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CATCHING THE NEXT RIDE: THE POTENTIAL FOR REGIONAL BUS RAPID SYSTEMS

BUS RAPID TRANSIT FOR THE NEW YORK REGION

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1. INTRODUCTION

Bus rapid transit systems are increasingly being developed throughout the world. In New York City, a comprehensive analysis of options led to New York City Transit implementing Select Bus Service on Fordham Road. A similar service will be installed on First and Second Avenues in Manhattan, Nostrand Avenue in Brooklyn, and Hylan Boulevard in Staten Island. Bus rapid transit proposals have been set forth for Central Ave and I-287 in Westchester County, and a BRT study is underway for Route 110 in Suffolk County. NJ TRANSIT operates BRT service along Springfield and Bloomfield Avenues and is exploring service along several other corridors in Northern New Jersey.

The discussion that follows builds upon these actions and proposals to develop the broad outlines of a regional bus rapid transit system for New York City and its environs. The goal is to develop a system that complements and extends the reach of the region's many rail transit lines.

2. CONTEXT AND ANTECEDENTS

Developing a regional bus rapid transit (BRT) system for the New York City region is a challenging and difficult task. The region – the nation's largest – is complex in terms of geography, travel patterns, and political structure.

The urbanized area has more than 20,000,000 residents of which about 8 million live in New York City's 320 square miles. The remainder lives in 7,500 square miles in New Jersey, Connecticut and New York State. Between 2005 and 2030, the region's population is expected to grow about 17%. Its employment will likely grow about 25% as seen in Table 1 below.

TABLE 1
POPULATION AND EMPLOYMENT TRENDS

	Population			Employment		
	2005	**2030**	**% Change**	**2005**	**2030**	**% Change**
New York City 5 Boroughs	8,209	9,492	15.6%	9,177	5,243	25.5%
Long Island Nassau/Suffolk	2,837	3,220	13.5%	1,489	1,812	21.7%
Mid Hudson 7 Counties	2,313	2,872	24.2%	1,124	1,412	25.6%
New Jersey 14 Counties	6,927	8,202	18.4%	3,882	4,986	28.4%
Subtotal	**20,286**	**23,876**	**21.5%**	**10,672**	**13,453**	**26.0%**
Connecticut 3 Counties	1,959	2,291	17.0%	1,072	1,274	18.9%
Total Region	**22,244**	**26,077**	**17.2%**	**11,744**	**14,727**	**25.4%**

Sources: New York Metropolitan Council, Technical Memorandum by Urbanomics, June 15, 2005
Tomorrow's Transit – Regional Plan Association, October, 2008.

Some 2,000,000 people work in Manhattan's central business district. Other major employment centers include Downtown Brooklyn, Jamaica and Flushing in Queens, and the Hub and Fordham Road

in the Bronx. Outlying employment concentrations are found in downtown Newark, downtown White Plains, and major commercial centers such as Garden State Plaza, Princeton, and Roosevelt Field Shopping Center.

Over the years, extensive rail and road systems have been built to serve the large number of travelers that converge on Manhattan and other major centers. Public transport riding is high, accounting for almost six million weekday riders. More than 60% use the subways and commuter rail lines that focus on the Manhattan business district and downtown Newark.

The subway and commuter rail systems reflect more than a century's effort to provide mobility and to overcome the barriers resulting from Hudson and East Rivers. They have been progressively improved, and they remain the backbone of the City's transport. A new trans-Hudson rail tunnel is being built to serve the growing number of travelers from New Jersey.

New York City has the largest bus system in North America in terms of patronage (2.9 million) and number of buses (6,000). The City's buses, along with those operating in suburban areas, serve markets that are not well served by rail. Bus service (with few exceptions) has been slow in the City and in many suburbs. Accordingly, various bus service improvements have been implemented over the past 40 years to enhance bus operations. These include the New Jersey Route 3 contra-flow bus lane on the approach to the Lincoln Tunnel, the Gowanus Expressway contra-flow lanes on the approach to the Brooklyn Battery Tunnel, and the contra-flow lane on the Long Island Expressway. These lanes carry large numbers of people, and have reduced travel times by as much as 15 minutes per trip [(2)].

The City also has one of the most extensive systems of bus priority lanes in the United States. Curbside bus lanes are found in all 5 boroughs. Madison Avenue's midtown dual bus lanes reduced journey times more than 30 percent and increased reliability about 35 percent.

New York City Transit operates one of the largest systems of limited stop bus routes in the United States. These routes include 1st and 2nd Avenue in Manhattan; Third Avenue, Grand Concourse, and Fordham Road in the Bronx; Flatbush and Nostrand Avenues in Brooklyn; and Hillside Avenue, Merrick Boulevard, and Union Turnpike in Queens. These lanes have reduced travel times over local service by about one minute per mile. The limited-stop bus routes were often incorporated into the City's bus rapid transit plans.

3. GENERAL GUIDELINES

Developing bus rapid transit in the New York City Region should reflect the following guidelines:

Markets and Service. Markets should be matched with rights-of-way. Both a good market and a viable running-way are essential.

- A BRT line should serve at least one major anchor. This may be the central business district (i.e. Manhattan), outlying business districts (i.e. Newark, Brooklyn, Fordham Road) or major outlying mega centers. A subway or commuter rail station can also serve as an anchor.

