A. EXISTING CONDITIONS

On-street pedestrian activity differs greatly between and within the various sections of the study area. Pedestrian activity on the eastern edge of the study area is generally very light compared with the central areas of Manhattan, as surrounding land uses do not generate much foot traffic and existing subway and bus lines are located at some distance from this area. During the AM period, pedestrian activity and density increases in the vicinity of the entrances to subway stations in residential areas and at the exits to subway stations in commercial areas as people travel to work. In the PM period, the reverse is true. Despite the existence of some intense pedestrian usage at locations adjacent to dense development, conditions at key pedestrian locations, such as the midblock areas of sidewalks and the corner crosswalks and reservoir areas, are generally acceptable. A more detailed review of pedestrian analysis procedures and operating characteristics is provided in Appendix D, as well as an overview of existing pedestrian conditions in each subarea.

New York City's *City Environmental Quality Review (CEQR) Technical Manual*, the guidance document used by City agencies for environmental review in New York City, includes guidance on appropriate levels of service for sidewalks and crosswalks within the city. This guidance is used here to evaluate sidewalk and crosswalk conditions, because of this project's location in Manhattan. The *CEQR Technical Manual* specifies that a level of service (LOS) D condition or better is considered acceptable for sidewalks, corner reservoirs, and crosswalks within intensely developed urban locations. LOS E and F are considered unacceptable, although these conditions are often prevalent in densely developed areas of Manhattan.

B. FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

Pedestrian activity levels in the study area would increase commensurate with demographic and socioeconomic trends and with any anticipated major development or redevelopment projects. Major changes in pedestrian activity patterns are not anticipated at this time. One significant exception to this would be the MTA Long Island Rail Road's (LIRR) proposed East Side Access (ESA) project, the extension of LIRR service into Grand Central Terminal (GCT) to better serve its East Side riders. ESA would increase pedestrian traffic into and within GCT and increase pedestrian activity levels on GCT's periphery (according to the ESA FEIS, an increase of 65,000 passengers into GCT is projected in the 6-10 AM peak period, with about half during the peak hour).

C. CONSTRUCTION IMPACTS OF THE PROJECT ALTERNATIVES

NO BUILD ALTERNATIVE

Under the No Build Alternative, the Second Avenue Subway would not be built. Therefore, there would be no pedestrian impacts caused by the construction or operation of the subway.

SECOND AVENUE SUBWAY

Construction of the Second Avenue Subway would narrow sidewalks adjacent to construction zones along the alignment; some sidewalks could also experience temporary short-term closures. For purposes of analysis, a significant adverse impact would occur if the closures at any one location were to last for longer than 2 weeks. The construction of a typical subway station is generally expected to take 3 to 5 years, and up to 10 years where access/shaft sites and staging areas are also proposed for removal of tunnel spoils and operation of construction equipment. During this construction time, the width of the sidewalk on one side of the Second Avenue alignment corridor or the other could be narrowed to approximately 5 feet wide to accommodate the construction zone. At some locations, the sidewalk on both sides of the street might need to be narrowed to provide an additional travel lane or a wider construction area. Maintenance and protection of traffic plans would be implemented to preserve pedestrian flows through areas affected by construction zones, but, at times, some temporary restrictions, sidewalk narrowings, and pedestrian detours may be needed. For purposes of analysis, a significant adverse impact would occur if the closures at any one location were to last for longer than 2 weeks.

On-street pedestrian impacts would occur on the narrow 5-foot-wide sidewalks through the construction zone if the 15-minute two-way pedestrian volumes exceed 750 pedestrians within Manhattan's Central Business District (CBD) or exceed 650 pedestrians outside of the CBD. This assumes that the effective width through the construction zone would be four feet. The full 5-foot walkway width would not be completely utilized by pedestrians since people normally do not press closely against walls lining a construction site; therefore, 6 inches of unused space are subtracted from both sides of the walkway when determining pedestrian level of service. Based on pedestrian data collected at study station locations, pedestrian volumes along the alignment are substantially lower than these threshold volumes and construction phase pedestrian impacts would not be expected. One exception is the Lower Manhattan area near Wall Street where significant pedestrian impacts might occur at times since on-street pedestrian volumes are just below the threshold volume and could occasionally peak above this limit.

