CHAPTER 1: EXECUTIVE SUMMARY

1.1 INTRODUCTION

The New York City Department of Environmental Protection (NYCDEP) is proposing to construct a vertical water supply shaft, Shaft 33B, to bring water from City Tunnel No. 3 to the local water distribution system in East Midtown and the Upper East Side in Manhattan. This Final Environmental Impact Statement (Final EIS) has been prepared to assist decision-makers by providing a full disclosure of the environmental consequences of construction and operation of the proposed Shaft 33B. This Final EIS analyzes the potential environmental impacts associated with construction and operation of Shaft 33B and associated water main connections from the new shaft to an existing trunk main beneath Third Avenue.

Potential impacts are evaluated for the preferred Shaft Site, at E. 59th Street and First Avenue adjacent to the Queensboro Bridge, and for the three feasible alternative Shaft Sites identified through an initial site evaluation process—the E. 59th Street/Second Avenue Shaft Site, E. 61st Street Shaft Site, and E. 54th Street/Second Avenue Shaft Site.

Construction of Shaft 33B is subject to environmental review pursuant to New York City's Environmental Quality Review (CEQR) process as set forth in Executive Order 91 of 1977 and its amendments creating the Rules of Procedure for CEQR, adopted by the City Planning Commission on June 26, 1991 and revised in October 2001 as well as the State Environmental Quality Review Act (SEQRA) (Section 8-0113, Article 8 of the Environmental Conservation Law) as set forth in 6NYCRR Part 617.

As lead agency, NYCDEP determined that the project may have potential significant adverse impacts on the environment, requiring the preparation of an EIS to provide full disclosure of all such impacts. This Final EIS examines the potential environmental impacts associated with construction and operation of Shaft 33B and its water main connections, describes mitigation measures for any significant adverse impacts, and examines alternatives.

On April 8, 2005, NYCDEP acting as lead agency publicly distributed a Draft Scope of Work for preparation of the Draft EIS for the proposed Shaft 33B project. A public hearing was conducted on May 9, 2005 to accept public comments on the Draft Scope of Work and comments were accepted via email and regular mail until July 6, 2005. A Final Scope of Work and Response to Comments were issued on July 25, 2005.

Following completion of the Final Scope of Work, two modifications were made to the description of the project analyzed in this EIS, as a result of further evaluation and consideration of the potential environmental impacts of the proposed action. These changes are as follows:

- Layout of Preferred Shaft Site: Two possible site layouts during construction are analyzed at the preferred Shaft Site—the "base configuration" and the "alternate site configuration." Under the base configuration, the preferred Shaft 33B Site would consist of a fenced parcel and adjacent area under the jurisdiction of the New York City Department of Transportation (NYCDOT) at First Avenue and E. 59th Street, as well as a portion of the adjacent sidewalks on E. 59th Street and First Avenue. In the alternate site configuration the preferred Shaft Site

would encompass that area, as well as the full width of the sidewalks on E. 59th Street and First Avenue and portions of the E. 59th Street and First Avenue roadways alongside the construction area. The alternate site configuration, 8,970 square feet in size, is slightly larger than the 7,400-square-foot base configuration and provides an analysis of a reasonable worst-case construction scenario that would occur if construction had to extend into the streetbeds of E. 59th Street and First Avenue to provide a more efficient construction equipment layout. At this time, NYCDEP anticipates that construction would occur using the base configuration.

- Additional Water Main Connection Route: As there are many possible routes for water main connections for the Shaft Site to the Third Avenue trunk main, the EIS analyses consider a reasonable worst-case route and two additional representative water main connection routes to identify the types of impacts that could occur from water main construction using any likely route. These three water main connection routes are: (1) a First Avenue route, traveling down First Avenue and then over to Third Avenue via E. 55th and E. 56th Streets ("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 west from the preferred Shaft Site to Third Avenue via E. 59th Street, and the other would travel up First Avenue two blocks and then west on E. 61st Street to Third Avenue. The E. 59th Street/E. 61st Street route was developed for assessment to represent the most direct water main connection, requiring the shortest construction time, from the preferred Shaft Site to the Third Avenue trunk main. Together, these three routes are representative of the routes that would ultimately be selected for the water main connections and the environmental consequences associated with the use of these routes is considered representative of potential environmental consequences that could result along other potential water main routes that might ultimately be selected.

Public review of the Draft EIS began on November 7, 2005 with the issuance of the Notice of Completion and the Draft EIS. As required under CEQR, the Draft EIS was available for public review for a minimum of 30 days following publication. The Draft EIS was circulated to interested and involved agencies and members of the public. A public notice advertising the availability of the Draft EIS and the date, time, and location of the public hearing on the Draft EIS was published in the *City Record* and in newspapers of general circulation in the affected area, including *The New York Post*, *New York Daily News*, and *Our Town*, a local weekly newspaper that is distributed in the Midtown area. The availability of the Draft EIS and information on the public hearing was also published in the New York State Department of Environmental Conservation's *Environmental Notice Bulletin*. The Draft EIS, on CD-ROM, was mailed directly to each member of the public who signed in at the public hearing on the Draft Scope of Work, provided comments on the Draft Scope of Work, or who had submitted written comments on the project. In addition, the Draft EIS was posted on the NYCDEP web page and hard copies of the document were made available for review in local libraries and Community Board offices. NYCDEP also met with the local Community Boards, Community Boards 6 and 8, to present the Draft EIS to each Board on November 14, 2005. NYCDEP also hosted two

informational forums to present the Draft EIS methodologies and analyses to the public. These informational forums, held on November 17 and 21, 2005, were intended to assist the public understanding the scope of the project and to assist the public in its review of the Draft EIS and included a substantial question and answer component. Copies of information presented at these sessions were posted on the NYCDEP website.

As required by CEQR, a formal public hearing was also held during the Draft EIS review period, to receive oral testimony from the public and from involved or interested public and private agencies. The public hearing was held on December 5, 2005 at the High School of Art and Design at 1075 Second Avenue in Manhattan. The public comment period remained open for 45 days, until December 22, 2005.

Following completion of the public review period, this Final EIS was prepared. The Final EIS includes responses to all substantive comments submitted during the comment period on the Draft EIS. This Final EIS has been distributed in the same manner as the Draft EIS: the Final EIS, on CD-ROM, was mailed directly to each member of the public on the project's mailing list, including those who provided comments on the Draft Scope of Work and Draft EIS as well as all attendees who signed in at the public hearing on either document and any others who asked to be added to the mailing list. In addition, the Final EIS was posted on the NYCDEP web page and hard copies of the document were made available in local libraries and Community Board offices. No less than 10 days following completion of the Final EIS, NYCDEP will make its final decision on the proposed location for Shaft 33B in the Statement of Findings prepared under CEQR.

This Executive Summary summarizes the conclusions of the Final EIS. In Section 1.2, it describes the purpose and need for the project and provides a project overview, including a description of the Shaft Sites and potential water main routes analyzed, the activities that would occur for construction and operation of the project, an estimated schedule for the project, and the permits and approvals that may be required. Section 1.3 summarizes the potential significant or temporary adverse impacts that would occur as a result of construction at the Shaft Sites, and Section 1.4 summarizes the potential significant or temporary adverse impacts that would occur as a result of construction of the potential water main connections from the Shaft Sites. The final Section, Section 1.5, summarizes the additional alternatives considered in this Final EIS, which include the No Action Alternative and a Water Main Only Alternative.

1.2 PURPOSE AND NEED AND PROJECT OVERVIEW

1.2.1 Introduction and Project Identification

NYCDEP is proposing to construct a vertical water supply shaft, Shaft 33B, to bring water from City Tunnel No. 3 to the local water distribution system in East Midtown and the Upper East Side in Manhattan. Once constructed, the shaft would be an unmanned, underground facility capable of conveying water from the new City Tunnel No. 3 to the surface distribution system that serves East Midtown and the Upper East Side. A new water supply shaft for City Tunnel No.

3 is critical for these two areas, to address water supply problems, provide adequate supply to meet the neighborhoods' heavy demand, and to provide redundancy to the existing water supply system.

City Tunnel No. 3 is currently under construction beneath Manhattan as well as in Brooklyn and Queens. The new tunnel is being constructed in part to facilitate inspection and repair of City Tunnel No. 1, which is currently the primary source of Manhattan's water supply. City Tunnel No. 1 was activated in 1917 and has been in continuous operation for almost 90 years, but before it can be inspected or repaired, an additional supply of water (City Tunnel No. 3) must be provided. The new City Tunnel No. 3 will also provide other important benefits, by increasing distribution system redundancy and maintaining sufficient water pressure in neighborhoods it serves. For the East Midtown area east of Park Avenue, the new water supply from City Tunnel No. 3 will improve water reliability as well, addressing an important problem in this area.

Shaft 33B is subject to environmental review pursuant to CEQR. This EIS was prepared pursuant to CEQR to examine the potential environmental impacts associated with construction and operation of Shaft 33B at a preferred Shaft Site and at several alternative Shaft Sites.

1.2.2 Project Purpose and Need

Need for Shaft 33B

Introduction

The proposed Shaft 33B would be a critical component of the City's water supply and distribution system. It is needed to deliver water from the new City Tunnel No. 3 to the local water distribution system in the northern part of East Midtown. One of the primary purposes for City Tunnel No. 3 is to provide water delivery alternatives to City Tunnel No. 1, thereby adding redundancy and reliability to the City's water distribution. At the same time, City Tunnel No. 3 is also being designed and constructed to help address local supply issues, such as a lack of redundancy in the local network. One critical area that would be served by the Stage 2, Manhattan Leg of the new tunnel, via Shaft 33B, is the Middle Intermediate Pressure Zone (MIPZ). In addition, this leg of the tunnel is being designed so that redundant water supply capacity will also be provided for the adjacent water pressure zone, the Northern Intermediate Pressure Zone (NIPZ).

Water Supply Issues in MIPZ and NIPZ

The MIPZ is located in Midtown Manhattan, bounded roughly by Tenth Avenue to the west, the East River to the east, approximately 34th Street to the south, and approximately 54th Street to the north. This area is home to Manhattan's largest Central Business District as well as a dense residential neighborhood east of Third Avenue. Immediately to the north of the MIPZ, the NIPZ spans the width of Manhattan between 54th Street and approximately 102nd Street. The NIPZ is broadly defined by the northern portion of the Midtown Manhattan Central Business District and by the densely developed residential neighborhoods of the Upper East Side and Upper West

Side. The boundaries of the pressure zones were not established by specific streets, but by the topography of the area.

With a total of more than 1 million employees and more than 500,000 residents[1], the MIPZ and NIPZ have very high water consumption rates in comparison to the rest of the City. According to NYCDEP estimates of the approximate water usage for different areas of the City, the average water consumption in the MIPZ is 30 million gallons per day (mgd) per square mile.

Shaft 33B

The Manhattan Leg of City Tunnel No. 3, Stage 2 is intended to address the problems of water pressure reliability and supply in the northeastern portion of the MIPZ, while adding flexibility and redundancy for the southeastern portion of the NIPZ. The north leg of City Tunnel No. 3's Stage 2 Manhattan Leg will follow a crosstown route, from Shaft 26B in West Midtown near Tenth Avenue eastward to Shaft 32B at Second Avenue near the MIPZ's southern boundary, and continue north up the East Side to a terminus in northern East Midtown at Shaft 33B. This northern leg is intended to convey water to the distribution system east of Park Avenue and in the MIPZ. Moreover, it is critical that this area is fed by a new shaft, so that there would be no service disruptions or dramatic changes in pressure in the MIPZ in the event of a planned or unplanned shutdown of City Tunnel No. 1, including when City Tunnel No. 1 is shut down for maintenance after City Tunnel No. 3 is on line. Shaft 33B would be one of two sources of water supply from City Tunnel No. 3 to the eastern section of the MIPZ; the other would be Shaft 32B located at Second Avenue near E. 35th Street. Having two sources of water supply to the pressure zone is important in terms of redundancy, to protect the water supply in the event that repairs must be made at one of the shafts. Shaft 33B would be the primary source of the water supply from City Tunnel No. 3 to the northeast portion of the MIPZ. It would be one of 10 water supply shafts along the Stage 2 Manhattan Leg, and is the final shaft to be sited.

Locating Shaft 33B in the northeastern portion of the MIPZ would improve water pressure reliability in the MIPZ. By providing two shafts in the MIPZ, it would also provide redundancy within the pressure zone in the event that the other shaft, Shaft 32B, must be taken out of service. Shaft 33B would similarly improve redundancy in the eastern section of the NIPZ, which would also have two shafts connected to City Tunnel No. 3 once Shaft 33B is complete. Finally, with Shaft 33B in place in this area, there would be no service disruptions or dramatic changes in pressure when City Tunnel No. 1 is taken off-line for maintenance upon completion of City Tunnel No. 3.

Inherent to NYCDEP's overarching goal of providing water supply redundancy on a City-wide basis is the commitment to provide redundancy at the local and neighborhood level. For this reason, NYCDEP strongly believes that the Shaft 33B site needs to have enough space to house two riser pipes to bring water from City Tunnel No. 3 to the surface.

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[1] Source: U.S. Census Bureau; Census 2000, Summary File 1; 2000 Census Transportation Planning Package (CTTP) Part 2: Total Workers at Place of Work (Regardless of Residence), Table CTPP2 P-1.

