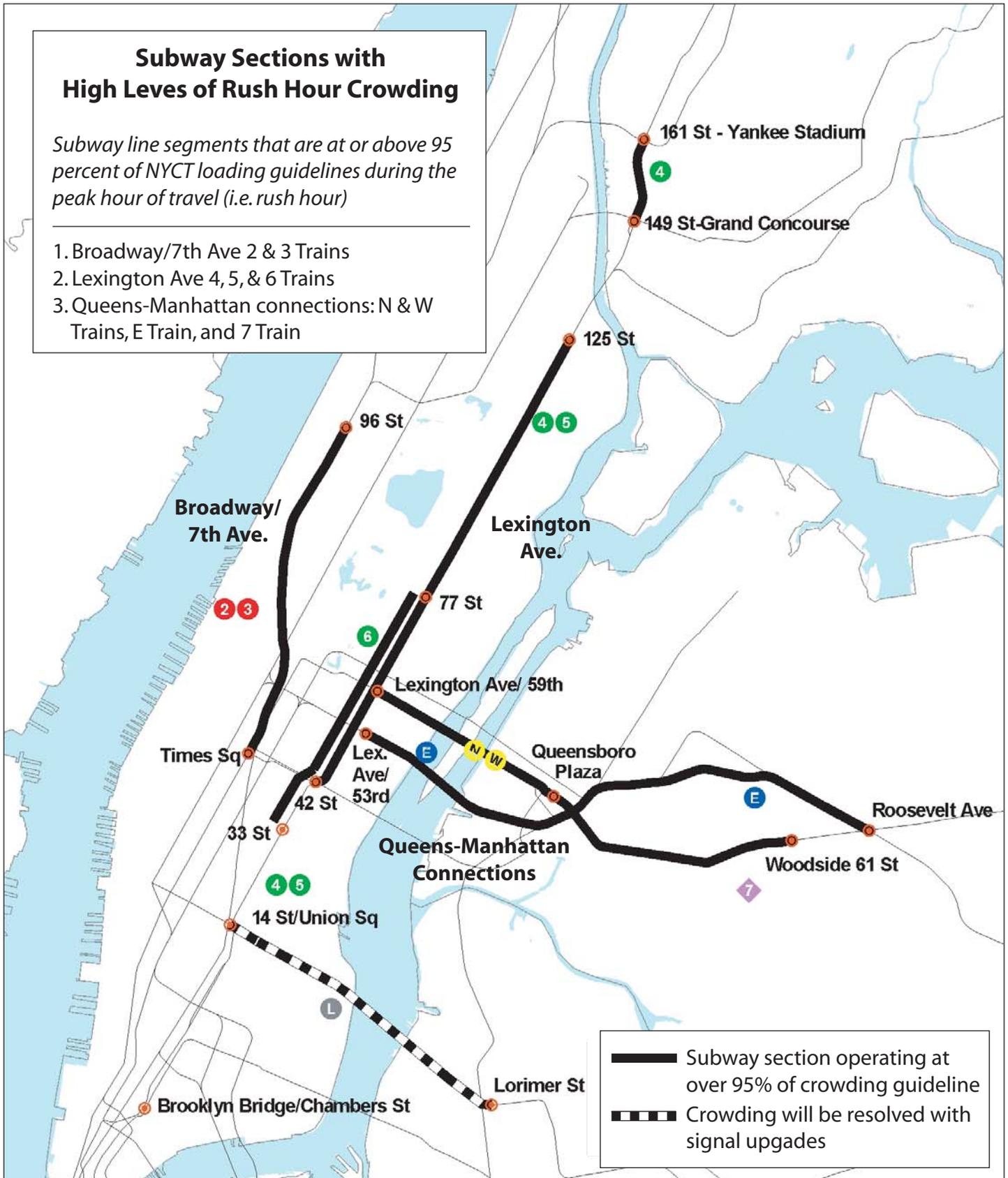
3. Subway Crowding

The study team endeavored to identify sections of the existing subway network that are experiencing severe crowding during the peak period and where a parallel BRT service could provide an attractive alternative for existing subway riders. NYCT sets a maximum standard for subway crowding of three square feet per passenger. The study team used MetroCard and NYCT ride check data to map sections of the subway system that operate at or above 95 percent of this standard during the A.M. peak hour. This data is presented in the map on the next page. The study team identified three main segments in need of capacity relief: the Broadway 1, 2, and 3 trains in Manhattan, the Lexington Avenue 4, 5, and 6 trains in Manhattan, and the main subway connections between Midtown and Queens: the 7 train, E train, and N and W trains.

