3.10 TRANSIT AND PEDESTRIANS

3.10.1 Introduction

This Section describes the transit and pedestrians analysis methodologies used to determine the existing conditions, Future Without the Project, and Future With the Project. The assessment of potential transit and pedestrian impacts associated with the project is conducted based on guidelines specified in the *CEQR Technical Manual*. Under CEQR, a transit and pedestrians analysis characterizes whether a proposed action is expected to have potential significant adverse impacts on transit service and pedestrian circulation.

The potential transit and pedestrian impacts differ based on the various components of the proposed project, including:

- Construction of the shaft;
- Construction of the water main connections;
- Activation of the shaft; and
- Operation of the shaft and water main connections.

The analysis year for the assessment of the potential impacts also varies with each project component. The potential effects associated with the construction of the shaft and the water main connections, such as potential disruptions to bus service and changes to the available pedestrian space, were identified and evaluated based on predicted construction conditions in 2008. The analysis year of 2008 was chosen because it coincides with the traffic analysis year for shaft and water main construction. Since 2012 is the anticipated first year of operation for the shaft and water main connections, it is the appropriate operational analysis year.

Project Construction and Study Areas

Potential impacts associated with the construction of the shaft include possible disruption of transit service and pedestrian space. Transit and pedestrian trips generated by construction workers would be nominal and occur mostly outside of peak analysis periods. The preferred Shaft Site at First Avenue and E. 59th Street is evaluated for transit and pedestrian impacts in Section 4.10. In addition, alternative shaft locations at Second Avenue and E. 59th Street (E. 59th Street/Second Avenue Shaft Site), E. 61st Street between First Avenue and Second Avenue (E. 61st Street Shaft Site), and Second Avenue and E. 54th Street (E. 54th Street/Second Avenue Shaft Site) are evaluated in Sections 6.10, 7.10, and 8.10 respectively. Qualitative discussions are provided for the E. 59th Street/Second Avenue and E. 61st Street Shaft Sites, because construction activities at these sites would not substantially encroach onto vehicular and pedestrian space. However, for the E. 54th Street/Second Avenue Shaft Site, traffic lanes and sidewalk space would be required for its construction; thus, a quantitative analysis was conducted to evaluate the potential construction-related impacts.

As with the shaft construction, potential impacts associated with the construction of the water main connections were evaluated to estimate the extent of possible disruption on transit service and pedestrian space. This assessment, presented in Chapter 5, "Water Main Connections," Section 5.10, addresses the potential impacts associated with the reasonable worst-case water main connection route and the additional representative routes, which are also evaluated for traffic and parking impacts in Section 5.9. The reasonable worst-case water main route or the First Avenue route would connect from the preferred Shaft Site to the existing trunk main distribution system at Third Avenue between E. 55th and E. 56th Streets via First Avenue and across E. 55th and E. 56th Streets. Other representative routes evaluated in this EIS include the Sutton Place route and the E. 59th Street/E. 61st Street route. The Sutton Place route considers primarily the same connections between the preferred Shaft Site and the Third Avenue trunk main between E. 55th and E. 56th Streets as the First Avenue Route, but instead of traversing First Avenue, the connections would be made via Sutton Place. The E. 59th Street/E. 61st Street Route considers one main traveling west on E. 59th Street to Third Avenue and the other traveling north on First Avenue and then west on E. 61st Street to Third Avenue. At Third Avenue, these mains would connect to the existing trunk main at two separate connection points, one between E. 59th and E. 60th Streets and the other between E. 60th and E. 61st Streets.

The analysis of conditions during construction of the shaft and water main connections includes available transit service and affected pedestrian elements at potential Shaft Site and water main connection locations in the upper East Midtown and lower Upper East Side sections of Manhattan. This Study Area is generally bordered to the north and south by E. 63rd and E. 53rd Streets and to the east and west by Sutton Place and Lexington Avenue. Study Areas determined for the alternative Shaft Site locations and other water main connection scenarios that are beyond the Study Area limits described above are provided within the discussions for each of the specific analyses. A summary of the primary detailed analyses conducted to assess potential construction impacts on transit operations and pedestrian flow is provided below.

