

Investing in New York's Transit Future:

An Assessment of the Capital Needs of
the Metropolitan Transportation Authority

Prepared for

Empire State Transportation Alliance

By

Regional Plan Association

September 1999

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Executive Summary

The Empire State Transportation Alliance (ESTA) is a coalition of civic, business, labor, and environmental groups, who have joined together to promote sound investment in New York's transportation infrastructure. One of ESTA's first efforts is to ensure the passage of an Metropolitan Transportation Authority (MTA) five year (2000-2004) capital plan that will continue to restore the transit system to a state of good repair, improve critical operations and also implement new initiatives to expand the system where capacity is most needed.

The first step in developing a capital program is to make a capital needs assessment, which is a summary of what would ideally be done if there were no significant constraints on capital funds. This report describes ESTA's assessment of the MTA's capital needs for both the next five and next twenty years. The assessment was prepared by combining information from previous MTA assessments of the condition of its physical plant with an independent assessment prepared by the New York City Comptroller. The assessment also uses recent investments as a guide and incorporates priority areas for new initiatives. Comparisons are made with the draft Transportation Improvement Program (TIP)¹ for the MTA where they are appropriate. ESTA will prepare a similar assessment of highway needs.

The assessment is designed to be used as a benchmark for the MTA's forthcoming Five Year Capital Program. ESTA expects to work with the MTA and other stakeholders to develop this plan.

Since 1982, MTA has invested over \$29 billion in the restoration of the Region's subway, bus, and commuter rail systems. Track fires and derailments have been eliminated, subway cars are no longer covered in graffiti, and service reliability has dramatically improved. Metro North is now regarded as the most efficient commuter railroad in the country, and the Long Island Rail Road carries more riders than any other commuter rail system in the country. In New York City, the renovation of the subway and bus system, a resurgent economy, and the fare discounts and free transfers made possible by MetroCard have brought subway ridership to its highest level since 1970. Bus ridership is also up, 36 percent over the last three years. Unfortunately, we are now victims of our success, since this surging ridership has packed buses and trains with riders and is straining to the break point a system that has not added capacity in 60 years.

The next capital program must therefore both continue the existing system's restoration and normal replacement, while also adopting new technologies and at the same time undertaking the first significant expansion of transit capacity in over half a century. ESTA's needs assessment sets out what the MTA must do to provide the mobility needed to sustain the New York metropolitan region's economic health and high quality of life.

¹ The TIP is a five-year transportation funding document prepared and approved by the New York Metropolitan Transportation Council (NYMTC) to disburse Federal transportation funds to the MTA, New York State Department of Transportation (NYSDOT), New York City Department of Transportation (NYCDOT), and other local agencies. The TIP allocates Federal dollars along with the state and local dollars that are required to match Federal grants.

This assessment discusses three specific program categories:

1. **General State of Good Repair (SOGR) & Normal Replacement:** SOGR is an ongoing program that has brought the region's subway, bus, and commuter rail systems back from the disrepair and the brink of collapse of the early 1980's. The work must continue. In addition, systems that have reached a state of good repair must be put on a normal replacement schedule so that the systems do not deteriorate. ESTA estimates the cost for SOGR and normal replacement will be approximately \$10.5 billion over the next five years (including \$6.8 billion for the city's subways) and more than \$31 billion over the next twenty years (\$19.7 billion for the subways).² The draft Transportation Improvement Program (TIP) estimates a need for \$10.2 billion for the entire MTA and \$6.4 billion for the subways.

2. **System Improvements:** These improvements to existing facilities and vehicles go beyond SOGR's goal of restoring existing facilities by introducing new technology and management reforms. The resulting improvements will reduce bus emissions, improve subway reliability and capacity, and resolve many of the problems associated with the subway station rehabilitation program.
 - **Clean Fuel Buses & Bus Fleet Expansion:** Diesel tailpipe emissions, which include toxic and carcinogenic fine particulates, now represent one of the most serious health hazards in New York City. Diesel buses are among the most significant emitters. Asthma rates in much of the city, particularly among children and the elderly, are the highest in the US. ESTA proposes a "no more diesels" approach that would accelerate investment in converting bus depots to compressed natural gas (CNG) operations and would replace diesel buses with CNG buses to the maximum extent possible. MTA Long Island Bus has already committed to purchase CNG buses to replace its diesel fleet as it is retired. New York City Transit (NYCT) has made small purchases of CNG vehicles (500 out of a 4,000-bus fleet) which will be assigned to Brooklyn and The Bronx, but they have not yet committed to complete replacement of their diesel fleet.

The MetroCard fare discounts, monthly and weekly passes, and free transfers have increased bus ridership by about 36 percent over the past three years. However, the bus fleet has only expanded by 10 percent in that period, which has led to severe crowding and deteriorating service. ESTA therefore recommends the expansion of the bus fleet by 400 buses (an additional 10 percent) in the next five-year program, with accompanying increases in storage and maintenance capacity.

This program will cost about \$1.2 billion over the next five years and \$3.6 billion over the next twenty. The draft TIP for NYCT requests only \$635 million for buses and depots, which would not include any new CNG bus purchases, or significantly expand the fleet.

- **Signal Modernization and Communications:** SOGR has largely focused on repairing the existing fixed-block subway signal system, a technology developed in the early 1900's. This

² ESTA has separated out three programs: buses, stations, and signals & communications from the SOGR program. The estimates for each of these areas are described in the following sections.

system limits train speed and the number of trains that can run over each subway line. The most modern technology is known as communications based train control (CBTC), which the MTA is testing on the Canarsie Line (L) and the diesel branches of the Long Island Rail Road. Once it is fully deployed, this technology will improve system reliability and safety and increase capacity. ESTA strongly endorses the MTA's rapid adoption of this technology and recommends that its deployment be accelerated as soon as possible. ESTA also recommends rapid improvements to the passenger information systems throughout the system. These improvements will include development of variable message signs to provide passengers with real-time information about the arrival of their next bus or train, and information kiosks in stations and on-line to help them plan their trips and avoid crowding and service disruptions. This expanded communications and signals program will cost about \$1.1 billion over the next five years and about \$6.6 billion over the next twenty. The draft TIP requests \$842 million over the next five years.

- **Subway Stations:** This program would overhaul the entire station rehabilitation process with the goals of improving cost management and accelerating repairs, focusing more on rider access and circulation improvements, and providing opportunities for greater input from the community. ESTA estimates that the total cost for renovation of the stations will be about \$1.6 billion over the next five years and nearly \$6 billion over the next twenty. The draft TIP requests nearly \$1.7 billion over the next five years.

3. System Expansion: The MTA must embark on a major initiative to provide new capacity to accommodate surging ridership. Several projects have been proposed by the MTA, the city, and interested civic groups, including:

- East Side Access: MTA's plan to connect the Long Island Rail Road to Grand Central Terminal, which will save 70,000 Long Islanders 45 minutes in commuting time each day.
- **MetroLink:** Regional Plan Association's proposal for a new subway serving Manhattan's East Side (including the Lower East Side), Brooklyn, Queens, and The Bronx. **MetroLink** would also provide high-speed connections for Long Island, Westchester County and Connecticut commuters to Lower Manhattan and a one-seat ride from Midtown, Lower Manhattan, and Downtown Brooklyn to JFK Airport.
- La Guardia Airport Subway Access (LASA): an examination of options to extend the N train to connect Manhattan with La Guardia Airport.
- West Side Extension of the Flushing Line: a city proposal which would extend the Flushing Line (#7) to the Javits Convention Center. Other proposals to improve West Side transit service include a new cross-town light rail trolley and RPA's Rx proposal for a new line under 43rd Street.
- Metro North Penn Station Access: This project would connect one or more of Metro North's lines to Penn Station, bringing commuters from the northern suburbs to the west side of Midtown.
- Restoration of commuter rail service on the West Shore rail line, serving Rockland County, NY and Bergen County, NJ to offer rail service to a corridor with the highest auto shares in the region for commuting into Manhattan.

- Access to the Region's Core (ARC): a project being considered jointly by the Port Authority, NJ TRANSIT, and the MTA, which would increase trans-Hudson commuter rail capacity and provide New Jersey and Rockland County commuters with better access to the East and West Sides of Midtown.
- Metro North's Harlem Line Third Track and Long Island Rail Road's Main Line Third Track projects, which will significantly expand commuter rail capacity and facilitate additional reverse commute service in Westchester County and on Long Island.

ESTA recommends the implementation of **MetroLink** in tandem with East Side Access, the construction of the Metro North Third Track and the final design of the Long Island Rail Road Third Track projects in the next five years. ESTA also recommends funding continued planning of the La Guardia Subway Access, Flushing Line, West Shore, ARC and Penn Station Access projects, to be followed by the implementation of those projects for which a consensus on need and scope is achieved. The cost of these new capacity projects will be approximately \$4 billion over the next five years, and \$20 billion over the next 20 years. The draft TIP requests approximately \$2.6 billion, which is almost totally dedicated to East Side Access and leaves out any significant funding for any element of **MetroLink** such as the Second Avenue subway, or for the LaGuardia, Flushing extension, West Shore or Penn Station projects.

Conclusion & Next Steps

ESTA estimates the full cost to meet the capital needs of the MTA would be \$18 billion in the next five years, and \$68 billion over twenty years. The 20-year assessment assumes the following objectives:

- All program areas reach a state of good repair and begin normal replacement cycles by 2019
- All diesel buses are replaced with CNG buses
- CBTC is installed on all subway and commuter rail lines and a full network of passenger information systems is in place
- All subway stations have been renovated, with access and circulation improvements where appropriate
- **MetroLink**, East Side Access, and the LIRR and Metro North Third Track projects are completed along with at least one of the other new capacity projects under consideration.

Table ES-1: MTA Five and Twenty Year Capital Needs

Category	Five Year Needs (\$ million)	Draft TIP (\$ million)	Difference	Percent Difference	Twenty Year Needs (\$ million)
State of Good Repair/ Normal Replacement					
NYCT	6,570	6,440	190	2.1%	19,750
LIRR	2,400	2,420	(30)	-1.0%	7,430
Metro North*	1,400	1,190	210	17.8%	4,420
SOGR SubTotal	10,370	10,050	320	3.2%	31,590
Clean Fuel Buses	1,240	640	600	94.5%	3,620
Signals & Communications	1,100	840	260	30.6%	6,600
Stations	1,560	1,680	(130)	-7.6%	5,900
System Expansion	3,930	2,570	1,360	56.2%	19,980
Total	18,190	15,790	2,400	15.2%	67,690

* The Metro North TIP estimate only includes the NYMTC draft TIP. It does not include costs assigned to other MPO's.

ESTA continues to seek an open dialogue with the MTA and other stakeholders in this process. Our campaign will include the following next steps:

- **Public Outreach:** ESTA is identifying the public's understanding of the need for sustained capital investment and specific capital priorities and opinions regarding financing tools. Focus groups, which were conducted this summer, have been instrumental in this effort. This research will inform an outreach and advertising campaign to build support for a sound investment package as it is presented to the MTA Board of Directors, Capital Program Review Board, NYMTC, the State Legislature, and New York City Council.
- **Creating an MTA Capital Program Dialogue Among Stakeholders:** ESTA will work to create an open, public dialogue among transit stakeholders on MTA capital priorities and financing options. This should include ESTA members, the MTA, staff from the Capital Program Review Board, NYMTC, the Governor's Office, the New York City Mayor's Office of Transportation, the offices of the Borough Presidents and suburban county executives.
- **Exploration of Additional Financing Options:** ESTA will examine the options for increasing financing for the next capital plan and seek to work with the MTA on developing a comprehensive package that can win the support of stakeholders.

I. Introduction

The Metropolitan Transportation Authority (MTA) is required to issue its proposed Five-Year Capital Program (for the years 2000-2004) this Fall. This program will identify and budget capital investments in the MTA's bus, subway, and commuter rail systems for the next five years.³ The Capital Program must be approved by the MTA Board and the Capital Program Review Board (CPRB).⁴ The New York State Legislature may also need to approve financing legislation to allow the MTA to sell bonds and to approve the state contribution to the Capital Program. The Federal government and New York City must also approve their contributions.⁵

To inform the public on the MTA capital program, the Empire State Transportation Alliance (ESTA)—a coalition of more than 30 business, labor, civic, and environmental groups—has prepared this assessment of the MTA system's capital needs for the next five and twenty years. This assessment will be used to inform a discussion on the project list, implementation schedule, and financing strategy for the Capital Program. ESTA seeks an open, public dialogue on the shape of this program, which it considers to be the most important economic development decision in the next five years.

