CHAPTER 8: E. 54TH STREET/SECOND AVENUE SHAFT SITE

8.1 PROJECT DESCRIPTION

8.1.1 Introduction

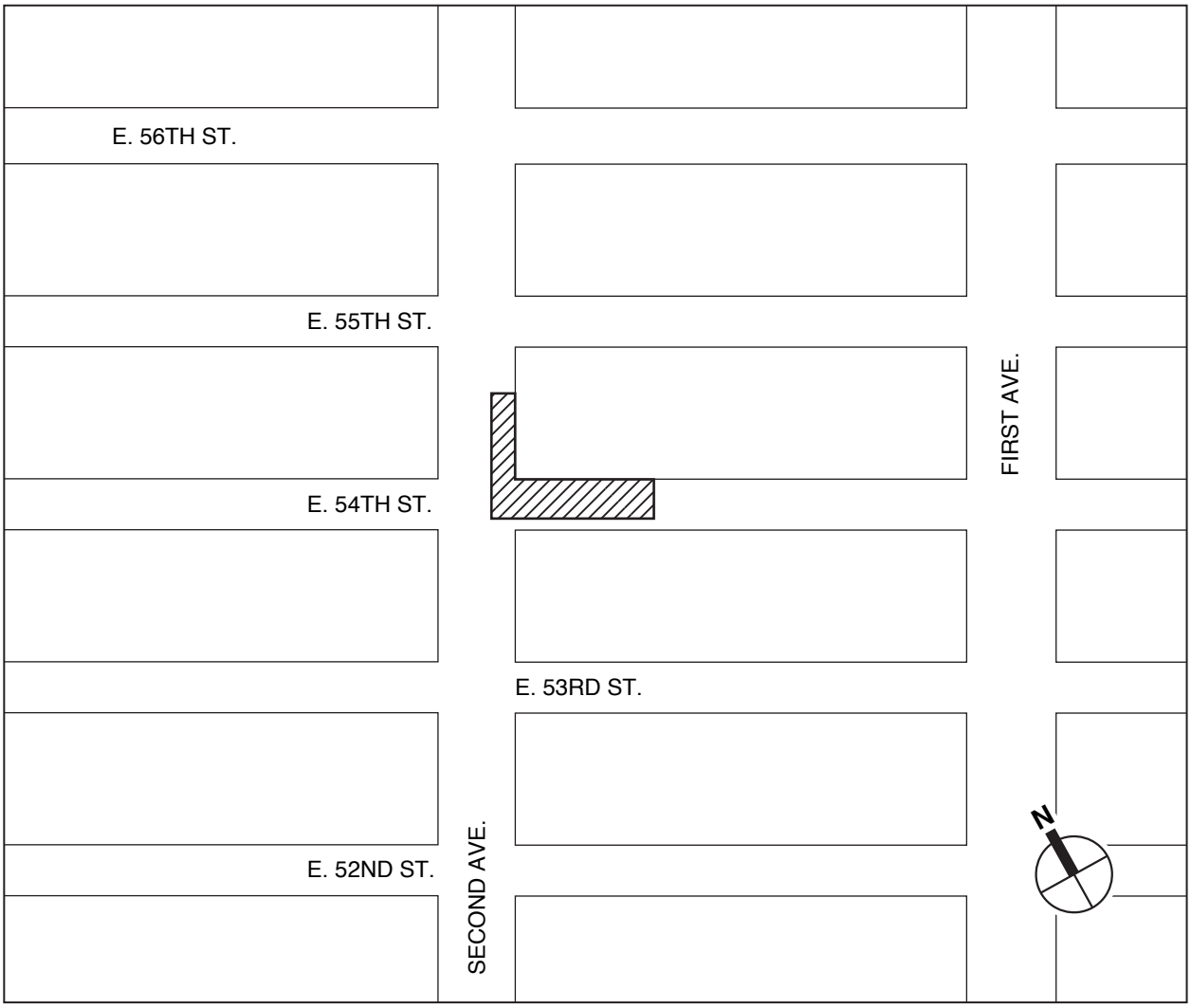
The New York City Department of Environmental Protection (NYCDEP) is proposing to construct a vertical water supply shaft, Shaft 33B, to bring water from City Tunnel No. 3 to the local water distribution system in East Midtown and the Upper East Side in Manhattan. Chapter 2 of this EIS, "Purpose and Need and Project Overview," describes the purpose and need for Shaft 33B. As discussed in Chapter 2, this new water shaft is needed in the general vicinity of the northeastern portion of the New York City water distribution system's Middle Intermediate Pressure Zone (MIPZ), which is roughly bounded by Tenth Avenue on the west, the East River on the east, 34th Street on the south, and approximately 54th Street on the north. The shaft would provide water to the MIPZ and to the adjacent water pressure zone, the Northern Intermediate Pressure Zone (NIPZ). NYCDEP has identified a preferred location for Shaft 33B, at the northwest corner of E. 59th Street and First Avenue, as well as three alternative feasible Shaft Site locations.

