A. INTRODUCTION AND SUMMARY OF KEY FINDINGS

INTRODUCTION

This chapter assesses the effects of the project alternatives on regional travel patterns and on specific local components of the region's transportation system—traffic, parking, subway, bus, other commuter railroads, and pedestrian conditions. In terms of regional travel, the project would provide an overall benefit by improving transportation service from Long Island and eastern Queens to Manhattan and Queens. It would provide commuters destined for Manhattan with increased and improved train service—there would be more trains into Manhattan, greater availability of seats, and the flexibility to get directly to the East Side of Midtown Manhattan in addition to the West Side. It would reduce auto commutation into Manhattan as well, by diverting auto trips from eastern Queens and Long Island, to the Long Island Rail Road (LIRR).

At the same time, however, the project could result in localized effects on other transportation elements. These would include the potential for increased traffic at intersections surrounding Grand Central Terminal (GCT), where the number of taxis would increase; these effects would also include increased traffic and parking at LIRR stations in eastern Queens and on Long Island, where the number of riders is projected to increase because of the Preferred Alternative. Other local effects would include increases to ridership on subways serving GCT, and increases to the number of pedestrians in the terminal. However, at the same time, there would be decreases in pedestrian, subway, and taxi activity in the Penn Station area, where passenger movements would be less congested, vehicle traffic on the street network would be less congested, and crowding in subway stations and on subway lines would be eased.

The project's effects on transportation are analyzed in the following sections of this chapter:

- *B: Regional Issues*, discussing regional travel patterns.
- *C: Grand Central Terminal Area*, which evaluates the vehicle traffic and taxi pickup and dropoff activity around GCT; pedestrian flows throughout GCT, including connections between LIRR platforms, the Lexington Avenue subway line, and street-level destinations; on-street pedestrian conditions near GCT; and passenger conditions at the 42nd Street Lexington Avenue subway station, including its stairwells, platforms, and line-haul capacity.
- *D: Sunnyside/Long Island City Area*, analyzing vehicle traffic, pickup and dropoff activity, and pedestrian conditions at the new Sunnyside station.
- *E: Eastern Queens and Long Island*, which considers increased vehicle traffic, pickup and dropoff activity, and parking demand at LIRR stations.

Each section includes a discussion of analysis methodologies; an assessment of existing conditions and future conditions common to all alternatives; an evaluation of the probable impacts of

the No Action, Transportation Systems Management, and Preferred Alternatives; and an identification of measures to mitigate any significant adverse impacts identified.

SUMMARY OF KEY FINDINGS

Since the traffic and transportation analyses conducted for this project were extremely comprehensive and quite detailed technically, a summary of the key findings is provided below. The analyses documented within the remainder of this chapter of the EIS focus primarily on the potential for significant adverse impacts and measures that would mitigate those impacts, as is the standard procedure for environmental impact studies. The substantial benefits that would be generated by the Preferred Alternative are noted, but are not documented at the same level of detail, as per typical environmental impact study procedures. The analyses summarized in the key findings below focus on year 2010 conditions, which is the analysis year for this EIS. The detailed analyses that follow within the remainder of this chapter outline conditions in both 2010 and 2020, a 10-year horizon analysis year also considered in the EIS.

REGIONAL EFFECTS

The Preferred Alternative is expected to bring about 62,000 LIRR riders into GCT during the 4-hour weekday AM peak period in the year 2010, and just 5 percent more (about 65,000) in the year 2020. It would also reduce the volume of LIRR riders arriving at Penn Station in the 4-hour AM peak period by about 45,700 in the year 2010 (representing a 45 percent reduction in LIRR commuter activity in Penn Station). Many of these new LIRR commuters into GCT currently take LIRR trains to Penn Station, but a significant volume of new riders would be diverted from their autos. Overall, the Preferred Alternative would reduce total daily vehicle miles traveled (VMT) by about 342,000 in 2010 and by 375,000 in 2020. There would be 11,000 fewer daily auto trips to work in 2010, and 12,000 fewer trips in 2020.

The Preferred Alternative would also improve transportation service for other providers. In Manhattan, the project would create new capacity in Penn Station that could benefit MNR, allowing MNR to bring service for its commuters to Penn Station if that agency's Penn Station Access Project is implemented. If MNR does bring new service into Penn Station, the number of MNR commuters shifted to Penn Station would be lower than the number of LIRR commuters shifted to GCT by East Side Access. In addition, the work proposed at Harold Interlocking in Queens would significantly improve congested conditions there. This would result in a positive impact for Amtrak, which operates its Northeast Corridor service through the interlocking.

GRAND CENTRAL TERMINAL AREA

Traffic

The Preferred Alternative would decrease general background traffic in the overall Midtown area by about 2 percent. There would be traffic increases on some streets near GCT due to increased taxi activity there, but also decreased taxi activity in the Penn Station area since LIRR commuters who presently travel to Penn Station and then take taxis to get to their East Midtown destinations could now take the LIRR directly to GCT.

There would be significant traffic impacts at 12 out of the 54 intersections in the traffic study area and significant traffic benefits at 9 intersections in the AM peak hour, 6 significant impacts and 2 significant benefits in the midday peak hour, and 8 significant impacts and 6 significant

benefits in the PM peak hour. All significant traffic impacts could be mitigated via standard traffic engineering improvements such as signal phasing and timing modifications, more restrictive parking regulations, and by providing exclusive phases for turning movements at some intersections where there are significant conflicts with high volumes of pedestrians.

The Preferred Alternative would significantly reduce parking demand in Manhattan by approximately 3,000 vehicles or more on a typical weekday.

Pedestrian Flows Within GCT

Introducing LIRR service into GCT would significantly affect GCT pedestrian flows and conditions. Current efforts at GCT would, however, help disperse these new pedestrians by improving circulation in and around GCT. Under the Preferred Alternative, all pedestrian movements within GCT would function acceptably except for the new escalator bank leading to the vicinity of the New York Transit Museum Store on the west side of GCT's upper concourse, and the eastern and western vertical circulation elements leading down to the Lexington Avenue Nos. 4, 5, and 6 subway line. The escalator bank near the Museum Store, which operates with one escalator up and one down at all times, would need to be operated with both escalators up in the AM peak period and both down in the PM peak period. Operating both escalators in the peak direction would partially mitigate the impact; however, this element would still be over capacity during peak periods. Improvements made at the subway level would help to ease the bottleneck at the Lexington Avenue subway circulation elements. All other existing stairwells, escalators, and concourse corridors and passageways within GCT would not be significantly impacted. The lower level platforms to be used by LIRR trains, and the stairwells, escalators, and cross passageways serving LIRR commuters to be built as part of the Preferred Alternative, would also all typically operate at acceptable levels of service.

Under certain delay circumstances, conditions in the 47th Street cross passage would become congested. Option 1 would greatly shorten the time it would take for the 47th Street cross passage to become overcrowded compared to the No Action condition. Option 2 would have much less of a negative effect, as LIRR riders waiting for delayed trains would have their own large waiting area below the 47th Street cross passage.

Lexington Avenue Subway

The Preferred Alternative would add about 2,310 southbound riders and 970 northbound riders to the Lexington Avenue subway line in the 8-9 AM peak hour. Ridership increases in the 5-6 PM peak hour would be about 15 percent lower than the AM increases. These additional riders would result in the following:

- The additional LIRR passengers on the Lexington Avenue subway line would result in significant impacts to the Nos. 4 and 5 express lines southbound in the AM peak hour. The local line would not experience significant impacts. Line-haul capacity utilization rates on the express lines would increase from 112 percent in the No Action condition to 117 percent with the Preferred Alternative; on the local line utilization would rise from 61 to 64 percent. On average, each car of each express train would have 6 additional riders, while each car of each local train would have 3 additional riders.
- The new passengers from the Preferred Alternative would increase crowding on the western stairs and escalators (west of the Grand Hyatt Hotel) leading from Grand Central Terminal to the subway station mezzanine area during the AM and PM peak periods. This would aggravate an overcrowded condition.

- The Preferred Alternative would significantly affect conditions on some stairwells connecting the mezzanine area to the platform. The new LIRR passengers would increase peak-direction flows on some stairs to the platforms by 20 to 25 percent, with the greatest number of passengers on the center stairs leading to the platforms. Overall, the project would cause Stair P14 (the center stair to the southbound platform) and Stairs P22 and P23 (the north end stairwells to both the southbound and northbound platforms) to operate over capacity.
- On the platforms, the analysis considered different zones to account for the different crowding conditions in different areas. The project would create the most congestion near the center stairwell (P14) on the southbound platform and the center stairwells (P17 and P19) on the northbound platform. In some locations, this increase in crowding would be significant.

Recognizing the crowded condition on the Lexington Avenue line, MTA/New York City Transit (NYCT) is expecting to increase service during peak periods based on signalization improvements on the Lexington Avenue line and the application of platform management techniques at 42nd Street station. These improvements are planned regardless of whether or not East Side Access goes forward. NYCT will pursue, at a minimum, the following programs to increase line-haul capacity: the "step aside and speed the ride" campaign, which includes etched tiles incorporated into the floor design telling passengers to "step aside" and let passengers off the trains; automated "dwell control announcements," quick response programs for customers who require medical attention while on the subway; platform assistants to expedite loading/unloading; and wider-door cars and changes in the design of new subway cars (now on order) to ease movement into and out of the cars.

In addition, the project team has been working with NYCT to develop potential mitigation measures to be included as part of the ESA project which would help alleviate the crowded conditions at the 42nd Street Lexington Avenue line station. These measures would be designed to help mitigate impacts on line-haul capacity, access to the subway platforms from the mezzanine, and access to the Lexington Avenue subway mezzanine from GCT—all of which are interrelated.

The critical strategy to mitigate line-haul capacity impacts is to add trains during the peak hour. Currently, dwell times at the 42nd Street station are long, resulting from high volumes of riders getting on and off Lexington Avenue line trains. A variety of initiatives (noted above) are designed to reduce dwell times to allow additional trains through the station. Operation of additional trains in the peak hour is physically possible, and it is NYCT's policy to bring this about.

To complement these measures, it is possible to modify stairwell configurations, add stairwells, and modify the design of the mezzanine level to better distribute passengers on the subway platform. This mitigation plan would balance the use of existing mezzanine stairs leading to the station's platforms to more evenly distribute pedestrian flows into the subway's paid zones. In addition, by spreading passengers on the station's platforms more evenly, these measures would in turn decrease dwell times at the station, thereby increasing the number of trains that can move through the station. Measures being considered include the following:

- Create a new turnstile bank just west of the existing main fare control area, to attract passengers directly into the mezzanine area from the free passageway, thereby lessening use of the western stair/escalator bank.

- Create a new south-end stairwell (P10) to continue that siphoning-off action from the new turnstiles, and reduce use of the overcrowded stairwell P14, which directly faces the fare control area and draws large pedestrian volumes.
- Restore Stair P16, to better distribute pedestrian volumes among stairwells in this area of the station.
- Enlarge the main fare control area's "turnstile line" farther east into the mezzanine, to provide additional circulation space in this control area, and help relieve congestion at the escalator's base.
- In addition, NYCT has already begun property acquisition from the Grand Hyatt Hotel for additional mezzanine space once occupied by Modell's Sporting Goods store. Opening this enclosed mezzanine space would widen the view corridor of entering pedestrians, and likely result in more even stairwell usage.

Second Avenue Subway/Manhattan East Side Alternatives Study

MTA is dedicated to developing a Second Avenue subway to extend the entire length of Manhattan's East Side, bringing critical relief to the Lexington Avenue subway. The alignment would extend generally along Second Avenue from 125th Street in East Harlem to the Financial District in Lower Manhattan. A total of $1.05 billion has been allocated in the MTA's 2000-2004 Capital Program for a full-length Second Avenue subway project. The goal of the Second Avenue subway is to improve mobility and reduce crowding on the East Side of Manhattan, including the reduction of peak hour demand on the Lexington Avenue express subway lines, reducing delays in passenger loading and unloading at major stations, including 42nd Street, and thus increasing train capacity by allowing better train throughput.

MTA NYCT is currently conducting the Manhattan East Side Alternatives (MESA) Study, which is the planning effort for the northern element of the full build subway. The MESA Study has identified several alternatives, including construction of the northern portion of the Second Avenue subway from 125th Street to 63rd Street, continuing via the unused Broadway line express tracks to West Midtown and Lower Manhattan. The MESA Study is an important and necessary step in the planning for the Second Avenue subway project.

The impact of the Second Avenue subway in conjunction with the Preferred Alternative would be to alleviate conditions on the Lexington Avenue line, particularly at the Grand Central subway station. In particular, the Second Avenue subway would divert riders from the Lexington Avenue line, bringing operations to below capacity on the Lexington Avenue line. With this improvement, the new riders generated by the Preferred Alternative would no longer exacerbate existing crowding in the subway system. Therefore, the Preferred Alternative would no longer result in significant adverse impacts on station elements and line-haul crowding in the subway. Nonetheless, construction of the Second Avenue subway, which is itself a multibillion-dollar undertaking, must be considered as a separate and distinct project serving independent goals and objectives, rather than as related to East Side Access.

Other Subway Lines

The Preferred Alternative would reduce demand levels and crowding on several other subway lines. In the year 2010, there would be 6,000 fewer riders on the northbound, or uptown, A/C/E lines (combined) in the AM peak hour, and about 13,600 fewer riders in the 4-hour peak periods. Queuing at stairwells, corridors, token booths, turnstiles, and platforms at the 34th Street station of these lines would all be significantly reduced. Southbound A/C/E ridership would decrease by about 200 in the AM peak hour and 500 in the 4-hour AM peak period. There would be improvements on other subway lines as well—700 fewer riders on the southbound ½/3/9 lines at 34th Street in the AM peak hour, 500 fewer riders on the northbound B/D/F/Q lines, and 1,185 fewer riders on the Manhattan-bound No. 7 Flushing line, and congestion-reduction benefits on other lines and their station facilities as well.

On-Street Pedestrian Flows

Pedestrian paths into and out from GCT were analyzed along with the key streets bordering GCT and adjacent to the new access and egress points (i.e., Grand Central North) opened recently by Metro-North along Park and Madison Avenues. With the introduction of LIRR service at GCT under the Preferred Alternative, pedestrian activity in the area would increase substantially. However, not all of these LIRR commuters are new pedestrians to the area, since many are already there after taking LIRR trains into Penn Station and either walking, taking subways or buses to the area, or taking taxis and then walking to their final destinations.

Detailed pedestrian flow analyses and intersection crosswalk and corner reservoir analyses and midblock sidewalk analyses indicate that there would be significant impacts requiring mitigation at several East Side locations. Some 15-foot-wide crosswalks would need to be widened to 20 feet. At some locations, street furniture and other impediments to pedestrian flow would need to be cleared or limited. This could include sidewalk vendors, newspaper kiosks, and flower boxes, for example. Quick, steady removal of refuse bags that often line sections of sidewalk in Midtown would also be needed.

Buses

Bus ridership projections show that there would be reduced demand for several bus routes that connect Penn Station with the East Side, since LIRR commuters could take direct LIRR service to GCT. There would also be some ridership increases on East Side bus routes by LIRR commuters arriving at GCT who would need to transfer to other routes to get to their final destinations. The bus routes subject to the highest ridership demand increases would be those that travel directly past GCT. The M101/102/103 bus routes would need up to 10 additional bus trips in the AM peak hour along its southbound Lexington Avenue portion and up to 7 additional bus trips in the PM peak hour along northbound Third Avenue. The M42 would require an extra two (PM) to four (AM) bus trips along 42nd Street. The buses traveling along Fifth Avenue (M1/2/3/4) would need up to three additional bus trips. It is NYCT's policy to adjust schedules and frequencies, within fiscal and operating constraints, as demand dictates.

SUNNYSIDE/LONG ISLAND CITY AREA

The Preferred Alternative is projected to generate 1,530 new LIRR riders in the 4-hour AM peak period at its proposed Sunnyside station, and 675 riders in the AM peak hour in the year 2010. There would be 1,300 riders in the PM peak period and 575 riders in the PM peak hour. It is anticipated that 90 percent of these LIRR commuters at Sunnyside would walk to their final

destination in the area after alighting from LIRR trains, that 9 to 10 percent would transfer to subways or buses, and that less than 1 percent would take taxis or be picked up or dropped off by car. Parking would not be provided as part of the station development, and park-and-ride activity is not expected. Significant traffic and transportation impacts are not expected.

EASTERN QUEENS AND LONG ISLAND

The analysis of potential impacts at LIRR stations focused in detail on 15 of the LIRR's 124 stations in Eastern Queens and Long Island. These stations represent the range of all stations, and included several of the busiest stations (Hicksville, Huntington, Ronkonkoma) and others with more moderate usage, stations within local business districts and others closer to residential areas or in fringe areas, stations with multiple bus routes and others with limited service, and stations with extensive parking capacity and others with very limited parking availability. Potential traffic impacts were examined at the 15 representative stations, while parking impacts—determined to be a much larger issue—were evaluated at all stations.

Traffic

The analysis of traffic conditions at a set of 39 intersections at the 15 stations studied indicated that 11 of the intersections would be characterized by significant impacts in the AM peak hour and 13 would have significant impacts in the PM peak hour in the year 2010. Each of the significant traffic impacts could be mitigated via standard traffic engineering improvements, such as the installation of traffic signals at unsignalized intersections that might be impacted, signal phasing and/or timing modifications at signalized intersections that would be impacted, lane re-striping, offsetting centerlines of streets where it would be necessary to gain additional capacity in one direction, and more restrictive parking regulations. These are standard measures within the day-to-day jurisdiction of the agencies responsible for maintaining traffic operations. Since the detailed traffic impact analyses were conducted for a representative set of 15 LIRR stations, it can reasonably be expected that standard traffic engineering improvements would likely be sufficient to mitigate traffic impacts that might occur at the LIRR's numerous other stations.

Traffic analyses were also conducted at eight grade crossing locations as a result of the operation of more LIRR trains through these locations as well as additional vehicle traffic generated by the Preferred Alternative. Impacts at the grade crossing locations analyzed would generally be minimal. At one location—at Executive Drive at the east end of the Deer Park station—significant increases in traffic delays could be partially, if not fully, mitigated by altering the amount of time that the LIRR grade crossing gate is activated and in the "down" position.

Parking

The Preferred Alternative can be expected to increase parking demands at each of the LIRR's 124 stations. Several stations would be able to accommodate the demands, while others would experience significant parking shortfalls (in many cases, parking shortfalls would be expected even under the No Action Alternative).

The range of projected parking shortfalls at the stations analyzed is quite extensive, and mitigation of these shortfalls would need to be individualized on a station by station basis. While LIRR owns only 28 percent and operates a much smaller percentage of the parking facilities at its stations, and the vast majority of these parking facilities are under the jurisdiction of the local town, village, or other municipal entity, LIRR has a parking improvement program to address

parking needs at its stations. Mitigation developed under this program could include one or more of the following measures: expansion of existing lots or construction of new lots or garages; modification of train service and schedules to increase service at stations with available parking or where parking could be added more easily; institution of fare policy changes to attract riders to a new station by shifting one or more stations from one fare zone to another; increasing bus service or heavily subsidizing fares; implementation of new feeder bus services; improving kiss-and-ride facilities to increase pickup and dropoff activity rather than parking; providing preferential parking areas for carpoolers, with enforcement; construction of new stations near or between two major stations where parking demands greatly exceed parking availability; promoting bicycle use; and others. Ridership and parking projections would need to be closely monitored, and the LIRR would need to be ready to implement one or more of these strategies at individual stations. ❖

B. REGIONAL ISSUES

EXISTING REGIONAL TRAVEL PATTERNS

The Long Island Transportation Corridor (LITC)—including New York (Manhattan), Queens, Kings (Brooklyn), Nassau, and Suffolk Counties—includes approximately two out of every five commuters in the New York Metropolitan area. Each day, more than 440,000 commuters travel from homes in Queens, Nassau, and Suffolk Counties to jobs in Manhattan each day. They do so using four primary modes of travel: LIRR, New York City Transit (NYCT) subways, NYCT and LI buses, and automobiles, each of which is discussed in detail in Chapter 1, "Project Purpose and Need," and summarized below.

In addition to the four primary modes of travel within the LITC, three other regional transportation providers are of relevance to this discussion: Metro-North Railroad (MNR), Amtrak, and NJ Transit. MNR brings commuters from Connecticut and from Bronx, Westchester, Putnam, and Dutchess counties in New York, into Grand Central Terminal (GCT). NJ Transit brings commuters from a number of branches in New Jersey into Penn Station. Amtrak offers train service from Washington to Boston, through New York's Penn Station.

LONG ISLAND RAIL ROAD

The Preferred Alternative focuses on the LIRR component of the LITC's transportation network. The LIRR transports approximately 270,000 passengers each day and 80 million passengers each year on 10 branches serving 124 stations. With a total of 365 route miles reaching from Penn Station on Manhattan's west side to the eastern tip of Long Island's North and South forks, 120 miles away, the LIRR is vital to commuting on Long Island. Three out of every four trips to work from Long Island to Manhattan are taken via LIRR. Currently, every one of those trips ends at Penn Station, on Manhattan's west side.

Manhattan-bound trains from all 10 LIRR branches currently share a single route into Penn Station. After merging at Jamaica and at Harold Interlocking in Sunnyside, trains from all branches move through the dense and crowded network of tracks and switches at Harold Interlocking—an approximately 1.5-mile-long portion of track leading to the East River tunnels—and travel through one of four East River tunnel tracks into Manhattan and Penn Station.

LIRR trains currently share Harold Interlocking with two other rail transit providers: Amtrak and NJ Transit. The Harold Interlocking allows connection among tunnel tracks, LIRR's Main Line tracks, Amtrak's Northeast Corridor tracks through Queens and over the Hell Gate Bridge, and loop tracks leading into and out of the yard. Together, the combined movements of LIRR, Amtrak, and NJ Transit providers make this one of the busiest interlockings in the entire country, with approximately 66 trains traveling through the interlocking in the AM peak hour. In addition, all LIRR, NJ Transit, and Amtrak trains must use one of four East River tunnels to get from Long Island to Penn Station. Current congestion at Harold Interlocking and in East River tunnels during peak hours has prevented the LIRR from significantly enhancing train service to Manhattan.

NEW YORK CITY TRANSIT BUSES AND SUBWAYS

The NYCT subway and bus system is as vital to residents of Brooklyn and Queens as the LIRR is to residents of Nassau and Suffolk. Serving more than 1.8 billion riders each year, NYCT

subways and buses are the most popular, the most convenient, and often, the only means of getting from the homes in the outer boroughs to jobs in Manhattan.

NYCT service between Manhattan and Queens centers around some key subway lines: the No. 7 Flushing Line, the Queens Boulevard (E, F, and R) lines, and the N train from Astoria, which together bring approximately 85,000 commuters into Manhattan in the peak AM hour. Because of the proximity of its stations to both homes and workplaces, its frequency of service, and its relatively inexpensive cost, residents in Queens tend to commute via subway into Manhattan, even though the LIRR does have a number of stations in Queens.

OTHER REGIONAL TRANSPORTATION PROVIDERS

MNR is the commuter rail equivalent to the LIRR for the area north of Manhattan. Second only to the LIRR in size, MNR brings a total of more than 200,000 passengers into and out of GCT each weekday. It provides the only commuter rail services from counties in New York and Connecticut north of Manhattan, and funnels all service from its three main lines—Hudson, Harlem, and New Haven—into GCT. MNR's operations are explained in detail in section C of this chapter.

At Penn Station, and along the tracks between Penn Station and Harold Interlocking in Queens, the LIRR shares space with both Amtrak and NJ Transit. While NJ Transit drops all of its New Jersey passengers off at Penn Station, some of its trains continue on into Queens for storage and maintenance in Sunnyside Yard. Amtrak also stores and maintains trains at Sunnyside Yard. Additionally, Amtrak uses Harold Interlocking as its main route for its Northeast Corridor service to and from Boston, as trains travel through Harold Interlocking and onto tracks that lead over the Hell Gate Bridge toward Boston.

HIGHWAYS AND BRIDGES

The highways and bridges most important to commuters in the LITC are those that link Manhattan to Queens, Nassau, and Suffolk Counties: three major east-west highways (Long Island Expressway, Northern State/Grand Central Parkway, Southern State/Belt Parkway), and three primary East River crossings (the Queens-Midtown Tunnel, the Queensboro Bridge, and the Triborough Bridge). Currently, all these major routes between Long Island and Manhattan are extremely congested during peak commuting hours, and alternate routes that parallel these major routes have subsequently become extremely congested.

FUTURE REGIONAL TRAVEL COMMON TO ALL PROJECT ALTERNATIVES

As detailed in Chapter 1, "Project Purpose and Need," a number of new transportation projects are in construction or being planned for the region. These include improvements being made by LIRR, MNR, Amtrak, and NJ Transit, among others. With these improvements in place and with the predicted increases in the population and employment in the region, ridership throughout the region will continue to grow in the future.

PROBABLE IMPACTS OF THE PROJECT ALTERNATIVES

RIDERSHIP FORECASTING

This assesses the impacts of the three project alternatives—the No Action, Transportation Systems Management (TSM), and Preferred Alternatives—on the regional and local transportation network. To assess those impacts, a ridership forecasting model was developed to quantify

use of the transportation network in 2010 and 2020, for each project alternative. This ridership forecasting model, used by the Metropolitan Transportation Authority (MTA) as part of its long-range planning effort, takes into account a number of factors to predict how people will get to and from home and work in their daily commute, including:

- Future population and employment projections.
- Current commuting preferences.
- The configuration and services provided by the current transportation network: local roads and highways, bus and transit services, commuter rail services, and ferries.
- Current and future transit service fare structures.
- Future improvements planned for the transportation network.
- The operating plans to be implemented under the No Action, TSM, and Preferred Alternatives.

The model represents most regional travel in the New York metropolitan area and, in particular, is designed to estimate trips for the following markets:

- LIRR and MNR commuters to Manhattan.
- NYCT subway and bus customers, particularly those attracted to destinations in Manhattan.
- Automobile travelers from the New York and Connecticut portions of the region to Manhattan who currently choose not to use transit because terminal locations or connections to their destinations are inconvenient.
- Transit customers from New Jersey to Manhattan.

The model uses the New York Metropolitan Transportation Council's (NYMTC's) highway network as a baseline for auto travel and also includes travel by ferry. The model does not, however, include air travelers residing outside New York, automobile travelers to or from New Jersey, trips by taxi, or nonmotorized (walk/bike) trips.

The model uses a geographic area system consisting of the entire MTA service area and includes 12 counties in New York State: New York (Manhattan), Bronx, Kings (Brooklyn), Queens, Richmond (Staten Island), Nassau, Suffolk, Westchester, Putnam, Dutchess, Rockland, Orange; and three counties in Connecticut: Fairfield, New Haven, and Litchfield.

The model was calibrated to produce ridership forecasts for the AM peak period (6-10 AM). AM peak hour, daily, and annual forecasts were derived from the AM peak period analysis. Details of the ridership forecasting methodology and its findings are provided in the Technical Appendix.

LIRR OPERATING PLAN

To develop ridership forecasts for the Preferred Alternative, the model used a preliminary 2010/2020 LIRR operating plan for East Side Access. This operating plan* included 36 AM peak hour trains arriving at Penn Station and 24 at GCT. For comparison, a No Action 2010/2020 LIRR

* Since the ridership forecasting analyses were completed, the operating plan has been modified slightly.

operating plan was developed, which included 41 AM peak hour arrivals at Penn Station and none at GCT. In every scenario, each train was assigned to 1 of 10 branches in the LIRR system. In addition, the model incorporated an MNR 2020 operating plan, as well as capital improvements planned for both MNR and the LIRR to develop ridership forecasts for the No Action Alternative. Table 9B-1 summarizes peak hour service for the No Action, TSM, and Preferred Alternatives' operating plans as modeled.

Table 9B-1

LIRR AM Peak Hour Train Arrivals: No Action and Preferred Alternatives

	Penn Station		GCT		Flatbush Avenue		Hunters-point Avenue		Long Island City		All Terminals	
Branch	N/A	Pref.	N/A	Pref.	N/A	Pref.	N/A	Pref.	N/A	Pref.	N/A	Pref.
Port Washington	8	6	0	6	0	0	0	0	0	0	8	12
Port Jefferson	6	6	0	6	1	0	1 (2)	1	0 (1)	0	8 (10)	13
Ronkonkoma	3	3	0	4	1	0	1	0	0	0	5	7
Oyster Bay	2	1	0	0	0	0	1 (2)	1	0	0	3 (4)	2
Hempstead	2	2	0	2	2	2	0	0	0	0	4	6
West Hempstead	1	1	0	0	1	1	0	0	0	0	2	2
Far Rockaway	3	1	0	1	2	2	0	0	0	0	5	4
Long Beach	3	4	0	1	1	1	0	0	0	0	4	6
Babylon	10	10	0	4	8	4	0	0	0	0	18	18
Montauk	3	2	0	0	0	0	1 (4)	1	1	1	5 (8)	4
Total	41	36	0	24	16	10	4 (9)	3	1	1	62(68)	74

Note: ( ) = Peak hour arrivals in TSM Alternative.

Services changes under the No Action Alternative include increasing service to Penn Station from 37 trains to 42 trains during the AM peak hour. Additional service will be provided on the shoulders of the peak hour within the AM peak period and throughout the PM peak period. Service will increase on the following branches:

- *Port Jefferson (dual-mode service)*
- *Oyster Bay (dual-mode service)*
- *Montauk (dual-mode service)*
- *Main Line/Ronkonkoma*
- *Huntington*
- *Port Washington*

In addition, the Main Line Third Track Project will construct an additional track between Bellerose and Hicksville, providing capacity for increased reverse commute service and greater operating reliability on the Main Line. The Main Line Third Track Project will double the amount of reverse commute service to Mineola, Hicksville, Huntington, and other Long Island centers of employment—from one train to two trains during the peak hour to and from Penn Station.

TSM Alternative Operations

The changes proposed under the TSM Alternative include increasing train capacity on selected LIRR trains, and increasing service at the Hunterspoint Avenue and Long Island city stations. Together, these changes would result in the following increases in passenger capacity:

- *2,400 additional seats per hour on the Babylon Branch;*
- *1,680 additional seats per hour on the Port Washington Branch;*
- *960 additional seats per hour on the Long Beach Branch; and*
- *720 additional seats per hour on the Far Rockaway Branch.*
- *One additional peak hour train from Port Jefferson to Hunterspoint Avenue.*
- *One additional peak hour train from Yaphank to Hunterspoint Avenue.*
- *One additional peak hour train from Oyster Bay to Hunterspoint Avenue.*
- *One additional peak hour train from Patchogue to Hunterspoint Avenue.*
- *One additional peak hour train from Port Jefferson to Hunterspoint Avenue and then continuing to Long Island City.*
- *One additional peak hour train from Speonk to Long Island City.*

Preferred Alternative Operations

The Preferred Alternative would increase peak hour service to Manhattan by approximately 45 percent over No Action conditions. Service would be added throughout the LIRR system as access to Manhattan's East and West Sides is provided. The Preferred Alternative would create new LIRR service to GCT at all hours of the day. During the AM peak hour, it would operate 24 electric trains to GCT and maintain the current service level of 37 trains to Penn Station. During the AM peak hour, the following service to GCT would be added: three to six trains each on the electric portions of the Babylon Branch, Port Washington Branch, and Ronkonkoma Branch; and two trains each on the Hempstead Branch, Long Beach Branch, and Far Rockaway Branch.

Reverse commute service on most branches throughout the LIRR system would more than double as compared to the No Action Alternative. To accommodate GCT service, the Preferred Alternative would increase peak hour reverse commute service from 11 trains under the No Action Alternative to 24 trains; with 12 trains operating from Penn Station and 12 trains operating from GCT. Service to Main Line destinations, Ronkonkoma, and Huntington stations, would be provided at 20-minute intervals from Manhattan during peak periods (currently, reverse peak trains run approximately hourly).

FUTURE STATION UTILIZATION

One important result of the ridership forecasting process is the number of trips utilizing LIRR western terminals that would be affected by the project—Penn Station, GCT, Long Island City, Hunterspoint Avenue, and Flatbush Avenue. Essentially, these data summarize how many people would ride LIRR trains in the future under each alternative. For reference, a "base 1995 network" was input into the model, which approximates ridership in 1995. These data, summarized

in Table 9B-2, provides a starting point for assessing impacts of each alternative on transportation systems in the western end of the Long Island Transportation Corridor (LITC).

Table 9B-2

LIRR Weekday AM Peak Period Arrivals at New York City Terminals: 2010, 2020

Terminal	2010			2020		
	No Action	TSM	Preferred Alternative	No Action	TSM	Preferred Alternative
Penn Station	103,856	100,348	58,154	110,522	106,849	62,249
Grand Central	0	0	62,334	0	0	65,676
Hunterspoint Avenue	3,260	4,682	514	3,598	5,098	603
Long Island City	44	131	40	46	138	43
Flatbush Avenue	11,374	12,275	9,911	12,144	13,049	10,519
Sunnyside	0	0	2,070	0	0	2,255
Total	118,533	117,435	133,024	126,310	125,135	141,345

In Manhattan, the project would create new capacity in Penn Station that could benefit MNR, *potentially* allowing MNR to bring service for its commuters to Penn Station if that agency's Penn Station Access Project is implemented. If MNR does bring new service into Penn Station, the number of MNR commuters shifted to Penn Station would be lower than the number of LIRR commuters shifted to GCT by East Side Access. *(This EIS does not assume that MNR Penn Station Access is implemented, however.)*

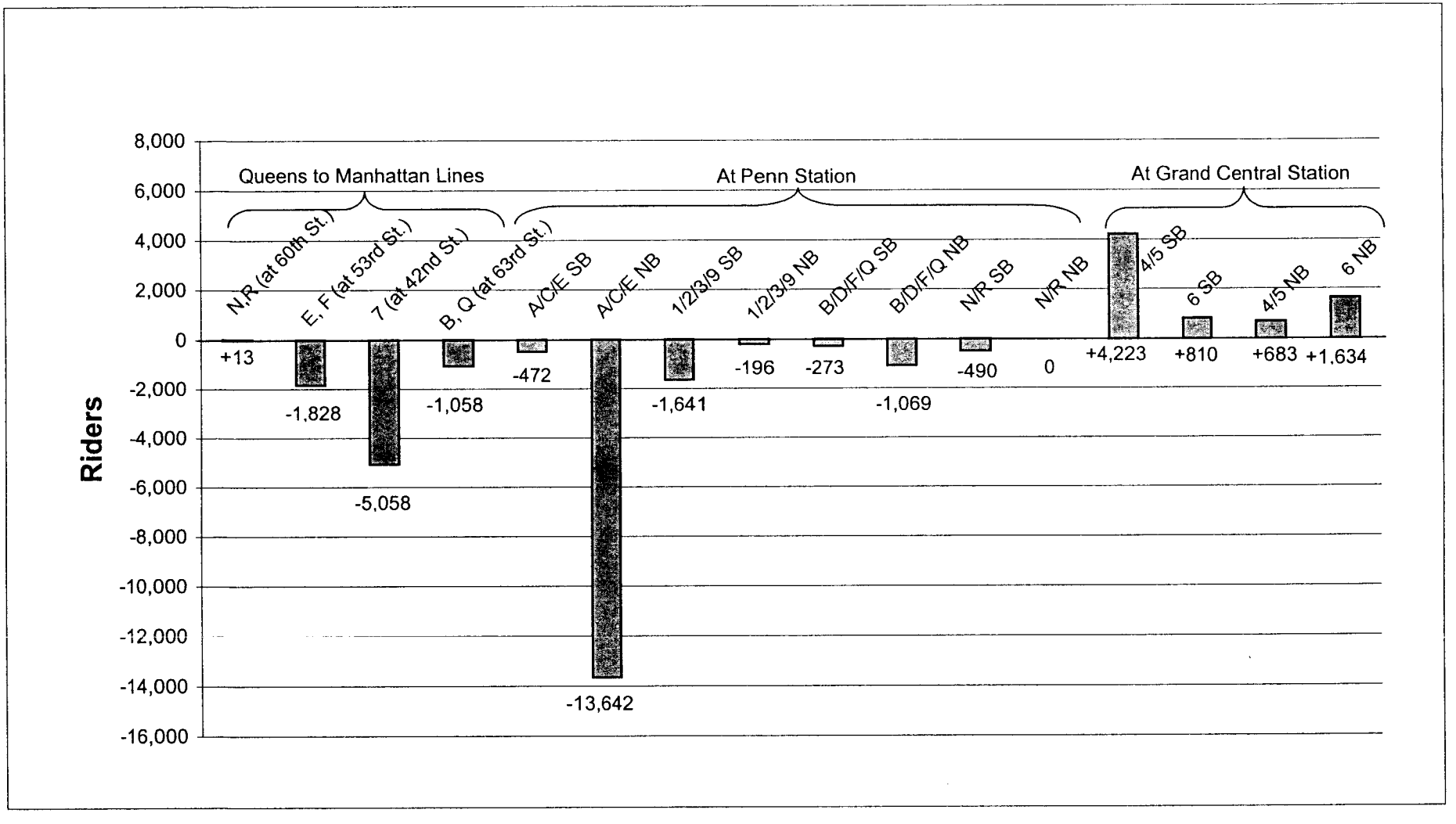
To assess impacts of each alternative on transportation systems on Long Island, future LIRR ridership was broken out by branch. Each trip destined for one of the LIRR's six (including GCT) western terminals originated on one the LIRR's 10 branches (plus the "City Terminal Zone," which was included as a distinct branch). The model also accounted for non-terminal passengers—those disembarking prior to a western terminal station—and reverse commuters, both of whose trips originate at a western terminal. Table 9B-3 summarizes ridership for each LIRR branch for the No Action, TSM, and Preferred Alternatives (boarding passengers only).

SUBWAY RIDERSHIP

By significantly changing commuting patterns both into Manhattan and within Manhattan, the Preferred Alternative would have an effect on subway ridership in addition to commuter rail ridership. The results of the ridership forecasting model indicated significant changes to subway ridership as a result of the Preferred Alternative in three general areas: on subways linking Queens and Manhattan; on subways to and from Penn Station; and on subways to and from GCT. Overall, the Preferred Alternative would reduce subway trips during peak hours (see Figure 9B-1).

Queens-Manhattan Subways

Weekday subway ridership from Queens into Manhattan in the AM peak period (6-10 AM) would decline by about 3 percent as a result of the Preferred Alternative (see Table 9B-4). The greatest reduction would occur on the No. 7 subway train into Manhattan, which would carry



MTA / LIRR
East Side Access

Figure 9B-1

Year 2010 AM Peak Period Subway Ridership Differences Between No Action and Preferred Alternatives

Table 9B-3

Ridership by Branch: Weekday AM Peak Period Boardings, 2010, 2020

Branch	2010			2020		
	No Action	TSM	Preferred Alternative	No Action	TSM	Preferred Alternative
City Terminal Zone*	6,074	6,348	8,223	6,582	6,609	9,040
Babylon	31,854	32,030	33,745	33,872	34,061	35,900
Far Rockaway	7,915	7,929	8,367	8,298	8,308	8,758
Hempstead	5,714	5,792	6,838	6,138	6,154	7,307
Long Beach	7,740	7,747	8,035	8,123	8,129	8,435
Montauk	4,347	4,575	4,411	4,845	5,100	4,915
Oyster Bay	2,979	3,391	2,964	3,145	3,579	3,130
Port Jefferson	32,073	32,893	33,334	34,425	35,342	35,818
Port Washington	17,128	17,358	21,283	18,289	18,189	22,639
Ronkonkoma	17,389	17,395	19,416	19,249	19,254	21,470
West Hempstead	1,765	1,768	2,162	1,849	1,852	2,257
Total	134,979	137,228	148,780	144,814	146,576	159,670

Note: * Includes western terminals and selected Queens stations.

Table 9B-4

AM Peak Period Ridership: Queens to Manhattan Subways, 2010, 2020

Subway*	2010			2020		
	No Action	*TSM*	Preferred	No Action	*TSM*	Preferred
N, R (at 60th Street)	67,260	*67,204*	67,273	70,652	*70,848*	70,368
E, F (at 53rd Street)	98,071	*97,688*	96,243	102,343	*102,222*	100,750
7 (at 42nd Street)	96,944	*99,902*	91,886	100,861	*103,736*	95,753
B, Q (at 63rd Street)	37,503	*37,570*	36,445	39,661	*39,422*	38,354
Total	299,778	*302,364*	291,847	313,517	*316,228*	305,226

Note: * Ridership measured as subway crosses East River into Manhattan.

approximately 5,000 fewer passengers into Manhattan in the AM peak period. *In contrast, the effect of the service changes included in the TSM Alternative would be to shift some LIRR riders who would otherwise arrive at Penn Station to the LIRR terminals at Hunterspoint Avenue and Long Island City in Queens, and Flatbush Avenue in Brooklyn (see Table 9B-2). Most of these new riders would transfer to the subways near those terminal stations, although some would also transfer to the ferry.*

Penn Station Subways

As described in "Future Station Utilization," above, the Preferred Alternative would result in a reduction in LIRR riders arriving at Penn Station in the peak period. This reduction would cause significant declines in LIRR passenger usage of subways in the Penn Station area, as shown in Table 9B-5. The greatest decline would occur on the uptown Eighth Avenue A/C/E trains, which

would carry about 14,000 fewer passengers north from Penn Station as a result of the Preferred Alternative.

Table 9B-5

LIRR Passengers Transferring to Subways in the Vicinity of Penn Station: AM Peak Period, 2010, 2020

	2010		2020	
	No Action	Preferred	No Action	Preferred
A/C/E Southbound	8,487	8,015	8,870	8,369
A/C/E Northbound	17,407	3,765	18,432	4,128
1/2/3/9 Southbound	12,354	10,713	13,027	11,383
1/2/3/9 Northbound	2,140	1,944	2,262	2,076
B/D/F/Q Southbound	1,586	1,313	1,684	1,399
B/D/F/Q Northbound	1,069	0	1,107	0
N/R Southbound	763	273	797	285
N/R Northbound	0	0	0	0
Total Transfer to Subway	43,806	26,023	46,179	27,640

Grand Central Terminal Subways

While Penn Station subways would experience ridership reductions as a result of the Preferred Alternative, GCT subways would carry more riders in the AM Peak period. As described in "Future Station Utilization," above, the Preferred Alternative would bring more than 60,000 new LIRR riders into GCT in the peak period. These new LIRR riders would increase ridership on GCT-area subways, as shown in Table 9B-6. The largest increase in subway ridership would occur on the downtown Nos. 4 and 5 Lexington Avenue express trains, which would carry almost 4,500 more passengers south from 42nd Street (GCT).

Table 9B-6

LIRR Passengers Transferring to Subways at Grand Central Terminal: 6-10 AM Peak Period, 2010, 2020

	2010		2020	
	No Action	Preferred	No Action	Preferred
4/5 Southbound	0	4,223	0	4,485
6 Southbound	0	810	0	842
4/5 Northbound	0	683	0	583
6 Northbound	0	1,634	0	1,646
7 Eastbound	0	4	0	4
7 Westbound	0	21	0	23
Shuttle	0	0	0	0
Total Transfer to Subway	0	7,375	0	7,583

REGIONAL TRANSPORTATION PROVIDERS

Overall, the Preferred Alternative would improve regional transportation service, not just on the LIRR, but also on other providers. In Manhattan, the East Side Access Project would create capacity in Penn Station that could be used by MNR, if that agency's Penn Station Access Project is implemented. At the same time, the new service would not result in significant adverse effects to MNR service at GCT.

The work proposed at Harold Interlocking (see Chapter 2, "Project Alternatives") would significantly improve congested conditions at Harold Interlocking. The modifications would reduce track crossings and create the added capacity and flexibility required at this busy location. By reducing existing and potential operational conflicts, the proposed changes at Harold Interlocking would have a positive impact on Amtrak's Northeast Corridor service.

The proposed changes would essentially segregate Amtrak's Northeast Corridor service from LIRR service in the vicinity of Harold Interlocking. This would reduce conflicts throughout the interlocking, thereby providing a quicker route through Harold Interlocking and allowing Amtrak trains to travel into and out of the East River tunnels at higher speeds (via an upgrade of switches). The Preferred Alternative would have no adverse impact on either Amtrak's or NJ Transit's non-revenue use of Sunnyside Yard (i.e., for train storage) or East River tunnels.

REGIONAL VEHICULAR TRAFFIC

In addition to forecasting ridership for each alternative, the model forecasted effects of each alternative on the highway network. For each commuter who would switch from driving to work, to taking the LIRR to work, there would be a reduction in "auto-mode trips" by one, and a reduction in "vehicle miles traveled" (VMT) by that person's round-trip commuting distance. Accordingly, the results of this forecasting are expressed in two forms: (1) as a change in vehicle trips in 2010 and 2020, and (2) as a change in VMT in 2010 and 2020. Overall, the Preferred Alternative would reduce total daily VMT by about 342,000 in 2010 and 375,000 in 2020.

Regional Trips

Total trips can be broken down into two subcategories: (1) trips made between home and work entirely via automobile, called "auto-mode trips," and (2) trips made between home and a local transit stop, called "drive-to-transit trips." While the Preferred Alternative would result in an anticipated decrease in auto-mode trips (people who drive to work), it would also result in an anticipated increase in drive-to-transit trips (people who drive to the train station). That is, fewer people would drive the entire distance to work and more people would drive to train stations to take the LIRR.

The Preferred Alternative would result in a net decrease in auto trips to work by approximately 11,000 in 2010 and 12,000 in 2020. Overall, the Preferred Alternative would result in an increase in total daily trips of approximately 10,000 in 2010 and 11,000 in 2020. This increase in total daily trips would be due to an increase in drive-to-transit trips that would outweigh the decrease in auto-mode trips. The vast majority of people who switch from driving to work, to taking the LIRR, would still drive to the train station, resulting in one less auto-mode trip and one more drive-to-transit trip. If these new LIRR riders get dropped off at the station in the morning and picked up in the evening, the result would be one less auto-mode trip and two more drive-to-transit trips, accounting for the increase in total daily trips.

In counties where there are no LIRR stations affected by the Preferred Alternative (i.e., outside of Queens and Long Island), there would be no new incremental drive-to-transit trips.

Regional Vehicle Miles Traveled

Total VMT can also be broken down into two subcategories: (1) VMT from auto-mode trips, and (2) VMT from drive-to-transit trips. The Preferred Alternative would result in a net decrease in auto-mode VMT, and a net increase in drive-to-transit VMT, resulting in an overall decrease in total VMT, because mileage reductions from fewer auto-mode trips to work would far outweigh mileage increases from new drive-to-transit trips (that is, trips to work are much longer than trips to train stations).

The Preferred Alternative would result in a reduction in total daily VMT of approximately 342,000 in 2010 and 375,000 in 2020, as compared with the No Action Alternative (see Table 9B-7), and represents a major benefit to the region. This reduction in daily VMT would be spread across all counties in the LITC—Manhattan, Queens, Brooklyn, Nassau, and Suffolk—as well as counties outside the LITC. The greatest daily VMT reductions would occur in Queens and Nassau. Queens VMT would decline due to two factors: fewer Queens residents commuting to Manhattan via automobile, and fewer Nassau and Suffolk County residents driving through Queens on their way to work. Nassau County, situated between Suffolk County and Manhattan, would experience the same effect.