In most cases, the narrowing of the sidewalk would shift from one side of the avenue to the other as the station excavation process advances from one side to the other; therefore, the effects of narrowed sidewalks would be "shared" by both sides of the street. At the tunnel shaft/access sites, the duration of the narrow sidewalk condition would be substantially longer on one side of the street since spoils removal and material delivery to the northbound and southbound subway tunnels would most likely be performed from one access site.

While construction is ongoing, the Second Avenue Subway construction zones would be similar to other existing building construction sites in New York City. To ensure pedestrian safety, physical separation would be provided between the construction zone and sidewalks, such as concrete barriers, wood fencing, or protective mesh fencing. If necessary, canopied or enclosed walkways may be provided to protect pedestrians.

Movement by work vehicles and equipment across designated pedestrian paths would be minimized and, if necessary, controlled by flagmen. Similarly, the turning radii of cranes or the daily operation of other construction equipment would be monitored so that they do not encroach within the pedestrian walkways.

Despite the pedestrian protection that would be provided on the construction side of the street, many pedestrians may decide to use the non-construction side of the street instead. As a result, some pedestrian crowding may occur on the sidewalks of the non-construction side. If construction-related pedestrian congestion should occur, it may be necessary to remove sidewalk furniture, such as benches, newspaper vending machines, and planters, and require that garbage be placed at the curb after the evening peak period to maximize pedestrian walking space.

D. PERMANENT IMPACTS OF THE PROJECT ALTERNATIVES

NO BUILD ALTERNATIVE

As described above under "Future Conditions Common to All Alternatives," pedestrian volume levels in the study area would increase. These increases, therefore, could result in significant pedestrian impacts at certain locations under No Build conditions. Deteriorated conditions would be expected at congested crosswalk and corner locations that currently operate at marginally acceptable or unacceptable levels of service. Pedestrian crosswalks and corner reservoir areas adjacent to GCT would be impacted by LIRR East Side Access into GCT, but could be mitigated by widening the crosswalks, and/or relocation of street furniture.

SECOND AVENUE SUBWAY

With the Second Avenue Subway, 16 new subway stations would be built, each of which would attract riders (i.e., pedestrians). A new express subway service would also be provided along the existing Broadway Line south to Canal Street, increasing pedestrian flows at existing N R Q Q and W stations through Midtown Manhattan as well, compared to the 2000 base year. The new Second Avenue Subway would relieve overcrowded conditions on the Lexington Avenue Line, which would also reduce on-street pedestrian congestion en route to and at Lexington Avenue subway stations.

Prior to publication of the SDEIS, it was unknown exactly where street-level station entrances would be located. The dimensions and configurations of the entrances as well as the number of entrances at each station are not final as engineering continues. For the SDEIS's analyses, assumptions were made about entrance locations based on preliminary project plans. In addition, it was conservatively assumed (from the perspective of pedestrian flow) that station entrances would be located within the sidewalk area rather than in buildings. As engineering work continued, more specific information regarding station entrance locations and design features has been developed to accommodate future entrance volumes and on-street pedestrian conditions. The analyses contained in the FEIS include the latest station planning and design information regarding the locations and design configurations of entrances, as well as updated subway ridership projections for each station analyzed.

The street corners were the primary pedestrian elements analyzed at most study locations since some station entrances would feed directly into the corners, and mezzanine passageways provided below ground would eliminate the need for pedestrians to cross the intersection at street level. A representative set of crosswalk locations was also analyzed.

On-street pedestrian elements at 11 representative station locations were selected for detailed analysis in the SDEIS. These analyses have been updated in this FEIS—at the 125th, 96th, 86th, 72nd, 42nd, 14th, Seaport, and Hanover Square Stations on the Second Avenue Subway; and at the 42nd Street/Times Square and 34th Street/Herald Square Stations on the Broadway Line. The Grand Central Station on the Lexington Avenue Line was also analyzed to quantify the on-street pedestrian flow benefits of reduced ridership on the Lexington Avenue Line. The Second Avenue station locations selected for analysis were chosen because they either represent stations with higher street entrance/exit volumes or would be located in areas with existing on-street pedestrian conditions that were likely to be impacted by additional pedestrian volumes. The two Broadway Line stations selected had the highest station entrance/exit pedestrian volume increment, at a specific entrance, of the express service stations and are located in two areas where on-street pedestrian volumes are substantial. For these analyses, new on-street pedestrian counts were performed in the spring of 2002. Pedestrian data collected in 2000 for the proposed Goldman Sachs office/trading facility at 55 Water Street was used for the Hanover Square Station area.

