

CHAPTER 11: COMPARISON OF ALTERNATIVES

11.1 INTRODUCTION

To aid in the decision-making process for Shaft 33B, this Chapter provides a guide for comparison of the alternatives included in the EIS. The first Section (Section 11.2) compares the preferred Shaft Site and three feasible alternative Shaft Sites with respect to their initial site characteristics and engineering considerations. As part of this comparison, a summary of the construction time for the water main connections to the four Shaft Sites is also presented. Following this, a comparison of the potential significant or temporary adverse impacts and unique environmental issues for each Shaft Site is provided in Section 11.3. Since the Water Main Only Alternative is substantially different than the Shaft Site with water main connections alternatives, the last Section of this Chapter (Section 11.4) summarizes the distinctions between the Water Main Only Alternative and the Shaft Site with water main connections. Chapter 10, “No Action Alternative” provides the comparison of the No Action Alternative to these other alternatives, and this information is not repeated in this Chapter.

11.2 CHARACTERISTICS AND ENGINEERING ISSUES

11.2.1 Shaft Sites

As discussed in Chapter 2, “Purpose and Need and Project Overview,” 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 prior to preparation of the Draft EIS:

- 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 and Shaft 26B instead of from Shaft 33B (i.e., raise bore method is preferable to surface excavation).

In addition to the criteria outlined above, there are additional engineering/site constraint issues that NYCDEP is considering before making a final selection of the Shaft Site. For example, as explained in Chapter 2, 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 should have enough space to house two riser pipes to bring water from City Tunnel No. 3 to the surface. Having two risers is particularly important at Shaft 33B, which is at the terminus of Stage 2, Manhattan Leg, of City Tunnel No. 3. With two riser pipes, water can continue to flow through this segment of City Tunnel No. 3 and the shaft if one of those pipes or one of the connecting water mains is taken out of service for repair or maintenance. With a single riser, if Shaft 33B is shut down for maintenance, water would become stagnant in the portion of the Tunnel north of the nearest upstream shaft, Shaft 32B near E. 35th Street, necessitating lengthy and complex procedures to disinfect and reactivate this whole Tunnel segment once the riser is repaired. With two risers, regular maintenance can be performed more effectively on the valves and equipment at Shaft 33B. The other terminal shaft in Manhattan, Shaft 31B, will also have two risers, for the same reasons. 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 Middle Intermediate Pressure Zone (MIPZ) and Northern Intermediate Pressure Zone (NIPZ).

In addition to the number of risers that can be accommodated on the sites, the ability to complete construction on time to activate the last stage of City Tunnel No. 3 in Manhattan is also a critical parameter for the final Shaft Site selection.

Table 11.2-1 presents a comparison of the site characteristics and engineering and construction issues for the four feasible sites for Shaft 33B—the preferred Shaft Site, the E. 59th Street/Second Avenue Shaft Site, the E. 61st Street Shaft Site, and the E. 54th Street/Second Avenue Shaft Site. These issues are summarized below.

Preferred Shaft Site

The entire preferred Shaft 33B Site is City-owned and is mapped as street (sidewalk) on City maps. No site acquisition would be required. The site is under the jurisdiction of the New York City Department of Transportation (NYCDOT). The distance from the site to the nearest sensitive use or “receptor” is 77 feet. The minimum site requirements for construction of Shaft 33B would be satisfied with this site. Two risers would be constructed at the preferred Shaft Site, satisfying one of NYCDEP’s critical goals for Shaft 33B.

No major utility relocations would be required at the preferred Shaft Site. Moreover, the site has a regular shape and street access on two sides, which would allow for efficient construction layout. Two possible site layouts during construction were considered at the preferred Shaft Site—the “base configuration” and the larger “alternate site configuration.” 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

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Table 11.2-1
Site Characteristics and Engineering Issues

Issue	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th St/ Second Ave
Property Owner/Type	City-owned mapped street	City-owned mapped street	Archdiocese of New York (private lot)	City-owned mapped street (construction easement through private property may required)
Site Size (square feet)	7,200-10,400	15,000	9,000	8,500
Site Shape	Regular	Slightly irregular	Regular	Irregular (L shaped)
Number of Risers	2	1	2	1
Major Utility Disruption	None	Relocate one Con Edison oil-o-static line	None	None
Distance to Nearest Sensitive Use	77 feet	86 feet	38 feet	11 feet
Other Construction Issues	Requires use of multi-use area during Stages 2 & 3 and coordination with NYCDOT and DSNY	Relocation of Con Edison oil-o-static line	Requires land acquisition	Requires removal of enclosed sidewalk cafe, potential temporary easement through private property for temporary sidewalk; disruption to construction for garage access
Construction Technique	Raise Bore	Surface excavation potentially required	Surface excavation potentially required	Surface excavation potentially required
Shaft Construction Duration (Raise Bore)	52 months (including 8-month contracting & equipment procurement period)	52 months (including 8-month contracting & equipment procurement period)	52 months (including 8-month contracting & equipment procurement period)	61 months (including 8-month contracting & equipment procurement period)
Shaft Construction Duration (Surface Excavation)	NA	65 months (including 8-month contracting & equipment procurement period)	65 months (including 8-month contracting & equipment procurement period)	70 months (including 8-month contracting & equipment procurement period)
Estimated Shaft Completion	June 2010	April 2011 (raise bore); May 2012 (surface excavation)	April 2011 (raise bore); May 2012 (surface excavation)	September 2011 (raise bore); June 2012 (surface excavation)

publicly owned parcel commonly referred to as “14 Honey Locusts Park” that is jointly used by NYCDOT as a Queensboro Bridge (Bridge) access area and by the public who generally use it for open space activities. Construction would be via the “raise bore” technique, in which the shaft is excavated from City Tunnel No. 3 below, with excavated materials removed via the Tunnel. The estimated construction completion date for the preferred Shaft Site is June 2010.

E. 59th Street/Second Avenue Shaft Site

Like the preferred Shaft Site, the E. 59th Street/Second Avenue Shaft Site is City-owned and is mapped street on City maps. No site acquisition would be required for this alternative Shaft Site. The distance from the site to the nearest sensitive receptor is 86 feet, which is slightly more desirable than the distance to the nearest receptor from the preferred Shaft Site (77 feet). The minimum site requirements for construction of Shaft 33B would be satisfied with this site. The shape, however, is less regular than the preferred Shaft Site and would therefore not afford the contractor with a layout as efficient as that for the preferred Shaft Site. Because of the narrow width of the distribution chamber at this site, which would be constrained by the presence of existing Con Edison oil-o-static lines beneath the adjacent streetbed, only one riser could be constructed at the E. 59th Street/Second Avenue Shaft Site. With only one riser, construction of Shaft 33B at this site would therefore mean that one of NYCDEP’s critical goals for Shaft 33B would not be accomplished.