- Preferred Shaft Site: During shaft construction at the preferred Shaft Site, located on the northwest corner of First Avenue and E. 59th Street, sidewalks adjacent to the construction site would be narrowed under the base configuration (as described in Chapter 2, "Purpose and Need and Project Overview"). An analysis was performed to determine how pedestrian circulation would be affected. A qualitative assessment of the alternate site configuration is provided as well to address the expected modifications in pedestrian circulation on First Avenue and E. 59th Street that would be necessary under that configuration.
- Water Main Connections: The different water main connection scenarios discussed in Section 5.10 would have the potential to change transit and pedestrian conditions along the route that is chosen. Potential conditions in the future with the project were evaluated with respect to each specific construction scenario. For example, the reasonable worst-case First Avenue route would require that bus stops be temporarily relocated to allow for curb lane closures. For one of the water main connection construction options, sidewalk space along First Avenue would be narrowed. A quantitative assessment of sidewalk operations was conducted to address the impact that this construction option could potentially have on

pedestrian flow. For those scenarios that are not likely to result in the disruption of pedestrian space, a qualitative discussion is provided.

- Alternative Shaft Site: As discussed above, a quantitative assessment of the affected pedestrian elements was performed for this alternative Shaft Site. During shaft construction at the E. 54th Street/Second Avenue Shaft Site, sidewalks and crosswalks adjacent to the site would be narrowed. Because the level of modification to pedestrian elements at the E. 61st Street or the E. 59th Street/Second Avenue Shaft Sites would be limited, only a qualitative assessment of pedestrian conditions during construction is provided for these locations.
- Water Main Only Alternative: If a shaft is not constructed, the connection to the water distribution system would require extending the water main connections from the Upper East Side to East Midtown. This scenario, while unlikely, is expected to result in similar transit and pedestrian conditions depicted for the reasonable worst-case water main connection route, however, within a substantially larger area. A qualitative assessment is provided to illustrate the extent of potential impacts associated with this scenario.

3.10.2 Existing Conditions Methodology

To establish the existing conditions, pedestrian data were collected (in March 2004, December 2004, and April 2005) during the AM, midday, and PM peak periods for numerous locations in the Study Area, including along First Avenue between E. 54th and E. 60th Streets and at the intersection of Second Avenue and E. 54th Street. While the data collection efforts took place on two different years, 2004 is commonly used as the analysis year for existing conditions to maintain consistency with the traffic and parking analysis. In addition to the pedestrian counts and vehicular data and roadway/curbside conditions documented for the traffic and parking analysis, an inventory of pedestrian elements were conducted to establish the physical parameters for the pedestrian analysis. This effort includes measuring the painted widths of crosswalks, identifying available corner reservoir areas, and estimating effective widths of sidewalks (by accounting for sidewalk furniture and narrowest points of constraint along individual segments or mid-blocks).

Transit Analysis

With only a nominal number of transit trips anticipated from the proposed project, no quantitative analysis was conducted. The assessment of existing transit conditions is limited to a description of available transit service and routes within the Study Area.

Pedestrian Operations Analysis

Similar to transit conditions, the proposed project would not result in a perceptible amount of pedestrian trips to warrant a quantitative analysis. However, since certain disruptions to pedestrian space are anticipated with the construction of the shaft and the water main connections, a detailed analysis was performed to address the potential construction-related

impacts on specific pedestrian elements. The operational methodology for conducting such an analysis is discussed below.

The adequacy of the Study Area's sidewalks, crosswalks, and corner reservoir capacities in relation to the demand imposed on them was assessed using the methodologies presented in the *CEQR Technical Manual* and the *Highway Capacity Manual (HCM) Special Report 209* (Transportation Research Board, 1994). Sidewalks were analyzed in terms of pedestrian flow. The calculation of the average pedestrians per foot per minute (PFM) of effective walkway width is the basis for LOS analysis. However, due to the tendency of pedestrians to move in congregated groups (i.e., a platoon), a platoon factor (+4 PFM) is applied in the calculation of pedestrian flow to more accurately estimate the dynamics of walking. This procedure generally results in a LOS one level poorer than the average flow.

Crosswalks and street corners are not easily measured in terms of free pedestrian flow, as they are influenced by the effects of traffic signals. Street corners must be able to provide sufficient space for a mix of standing pedestrians (queued to cross a street) and circulating pedestrians (crossing the street or moving around in the corner). The HCM methodologies apply a measure of time and space availability based on the area of the corner, the timing of the intersection signal, and the estimated space used by circulating pedestrians.