Table 9B-7

Change in Vehicle Miles Traveled: 2010, 2020 No Action vs. Preferred Alternative

	2010			2020		
Location	Auto-Mode	Drive-to-Transit	Total	Auto-Mode	Drive-to-Transit	Total
Manhattan	(41,897)	0	(41,897)	(44,590)	0	(44,590)
Queens	(127,745)	8,336	(119,409)	(138,325)	8,719	(129,606)
Brooklyn	961	0	961	710	0	710
Bronx	(50,923)	0	(50,923)	(54,949)	0	(54,949)
Nassau	(117,720)	12,669	(105,051)	(129,059)	13,816	(115,243)
Suffolk	(37,997)	11,522	(26,475)	(42,832)	13,386	(29,446)
Other Counties	992	0	992	(1,553)	0	(1,553)
All Counties	(374,330)	32,527	(341,803)	(410,598)	35,921	(374,677)

Note: ( ) = reduction in VMT.

Another beneficiary of reduced VMT as a result of the Preferred Alternative would be Bronx County (-51,000 VMT in 2010 and -55,000 VMT in 2020). A worsening of already congested highway conditions in Queens for 2010 and 2020 is forecast to cause commuters to divert to Bronx roads in large numbers without the construction of the Preferred Alternative (the No Action Alternative). With the construction of the Preferred Alternative, these Bronx "through-trips" would be greatly reduced.

East River Crossings

The reduction in automobile commutes to work as a result of the Preferred Alternative (of approximately 11,000 in 2010 and 12,000 in 2020) would reduce the number of cars on East River bridge and tunnel crossings. Each day, the Triborough Bridge and the Queens-Midtown Tunnel would carry approximately 10,000 fewer cars into and out of Manhattan in 2010 (and almost 11,000 in 2020). While the Preferred Alternative would also remove cars from the Queensboro Bridge, it would not decrease the total number of cars on that bridge, as other cars (which formerly used the Triborough Bridge, Queens-Midtown Tunnel, or other East River crossings) would transfer to the toll-free Queensboro Bridge, filling it to capacity once again.

SUMMARY

Regional and Local Benefits of the Preferred Alternative

The Preferred Alternative would result in a number of substantial benefits to both regional and local transportation systems in the New York metropolitan area. These benefits can best be summarized by looking at the effects of the Preferred Alternative on travel in the AM peak period, when the transportation system is most crowded. The benefits of the Preferred Alternative can be summarized as follows:

- A reduction in daily vehicle miles traveled of almost 342,000 in 2010 and 375,000 in 2020.
- A reduction in the daily number of automobiles using East River crossings of approximately 10,000 in 2010 and 11,000 in 2020.
- A reduction in AM peak period passengers on the No. 7 subway line into Manhattan of more than 5,000 in 2010 and 2020. This subway line currently operates at capacity.
- A reduction in AM peak period passengers on Penn Station-area subway lines of almost 18,000 in 2010 and more than 18,000 in 2020.

Local Impacts of the Preferred Alternative

The Preferred Alternative would also result in some impacts to local transportation systems in Manhattan and on Long Island. These include:

- An increase in the number of pedestrians and taxis in the GCT area during peak hours.
- An increase in the number of passengers boarding the Lexington Avenue subway lines in the peak hour. The biggest impact would be on the southbound 4/5 trains, which would receive approximately 4,200 more peak period riders in 2010 and 4,500 in 2020.
- Increased traffic and parking demand at LIRR stations on Long Island.

All three of these issues are addressed in depth later in this chapter. ❖

C. GRAND CENTRAL TERMINAL (GCT) AREA

The area surrounding GCT is the focus of intensive concentrations of activity by all modes of transportation. The GCT area, therefore, was analyzed in detail for all modes—traffic and parking, pedestrian flows inside and outside of the terminal itself, commuter rail passenger flows, subway issues, and bus transportation—since any or all of them could potentially be impacted by the East Side Access Project. Overall, the Preferred Alternative would provide additional capacity and flexibility for commuters from eastern Queens and Long Island to travel to work by public transportation rather than by auto. It would produce a series of benefits and impacts due to the transferral of much commuter activity to the GCT area from the Penn Station area, which are assessed in detail in this section of the EIS.

EXISTING CONDITIONS

TRAFFIC

The GCT traffic study area encompasses the area bounded by and including 48th Street to the north, 40th Street to the south, Third Avenue to the east, and Fifth Avenue to the west, and other intersections along 42nd Street extending west to Times Square and east to First Avenue. It is within this area that the vast majority of new traffic generated by the project can be anticipated, primarily by taxis picking up or dropping off LIRR commuters in the immediate vicinity of GCT. This traffic study area is shown in Figure 9C-1; it encompasses 54 intersections overall.

Traffic volumes in the GCT area are generally constant throughout a typical business weekday. Examination of traffic volumes entering a cordon around the traffic study area indicates that AM, midday, and PM peak hour volumes overall are generally within 5 percent of each other. Crosstown volumes along 42nd Street are generally 700 to 900 vehicles per hour (vph) right in front of GCT at Park Avenue, while other east-west crosstown street volumes are generally in the 400 to 700 vph range for streets that "go through" the entire area (other streets that are discontinuous, i.e., don't "go through" the entire area because they are blocked by GCT, have volumes that are generally in the 150 to 450 vph range).

North-south avenue volumes are higher, but are also fairly consistent during the AM, midday, and PM peak hours. Traffic volumes along Fifth, Madison, Lexington, and Park Avenues (each direction along Park Avenue) are generally in the 1,200 to 1,800 vph range. Traffic volumes are higher on Third and Second Avenues, reflecting their function more as through traffic carriers; they generally carry about 2,200 to 2,700 vph, with Second Avenue carrying 3,000 to 3,800 vph in the AM peak hour, since it is a major southbound route for traffic that enters Manhattan via the Queensborough Bridge at 59th Street and Second Avenue.

The analysis of traffic conditions followed *1994 Highway Capacity Manual (HCM)* procedures. According to the *HCM*, the capacities of intersections are based on geometric conditions (number of lanes, lane widths, etc.), traffic conditions (volumes, vehicle classifications, pedestrians, etc.), and signalization conditions (cycle lengths, phasing, and green time allocations).

Based on the intersection capacity analyses, levels of service (LOSs) are established defined in terms of average vehicle delay, with the conditions that the driver is likely to encounter at each LOS as follows for signalized intersections:

- LOS A describes operations with very low delay, i.e., less than 5.0 seconds per vehicle. This occurs when signal progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all.
- LOS B describes operations with delay in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. Most vehicles do not stop.
- LOS C describes operations with delay in the range of 15.1 to 25.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- LOS D describes operations with delay in the range of 25.1 to 40.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (v/c) ratios. Many vehicles stop.
- LOS E describes operations with delay in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios.
- LOS F describes operations with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios with cycle failures. Poor progression and long cycle lengths may also occur.

According to generally accepted practice, LOS A, B, and C reflect the existence of delays within an acceptable-to-tolerable range, and LOS D and E suggest delays increasing into often unacceptable or breakdown conditions (LOS F, or LOS F* which indicates severe levels of congestion).

The analysis of existing traffic conditions in the GCT traffic study area was based on a blend of new counts conducted for this EIS and counts conducted in the area for the Bear Stearns EIS, for its office development at 383 Madison Avenue. A total of 54 intersections were analyzed in detail, including two unsignalized intersections along Vanderbilt Avenue. During the AM peak hour, 34 of the 54 intersections were operating at *overall* LOS A or B, 12 at LOS C, 7 at LOS D, 1 at LOS E, and none at LOS F (the "overall" conditions for an intersection represent a weighted average of all traffic movements at that intersection). Fourteen of the 54 intersections analyzed had at least one traffic movement at unacceptable LOS E or F. In general, for the *overall* intersection to be at LOS E or F, either one particular traffic movement needs to be operating at extremely congested conditions or two or more traffic movements need to be at LOS E or F.

In the midday peak hour, 31 of the 54 intersections were operating at LOS A or B, 20 at LOS C, 1 at LOS D, 2 at LOS E, and none at LOS F. Twelve of the 54 intersections had at least one traffic movement at unacceptable LOS E or F.

In the PM peak hour, 37 of the 54 intersections were at overall LOS A or B, 15 were at LOS C, 2 at LOS D, and none at LOS E or F. Eight of the 54 intersections were characterized by at least one traffic movement at unacceptable LOS E or F.

Most of the individual traffic movements currently operating at LOS E or F conditions generally occur along the 42nd Street corridor or on other east-west crosstown streets approaching the

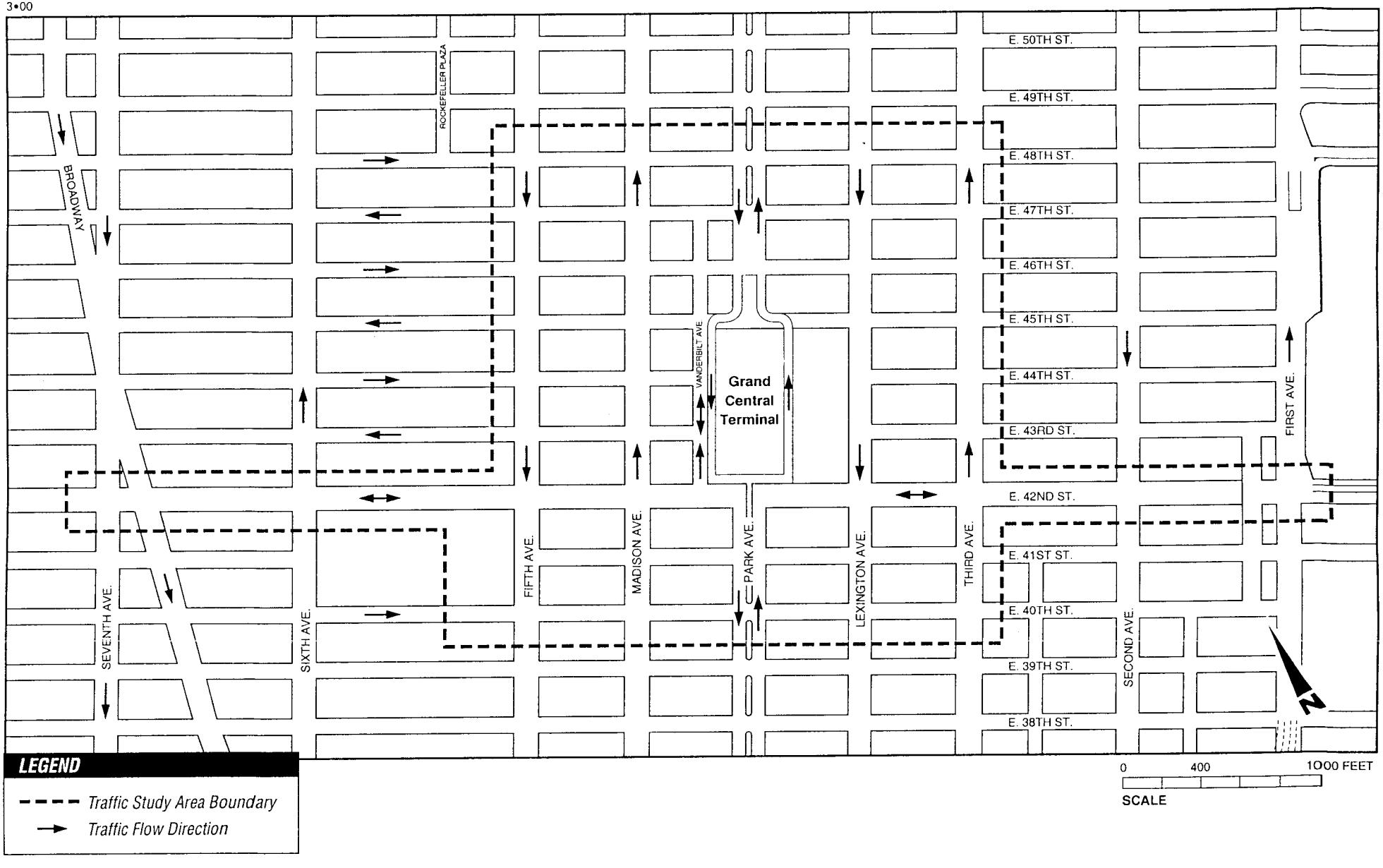


Figure 9C-1

Traffic Study Area in Manhattan

major north-south avenues. A summary of the intersection LOS findings is presented in Table 9C-1; details of the analyses are provided in the Technical Appendix.

PARKING

The East Side Access Project is not expected to generate any automobile parking demands at GCT because it is unlikely that people would drive to GCT, park in the area, and then take LIRR service to Queens or Long Island. It would, however, generate additional taxi usage and, thereby, additional utilization of curb space. It is the availability of curb space at GCT and other taxi stand locations near GCT that is the focus of this section.

In general, daily or hourly parking on the avenues or cross-streets throughout the GCT study area is prohibited. The predominant on-street parking regulation is "No Standing Anytime between 7 AM and 7 PM Except for Loading and Unloading." Along Fifth, Madison, Lexington, and Third Avenues, parking or standing along one side of the avenue is prohibited, since these curbs are used for bus stops or the curb lane is an active bus lane. At some locations, the regulations are "No Standing Anytime" (for example, along the east side of Fifth Avenue between 42nd and 48th Streets), and in other locations, the curb is reserved for taxi stands (e.g., east side of Lexington Avenue between 42nd and 44th Streets and the north side of 42nd Street between Park and Vanderbilt Avenues).

During the AM and midday peak periods, two parking conditions prevail. Blockfaces that allow standing for loading and unloading are usually filled with commercial delivery vehicles, while those curbs where parking or standing are prohibited are usually free of any vehicles. Some streets have double-parked delivery vehicles, including 43rd and 44th Streets west of GCT, 45th Street between Vanderbilt and Lexington Avenues, and 40th Street between Madison and Lexington Avenues. During the PM peak period, the parking occupancies along the left (or, non-bus) curb faces on the avenues drop to about 60 percent while legal loading and unloading spaces along the cross streets remain close to 100 percent occupied.

Parking regulations and usage around the GCT superblock vary according to each side. On Vanderbilt Avenue, "No Standing Anytime" regulations are posted along the west side of GCT yet most of the curb spaces are occupied by delivery vehicles or personal autos with official permits in the windshield. On the south curb of 45th Street, near Vanderbilt Avenue, where the parking regulations prohibit standing except for deliveries, many vehicles are usually double parked. Between the Helmsley Walks, the regulation changes to "No Stopping Anytime," yet delivery vehicles can be found parked there as well. Approaching Lexington Avenue, the south curb is occupied by postal vehicles where the regulations allow for only these vehicles. On Lexington Avenue, the west curb adjacent to GCT is reserved for bus stops and taxi drop-offs, and is generally free of any parked or standing vehicles. South of GCT on 42nd Street, the north curb in front of the Grand Hyatt Hotel is usually very active with taxi and charter bus drop-offs and pick-ups. Just west of the hotel, at GCT's "front door," the curb is typically clear, since it is a bus stop, and between Park and Vanderbilt Avenues, as a taxi stand.

There are posted taxi stands along the south and west blockfaces of the terminal near the Vanderbilt Avenue/42nd Street intersection and on the east side of Lexington Avenue across from GCT. The Grand Central Partnership employs taxi control agents at each location during the 7-11 AM and 3-11 PM periods to manage the flow of cabs and keep the taxi queuing locations

Table 9C-1

Existing Traffic Level of Service (LOS) Summaries: Grand Central Terminal Study Area

Intersection	AM Peak Hour	Midday Peak Hour	PM Peak Hour
Seventh Ave. and 42nd St.	D	B	B
Broadway and 42nd St.	C	C	C
Sixth Ave. and 42nd St.	D	C	C
Fifth Ave. and 48th St.	B	B	B
Fifth Ave. and 47th St.	B	B	B
Fifth Ave. and 46th St.	B	B	B
Fifth Ave. and 45th St.	B	C	B
Fifth Ave. and 44th St.	B	B	B
Fifth Ave. and 43rd St.	B	C	B
Fifth Ave. and 42nd St.	C	C	C
Fifth Ave. and 41st St.	B	B	B
Fifth Ave. and 40th St.	B	B	B
Madison Ave. and 40th St.	B	C	B
Madison Ave. and 41st St.	B	C	B
Madison Ave. and 42nd St.	D	D	C
Madison Ave. and 43rd St.	B	B	B
Madison Ave. and 44th St.	B	B	B
Madison Ave. and 45th St.	B	C	B
Madison Ave. and 46th St.	B	C	B
Madison Ave. and 47th St.	B	B	B
Madison Ave. and 48th St.	B	B	B
Vanderbilt Ave. and 47th St.	C	B	B
Vanderbilt Ave. and 46th St.	B	B	B
Vanderbilt Ave. and 45th St.	C	B	C
Vanderbilt Ave. and 44th St.*	A-B	A-B	A-B
Vanderbilt Ave. and 43rd St.*	A-B	A-B	A-B
Vanderbilt Ave. and 42nd St.	C	C	C
Park Ave. and 40th St.	B	B	C
Park Ave. SB and 41st St.	B	B	C
Park Ave. NB and 41st St.	B	B	B
Park Ave. and 42nd St.	D	C	C
Park Ave. and 46th St.	C	C	C
Park Ave. and 47th St.	B	B	B
Park Ave. and 48th St.	C	B	B
Lexington Ave. and 48th St.	B	B	B
Lexington Ave. and 47th St.	C	C	B
Lexington Ave. and 46th St.	B	C	B
Lexington Ave. and 45th St.	D	E	C
Lexington Ave. and 44th St.	C	E	D
Lexington Ave. and 43rd St.	C	B	C
Lexington Ave. and 42nd St.	E	C	C
Lexington Ave. and 41st St.	C	B	B
Lexington Ave. and 40th St.	B	B	B
Third Ave. and 40th St.	B	B	B
Third Ave. and 41st St.	B	B	B
Third Ave. and 42nd St.	D	C	C
Third Ave. and 43rd St.	B	B	B
Third Ave. and 44th St.	B	B	B
Third Ave. and 45th St.	B	B	B
Third Ave. and 46th St.	B	B	B
Third Ave. and 47th St.	B	C	B
Third Ave. and 48th St.	B	C	B
Second Ave. and 42nd St.	C	C	C
First Ave. and 42nd St.	D	C	D

Note: * Indicates unsignalized intersection.

clear of other vehicles. Field observations indicate the Vanderbilt Avenue stand is more "popular" for commuters (between 10 and 30 people wait in queue at any time during the AM peak) as it appears to process the highest taxicab throughput. Even when 20 individuals are on line for a taxi, the volume of taxicabs entering is such that an individual usually waits for only a few minutes for a taxi. In addition, it is protected from the weather and has a slightly better interface with the terminal than any other nearby taxi stand. The 42nd Street taxi stand is used by fewer people, with 10 to 15 people noted in queue at any time during the morning hours. Although the taxi stand is situated on a main crosstown street, people generally have to wait much longer for a taxi as the volume of taxicabs at this location is much less than that at the Vanderbilt Avenue stand. One possible reason for this is that an empty taxi, heading west on 42nd Street past the main terminal street access and the Grand Hyatt hotel, will likely be hailed before arriving at this taxi stand.

COMMUTER RAIL

Metro-North Railroad

Currently, one commuter railroad serves GCT—MTA Metro-North Railroad (MNR). Metro-North is the second-largest commuter rail system in the United States, providing more than 200,000 customer trips each weekday and some 62 million trips per year. The service currently provided by MNR began with the New York & Harlem Railroad, which introduced a horse-car line in Lower Manhattan in 1832. MNR currently has a fleet of more than 800 cars and engines, 339 route miles, and 738 miles of track.

Operations at GCT. Grand Central Terminal is MNR's primary destination for commuters each morning—four out of every five trips on MNR end at GCT during the AM peak period (6 AM to 10 AM). This translates to more than 75,000 passengers arriving at GCT during the morning peak period and approximately 45,000 during the peak AM hour. During the AM peak hour, 50 trains are scheduled to arrive at GCT, with a total of 373 cars. While the average train is seven cars long, train length varies from a few as 4 cars to as many as 12.

MNR operations include three train lines—serving commuters from the Bronx, Westchester, Putnam, and Duchess Counties in New York, as well as Fairfield and New Haven Counties in Connecticut—all of which terminate in GCT. Of these three lines, the New Haven Line carries about 43 percent of MNR commuters, the Harlem Line about 35 percent, and the Hudson Line 22 percent.

South of 96th Street, trains from all three MNR lines all run via tracks under Park Avenue, into and out of the upper and lower levels of GCT. GCT itself contains a total of 44 tracks that can be used for passenger trains—29 on its upper level and 15 on its lower level. In addition to these "platform" tracks, GCT also contains 49 yard tracks, currently used by Metro-North for storage and routine maintenance of trains.

Because Metro-North runs more scheduled trains in peak periods than in off-peak periods, trains that arrive in the morning peak period need to be stored during midday, awaiting use for commuters leaving during the evening peak period. In addition to storing approximately 31 trainsets on storage tracks within GCT, Metro-North uses a large portion of its main platform tracks to store approximately 34 trainsets in the midday. An additional 14 trainsets are stored at remote suburban yards (Croton-Harmon, North White Plains, or Stamford) for lay-up in the midday; these trains return to GCT to carry passengers in the peak PM period.

Some of the track elements constructed for GCT when it opened in 1913 have since been removed to streamline MNR's operations at GCT. The eliminated features include a circular "loop" track on the lower level, several yard tracks, numerous switch turnouts and crossovers, and segments of "ladder" lead tracks that provided alternate routes for trains to switch between tracks. Although it is no longer used, the lower level loop track still exists beneath GCT. Additionally, certain existing yard tracks have been stub-ended, preventing through movement and requiring access from one end only. Three former platform tracks (the former upper-level tracks 22 and 31 and former track 113 on the lower level) have had their track/platform expanse converted into support facilities for train servicing activities (i.e., yard supervision offices, employee locker/lunch rooms, technical backshops, and tool and parts component storehouses).

Operations North of GCT. MNR operations depart GCT to the north on a four-track main line that initially operates under Park Avenue before rising to a viaduct over Park Avenue at 96th Street. Five miles north of GCT, the Hudson Line separates from the combined Harlem and New Haven Lines at Mott Haven Junction in the South Bronx. Those two routes then break away from one another 6.5 miles farther north at Woodlawn Junction.

With three heavily traveled routes operating on the four-track Park Avenue main line feeding GCT, peak-period operations on MNR face potential congestion. To accommodate the heavy volume of trains during the 90 busiest minutes of the peak AM and PM periods, MNR operates the four-track main line with three tracks in the peak direction and one for reverse peak operations.

Amtrak and NJ Transit

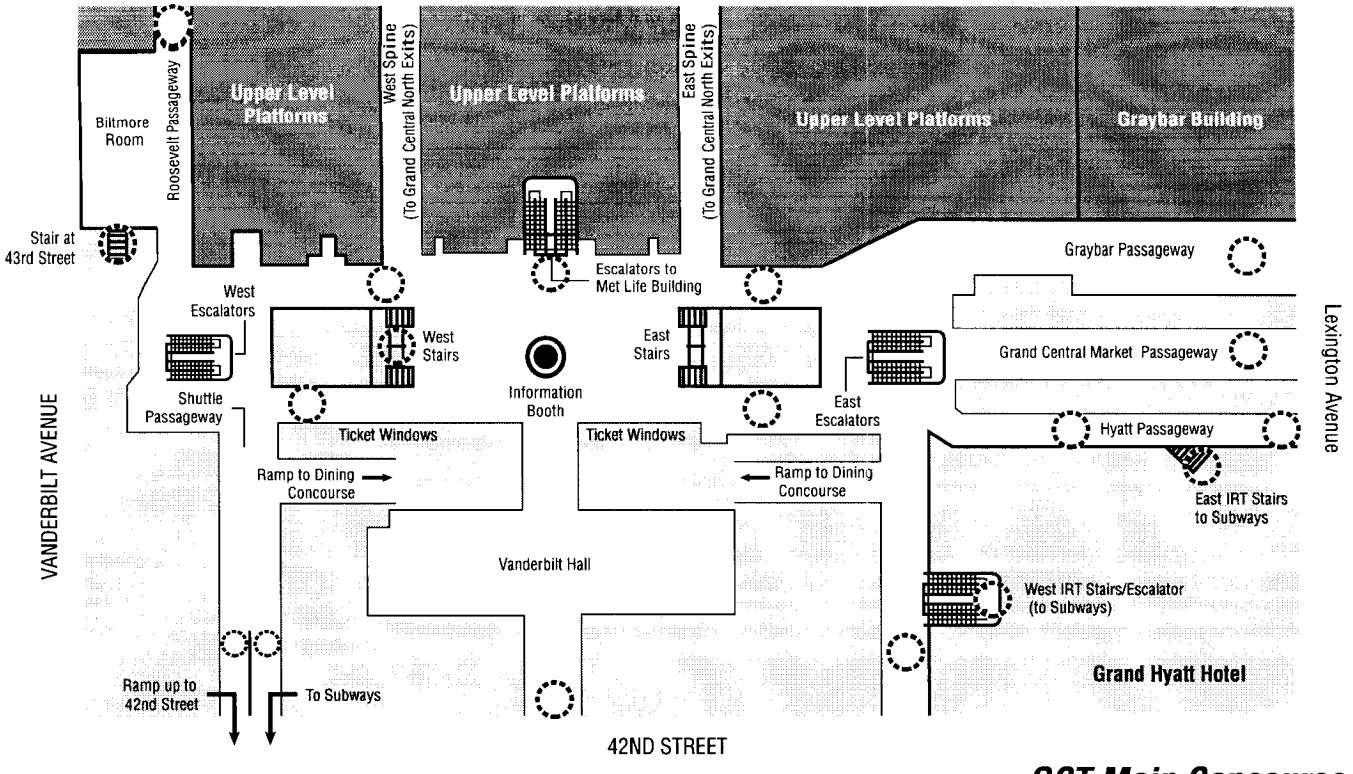
As described in the "Project Alternatives" chapter, the Preferred Alternative's route into GCT would take LIRR trains along tracks at Harold Interlocking in Queens, currently used by both Amtrak and NJ Transit. Both NJ Transit and Amtrak currently store and maintain trains in Sunnyside Yard, and use Harold Interlocking to get trains from the East River tunnels to the yard. Additionally, Amtrak uses Harold Interlocking as its main route for Northeast Corridor service to and from Boston, as trains travel through Harold Interlocking and onto tracks that lead over the Hell Gate Bridge toward Boston.

PEDESTRIAN CONDITIONS WITHIN GCT

The analysis of potential impacts within GCT focused on key representative corridors, passageways, and stairwells that could be affected by introduction of LIRR service into GCT. LIRR service would utilize tracks that lie under the terminal's west edge on the Dining Concourse, and result in new pedestrian flows within the terminal. These affected areas would include the track platforms and its stairwells to the dining and Main Concourse levels of GCT, to concourse and passageway elements designed for the LIRR and for MNR riders under the Grand Central North (GCN) project, to subway connections within GCT, and to the streets and sidewalks bordering GCT and farther away from the terminal.

Within the 1993 LIRR East Side Access Feasibility Study that preceded this EIS, the ability of GCT track platforms, stairwells connecting the platforms with the newly designed LIRR and GCN passageways, and the new passageways themselves to accommodate maximum anticipated ridership levels were analyzed in detail, with regard to both typical LOSs and their ability to satisfy the National Fire Protection Association's (NFPA) 130 emergency egress requirements. That study showed that acceptable standards could be achieved in a 10-exit scheme. For this EIS, analyses for potentially affected pedestrian elements are shown in Figure 9C-2.

PLAN NOT TO SCALE



GCT Main Concourse

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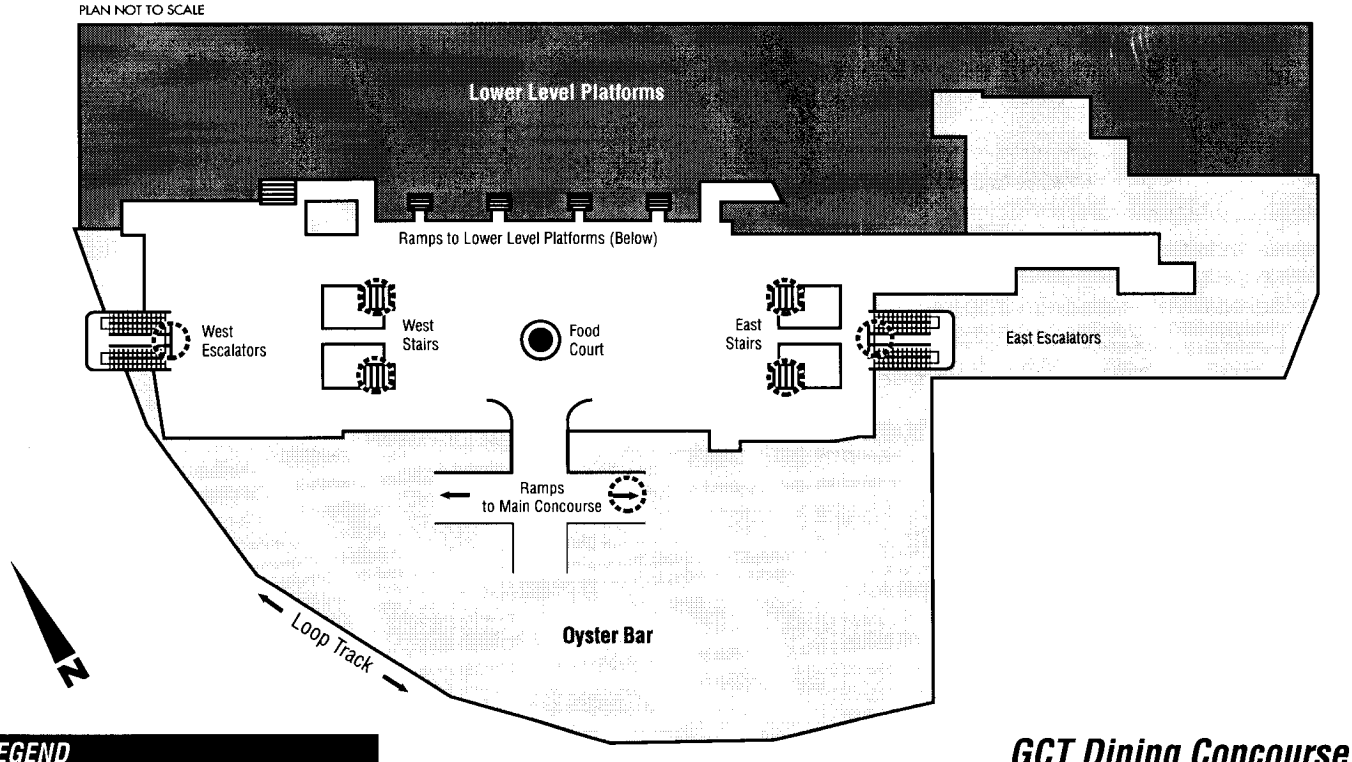


GCT Dining Concourse

LEGEND

- Track and Platform Areas
- Retail and Other Areas
- Pedestrian Count Location

MTA / LIRR

East Side Access

Figure 9C-2

Pedestrian Count Locations: Grand Central Terminal

Typically, pedestrian volumes are directionally peaked out of GCT in the morning as commuters are traveling to work, while the reverse is true in the late afternoon periods. AM peak pedestrian conditions in the Dining Concourse experience only limited congestion, helped in part by single train arrivals spread across all tracks. The Dining Concourse area is not subject to the daily high cross-flow conflicts of multiple train unloadings that are common in the upper, or main, concourse. However, with the recent openings of new restaurants and seating areas in the Dining Concourse, there has been a significant reduction in free circulation space, though no undue congestion has been noted.

The focus of the analysis is on identifying those circulation patterns that would closely mirror future LIRR patterns from the westernmost tracks in the Dining Concourse, and observing the current usage of those elements. This will allow determination of existing LOSs, assignment of LIRR passengers through the area, and impact determination.

The busiest pedestrian element in the Dining Concourse is the north staircase of the west stairs, with about 1,700 people traveling up along it in the AM peak hour and another 1,700 people using it to descend in the PM peak hour. The new escalator leading up facing the New York Transit Museum store processes about 1,550 people in the AM peak hour, while 1,400 people descend this element in the PM peak hour. About 1,600 people use the Oyster Bar ramp heading east toward the IRT subway stairwell and 1,450 people travel down this ramp in the PM peak hour.

In the Main Concourse, 12,000 people move up the Met Life building escalators in the AM peak hour, while 10,200 people use this element to enter GCT in the PM peak hour. The Roosevelt Passageway is used by between 5,000 and 4,200 people in the respective AM (outbound) and PM (inbound) peak hours. Stairs from the incoming train room, now referred to as the Biltmore Room, are used by 2,250 people leaving the terminal during the morning peak hour, while 1,700 people descend this stairwell in the PM peak hour. About 4,500 people (AM) use the Graybar Passageway to exit GCT toward Lexington Avenue, and 4,200 people (PM) to enter the terminal. The Hyatt Passageway carries a variety of flows and depending on location along it, are either balanced in both directions near the large Hudson News store (5,000-6,000 people in AM and PM peak hours) or unidirectional closer to Lexington Avenue (3,400 people out in the AM, 4,400 people in during the PM) due to the presence of the Lexington Avenue subway. About 3,250 people enter and exit from the main "front door" to 42nd Street past the main waiting room (Vanderbilt Hall) in the AM peak hour, while about 4,000 people use this access in the PM peak hour. The passageway leading to the shuttle is used by 2,450 (AM peak hour) to 2,850 (PM peak hour) people as they exit the terminal, while this same corridor is used by 1,900 people (AM and PM) to enter GCT. The parallel ramp leading up to the Vanderbilt/42nd corner carries 2,300 people in the AM and 3,050 in the PM peak hours.

The two stair/escalator elements leading to the IRT subway station are among the most heavily used in the entire terminal (see Figure 9C-2). Although these elements are used by many pedestrians and have limited available capacity, they would also be significantly used by LIRR riders. The stair/escalator bank serving the south end of the subway platform is the busier of the two IRT vertical circulation banks, with about 11,000 people using it during both the AM and PM peak hours. Of these flows, the down movements are heavier, with 6,000 to 7,000 people descending toward the subway. The stairwell closer to Lexington Avenue is about half as busy with 3,000 to 3,200 pedestrians moving up or down between the Hyatt Passageway and the subway (through FCA 240) during peak hours.

The *HCM* was used as the procedural basis for all pedestrian LOS analyses on stairwells, within corridors and passageways, and for sidewalks and crosswalks. The time-space analysis procedures, which allow for analysis of assembly areas, were used to assess all platform and cross passage areas. Brief descriptions of each LOS standard for stairs and walkways follow.

- LOS A (20 or more square feet per pedestrian [sfp] on stairs; 40 sfp on walkways), there is sufficient area provided to freely select stair walk speed, to bypass slow pedestrians, and to easily permit reverse flows. A v/c ratio of 0.45 or better characterizes this LOS.
- LOS B (15-20 sfp on stairs; 24-40 sfp on walkways) sees virtually all persons freely selecting their stair walking speeds, but some difficulties would be experienced passing slower pedestrians. Also, reverse flows present no serious conflicts. V/C ratios in the 0.45-0.70 range characterize this LOS.
- Within LOS C (10-15 sfp on stairs; 16-24 sfp on walkways), stair walking speeds are slightly restricted due to the inability to pass slower pedestrians, and no serious conflicts with reverse flows are apparent. V/C ratios in the 0.70-1.00 range characterize this LOS.
- At LOS D (7-10 sfp on stairs; 11-16 sfp on walkways), the initial range begins where some circulation ability is restricted, with some friction between pedestrians becoming noticeable. Stair walking speeds are restricted for the majority of persons due to the inability to pass slower pedestrians, and reverse flows encounter some conflicts. V/C ratios in the 1.00-1.33 range characterize this LOS.
- At LOS E (4-7 sfp on stairs; 6-11 sfp on walkways), the theoretical capacity of the stairwell is reached, where normal stair walking speeds are reduced because of minimum tread space and an inability to bypass others. Also, intermittent stoppages may occur, reverse flows experience serious conflicts, and "shuffling" is common. Levels E and D are typically experienced for short-term periods when, for example, train arrivals into a terminal unload a large body of riders at once. V/C ratios in the 1.33-1.67 range characterize this LOS.
- In LOS F (4 or less sfp on stairs; 6 sfp or less on walkways), unavoidable contact occurs between passing pedestrians, and most pedestrians are queued rather than actively moving. A complete breakdown in pedestrian flow is experienced, with many stoppages occurring. V/C ratios greater than 1.67 signify LOS F conditions.

Depending on the type of pedestrian element examined, different processing rates prevail. Specifically, stairways process, or move, fewer pedestrians than do corridors and passageways since vertical movement is involved. Escalators, on the other hand, process pedestrians at fixed rates, since their operating speeds are constant.

Within GCT, with one exception, no vertical circulation element on the dining concourse experiences significant congestion during the AM and PM peak periods, and conditions are characterized by LOS C/D or better throughout both periods. The sole point of some congestion (LOS D, but still "under capacity") is the new escalator that rises to face the NYCT Museum Store on the upper concourse. This element has two escalators, but because only one moves upward in the AM peak, there is limited capacity to process high passenger demands, particularly when trains arrive at nearby Tracks 111-116 that lie to the dining concourse's west side. For all other cases, passenger demands are lower than processing rates of the stairs and escalators being used. These acceptable conditions are helped in part by the introduction of new vertical circulation elements between the dining and upper concourses in GCT's revitalization efforts. Also, the

scattered train arrival and departure schedules on the lower level tend to disperse pedestrians to different exit points.

Table 9C-2 presents pedestrian flow conditions through selected circulation elements on the Main Concourse level for the peak 5- and 15-minute periods (see Figure 9C-3 for analysis locations). The Main Concourse operates acceptably with a few exceptions. The Met Life escalators operate at or over capacity but only in the 5-minute peak period upward in the AM; over the course of the more conventional 15-minute analysis period, capacity is not an issue. The stair/escalator bank leading to the west IRT 4/5/6 mezzanine operates at LOS E/F during each peak period, indicating overcrowding and queuing at its landing areas. All doorways leading to outside sidewalks operate at LOS C/D or better (see Table 9C-3).

LEXINGTON AVENUE SUBWAY CONDITIONS

The analysis of subway conditions focuses on access to the Lexington Avenue subway line—at its mezzanine level and stairwells from the mezzanine level down to the platform level, and its platforms—as well as on line-haul capacity on the Lexington Avenue line (i.e., the capacity of the overall subway line to transport riders along the corridor), since the Preferred Alternative is expected to increase transfers to that line. The project is similarly expected to reduce demands on the IRT Seventh Avenue lines and the 42nd Street shuttle, since a significant number of LIRR commuters presently using those lines after arriving in Penn Station would no longer use them, but would arrive at GCT instead; these reduced ridership demands, i.e., benefits, are also quantified in this section of the EIS.

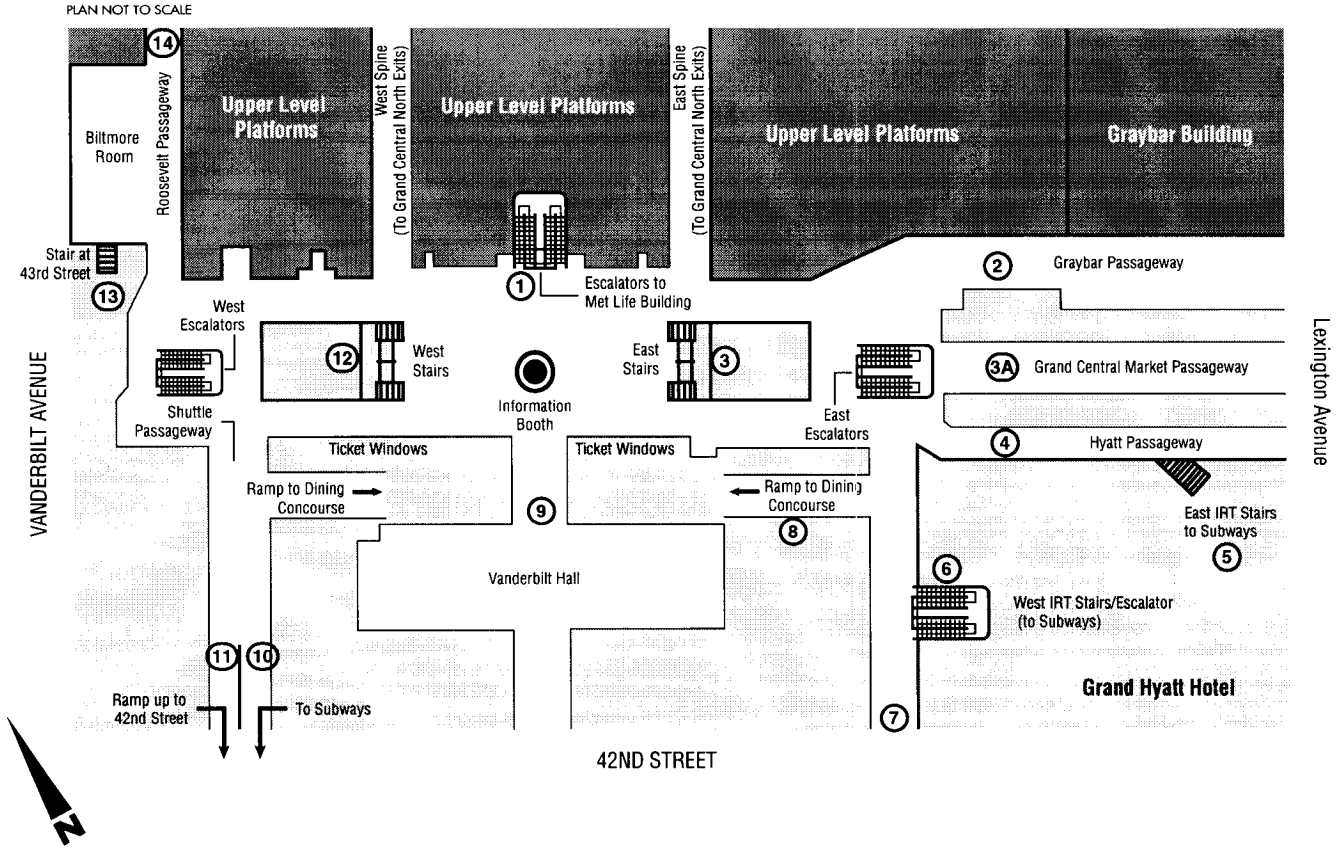
For the analysis of subway platforms, pedestrian LOS standards are applied to peak pedestrian volumes that use the space (the platform) over a given time period. To address how such areas function, the time-space methodology is the standard procedure used to assess platforms and other such waiting areas. The methodology recognizes that people are involved in walking and waiting activities in a given space for a given period of time. The technique models how platforms are used today or would be used in the future if additional platform elements, such as new or relocated stairwells, are introduced.

Initially, acceptable LOS C/D standards* (associated with a v/c ratio of 1.00) are used to calculate stair and passageway walk-space requirements in existing conditions, or walk space requirements when designing a new pedestrian space, such as a platform or waiting area. In cases where an existing pedestrian area is being analyzed and the calculated v/c ratios are less than 1.00, pedestrian operations are actually LOS C/D or better. In the event that the calculated LOSs exceed these standards and v/c ratios exceed 1.00, the actual pedestrian flow conditions are worse than LOS C/D. Then, lower LOS standards (i.e., LOS D or worse thresholds) are used to recompute pedestrian conditions. When computed v/c ratios drop below a capacity condition (v/c = 1.00), the actual LOS is identified.

* NYCT's most recent *Station Planning and Design Guidelines (1992)* provide LOS criteria for various station elements, and were used in these analyses.

Table 9C-2
EXISTING PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak 15 - Minute Period		Peak 15 - Minute Period	
Location	**Section**	**AM**	**PM**	**AM**	**PM**
1. Met Life Building Escalators	3 Up Escalators	over capacity	under capacity	under capacity	under capacity
	1 Down Escalator	under capacity	under capacity	under capacity	under capacity
2. Graybar Passageway	Corridor	B	B	B	B
3. East Stairs / Escalators	North Stairs from Lower Concourse	A	A	A	A
	South Stairs from Lower Concourse	A	A	A	A
	Up Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	North Corridor	A	A	A	A
	South Corridor	C	B	B	B
4. Hyatt Passageway	Corridor	B	B	B	B
5. Eastern IRT Subway Stairs	Stairs	C	C	C	C
6. Western IRT Subway Stairs / Escalators	Stairs	E	F	D	E
	Up Escalator	over capacity	under capacity	under capacity	under capacity
	Down Escalator	under capacity	under capacity	under capacity	under capacity
7. East Passageway to 42nd St. (Park-Lex)	Corridor	B	B	B	B
8. Dining Concourse East Ramp	Ramp	A	A	A	A
9. 42nd St. Main Entrance	Corridor	A	A	A	A
10. Shuttle Passageway	Corridor	B	A	A	A
11. Ramp to Vanderbilt Ave. / 42nd St. Corner	Ramp	B	B	A	B
12. West Stairs / Escalators	North Stairs from Dining Concourse	B	B	B	B
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	North Corridor	B	B	A	A
	South Corridor	B	A	A	A
13. 43rd St. Stairs in Biltmore Room	Stairs	C	B	B	B
14. Roosevelt Passageway	Corridor	C	C	C	C



LEGEND

- Track and Platform Areas
- Retail and Other Areas
- (8) Analysis Location

MTA / LIRR
East Side Access

Figure 9C-3

Pedestrian Circulation Analysis Locations: Grand Central Terminal Upper Concourse

Table 9C-3
Existing AM and PM Peak Period Level of Service of Key GCT Exit Elements

GCT-to-Street Elements	Analysis Period	Peak Period LOS	
		AM	PM
7 Doors to Vanderbilt Avenue Taxi Stand	15-minute	C/D or better	C/D or better
	5-minute		
11 Doors to Vanderbilt Ave./42nd St. Corner	15-minute	C/D or better	C/D or better
	5-minute		
7 Doors to Park Ave./42nd St.	15-minute	C/D or better	C/D or better
	5-minute		
6 Doors to 42nd St. near Hyatt Hotel	15-minute	C/D or better	C/D or better
	5-minute		
10 Doors to Lexington Ave. from Graybar Passageway	15-minute	C/D or better	C/D or better
	5-minute		
7 Doors to Lexington Ave. from Hyatt Passageway	15-minute	C/D or better	C/D or better
	5-minute		
Free Passageway to IRT 4, 5, 6 Fare Control Area #238	15-minute	C/D or better	C/D or better
	5-minute		

For the Lexington Avenue subway at 42nd Street, all platforms and stairs and conditions in the main fare control area leading down to the subway from GCT (FCA 238*) were analyzed (see Figure 9C-4). Generally, the turnstile bank leading to the southernmost subway platform areas is the most heavily used, since it is closest to the core of the terminal above. In the future with LIRR passengers using this station, a determination of their likely travel path into the station and down to the platform was done.