One of the Con Edison oil-o-static lines beneath E. 59th Street at the site would have to be relocated prior to construction at the E. 59th Street/Second Avenue Shaft Site. This major utility relocation would likely delay commencement of construction by 10 months to one year. In addition, this may mean that City Tunnel No. 3 would not be used for removal of excavated materials from Shaft 33B during construction. In that event, the shaft would have to be constructed from the surface (“surface excavation”) rather than from the Tunnel below, further extending the construction duration. Depending on the construction technique used, the approximate construction completion date at this alternative Shaft Site may be between April 2011 and May 2012, which would be 10 to 23 months later than the preferred Shaft Site.

E. 61st Street Shaft Site

Unlike the preferred Shaft Site, the E. 61st Street Shaft Site is not City-owned. The parcel is owned by the Archdiocese of New York, who is planning to develop this site with a residential structure. Before construction of Shaft 33B could commence at this location, this site would need to be acquired from the Archdiocese of New York. The process of negotiation and public review for site selection and acquisition of private property has been estimated at 10 months. The distance from the site to the nearest sensitive receptor is 38 feet, which is less desirable than the distance to the nearest receptor from the preferred Shaft Site (77 feet). The minimum site requirements for construction of Shaft 33B would be satisfied with the E. 61st Street Shaft Site. While the regular shape of the site is favorable, vehicular access is available only along one side. Two risers would be constructed at the E. 61st Street Shaft Site, satisfying one of NYCDEP’s critical goals for Shaft 33B.

The site acquisition would likely delay commencement of construction approximately 10 months. This may mean that City Tunnel No. 3 would not be used for removal of excavated materials from Shaft 33B during construction. In that event, the shaft would have to be constructed using surface excavation rather than from the Tunnel below, further extending the construction duration. Depending on the construction technique used, the approximate construction completion date for this alternative Shaft Site may be between April 2011 and May 2012, which would be 10 to 23 months later than the preferred Shaft Site.

E. 54th Street/Second Avenue Shaft Site

Like the preferred Shaft Site, the E. 54th Street/Second Avenue Shaft Site is City-owned and is shown on City maps as street and sidewalk. No site acquisition would be required for this alternative Shaft Site, although a temporary construction easement across private property might be required to allow provision of street and sidewalk widths adjacent to the construction area that meet the Fire Department of New York's (FDNY) access requirements for this site. The distance from the site to the nearest sensitive receptor is 11 feet, substantially closer than at any of the other three feasible Shaft Sites. The minimum site requirements for construction of Shaft 33B would be satisfied with this site. Because of this site's irregular shape and the access zones that must be left clear within the site, however, this site would not afford the contractor with a layout as efficient as that for the preferred Shaft Site. Because of the narrow width of the site, only one riser could be constructed at the E. 54th Street/Second Avenue Shaft Site. With only one riser, construction of Shaft 33B at this site would mean one of NYCDEP's critical goals for Shaft 33B would not be accomplished.

Removal of a sidewalk café that extends into the City sidewalk at the construction site would need to begin prior to construction at this site. This would likely delay commencement of shaft construction several months. In addition, the site's proximity to the nearest buildings would mean that alternate construction techniques would have to be used for excavation of the upper portions of the shaft, substantially extending the construction duration for this site compared to the others. This may mean that City Tunnel No. 3 would not be used for removal of excavated materials from Shaft 33B during construction. In that event, the shaft would have to be constructed using surface excavation rather than from the Tunnel below, further extending the construction duration. Depending on the construction technique used, the approximate construction completion date may be between September 2011 and June 2012, which would be 15 to 24 months later than the preferred Shaft Site.

11.2.2 Duration of Construction for Water Main Connection Routes

While the water main route is not being finalized at this time, NYCDEP is taking into consideration the potential environmental impacts of future water main connections in the final evaluation of Shaft Sites. This construction is critical to the operation of Shaft 33B. Duration of construction for the water main connections to the Shaft Site may ultimately affect when Stage 2 of Water Tunnel No. 3 may be activated.

Table 11.2-2 presents a comparison of estimated construction times for the water main connection routes the Shaft Sites that were analyzed in this EIS—(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 Shaft Site (22 months). The estimated construction duration for the First Avenue route (41 to 47 months) and Sutton Place route (51 to 57 months) would be longer.

Table 11.2-2
Estimated Months of Construction,
Water Main Connection Routes for Shaft Sites

Water Main Route	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th St/ Second Ave
First Avenue Route	41	47	46	22
Sutton Place Route	51	57	56	N/A
E. 59 th Street/E. 61 st 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. 54 th Street/Second Avenue Shaft Site is considered to be the “First Avenue” route for presentation purposes in this table.				

11.3 COMPARISON OF ENVIRONMENTAL IMPACTS

11.3.1 Overview

This Section compares the 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. In addition, issues that may not be significant or temporary adverse impacts but would be notable for a particular Shaft Site are also discussed. Additional summary comparative discussions for the water main connections routes are also provided. Table 11.3-1 highlights these items for the Shaft Sites, and Table 11.3-2 highlights the temporary and potential significant impacts associated with the reasonable worst-case and additional representative water main connection routes.

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Table 11.3-1
Most Notable Significant or Temporary Adverse Construction Impacts,
Potential Shaft Sites

Issue	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th 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 impacts 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. 54 th St. between First Ave. and midblock to Third Ave., and along Second Ave. between E. 53 rd and E. 55 th Sts.
Vibration	—	—	—	—
Hazardous Materials	—	—	—	—
Public Health	—	—	—	—

**Table 11.3-2
Most Notable Significant or Temporary Adverse Construction Impacts,
Water Main Connection Routes**

Issue	Water Main Connection Route		
	First Avenue	Sutton Place	E. 59 th St/E. 61 st St
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	—	—	—

11.3.2 Land Use and Community Facilities, Zoning, and Public Policy

Shaft Sites

At the preferred Shaft Site and the E. 59th Street/Second Avenue Shaft Site, construction would represent a continuation of City construction activity on the affected site, although this use would be more noticeable for Shaft 33B than the NYCDOT Queensboro Bridge staging work for construction occurring on those sites today. At the preferred Shaft Site, NYCDOT operational uses would be displaced for construction, but could be accommodated at other NYCDOT facilities in the vicinity of the Bridge. Once the shaft is complete, NYCDOT operations would not be adversely affected by the presence of the shaft at the site.