The total "time-space" available for these activities is the net area of the corner (in square feet) multiplied by the cycle length, which is expressed in square feet per minute. The analysis then determines the total circulation time for all pedestrian movements at the corner (expressed as pedestrians per minute). The ratio of net time-space divided by pedestrian circulation time provides the LOS measurement of square feet per pedestrian (SFP).

Crosswalk LOS is also a function of time and space. Similar to the street corner analysis, crosswalk conditions are first expressed as a measurement of the available area (the crosswalk width multiplied by the width of the street) and the permitted crossing time. This measure is expressed in square feet per minute. The average time required for a pedestrian to cross the street is calculated based on the width of the street and an assumed walking speed. The ratio of time-space available in the crosswalk to the average crossing time is the LOS measurement of available square feet per pedestrian. The LOS analysis also accounts for vehicular turning movements that traverse the crosswalk. Additionally, in the first seconds of the "walk" cycle, the initial movements of pedestrians queued to cross the street create a surge effect. To account for this effect, the LOS analysis incorporates a "surge" factor to estimate worst-case conditions. Table 3.10-1 shows the LOS standards for sidewalks, corner reservoirs, and crosswalks. The 1985 HCM provides different thresholds for LOS determination than the *CEQR Technical Manual*. The reported LOS results in this study are based on the latest CEQR LOS criteria, reproduced in Table 3.10-1, which may differ from those determined in the HCS analysis outputs. Also, since the ranges for sidewalk analysis results are relatively narrow, a "+" or "-" sign is provided for rounded PFM values coinciding with the different service level thresholds (i.e., LOS A/B = 5 PFM) to show the variation in LOS. For example, analysis results of 4.9 and 5.1 PFM both round to 5 PFM. However, the former would be denoted as 5- PFM and LOS A, whereas the latter would be denoted as 5+ PFM and LOS B.

Table 3.10-1
Level of Service Criteria for Pedestrian Elements

LOS	Sidewalks	Corner Reservoirs and Crosswalks
A	5 PFM or less	60 SFP or More
B	5 to 7 PFM	40 to 60 SFP
C	7 to 10 PFM	24 to 40 SFP
D	10 to 15 PFM	15 to 24 SFP
E	15 to 23 PFM	8 to 15 SFP
F	More than 23 PFM	Less than 8 SFP

Notes: PFM = pedestrians per foot per minute.
SFP = square feet per pedestrian.
Source: New York City Mayor's Office of Environmental Coordination, *CEQR Technical Manual*

The *CEQR Technical Manual* specifies that a LOS D condition or better is considered reasonable for sidewalks, corner reservoirs, and crosswalks within the Manhattan Central Business District (CBD), which is generally the area south of 60th Street. For crosswalks and corner reservoirs, a LOS D condition requires a minimum of 15 SFP, while for sidewalks, a LOS D condition requires a maximum of 15 PFM.

3.10.3 Future Conditions Without the Project Methodology

In the Future Without the Project (also referred to as the No Build conditions), the construction of Shaft 33B and the water main connections would not occur and the Study Area is assumed to generally retain the same land uses as exist in 2004. During the 2004 to 2008 period, it is expected that transportation demands in the Study Area would increase due to anticipated residential, commercial, and institutional projects in the area, as well as general background growth. To estimate these demands in the Future Without the Project, an annual growth rate of 0.5 percent per year was applied to existing conditions to reflect background growth, in accordance with the *CEQR Technical Manual* for areas in Manhattan. As stated in Section 3.9, for traffic and parking, projected vehicle trips from future development projects were considered in the No Build traffic operations analysis. For the No Build pedestrian analysis, the pedestrian trips associated with these same development projects were largely not included, because they are not likely to affect the specific locations identified for analysis and because pedestrian flow is typically more spread out, except for routes connecting to key transit stations or bus stops, and confined to a smaller area than vehicular traffic.

Transit Analysis

Anticipated changes to the area's transit service and potential transit initiatives were identified for the No Build conditions.

Pedestrian Operations Analysis

As with the pedestrian analysis conducted for existing conditions, an analysis of the Future Without the Project was conducted to provide baseline conditions against which potential impacts of the project could be assessed.