All platform zones except for one operate at LOS C/D conditions or better when examining a 5- or 15-minute peak period; the one exception is the centermost zone of the northbound platform (see Table 9C-4). The 5- and 15-minute analyses reflect average conditions for those periods. However, during these time periods, there are multiple train arrivals which relieve the platform loads and, consequently, the analyses tend to "flatten" out the shorter very congested periods when subway riders gather onto the platform just before a train arrives. It is during these short periods just before trains pull into the station that crowding is most intense.

For the station's platform stairwells, 3 of the existing 11 stairwells analyzed operate at LOS E or F during the 5-minute peak period, with 2 others in the LOS D range, including 4 stairwells (P12, 14, 18, 22) leading to the southbound platform and the northernmost stairwell (P23) to the northbound platform. During the 15-minute period, conditions remain congested or approach congestion with several stair elements (P12, 14, 22, 23) at or just below capacity LOS D and E conditions (see Table 9C-5 and Figure 9C-4 for stairwell analysis locations). These conditions do not meet the NYCT acceptable standard of LOS C/D, and indicate that two improvements are already needed. First, there is a need for additional stair elements and a more efficient, uncluttered mezzanine configuration to better load the platform's underutilized areas. Second, should mezzanine and stairwell improvements be made, the ability to process people out of the station

* Each Fare Control Area (FCA) and vertical circulation element in the NYCT subway system has an alphanumeric designation as indicated in this report.

Table 9C-4

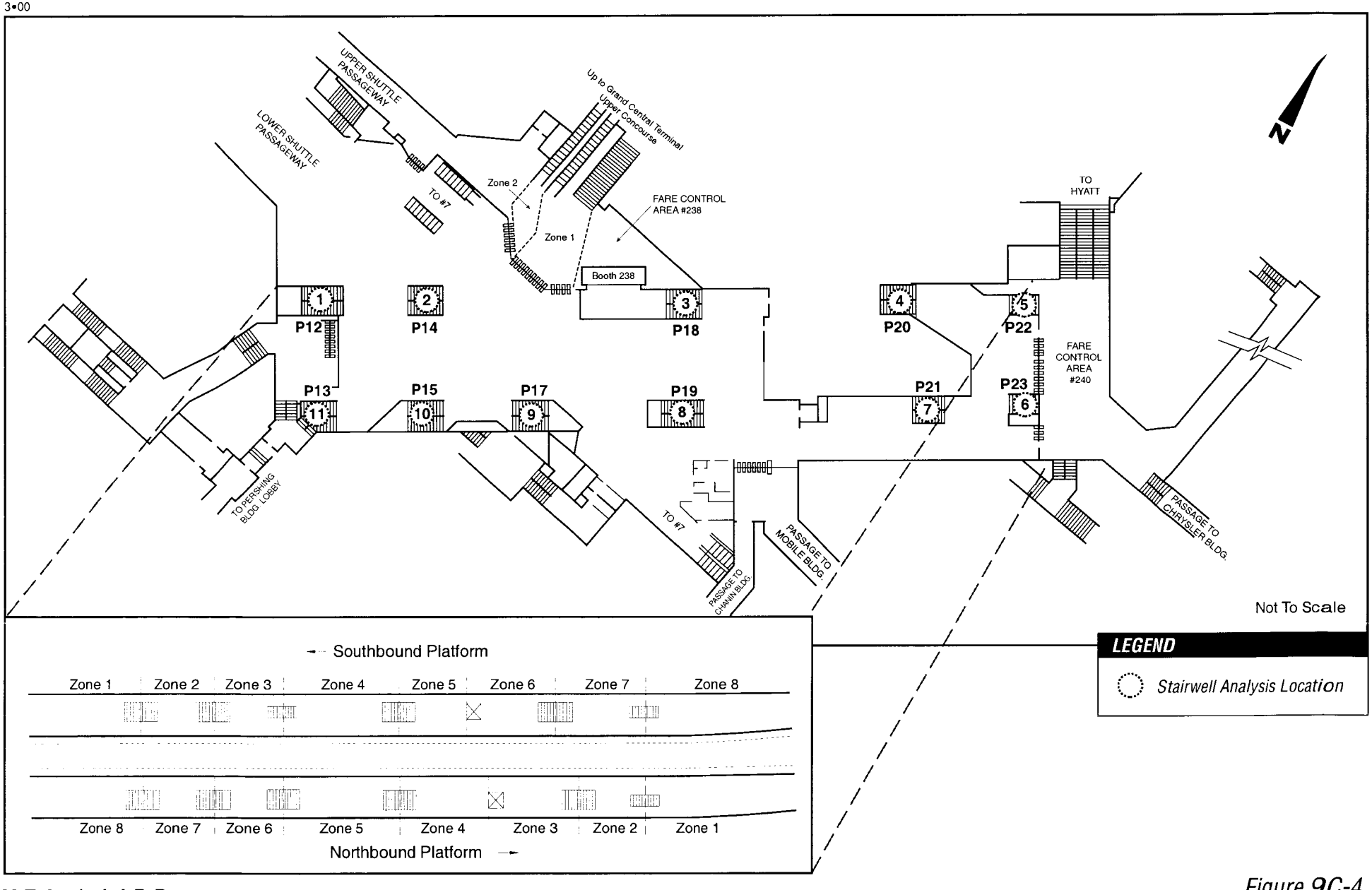
Existing Pedestrian Time-Space Analyses: Lexington Avenue Subway (IRT 4, 5, 6) Platforms at Grand Central Terminal

Time-Space Zone	AM LOS		PM LOS	
	Peak 5 Minutes	Peak 15 Minutes	Peak 5 Minutes	Peak 15 Minutes
Northbound IRT Platform				
1	C/D or better	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones
2	C/D or better			
3	C/D or better			
4	C/D or better			
5	C/D to Mid-D			
6	C/D or better			
7	C/D or better			
8	C/D or better			
Southbound IRT Platform				
1	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones
2				
3				
4				
5				
6				
7				
8				

Table 9C-5

Existing Subway Stair Analyses: Lexington Avenue Subway (IRT 4, 5, 6) Platforms at Grand Central Terminal

Stairwell Number	NYCT Pedestrian Element	AM LOS		PM LOS	
		Peak 5 Minutes	Peak 15 Minutes	Peak 5 Minutes	Peak 15 Minutes
1	P12	D	D	A	A
2	P14	E	D	C	C
3	P18	D	C	B	A
4	P20	C	C	B	B
5	P22	E	D	D	D
6	P23	F	E	F	D
7	P21	C	B	C	B
8	P19	C	B	B	B
9	P17	B	B	C	B
10	P15	A	A	B	B
11	P13	B	A	C	B



MTA / LIRR

East Side Access

Figure 9C-4

Stairwell and Platform Analysis Locations: Lexington Avenue Subway Mezzanine at Grand Central Terminal

with shorter train headways is required because platforms would be loaded quicker. NYCT is currently implementing a number of improvements to decrease dwell times and therefore increase line-haul capacity. This would work in conjunction with proposed platform and mezzanine improvements.

FCA 238 operates with two separate circulation areas: one large zone through which people enter and exit the station and purchase tokens, and a second smaller zone that forms between the exit-only turnstiles and the base of the escalator bank in which people queue to enter the up escalator (see Figure 9C-4). During the 5-minute AM peak period, the larger zone operates in the congested LOS D/E range, while the smaller zone operates at over capacity LOS E/F, with significant queuing through and beyond the turnstile line noted. During the 15-minute AM peak period, both zones operate at LOS D/E. The entire bank of 15 turnstiles operate acceptably, indicating that there is ample fare-entry capacity (see Table 9C-6).

Table 9C-6

Existing Pedestrian Time-Space Analyses:
IRT Fare Control Area 238 at 42nd Street Station

FCA Time-Space Zone	AM LOS		PM LOS	
	Peak 5 Minutes	Peak 15 Minutes	Peak 5 Minutes	Peak 15 Minutes
1	D/E	D/E	C/D	C/D
2	E/F	D/E	C/D	C/D

AM Turnstile v/c Ratio		PM Turnstile v/c Ratio	
Peak 5 Minutes	Peak 15 Minutes	Peak 5 Minutes	Peak 15 Minutes
0.51	0.40	0.42	0.37

LEXINGTON AVENUE SUBWAY LINE-HAUL CAPACITY

For line-haul capacity, the analysis determines whether there is sufficient capacity per car per train to handle existing and projected future transit loads. The analyses are based on per-car practical capacity standards (seated plus standing loads) used by MTA and NYCT. For the Lexington Avenue line, each subway car has a guideline capacity of 110 passengers and a maximum loading of 160 passengers (i.e., "crush capacity").

For this study, the critical peak direction was analyzed, namely, southbound on the IRT 4/5/6 lines at GCT in the AM peak period when ridership is highest throughout the day (this is consistent with NYCT's Manhattan East Side Transit Alternatives [MESA] MIS/DEIS). Peak period observations made between 1995 and 1997 for the MESA MIS/DEIS indicated that an average of about 1,120 passengers per 10-car express train and 615 passengers per 10-car local train existed. These average volumes were increased by 8.5 percent to achieve 1999 passenger volume data. Currently, express and local service at GCT each average 23 trains per hour. As a result, the IRT Nos. 4 and 5 express lines exceed their guideline capacity, with a utilization level of 110 percent, as shown in Table 9C-7. The local No. 6 line operates at about 61 percent utilization.

Table 9C-7

Existing Lexington Avenue Subway Line-Haul Conditions at 42nd Street/Grand Central Station Downtown (AM Peak)

Subway Lines	Trains/ Hour	Cars/ Hour	Total Guideline Capacity/Hour (passengers/hour)	Passengers/ Hour	Utilization Rate
Nos. 4 and 5 Express Trains	23	230	25,300	27,925	1.10
No. 6 Local Train	23	230	25,300	15,345	0.61

PEDESTRIAN CONDITIONS AT STREET LEVEL

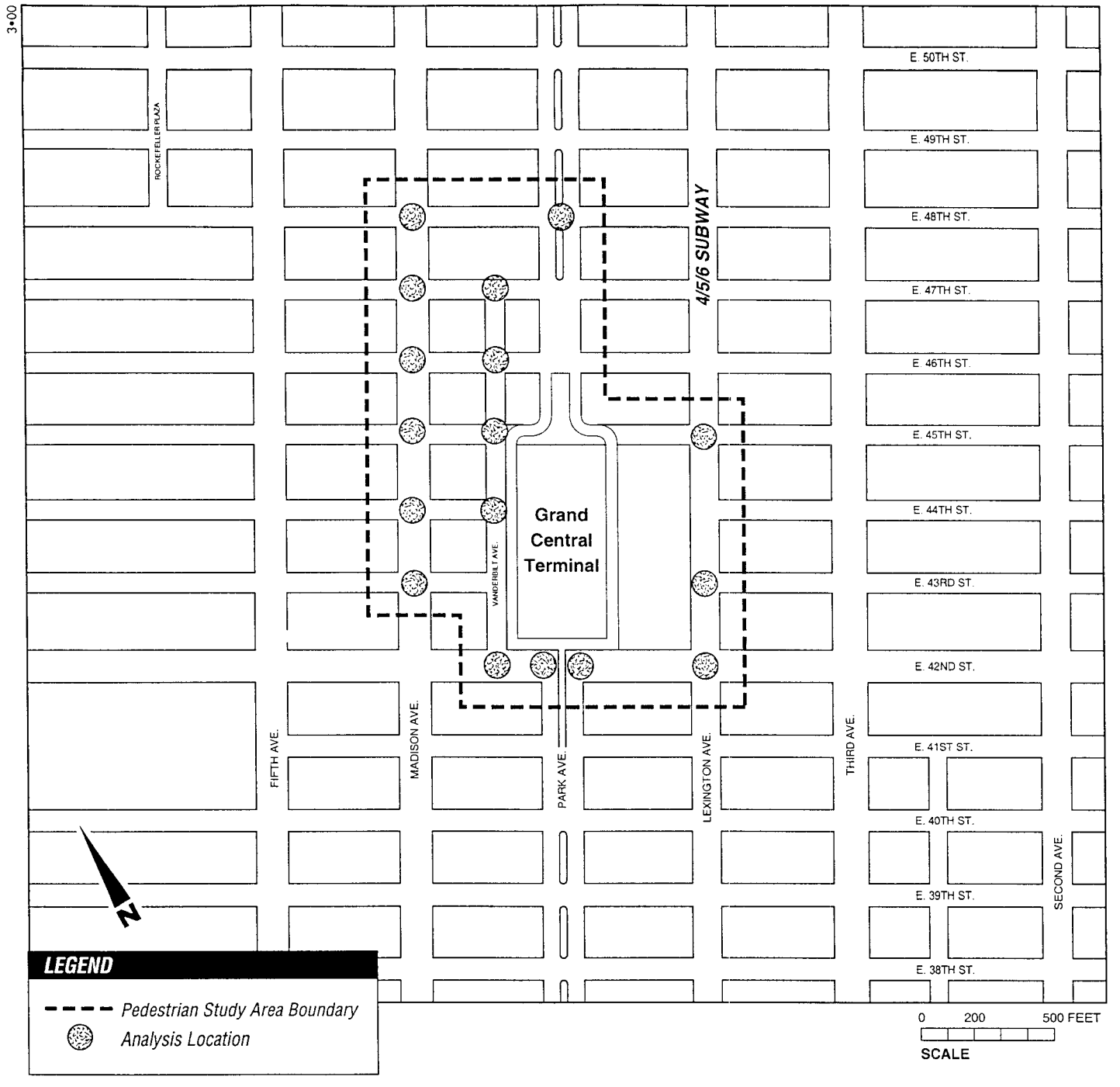
The analysis of crosswalks and corner reservoirs outside of GCT focused on the sides of the terminal where pedestrian activities are most pronounced (see Figure 9C-5). Selected midblock sidewalk locations on cross-streets just east of Madison Avenue were also examined as representative of other such midblock areas.

The analysis of sidewalks and crosswalks surrounding GCT was based on May 1999 field surveys conducted at each of the locations cited above, and other recent pedestrian data available from the Bear Stearns DEIS (July 1998). These surveys were conducted before new entrances were opened at GCT's north end, which was simulated in the No Action condition. The highest pedestrian volumes occurred across 45th Street between the Met Life building and the Helmsley Walks, with between 8,100 and 9,100 pedestrians in the AM and PM peak hours. Of the four corners of the GCT block, the southeast corner at 42nd Street and Lexington Avenue is the most intensely used. In each of the peak hours, 3,000-3,400 people travel across Lexington Avenue, while another 2,900 use the north-south 42nd Street crosswalk. The southwest corner at Vanderbilt Avenue is only slightly less used, with between 4,300 (AM) to 5,600 (PM) pedestrians crossing Vanderbilt and 1,450 (AM) to 1,250 (PM) traversing 42nd Street. At the 45th Street/ Lexington Avenue intersection, the heaviest crossing volumes (2,700) traverse 45th Street, while another 1,150 people cross Lexington Avenue.

Along the north-south crosswalks of Madison Avenue's east side, pedestrian volumes tend to peak between 43rd and 48th Streets which are closest to the terminal: between 1,300 (at 48th) and 2,250 (at 45th) in the AM; a similar pattern is exhibited in the PM. Between 850 (at 46th) and 1,950 (at 43rd) pedestrians crossed Madison Avenue in the AM, while between 900 (at 46th) and 2,250 (at 45th) pedestrians crossed in the PM.

On the east side of GCT along Lexington Avenue between 42nd and 45th Streets, there are a number of street corners, crosswalks, and sidewalks that currently operate at capacity LOS E (see Tables 9C-8, 9C-9, and 9C-10). At these locations, sidewalks are narrow and are narrowed even further by the presence of large planters. Such conditions are due, in part, to the lack of direct pedestrian connections to surrounding buildings. Crosswalks are often very congested with large groups of pedestrians, and many people choose to cross midblock in between standing vehicles.

Along Vanderbilt Avenue, pedestrian flows are less intense in their concentrations due, in large part, to a number of direct underground connections into surrounding buildings. This allows pedestrians to travel in a more even manner and results in more acceptable pedestrian conditions along GCT's west edge. Pedestrian conditions at corners and crosswalks are typically in the



MTA / LIRR
East Side Access

Figure 9C-5

Pedestrian Study Area in Manhattan

Table 9C-8

Existing Corner Reservoir Pedestrian Levels of Service: Grand Central Terminal Study Area

Location	Corner	AM	Midday	PM
Lexington Avenue at 42nd Street	Northwest	D	C	D
Lexington Avenue at 45th Street	Southwest	E	E	E
Madison Avenue at 43rd Street	Northeast	D	C	C
	Southeast	D	C	C
Madison Avenue at 44th Street	Northeast	B	C	C
	Southeast	C	D	C
Madison Avenue at 45th Street	Northeast	E	D	E
	Southeast	D	C	D
Madison Avenue at 46th Street	Northeast	B	B	C
	Southeast	D	C	C
Madison Avenue at 47th Street	Northeast	B	B	C
	Southeast	C	C	C
Madison Avenue at 48th Street	Northeast	B	B	C
	Southeast	B	B	B
Vanderbilt Avenue at 42nd Street	Northeast	C	B	C
Vanderbilt Avenue at 44th Street	Northwest	B	B	B
Vanderbilt Avenue at 45th Street	Northwest	C	D	C
	Southwest	B	C	C
	Southeast	B	C	C
Vanderbilt Avenue at 46th Street	Northeast	B	C	B
	Southeast	B	C	B
	Northwest	B	B	B
	Southwest	B	C	B
Vanderbilt Avenue at 47th Street	Southwest	C	B	B
Park Avenue at 48th Street	Northeast	B	B	B
	Southwest	B	B	B

LOS C to D range, although the 45th Street intersection does show some congestion (LOS E) during the midday and PM peaks.

Along Madison Avenue between 43rd and 48th Streets, where much of the pedestrian flows are highly directional (northward in the AM, southward in the PM), crosswalks operate with some noticeable congestion (LOS D to E). Similar to the Lexington Avenue side, many people cross Madison Avenue in large platoons in between intersections as signals allow, since corner reservoirs are often too small to accommodate them. Representative cross-street sidewalk LOSs are acceptable, since most of the flows are unidirectional and there are few of the crossing conflicts that occur at the intersection's corners. There are, however, two exceptions of note. The north sidewalk of 43rd Street and the south sidewalk of 45th Street both between Madison and Vanderbilt Avenues operate at LOS D to E in both peak hours. Most of these pedestrians are destined to or from existing GCT entries on 43rd and 45th Streets.

Pedestrian flows along the south side of GCT on 42nd Street have a number of exit points—three from GCT itself and others from the subway complex below. Given such a large number of access locations, pedestrian flows leaving the terminal are spread in several directions. Also, since some people cross midblock along 42nd Street, crowding in the corner reservoirs is minimized, as indicated by LOS D in the peak periods at the two corners. On the other hand, the east-west crosswalks at these corners are highly congested (LOS E), since a number of conflicting flows converge there.

Table 9C-9

Existing Crosswalk Pedestrian Levels of Service: GCT Study Area

Location	Crosswalk	AM	Midday	PM
Lexington Avenue at 42nd Street	North	E	D	E
	West	E	D	E
Lexington Avenue at 43rd Street	North	E	N/A	N/A
Lexington Avenue at 45th Street	South	C	D	C
	West	E	E	E
Madison Avenue at 43rd Street	North	D	B	D
	East	D	E	D
	South	D	C	C
Madison Avenue at 44th Street	North	C	B	C
	East	D	E	D
	South	C	C	C
Madison Avenue at 45th Street	North	D	C	D
	East	D	D	E
	South	C	C	D
Madison Avenue at 46th Street	North	B	B	B
	East	E	E	E
	South	D	C	C
Madison Avenue at 47th Street	North	B	B	B
	East	D	E	E
	South	C	C	C
Madison Avenue at 48th Street	North	B	B	B
	East	D	E	E
	South	B	B	B
Vanderbilt Avenue at 42nd Street	North	E	E	E
	East	C	B	C
Vanderbilt Avenue at 44th Street	North	D	C	C
	West	C	C	C
Vanderbilt Avenue at 45th Street	North	D	E	D
	East	D	C	C
	South	C	E	E
	West	C	C	C
Vanderbilt Avenue at 46th Street	North	B	C	B
	East	C	D	C
	South	B	D	B
	West	C	C	C
Vanderbilt Avenue at 47th Street	South	C	C	C
	West	C	C	C
Park Avenue at 48th Street	North	B	B	B
	East	E	D	E
	South	B	B	B
	West	C	C	C
Park Avenue at 42nd Street	East	D	C	C
	West	C	C	D

Table 9C-10
Existing Mid-Block Pedestrian Levels of Service: GCT Study Area

Location	Street Side	Platoon LOS		
		AM	Midday	PM
Lexington Avenue between 43rd and 44th Streets	West	E	D	E
Madison Avenue between 43rd and 44th Streets	East	C	C	C
Madison Avenue between 44th and 45th Streets	East	B	C	C
Madison Avenue between 45th and 46th Streets	East	D	C	D
Madison Avenue between 46th and 47th Streets	East	C	C	D
Madison Avenue between 47th and 48th Streets	East	C	C	C
Vanderbilt Avenue between 45th and 46th Streets	East	B	B	C
	West	B	B	B
Vanderbilt Avenue between 46th and 47th Streets	East	B	B	B
	West	B	B	B
43rd Street between Madison and Vanderbilt Avenues	North	E	C	D
	South	C	B	C
45th Street between Madison and Vanderbilt Avenues	North	C	C	C
	South	D	D	E
46th Street between Madison and Vanderbilt Avenues	North	B	B	B
	South	B	B	B
47th Street between Park and Lexington Avenues	South	B	B	B
47th Street between Vanderbilt and Park Avenues	North	B	B	B
	South	B	B	B
47th Street between Vanderbilt and Madison Avenues	North	B	B	B
	South	B	B	B
48th Street between Park and Lexington Avenues	North	B	B	B
48th Street between Madison and Park Avenues	South	B	B	B

For destinations directly north of GCT through the Met Life building, 45th Street is crossed to access the Helmsley Walks East and West. In general, pedestrian flows across 45th Street are intense but, because there is no defined crosswalk and the path is rather wide, not significantly congested.

BUSES

Grand Central Terminal is served by some of the most heavily traveled bus corridors in the metropolitan area. Its East Midtown location is well served by frequent and comprehensive bus service by the following bus routes which stop either right at GCT or within one or two blocks of GCT:

- M1, M2, M3: Local service along Fifth and Madison Avenues.
- M42: Crosstown service along 42nd Street.
- M104: Crosstown service along 42nd Street between First and Eighth Avenues, continuing north to the Upper West Side.
- M98: Weekday limited rush hour service along Lexington and Third Avenues.
- M101, M102, M103: Local service along Lexington and Third Avenues.

The frequency of service on these routes is generally excellent, with the headways on some routes, i.e., the time between bus arrivals, scheduled to be as low as 2 minutes (M42) during peak periods. The M101, M102, and M103 routes are scheduled to provide service with 3-minute headways. The longest headways are on the M3 route with 9 minutes scheduled between

buses, although the M1 and M2 also operate on Madison Avenue and, all together, provide excellent frequency of service (every 2-3 minutes on average overall). The frequent nature of bus service results in thousands of travelers arriving and departing the GCT area during the peak hours.

Two bus routes currently provide service between GCT and Penn Station. The M4 route operates primarily along Fifth and Madison Avenues with its southern terminus at Penn Station. This route transports LIRR riders from Penn Station (from 32nd Street just east of Seventh Avenue) to destinations on the East Side. In the AM peak period, extensive queues of bus riders can be seen waiting to board the M4 for their connections to the East Side. The Q32 route provides service from Penn Station to the East Side along the same route as the M4 (eastbound 32nd Street and northbound Madison Avenue away from the Penn Station area; southbound Fifth Avenue and westbound 34th Street to the Penn Station area). The M4 and Q32 share the same bus stops below 60th Street.

NYCT guidelines are designed to ensure that there are enough buses on a given route to accommodate riders during a particular time period. Guidelines have been developed for both "feeder" routes, i.e., routes on which most of the passengers have a common origin or destination, and "grid" routes, which are characterized by a series of significant on/off activities. Most of the routes in the study area are grid routes, and they are discussed below.

The grid route schedule guidelines indicate that buses are expected to accommodate up to a maximum of 60 people during the peak periods, which is approximately 1.5 times the seated capacity of a bus. A bus loaded with more than 60 people would not have the floor space to permit passengers to comfortably maneuver through it for seating or exiting. Consistent with these guidelines, three levels of loading standards have been developed for NYCT buses: seated (less than 40 passengers on a bus); standing (between 41 and 60 passengers per bus); and overcrowded (more than 60 passengers per bus).

Table 9C-11 summarizes bus passenger volumes at the peak load point for each route. As shown, all but one of the bus routes identified within the study area are currently operating within standing capacity, i.e., within a load level of 41 to 60 passengers per bus.

Table 9C-11

Existing Bus Ridership Levels: GCT Area

Route	AM Peak Hour			PM Peak Hour		
	No. of Buses	Total Riders	Riders/ Bus	No. of Buses	Total Riders	Riders/ Bus
M1	12	560	47	15	726	48
M2	9	492	55	10	562	56
M3	7	379	54	8	418	52
M42	36	2,300	64	15	831	55
M98	8	440	55	6	314	52
M101/102/103	24	1,328	55	23	1,214	53
M104	19	839	44	20	939	47
M4	16	838	52	14	734	52
Q32	8	369	46	8	420	53

Source: NYC Transit 1997 Bus Route Profiles.

FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

TRAFFIC

Future traffic growth in the GCT area was established for both vehicle traffic and transit/pedestrian analyses. Vehicular traffic volume growth to the 2010 analysis year was determined using a background growth rate of 0.5 percent per year to reflect journey-to-work traffic increases, which includes work trips expected to be made to the 383 Madison Avenue office tower currently under construction at Madison Avenue between 46th and 47th Streets. Also included within the background traffic growth was retail and entertainment generated traffic from the 42nd Street Redevelopment Plan. For traffic analyses for the year 2020, a lower background growth rate of 0.25 percent per year was used since it is unlikely that the peak AM and PM hours could sustain continued volume growth at current levels for 20 years in light of limited bridge and tunnel capacities.

For traffic impact analyses under projected future No Action and Preferred Alternative conditions, significant impact criteria for the Midtown Manhattan (and Sunnyside) area analyses were defined as follows based on the criteria used in the recently completed MESA MIS/DEIS and the Route 9A Reconstruction Project EIS: 1) No Action LOS A, B, C, or D deteriorating to LOS E or F under the Build condition providing that the average vehicle delay increase is 10 seconds or more; and 2) No Action LOS E deteriorating to LOS F for the Build condition providing that the average vehicle delay increases by 10 seconds or more. Deterioration from the No Action condition to the Build condition within either LOS E or F with 10 seconds or more of additional delay is defined as a significant worsening of a pre-existing problem.

COMMUTER RAIL—METRO-NORTH

Forecasts indicate that Metro-North's future ridership will grow approximately 17 percent from 1995 to 2010, and 24 percent to 2020 (see Table 9C-12). Current plans call for Metro-North to increase its level of peak hour and peak period service to accommodate future ridership levels. This would be accomplished by increasing the number of scheduled trains arriving at and departing from GCT during peak periods, and, where platform capacity exists, increasing the number of rail cars on peak period trains.

Table 9C-12
Metro-North Arrivals/Departures from GCT: 1995, 2010, 2020

Time Period	1995 Base	2010	2020
Peak AM Hour	37,117	43,594	45,919
Peak AM Period	74,233	87,188	91,837
Average Weekday	176,675	207,507	218,572

PEDESTRIAN CONDITIONS

For transit and pedestrian flow analyses, new access paths and circulation elements being implemented by MNR as part of its GCN plan were taken into account, along with general background pedestrian volume growth and pedestrian volumes generated by the building at 383 Madison Avenue.

Within GCT, analyses examined conditions in the year 2010, the first analysis year, and in the year 2020, to ensure that these designs can adequately process pedestrian demands after the project is completed. These pedestrian facilities include the new LIRR platforms and cross passageways, elements within GCT itself, and locations in the Lexington Avenue subway. Pedestrian elements outside of GCT, such as along sidewalks and crosswalks which would not be newly designed were examined primarily for the year 2010 with analysis of 2020 conditions for a set of representative locations.

Two steps were taken to project future pedestrian conditions. First, because both MNR trains and various subway lines enter GCT, different annual background growth rates were applied to the various pedestrian flows in the terminal (1.1 percent for MNR; 0.5 percent for NYCT). Second, previous studies at GCT indicate that as much as a third of all pedestrians do not use the rail services at all, but rather simply use the terminal to walk through (annual growth of 0.26 percent for these pedestrians). Weighted averages of these growth rates were used at many analysis locations, since some pedestrian flows within GCT are composed of riders from commuter trains, subways, and pass-through pedestrians.

Second, during the data collection period in early 1999, GCN was still under construction but was scheduled to be opened later in the same year. Since these new circulation elements would change the paths people use into and through the terminal, an estimate of these pedestrian changes was required. Within GCT, the new elements include three new stair/escalator elements between the dining and Main Concourses, a new passage to East 43rd Street from the Main Concourse, and a reopening of the IRT "free" shuttle corridor. Also, GCT's restoration effort closed the west corridor to the IRT shuttle and two stairwells in the Dining Concourse. Furthermore, the impact of the GCN elements themselves had been projected by a variety of studies to reduce the passenger volumes into the Main Concourse by as much as 60 percent, since many work destinations lie north of GCT's midpoint.

PROBABLE IMPACTS OF THE PROJECT ALTERNATIVES

NO ACTION ALTERNATIVE

Traffic

Under the No Action Alternative, traffic conditions are expected to deteriorate substantially as background traffic increases throughout the study area. As shown in Table 9C-13, overall, under future No Action conditions, 28 of the 54 intersections will operate at overall LOS A or B conditions in the AM peak hour, 7 will be at LOS C, 4 at LOS D, and 15 will be at overall LOS E or F in the year 2010. This represents a significant deterioration from existing conditions, characterized by 7 intersections at overall LOS D and just 1 at LOS E or F. The analysis also indicates that 22 of the 54 intersections will have at least one traffic movement at unacceptable LOS E or F, as opposed to 14 intersections having similar characteristics under existing conditions.

In the midday peak hour in the year 2010, 26 of the 54 intersections will operate at overall LOS A or B, 15 at LOS C, 3 at LOS D, and 10 at overall LOS E or F, as opposed to just 1 intersection currently operating at overall LOS D and 2 at LOS E or F. Under future No Action conditions, 23 of the 54 intersections will have at least one traffic movement at LOS E or F in the midday peak hour, as opposed to just 12 intersections currently.

Table 9C-13
Traffic Level of Service Summary Comparison: Existing vs. Future No Action Conditions (Year 2010)

	Existing			No Action		
	AM	Midday	PM	AM	Midday	PM
Intersections at Overall LOS A/B	34	31	37	28	26	34
Intersections at Overall LOS C	12	20	15	7	15	8
Intersections at Overall LOS D	7	1	2	4	3	2
Intersections at Overall LOS E/F	1	2	0	15	10	10
Intersections with Movements at LOS E or F	14	12	8	22	23	18

In the PM peak hour in the year 2010, 34 of the 54 intersections will operate at overall LOS A or B, 8 at LOS C, 2 at LOS D, and 10 at overall LOS E or F, as opposed to just 2 intersections currently operating at overall LOS D conditions and none at LOS E or F. Under future No Action conditions, 18 of the 54 intersections will have at least one traffic movement at LOS E or F in the midday peak hour, as opposed to just 8 intersections under existing conditions.

The detailed intersection-by-intersection LOS findings are presented in Table 9C-14. It is also apparent from the table that many of the intersections expected to be operating at unacceptable LOS E or F conditions, will be characterized by extreme delays as indicated by the LOS F* resulting from the detailed capacity analysis.

For the year 2020 No Action conditions, traffic analyses were conducted for 12 of the 54 intersections studied under existing and year 2010 conditions. These 12 intersections are located at key analysis locations along 42nd Street, Madison Avenue, and other potential impact locations. In the AM peak hour, 2 of the 12 intersections would operate at overall LOS A or B, 2 at LOS C, 1 at LOS D, and 7 at LOS E or F. Eight of the 12 intersections would have at least one traffic movement at LOS E or F in the AM peak hour. At midday, 4 of the 14 intersections would operate at overall LOS A or B, 2 at LOS C, 1 at LOS D, and 5 at LOS E or F. Six of the 12 intersections would have at least one traffic movement at LOS E or F in the midday peak hour. In the PM peak hour, 4 of the 12 intersections would operate at overall LOS A or B, 4 at LOS C, 2 at LOS D, and 2 at LOS E or F. Five of the 12 intersections would have at least 1 traffic movement at LOS E or F.

Parking

The revitalization of GCT, the construction of the Bear Stearns building at 383 Madison Avenue, and the overall business growth in the Grand Central district will further increase the demand for available curb parking space for loading and unloading vehicles in the No Action condition. Double parking activity, mostly delivery vehicles, widely prevails along numerous east-west streets and could increase as traffic and business demands increase. The City of New York has, at times, increased its enforcement of on-street parking regulations to maintain reasonably adequate traffic flow conditions. Such efforts will continue and could increase depending on future conditions and policy-level decisions.

Pedestrian Conditions in GCT

Some pedestrian conditions will be affected by the growth in commuters and pedestrians through GCT's corridors, stairwells, etc. For some elements not affected by GCN (e.g., IRT stairwells from the Main Concourse), conditions will deteriorate significantly, since subway

Table 9C-14

No Action (Year 2010) Traffic Level of Service Summaries: GCT Study Area

Intersection	AM Peak Hour		Midday Peak Hour		PM Peak Hour	
	Existing	No Action	Existing	No Action	Existing	No Action
Seventh Ave. and 42nd St.	D	F*	B	C	B	C
Broadway and 42nd St.	C	F*	C	F*	C	F*
Sixth Ave. and 42nd St.	D	F*	C	F*	C	F*
Fifth Ave. and 48th St.	B	B	B	B	B	B
Fifth Ave. and 47th St.	B	B	B	B	B	B
Fifth Ave. and 46th St.	B	B	B	B	B	B
Fifth Ave. and 45th St.	B	B	C	C	B	B
Fifth Ave. and 44th St.	B	B	B	B	B	B
Fifth Ave. and 43rd St.	B	B	C	F*	B	B
Fifth Ave. and 42nd St.	C	F*	C	D	C	F*
Fifth Ave. and 41st St.	B	B	B	B	B	B
Fifth Ave. and 40th St.	B	B	B	B	B	B
Madison Ave. and 40th St.	B	B	C	C	B	B
Madison Ave. and 41st St.	B	C	C	C	B	B
Madison Ave. and 42nd St.	D	F*	D	F*	C	D
Madison Ave. and 43rd St.	B	B	B	B	B	B
Madison Ave. and 44th St.	B	C	B	B	B	B
Madison Ave. and 45th St.	B	B	C	C	B	B
Madison Ave. and 46th St.	B	B	C	C	B	B
Madison Ave. and 47th St.	B	B	B	B	B	B
Madison Ave. and 48th St.	B	B	B	B	B	B
Vanderbilt Ave. and 47th St.	C	C	B	C	B	B
Vanderbilt Ave. and 46th St.	B	B	B	B	B	B
Vanderbilt Ave. and 45th St.	C	D	B	B	C	C
Vanderbilt Ave. and 44th St.**	A-B	A-B	A-B	A-B	A-B	A-B
Vanderbilt Ave. and 43rd St.**	A-B	A-B	A-B	A-B	A-B	A-B
Vanderbilt Ave. and 42nd St.	C	C	C	C	C	C
Park Ave. and 40th St.	B	C	B	B	C	F*
Park Ave. SB and 41st St.	B	B	B	B	C	C
Park Ave. NB and 41st St.	B	B	B	B	B	B
Park Ave. and 42nd St.	D	F*	C	F*	C	F*
Park Ave. and 46th St.	C	F*	C	F*	C	F*
Park Ave. and 47th St.	B	C	B	B	B	B
Park Ave. and 48th St.	C	F*	B	C	B	C
Lexington Ave. and 48th St.	B	B	B	C	B	B
Lexington Ave. and 47th St.	C	D	C	D	B	B
Lexington Ave. and 46th St.	B	B	C	C	B	B
Lexington Ave. and 45th St.	D	F*	E	F*	C	C
Lexington Ave. and 44th St.	C	C	E	F*	D	E
Lexington Ave. and 43rd St.	C	D	B	B	C	C
Lexington Ave. and 42nd St.	E	F*	C	D	C	D
Lexington Ave. and 41st St.	C	D	B	B	B	B
Lexington Ave. and 40th St.	B	B	B	B	B	B
Third Ave. and 40th St.	B	B	B	B	B	B
Third Ave. and 41st St.	B	B	B	B	B	B
Third Ave. and 42nd St.	D	F*	C	F*	C	F*
Third Ave. and 43rd St.	B	F*	B	B	B	B
Third Ave. and 44th St.	B	B	B	B	B	B
Third Ave. and 45th St.	B	B	B	B	B	B
Third Ave. and 46th St.	B	B	B	C	B	B
Third Ave. and 47th St.	B	B	C	F*	B	F*
Third Ave. and 48th St.	B	F*	C	C	B	B
Second Ave. and 42nd St.	C	F*	C	C	C	C
First Ave. and 42nd St.	D	F*	C	C	D	F*

Notes:

* *Indicates that delay and LOS are not meaningful because v/c is greater than 1.2. It is beyond the scope of HCM to assess delay for an approach operating in oversaturated conditions.*

** Indicates unsignalized intersection. LOS shown in for critical movement.

ridership will increase with no redistribution of pedestrians using subway facilities. At other locations where new GCN pedestrian redistributions will occur, only slight deterioration in LOSs will be expected, since new GCN elements will offset increases in MNR ridership.

For the three GCT passageways leading to Lexington Avenue, acceptable LOS A/B conditions or better will continue during the AM and PM peak periods in 2010 and 2020. All stair/escalator elements leading up from the Dining Concourse will operate acceptably. The eastern stair bank to the IRT subway from the Main Concourse will operate at LOS D, some significant congestion will occur in both AM and PM peak periods in 2010 and 2020. The western IRT stair and escalator elements closer to the center of the terminal's Main Concourse will deteriorate further into congested LOS F conditions, beginning in 2010 and worsening in 2020 in the peak 5-minute period.

Elsewhere in GCT, the Met Life building escalators will experience a significant improvement in the AM and PM peak periods in 2010 and 2020, with volumes well under their capacity, due to the diversion of commuters to other GCN circulation elements. The Roosevelt passageway will also improve to acceptable LOSs during both AM and PM peak periods. The 43rd Street stairs leading out from the Biltmore Room will continue to function acceptably during both daily peak periods in both analysis years. All doorways to exterior sidewalks will continue to function at acceptable LOS C/D or better (see Tables 9C-15 and 9C-16).

Pedestrian conditions when MNR train delays (i.e., no departures) occur were examined in the 47th Street cross passage using the time-space procedures as described earlier. In the first 15 minutes after a delay, some slight congestion would occur, building to and deteriorating into near-capacity conditions should a delay extend to a full 30 minutes. For the sole use of the cross passage by MNR riders in the future No Action condition, the threshold of capacity would be crossed 40 minutes after the first train delays would occur.

Lexington Avenue Subway Conditions

During the 5- and 15-minute periods, conditions will remain congested with several stairways in LOS F and others at or just below capacity LOS D and E conditions. Similar congestion will prevail during the PM peak period, although slightly less than that of the morning hours. Also, the congestion will tend to increase, but not be as intense as in the AM, on the northbound stairwells as the northbound flows peak out of the 4/5/6 subway lines. The prevailing LOSs will be C or better in both 2010 and 2020 for the 5- and 15-minute peak periods for four of the six stairwells leading up from the northbound platform, although one other stairwell (the northernmost, P23) will operate in LOS F (see Table 9C-17). The platforms will continue to remain crowded in the areas close to the heaviest stair movements, although over a 5- to 15-minute period when trains constantly move people out of the station, all zones will operate at LOS C/D or better. Congestion will be more pronounced on the platform during the short-term peaks just before trains pull into the station, and on some stairwells.

Congestion will become intense on the stairwells leading up from the northbound subway platform in the PM periods as northbound subways carry heavier volumes into GCT. Four zones, spaced throughout the platform, will operate at LOS mid-D to E, with the centermost zone experiencing the heaviest congestion. The northbound platform's main source of congestion will continue to occur in the centermost zone (LOS D/E) for the peak 15-minute AM periods. All other zones on the northbound platform will operate within acceptable levels (see Table 9C-18. Pedestrian conditions within FCA 238 will continue to operate with significant congestion (see Table 9C-19).

Table 9C-15
2010 NO ACTION PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak 15 - Minute Period		Peak AM 15 - Minute Period	
Location	**Section**	**AM**	**PM**	**AM**	**PM**
1. Met Life Building Escalators	3 Up Escalators	under capacity	under capacity	under capacity	under capacity
	1 Down Escalator	under capacity	under capacity	under capacity	under capacity
2. Graybar Passageway	Corridor	A	A	A	A
3. East Stairs / Escalators	North Stairs from Dining Concourse	A	A	A	A
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	North Corridor	A	A	A	A
	South Corridor	C	C	B	B
3A. 43rd Street Passageway	Corridor	A	A	A	A
4. Hyatt Passageway	Corridor	B	A	A	A
5. Eastern IRT Subway Stairs	Stairs	D	C	C	C
6. Western IRT Subway Stairs / Escalators	Stairs	F	F	E	E
	Up Escalator	over capacity	under capacity	under capacity	under capacity
	Down Escalator	under capacity	under capacity	under capacity	under capacity
7. East Passageway to 42nd St. (Park-Lex)	Corridor	B	B	B	B
8. Lower Concourse East Ramp	Ramp	A	A	A	A
9. 42nd St. Main Entrance	Corridor	A	A	A	A
10. Shuttle Passageway	Corridor	B	B	B	B
11. Ramp to Vanderbilt Ave. / 42nd St. Corner	Ramp	B	B	A	B
12. West Stairs / Escalators	North Stairs from Dining Concourse	B	B	B	B
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	North Corridor	A	A	A	A
	South Corridor	B	A	A	A
13. 43rd St. Stairs in Biltmore Room	Stairs	B	B	B	A
14. Roosevelt Passageway	Corridor	A	A	A	A

Table 9C-16
2020 NO ACTION PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak 15 - Minute Period		Peak AM 15 - Minute Period	
Location	**Section**	**AM**	**PM**	**AM**	**PM**
1. Met Life Building Escalators	3 Up Escalators	under capacity	under capacity	under capacity	under capacity
	1 Down Escalator	under capacity	under capacity	under capacity	under capacity
2. Graybar Passageway	Corridor	A	A	A	A
3. East Stairs / Escalators	North Stairs from Dining Concourse	B	A	A	A
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	North Corridor	B	A	A	A
	South Corridor	C	C	C	C
3A. 43rd Street Passageway	Corridor	A	A	A	A
4. Hyatt Passageway	Corridor	A	A	A	A
5. Eastern IRT Subway Stairs	Stairs	D	D	C	C
6. Western IRT Subway Stairs / Escalators	Stairs	F	F	E	E
	Up Escalator	over capacity	under capacity	under capacity	under capacity
	Down Escalator	under capacity	under capacity	under capacity	under capacity
7. East Passageway to 42nd St. (Park-Lex)	Corridor	B	B	B	B
8. Lower Concourse East Ramp	Ramp	A	A	A	A
9. 42nd St. Main Entrance	Corridor	A	A	A	A
10. Shuttle Passageway	Corridor	B	B	B	B
11. Ramp to Vanderbilt Ave. / 42nd St. Corner	Ramp	B	B	B	B
12. West Stairs / Escalators	North Stairs from Dining Concourse	C	C	B	B
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing NYC Transit Museum Store	under capacity	under capacity	under capacity	under capacity
	North Corridor	A	A	A	A
	South Corridor	B	B	A	A
13. 43rd St. Stairs in Biltmore Room	Stairs	B	B	B	A
14. Roosevelt Passageway	Corridor	A	A	A	A

Table 9C-17

No Action Subway Stair Analyses: Lexington Avenue Subway (IRT 4, 5, 6) Platforms at Grand Central Terminal

Stairwell Number	Pedestrian Element	AM LOS				PM LOS			
		Peak 5 Minutes		Peak 15 Minutes		Peak 5 Minutes		Peak 15 Minutes	
		2010	2020	2010	2020	2010	2020	2010	2020
1	P12	D	E	D	D	A	B	A	A
2	P14	F	F	E	E	C	D	C	C
3	P18	E	E	D	D	B	B	B	B
4	P20	D	D	D	D	B	B	B	B
5	P22	E	F	D	E	E	E	D	D
6	P23	F	F	E	F	F	F	D	E
7	P21	C	C	B	C	C	C	C	C
8	P19	C	C	B	C	B	B	B	B
9	P17	B	B	B	B	C	C	C	C
10	P15	A	A	A	A	C	C	B	B
11	P13	B	B	B	B	C	C	B	C

Table 9C-18

No Action Pedestrian Time-Space Analyses: Lexington Avenue Subway (IRT 4, 5, 6) Platforms at Grand Central Terminal

Time-Space Zone	AM LOS				PM LOS			
	Peak 5 Minutes		Peak 15 Minutes		Peak 5 Minutes		Peak 15 Minutes	
	2010	2020	2010	2020	2010	2020	2010	2020
Northbound IRT Platform								
1	C/D or better	C/D or better	C/D or better	C/D or better	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones
2	C/D or better	C/D or better	C/D or better	C/D or better				
3	C/D or better	C/D or better	C/D or better	C/D or better				
4	C/D or better	C/D or better	C/D or better	C/D or better				
5	C/D - Mid-D	Mid-D	C/D - Mid-D	C/D - Mid-D				
6	C/D or better	C/D or better	C/D or better	C/D or better				
7	C/D or better	C/D or better	C/D or better	C/D or better				
8	C/D or better	C/D or better	C/D or better	C/D or better				
Southbound IRT Platform								
1	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones	C/D or better for all zones
2								
3								
4								
5								
6								
7								
8								

Table 9C-19

No Action Pedestrian Time-Space Level-of-Service Analyses: IRT Fare Control Area 238 at 42nd Street Station

FCA Time-Space Zone	AM LOS				PM LOS			
	2010 Peak 5 Minutes	2020 Peak 5 Minutes	2010 Peak 15 Minutes	2020 Peak 15 Minutes	2010 Peak 5 Minutes	2020 Peak 5 Minutes	2010 Peak 15 Minutes	2020 Peak 15 Minutes
1	D/E	D/E	D/E	D/E	C/D	C/D	C/D	C/D
2	E/F	E/F	D/E	D/E	C/D	D/E	C/D	C/D

	AM Turnstile v/c Ratio		PM Turnstile v/c Ratio	
	Peak 5 Minutes	Peak 15 Minutes	Peak 5 Minutes	Peak 15 Minutes
2010	0.54	0.44	0.45	0.40
2020	0.57	0.47	0.48	0.42

Lexington Avenue Subway Line-Haul Capacity

Under the No Action Alternative, subway service provided by NYCT is expected to increase during peak periods due to signalization improvements on the Lexington Avenue line and the application of platform management techniques at Grand Central station. NYCT will pursue at least the following programs in order to increase line-haul capacity: the "step aside and speed the ride" campaign, which includes etched tiles incorporated into the floor design telling passengers to "step aside" and let on-train passengers out, automated "dwell control announcements," quick response programs for customers who require medical attention while on the subway, platform assistants to expedite loading/unloading, and wider-door cars, and changes in the design of new subway cars (now on order) to ease movement into and out of the cars. Assuming an annual subway ridership growth of 0.5 percent to the year 2010, the express lines will continue to exceed their guideline capacity with a utilization level of 112 percent, while the local line will remain at 61 percent utilization (see Table 9C-20).