At the E. 61st Street Shaft Site, construction and permanent placement of Shaft 33B on the site would preclude the Archdiocese of New York’s planned residential structure for priests. At the E. 54th Street/Second Avenue Shaft Site, use of the site would temporarily convert street lanes and sidewalk areas for construction activity. An enclosed sidewalk café extending from an adjacent building would have to be removed at the Shaft Site, and a temporary easement through a landscaped area in front of a nearby apartment building would have to be acquired to provide a sidewalk area during construction.

At the preferred Shaft Site and the three alternative Shaft Sites, construction of Shaft 33B would at times be disruptive to the surrounding land uses. Disruptions would include increased activity,

noise, and changes to traffic patterns at each site. All four sites are located in predominantly residential neighborhoods, with the nearest residence less than 100 feet away. Among the sites, the preferred Shaft Site is most buffered from nearby sensitive uses by a combination of distance from those uses, the presence of the Queensboro Bridge north of the site, which completely separates it from the area beyond the Bridge, and this site's greater distance to the nearest high-rise residential building. At any of the sites, the use of a construction barrier around the construction site would serve as a buffer between the Shaft Site and surrounding land uses and serve to attenuate some of the noise and separate those residences from the construction activity. At the 54th Street/Second Avenue Shaft Site, this construction barrier could only be 10 feet high, rather than 20 feet at the other sites, and therefore would be less effective as a buffer. In general, the construction activity would at times be disruptive to the nearest land uses, but would not result in potential significant land use impacts. These construction disruptions would not be expected to result in changes to overall development patterns or trends in the surrounding areas, since they would be relatively short term.

However, at the E. 61st Street Shaft Site, potential significant noise impacts would occur to the Manhattan Center for Early Education and Manhattan Center for Early Intervention, adjacent to the alternative Shaft Site, for the duration of the construction period. This facility, which provides day care and pre-school educational functions and therapeutic intervention to families and children with disabilities, depends on a quiet atmosphere during the daytime so that children can learn and receive therapy. Therefore, the noise impact on this facility would result in a significant conflict with this noise-sensitive land use that could interfere with the proper functioning of the land use, and a consequently potential significant adverse land use impact would occur to this facility throughout the construction period.

At all sites, access would be maintained to surrounding land uses at all times. Where construction activity would affect a sidewalk, a narrower sidewalk or temporary pedestrian passageway would be maintained. However, at all four sites there would be temporary disruptions to access during the initial period of blasting on the sites (until a depth of approximately 100 feet below ground surface was reached). Following FDNY requirements, when blasting is occurring (up to two times per day), pedestrian and vehicular activity within approximately 100 to 150 feet of the Shaft Site would be halted. Blast events would likely occur only once or twice a day, with access restrictions enduring for approximately up to five minutes for each blast, in accordance with the whistle warning protocol; however, NYCDEP would seek a waiver from the FDNY to reduce the whistle warning period to one minute. FDNY has indicated that it could issue this waiver.

Construction at any of the Shaft Sites would be consistent with applicable public policies, including Community Board 8's 197-a plan if it is adopted, which proposes a landscaped buffer around the preferred Shaft Site and which endorses a plan by the New York City Department of Parks and Recreation (NYCDPR) to improve the multi-use area. Use of the preferred Shaft Site would delay implementation of the buffer and the NYCDPR improvement until shaft construction is complete, but NYCDEP would restore the multi-use area consistent with the direction of NYCDOT and the community, as applicable.

Water Main Connections

Daytime construction work for the water mains could be disruptive to nearby residences, nearby institutional uses (including the high schools, elementary schools, and nursery schools in the Study Area), and commercial uses. Work in the evenings, at night, and on the weekends would be particularly disruptive to the surrounding residences. In all scenarios, access to residences and businesses would be maintained using a variety of methods throughout the construction process. Vehicular access could be affected for very short periods (typically less than a week) as the water mains are constructed in front of garage entrances and driveways, but would be restored as quickly as possible. Emergency access, pedestrian walkways, and access to building entrances would be maintained at all times. NYCDDC would employ an extensive community outreach program to keep affected businesses, residents, and neighbors informed about upcoming construction activities. Overall, given the temporary nature of the disruption, no potential significant adverse impacts on land use or community facilities are anticipated.

11.3.3 Open Space

Shaft Sites

Construction of Shaft 33B at the preferred Shaft Site would occur immediately adjacent to a space shared by NYCDOT and by the public as an open space. This “multi-use” area, commonly referred to as “14 Honey Locusts Park” is under the jurisdiction of NYCDOT, which uses it for Bridge access and parking, but also is generally used for strolling and dog walking by members of the public. Under either construction configuration at the preferred Shaft Site, a small portion (1,800 square feet) of the multi-use area would be used during two stages of construction for 23 months. This portion of the multi-use area would be enclosed behind the construction barrier and two honey locust trees would be removed from the area. With either the base or alternate site configuration, no potential significant adverse impacts on open space are expected to occur. The temporary use of a small portion of the multi-use area during two stages of construction would not be anticipated to result in potential significant adverse impacts on the multi-use area, given its proximity to a construction site today, its ongoing and current use for both transportation and open space activities, and its lack of basic open space amenities. Access to the multi-use area would be maintained in both configurations, and the presence of construction activity adjacent to the multi-use area during all stages of construction is not anticipated to result in potential significant adverse impacts to the use and enjoyment of the multi-use area, since the multi-use area is already located adjacent to a construction area, lacks basic open space amenities and is subject to high noise levels, and is used primarily by people who spend little time there. Following completion of Stage 3 (in 2008), the directly affected portion of the multi-use area would be restored in accordance with NYCDOT and the community as applicable. This would be consistent with NYCDPR’s plans for restoration of the multi-use area following completion of Bridge construction activities in 2009.

At other open spaces in the immediate area, construction activities would not be as noticeable, because of their distance from the construction site and because of the barrier around the site.

Open spaces in the surrounding area would not be overburdened by the few people who might choose not to use the multi-use area during construction or by the limited numbers of workers at the preferred Shaft Site who might visit open spaces nearby during their breaks. Therefore, no potential significant adverse impacts on open space are expected to occur from construction of Shaft 33B at the preferred Shaft Site.

At the E. 59th Street/Second Avenue and E. 61st Street Shaft Sites, construction activities for Shaft 33B would not result in potential significant adverse impacts to open spaces in the immediate area, because of the distance between those spaces and the construction site and because of the barrier wall around the site.

At the E. 54th Street/Second Avenue Shaft Site, 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 and local residences from nearby Midtown businesses and apartments. 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.

At any of the Shaft Sites, NYCDEP would fund and support NYCDPR re-vegetation and greening efforts in the Study Area; these efforts could include the provision of additional street trees or support for other park or open space improvement initiatives intended to benefit the residents of local communities. NYCDEP would work with NYCDPR and the community to identify desired improvements in the general project area.