The economic resurgence of the New York Metropolitan Region would not have been possible without the MTA investments that have restored the system since its near collapse the early 1980's. Now, with much of the MTA's systems operating at or above capacity the Region must embark on an expansion program that will increase capacity and bring service to areas that are not yet connected. Without these investments, New York City, and the Region will risk hitting a ceiling on its economic growth. How can the Region add the 1.4 million jobs it is forecast to gain, if there is no capacity to bring people to work?

To meet the Region's transportation needs, the MTA must provide adequate funding for: State of Good Repair and Normal Replacement, System Improvements to existing facilities, and System Expansion.

1. **State of Good Repair (SOGR) Program:** Since 1982, the MTA has invested over \$29 billion in the restoration of the New York Region's subway, bus, and commuter rail systems. This \$29 billion investment has brought the transit system back from the brink of collapse. Subway track fires and derailments are no longer a weekly occurrence, subway cars are no longer billboards for graffiti, and system reliability and performance have dramatically improved. The commuter railroads have seen

³ The MTA is required to prepare and adopt a capital program every five years. Previous programs were adopted in 1982, 1987, 1992, and 1995 (the 1995 program rolled over and extended the 1992 program). MTA Bridges and Tunnels, previously known as the Tri Boro Bridge & Tunnel Authority, is not included in the MTA's transit capital programs. Bridges and Tunnels funds its capital program with operating revenues from the tolls on the bridges and tunnels. The surplus from these revenues are transferred to the transit agencies.

⁴ The CPRB includes representatives from the New York State Assembly, New York State Senator, New York City Mayor's Office, and the Governor's Office. The CPRB must unanimously approve the Capital Program. Any single member can veto it. The representatives to the CPRB are Assemblywoman Cathy Nolan, State Senator Dean Skelos, New York City Deputy Mayor Joe Lhota, and NYSDOT Commissioner Joe Boardman.

⁵ Its important to note that New York City has proposed to earmark its capital contribution for the implementation of the La Guardia Airport Subway Access project. However, the draft TIP does not reflect this assignment.

similar improvements in reliability and performance and the entire bus fleet has been replaced. These initiatives, along with a strong economy and the development of the MetroCard free transfers and discounts, have helped win back the riders that were lost in the 1970's and early 1980's.

The momentum generated by these investments must be sustained, or we risk a return to the problems of the late 1970's. Continuation of SOGR will ensure the preservation of the investments of the last two decades and prevent the system from deteriorating.

- 2. System Improvements:** Improvements to existing facilities and vehicles that go beyond SOGR's to introduce new technology and more effective management to reduce bus emissions, improve communications and information systems, and resolve many of the problems associated with the subway station rehabilitation program.

Clean Fuel Buses & Bus Fleet Expansion: In the past decade, compressed natural gas (CNG) engines have been tested and deployed by many bus system operators with extraordinary success. Transit operators in Palm Springs, Syracuse, and Los Angeles have all found that CNG buses provide reliable service with significantly less pollution. Diesel emissions from standard model buses are a major source of soot or fine particulates, which have been linked to the unusually high asthma rates seen throughout much of the city. MTA Long Island Bus and New York City Department of Transportation (in fleet purchases for private operators) have successfully procured and deployed CNG vehicles on Long Island and in the City. Several years ago, Governor Pataki and Chairman Conway committed themselves to an initial purchase of 500 CNG buses for NYCT. However, this is only a small fraction of the total problem, and NYCT has given no indication that they intend to follow up with additional purchases. ESTA recommends the adoption of a "no more diesels" policy to purchase only CNG buses as the fleet undergoes normal replacement. This will also require modification to the bus depots, so that they can fuel and perform maintenance on the fleet. An added benefit of the conversion to CNG will be significant operating cost savings due to lower fuel costs and lower maintenance costs.

Recognizing the 36 percent growth in ridership following the implementation of free transfers, ESTA also recommends the purchase of an additional 400 buses (above the vehicles that the MTA has already committed to add) to provide additional service on the most crowded routes. These additional vehicles will also require the construction of two new bus depots or equivalent expansions to existing depots.

Signal Modernization & Passenger Communications: NYCT has initiated a pilot project to install and test communications based train control (CBTC) on the Canarsie (L) line. The Long Island Rail Road is also installing CBTC on its eastern diesel territory in Suffolk County. CBTC would replace

the fixed-block signal system that has been used in the subways since their construction a century ago. The new system will rely on wireless communications and centralized control to manage train movements. CBTC will improve reliability and safety, increase capacity at points where two lines join, and allow for higher speeds.

New communications technology and automatic vehicle location systems (AVL) will make it possible to provide passengers with information to tell them when their next bus or train will come, what route to take to get to their destination, and to keep them informed when service is disrupted. These innovations will make the system more user-friendly and attractive, which will bring new ridership.

Station Rehabilitation and Reconstruction: The renovation of the subway and commuter rail stations has been proceeding as part of the SOGR program but, in the case of the subway stations, it has been plagued with cost overruns and delays. In several cases underdesign and bad materials choices have resulted in damaged floors and walls almost as soon as the work has been completed. At the current pace, the stations will not be completely restored by the 2019 deadline. Stations serve as the gateways to the transit system and are so important to its image and health that ESTA proposes that they be given special prominence and that the design and procurement system be completely overhauled. A revised program would involve neighborhoods more closely in station design and apply performance contracting, which has proven so successful in expediting recent projects like the Lenox Avenue Invert reconstruction. Future station projects should go beyond the current focus on cosmetics to improve pedestrian access, make transfers easier, and improve comfort on platforms.

3. **System Expansions:** For the first time in a generation, New York is seriously considering adding new capacity to its commuter rail and rapid transit systems. Over half a dozen major projects are under consideration, most significantly the Second Avenue Subway and the East Side Access (ESA) project, which will connect the Long Island Rail Road to Grand Central Terminal. There is a growing popular consensus that, because of the added burden East Side Access would place on the East Side's only subway—6,000 additional peak hour riders on the Lexington Ave. Line—that ESA should move to construction in tandem with a Second Avenue Subway that runs the length of Manhattan.

RPA has issued a proposal, called **MetroLink**, which includes a full length Second Avenue Subway that would serve the Lower East Side and extend to Co-op City in The Bronx. **MetroLink** would also provide better connections to Queens and Brooklyn, add subway service in southeastern Queens, dramatically improve connections from the northern and Long Island suburbs to Lower Manhattan, and provide a one-seat ride from Midtown, Lower Manhattan, and Downtown Brooklyn to JFK Airport. **MetroLink** would, with a single project, address the needs identified in at least three separate MTA Studies.⁶

Other expansion proposals have been advanced; including a new subway connection to LaGuardia Airport, several proposals to improve transit service to the Javits Center, bringing Metro North trains

⁶ These studies include: Manhattan East Side Alternatives (MESA), Lower Manhattan Access (LMA), and the MTA's study of one-seat ride options to JFK Airport.

into Penn Station, providing new transit capacity from New Jersey to Midtown (Access to the Region's Core), and providing transit service on the West Shore Line to serve Bergen and Rockland Counties.

Benefits

Robust investment in these areas will provide a wide range of benefits to the Metropolitan Region's economic health and quality of life:

- **Capacity to Accommodate Job Growth:** Bus and subway fleet expansion will provide more capacity over existing routes during peak commuting periods. **MetroLink** will provide the capacity to bring 240,000 new workers into the Manhattan Central Business District each morning, and will also provide new transit capacity to accommodate reverse commuters to Brooklyn, the Hub and Hospital Center in The Bronx, and Jamaica Center in Queens. East Side Access will significantly increase the capacity of Long Island Rail Road to bring commuters into Midtown Manhattan.
- **Faster, More Reliable Service:** The installation of CBTC will result in a system-wide improvement in subway reliability by reducing congestion and delay at key junctions where two lines intersect.
- **Greater Comfort:** The new capacity that will be provided by bus and subway fleet expansions and by expansion projects like **MetroLink** will improve the sardine-like conditions on the Lexington Avenue (#4, 5, 6) and Queens Boulevard (E, F) lines as they enter Manhattan.
- **Access to New Neighborhoods and Destinations:** **MetroLink** will provide new connections to over 60 previously unserved or under-served neighborhoods, including Manhattan's East Side, Lower Manhattan, Co-op City and the Hospital Center in The Bronx, Southeast Queens, and JFK Airport. East Side Access will bring over 70,000 Long Island Rail Road commuters into Midtown's East Side.
- **Enhanced Environmental Quality:** The replacement of diesel buses with CNG or other clean fuel buses will substantially reduce the emission of fine particulates, which have been identified as a primary cause of the abnormally high incidence of asthma and other respiratory illnesses in the City. The East Side Access project will reduce the auto trips into Manhattan from Long Island and eastern Queens, and reduce auto miles travelled by 100 million per year.

Costs

ESTA calculates a capital need over \$18 billion for the 2000-2004 Capital Program, and more than \$67 billion for the next 20 years (2000-2020).⁷ This translates to an annual cost of about \$3.5 billion per year. The draft Transportation Improvement Program (TIP), requests \$15.8 billion for the MTA over the next five years (detailed tables of the projects identified in the draft TIP can be found in the Appendix). The most significant differences between the ESTA assessment and MTA TIP requests are ESTA's inclusion of **MetroLink**, its proposal for bus and subway fleet expansion, and investment in CNG buses.

These investment needs are great, but they should be viewed from the perspective of investing to support an \$800 billion regional economy. The new jobs that will be supported by the increases in transit capacity are expected to exceed 350,000, with an annual estimated payroll of \$18 billion (generating over \$1.5 billion in annual state and local tax revenues). More importantly, it will help the region maintain its competitiveness with other US and world cities: Atlanta, Seattle, Los Angeles, Tokyo, Hong Kong, and London.

Table I-1: MTA Five and Twenty Year Capital Needs

Category	Five Year Needs (\$ million)	Draft TIP (\$ million)	Difference	Percent Difference	Twenty Year Needs (\$ million)
State of Good Repair/ Normal Replacement					
NYCT	6,570	6,440	190	2.1%	19,750
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Metro North*	1,400	1,190	210	17.8%	4,420
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Signals & Communications	1,100	840	260	30.6%	6,600
Stations	1,560	1,680	(130)	-7.6%	5,900
System Expansion	3,930	2,570	1,360	56.2%	19,980
Total	18,190	15,790	2,400	15.2%	67,690

* The Metro North TIP estimate only includes the NYMTC draft TIP. It does not include costs assigned to other Metropolitan Planning Organizations in the Hudson Valley or Connecticut, where the MTA also operates its services.

⁷ All cost figures in this report use 1999 dollars, with the exception of references to previous expenditures.

II. State of Good Repair Program and Normal Replacement:

The capital needs for the State of Good Repair (SOGR) and normal replacement programs were determined using the MTA's documents supporting the 1995-1999 Capital Plan, along with the New York City Comptroller's Report: "Dilemma in the Millenium." In most cases the capital needs are identified at the cost category level (i.e., miles of track), rather than specific facilities.

Investment in SOGR began with the 1982 Capital Program. By 1982 the subway, bus and commuter rail systems were near collapse due to chronic dis-investment over the previous twenty years. SOGR has focused the MTA Capital Program on the restoration of the existing infrastructure to ensure its continued safe and efficient operation.

The five year horizon identifies the SOGR investment that is needed keep pace with the goal of achieving system-wide SOGR by 2019.⁸ While this may seem like an unreasonable delay, the realities of scheduling work on a complex system that must continue to operate with a growing ridership demand that the work be sequenced to minimize disruption of service. We must also recognize that contracting demand should not significantly exceed supply, or project costs will increase dramatically. The system categories that have already achieved SOGR have an annual normal replacement cost assigned to them based on useful life assumptions.

The twenty year horizon envisions the completion of all state of good repair work by 2019, and the implementation of normal replacement cycles as SOGR is achieved in each category. In most cases the normal replacement cycle is assumed to begin once SOGR has been achieved in a category. This program replaces infrastructure and equipment as it reaches the end of its useful life. Normal replacement is a capital cost while ongoing maintenance, which may include the replacement of smaller sub-components are including in operating costs.

⁸ The goal of achieving 100% SOGR with all systems was established with the first Five-Year Capital Program in 1982.

IIA. New York City Transit

The New York City Transit (NYCT) Authority is the MTA agency responsible for the New York City subway and bus systems. It is also responsible for the Staten Island Rapid Transit Operating Authority, which operates a rapid transit line from St. George to Tottenville. ESTA estimates that \$6.5 billion are required to meet NYCT's SOGR and Normal Replacement needs over the next five years, and \$17.9 billion will be required over the next 20 years (See Table IIA-1).