This Chapter addresses the potential environmental impacts associated with the construction and operation of Shaft 33B at the alternate shaft site location of E. 54th Street and Second Avenue (the "E. 54th Street/Second Avenue Shaft Site"). This Section presents an overall description of the E. 54th Street/Second Avenue Shaft Site (Section 8.1.2), the proposed site layout of Shaft 33B at the site (Section 8.1.3), the construction activities that would be undertaken at the E. 54th Street/Second Avenue Shaft Site to construct Shaft 33B (Section 8.1.4), activation and operation (Section 8.1.5), and the required permits and approvals for this site (Section 8.1.6). The following Sections of this Chapter, Sections 8.2 through 8.17, assess the potential environmental impacts related to the construction and operation of Shaft 33B at the E. 54th Street/Second Avenue Shaft Site.

The water main connections that would connect the E. 54th Street/Second Avenue Shaft Site to the existing water distribution system via the Third Avenue trunk main are also described in Section 8.1, and the potential environmental impacts associated with construction and operation of those water main connections are considered in Sections 8.2 through 8.17.

8.1.2 Description of E. 54th Street/Second Avenue Shaft Site

The E. 54th Street/Second Avenue Shaft Site is located at the northeast corner of E. 54th Street and Second Avenue (Figure 8.1-1). The approximately 8,500-square-foot, "L"-shaped area is located entirely within the street and sidewalk of E. 54th Street and of Second Avenue. Along Second Avenue, the Site abuts Block 1347, Lots 1, 2, 3, 4, and 102. Along E. 54th Street, the site also abuts Block 1347, Lots 1, 5, 7, and 52. These parcels include active residential and commercial uses. The site is currently divided in four segments—by two fire lanes, a pedestrian walkway, and a garage entrance.



NOT TO SCALE

Legend:

Site Boundary

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2-MANHATTAN LEG
E. 54TH STREET/ SECOND AVENUE SHAFT SITE

SITE LOCATION

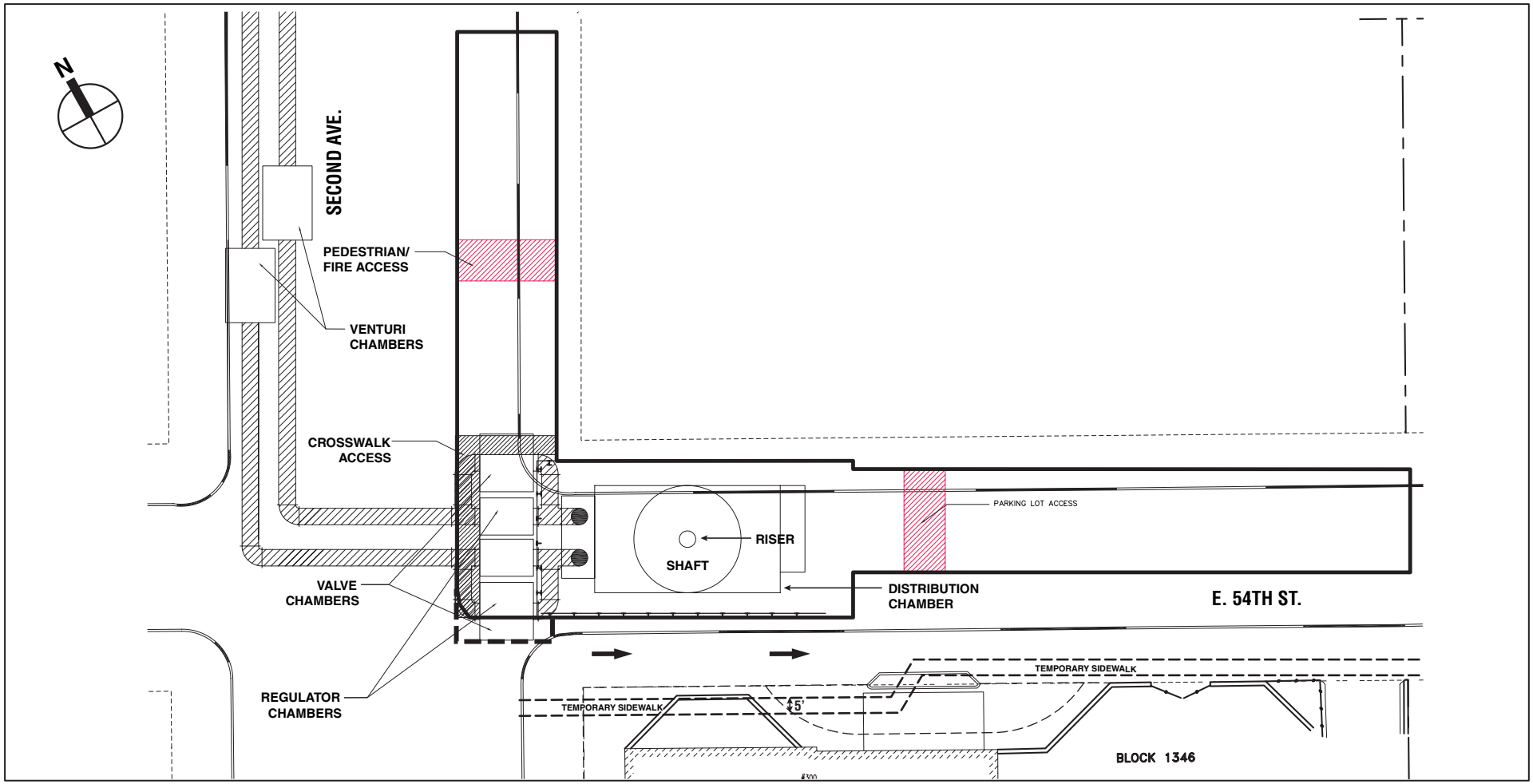
FIGURE 8.1-1

An existing restaurant (Lenny's) on the corner of E. 54th Street and Second Avenue has an enclosed sidewalk café that extends from the building onto the City-owned sidewalk. This structure would need to be removed for shaft construction on this Site. The shaft construction would occupy one parking lane and one traffic lane on E. 54th Street and one parking lane and one traffic lane on Second Avenue. In addition, to allow the remaining lane on E. 54th Street to be wide enough for traffic flow, a portion of the southern sidewalk along E. 54th Street would be used as part of the southern traffic lane (Figure 8.1-2). 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.

The site's small size and L-shaped configuration would present several issues. First, the site is not large enough to accommodate two risers, a critical NYCDEP goal for Shaft 33B. As described in Chapter 2, risers are the vertical pipes that would bring water from City Tunnel No. 3 through the shaft to the surface water distribution system. Second, the site has a non-contiguous configuration, since it would be divided by two 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 make construction there difficult. This driveway would require constant monitoring during construction; vehicle ingress and egress at this garage would likely require temporary halting of construction near this portion of the site so that passage can be ensured. In addition, work at this site could potentially take up 9 to 19 months longer than at the preferred Shaft Site, delaying the time when Shaft 33B and the associated segment of City Tunnel No. 3 can be operational. At the same time, however, the water main connections from this site are likely to follow a much shorter route to the Third Avenue trunk main. The estimated duration of this work would be 22 months, much shorter than construction of water main connections from the preferred Shaft Site following the potential routes analyzed in this EIS. These and other construction issues are presented in more detail in Section 8.1.4 below.

8.1.3 Location of Shaft Components on the E. 54th Street/Second Avenue Shaft Site

As described in Chapter 2, "Purpose and Need and Project Overview," Shaft 33B would consist of a vertical shaft, approximately 450 feet deep, which would house 48-inch riser pipes to bring water from City Tunnel No. 3 up to the neighborhood water distribution system. At the E. 54th Street/Second Avenue Shaft Site, however, only one riser could be provided due to the limited width of the distribution chamber. As detailed in Chapter 2, in addition to the riser pipes, Shaft 33B would contain several other below-grade structures required for distribution of water from City Tunnel No. 3 to the local distribution system. These would include two underground chambers at the shaft, the riser valve chamber and the distribution chamber. Above the shaft, two hatchways would provide access to these underground chambers. A 10-foot-high air vent, 14 inches in diameter, would be located permanently on the sidewalk (above ground) to provide air into the shaft for maintenance workers, and two standard three-foot-high hydrants would provide air relief from the piping during activation. These hydrants could also be used for fire protection.