Water Main Connections

No water main construction activities are anticipated to occur in open spaces. In general, the noise, dust, and disruption to traffic and pedestrian flows associated with water main construction could temporarily disrupt the use of nearby open spaces for the 10- to 12-week period when work occurs nearby. The construction noise would at times be intrusive and disruptive, resulting in temporary adverse noise impacts. At the open spaces adjacent to the construction zone, the noise and traffic congestion could make the plazas less attractive for open space users, and it is possible that fewer people would choose to use these spaces during the construction period. Construction work would be adjacent to a particular open space for only a short duration, and access to all open spaces would be maintained at all times. Because of the short-term nature of this project-related effect, the disruption during construction is not anticipated to result in a potential significant adverse impact to open spaces in the Study Area.

11.3.4 Socioeconomic Conditions

Shaft Sites

Table 11.3-3 presents a comparison of socioeconomic issues for the Shaft Sites including costs of the project and socioeconomic effects on residents and businesses. The cost estimates provided are not directly comparable, since the variability of costs from site to site is affected by site conditions such as differences in construction techniques that would be required, geological conditions, and size limitations. Construction costs would be highest at the E. 61st Street Shaft Site due primarily to land acquisition costs. Costs at the E. 54th Street/Second Avenue Shaft Site and E. 59th Street/Second Avenue Shaft Site would be lowest, primarily because the shafts at these constrained sites would need to be smaller and would only be able to accommodate one riser; these sites would not meet a primary goal of the project for redundancy. Compared to these two sites, costs would be somewhat, but not substantially, higher for the preferred Shaft Site. In addition, the preferred Shaft Site is the only site that would not potentially require the additional costs associated with surface excavation.

The project would not directly displace any existing businesses or residents. At the E. 54th Street/Second Avenue Shaft Site, within the construction area for the project there is an enclosed sidewalk café area that is part of a restaurant. Although the sidewalk café area would be removed, the business would not be directly displaced. At the 61st Street Shaft Site, the Archdiocese's planned residential building could not be constructed if this site were selected.

By far the greatest extent of potential construction-related impacts on residents and businesses would occur at the E. 54th Street/Second Avenue Shaft Site where impacts, particularly noise impacts, could affect residents and businesses located between First Avenue and the midblock to Third Avenue along E. 54th Street and between E. 53rd and E. 55th Streets along Second Avenue. This is the only site where uses would be surrounded by the construction zone. Due to a combination of noise, vibration, pedestrian access, and visibility issues at this site, there could be possible indirect displacement of businesses on or near the northeast corner of E. 54th Street and Second Avenue. Businesses located farther from this area would be expected to fare better. No indirect displacement effects are expected in the vicinity of any of the other Shaft Sites.

Although local economic conditions in the immediate vicinity of the Shaft Sites could decline somewhat during intense construction periods, the net effect on the economy of the surrounding areas would be negligible. Overall, the effects of the project are not unlike the effects from other major construction in Manhattan that involves the use of heavy construction in close proximity to residential and commercial uses. Given the Shaft Sites' locations in well-established neighborhoods of Midtown Manhattan, large-scale neighborhood character or socioeconomic changes would not be expected to occur. Therefore, it is not anticipated that construction of Shaft 33B would result in the potential for significant adverse socioeconomic effects during construction at any of the Shaft Sites.

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Table 11.3-3
Socioeconomic Issues for Potential Shaft Sites

Issue	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th St/ Second Ave
Cost to Construct Shaft	\$71.5 million	\$67 million	\$103 million (including land acquisition costs)	\$63 million
Cost to Construct Water Main (First Avenue Route)	\$9.5 million	\$11 million	\$11.5 million	\$5 million
<u>Cost to Construct Water Main (Sutton Place Route)</u>	<u>\$14 million</u>	<u>\$15.5 million</u>	<u>\$16 million</u>	<u>Not applicable</u>
<u>Cost to Construct Water Main (E.59/61st St Route)</u>	<u>\$8.1 million</u>	<u>\$8.1 million</u>	<u>\$8.1 million</u>	<u>Not applicable</u>
Additional Cost for Surface Excavation Method (if required)	NA	\$15 million	\$15 million	\$15 million
Estimated Cost to City Ratepayers (per month)	24 cents	22 cents	34 cents	21 cents
Potential Direct Displacement of Businesses/Residents	None—City-owned property	None—City-owned property	Planned Arch-diocese residence could not be built	None—street/sidewalk
Potential Impacts to Residents and Businesses	Potential significant noise impacts; potential intermittent annoying vibration effects	Potential significant noise impacts; potential intermittent annoying vibration effects	Potential significant noise impacts; potential intermittent annoying vibration effects	Potential significant noise impacts; potential intermittent annoying vibration effects; restricted pedestrian access; reduced visibility
Geographical Extent of Impacts to Residents and Businesses	Residential/commercial buildings across E. 59 th St. from the Shaft Site	Residential/commercial buildings across E. 59 th St. from Shaft Site	Certain residences/ businesses between the Shaft Site and First Ave.	Certain residence/businesses along E. 54 th St. between First Ave. and midblock to Third Ave.; along Second Ave. between E. 53 rd and E. 55 th Sts.
Potential Indirect Displacement of Businesses/Residents	NA	NA	NA	1 or more businesses near northeast corner of E. 54 th St./Second Ave. could be displaced due to combined effects

Water Main Connections

Along all potential water main routes, construction would occur in a segmented fashion and residences and businesses would be exposed to potential impacts on a temporary, short-term, and transient basis. Access to the residents and businesses would be maintained throughout the construction period. No potential significant environmental impacts on these businesses or residents would occur. Construction activities along any street segment would be short-term and temporary. Although local economic conditions in the immediate vicinity of the construction site could decline somewhat during intense construction periods, the net effect on the area's economy would be negligible. Overall, the effects of the construction are not unlike the effects from other major construction in Manhattan that involves the use of heavy construction in close proximity to residential and commercial uses. Given the potential water main routes' locations in well-established neighborhoods of Midtown Manhattan, large-scale neighborhood character or socioeconomic changes would not be expected to occur. Therefore, it is not anticipated that water main construction would result in the potential for significant adverse socioeconomic effects during construction along any of the routes.

11.3.5 Historic Resources

Shaft Sites

Two of the alternative Shaft Sites—the E. 61st Street Site and the E. 54th Street/Second Avenue Site—may contain buried archaeological resources. To avoid any potential significant adverse impacts on the potential archaeological resources should the E. 61st Street Shaft Site be selected, archaeological testing would be undertaken at the site prior to project construction in coordination with the New York City Landmarks Preservation Commission (NYCLPC) prior to any subsurface excavation on the site and any resources encountered will be documented and properly recorded in consultation with NYCLPC. At the E. 54th Street/Second Avenue Site, monitoring by a professional archaeologist would be undertaken during construction so that any archaeological features, if encountered, are properly treated and recorded.