Subway Sections with High Levels of Rush Hour Crowding

Subway line segments that are at or above 95 percent of NYCT loading guidelines during the peak hour of travel (i.e. rush hour)

1. Broadway/7th Ave 2 & 3 Trains
2. Lexington Ave 4, 5, & 6 Trains
3. Queens-Manhattan connections: N & W Trains, E Train, and 7 Train



 Subway section operating at over 95% of crowding guideline
 Crowding will be resolved with signal upgrades

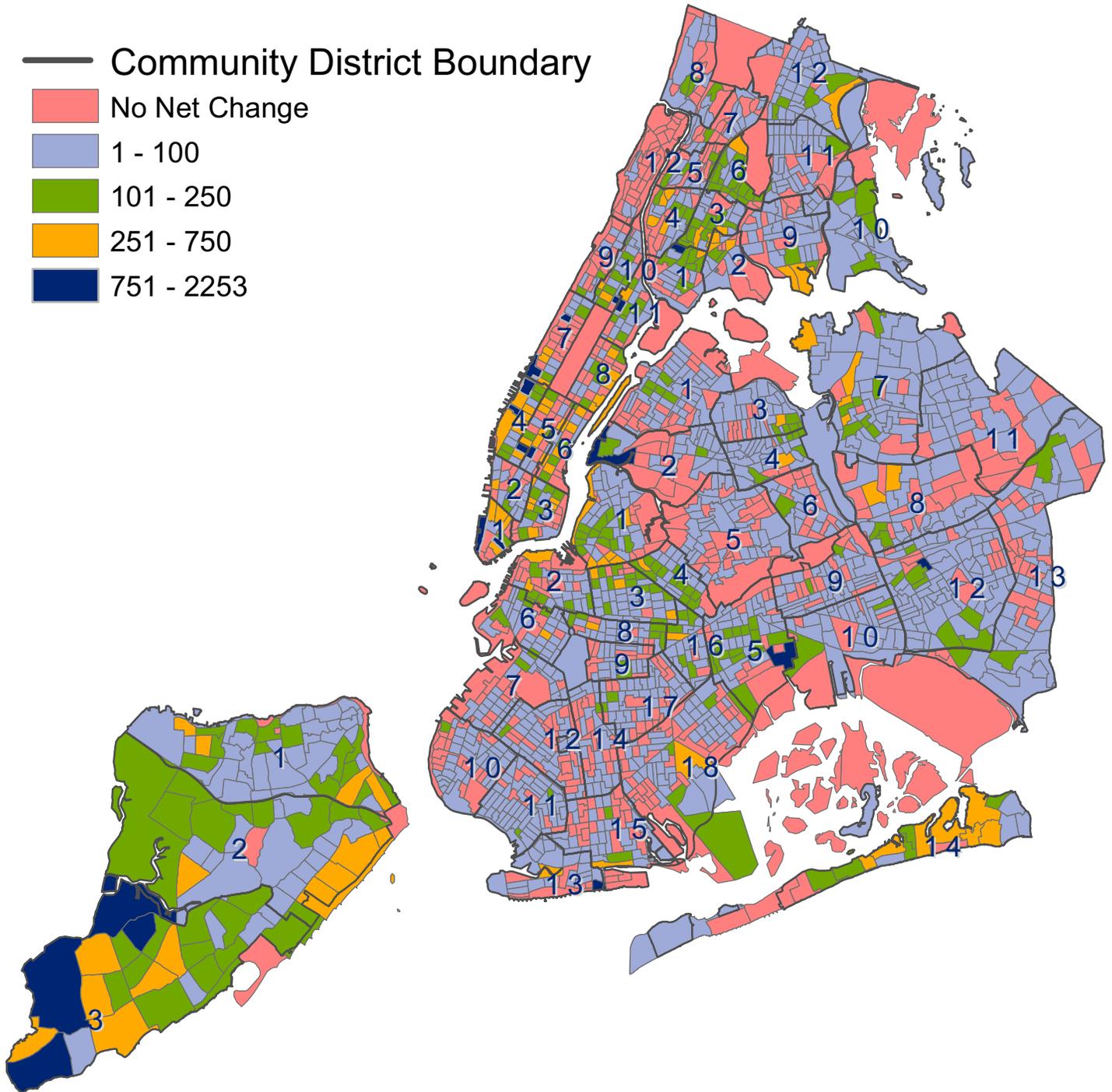
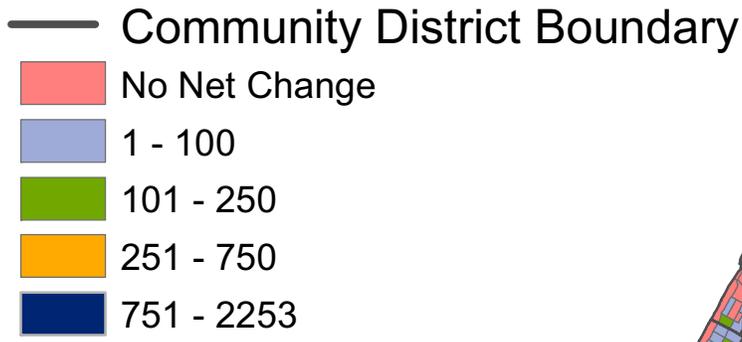
4. Growth Areas

The study team endeavored to identify areas of the City that are experiencing rapid growth and areas that are under study for potential development in the future. A particular focus was put on growth areas that have limited access to rail transit and may present a potential market for BRT. The study team compiled and mapped the following data:

- Net Change in housing units January 2008 through July 2008, source: New York City Department of Buildings
- Residential Units Issued Permits But Not Completed as of July 2008, source: New York City Department of Buildings

The study team also reviewed recent major zoning initiatives and major redevelopment studies currently underway. Based on this analysis, the study team identified 4 growth areas and one study area. These maps are presented on the pages that follow.