NOT TO SCALE

Legend:

- *Site Boundary*
- *Curbline*
- *Building Line*
- *Stage 4B Only*
- *Temporary Detour Path*

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROPOSED SHAFT 33B TO CITY WATER TUNNEL NO. 3
STAGE 2-MANHATTAN LEG
E. 54TH STREET/ SECOND AVENUE SHAFT SITE

CONCEPTUAL SITE LAYOUT

FIGURE 8.1-2

Figure 8.1-2 illustrates the potential location of these project elements at the E. 54th Street/Second Avenue Shaft Site. As shown in the figure, the 25-foot-wide shaft would be located on E. 54th Street. Near the surface, the shaft would pass through the underground distribution chamber, approximately 26 feet by 45 feet in size and approximately 3 feet below the surface. The width of the distribution chamber at this site is limited by the need to keep a lane of E. 54th Street open to traffic, including fire trucks. The riser valve chamber would be located directly beneath the distribution chamber.

Two 48-inch water main connections would extend from the shaft, continuing under the street to connect to a 30-inch trunk main under Third Avenue. Although only one riser could be constructed at the E. 54th Street/Second Avenue Shaft Site because of the narrow width of the distribution chamber, this would not preclude provision of two water mains. Two water mains would still be required to service both the MIPZ and the NIPZ. As described in Chapter 2 and in Section 5.1, "Project Description," in Chapter 5, "Water Main Connections," the specific route for the water main connections has not yet been determined. The water main route will be selected by NYCDEP after selection of the Shaft Site, for design and construction by the New York City Department of Design and Construction (NYCDDC). NYCDDC is the agency that implements the design and construction of water mains in New York City streets.

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 water main connections from this site 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 Shaft Site than from the preferred Shaft Site. Figures 2-5, 2-6, and 2-7 in Chapter 2 illustrate the water main connections from this alternative Shaft Site.

Several below-ground chambers related to the water main connections would be located on or close to the Shaft Site. These include valve, regulator, and venturi chambers, providing access to valves and equipment that regulates and monitors the flow to the water main connections that would extend from the shaft. Assuming the water main connection routes described above and given the size and shape of the E. 54th Street/Second Avenue Shaft Site, it was assumed for this EIS that the valve and regulator chambers would be located directly west of the shaft, and the venturi chambers would be located along the water main connection route beneath the street or sidewalk on the west side of Second Avenue.

8.1.4 Description of Construction at the E. 54th Street/Second Avenue Shaft Site

Construction Activity

Chapter 2, "Purpose and Need and Project Overview," describes the construction activities required to install Shaft 33B and its water main connections, and Chapter 4, "Preferred Shaft Site," discusses these activities as they would occur at the preferred Shaft Site. For the E. 54th Street/Second Avenue Shaft Site, because of the proximity of the nearest buildings and the

shallow bedrock, construction techniques would vary somewhat from the techniques used at the other sites, as described below.

During construction, the E. 54th Street/Second Avenue Shaft Site would be enclosed with a 10-foot-high construction barrier. Given the narrow width available for work at this alternative site and proximity to building facades, unlike the preferred Shaft Site and the other alternative sites, the E. 54th Street/Second Avenue site could not accommodate a 20-foot-high construction barrier. An additional 10-foot-high construction barrier would be located around the regulator and valve chambers during Stage 4B (Figure 8.1-2).

As shown in Figure 8.1-2, the shaft excavation would occur within the sidewalk and northern two lanes on E. 54th Street east of Second Avenue. Cranes used during construction would generally be on E. 54th Street to the east of the shaft. It is anticipated that truck access to the site would be at the eastern edge of the site on E. 54th Street. A portion of the sidewalk and two lanes of Second Avenue would also be behind the construction barrier and would be used for storage of equipment. Five- to seven-foot-wide sidewalks would remain between the construction zone and the existing buildings at the corner of Second Avenue and E. 54th Street. In addition, NYCDEP would commit to providing the funding for a traffic enforcement agent (TEA) at the E. 54th Street/Second Avenue Shaft Site during its construction to facilitate vehicular and pedestrian flow.