Station entrance pedestrian flows analyzed were obtained from the NYCT transit model of the Second Avenue Subway during the AM peak hour. Assumptions for station entrance locations at intersections, the methodology for assigning pedestrians, and the criteria for identifying significant pedestrian impacts are provided in Appendix D. On-street pedestrian level of service analyses indicate that significant impacts can be expected at some station entrance locations (see Appendix Tables D.2-15 and D.2-16). The final number and specific locations of station entrances will be reviewed, evaluated, and may be modified as engineering continues. Additional significant impacts could occur if fewer entrances are constructed than the number that was assumed for these analyses. Additional impacts could also be created at other locations if station entrances were moved or added. Following is a detailed explanation of the findings at study station entrances and a description of possible pedestrian improvement measures that could be considered.

EAST HARLEM

Pedestrian elements at the intersection of 125th Street at Lexington Avenue and 125th Street at Park Avenue were analyzed for the future 125th Street terminal station of the Second Avenue Subway. This station would be built in Phase 2 of the project. With the Second Avenue Subway, the combined subway pedestrian volume at these two station entrances would be over 50 percent higher (approximately 1,200 pedestrians) than the station entrance volume at Lexington Avenue without the new subway line. However, the transit model output indicates that the pedestrian flows at the Lexington Avenue entrance would experience a decrease of about 20 percent (about 750 pedestrians) in the Build condition during the AM peak hour, as a result of: 1) new Park Avenue entrances that would intercept local area pedestrians and bus and commuter railroad riders from the west; and 2) the new Second Avenue Subway station at 116th Street, which would attract existing 4 5 6 subway riders from nearby residential areas who previously used the 125th Street Station. As a result, pedestrian conditions at corners and crosswalks would improve at the 125th Street and Lexington Avenue intersection.

The station entrance locations at the intersection of 125th Street and Park Avenue would be located on the north and south medians. Compared with No Build conditions, the analysis shows that the south crosswalk at Park Avenue would deteriorate from LOS C to LOS E during the AM and PM peak hours. Similarly, the north crosswalk would deteriorate only during the AM peak

hour from LOS D to LOS E. Increasing the crosswalk widths from 12 feet to 16 feet and from 13 feet to 19 feet could mitigate the impact at the north and south crosswalks, respectively.

UPPER EAST SIDE

The 94th Street entrances at the 96th Street Station were selected for analysis since these entrances were estimated to process among the highest volumes on the proposed Second Avenue Subway Line. This station would be built in Phase 1 of the project. Model estimates completed for the FEIS indicate that some 6,400 people would use these station entrances in the AM peak hour, of which 75 percent would be entering the subway from the residential areas on the Upper East Side between 90th and 95th Streets.

The station entrances at 94th Street were analyzed with entrances at the northeast and southwest corners. With two entrances at this location, the analysis indicates that the east crosswalk (across 94th Street) would deteriorate from LOS B to LOS E conditions in the AM and PM peak hours. This impact could not be fully mitigated to acceptable conditions by widening the crosswalk or providing more pedestrian crossing time. The corner reservoir areas are wide but would not acceptably accommodate the future pedestrian flows. The analysis also indicates that the southeast corner would deteriorate from LOS A to LOS E in the AM peak hour. This impact cannot be fully mitigated by widening the sidewalks.

Adding a new station entrance on the southeast corner of 94th Street would be an alternative mitigation measure for the above crosswalk and corner impacts, but it would create significant additional residential and business displacement impacts, and it would be costly. Therefore, it was determined that the benefits of adding a new entrance did not outweigh the impacts that it would create. Therefore, some crosswalk and corner reservoir impacts would remain unmitigated.