Table 9C-20

Lexington Avenue Subway Line-Haul Conditions at 42nd Street/Grand Central Station (No Action Alternative Year 2010) Downtown (AM Peak)

Subway Lines	Trains/ Hour	Cars/ Hour	Total Guideline Capacity/ Hour (passengers/ hour)	Passengers/ Hour	Utilization Rate
Nos. 4 and 5 Express Trains	24	240	26,400	29,488	1.12
No. 6 Local Train	24	240	26,400	16,207	0.61

Pedestrian Conditions at Street Level

On the east side of GCT along Lexington Avenue between 42nd and 45th Streets, a number of crosswalks and sidewalks that currently operate at- or over-capacity LOS E and F will improve to LOS D or better, since there will be some diversion of MNR commuters to its new GCN facilities. Some specific examples include the south and west crosswalks of the 45th Street/ Lexington Avenue intersection, which will improve to LOS B to D during each of the AM, midday, and PM peak hours. The pedestrian elements closer to 42nd Street, however, will continue

to operate poorly, since there will be no GCN diversion experienced at points south of the terminal.

Of the Madison Avenue crosswalks examined between 42nd and 48th Streets, operations at the 43rd Street intersection will show some deterioration during the AM peak period (LOS D to E) on the east and south crosswalks where no north end diversion will occur. North of 47th Street, where one new GCN element is to be placed, pedestrian conditions will deteriorate, since there will be a new concentration of exiting pedestrians that will have not yet dispersed up to points west.

Of the midblock locations examined, many will experience slight improvement with the shift of people to GCN elements. One location of note, the midblock point on Lexington Avenue between 43rd and 44th Streets, will show an improvement from LOS E to D in the AM peak period when some of the highest pedestrian volumes were recorded (see Tables 9C-21, 9C-22, and 9C-23).

Table 9C-21

2010 No Action Corner Reservoir Pedestrian Levels of Service: Grand Central Terminal Study Area

Location	Corner	AM	Midday	PM
Lexington Avenue at 42nd Street	Northwest	D	C	D
Lexington Avenue at 45th Street	Southwest	D	E	D
Madison Avenue at 43rd Street	Northeast	C	C	C
	Southeast	D	C	C
Madison Avenue at 44th Street	Northeast	B	C	C
	Southeast	C	D	C
Madison Avenue at 45th Street	Northeast	D	C	D
	Southeast	B	C	C
Madison Avenue at 46th Street	Northeast	B	B	C
	Southeast	C	C	C
Madison Avenue at 47th Street	Northeast	B	B	C
	Southeast	B	C	C
Madison Avenue at 48th Street	Northeast	C	C	C
	Southeast	B	B	B
Vanderbilt Avenue at 42nd Street	Northeast	C	B	C
Vanderbilt Avenue at 44th Street	Northwest	B	B	B
Vanderbilt Avenue at 45th Street	Northwest	C	D	D
	Southwest	B	C	C
	Southeast	B	C	C
Vanderbilt Avenue at 46th Street	Northeast	B	C	B
	Southeast	B	C	B
	Northwest	B	B	B
	Southwest	B	C	B
Vanderbilt Avenue at 47th Street	Southwest	B	B	B
Park Avenue at 48th Street	Northeast	B	B	B
	Southwest	B	B	B

Table 9C-22

2010 No Action Crosswalk Pedestrian Levels of Service: GCT Study Area

Location	Crosswalk	AM	Midday	PM
Lexington Avenue at 42nd Street	North	E	D	E
	West	E	D	E
Lexington Avenue at 43rd Street	North	E	N/A	N/A
Lexington Avenue at 45th Street	South	C	D	C
	West	C	D	D
Madison Avenue at 43rd Street	North	D	B	C
	East	E	E	D
	South	D	C	C
Madison Avenue at 44th Street	North	C	B	C
	East	C	E	D
	South	C	C	C
Madison Avenue at 45th Street	North	D	C	D
	East	C	D	D
	South	B	C	D
Madison Avenue at 46th Street	North	B	B	B
	East	C	E	E
	South	D	C	B
Madison Avenue at 47th Street	North	D	B	D
	East	C	E	E
	South	C	C	C
Madison Avenue at 48th Street	North	C	C	B
	East	E	E	E
	South	B	B	B
Vanderbilt Avenue at 42nd Street	North	E	E	E
	East	C	B	C
Vanderbilt Avenue at 44th Street	North	D	C	C
	West	C	C	C
Vanderbilt Avenue at 45th Street	North	D	E	D
	East	D	D	C
	South	C	E	E
	West	C	C	C
Vanderbilt Avenue at 46th Street	North	B	C	B
	East	C	D	C
	South	B	D	B
	West	C	C	C
Vanderbilt Avenue at 47th Street	South	C	C	C
	West	C	C	C
Park Avenue at 48th Street	North	B	B	B
	East	D	C	C
	South	B	B	B
	West	C	C	C
Park Avenue at 42nd Street	East	D	C	C
	West	C	C	D

Table 9C-23

2010 No Action Mid-Block Pedestrian Levels of Service: GCT Study Area

Location	Street Side	Platoon LOS		
		AM	Midday	PM
Lexington Avenue between 43rd and 44th Streets	West	E	D	E
Madison Avenue between 43rd and 44th Streets	East	B	C	C
Madison Avenue between 44th and 45th Streets	East	B	C	C
Madison Avenue between 45th and 46th Streets	East	C	C	C
Madison Avenue between 46th and 47th Streets	East	C	C	C
Madison Avenue between 47th and 48th Streets	East	C	C	D
Vanderbilt Avenue between 45th and 46th Streets	East	B	B	C
	West	B	B	B
Vanderbilt Avenue between 46th and 47th Streets	East	B	B	B
	West	B	B	B
43rd Street between Madison and Vanderbilt Avenues	North	D	C	D
	South	C	C	C
45th Street between Madison and Vanderbilt Avenues	North	C	C	C
	South	C	C	D
46th Street between Madison and Vanderbilt Avenues	North	B	B	B
	South	B	B	B
47th Street between Park and Lexington Avenues	South	B	B	B
47th Street between Vanderbilt and Park Avenues	North	B	B	B
	South	B	B	B
47th Street between Vanderbilt and Madison Avenues	North	B	B	B
	South	B	B	B
48th Street between Park and Lexington Avenues	North	B	B	B
48th Street between Madison and Park Avenues	South	B	B	B

For the year 2020 No Action condition, pedestrian analyses were conducted at eight representative locations in the study area, including seven intersections surrounding GCT and the north and south sidewalks of 45th Street between Madison and Vanderbilt Avenues. The sidewalks on 45th Street would not experience a change in level of service between No Action conditions in 2010 and 2020. Two crosswalks are projected to deteriorate slightly—the east crosswalk at Vanderbilt Avenue and 42nd Street in the midday peak hour (from LOS B to C), and the south crosswalk at Vanderbilt Avenue and 45th Street in the AM peak hour (from LOS C to D). Three corner reservoir areas are projected to deteriorate between 2010 and 2020—Lexington Avenue at 42nd Street in the AM peak hour (from LOS D to E), and Madison Avenue at 45th Street in the AM peak hour (from LOS D to E) and in the midday peak hour (from LOS C to D).

Two other analysis areas were considered. The first examined the critical door elements leading directly to the outside of GCT, since slow or very congested passage through them could create significant queuing backwards in the terminal or on the surrounding sidewalks. In both 2010 and 2020, all main doorways leading to Lexington Avenue from all three east-west passageways and the three north-south passageways leading out to 42nd Street will function acceptably within LOS C/D conditions. The second set of analyses involved the new GCN vertical circulation elements situated along 47th Street. In this case, these elements were analyzed to include a proposed element into the Bear Stearns (formerly, American Brands) building between Park and Lexington Avenues. All elements will function acceptably within LOS C/D conditions during both 2010 and 2020.

Buses

Bus ridership was assumed to grow annually by 0.75 percent, resulting in bus usage to be about 8.5 percent higher in the 2010 No Action Alternative than for existing conditions. Assuming that existing bus frequencies remain the same in the No Action condition, most bus lines will be operating at or near overcrowded levels (more than 60 passengers per bus), which exceeds NYCT acceptable guidelines during the AM and PM peak hours (see Table 9C-24). With one exception, these bus lines will need an additional bus during the AM and PM peak hours to accommodate the additional peak hour riders. The M42 bus line, which is operating at overcrowded conditions in the existing AM peak hour, will need six additional buses during the AM peak hour to reduce the number of riders per bus from 69 to just under 60 (guideline capacity).

Table 9C-24

2010 No Action Alternative Bus Ridership Levels: GCT Area

Route	AM Peak Hour			PM Peak Hour		
	No. of Buses	Total Riders	Riders/ Bus	No. of Buses	Total Riders	Riders/ Bus
M1	12	610	51	15	790	53
M2	9	535	59	10	610	61
M3	7	410	59	8	455	57
M42	36	2,495	69	15	900	60
M98	8	475	59	6	340	57
M101/102/103	24	1,440	60	23	1,320	57
M104	19	910	48	20	1,020	51
M4	16	910	57	14	795	57
Q32	8	400	50	8	455	57

Source: NYC Transit 1997 Bus Route Profiles.

TSM ALTERNATIVE

Under the TSM Alternative, there would be no LIRR service at GCT and no additional service at Penn Station. There would be some additional ridership on LIRR trains arriving at the LIRR's terminal stations at Hunters Point Avenue, Long Island City, and Flatbush Avenue.

It is projected that close to 550 to 650 additional LIRR commuters would arrive at the Hunters Point Avenue terminal station in the AM peak hour, the vast majority of whom would then transfer to westbound IRT No. 7 Flushing line trains to Manhattan's East Side at the No. 7 line's Hunters Point Avenue station. These No. 7 trains are already subjected to serious crowding conditions, so the addition of new riders would exacerbate those conditions. About 40 to 50 new LIRR riders are projected to use the very infrequent LIRR service to its Long Island City station; many of these riders would also transfer to the No. 7 line at its Vernon-Jackson station.

It is also projected that during the AM peak hour, about 350 LIRR riders would travel to the Flatbush Avenue terminal in downtown Brooklyn and transfer to the northbound Nos. 2, 3, 4, and 5 lines. Those lines are also subjected to serious crowding levels, and the addition of new LIRR commuters there would exacerbate those conditions.

There would likely be no significant change in traffic or pedestrian conditions at Penn Station, nor would there be any significant impact at GCT. Conditions at both locations would be essentially the same as in the No Action Alternative.

PREFERRED ALTERNATIVE (OPTION 1)

The Preferred Alternative includes two options at GCT—Option 1, with tracks and platforms on the existing lower level of GCT, and Option 2, with tracks and platforms on a new, deeper level below the lower level. The analysis below focuses first on Option 1 and then on Option 2. As is described below, in most respects, the effects of the two options on transportation conditions would be essentially the same. The ridership modeling methodology appendix details the methodology used to determine what mode (i.e., walk, taxi, bus, subway) the new LIRR commuters would use to depart from GCT. *As noted in Chapter 2 ("Project Alternatives"), Option 2 has been selected as the Preferred engineering option for the East Side Access project.*

Traffic

The Preferred Alternative would have a series of effects on Midtown traffic. First, it would decrease the general volume of background traffic in the Midtown area. This would be due to the LIRR commuters who presently drive to work at East Side destinations who would now take LIRR trains to GCT. Secondly, on the other hand, there would be some increase in taxi activity in the GCT area, since some of these new LIRR commuters to GCT would take taxis for the subsequent leg of their work trip. At the same time, however, taxi trips near Penn Station would decrease because of current LIRR commuters to Penn Station who currently take taxis to their East Side work destinations, but who would in the future be able to take LIRR trains directly to GCT and then walk to their destinations. This analysis process is explained in more detail below and formed the basis of the LOS analyses of the Preferred Alternative.

The ridership projections developed for the Preferred Alternative were used as the basis for determining the level of trip reduction in the traffic study area around GCT, and it was estimated that the background trip reduction in the GCT area would be 2 percent in the AM and PM peak hours and 0.5 percent in the midday peak hour.

In terms of new vehicle traffic attracted to the GCT area with the Preferred Alternative, the ridership projections indicated that there would be about 330 new vehicle trips in the AM peak hour, 140 vehicle trips in the midday peak hour, and 280 vehicle trips in the PM peak hour. These new trips were assigned to the street network based on their final destination, the locations at which taxis are expected to pick up LIRR commuters, and the most logical route between the two.

The traffic analyses also accounted for taxi trips that are currently made by LIRR commuters once they arrive at Penn Station (or, conversely, traveling to Penn Station) by taxi to their East Side destinations. This was done by simulating the routes that taxis currently take from Penn Station to East Side destinations and back to Penn Station either with passengers or deadheading to pick up a fare from Penn Station.

Coupled with the traffic assignments were the increased volume of pedestrian traffic on the street resulting from the influx of LIRR commuters into the GCT area. This is an important consideration, since in some cases the addition of increased pedestrian volumes by itself could be sufficient to significantly affect vehicle traffic LOSs by producing increased conflicts and, thus, reducing capacity.

Overall, the Preferred Alternative's traffic analysis resulted in the following broad conclusions:

- The Preferred Alternative would create significant traffic impacts at some locations where new taxi trips are expected, where substantial volumes of new pedestrian traffic would affect background traffic congestion, or where the combinations of new taxis and new pedestrians would significantly affect LOSs.
- This alternative would reduce crosstown taxi volumes and thus reduce traffic congestion at some locations where taxi concentrations en route to or from Penn Station are pronounced, as well as in front and alongside of Penn Station. This is because with the Preferred Alternative in place, taxi trips once taken by LIRR commuters at Penn Station but now switching to GCT will be eliminated.
- This alternative would also produce an overall modest—2 percent—reduction in Midtown traffic even beyond the immediate GCT and Penn Station areas, which is an important benefit of the project.
- Significant traffic impacts generated by the Preferred Alternative would be mitigatable via standard traffic engineering measures.

Table 9C-25 presents an overall comparison of traffic conditions under the Preferred Alternative as compared with the No Action Alternative for the year 2010; details of the analyses are presented in Table 9C-26 (detailed comparisons of the No Action and Preferred Alternatives are included in the Technical Appendix). Figure 9C-6 depicts all analysis locations and LOS results by time of day. Overall, there would be a relatively modest increase in the number of intersections characterized by LOS E or F conditions under the Preferred Alternative—an increase of 2 such intersections in the AM peak hour, 3 intersections in the midday peak hour, and 1 in the PM peak hour.

Table 9C-25

Traffic Level of Service Summary Comparison: Preferred Alternative vs. Future No Action Alternative (Year 2010)

	No Action Peak Hours			Preferred Peak Hours		
	AM	Midday	PM	AM	Midday	PM
Intersections at Overall LOS A/B	28	26	34	27	25	32
Intersections at Overall LOS C	7	15	8	7	12	9
Intersections at Overall LOS D	4	3	2	3	4	2
Intersections at Overall LOS E/F	15	10	10	17	13	11
Intersections with Movements at LOS E or F	22	23	18	22	22	14
Intersections with Significant Traffic Impacts	—	—	—	12	6	8
Intersections with Significant Traffic Benefits	—	—	—	9	2	6

Table 9C-26

Preferred Alternative Traffic Level of Service Summaries (Year 2010): Grand Central Terminal Study Area

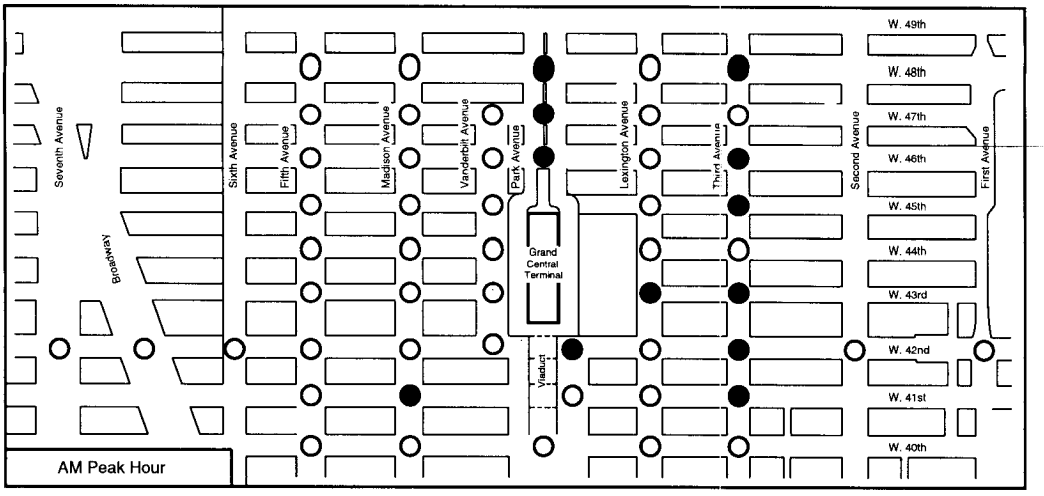
Intersection	AM Peak Hour			Midday Peak Hour			PM Peak Hour		
	No Action	Preferred Alternative	Signif. Impact/ Benefit	No Action	Preferred Alternative	Signif. Impact/ Benefit	No Action	Preferred Alternative	Signif. Impact/ Benefit
Seventh Ave. and 42nd St.	F*	C	Benefit	C	C		C	C	
Broadway and 42nd St.	F*	D	Benefit	F*	F*	Benefit	F*	F*	Benefit
Sixth Ave. and 42nd St.	F*	F*		F*	F*		F*	F*	Both (1)
Fifth Ave. and 48th St.	B	B		B	B		B	C	
Fifth Ave. and 47th St.	B	B		B	B		B	B	
Fifth Ave. and 46th St.	B	B		B	B		B	B	
Fifth Ave. and 45th St.	B	B		C	F*		B	B	
Fifth Ave. and 44th St.	B	B		B	B		B	B	
Fifth Ave. and 43rd St.	B	B		F*	F*		B	B	
Fifth Ave. and 42nd St.	F*	C	Benefit	D	D		F*	F*	Benefit
Fifth Ave. and 41st St.	B	B		B	B		B	B	
Fifth Ave. and 40th St.	B	B		B	B		B	B	
Madison Ave. and 40th St.	B	B		C	C		B	B	
Madison Ave. and 41st St.	C	F*	Impact	C	C		B	B	
Madison Ave. and 42nd St.	F*	D	Benefit	F*	F*	Benefit	D	C	Benefit
Madison Ave. and 43rd St.	B	B		B	B		B	B	
Madison Ave. and 44th St.	C	B		B	B		B	B	
Madison Ave. and 45th St.	B	B		C	C		B	B	
Madison Ave. and 46th St.	B	B		C	C		B	B	
Madison Ave. and 47th St.	B	B		B	B		B	B	
Madison Ave. and 48th St.	B	B		B	B		B	B	
Vanderbilt Ave. and 47th St.	C	C		C	C		B	B	
Vanderbilt Ave. and 46th St.	B	B		B	C		B	B	
Vanderbilt Ave. and 45th St.	D	F*		B	B		C	D	
Vanderbilt Ave. and 44th St.**	A-B	A-B		A-B	A-B		A-B	A-B	
Vanderbilt Ave. and 43rd St.**	A-B	A-B		A-B	A-B		A-B	A-B	
Vanderbilt Ave. and 42nd St.	C	C		C	C		C	C	
Park Ave. and 40th St.	C	C		B	B		F*	F*	
Park Ave. SB and 41st St.	B	B		B	B		C	C	
Park Ave. NB and 41st St.	B	B		B	B		B	B	
Park Ave. and 42nd St.	F*	F*	Impact	F*	F*	Impact	F*	F*	Impact
Park Ave. and 46th St.	F*	F*	Both	F*	F*		F*	C	Benefit
Park Ave. and 47th St.	C	F*	Impact	B	B		B	B	Impact
Park Ave. and 48th St.	F*	F*	Impact	C	C	Impact	C	C	Impact
Lexington Ave. and 48th St.	B	B		C	C		B	B	
Lexington Ave. and 47th St.	D	D		D	D		B	B	
Lexington Ave. and 46th St.	B	B		C	D		B	B	
Lexington Ave. and 45th St.	F*	F*	Benefit	F*	F*		C	C	
Lexington Ave. and 44th St.	C	C		F*	F*		E	D	
Lexington Ave. and 43rd St.	D	F*	Impact	B	F*	Impact	C	F*	Impact
Lexington Ave. and 42nd St.	F*	F*	Benefit	D	D		D	F*	
Lexington Ave. and 41st St.	D	C		B	B		B	B	
Lexington Ave. and 40th St.	B	B		B	B		B	B	
Third Ave. and 40th St.	B	B		B	B		B	B	
Third Ave. and 41st St.	B	F*	Impact	B	B		B	B	Impact
Third Ave. and 42nd St.	F*	F*	Impact	F*	F*	Impact	F*	F*	Impact
Third Ave. and 43rd St.	F*	F*	Impact	B	B	Impact	B	F*	Impact
Third Ave. and 44th St.	B	B		B	B		B	B	
Third Ave. and 45th St.	B	B	Impact	B	B		B	B	
Third Ave. and 46th St.	B	F*	Impact	C	B		B	B	
Third Ave. and 47th St.	B	B		F*	F*		F*	F*	Benefit
Third Ave. and 48th St.	F*	F*	Impact	C	F*	Impact	B	B	
Second Ave. and 42nd St.	F*	F*	Benefit	C	C		C	C	
First Ave. and 42nd St.	F*	F*	Benefit	C	C		F*	F*	

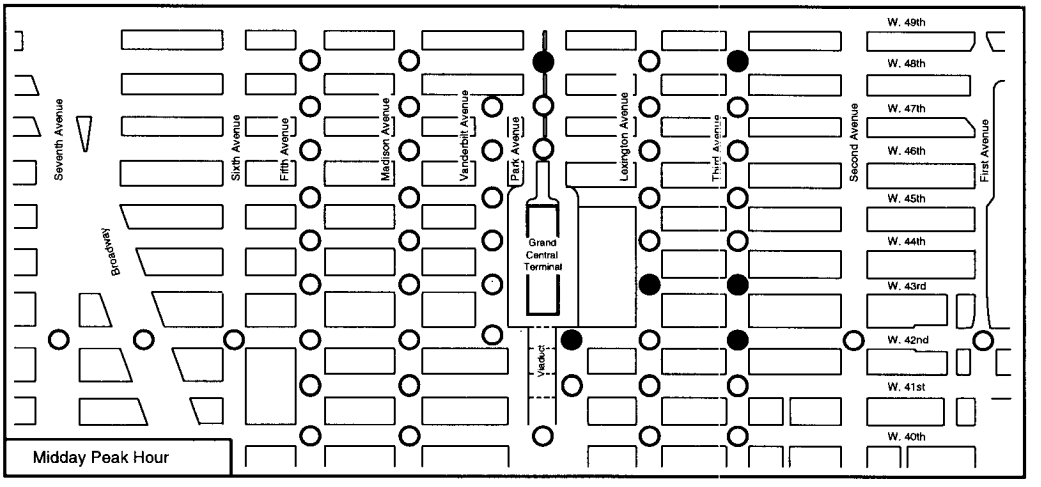
Notes:

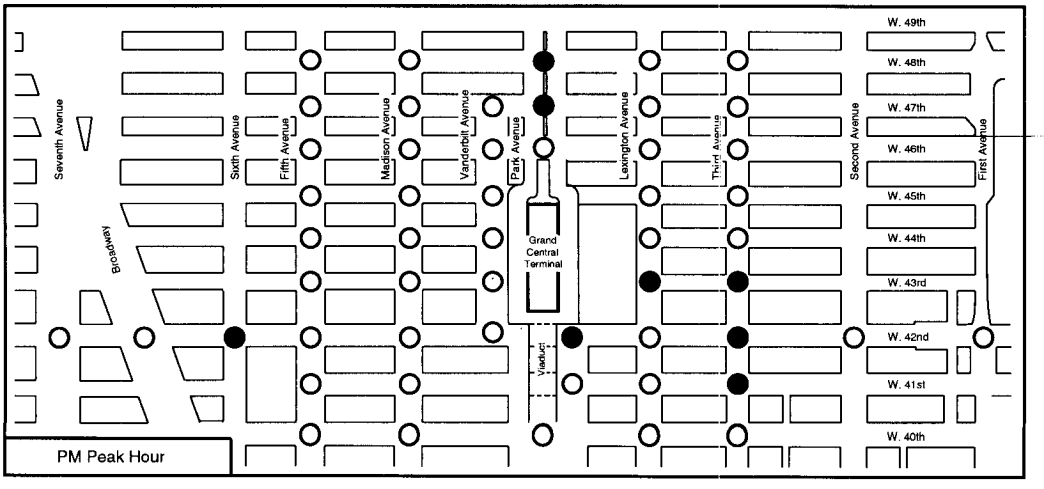
* *Indicates that delay and LOS are not meaningful because v/c is greater than 1.2. It is beyond the scope of HCM to assess delay for an approach operating in oversaturated conditions.*

** Indicates unsignalized intersection.

(1) One approach has a significant benefit, while another has a significant impact. LOS shown for critical movement.







LEGEND

- ○ *No Significant Impacts*
- ● *Mitigatable Significant Impacts*

MTA / LIRR
East Side Access

Figure 9C-6

2010 Preferred Alternative Significant Traffic Impact Locations

During the AM peak hour, the Preferred Alternative would create significant traffic impacts at 12 intersections in the year 2010, yet would also create significant traffic benefits at 9 other intersections. For the purposes of this assessment, "significant traffic benefits" have been defined as travel delay reductions of 10 seconds or more for traffic movements characterized by LOS D, E, or F under the No Action condition, which parallels the significant traffic impact definition. During the midday peak hour, there would be significant impacts at 6 intersections and significant benefits at 2 intersections, in the PM peak hour, there would be significant impacts at 8 intersections and significant benefits at 6 intersections.

It is important to note that all of the significant impacts generated by the Preferred Alternative can be mitigated via standard traffic engineering improvements, such as signal timing modifications, more restrictive parking regulations, and by providing some vehicular traffic movements with exclusive phases (e.g., left-turn arrows) to minimize conflicts with crossing pedestrians. These are the types of traffic operations improvements that are typically and regularly implemented by the New York City Department of Transportation (NYCDOT) in response to LOS or operational problems throughout the city. None of the significant traffic impacts identified would require costly engineering improvements, such as street widenings, traffic patterns modifications (such as would occur, for example, if turn prohibitions were needed), or reductions of sidewalk space. A discussion of the types of mitigation measures that might be needed to accommodate traffic demands associated with the Preferred Alternative in the year 2010 follow.

In the *Times Square area*, there would be significant traffic benefits in both the AM, midday, and PM peak analysis periods as a decrease in taxi traffic en route to Penn Station is expected.

Along *Fifth Avenue*, there would be a significant traffic benefit along westbound 42nd Street at Fifth Avenue in the AM and PM peak periods, also as a result of reduced taxi traffic to Penn Station. There would be no expected significant traffic impacts anywhere along Fifth Avenue in the study area.

Along *Madison Avenue*, there would be no major differences from No Action traffic conditions. There would be some significant traffic delay reduction benefits along 42nd Street at Madison Avenue in the AM, midday, and PM peak analysis periods, and one significant traffic impact along eastbound 41st Street in the AM peak hour. This one significant impact could be mitigated by daylighting (i.e., prohibiting parking) along the north side of the 41st Street approach to the intersection to add an eastbound left-turn lane and by providing a protected signal phase for the eastbound left turns (i.e., not allowing pedestrians to cross this section of Madison Avenue during the phase that eastbound 41st Street left turns receive an "exclusive" green signal phase).

There would be no significant traffic impacts nor benefits anticipated for the *Vanderbilt Avenue* intersections. This entry/exit point to GCT is not expected to be significantly used by LIRR commuters or taxis attracted to it as a result of the Preferred Alternative.

Significant traffic impact locations would occur on *Park Avenue* at 42nd, 46th, 47th, and 48th Streets. Each of these impacts is primarily attributable to the increased volume of pedestrians emerging from GCT, rather than from increased taxi traffic itself. That is because increased pedestrian traffic would increase conflicts with vehicular traffic that needs to make turns at these intersections, thereby affecting vehicular traffic LOSs.

At Park Avenue and 42nd Street, it would be necessary to prohibit parking along the northbound Park Avenue approach to the intersection and create two right-turn lanes along with the one left-turn lane, to provide a protected signal phase for northbound Park Avenue traffic to reduce

conflicts with pedestrian crossings at this locations, and to shift a modest amount of green signal time (2 seconds) from the northbound phase to the east/west phase (signal timing changes would be for the midday and PM peak periods only). This would provide the required amount of capacity to mitigate significant impacts.

At Park Avenue's intersections with 46th, 47th, and 48th Streets, a series of mitigation improvements would be needed, varying by intersection and by time period. For example, at Park Avenue and 46th Street, in the AM peak period, it would be necessary to remove parking along the southbound Park Avenue approach to provide two left-turn lanes and two through traffic lanes. In the midday peak period, it would be necessary to provide a protected north/south signal phase and to daylight the south curb of the eastbound 46th Street approach to the intersection. In the PM peak period, mitigation would not be required.

At Park Avenue and 47th Street, it would be necessary to provide a protected north/south phase in the AM and PM peak periods. At Park Avenue and 48th Street, it would be necessary to daylight the south curb of the eastbound 48th Street approach and to provide a protected north/south phase in the AM and PM peaks.

Along *Lexington Avenue*, there would, overall, not be major differences in traffic conditions under the Preferred Alternative as compared with the No Action Alternative. There would be one significant traffic impact location during all three analysis periods—at Lexington Avenue and 43rd Street, primarily as a result of additional pedestrian traffic through this intersection generated by the Preferred Alternative. This can be readily mitigated by providing westbound 43rd Street traffic with a protected phase to reduce conflicts with pedestrian traffic.

There would be a series of significant traffic impacts along *Third Avenue* as a result of increased pedestrian volumes generated by the Preferred Alternative. These impacts could be mitigated by one or more of the following measures: daylighting one curb along specific east/west streets and/or providing protected east/west signal phases, and, in some cases, making modest shifts in signal timings. The specific mitigations intersection-by-intersection are detailed in the Technical Appendix.

There would also be significant traffic benefits resulting from the project along 42nd Street at *First and Second Avenues*, as a result of reduced crosstown taxi traffic.

In addition to the traffic benefits cited above, both areawide within Midtown Manhattan and at specific East Midtown and 42nd Street intersections where detailed LOS analyses were conducted, there would be other traffic benefits along routes leading to and from Penn Station. That is because much of the taxi traffic attracted to GCT to serve LIRR commuters would no longer be attracted to Penn Station, resulting in traffic volume reductions along several approach routes (such as southbound Seventh Avenue, northbound Sixth Avenue, and westbound 31st, 33rd, and 34th Streets).

For year 2020 conditions, 12 of the study area intersections were analyzed in detail for potential traffic impacts. Of the 12 analysis locations, new significant impacts were identified at 1 location in the AM peak hour (Lexington Avenue/42nd Street), and at 3 locations in the PM peak hour (Vanderbilt Avenue/45th Street, Lexington Avenue/45th Street, and Lexington Avenue/42nd Street). No new significant impact locations were identified among the year 2020 analysis intersections in the midday peak hour. Significant impacts could be mitigated at these locations by NYCDOT in the year 2020 using standard traffic engineering measures, such as signal phasing and timing adjustments, and curb parking regulation modifications.

Parking

Under the Preferred Alternative, the demand for parking at GCT would not be expected to increase, since LIRR riders would not be parking their personal vehicles near GCT. The level of taxi activity around the terminal would increase and require additional curb space. These taxis would use the existing dedicated stands around GCT, while new stands would likely be needed along curb areas adjacent to the new LIRR entrances. The new taxi stands would slightly reduce the available supply of loading/unloading curb space and could therefore slightly increase the prevalence of double parking on the cross streets around GCT. Since, overall, there would probably be six new taxi stands totaling 30 to 40 curbside spaces, the amount of displaced curbside parkers would probably represent a negligible percentage increase of overall curbside parking in the area.

More importantly, the Preferred Alternative would reduce parking demand in Manhattan, since a significant number of auto commuters would take LIRR trains directly to Manhattan's East Side. It is estimated that there would be a reduction in parking demand of approximately 2,800 autos from reduced home-based work trips and additional reductions for non-work trips.

Commuter Rail: Metro-North Railroad

The Preferred Alternative (under both engineering options) would displace a total of 15 MNR tracks in GCT: four platform tracks (114-117), nine storage tracks, and two tracks used for train maintenance. All of the above tracks are currently used for midday storage and maintenance of MNR trains. The Preferred Alternative would also take over use of the lower-level loop track, which is no longer used by MNR.

To preserve MNR's capacity for storing and maintaining trains through the year 2020, the Preferred Alternative would construct five new storage tracks and expand five existing storage tracks within GCT (in the lower level's East End Yard). Additionally, it would construct new storage tracks and maintenance facilities in Highbridge Yard in the Bronx. The expansion of the East Yard in GCT's lower level, combined with the construction of additional facilities in Highbridge, would be more than adequate to replace tracks taken for the Preferred Alternative and to provide for MNR's current and future train storage needs. In addition, the construction of new facilities in Highbridge Yard would provide additional storage capability for MNR to accommodate future ridership increases and reduce present daily deadhead mileage of those trainsets stored midday at Croton-Harmon, North White Plains, and Stamford.

The project would also create new capacity in Penn Station that could benefit MNR, allowing MNR to bring service for its commuters to Penn Station if that agency's Penn Station Access Project is implemented. If MNR does bring new service into Penn Station, the number of MNR commuters shifted to Penn Station would be lower than the number of LIRR commuters shifted to GCT by East Side Access.

Commuter Rail: Amtrak and NJ Transit

The work proposed at Harold Interlocking (see Chapter 2, "Project Alternatives") would segregate Amtrak's Northeast Corridor service from LIRR service in the vicinity of Harold Interlocking, and would have a positive impact on Amtrak's Northeast Corridor service between Boston and New York. By providing a quicker route through Harold Interlocking and allowing Amtrak trains to travel into and out of the East River tunnels at higher speeds (via an upgrade of switches), the improved Harold Interlocking would have a positive impact on Amtrak.

The Preferred Alternative would have no adverse impact on either Amtrak's or NJ Transit's non-revenue use of Sunnyside Yard (i.e., for train storage) or East River tunnels.

Pedestrian Conditions Within GCT

Introducing LIRR service into GCT would significantly affect GCT pedestrian flows and conditions. During the 4-hour AM peak period, about 62,000 new LIRR riders would pass through GCT in 2010, rising to about 65,000 in 2020. About 44 percent of this new ridership would be concentrated in the 8-9 AM peak hour (27,500 in 2010; 29,000 in 2020). This represents a nearly 75 percent increase in the number of commuters that are projected to enter GCT. While this represents a significant increase in pedestrian usage of the terminal, these new riders would be better dispersed with the current GCN and restoration efforts adding to the number of ways people can circulate in and around GCT.

In terms of where these new LIRR riders would circulate through GCT, most would be bound to points north of the terminal and not enter the main terminal concourse. About 42,200 people (65 percent) would be destined to 45th through 49th Streets or above during the 6-10 AM peak period, which is consistent with other GCN projections. Some 15,300 people (23.5 percent) would be oriented to 45th Street or south. The remaining 7,450 (11.5 percent) people would be leaving GCT to use the IRT 4/5/6 subway lines (5,240 to the southbound platform, 2,190 to the northbound platform).

The projected distribution of 2020 LIRR peak period/hour ridership at GCT is shown in Table 9C-27 and Figure 9C-7.

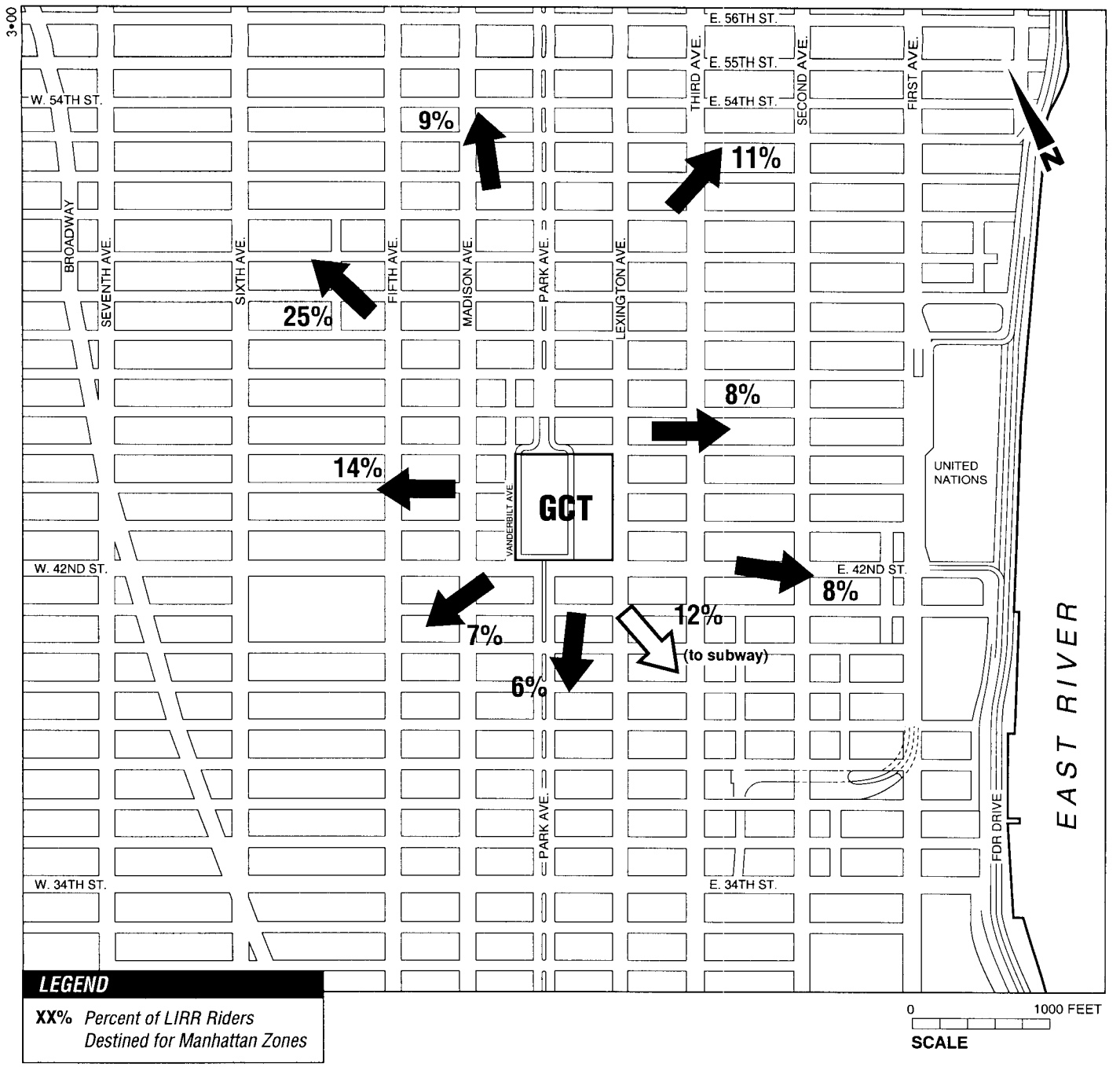
Table 9C-27

Distribution of AM Peak LIRR Passengers Arriving at GCT in 2020

Access/Egress Link	6-10 AM Peak Period Arrivals	8-9 AM Peak Hour Arrivals
IRT 4/5/6 Southbound	5,327	2,311
IRT 4/5/6 Northbound	2,229	968
IRT 7 Eastbound	4	2
IRT 7 Westbound	23	10
IRT Shuttle	0	0
42nd Street (East Side +)	*12,453*	*5,492*
42nd Street (West Side +)	*2,839*	*1,252*
45th Street (West Side)*	*14,483*	*6,387*
47th Street (East Side)*	*5,063*	*2,233*
47th Street (West Side)*	*30*	*13*
49th Street (West Side)*	*22,592*	*9,963*
Totals	***65,043***	***28,631***

Notes:
+ "East" and "West" refer to areas east and west of GCT, respectively.
* Do not enter GCT dining or Main Concourses.

To assign LIRR riders to their final Midtown destination, exiting LIRR patrons were assumed to use one or more of the nearest exits closest to their end location. That is, people were assumed to ride commuter trains so as to exit that train as close as possible to either a GCN escalator/stairwell or into and through GCT, which in turn would be closest to their work location. (Since GCN opened in late 1999, this is occurring on MNR trains, with less crowding into the



MTA / LIRR

East Side Access

Figure 9C-7

Projected Distribution of LIRR Ridership at Grand Central Terminal

front cars of trains and more evenly distributed train loadings.) Once on the street, people were assumed to follow as direct a path as possible into that Midtown destination zone. LIRR riders would primarily use the closest Vanderbilt Avenue escalator that leads to the New York Transit Museum store on the Main Concourse (about 60 percent), followed by the west staircase (about 15 percent) and the Oyster Bar east ramp (12 percent). About 8 percent of exiting passengers from Tracks 111-116 would likely make their way along the entire length of the Dining Concourse to a stair leading up to the Graybar passageway. Other vertical circulation elements in GCT's east side would likely be used by small amounts of 1 or 2 percent each. Once on the Main Concourse, various paths are available out of the terminal so that no particular pedestrian element would likely be overburdened with the exception of a few particular elements that are congested even today.

Within GCT, the new escalator bank behind the west stairs, situated closely to the LIRR tracks on the terminal's west side, would be the most heavily used vertical circulation element with 2,300 to 2,500 people (LIRR and MNR) coming up in the respective 2010 and 2020 AM peak 15-minute periods, and 2,000 to 2,100 descending it in the PM peak period in 2010 and 2020 analysis years. The heaviest corridor would be the connection between the Oyster Bar east ramp and the western IRT stair/escalator bank, with 3,200 (2010 PM) and 3,850 (2020 AM) pedestrians traversing it during peak 15-minute periods. The two corridors at GCT's southwest corner, one leading up to the 42nd/Vanderbilt corner and a second directed to the subway shuttle fare control area (FCA 236), would each be used by 1,400-1,800 pedestrians per AM and PM peak 15-minute periods in 2010, and upwards of 2,000 in the shuttle passage in year 2020. The Met Life buildings escalator bank would continue to be a major pedestrian element, with between 2,500 and 3,200 people using it during the AM and PM peak periods. Most other elements would carry between 1,000 and 2,000 pedestrians during each of the AM and PM peak 15-minute periods. Overall, some elements, predominantly in GCT's west side and to the IRT subway, would become very heavily used—yet still within capacity limits. Other elements would be characterized by only modest increases, such as corridor connections toward Lexington Avenue.

To determine whether these new LIRR pedestrian flows would create significant impacts, LOS criteria cited in the New York City *CEQR Technical Manual* were used as follows:

- For stairways: For a Build LOS D condition, a required widening of 6 inches or more is considered significant; for a Build LOS E condition, a 3- to 6-inch widening is considered significant; for LOS F, a 1- to 3-inch widening is considered significant. As noted in the *CEQR Technical Manual*, the MTA generally does not implement a widening of less than 6 inches, and at times, not less than 1 foot, since it may not be practicable to disrupt service on an existing stairway.
- For passageways and corridors: For a Build LOS D condition, a required widening of 12 inches or more is considered significant; for a Build LOS E condition, a 6- to 12-inch widenings are considered significant; for LOS F, a 3- to 6-inch widening are considered significant; a widening of less than 3 inches is not considered significant.
- For platforms: Although there are no definitive MTA guidelines for platform impacts, the *CEQR Technical Manual* mentions a deterioration of future No Action conditions from better than LOS C/D to worse than C/D, or for any worsening when already in C/D conditions is considered significant. This is consistent with LOS C/D conditions being sought at other pedestrian elements.

- For turnstiles: Any increase in a turnstile's v/c ratio above 1.00 and above which would result in queuing is considered a significant impact.

One type of element that is not addressed in detail in the *CEQR Technical Manual* or the *NYCT Planning and Design Guidelines* is an escalator and how to assess pedestrian conditions on them. In general, these elements have fixed speeds and processing rates and, therefore, maximum theoretical capacities. Thus, determining significant impacts for an escalator may be reasonably based on the volume of people using it versus the escalator's ability to process the load (i.e., v/c ratio), and whether the pedestrian demand on it is under or over capacity (i.e., a v/c ratio $\leq$ or $>$ 1.00).

Thus, a significant impact for an escalator was identified when its capacity is exceeded when comparing future No Action with Preferred Alternative demands. A second criterion was considered when the v/c ratio is already greater than 1.00 in the No Action case. In such cases, a significant impact would be realized when v/c ratios increase by 5 percent with the addition of the incremental pedestrian flows to escalators. This is roughly equivalent to a 1-inch widening (associated with stairway LOS F) based on the similar processing rates of a standard 24-inch-wide stair exit lane or of a single 20-inch lane of a dual-lane, 40-inch wide escalator.*

The resulting pedestrian LOSs would deteriorate over those identified for the No Action Alternative unless additional improvements were provided. The most significant deterioration in LOS would occur on the eastern and western vertical circulation elements leading down to the IRT 4/5/6 subway and the escalator bank connecting the dining and Main Concourses near the New York Transit Museum store. In each of the AM and PM peak periods for both 5- and 15-minute analysis periods, these elements would experience significant pedestrian impacts with LOSs deteriorating to worse than C/D and, in some instances, well into the E/F range. It is of note that when such congestion occurs on stairs and escalators, there tends to be a metering effect at the downstream locations with a slightly lower arrival rate. Accordingly, the Graybar, new 43rd Street (which would also provide added width out to Lexington Avenue), and Lexington Avenue passageways would operate within generally acceptable LOS C/D or better conditions. All doorways to exterior sidewalks would continue to function at acceptable LOS C/D or better. Tables 9C-28 and 9C-29 list LOS results for the pedestrian flow elements analyzed for the Preferred Alternative within GCT.

On the Dining Concourse *level*, there would be some queuing at the bottom of the stairs and escalators, although there would appear to be ample room in the waiting area to accommodate such queues. This is not unusual for major commuter rail terminals. On the other hand, the key problem areas would likely occur in the Main Concourse areas leading to the IRT stairwells, which could extend back into their connecting passageways and cause some circulation stoppages.