- BRT lines should have sufficient market potentials to support frequent all-day service. Within New York City, there should be at least 15,000 weekday riders to allow 7-10 minutes service on both the BRT route and the parallel local service. If only the BRT route is operated, the minimum ridership should be about 10,000 riders. In suburban areas, the corresponding thresholds should be about 12,000 and 8,000 weekday riders respectively.

- BRT lines should generally be at least 5 to 6 miles long to attract riders and to maximize benefits.

- BRT lines should complement rail lines. They can serve as extensions that increase the reach of rapid transit. They can operate in cross-town corridors, or in radial corridors that are removed from rail lines.

- BRT lines can serve as precursors to subways or other rail transit lines along the same street or within the same corridor.

- BRT lines should use high type roadways (e.g. multi-lane arterials) to the maximum extent possible. An interconnected system is desirable, but it may be hard to achieve.

- Off-street (separate) running ways permit higher speeds, greater reliability, and clearer identity. They provide a sense of permanence that can attract land development. But they are difficult to provide in built-up parts of the region.

- BRT lines should operate on arterials where bus lanes or median busways can be provided.

BRT Features. A full-featured BRT line (one that includes improved running ways, stations, vehicles, service patterns, ITS applications, off-vehicle fare collection and rapid boarding) can increase base ridership up to 25%. This is in addition to gains resulting from improved service frequencies and travel speeds.

BRT lines in the New York area should contain as many of these features as practical. However, some features (e.g. stations, and high type running ways) may be difficult to provide. Therefore, a 15% gain is a likely target.

Moreover, in giving buses priority use of streets and roadways, the needs of automobiles, service vehicles and pedestrians must be accommodated.

Speed, Reliability, and Identity. BRT speed, reliability, and identity should be maximized.

- Service patterns should be clear and understandable. One BRT route per street (sometimes with 2 branches) should be the goal.

- Wide stop spacing – typically up to 0.6 to 1.5 mile intervals should be provided.

- Off-vehicle fare payment that allows all-door bus boarding should be encouraged.

- Modern three (or four) door buses, with multi-channel doors are desirable.

- Priority use of road space can reduce traffic-imposed delays. Curb, interior and dual bus lanes, and transit signal priorities should be provided where needed. Signal priorities will save each bus about 5 to 7 seconds per location. Bus lanes will increase bus speeds 1 – 1.5 mph.

4. NEW YORK CITY BRT OPPORTUNITIES

There are many opportunities for BRT service within the city's five boroughs. A comprehensive set of analyses and suggested directions emerged from the NCYT-NYCDOT BRT study that was initiated in 2004. The study was a cooperative effort of the New York City Department of Transportation (NYCDOT), New York Department of Transportation (NYSDOT), and New York City Transit (NYCT). The goal was to identify the most promising corridors for BRT within the City [(3)].

Analysis and Screening Process. The screening process started with a review of about 100 corridors with average weekday ridership that exceeds about 15,000. Approximately 20 corridors were eliminated because of perceived fatal flaws. The remaining 80 corridors were evaluated from which 36 candidate corridors were identified. These corridors were then presented to the public in citywide workshops. Further evaluation and screening led to the most 15 promising candidates. The analyses considered BRT benefits (including ridership, frequency, and travel time savings) and BRT compatibility (including physical feasibility and parking impacts). The 15 strongest candidates' corridors were ranked as shown in Table 2, and five were selected for implementation – one corridor in each borough.

TABLE 2
RECOMMENDED 15 CORRIDORS

Corridor Name	Borough	Benefits	Compatibility
1st/2nd Ave + 125th Street	Manhattan	17	15
Fordham Road/Pelham Parkway	Bronx	17	14
Flatbush Avenue	Brooklyn	17	13
Grand Concourse	Bronx	16	16
Nostrand Avenue	Brooklyn	16	13
Webster Avenue + 3rd Avenue	Bronx	15	16
West Side Manhattan Corridor	Manhattan	15	15
Hylan Boulevard	Staten Island	14	17
Flatlands Avenue + Kings Highway	Brooklyn	14	15
Union Turnpike	Queens	14	15
Hillside Avenue	Queens	13	16
Guy R. Brewer Boulevard	Queens	13	14
Horace Harding Expressway	Queens	13	14
Main St. + Parsons/Kissena Blvd.	Queens	13	14
Merrick Boulevard	Queens	12	15
Cross Bronx Corridor*	Bronx	N/A	N/A
Staten Island Expressway Corridor**	Staten Island	N/A	N/A

** Cross Bronx Corridor (I-95) is part of a long-range plan*

***Staten Island Expressway Corridor (I-278) is currently under construction but listed to bring attention to this initiative. Neither of these corridors will be included in the 15 corridors to be examined in the next step of the NYCBRT Study.*

Priority Corridors. The suggested phase priority corridors for early implementation are shown in **Figure 1**. They include (1) Fordham Road-Pelham Parkway, the Bronx; (2) First and Second Avenues, Manhattan; (3) Nostrand Avenue, Brooklyn and (4) Hylan Boulevard-Richmond Avenue, Staten Island.