On-street pedestrian conditions were also examined at the 86th Street Station, which would be built during Phase 1 of the project. Station entrances are currently assumed on the northeast and southeast corners at Second Avenue and 86th Street and on the northeast corner at Second Avenue and 83rd Street. Model output reports indicate that the 86th Street entrances would process about 8,800 pedestrians during the AM peak hour. The pedestrian analysis indicates that the north crosswalk would deteriorate during the AM peak hour from LOS D in the No Build to LOS E in the Build condition. Widening the north crosswalk by 3 feet would mitigate this impact. The analysis also indicates that the corner reservoir areas at 86th Street are wide and would acceptably accommodate the future year pedestrian flows.

The 72nd Street Station entrances on 72nd Street were selected for analysis since these entrances were estimated to process among the highest station entrance volumes on the proposed subway line—over 6,900 pedestrians in the AM peak hour. Station entrances would be provided on the north side of 72nd Street, and the results of the pedestrian analysis indicate that all corners would continue to operate at acceptable levels of service during the AM and PM peak 15-minute periods. This station would be built in Phase 1 of the project.

EAST MIDTOWN

In the East Midtown area, pedestrian analyses were performed for the 42nd Street Station's entrances at 44th Street and 42nd Street. This station would be built in Phase 3 of the project. AM peak hour pedestrian flows of approximately 5,850 and 2,800 pedestrians per hour are projected at the 44th and 42nd Street entrances, respectively. The pedestrian analyses indicate

that the corner reservoir areas at the 42nd Street intersection would continue to operate at acceptable level of service conditions. However, at 44th Street, the northeast corner (during the AM peak hour) and the northwest corner (during the PM peak hour) would deteriorate from LOS B in the No Build to LOS E in the Build condition. Relocating all street furniture, such as refuse cans, mail boxes, and phone booths from the corner reservoir area would fully mitigate the significant adverse impacts. The west crosswalk at 44th Street would deteriorate to LOS E during the AM and PM peak periods. Widening the crosswalk from its existing 12-foot width to a width of 20 feet would fully mitigate the impacts on this crosswalk.

Pedestrian conditions at the 42nd Street intersection with Lexington Avenue were also analyzed to quantify the pedestrian benefits of fewer riders on the Lexington Avenue subway as a result of the nearby 42nd Street Station on the new Second Avenue Subway. In the AM peak hour, the heavily used Lexington Avenue station entrance would serve nearly 3,300 fewer pedestrians—a 27 percent reduction—compared with the No Build condition. This reduction in subway station entry/exit volume would improve pedestrian flow conditions on the northwest and northeast corners of Lexington Avenue and 42nd Street from LOS E to LOS D or better in the AM and PM peak hours.

GRAMERCY PARK/UNION SQUARE

Within this area, AM peak hour pedestrian flows at the 14th and 23rd Street Station entrances would be 2,600 and 4,950 pedestrians per hour, respectively. These two stations would be built in Phase 3 of the project. The estimated 14th Street Station entrance volumes are lower than the 23rd Street Station volumes, but the 14th Street Station was selected for analysis since it was anticipated that pedestrian volumes would be more concentrated at specific sidewalk corners due to the volume of passengers transferring from crosstown buses that serve Avenues A, B, C, and D. Station entrances are currently planned for the northwest and southeast corners at Second Avenue and 14th Street. The analysis determined that the northwest and southeast corners would continue to operate at an acceptable level of service. These two corner reservoir areas are expected to process the highest increment of new pedestrians since these are the corners that would accommodate transfer movements between the crosstown M9 and M14 buses and the Second Avenue Subway.

EAST VILLAGE/LOWER EAST SIDE/CHINATOWN

The stations at Houston Street, Grand Street, and Chatham Square were estimated to process the lowest station entrance volumes along the Second Avenue alignment, ranging from 1,000 to 2,100 pedestrians during the AM peak hour. The Houston Street Station would be built in Phase 3, and the Grand Street and Chatham Square Stations would be built in Phase 4 of the project. In this study area, on-street pedestrians at the Grand Street Station might experience the most substantial decline in levels of service due to the currently congested sidewalk conditions at Grand Street and Chrystie Street. The sidewalks are narrow, are occupied by obstructions such as newsstands, fruit and vegetable vendors, trash receptacles, and street light poles, and can become congested with a low volume of pedestrians.