The two risers at Shaft 33B would feed two separate 48-inch water main connections that would bring the water to the Third Avenue trunk main for distribution throughout the MIPZ and NIPZ. Providing two risers in the shaft provides redundancy within the shaft itself. One water main would connect to the Third Avenue trunk main in the MIPZ, and the other would connect in the NIPZ. Having these two mains would allow Shaft 33B to serve both pressure zones, one of the critical goals for the project.

1.2.3 Proposed Location for Shaft 33B

Shaft 33B is intended to address the issues of water pressure and water distribution in the portion of the MIPZ east of Park Avenue. To meet this need, the shaft also must be located east of Park Avenue. Construction of Shaft 33B would require a site of a certain size and configuration to accommodate the space required for construction. A minimum site width of 39 feet is required for excavation of the distribution chamber, which has a minimum width of 26 feet, plus a 5-foot-wide workspace on either side of the excavation, and additional room for minimal excavation support. This minimum width assumes the presence of bedrock close to the surface; for sites where bedrock is deeper, more substantial support (a cofferdam) would be constructed around the distribution chamber, adding to the width required on the site. A site length of about 175 to 200 feet is necessary to accommodate shaft construction, construction staging area, and to provide room for maneuverability of equipment (e.g., a crane). In addition, a certain amount of overhead clearance would be needed for the crane.

A site screening process was undertaken to identify possible Shaft Sites in the general area where Shaft 33B must be located to meet its intended purpose. As noted earlier, this is the general area within an acceptable distance from the boundary between the MIPZ and NIPZ at the Third Avenue trunk main. While Shaft 33B could be located at a greater distance from the connection point to the Third Avenue trunk main, the need to connect to that trunk main close to the boundary between the MIPZ and NIPZ would not change and therefore longer water main connections would be required. Given the greater disruption that would be required for these water main connections, NYCDEP restricted the review of available sites to those sites that are proximal to the northern portion of the MIPZ and southern portion of the NIPZ. During this process, NYCDEP identified underutilized properties between E. 46th and E. 62nd Streets east of Third Avenue and evaluated them for their feasibility and suitability to serve as a Shaft Site. Nineteen locations were identified and each of these sites was evaluated to determine whether construction of the shaft would be feasible at that location. Based on the initial evaluation of each site, 15 sites were removed from further consideration for Shaft 33B. Insufficient site size was the most prevalent disqualifying factor in the screening of the 19 sites. Four sites were considered to be potentially feasible locations for Shaft 33B—at E. 59th Street and First Avenue; E. 59th Street and Second Avenue; E. 61st Street between First and Second Avenue; and E. 54th Street and Second Avenue. For these four sites, a preliminary review of site characteristics and engineering and environmental considerations was conducted to identify a preferred Shaft Site for consideration in the EIS. Several factors were considered in conducting preliminary evaluations of these potential sites:

- City-owned sites are preferred to privately owned sites, because these sites reduce the complications and potential delay associated with acquiring private property.
- Sites with greater distance to the nearest residences would reduce potential disturbance during construction and improve constructability of the shaft.
- Sites larger than the minimum size would allow construction of a construction barrier during construction.
- Sites with regular shapes and access on more than one side would be more efficient for construction.
- Sites within mapped streets or sidewalks are preferred for the permanent placement of utilities.
- Sites that minimize disruption to existing utilities and minimize or avoid traffic lane closures are preferred.
- Sites where excavation can be completed before mid-2007 are preferred, so that excavated material can be removed through City Tunnel No. 3 instead of from Shaft 33B. City Tunnel No. 3 and its staging area at Shaft 26B will no longer be available for this use once the Tunnel is lined with concrete. At this time, based on the current Tunnel schedule, it appears that the Tunnel and Shaft 26B will not be available after July 2007.

As a result, a preferred Shaft Site and three feasible alternative sites were identified. These are evaluated in this EIS.

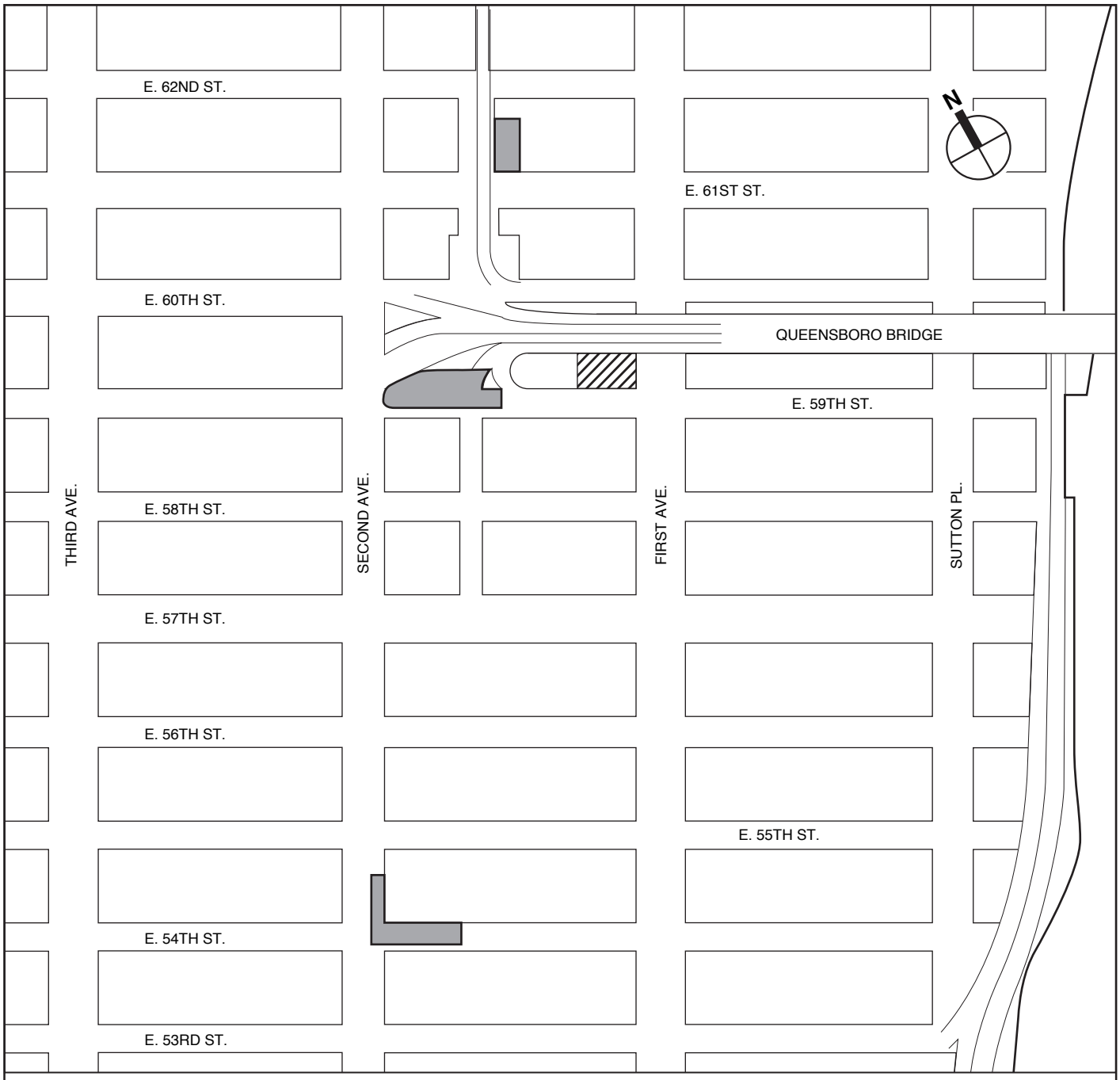
1.2.4 Sites Evaluated in this EIS

The four potential Shaft Sites and three potential water main connection routes analyzed in the EIS are illustrated in Figures 1.1-1 and 1.1-2 and described below.

Preferred Shaft Site and Water Main Connections

The preferred Shaft 33B Site is located adjacent to the Queensboro Bridge (Bridge) approach structure at the northwest corner of E. 59th Street and First Avenue (Block 1434 Lot 1). The entire preferred Shaft 33B Site is City-owned and is mapped street (sidewalk). The site is under the jurisdiction of NYCDOT, and used by NYCDOT for Bridge-related activities.

This site is large enough for the construction and operation of two risers. In addition, the preferred Shaft Site has physical configuration that allows efficient construction, with a regular shape and street access on two sides. Two possible site layouts during construction were considered at the preferred Shaft Site—the "base configuration" and the "alternate site configuration." The alternate site configuration, 8,970 square feet in size, is slightly larger than the 7,400-square-foot base configuration and provides an analysis of a reasonable worst-case construction scenario that would occur if construction had to extend into the streetbeds of E. 59th Street and First Avenue to provide a more efficient construction equipment layout. At this time, NYCDEP anticipates that construction would occur using the base configuration; the alternate site configuration could be used by the contractor only with NYCDEP's approval.

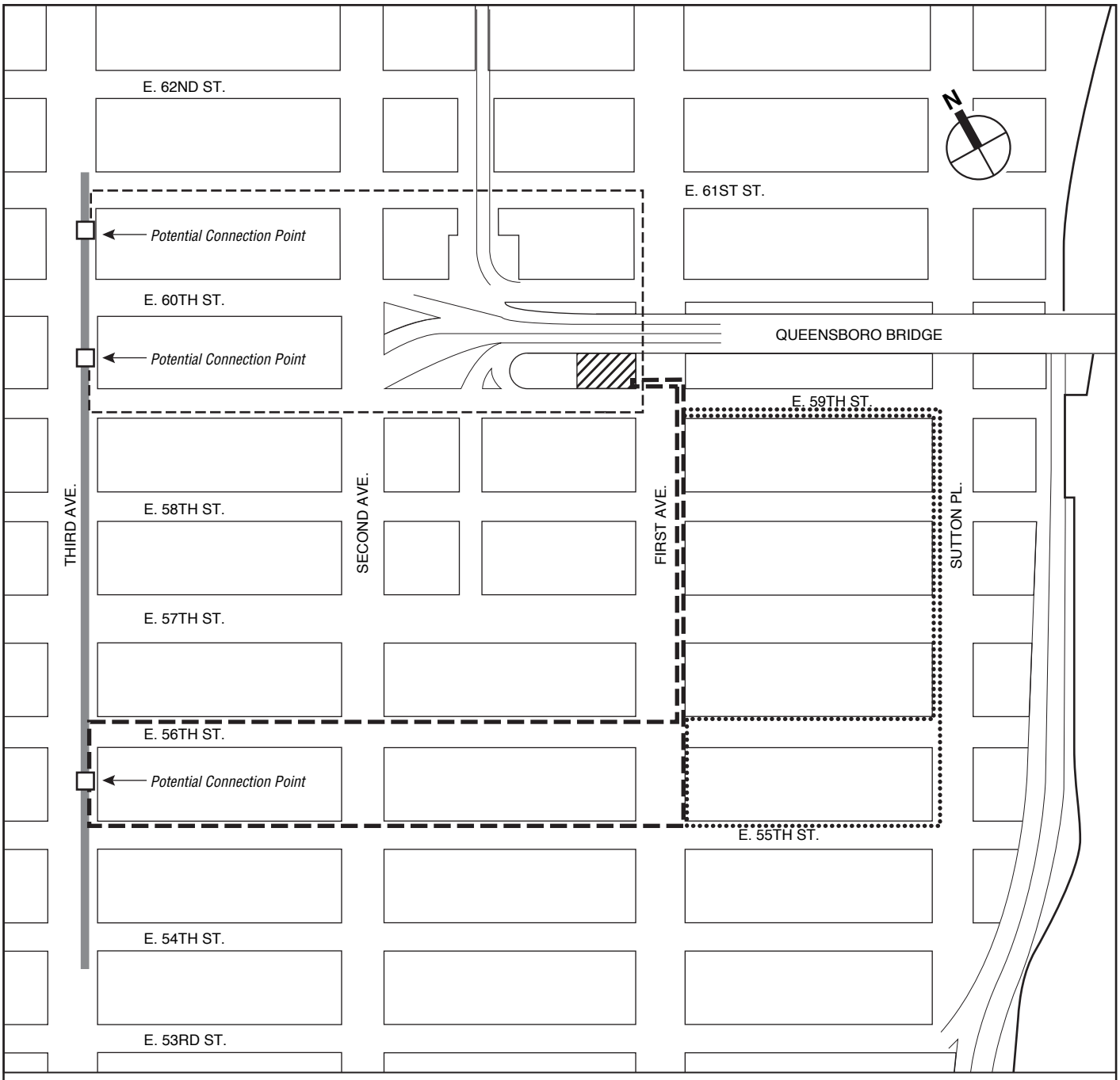


NOTE: *This figure has been updated for the Final EIS*

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2-MANHATTAN LEG

SHAFT SITE LOCATIONS

FIGURE 1.1-1



NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2-MANHATTAN LEG

POTENTIAL WATER MAIN CONNECTION ROUTES

FIGURE 1.1-2

Under either site configuration, during 23 months of construction in Stages 2 and 3, the construction area at the preferred Shaft Site would expand to include an 1,800-square-foot portion of an adjacent publicly owned parcel commonly referred to as "14 Honey Locusts Park" or "Gateway Plaza." The area is under the jurisdiction of NYCDOT and has historically been used as a shared resource, by NYCDOT as a Bridge access area for parking and maintenance and rehabilitation activities, and by the public who generally use it for open space activities. Since the parcel supports several uses, it is referred to as the "multi-use area" in this EIS. Use of this area for construction of the shaft would require removal of two honey locust trees.