The Queensboro Bridge, a historic structure, would be immediately adjacent to the construction area for both the preferred Shaft Site and the E. 59th Street/Second Avenue Shaft Site. A construction protection plan will be developed and implemented for the historic Queensboro Bridge in coordination with NYCLPC to ensure that no potential significant adverse impacts occur to the Queensboro Bridge as a result of any of the proposed construction activities. For proposed work on the Queensboro Bridge piers at the preferred Shaft Site, a permit would be obtained from NYCLPC and an advisory letter would be obtained from NYCLPC for other work adjacent to the Bridge. Construction activities at either of these Shaft Sites would not be anticipated to result in potential significant adverse impacts to the context of the historic Queensboro Bridge, since construction activities would have only limited visual effects to the Bridge.

Water Main Connections

NYCDEP will coordinate with NYCDDC prior to construction of future water main connections to ensure that appropriate measures to protect historic resources are undertaken in accordance with NYCLPC's established procedures with respect to archaeological resources. As set forth in NYCLPC's publication, *Landmarks Preservation Commission Guidelines for Archaeological Work in New York City*, dated April 12, 2002, these procedures involve initial review by NYCLPC to determine if archaeological work is necessary, archaeological documentary study if warranted, archaeological field testing if warranted by the results of the study, and, for any archaeological resources identified using this process, measures to avoid significant adverse impacts such as monitoring during construction, data recordation, and/or excavation. With these measures in place, no potential significant adverse impact would occur to archaeological resources.

While potential archaeological resources could have been destroyed by road construction and previous utility installation, there is a possibility that buried archaeological resources remain in certain segments of the First Avenue route. If the First Avenue route is selected, a protocol for archaeological monitoring will be prepared and implemented in consultation with NYCLPC prior to any subsurface excavation in the sensitive area. Following this protocol, any archaeological resources encountered during construction will be documented and properly recorded in consultation with NYCLPC. It is also possible that archaeological resources remain in place along the Sutton Place and E. 59th Street/ E. 61st Street routes or any additional water main route that might be selected. For any selected water main route that was not evaluated in a Phase 1A Assessment, NYCLPC's archaeological procedures will be followed. NYCLPC will be consulted to determine if an archaeological study would be warranted. If NYCLPC determines that a study is warranted, a Phase 1A Assessment will be prepared for NYCLPC review to determine if the selected route has the potential to contain Native American or historic-period archaeological resources. Should any potential resources be identified, a monitoring plan would be developed in consultation with the NYCLPC prior to any project construction. Any resources encountered would be properly documented in consultation with NYCLPC. Thus, no potential significant adverse impacts to archaeological resources would occur as a result of the water main construction.

Construction of the water mains would not be anticipated to result in potential adverse impacts to architectural resources within the Study Areas, given the short duration of the work and the limited vibration. At locations where pavement breaking (with the use of jackhammers) is required, deep saw cuts would be made first. These saw cuts would minimize the transmission of vibrations from pavement-breaking operations to the foundations of nearby structures. However, for the E. 59th Street/E. 61st Street route, NYCLPC will be consulted regarding any construction in the Treadwell Farm Historic District to avoid any potential significant adverse impacts on this historic resource.

11.3.6 Urban Design and Visual Resources

Shaft Sites

During construction, activities and equipment on the preferred or alternative Shaft Sites would be shielded from view by a construction barrier that would be 20 feet high at the preferred, E. 59th Street/Second Avenue, and E. 61st Street Shaft Sites. The only equipment visible above the barrier from street level would be a crane and, possibly, a concrete truck enclosure. While the barrier would block off the construction zone from the surrounding area, resulting in a change to the urban design of the affected site, the project's construction activities would not involve any changes to block form; street pattern or hierarchy; topography; natural features; or building arrangement, bulk, use, or type within the Study Area. To facilitate the limited construction work that would occur on the Shaft Site in the evening, lighting would be installed around the site. This lighting would be noticeable from the surrounding area, but would not be substantially different from the lighting that already illuminates the Study Area at night.

At the preferred Shaft Site, two honey locust trees would be removed from the adjacent multi-use area to facilitate construction. No trees would be removed at the E. 59th Street/Second Avenue or E. 61st Street Shaft Site. At the E. 54th Street Shaft Site, the six street trees and other street furniture on the alternative Shaft Site would be removed. In addition, a portion of the south sidewalk on E. 54th Street alongside the construction zone would be cleared for use as part of the single traffic lane that would remain on this end of the block, and a new temporary sidewalk may be created through a privately owned landscaped area adjacent to a high-rise residential building. The traffic detour would require removal of five street trees along this sidewalk and a raised planter in the landscaped area. The removal of these trees and landscaped area to allow a shift to traffic and pedestrian patterns adjacent to the construction zone would change urban design in the immediate area, but this change would not be anticipated to result in potential significant adverse urban design impacts.

The construction barrier around the preferred and alternative Shaft Sites would block some views through the site from the immediate area, but no significant views of visual resources would be affected. At the preferred Shaft Site and E. 59th Street/Second Avenue Shaft Site, the adjacent historic Queensboro Bridge is a visual resource, but numerous views of the Bridge would be readily accessible from the public side of the construction enclosure at these two sites. Views to any other visual resources near the Shaft Sites would also remain accessible.

Overall, due to the limited nature of the potential changes to streetscape during construction of Shaft 33B at any of the sites, no potential significant adverse impacts to the urban design of the Study Area or visual resources are anticipated as a result of construction activities required for any of the Shaft Sites.

Water Main Connections

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.

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 route 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 11.3-3. 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).

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.

**Table 11.3-4
Number of Street Trees Potentially Affected
Water Main Connection Routes for Shaft Sites**

Water Main Route	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th 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. 59 th St./E. 61 st St. Route	29	29	29	NA
Note: The water main connection route from the E. 54 th Street site is considered to be the “First Avenue route” for purposes of this table.				

11.3.7 Neighborhood Character

Shaft Sites

Construction of Shaft 33B at the preferred Shaft Site and any of the alternative Shaft Sites would be expected to be intrusive at times to surrounding residents in terms of increased noise levels and potential intermittent traffic disruptions. This type of construction disturbance is fairly consistent with other construction projects that occur throughout the City, and it would not be expected to influence land use or development patterns. During the construction period, NYCDEP would address noise and traffic disruptions.