Table IIA-1

ESTA's Estimated Funding Levels for Subway SOGR & Normal Replacement (\$ million)

Cost Category	1995-1999 Capital Program	ESTA Five Year Needs	Percent Change*	Twenty Year Needs
Subway Cars	2,144	2,777	30%	6,627
Shops & Yards	88	526	498%	1,171
Mainline Track	17	725	1%	2,899
Line Equipment	428	793	85%	2,939
Line Structures	536	446	-17%	1,782
Power	145	392	170%	782
Service Vehicles	40	44	8%	140
Security	132	70	-47%	280
Miscellaneous & Contingency	637	675	6%	2,700
Staten Island Railway	80	126	58%	426
Total	4,948	6,574	33%	19,745

*1995-1999 Capital Program vs. 2000-2004 needs

Table IIA-2

ESTA Five Year Needs vs. MTA's Subway Draft TIP Request

Cost Category	ESTA Five Year Needs Assessment	Draft TIP Request	Difference	Percent Difference
Subway Cars	2,777	2,588	190	7.3%
Shops & Yards	526	1,024	(498)	-48.7%
Mainline Track	725	748	(23)	-3.1%
Line Equipment	793	590	202	34.2%
Line Structures	446	471	(25)	-5.4%
Power	392	519	(127)	-24.5%
Service Vehicles	44	57	(13)	-22.8%
Security	70	43	27	61.3%
Miscellaneous & Contingency	675	362	313	86.6%
Staten Island Railway	126	38	87	226.4%
Total	6,574	6,442	132	2.1%

The costs for each investment area are shown below:

Subway Cars

Subway cars have an expected useful life of 35–40 years. NYCT operates two types of subway vehicles. “A” Division (IRT) vehicles are 51 feet long and 9 feet wide. They run on the numbered subway lines. “B” Division (IND and BMT) vehicles are 60 or 75 feet long and 10 feet wide. They run on the lettered subway lines.

NYCT maintains an inventory of 2,551 A Division cars. They will begin to take delivery of a 1,080-vehicle order to replace the “Red Bird” cars that run on the Lexington Avenue, Flushing and Seventh Avenue express lines in the next year (funded in the 1995-1999 Capital Program). The draft TIP requests funds to purchase 325 A Division cars over the next five years at a unit cost of \$1.32 million per vehicle and a total cost of \$480 million (including procurement costs). The ESTA estimate for A Division vehicles was roughly the same: 323 cars over the next five years. In addition, ESTA sees a need to add 230 new cars over the next 20 years to expand the fleet and allow all lines to operate at a four minute headway in the peak hour.

NYCT will also be taking delivery of a 212-vehicle order of B Division cars to provide the additional rolling stock needed for the Queens Connector (also funded in the 1995-1999 Capital Program). The draft TIP requests 1,070 B Division cars in the next five years at a unit cost of about \$1.78 million per car (plus procurement costs). ESTA estimates a slightly larger requirement: 1,184 vehicles during the next five year capital program and an additional 1,422 cars (for a total of 2,606) over the next twenty years to replace vehicles as they reach the end of their useful life. ESTA also sees a need to expand the B Division subway fleet by 100 additional vehicles in the next five years and by a total of 577 cars over the next 20 years in order to provide a four-minute headway in the peak hour. Because the larger order will likely come at a lower unit cost, ESTA assumed a 10 percent discount per vehicle (unit cost \$1.6 million, plus procurement). Such discounts are consistent with recent experiences on large vehicle orders. New vehicle purchases to provide services on new routes are not counted in this total. The cost for those vehicles will be included in the individual project cost estimates.

Table IIA-3: NYCT Rolling Stock Requirements

Rolling Stock	Five Year Needs			Twenty Year Needs		
	Units	Unit Cost (\$ million)	Total Cost (\$ million)	Units	Unit Cost (\$ million)	Total Cost (\$ million)
A-Division	303	1.32	400	533	1.32	704
B-Division*	1,284	1.60	2,054	3,183	1.60	5,093
Procurement Costs	1,587	0.18	278	3,716	0.18	650
Overhauls & Component Replacement	N/A	Lump Sum	45	N/A	Lump Sum	180
Total			2,777			6,627

* Does not include vehicle purchases for system expansion projects.

Car Shops and Yards

Subway cars require periodic maintenance to prevent malfunctions and make repairs to equipment. This work is essential for maintaining reliable service. It is done in the 14 car shops and 2 overhaul shops. Since the system operates many more trains during the peak period than in the off-peak, the extra trains must be stored in yards and on layover tracks so that they do not impede operations. Investment in these facilities was largely deferred during the 1995-1999 Capital Program, which leads ESTA to recommend a significant increase in investment, totaling \$425 million in the next five years. The draft TIP also indicates a significant increase in investment, to over \$1 billion in the next five years. The difference between the TIP and the ESTA estimate can be attributed to the \$300 million the draft TIP assigns to yard expansion, and the estimates for the rehabilitation of the 207th Street overhaul shop and the subway maintenance shops, which are several hundred million dollars higher than was indicated in the Comptroller's report.

- Maintenance Shops: Subway car maintenance shops are critical for preventing the breakdown of rolling stock. Seven of NYCT's 14 car maintenance shops are still not in a state of good repair. None of the shops were overhauled in the 1995-1999 Capital Program. NYCT and the Comptroller concur on a per-shop repair cost of about \$22 million. ESTA recommends that three shops be repaired during the 2000-2004 Capital program and that the remaining four shops be repaired over the next 20 years. The draft TIP identifies only one shop to be overhauled, at a cost of \$153 million, a significantly higher unit cost than was indicated in the Comptroller's Report. The 1992-1996 Capital Plan included the rehab of the E. 180th Street shop at a cost of about \$60 million.
- Overhaul Shops: NYCT has overhaul shops at Coney Island (B Division only) and 207th Street (A Division & B Division). The Coney Island shop is in a state of good repair, but the 207th Street shop is not. Restoration of the 207th Street shop must be part of the next capital program, since the A Division's R62 and R62A cars will be nearing their mid-life overhauls. NYCT and the Comptroller concur on a restoration cost estimate of \$154 million for the 207th Street Yard, which ESTA has adopted for its recommendation. However, the draft TIP estimates the cost to rehab the 207th Street shop at \$326 million.
- Yard Switches: Yard switches are used to route trains into and out of yards. Reliability is crucial, since a single failure can cause a derailment that would block other trains from entering or leaving a yard. The Comptroller's Report cited an NYCT quadrennial yard track & switch survey conducted in 1995 that concluded that 445 switches (out of 1,010) would require replacement by the end of the year 2004 at a per unit cost of \$300,000. Only 32 switches were scheduled for replacement in the 1995-99 capital program. ESTA recommends the replacement of 413 switches in the next capital program at a cost of \$124 million. The draft TIP allocates only about \$65 million to switch replacement (without specifying the number to be replaced). In the next 20 years a total of 772 switches will need replacement.

- **Yard Signals:** Yard signals control the movement of trains as they enter, leave and navigate through yards. NYCT and the Comptroller concur in their cost estimate for the restoration of the signal system at \$63.2 million. ESTA recommends the completion of this restoration in the next five years. The draft TIP includes signal overhauls at two yards for a total cost of about \$110 million.
- **Yard Track:** Trains are stored on yard tracks when they are not in use. Their good repair is critical to preventing derailments that could potentially obstruct access and egress to the yards. NYCT estimated that only 56 of 120 miles of yard track were in SOGR. The Comptroller estimates that 96 of 130 (sic) miles are in SOGR. The 1995-1999 Capital program did not include any funds to restore yard track. ESTA recommends that 22 miles of track be restored during the next five-year program. A total of 79 miles needs replacement over the next 20 years. The cost in the next five years would be approximately \$19 million. The draft TIP includes \$26.5 million for yard track replacement (without specifying track mileage).
- **New Yard Capacity:** The purchase of new subway cars to increase service on existing lines will require an increase in storage capacity. ESTA assumes a need for 500 additional car spaces over the next 20 years (the remaining vehicles would be absorbed into overnight services, where minimum train frequency would increase from three to four trains per hour. The cost would be \$100 million over the next five years and \$500 million for the next 20 years.

Table IIA-4: NYCT Car Shops and Yards

Cost Category	Units not in SOGR	Five Year Needs			Twenty Year Needs		
		Units	Unit Cost (\$ million)	Total Cost (\$ million)	Units	Unit Cost (\$ million)	Total Cost (\$ million)
Maintenance Shops	7.0	3.0	22.0	66	7	22.0	154
Overhaul Shops	1.0	1.0	153.9	154	1	153.9	154
Yard Switches	413.0	413.0	0.3	124	772	0.3	232
Yard Signals*	Lump Sum			63			63
Yard Track (miles)	64.0	22.0	0.9	19	79	0.9	68
New Yard Capacity	Lump Sum			100			500
Total				526			1,171

*This category may increase if CBTC is adopted by NYCT as its new signal standard.

Mainline Track and Switches

NYCT maintains 656 miles of mainline subway, elevated, and at-grade track; and 1,621 mainline switches. NYCT reports that its entire inventory of mainline track switches will have reached SOGR upon completion of the 1995-1999 Capital Program. Once SOGR has been achieved they anticipate a normal replacement rate of 10 miles of track and 48 switches per year at an average cost of \$10.8 million per mile for track and \$770,000 per switch. ESTA's estimated cost for track and switch replacement will be approximately \$725 million over the next five years and \$2.9 billion over the next twenty years. The Draft TIP requests \$565 million for track replacement and \$183 million for switch replacement.

Table IIA-5: NYCT Mainline Track and Switches

Mainline Track and Switches	Five Year Needs			Twenty Year Needs		
	Units	Unit Cost (\$million)	Total Cost (\$million)	Units	Unit Cost (\$million)	Total Cost (\$million)
Track (miles)	50.0	10.8	540	200.0	10.8	2,160
Switches (each)	240.0	0.8	185	960.0	0.8	739
Total			725			2,899

Line Equipment

Line equipment includes tunnel lighting, fan plants, and pump rooms that are installed in subway tunnels to ensure their safe operation. ESTA recommends an overall investment of about \$790 million over the next five years, \$200 million more than the amount requested in the draft TIP. ESTA estimates the 20-year cost for line equipment at \$2.9 billion.

- Tunnel Lighting: Tunnel lighting is used for emergency evacuations and to improve working conditions for inspection and repair crews. Tunnel lighting has a useful life of 35 years. Of 417 miles, 243 are not yet in a state of good repair. Once SOGR is achieved, the normal tunnel lighting replacement rate will be about 60 miles every five years. The TA replaced less than 50 miles of tunnel lighting in the 1995-1999 Capital Program, a rate that will not even keep pace with normal replacement. To accelerate replacement so that SOGR can be achieved by 2019, ESTA recommends a replacement rate of 65 miles per five year plan. At an average cost per mile of \$2.3 million, the total cost for the 65 miles would be \$150 million for the next five-year plan. The cost to replace all of the remaining 243 miles over the next 20 years will be approximately \$560 million. The draft TIP requests \$101 million for tunnel lighting, although the last three years of the TIP request approximately \$275 million for unspecified line equipment, which may include tunnel lighting.

- **Fan Plants:** Fan plants are used to provide emergency ventilation and smoke removal, and to relieve heat build-up from air-conditioned cars. According to NYCT’s ‘95-99 Capital Program proposal, 123 of 199 fan plants will still require restoration after 1999. Fan plants have a 35-year useful life, so the normal replacement rate will be approximately 6 plants each year. NYCT must accelerate its restoration of these fan plants to 32 in the next five-year capital program to achieve SOGR and stay ahead of normal replacement. At a unit cost of \$16.75 million, this calls for a commitment of about \$536 million in the next capital program. The draft TIP requests \$123 million to replace 6 fan plants in the next five years (although the unspecified \$275 million for line equipment will likely make up some, but not all of the shortfall). The cost to replace 123 plants over the next 20 years will be approximately \$2.1 billion.
- **Pump Rooms:** The subways have 278 pump rooms equipped with more than 900 pumps that are used to remove ground and storm water that infiltrates the tunnels. By the end of the 1995-1999 Capital Program 213 pump rooms will be in a state of good repair and 65 will still need overhauls. The pumps and rooms have a useful life of 35 years, so the normal replacement rate will be about 8.5 rooms per year. The unit cost to replace a pump room is approximately \$2.5 million. ESTA estimates that the replacement of 43 rooms will cost \$107.5 million over the next five years. The draft TIP requests \$92 million to rehab 18 locations and replace some standpipes. The total cost to replace 128 pump rooms on a normal replacement cycle for the next 20 years will be approximately \$320 million.⁹

Table IIA-6: NYCT Line Equipment

Line Equipment	Five Year Needs				Twenty Year Needs		
	Units not in SOGR	Units	Unit Cost (\$million)	Total Cost (\$million)	Units	Unit Cost (\$million)	Total Cost (\$million)
Tunnel Lighting	243	65.0	2.3	150	243	2.3	559
Fan plants	123	32.0	16.8	536	123	16.8	2,060
Pump Rooms	53	43.0	2.5	108	128	2.5	320
Total				793			2,939

Line Structures

Line structures, including steel elevated structures (59.6 miles) , tunnel structures (137.4 miles), and at-grade structures (25.3 miles) are the civil infrastructure that support the tracks and equipment of the subway system. NYCT notes that these structures are complex systems with multiple sub-components. They are therefore reluctant to characterize a state of good repair on a percentage basis. However, the Comptroller’s Report has determined that only 58 percent of the elevated structures, 33 percent of the subway structures, and 24 percent of the at-grade structures were at a state of good repair in 1997. Structural problems can include rusted or cracked structural steel; cracked, spalled, or loose concrete; and settlement or erosion caused by water infiltration. Deterioration of structural elements can also lead to

⁹ Pump rooms that were replaced prior to the initiation of the SOGR program in 1982 will require replacement during the next 20 years.

premature deterioration of other infrastructure and rolling stock. Most of these problems can be prevented through regular maintenance once state of good repair has been achieved, and the useful life of well-maintained infrastructure is at least 100 years.