The specific route for the water main connection from the preferred Shaft Site to the Third Avenue trunk main has not yet been determined; the route of the water main connections would be selected by NYCDEP after Shaft 33B is sited. The New York City Department of Design and Construction (NYCDDC) will then design and construct the water mains. NYCDDC is the City agency charged with design and construction of many of the City-sponsored construction projects occurring within City streets and sidewalks. This allows coordination of the various projects, so that disturbance to the street can be minimized. For more information on construction of water main connections, see Section 5.1 of this EIS.

As there are many potential possible water main connection routes, the EIS analyses consider a reasonable worst-case route and two additional representative water main connection routes to identify the types of impacts that could occur from water main construction using any likely route. These three water main connection routes are: (1) a First Avenue route, traveling down First Avenue and then over to Third Avenue via E. 55th and E. 56th Streets ("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 from the preferred Shaft Site to Third Avenue via E. 59th Street, and the other would travel up First Avenue two blocks and then over to Third Avenue via E. 61st Street.

Alternative Sites and Water Main Connections

In addition to the preferred Shaft Site, this EIS also analyzes three feasible alternative Shaft Sites, at E. 59th Street and Second Avenue, at E. 61st Street between First and Second Avenues, and at E. 54th Street and Second Avenue.

E. 59th Street/Second Avenue Shaft Site

The E. 59th Street/Second Avenue Shaft Site is located in a portion of the street and sidewalk on the northern side of E. 59th Street east of Second Avenue. The approximately 15,000-square-foot site is City-owned and includes an area adjacent to the Queensboro Bridge that is mapped street, as well as the northern part of the E. 59th Street roadbed at the western end of the block, close to Second Avenue. A single eastbound lane would be maintained on E. 59th Street alongside the construction site, which is the same as in the existing condition.

Construction at this alternative Shaft Site would be constrained by the site's irregular shape and its location partially beneath a Queensboro Bridge access ramp. Moreover, due to the site

configuration and the presence of utilities immediate to the shaft footprint, the site is not large enough to accommodate two risers, a critical NYCDEP goal for Shaft 33B. In addition, a sensitive Con Edison oil-o-static line and its associated chamber would need to be relocated at this site before construction of the shaft can begin. The process of relocating this oil-o-static line, including planning and implementation, may take a total of 10 to 12 months. Delays to the construction schedule might mean that rock excavated from this alternative Shaft Site would not be removed through City Tunnel No. 3.

Similar to the preferred Shaft Site, water main connections from this alternative Shaft Site could follow many possible routes to the Third Avenue trunk main. For purposes of the EIS, it was assumed that the same potential routes would be followed as for the preferred Shaft Site since it is in close proximity to the preferred Shaft Site.

E. 61st Street Shaft Site

This site is located on the north side of E. 61st Street, between First and Second Avenues immediately east of the elevated exit ramp from the upper level of the Queensboro Bridge (Block 1436 Lot 13). The 9,000-square-foot vacant parcel is owned by the Archdiocese of New York. This site is large enough to accommodate two risers in the shaft and is regular in shape, which would facilitate construction. However, the Archdiocese is planning to develop this site with a residential structure, and has not been receptive to NYCDEP's acquisition or use of the site. The lengthy site acquisition process could result in construction delays that might mean that rock excavated from the shaft and chambers would not be removed through City Tunnel No. 3.

Similar to the preferred Shaft Site, water main connections from this alternative Shaft Site could follow many possible routes to the Third Avenue trunk main. For purposes of the EIS, it was assumed that the same potential routes would be followed as for the preferred Shaft Site since it is in same general area as the preferred Shaft Site and the Queensboro Bridge.

E. 54th Street/Second Avenue Site

The E. 54th Street/Second Avenue Shaft Site is an approximately 8,500-square-foot, "L"-shaped area located entirely in the street and sidewalk of E. 54th Street and of Second Avenue, at the northeast corner of that intersection. This site is located completely within City property. Construction at this site would require several lane closures for the duration of the construction period, including two lanes (one parking lane and one traffic lane) on Second Avenue and two of the three lanes (one parking lane and one traffic lane) on E. 54th Street. In addition, it would require the use of some of the sidewalk on the south side of E. 54th Street as a vehicle lane, to keep the street open to traffic. To maintain a sidewalk along the southern side of the street adjacent to the shifted vehicle lane, this alternative Shaft Site might require a temporary easement, approximately six feet wide, across private property through a landscaped area that faces E. 54th Street near Second Avenue. Limited utilities within the street bed would need to be relocated for shaft construction at this site.

The site's small size and L-shaped configuration would present several disadvantages. First, the site is not large enough to accommodate two risers, a critical NYCDEP goal for Shaft 33B.

Second, the site has a non-contiguous configuration, since it would be divided by different areas that must be kept free for potential emergency access by the Fire Department of New York (FDNY) as well as for an access point for a private parking garage, which would complicate the constructability of the site. In addition, an enclosed sidewalk café area built as an extension to a restaurant would have to be removed before construction can begin. Further, because of this site's proximity to residential buildings, blasting cannot be used for excavation of the distribution chamber or upper portion of the shaft. This excavation would be conducted using alternative techniques, such as hydraulic splitting, which are much slower than blasting. The resulting delays to the schedule could mean that rock excavated from the shaft and chambers would not be removed through City Tunnel No. 3.

Water main connections from this alternative Shaft Site could follow several possible routes to the Third Avenue trunk main. For purposes of the EIS, it was assumed that both water main connections would head north from the alternative Shaft Site on Second Avenue, and then west on E. 55th and E. 56th Streets to Third Avenue. Using this or other possible routes, the distance to the Third Avenue trunk main would be substantially less from the E. 54th Street/Second Avenue Shaft Site than from the preferred Shaft Site.

Other Alternatives

In addition, this EIS also considers two other alternatives: a Water Main Only Alternative, in which no new Shaft 33B is provided, but new water main connections extending 42 blocks from the two nearest water tunnel shafts—at Second Avenue near E. 35th Street, and at York Avenue near E. 77th Street—are provided to supply water throughout the MIPZ and NIPZ; and a No Action Alternative, in which no construction of a new water shaft to City Tunnel No. 3 or any water main connections occurs. These alternatives are discussed in Section 1.5, "Summary of Alternatives," below.

1.2.5 Overview of Shaft Site and Water Main Components

Shaft

The Shaft 33B structure would consist of the same basic components regardless of its location. Shaft 33B would consist of a vertical cylindrical hole approximately 450 feet deep, constructed primarily in bedrock and encased in concrete. The shaft would be about 25 feet in diameter at the surface and would taper slightly as the depth increases. Within the shaft, 48-inch-diameter steel pipes encased in concrete ("risers") would bring water from City Tunnel No. 3 up to the neighborhood water distribution system.

Within the shaft, the risers would pass through two separate chambers. The first, the riser valve chamber, would house valves and actuators (mechanical devices used to open and close the valves) that could be used to shut down the risers for maintenance or repairs. This chamber would be located approximately 150 to 200 feet below ground surface. The second chamber, the distribution chamber, would be above the valve chamber and approximately 3 feet below the surface. This 25-foot-deep chamber would be approximately 60 feet long and 30 feet wide, and

would house the connections between the risers and the shaft's water main connections. Above the shaft, two ground-level hatchways, each approximately 3 feet by 5 feet, would provide access to these underground chambers.

In addition, an above-ground 10-foot-high air vent, 14 inches in diameter, would be located permanently on the site or adjacent sidewalk to provide air into the shaft for maintenance workers. Up to two standard 3-foot-high hydrants, 6 inches in diameter, would be provided on the site or adjacent sidewalk for use when the piping is activated.

Water Main Connections

Two 48-inch-diameter water mains would extend underground from the distribution chamber at Shaft 33B to provide a connection between the risers in Shaft 33B and the existing water distribution system. These water mains would run from the Shaft Site to the 30-inch Third Avenue trunk main, which is the primary distribution main for all water in the portions of the MIPZ and NIPZ east of Park Avenue. Close to Shaft 33B the new water main connections would pass through several below-grade chambers housing equipment that regulates and monitors the flow to the water main connections that would extend from the shaft. These include regulator, valve, and venturi chambers.

1.2.6 Description of Construction Activity

Shaft Site Construction

Overview

The preferred Shaft Site and each alternative Shaft Site would each face different construction issues, and construction activities would vary from site to site. In general, however, most activities would be similar at all four sites. Construction of Shaft 33B would be conducted in four stages. During the first three stages, the shaft and its valve and distribution chambers would be excavated and the riser pipes would be installed. Following Stage 3, the Shaft Site would be secured and inactive for an 8-month period while specialized equipment is ordered. The fourth stage of construction would consist of equipment installation in the shaft and chambers and construction of regulator and valve chambers. Separate from the shaft construction, water main connections would likely occur simultaneously with the other construction stages and would consist of installation of water main connections between Shaft 33B and the Third Avenue trunk main.

At the three alternative Shaft Sites, construction of the shaft during Stage 2 could be conducted using either the raise bore method or surface excavation, depending on the anticipated schedule. The raise bore technique involves excavating the shaft from the bottom, working from City Tunnel No. 3 below. Excavated materials would be removed via the Tunnel. However, City Tunnel No. 3 and its staging area at Shaft 26B may no longer be available for this use after a certain date as construction in that area nears completion. At this time, based on the current Tunnel schedule, it appears that the Tunnel and Shaft 26B will not be available after July 2007.

If excavation (Stage 2) for Shaft 33B at the alternative Shaft Sites cannot be completed by that time, then the raise bore technique cannot be used. In this case, the shaft would be constructed downward from the surface ("surface excavation"). If the raise bore technique is used, most of the work on the alternative Shaft Site would occur underground. In contrast, if the surface excavation technique is used, a greater level of activity would occur at the surface of the site.

Before construction begins, the site would be enclosed with secure concrete barriers and fencing. In the initial phase, a 20-foot-high construction barrier would be erected (however, at the E. 54th Street/Second Avenue Shaft Site, this barrier would be 10 feet high). Throughout the construction process, 24-hour security would be provided at the Shaft Site.

It is anticipated that construction at the Shaft Site would be conducted in two shifts, from 7:00 a.m. to 3:00 p.m. and from 3:00 p.m. to 11:00 p.m. (Monday through Friday). The majority of the heavy work would likely occur during the first shift. If the raise bore technique is used, a third (night) shift would occur during a three-month period in Stage 2 when underground raise-bore excavation would occur, which would require limited surface activity to monitor the raise-bore machine, as discussed below (seven days a week). An estimated 10 to 15 workers would work at the site per shift during the busiest stages. If the raise bore technique is used, most of the work would occur within the shaft or its chambers; if the surface excavation technique is used, more activity would occur at the surface throughout the construction period.

The work anticipated during the four stages of construction activity at the preferred Shaft Site or alternative Shaft Sites is described below and summarized in Table 1.2-1. Work during the fifth stage would include water main construction.

Blasting Procedures

Excavation of the shaft and the distribution chamber during Stage 2 would involve blasting. The initial excavation, conducted in Stage 1, would include removal of soil. Stage 2 would involve removal of rock within that excavation area, to bring the base of the chamber to its final elevation, and excavation of the shaft. At most sites, the rock would be removed by controlled drilling and blasting. However, at the E. 54th Street/Second Avenue Shaft Site, where blasting would not be conducted close to the surface, alternative techniques such as hydraulic splitting would be used instead. The rock displaced during blasting (or hydraulic splitting) would be removed through City Tunnel No. 3.

Controlled drilling and blasting involves drilling many small (i.e., 2-inch) holes in the rock using rock drills, and then placing small amounts of explosives in each hole. Blast mats are then placed on the rock, to control potential flying debris during blasting. Under carefully controlled and monitored conditions, explosives are then detonated sequentially, breaking the rock while spreading the release of energy from individual explosives, lessening the potential ground vibration and air blast effects above. 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. Construction specifications would require adherence to all applicable rules and regulations, including the rules and regulations of the FDNY, and would require the use of modern blasting techniques including timed multiple charges, blast mats, etc.