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* A "lane" is generally considered to be a person's shoulder breadth, typically 24 inches accounting for slight body sway and heavy clothing. The processing rate of a standard 24-inch-wide stair exit "lane" is approximately 35 persons per minute per *lane* (i.e., 17 persons per foot per minute multiplied by the 2-foot lane width). The processing rate for a 48-inch (40-inch tread), double-width, dual-lane escalator is about 75 persons per minute as measured at all GCT escalators, or about 37 persons per minute per lane.

Table 9C-28
2010 PREFERRED ALTERNATIVE PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak 15 - Minute Period		Peak 15 - Minute Period	
Location	**Section**	**AM**	**PM**	**AM**	**PM**
1. Met Life Building Escalators	3 Up Escalators	under capacity	under capacity	under capacity	under capacity
	1 Down Escalator	under capacity	under capacity	under capacity	under capacity
2. Graybar Passageway	Corridor	A	A	A	A
3. East Stairs / Escalators	North Stairs from Dining Concourse	B	A	A	A
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	North Corridor	A	A	A	A
	South Corridor	C	C	C	C
3A. 43rd Street Passageway	Corridor	A	A	A	A
4. Hyatt Passageway	Corridor	B	A	A	A
5. Eastern IRT Subway Stairs	Stairs	D*	C	C	C
6. Western IRT Subway Stairs / Escalators	Stairs	F	F	E*	E
	Up Escalator	over capacity	under capacity	under capacity	under capacity
	Down Escalator	under capacity	under capacity	under capacity	under capacity
7. East Passageway to 42nd St. (Park-Lex)	Corridor	B	B	B	B
8. Lower Concourse East Ramp	Ramp	A	A	A	A
9. 42nd St. Main Entrance	Corridor	A	B	A	A
10. Shuttle Passageway	Corridor	B	B	B	B
11. Ramp to Vanderbilt Ave. / 42nd St. Corner	Ramp	C	C	B	C
12. West Stairs / Escalators	North Stairs from Dining Concourse	D*	D	D*	D
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing NYC Transit Museum Store	over capacity*	under capacity	over capacity*	under capacity
	Down Esc. Facing NYC Transit Museum Store	under capacity	over capacity	under capacity	over capacity*
	North Corridor	B	B	B	B
	South Corridor	B	B	A	B
13. 43rd St. Stairs in Biltmore Room	Stairs	C	C	C	C
14. Roosevelt Passageway	Corridor	B	A	A	A

* SIGNIFICANT IMPACTS

Table 9C-29
2020 PREFERRED ALTERNATIVE PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak 15 - Minute Period		Peak 15 - Minute Period	
Location	**Section**	**AM**	**PM**	**AM**	**PM**
1. Met Life Building Escalators	3 Up Escalators	under capacity	under capacity	under capacity	under capacity
	1 Down Escalator	under capacity	under capacity	under capacity	under capacity
2. Graybar Passageway	Corridor	A	A	A	A
3. East Stairs / Escalators	North Stairs from Dining Concourse	B	A	A	A
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	Down Esc. Facing Hudson News	under capacity	under capacity	under capacity	under capacity
	North Corridor	B	B	A	A
	South Corridor	C	C	C	C
3A. 43rd Street Passageway	Corridor	A	A	A	A
4. Hyatt Passageway	Corridor	B	B	B	A
5. Eastern IRT Subway Stairs	Stairs	D	D	C	C
6. Western IRT Subway Stairs / Escalators	Stairs	F*	F*	E*	E*
	Up Escalator	over capacity	under capacity	near capacity	under capacity
	Down Escalator	over capacity*	under capacity	over capacity*	under capacity
7. East Passageway to 42nd St. (Park-Lex)	Corridor	C	B	B	B
8. Lower Concourse East Ramp	Ramp	A	B	A	A
9. 42nd St. Main Entrance	Corridor	A	B	A	A
10. Shuttle Passageway	Corridor	C	B	B	B
11. Ramp to Vanderbilt Ave. / 42nd St. Corner	Ramp	C	C	C	C
12. West Stairs / Escalators	North Stairs from Dining Concourse	E*	D*	D*	D*
	South Stairs from Dining Concourse	A	A	A	A
	Up Esc. Facing NYC Transit Museum Store	over capacity*	under capacity	over capacity*	under capacity
	Down Esc. Facing NYC Transit Museum Store	under capacity	over capacity*	under capacity	over capacity*
	North Corridor	B	B	B	B
	South Corridor	B	B	B	B
13. 43rd St. Stairs in Biltmore Room	Stairs	D*	C	C	C
14. Roosevelt Passageway	Corridor	B	A	B	A

* SIGNIFICANT IMPACTS

The one significantly affected element within GCT would be the escalator bank leading to the New York Transit Museum store on the west side of GCT's Main Concourse. One mitigation measure for this significant impact would be a redirection of the escalators, which currently do not appear to be servicing the peak direction. Today, one escalator is carried up and another down, with the reverse-peak direction processing about 20 percent of the peak direction flow (less than 50 people during any 15-minute peak period). With the heavy increase of LIRR riders onto this element and a significant overutilization likely to occur in the peak direction, having both escalators operating in the peak direction during peak hours could effectively double the vertical circulation capacity. While v/c ratios would still show over-capacity conditions, the figures would be much closer to 1.00. During off-peak hours and midday periods, these escalators could be operated one up and one down. Other mitigation strategies for the subway elements will be detailed below in the section discussing the Lexington Avenue subway.

Pedestrian Conditions within LIRR Platforms and Cross Passageways

Pedestrian conditions were also analyzed within LIRR platform and cross passage elements being designed for the East Side Access Project. Each cross passage under 48th, 45th, and 43rd Streets was designed with at least two exits to prevent "dead-end" conditions. The 47th Street cross passage, now open with two exits (soon to be three when the Bear Stearns building at 383 Madison Avenue is completed), would have another exit closer to Lexington Avenue, bringing that total to four.

The platforms would have varying widths, ranging from 17 feet (Platforms 4 and 5 to the far west) to almost 23 feet (Platforms 1-3 on the east). Each platform would have stair elements positioned to ensure that walk distances meet National Fire Protection Association criteria. The new 45th and 48th Street cross passages would be 24 feet wide (47th Street's is 22 feet wide), and pedestrians would ascend stairs from the platforms below by one or two vertical circulation elements. One escalator would be provided on each platform, situated up to the 45th Street cross passage. In total, each platform would have six egress points.

As described in the "Project Alternatives" chapter, the Preferred Alternative would create five new exits from GCT. Based on the engineering studies to date, new street accesses would be created in Option 1 as follows:

- On the south side of 45th Street, midblock between Madison and Vanderbilt Avenues in the 347 Madison Avenue building;
- On the southeast corner of 45th Street/Vanderbilt Avenue corner in the 200 Park Avenue building (Met Life);
- On south side of 48th Street, just west of Park Avenue in the 270 Park Avenue building (Chase Bank);
- On the north side of 48th Street or the south side of 49th Street, midblock between Madison and Park Avenues in or adjacent to the 280 Park Avenue building (Bankers Trust);
- On 47th Street, midblock between Park and Lexington Avenues in the 245 Park Avenue building (Bear Stearns);
- An entrance being constructed at 383 Madison Avenue;
- Two entrances constructed in the 47th Street cross passage as part of the GCN project;

- Direct access to the terminal's Dining Concourse from the south end of Platforms 1, 2, and 3; and
- Escalators to the Biltmore Room from Platforms 4 and 5.

If the locations of these exits vary slightly from those analyzed, the results of the analysis would not differ significantly.

During AM conditions, clearing platform queues in a reasonable time is a main concern. The stair/escalator analyses indicate that the elements leading to the 47th and 48th Street cross passages would each operate at a slightly congested LOS D in the AM peak 15-minute period, while all other elements to the platforms' south end would operate under capacity and at acceptable LOS. A typical LIRR platform stairwell layout is shown in Figure 9C-8.

It was also necessary to assess the clearance times off the platforms, since excessive clearance times could result in undue congestion on the platform itself in the AM peak periods. Stairwell queuing analyses indicated that the north end stair queues would dissipate in 5 or less minutes, while south end elements would need less than 3 minutes to clear. Considering there would be 10 tracks/5 platforms, it is highly unlikely that successive trains to the same platform would be scheduled, and each platform would have at least 5 minutes between arrivals. Thus, platform clearance times would not be a major concern.

During PM conditions, the most important concern is that of platform and cross passage queuing conditions, and whether the waiting area is sufficient. To analyze the LIRR-only cross passages, operations considered 2.5-minute train headways, near-full passenger loads for a 12-car train. Analyses of the 47th Street cross passage would have both LIRR trains and 10-car MNR trains. These are reasonably worst-case conditions in that many peak-period train consists are shorter and have lower passenger occupancies. During the peak 15 minutes, there would be a constant turnover of passengers in the cross passage, since trains would depart GCT continuously; however, there would likely would be no time when the cross passage would be completely empty.

Since it is likely that some passengers would wait on the platform and others in the cross passages, the analyses assumed several scenarios that "assign" people to both platform and cross passage areas. For example, one analysis case involved having 50 percent of a train's load waiting on the platform and 50 percent in the cross passage; other cases varied these percentages (e.g., 75 percent on platform/25 percent in cross passage).

The LIRR-only cross passages under 45th and 48th Streets were assumed to have one large, homogeneous zone with train departures (and loadings) equally timed from all of their tracks. For the 47th Street cross passage, however, two time-space zones were assumed, since only the western end would have LIRR and MNR passengers queuing, while the eastern MNR-only end would likely have only MNR riders.

Examining the LIRR platforms, three separate waiting zones would exist between the stairs leading up to the cross passages (see Figure 9C-8). The analysis indicates that, for a single train load of people all waiting on the platform, LOS C/D or better would prevail on all LIRR platforms for the peak 5 and 15 minutes prior to train boarding.

With LIRR passengers likely using a new waiting area in the western sections of the 47th Street cross passage (which would link the 47th and 48th Street cross passageways) and the majority of MNR riders (no LIRR riders) using the eastern sections, the analysis of normal operations with no delays indicates that conditions would continue to vary along the length of the cross

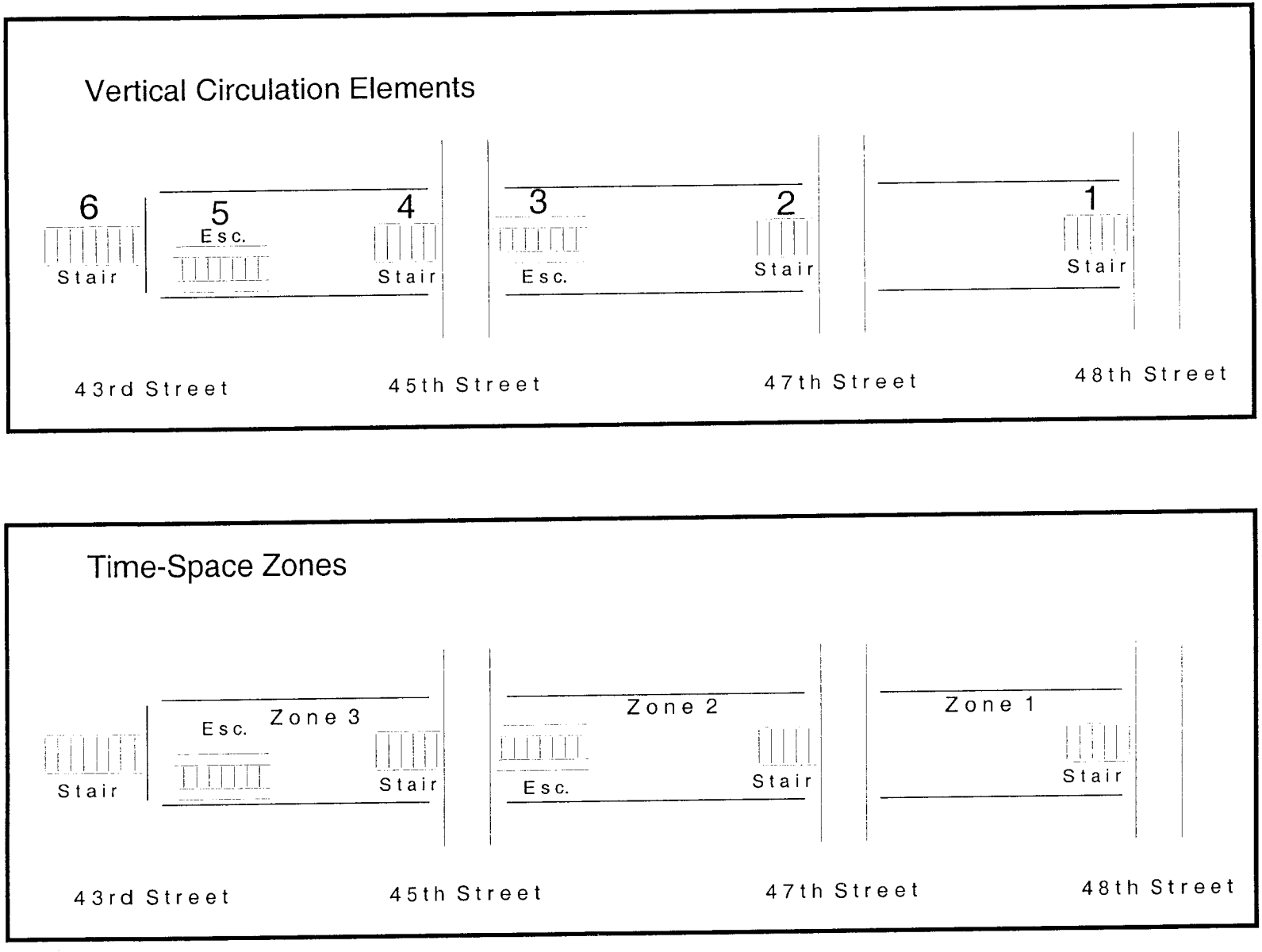

Figure 9C-8

Typical LIRR Platform at Grand Central Terminal:
Vertical Circulation Elements and Time-Space Zones

passage. The worst condition would occur in the LIRR/MNR zone to the west end: LOS C/D and mid-D conditions would prevail (a time-space utilization of about 80 percent for 5- and 15-minute periods) when people queue in the cross passage at a train-load rate of 75 percent waiting there. If the cross passage becomes more crowded, a higher proportion of people will wait on the platform, and then LOS C/D or better would prevail in the cross passage. In the cross passage's east end where MNR passengers would wait, LOS C/D or better would occur (a time-space utilization of 70 percent or less) in all scenarios. For the LIRR-only cross passages along 45th and 48th Streets, LOS C/D would prevail in all passenger-waiting scenarios.

Pedestrian conditions in the initial 15 minutes of delay (i.e., no LIRR or upper-level MNR trains departing) would vary along the length of the 47th Street cross passage. In the west end where both LIRR and MNR riders mix, significant congestion and over-capacity conditions would prevail, while in the cross passage's east end—where MNR passengers would wait—slightly better, near-capacity conditions would occur. For a condition with 30-minute delays, the analyses indicate that conditions within the shared west end of the cross passage would deteriorate well into over-capacity conditions. With joint use by LIRR and MNR, the threshold of capacity would be reached 15 minutes after the first train delay occurs, as opposed to 40 minutes under the No Action Alternative.

Lexington Avenue Subway Conditions

The analysis of potential impacts at the IRT 42nd Street subway station focused on key station elements and line-haul capacity.

The Preferred Alternative would significantly affect conditions on some stairwells connecting to critical platform areas. During the AM peak period, about 5,240 new subway riders (2,310 in the 8-9 AM peak hour) would be destined to Lower Manhattan and other points south of GCT, while another 2,195 people (970 in the AM peak hour) would be using the northbound subway lines as part of their trip. Slightly lower (i.e., about 15 percent) pedestrian volumes would occur (although reversed, into GCT) during the PM peak hour.

In the future with LIRR passengers using this station, pedestrians were assigned based on prevailing uses of each stairwell.

- For the western mezzanine FCA 238, there are three and four stairwells serving the respective south- and northbound platforms. Surveys indicated that about 50 percent of all people entering the subway in this area use the stairwell (P14) directly in front of the turnstiles when traveling downtown. Uptown stairwells are used in a more even manner with about 30-35 percent of the FCA 238 pedestrian traffic using the three nearest elements (P15, 17, 19).
- For the eastern mezzanine at FCA 240, where two stairwells can be accessed to descend to the south- and northbound platforms, there is another utilization imbalance. For downtown service, the stairwell (P20) facing the turnstiles is used by about two-thirds of all southbound riders, while when traveling uptown, the stairwell (P23) directly adjacent to the turnstile line is used by a similar percentage.

Applying the percentages to the analysis elements, about 1,050 people in 2010 and 2020 would use the center southbound stair (P14) to access the platform during the 8-9 AM peak hour, with another 500 to 600 people using the adjacent stairwells. For the northbound platform, about 570 people would travel into the center northbound platform area using two stairwells (P17/19). Stairwells near FCA 240 at the station's north end would be used by between 75 and 125

pedestrians connecting to the southbound platform. In the PM peak when the heaviest flows out of the station emanate from the northbound platform, between 450 and 550 pedestrians would use each of the three southernmost stairwells (P13, 15, 17). From the north end of the northbound platform, just under 100 pedestrians would use the two stairwells to leave the station. Combining these north- and southbound volumes and comparing these with the peak-direction flows (down in the AM, up in the PM), these volumes would represent a 20 to 25 percent increase over the existing peak-direction pedestrian volumes moving through these subway elements.

The analyses of pedestrian conditions within the Lexington Avenue subway's 42nd Street station indicate that there would be several periods when the stairwells and platforms would deteriorate either further within congested LOS E to F or newly enter these levels from the future No Action condition. For example, stairwell P14 would operate at LOS F throughout the 5- and 15-minute AM analysis periods, whereas No Action conditions had this element operating within capacity limits. The same deterioration would occur for each platform's north end stairwells (P22/23). In the PM period, similar deteriorations within unacceptable LOSs would occur. According to NYCT and *CEQR Technical Manual* assessment criteria, these conditions would be considered a significant impact or worsening.

In platform zones that would experience the highest increases in pedestrian flows, LOS deteriorations would, in general, worsen one level or just exceed a threshold into the next level. Platform zones facing stairwells P14 (southbound) and P17/19 (northbound) would be the most congested areas during 5- and 15-minute periods.

Analyses of fare collection area and turnstiles, mezzanine stairs, and IRT platform zones indicate that significant pedestrian impacts are limited to circulation elements already experiencing congestion. Specifically, the three stairs (P12, P14, and P18) leading to downtown subways directly facing FCA 238 would be affected in the peak AM periods, as would two stairs (P9, P11) serving the northbound platform in the PM peak periods (see Table 9C-30). Only one platform zone (P5, on the south platform in the PM peak 5 minutes) would be significantly affected. Zone 2 in FCA 238 facing the up escalator would be significantly affected in various periods (see Table 9C-31).

Lexington Avenue Subway Mitigation

The addition of LIRR commuters onto the Lexington Avenue subway line as a result of the Preferred Alternative would significantly impact line-haul conditions on the Nos. 4 and 5 express lines southbound in the AM peak hour (the northbound condition in the PM peak hour was not analyzed, since it is not as critical as southbound in the AM, following the analysis procedure used in NYCT's MESA MIS/DEIS).

With the express and local subway lines each operating at 24 trains per hour, this addition of LIRR commuters would result in increased line-haul capacity utilization rates from 1.12 on the express line under the No Action Alternative to 1.17 under the Preferred Alternative, and from 0.61 on the local line under the No Action Alternative to 0.64 under the Preferred Alternative, as shown in Table 9C-32. On average, each car of each express train would have 6 additional riders, while each car of each local train would have 3 additional riders. The increased capacity utilization on the express line would represent a significant impact of the Preferred Alternative, while the condition on the local line would not. For comparative purposes, the MESA Study also indicated that the IRT 86th Street station currently experiences utilization of 116 percent on the express line.

Table 9C-30

Preferred Alternative Subway Stair Analyses: Significant Impact Locations, Lexington Avenue Subway (IRT 4, 5, 6) Platforms at Grand Central Terminal

Stairwell Number	NYCT Pedestrian Element	2010 AM LOS				2010 PM LOS			
		Peak 5 Minutes		Peak 15 Minutes		Peak 5 Minutes		Peak 15 Minutes	
		No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative
1	P12	D	E*	D	D*	A	B	A	A
2	P14	F	F*	E	F*	C	D*	C	C
3	P18	E	E*	D	D*	B	B	B	B
Stairwell Number	**NYCT Pedestrian Element**	**2020 AM LOS**				**2020 PM LOS**			
		Peak 5 Minutes		Peak 15 Minutes		Peak 5 Minutes		Peak 15 Minutes	
		No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative	No Action	Preferred Alternative
1	P12	E	E*	D	D*	B	B	A	A
2	P14	F	F*	E	F*	D	D	C	D
3	P18	E	E*	D	D*	B	B	B	B
9	P17	B	B	B	B	C	D*	C	C
11	P13	B	B	B	B	C	D*	C	C

Note: * Significant impact.

Table 9C-31

Preferred Alternative Pedestrian Time-Space Analyses Significant Impact Locations, IRT Fare Control Area 238 at 42nd Street Station

Analysis Period	FCA Time-Space Zone	LOS	
		No Action	Preferred Alternative
2010 Peak 5 Minutes within Peak PM 15-Minute Period	2	C/D	D/E*
2020 Peak AM 15-Minute Period	2	D/E	E/F*
2020 Peak PM 15-Minute Period	2	C/D	D/E*

Note: * Significant impact.

Table 9C-32

Lexington Avenue Subway Line-Haul Conditions at 42nd Street/Grand Central Station (Preferred Alternative Year 2010): Downtown (AM Peak)

Subway Lines	Trains/ Hour	Cars/ Hour	Total Guideline Capacity/Hour (passengers/hour)	Passengers/ Hour	Utilization Rate
Nos. 4 and 5 Express Trains	24	240	26,400	30,980	1.17
No. 6 Local Train	24	240	26,400	17,026	0.64

Mitigation strategies aimed at NYCT facilities must be considered as a system from the point where people enter the first descending vertical circulation element from GCT to and through FCAs, to stairwells leading to platforms, to along the platform, and finally, onto trains. A critical link in this system-wide approach is NYCT's effort to decrease dwell times at this station to increase line-haul capacity.

The first step in assessing mitigation in this portion of the station is to examine what pedestrian facilities are now fully open (previously, certain elements were closed due to reconstruction), and whether these elements are being used to their full potential. If not, increasing usage of underutilized areas needs addressing through signing inside GCT, strategic placement of control agents directing pedestrian flows, and installation of additional readily implementable pedestrian elements, such as new turnstile banks.

One key problem today is the intense use of the western stair/escalator bank and the low use of the "free" passage connecting NYCT FCAs 236 at the shuttle turnstile area entrance and 238 at the Lexington Avenue Nos. 4/5/6 western turnstile bank. The low use of the free passageway may be due to a number of factors, including perceived security issues because of "blind" corners within it, unawareness of its availability on the part of pedestrians, its lack of proximity to the routes of many current NYCT customers, established habits of using other existing elements, and the fact that there has been construction in the immediate vicinity for some years.

Potential mitigation and station reconstruction schemes have been discussed with NYCT. In addition to increasing the use of the free passageway, a number of changes can be made at FCA 238 that could serve to facilitate movements into the subway paid areas more easily than descending through the overcrowded western stair/escalator bank (see Figure 9C-9), including the following measures:

- A new turnstile bank just west of FCA 238 would "siphon off" people in the free passageway directly into the IRT's mezzanine area, and relieve use of the western stair/escalator bank. This measure would require a relocation or elimination of an existing news stand.
- A new south-end stairwell (P10) would continue that siphoning-off action from the new turnstiles, and reduce use of the overcrowded stairwell P14, which directly faces the fare control area and draws large pedestrian volumes. This stairwell may require elimination of the southbound platform's south-end control booth.
- A widening of the corridor mouth into space currently occupied within the Pershing Building's basement where the "paid" shuttle corridor leads into the IRT's mezzanine to allow construction of new stair P10.
- The restoration of stairwell P16, to better distribute pedestrian volumes.
- An enlargement of FCA 238's "turnstile line" farther east into the IRT's mezzanine would provide additional circulation space in this control area, and help relieve congestion at the escalator's base. The existing large token booth can be repositioned and reduced in size (since automatic fare machines are now in-place) to the north wall to keep it out of the main stream of pedestrian traffic. Currently, there are about 1,200 "usable" or effective square feet available in this area, discounting for column and refuse can footprints, token booth queue area, and unused corner "dead" space. The enlargement of this area can increase the usable space to about 2,000 square feet.

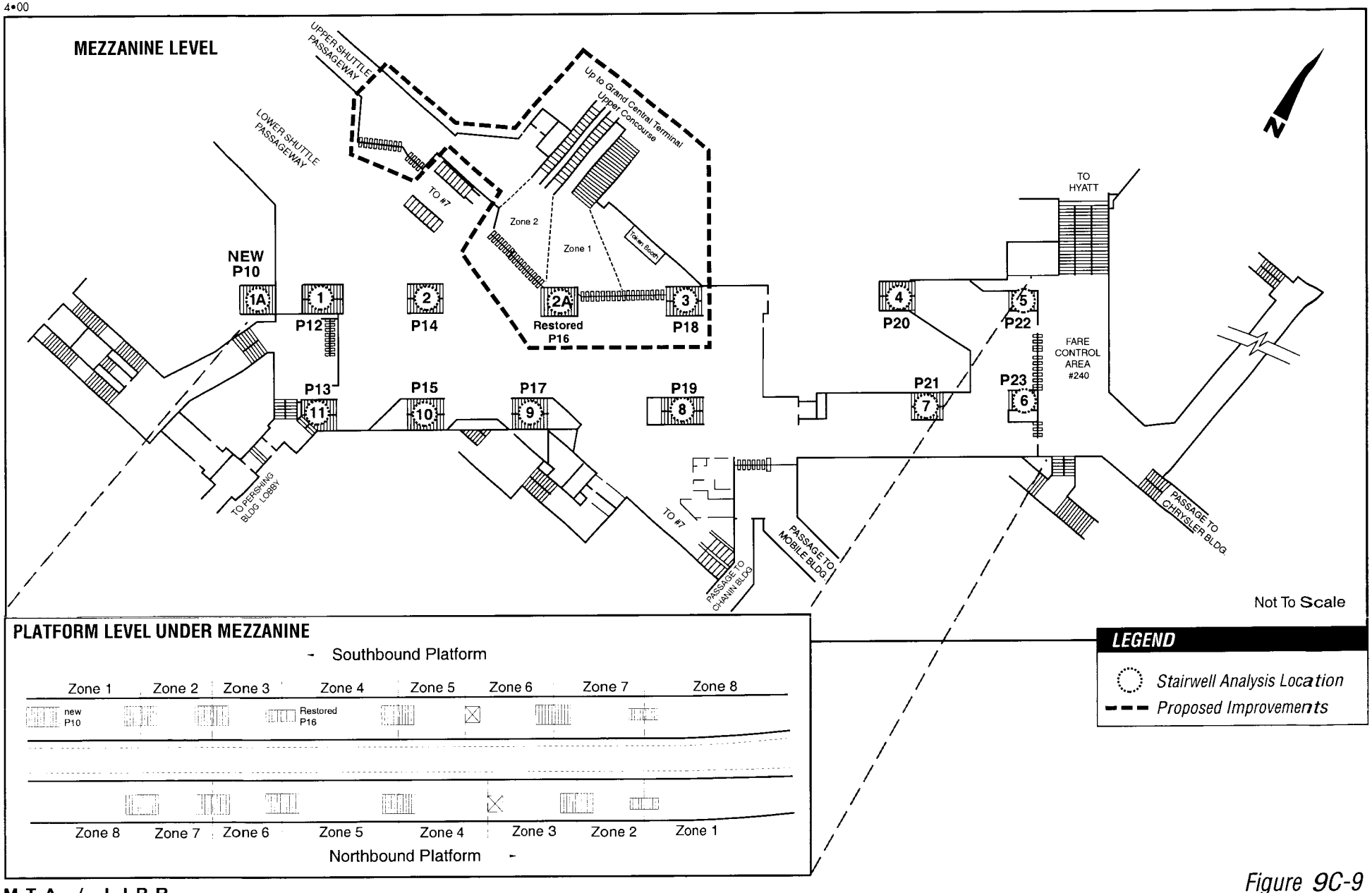

Figure 9C-9

MTA / LIRR

East Side Access

Potential Stairwell and Fare Control Area Improvements
Lexington Avenue Subway at Grand Central Terminal

The combination of these potential measures is intended to accomplish a more balanced use of existing mezzanine stairs leading to the IRT's platforms and a distribution of pedestrian flows into the subway's paid zones. Measures would continue to be investigated through the FEIS to determine their feasibility and effectiveness. In addition, NYCT has already begun property acquisition from the Grand Hyatt Hotel for additional mezzanine space once occupied by Modell's Sporting Goods store. Currently, a low percentage of people entering this subway station proceed from the mezzanine's east end to its west end and vice versa. Opening this enclosed mezzanine space would widen the view corridor of entering pedestrians, and likely result in more even stairwell usage.

The above series of station improvements would fully mitigate some significant impacts and partially mitigate others: 1) Impacts at the western bank of escalators/stairwells would be partially mitigated by the diversion of pedestrians to the free passageway and the new stairwell at the south end of the subway platform. Full mitigation would require new, higher capacity escalators or an additional stairwell, which may not be feasible. 2) Impacts at the turnstiles, fare control areas, and on the stairwells leading from the subway mezzanine level to the subway platforms would be fully mitigated. 3) An impact on the northbound subway platform within the PM 5-minute peak period would be fully mitigated by the better distribution of pedestrians afforded by the overall plan; conditions during the short-term peak surges that occur as trains load/unload would also be improved. Details of the analyses follow later in this section of the EIS.

At the platform level as well as in fare control and mezzanine circulation areas, other basic improvement measures are possible, including elimination or shifting of moveable objects on the platform, including refuse containers and map displays that are directly in the path of people or occupy too much room on the platform. Refuse containers can be placed against the wall space under stairwells on the platform, while benches can be moved or replaced by the thinner type whose spring-loaded seats rest in the up position when not being used. Should refuse cans remain on the platforms, then a different (rectangular) design, such as those used in MNR stations could be used that fits into corners better than currently used round types, thereby reducing surrounding wasted space. At the mezzanine level, station support columns enclosed in wraparound cladding that reduces circulation space and obscures sight lines could have the wraparound cladding removed. In addition, NYCT control agents could be positioned at the tops of stairs to control and direct pedestrian movements on the stairs themselves, and at subway car door mouths on the platform.

It is also important to note some congestion at the IRT mezzanine level can be traced to the closure of some passageways at that level and/or due to the dark and, therefore, underutilized passageways. Some pedestrians are probably selecting to use GCT as a link in their path as a substitute. In fact, there are many subsurface passageways that connect to the mezzanine level and completely avoid the main GCT confines. Some are open today, such as the corridors that lead to the Chrysler Building on Lexington Avenue and farther east to Third Avenue directly into the Kent building. A number of these passages, however, are closed, such as one angling off the Chrysler passageway leading into the Graybar building from FCA 240. Still others, such as two leading to Park Avenue just south of 42nd Street, are open, but involve passing along secluded, dimly lit corners. Opening the passageways that are closed and refurbishing others to provide a more attractive appearance could provide some measure of relief to the IRT mezzanine-level congestion.

The mitigation analyses of the Lexington Avenue subway pedestrian elements used the above-mentioned physical changes as the basis of redistributing pedestrian flows into the station. The

analyses assumed that a reconfigured FCA 238 and new turnstiles slightly west to siphon off free passageway walkers would attract 75 percent of new LIRR-to-subway commuters, with the remaining 25 percent split between the western stair/escalator bank (22 percent) and eastern stair bank (3 percent) proportionally as they are currently used. The free passageway is not currently heavily used, because it is not near the routes of most current NYCT passengers at GCT. In contrast, it would be proximate and convenient to LIRR commuters transferring to the subway and therefore would be heavily used by these passengers. Measures to accomplish this include way-finding signage, siphoning, and customer campaigns to encourage use of this newly renovated passage. Table 9C-33 lists results of the stairwell analyses of the eastern and western vertical circulation elements.

With these new elements, the manner in which the mezzanine would be used would change for both existing MNR users and in the manner in which LIRR commuters were projected to flow through the station. A new stairwell (P10) placed on the southbound platform's southernmost end was assumed to attract 80 percent of the pedestrian flow from the paid shuttle passageway, with the remaining 20 percent using the next stairwell (P12) just north. This redistribution away from a heavy use of P12 would present commuters entering the new turnstile bank with a direct (and fairly under used by other subway flows) path to P12; thus, 75 percent of these new turnstile movements were assigned to it. Further, with a shift of pedestrian flows away from the core of FCA 238 and with a restored P16, stairwell P14 would process less pedestrian flows and be less congested.

Resulting levels of service on stairwells would be returned to year 2010 and 2020 future No Action levels, albeit still within unacceptable levels E and F. For most stairwells serving the southbound platform, which would operate at LOS D or worse in all study periods, the new redistribution would limit extreme congestion to the 5-minute period, and allow lower congestion levels below capacity limits to prevail in the peak 15-minute period.

All platform zones would operate within LOSs calculated for the No Action conditions in 2010 in the 5- and 15-minute analysis periods, although again, some of these conditions would still be characterized as unacceptable. In 2020, Zone 5 for the southbound platform would remain as an unmitigated significant impact in the PM peak 5 minutes. Also, FCA 238 would be fully mitigated with an enlarged and reconfigured turnstile area (see Figure 9C-9).

One strategy to mitigate line-haul capacity impacts would be to add trains during the peak hour. Currently, dwell times at the 42nd Street station are long, resulting from high volumes of riders getting on and off Lexington Avenue line trains. A variety of initiatives, noted above, are designed to reduce dwell times to allow additional trains through the station. Operation of several additional trains in the peak hour is physically possible, and it is NYCT's policy to bring this about. To complement these measures, it is possible to modify stairwell configurations, add stairwells, and modify the design of the mezzanine level (described above) to better distribute passengers on the subway platform. This mitigation plan would at least partially mitigate line-haul impacts by spreading some of the platform crowding and reducing dwell times.

It is important to note that, separately from the East Side Access Project, MTA is dedicated to developing a Second Avenue subway to extend the entire length of Manhattan's East Side, bringing critical relief to the Lexington Avenue subway. The alignment would extend generally along Second Avenue from 125th Street in East Harlem to the Financial District in Lower Manhattan. The goal of the Second Avenue subway is to improve mobility and reduce crowding on the East Side of Manhattan, including the reduction of peak hour

Table 9C-33
MITIGATED PREFERRED ALTERNATIVE AM AND PM PEAK PERIOD LEVEL-OF-SERVICE (LOS) ANALYSIS OF PEDESTRIAN CIRCULATION ELEMENTS WITHIN GRAND CENTRAL TERMINAL

Pedestrian Element		Peak 5 Minutes within Peak AM 15 - Minute Period			Peak AM 15 - Minute Period		
Location	Section	2010 LOS	2020 LOS	Mitigation Measure	2010 LOS	2020 LOS	Mitigation Measure
5. Eastern IRT Subway Stairs	Stairs	D	D	Reassigned pedestrian flows into "free" shuttle passageway.	C	C	Reassigned pedestrian flows into "free" shuttle passageway.
6. Western IRT Subway Stairs / Escalators	Stairs	F*	F*	Reassigned pedestrian flows into "free" shuttle passageway.	E*	E*	Reassigned pedestrian flows into "free" shuttle passageway.
12. West Stairs / Escalators	North Stairs from LC	D	E	Although significant impact noted, a more balanced flow and acceptable	D	D	Although significant impact noted, a more balanced flow and acceptable
	South Stairs from LC	A	A	LOS between north and south stairs will likely result.	A	A	LOS between north and south stairs will likely result.
	Up Escalators	over capacity	over capacity	Direct both escalators up in AM (reassign down flow to nearest stair).	over capacity	over capacity	Direct both escalators up in AM (reassign down flow to nearest stair).
13. 43rd St. Stairs in Biltmore Room	Stairs	NA	D	Direct both escalators up in AM (reassign down flow to nearest stair).	NA	—	—

Pedestrian Element		Peak 5 Minutes within Peak PM 15 - Minute Period			Peak PM 15 - Minute Period		
Location	Section	2010 LOS	2020 LOS	Mitigation Measure	2010 LOS	2020 LOS	Mitigation Measure
5. Eastern IRT Subway Stairs	Stairs	C	D	Reassigned pedestrian flows into "free" shuttle passageway.	C	C	Reassigned pedestrian flows into "free" shuttle passageway.
6. Western IRT Subway Stairs / Escalators	Stairs	F*	F*	Reassigned pedestrian flows into "free" shuttle passageway.	E*	E*	Reassigned pedestrian flows into "free" shuttle passageway.
12. West Stairs / Escalators	North Stairs from LC	D	D	Although significant impact noted, a more balanced flow and acceptable	D	D	Although significant impact noted, a more balanced flow and acceptable
	South Stairs from LC	A	A	LOS between north and south stairs will likely result.	A	A	LOS between north and south stairs will likely result.
	Down Escalators	under capacity	over capacity	Direct both escalators down in PM (reassign up flow to nearest stair).	under capacity	under capacity	Direct both escalators down in PM (reassign up flow to nearest stair).

*NOT FULLY MITIGATED SIGNIFICANT IMPACT

demand on the Lexington Avenue express subway lines, reducing delays in passenger loading and unloading at major stations, including 42nd Street, and thus increasing train capacity by allowing better train throughput. A total of $1.05 billion has been allocated in the MTA's 2000-2004 Capital Program for a full-length Second Avenue subway project.

MTA NYCT is currently conducting the Manhattan East Side Alternatives (MESA) Study, which is the planning effort for the northern element of the full build subway. The MESA Study has identified several alternatives, including construction of the northern portion of the Second Avenue subway from 125th Street to 63rd Street, continuing via the unused Broadway line express tracks to West Midtown and Lower Manhattan. The MESA Study is an important and necessary step in the planning for the Second Avenue subway project.

The impact of the Second Avenue subway in conjunction with the Preferred Alternative would be to alleviate conditions on the Lexington Avenue line, particularly at the Grand Central subway station. In particular, the Second Avenue subway would divert riders from the Lexington Avenue line, bringing operations to below capacity on the Lexington Avenue line. With this improvement, the new subway riders generated by the Preferred Alternative would no longer exacerbate existing crowding in the subway system. Therefore, the Preferred Alternative would no longer result in significant adverse impacts on station elements and line-haul crowding in the subway. Nonetheless, construction of the Second Avenue subway, which is itself a multibillion dollar undertaking, must be considered as a separate and distinct project serving independent goals and objectives, rather than as related to East Side Access.

Other Subway Lines

Although the Preferred Alternative would create significant impacts on the Lexington Avenue subway line, it would also produce benefits on other subway lines through the diversion of riders from those lines to the Lexington Avenue line. For example, ridership projections developed for the project indicate that ridership on the south- and northbound 1/2/3/9 Seventh Avenue lines through its 34th Street station would decrease by about 700 riders and 85 riders, respectively, in the AM peak hour. Since many of these Seventh Avenue subway riders subsequently transfer to the 42nd Street shuttle, there would also be a decrease in load levels on that crosstown line. This is because many LIRR commuters who presently arrive at Penn Station who transfer to the 1/2/3/9 Seventh Avenue lines and then to the shuttle, would be able to take direct LIRR service into GCT. Ridership on the south- and northbound B/D/F/Q Sixth Avenue lines would decrease by about 120 and 500 riders, respectively. Ridership on the southbound N/R Broadway lines would decrease by about 215 riders.

The Preferred Alternative would substantially reduce demands on the A/C/E subway lines, especially in the northbound (uptown) direction in the AM peak. With the Preferred Alternative, LIRR commuters would no longer choose to use the E train to travel from Penn Station to East Midtown, or the A and C express trains to transfer to those E trains. In year 2010, there would be a reduction of about 6,000 riders on these lines (combined) in the AM peak hour, and about 13,600 fewer riders in the four-hour AM peak period. Southbound A/C/E ridership would decrease by about 200 in the AM peak hour and 500 in the four-hour peak period. Similar, or slightly higher, benefits would occur in 2020. Queuing at stairwells, corridors, token booths, turnstiles, and platforms would all be reduced significantly as a result of the Preferred Alternative.

There would also be benefits to the westbound IRT No. 7 Flushing line in Queens, since more than half of LIRR commuters who presently transfer at the LIRR's Hunterspoint Avenue terminal station and take the Flushing line to East Side destinations would be able to take LIRR trains directly into GCT. Ridership projections indicate that there would be about 1,200 fewer riders on the westbound No. 7 train in the AM peak hour. There would also be ridership reduction benefits at the LIRR's Flatbush Avenue terminal station in Brooklyn, which connects with the Lexington Avenue 4/5/6 lines and currently brings LIRR riders to Lower Manhattan. About 650 riders are projected to divert from the Flatbush Avenue station (and its connecting northbound 4 and 5 lines) to GCT.

Pedestrian Conditions at Street Level

The analysis of pedestrian impacts included identifying likely pedestrian paths into and out of GCT and along neighboring streets, analyzing future LOSs, including GCN circulation improvements, and identifying mitigation needed to relieve significant impacts.

The assignment of new pedestrian trips concentrated on the sidewalks surrounding GCT and to points through and out of the main traffic study area (40th through 48th Streets, Third through Fifth Avenues), outside of which these walking platoons would be less concentrated and their effects less discernable. In general, pedestrians tend to utilize the GCT interior passageways before moving outside; this is consistent in the manner in which pedestrians were assigned from LIRR trains.

In the AM peak hour, LIRR-generated pedestrian flows would increase by as much as 900 to, at one particular corner, *2,600* per hour at the 48th Street/Park Avenue corner where the GCN element at the Westvaco building would draw a significant proportion of new LIRR commuters. Pedestrians crossing the 45th Street midblock to use the Helmsley Walk arcades between Vanderbilt and Lexington Avenues would increase by about *2,440*, about a 30 percent increase. Across Vanderbilt Avenue at 42nd Street (GCT's southwest corner), almost *550* more pedestrians would be added (a *12* percent increase). The crosswalks at GCT's southeast corner at 42nd and Lexington would increase by an additional *170* to *380* pedestrians. Madison Avenue's east side crosswalks at 44th and 45th Streets would be used by an additional *760* to *980* north/south pedestrians, a near doubling of future flows. Between 48th and 49th Streets, incremental pedestrian flows on the east sidewalks would range between *2,300* and *3,300* pedestrians, one of the highest single loaded locations, since it is very near the LIRR's new 48th Street underground cross passage and since many pedestrians would be destined to areas northwest of GCT.

During the PM peak hours, while the LIRR-generated pedestrian flows would be about 15 percent lower than the comparable AM peak periods, there would tend to be more pedestrian impacts, since there appears to be a significant portion of sidewalk space already lost to bus passenger queues and store refuse placed outside. Incremental LIRR pedestrian flows during the midday hour are typically about 25 percent of the combined peak AM and PM flows. Assigned flows are generally between 100 and 400 pedestrians per location, with a high of *770* to *1,420* using the east side of Madison Avenue between 48th and 49th Streets near a new LIRR GCN element there.

The impact assessment does not account for two unique phenomena that occur in Midtown as pedestrians attempt to shorten their travel time. The first is called "checkerboarding." Platoons of pedestrians tend to continue their walk by using the crosswalk that has the green signal rather than wait at street corners. The second pattern occurs when side streets are given green signal

time, but do not have a heavy vehicle flow along them. During such cases, pedestrians take advantage of such gaps and cross diagonally across the avenue and never reach the approaching corner. This frequently takes place along Madison Avenue during the AM peak hours when northbound traffic flows out of Midtown are low, and there are often times when unused signal time prevails. The effect of these phenomena is that the LOS computed by the *HCM* and CEQR analysis methodologies may actually be somewhat worse than what actually occurs. Actual field reconnaissances showed that much of the predicted queuing does not occur at all.

The findings of the on-street pedestrian LOS analyses indicate that pedestrian conditions would continue to deteriorate from those under the No Action Alternative (see Tables 9C-34 through 9C-36). There would appear to be a mix of slight congestion (LOS D) to extreme bunching or even stoppages (LOS F) in the year 2010. This is not surprising, since some paths into and out of GCT are more "popular" than others. Some specific examples follow.

Table 9C-34

2010 Preferred Alternative Corner Reservoir Pedestrian Levels of Service: GCT Study Area

Location	Corner	AM	Midday	PM
Lexington Avenue at 42nd Street	Northwest	E*	C	D
Lexington Avenue at 45th Street	Southwest	D	E	D
Madison Avenue at 43rd Street	Northeast	D	C	C
	Southeast	D	C	C
Madison Avenue at 44th Street	Northeast	C	C	C
	Southeast	D	D	D
Madison Avenue at 45th Street	Northeast	E*	D	E*
	Southeast	C	C	D
Madison Avenue at 46th Street	Northeast	B	B	C
	Southeast	D	C	C
Madison Avenue at 47th Street	Northeast	C	B	C
	Southeast	C	D	D
Madison Avenue at 48th Street	Northeast	D	C	D
	Southeast	B	B	B
Vanderbilt Avenue at 42nd Street	Northeast	C	B	C
Vanderbilt Avenue at 44th Street	Northwest	B	B	B
Vanderbilt Avenue at 45th Street	Northwest	C	D	D
	Southwest	B	C	C
	Southeast	B	C	C
Vanderbilt Avenue at 46th Street	Northeast	B	C	B
	Southeast	B	C	B
	Northwest	B	B	B
	Southwest	B	C	B
Vanderbilt Avenue at 47th Street	Southwest	B	B	B
Park Avenue at 48th Street	Northeast	C	B	C
	Southwest	B	B	B

Note: * Significant impact.

Table 9C-35
2010 Preferred Alternative Crosswalk Pedestrian Levels of Service: GCT Study Area

Location	Crosswalk	AM	Midday	PM
Lexington Avenue at 42nd Street	North	E	D	E
	West	E*	D	E*
Lexington Avenue at 43rd Street	North	E	N/A	N/A
Lexington Avenue at 45th Street	South	C	D	C
	West	D	D	D
Madison Avenue at 43rd Street	North	D	B	D
	East	E*	E*	E*
	South	D	C	D
Madison Avenue at 44th Street	North	C	B	C
	East	D	E*	E*
	South	D	D	C
Madison Avenue at 45th Street	North	E	C	D
	East	D	D	E*
	South	C	C	D
Madison Avenue at 46th Street	North	B	B	B
	East	E	E*	E*
	South	D	C	C
Madison Avenue at 47th Street	North	D	B	D
	East	D	E*	E*
	South	C	C	C
Madison Avenue at 48th Street	North	E*	D	D
	East	E*	E*	E*
	South	C	C	C
Vanderbilt Avenue at 42nd Street	North	E	E*	E
	East	D	C	C
Vanderbilt Avenue at 44th Street	North	D	C	C
	West	C	C	C
Vanderbilt Avenue at 45th Street	North	D	E	D
	East	D	D	D
	South	D	E	E
	West	C	C	C
Vanderbilt Avenue at 46th Street	North	B	C	B
	East	C	D	C
	South	B	D	B
	West	C	C	C
Vanderbilt Avenue at 47th Street	South	C	C	C
	West	C	C	C
Park Avenue at 48th Street	North	B	B	B
	East	D	C	D
	South	B	B	B
	West	D	D	D
Park Avenue at 42nd Street	East	D	C	C
	West	C	C	D

Note: * Significant impact.