Figure 1

New York City Phase 1 BRT Program

Merrick Boulevard, Queens was initially identified as a Priority Corridor, but was subsequently dropped, and 34th Street was added as a bus priority street. A brief description of each corridor follows.

1. **Fordham Road - Pelham Parkway, The Bronx**. This cross-town corridor extends from Broadway in Upper Manhattan to Coop City in the Bronx, a distance of about 8 miles. It connects with six subway lines, and two Metro North Commuter Railroad branches. It serves the Fordham Road business district, Fordham University, the Bronx Municipal Hospital and Coop City. The BX12 Limited and local buses carried about 43,000 passengers each weekday in 2007. The BRT would replace the Limited Stop service; improvements would include extended bus lanes, traffic signal priorities, and all-day parking restrictions in the Fordham Road business district.

2. **First and Second Avenues.** This corridor is the busiest bus route in Manhattan. The Limited and local buses carry more than 57,000 riders each weekday. The proposed BRT service would generally follow the same 8-mile route. It would serve as a precursor to - but not a

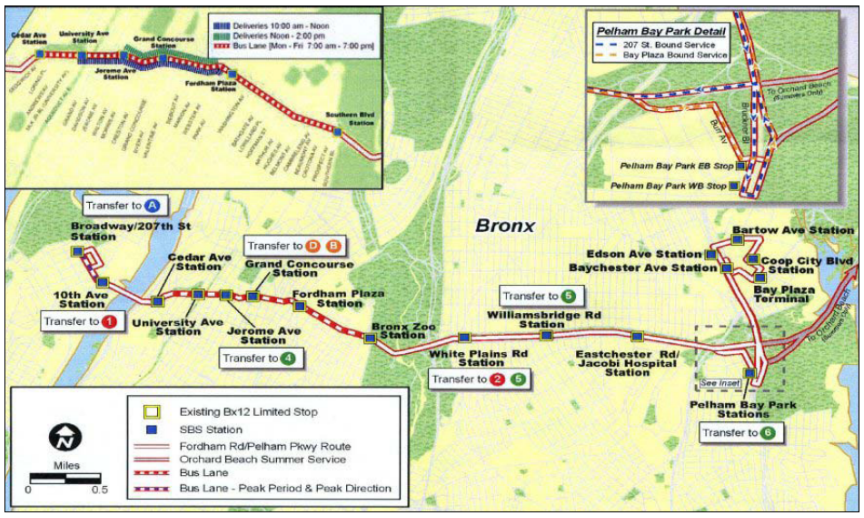
replacement of - the long-planned Second Avenue subway. "Interior" normal flow bus lanes are proposed for most of the BRT route; curb parking generally would be retained except in peak periods.

3. **<u>Nostrand Avenue, Brooklyn</u>**. This 9-mile cross-town corridor extends from the Williamsburg Bridge in Northern Brooklyn to Sheepshead Bay. It connects with three subway lines and overlays a short section of subway Routes 2 and 5. The current B44 Limiteds and locals carry about 44,000 people each weekday.

The proposed BRT routing would operate on both one-way and two-way streets using sections of Nostrand, Rogers, and Bedford Avenues. Plans call for the use of "interior" bus lanes along sections of the route. Curb parking would be retained along many roadway sections.

4. **<u>Hylan Boulevard – Richmond Avenue, Staten Island</u>**. This proposed BRT route serves as an extension of the Fourth Avenue (R) subway in Brooklyn. It crosses the Verrazano Narrows Bridge and runs via Hylan Boulevard and Richmond Avenue to the Staten Island Mall. A branch of the route would connect with the Staten Island Ferry terminal in St. George. The BRT line would complement the existing peak-period premium fare Staten Island – Manhattan Express bus service that runs along Hylan Boulevard. Various running way options are under study in cooperation with the impacted community. There are about 16,000 weekday riders on the existing local bus route.

Figure 2



Source: New York City Transit.

Bx12 Select Bus Service Map

<u>Fordham Road Select Bus</u>. The Fordham Road Select Bus Service (SBS) was inaugurated on June 29, 2008 as a cooperative effort of New York City DOT and MTA New York City. The BX12 SBS (which replaced the BX12 Limited) was implemented within one year at a relatively low cost of approximately 10 million dollars [(4)]. **Figure 2** shows the SBS route and stops. The Route 12 SBS route operates between 207th Street in Inwood, Manhattan and Co-op City – a distance of about 8 miles. Service operates from early morning to late evening [(4)] at three to six-minute headways. The route serves the Fordham Road Business District, Fordham University, Bronx Zoo, New York Botanical Garden and the Pelham Parkway neighborhood. The busiest part of the corridor is between the Metro North commuter rail station at Fordham Plaza/Webster Avenue and University Avenue. Most people traveling to the Fordham Road business district arrive by public transport.

Improvements were designed to improve speed, reliability and identity. They include "red" expanded curbside bus lanes along Fordham Road and 207th Street, transit signal priority at key locations and off-vehicle fare collection.

- The bus lanes generally are in effect along 60-foot wide Fordham Road from 7 A.M. to 7 P.M., and along 207th Street during the A.M. and P.M. rush periods. The all-day bus lanes are colored red. There are "delivery windows" for commercial vehicles midday.

- Off-vehicle fare collection at 16 stops along the 8-mile Select-Bus route permits all-door boarding of buses. Fare collection machines are provided at each stop. Buses make two fewer stops than the former BX12 Limited.