Table 1.2-1
Shaft Construction Stages

Stage	Raise Bore Technique		Surface Excavation Technique	
	Activity	Major Equipment	Activity	Major Equipment
SHAFT AND DISTRIBUTION CHAMBER				
1	Sidewalk and asphalt pavement demolition; initial excavation, installation of excavation support (except at E. 54th Street/Second Avenue Site)	On-site: Backhoe, jackhammers, pile drilling rig, excavator, telescoping crane, compressor, front-end loader Trucks: Dump trucks, flatbed trucks	Same as for raise bore	Same as for raise bore
2A	Drill pilot hole, excavate shaft with raise bore	On-site: Derrick crane, raise bore machine, front-end loader Trucks: Dump trucks, flatbed trucks	E. 59th Street/Second Avenue and E. 61st Street Sites: Excavate distribution chamber by blasting E. 54th Street/Second Avenue Site: Excavate distribution chamber by hydraulic splitting and blasting	On-site: Rock drills, pneumatic hammer, excavator, front end loader, derrick crane, compressor Trucks: Dump trucks, flatbed trucks
2B	Distribution chamber excavation (blasting, except at E. 54th Street/Second Avenue Site, where hydraulic splitting would be used)	On-site: Derrick crane, excavator, rock drills, compressor, pneumatic hammer, front-end loader Trucks: Concrete trucks, dump trucks, flatbed trucks	Shaft excavation, line shaft with concrete. E. 59th Street/Second Avenue and E. 61st Street Sites: blasting; E. 54th Street/ Second Avenue Site: hydraulic splitting at top, blasting below	On-site: Excavator, front end loader, derrick crane, compressor, pneumatic hammer Trucks: Dump trucks, flatbed trucks
2C	Slashing/lining the shaft by drill and blast (top portion by hydraulic splitting at E. 54th Street/Second Avenue Site)	On-site: Derrick crane, rock drills, compressor, front-end loader Trucks: Concrete trucks, dump trucks, flatbed trucks	No Stage 2C for surface excavation	
3	Install riser piping and refill with concrete; distribution chamber construction (form/place reinforced concrete)	On-site: Derrick crane, front-end loader, compressor, pumper truck Trucks: Concrete trucks, dump trucks, flatbed trucks	Same as for raise bore	Same as for raise bore
Contracting and Equipment Procurement Period: Site Secured and Inactive				
EQUIPMENT INSTALLATION				
4A	Installation of distribution pipes and valves; completion of riser/distribution chambers (mechanical, electrical, plumbing); install piping	On-site: Excavator, crane, front-end loader Trucks: concrete trucks, flatbed trucks, dump trucks	Same as for raise bore	Same as for raise bore
4B	Construction of regulator and valve chambers (excavate, form, and pour chambers, install equipment)	On-site: Excavator, crane Trucks: concrete trucks, flatbed trucks, dump trucks	Same as for raise bore	Same as for raise bore
4C	Demobilize and grade site; water main connections at edge of Shaft Site; restore site	On-site: Loader, compactor, backhoe, cherry picker, paver Trucks: flatbed truck, dump trucks	Same as for raise bore	Same as for raise bore
5	Water main connections (excavate trench, relocate/protect utilities, lay bedding/pipe, backfill, pave)	On-site: Backhoe, cherry picker, paver Trucks: dump truck, flatbed trucks	Same as for raise bore	Same as for raise bore

When blasting would be conducted, one to two blasts would be expected to occur on a given day. The typical blasting sequence is as follows:

- Placement of explosives (1 to 2 hours)
- Placement of blasting mats (1 hour)
- Detonation of explosives (instantaneous)
- Removal of blast mats (1 hour)

After this sequence, the contractor could either place a new round of explosives (if holes are already drilled) or clear the rock down the hole. Because the entire process takes three to four hours or more, it is highly unlikely that more than two blasts would occur on a given day. Based on experience with other construction projects that involve blasting, it is expected that blasting would typically occur during the first shift (7:00 a.m. to 3:00 p.m.). In general, blasting would not occur until 10:00 a.m. since it can take two to three hours to prepare for the blast. The second blast, if it occurred, would generally take place either in the early afternoon (i.e., around 3:30 p.m.) or towards the end of the evening peak period (i.e., around 6:30 p.m.). FDNY restricts blasting times to between 7:00 a.m. and 7:00 p.m. or sun up to sun down. Although not expected to be needed, subject to prior approval and issuance of a variance by FDNY, extension of blasting operations may be granted on a case-by-case basis.

Blasting would be conducted in a manner that is protective of public health and safety, in coordination with FDNY. At the beginning of the blasting process and continuing potentially until the blasting is at a depth of 100 feet, these protective measures would include vehicular and pedestrian traffic being prohibited from traveling adjacent to the site.

Typically, a few minutes prior to blasting, warning whistles would alert the area that blasting was about to begin. The typical warning whistle communication protocol could result in the halting of vehicular and pedestrian traffic near the blast site as follows:

- 1 long whistle – vehicular and pedestrian traffic stopped
- 2 short whistles – blast will commence
- 3 long whistles – all clear: blast is completed and traffic flow can resume

This warning whistle communication protocol could take up to five minutes to implement. Because traffic levels in the area surrounding the preferred Shaft Site are substantial throughout the day, traffic stoppage for a 5-minute period could result in sustained traffic back-ups for several key travel corridors (i.e., First Avenue, Second Avenue, and Queensboro Bridge). The FDNY has indicated that they could issue a waiver to the protocol and reduce the whistle warning time to one minute. The contractor intends to seek this wavier. The waiver would permit a blasting sequence that is safe and functional, and would minimize the need for traffic and pedestrian stoppages during such events. This blasting sequence would be as follows:

- The contractor would notify flag persons who are on standby at locations designated for traffic and pedestrian stoppages that everything is properly set up for the blast. Personnel from FDNY and the New York City Police Department (NYPD) would likely be on site during the initial blasts and may also participate in the traffic halting process, if warranted.

- At this time, the contractor would blow one long whistle, as noted above for standard blasting procedures, at which time flag persons would halt vehicular and pedestrian flow at the designated locations. Once traffic is stopped and the area near the site (generally approximately 100 to 150 feet away) is cleared, the flag persons would radio back to the site to confirm that stoppage is complete.
- The contractor would then blow two short whistles to signify that the blast is about to begin and set off the explosives with a trigger.
- Upon the instantaneous completion of the blast, the contractor would blow three short whistles and communicate to the flag persons via radio to indicate the end of the blasting sequence for vehicular and pedestrian traffic movements to proceed.

The duration of the above sequence (including the preliminary notification to the flag persons to get ready) is estimated to be approximately 2 to 4 minutes, with the temporary stoppage of traffic lasting about 1 minute. This duration would only be slightly longer than the typical signal stoppage (usually 40 to 50 seconds) at nearby intersections, and while increasing delays, would not result in sustained back-ups on the key travel corridors indicated above. Following the all clear signal, nearby traffic is expected to recover to pre-blasting conditions within a few minutes after the one-minute stoppage. For blasting at the preferred Shaft Site, the cordon for short-term stoppage of vehicular and pedestrian traffic is expected to include:

- E. 59th Street westbound at First Avenue;
- E. 59th Street eastbound east of Second Avenue;
- First Avenue northbound at E. 59th Street;
- Second Avenue entrance to the Queensboro Bridge lower-level inner roadway; and
- Queensboro Bridge ramp approach to the Queens-bound upper-level roadway.

Based on discussions with FDNY, at times when the passage of emergency vehicles coincides with blasting events, the execution of the above sequence would be halted until the passage of the emergency vehicles is completed.

During approximately the first four months of blasting, intermittent blast events conducted at the Shaft Site would halt vehicular and pedestrian traffic flows adjacent to the site. However, during this four-month period, blast events would likely occur only once or twice a day, with traffic stoppages enduring for approximately one minute for each blast in accordance with the whistle waiver the contractor would seek from FDNY. Blasts may not occur every day during this period and would likely occur outside of the peak traffic hours based on typical blasting procedures employed. If the stoppage of traffic was undertaken for a longer period of time at the preferred Shaft Site (i.e., 5 minutes), temporary additional queuing could occur along the affected corridors. The period during blasting, when traffic stoppages would be necessary is short-term and temporary and traffic halting events would be intermittent during the blasting period.

When larger trucks (55 feet long) need to access the Shaft Site for deliveries, some temporary queuing of traffic could be expected near the Shaft Site. This disruption in traffic from these

truck movements would cause traffic congestion and increase the queue lengths on nearby adjacent streets. For all of the Shaft Sites, NYCDEP would commit to providing funding for as many traffic enforcement agent (TEA) during its construction as appropriate to facilitate vehicular and pedestrian flow near the preferred Shaft Site. NYCDEP will continue its coordination with NYCDOT regarding the need for additional TEAs.

NYCDEP and its contractors would conduct extensive outreach to those in the vicinity of the Shaft Site that could be affected by blasting. This would include providing the nearby community with the expected start date for blasting operations, the general time pattern during the ensuing months, and the timing and significance of the warning whistles.

Water Main Construction

NYCDDC would construct the two 48-inch water mains from Shaft 33B at any of the Shaft Sites in the streets using standard construction techniques and following NYCDOT traffic stipulations. NYCDDC is the City agency charged with design and construction of many of the City-sponsored construction projects occurring within City streets and sidewalks.

The specific construction methods to be used for the water mains therefore have not yet been determined. However, based on past NYCDDC practices, it is likely that water mains would be constructed using the "cut and cover" technique, which involves excavating small areas at a time and covering them once construction is complete. Using this technique, the water mains would likely be constructed in segments so that the entire construction route would not be disrupted simultaneously. Construction areas would typically be limited to a single block, not including its intersections, or a single intersection where a main must cross another street. To expedite the schedule, work could be conducted on several non-adjacent areas simultaneously. For construction along north- and southbound avenues or Sutton Place, the area under construction at any given time (a "segment") would be anticipated to include two non-adjacent City blocks or one or two street intersections. East- and westbound cross streets would likely be constructed one block at a time, with intersections constructed separately. On a given cross-street, work would be conducted one half-block at a time, so that space remains for cars to maneuver around the work zone and to pull over for deliveries. Again, work on a cross-street segment might be conducted at the same time as work on a non-adjacent intersection, to reduce the overall duration of the construction project. Construction work for the water main connections would occur during one eight-hour shift per day. This would typically occur during the daytime, but work could also potentially occur during an evening shift (from 3:00 p.m. until 11:00 p.m.) if NYCDOT Office of Construction Mitigation and Coordination (OCMC) deems evening construction work to be necessary to avoid severe traffic tie-ups. It is also possible NYCDOT may require weekend work or water main construction during the overnight shift (11:00 p.m. to 7:00 a.m.). Given the residential nature of the surrounding area, it is not anticipated that OCMC would request overnight work; however, this EIS addresses the potential effects of such work in relevant analyses.

Overall Construction Schedule

The total construction period for Shaft 33B, including the 8-month period in which the site is secured and inactive while equipment is procured, is an estimated 52 months at the preferred Shaft Site. For the alternative Shaft Sites, the total construction period depends on whether the raise bore or surface excavation construction method is used. For the E. 59th Street/Second Avenue Shaft Site or E. 61st Street Shaft Site, the construction period would be the same approximately 52-month period with raise bore or approximately 65 months with surface excavation. For the E. 54th Street/Second Avenue Shaft Site, the construction period would be approximately 61 months with raise bore or approximately 70 months with surface excavation.

Water main construction is conservatively estimated at up to 12 weeks for an avenue or street block segment and up to 10 weeks for an intersection segment. Table 1.2-2 presents estimated construction times for the analyzed water main connection routes in the EIS to the Shaft Sites—(1) the First Avenue route (the reasonable worst-case route); (2) the Sutton Place route (an additional representative route); and (3) the E. 59th Street/E. 61st Street route (an additional representative route). As noted in the table, the routes with the shortest construction duration would be the E. 59th Street/E. 61st Street route (31 months) from the preferred Shaft Site, the E. 59th Street/Second Avenue Shaft Site, and the E. 61st Street Shaft Site, as well as the water main route from the E. 54th Street/Second Avenue Shaft Site (22 months). The construction duration for the First Avenue route (41 to 47 months) and Sutton Place route (51 to 57 months) would be longer.

Table 1.2-2
Estimated Months of Construction,
Water Main Connection Routes for Shaft Sites

Water Main Route	Shaft Site			
	Preferred	E. 59th St/ Second Ave	E. 61st St	E. 54th St/ Second Ave
First Avenue Route	41	47	46	22
Sutton Place Route	51	57	56	N/A
E. 59th Street/E. 61st Street Route	31	31	31	N/A

Notes: Durations are in months and include holiday black-out dates.
N/A = This route is not applicable for this Shaft Site.
The water main connection route from the E. 54th Street site is considered to be the "First Avenue route" for presentation purposes in this table.

Activation

Once construction of the shaft and water mains has been completed, an activation procedure to disinfect the Tunnel and shaft and clear them of air and debris would be implemented before the shaft and connecting water mains can be used. Activation of Shaft 33B would likely occur at the same time as the activation for City Tunnel No. 3, Stage 2 Manhattan Leg. The conceptual

activation procedure for Shaft 33B would consist of three separate steps—shaft filling, shaft flushing, and shaft disinfection. Each step would last an estimated 3 to 5 days.

1.2.7 Operation and Maintenance

Shaft 33B is anticipated to be operational in 2012. The shaft would operate unmanned, 24 hours a day, seven days a week. Water flow from the shaft to the water distribution system would be automatically controlled by the regulators and valve chambers, which are manually set at a particular pressure setting. 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 the Shaft Site or sidewalk, and up to two air release hydrants (3-foot-high by 6-inch-diameter). Neither air emissions nor above-ground noise would be generated by the shaft during normal operations.

Although regular operations of the shaft would occur unmanned, maintenance crews would routinely visit the site several times a week for inspection and maintenance activities. A range of zero to five visits could be expected weekly.

1.2.8 Potential Permits and Approvals

Construction and operation of Shaft 33B and its water mains may require a variety of permits, approvals, or reviews by New York State and New York City agencies. NYCDDC would implement construction of the water mains, and therefore is treated as an involved agency for environmental review under CEQR. The permits and approvals associated with construction of Shaft 33B at the preferred Shaft Site and for the water main connections are as follows:

- FDNY Blasting Permits;
- NYCDOT Construction Activity Permits, Sidewalk Construction Permits, and Street Opening Permits;
- NYCDEP Tunneling Permit;
- NYCDEP Sewer Discharge Permit;
- Memorandum of Understanding between NYCDEP and NYCDOT;
- New York City Landmarks Preservation Commission (NYCLPC) Permit, advisory letter, and review;
- Metropolitan Transportation Authority (MTA) New York City Transit (NYCT) approval;
- NYCDOT Construction Activity Permits, Sidewalk Construction Permits, and Street Opening Permits; and
- New York City Department of Parks and Recreation (NYCDPR) Tree Work Permit.