Table 9C-36

2010 Preferred Alternative Mid-Block Pedestrian Levels of Service: GCT Study Area

Location	Street Side	Platoon LOS		
		AM	Midday	PM
Lexington Avenue between 43rd and 44th Streets	West	E	D	E
Madison Avenue between 43rd and 44th Streets	East	C	C	C
Madison Avenue between 44th and 45th Streets	East	C	C	D
Madison Avenue between 45th and 46th Streets	East	D	C	D
Madison Avenue between 46th and 47th Streets	East	C	C	D
Madison Avenue between 47th and 48th Streets	East	D	D	D
Vanderbilt Avenue between 45th and 46th Streets	East	B	B	C
	West	B	B	B
Vanderbilt Avenue between 46th and 47th Streets	East	B	B	B
	West	B	B	B
43rd Street between Madison and Vanderbilt Avenues	North	E*	C	E
	South	C	C	C
45th Street between Madison and Vanderbilt Avenues	North	C	C	C
	South	D	D	E*
46th Street between Madison and Vanderbilt Avenues	North	B	B	B
	South	B	B	B
47th Street between Park and Lexington Avenues	South	B	B	B
47th Street between Vanderbilt and Park Avenues	North	B	B	B
	South	B	B	B
47th Street between Vanderbilt and Madison Avenues	North	B	B	B
	South	B	B	B
48th Street between Park and Lexington Avenues	North	B	B	B
48th Street between Madison and Park Avenues	South	C	B	C

Note: * Significant impact.

During the AM peak period, two of the corners of the GCT "superblock" would deteriorate to near- or over-capacity conditions. At the Lexington Avenue corners at 42nd and 45th Streets, LOS E conditions would prevail in the reservoir areas. In the AM and PM peak periods, significant pedestrian impacts would occur at Madison Avenue's 43rd to 48th Street crosswalks and at the 42nd Street crosswalks at Lexington and Vanderbilt Avenues in the respective AM and midday periods.

Two specific midblock locations directly outside GCT exits, between Madison and Vanderbilt Avenues on 43rd Street (north side) and 45th Street (south side), would be significantly impacted during the respective AM and PM peak periods. While there would be no other significant pedestrian impacts in the area, there would be a significant increase in the number of people walking through this area that create LOSs at near-threshold congested conditions. Also, since some crosswalks would be significantly affected, there could be some ripple effects along the sidewalk areas just upstream. In fact, this is evidenced today as people cross midblock and sometimes dodge traffic to avoid the crowded crosswalks. The types of measures that would clear more sidewalk space and avail pedestrians of more walking capacity are discussed below.

One practical mitigation strategy that could be employed to the sidewalk areas around GCT is clearing or limiting street furniture and other impediments that block the paths of pedestrians. Some would require permanent relocation, others would need to be eliminated completely, while still other clearances would need regular enforcement to prevent recurrence. Since many

of these are considered pedestrian amenities, there is some trade-off between amenities and additional pedestrian flow capacity. *The mitigation strategies would be implemented by the New York City Department of Transportation, if it determines the measures are warranted.*

During different time periods, the area's already narrow sidewalks are cramped considerably by a variety of conditions. In the AM, refuse bags left at corners near their containers await pickups by New York City Department of Sanitation or private carters, create restrictions in reservoir spaces, and can narrow crosswalks themselves, since pedestrians walk paths have been altered at their crossing origin. One measure to clear sidewalk space is a quick removal of these obstructions, perhaps on a half-hourly basis, by a roving collector during weekday peak periods. Sidewalk vendors could be removed through active enforcement by police personnel. Newspaper kiosks and flower boxes could be eliminated or shifted to other, less-obtrusive, areas.

During the PM peak periods when many pedestrians are homebound, sidewalks are made even narrower by long queues of people awaiting private express and local buses along nearly each block along Madison Avenue in Midtown. Just about each block along Madison Avenue has four or more bus stops along it. There are two blocks, however, that have only one or no bus stops, those being the 43rd through 44th and 50th through 51st blockfaces which are free of any bus stop paraphernalia, such as sign posts and shelters that constrict walk space. At these locations, there is considerably more maneuverability afforded to pedestrians in their travels. It may be possible that the five blocks between 43rd and 48th Streets have to be cleared entirely of any bus stops, since this is the area adjacent to GCT and its new access locations. In doing so, the clear conditions at the bus stop-free blocks can be replicated in this area. However, since this may create additional sidewalk crowding at nearby blocks for people boarding their buses there, and impact those riders, this is not necessarily recommended, but the concept could be studied further.

Another sidewalk interference noted during the late afternoon hours occurs when store merchants place their rubbish either at the curb or next to their front door to await private-carter pickup. The Grand Central Partnership (GCP) can enforce storage restrictions to, say, after 6 PM when the commuter pedestrian flows have abated, and the need for maximum sidewalk space has lessened.

Other scattered fixed objects force pedestrians to weave in and out to avoid contact which, in turn, reduces sidewalk capacities. Some objects can be modified (in accordance with the requirements of the Americans with Disabilities Act) and many should be moved or eliminated, since their presence is not essential, as examples that follow show. Refuse containers' shape, size, and position can be changed to a rectangular form with smaller dimensions and positioned directly along the curb (an area that is usually not utilized by walkers), instead of jutting out in the middle of pedestrian sidewalk space. GCP newspaper kiosks are one example of a better shaped form; however, these, too, are located about 2 feet in from the curb, which has actually created a small "dead zone" on the sidewalk that, with a slight shift of the kiosk closer to the curb, can be reclaimed as usable sidewalk space. Private bus companies have placed large concrete blocks haphazardly along curbs to hold their sign posts. The GCP has placed many various-sized planters either along the curb or against buildings that can be relocated. The east side of Madison Avenue between 43rd and 44th Streets has two modest-sized trees contained in ground-level fenced planters that could be transplanted elsewhere. *Should the project require removal of any street trees (or should the New York City Department of Transportation or other entities determine it appropriate), those trees would be replaced pursuant to the*

New York City Department of Parks and Recreation's (DPR) Basal Area Replacement Formula, in consultation with DPR.

For narrower 15-foot crosswalks that would operate over capacity, widening their widths to 20 feet would provide for additional pedestrian capacity; such widenings should not significantly decrease the amount of street space available for vehicles queuing. Also, any street furniture on the receiving sidewalk must be relocated to maximize the crosswalk widening's benefit.

Using these improvement measures at sidewalks and crosswalks indicate that most of the significant pedestrian impacts can be eliminated or reduced. For example, along 43rd Street between Madison and Vanderbilt Avenues, a cleared sidewalk would operate at a LOS D, with platoon spacings slightly better than indicated in No Action conditions. At GCT's southeast corner at the Lexington Avenue/42nd Street intersection, widened crosswalks with cleared corners would result in LOSs in the D/E range in the crosswalk, or the same conditions as in the 2010 No Action condition. At this same corner, cleared of street furniture and enlarged to match the widened crosswalk width, LOS D in the peak AM and PM periods would prevail to match No Action conditions. The northeast corner of Madison Avenue and 45th Street would operate at LOS C to D in the AM and PM peak periods with a cleared corner reservoir (see Tables 9C-37 and 9C-38).

Table 9C-37

Mitigated Preferred Alternative Corner Reservoir Pedestrian Levels of Service (Year 2010): GCT Study Area

Location	Corner	AM	Midday	PM
Lexington Avenue at 42nd Street	Northwest	D	C	C
Madison Avenue at 45th Street	Northeast	D	C	D

Table 9C-38

Mitigated Preferred Alternative Crosswalk Pedestrian Levels of Service (Year 2010): GCT Study Area

Location	Crosswalk	AM	Midday	PM
Lexington Avenue at 42nd Street	West/North	E	D	E
Madison Avenue at 43rd Street	East	E	E	D
Madison Avenue at 44th Street	East	D	E	D
Madison Avenue at 45th Street	East	D	D	D
Madison Avenue at 46th Street	East	D	D	E
Madison Avenue at 47th Street	North	D	D	E
Madison Avenue at 48th Street	North/East	E/D	C/E	D/E
Vanderbilt Avenue at 42nd Street	North	E	E	E

For year 2020 conditions, eight representative pedestrian locations were analyzed under the Preferred Alternative (Option 1) and compared to year 2020 No Action conditions. New significant pedestrian impacts were identified at two of the eight locations in the AM peak hour (at Vanderbilt Avenue/42nd Street and at Madison Avenue/45th Street), and at none of the eight analysis

locations in the midday and PM peak hours. Mitigation would consist of crosswalk widenings, similar to the measures identified for year 2010 impacts.

Buses

The Preferred Alternative would likely result in reduced ridership demand on bus routes that currently provide connecting service between Penn Station and East Midtown near GCT, such as the M4 and Q32, and increase bus ridership on routes that currently go past GCT into other areas of Manhattan that some commuters would consider slightly unwalkable but not warranting a trip on the subway. The ridership model identified the Manhattan zones to which LIRR riders coming into GCT would be destined. These new LIRR-to-bus riders were then "matched" to logical bus routes that would bring them to their destinations.

In determining the possible number of new buses required to meet this LIRR-to-bus demand, incremental peak hourly rider volumes were added to No Action levels, and then compared to NYCT Load Guidelines for each affected bus route. If the incremental ridership demand increased the No Action demand above these load guidelines, then the need for additional bus runs was identified by a NYCT Service Capacity Rating (i.e., volume-to-capacity ratio) of greater than 100 percent. The number of additional bus runs was determined by adding incremental service to lower the capacity rating to 100 percent or less. If the cumulative ridership demand remained less than the capacity threshold, no additional bus service would be needed. NYCT changes the service capacities over the course of the day depending on ridership demands. Thus, if the Preferred Alternative adds new riders to existing routes, it is possible that higher service ratings could be tolerated, thereby lowering the number of additional buses needed, and the figures presented in this section are conservative.

The bus routes subject to the highest ridership demand increases would be those that travel directly past GCT. The M101/102/103 bus routes would need up to *four* additional bus trips in the AM peak hour along its southbound Lexington Avenue portion and up to *two* additional bus trips in the PM peak hour along northbound Third Avenue. The M42 would require an extra *one* (PM) to *three* (AM) bus trips along 42nd Street. The buses traveling along Fifth Avenue (M1/2/3/4) would need up to *two* additional bus trips (see Table 9C-39).

While no analyses or rider surveys were conducted for the M4 and Q32 buses commencing their trips at Penn Station, it is reasonable to consider that existing load levels on these routes would decrease in the route segment leading up to GCT. It would also appear unlikely that bus service on either of these routes would be reduced due to lower ridership at the extreme southern end of the route at Penn Station, especially considering that there would be some new LIRR-to-bus riders using these same routes north of GCT.

PREFERRED ALTERNATIVE (OPTION 2)

As noted in Chapter 2, ("Project Alternatives"), Option 2 has been selected as the preferred engineering option for the East Side Access Project. Under *Option 2*, the LIRR platform/track level would be constructed *on a new level beneath the existing lower level of GCT. At the existing lower platform level, a new concourse would be created* as a waiting and retail area for LIRR passengers before they descend to *the platforms* below. The two *design concepts being considered for Option 2 vary in the layout of the tracks and platforms under Option 2: one concept would have eight tracks served by four platforms on one new lower level, approximately 90 feet below the new concourse and existing*

Table 9C-39
2010 Preferred Alternative Bus Ridership Levels: GCT Area

Route	No. of Buses	No Action Total Riders	No Action Riders/Bus	New Riders	Total Riders	Load Guideline	Service Capacity Rating	Additional Buses Needed
AM Peak Hour								
M1	12	610	51	*5-6*	*56-57*	60	*95%*	*0*
M2	9	535	59	*2-6*	*61-65*	55	*118%*	*2*
M3	7	410	59	*2-6*	*61-65*	54	*120%*	*2*
M42	36	2,495	69	*1*	*70*	65	*108%*	*3*
M98	8	475	59	*0*	*59*	55	*107%*	*1*
M101/102/103	24	1,440	60	*7-9*	*67-69*	60	*115%*	*4*
M104	19	910	48	*3*	*51*	60	*85%*	*0*
M4	16	910	57	*2-6*	*59-63*	60	*105%*	*1*
Q32	8	400	50	*3*	*53*	55	*96%*	*0*
PM Peak Hour								
M1	15	790	53	*2-5*	*55-58*	60	*97%*	*0*
M2	10	610	61	*2-5*	*63-66*	58	*114%*	*2*
M3	8	455	57	*2-5*	*59-62*	55	*113%*	*2*
M42	15	900	60	*2-3*	*62-63*	60	*105%*	*1*
M98	6	340	57	*0*	*57*	50	*114%*	*1*
M101/102/103	23	1,320	57	*6-8*	*63-65*	60	*108%*	*2*
M104	20	1,020	51	*5*	*56*	60	*93%*	*0*
M4	14	795	57	*2-5*	*59-62*	60	*103%*	*1*
Q32	8	455	57	*2*	*59*	55	*107%*	*1*

lower level at GCT, while the other concept would have eight tracks served by four platforms on two new levels, approximately 90 feet and 110 feet below the concourse level. To access the new concourse from the platforms, LIRR customers would use one of several escalator banks. Each bank would have four escalators, three of which would operate in the peak direction of travel. From the platforms, the escalators would connect to a series of east-west cross passages that would allow passengers to switch platforms below if needed. *From these mezzanine-level cross passages, escalators would rise to the concourse.* These four main levels (i.e., platform, mezzanine, *concourse*, street) would be connected by a number of vertical circulation elements, including high-efficiency escalators between the cross passages and mezzanine.

At the street level, with one exception, all street accesses detailed in the discussions of Option 1 earlier in this would be the same, with some minor shifting of positions along the same blockface. The single exception would be the street entrance into 200 Park Avenue at the southeast corner of 45th Street and Vanderbilt Avenue under Option 1, which would be eliminated under Option 2. In its place, another new street entrance would be constructed nearby along 44th Street between Vanderbilt and Madison Avenues to maintain the same total number of street access points, thus maintaining the same LIRR passenger assignments to Manhattan work destinations as in Option 1. In turn, traffic, taxi, bus, and street pedestrian impacts would be nearly the same as detailed in Option 1 since the same number of pedestrians would be assigned to the same street locations.

Both options would make use of the 47th Street cross passage, with one major difference. In Option 2, LIRR riders would use the same street accesses as described in Option 1. However, to access the *concourse* level, which would be below the 47th Street cross passage, LIRR riders would use a stair bank positioned near the existing west spine (i.e., the Northwest Passage) stairwell. While LIRR riders would have to use the existing cross passage, they would not queue and wait in it but rather walk through it as another link in their path to the *concourse* below and the street above. In Option 1, which would have no LIRR *concourse* level, LIRR platforms would be constructed just below the 47th Street cross passage, with their passengers being required to both walk along the cross passage and at times wait within it. Option 1 would also have a separate LIRR waiting space constructed just north of the 47th Street cross passage's west end; this separate waiting space would not be constructed nor needed in Option 2. LIRR patrons would also be able to access this waiting area via the LIRR 48th Street cross passage since this new waiting space would run the length of the block between 47th and 48th Streets.

For Option 2, LIRR passengers would still access the 47th Street cross passage and use a new vertical circulation element to descend to *the concourse* one level down. During the first 15 minutes when all train departures would be delayed, examining the cross passage's east and west ends in which only MNR passengers would wait and through which LIRR passengers were considered to only walk on their way to the *concourse* below, the analysis results indicate that conditions would be near capacity. In a 30-minute delay period, the analyses indicate that significant congestions would occur throughout the cross passage. The limit of capacity in the cross passage would be reached in about 36 minutes after a delay is first encountered, close to the 40-minute threshold under the No Action Alternative and as compared to 15 minutes under Option 1.

Many pedestrians destined to areas south of 42nd Street would walk through GCT as a link in their travel. A significant difference between Options 1 and 2 would be related to the means of processing people within GCT. In Option 1, pedestrians entering GCT would use one of two vertical circulation elements that carry people up directly into the Biltmore Room under 43rd Street. Pedestrians would also be able to enter GCT's Dining Concourse near and just west of track 116 after walking through a small waiting area at the south end of LIRR tracks. In Option 2, all pedestrians would first enter the Dining Concourse near track 116 to make their way upward using a number of vertical circulation elements available such as the Oyster Bar ramps and the new escalator bank bringing people up near the New York Transit Museum store. Since LIRR riders would be able to use any of the vertical circulation elements between GCT's Dining and *Main* Concourses, there would be little or no major shifts of pedestrian flows through either concourse from one option to the other.

In terms of impacts to the Lexington Avenue subway lines, both options would require all subway patrons to walk through GCT's Dining and Main Concourses to access the 42nd Street station. Thus, there would be no difference in the number of and paths used by pedestrians assigned into that subway station and in the level of impacts created.

MITIGATION MEASURES

VEHICULAR TRAFFIC

Increased taxi activity on streets near Grand Central Terminal would result in significant adverse impacts at up to 12 intersections during peak hours. Mitigation for these impacts, which is the responsibility of the New York City Department of Transportation as part of

their normal procedures, consists of standard traffic engineering improvements, such as signal phasing and timing modifications, more restrictive parking regulations, and by providing exclusive phases (e.g., left-turn arrows) for turning movements at some intersections to minimize conflicts with crossing pedestrians. These measures would be implemented if the New York City Department of Transportation deems them warranted upon project completion. Table 9C-40 summarizes the traffic mitigation measures that may be warranted for East Side Access.

PARKING

No significant adverse impacts on parking conditions in Manhattan would occur as a result of the Preferred Alternative; therefore, no mitigation is required.

COMMUTER RAIL

The Preferred Alternative would not result in significant adverse impacts on commuter rail operations; no mitigation is required.

SUBWAYS

With the East Side Access Project, a number of improvements would be made to elements of the New York City Transit Lexington Avenue line subway station at 42nd Street/Grand Central Terminal. These measures are designed to mitigate congestion on stairwells, platforms, and line-haul capacity of the Lexington Avenue subway by improving circulation patterns and train throughput. The specific mitigation measures are as follows:

- *Increase use of the free passage connecting NYCT fare control area 236 at the shuttle turnstile area entrance and fare control area 238 at the Lexington Avenue line western turnstile bank.*
- *Create a new turnstile bank just west of fare control area 238 to attract passengers from the free passageway area into the mezzanine area and relieve use of the western stair/escalator bank.*
- *Widen the corridor mouth into space currently occupied by the Pershing Building's basement to create a new stair P10.*
- *Restore stair P16.*
- *Enlarge fare control area 238's turnstile line farther east into the mezzanine area.*

BUSES

Increases in demand for bus service in the vicinity of Grand Central Terminal would be mitigated by NYCT as demand dictates, through the adjustment of bus schedules and frequencies, as is their policy.

PEDESTRIAN CONDITIONS

Increased pedestrian flows in Grand Central Terminal would result in a significant adverse impact at the escalator bank leading to the New York Transit Museum store on the west side of the Main Concourse. Partial mitigation for this impact could be achieved through

Table 9C-40†

Summary of Mitigation Measures for the Preferred Alternative 2010, Grand Central Terminal Area

Intersection	No Action	Preferred Alternative	Mitigated	Mitigation Measure
AM PEAK HOUR				
Madison Avenue & 41st Street	C	F*	B	Prohibit parking on northside of EB lanes to create a left-turn lane; provide a protected EB LT phase.
Park Avenue & 42nd Street	F*	F*	F*	Prohibit parking on the NB lanes to provide 2 RT/1 LT lanes; adjust signal timing to provide protected NB movement.
Park Avenue & 46th Street	F*	F*	C	Remove parking on the SB lanes to provide 2 LT/ 2 RT lanes.
Park Avenue & 47th Street	C	F*	B	Provide protected NB/SB phase.
Park Avenue & 48th Street	F*	F*	B	Provide a protected NB/SB phase; daylight the south curb of the EB approach.
Lexington Avenue & 43rd Street	C	F*	B	Provide protected WB signal phase.
Third Avenue & 41st Street	B	F*	B	Provide protected EB/WB signal phase.
Third Avenue & 42nd Street	F*	F*	D	Provide protected EB/WB signal phase.
Third Avenue & 43rd Street	F*	F*	B	Prohibit parking on northside of WB lanes to create an exclusive RT lane; provide protected WB signal phase.
Third Avenue & 45th Street	B	B	B	Prohibit parking on northside of WB lanes to create an exclusive RT lane.
Third Avenue & 46th Street	B	F*	B	Prohibit parking on northside of EB lanes to create an exclusive LT lane.
Third Avenue & 48th Street	F*	F*	B	Prohibit parking on northside of EB lanes to create an exclusive LT lane.
MIDDAY PEAK HOUR				
Park Avenue & 42nd Street	F*	F*	F*	Prohibit parking on north side of EB lanes to create 2 RT/1 LT lanes; adjust signal timing to provide a protected NB movement and shift green time from the NB phase to the EB/WB phase.
Park Avenue & 48th Street	C	C	B	Same as AM.
Lexington Avenue & 43rd Street	B	F*	B	Same as AM.
Third Avenue & 42nd Street	F*	F*	D	Provide protected NB signal phase; shift green time from the NB phase to the EB/WB phase; prohibit parking on westside of EB lanes.
Third Avenue & 43rd Street	B	B	B	Shift green time from the NB phase to the WB phase.
Third Avenue & 48th Street	C	F*	C	Prohibit parking on northside of EB lanes to create an exclusive LT lane.
PM PEAK HOUR				
Sixth Avenue & 42nd Street	F*	F*	F*	Prohibit parking along the NB lanes to provide 2 RT/1 LT; adjust signal timing to provide a protected NB movement and shift green time from the NB phase to the EB/WB phase.
Park Avenue & 42nd Street	F*	F*	F*	Same as midday.
Park Avenue & 47th Street	B	B	B	Provide protected NB/SB signal phase.
Park Avenue & 48th Street	C	C	B	Same as AM.
Lexington Avenue & 43rd Street	C	F*	C	Same as AM.
Third Avenue & 41st Street	B	B	B	Prohibit parking on northside of WB lanes.
Third Avenue & 42nd Street	F*	F*	D	Same as AM.
Third Avenue & 43rd Street	B	B	B	Same as midday.

Note: * Indicates that delay and LOS are not meaningful because v/c is greater than 1.2. It is beyond the scope of HCM to assess delay for an approach operating in oversaturated conditions.

† ***Note:*** *This entire table is new to the FEIS.*

redirection of the escalator so both elements operate in the peak direction, if warranted upon completion of the project.

Outside the terminal, for significant impacts on sidewalks and at crosswalks due to the increase in pedestrian activity in the Grand Central Terminal area, mitigation measures identified include widening of crosswalks in some locations. In other locations, the New York City Department of Transportation may choose to limit sidewalk vendors and/or street furniture such as newspaper kiosks and flower boxes to create more sidewalk capacity. These measures would be implemented if the New York City Department deems them warranted upon project completion. ❖

D. SUNNYSIDE/LONG ISLAND CITY AREA

The Preferred Alternative of the East Side Access Project would create a new station adjacent to Sunnyside Yard, underneath the Queens Boulevard viaduct. This new station would be expected to serve primarily LIRR commuters who work in the local area, and provide another option for LIRR commuters who wish to transfer to the subway en route to destinations in Manhattan. The majority of LIRR commuters using this station would likely walk from the station to their workplace, or could transfer to the subway for a short second "leg" of their overall trip. A modest number would use buses or taxis to reach their final trip destination. Overall, these would not be significant impacts in the Sunnyside/Long Island City area, as is documented in this section of the EIS.

EXISTING CONDITIONS

TRAFFIC

The Sunnyside area is the focus of substantial traffic volumes, including traffic destined to the immediate area as well as through-traffic en route to work places just over the Queensboro Bridge in Manhattan. The major east-west traffic arterial in the area is Queens Boulevard, which leads directly onto the lower level of the Queensboro Bridge. It is heavily trafficked during both the AM and PM peak periods (westbound into Manhattan in the AM, and eastbound out from Manhattan in the PM). Since the Queensboro Bridge is not a tolled facility (as opposed to the Queens-Midtown Tunnel about 1 mile south), it attracts a high volume of commuter traffic either via Queens Boulevard or via the Long Island Expressway en route to the bridge's upper and lower levels via northbound Van Dam Street.

A set of four representative critical locations was selected for detailed analysis: Queens Boulevard at Van Dam Street and Thomson Avenue, a critical location comprising two intersections where motorists decide whether to continue on Queens Boulevard toward Manhattan via the lower level of the Queensboro Bridge, or turn onto Thomson Avenue to travel to Manhattan via the upper level of the bridge; Queens Boulevard at Skillman and Jackson Avenues, which are the two critical intersections at the east and west ends of the Queens Boulevard viaduct over the Sunnyside Yards, the site of the proposed Sunnyside station; and the intersection of Northern Boulevard, Queens Plaza North, and 41st Avenue, another important intersection for traffic from the north heading into both the study area and toward the bridge. The ridership projections for Sunnyside station do not indicate that there would be a substantial volume of vehicle trips to and from this station, so this set of four heavily trafficked locations near the station site would indicate the potential for traffic impacts from the East Side Access Project.

Traffic conditions along the corridors leading into the area and to and from the upper and lower levels of the Queensboro Bridge are highly congested during the AM and PM peak traffic hours and throughout much of the extended peak periods. As shown in Table 9D-1, all four locations analyzed in the AM peak hour are operating at congested level of service (LOS) F* conditions (with the F* indicating that at least one traffic movement at the intersection is operating at severe congestion levels). During the PM peak hour, three of the four intersections operate at LOS F* conditions, with the fourth intersection at overall LOS D. These LOS findings depict the bumper-to-bumper conditions in the area along the Queens Boulevard/Queens Plaza North and South corridor during peak commuter hours.

Table 9D-1
Existing Traffic Level of Service Summaries: Sunnyside Study Area

Intersection	LOS	
	AM	PM
Queens Boulevard and Van Dam Street/Thomson Avenue	F*	F*
Queens Boulevard and Skillman Avenue	F*	F*
Queens Boulevard and Jackson Avenue/Queens Plaza East	F*	F*
Northern Boulevard and Queens Plaza North/ 41st Avenue	F*	D
Note: Overall intersection LOS is shown.		

PARKING

The Sunnyside/Long Island City area has a number of parking lots and garages available to the public. Most prominent in this supply is the Municipal Garage, operated by Kinney and located at the southwest corner of Queens Plaza South and Jackson Avenue. This parking facility has a capacity of 1,038 spaces and is typically about 80 percent occupied on weekdays. There are other smaller parking facilities in the general area; however, it is not expected that there would be a significant level of park-and-ride activity at the proposed Sunnyside station. Most riders would walk to or from their local origins/destinations, some would take subways or buses, and a small number would use taxis or be dropped off or picked up by car. Therefore, a complete inventory of available parking facilities was not needed for this EIS.

PEDESTRIANS

Sections of Sunnyside/Long Island City that are reasonably close to the proposed Sunnyside station are characterized by moderate levels of pedestrian activity. These activity levels are heaviest in the vicinity of Queens Plaza, where there is a significant amount of employment, and east of the proposed station location near LaGuardia Community College and other destinations below Thomson Avenue and east of Skillman Avenue.

The LIRR Sunnyside station would be located directly under the Queens Boulevard viaduct over the Sunnyside yards. The destination of LIRR commuters leaving the station would likely be oriented either west to employment areas near Queens Plaza or southeast to employment/educational destinations south of Thomson Avenue. Therefore, two pedestrian analysis locations were selected for detailed study: crosswalks and corner reservoir areas at Queens Boulevard/Jackson Avenue in the Queens Plaza area; and crosswalks and corner reservoir areas at the intersection of Queens Boulevard, Thomson Avenue, and Van Dam Street.

Pedestrian volumes were counted during September 1999, when LaGuardia Community College opened after Labor Day. These counts indicated that pedestrian volumes are light at Queens Boulevard/Jackson Avenue (20 to 30 pedestrians use its crosswalks during the AM, midday, and PM peak 15-minute periods). Pedestrian volumes are somewhat heavier at Queens Boulevard/ Thomson Avenue/Van Dam Street, since commuting students use these crosswalks from the Rawson/33rd Street station of the No. 7 Flushing line just east of the intersection. Pedestrian volume counts ranged from a low of about 50-70 people using the north-south crosswalk of Thomson Avenue in the midday and PM, to a high of about 700 people crossing Van Dam Street

in the AM peak period. Pedestrian LOS analyses indicated that pedestrian conditions are acceptable for all crosswalk and corner reservoir areas analyzed, with one exception. The south crosswalk of Van Dam Street is very busy as it connects the main LaGuardia College building to the nearby No. 7 Flushing line a few blocks to the east. LOSs at this crosswalk are between C and D during all peak analysis periods, indicating some slight pedestrian congestion.

SUBWAYS

The Sunnyside/Long Island City area is served by a significant amount of subway service. This includes stations along several lines—the E, F, G, and R lines at the Queens Plaza station; the N and No. 7 lines at Queensboro Plaza station; and the No. 7 line at the Rawson/33rd Street station. These lines carry substantial passenger volumes into and out of Manhattan in the AM and PM peak periods. Crowding is severe on the E and F lines in the rush hours, even though the combined headway on these lines is among the shortest in the subway system. Subway operations along the E, F, and No. 7 lines during these periods approach or match the theoretical capacity of their respective tunnels into Manhattan (i.e., the Steinway and 53rd Street tunnels, respectively).

The Queens Plaza and Rawson/33rd Street stations are also significantly used in the AM and PM peak periods. The Queens Plaza station is used by subway riders exiting the system for work destinations in the immediate area, and by auto commuters who park at the Municipal Garage at the southwest corner of Queens Plaza/Jackson Avenue and then board one of the various subway routes traveling to Manhattan. The 33rd Street station is heavily used by LaGuardia Community College students going to school. It is not anticipated that the volume of LIRR commuters who may transfer to one of these subway lines would be enough to create significant impacts on subway services or conditions, so further analyses were not warranted.

BUSES

The proposed LIRR Sunnyside station would be located near five local and four express bus routes, which are operated either by NYCT, Green Bus Lines, the Queens Surface Corporation, or the Triboro Coach Corporation. The Q32 and Q60 routes, operated by NYCT and Green Lines, respectively, provide local bus service along Queens Boulevard. Each operates at 8-minute headways (planned time intervals between buses) during the peak periods. The X51, X63, X64, and X68 routes, operated by NYCT, provide express bus service along Queens Boulevard from different sections of north- and southeast Queens. Their headways vary, but are generally in the 10-20 minute range in peak periods. The Triboro Coach route Q39 originates in the Ridgewood section of central Queens and operates along 48th Avenue, Van Dam Street, and Thomson Avenue within the study area, at 4-minute headways in the AM peak and 7-minute headways in the PM peak. The Q101 operated by Queens Surface extends from Astoria, Queens, to 59th Street/Second Avenue in Manhattan via Steinway Street and Northern Boulevard. It operates at a 15-minute headway in the AM peak and a 20-minute headway in the PM peak.

Although nearly all of these routes are within a reasonable distance of the proposed Sunnyside station, it is not anticipated that a significant volume of LIRR riders would access the station by bus. Therefore, an analysis of bus load levels was not needed for this EIS.

FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

For future year 2010 conditions, existing traffic volumes were increased by a background growth rate of 0.5 percent per year, which is higher than assumed background traffic growth rates in the GCT area, as suggested in New York City's *CEQR Technical Manual.* Vehicle traffic that is expected to be generated by two major actions—the full buildout of the Queens West/ Hunters Point Waterfront Development Project planned to encompass approximately 9 million square feet of new commercial and residential space, and the traffic expected to be generated by the New York City Department of City Planning's proposed rezoning of a 32-block area in Long Island City—was also included.

Overall, these two actions—Queens West and Long Island City rezoning—would generate a substantial volume of vehicle trips in the AM and PM peak hours throughout the area, a percentage of which would pass through the four intersections analyzed in this EIS. Between existing conditions and year 2010 No Action conditions, traffic volumes through the four analysis locations are projected to increase by about 15 percent overall (increases range from intersection to intersection).

For traffic impact analyses under the No Action and Preferred Alternatives, the same significant impact criteria defined earlier in this for the Grand Central Terminal area were also used for the Sunnyside area: (1) No Action LOS A, B, C, or D deteriorating to LOS E or F under conditions with the Preferred Alternative, providing that the average vehicle delay increase is 10 seconds or more; and (2) No Action LOS E deteriorating to LOS F for the conditions with the Preferred Alternative providing that the average vehicle delay increases by 10 seconds or more. Deterioration from the No Action condition to the Preferred Alternative condition within either LOS E or F with 10 seconds or more of additional delay is defined as a significant worsening of a preexisting problem.

Since the analyses conducted for year 2010 conditions under the Preferred Alternative (see following section) indicated that there would be no significant impacts, and year 2020 demands would be only marginally higher, year 2020 analyses were not needed.

PROBABLE IMPACTS OF THE PROJECT ALTERNATIVES

NO ACTION ALTERNATIVE

As shown in Table 9D-2, intersections currently operating at LOS F* would deteriorate further, with increased traffic delays at each location. The one intersection operating at overall LOS D in the PM peak hour would deteriorate to overall LOS F*. Pedestrian analysis locations currently operating at LOS A or B conditions would remain at those levels of service. There would be no significant deterioration at any of the street corners or crosswalks analyzed.

TSM ALTERNATIVE

Since there would be no LIRR station at Sunnyside under the TSM Alternative, conditions at Sunnyside would be the same as under the No Action Alternative. Under the TSM Alternative, additional LIRR ridership would transfer to the No. 7 Flushing subway line at its Hunterspoint Avenue station, adding approximately 530 riders on the No. 7 trains during the AM peak hour and further congestion to its operation.

Table 9D-2
No Action Traffic Level of Service Summaries: Sunnyside Study Area

Intersection	Existing		No Action	
	AM	PM	AM	PM
Queens Boulevard and Van Dam Street/ Thomson Avenue	F*	F*	F*	F*
Queens Boulevard and Skillman Avenue	F*	F*	F*	F*
Queens Boulevard and Jackson Avenue/ Queens Plaza East	F*	F*	F*	F*
Northern Boulevard and Queens Plaza North/ 41st Avenue	F*	D	F*	F*
Note: Overall intersection LOS is shown.				

PREFERRED ALTERNATIVE

The results of LIRR's ridership projections indicate that the proposed Sunnyside station would generate about 1,530 new travelers in the 4-hour AM peak period in the year 2010 (675 in the AM peak hour) and 1,300 new travelers in the 4-hour PM peak period (575 in the PM peak hour). It is estimated that 90 percent would walk to or from their local destinations, 9-10 percent would transfer to or from subways or buses, and 0.5 percent would be picked up or dropped off by car or taxi. There would be no commuter parking at the new station, so park-and-ride activity with LIRR service is not expected. In the AM and PM peak hours, just 16 and 13 vehicle trips are expected, respectively, counting auto or taxi dropoffs (or pickups) as two trips—one to and one leaving the station. This volume of generated vehicle traffic is less than the level of trip-making that might have a potential for impact—New York City's *CEQR Technical Manual* states that proposed actions generating fewer than 30 vehicle trips in the peak hour do not have the potential for significant traffic impacts and therefore do not require detailed analyses.

Similarly, expected levels of subway and bus use combined would total approximately 65 person-trips in the AM peak hour and 55 person-trips in the PM peak hour. Split among the various subway and bus routes, this level of increase does not indicate the potential for significant transit system impacts (the *CEQR Technical Manual*'s threshold for potential impacts is 100 person-trips in the peak hour).

Since the project-generated pedestrian trips within the Sunnyside area could be significant (this would include walk trips to local work or school destinations as well as walk trips to nearby subway and bus routes), a detailed analysis of pedestrian LOSs in the future with the Preferred Alternative was conducted. This analysis indicated that pedestrian LOSs would continue at acceptable conditions with the Preferred Alternative in place, except at the south crosswalk across Van Dam Street, which would worsen slightly within LOS C to D with the modest addition of 10 to 20 crossing pedestrians.

Additionally, the MTA has allocated $2 million in its 2000-2004 Capital Program to study improving pedestrian connections between the proposed East Side Access Sunnyside station and transit stations at Queens Plaza and Queensboro Plaza. This study would be conducted outside the scope of the East Side Access Project.

MITIGATION MEASURES

Since the Preferred Alternative of the East Side Access Project would not generate any significant traffic, parking, transit, or pedestrian impacts in the Sunnyside area, there would be no need for any mitigation measures. ❖

E. EASTERN QUEENS AND LONG ISLAND

The Preferred Alternative is expected to increase LIRR ridership systemwide, with additional ridership anticipated for virtually all stations. Manhattan-bound commuters from eastern Queens and Long Island would have additional train service available to them—more trains, more seats, and more flexibility to get to East Side as well as West Side destinations. Most LIRR commuters traveling to and from their stations do so by car; therefore, the analysis of traffic and transportation conditions in Eastern Queens and Long Island focused on traffic and parking conditions at LIRR stations. Bus service is available at all of the major LIRR stations and is significantly used by LIRR riders at several stations. Bus services are also described in this section of the EIS.

EXISTING CONDITIONS

TRAFFIC

The analyses that follow focus on a representative set of 15 stations out of a total 124 in the LIRR system (see Figure 9E-1). This group includes:

- Several of the most intensively used stations and some with more moderate usage;
- Stations within local business districts or shopping areas and stations situated closer to residential areas or in fringe areas;
- Stations with multiple bus routes and stations with limited bus service;
- Stations with extensive parking capacity and others with very limited parking availability;
- Stations where LIRR commuters are nearly 100 percent park-and-riders and others where a significant number of commuters take the bus or walk to the station; and
- Stations with multiple access and egress routes and others where access is limited to a confined access corridor.

Overall, the 15 stations represent the range of stations that could be affected by the project. These stations cover all of the LIRR's branches, except for the Montauk Branch east of Babylon, and include Bayside, Great Neck, and Port Washington on the Port Washington Branch; Mineola on the Main Line (serving the Port Jefferson, Ronkonkoma, and Oyster Bay Branches); Hicksville, Huntington, and Port Jefferson on the Port Jefferson Branch; Deer Park and Ronkonkoma on the Ronkonkoma Branch; Valley Stream on the Far Rockaway Branch; Merrick and Babylon on the Babylon Branch; Hempstead on the Hempstead Branch; Malverne on the West Hempstead Branch; and Long Beach on the Long Beach Branch (see Figure 9E-1). Profiles of these stations are provided below.

The *Mineola* station serves both Main Line (Port Jefferson and Ronkonkoma Branch) trains and Oyster Bay Branch trains. The station has a significant number of AM peak period (i.e., 6-10 AM) boardings (2,217). Almost all of the 564 station parking spaces are occupied (97 percent) on a typical weekday. The station is situated within the general Mineola business district. Winthrop-University Hospital is just to the north, and the County Seat's institutional complex is to the south. The station is served by seven MTA Long Island Bus (LI Bus) routes that connect this station with several of the surrounding communities, the County Seat offices nearby, and the area's numerous shopping malls and districts. Two intersections near the station were selected for detailed analysis: Old Country Road and Mineola Boulevard/Franklin Avenue

two blocks south of the station and at a critical traffic location within the area; and, Mineola Boulevard and 2nd Street, at the foot of the overpass over the LIRR tracks on the north side of the station.

The *Hicksville* station serves both Port Jefferson and Ronkonkoma Branch trains and is one of the most heavily utilized stations in the LIRR system. Boardings during the AM peak reach 6,290. The station has several parking lots surrounding it; the major parking garage can accommodate 1,272 commuter vehicles. Overall, there are 3,328 parking spaces at the station and they are fully utilized. The station is served by several bus routes that connect it with several businesses, shopping centers, and hospital facilities in the adjoining area. Four intersections located in the generally commercial area bordering the station were analyzed in detail: Route 106/John Street and Route 107/John Street just north of the station; Route 106 and Duffy Avenue, one block south of the station at the corner of the station's commuter parking garage; and Woodbury Road at Bay Avenue/East Barclay Street, just east of the station.

Huntington is the busiest station on the Port Jefferson Branch east of Hicksville, with 4,628 riders boarding during the AM peak period. The station straddles a low-density commercial street (Route 110/New York Avenue) in a mixed-use area. Huntington station has 3,820 parking spaces within a number of parking lots and two multi-level parking garages. On a typical weekday, its parking facilities are 95 percent occupied. The station is served by two bus routes that connect the station with Walt Whitman Mall and local hospitals. Two traffic locations were analyzed: the intersection of Route 110/New York Avenue and Broadway, immediately adjacent to the western edge of the station and at the focus of all of the station's various parking facilities; and Broadway and Park Avenue, about ½ mile to the east and used by traffic approaching the station from the northeast and southeast.

The eastern terminal station on the Ronkonkoma Branch, *Ronkonkoma* station is the busiest station in Suffolk County, attracting riders from an extensive catchment area due to its direct, attimes non-stop service into Penn Station. Boardings during the AM peak are 5,403. The station is located in a low-density setting, with the area north of the station primarily residential in nature and the area to the south either uninhabited or industrial. Ronkonkoma has a total of 4,998 parking spaces, including an expansive parking lot on the south side of the tracks with multiple access/egress points, and a multi-level parking garage and additional surface parking on the north side of the tracks. The multi-level garage was completed in 1995 to accommodate the dramatic increase in ridership at this station. These parking facilities are fully utilized on a typical weekday, with many vehicles parked illegally within the station's parking lots. The station is served by local Huntington Area Rapid Transit (HART) and Suffolk County Transit (SCT) bus routes. Four representative traffic analysis locations were selected: Hawkins Avenue at the north and south service roads of the Long Island Expressway (LIE) just north of the station; Hawkins and Union Avenues near the parking garage on the north side of the station; and the intersection of the ramp from Ronkonkoma Avenue (which passes over the station complex in a north-south direction) and Railroad Avenue on the north side of the station.

The *Babylon* station, on the Babylon Branch, has 3,245 AM peak boarding riders. The station is situated between two commercial streets—Deer Park Avenue on the east side of the station and West Main Street a few blocks south of the station. There are several access/departure points from its parking lots, giving it good overall traffic distribution from its parking facilities. About 84 percent of its 2,026 parking spaces are utilized on a typical weekday. The station is served by two LI Bus routes and seven SCT routes. Three representative traffic analysis locations were studied: Park and Deer Park Avenues, northeast of the station; Deer Park Avenue

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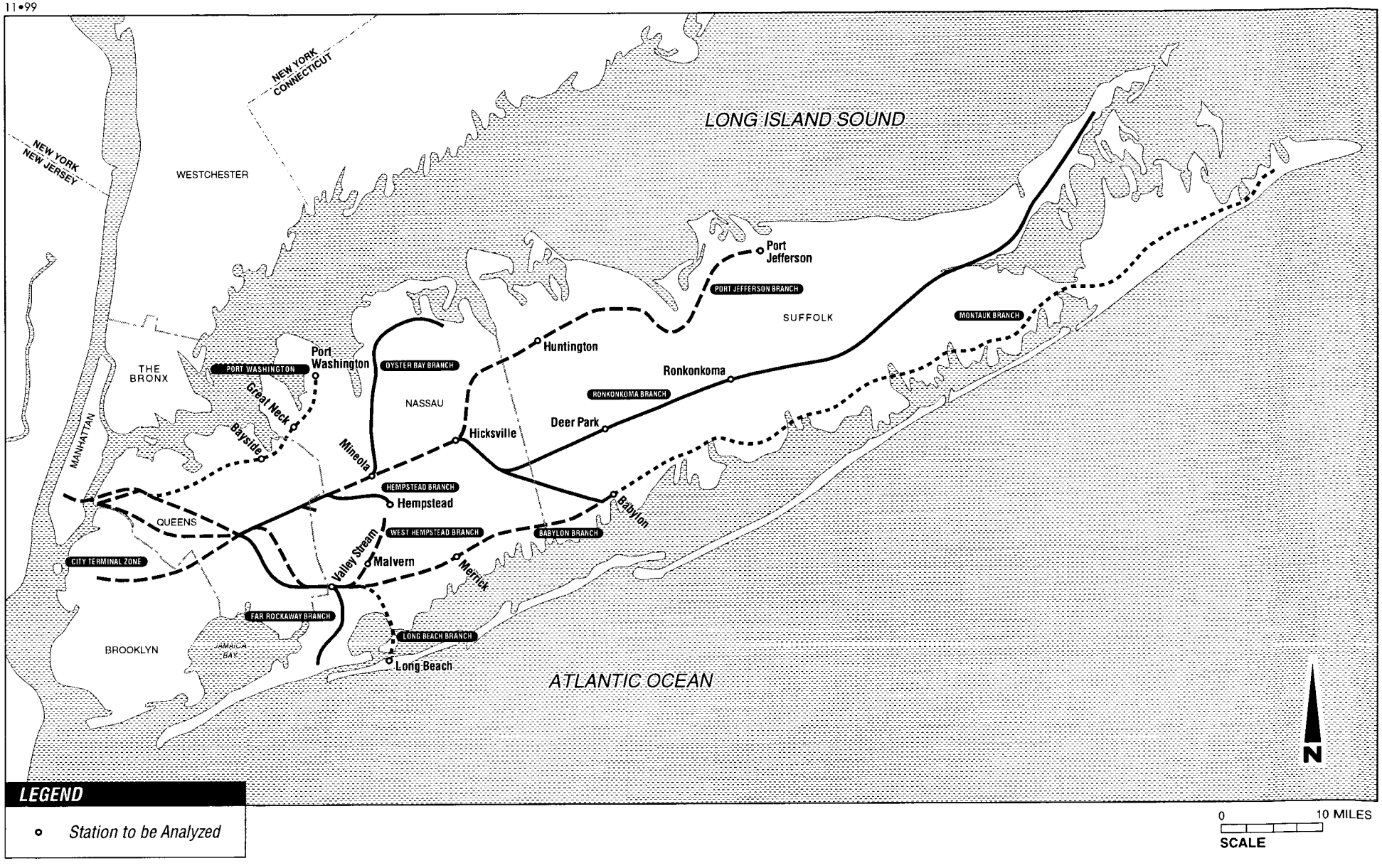


MTA / LIRR

East Side Access

Figure 9E-1

Long Island Rail Road Station Analysis Locations

and West Main Street, southeast of the station; and Deer Park Avenue and Railroad Avenue, at one of the unsignalized access points into the station's parking lot area.

The *Great Neck* station is a significantly used station on the Port Washington Branch, with 2,989 AM peak boardings. This high usage is at least partially due to the 24-minute express commute into Penn Station characterizing several peak period trains. It is situated along Middle Neck Road in the heart of the Great Neck business district. There is very limited parking available near the station; its 360 parking spaces are 98.6 percent occupied. The station is served by five LI Bus routes. Two nearby intersections on either side of the station were analyzed in detail: the intersections of Middle Neck Road at North Station Plaza and at South Station Plaza.