Since the Ⓑ Ⓓ subway routes did not stop at Grand Street when the EIS analyses were prepared, because of the Manhattan Bridge reconstruction project, a quantitative pedestrian analysis was not performed at the Grand Street Station. As a result, existing station entrance volumes are lower than would normally be expected and do not provide an accurate base for future year analyses. However, significant on-street pedestrian impacts would not be expected at this station

since future year conditions would be evaluated during continuing engineering, and design improvements would be incorporated to accommodate additional pedestrian traffic.

LOWER MANHATTAN

At the Seaport Station in Lower Manhattan, the proposed entrances at the northeast and northwest corners of Fulton Street and Water/Pearl Streets were selected for analysis. This station would be built in Phase 4 of the project. The Fulton Street entrances are expected to process more than 2,900 pedestrians during the AM peak hour. The pedestrian analysis indicated that all corners and crosswalks at the Fulton Street intersection would operate at LOS D or better in the AM and PM peak hours.

On-street pedestrian conditions were also analyzed at the Hanover Square Station, the southern terminal of the proposed Second Avenue Subway, which would also be built in Phase 4 of the project. Station entrances are currently planned on the northeast and northwest corners of Water and Wall Streets, the southeast corner of Water Street and Hanover Square, and on the southwest corner of Coenties Slip and Water Street. The intersection of Water Street and Wall Street was analyzed because existing pedestrian volumes were highest at this intersection. The analysis found the crosswalks and corners at this intersection would operate at LOS D or better, which is acceptable for a business district in Manhattan.

BROADWAY LINE

On-street pedestrian conditions at the Times Square, Herald Square, and Union Square Stations were examined to determine the effect of operating the extended Q route of the Second Avenue Subway, as an express service along the Broadway Line. The extended Q service would begin operating at the completion of Phase 1 of the project.

The Times Square and Herald Square Stations currently process high pedestrian volumes at their entrances and were identified to experience an increase in station entrance flows with the Second Avenue Subway service. Total station entrance flows would increase by about 1.8 percent (500 pedestrians) and 5 percent (600 pedestrians) at the Times Square and Herald Square Stations, respectively, in the AM peak hour.

At the Times Square Station, the entrance at Seventh Avenue/40th Street would process an increased volume compared with the No Build condition, even though the overall increase in station entry/exit volumes at the station complex is small. It was determined that the eastern crosswalk at this intersection would noticeably deteriorate within LOS E, but could be mitigated by widening the crosswalk by 1 foot, i.e., from 19 feet to 20 feet. At the Herald Square Station, the moderate overall increase in entry/exit volumes, forecast in the latest model runs, when spread over several stairs, could be satisfactorily accommodated without mitigation. For example, at the Sixth Avenue/32nd Street intersection, which was analyzed in the SDEIS, all corners and crosswalks with the lower forecasted volumes were found to operate in the Build condition at levels that are equal to or better than No Build conditions.

The 14th Street entrance to the 14th Street-Union Square Station would have a slight decrease in pedestrian volumes, because the Lexington Avenue Line, which also serves this station, would experience a ridership decrease due to the new Second Avenue Subway and its station at 14th Street.

OTHER STATION AREAS

Although on-street pedestrian conditions were not examined at the other station entrance locations, it is possible to extrapolate the findings of the detailed analyses to these other stations. Except for the 55th Street Station, model estimates indicated that all other station entrances would process pedestrian flows of 2,500 pedestrians or less in the peak travel hours. The pedestrian elements adjacent to these station entrances would likely be able to accommodate these new pedestrian flows at an acceptable level of service; otherwise, standard improvements, such as widening the crosswalk or relocating street furniture, would most likely mitigate potential impacts.

INTERIM TERMINAL STATIONS

As described in Chapter 3, "Description of Construction Methods and Activities," NYCT plans to construct the Second Avenue Subway in four phases. Under the selected construction-sequencing plan, the first operating phase would connect to the 63rd Street Line and include three entirely new subway stations—96th Street, 86th Street, and 72nd Street—plus new subway entrances at the existing subway station at 63rd Street and Lexington Avenue. It would also include tunnels and tracks connecting the area from 105th Street to 62nd Street. The 96th Street Station would serve as the interim terminal station. The effects of this interim terminus on pedestrian conditions on nearby sidewalks and crosswalks are described below.