The same permits and approvals would also be required for construction of Shaft 33B at the alternative Shaft Sites and for the associated water main connections. In addition, public review under the City's Uniform Land Use Review Procedure would be required for the acquisition of

private property at the E. 61st Street Shaft Site and could potentially be required for acquisition of a temporary easement across private property at the E. 54th Street/Second Avenue Shaft Site.

1.3 SUMMARY OF POTENTIAL SIGNIFICANT OR TEMPORARY ADVERSE IMPACTS—SHAFT SITES

1.3.1 Introduction

This Section discusses the potential Shaft Sites with respect to potential significant or temporary adverse impacts. The distinction between "potential significant" impacts and "temporary" impacts is made primarily based on the combination of duration and severity of the effect on a specific sensitive population. Transient and temporary effects have been carefully reviewed and, when feasible, attenuation measures have been identified and would be implemented to relieve the temporary effects; however, in accordance with CEQR guidelines these short-term effects are not considered significant. Table 1.3-1 highlights these impacts for construction at the Shaft Sites; there is no potential for significant or temporary adverse impacts from operation of Shaft 33B at any of the Shaft Sites. Additional summary discussions for the water main connections routes are provided in Section 1.4, below.

1.3.2 Preferred Shaft Site

Construction of Shaft 33B at the preferred Shaft Site would not result in potential significant adverse impacts on land use and community facilities, zoning, and public policy; open space; socioeconomic conditions; historic resources; visual resources and urban design; neighborhood character; infrastructure and energy; traffic and parking; transit and pedestrians; air quality; vibration; hazardous materials; or public health. There would be the potential for significant adverse noise impacts during construction at the preferred Shaft Site.

Noise

Blasting

Blasting would result in high instantaneous noise levels. Noise levels associated with blasting are dependent on the amount of explosive used, geological conditions between the blast site and the receptor, and the fact that blasting will take place at least 20 feet below the surface. NYCDEP will implement the protective measures described below, including monitoring and control measures, to minimize adverse noise effects. However, despite these measures, blasting noise could result in startle effects and be intrusive and disturbing to humans.

Table 1.3-1
Most Notable Significant or Temporary Adverse Construction Impacts
Potential Shaft Sites

Issue	Shaft Site			
	Preferred	E. 59th St/ Second Ave	E. 61st St	E. 54th St/ Second Ave
Land Use and Community Facilities, Zoning and Public Policy	—	—	Potential significant adverse impacts on early childhood educational facility adjacent to the site due to construction noise	—
Open Space	—	—	—	Potential significant adverse impact on nearby open space due to construction noise
Socioeconomics	—	—	—	—
Historic Resources	—	—	—	—
Urban Design and Visual Resources	—	—	—	—
Neighborhood Character	—	—	—	—
Infrastructure and Energy	—	—	—	—
Traffic and Parking	—	—	—	—
Transit and Pedestrians	—	—	—	—
Air Quality	—	—	—	—
Noise	Potential significant adverse impact on two buildings	Potential significant adverse impacts on three buildings	Potential significant adverse impacts on certain receptors between the shaft and First Avenue	Potential significant adverse impacts on buildings along E. 54th St. between First Ave. and midblock to Third Ave., and along Second Ave. between E. 53rd and E. 55th Sts.
Vibration	—	—	—	—
Hazardous Materials	—	—	—	—
Public Health	—	—	—	—

Blasting is regulated by a NYCDEP Tunnel Construction permit and by the FDNY. To reduce noise levels associated with blasting, construction specifications would require adherence to all applicable rules and regulations (including the rules and regulations of the FDNY) and would require the use of modern blasting techniques including timed multiple charges, blast mats, etc. These techniques would be used to reduce noise levels.

In addition, controlled blasting would employ time-delayed (in milliseconds) small multiple charges of limited blast intensity. Also, to reduce further the audible airborne blast sounds, crushed rock would be employed to contain blast energy when blasting near the top of the shaft.

During construction, noise levels will be monitored at nearby sensitive receptors during all blasting activities. The airborne sound from each blast would be monitored and the results maintained in a dated blasting log. Recordings will be made by qualified personnel in the employ of an independent noise consulting firm. The contractor would submit promptly to the NYCDEP Engineer a record of all data concerning each blast. The contractor will be required to ensure that blasting activities do not exceed 140 decibels (dB) at 25 feet from the shaft opening.

Other Construction Activities

Measures to Reduce Noise at the Site

NYCDEP is committing to providing a number of measures that would be provided at the preferred Shaft Site to minimize potential noise impacts from construction. This includes a prefabricated 20-foot-high concrete wall to be constructed around the perimeter of the Shaft Site. The wall will be covered with a sound absorptive fabric on the inside to reduce reflective noise. During Stage 4B only, the eastern end of the Shaft Site would have a 10-foot-high wall. Since concrete operations during Stages 2C, 3, and 4A are among the noisiest operations, the concrete mixing trucks will also be enclosed in an acoustical sound enclosure providing 15 dBA attenuation.

While not assumed in the quantitative noise analysis conducted for this EIS, NYCDEP will undertake a number of other measures to minimize noise impacts from the project. The contractor will be required to have a noise monitoring program in place during all construction activities. A high quality muffler will be used on the crane engine. NYCDEP will also require the contractor to use newer equipment (2003 or later for most equipment) and minimize idling. Other noise abatement measures that the contractor may be required to take as necessary include: soundproof housings or enclosures for noise producing machines and other facilities; use of electrically operated hoists and compressor plants; silencers on air intakes and exhaust mufflers on internal combustion engines; maximum-sized intake and exhaust mufflers on internal combustion engines; gears on machinery designed to reduce noise to a minimum; hoppers and storage bins lined with sound-deadening material; possible prohibition of the use of air- or gasoline-driven saws and similar equipment; and delivering and removing materials, and the loading and unloading of materials into or from various conveyances in such a manner that will keep noise to a minimum.

Through NYCDEP's authority under the construction contract, the Tunneling Permit, and the New York City Noise Code, NYCDEP can send inspectors to the site, enforce against the contractor, and require further attenuation measures or shutdown construction on the site if noise is too excessive.

Potential Noise Impacts

For each stage and each shift, the existing ambient noise levels, noise levels generated by the construction equipment, and total combined existing and construction-generated noise levels were calculated at ground and elevated receptor locations. To determine potential noise impacts, the increase between the combined level and existing conditions this increase is compared to the 3 dBA CEQR impact threshold.

During other construction activities at the preferred Shaft Site, based on the range of analysis conducted, there is the potential for adverse noise impacts on the upper floors of the residential apartment located directly across E. 59th Street from the Shaft Site during all stages with the exception of Stage 2A. Potential adverse noise impacts at this location would range from 3.1 to 11.6 dBA during Shift 1 (7:00 a.m. to 3:00 p.m.) and from 3.1 to 10.7 dBA during Shift 2 (3:00 p.m. to 11:00 p.m.). These impacts would range from marginally perceptible to, at times, intrusive based on the results of the noise modeling and the predicted noise level changes from this project. The apartment building located on the southeast corner of E. 59th Street could also be adversely impacted during all stages with the exception of Stages 2A, 2C, and 3. Potential adverse noise impacts at this location would range from between 3.0 and 10.7 dBA during Shifts 1 and 2, which would range from marginally perceptible to, at times, intrusive. At the lower floors of these receptors, which would be protected by the Shaft Site's concrete wall, construction noise levels would generally be low or less than 3 dBA. At all locations further from the construction site, the estimated construction noise levels would be less than 3 dBA.

Conclusions

Due to the extended duration that potential noise impacts could occur throughout the construction period, these impacts are considered to be significant. Section 1.4, "Water Main Connections Noise," below discusses noise impacts generated by construction of the water main connections and venturi chambers. Noise impacts to receptors along these potential routes are considered to be temporary adverse impacts. In the event of concurrent construction of the shaft, water main connections, and venturi chambers, no additional receptors would experience potential significant adverse impacts, but the receptors that are in the immediate vicinity of both construction projects would experience higher noise levels than they would experience if only the shaft would be constructed for the relatively short time (20 weeks) that both construction projects were under way at the same time.

These conclusions are based on the increases and duration of the noise levels due to the construction activities at the Shaft Site. The potential increases in noise levels are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed. Typically, noise impacts during construction are not classified as potential significant adverse impacts, but because the construction of Shaft 33B would take 52 months,

NYCDEP considers this to be an issue that will be considered in its final decision making. NYCDEP is exploring potential mitigation measures that could attenuate noise levels at the affected receptors, in addition to measures already committed to as part of the project. However, because the construction related noise would persist for a lengthy time period and would require loud construction activities such as blasting, concrete operations, and excavation work, and due to the proximity of sensitive receptors to the Shaft Site, the potential significant noise impacts cannot be fully mitigated. Therefore, these potential significant noise impacts would be unavoidable.

1.3.3 E. 59th Street/Second Avenue Shaft Site

Construction of Shaft 33B at the E. 59th Street/Second Avenue Shaft Site would not result in potential significant adverse impacts on land use and community facilities, zoning, and public policy; open space; socioeconomic conditions; historic resources; visual resources and urban design; neighborhood character; infrastructure and energy; traffic and parking; transit and pedestrians; air quality; vibration; hazardous materials; or public health. There would be the potential for significant adverse impacts on noise during construction at this Shaft Site.

Noise

Blasting

Blasting would result in high instantaneous noise levels. Noise levels associated with blasting are dependent on the amount of explosive used, geological conditions between the blast site and the receptor, and the fact that blasting will take place at least 15 feet below the surface. Section 1.3.2 "Preferred Shaft Site Noise," discusses blasting procedures including protective measures that will be implemented to minimize potential construction-related noise impacts from blasting at the preferred Shaft Site. These same procedures would be put in place at the E. 59th Street/Second Avenue Shaft Site. However, despite these measures, blasting noise could result in startle effects and be intrusive and disturbing to humans.

Other Construction Activities

Measures to Reduce Noise at the Site

NYCDEP is committing to providing a number of measures that would be provided at the alternative Shaft Site to minimize potential noise impacts from construction. This includes a prefabricated 20-foot-high concrete wall to be constructed around the perimeter of the Shaft Site. The wall will be covered with a sound absorptive fabric on the inside to reduce reflective noise. Since concrete operations during Stages 2C, 3, and 4A are among the noisiest operations, the concrete mixing trucks will also be enclosed in an acoustical sound enclosure providing 15 dBA attenuation.

While not assumed in the quantitative noise analysis conducted for this EIS, NYCDEP will undertake a number of other measures to minimize noise impacts from the project as described in

Section 1.3.2, "Preferred Shaft Site Noise." The contractor will also be required to have a noise monitoring program in place during all construction activities.

Potential Noise Impacts

For each stage and each shift, the existing ambient noise levels, noise levels generated by the construction equipment and total combined existing and construction-generated noise levels were calculated at ground and elevated receptor locations. To determine potential noise impacts, the increase between the combined level and existing conditions this increase is compared to the 3 dBA CEQR impact threshold.

During other construction activities at the E. 59th Street/Second Avenue Shaft Site, based on the range of analysis conducted, there is the potential for adverse noise impacts on the upper floors of the residential apartment building located directly across E. 59th Street from the Shaft Site during all stages with the exception of Stages 2A, 2C, and 3. Potential adverse noise impacts at this location would range from 3.9 to 7.6 dBA during Shift 1 (7:00 a.m. to 3:00 p.m.) and from 3.1 to 9.3 dBA during Shift 2 (3:00 p.m. to 11:00 p.m.). These impacts would range from marginally to readily noticeable, based on the results of the noise modeling and the predicted noise level changes from this project. In addition, at the closest retail/residential building to the south of this apartment building, there could be readily noticeable noise impacts during Stage 4B, and the residential building located on the southeast corner of E. 59th Street could be marginally affected during Stages 1 and 4B. At all locations further from the construction site, the estimated construction noise levels would be less than 3 dBA.

If surface excavation were to be used, the peak hour noise levels during Stage 2 generated by construction equipment would be comparable to the raise bore method because similar types of equipment would be used, but the equipment would be used for a greater number of hours and the duration of noise impacts would be longer on a given day. In addition, noise levels would also be expected to be higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground.

Conclusions

Due to the extended duration that potential noise impacts could occur throughout the construction period, these impacts are considered to be significant. Section 1.4, "Water Main Connections Noise," below discusses noise impacts generated by construction of the water main connections and venturi chambers. Noise impacts to receptors along these potential routes are considered to be temporary adverse impacts. In the event of concurrent construction of the shaft, water main connections, and venturi chambers, no additional receptors would experience potential significant adverse impacts, but the receptors that are in the immediate vicinity of both construction projects would experience higher noise levels than they would experience if only the shaft would be constructed for the relatively short time (20 weeks) that both construction projects were under way at the same time.

These conclusions are based on the increases and duration of the noise levels due to the construction activities at the Shaft Site. The potential increases in noise levels are not permanent

environmental changes and no changes in the noise levels will occur from this project after it has been constructed. Typically, noise impacts during construction are not classified as potential significant adverse impacts, but because the construction of Shaft 33B would take 52 months (65 months for the surface excavation method), NYCDEP considers this to be an issue that will be considered in its final decision making. As discussed in Section 6.16, "Mitigation Measures" of Chapter 6, "E. 59th Street/Second Avenue Shaft Site," NYCDEP is exploring potential mitigation measures that could attenuate noise levels at the affected receptors, in addition to measures already committed to as part of the project. However, because the construction-related noise would persist for a lengthy time period and would require loud construction activities such as blasting, concrete operations, and excavation work, and due to the proximity of sensitive receptors to the Site, the potential significant noise impacts cannot be fully mitigated. Therefore, these potential significant noise impacts would be unavoidable.