The terminus of the Port Washington Branch, *Port Washington* station, is located along Main Street, Port Washington's local retail street. The station has 2,429 boarding riders in the AM peak period. There are a total of 795 parking spaces at the station, which are 98 percent occupied on a typical weekday. Port Washington station is served by one LI Bus route. Traffic locations analyzed for this EIS included Main Street at the entrance to the station; and Main Street and Port Washington Boulevard, at the area's busiest traffic intersection, a few blocks east of the station.

The *Deer Park* station is located just three stops west of Ronkonkoma station and is characterized by AM peak boardings of 1,809 commuters. It is located in a generally open area just south of the recently developed Heartland Industrial Park. There are 1,061 parking spaces at the station, all situated on its north side between the station and Long Island Avenue. On a typical weekday, the parking lot is filled to more than 100 percent of its capacity. The station is served by five SCT bus routes. Access to station parking from the south side of the tracks is constrained by an at-grade crossing of the tracks at the east end of the station. Traffic analysis locations included Pine Aire Drive and Executive Drive, and Long Island Avenue and Executive Drive.

The *Merrick* station on the Babylon Branch has 2,797 AM peak boardings. It is located on an elevated structure just north of Sunrise Highway and straddling Merrick Avenue, the main street within the Merrick business district. This station has the prototypical configuration for several stations along this branch. There are 1,563 parking spaces within the various surface parking lots surrounding the station on all sides; these parking spaces are more than 100 percent occupied on a typical weekday. The Merrick area is served by four bus routes, with one route stopping at the station. Three local intersections along Merrick Avenue were analyzed in detail: at Sunrise Highway, at Broadcast Plaza (the entrance to one of the station's primary parking lots), and at Smith Street located a few blocks to the north.

The *Hempstead* station is the eastern terminus on the Hempstead Branch and is characterized by 800 westbound boardings in the AM peak as well as significant eastbound alightings. This is attributable to the station's location in the midst of the well-developed Hempstead business district and alongside a very active bus terminal, the Hempstead Transit Center, serving 20 LI Bus routes. This station, with its 896 surface parking spaces, has many access points, resulting in a good distribution of traffic into and out from the station area. Parking spaces at this station are 84 percent occupied on a typical weekday. Three key intersections near the station were analyzed in detail: Fulton and Main Streets; Fulton and Washington Streets; and Main and West Columbia Streets.

The *Long Beach* station has the highest ridership on the Long Beach Branch with 1,631 AM peak boardings. There is also significant ridership at this station in the off-peak period from Long Beach's older resident population. The station and its parking lots are located along the

north side of West Park Avenue, Long Beach's main east-west street in the heart of its business district. There are 223 parking spaces at the station and they are 90 percent utilized. The station is also accessed by two bus routes serving the Long Beach area. Three intersections along West Park Avenue were selected for detailed traffic analysis: at Centre Street, at the main station exit location; and at Park Place/Edwards Boulevard.

The *Bayside* station on the Port Washington Branch is located along Bell Boulevard, Bayside's primary commercial street. The station generates 3,214 AM peak boardings on a typical weekday. There is a very limited amount of parking available in parking lots, totaling about 75 parking spaces, which are 64 percent utilized on a typical weekday (these include some short-term shopper parking spaces; all of the long-term commuter parking spaces are generally occupied). The station is also directly served by two bus routes on Bell Boulevard; three other bus routes operate a few blocks away on Northern Boulevard. Two local traffic intersections were analyzed: Bell and Northern Boulevards, the most heavily trafficked intersection in the area; and Bell Boulevard at 41st Avenue, just north of the station.

The *Valley Stream* station on the Far Rockaway Branch is located just north of Sunrise Highway, three stops east of Jamaica station. In the AM peak, there are 2,209 westbound boardings. There are 1,285 parking spaces at the station and they are typically 83 percent utilized. The Valley Stream station is served by three LI Bus routes that connect it with the Green Acres Mall and areas nearby. Two MTA New York City Transit bus routes also serve the station. Three traffic locations were analyzed: South Franklin Avenue and Sunrise Highway, South Franklin Avenue and Hawthorne Avenue, and Franklin Avenue and Merrick Road.

The *Port Jefferson* station is the eastern terminus of the Port Jefferson Branch and is located along Main Street, the area's local shopping street. The station has 358 AM peak boardings. There are two parking lots at the station with 518 spaces, about 49 percent of which are occupied on a typical weekday. Four SCT bus routes serve the station. The traffic analysis locations for this station included Main Street at the station entrance, just north of Main Street's at-grade crossing of the LIRR tracks; and Main Street at North Country Road, two blocks north of the station.

The *Malverne* station on the West Hempstead Branch has 524 AM peak boardings. It is located alongside Hempstead Avenue, which is a local shopping street in the business district, and a connecting street to West Hempstead to the north. Surface parking lots both east and west of the station provide 188 parking spaces, which are approximately 92 percent occupied. The station is served by one bus route, which links it with the Hempstead Transit Center. Two traffic intersections were analyzed, one on each side of the at-grade crossing of the LIRR tracks with Hempstead Avenue: Hempstead Avenue and Utterby Road, and Hempstead Avenue at the entrance to the station parking lot on the west side of the station.

Additional traffic analyses within this section include at-grade crossings of the LIRR tracks by local roads. Therefore, a representative set of at-grade crossings was also analyzed as part of this EIS. Each grade crossing included in this analysis is located adjacent to a significantly utilized roadway or has been cited as a problem location under existing conditions. These locations included New Hyde Park Road (New Hyde Park), Robbins Lane (Syosset), Jackson Avenue (Syosset), and Franklin Avenue (Garden City). These are in addition to other at-grade crossing locations cited above—Willis Avenue in Mineola, Hempstead Avenue in Malverne, Main Street in Port Jefferson, and Executive Drive in Deer Park.

Overall, a set of 39 intersections and 8 at-grade crossing locations were analyzed for existing traffic conditions. Traffic counts were conducted for the AM and PM peak periods at all locations via a combination of manual counts and 24-hour Automatic Traffic Recorder (ATR) machine counts, and the specific peak traffic hours for each location were established (except for the Hicksville station area, where recent traffic count data was provided by the Town of Oyster Bay Department of Public Works (DPW) from its ongoing Hicksville Traffic Flow Study, and Merrick, where recent traffic count data was provided by the LIRR from its Merrick Area Revitalization Study).

For the intersection analyses, existing capacities, volume-to-capacity (v/c) ratios, average vehicle delays, and levels of service (LOS) were determined using the *1994 Highway Capacity Manual* procedures for each intersection approach and for the overall intersection.

Existing traffic conditions in each of the station areas studied encompass multiple traffic components—commuter traffic passing through the area on their way to work by car, LIRR commuters en route to the LIRR station either to park and ride from there or to pick up or drop off passengers and others (students or school buses in the AM peak period, shoppers in the PM peak period, etc.). At some of the station areas, there is a single pronounced traffic peak hour in the AM period and one in the PM period. At most locations, however, there are two peak periods for local traffic—the overall area's peak traffic hour (referred to below as the "peak traffic hour") and peak time periods for the traffic to the LIRR station (referred to below as the "peak train hour"). These conditions vary area by area and by intersection within specific areas. For example, the traffic peak hour in the Great Neck study area is much more oriented to the commercial nature of the overall area; the resulting peak morning traffic hour is 8-9 AM. At other locations, particularly intersections right at entry points to a station's parking facilities, the peak hour may be more oriented to the specific train arrival and departure times. The existing traffic LOS analyses considered the traffic hour with the greatest potential for impact.

Overall, 39 intersections were analyzed at the 15 station areas studied, as shown in Table 9E-1. In the AM peak hours at the respective locations, 24 of 39 intersections operated at overall LOS A or B, 13 at LOS C, and 2 at LOS D. Although none of the intersections were determined to be operating at overall LOS E or F, 7 of the 39 intersections had at least one traffic movement at these unacceptable LOSs. In general, for the *overall* intersection to be at LOS E or F, either one particular traffic movement needs to be operating at extremely congested conditions or two or more traffic movements need to be at LOS E or F (the overall intersection LOS is a weighted average of all of the individual traffic movements).

In the PM peak hours, the LOS findings were very similar—24 of the 39 intersections operated at overall LOS A or B, 13 at LOS C, and 2 at LOS D. Although none of the intersections were at overall LOS E or F, 10 of the 39 intersections had at least one traffic movement at LOS E or F in the PM peak hour.

The analysis of traffic conditions also included eight significant grade crossing locations—i.e., where the LIRR tracks cross the street network at-grade and where local traffic must wait for a period of time for trains to pass. Table 9E-2 summarizes the findings of a survey of queue lengths and average time that traffic was stopped while the crossing gates were being activated or were in the down position at the eight locations during the peak auto traffic hour; train crossings reflect counts on the survey day. (For the peak *train* hour, see Table 9E-3.)

Table 9E-1
Existing Traffic Level of Service Summaries: Long Island Rail Road Station Areas

Intersection	AM Peak Hour	PM Peak Hour
Mineola		
Old Country Road and Mineola Boulevard/Franklin Avenue	D	C
Mineola Boulevard and 2nd Street	B	C
Hicksville		
Route 106 and West John Street	C	C
Route 106 and Duffy Avenue	C	D
Route 107 and East John Street	C	C
Woodbury Road and Bay Avenue/East Barclay Street	B	B
Huntington		
Route 110 and Broadway/Railroad Street	C	C
Park Avenue and Broadway	B	B
Ronkonkoma		
Hawkins Avenue and LIE North Service Road	C	C
Hawkins Avenue and LIE South Service Road	C	C
Hawkins Avenue and Union Avenue	B	B
Ronkonkoma Avenue Ramp and Railroad Avenue	A	A
Babylon		
Deer Park Avenue and Park Avenue	B	B
Deer Park Avenue and Railroad Avenue	A	B
Deer Park Avenue and West Main Street	B	C
Great Neck		
Middle Neck Road and North Station Plaza	B	B
Middle Neck Road and South Station Plaza	B	B
Port Washington		
Main Street and Port Washington Boulevard	C	B
Main Street and LIRR Station Entrance	A	A
Deer Park		
Executive Drive and Long Island Avenue	B	C
Executive Drive and Pine Aire Drive	C	C
Merrick		
Merrick Avenue and Sunrise Highway	D	C
Merrick Avenue and Broadcast Plaza	A	A
Merrick Avenue and Smith Street	C	C
Hempstead		
Main Street and West Columbia Street	B	B
Main Street and Fulton Street (Route 24)	B	B
Fulton Street (Route 24) and Washington Avenue	C	C
Long Beach		
West Park Avenue and Parking Lot Entrance	B	B
West Park Avenue and Center Street	B	B
West Park Avenue and Edwards Boulevard	B	B
Bayside		
Bell Boulevard and Northern Boulevard	B	B
Bell Boulevard and 41st Avenue	C	B
Valley Stream		
South Franklin Avenue and Sunrise Highway	B	B
South Franklin Avenue and West Hawthorne Avenue	B	B
South Franklin Avenue and Merrick Road	B	B
Port Jefferson		
Main Street (Route 25A) and LIRR Entrance	A	A
Main Street (Route 25A) and North Country Road	C	D
Malverne		
Hempstead Avenue and Utterby Road	C	B
Hempstead Avenue/Francis Street/LIRR Entrance	B	B

Note: Overall intersection LOS is shown.

Table 9E-2
LIRR Grade Crossings: Existing Delays, Auto Peak Hour

Location	Auto Peak Hour	Volumes		Train Crossings	Average Delay at Gate (seconds)	Average Queues (in vehicles)	
		North-bound	South-bound			North-bound	South-bound
AM Peak Hour							
New Hyde Park Road (New Hyde Park)	7:30-8:30	710	314	15	82	8+	4
Willis Avenue (Mineola)	8-9	162	270	15	102	4	6
Franklin Avenue (Garden City)	8-9	1,271	668	5	90	16+	7
Robbins Lane (Syosset)	8-9	1,042	348	6	45	5	2
Jackson Avenue (Syosset)	8-9	549	537	5	109	14+	17+
Main Street (Port Jefferson)	7:30-8:30	948	534	5	124	12+	11+
Hempstead Avenue (Malverne)	8-9	421	387	2	133	9	9
Executive Drive (Deer Park)	7:30-8:30	960*	309	3	63	20+*	3
PM Peak Hour							
New Hyde Park Road (New Hyde Park)	4:45-5:45	374	676	18	77	4	7
Willis Avenue (Mineola)	5:15-6:15	276	276	15	124	6	6
Franklin Avenue (Garden City)	4:30-5:30	945	1,358	2	99	11	9
Robbins Lane (Syosset)	4:45-5:45	377	1,201	9	49	2	7
Jackson Avenue (Syosset)	4:45-5:45	580	770	10	72	15+	18+
Main Street (Port Jefferson)	5-6	915	1,082	2	94	13	11
Hempstead Avenue (Malverne)	4:30-5:30	394	542	2	120	8	10
Executive Drive (Deer Park)	4:45-5:45	349*	820	4	122	11*	20+

Note: * Denotes right turn movement from WB Pine Aire Drive onto NB Executive Drive.

Table 9E-3
LIRR Grade Crossings: Existing Delays, Train Peak Hour

Location	Train Peak Hour	Volumes		Train Crossings	Average Delay at Gate (seconds)	Average Queues (in vehicles)	
		North-bound	South-bound			North-bound	South-bound
AM Peak Hour							
New Hyde Park Road (New Hyde Park)	8-9	710	312	15	64	8+	4
Willis Avenue (Mineola)	7:45-8:45	159	241	17	92	3	6
Franklin Avenue (Garden City)	7:45-8:45	1,180	646	6	92	16+	7
Robbins Lane (Syosset)	7-8	793	231	8	48	5	2
Jackson Avenue (Syosset)	7-8	379	368	8	145	13	17+
Main Street (Port Jefferson)	7:30-8:30	948	534	5	124	12+	11+
Hempstead Avenue (Malverne)	7-8	312	226	3	164	8	6
Executive Drive (Deer Park)	7-8	937*	252	4	64	21+*	4
PM Peak Hour							
New Hyde Park Road (New Hyde Park)	5-6	327	648	19	77	4	7
Willis Avenue (Mineola)	5:30-6:30	257	261	17	120	6	6
Franklin Avenue (Garden City)	5:45-6:45	679	959	7	100	10+	9+
Robbins Lane (Syosset)	5-6	363	1,194	10	50	3	8
Jackson Avenue (Syosset)	4:45-5:45	580	770	10	72	15+	18+
Main Street (Port Jefferson)	5:45-6:45	874	902	5	89	13+	11+
Hempstead Avenue (Malverne)	5-6	344	470	3	131	8	11
Executive Drive (Deer Park)	6-7	271*	706	5	118	8*	17+

Note: * Denotes right turn movement from WB Pine Aire Drive onto NB Executive Drive.

The average queue lengths are a function of a number of factors, e.g.. the number of times the crossing gates are down because of LIRR trains passing through the area, the speed at which LIRR trains pass through the affected area (train speeds are generally slower at stations and, especially, at terminal stations), traffic volumes on the streets crossing the tracks, and the number of traffic lanes available within which stopped traffic can queue.

As shown in Table 9E-2, in the AM *auto* peak hour, the grade crossings at New Hyde Park Road and Willis Avenue on the Main Line have a high frequency of train crossings, with significant lost time at the crossing gates—82 and 102 seconds, respectively. At New Hyde Park Road, cross-street volumes are moderate (710 and 314 vph in the north- and southbound directions, respectively) and the resulting queue lengths are more than eight vehicles north- and four southbound. At Willis Avenue in Mineola, average crossing gate delays are higher, but the queue lengths are somewhat lower due to much lower cross-street traffic volumes. Of the grade crossing locations analyzed, the crossing at Franklin Avenue has the highest volumes of cross-street traffic and consequently has one of the longest queues (more than 16 car lengths northbound). The LIRR crossings of Main Street in Port Jefferson and Hempstead Avenue in Malverne have the greatest stopped time delays in the AM peak hour. This is due primarily to much slower operating speeds for trains pulling into and out from these stations.

Table 9E-3 presents similar data for the peak *train* hour (i.e., the hour with the most LIRR trains crossing through the area). In a few cases the peak train hour and the peak auto hour are synonymous; in others they are not.

PARKING

Detailed information on capacity and parking utilization is available from LIRR databases for all stations in its system. This information is summarized in Table 9E-4 on a branch-by-branch basis. It is apparent from a review of the data that most stations are operating with parking lots and garages at much greater than 90 percent utilization levels; several are operating at levels very close to, if not greater than, 100 percent.

As indicated in Table 9E-4, the Babylon and Port Jefferson Branches offer the largest number of parking spaces, with 16,333 and 15,617 spaces, respectively. The parking lots at almost half of the stations along the Babylon Branch are utilized at more than 100 percent of capacity, with the branch as a whole having close to 95 percent of its total supply of parking utilized. Ronkonkoma Branch parking supply is more than 100 percent utilized, including six stations with greater than 100 percent utilization levels. The Port Washington Branch parking supply is 95 percent occupied; several stations in Eastern Queens have substantial levels of on-street parking (Broadway, Auburndale, Bayside, Douglaston, and Little Neck), but have very limited amounts of parking provided in lots.

The parking lots along several other branches are relatively lightly used. The West Hempstead and Montauk Branches have a 50 percent utilization level overall, and the Oyster Bay Branch has a 60 percent utilization level. The Far Rockaway and Hempstead Branches have 80 percent utilization levels overall and the Long Beach Branch has 87 percent.

The 15 stations analyzed in detail in this EIS include the four stations with the largest amount of station parking provided. These include Ronkonkoma, Huntington, Hicksville, and Babylon, which collectively have about 97 percent of their station parking spaces filled on a typical commutation day. As shown in Table 9E-4, several of the 15 analysis stations currently have parking utilization levels approaching, at, or greater than 100 percent, or have significant on-street

Table 9E-4
Existing Parking Capacity and Utilization at LIRR Stations

Station	Off-Street Capacity	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Babylon Branch				
Rockville Centre	1,419	1,383	97.5	100
Baldwin	1,266	1,222	96.5	286
Freeport	1,152	767	66.6	97
Merrick	1,563	1,628	104.2	160
Bellmore	1,573	1,615	102.7	14
Wantagh	1,508	1,547	102.6	50
Seaford	1,148	1,163	101.3	0
Massapequa	1,798	1,791	99.6	153
Massapequa Park	723	701	97.0	58
Amityville	625	501	80.2	0
Copiague	742	767	103.4	93
Lindenhurst	790	675	85.4	160
Babylon	2,026	1,701	84.0	37
Branch Total	*16,333*	*15,461*	*94.7*	*1,208*
Ronkonkoma Branch				
Bethpage	889	922	103.7	100
Farmingdale	507	536	105.7	50
Pinelawn	N/A	N/A	N/A	N/A
Wyandanch	960	1,039	108.2	26
Deer Park	1,061	1,457	137.3	254
Brentwood	871	596	68.4	33
Central Islip	922	1,144	124.1	0
Ronkonkoma	4,998	5,395	107.9	167
Holtsville	N/A	N/A	N/A	N/A
Medford	20	7	35.0	0
Yaphank	42	2	4.8	0
Riverhead	22	17	77.3	0
Mattituck	71	32	45.1	0
Southold	20	1	5.0	0
Greenport	99	49	49.5	0
Branch Total	*10,482*	*11,197*	*106.8*	*630*
Hempstead Branch				
Hollis	N/A	N/A	N/A	N/A
Queens Village	87	62	71.3	0
Bellerose	37	37	100.0	0
Floral Park	636	532	83.6	29
Stewart Manor	157	142	90.4	0
Nassau Boulevard	249	246	98.8	0
Garden City	373	369	98.9	19
Country Life Press	417	135	32.4	0
Hempstead	896	756	84.4	0
Branch Total	*2,852*	*2,279*	*79.9*	*48*
Far Rockaway Branch				
Locust Manor	0	0	—	22
Laurelton	52	52	100.0	10
Rosedale	211	45	21.3	130

Table 9E-4 (Continued)
Existing Parking Capacity and Utilization at LIRR Stations

Station	Off-Street Capacity	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Far Rockaway Branch (continued)				
Valley Stream	1,285	1,063	82.7	43
Gibson	71	68	95.8	20
Hewlett	815	889	109.1	19
Woodmere	291	284	97.6	400
Cedarhurst	797	626	78.5	30
Lawrence	201	113	56.2	30
Inwood	212	105	49.5	0
Far Rockaway	150	1	0.7	0
Branch Total	*4,085*	*3,246*	*79.5*	*704*
Montauk Branch				
Bay Shore	449	294	65.5	0
Islip	395	185	46.8	0
Great River	91	59	64.8	0
Oakdale	246	97	39.4	0
Sayville	485	358	73.8	0
Patchogue	594	274	46.1	0
Bellport	35	0	0.0	0
Center Moriches	N/A	N/A	N/A	N/A
Mastic-Shirley	195	124	63.6	0
Speonk	180	97	53.9	1
Westhampton	38	8	21.1	0
Quogue	N/A	N/A	N/A	N/A
Hampton Bays	190	30	15.8	0
Southampton	74	44	59.5	0
Southampton Campus	N/A	N/A	N/A	N/A
Bridgehampton	85	50	58.8	0
East Hampton	373	103	27.6	18
Amagansett	35	20	57.1	0
Montauk	60	3	5.0	0
Branch Total	*3,525*	*1,746*	*49.5*	*19*
Port Washington Branch				
Flushing	572	572	100.0	0
Murray Hill	0	0	N/A	315
Broadway	79	90	113.9	665
Auburndale	0	0	N/A	839
Bayside	75	48	64.0	999
Douglaston	118	119	100.8	500
Little Neck	113	111	98.2	400
Great Neck	360	355	98.6	0
Manhasset	496	491	99.0	0
Plandome	255	169	66.3	0
Port Washington	795	775	97.5	0
Branch Total	*2,863*	*2,730*	*95.4*	*3,718*
Port Jefferson Branch				
New Hyde Park	651	586	90.0	76
Merillon Avenue	153	167	109.2	0
Mineola	564	548	97.2	313

Table 9E-4 (Continued)
Existing Parking Capacity and Utilization at LIRR Stations

Station	Off-Street Capacity	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Port Jefferson Branch (cont'd)				
Carle Place	14	44	314.3	20
Westbury	577	563	97.6	157
Hicksville	3,328	3,331	100.1	120
Syosset	1,221	1,235	101.1	118
Cold Spring Harbor	969	945	97.5	0
Huntington	3,820	3,636	95.2	266
Greenlawn	435	239	54.9	0
Northport	1,046	623	59.6	0
Kings Park	771	564	73.2	12
Smithtown	794	338	42.6	0
St. James	312	163	52.2	0
Stony Brook	444	313	70.5	0
Port Jefferson	518	252	48.6	0
Branch Total	*15,617*	*13,547*	*86.7*	*1,082*
Oyster Bay Branch				
East Williston	201	192	95.5	50
Albertson	77	21	27.3	61
Roslyn	336	226	67.3	61
Greenvale	190	69	36.3	13
Glen Head	168	116	69.0	10
Sea Cliff	133	96	72.2	0
Glen Street	132	84	63.6	0
Glen Cove	161	122	75.8	0
Locust Valley	187	185	98.9	0
Mill Neck	N/A	N/A	N/A	N/A
Oyster Bay	338	35	10.4	0
Branch Total	*1,923*	*1,146*	*59.6*	*195*
West Hempstead Branch				
St. Albans	N/A	N/A	N/A	N/A
Westwood	62	44	71.0	0
Malverne	188	173	92.0	0
Lakeview	55	52	94.5	18
Hempstead Gardens	0	0	N/A	52
West Hempstead	980	384	39.2	0
Branch Total	*1,285*	*653*	*50.8*	*70*
Long Beach Branch				
Lynbrook	940	677	72.0	91
Centre Avenue	116	88	75.9	6
East Rockaway	169	167	98.8	0
Oceanside	561	562	100.2	67
Island Park	466	458	98.3	0
Long Beach	223	200	89.7	262
Branch Total	*2,475*	*2,152*	*86.9*	*426*

Notes:
Numbers include on- and off-street parking spaces available to commuters from all sources—LIRR, municipal or private.
Cars parked in lots but out-of-space are included. On-street parking is not included in utilization percent, because of the difficulty in quantifying the number of available spaces.

parking levels due to the small or insufficient amount of parking currently in existence at the station itself.

FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

In determining traffic volumes at the various LIRR station study area intersections in the future, baseline background traffic growth rates were applied to existing traffic volumes. For Nassau County, a 0.75 percent per year traffic growth rate was used, as suggested by the Traffic Engineering Director's Office of the Nassau County DPW; for western Suffolk County, 2 percent growth per year was assumed, as suggested by the Suffolk County DPW (there were no analysis locations in eastern Suffolk County). Compounded annually, these growth rates would produce an overall traffic growth of about 9 percent at analysis locations in Nassau County and about 27 percent in Suffolk County for year 2010.

For traffic impact analyses within Nassau and Suffolk Counties, the generally accepted practice on Long Island is to define significant impacts as any degradation in an LOS (e.g., LOS D to E), including even degradation from LOS A to B or C (even though this can be qualified as still being within acceptable conditions). For the purposes of this EIS, deterioration from LOS A to B, and from LOS A or B to C were not considered significant impacts requiring mitigation, since they would still be within acceptable flow conditions, but deterioration from LOS C to D was considered significant. In Nassau and Suffolk Counties, deterioration from LOS F to F* would be considered a significant impact, as would significant deterioration within LOS E or F (although this is subjective, depending on the judgement of the reviewing agency). For the purposes of this EIS, deterioration within LOS E or F (including deterioration from LOS F to F*) was considered significant if it included delay increases of 10 seconds or more (thus following the criteria cited previously for intersection analyses in New York City).

The detailed traffic analyses that follow focus on year 2010 conditions, since that is a realistic time frame for predicting traffic growth with and without the Preferred Alternative. It is substantially more difficult to predict background traffic growth rates and conditions at local intersections so far in the future, let alone the impacts of the Preferred Alternative in 20 years. At the growth rates assumed in the year 2010 analyses, overall background traffic growth of 18 percent in Nassau County and 55 percent in western Suffolk County would be expected by the year 2020. Due to the more conjectural nature of conditions in the year 2020 and the determination that the volume of vehicle trips generated by the Preferred Alternative over No Action conditions in the year 2020 is only negligibly higher than its counterpart in the year 2010, a sample set of traffic analysis locations is addressed for the year 2020.

PROBABLE IMPACTS OF THE PROJECT ALTERNATIVES

NO ACTION ALTERNATIVE

Traffic

As shown in Table 9E-5, overall, under the future No Action Alternative, 16 of the 39 intersections would operate at overall LOS A or B in the AM peak hour, 6 would be at LOS C, 6 at LOS D, and 11 at overall LOS E or F in the year 2010. This represents a substantial deterioration from existing traffic conditions, characterized by two intersections at overall LOS D and none at LOS E or F. The analysis also indicates that 22 of the 39 intersections would have at least one traffic movement at an unacceptable LOS E or F, as opposed to 7 intersections with similar characteristics under existing conditions.

Table 9E-5

Traffic Level of Service Summary Comparison: Existing vs. Future No Action and Preferred Alternatives (Year 2010)

	Existing Peak Hour		No Action Peak Hour		Preferred Alternative Peak Hour	
	AM	PM	AM	PM	AM	PM
Intersections @ Overall LOS A/B	23	24	16	13	16	13
Intersections @ Overall LOS C	14	13	6	10	6	7
Intersections @ Overall LOS D	2	2	6	6	5	5
Intersections @ Overall LOS E/F	0	0	11	10	12	14
Intersections with Movements at LOS E or F	7	10	22	24	22	25
Intersections with Significant Traffic Impacts	N/A	N/A	N/A	N/A	11	13

In the PM peak hour, the year 2010 LOS findings were very similar—13 of the 39 intersections would operate at overall LOS A or B, 10 at LOS C, 6 at LOS D, and 10 at overall LOS E or F in the year 2010, as opposed to just 2 intersections operating at overall LOS D conditions and currently none at LOS E or F conditions. Under the future No Action Alternative, 24 of the 39 intersections would have at least one traffic movement at LOS E or F in the PM peak hour, as opposed to just 10 intersections having similar characteristics under existing conditions.

The conclusions are not surprising given a steady traffic growth rate accumulating to a substantial overall growth percentage to the 2010 analysis year.

The detailed intersection-by-intersection LOS analysis findings are presented in Table 9E-6. Many of the intersections expected to be operating at unacceptable LOS E or F conditions would be characterized by extreme delays, as indicated by the LOS F* resulting from the detailed capacity analysis.

Traffic conditions at the eight grade crossing analysis locations were modeled under the future No Action Alternative. This analysis assumed that the number of trains crossing at each location would remain the same as under existing conditions and that traffic volumes would increase according to background growth rates. The findings of the year 2010 analyses are shown in Table 9E-7 and discussed below.

In the AM peak hour, the average maximum queues of vehicles waiting to cross the LIRR tracks while the crossing gates are activated would generally increase by two vehicles or fewer, except at one location. At Port Jefferson station, vehicle queues along north- and southbound Main Street would increase by an estimated seven and five vehicles, respectively. The delay time to the "average" vehicle crossing the tracks at the eight analysis locations would be 2 seconds or less, except for westbound Pine Aire Drive traffic approaching Executive Drive and the LIRR crossing at Deer Park station, which would experience delay increases of about 4 seconds. This condition would not be considered a significant impact to motorists, assuming that the 10 seconds of additional delay threshold used to identify significant impacts for signalized intersections are applied to at-grade crossing locations as well.

Table 9E-6

No Action and Preferred Alternatives (Year 2010) Traffic Level of Service Summaries: Long Island Rail Road Station Areas

Intersection	AM Peak Hour			PM Peak Hour		
	Existing	No Action	Preferred	Existing	No Action	Preferred
Mineola						
Old Country Road and Mineola Boulevard/ Franklin Avenue	D	D	D	C	F*	F*
Mineola Boulevard and 2nd Street	B	F*	F*	C	F*	F*
Hicksville						
Route 106 and West John Street	C	C	C	C	F*	F*
Route 106 and Duffy Avenue	C	D	D	D	F*	F*
Route 107 and East John Street	C	C	C	C	C	C
Woodbury Road and Bay Avenue/East Barclay Street	B	B	B	B	B	B
Huntington						
Route 110 and Broadway/Railroad Street	C	C	C	C	F*	F*
Park Avenue and Broadway	B	F*	F*	B	C	F*
Ronkonkoma						
Hawkins Avenue and LIE North Service Road	C	D	D	C	C	C
Hawkins Avenue and LIE South Service Road	C	D	D	C	C	F*
Hawkins Avenue and Union Avenue	B	B	B	B	C	C
Ronkonkoma Avenue Ramp and Railroad Avenue	A	A	A	A	A	A
Babylon						
Deer Park Avenue and Park Avenue	B	F*	F*	B	D	D
Deer Park Avenue and Railroad Avenue	A	B	B	B	D	E
Deer Park Avenue and West Main Street	B	C	C	C	F*	F*
Great Neck						
Middle Neck Road and North Station Plaza	B	F*	F*	B	F*	F*
Middle Neck Road and South Station Plaza	B	F*	F*	B	C	C
Port Washington						
Main Street and Port Washington Boulevard	C	F*	F*	B	C	D
Main Street and LIRR Station Entrance	A	A	A	A	A	A
Deer Park						
Executive Drive and Long Island Avenue	B	B	B	C	D	D
Executive Drive and Pine Aire Drive	C	F*	F*	C	D	D
Merrick						
Merrick Avenue and Sunrise Highway	D	F*	F*	C	D	D
Merrick Avenue and Broadcast Plaza	A	A	A	A	A	A
Merrick Avenue and Smith Street	C	D	D	C	F*	F*
Hempstead						
Main Street and West Columbia Street	B	B	B	B	B	B
Main Street and Fulton Street (Route 24)	B	B	B	B	B	B
Fulton Street (Route 24) and Washington Avenue	C	F*	F*	C	F*	F*
Long Beach						
West Park Avenue and Parking Lot Entrance	B	B	B	B	B	B
West Park Avenue and Center Street	B	B	B	B	B	B
West Park Avenue and Edwards Boulevard	B	B	B	B	B	B

Table 9E-6 (Continued)
No Action (Year 2010) and Preferred Alternatives: Traffic Level of Service Summaries Long Island Rail Road Station Areas

Intersection	AM Peak Hour			PM Peak Hour		
	Existing	No Action	Preferred	Existing	No Action	Preferred
Bayside						
Bell Boulevard and Northern Boulevard	B	F*	F*	B	C	C
Bell Boulevard and 41st Avenue	C	D	F*	B	D	F*
Valley Stream						
South Franklin Avenue and Sunrise Highway	B	B	B	B	B	B
South Franklin Avenue and West Hawthorne Avenue	B	B	B	B	B	B
South Franklin Avenue and Merrick Road	B	B	B	B	C	C
Port Jefferson						
Main Street (Route 25A) and LIRR Entrance	A	A	A	A	B	B
Main Street (Route 25A) and North Country Road	C	F*	F*	D	F*	F*
Malverne						
Hempstead Avenue and Utterby Road	C	C	C	B	B	B
Hempstead Ave./Francis St./LIRR Entrance	B	C	C	B	C	C

Note: Overall intersection LOS is shown.

Table 9E-7
LIRR Grade Crossing Impacts: No Action Alternative (Year 2010) vs. Existing Conditions

Location	Additional Train Crossings	Additional Queue Length (vehicles)		Additional Stopped Time at the Gate	
		NB	SB	NB	SB
AM Peak Hour					
New Hyde Park Road (New Hyde Park)**	0	+2	0	—*	—
Willis Avenue (Mineola)	0	0	+1	—	—
Franklin Avenue (Garden City)	0	+2	+1	—	—
Robbins Lane (Syosset)	0	+2	0	—	—
Jackson Avenue (Syosset)	0	+2	+1	—	—
Main Street (Port Jefferson)	0	+7	+5	—	—
Hempstead Avenue (Malverne)	0	+2	0	—	—
Executive Drive (Deer Park)	0	EB +2 WB +2	SB 0	EB — WB 4 sec.	SB —
PM Peak Hour					
New Hyde Park Road (New Hyde Park)**	0	+1	+1	—*	—
Willis Avenue (Mineola)	0	+1	+1	—	—
Franklin Avenue (Garden City)	0	+1	+2	—	—
Robbins Lane (Syosset)	0	+1	+1	—	—
Jackson Avenue (Syosset)	0	+2	+3	—	2 sec.
Main Street (Port Jefferson)	0	+6	+7	—	—
Hempstead Avenue (Malverne)	0	+1	+2	—	—
Executive Drive (Deer Park)	0	EB +1 WB +3	SB +5	EB — WB —	SB 7 sec.

Notes:
* — = Negligible, i.e., under 2 seconds.
** These grade crossings may be eliminated in conjunction with the Main Line Third Track Project.

In the PM peak hour, the average maximum queues of vehicles waiting to cross the LIRR tracks while the crossing gates have been activated would generally increase by two vehicles or fewer, except for the following three locations: at Port Jefferson station, vehicle queues along north- and southbound Main Street would increase by an estimated 6 and 7 vehicles, respectively; at Syosset station, north- and southbound queues along Main Street are estimated to increase by 2 and 3 vehicles, respectively; and at Deer Park station, westbound queues along Pine Aire Drive and southbound queues along Executive Drive are estimated to increase by 3 and 5 vehicles, respectively. The delay time to the "average" vehicle crossing the tracks at the eight analysis locations would be 2 seconds or less, except for southbound Executive Drive approaching the LIRR crossing at Deer Park station. Vehicles here would experience delay increases of about 7 seconds. This condition would not be considered a significant impact to motorists (assuming that 10 seconds of additional delay is the threshold for significant impact), but it approaches the threshold of one.

For year 2020 No Action conditions, traffic analyses were conducted for five of the stations encompassing 14 intersections. These five stations were Bayside, Great Neck, Hicksville, Deer Park, and Ronkonkoma, and they reflect five of the busiest LIRR stations addressed in this EIS. In the AM peak hour, 2 of the 14 intersections will operate at overall LOS A or B, 2 at LOS C, 1 at LOS D, and 9 at LOS F. Of the 14 intersections, 11 will have at least one traffic movement at LOS E or F in the AM peak hour. In the PM peak hour, 1 of the 14 intersections will operate at overall LOS A or B, 3 at LOS C, none at LOS D, and 10 at LOS F. Of the 14 intersections, 12 will have at least one traffic movement at LOS E or F. One key LIRR grade crossing location was also analyzed for year 2020 No Action conditions: Deer Park station. Vehicular traffic will experience substantially longer queuing and delays westbound (for right turns delayed while waiting for opportunities to cross the tracks) in the AM peak hour and southbound in the PM peak hour.

Parking

For the evaluation of station parking conditions under the No Action Alternative, LIRR ridership growth projections were compared with parking supply increases anticipated by LIRR without the Preferred Alternative.

No Action parking conditions in the year 2010 were determined using LIRR ridership projections that estimated the volume of new riders generated at each station and assume modal splits and average vehicle occupancy rates similar to existing conditions. This analysis identified the following ridership growth factors branch-by-branch:

- Babylon +19.3%
- Far Rockaway +12.0%
- Hempstead + 4.0%
- Long Beach +17.2%
- Montauk +64.0%
- Oyster Bay +50.6%
- Port Jefferson +33.6%
- Port Washington + 3.4%
- Ronkonkoma +31.0%
- West Hempstead +26.2%

LIRR anticipates parking increases at 28 LIRR stations, ranging from fewer than 10 spaces at some stations to as many as 300 or more spaces at others. Major increases are currently programmed at Bellmore (250 spaces), Deer Park (300 spaces), Farmingdale (357 spaces), Lindenhurst (118 spaces), Lynbrook (100 spaces), Port Jefferson (160 spaces), Speonk (125 spaces), and Valley Stream (230 spaces). Overall, an increase of 2,382 parking spaces are currently planned to be added (excluding additional spaces that may be created at stations currently under study, but which are not yet planned).

A detailed station-by-station parking space utilization comparison is presented in Table 9E-8. As shown, numerous LIRR stations can be expected to experience significant parking shortfalls in the No Action Alternative. The number of stations experiencing parking utilization rates in excess of 100 percent can be expected to more than double, increasing from the current 22 to 51 stations in the No Action Alternative. Three branches—Babylon, Port Jefferson, and Ronkonkoma—would experience overall parking utilization conditions that would increase from current rates less than 100 percent to future No Action rates in excess of 100 percent. This would occur even with the expected parking increase improvements.

TSM ALTERNATIVE

Under the TSM Alternative, LIRR ridership would be only marginally higher in the year 2010—1.7 percent higher—than under the No Action Alternative. Over the 4-hour AM peak period, ridership increases under the TSM Alternative would be about 15 percent of the increase projected for the Preferred Alternative, which is analyzed below. Therefore, it can be assumed that peak hour vehicle traffic generated at each LIRR station would also be about 15 percent of the traffic that was determined to be generated at these stations under the Preferred Alternative.

Table 9E-9 presents the projected vehicle traffic generated at each of the 15 stations analyzed in detail, compared with the traffic generation at each station under the Preferred Alternative.

Since the Preferred Alternative would generate six to seven times the volume of traffic at these stations compared to the TSM Alternative, and since all significant traffic impacts created by the Preferred Alternative were found to be mitigatable via standard non-capital intensive traffic engineering measures (see the discussion below), it can readily be concluded either that the TSM Alternative would not generate significant impacts or that its impacts would also be readily mitigatable.

Regarding station parking demands, the TSM Alternative would also generate a far smaller demand for parking than would the Preferred Alternative, since it would generate and be able to service just a modest number of new riders. Station-by-station parking demands under the TSM Alternative were also estimated as 15 percent of the increased demand for the Preferred Alternative, as shown in Table 9E-10.

In several of the station "cases" examined above, parking increases are so small that they can be considered either negligible or within the range of day-to-day variation. They would therefore not require significant mitigation—i.e., expansion of the parking lot or creation of new parking facilities. The one notable exception would be at Ronkonkoma, where a combination of existing parking space shortfalls and a projected parking demand increase of 139 spaces would create a need for mitigation.

Table 9E-8

No Action and Preferred Alternatives (Year 2010) Parking Capacity and Utilization at LIRR Stations

Station		No Action Alternative			Preferred Alternative		
	Off-Street Capacity	Off-Street Parking Usage	Utilization (percent)	Parked On-Street	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Babylon Branch							
Rockville Centre	1,419	1,650	116.3	119	1,744	122.9%	126
Baldwin	1,302	1,458	112.0	341	1,541	118.4	361
Freeport	1,152	915	79.4	116	967	84.0	122
Merrick	1,563	1,942	124.3	191	2,053	131.1	202
Bellmore	1,823	1,927	105.7	17	2,037	111.7	18
Wantagh	1,508	1,846	122.4	60	1,951	129.4	63
Seaford	1,148	1,387	120.9	0	1,467	127.7	0
Massapequa	1,798	2,137	118.8	183	2,258	125.6	193
Massapequa Park	723	836	115.7	69	884	122.3	73
Amityville	625	598	95.6	0	632	101.1	0
Copiague	742	915	123.3	111	967	130.3	117
Lindenhurst	908	805	88.7	191	851	93.7	202
Babylon	2,043	2,029	99.3	44	2,145	105.0	47
Branch Total	*16,754*	*18,445*	*110.1*	*1,441*	*19,496*	*116.4*	*1,523*
Ronkonkoma Branch							
Bethpage	889	1,208	135.9	131	1,360	153.0	148
Farmingdale	845	702	83.1	66	791	93.6	74
Pinelawn	N/A	N/A	N/A	N/A	N/A	N/A	NA
Wyandanch	1,011	1,361	134.6	34	1,533	151.6	38
Deer Park	1,361	1,909	140.2	333	2,149	157.9	375
Brentwood	871	781	89.6	43	879	100.9	49
Central Islip	922	1,499	162.5	0	1,687	183.0	0
Ronkonkoma	4,998	7,067	141.4	219	7,958	159.2	246
Holtsville	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medford	20	9	45.9	0	10	51.6	0
Yaphank	42	3	6.2	0	3	7.0	0
Riverhead	22	22	101.2	0	25	114.0	0
Mattituck	71	42	59.0	0	47	66.5	0
Southold	20	1	6.6	0	1	7.4	0
Greenport	99	64	64.8	0	72	73.0	0
Branch Total	*11,171*	*14,668*	*131.3*	*826*	*16,515*	*147.8*	*930*
Hempstead Branch							
Hollis	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Queens Village	87	64	74.1	0	77	88.2%	0
Bellerose	42	38	91.6	0	46	109.0%	0
Floral Park	636	553	87.0	30	658	103.5%	36
Stewart Manor	157	148	94.1	0	176	111.9%	0
Nassau Boulevard	249	256	102.7	0	304	122.3%	0
Garden City	373	384	102.9	20	457	122.4%	24
Country Life Press	417	140	33.7	0	167	40.1%	0
Hempstead	896	786	87.8	0	936	104.4%	0
Branch Total	*2,857*	*2,370*	*83.0*	*50*	*2,820*	*98.7%*	*60*

Table 9E-8 (Continued)

No Action and Preferred Alternatives (Year 2010) Parking Capacity and Utilization at LIRR Stations

Station	Off-Street Capacity	No Action Alternative			Preferred Alternative		
		Off-Street Parking Usage	Utilization (percent)	Parked On-Street	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Far Rockaway Branch							
Locust Manor	0	0	N/A	25	0	N/A	26
Laurelton	52	58	112.0	11	61	118.0	12
Rosedale	211	50	23.9	146	53	25.2	153
Valley Stream	1,515	1,191	78.6	48	1,255	82.8	51
Gibson	71	76	107.3	22	80	113.1	24
Hewlett	815	996	122.2	21	1,049	128.8	22
Woodmere	306	318	103.9	448	335	109.6	472
Cedarhurst	797	701	88.0	34	739	92.7	35
Lawrence	201	127	63.0	34	133	66.4	35
Inwood	212	118	55.5	0	124	58.5	0
Far Rockaway	150	1	0.7	0	1	0.8	0
Branch Total	*4,330*	*3,636*	*84.0*	*789*	*3,832*	*88.5*	*830*
Montauk Branch							
Bay Shore	499	482	96.6	0	488	97.8	0
Islip	445	303	68.2	0	307	69.0	0
Great River	121	97	80.0	0	98	80.9	0
Oakdale	271	159	58.7	0	161	59.4	0
Sayville	535	587	109.7	0	594	111.1	0
Patchogue	653	449	68.8	0	455	69.0	0
Bellport	35	0	0.0	0	0	0.0	0
Center Moriches	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mastic-Shirley	195	203	104.3	0	206	105.5	0
Speonk	305	159	52.2	2	161	52.8	2
Westhampton	88	13	14.9	0	13	15.1	0
Quogue	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hampton Bays	190	49	25.9	0	50	26.2	0
Southampton	99	72	72.9	0	73	73.8	0
Southampton Campus	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bridgehampton	85	82	96.5	0	83	97.6	0
East Hampton	373	169	45.3	30	171	45.8	30
Amagansett	35	33	93.7	0	33	94.8	0
Montauk	60	5	8.2	0	5	8.3	0
Branch Total	*3,989*	*2,863*	*71.8*	*32*	*2,898*	*72.6*	*32*
Port Washington Branch							
Flushing	572	591	103.4	0	714	124.9	0
Murray Hill	0	0	N/A	326	0	N/A	393
Broadway	79	93	117.8	688	112	142.3	831
Auburndale	0	0	N/A	868	0	N/A	1,048
Bayside	75	50	66.2	1,033	60	79.9	1,248
Douglaston	118	123	104.3	517	149	126.0	625
Little Neck	113	115	101.6	414	139	122.7	500
Great Neck	360	367	102.0	0	443	123.3	0
Manhasset	496	508	102.4	0	613	123.6	0
Plandome	255	175	68.5	0	211	82.8	0
Port Washington	795	801	100.8	0	968	121.8	0
Branch Total	*2,863*	*2,823*	*98.6*	*3,844*	*3,409*	*119.1*	*4,644*

Table 9E-8 (Continued)

No Action and Preferred Alternatives (Year 2010) Parking Capacity and Utilization at LIRR Stations

Station	Off-Street Capacity	No Action Alternative			Preferred Alternative		
		Off-Street Parking Usage	Utilization (percent)	Parked On-Street	Off-Street Parking Usage	Utilization (percent)	Parked On-Street
Port Jefferson Branch							
New Hyde Park	651	783	120.3	102	815	125.2	106
Merillon Avenue	153	223	145.8	0	232	151.8	0
Mineola	564	732	129.8	418	762	135.1	435
Carle Place	14	59	419.9	27	61	437.1	28
Westbury	583	752	129.0	210	783	134.3	218
Hicksville	3,328	4,450	133.7	160	4,633	139.2	167
Syosset	1,221	1,650	135.1	158	1,718	140.7	164
Cold Spring Harbor	969	1,263	130.3	0	1,314	135.6	0
Huntington	3,820	4,858	127.2	355	5,057	132.4	370
Greenlawn	452	319	70.6	0	332	73.5	0
Northport	1,096	832	75.9	0	866	79.1	0
Kings Park	771	754	97.7	16	784	101.7	17
Smithtown	794	452	56.9	0	470	59.2	0
St. James	312	218	69.8	0	227	72.7	0
Stony Brook	444	415	94.2	0	435	98.0	0
Port Jefferson	678	337	49.7	0	350	51.7	0
Branch Total	*15,850*	*18,099*	*114.2*	*1,446*	*18,839*	*118.9*	*1,505*
Oyster Bay Branch							
East Williston	201	289	143.9	75	291	144.6	76
Albertson	77	32	41.1	92	32	41.3	92
Roslyn	336	340	101.3	92	342	101.8	92
Greenvale	190	104	54.7	20	104	55.0	20
Glen Head	168	175	104.0	15	176	104.5	15
Sea Cliff	133	145	108.7	0	145	109.2	0
Glen Street	132	127	95.8	0	127	96.3	0
Glen Cove	161	184	114.1	0	185	114.7	0
Locust Valley	187	279	149.0	0	280	149.7	0
Mill Neck	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oyster Bay	338	53	15.6	0	53	15.7	0
Branch Total	*1,923*	*1,726*	*89.7*	*294*	*1,735*	*90.2*	*295*
West Hempstead Branch							
St. Albans	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Westwood	62	56	89.6	0	67	107.8	0
Malverne	188	218	116.1	0	263	139.8	0
Lakeview	55	66	119.3	23	79	143.7	27
Hempstead Gardens	0	0	N/A	66	0	N/A	79
W. Hempstead	980	485	49.4	0	583	59.5	0
Branch Total	*1,285*	*824*	*64.1*	*88*	*992*	*77.2*	*106*
Long Beach Branch							
Lynbrook	1,040	793	76.3	107	823	79.1	111
Centre Avenue	133	103	77.5	7	107	80.4	7
East Rockaway	169	196	115.8	0	203	120.1	0
Oceanside	580	659	113.6	79	683	117.8	81
Island Park	466	537	115.2	0	557	119.4	0
Long Beach	223	234	105.1	307	243	109.0	318
Branch Total	*2,611*	*2,522*	*96.6*	*499*	*2,615*	*100.2*	*518*

Table 9E-9

Vehicle Trips Generated at LIRR Stations Under the TSM Alternative (AM Peak Hour, Year 2010)

Station	Vehicle Trips	
	TSM Alternative	Preferred Alternative
Bayside	28	189
Great Neck	26	176
Port Washington	29	193
Mineola	2	16
Hicksville	20	132
Huntington	14	90
Port Jefferson	1	4
Long Beach	1	8
Hempstead	5	36
Malverne	1	5
Valley Stream	4	27
Merrick	6	37
Babylon	11	72
Deer Park	10	64
Ronkonkoma	41	270

Table 9E-10

Parking Demand Generated at LIRR Stations Under the No Action and TSM Alternatives vs. the Preferred Alternative (Year 2010)

Station	New Parking Needs		
	No Action Alternative	TSM Alternative	Preferred Alternative
Bayside	36	34	225
Great Neck	12	11	76
Port Washington	26	25	167
Mineola	289	7	47
Hicksville	1,159	28	189
Huntington	1,311	32	214
Port Jefferson	85	2	14
Long Beach	79	3	20
Hempstead	30	22	149
Malverne	45	7	45
Valley Stream	133	10	64
Merrick	345	18	122
Babylon	335	18	119
Deer Park	531	42	282
Ronkonkoma	1,724	139	927

PREFERRED ALTERNATIVE

Traffic

Traffic impacts of the Preferred Alternative are related to the number of new riders projected to use each LIRR station; specifically, the number of auto trips that these new riders would generate. The volume of new riders that would drive or be dropped off/picked up by car or taxi (modal split) was determined using projected LIRR ridership growth percentages and modal split data for each of the 15 analysis stations. This analysis identified the following ridership growth factors that can be expected for each branch for the year 2010 in addition to the growth expected in the No Action conditions (as outlined above):

- Babylon + 5.7%
- Far Rockaway + 5.4%
- Hempstead +19.0%
- Long Beach + 3.7%
- Montauk + 1.2%
- Oyster Bay + 0.5%
- Port Jefferson + 4.1%
- Port Washington +20.8%
- Ronkonkoma +12.6%
- West Hempstead +20.4%

The modal splits for vehicle traffic ranged from 32 percent by auto at Malverne; 43 to 48 percent by auto at Bayside, Long Beach, and Great Neck; to 95 to 99 percent at Huntington, Deer Park, and Ronkonkoma. At most of the remaining stations, about 80 to 90 percent of their riders arrive by auto, most of which park at the station; many others are dropped off by someone else.