- BX12 SBS stations contain enhanced version of New York City's standard new bus shelters including double-size shelters where space permits.

- Transit signal priorities are used at several locations.

- A distinctive branding and design program was developed for vehicles and shelters.

Benefits resulting from the SBS include increased bus ridership and reduced bus travel times. Average weekday ridership for the BX12 (SBS and local) increased from 45,000 in October 2007 to almost 50,000 in October 2008 – a gain of 11.4 per cent. However, SBS ridership increased 32% while local ridership dropped 15%. Bus travel times decreased from 58 minutes to 47 minutes after the SBS was implemented – a 19% reduction. This translates into almost 1.4 minutes per mile saving **as seen in Table 3 below.** Further benefits would accrue when additional roadway and traffic improvements along the route are implemented.

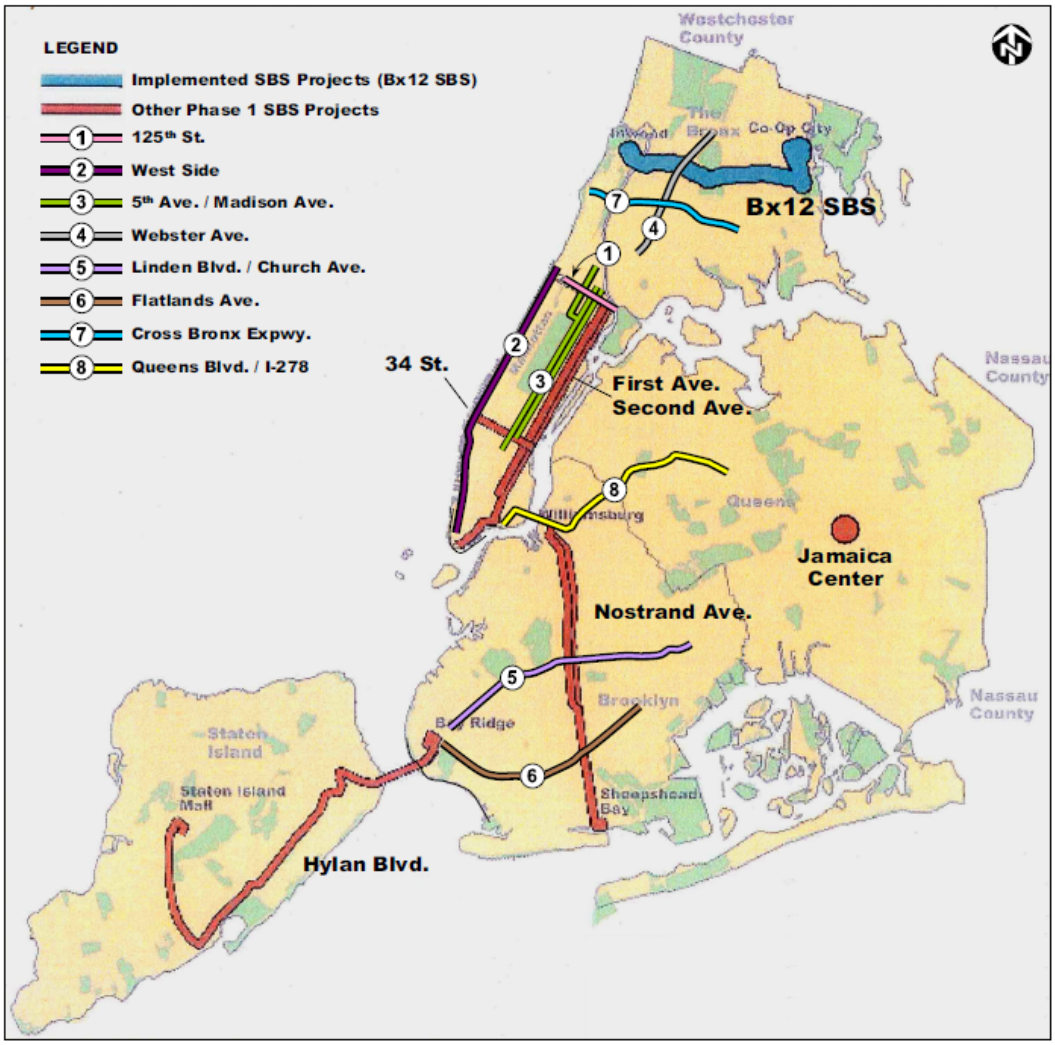
TABLE 3
REPORTED BENEFITS OF FORDHAM ROAD
SELECT BUS SERVICE

Item	Before	After	Change	Change/Mile(1)
In Motion	28.5	28.4	-0.1	Neg
Bus Stop	15.8	9.6	-6.2	-0.8
Traffic Signal	12	7.5	-4.5	-0.6
Other	1.6	1.2	-0.8	Neg
Total	**57.9**	**46.7**	**11.2**	**1.4**

(1) Assumes 8-mile one-way trip;
Sources: Barr, J.E., Beaton, E.B., Chiamonte J.V., and Orosz, T.V.
Select Bus Service on the BX12 in New York City: A Partnership Between the New York City DOT and MTA New York City Transit (Paper submitted to TRB July 31, 2009)

Expanding the Horizon. Several additional BRT routes should be considered from a regional BRT perspective. Most of these were among the 15 corridors in the BRT Phase I study. A few others are suggested to fill "voids", improve connectivity and take advantage of highway improvements. These additional corridors are shown in **Figure 3**.