1.3.4 E. 61st Street Shaft Site

Construction of Shaft 33B at the E. 61st Street Shaft Site would not result in potential significant adverse impacts on open space; socioeconomic conditions; historic resources; visual resources and urban design; neighborhood character; infrastructure and energy; traffic and parking; transit and pedestrians; air quality; vibration; hazardous materials; or public health. There would be the potential for significant adverse impacts on land use and noise during construction at the alternative Shaft Site.

Land Use

Construction of Shaft 33B on the E. 61st Street Shaft Site would convert a currently vacant site to an active construction site. The construction work for the new shaft and its water main connections would result in limited disruptions to the surrounding Study Area, including potential significant adverse noise impacts on the floors above ground level of nearby buildings. These construction disruptions would not be expected to result in changes to overall development patterns or trends in the Study Area, since they would be relatively short term. However, the potential significant noise impacts that would occur to the Manhattan Center for Early Education and Manhattan Center for Early Intervention, directly north of the alternative Shaft Site, for the duration of the construction period would result in a significant conflict with this noise-sensitive land use that could interfere with the proper functioning of the land use. Therefore, a potential significant adverse land use impact would occur to this facility throughout the construction period. As discussed below, this potential significant adverse impact due to noise cannot be fully mitigated and thus would be unavoidable.

Noise

Blasting

Blasting would result in high instantaneous noise levels. Noise levels associated with blasting are dependent on the amount of explosive used, geological conditions between the blast site and the

receptor, and the fact that blasting will take place at least 18 feet below the surface. Section 1.3.2, "Preferred Shaft Site Noise," discusses blasting procedures including protective measures that will be implemented to minimize potential construction-related noise impacts from blasting at the preferred Shaft Site. These same procedures would be put in place at the E. 61st Street Shaft Site. However, despite these measures, blasting noise could result in startle effects and be intrusive and disturbing to humans.

Other Construction Activities

Measures to Reduce Noise at the Site

NYCDEP is committing to providing a number of measures that would be provided at the alternative Shaft Site to minimize potential noise impacts from construction. This includes a prefabricated 20-foot-high concrete wall to be constructed around the perimeter of the Shaft Site. The wall will be covered with a sound absorptive fabric on the inside to reduce reflective noise. During Stage 4B only, the southern end of the Shaft Site would have a 10-foot-high wall. Since concrete operations during Stages 2C, 3, and 4A are among the noisiest operations, the concrete mixing trucks will also be enclosed in an acoustical sound enclosure providing 15 dBA attenuation.

While not assumed in the quantitative noise analysis conducted for this EIS, NYCDEP will undertake a number of other measures to minimize noise impacts from the project as described in Section 1.3.2, "Preferred Shaft Site Noise." The contractor will also be required to have a noise monitoring program in place during all construction activities.

Potential Noise Impacts

For each stage and each shift, the existing ambient noise levels, noise levels generated by the construction equipment, and total combined existing and construction-generated noise levels were calculated at ground and elevated receptor locations. To determine potential noise impacts, the increase between the combined level and existing conditions this increase is compared to the 3 dBA CEQR impact threshold.

During other construction activities at the E. 61st Street Shaft Site, based on the range of analysis conducted, there is the potential for adverse noise impacts during most stages of construction at several of the receptors analyzed. At the affected receptors, potential adverse noise impacts during average conditions would range from 3.3 dBA to 17.1 dBA during Shift 1 (7:00 a.m. to 3:00 p.m.) and from 3.1 dBA to 19.1 dBA during Shift 2 (3:00 p.m. to 11:00 p.m.). Potential adverse noise impacts during peak conditions would range from 3.1 dBA to 20.0 dBA during Shift 1 and from 3.3 dBA to 22.0 dBA during Shift 2. These impacts would range from marginally perceptible to, at times, highly intrusive. Potential impacts would extend to additional receptor locations beyond those modeled. During several stages of construction, it is estimated that potential noticeable noise impacts could extend to the backs of several buildings located between the Shaft Site and First Avenue and to buildings located along E. 61st Street between the Shaft Site and midblock to First Avenue.

If surface excavation were to be used, the peak hour noise levels during Stage 2 generated by construction equipment would be comparable to the raise bore method because similar types of equipment would be used, but the equipment would be used for a greater number of hours and the duration of noise impacts would be longer on a given day. In addition, noise levels would also be expected to be higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground.

Conclusions

Due to the extended duration that potential noise impacts could occur throughout the construction period, these impacts are considered to be significant. Section 1.4, "Water Main Connections Noise," below discusses noise impacts generated by construction of the water main connections and venturi chambers. Noise impacts to receptors along these potential routes are considered to be temporary adverse impacts. In the event of concurrent construction of the shaft, water main connections, and venturi chambers, no additional receptors would experience potential significant adverse impacts, but the receptors that are in the immediate vicinity of both construction projects would experience higher noise levels than they would experience if only the shaft would be constructed for the relatively short time (20 weeks) that both construction projects were under way at the same time.

These conclusions are based on the increases and duration of the noise levels due to the construction activities at the Shaft Site. The potential increases in noise levels are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed. Typically, noise impacts during construction are not classified as potential significant adverse impacts, but because the construction of Shaft 33B would take 52 months (65 months for the surface excavation method), NYCDEP considers this to be an issue that will be considered in its final decision making. As discussed in Section 7.16, "Mitigation Measures" of Chapter 7, "E. 61st Street Shaft Site," NYCDEP is exploring potential mitigation measures that could attenuate noise levels at the affected receptors, in addition to measures already committed to as part of the project. However, because the construction-related noise would persist for a lengthy time period and would require loud construction activities such as blasting, concrete operations, and excavation work, and due to the proximity of sensitive receptors to the site, the potential significant noise impacts cannot be fully mitigated. Therefore, these potential significant noise impacts would be unavoidable.

1.3.5 E. 54th Street/Second Avenue Shaft Site

Construction of Shaft 33B at the E. 54th Street/Second Avenue Shaft Site would not result in potential significant adverse impacts on land use and community facilities, zoning, and public policy; socioeconomic conditions; historic resources; visual resources and urban design; neighborhood character; infrastructure and energy; traffic and parking; transit and pedestrians; air quality; vibration; hazardous materials; or public health. There would be the potential for significant adverse impacts on open space and noise during construction at this Shaft Site.

Open Space

No open spaces would be directly affected by construction of Shaft 33B at the E. 54th Street/ Second Avenue Shaft Site; however, intrusive noise levels are anticipated at the Connaught Tower plaza across from the site, and potential significant adverse noise impacts are anticipated in this open space throughout the construction period.

The Connaught Tower plaza is heavily used during the daytime by office workers from nearby Midtown businesses and local residents. It consists entirely of passive recreation features, including seating and landscaping. As an open space in an area with few outdoor seating areas, it is valuable because of its presence and is also a space where users are likely to value the relative quiet the space currently provides.

Construction-related noise could detract from the quality of this open space and make this open space less attractive for open space users. However, many of the open space users likely value the space because of its outdoor seating close to Midtown, rather than because of its quiet. Given the relative dearth of open space resources nearby, this potential adverse effect on the quality of this space during the construction period may result in a potential significant adverse open space impact, but open space users are likely to continue to use the space in any event. As discussed below, this potential significant adverse impact due to noise cannot be fully mitigated and therefore would be unavoidable.

Noise

Blasting

Blasting would result in high instantaneous noise levels. At this site, hydraulic splitting would be employed to minimize the potential for any inadvertent damage to nearby structures. Blasting would not occur until a substantial distance below the top of bedrock was reached. Section 1.3.2, "Preferred Shaft Site Noise," discusses blasting procedures including protective measures that will be implemented to minimize potential construction-related noise impacts from blasting at the preferred Shaft Site. These same procedures would be put in place at the E. 54th Street/Second Avenue Shaft Site. However, despite these measures, blasting noise could result in startle effects and be intrusive and disturbing to humans.

Other Construction Activities

Measures to Reduce Noise at the Site

NYCDEP is committing to providing a number of measures that would be provided at the alternative Shaft Site to minimize potential noise impacts from construction. This includes a prefabricated 10-foot-high concrete wall to be constructed around the perimeter of the Shaft Site. The wall will be covered with a sound absorptive fabric on the inside to reduce reflective noise. Since concrete operations during Stages 2C, 3, and 4A are among the noisiest operations, the concrete mixing trucks will also be enclosed in an acoustical sound enclosure providing 15 dBA attenuation.

While not assumed in the quantitative noise analysis conducted for this EIS, NYCDEP will undertake a number of other measures to minimize noise impacts from the project as described in Section 1.3.2, "Preferred Shaft Site Noise." The contractor will also be required to have a noise monitoring program in place during all construction activities.

Potential Noise Impacts

For each stage and each shift, the existing ambient noise levels, noise levels generated by the construction equipment, and total combined existing and construction-generated noise levels were calculated at ground and elevated receptor locations. To determine potential noise impacts, the increase between the combined level and existing conditions this increase is compared to the 3 dBA CEQR impact threshold.

During other construction activities at this Shaft Site, based on the range of analysis conducted, there is the potential for adverse noise impacts during all stages of construction. At the affected receptors, potential adverse noise impacts during average conditions would range from 3.0 dBA to 15.0 dBA during Shift 1 (7:00 a.m. to 3:00 p.m.) and from 3.0 dBA to 19.0 dBA during Shift 2 (3:00 p.m. to 11:00 p.m.). Potential adverse noise impacts during peak conditions would range from 3.0 dBA to 20.5 dBA during Shift 1 and from 3.1 dBA to 24.5 dBA during Shift 2. These impacts would range from marginally perceptible to, at times, highly intrusive. Potential impacts would extend to additional receptor locations beyond those modeled. During several stages of construction, it is estimated that potential noise impacts could extend to buildings located between First Avenue and the midblock to Third Avenue along E. 54th Street and between E. 53rd and 55th Streets along Second Avenue.

If surface excavation were to be used, the peak hour noise levels during Stage 2 generated by construction equipment would be comparable to the raise bore method because similar types of equipment would be used, but the equipment would be used for a greater number of hours and the duration of noise impacts would be longer on a given day. In addition, noise levels would also be expected to be higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground.

Conclusions

Due to the extended duration that potential noise impacts could occur throughout the construction period, these impacts are considered to be significant. Section 1.4, "Water Main Connections Noise," below discusses noise impacts generated by construction of the water main connections and venturi chambers. Noise impacts to receptors along these potential routes are considered to be temporary adverse impacts. In the event of concurrent construction of the shaft, water main connections, and venturi chambers, no additional receptors would experience potential significant adverse impacts, but the receptors that are in the immediate vicinity of both construction projects would experience higher noise levels than they would experience if only the shaft would be constructed for the relatively short time (20 weeks) that both construction projects were under way at the same time.

These conclusions are based on the increases and duration of the noise levels due to the construction activities at the Shaft Site. The potential increases in noise levels are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed. Typically, noise impacts during construction are not classified as potential significant adverse impacts, but because the construction of Shaft 33B would take 61 months (70 months for the surface excavation method), NYCDEP considers this to be an issue that will be considered in its final decision making. As discussed in Section 8.16, "Mitigation Measures" of Chapter 8, "E. 54th Street/Second Avenue Shaft Site," NYCDEP is exploring potential mitigation measures that could attenuate noise levels at the affected receptors, in addition to measures already committed to as part of the project. However, because the construction-related noise would persist for a lengthy time period and would require loud construction activities such as blasting, concrete operations, and excavation work, and due to the proximity of sensitive receptors to the Site, the potential significant noise impacts cannot be fully mitigated. Therefore, these potential significant noise impacts would be unavoidable.

1.4 SUMMARY OF POTENTIAL SIGNIFICANT OR TEMPORARY ADVERSE IMPACTS—WATER MAINS

1.4.1 Introduction

As discussed above, three potential water main connection routes are analyzed throughout the EIS. These routes are as follows:

- First Avenue route (reasonable worst-case route): This water main route would travel down First Avenue and then over to Third Avenue via E. 55th and E. 56th Streets;
- Sutton Place route (additional representative route): This water main route would travel 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
- E. 59th Street/E. 61st Street route (additional representative route): In this route, one water main would travel from the preferred Shaft Site to Third Avenue via E. 59th Street, and the other would travel up First Avenue two blocks and then west to Third Avenue via E. 61st Street.

There would be no significant adverse impacts from construction of the water main connections. Several temporary adverse impacts would occur as summarized below and listed in Table 1.4-1.

Urban Design and Visual Resources

During construction of the water main connections, the sidewalk area would be reduced, street pavement would be cut up, and construction equipment would be located in the street. These changes are typical of construction projects in Manhattan.

Table 1.4-1
Most Notable Significant or Temporary Adverse Construction Impacts
Water Main Connection Routes

Issue	Water Main Connection Route		
	First Avenue	Sutton Place	E. 59th Street/E. 61st Street
Land Use and Community Facilities, Zoning and Public Policy	—	—	—
Open Space	—	—	—
Socioeconomics	—	—	—
Historic Resources	—	—	—
Urban Design and Visual Resources	Potential temporary adverse urban design impact from possible loss of street trees	Potential temporary adverse urban design impact from possible loss of street trees	Potential temporary adverse urban design impact from possible loss of street trees
Neighborhood Character	—	—	—
Infrastructure and Energy	—	—	—
Traffic and Parking	Potential temporary adverse traffic impacts	Potential temporary adverse traffic impacts	Potential temporary adverse traffic impacts
Transit and Pedestrians	—	—	—
Air Quality	—	—	—
Noise	Potential temporary adverse noise impacts	Potential temporary adverse noise impacts	Potential temporary adverse impacts
Vibration	—	—	—
Hazardous Materials	—	—	—
Public Health	—	—	—

Every effort would be made to protect and maintain street trees before and during construction. However, it is possible that several street trees along the water main routes would be removed. For street segments that would involve use of a 2-foot-wide strip of sidewalk, all street trees and street furniture (e.g., fire hydrants, bus shelters, street lights, traffic signals, walk/don't walk signs, etc.) located within the affected sidewalk areas may be removed during construction. In addition, it is also possible that some additional street trees would be lost in locations where no sidewalk work is proposed, because of the excavation activities close to those trees.