The 1995-1999 Capital Program identified only 0.5 miles of subway tunnel, 6.2 miles of elevated structure, and 1.9 miles of at-grade structure and viaduct for repair or replacement. This represents a significant slowdown from previous capital programs. ESTA estimates that the next capital program should include funds to repair 3.5 miles of the remaining unrepaired elevated structure, 23.1 miles of the remaining unrepaired subway structure, and 5.5 miles of the remaining unrepaired at-grade structure and viaduct. The total cost of these repairs would be \$446 million. The cost to complete restoration of the system's structures over the next 20 years is \$1.8 billion.¹⁰ The draft TIP includes requests for \$440 million to restore elevated structure, but only \$12.5 million for tunnel rehab and less than \$20 million for other repairs.¹¹ This lack of investment in tunnel rehab is a cause for concern.

Table IIA-7: NYCT Line Structures

Line Structures	Five Year Needs				Twenty Year Needs		
	Units not in SOGR	Units	Unit Cost (\$million)	Total Cost (\$million)	Units	Unit Cost (\$million)	Total Cost (\$million)
Steel Elevated Structure (miles)	14.1	3.5.0	25.1	88	14.1	25.1	353.9
Subway Tunnel (miles)	92.2	23.1	13.0	300	92.2	13.0	1198.6
At-Grade Structure (miles)	17.6	4.4	6.9	30	17.6	6.9	121.4
Concrete Viaduct (miles)	4.3	1.1	25.1	28	4.3	25.1	107.9
Total				446			1781.9

Power

The NYCT subway system operates on electric power. High voltage AC current supplied by the New York Power Authority is converted to DC current at 215 substations throughout the system. The substations transfer the current to the third rail. These systems have a useful life of 75 years and a normal replacement rate of almost three units per year. All but 15 of the units will have been brought into a state of good repair by the end of the 1995-1999 Capital Program. The Comptroller's Report shows that 14 additional units will reach the end of their useful life between 2000 and 2004 and a total of 41 units will reach the end of their useful life by 2019. ESTA estimates that 29 substations will need to be replaced during the 2000-2004 Capital Program to satisfy SOGR and normal replacement needs, at an estimated cost of nearly \$400 million. The draft TIP requests \$519 million for power improvements over the next five years. The cost to complete SOGR and maintain normal replacement over the next 20 years will be approximately \$780 million.

¹⁰ It may be possible to reduce this category of costs by replacing segments of some elevated lines with new subway tunnels, provided the replacements offer needed new services. For a review of such opportunities, see RPA's Third Regional Plan: A Region At Risk.

¹¹ The draft TIP request for structures includes \$250 million for restoration of the Stillwell Terminal Complex. This complex is located on Coney Island and is the terminus for three subway lines. The cost to restore the complex may include items other than elevated structures.

Table IIA-8: NYCT Power

Power		Five Year Needs			Twenty Year Needs		
	Units not in SOGR	Units	Unit Cost (\$million)	Total Cost (\$million)	Units	Unit Cost (\$million)	Total Cost (\$million)
Enclosures	15	29.0	13.1	380	56	13.1	734
Equipment	N/A			12			48
Total				392			782

Other Items

There are several other cost categories that have ongoing capital needs.

- Service vehicles are used to react to breakdowns and mishaps throughout the rail and bus system and to perform maintenance and capital construction on the subway system's physical plant. The system's service vehicle fleet is currently in a state of good repair, but will have a five year normal replacement need of \$44 million, including \$30 million for rubber tired vehicles and \$14 million to overhaul or replace work trains. This cost was extended for twenty years, totaling approximately \$140 million. The draft TIP requests \$57 million for the next five years.
- Security and police needs: The police facilities in the subways are currently at a 55 percent state of good repair. NYCT estimates that \$70 million will be required to continue to renovate these facilities in the next five years. In the absence of a long range assessment of normal replacement needs, a twenty year needs requirement at the same investment pace, totaling \$280 million, was assumed. The draft TIP requests \$43 million.
- Miscellaneous and contingency items include funds to address emergencies and unforeseen needs, ongoing asbestos abatement, fire standpipes in stations, employee facility rooms, underground storage tanks, Human Resources/administration facilities, computer systems, and station platform gap fillers. The total cost for these items is estimated at \$675 million for the next five years and \$2.7 billion over the next 20 years. The draft TIP requests \$362 million. Some or all of the difference between the two estimates may represent funds that have been assigned to specific program areas in the TIP.
- Staten Island Rapid Transit (SIRTOA) is an independent operating agency under the jurisdiction of NYCT that operates a rapid transit line (B Division-compatible) from St. George to Tottenville. The system includes 29 track miles, 22 stations, and 64 vehicles. SIRTOA estimates that it needs \$126 million over five years to achieve SOGR and make necessary upgrades, including public address

systems at stations and power upgrades. The draft TIP requests \$39 million. The twenty-year needs total about \$426 million.

Table IIA-9: NYCT Service Vehicles, Security, Miscellaneous, and SIRTOA Needs

Cost Category	1995-1999 Capital Program	Five Year Needs	Percentage Change*	Twenty Year Needs
Service Vehicles	41	44	8%	140
Security	132	70	-47%	280
Miscellaneous & Contingency	637	675	6%	2,700
Staten Island Rapid Transit	80	126	58%	426
Total	890	915	3%	3,546

IIB. Long Island Rail Road and Metro North¹²

The MTA's commuter railroads are in substantially better condition than the NYCT subway system. The Long Island Rail Road(LIRR) has reportedly reached a state of good repair for all of its rolling stock and for all of its physical plant except for line structures. The line structures are at a 75 percent state of good repair and are scheduled to reach 100 percent by 2011 (according to the 1995-1999 proposed capital program). Over 85 percent of the 1995-1999 Capital Program has been dedicated to normal replacement needs. The most recent capital program included funds to replace the diesel fleet that operates on the eastern part of the system with new coaches and dual-mode (diesel & electric) locomotives that will allow these trains to come into Manhattan. It

¹² The published information on the progress of the commuter railroads towards SOGR is not nearly as detailed as the information on NYCT. Whereas NYCT's progress is detailed in its presentation package for the 1995-1999 Capital Plan and in the Comptroller's Report, the commuter railroads' progress is only described using a bar graph and pie chart for broad cost categories in the initial 1995-1999 Capital Plan submission. Without these details, and without detailed unit cost assumptions, this needs assessment for the commuter railroads is necessarily less detailed and subject to more assumptions. The draft TIP for the LIRR and Metro North give an indication of the investments these agencies intend to make over the next five years, but without a needs assessment it is difficult to independently verify that these are the most needed priorities.

also continued a cycle of rehabilitation and replacement of the electric multiple unit (EMU) fleet.¹³ The LIRR has forecast a requirement to purchase 236 EMU cars in the next five years, and a total of 635 EMU cars over the next 20 years. The LIRR will also need to conduct 60 minor overhauls and 416 major vehicle overhauls in the next five years, and a total of 664 major overhauls in the next twenty years. The LIRR will also acquire additional rolling stock beyond the next five-year program to run its new East Side Access services, which will be needed by 2012.

Table IIB-1: LIRR & MNR Rolling Stock Replacement

Cost Category	Five Year Needs			Twenty Year Needs		
	Units	Unit Cost (\$ million)	Total Cost (\$ million)	Units	Unit Cost (\$ million)	Total Cost (\$ million)
Purchase LIRR EMU Vehicles	236	2.46	580.56	635	2.46	1,562.1
Purchase MNR EMU Vehicles	240	2.46	590.4	480	2.46	1,180.8
Minor Overhaul LIRR EMU Vehicles	60	0.64	38.4	60	0.64	38.4
Major Overhaul LIRR EMU Vehicles	416	1.28	532.48	664	1.28	849.92
Total			1,741.84			3,631.22

Without a more detailed evaluation of the condition of the LIRR’s physical plant, it is difficult to independently assess the infrastructure requirements for the LIRR and determine whether recent complaints about service quality

¹³ The manufacturers of these vehicles has encountered delays in delivering the vehicles in these orders. The LIRR expects to take delivery in the next 2-3 years.

are related to capital needs or improved maintenance. In the absence of more specific needs data, ESTA estimated the costs for SOGR and normal replacement work on the LIRR by escalating the 1995-1999 Capital Plan category costs at an annual inflation rate of 2.5 percent. When these figures are added to the rolling stock cost estimate, the total for the LIRR SOGR and normal replacement program is approximately \$2.4 billion in the next five years and \$7.4 billion in the next twenty years. The draft TIP also requests a total of approximately \$2.4 billion for SOGR and normal replacement.¹⁴ The most significant difference between the ESTA assessment and the draft TIP are for line structures (ESTA estimates a need for \$140 million vs. \$74.5 in the draft TIP), the only area that has not yet reached SOGR.

Table IIB-2: Long Island Rail Road Capital Needs (SOGR & Normal Replacement)

Category	Five Year Needs (\$ million)	Twenty Year Needs (\$ million)
Rolling Stock	1,151	2,450
Stations	400	1,600
Track	280	1,120
Line Structures	140	560
Power	14	56
Communications & Signals	90	360
Shops & Yards	160	640
Miscellaneous	160	640
Total	2,395	7,426

Metro North (MNR) is not quite as far along with its SOGR program as the LIRR. All of the mainline track,

¹⁴ The draft TIP also includes a request for \$2.4 billion for the East Side Access project to connect the Long Island Rail Road to Grand Central Terminal.

signals & communications, and rolling stock are at 100 percent SOGR and the power systems, shops & yards, stations, and line structures are at more than 80 percent SOGR and are on schedule for 100 percent by 2011..

Metro North has replaced much of its diesel fleet in its recent capital programs. The 1992-2011 Capital Needs Assessment forecast the replacement of 480 EMU's in the decade beginning in the year 2000. Assuming that half of these replacements come in the next five year program, the rolling stock cost will be \$590 million. The twenty year cost, assuming there are no additional needs between 2010 and 2019, will be approximately \$1.18 billion.

As with the LIRR, there is a shortage of detail on the condition of Metro North's physical plant. To develop an infrastructure cost estimate, the methodology described for the LIRR was applied to Metro North.¹⁵ When these figures are added to the rolling stock cost estimate, the total for the Metro North SOGR and normal replacement program is approximately \$1.4 billion in the next five years and \$4.3 billion in the next twenty years. The draft TIP (NYMTC only) requests \$1.2 billion for SOGR and normal replacement.

¹⁵ The one exception to this methodology involved stations. The 1995-1999 Capital plan included \$100 million for the rehabilitation of Grand Central Terminal, a unique and unusually expensive project. To estimate the ongoing station rehabilitation needs, the GCT line item was subtracted from the 1995-1999 plan and the remaining costs were escalated at an annual rate of 2.5 percent.

Table IIB-3: Metro North Capital Needs (SOGR & Normal Replacement)

Category	Five Year Needs (\$ million)	Twenty Year Needs (\$ million)
Rolling Stock	590	1,181
Stations	250	1,000
Track & Structures	300	1,200
Power	30	120
Communications & Signals	50	200
Shops & Yards	50	200
Miscellaneous	90	360
Total	1,360	4,261

III. System Improvements

Three facility areas that the MTA includes under SOGR have been given special attention in this report because they require major improvements that go beyond the replacement of existing infrastructure.

These areas are:

- **Buses:** where ESTA recommends replacement of the diesel fleet with cleaner compressed natural gas (CNG) buses, a “no new diesels” policy
- **Signals and Communications:** where ESTA supports the MTA’s adoption of CBTC and recommends accelerated introduction of improved passenger information systems
- **Subway Stations:** where ESTA recommends an overhaul of management of the stations program to accelerate station rehabilitation, improve productivity and lower costs, provide for more access and circulation improvements, and provide for greater community input.