Average vehicle occupancy rates were then established by survey for a sample set of stations, and indicated that the average auto occupancy at Long Island stations was 1.08. Therefore, the vast majority of cars parked at Long Island stations or used to drop off riders had just one commuter in them. The small number of vehicles with two or more commuters raised the average to 1.08.

Based on this trip generation, modal split, and average vehicle occupancy information, the volume of vehicle traffic that is expected to be generated by the Preferred Alternative was determined for each of the 15 analysis stations (see Table 9E-11). Vehicle pick-ups or drop-offs are counted as two vehicle "trips" to reflect that each car or taxi coming to drop off a rider is both an arriving and departing vehicle trip. Traffic expected to be generated by the Preferred Alternative in the year 2020 would be only slightly higher—17 additional vehicle trips in the AM peak hour at Bayside (i.e., 206 vehicle trips in 2020 versus 189 in the year 2010), 16 additional vehicle trips at Great Neck, 10 at Hicksville, 8 at Deer Park, and 29 at Ronkonkoma.

The vehicle trips expected to be generated at each of the stations analyzed were then assigned to the local street network to determine future (with the Preferred Alternative) traffic LOSs and the potential for significant traffic impacts at the 15 "test" stations. An overview comparison of future No Action and Preferred Alternatives was shown previously in Table 9E-5 for the year 2010.

Table 9E-11

Vehicle Trips Generated at LIRR Stations by the Preferred Alternative (AM Peak Hour, Year 2010)

Station	Vehicle Trips Parking at Station	Vehicle Pick-up or Drop-off Trips	Total Generated Vehicle Trips
Bayside	95	47 x 2 = 94	189
Great Neck	90	43 x 2 = 86	176
Port Washington	111	41 x 2 = 82	193
Mineola	10	3 x 2 = 6	16
Hicksville	106	13 x 2 = 26	132
Huntington	78	6 x 2 = 12	90
Port Jefferson	2	1 x 2 = 2	4
Long Beach	6	1 x 2 = 2	8
Hempstead	24	6 x 2 = 12	36
Malverne	3	1 x 2 = 2	5
Valley Stream	19	4 x 2 = 8	27
Merrick	29	4 x 2 = 8	37
Babylon	44	14 x 2 = 28	72
Deer Park	52	6 x 2 = 12	64
Ronkonkoma	228	21 x 2 = 42	270

Overall, in the year 2010, the Preferred Alternative can be expected to create significant traffic impacts at 11 of the 39 intersections analyzed in the AM peak hour and at 13 intersections in the PM peak hour. Table 9E-5 indicates that, for the most part, intersections expected to operate at clearly acceptable LOSs A, B or C would generally continue to operate at similar LOSs. Several intersections operating at marginally acceptable/unacceptable LOS D under the No Action Alternative would deteriorate into unacceptable LOS E or F. Some intersections would experience significantly increased delays within conditions that are already LOS E or F. Intersection-by-intersection LOS findings are shown in Table 9E-12. Additional details on average vehicle delays and volume-to-capacity (v/c) ratios are provided in the Technical Appendix, which gives a more detailed comparison of the No Action and Preferred Alternatives for each traffic movement at each of the 39 intersections analyzed.

It is even more important to note that each of the significant traffic impacts identified in this analysis can be mitigated using standard traffic engineering improvements, such as signal phasing and/or timing changes, restriping traffic lanes to provide slightly additional or reconfigured lane widths, and/or more restrictive parking regulations. These are the types of traffic capacity improvements typically implemented at the state or county level as part of a transportation agencies' standard responsibilities. None of the significant traffic impacts identified would require costly engineering improvements, such as roadway widenings. A description of the types of mitigation measures that might be needed to accommodate the traffic demands associated with the Preferred Alternative in the year 2010 follows for locations that would have significant impacts.

At the *Great Neck* station area, both intersections analyzed along Middle Neck Road—at Station Plaza North and at Station Plaza South—would have significant impacts. These are the two intersections located right at the edge of the LIRR station area that would be the focus of new

Table 9E-12

Preferred Alternative Traffic Level of Service and Significant Impact Summaries: Long Island Rail Road Station Areas (Year 2010)

Intersection	AM Peak Hour			PM Peak Hour		
	No Action	Preferred Alternative	Signif. Impact	No Action	Preferred Alternative	Signif. Impact
Mineola						
Old Country Road and Mineola Boulevard/Franklin Avenue	D	D	—	F*	F*	—
Mineola Boulevard and 2nd Street	F*	F*	—	F*	F*	—
Hicksville						
Route 106 and West John Street	C	C	—	F*	F*	—
Route 106 and Duffy Avenue	D	D	yes	F*	F*	yes
Route 107 and East John Street	C	C	—	C	C	—
Woodbury Road and Bay Avenue/East Barclay Street	B	B	—	B	B	—
Huntington						
Route 110 and Broadway/Railroad Street	C	C	—	F*	F*	—
Park Avenue and Broadway	F*	F*	yes	C	F*	yes
Ronkonkoma						
Hawkins Avenue and LIE North Service Road	D	D	yes	C	C	—
Hawkins Avenue and LIE South Service Road	D	D	—	C	F*	yes
Hawkins Avenue and Union Avenue	B	B	—	C	C	yes
Ronkonkoma Avenue Ramp and Railroad Avenue	A	A	—	A	A	—
Babylon						
Deer Park and Park Avenues	F*	F*	yes	D	D	yes
Deer Park and Railroad Avenues	B	B	yes	D	E	yes
Deer Park Avenue and West Main Street	C	C	—	F*	F*	yes
Great Neck						
Middle Neck Road and North Station Plaza	F*	F*	yes	F*	F*	yes
Middle Neck Road and South Station Plaza	F*	F*	yes	C	C	yes
Port Washington						
Main Street and Port Washington Boulevard	F*	F*	yes	C	D	yes
Main Street and LIRR Station Entrance	A	A	—	A	A	—
Deer Park						
Executive Drive and Long Island Avenue	B	B	—	D	D	—
Executive Drive and Pine Aire Drive	F*	F*	yes	D	D	—
Merrick						
Merrick Avenue and Sunrise Highway	F*	F*	—	D	D	—
Merrick Avenue and Broadcast Plaza	A	A	—	A	A	—
Merrick Avenue and Smith Street	D	D	—	F*	F*	yes
Hempstead						
Main Street and West Columbia Street	B	B	—	B	B	—
Main Street and Fulton Street (Route 24)	B	B	—	B	B	—
Fulton St. (Route 24) and Washington Avenue	F*	F*	—	F*	F*	—
Long Beach						
West Park Avenue and Parking Lot Entrance	B	B	—	B	B	—
West Park Avenue and Center Street	B	B	—	B	B	—
West Park Avenue and Edwards Boulevard	B	B	—	B	B	—
Bayside						
Bell Boulevard and Northern Boulevard	F*	F*	yes	C	C	—
Bell Boulevard and 41st Avenue	D	F*	yes	D	F*	yes

Table 9E-12 (Continued)

Preferred Alternative Traffic Level of Service and Significant Impact Summaries: Long Island Rail Road Station Areas (Year 2010)

Intersection	AM Peak Hour			PM Peak Hour		
	No Action	Preferred Alternative	Signif. Impact	No Action	Preferred Alternative	Signif. Impact
Valley Stream						
South Franklin Avenue and Sunrise Highway	B	B	—	B	B	yes
South Franklin Avenue and West Hawthorne Avenue	B	B	—	B	B	—
South Franklin Avenue and Merrick Road	B	B	—	C	C	—
Port Jefferson						
Main Street (Route 25A) and LIRR Entrance	A	A	—	B	B	—
Main Street (Route 25A) and North Country Road	F*	F*	—	F*	F*	—
Malverne						
Hempstead Avenue and Utterby Road	C	C	—	B	B	—
Hempstead Avenue/Francis Street/LIRR Entrance	C	C	—	C	C	—

Note: Overall intersection LOS is shown. Significant impacts may occur at locations where the overall LOS does not change if one or more traffic movements deteriorate significantly.

traffic en route to or from the station. However, with traffic lane restripings, signal timing modifications, and installation of new actuated lead or left-turn phases, these impacts would be mitigated.

At *Hicksville*, one of the four intersections analyzed would experience a significant traffic impact as a result of the project—Newbridge Road (Route 106) at Duffy Avenue, located at the northeast corner of the municipal parking garage which is used by LIRR commuters. This impact could be mitigated with minor signal retiming. None of the other intersections analyzed would be significantly impacted.

At *Bayside*, both intersections analyzed would experience significant impacts and require traffic mitigation. At the intersection of Northern Boulevard and Bell Boulevard, which has the heaviest traffic volumes in the area, it would be necessary to prohibit parking on the northbound Bell Boulevard approach in the AM peak period; re-stripe the eastbound Northern Boulevard approach from its current designation with a shared left-turn/through lane, two through lanes, and a right-turn lane, to a left-turn-only lane, two through lanes, and a right-turn lane; and re-time the traffic signal. At the Bell Boulevard/41st Avenue intersection, located right across from the LIRR station stairwells and the focal point for considerable LIRR rider pick-up and drop-off activity, a 2-foot offsetting of the Bell Boulevard centerline to permit inclusion of a northbound left-turn lane on Bell Boulevard, plus a retiming of the traffic signal, would be sufficient to mitigate traffic impacts from the Preferred Alternative.

At *Port Washington*, signal retiming would mitigate significant impacts at the intersection of Main Street and Port Washington Boulevard. This is the most heavily trafficked intersection in the area, traversed by traffic heading toward the LIE, the LIRR station area, and commercial Main Street. The other intersection analyzed—at the entrance to the LIRR station from Main Street—would not be significantly impacted.

At *Valley Stream*, one of the three intersections analyzed would experience significant impacts—Merrick Road and South Franklin Avenue. It would require a minor signal retiming during the PM peak hour.

At *Merrick*, one of the three intersections analyzed—Merrick Avenue and Smith Street—would have a significant impact and require a minor signal retiming during the PM peak hour.

At *Babylon*, all three intersections analyzed along Deer Park Avenue would require traffic improvements to mitigate expected traffic impacts. At Deer Park and Railroad Avenues, a significant egress point from the LIRR station, it would be necessary to signalize this currently unsignalized intersection. At Deer Park and Park Avenues, a key intersection through which station and nonstation traffic passes, it would be necessary to remove four on-street parking spaces to formally add a second southbound traffic lane at the intersection. There are currently two traffic lanes available at the approach to the intersection, but the curb lane is available for a short distance; according to capacity analysis procedures, a greater length is needed for this short lane to operate effectively. Signal retiming would also be needed at this location. At Deer Park Avenue and Main Street, signal retiming would be needed during the PM peak period.

One of the two intersections analyzed at *Deer Park* would experience significant impacts. The traffic signal at Pine Aire and Executive Drives on the south side of the LIRR tracks would need to be retimed in the AM peak. This would provide additional green signal time to the heavy right-turn movement along westbound Pine Aire Drive en route to the LIRR station and Heartland Industrial Park.

One of the two intersections analyzed at *Huntington* would have significant impacts. The signal timings at the intersection of Broadway and Park Avenue would need to be retimed to be more responsive to directional traffic demands. This would entail providing more exclusive green signal time to left turns from northbound Park Avenue in the AM peak, and slightly more green time to eastbound Broadway in the PM peak.

At *Ronkonkoma*, three of the four intersections analyzed would require signal retimings to mitigate otherwise significant traffic impacts. These intersections are Hawkins and Union Avenues, one block north of the station (PM peak hour impact), and the intersections of the LIE service roads and Hawkins Avenue (one AM impact, one PM impact).

The analyses conducted at the other five LIRR stations—Mineola, Hempstead, Malverne, Long Beach, and Port Jefferson—indicated that significant traffic impacts are not expected and traffic mitigation measures would therefore not be needed.

Since the detailed year 2010 traffic impact analyses were conducted for a representative set of 15 LIRR stations, it can reasonably be expected that standard traffic engineering improvements would likely be sufficient to mitigate traffic impacts that might occur at any of the LIRR's numerous other stations. This is based on a detailed analysis of a set of intersections that include some of the most heavily trafficked locations near LIRR stations, along key local arterials, and within existing commercial areas.

Traffic conditions at the eight at-grade crossing analysis locations were simulated under the Preferred Alternative for year 2010 conditions. This simulation assumed that the number of trains crossing at each location would increase according to the LIRR's anticipated operations plan, and that traffic volume increases at these crossing locations would reflect project-generated trips to and from adjacent LIRR stations. The findings are shown in Table 9E-13 and discussed below.

Table 9E-13
LIRR Grade Crossing Impacts: Preferred Alternative vs. No Action Alternative (Year 2010)

Location	Additional Train Crossings	Additional Queue Length (in vehicles)		Additional Stopped Time at the Gate	
		NB	SB	NB	SB
AM Peak Hour					
New Hyde Park Road (New Hyde Park)**	13	0	+1	11 sec.	10 sec.
Willis Avenue (Mineola)**	13	+1	+1	26 sec.	28 sec.
Franklin Avenue (Garden City)	0	0	0	—*	—
Robbins Lane (Syosset)	8	0	0	—	—
Jackson Avenue (Syosset)	8	0	0	12 sec.	12 sec.
Main Street (Port Jefferson)	1	0	0	2 sec.	—
Hempstead Avenue (Malverne)	0	0	0	—	—
Executive Drive (Deer Park)	4	EB 0 WB 0	SB +1	EB — WB 2 sec.	SB 2 sec.
PM Peak Hour					
New Hyde Park Road (New Hyde Park)**	13	0	0	8 sec.	10 sec.
Willis Avenue (Mineola)**	13	0	+1	16 sec.	15 sec.
Franklin Avenue (Garden City)	0	+1	0	—	—
Robbins Lane (Syosset)	8	0	0	—	2 sec.
Jackson Avenue (Syosset)	8	0	0	7 sec.	8 sec.
Main Street (Port Jefferson)	1	+1	0	—	—
Hempstead Avenue (Malverne)	0	0	0	—	—
Executive Drive (Deer Park)	4	EB 0 WB +2	SB +3	EB — WB —	SB 18 sec.

Notes:
* — = Negligible, i.e., under 2 seconds.
** These grade crossings may be eliminated in conjunction with the Main Line Third Track Project.

In general, the primary impacts of the Preferred Alternative on traffic delays at at-grade crossing locations would result from the increased number of LIRR trains being operated rather than from increased traffic generated at these crossing locations. At a number of locations, impacts would be attributable to a combination of these two factors. The largest impact at grade crossings would be experienced along the Main Line, since the operating plans assumed under the Preferred Alternative indicate that 13 additional trains would be operated along this line through New Hyde Park and Mineola, with 8 of the 13 additional trains operated through Syosset. The findings of the simulated Preferred Alternative analyses are shown in Table 9E-13 and discussed below.

In the AM and PM peak hours in the year 2010, the average maximum queues of vehicles waiting to cross the LIRR tracks while the crossing gates have been activated are projected to increase, generally, by one vehicle or fewer at all analysis locations, with one exception: at Deer Park station. Here, PM peak hour queues are projected to increase by two vehicles along westbound Pine Aire Drive and by three vehicles along southbound Executive Drive. In terms of increased stopped delays to vehicles crossing the LIRR tracks at the eight analysis locations, there are only a few locations where such delays are projected to be close to the 10-second significant impact threshold or more than 10 seconds. These are discussed further below.

Traffic delay increases are projected to be approximately 10-11 seconds per direction to the average vehicle crossing the LIRR tracks along New Hyde Park Road near the New Hyde Park station in the AM peak hour, and 8 to 10 seconds in the PM peak hour. Thus, under the Preferred Alternative, the average vehicle delay to all vehicles crossing the tracks would range from about 21 to 25 seconds in both the AM and PM peak hours. If resulting delays at this grade crossing were to be viewed as the equivalents of delays at traffic signals, the resulting 21- to 25-second delays would be equivalent to LOS C conditions. Although the incremental delay caused by the Preferred Alternative would be greater than 10 seconds in the AM peak hour, this LOS C condition would be considered an acceptable LOS and would not constitute a significant traffic impact.

At the Willis Avenue at-grade crossing of the LIRR tracks just east of Mineola station, traffic delays would increase by a projected 26 to 28 seconds per vehicle in the AM peak hour and by 15 to 16 seconds in the PM peak hour. The resulting equivalent LOS would be mid-LOS D in both time periods and would not constitute a significant traffic impact on motorists crossing at this location, since LOS D is considered marginally acceptable. Prevailing traffic volumes along Willis Avenue in this area are generally modest to moderate, with about 150 to 200 vehicles per hour per direction crossing the tracks in the AM peak and 250 to 300 vehicles per hour in the PM peak. This is a complex crossing location, since the LIRR tracks diverge with one set of tracks following the Main Line alignment eastward and the other following the Oyster Bay Branch alignment northeastward. Currently, at times when the LIRR crossing gates are activated by approaching trains, some vehicle traffic chooses to divert to alternate routes rather than accept the delays by waiting for the crossing gates to stop blocking traffic. This observed reaction on the part of drivers would likely continue as the number of trains crossing Willis Avenue increases significantly (by 13 in the AM and PM peak hours) and as the resulting delays also increase.

At the LIRR at-grade crossing of Jackson Avenue near the Syosset station, traffic delays would increase by a projected 12 seconds in the AM peak and 7 to 8 seconds in the PM peak. In both analysis periods, the resulting average vehicle delays would be about 18 to 20 seconds, indicating LOS C, or acceptable, conditions.

At Deer Park station, there would be one significant traffic impact at the at-grade crossing location at the east end of the track, along Executive Drive. This would occur in the PM peak, when there is a substantial level of traffic departing the area from the Heartland Industrial Park. Southbound Executive Drive traffic would experience increased delays of about 18 seconds. This condition could be partially, if not fully, mitigated by altering the amount of time that the LIRR crossing gate is activated, or in the "down" position. Currently, it appears that the gate is activated once an eastbound train approaches the Deer Park station, even if that train is slowing down to stop at the station. If the point of activation of the crossing gate is changed to the time at which the train comes to a full stop in the station, a considerable amount of unnecessary traffic delay time at the crossing gate can be saved.

Traffic analyses were conducted for year 2020 conditions under the Preferred Alternative, for the same five LIRR stations and one key grade crossing location addressed for the No Action Alternative. The Preferred Alternative can be expected to create significant impacts at 11 of the 14 intersections analyzed in the AM peak hour in the year 2020, and at 9 of the 14 intersections in the PM peak hour. By comparison, in the year 2010, there would be significant impacts at 7 of the 14 intersections in the AM and at 6 intersections in the PM. Analyses at these locations indicate that standard traffic operations improvements—such as signal phasing and timing

modifications, lane restripings, and parking prohibitions—would be sufficient to mitigate year 2020 impacts, as was determined for year 2010 conditions, although there would be more such locations to be mitigated.

Year 2020 analyses of the LIRR grade crossing on Executive Drive at the Deer Park station indicate that projected significant impacts would be greater than projected for the year 2010, and probably could not be fully mitigated by altering the amount of time that the LIRR crossing gate is activated, or in the "down position." For example, in the year 2020 PM peak hour analysis condition, southbound Executive Drive traffic could experience increased delays of about 2 minutes due to the combination of additional trains and increased traffic. Potential strategies to mitigate these impacts could include grade crossing elimination or construction of parking facilities on the south side of the LIRR tracks to eliminate the need for many auto commuters to the station from having to cross the tracks to get to the station's one parking lot.

Parking

The LIRR ridership growth projections were utilized to determine impacts on parking at each station under the Preferred Alternative in the year 2010. Station-by-station parking projections are presented within Table 9E-8. The Preferred Alternative can be expected to increase parking demands at each of the LIRR's 124 stations in suburban Queens and Long Island over the levels predicted for the No Action Alternative. Several stations would be able to accommodate the projected parking demands because there would be sufficient parking space in their parking facilities in the future. At other stations where there would be sufficient parking in place without the proposed project, the parking demands generated by it would cause shortfalls that would not be expected under the No Action Alternative. At still other stations, future parking demands even without the Preferred Alternative are projected to exceed future parking capacities—in some cases at stations where capacity increases are already planned and where the project could exacerbate anticipated parking shortfalls. Defining the parking impacts or "contribution" of the project to anticipated parking shortfalls must be viewed on a station-by-station basis. However, there are a series of parking mitigation options available, with the selection of the most viable options varying by station.

The parking impact analysis that follows begins with an assessment of potential impacts at the 15 representative stations profiled and analyzed within this EIS (see Figures 9E-2a and 9E-2b), and then proceeds to an extrapolation of findings just as was done for the traffic impact analyses.

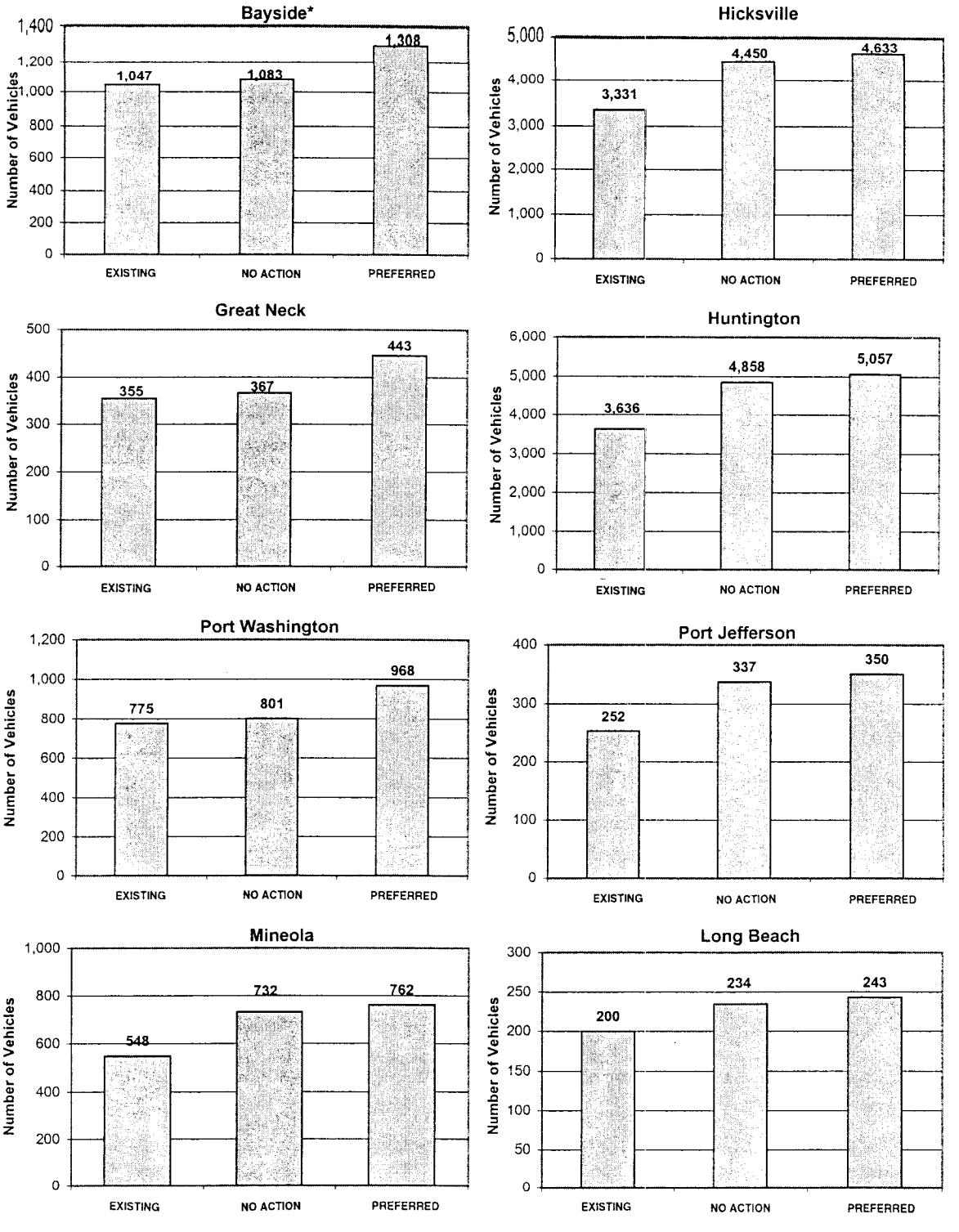
At *Bayside*, the Preferred Alternative is expected to increase parking demand by about 225 spaces over the No Action Alternative. The off-street parking supply at the station is currently limited to a single 75-space parking lot, of which only about half of the spaces are long-term commuter-type parking. LIRR surveys have indicated that about 1,000 riders currently park on nearby residential streets or on other streets at some distance from the station. Under the No Action Alternative, the parking demand is expected to increase fairly modestly, so the projected increase of 225 additional spaces from the Preferred Alternative would place considerable burdens on the adjacent residential areas and would be considered a significant impact requiring mitigation. It is also possible that at Bayside, which is characterized by a very significant percentage of bus use and pick-ups/drop-offs without parking, the transit/pick-up/drop-off share would increase to accommodate projected new parking demands.

At *Great Neck*, the Preferred Alternative is expected to increase parking demand by about 76 spaces over the No Action Alternative. The existing supply of off-street parking spaces in the station area is currently limited and nearly fully utilized, and can be expected to be fully utilized under the No Action Alternative. Mitigation options at this station include adding new off-street parking facilities or further encouraging the already significant use of bus access and pick-up/drop-off activity at the station.

At *Port Washington*, the Preferred Alternative is expected to increase parking demand by about 167 spaces over the No Action Alternative. Under the No Action Alternative, it is projected that the parking supply at this station will be 100 percent utilized (current parking utilization is very close to that as well). Because of very restrictive parking regulations on the residential streets within walking distance of the station, there are few, if any, on-street parkers today; such activity would not be likely to occur in the future. Previous studies have been undertaken (however, not by LIRR) to implement shuttle bus service to the station, but so far none have prevailed. Therefore, mitigation options at this station could include implementation of shuttle bus service as well as the more conventional option of increasing parking supply.

The *Mineola* station is projected to have a parking demand increase for 47 parking spaces over the No Action Alternative. Parking supply at this station currently comprises about 564 off-street spaces and considerable use of on-street metered spaces that allow for long-term commuter parking south of the tracks. Under the No Action Alternative, parking demands are expected to increase substantially—by about 289 spaces—and would result in demand levels in excess of available spaces off-street. This would also test the limit of availability for on-street spaces, although there are a number of blocks south of the tracks and west of the immediate parking area where metered parking is still available. These two projections—a parking demand increase of about 289 spaces in the No Action Alternative and 47 additional spaces under the Preferred Alternative—appear to affect future parking planning in the following way. Any measures to increase off-street parking supplies would need to increase the number of spaces incrementally to accommodate new riders resulting from the Preferred Alternative. The Mineola station is also a station with a significant level of bus service and pick-up/drop-off activity, so transit access should be encouraged. Another option that can be considered here would be improvement of pick-up/drop-off space to further encourage such activity in lieu of parking demands. Current pick-up/drop-off activity occurs on both sides of the tracks without the benefit of design clarity and with significant delays to auto traffic. Improvements to these conditions could further encourage pick-ups and drop-offs and reduce the demand for parking to some degree.

At *Hicksville*, the Preferred Alternative is expected to increase parking demand by about 189 spaces over the No Action Alternative. This station currently possesses one of the largest supplies of off-street parking of any LIRR station (over 3,300 spaces). These are fully used, in addition to an estimated 120 commuter vehicles parking on-street. Under the No Action Alternative, parking demand is projected to increase by about 1,159 spaces and would be a considerable challenge to accommodate. The Preferred Alternative is projected to increase parking demand at the station by 15 percent (189 additional spaces). Parking solutions at this station to the No Action Alternative would invariably need to consider provision of additional parking, possibly decking one of the existing parking lots with a second parking structure (there already is one major parking garage one block south of the station). The incremental needs generated by the Preferred Alternative should be incorporated within any solution considered for the No Action Alternative.

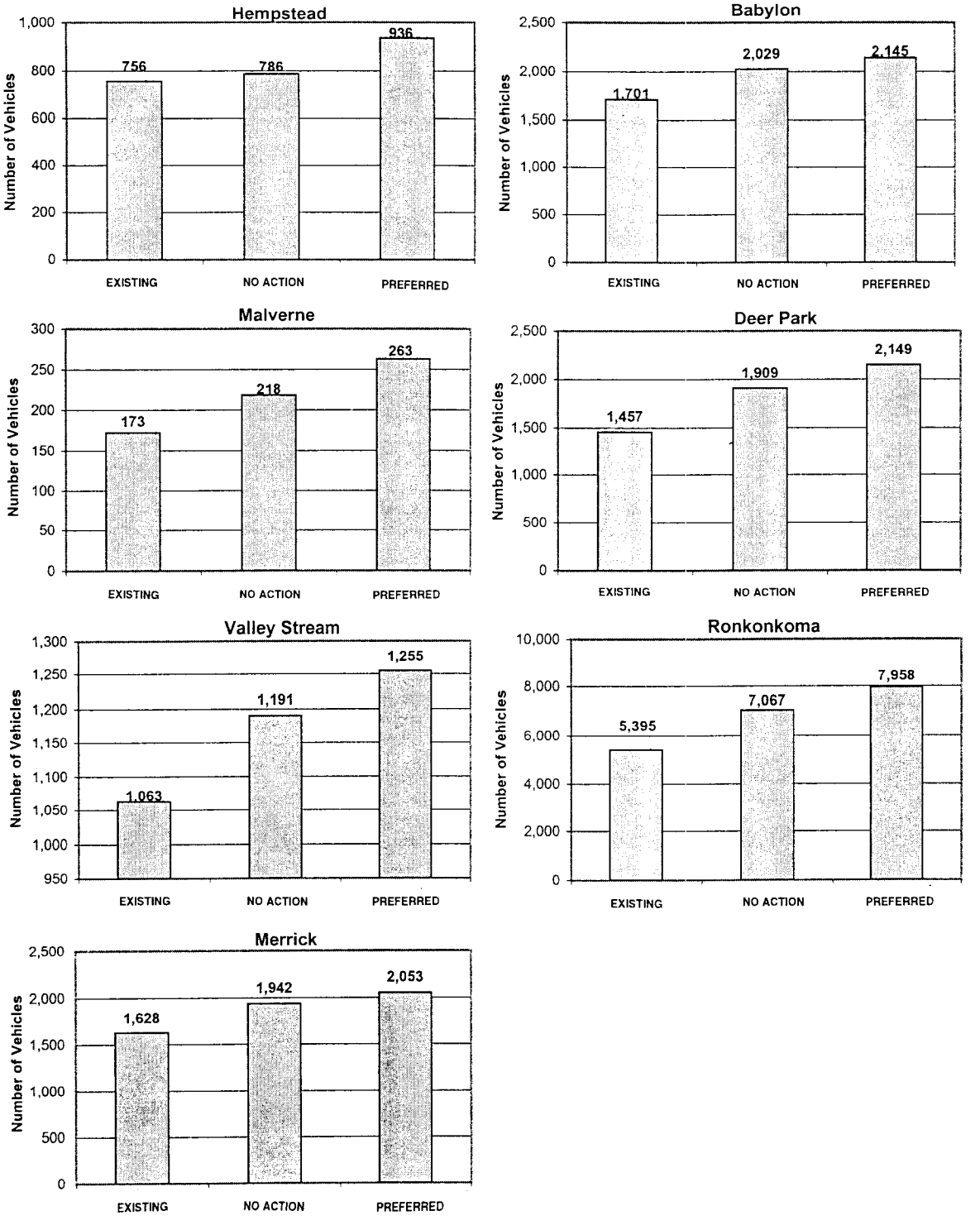


*Bayside parking demand also includes on-street parking since off-street station parking is extremely limited.

MTA / LIRR
East Side Access

Figure 9E-2a

Off-Street Parking Demand by Station for Existing, No Action and Preferred Alternatives



MTA / LIRR
East Side Access

Figure 9E-2b

Off-Street Parking Demand by Station for Existing, No Action and Preferred Alternatives

At *Huntington*, the Preferred Alternative is expected to increase parking demand by about 214 spaces over the No Action Alternative. This station currently has about 3,820 off-street parking spaces within two parking garages and a number of parking fields, and is operating at about 95 percent of capacity. Under the No Action Alternative, projected parking demand increases in excess of 1,300 spaces would leave a substantial parking shortfall; the Preferred Alternative's parking demands would represent a surcharge of about 15 percent and would need to be accommodated in conjunction with any plan the LIRR develops to meet its future parking shortfall at this station.

At *Port Jefferson*, the Preferred Alternative is projected to increase parking demands by 14 spaces over the No Action Alternative. There would be ample space available to accommodate this incremental demand, since current parking lot utilization is slightly less than 50 percent, and since the LIRR has plans to increase parking supplies at the station by about 150 spaces as part of its current program.

The *Long Beach* station's parking lots are currently utilized at about 90 percent of their capacity of 223 spaces, with more than 260 commuter vehicles parking on-street. Under the No Action Alternative, the parking demand is projected to increase by about 79 vehicles, while the Preferred Alternative is projected to increase parking demand by an additional 20 spaces. Although there would not be a sufficient number of spaces in the station's parking lots to accommodate the 20-car demand increase, this incremental demand is small enough so as not to be considered a significant impact. If plans materialize to increase parking supplies at the station, it would be easy to accommodate this 20-car incremental demand as well. If not, there is a considerable level of bus access activity at the station and on-street parking supplies south of Park Avenue that could accommodate this level of parking need.

At *Hempstead*, the Preferred Alternative is expected to increase parking demand by about 149 vehicles over the No Action Alternative. This would increase projected parking demand levels at the station's parking lots from about 88 percent under the No Action Alternative to 104 percent under the Preferred Alternative, with a projected parking shortfall of about 40 spaces. Since this shortfall falls within 5 percent of the existing parking lot capacities, and a 5 percent variation of parking demand is not unusual day-to-day, there could in fact be no shortfall in the future. This condition could be monitored and, if necessary, minor parking space capacity improvements in the parking lots at the station may accommodate this incremental demand. There is also a considerable amount of feeder bus activity at this station, which could also serve to accommodate a slightly higher level of bus transit use in lieu of parking.

At *Malverne*, the Preferred Alternative is expected to increase parking demand by about 45 vehicles over the No Action Alternative. Although the existing parking lots at the station are currently operating at about 92 percent of their 188-space capacity, the No Action Alternative is projected to have a shortfall of 30 parking spaces. It may be possible to increase the amount of off-street parking spaces to accommodate these demands. It is also possible that many of the commuters using this station who live in West Hempstead just north of the Southern State Parkway would instead begin to use that station which has considerable excess parking lot capacity.

The *Valley Stream* station currently has approximately 1,285 off-street parking spaces that are planned by the LIRR to increase to 1,515 under the No Action Alternative, whereby parking lot utilization would be at about 79 percent. The Preferred Alternative is expected to increase

parking demands by an additional 64 spaces, which should be readily accommodated by the availability of spaces at the station, and there would be no parking impact or need for mitigation.

At *Merrick*, the Preferred Alternative is expected to increase parking demand by about 122 vehicles over the No Action Alternative. Parking lots at this station are currently utilized above their capacity, with about 160 additional vehicles parking on the street. Under the No Action Alternative, parking demand is projected to increase by about 345 vehicles and could not be accommodated "as is." LIRR is currently undertaking a Merrick Area Revitalization Study, which is also investigating the need and opportunities for increasing parking supplies at this station. Recommendations emerging from this study could incorporate the additional parking demand projected from the Preferred Alternative.

At *Babylon*, the Preferred Alternative is expected to increase parking demand by about 119 vehicles over the No Action Alternative. Under the No Action Alternative, it is projected that current parking capacity (about 84 percent utilized) would be 100 percent utilized. Accommodation of the parking demand from the Preferred Alternative would be needed, possibly via parking capacity expansion at grade, possibly along the north side of Railroad Avenue, via creation of another surface lot east of Deer Park Avenue, or at another site to be determined.

At *Deer Park*, the Preferred Alternative is expected to increase parking demand by about 282 vehicles over the No Action Alternative. The one parking lot currently located at the station is well above capacity, with commuters parking illegally in the aisles, on dividers and landscaped areas, and on the street. LIRR has planned to expand this parking lot by 300 spaces, and it is included as part of the future No Action Alternative. Yet even with this capacity increase, future No Action parking demands will continue to greatly exceed the increased supply, with future No Action shortfalls in excess of 350 spaces. The impact of the Preferred Alternative, assuming the projected demand at this station materializes, would be significant, since it would compound No Action parking shortfalls to a significant degree. The primary solution at this station would appear to be a significant parking increase, i.e., beyond the 300 spaces planned, either by creating structured parking on the north side of the tracks or by creating new parking on the south side of the tracks.

Ronkonkoma station is one of the busiest and most heavily used stations in the LIRR system, with its nearly 5,000 parking space capacity fully utilized along with considerable illegal parking (as described for Deer Park above). Under the No Action Alternative, approximately 1,700 more vehicles would be anticipated at this terminal station, while the Preferred Alternative is expected to increase parking needs still further, by about an additional 927 spaces. This is a major shortfall under both the No Action and Preferred Alternatives that would call for additional parking garage(s) beyond the major facility built several years ago, or else a strategy of diverting rider demand to another station (or stations) at which the increased ridership and its parking demand could be satisfied.

The parking analyses and Table 9E-8 identify the need for strategies to accommodate increased parking demands generated by the Preferred Alternative. It should be noted that LIRR owns approximately 28 percent and operates and maintains a much smaller percentage of the parking facilities at its stations; the vast majority of these parking facilities falls under the jurisdiction of either the local town, village, or other local governing municipal entity. As discussed above, additional parking facilities would be needed at some LIRR stations, but not all. Some stations would retain the capacity to accommodate additional parking demands.

An identified parking shortfall is but one of the considerations that contribute to the decision to build additional parking at a station. The provision of additional parking is tied to considerations of potential future service changes and a need to balance the frequency and type of LIRR service with the size of the parking facilities at a series of stations—comprising an entire service catchment area. In addition, station planning and community considerations heavily contribute to the amount and type of parking provided at any one particular station.

Parking shortfalls at LIRR stations on Long Island, which occur in the existing condition and are predicted for both the No Action and Preferred Alternatives, would be mitigated on a station-by-station basis, as part of LIRR's existing parking program. This program involves working with the local jurisdictions that own, operate, and maintain the affected parking facilities at LIRR stations to identify and implement appropriate mitigation measures. The range of parking mitigation or accommodation options could include consideration of one or more of the following on a station-by-station basis:

- Re-striping of existing surface parking lots to increase capacity, expansion of existing lots, or construction of new lots.
- Construction of parking garages atop existing surface lots or at new locations.
- Modification of train service and schedules to improve or increase service at stations with available parking or where parking could be added more easily.
- Institution of fare policy changes to attract riders to a new station by shifting one or more stations from one fare zone to another.
- Increase of existing bus service to stations to promote bus use. Free or heavily subsidized fares and combination fare tickets could also be considered.
- Implementation of new station-oriented feeder bus service or jitney service, with local riders or a local Chamber of Commerce or Business Improvement District group designing the route themselves.
- Substantial improvements to and prioritization of kiss-and-ride facilities to increase pick-up/drop-off activity and reduce parking demand.
- Provision of preferential parking areas for carpoolers, with enforcement. Consideration could also be given to decreasing parking charges for carpoolers, although this is generally outside of LIRR jurisdiction, since the vast majority of station parking facilities are owned, operated, and maintained by local governmental bodies, and not LIRR.
- Construction of new station(s) near or between two major stations where parking demands greatly exceed parking availability.
- Provision of bicycle racks and/or lockers to promote increased bicycle use for access to stations.
- Various combinations of the above.

Ridership and parking projections that have been completed as part of the Preferred Alternative will need to be monitored, and the LIRR would need to work with the local jurisdictions who own, operate, and maintain these parking facilities to implement one or more of the strategies listed above to mitigate parking impacts of the project at individual stations. Comprehensive studies are underway at the Merrick and Mineola stations as part of the LIRR's assessment of long-term parking needs and their integration within the local station area.

Long Island Storage Yards

Potential new storage yards on Long Island would not be expected to result in any significant adverse impacts related to vehicular traffic, regardless of which sites are selected. The largest yards would provide approximately 80 parking spaces, and employees using these spaces would drive to and from work from approximately 4-9 AM and 3-9 PM. During peak hour (5:00-7:00 AM and 6:00-8:30 PM), a maximum of approximately 35 employees would enter and leave the yards.

MITIGATION MEASURES

The Preferred Alternative would generate significant traffic and parking impacts at LIRR stations in Eastern Queens and Long Island that would require mitigation. As detailed in the preceding section of this EIS, significant traffic impacts would occur at some, but not all, LIRR stations areas, and could be mitigated via standard traffic engineering improvements such as the following: installation of traffic signals at significantly impacted intersections that are not currently signalized; signal phasing and timing modifications at intersections that are currently signalized; lane restriping and/or parking restrictions where necessary to add capacity at the approaches to critical intersections; and, the offset of the centerline of a street where it would be necessary to add capacity to one direction of traffic flow. These are generally low-cost, readily implementable traffic capacity improvements typically implemented at the local, state, or county level. This is based on detailed analyses of projected traffic conditions at representative LIRR stations.

Based on a detailed analysis of eight representative LIRR at-grade crossing locations, there could also be significant impacts at a smaller number of such locations. At such locations, for example, at the east end of the Deer Park station, it may be possible for LIRR to modify the amount of time that the crossing gate is in the "down" position while a train is stopped within the station to serve riders getting on or off, in order to accommodate vehicular traffic crossing the tracks in the year 2010; by the year 2020, at this location (for example), much more capital-intensive measures, such as eliminating the grade crossing or constructing parking facilities to reduce the volume of vehicular traffic crossing the tracks, may be needed.

More importantly, the Preferred Alternative would result in substantial increases in ridership demand at many LIRR stations. Resulting parking shortfalls at LIRR stations—which would occur under the No Action Alternative as well, but which would be exacerbated with the Preferred Alternative—would be monitored station by station by the LIRR. As detailed in the preceding section, *mitigation would be implemented through LIRR's existing parking program, which involves working with local jurisdictions that own, operate, and maintain the affected parking facilities to identify and implement appropriate mitigation measures. The* range of strategies available to mitigate shortfalls and accommodate the growth in ridership includes physical expansion of the amount of parking available at some stations; modification of train schedules to improve or increase service at stations where parking would still be available or where additional parking would be easier to build; the increase and promotion of bus service, carpooling, and kiss-and-ride at selected stations; construction of new stations with new parking facilities; and other measures (refer to the end of the previous section for additional discussion of these options). ❖