Figure 3



Conceptual New York City BRT System

These proposals are generally consistent with NYCT and NCYDOT Phase II BRT proposals. They include:

1. A 125th Street rush period extension of the proposed 1st – 2nd Avenue BRT.

2. A West Side Manhattan BRT Route from 116th/125th Streets to Lower Manhattan.

3. A Fifth-Madison BRT service that connects the Manhattan business district to Harlem and Upper Manhattan.

4. A Relocated Third Avenue BX55 Limited on Webster Avenue, and extending BRT service to Gun Hill Road.

5. A Cross-Brooklyn BRT along Linden Boulevard/Church Avenue and/or Linden Boulevard.

6. A southern Cross-Brooklyn BRT in the Bay Parkway-Kings Highway-Flatlands Avenue corridors.

7. A longer term BRT along the Cross Bronx Expressway service roads after the expressway is rebuilt.

8. A new BRT service between Lower Manhattan and Forest Hills via Delancey Street, the Williamsburg Bridge, I-278 and Queens Boulevard (contingent upon building a new 8 to 10-lane bridge over Newtown Creek.

1. **125th Rush Hour BRT**. Current plans call for the 1st-2nd Avenue BRT to terminate at 125th Street. Extending some of this service along 125th Street during rush hours would permit easy transfer from the Lexington Avenue, Martin Luther King, and Eighth Avenue subway Lines, thereby improving east-side access from the Bronx and offering some relief to overcrowded lines. The service would run only during rush hours, and would be complemented with rush period parking bans along 125th Street.

2. **West Side Manhattan BRT**. This service – along 10th and/or 11th Avenues would improve transit service to the growing West Side where much development is planned. This corridor is almost a half mile from subways to the south of 59th Street. The southern terminal could be in Lower Manhattan and the northern terminal in the Morningside Heights area. There are more than 30,000 weekday riders on existing bus routes in the corridor.

3. **Fifth – Madison BRT**. These two avenues carry more than 70,000 weekday riders. A large number of local, limited, and express routes use the two avenues in Midtown Manhattan. Bus lanes are provided on both avenues in the Midtown Area – including dual bus lanes on Madison Avenue between 42nd and 59th Streets. It is desirable to provide limited stop service north of Central Park on several routes, with accompanying local service. This will involve some restructuring of the existing M-1 and M-2 service.

Making the BRT work will require extending bus lanes on Madison Avenue from 23rd to 42nd Streets and north of 59th Street. Dual peak-period bus lanes, possibly with right-turn restrictions along Fifth Avenue between 65th Street (or 59th Street) and 23rd Street is a sensitive BRT proposal that may need community support and further refinement.

4. **Webster Avenue BRT**. Relocating the BX55 Limited stop service to Webster Avenue north of 149th Street would serve a larger catchment area and facilitate a northerly extension to Gun Hill Road. A terminal could be provided in the Medical Complex along Gun Hill Road. Weekday ridership in the corridor exceeds 75,000.

5. **Linden Boulevard/Church Avenue BRT**. An east-west BRT line along Church Avenue and/or Linden Boulevard would improve bus access for several areas without direct subway service. For many years, Church Avenue was a heavily used street railway line and bus ridership remains high; weekday ridership exceeds 40,000. This BRT line would connect with the West End, Culver, Brighton, and Nostrand Avenue subway lines. The eastern terminus could be at Lefferts Boulevard.

6. **South Brooklyn Cross-town BRT**. This BRT line along Kings Highway and Flatlands Avenue could extend from Bay Parkway to about Euclid Avenue. It would interchange with four subway lines, improve access to developing areas, and penetrate business areas. Weekday ridership on Flatlands Avenue exceeds 50,000.

7. **Cross Bronx Expressway Service Roads BRT**. Proposals have been set forth to "reconnect the Bronx" by building platforms over sections of the Cross Bronx Expressway, and by extending the service road system. The service roads are well located for BRT service – they penetrate high density areas, cross major bus lines, and are about a half-mile from the Tremont Avenue bus line. The BRT line would run from the George Washington Bridge Bus Station to the East Bronx at Westchester Avenue.

8. **I-278 BRT**. Plans are underway to provide a new eight-lane bridge on I-278 over Newtown Creek. This improvement will create a better lane balance along the expressway, provide more gradual gradients, and eliminate recurrent peak period congestion. After this improvement is completed, a BRT service could be provided along the expressway.

   The suggested BRT service would operate between Forest Hills and Lower Manhattan. It would run via Queens Boulevard (making limited stops), I-278, the Williamsburg Bridge, and Delancey Street. It would provide a quick route between Queens and Lower Manhattan that would give relief to crowded Queens Boulevard subway lines.

   An even bolder, perhaps second stage project, would be to build a new physically segregated roadway for buses (and perhaps trucks) between the Long Island Expressway and the Williamsburg Bridge. An intermediate station, with passing lanes could be provided in the Williamsburg area – perhaps with a passenger connection to the 14th Street Canarsie (L) subway Line.