To allow the remaining lane on E. 54th Street to be wide enough for traffic flow, a portion of the southern sidewalk along E. 54th Street would be used as part of the southern traffic lane. 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.

Construction at the E. 54th Street/Second Avenue Shaft Site could be conducted using either raise bore excavation or surface excavation, depending on the anticipated schedule. As described in Chapter 2, 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 E. 54th Street/Second Avenue Shaft Site cannot be completed by that time, then the raise bore technique cannot be used. In this case, the shaft would be constructed from the surface downward ("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, work would occur at the surface of the Site. Both techniques are described below.

Stage 1

Stage 1 would begin after removal of the enclosed sidewalk café that extends onto the City-owned sidewalk. It would consist of securing the site, removing the pavement in the work area, and excavating the limited soils from the area above the bedrock. At the E. 54th Street/Second

Avenue Shaft Site, bedrock is shallow (approximately three feet below the surface), so this stage would be shorter than for the other sites and no excavation support would be required to hold back the soil during construction. An excavator would be used to remove the soil and place it into dump trucks. The excavation would be completed once bedrock is reached. During a typical day during Stage 1, one to three total trucks would arrive at and depart (with a maximum of three in the peak hour from the E. 54th Street/Second Avenue Shaft Site, bringing deliveries and taking away debris). Stage 1 would have a total duration of three months.

Stage 2

Stage 2 would involve excavation of the shaft and distribution chamber at the E. 54th Street/Second Avenue Shaft Site. The work involved and the schedule for Stage 2 would be substantially different depending on whether raise bore excavation or surface excavation is used, as described below.

Raise Bore Excavation

During Stage 2A (with a duration of 3 months), a pilot hole would be drilled from the top of the Shaft down to City Tunnel No. 3 below. A power supply would be established off-site, with power supplied via the pilot hole. A 10-foot-wide shaft would be excavated from the tunnel upward using the raise bore machine. Excavated material would be removed from the bottom of the shaft and transported to an off-site location using City Tunnel No. 3.

In Stages 2B and 2C, rock would be further excavated to form the distribution chamber near the top of the shaft (Stage 2B) and to enlarge the diameter of the shaft to its full width of approximately 22 to 27.5 feet (Stage 2C). Unlike the preferred Shaft Site and the alternative Shaft Sites, where this work would be accomplished using controlled drilling and blasting, at the E. 54th Street/Second Avenue Shaft Site alternative excavation techniques would be used near the surface, since the bedrock at the alternative Shaft Site is very shallow and the nearest residential building is very close (11 feet from the edge of the shaft chamber). At this site, blasting would likely not occur until a substantial depth below the top of bedrock was reached. To excavate to this distance, alternative techniques such as hydraulic splitting[1] may be employed to minimize potential for damage to nearby structures.

Hydraulic splitting would be used to excavate the entire distribution chamber and approximately the top 50 feet of the shaft. Once a safe depth has been reached to allow blasting (approximately 50 feet), Stage 2C would involve blasting. During the approximately six months when blasting would be conducted, blasting procedures would be the same as those described in Chapter 2. As determined necessary by FDNY, warning whistles would be used to alert the area that blasting was about to begin. For approximately the first two months of blasting (until a depth of approximately 100 feet), flag persons would halt vehicular and pedestrian flow at designated

[1] Hydraulic splitting is a controlled demolition technique that uses a metal device to break concrete or rock. Typically, the splitter includes a cylinder with a control valve and two metal sheets referred to as "feathers." A hole is drilled, the device is inserted, and a piston wedge is used to push the feathers apart and split the material. The piston wedge is pressurized by compressors. Typically, several hydraulic splitters are used simultaneously to split large sections of rock.

locations prior to blasting. Blasting would be conducted only once the area near the site is clear of traffic and pedestrians. Stage 2C would also involve pouring concrete at the site to line the shaft walls. During Stage 2 and Stage 3, the E. 54th Street Shaft Site would have an enclosed, ventilated structure that would house the concrete trucks operating at the site.

Using the raise bore technique at the E. 54th Street/Second Avenue Shaft Site, Stage 2 would last an estimated 21 months. During this period, one to three trucks would arrive at and depart from the site during the peak hour.