IIIA NYCT Buses

NYCT maintains a fleet of 4,108 buses, including 3,536 standard 40-foot buses, 463 suburban buses, and 109 articulated 60-foot buses. All of the buses are currently in a state of good repair. According to industry standards, the useful life of a bus is 12 years. Two new issues need to be addressed when considering future investments in NYCT’s bus service: the increase in ridership that has come with the MetroCard and free transfers, and the environmental impacts of diesel bus emissions.

Bus ridership is up 36 percent since 1997, mostly due to the MetroCard free transfer that has encourage bus-to-subway and bus-to-bus transfers. Much of this incremental ridership has also come during the peak commuting periods, where additional capacity can only be added by increasing the size of the fleet. Since 1997, NYCT has increased peak period bus service capacity by about 10 percent through purchases of 350 new buses. They have also begun to run larger articulated buses on high volume routes. Articulated buses have 42 percent more capacity than the standard 40-foot bus. However, they still have only one entrance and one exit, which increases the time they must spend at busy stops as they load and unload. Additional bus purchases are needed for improved bus service, particularly in areas with no other transit options, such as the Lower East Side and large parts of Brooklyn, Queens, The Bronx, and Staten Island.

Almost all of the NYCT fleet uses diesel fuel, which is a major source of the fine particulate (PM) pollution that has been linked to the high rates of asthma seen in many of the city’s neighborhoods. Clean fuel technologies can significantly reduce PM emissions. Proven options include compressed natural gas (CNG) and electric engines. CNG has shown the greatest potential for reducing PM emissions in New York. CNG has been effectively deployed by NYCDOT for bus lines run by private operators, and by MTA’s Long Island Bus division. It has also been successfully employed by other transit agencies around the country, including Los Angeles, Palm Springs, and Syracuse. NYCT is currently committed to the purchase of 190 CNG buses at a cost of \$62.6 million (\$330,000 each vs. \$270,000 per diesel bus). These buses will be run from the Jackie Gleason depot in Brooklyn.

The draft TIP requests only \$300 million for new diesel buses, a number insufficient to meet the increasing demand. NYCT has given no indication that it intends to follow up on its initial CNG bus purchases with any systematic replacement of its diesel buses.

ESTA makes the following recommendations:

- Retire the diesel fleet through normal attrition and replace all diesel buses with CNG as depot conversions allow (about 1,500 in the next capital program).
- Expand the bus fleet by 400 buses in order to accommodate additional ridership. These buses would have CNG powerplants.
- Continue testing hybrid diesel-electric buses as an alternative to CNG. If these hybrids match the emissions standards of the CNG buses, the MTA may eventually elect to deploy them as an alternative to CNG. However, the CNG program should proceed on pace until the hybrids are proven.
- Remanufacturing buses to extend their useful lives by up to 8 years is not contemplated in this capital cost estimate and should only be allowed if the remanufactured buses use CNG or have clean-fuel technology.

Table IIIA-1: NYCT Buses

Buses	Five Year Needs			Twenty Year Needs		
	Units	Unit Cost (\$ million)	Total Cost (\$ million)	Units	Unit Cost (\$ million)	Total Cost (\$ million)
CNG Buses	1,500	0.33	495	4,650	0.33	1,535
Diesel Buses	150	0.27	41	150	0.34	51
Articulated Buses	200	0.42	84	1,325	0.42	557
Over the Road Coaches	250	0.40	100	1,375	0.40	550
Total	2,100		720	7,500		2,692

Bus Depots

Bus depots are the storage, fueling, and repair facilities for the NYCT bus fleet. There are currently 19 depots and one base shop in the system. All but two will have reached a state of good repair by the end of the 1995-1999 Capital Program. The New York City Comptroller's office and NYCT concur that depots and base shops have a useful life of approximately 100 years, but require complete overhauls every 50 years and subsystem overhauls every 17 years.

The conversion to CNG power will require new fueling equipment at the depots where the new buses are based. The conversion of the Jackie Gleason depot (capacity: 250 buses) will be completed in the next few months, and the Coliseum depot (220 buses) is scheduled for completion by 2001. The Jackie Gleason conversion has cost approximately \$21 million. NYCT is also committed to converting the Manhattanville depot (250 buses), which is included in the draft TIP for FY 2002 at a cost of \$25 million.

Assuming the fleet expansion and modernization goals described above, two additional depots, each capable of accommodating 200-250 buses will be required by the end of the upcoming capital plan. Two existing depots will also require replacement. These four depots would all be outfitted with CNG fueling and maintenance equipment. In addition, CNG fueling and maintenance equipment would be installed at three additional depots. Upon completion of the previously scheduled CNG conversions, the depot

replacements and new depot construction, and the installation of three additional CNG fueling systems, NYCT should have depot capacity to accommodate approximately 2,500 CNG buses.¹⁶ Finally, rehabilitation and replacement of subsystems, including lifts, washers, HVAC systems, and paintbooths would continue at the current NYCT pace. ESTA estimates the five year cost for this program to be approximately \$520 million and the 20-year cost for full conversion to CNG operations to be \$930 million. The draft TIP requests \$340 million and does not include any funds to convert to CNG operations beyond the Manhattanville Depot or to increase depot capacity.

Table IIIA-2: NYCT Bus Depots

	Five Year Needs			Twenty Year Needs		
	Units	Unit Cost (\$ million)	Total Cost (\$ million)	Units	Unit Cost (\$ million)	Total Cost (\$ million)
Depot Replacement	2	95	190	2	95	190
New Depots	2	105	210	2	105	210
New CNG Systems	3	20	60	16	20	320
CNG System for Manhattanville	Partial	10	10	Partial	10	10
Depot Equipment & Subsystems	lump sum	47	47	Lump sum	200	200
Total			517			930

¹⁶ None of these investments are likely to come on line until the third year of the Capital plan, leaving the system with a temporary shortfall in CNG depot capacity. For this reason, limited purchases of diesel buses may be required in the first two years in order to maintain normal replacement schedules.

IIIB. Signals and Communications

Train control signals manage train movements and prevent collisions. NYCT currently relies on fixed block signals, the technology that has been in place since the construction of the system at the beginning of this century. By the end of the 1995-99 Capital Program, the SOGR signal program on the A Division (IRT) will be complete, and the B Division (BMT & IND) will be 50 percent complete.

NYCT is currently engaged in a pilot project to develop new-technology communications-based train control (CBTC). CBTC would represent a significant upgrade to the subway's communications systems. This technology appears promising, but is not developed to a point where NYCT believes it can commit to adopting it as the system standard.

ESTA recommends NYCT's next capital plan should continue to invest in repairing the existing signal system, but at the same time accelerate the Canarsie Line pilot project and be prepared to transition to CBTC as soon as the technology is proven. One billion dollars would be assigned to this program to maintain the current level of investment. The full twenty year cost to install CBTC throughout the system may be as high as \$5 billion.

In addition, MTA should accelerate the improvement of its passenger information systems by installing variable message signs at bus stops and subway stations. Many of these features are already being installed in the commuter rail system. This system would be integrated with the automatic vehicle location (AVL) systems that are being installed in the buses and with the CBTC system mentioned above. Specific features would include:

- Electronic message signs at bus stops, commuter rail stations, and on subway platforms which would tell passengers how long it will take for the next train/bus to arrive and let them know if the trains/buses are running late.
- Information kiosks at subway stations, commuter rail stations and major bus terminals to help passengers plan their trips, including transfers and alternate routes when part of the system is disrupted.
- An interactive internet website to provide the above-mentioned trip-planning functions. At least two privately operated websites already exist to report service disruptions, but these sites do not have access to the same detailed information that will be available to the MTA.

Many transit systems throughout the United States and in other major cities have already installed these passenger information systems. One hundred million dollars should be assigned in the next five years to develop and begin deployment in New York.

In comparison to ESTA's recommended \$1.1 billion investment over the next five years, the draft TIP requests \$842 million and includes line items for signals (including CBTC) and customer information systems.

IIIC. Subway Stations¹⁷

NYCT maintains 468 stations on its subway, elevated, and surface lines. Eighty-one of these stations provide transfers between local and express service or among different trunk lines and branches. The stations are the passengers' gateway into the subway system and should be considered important public spaces in their communities.

The SOGR program for stations has been focused on mostly cosmetic restoration of walls, entrances, and floors. In some cases station projects have installed new entrances or included new infrastructure to improve circulation, but many design opportunities to improve access and circulation have been missed, especially opportunities to work with adjoining property owners. One hundred "flagship" stations have also been slated for installation of ADA-compatible elevators and ramps. As of 1995, 109 stations, including 22 ADA-compatible stations had been contracted for replacement. Thirty-three additional stations, including 18 ADA-compatible stations were identified for renovation in the 1995-1999 Capital Program. However, these repairs have had higher costs and have taken far longer to complete than anticipated. The remaining 326 stations must be completed by 2019 to keep pace with the 35-year normal replacement cycle. At the current pace, even accepting that the initial focus has been on more complex "flagship" stations, the MTA will not come close to meeting that goal.

Stations vary widely in their complexity and the degree of difficulty of their rehabilitation. A simple station like 33rd Street on the Lexington Avenue (6) IRT has turnstiles at the platform level, immediately below the street, and uses side platforms. This station was restored at a cost of \$10.4 million. A complex station like Union Square includes multiple platforms, mezzanine levels and changes in elevation, as well as a complex of underground pedestrian tunnels. The expected cost to rehabilitate this station (work is ongoing) is slightly more than \$50 million. The Times Square station, the system's busiest complex, providing access to five separate lines (three offering local and express service), will undergo an extensive, but largely cosmetic renovation that will not improve access from the street, at a cost of \$180 million.

In addition, the station rehabilitations that have been completed have often fallen short of the public's expectations. The manufactured floor tiles that were installed in the first stations to be rehabbed are slippery when wet. The yellow plastic sensing tiles that have been installed on platform edges have drawn many complaints because the raised knobs create an uneven surface that causes many passengers to stumble or trip. Many of the repaired features have also been almost immediately damaged by heavy wear and water intrusion, and then patched with an unsightly, non-matching finish.

This situation argues that, along with an increase in funding, there must be reforms of the design, procurement, and construction process so that repairs are accelerated, quality is improved, and the additional funding is not wasted. Elements of such a reform program would include:

¹⁷ The LIRR and Metro North Stations, which have already reached SOGR, are included in the commuter rail SOGR program.

- Incentive contracting to improve on-time completion, quality, and cost control. These contracts would use performance bonuses for completion ahead of schedule and penalties if schedules are not met.
- Increased involvement of the community in station design and project development. This would ensure that the stations reflect the needs of the community with regard to access, hours of operation, and appearance.
- A commitment to improve access for all system users through the development of improved entrances and better transfer passages.
- A commitment to address safety concerns on island platforms at problem stations like 72nd Street & Broadway and 53rd & Lexington Avenue.
- A commitment to improve climate control on station platforms and in mezzanines and passageways.

The current pace (1995-1999) of investment in station infrastructure repairs is about \$220 million per year, which if sustained would require \$1.1 billion from 2000 to 2004. Acceleration of repairs and expansion of their scope may require an increase on that amount of up to 50 percent, raising the total to \$1.55 billion, incorporating the recommended productivity reforms. The cost to complete rehabilitation of all the stations, through 2019, has been estimated by the Comptroller to be approximately \$5.9 billion. The draft TIP requests \$1.68 billion over the next five years.

IV. System Expansion

The MTA has rightfully focused its capital programs over the past 20 years on renewing the systems that had fallen into severe disrepair. But now new capacity is desperately needed and must become an equal priority. Few people realize that the subway system has actually shrunk since 1940. Meanwhile, thanks to the investments in SOGR that have brought the system back from the brink of collapse, the rebounding economy and the MetroCard discounts and free transfers have raised ridership to its highest point since 1970. With subways jammed and no tunnel capacity for more commuter rail trains, the subway and commuter rail system must be expanded to:

- accommodate job growth in corridors where trains or tunnel are overloaded, such as on the east side of Manhattan, in Queens, and into Penn Station from both Long Island and New Jersey;
- bring modern subway service to areas without it, such as the south-central and Co-op City sections of The Bronx, southeastern Queens and the Lower East Side;
- offer better connections from the commuter rail system to the centers of commerce, such as to Wall Street and, in the case of Long Island, to the east side of Midtown;
- provide better reverse commute service to Long Island and Westchester Counties, and

- serve new markets like the far western side of midtown, and Kennedy and LaGuardia Airport.