5. SUBURBAN BRT OPPORTUNITIES

Developing BRT lines in cities and counties surrounding New York City will be influenced by many factors.

- Terrain is difficult in sections of New Jersey and New York.
- Travel patterns are diffused.
- Population densities and transit ridership potentials are lower than within the city.

- A large number of communities make decision-making more difficult and time-consuming.

- An extensive rail system serves trips to New York City, the Hudson River Waterfront and downtown Newark – this limits BRT opportunities in many radial corridors.

Figures 4, 5, and **6** show some BRT opportunities for Westchester-Putnam Counties, Long Island and Northern New Jersey respectively. They include existing BRT services, ongoing proposals, and some further thoughts and suggestions. (Numbers in parenthesis are keyed to the maps).

<u>WESTCHESTER – ROCKLAND COUNTIES</u> (Figure 4)

Two BRT opportunities have been identified by public agencies: an arterial BRT line from the Bronx to White Plains along Central Avenue (NY 100), and a busway in the I-287 corridor that connects Orange and Rockland Counties with downtown White Plains, and possibly Port Chester.

Figure 4

<u>Central Avenue-Route 100 BRT (A)</u>. This 15-mile proposed BRT connects the Jerome Avenue and Concourse subway stations in the Bronx with the Metro North station and shopping areas in downtown White Plains. Weekday bus ridership – before Metro card availability and expanded activity at the Yonkers Raceway – approximated 12,000 – the highest ridership in the County's Bee Line system.

Daily traffic on Central Avenue ranged from about 25,000 to 50,000 vehicles per day. The traffic signals are coordinated on several different systems.

The previous (2006) Route 41 bus service included an all-day local service with limited peak-hour one-direction express buses. The current (2009) operation also includes a short-turn service between the Woodlawn (#4) subway station and the Raceway.

The proposed service plan adds an all day limited stop "BRT" service between White Plains and the subway. It also extends the short-turn service to the Cross County Shopping Center – one of the heaviest boarding points on the line. The BRT would make fewer stops than the existing rush hour limited. Several queue jumps and extensive transit signal priorities are proposed.

A new climate-controlled "Ponte Vecchio" bridge across the New York State Thruway was proposed to allow the BRT service to directly serve the heavily-used Cross County Shopping Center without the need for time-consuming route diversions.

New roadway bridges across the Throughway at several critical intersections would simplify signal sequences and reduce both bus and traffic congestion, but these were not included in the proposed plan.

I-287 (B). A planning study for a new I-287 multi-modal Tappan Zee Bridge across the Hudson River proposes a BRT service, largely in an exclusive busway within the median or alongside the expressway. Current plans suggest BRT service from about Suffern/Spring Valley to White Plains and possibly Port Chester. Service would include stops at the Tarrytown, White Plains and Port Chester Metro North stations. Status and timing of the I-287 improvement and BRT service is not known.

It may be desirable to stop the BRT service at White Plains. This is because existing ridership between White Plains and Port Chester is low; most office developments are several hundred feet away from I-287, there is little residential catchments, and peak-period speeds on I-287 are high.

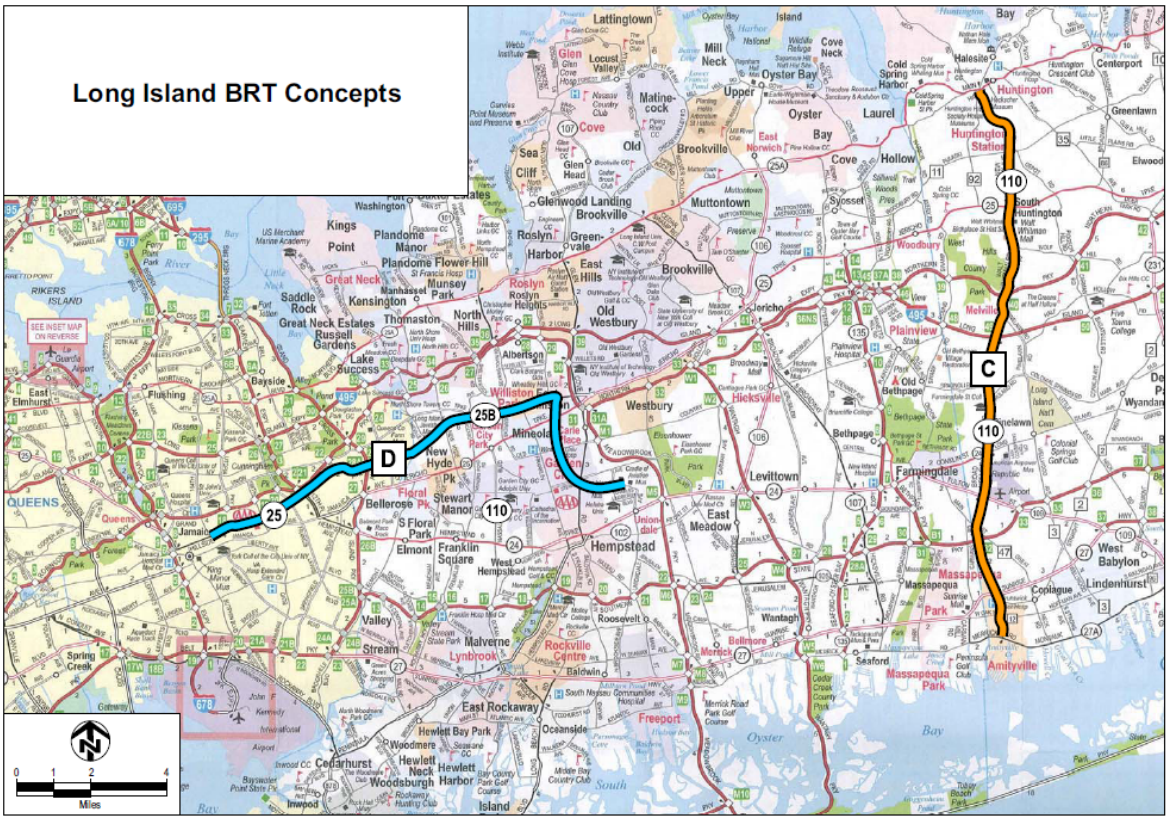
LONG ISLAND (FIGURE 5).