Surface Excavation

If City Tunnel No. 3 could not be used for removal of excavated material, Shaft 33B could not be constructed from below using the raise bore method. In that case, all excavation for the chambers and shaft at the E. 54th Street/Second Avenue Shaft Site would have to be conducted from the surface (the "surface excavation method"). The surface excavation method would use controlled drilling and blasting (once sufficient depth is reached), and other excavation techniques to create the shaft from the surface level, rather than a raise bore machine. Excavated soil and rock would be removed from the site by trucks for the entire shaft excavation.

During Stage 2A (12 months) using surface excavation, the distribution chamber would first be excavated. Because this chamber would be constructed close to the surface, it would be excavated using an alternative excavation technique such as hydraulic splitting. No pilot hole would be drilled for the shaft, and power would not be provided from City Tunnel No. 3 below; instead, the contractor would obtain power from Con Edison for the construction activities at the site. During Stage 2B, the shaft would be excavated. The top portion of the shaft would be excavated using hydraulic splitting; once the shaft excavation had reached a safe depth below the top of bedrock (approximately 50 feet), controlled drilling and blasting could be used to continue the excavation of the shaft. The shaft and chamber would also be lined with concrete during Stage 2B. No Stage 2C (widening the shaft) would be necessary using surface excavation techniques.

During the 15-month period when blasting would be conducted (Stages 2A and 2B) using surface excavation, blasting procedures would include use of the warning whistle protocol to stop vehicular and pedestrian flow at designated locations prior to blasting. This would occur for approximately the first 3 months of blasting (until a depth of approximately 100 feet).

In addition to the trucks arriving at and departing from the site each day bring materials, including concrete, an additional 5 to 10 trucks per day would haul away excavated rock from the site during Stage 2 using surface excavation. This would add a small number of trucks to the estimated three trucks in the peak hour using raise bore method.

Stage 3

During Stage 3, riser piping would be installed in the shaft and the distribution chamber's floor, walls, columns, and roof would be constructed. Both of these activities would involve pouring of concrete at the E. 54th Street/Second Avenue Shaft Site. Concrete trucks would operate within the enclosed, ventilated structure on the Site. As explained in Section 8.8, "Infrastructure and

Energy," concrete trucks would be rinsed on-site and the resulting discharge would be passed through a sediment trap prior to entering the catch basin. Throughout Stage 3, it is estimated that three trucks might arrive at and depart from the site during the peak period on a given day. A maximum of 30 concrete trucks per day would be expected on the peak days.

Stage 4

Following Stage 3, the site would be secured and inactive for 8 months while equipment is procured. Once that equipment is available, Stage 4 would consist of installation of distribution pipes, valves, and mechanical and electrical equipment, construction of regulator and valve chambers for the water main connections, and final site clean-up and restoration. Stage 4B would include construction of the regulator and valve chambers required for the water mains, which would extend slightly beyond the site boundaries. Construction of these chambers would take approximately 2 to 3 months. As explained in Chapter 2, NYCDDC would construct the regulator and valve chambers; it is NYCDEP's intent to coordinate this work to maintain traffic movements along E. 54th Street. Soil would be excavated and concrete floors would be placed, followed by installation of the 48-inch piping. Concrete walls and roofs would be poured into the chambers and the open excavations would be backfilled. During a typical day during Stage 4, one to three total trucks would arrive at and depart from the E. 54th Street/Second Avenue Shaft Site, bringing deliveries and taking away debris.

Construction Equipment

Using preliminary engineering information, estimated equipment usage factors were developed for the major pieces of equipment to be used during construction of Shaft 33B at the E. 54th Street/Second Avenue Shaft Site (e.g., equipment usage factors were not developed for the hydraulic splitter, which would not generate noise or air emissions). These equipment usage factors are estimates of the percentage of time that each piece of equipment would be used during each construction stage (assuming a 16-hour work day). The equipment usage factors for the E. 54th Street/Second Avenue Shaft Site using the raise bore method are presented in Table 8.1-1, and the factors using the surface excavation method are presented in Table 8.1-2. As discussed in Section 8.11, "Air Quality," NYCDEP will require the contractor for Shaft 33B to use control measures to ensure the construction is conducted in a manner protective of air quality. More specific information regarding equipment to be used at the E. 54th Street/ Second Avenue Shaft Site and their usage factors is presented in the air quality, noise, and vibration analyses in Sections 8.11, 8.12, and 8.13.