It is currently anticipated that sidewalk areas that could be affected would include the following:

- First Avenue route, Base Scenario: North side of E. 55th and E. 56th Streets for all Shaft Sites; E. 59th Street/Second Avenue Shaft Site could also affect the south side of E. 59th Street and a traffic island on the north side of E. 59th Street; E. 61st Street Shaft Site could also affect the north side of E. 61st Street from the site to First Avenue.
- First Avenue route, Scenario A: In addition to the sidewalk areas affected in the Base Scenario, this route would add the east side of First Avenue between E. 59th and E. 55th Streets; for the E. 61st Street Shaft Site, it would also add the east side of First Avenue between E. 61st and E. 59th Streets.
- Sutton Place route: Same as the areas affected for the First Avenue route, Base Scenario, but with additional blocks on E. 55th and E. 56th Streets between Sutton Place and First Avenue and with the north side of E. 59th Street between Sutton Place and First Avenue.

- E. 59th Street/E. 61st Street route: South side of E. 59th Street from First to Third Avenue and small traffic island on north side of E. 59th Street.

The numbers of street trees located in the sidewalk areas that could potentially be affected are listed in Table 1.4-2. As shown in the table, for a given water main connection route, the E. 59th Street/Second Avenue Shaft Site would have the potential to affect the greatest number of trees and the water main connections from the E. 54th Street/Second Avenue Shaft Site could potentially affect by far the fewest (although, as noted above, up to 11 street trees would also have to be removed at the construction zone for this site). For water main connections from the E. 59th Street/Second Avenue site, a potential traffic detour for eastbound traffic could require removal of three trees in a traffic island that is considered to be part of the area known as "14 Honey Locusts Park." Among the water main connection routes, the E. 59th Street/E. 61st Street route and the route from the E. 54th Street/Second Avenue site could potentially affect the fewest trees (not including the 11 trees at the E. 54th Street/Second Avenue Site).

Table 1.4-2
Number of Street Trees Potentially Affected
Water Main Connection Routes for Shaft Sites

Water Main Route	Shaft Site			
	Preferred	E. 59th St/ Second Ave	E. 61st St	E. 54th St/ Second Ave
First Avenue Route				
Base Scenario	56	70	59	28
Scenario A	77	91	88	NA
Sutton Place Route	94	108	97	NA
E. 59th St./E. 61st St. Route	29	29	29	NA

Note: The water main connection route from the E. 54th Street site is considered to be the "First Avenue route" for purposes of this table.

Where possible along the water main routes, the NYCDDC would replace any removed street trees in accordance with the requirements of NYCDPR, which administers the street tree program in New York City. The replacement trees would in most cases be smaller than the trees that were lost. The potential elimination of mature street trees, in the numbers described, would have a temporary adverse impact on urban design that would be offset by additional tree planting in the community. The elimination of these trees is not considered to be a significant impact because the urban design and visual resources characteristic of this area is not defined by this element.

Traffic

The temporary adverse traffic impacts predicted for the reasonable worst-case First Avenue route and the two additional representative routes, Sutton Place route and E. 59th Street/E. 61st Street route, are described below. This analysis considered the effects of construction based on a potential staging plan developed for water main connections, consisting of 13 different segments.

On north- and southbound avenues, these segments typically include two non-adjacent City blocks or one or two street intersections. Segments on east- and westbound cross streets typically include only one block at a time, with intersections constructed separately.

For the First Avenue route, up to four intersections would experience temporary adverse traffic impacts while a particular segment is under construction. The resulting increases in projected delays are expected to severely impact the overall traffic flow along First Avenue. With this condition persisting for most of the day, many of the approximately 40,000 daily motorists who travel on First Avenue in the area of the Queensboro Bridge would experience substantial increases in travel time. Based on the current construction schedule, these impacts would occur over a period of about 100 weeks. For approximately the first 75 weeks when First Avenue would be under construction, predicted queues would extend several blocks upstream beyond the construction zones.

In addition to the potential temporary adverse impacts predicted using standard traffic impact methodology, additional traffic congestion from longer queue lengths and therefore increased travel time along First Avenue and adjacent cross streets could occur, such that queues could potentially extend beyond what the analysis has projected. Queues currently form on First Avenue regularly for varying lengths throughout the day approaching the Queensboro Bridge. Generally, these queues occur during the AM, midday, and PM peak periods, with conditions during the PM peak period being the most congested because commuter demands along First Avenue en route to Queens are typically the highest in the afternoon.

Currently, traffic queues on First Avenue at times extend to the area of the First Avenue tunnel (located between E. 41st and E. 48th Streets). It is possible, with the potential water main connections, that these queue lengths would grow by up to 5 blocks beyond the queue lengths projected for the No Build conditions, which are based on the Highway Capacity Software[2] (HCS) analysis outputs of average queue lengths. During other periods of the day or when peak hour congestion is less pronounced, it is still likely that queue lengths would be notably longer due to the potential water main connections' reduction of capacity on First Avenue from the construction of the water main connections. As discussed above, this traffic disruption is expected to have a duration of approximately 75 weeks.

Under sustained congestion and queuing, it is possible that traffic upstream from the bottleneck would divert to other travel routes, such as the FDR Drive and other access routes leading to northbound roadways. The effects and anticipated magnitude of such diversions, after incorporating conceptual mitigation and other traffic attenuating measures likely to be employed in the future to impacted locations, were evaluated and summarized below. With regard to the use of curb lanes for parking or deliveries, up to 20 spaces would be displaced during the

[2] The traffic analysis for the project was conducted following the methodology presented in the 2000 Highway Capacity Manual (HCM) using the *Highway Capacity Software (HCS) Version 4.1e*. The HCS methodology expresses the quality of traffic flow in terms of Level of Service (LOS), which is based on the amount of delay that a driver typically experiences at an intersection. The data outputs from the model were also used to estimate queue lengths during construction.

construction of avenue segments, while up to 25 spaces would be displaced during each 200-foot-long section of construction along the crosstown streets.

For the Sutton Place route, up to two intersections would experience temporary adverse impacts during the construction of each water main connection construction segment. The resulting increases in projected delays are expected to severely impact the overall traffic flow along Sutton Place, where average weekday daily traffic levels are approximately 10,000 vehicles northbound and 13,000 vehicles southbound. With congestion persisting for most of the day, many of these motorists would experience substantial increases in travel time. The total duration over which temporary construction impacts would occur is estimated to be about 115 weeks. For approximately the first 70 weeks, when E. 59th Street and Sutton Place would be under construction, predicted queues would extend several blocks along York Avenue/Sutton Place. Since Sutton Place is less of a through or feeder route than First Avenue, potential diversion of traffic away from the construction zone to other parallel routes is less likely. With regard to the use of curb lanes for parking or deliveries, up to 10 spaces would be displaced during the construction of the E. 59th Street segment, up to 20 spaces each would be displaced during the construction of Sutton Place segments, and up to 25 spaces would be displaced during each 200-section of construction along the other crosstown streets.

For the E. 59th Street/E. 61st Street route, up to two intersections would experience temporary adverse impacts during the construction of a water main connections construction segment. These impacts are expected to occur over a duration of just over 120 weeks, which is nearly the entire 31-month period of construction. For just approximately 50 weeks when E. 61st Street between Marginal Street and Third Avenue and E. 59th Street between Second and Third Avenues would be under construction, predicted queues would extend several blocks upstream beyond the respective construction zones. Because E. 59th Street between Second and Third Avenues is a major access to the Queensboro Bridge and E. 61st Street connects directly with the FDR Drive, disruptions on these roadways could result in area-wide traffic diversions and congestion at other nearby locations. Since conventional mitigation measures are not likely to alleviate the projected traffic impacts, conceptual traffic management strategies involving potential detour routes were developed. With regard to the use of curb lanes for parking or deliveries, up to 10 spaces would be displaced along each block of First Avenue. The construction of E. 59th Street between First and Second Avenues would also result in the displacement of up to 10 spaces. For E 61st Street, up to 25 spaces at a time would be displaced, and for E. 59th Street, up to 15 spaces at a time would be displaced.

Table 1.4-3 provides a representative summary of the maximum durations for which temporary adverse traffic impacts, traffic queuing, and potential traffic diversions could occur under the Build conditions for each of the water main connection routes analyzed. While adverse traffic impacts were identified for all three connection routes, and extensive queuing and potential traffic diversions were identified for substantial portions of the First Avenue and the E. 59th Street/E. 61st Street routes, these conditions would be temporary and not persist beyond the respective construction periods. Therefore, construction of the water main connection would not result in potential significant adverse traffic impacts.

Table 1.4-3
Water Main Connections to Preferred Shaft Site
Summary of Temporary Adverse Traffic Impacts

Study Area Intersections	First Avenue Route												Sutton Place Route													E. 59th Street/E. 61st Street Route											
	Impacted			Estimated Duration (weeks)									Impacted			Estimated Duration (weeks)											Impacted			Estimated Duration (weeks)									
	AM	MD	PM	Tot	20	40	60	80	100	120			AM	MD	PM	Tot	20	40	60	80	100	120	140	160			AM	MD	PM	Tot	20	40	60	80	100	120	140	
York Ave. & E. 60th St.													◆		◆	36	▪▪▪▪▪▪▪▪▪																					
York Ave. & E. 59th St.														◆		34		▪▪▪▪▪▪▪▪▪																				
Sutton Pl. & E. 58th St.														◆	◆	22			▪▪▪▪▪▪																			
Sutton Pl. & E. 57th St.																																						
Sutton Pl. & E. 56th St.																																						
Sutton Pl. & E. 55th St.																																						
First Ave. & E. 61st St.																											◆			12			▪▪▪					
First Ave. & E. 60th St.																																						
First Ave. & E. 59th St.	◆	◆		44	▪▪▪▪▪					▪▪▪▪▪▪				◆	◆	48	▪▪▪▪▪▪▪							▪▪▪▪▪▪					◆	60	▪▪▪▪▪▪▪▪				▪▪▪▪▪▪▪▪		
First Ave. & E. 58th St.		◆		66	▪▪▪▪▪▪▪▪▪▪▪					▪▪▪▪▪▪						24								▪▪▪▪▪▪														
First Ave. & E. 57th St.	◆	◆	◆	76	▪▪▪▪▪▪▪▪▪▪▪▪▪					▪▪▪▪▪▪						24								▪▪▪▪▪▪														
First Ave. & E. 56th St.		◆		22		▪▪▪▪▪▪																																
First Ave. & E. 55th St.		◆		22		▪▪▪▪▪▪																																
Second Ave. & E. 61st St.																											◆	◆	◆	16				▪▪▪▪				
Second Ave. & E. 59th St.																											◆	◆	◆	22								▪▪▪▪▪▪
Second Ave. & E. 57th St.																																						
Second Ave. & E. 56th St.	◆	◆	◆	22				▪▪▪▪▪▪					◆	◆	◆	22						▪▪▪▪▪▪																	
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Third Ave. & E. 59th St.																											◆	◆	◆	22								▪▪▪▪▪▪
Third Ave. & E. 56th St.																																						
Third Ave. & E. 55th St.																																						
Potential Residual Queuing																																						
First Ave. south of E. 55th St.				76	▪▪▪▪▪▪▪▪▪▪▪▪▪					▪▪▪▪▪▪						24								▪▪▪▪▪▪														
York Ave. north of E. 59th St.																24	▪▪▪▪▪▪																					
Sutton Pl. south of E. 59th St.																44		▪▪▪▪▪▪▪▪▪▪▪▪																				
E. 61st St. east of Third Ave.																														28				▪▪▪▪▪▪▪				
E. 59th St. west of Second Ave.																														22								▪▪▪▪▪▪
Third Ave. south of E. 59th St.																														22								▪▪▪▪▪▪
Potential Traffic Diversions				76	▪▪▪▪▪▪▪▪▪▪▪▪▪					▪▪▪▪▪▪						24								▪▪▪▪▪▪						50				▪▪▪▪▪▪▪			▪▪▪▪▪▪

Note: The above reflects the maximum durations of potential traffic impacts during construction. Since intersection work could be conducted during off-peak hours at smaller construction zones and mid-block work would be at up to 200 feet at a time, the likely disruptions from connecting the water mains via the three potential routes analyzed are expected to be considerably shorter in duration. Sutton Place route durations beyond the first 92 weeks of construction represent continuing construction along the First Avenue route.

Mitigation

As presented above, construction-related temporary adverse traffic impacts were identified for numerous Study Area locations for the reasonable worst-case First Avenue route and the other two representative routes, Sutton Place route and E. 59th Street/E. 61st Street route. It is expected that construction efforts would be coordinated with NYCDOT OCMC and incorporate conventional mitigation and more aggressive measures as an overall effort to attenuate conditions for traffic flow at critical locations. The EIS identifies conventional mitigation measures that could be implemented to reduce congestion at impacted locations. Where the temporary adverse traffic impacts could not be fully mitigated with these measures, conceptual traffic management strategies that could further alleviate traffic congestion during the construction of the water main connections were also explored.