Nassau and Suffolk counties have a largely flat terrain. They are served by a grid of freeways, parkways and arterial roads. The Long island Railroad (LIRR) connects the north shore, center of the Island and the relatively densely developed south shore, with Jamaica Queens, downtown Brooklyn, and Midtown Manhattan. Major retail and employment areas are mainly highway oriented.

Route 110 Corridor (C). A BRT line is being studied for Route 110 – a wide multi-lane north-south arterial in Western Suffolk County. The main generators include the LIRR stations in Huntington, Farmingdale, and Amityville. There large amount of commercial development in the corridor; is mainly auto-oriented and is set back from the roadway.

Any BRT (or other improved bus transit) would be strongly enhanced by infilling of this commercial development to bring activities closer to major transit stops.

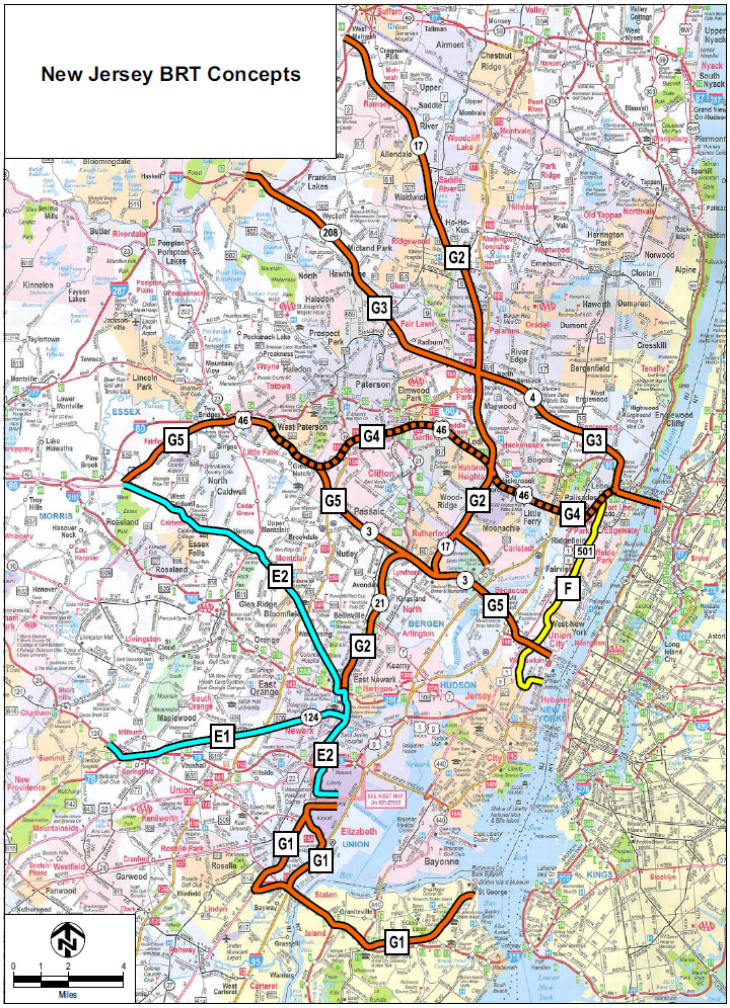
Figure 5



Queens-Nassau BRT (D). A BRT Line along Hillside Avenue in Queens, and Nassau County should be explored. The Line would extend from the 179th Station of the 'F' train in Jamaica, Queens along Hillside Avenue, Franklin Avenue, and Stewart Avenue to the Nassau Coliseum and the Roosevelt Field shopping center. It would also serve the Garden City shopping district. This BRT Line would require a change in operating policy to enable certain MTA-Long Island Bus routes to make limited stops within New York City.

Hillside Avenue is heavily used by MTA New York City buses, especially west of Francis Lewis Boulevard, where peak-period bus lanes have been in effect for many years. These bus lanes would be extended to the NYC/Nassau Line, and dual bus lanes may be desirable on the westernmost section. The BRT service would reduce journey times for many residents living along the line in Queens and Nassau County.

Figure 6



NEW JERSEY

The Northern New Jersey part of the New York City Region has diverse topography, development patterns and transportation facilities. Population and employment are concentrated along the Hudson River waterfront, central Newark, and long established communities. Employment and retail activities are also located along major express highways, and major regional shopping centers such as Garden State Plaza have spanned nearby commercial areas.