Table 8.1-1
E. 54th Street/Second Avenue Shaft Site:
Average Equipment Usage Assumptions for Construction With Raise Bore Excavation

Equipment	Percentage of Time Equipment is Used in Each Construction Stage*							
	Stage 1 (3 mos.)	Stage 2A (3 mos.)	Stage 2B (10 mos.)	Stage 2C (8 mos.)	Stage 3 (12 mos.)	Stage 4A (12 mos.)	Stage 4B (3 mos.)	Stage 4C (2 mos.)
Rock Drill – Two			20 (per)					
Concrete Truck				15	25	5	25	
Paver						5	15	5
Pneumatic hammer			10					
Jackhammer	5						10	
Rock Drill				25				
Backhoe							25	
Excavator	10		15			5		
Front End Loader	20	10	10	5	5	10	10	10
Dump Truck at Idle	20	10	10			10	25	10
Flatbed Truck at Idle	15	5	10	5	20	20	10	10
Derrick Crane	10	5	5	20	25	10		
Telescoping Crane							10	
Pavement Cutter							10	
Compactor						5	10	
Welder	10	5	5	5	20	20	10	
Saw, electric	10	5	5	5	15	20	25	
Compressor (NYC)	5		70	70	5	5	25	
Raise Bore Machine		80						
Concrete Pump				10	25			

Note: Usage factors are based on a 16-hour workday.

Table 8.1-2
E. 54th Street/Second Avenue Shaft Site:
Average Equipment Usage Assumptions for Construction With Surface Excavation

Equipment	Percentage of Time Equipment is Used in Each Construction Stage*						
	Stage 1 (3 mos.)	Stage 2A (12 mos.)	Stage 2B (18 mos.)	Stage 3 (12 mos.)	Stage 4A (12 mos.)	Stage 4B (3 mos.)	Stage 4C (2 mos.)
Rock Drill – Two		15 (per)					
Concrete Truck			10	25	5	25	
Paver					5	15	5
Pneumatic hammer		10	10				
Jackhammer	5					10	
Rock Drill			25				
Backhoe						25	
Excavator	10	30	30		5		
Front End Loader	20	10	10	5	10	10	10
Dump Truck at Idle	20	30	30		10	25	10
Flatbed Truck at Idle	15	5	5	20	20	10	10
Derrick Crane	10	20	20	25	10		
Telescoping Crane						10	
Pavement Cutter						10	
Compactor					5	10	
Welder	10	5	5	20	20	10	
Saw, electric	10	5	5	15	20	25	
Compressor (NYC)	5	70	70	5	5	25	
Concrete Pump			10	25			

Note: Usage factors are based on a 16-hour workday.

Water Main Construction

Assuming the water main connection route described earlier, construction of water main connections from the E. 54th Street/Second Avenue Shaft Site would involve additional lane closures on Second Avenue. If two mains are laid in Second Avenue, a trench approximately 14 feet wide would be needed along Second Avenue, along with a construction barrier and an equipment lane. A total of 24.5 feet of sidewalk and/or roadway width would be closed during this construction. Upon reaching E. 55th and E. 56th Streets, the water main connection route would be the same as that for the First Avenue route or the Sutton Place route (presented in Chapter 5, Section 5.1).

Construction Schedule

Using the raise bore technique, construction activities at the E. 54th Street/Second Avenue Shaft Site would require an estimated total of 61 months, including the eight-month period between Stages 3 and 4 when contracting and equipment procurement would occur. As noted above, this construction would take nine months longer than at the preferred or other alternative Shaft Sites because of the need to use hydraulic splitting or other alternatives to blasting for excavation of shallow rock at the Site. This construction work would not begin until the existing sidewalk café had been demolished from the work area, which is estimated to take approximately six months.

Because of the delay to construction associated with removal of the sidewalk café and the lengthier construction process required to avoid blasting near the surface, City Tunnel No. 3 may not be available for use during Stage 2 at the E. 54th Street/Second Avenue Shaft Site. In that case, surface excavation would be used instead. This would further lengthen the construction schedule at the site, because the combination of hydraulic splitting and blasting is slower than raise bore excavation. Using the surface excavation technique, construction activities would take an additional nine months, for a total of approximately 70 months.