At the E. 54th Street/Second Avenue Shaft Site, because of the proximity of this site to the nearest uses and because this site, unlike the others, would consist entirely of actively used street and sidewalks, would be expected to be intrusive in the area immediately surrounding the construction site—to residents, ground-floor businesses on the east side of Second Avenue and their customers, and a nearby open space—in terms of increased noise levels, potential traffic disruptions, and reduced access and visibility to the businesses. Nonetheless, this type of construction disturbance is fairly typical of other construction projects that occur throughout the City, including several recently completed and ongoing construction projects within the neighborhood, and it would not be expected to significantly influence land use or development patterns. Overall, construction at the preferred Shaft Site or any of the alternative Shaft Sites would not be anticipated to result in potential significant adverse impacts to the combined elements contributing to the neighborhood character of the Study Area.

Water Main Connections

While water main construction related to any of the Shaft Sites would be disruptive at times, requiring lane closures and resulting in temporary adverse traffic and noise impacts as well as the potential loss of street trees, overall, given the brief duration of the construction disturbance in specific areas, and the limited nature of the potential changes, the construction activities

associated with the new water mains would not be anticipated to result in any significant adverse impacts to neighborhood character.

11.3.8 Infrastructure and Energy

No major utilities would need to be relocated to construct at any of the Shaft Sites except for the E. 59th Street/Second Avenue Shaft Site. At this Shaft Site, a major utility relocation—moving a Con Edison oil-o-static line and associated chamber—would be required. This would likely delay commencement of construction six months to one year. To avoid service disruption to customers, Con Edison would install a temporary service line.

Major utility relocation is not expected to be needed at any of the potential water main routes. During final design, NYCDDC would take into account the presence of buried infrastructure so as to avoid the need for major relocation of utilities to the extent possible.

For all potential Shaft Sites and water main routes, construction activities would place limited demand on water and sewer utilities. The contractors would implement appropriate soil erosion and sediment control and other measures to control runoff from the site. Potential disruptions during water service connection to the sites, if any, would be short-term and temporary. Measures would be put in place to notify affected residents and businesses and to minimize any interruptions in service. Additional energy demand during construction and operation would be minimal. Therefore, no potential significant adverse impacts to infrastructure and energy are expected at any of the Shaft Sites or water main routes.

11.3.9 Traffic & Parking

Shaft Sites

Shaft Site construction would not generate a substantial amount of peak hour truck or construction worker trips. However, all potential Shaft Sites, to different extents, would result in disruptions to adjacent roadways. The analysis conducted to evaluate such disruptions revealed that adequate traffic operations would generally be maintained because such disruptions would be intermittent during construction, and therefore potential significant adverse traffic impacts are not anticipated from the construction of any of the potential Shaft Sites. Traffic disruptions during construction involve truck delivery activities at the potential Shaft Sites. While expected to be infrequent, traffic halting for up to two minutes during truck movements could take place intermittently at all potential Shaft Sites, except for the E. 54th Street/Second Avenue Shaft Site. Extensive queuing resulting from this operation could be most prevalent for the preferred and the E. 61st Street Shaft Sites.

Blasting would result in temporary traffic stoppages adjacent to all potential Shaft Sites. Blast events would likely occur only once or twice a day, with traffic stoppages enduring for approximately one to five minutes for each blast in accordance with the whistle warning protocol; however, NYCDEP would seek a waiver from the FDNY to reduce the whistle warning period to one minute. FDNY has indicated that it could issue the waiver. While three blasts a day

could possibly occur, such undertaking is considered unlikely and would not occur on a regular basis, if at all. In addition, blasts may not occur every day during the blasting period and would likely occur outside of the peak traffic hours based on typical blasting procedures employed. In comparison, blasting requiring halting of vehicular traffic would likely occur over a 4-month period at the preferred Shaft Site, a 4-month (with raise bore) to 12-month (with surface excavation) period at the E. 59th Street/Second Avenue and the E. 61st Street Shaft Sites, and a two-month (raise bore) to three-month (surface excavation) period at the E. 54th Street/Second Avenue Shaft Site. For the one-minute blasting sequence, minimal disruptions to area traffic are anticipated since the stoppage period is comparable to typical stoppage experienced by motorists at traffic signals. Although the FDNY has indicated that it could grant this whistle waiver, if the whistle waiver is not attained, halting of traffic due to blasting may take up to five minutes. This blasting sequence could result in extensive congestion and queuing of traffic for a large distance extending from the blast site. The most pronounced effects from such traffic stoppage could be experienced at the preferred and the E. 59th Street/Second Avenue Shaft Sites.

While both truck access/egress maneuvers and blasting at the potential Shaft Sites could cause pronounced traffic congestion, these occurrences would be intermittent and/or temporary and not result in the potential for significant adverse traffic impacts. At all potential blast sites, flag persons and a traffic enforcement agent(s) (TEA) funded by NYCDEP would be present to facilitate safe and efficient execution of these truck access/egress and blasting events.

With regard to parking, temporary displacement of curbside spaces would be necessary for the construction of all potential Shaft Sites except the E. 59th Street/Second Avenue Shaft Site. Where curbside disruptions would occur, the number of spaces lost would not be substantial, with the E. 54th Street/Second Avenue Shaft Site incurring the most number of displaced curbside spaces, up to a total of 30 spaces.

Water Main Connections

Three potential routes were assessed for the water main connections: 1) the reasonable worst-case First Avenue route; 2) the Sutton Place route; and, 3) the E. 59th Street/E. 61st Street route. While the actual construction of the water main connections would be coordinated with NYCDOT Office of Construction Mitigation and Coordination (OCMC) and may incorporate conventional mitigation and other traffic attenuation measures, the analysis revealed the potential for temporary adverse traffic impacts for all three representative routes. These impacts range from moderate increases in delays to congestion that would result in traffic diversions.

For the First Avenue route, projected increases in delays are expected to severely impact the overall traffic flow along First Avenue. 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. 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.

For the Sutton Place route, projected increases in 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. The total duration over which temporary construction impacts would occur is estimated to be about 115 weeks. For approximately the first 70 weeks, predicted queues would extend several blocks along York Avenue/Sutton Place.

For the E. 59th Street/E. 61st Street route, projected disruptions to key feeder routes from the FDR Drive and to the Queensboro Bridge are expected to result in areawide traffic diversions and congestion at other nearby locations. These conditions are expected to occur for just over 120 weeks, which is nearly the entire 31-month period of construction.

While adverse traffic impacts were identified for all three connection routes, and extensive queuing and potential traffic diversions are anticipated 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. It is expected that as part of an overall effort to further attenuate conditions for traffic flow at critical locations, NYCDOT OCMC will require more aggressive measures that will be identified in the maintenance and protection of traffic (MPT) that were not analyzed as part of this EIS. The temporary construction-related impacts would not be considered to result in potential significant adverse traffic impacts because they would be transient and short-term, persisting only during the construction period. Table 11.3-5 provides an illustration of the relative durations of traffic impacts under the three representative water main connection routes.