Complex rail and road systems serve Northern New Jersey. The rail lines focus on Newark, Hoboken and the two PATH tubes and the Amtrak Trans-Hudson Tunnels. The Access to the Regional Core project, under construction, will provide two additional tracks under the Hudson River and serve a new Manhattan station on 34th Street. Express bus lines enter Manhattan via the Lincoln and Holland Tunnels. The Route 3 contra-flow exclusive bus lane system brings 30,000 to nearly 40,000 people into Manhattan during the morning rush hour.

Existing and proposed bus rapid transit lines in Northern new Jersey complement these facilities by focusing on downtown Newark (with about 100,000 jobs), and other urban centers. They also provide service in corridors that are not well served by rail lines. **Figure 6** shows some BRT opportunities for Northern New Jersey.

NJ TRANSIT. NJ TRANSIT has taken an incremental approach to BRT development. Drawing, in part, on information sharing with New York City Transit, the agency has implemented "BRT-Lite" service on two urban routes with established markets. These routes serve downtown Newark, several universities and Newark International Airport. Go-Bus Route 25 began on Springfield Avenue in 2008 (E-1). Go-Bus Route 28 started on Bloomfield Avenue in October 2009 (E-2).

- Both Go-Bus routes have stops about every half mile.
- Shelters at stops are uniquely designed.
- Route maps are painted on the outside of each bus.

- The Bloomfield Avenue Line also has "next bus" announcements and transit signal priorities at selected locations.

- Ridership on the Springfield Avenue Line (Go-Bus 25) has increased. NJ TRANSIT reports increased customer satisfaction.

- NJ TRANSIT is also exploring BRT possibilities in Bergen County, Elizabeth, New Brunswick and Princeton.

RPA Proposals. The Regional Plan Association in its 2008 report on new mobility for the region's Core suggested several additional BRT opportunities [(1)]. These include a Broad Street and Bergen Line Avenue BRT (F).

Regional Opportunities. Northern New Jersey has many high-type arterial roadways that offer promise for inter-community BRT. Some initial concepts that reflect discussions with NJ Transit include the following.

- **Staten Island – Newark Liberty Airport BRT** (G-1). This BRT Line would link the St. George Ferry Bus Terminal and Northern Staten Island with the airport. The route could follow Victory Boulevard, the Staten Island Expressway, the Goethals Bridge, and US I-9 (or New Jersey Turnpike and Route 81).

- **Route 17 BRT** (G-2). This north-south service could link Northern New Jersey with Paramus, Hackensack, and the Meadowlands Sports Complex. A portion of the service could serve Passaic and Newark. Service patterns should take advantage of the controlled access features along Route 17; bus stops should be removed from high-speed lanes, have suitable passenger amenities, and be easily reached from cross streets.

- **Route 208/Route 4 BRT** (G-3). This service could extend from about Franklin Lakes to the George Washington Bridge Bus Station in Manhattan.

- **Route 46-BRT.** This route could extend from about West Caldwell through West Paterson, Clifton and Fort Lee to the George Washington Bridge Bus Station (G-4) and/or Route 3 (G-5) to the Port Authority Bus Terminal in midtown, or via Route 21 to downtown Newark.

6. COMPLEMENTARY ACTIONS

Several complementary actions in New York City and suburban areas will benefit BRT service.

- Expanding application of all-door boarding, and off-bus fare collection at BRT stops (at least at major stops).

- Converting the Metro Card to a "touch card" to reduce passenger service times.

- Acquiring multi-door buses for use on BRT routes.

- Bringing BRT service to major regional shopping and activity centers.
- Fostering "infill" programs that intensify land development around BRT stations.
- Encouraging major land development at BRT stops and limiting developments elsewhere.
- Preserving rights-of-way for BRT and adapting street (and expressway) designs for BRT service.

7. MAKING BRT A REALITY

Making BRT happen in the New York City Region calls for close working relationships among various public agencies. Transit planners, traffic engineers and enforcement personnel should work together in developing, managing and enforcing BRT. This coordination has been achieved in planning, implementing and operating the Fordham Road Select Bus Service.

It is essential to work closely and cooperatively in addressing the concerns of impacted businesses and residents along possible BRT routes. Essential access to establishments must be maintained, especially for delivery and service vehicles. (This was accomplished along Fordham Road by providing access "windows" on each side of the street).

8. CONCLUDING OBSERVATIONS

This paper has defined some of the guiding principles that underlie developing BRT in the New York region. It has identified existing and planned BRT services that can complement the rail lines in providing regional rapid transit. And it has also set forth some additional suggestions and opportunities that should be explored. Translating these concepts into reality will require further analyses of ridership potentials, operating feasibility, land development possibilities, and community acceptance.

BRT offers promise in the New York City region in the years ahead. It will increasingly complement (not replace) the rail lines in providing regional rapid transit. The opportunities are selective since BRT (or Select Bus Service) will not be appropriate in every corridor. However, many corridors will benefit from adopting various BRT components. Collectively, these actions will improve transit service and attract new riders.

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TCRP 117 – Busway intersection Design, 2007, Co-author

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