Net Change in Housing Units January 2000 through July 2008



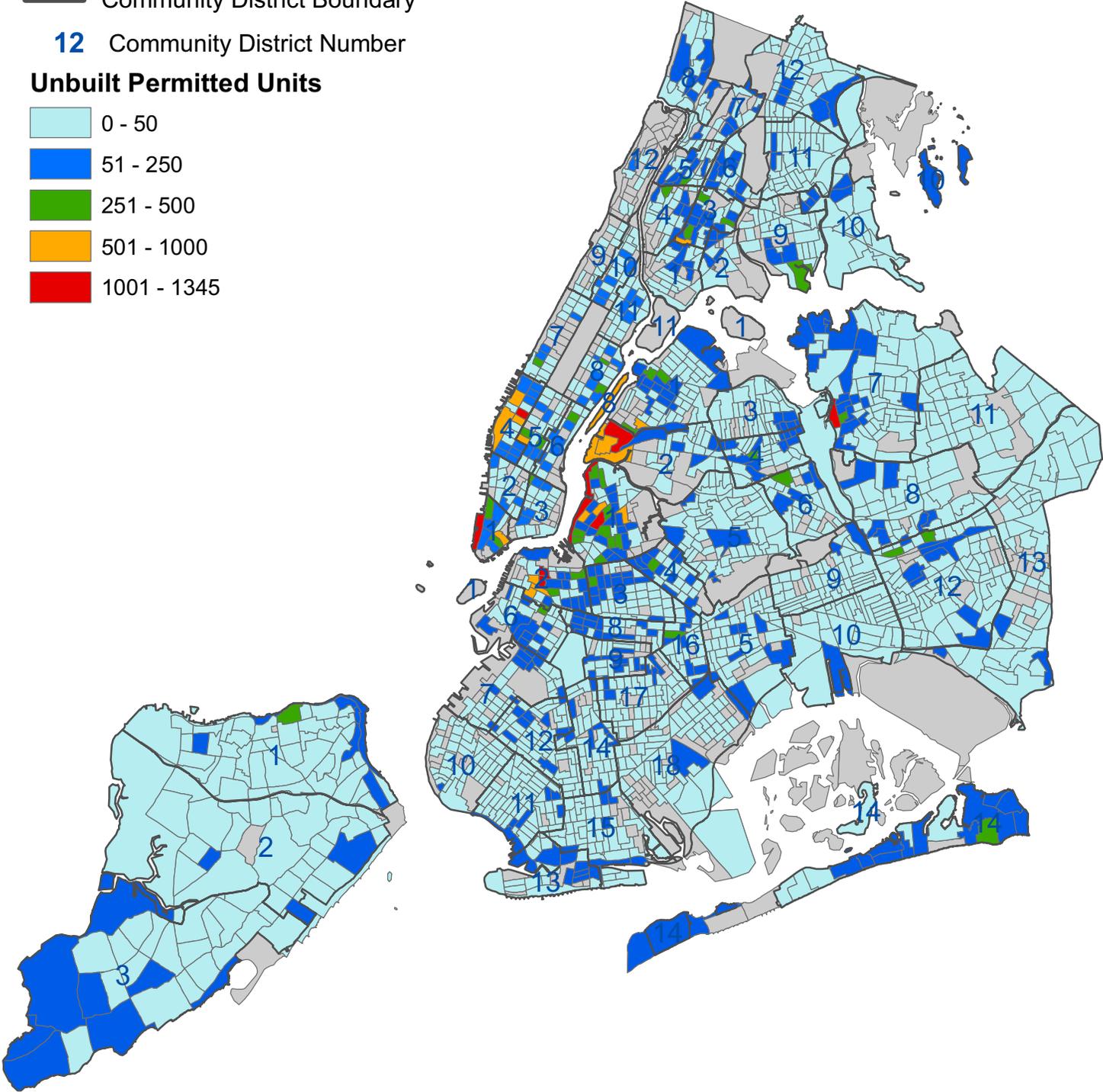
Residential Units Issued Permits But Not Completed As of July 2008

— Community District Boundary

12 Community District Number

Unbuilt Permitted Units

- 0 - 50
- 51 - 250
- 251 - 500
- 501 - 1000
- 1001 - 1345



Growth Areas

Areas that are undergoing or may undergo significant growth in housing units and that have limited transit access

Growth Areas

1. South Bronx
2. Queens East River waterfront
3. Brooklyn East River waterfront
4. Western Shore of Staten Island

Study Area

5. North Shore of Staten Island