In the past five years, the MTA, along with other interested parties including the City and RPA, has studied several options for expanding the subway system. The MTA is currently conducting (or has recently completed) the following studies:

East Side Access: The MTA recently completed an MIS and Draft Environmental Impact Statement for a project that would connect the Long Island Rail Road to Grand Central Terminal via the lower level of the 63rd Street tunnel. This project would save 70,000 Long Island commuters to the East Side 45minutes in travel time each day and remove over 12,000 automobile trips from the road each day. The total capital cost for this project (including the purchase of rolling stock) is estimated by the MTA at \$3.4 billion.

Table IV-1: The MTA’s East Side Access Capital Cost Estimate

Category	Cost (\$million)
Right-of-Way	400
Construction	2,194
Rolling Stock	781
Total	3,375

Manhattan East Side Alternatives (MESA) has examined options for addressing the subway capacity crisis on Manhattan’s East Side. This Major Investment Study (MIS) has recommended a new “north” subway from 125th Street & Lexington Avenue to 63rd Street, running along Second Avenue. The new line would connect to the existing 63rd Street tunnel and then run trains down the express tracks of the Broadway Line (N & R). MESA may also recommend construction of a new light rail transit line to serve the Lower East Side. The MTA estimates the total capital cost for this project is estimated at \$4 billion.

Lower Manhattan Access Alternatives (LMAA) is examining options for improving suburban access to Lower Manhattan from the northern and Long Island suburbs. Lower Manhattan commuters must currently use crowded, slow and unreliable subway service to connect to Lower Manhattan from the three major commuter rail terminals. This MIS is still in its early stages and is considering both commuter rail and subway options for connecting Grand Central Terminal and Jamaica Station to Lower Manhattan.

LaGuardia Airport Subway Access (LASA) is examining options for extending the N line to La Guardia Airport. Two alternatives are under consideration. One would extend the existing elevated line from Ditmars Boulevard along Nineteenth Avenue. The other would develop a new branch that would run along Sunnyside Yard and St. Michaels Cemetery. The cost to build this project is expected to be between \$1.0 and \$2.0 billion. However, both options have encountered substantial community opposition due to their environmental impacts, and additional options that reduce the impact on the community are being sought.

JFK Airport One-Seat Ride Study: This study is examining options for connecting JFK Airport's Airtrain system to Midtown Manhattan using either the subway (IND/BMT) or the Long Island Rail Road. The alternatives under consideration have not been publicly released.

In addition to the MTA studies, the following studies are underway:

Access to the Region's Core: This joint MTA, Port Authority, and NJ TRANSIT study has examined options for providing new trans-Hudson rail commuter rail capacity. The alternative that is currently under examination would add a new tunnel from New Jersey to Penn Station and then connect to Grand Central Terminal. The existing commuter rail tunnel and the Lincoln Tunnel's exclusive bus lane are currently operating at their maximum capacity and will be unable to accommodate future growth in ridership. A new tunnel would provide capacity for an additional 20 trains per hour. The cost for the project has been estimated in the \$5-6 billion range (assuming a connection to Grand Central Terminal) of which the MTA might ultimately be responsible for \$500 million.¹⁸

West Side Transit: The City has suggested that the Flushing Line (#7) be extended past 11th Avenue to the Hudson River Waterfront to serve the Javits Convention Center, a potential new football stadium, and a relocated Madison Square Garden. Other proposals for improved West Side transit include a Light Rail Transit Line that would run along 42nd Street, connect to the Javits Center and Penn Station, and run up Broadway to Lincoln Center; extension of the Flushing Line under the Hudson River to New Jersey to meet the trans-Hudson capacity needs, and RPA's 1996 Rx proposal, which would construct a new subway line across Midtown and into New Jersey, serving far West Side and New Jersey needs. A new transit system could serve as a catalyst for new residential, commercial, and office development west of Eighth Avenue in Midtown. The cost for the Flushing Line extension has been estimated at about \$1.0 billion.

MetroLink: RPA has issued a proposal for a new rapid transit system that would serve Manhattan, The Bronx, Brooklyn, and Queens. This project, called **MetroLink**, starts with a full-length Second Avenue Subway and would address the concerns identified in the MESA, LMAA, and JFK Access studies. This project would entail construction of 19 miles of new tunnel and the use of an additional 56 miles of underused subway and other tracks and right-of-way. Five new services would be provided:

- **Co-op City to Whitehall Street:** running along Amtrak's New Haven Line, through Melrose Commons and the Hub in the South Bronx, down Second Avenue to 63rd Street and then connecting to the express tracks of the Broadway Line (N, R).
- **125th Street to Jamaica Station:** running down Second Avenue and Water Street, through a new East River Tunnel, stopping in Downtown Brooklyn, and then connecting to the Atlantic Branch of the Long Island Rail Road (converted to subway).
- **Laurelton to southern Brooklyn:** via the Queens Boulevard Line, 63rd Street tunnel, Second Avenue, Lower East Side and the Culver Line.

¹⁸ ESTA assumes a 10 percent MTA share as the MTA contribution for a project that would benefit Rockland and Orange County riders, as well as NJ TRANSIT.

- **Grand Central Terminal to Bensonhurst:** via Second Avenue, the Nassau Street loop and the West End Line.
- **Grand Central Terminal to JFK Airport:** via Second Avenue, Water Street, a new East River tunnel, Downtown Brooklyn, the LIRR Atlantic Branch and the Airtrain that is currently being built by the Port Authority.

Major benefits of **MetroLink** include:

- Capacity for an additional 240,000 morning commuters each day
- Elimination of overcrowding on the Lexington Avenue and Queens Boulevard lines
- Subway access is brought within easy walking distance of large areas of Manhattan's East Side, the North and Central Bronx and Southeast Queens
- Better connections between residential areas and job centers, particularly in Lower and Midtown Manhattan and Downtown Brooklyn
- Reduced travel times for many riders, up to 30 minutes per trip in some cases
- Elimination of difficult transfers among subway lines and improved transfer connections
- A one-stop express from Grand Central Terminal to the east side and center of the Wall Street area
- Fast and frequent service for Metro North and Long Island Rail Road commuters to Lower Manhattan and Downtown Brooklyn.
- A fast, one-seat ride to JFK Airport from Midtown(32 minutes) and Lower Manhattan (25 minutes) and Downtown Brooklyn (20minutes)

Table IV-2: MetroLink Capital Cost Estimate

Items	Unit	Unit Cost (\$ million)	Units	Total Cost (\$ million)
Tunneling (two-track)	per mile	350	16.5	5,775
Tunneling (four-track)	per mile	600	2.4	1,440
New Surface Tracks	per mile	25	3.0	75
Upgrade Atlantic Branch	per mile	20	13.0	260
Stations	each	75	33	2,475
Broadway Line Improvements	lump sum	100	N/A	100
Queens Boulevard Line Improvements	lump sum	450	N/A	450
New Connection to <i>Airtrain</i>	lump sum	100	N/A	100
Rolling Stock	per vehicle	1.3	950	1,235
Yard Capacity	per vehicle	1.0	950	950
Total				12,860

Metro North and the Long Island Rail Road have advanced three smaller expansion projects to increase service on the Harlem Line and expand service in Rockland County (in partnership with NJ TRANSIT). These projects are:

- **Harlem Line Third Track:** This project will add a third track to the Harlem Line from Mt. Vernon West to Crestwood (3.2 miles) to allow Metro North to run 10 additional trains in the peak period/direction and ensure continued high-quality reverse service to connect city residents to job centers in Westchester County. This is the most heavily traveled two-track segment on Metro North's three main branches, with over 74,000 inbound riders every day. Metro North is currently addressing community and environmental concerns with the project and should be prepared to go to construction in the next five year capital program. This project will cost approximately \$43 million to complete.
- **Long Island Rail Road Main Line Third Track:** This project will add a third track to the Main Line to allow for reverse commuting trips to suburban job centers like Mineola and Hicksville. This project will require \$10 million for design in the next five years and approximately \$100 million to complete.
- **West Shore Line:** NJ TRANSIT has been examining options for improving transit service in eastern Bergen and Rockland Counties. One of the corridors that is likely to advance to construction is a new commuter rail line to West Nyack, in Rockland County. The Metro North share of this project would be approximately \$100 million. This project would improve transit service for eastern Rockland County residents traveling to Bergen County and New York City. It will also provide a transit alternative to the George Washington and Tappan Zee Bridges, two of the most congested highway links in the region.

ESTA makes the following recommendations:

- East Side Access should proceed in tandem with **MetroLink**, so that both projects are completed by the year 2012. Implementation of **MetroLink** will eliminate the requirement for separate projects contemplated by the MESA, LMAA, and JFK One Seat Ride studies. This will require an expenditure of \$1.5 billion for East Side Access and \$2.0 billion for **MetroLink** in the next five years, allowing both projects to break ground by the end of 2003.

- The Harlem Line Third Track project should advance through construction in the next five years at a cost of \$43 million.

- The LIRR Main Line Third Track project should advance through design and permitting at a cost of \$10 million over the next five years. Construction would take place in the following five years.

- A strategic investment planning, engineering and design fund of \$370 million should be used to advance planning, engineering, and environmental work on strategic investment projects that may include the La Guardia Airport Subway Access project, Metro North Penn Station Access, Access to the Region’s Core, The West Shore Line and West Side transit. Those projects that successfully advance through the initial planning stages may eventually be advanced to construction.

Table IV-3: MTA System Expansion Projects

Project	Five Year Needs (\$ million)	Twenty Year Needs (\$ million)
East Side Access	1,500.0	3,375
MetroLink	2,000.0	12,860
Harlem Line Third Track	43.0	43
LIRR Main Line Third Track	10.0	100
Planning, Engineering & Design for Strategic Initiatives	375.0	3,600
Total	3,928.0	19,978

The MTA has requested \$2.4 billion for East Side Access in the draft TIP, plus an additional \$160 million in design & engineering funds for unspecified projects, which might include their MESA “North Subway” or the LASA project to connect to La Guardia Airport. These funds would be insufficient to complete design or begin construction on either MESA or LASA in the next five years.

V. Next Steps

This assessment is intended to be used as a starting point for a dialogue with the MTA and other stakeholders on the forthcoming MTA Five-Year Capital Program. Using this assessment as a benchmark for that dialogue will hopefully lead to a consensus on a package of capital priorities and financing elements for the next five year plan. ESTA will also take the following additional steps to further its goals of a Capital Program that provides adequate funding for both the existing system and capacity expansions (i.e.;MetroLink and East Side Access):

- **Public Opinion Research:** ESTA is identifying the public's understanding of the need for sustained capital investment and specific capital priorities and opinions regarding financing tools. Focus groups, which were conducted this summer, have been instrumental in this effort. This research will inform an outreach and advertising campaign to build support for a sound investment package as it is presented to the MTA Board of Directors, Capital Program Review Board, NYMTC, the State Legislature, and New York City Council.
- **Formation of a Capital Program Working Group:** ESTA will propose to the MTA the creation of a joint working group to review capital priorities and financing options. This group should include representatives from ESTA, the MTA, staff from the Capital Program Review Board, NYMTC, the Governor's Office, the New York City Mayor's Office of Transportation, and the offices of the Borough Presidents and suburban county executives.
- **Development of Financing Options:** ESTA will examine the options for increasing financing for the next capital plan and seek to work with the MTA on developing a comprehensive package that can win the support of stakeholders.