The ridership model forecasts that nearly 3,200 pedestrians would be attracted to the 96th Street Station during the AM peak hour at the completion of Phase 1 of the project. Analyses were conducted that assumed current plans for an entrance on the southwest corner of 96th Street and Second Avenue, when this station would be the interim northern terminus of the new subway line. The analyses indicated that the crosswalks would operate at LOS C or better in both the AM and PM peak hours. Similarly, the corners would operate at LOS B or better in both the AM and PM peak hours.

Pedestrian conditions at 94th Street, where additional entrances to the 96th Street Station would be located, were also analyzed for this initial operating phase. The analysis indicated that pedestrian conditions would be essentially the same as those with the full-length Second Avenue Subway (see discussions above).

The conclusions about pedestrian conditions at 96th Street under the first operating phase can be used to extrapolate conditions at any other station location used for a temporary terminal. At the completion of Phase 3 of the project, the interim terminal station at the south end would be at Houston Street. While the interim terminal station would experience higher bus transfer volumes than predicted for the station once the full-length subway is complete, the resulting entry/exit volumes would be relatively low and, like 96th Street Station, significant adverse impacts are not expected.

E. SUMMARY OF SIGNIFICANT ADVERSE IMPACTS AND MITIGATION MEASURES

SIGNIFICANT ADVERSE IMPACTS

- Impacts to pedestrian conditions would occur during construction at locations where sidewalks are already congested and where such sidewalks are substantially narrowed during

construction. This type of impact could not be mitigated because of construction constraints and would occur during construction of all phases of the project.

- To assess operational impacts, on-street pedestrian elements at 11 representative station locations were selected for detailed analysis on the Second Avenue and Broadway Lines and at the Grand Central-42nd Street Station on the Lexington Avenue Line. Based on preliminary plans for entrance locations, significant adverse impacts could occur at the following crosswalk locations beginning at the completion of the construction phase in which the station is built, and continuing once the full project is complete:
  - 125th Street and Park Avenue, north crosswalk (AM peak) and south crosswalk (AM and PM peaks), beginning at the completion of the construction of Phase 2;
  - 94th Street and Second Avenue, east crosswalk (AM and PM peaks), beginning at the completion of Phase 1;
  - 86th Street and Second Avenue, north crosswalk (AM peak), beginning at the completion of Phase 1;
  - 44th Street and Second Avenue, west crosswalk (AM and PM peaks), beginning at the completion of Phase 3; and
  - Wall Street and Water Street, north crosswalk (AM and PM peaks), beginning at the completion of Phase 4.
  - 40th Street and Seventh Avenue, east crosswalk (AM and PM peaks), beginning with the completion of Phase 1.

  The number and location of station entrances will not be final until continuing engineering is completed. Therefore, the locations of these impacts could shift or additional, similar, significant adverse impacts could be created beyond those listed here.

- Based on the representative station analyses conducted, and using preliminary plans for the number and locations of station entrances, significant adverse impacts could occur at the following corner locations, beginning with the completion of the construction phase in which the station is built, and continuing through and including the completion of the full-length Second Avenue Subway.
  - 94th Street and Second Avenue, northeast corner (AM and PM peaks), beginning at the completion of the construction of Phase 1.
  - 44th Street and Second Avenue, northeast corner (AM peak hour) and the northwest corner (PM peak hour), beginning at the completion of Phase 3.

  Since the locations of station entrances will not be final until Preliminary Engineering is completed, the exact nature of the impacts at these locations may change.

MITIGATION MEASURES

- As Preliminary Engineering continues, MTA/NYCT will continue to discuss specific entrance locations with the community.
- Planning for station entrance locations will consider on-street pedestrian conditions before any station plans are finalized, and if significant adverse impacts were to result, NYCT would consider a variety of potential mitigation measures, including widening crosswalks, relocating street furniture, and creating sidewalk bump-outs. ✷