3.10.4 Future Conditions With the Project Methodology

Construction

For the assessment of the Future With the Project (also referred to as the Build conditions), potential impacts to the Study Area transit and pedestrian conditions were determined in connection with the anticipated disruptions of vehicular traffic and pedestrian space. As stated above, since transit and pedestrian trips associated with the construction of the shaft and water main connections would not be perceptible and likely occur outside of analysis peak periods, the future baseline volumes were used to assess the potential effects of project construction on transit service and pedestrian circulation. Three water main connection routes were analyzed to the appropriate levels for each of the Shaft Sites. These include: 1) a First Avenue route, traveling down First Avenue and then over to Third Avenue via E. 55th and E. 56th Street (the reasonable worst-case route); 2) a Sutton Place route, traveling over to Sutton Place on E. 59th Street, down Sutton Place, and then over to Third Avenue via E. 55th and E. 56th Streets; and 3) an E. 59th Street/E. 61st Street route, in which one water main would travel to Third Avenue via E. 59th Street, and the other would travel to Third Avenue via E. 61st Street.

Transit Analysis

Anticipated changes and potential disruptions to transit service were identified for the Build conditions.

Pedestrian Operations Analysis

The Build pedestrian conditions in the Study Area were analyzed and potential construction-related pedestrian impacts were determined based on the criteria set forth in the *CEQR Technical Manual* for permanent actions. For areas within the Manhattan CBD, project-related sidewalk impacts are considered significant and require examination of mitigation if there is an increase of 2 PFM over a No Build condition that is characterized by flow rates greater than 15 PFM (the breakpoint between LOS D and LOS E). For corners and crosswalks, a decrease of 1 SFP under the Build condition when the No Build condition has an average occupancy of less than 15 SFP (the breakpoint between LOS D and LOS E) is considered significant. However, if there is less than a 30-person increase at a location within the peak 15-minute time period, any impact is not considered significant since such increases would not typically be perceivable. While potential pedestrian impacts associated with the construction of the shaft and water main connections would not be permanent and therefore may not be considered as significant, the determination of temporary construction-related impacts was made based on the above criteria for permanent actions.

As discussed in Chapter 2, blasting would be necessary at the Shaft Sites. It would not occur at the surface, and blasting procedures are developed on a site-specific basis depending on geological conditions as well as traffic and other environmental conditions at the time of blasting. Blasting will be required to be conducted in a manner that is protective of public health and safety. For approximately four months (or up to a depth of about 100 feet below the surface) at the beginning of the blasting process the protective measures implemented would include prohibiting vehicular and pedestrian traffic from traveling adjacent to the site. The typical approach to blasting based on blasting experience at other NYCDEP shaft sites, and other construction projects throughout Manhattan was examined. The likely approach to be taken at the Shaft Sites was assessed. Initial meetings were held with the FDNY to determine the likely roadway segments that could require temporary stoppage of traffic and pedestrian flow during the initial phases of blasting. The potential impacts of these discrete blasting events on transit service and pedestrian operations in the community for each of the Shaft Sites were assessed.

Operation

Once Shaft 33B is operational in 2012, in addition to the underground shaft and distribution chamber, there would be some features of the shaft that would be above ground. These include two at-grade access hatchways to the shaft, a 10-foot high by 14 inch-diameter air vent located on site or on the sidewalk, and up to two air release hydrants (3-foot high by 6-inch diameter). A small crew of NYCDEP personnel would visit the site several times a week for routine inspection and maintenance activities. Occasionally, when critical equipment needs to be replaced, additional workers would also be on the site.

Based on the analysis criteria set forth by the *CEQR Technical Manual*, this level of induced pedestrian activities (and potential transit riders) does not require a detailed analysis for the operational year (2012) because it falls below the project-induced 200 peak hour trip threshold that would require a detailed analysis. However, since the air vent and the air release hydrants could potentially take up sidewalk space, a discussion of the likely effects on pedestrian flow was provided by comparing conditions under the operation of the Shaft versus those during its construction.

Because the water main connections (once built) would be located entirely within the streets and would have no above-ground features or other operational activities, no potential significant adverse impacts to transit and pedestrians would occur as a result of their operation. Similarly, since the activation of the shaft occurs for a very short period of time (approximately one month) and would not affect the surrounding pedestrian flow, no potential significant adverse impacts are anticipated. For these reasons, disruptions caused by the construction of Shaft 33B and the water main connections would be the primary source of potential adverse impacts, while temporary, on transit and pedestrian conditions. Hence, the construction process is hereafter referred to as the project for impact assessment purposes.

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