First Avenue Route

Construction of the water main connections along the reasonable worst-case First Avenue route would result in temporary adverse traffic impacts along First Avenue at all intersections between E. 55th and E. 59th Streets during construction of certain water main segments. There would also be temporary adverse traffic impacts on the eastbound approach of E. 56th Street at Second Avenue during one segment of construction. The conventional mitigation measures used to address these impacts consist of extending the curbside restrictions on the west side of First Avenue and incorporating signal timing changes at Second Avenue and E. 56th Street.

Mitigation Assessment Summary

While the provision of an extra travel lane by imposing more stringent curbside restrictions on First Avenue during the AM and midday peak periods would, after accounting for traffic diversions, reduce temporary adverse impacts at many of the affected intersections, unmitigated impacts lasting several months would persist at the E. 57th Street intersection during the AM and midday peak periods and at the E. 59th Street intersection during the AM peak period. Furthermore, with no mitigation measures imposed for the PM peak period, the temporary adverse impacts at First Avenue and E. 57th Street would also remain unmitigated. The agencies, including NYCDEP, NYCDDC, and NYCDOT, would coordinate during construction to determine the appropriate actions to further alleviate congestion and improve traffic flow beyond the conditions described above. Some more aggressive traffic attenuating measures that may be considered as part of a comprehensive traffic management plan are discussed below.

Conceptual Traffic Management Strategies

The use of traffic enforcement agents (TEAs) to facilitate more efficient traffic flow is commonly applied at congested locations in New York City. Along First Avenue, TEA presence is currently evident at its intersections with E. 57th and E. 59th Streets during peak periods. Increasing additional TEA presence at these locations and at intersections upstream from the immediate access/egress links of the Queensboro Bridge (i.e., at E. 54th, E. 55th, and E. 56th Streets) could further improve traffic flow and reduce the potential for gridlock conditions at congested intersections. In the mitigation analysis, parking restrictions on the west curb lane of

First Avenue were considered to be only partially effective in providing an additional travel lane (i.e., the analysis conservatively assumes the lane would only be available 25 percent of the time). This is due to the nature of the curbside activity on First Avenue, which is characterized by commercial loading/unloading and short-term parking for commercial activity. A more aggressive measure may be to impose more stringent enforcement on the west curb lane restriction on First Avenue during construction. Through prompt ticketing and even towing of violators, blockages on the west curb lane could become less frequent, thereby increasing the effectiveness of the mitigation measure and potentially achieving a higher throughput capacity than the 25 percent assumed for this lane. Installing appropriate signage, including fixed and possibly variable message signs, well in advance of the construction zone (i.e., at E. 42nd Street and south of the First Avenue tunnel) would provide motorists the opportunity to make informed decisions on what travel routes to take. Making frequent public announcements of conditions during construction could also further the choice-making of motorists and reduce the traffic demand on First Avenue.

Sutton Place Route

Construction of the water main connections along the Sutton Place route would result in temporary adverse traffic impacts at the First Avenue intersection with E. 59th Street and at the Sutton Place intersections at E. 57th, E. 58th, and E. 59th Streets. Since the Sutton Place route joins the First Avenue route at First Avenue to continue west along E. 55th and E. 56th Streets, the impacts identified above for the First Avenue route would also occur. The conventional mitigation measures used to address these impacts consist of imposing curbside restrictions on the east side of Sutton Place and incorporating signal timing changes at several Study Area intersections.

Mitigation Assessment Summary

While the mitigation measures identified would reduce temporary adverse impacts at most of the affected intersections, unmitigated impacts would persist at First Avenue and E. 59th Street in the PM peak hour until the E. 59th Street segment construction is complete and two-way traffic is restored between First Avenue and Sutton Place/York Avenue. At Sutton Place and E. 57th Street, the temporary adverse impacts identified for the midday peak hour during construction at this location would remain unmitigated. With construction along E. 59th Street staged in 200-foot-long intervals at a time, the projected temporary adverse impacts at adjacent intersections are likely to be less severe and mitigation measures would not likely to be required for the entire duration of the segment's construction. For southbound Sutton Place at E. 57th Street, the unmitigated impacts would persist for the duration of construction at this location. Although conventional mitigation measures would not be appropriate at this location due to substantial traffic volumes in competing approaches, it would be viable for a TEA to facilitate more efficient traffic flow. To mitigate the temporary southbound impact during the midday peak period, a second southbound lane is needed. While it would be infeasible to create a lane shift via restriping for this additional southbound lane, similar operational results could be achieved with using traffic cones to expand the available width on the southbound roadway while adjacent construction in under way. When the construction zone would be narrowed after the midday

peak period, the "manual" shifting of lane channelization could be terminated at the discretion of the TEA stationed at the intersection. As discussed, the agencies, including NYCDEP, NYCDDC, and NYCDOT, would coordinate during construction to determine the appropriate actions to further alleviate congestion and improve traffic flow beyond the conditions described above.

E. 59th Street/E. 61st Street Route

Construction of the water main connections along the E. 59th Street/E. 61st Street route would result in temporary adverse traffic impacts at the First Avenue intersections with E. 59th and E. 61st Streets, the Second Avenue intersections with E. 59th and E. 61st Streets, and at the Third Avenue intersections with E. 59th and E. 61st Streets. The conventional mitigation measures used to address these impacts consist of only incorporating signal timing changes at the First Avenue intersections with E. 59th and E. 61st Streets.

Mitigation Assessment Summary

Construction of the water main connections along the E. 59th Street/ E. 61st Street route would result in temporary adverse traffic impacts that could not be mitigated with conventional mitigation measures. While projected impacts at the First Avenue intersections with E. 59th and E. 61st Streets could be mitigated with adjustments to signal timing, unmitigable impacts predicted for the E. 61st Street corridor from First Avenue to Third Avenue and for the E. 59th Street block from Third Avenue to Second Avenue have the potential to cause noticeable queuing and traffic diversions. As discussed, the agencies, including NYCDEP, NYCDDC, and NYCDOT would coordinate during construction to determine the appropriate actions to further alleviate congestion and improve traffic flow. Some more aggressive traffic attenuating measures that may be considered as part of a comprehensive traffic management plan are discussed below.

Conceptual Traffic Management Strategies

As discussed earlier, the construction efforts would be conducted in coordination with NYCDOT OCMC, which requires the preparation of maintenance and protection of traffic (MPT) plans to address potential traffic impacts, such as those resulting from capacity reductions during construction on the heavily traveled cross-town routes of E. 59th and E. 61st Streets. Currently, two or three traffic lanes are available at the approaches of these streets at Second and Third Avenues, and the reduction to a single lane on these approaches would result in delays and queues that are beyond what conventional mitigation techniques could alleviate.

To address the unmitigated construction-related impacts, while temporary, on these cross-town streets during the construction of certain segments, a comprehensive traffic management plan considering various options would need to be formulated. This plan, which may identify potential diversion routes and coordinate traffic controls at key locations, would need to be managed within a more sizeable area beyond only the E. 59th and E. 61st Street corridors to further attenuate traffic flow at critical locations. The potential elements of such a plan are likely to be similar to those described previously for the First Avenue route and could include the following:

- Identify alternate westbound routes for traffic exiting the northbound FDR Drive at E. 61st Street, which may include E. 57th, E. 63rd, E. 66th, and E. 72nd Streets;
- Identify alternate routes to the Queensboro Bridge for eastbound traffic on E. 59th Street, which may include E. 57th and E. 58th Streets, First Avenue, and Second Avenue;
- Implement "Buses Only" traffic restrictions on Marginal Street between the Queensboro Bridge and E. 61st Street during construction on the segments that include First Avenue between E. 57th and E. 58th Streets, First Avenue between E. 55th and E. 56th Streets, and E. 56th Street from First to Second Avenue;
- Recommend temporary capacity improvement measures to accommodate additional traffic volumes on designated detour routes, which may include additional restrictions of curbside usage, daylighting of intersection approaches, modifying signal timing, and creating channelization for enhanced traffic flow; and
- Provide appropriate signage, frequent public announcements, TEAs, and traffic enforcement, where necessary, to facilitate effective traffic detours.

Noise

During water main construction, based on the range of analysis conducted, there is the potential for temporary and transient adverse impacts to sensitive receptors along the potential water main connection routes. These impacts would range from marginally perceptible to, at times, highly intrusive. As described above, depending on the location, impacts to potential sensitive receptors could have an estimated duration of approximately 32 to 34 weeks. In addition, during certain construction steps, marginally to readily noticeable noise impacts could spill over to adjacent blocks, extending the period of exposure.

On any given block or construction segment, the duration of impacts to affected receptors would be similar for the three routes. However, because the overall length of each route differs substantially, there would be substantial differences in the geographic area affected for the potential three routes. The geographic area affected along the E. 59th Street/E. 61st Street route from the preferred Shaft Site, the E. 59th Street/Second Avenue Shaft Site, and the E. 61st Street Shaft Site, as well as the water main route from the E. 54th Street/Second Avenue Shaft Site, would affect fewer sensitive receptors than the longer routes along First Avenue and Sutton Place.

NYCDEP will work with NYCDDC, who will be responsible for the water main construction work, to implement measures to minimize potential noise impacts. These measures could include use of newer equipment, mufflers and silencers, housings or enclosures for noise producing equipment, possible prohibition of the use of air or gasoline driven saws and similar equipment, and implementation of a noise monitoring program.

The water main construction would occur segment by segment and would not impact receptors along any given block for an extended period. Due to the short-term duration that potential adverse impacts could occur, these impacts are considered to be temporary adverse impacts. For conclusions of significance related to the combined effects of the Shaft Site construction, water

main connection construction, and venturi chamber construction, see the noise sections for each of the potential Shaft Sites.

Overall, the effects from water main construction are not unlike the effects from other major construction in Manhattan that involves the use of heavy construction in close proximity to sensitive receptors. The potential increases in noise levels are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed. Therefore, it is not anticipated that water main construction would result in the potential for significant adverse noise impacts during construction.

1.5 SUMMARY OF OTHER ALTERNATIVES

1.5.1 No Action Alternative

The No Action Alternative assumes that no shaft and no new water mains (either the potential connections to Shaft 33B or as conceptualized for the Water Main Only Alternative) are constructed. In the event that the proposed Shaft 33B were not constructed, the City Tunnel No. 3, Stage 2 Manhattan Leg west-east tunnel spur would terminate at Shaft 32B near E. 35th Street.

The No Action Alternative would not result in any potential significant or temporary adverse impacts. However, NYCDEP would not pursue the No Action Alternative because it would leave a large and densely populated area of Manhattan without sufficient water distribution mechanisms when City Tunnel No. 1 is taken off-line for inspection and rehabilitation.

1.5.2 Water Main Only Alternative

Under the Water Main Only Alternative, Shaft 33B would not be built. Instead, two 48-inch water mains from Shaft 14B on York Avenue between E. 77th and E. 78th Streets to Shaft 32B near E. 35th Street and Second Avenue would need to be constructed. A conceptual route for the water mains has been developed for evaluation purposes. This route would begin near E. 77th Street and York Avenue and run west to First Avenue, then run down First Avenue. The route would then cross from First Avenue to Second Avenue at E. 56th and E. 55th Streets and then run down Second Avenue until reaching Shaft 32B, located near E. 35th Street.

There would be no potential significant adverse impacts on land use, community facilities, zoning, or public policies; open space; socioeconomic conditions; historic resources; urban design; neighborhood character; infrastructure and energy; parking; transit and pedestrians; air quality; vibration; hazardous materials; and public health. However, the Water Main Only Alternative would result in temporary adverse impacts on urban design and noise and significant adverse traffic impacts.

Urban Design and Visual Resources

Construction of a 42-block-long water main has the potential to affect many trees along the route. While every effort would be made to maintain and protect the trees along the route, the potential elimination of mature street trees would have a temporary adverse impact on urban design that would be offset by additional tree planting in the community. The elimination of street trees is not considered to be a significant impact because the urban design and visual resources characteristic of this area is not defined by this element. For the Water Main Only Alternative, a great number of trees could potentially be affected given the length of the water main construction work.

Traffic

Construction of the Water Main Only Alternative would result in extensive traffic impacts between E. 35th and E. 77th Streets as construction progressed along the potential route. These impacts, although transient, would represent a reduction in capacity at First and Second Avenue intersections that could also result in spillbacks and queuing along these important north-south corridors. Capacity reduction on the avenues would increase delays along the corridors and adversely impact a number of intersections in one or more peak hours for several years. Since these adverse impacts would be expected to persist along and adjacent to key traffic corridors on the Water Main Only route for much of the entire five- to seven-year construction period, this alternative would result in significant adverse traffic impacts.

Noise

During the construction of the Water Main Only Alternative, there is the potential for temporary and transient adverse impacts to sensitive receptors along the potential water main connection routes. These impacts would range from marginally perceptible to, at times, highly intrusive. Impacts to potential sensitive receptors could have an estimated duration of approximately 32 to 34 weeks or longer. Because the overall length of the Water Main Only route covers a substantial geographic area, a great number of sensitive receptors would be affected.

NYCDEP would work with NYCDDC, who would be responsible for the water main construction work, to implement measures to minimize potential noise impacts. These measures could include use of newer equipment, mufflers and silencers, housings or enclosures for noise producing equipment, possible prohibition of the use of air- or gasoline-driven saws and similar equipment, and implementation of a noise monitoring program.

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