In either case, construction would not begin until the existing sidewalk café had been removed from the work area. This could take an estimated six months. Altogether, therefore, it is estimated that construction of Shaft 33B at the E. 54th Street/Second Avenue Shaft Site would be completed in late 2011 or mid 2012, depending on which technique is used. As a result, Shaft 33B would be completed 15 to 24 months later at the E. 54th Street/Second Avenue Shaft Site than at the preferred Shaft Site (which could be completed in mid-2010), because of the additional time required to excavate bedrock via hydraulic splitting and depending on whether raise bore operations can be conducted there or not. The schedule for construction at this site using either method is presented in Table 8.1-3. As shown in the table, use of the E. 54th Street/Second Avenue Shaft Site could substantially delay the time when Shaft 33B and the associated segment of City Tunnel No. 3 can be operational.

Table 8.1-3
Shaft Construction Stages at E. 54th Street/Second Avenue Shaft Site
Raise Bore vs. Surface Excavation
(Assuming Estimated Start Date of March 2006)

Stage	Activity		Conceptual Schedule			
			Months		Dates	
	Raise Bore	Surface Excavation	Raise Bore	Surface Excavation	Raise Bore	Surface Excavation
	Demolish sidewalk café		6	6	March 1, 2006–August 31, 2006	March 1, 2006–August 31, 2006
1	Cut/demolish sidewalk and asphalt pavement; excavate soil		3	3	September 1, 2006–November 30, 2006	September 1, 2006 November 30, 2006
2A	Drill pilot hole; raise bore the shaft	Excavate distribution chamber by hydraulic splitting	3	12	December 1, 2006–February 28, 2007	December 1, 2006–November 30, 2007
2B	Distribution chamber excavation (hydraulic splitting)	Shaft excavation (hydraulic splitting and blasting)l line shaft with concrete	10	18	March 1, 2007–December 31, 2007	December 1, 2007–May 31, 2009
2C	Slashing/lining the shaft (hydraulic splitting and blasting)	No Stage 2C	8	NA	January 2, 2008–August 31, 2008	NA
3	Riser piping installation, refill with concrete; distribution chamber construction (form and place reinforced concrete)		12	12	September 1, 2008–August 31, 2009	June 1, 2009–May 31, 2010
Contracting and Equipment Procurement			8	8	September 1, 2009–April 30, 2010	June 1, 2010–January 31, 2011
4	Equipment installation; construction of regulator/valve chambers and water main connections at Site		17	17	May 1, 2010–September 30, 2011	February 1, 2011–June 30, 2012
		Total, Excluding Café Demolition	61	70		

At the same time, however, the water main connections from this site are likely to follow a much shorter route to the Third Avenue trunk main. The estimated duration of this work would be 22 months, much shorter than construction of water main connections from the preferred Shaft Site following the potential routes analyzed in this EIS.

8.1.5 Activation and Operation

Activation and operation procedures would be consistent among all potential Shaft Site locations and are described in Chapter 2.

8.1.6 Permits and Approvals

Construction of Shaft 33B at the E. 54th Street/Second Avenue Shaft Site would require similar potential permits and approvals as the preferred Shaft Site (described in Section 4.1), with one possible exception: public review under the City's Uniform Land Use Review Procedure

(ULURP) may be required for acquisition of a temporary easement through private property. The potential permits and approvals for this site are as follows:

- FDNY Blasting Permits: FDNY regulates the transport and use of explosives within the City to ensure their safe usage. All blasting at the Shaft Site would be conducted in coordination with FDNY.
- NYCDOT Construction Activity Permits, Sidewalk Construction Permits, and Street Opening Permits: NYCDOT permits would be required for construction-related activities on sidewalks and within streets. These permits typically provide detailed stipulations for traffic and pedestrian control during construction.
- NYCDEP Tunneling Permit: These permits are required for all tunnel construction in the City and set specific limits on blasting and noise levels, construction area layout, muck removal, and other aspects of tunnel construction.
- NYCDEP Sewer Discharge Permit: A permit would be required for discharge into the sewer during the dewatering and Shaft activation process. This permit would specify the quality and quantity of water that can be discharged into a City sewer.
- NYCDEP Air Permit: A permit may be required pursuant to the City's Air Pollution Code for operation of a ventilation system for the concrete truck enclosure.
- New York City Department of Parks and Recreation (NYCDPR) Tree Work Permit: NYCDPR administers the street tree program in NYC. When street tree removal is required, NYCDPR must issue a permit and requires the project proponent to compensate the neighborhood for the loss of established greenery and provide additional street trees where possible in the general area of disturbance.
- Uniform Land Use Review Procedure: ULURP may be required for acquisition of a temporary easement through private property.

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