In comparing the three representative routes, only the Sutton Place route would not likely result in traffic diversions to other corridors. For both the First Avenue route and, in particular, the E. 59th Street/E. 61st Street route, traffic management strategies that include identifying viable detour routes, implementing temporary capacity improvement measures, and providing appropriate signage, frequent public announcements, TEAs, and traffic enforcement are likely to be necessary to facilitate effective traffic flow.

With regard to parking, temporary displacement of curbside spaces would be necessary for the construction of the water main connections. Along the north-south avenue corridors, up to 10 spaces per block could be temporarily displaced. Along the cross-town streets, since construction would be staged in up to 200-foot segments, up to 25 spaces per block could be temporarily displaced at any one time. It is also expected that additional curbside spaces could be restricted as part of mitigation measures or other traffic management strategies to increase roadway capacity and improve traffic flow.

The extent of construction-related traffic and parking impacts could also depend on the geographic area of the potential Shaft Sites. Where comparable connections and construction periods are required for the preferred, E. 59th Street/Second Avenue, and E. 61st Street Shaft Sites, a substantially shorter connection route would be required of the E. 54th Street/Second Avenue Shaft Site. Therefore, the anticipated duration and the extent of temporary construction-related adverse traffic impacts from the construction of water main connections would be measurably less with the E. 54th Street/Second Avenue Shaft Site.

11.3.10 Transit & Pedestrians

Shaft Sites

Shaft Site construction would not generate a perceptible number of peak hour transit or pedestrian trips in the vicinity of the potential Shaft Sites. It would also not affect the area's available transit service. While pedestrian space would be disrupted with the preferred and the E. 54th Street/Second Avenue Shaft Sites, adequate pedestrian circulation would be maintained, such that no adverse impacts to pedestrian flow would result.

Blasting would result in temporary vehicular and pedestrian stoppages adjacent to all potential Shaft Sites. As described for traffic and parking, blast events would be intermittent and conducted in accordance with approved FDNY procedures. Temporary halting of area buses and pedestrian flow would be required during blasting. Since these occurrences are intermittent and adequate pedestrian circulation would be maintained, no significant adverse transit and pedestrian impacts are anticipated from the construction of the Shaft Sites.

Water Main Connections

Some disruptions to the area's transit service and pedestrian space are anticipated during the construction of water main connections under the First Avenue, Sutton Place, and E. 59th Street/E. 61st Street Routes. These disruptions include temporary loss of bus-only lanes, relocation of bus stops, and reduction of sidewalk widths. The analysis of affected pedestrian elements concludes that adequate pedestrian circulation would be maintained at all times. Based on the above, the construction of water main connections would not result in a potential for significant adverse impacts.

11.3.11 Air Quality

Shaft Sites

An evaluation of the potential air quality impacts from the operation and construction of the Shaft Sites was undertaken for all four Shaft Sites. For the construction at any of the four potential Shaft Site locations, NYCDEP will require the contractor for Shaft 33B to reduce particulate matter emissions to the extent practicable by employing relatively new equipment (model years 2003 and newer), installing emissions controls on diesel equipment greater than 50 horsepower (hp), such as diesel particulate filters (DPFs) or diesel oxidation catalysts (DOCs), and using alternate means of powering the equipment, such as electricity. For diesel equipment greater than 50 hp in size that will likely not be able to implement DPFs, DOCs will be required. There would be slight differences in effects among the Shaft Sites; Shaft Sites that are located in closer proximity to sensitive receptors and that would have a longer construction duration such as the E. 54th Street/Second Avenue Site, would result in somewhat greater exposure. For all four Shaft Site locations, no significant adverse impacts were predicted from the construction, activation or operation of the Shaft Site.

Water Main Connections

The route which is most likely to have the worst air quality impacts for the preferred Shaft Site (the reasonable worst-case route) was analyzed quantitatively for the preferred Shaft Site. Impacts of other reasonable routes were addressed by comparing their potential impacts with the reasonable worst-case route assessment. For any future water main connection route, the construction activities that would be contracted by the NYCDDC will be subject to New York City Local Law 77, which will require the use of Best Available Technology for equipment at that time. For all the water main connection options, no significant adverse impacts were predicted from the construction, activation or operation of the water main connections.

11.3.12 Noise

Shaft Sites

Blasting would result in high instantaneous noise levels at all potential Shaft Sites. NYCDEP will implement preventative measures to minimize adverse effects from blasting.

As shown in Table 11.3-6, for the other construction activities, potential noise impacts would differ for each Shaft Site. Maximum predicted noise levels would be lowest at the E. 59th Street/Second Avenue Shaft Site and the preferred Shaft Site and highest at the E. 61st Street Shaft Site and E. 54th Street/Second Avenue Shaft Site. In addition, the numbers of affected sensitive receptors impacted would be far lower for the E. 59th Street/Second Avenue Shaft Site and the preferred Shaft Site. At these locations, it estimated that two to three apartment buildings would be affected. In contrast, at the E. 61st Street Shaft Site, numerous receptors between the Shaft Site and First Avenue would be affected. The greatest extent of impacts would be generated by the E. 54th Street/Second Avenue Shaft Site where 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 E. 55th Streets along Second Avenue. Furthermore, because hydraulic splitting would be required at the E. 54th Street/Second Avenue Shaft Site, the construction duration, and therefore the noise impacts, would be nine months longer than at the other sites (under the raise bore method).

**Table 11.3-6
Comparison of Noise Issues for Shaft Sites**

Issue	Shaft Site			
	Preferred	E. 59 th St/ Second Ave	E. 61 st St	E. 54 th St/ Second Ave
Range of Significant Impacts-Average Conditions	Shift 1: 3.2 -9.2 dBA Shift 2: 3.4 -8.0 dBA	Shift 1: 3.9-6.2 dBA Shift 2: 4.0-7.0 dBA	Shift 1: 3.3- 17.1 dBA Shift 2: 3.1- 19.1 dBA	Shift 1: 3.0-15.0 dBA Shift 2: 3.0- 19.0 dBA
Range of Significant Impacts- Peak Conditions	Shift 1: 3.0-11.6 dBA Shift 2: 3.0-10.7 dBA	Shift 1: 3.2-7.6 dBA Shift 2: 3.1-9.3 dBA	Shift 1: 3.1 -20.0 dBA Shift 2: 3.3 - 22.0 dBA	Shift 1: 3.0 -20.5 dBA Shift 2: 3.1-24.5 dBA
Geographical Extent of Impacts to Sensitive Receptors	2 apartment buildings affected	3 apartment buildings affected	Certain receptors between the Shaft Site and First Avenue	Certain receptors along E. 54 th St between First Ave. and midblock to Third Ave.; along Second Ave. between E. 53 rd and E. 55 th Sts.