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Appendix: Draft 2000-2004 TIP Projects for the MTA

Table App-1: NYCT Draft TIP-Subway Cars

Line Number	Description	Cost (\$ million)
CM09-5022	Purchase 325 New A Division Cars	487.5
CM09-5023	Purchase 680 New B Division Cars	1,320
CM09-5024	Purchase 390 New B Division Cars	780
Total		2,587.5

Table App-2: NYCT Draft TIP-Subway Yards & Shops

Line Number	Item	Cost (\$ million)
CM03-5106	Rehab 207th St Overhaul Shop	326.4
CM03-5293	Rehab Corona Maintenance Shop	153.3
MW09-1855	240th St Yard Deck	42.5
MW38-5303	Signal System Modernization-Concourse Yard	79.2
MW38-5732	Signal System Modernization-E 180th St Yard	31.4
MW46-5087	Yard Track Rehab (2000)	5.3
MW46-5088	Yard Track Rehab (2001)	5.3
MW46-5835	Yard Track Rehab (2002)	5.3
MW46-5836	Yard Track Rehab (2003)	5.3
MW46-5837	Yard Track Rehab (2004)	5.3
MW51-5117	Yard Switch Replacement (2000)	13.0
MW51-5118	Yard Switch Replacement (2001)	13.0
MW51-5838	Yard Switch Replacement (2002)	13.0
MW51-5839	Yard Switch Replacement (2003)	13.0
MW51-5840	Yard Switch Replacement (2004)	13.0
T-15-2004	Yard Capacity Enhancements	300.0
Total		1,024.3

Table App-3: NYCT Draft TIP-Mainline Track & Switches

Line Number	Description	Cost (\$ million)
MW26-5043	Mainline Track Rehab (2000)	78.1
MW26-5044	Mainline Track Rehab Track Force Account (2000)	35.0
MW26-5045	Mainline Track Rehab (2001)	78.1
MW26-5046	Mainline Track Rehab Track Force Account (2001)	35.0
MW26-5806	Mainline Track Rehab (2002)	78.1
MW26-5807	Mainline Track Rehab Track Force Account (2002)	35.0
MW26-5808	Mainline Track Rehab (2003)	78.1
MW26-5809	Mainline Track Rehab Track Force Account (2003)	35.0
MW26-5810	Mainline Track Rehab (2004)	78.1
MW26-5811	Mainline Track Rehab Track Force Account (2004)	35.0
MW28-5050	Mainline Switch Replacement (2000)	36.5
MW28-5051	Mainline Switch Replacement (2001)	36.5
MW28-5812	Mainline Switch Replacement (2002)	36.5
MW28-5813	Mainline Switch Replacement (2003)	36.5
MW28-5814	Mainline Switch Replacement (2004)	36.5
Total		748

Table App-4: NYCT Draft TIP—Line Equipment

Line Number	Description	Cost (\$ million)
MW18-3335	Tunnel Lighting Rehab-95th St to Pacific St (4th Ave)	26.0
MW18-3784	Tunnel Lighting Rehab-Hoyt-14th St (7th Ave)	45.0
MW18-4598	Tunnel Lighting Rehab-Flushing Line	23.1
MW18-5173	Tunnel Lighting Rehab(42nd St Shuttle)	7.3
<i>Tunnel Lighting subtotal</i>		<i>101.4</i>
MW19-5064	Pumping Facilities Rehab-6 locations (8th Ave)	21.7
MW19-5065	Pumping Facilities Rehab-10 locations (Queens Blvd)	34.1
MW19-5066	Pumping Facilities Rehab-2 locations (BMT 2000)	16.9
SS04-5960	Rehab Wet Standpipe-63rd St Tube	11.5
T-06-2000	Fire & Discharge Lines-53rd St Tube	7.2
<i>Pumping Facilities subtotal</i>		<i>91.4</i>
MW24-5061	Fan Plant Rehab/Modernization-3 locations (6th Ave)	61.3
MW24-5063	Fan Plant Rehab/Modernization-3 locations (6th Ave & Queens Blvd)	61.3
<i>Fan Plant subtotal</i>		<i>122.6</i>
T-06-2002	Line Equipment Rehab	91.8
T-06-2003	Line Equipment Rehab	91.8
T-06-2004	Line Equipment Rehab	91.8
<i>Line Equipment subtotal</i>		<i>275.4</i>
Total		590.8

Table App-5: NYCT Draft TIP—Line Structures

Line Number	Description	Cost (\$ million)
MW01-5927	Sidewalk & Vault Ceiling Repair	10.0
MW49-5082	Elevated Structure Rehab-Nassau Line Reconfiguration	25.0
MW49-5222	Elevated Structure Rehab-Sheepshead Bay-W. 8th St(Brighton)	18.4
MW49-5657	Elevated Structure Rehab-E. 180th St-241st St (Wh Plns Rd)	78.2
MW49-5708	Elevated Structure Rehab-Street Overpasses (5 locations)	2.3
MW49-5709	Elevated Structure Rehab-Street Overpasses (5 locations)	2.3
MW49-5913	Elevated Structure Rehab-Atlantic Ave Interlocking Reconfiguration (Phase 2)	35.4
MW49-5921	Elevated Structure Rehab-Queensboro Plaza-Court House Square (Flushing)	8.1
MW49-5926	Elevated Structure Rehab-Culver Viaduct-Phase 2	20.0
MW49-5928	Elevated Structure Rehab-Stillwell Terminal Viaduct	250.0
MW50-5914	Subway Tunnel Rehab -Joralemon-Nevins (Lex)	12.5
T-07-2002	Line Structure Rehab (System-wide)	9.2
	Total	471.4

Table App-6: NYCT Draft TIP--Power

Line Number	Description	Cost (\$ million)
MW25-4310	Replace Circuit Breaker House & Pos/Neg Cables-E New York	8.3
MW25-5408	Rehab Circuit Breaker Houses-6 Locations	24.2
PW03-1168	Rehab Circuit Breaker Houses-Jackson Ave/West St	20.0
PW08-3340	Substation Modernization-Nostrand Ave	30.3
PW08-3357	Substation Modernization-Sheepshead (Brighton)	32.6
PW08-5815	Substation Modernization-Joralemon (Adams)	22.9
PW08-5900	Substation Modernization-239th St	44.2
PW09-5099	Substation Rehab-Harlem 3 units and Dyckman 1 unit	100.4
PW10-5104	Replace Control and Battery Cables-4 substations	38.9
PW10-5105	Replace Control and Battery Cables-4 substations	30.5
T-09-2002	Power Substation Rehab	55.5
T-09-2003	Power Substation Rehab	55.5
T-09-2004	Power Substation Rehab	55.5
	Total	518.8

Table App-7: NYCT Draft TIP—Service Vehicles

Line Number	Description	Cost (\$ million)
T-13-2000	Work Trains & Service Vehicles	11.4
T-13-2001	Work Trains & Service Vehicles	11.4
T-13-2002	Work Trains & Service Vehicles	11.4
T-13-2003	Work Trains & Service Vehicles	11.4
T-13-2004	Work Trains & Service Vehicles	11.4
Total		57.0

Table App-8: NYCT Draft TIP--Security

Line Nu mbe r	Description	Cost (\$ million)
PL04-4381	Police Facilities-Replace District Office-161st St	11.4
PL04-4397	Police Facilities-Expand District Office #23/Rockaway Park	5.1
PL04-5142	Police Facilities-District Office #4/Union Square	13.2
T-14-2002	Police/Security Improvements	11.9
PD02-5219	Security Improvements-Coney Island Storage Facility	1.8
Total		43.4

Table App-9: NYCT Draft TIP—Miscellaneous Items

Line Nu mbe r	Description	Cost (\$ million)
MW57-5487	Employee Facilities-96th St Sta (7th Ave)	3.3
MW57-5724	Employee Facilities-Fresh Pond Tower	1.5
MW57-5725	Employee Facilities-Tremont Ave (Concourse)	1.4
MW57-5973	Employee Facilities-Canal St (8th Ave)	1.4
MW57-5974	Employee Facilities-99th St Shop	3.2
MW57-5975	Employee Facilities-14th St Passage (6th/7 th Ave)	1.4
MW57-5976	Employee Facilities-Utica Ave (Fulton)	1.6
MW57-5977	Employee Facilities-Rockefeller Center	0.9
MW57-5978	Employee Facilities-Franklin Ave (Eastern Parkway)	1.6
MW57-5979	Employee Facilities-E 180th St(Wh Plns Rd)	1.9
TR02-4674	Employee Facilities-Essex St (Nassau)	1.6
RC11-5613	Rehab 4 Revenue Field Locations	1.6
SS01-5961	System Safety-Backflow Preventers (2 locations)	2.3
SS02-5205	Asbestos Abatement-Priority Locations Phase V	7.5
SS03-5949	Underground Storage Tank Upgrade Replacement Alternative	4
SS04-5705	Standpipe Systems-10 locations (2000)	8.5
SS04-5706	Standpipe Systems-10 locations (2001)	8.5
T-16-2000	Program Support & Miscellaneous Investments	52.5
T-16-2001	Program Support & Environmental/Safety Investments	66.7
T-16-2002	Program Support & Environmental/Safety Investments	53.7
T-16-2003	Program Support & Environmental/Safety Investments	49.7
T-16-2004	Program Support & Environmental/Safety Investments	87.0
Total		361.8

Table App-10: NYCT Draft TIP--SIRTOA

Line Nu mbe r	Description	Cost (\$ million)
SI02-5478	Track Rehabilitation: St. George Interlocking	5
SI04-5254	New Power Substation	11.2
SIR-2000	Track, Structure, Power Rehab	5.6
SIR-2002	Track, Structure, Power Rehab	5.6
SIR-2003	Track, Structure, Power Rehab	5.6
SIR-2004	Track, Structure, Power Rehab	5.6
Total		38.6

Table App-11: Long Island Rail Road Draft TIP

Line Number	Description	Cost (\$ million)
Rolling Stock		
L/01/RS	Rolling Stock Projects	1,077.7
Stations		
L/02/2H	Atlantic Terminal	56.2
L/02/3A	Jamaica Rehab	100.0
L/02/5Z	Babylon Rehab & Intermodal Ctr	1.3
L/02/HIC	Hicksville/Mineola Intermodal Ctrs	28.8
L/02/PH	Parking & Hub Projects	35.2
L/02/SR	Station Rehabilitation Program	60.6
L/02/TVM	Ticket Vending Machines	6.0
<i>Stations Subtotal</i>		<i>288.1</i>
Track		
L/03/1C	Track Construction Equipment	7.5
L/03/1R	Right-of-way Improvements	17.2
L/03/4M	Bridge Rehab Program	27.5
L/03/TR	Track Rehab Program	275.5
<i>Track subtotal</i>		<i>327.7</i>
Line Structures		
L/04/4C	East River Tunnels	74.5
Power		
L/07/7M	Annual Power Program	29.3
Communications & Signals		
L/05/3M	Communications Projects	100.0
L/05/SIG	Signal Projects	322.0
<i>Communications & Signals subtotal</i>		<i>422.0</i>
Shops & Yards		
L/06/BSW	Babylon State Warehouse	3.4
L/06/CWBAB	Car Wash- Babylon	5.0
L/06/CWPI	Car Wash-Port Jefferson	8.9
L/06/HICKS	Employee Facility-Hicksville	8.7
L/06/PW	Employee Facility-Port Washington	3.3
L/06/SY	Shops & Yards Projects	147.6
<i>Shops & Yards Subtotal</i>		<i>176.9</i>
Miscellaneous		
L/08/5B	Regulatory & Compliance Projects	18.3
L/10/PFE	Police Facilities & Equipment	5.6
<i>Miscellaneous Subtotal</i>		<i>23.9</i>
Total		2,420.1

Table App-12: Draft Metro North TIP

Line Number	Description	Cost (\$ million)
Rolling Stock		
M401-01-01	Purchase M-7 Cars to Replace Existing Rolling Stock	100.0
M401-01-06	Purchase West of Hudson Rolling Stock	35.0
M401-01-09	Rolling Stock	177.0
	Rolling Stock Subtotal	312.0
Stations		
M302-09-22	Golden's Bridge Railroad Parking Improvements	11.6
M302-11-16	Mid-Harlem Station Improvements	6.5
M302-11-19	Upper Harlem Station Improvements	4.8
M302-11-21	Ossining to Haverstraw Ferry	0.2
M402-01-01	Grand Central Terminal Leak Remediation	21.2
M402-01-03	Grand Central Terminal Exhaust/Vent Rehabilitation	7.2
M402-01-04	Grand Central Terminal Halls Fire Safety Rehabilitation	2.0
M402-01-05	Grand Central Terminal Lighting/Emergency Power Upgrade	9.6
M402-01-06	Grand Central Terminal Trainshed	12.8
M402-01-07	Grand Central Terminal Elevator Rehabilitation	5.5
M402-01-08	Park Avenue Tunnel Utility Bay Rehabilitation	2.0
M402-02-07	Lower Harlem Station Rehabilitation	2.0
M402-02-08	Hudson Line Station Rehabilitation	83.0
M402-02-09	Yonkers Viaduct and Station Rehabilitation (includes new parking)	32.6
M402-02-10	Mid Harlem Line Station Rehabilitation	11.6
M402-02-12	Brewster North Station Improvements (includes new parking)	11.7
M402-02-13	New Haven Line Station Rehabilitation	6.9
M402-02-14	West of Hudson Station Improvements	4.6
M402-02-16	Stations Rehabilitations & Improvements	81.3
M402-03-05	Sloatsburg Parking	0.7
	<i>Stations Subtotal</i>	<i>317.8</i>

Table App-12 (cont): Draft Metro North TIP

Track		
M303-06-03	Grand Central Terminal Loop Track Renewal	5.6
M303-08-04	West of Hudson Improvements	2.0
M403-01-01	Cyclical Track	41.2
M403-01-02	Grand Central Terminal Switch/Track	16.3
M403-01-03	Turnouts-Mainline	32.7
M403-01-05	Drainage/Undercutting	4.5
M403-01-07	Concrete Ties	5.0
M403-02-15	Miscellaneous Track & Structure	48.5
M403-03-01	Main/Bergen Line Improvements	6.6
M403-03-03	Pascack Valley Line Improvements	13.0
	<i>Track subtotal</i>	<i>175.4</i>
Line Structures		
M403-02-01	Bridge Preservation	8.5
M403-02-05	Bridge Rehabilitations (Overhead)	19.6
M403-02-06	Bridge Rehabilitations (Undergrade)	32.4
M403-02-13	Rehabilitate Retaining Walls	8.6
M403-02-17	Bridge Rehabilitation: Park Avenue, Mt. Vernon	5.7
M403-02-18	Bridge Rehabilitation: Bridge Street, Irvington	2.5
M403-02-19	Bridge Rehabilitation: N. Barry Avenue, Mamaroneck	2.5
	Line Structures Subtotal	79.8
Power		
M403-02-14	Catenary Painting	5.0
M405-01-01	Supply Substation-- Bridge 23 MV	6.8
M405-01-02	Grand Central Terminal Third Rail Replacement	3.2
M405-01-12	Harlem River Lift Bridge Rehabilitation	36.3
M405-01-13	Power Rehabilitation Improvements	12.0
	Power Subtotal	63.3
Communications & Signals		
M403-03-02	Port Jervis Line Signal Improvements	10.6
M304-05-12	Equipment Replacement (Code Rack, Local Control Panel, Block Carrier Replacement)	2.0
M304-05-14	Signalization: Brewster North-Wassaic	3.5
M404-01-04	Grand Central Terminal Office CTC System	2.0
M404-01-13	Fiber Optics/ Network Infrastructure Upgrade	11.4
M404-01-14	Kit Room Backup	6.4
M404-01-18	Upper Harlem Line Improvements	14.9
M404-01-19	Signal Rehabilitation	18.8
	<i>Communications & Signals subtotal</i>	<i>69.6</i>

Table App-12 (cont): Draft Metro North TIP

Shops & Yards		
M403-01-04	Turnouts-Yards/Sidings	7.3
M406-01-01	Harmon Shop Rehabilitation	70.0
M406-01-03	Woodbine Yard Rehabilitation	10.0
M406-01-04	Shops & Yards Rehabilitations & Improvements	35.0
<i>Shops & Yards Subtotal</i>		<i>122.3</i>
Miscellaneous		
M408	Miscellaneous Track & Structure	14.6
M408-01-01	Asbestos Abatement	10.3
M408-01-06	Program Development	14.0
M408-01-07	Contingency	35.0
<i>Miscellaneous Subtotal</i>		<i>49.0</i>
Total		1,189.2

* The draft TIP also assigns \$43 million for the Harlem Third Track and \$15 million to study the feasibility of new service, including Penn Station Access.

Table App-13: NYCT Draft TIP--Buses

Line Number	Description	Cost (\$ million)
SF02-5035	140 Articulated Buses (2000)	65.2
SF02-5383	125 Articulated Buses (2001)	58.7
SF02-5731	83 Suburban Buses(2000)	35.9
T-03-2002	Bus Replacement (2002)	45.9
T-03-2003	Bus Replacement (2003)	45.9
T-03-2004	Bus Replacement(2004)	45.9
Total		297.5

Table App-14: NYCT Draft TIP—Bus Depots

Line Number	Description	Cost (\$ million)
SF04-5127	Replace 8 air compressors at 3 depots	0.6
SF06-4027	Rehab Central Maintenance Facility	50.0
SF06-5305	Manhattanville Depot CNG Modification	25.0
SF07-5122	Replace Windows at 3 locations	1.9
SF07-5713	Replace Roof-2 locations	7.1
SF07-5714	Employee Facilities Upgrade-Flatbush Depot	20.0
SF07-5716	Paving-3 locations (2001)	4.0
SF07-5717	Replace wells at 2 locations	0.7
SF07-5718	Elevator Replacement-Yukon Depot	1.4
SF08-5712	Bus washer replacement-5 depots	6.0
T-12-2001	Depot Rehab	32.6
T-12-2002	Depot Rehab	75.1
T-12-2003	Depot Rehab	56.9
T-12-2004	Depot Rehab	56.8
Total		338.1

Table App-15: NYCT Draft TIP—Signals & Communications

Line Number	Description	Cost (\$ million)
MW38-5090	Signal System Modernization (Concourse)	218.9
MW38-5802	Signal System Modernization-Solid State Interlocking Pilot(Nassau/Crosstown)	25.2
MW38-5864	Signal Key-by Modifications-Phase I	32.4
MW53-5671	Signal System Equipment-149th St-Bronx Park East(Wh Plns Rd), E 180th St (Dyre)	152.8
MW56-5868	Communications Based Signal System-Flushing Line Interlockings-Phase 2	159.2
T-08-2003	Signal Equipment Rehab	16.0
TR01-5229	Rapid Transit Operations-Automatic Train Supervision B1 Division (Rail Control Center Phase 2)	187.9
TR01-5870	Rapid Transit Operations-Consolidate Decision Support Systems (Rail Control Center-Phase 3)	50.0
ST12-4248	Public Address System/Customer Info Signs—Phase II	139.0
ST12-2001	Public Address System/Customer Info Signs—Phase III	70.4
Total		842.4

Table App-16: NYCT Draft TIP—Subway Stations

Line Number	Description	Cost (\$ million)
MW01-5711	Gap Fillers (Times Square)	3.0
MW01-5719	Gap Fillers (Union Square)	20.6
MW03-5074	Escalator Replacement (8) at Bowling Green	35.7
MW03-5075	Escalator Replacement (16) Herald Square	61.2
MW12-5419	Water Condition Remedy	2.0
ST02-4658	Station Reconst.-- Lexington Ave (E/F)	39.7
ST02-5740	Station Reconst.-Times Square Phase II	63.8
ST02-5824	Station Reconstruction--W. 4th St (8th Ave)	59.2
ST04-4614	Station Accessibility (ADA)-Pelham Pkwy (Wh. Plns Rd)	13.2
ST04-4906	Station Accessibility (ADA)-74th St (Flushing)	4.0
ST04-4907	Station Accessibility (ADA)-Roosevelt Ave (Quns Blvd)	4.8
ST04-5235	Station Accessibility(ADA)- Jay St	13.3
ST04-5487	Station Accessibility (ADA)- 96th St (7th Ave)	14.7
ST04-5490	Station Accessibility (ADA)-Chambers St (7th Ave)	9.0
ST04-5491	Station Accessibility(ADA)-DeKalb Ave	10.2
ST04-5500	Station Accessibility (ADA)-Queens Plaza	9.9
ST04-5503	Station Accessibility (ADA)-Myrtle-Wyckoff	13.3
ST04-5543	Station Accessibility (ADA)--Fordham Rd (Jerome)	9.8
ST04-5740	Station Accessibility (ADA)-Times Square Phase 2	9.3
ST04-5824	Station Accessibility (ADA)--W. 4th St (8th Ave)	32.6
ST04-5845	Station Accessibility (ADA)-59th St (7 th Ave)	13.3
ST04-5846	Station Accessibility (ADA)-59th St (8 th Ave)	19.2
ST04-5856	Station Accessibility (ADA)-Flushing Ave (Jamaica)	13.6
ST04-5906	Station Accessibility (ADA)-Prospect Park (Brighton)	10.9
ST04-5907	Station Accessibility (ADA)-179th St (Quns Blvd)	10.1
ST04-5908	Station Accessibility (ADA)-Junction Blvd (Flushing)	10.1
ST07-4612	Station Rehab-- Myrtle Ave (Canarsie)	24.5
ST07-4613	Station Rehab--Mt Eden Ave (Jerome)	13.0
ST07-4614	Station Rehab-- Pelham Pkwy (Wh Plns Rd)	15.0
ST07-4616	Station Rehab-42nd St(8th Ave)	38.1
ST07-4617	Station Rehab-8th St (Bdwy)	24.2
ST07-4673	Station Rehab-Delancey St (6th Ave)	16.9
ST07-4674	Station Rehab--Essex St (Nassau)	18.9
ST07-4790	Station Rehab-Chambers St (Nassau)	64.8
ST07-4815	Station Rehab-Prince St (Bdwy)	10.2
ST07-4906	Station Rehab-74th St (Bdwy/Flushing)	22.2
ST07-4907	Station Rehab-Roosevelt Ave (Quns Blvd)	22.2
ST07-5231	Station Rehab-Gun Hill Rd (Wht Plns Rd)	35.5

Table App-16 (cont): NYCT Draft TIP—Subway Stations

Line Number	Description	Cost (\$ million)
ST07-5235	Station Rehab-Jay St/Borough Hall (Fulton)	40.4
ST07-5236	Station Rehab-City Hall(Bdwy)	13.1
ST07-5842	Station Rehab-6th Ave (Canarsie)	23.4
ST07-5484	Station Rehab-77th St (Lex)	18.5
ST07-5487	Station Rehab-96th St (7th Ave)	25.6
ST07-5489	Station Rehab-183rd St(Jerome)	13.0
ST07-5490	Station Rehab-Chambers St (7th Ave)	24.9
ST07-5491	Station Rehab-Dekalb Ave (4th Ave)	32.2
ST07-5492	Station Rehab-86th St(Lex)	28.5
ST07-5495	Station Rehab-149th St/Grand Concourse (Jerome)	26.2
ST07-5496	Station Rehab-149th St/Grand Concourse (Wh Plns Rd)	18.4
ST07-5497	Station Rehab-14th St (Bdwy)	27.2
ST07-5500	Station Rehab-Queens Plaza(Quns Blvd)	40.2
ST07-5501	Station Rehab-5th Ave (Flushing)	24.5
ST07-5502	Station Rehab-E 180th St (Wh Plns Rd)	40.4
ST07-5503	Station Rehab-Wyckoff Ave (Myrtle)	13.3
ST07-5505	Station Rehab-23rd St (Bdwy)	22.7
ST07-5508	Station Rehab-116th St (Lex)	16.6
ST07-5509	Station Rehab-14th St (6th Ave)	32.5
ST07-5515	Station Rehab-167th St (Jerome)	13.0
ST07-5517	Station Rehab-Woodlawn(Jerome)	16.3
ST-07-5518	Station Rehab-Mosholu Pkwy (Jerome)	19.4
ST07-5519	Station Rehab-Bedford Park Blvd (Jerome)	13.0
ST07-5520	Station Rehab-Kingsbridge Rd (Jerome)	13.0
ST07-5527	Station Rehab-Gates Ave (Jamaica)	10.0
ST07-5530	Station Rehab-Hewes St (Jamaica)	9.6
ST07-5543	Station Rehab-Fordham Rd (Jerome)	13.0
ST07-5844	Station Rehab-Burnside Ave (Jerome)	13.0
ST07-5845	Station Rehab-59th St(7th Ave)	24.3
ST07-5846	Station Rehab-59th St (8th Ave)	55.7
ST07-5847	Station Rehab-170th St(Jerome)	13.0
ST07-5848	Station Rehab-176th St(Jerome)	13.0
ST07-5849	Station Rehab-138th St (Jerome)	12.4
ST07-5850	Station Rehab-Brook Ave (Pelham)	13.3
ST07-5851	Station Rehab-President St (Nostrand)	21.4
ST07-5852	Station Rehab-Avenue M(Brighton)	18.2
ST07-5853	Station Rehab-Neck Road (Brighton)	22.4
ST07-5856	Station Rehab-Flushing Ave (Jamaica)	9.6
ST07-5937	Station Rehab-Avenue U (Brighton)	18.0
ST09-5376	Intermodal X-fer-Myrtle/Wyckoff	4.5
ST09-xxx1	Intermodal X-fer-Bdway-Lafayette/Bleecker	24.4

Table App-16 (cont): NYCT Draft TIP—Subway Stations

Line Number	Description	Cost (\$ million)
ST09-xxx2	Intermodal X-fer-Jay/Lawrence	9.1
T-04-2004	Station Rehab & Improvements	4.4
T30412JC	Intermodal X-fer-Jamaica Ctr	5.5
T-15-2003	Flatbush Terminal Improvements	50.0
Total		1,683.1

Table App-17: MTA Draft TIP System Expansion Items

Line Number	Description	Cost (\$ million)
T-15-2000	New Routes Design & Engineering	42.0
T-15-2001	Network Expansion Studies	2.0
T-15-2002	New Routes Design & Engineering	30.0
T-15-2003	New Routes Design & Engineering	20.0
L/09/2W	East Side Access	2,410.7
M303-08-01	Harlem Line Third Track	43.3
M407-01-01	Study the Feasibility of New Service	15.0
L/09/ML	Main Line Third Track-Design	10.0
Total		2,573.0