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At the preferred Shaft Site, the raise bore method would be used. If the surface excavation were required at the three alternative Shaft Sites, noise levels could be somewhat higher due to the higher level of construction activity associated with moving rock at the surface, rather than below ground. In addition, these effects would be felt for longer periods of the day and for 9 to 13 months longer than at the preferred Shaft Site.

NYCDEP understands that noise is a major issue of concern to the communities surrounding the potential shaft sites. NYCDEP has extensively evaluated measures to reduce potential noise impacts during construction and is committing to several measures as part of the project. At all Shaft Sites except the E. 54th Street/Second Avenue Shaft Site, a 20-foot concrete wall can be constructed around the perimeter of the Shaft Site. Due to site constraints at the E. 54th Street/Second Avenue Shaft Site, however, only a 10-foot wall can be constructed there. At all potential Shaft Sites, concrete mixing trucks will be enclosed in an acoustical sound enclosure providing 15 dBA attenuation during Stages 2C, 3, and 4A.

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.

NYCDEP will continue to investigate noise mitigation and attenuation measures and will work with NYCDDC to implement measures to further reduce noise during construction of Stage 4B at the Shaft Site. However, despite a thorough evaluation of measures to reduce noise at the site, noise attenuation measures that have been included as part of the project, and further investigations that will be conducted to identify other practicable and feasible noise mitigation strategies, potential significant noise impacts would remain unmitigated at all four shaft sites during construction. 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 are unavoidable in order to achieve the goals of the project. These impacts are not permanent environmental changes and no changes in the noise levels will occur from this project after it has been constructed.

Water Main Connections

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 all of the potential water main connection routes. These impacts would range from marginally perceptible to, at times, highly intrusive. Table 11.3-7 summarizes the range of noise effects for the water main connection routes. On any given block or 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.

Table 11.3-7
Comparison of Temporary Adverse Noise Impacts for Water Main Connection Routes

Range of Temporary Adverse Impacts	Water Main Connection Route		
	First Avenue Route	Sutton Place Route	E. 59 th Street / E. 61 st Street Route
Range of Temporary Impacts—Average Conditions	4.0 – 26.4 dBA	6.0 – 26.4 dBA	4.2 – 23.4 dBA
Range of Temporary Impacts—Peak Conditions	3.0 – 35.7 dBA	3.9 – 35.7 dBA	3.1 – 32.7 dBA

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.

Due to the short-term duration when potential adverse impacts could occur, the potential noise impacts along the water main route are considered to be temporary adverse impacts. Overall, the effects of the proposed project 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.

11.3.13 Vibration

At all four potential Shaft Sites and water main connections routes, NYCDEP and/or NYCDDC would implement preventative measures during blasting and other construction activities to ensure that vibration levels would be limited to levels that would not cause structural damage. At the E. 54th Street/Second Avenue Shaft Site, additional measures would be required. Due to the very close proximity of the residences and restaurant to the site, as close as 11 feet from the edge of the shaft chamber, and because the bedrock is only 3 feet from the surface, hydraulic splitting, instead of blasting, would be employed until a substantial distance below bedrock was reached to minimize the potential for any inadvertent damage to nearby structures. These measures would add several months to the construction schedule at this Shaft Site.

At times, vibration levels would still occur at levels that would be likely to cause annoyance to residents and other sensitive receptors in the immediate vicinity of the site. These annoyance effects could be somewhat higher at potential shaft sites that are located closer to sensitive receptors such as the E. 54th Street/Second Avenue Shaft Site and lower at sites that are further away such as the preferred Shaft Site and the E. 59th Street/Second Avenue Shaft Site. In general, vibration-causing construction activities would be used on an intermittent basis during the construction period or would be used primarily below the surface. These potential impacts are considered short-term and temporary in nature. The contractor will be required to have a vibration control plan and monitoring program in place during all construction activities. Therefore, no potential significant adverse vibration impacts would be anticipated to occur from construction at any of the potential shaft sites or water main routes.

11.3.14 Hazardous Materials

An evaluation of potential hazardous materials impacts from construction was undertaken for the four Shaft Sites and three potential water main routes. At each of the sites, the subsurface soils that would be excavated and the groundwater that would be removed during construction may contain contaminants resulting from a number of sources including deposition and infiltration, contamination from off-site sources, and from historic fill material commonly used throughout the City of New York. Similar preventative measures will be utilized at any of the potential project sites to minimize exposure to potentially contaminated soils during construction which include subsurface investigations to determine disposal requirements; soil removal and disposal off-site in accordance with all applicable federal, state, and local regulations; implementation of a Construction Health and Safety Plan; implementation of a Remedial Action Plan; and testing and potential treatment of groundwater from dewatering activities to levels specified in applicable local and state permits. During the final stage of construction, the site will be filled with certified clean fill or capped with an impervious surface. With implementation of these measures there would be no potential significant adverse hazardous materials impacts from construction or operation at any of the potential Shaft Sites or water main routes.

11.3.15 Public Health

Evaluations of the potential public health impacts from the operation, activation and construction of the Shaft Sites and Water Main Connections were undertaken. No potential significant adverse impacts on public health were determined for all Shaft Sites and water main connection routes.

11.4 WATER MAIN ONLY ALTERNATIVE

11.4.1 Overview

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.

Similar to the water main connections for the Shaft Sites, 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. These are described below in comparison to the effects of the Shaft Sites' water main connections.

11.4.2 Urban Design and Visual Resources

Construction of a 42-block-long water main has the potential to affect many trees along the route. As with the water main connections analyzed for the other alternatives, every effort would be made to maintain and protect the trees along the route. Nonetheless, if trees along the route were affected, 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 far greater number of trees could potentially be affected given the much longer length of the water main construction work than for the other alternatives and thus this potential temporary adverse impact on urban design from the loss of trees could be substantially greater from this alternative. However, the Water Main Only Alternative as currently envisioned would affect fewer east-west blocks than water main connections from the preferred Shaft Site. The potential for effects to trees on the east-west blocks may be greater than on the north-south

blocks, because of the narrower width of the side streets and the need to create a zone for traffic to flow past water main construction work.

11.4.3 Traffic

Based on the analysis results presented in Chapter 9, “Water Main Only Alternative” and in Section 5.9, it can be concluded that 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, compared to the temporary adverse impacts expected for the water main connections from any of the Shaft Sites.

11.4.4 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. Like the water main connection alternatives to the Shaft Sites, 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. However, because the overall length of the Water Main Only route covers a substantially greater geographic area, a greater number of sensitive receptors would be affected compared to the water main connections for the Shaft Sites.

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.

