4.14 HAZARDOUS MATERIALS

4.14.1 Introduction

Following the methodology described in Section 3.14, "Hazardous Materials" of Chapter 3, "Impact Methodologies," this Section evaluates whether the construction and operation of the preferred Shaft Site would create an increased potential exposure of the public or the environment to hazardous materials. These substances could include heavy metals, volatile and semivolatile organic compounds (VOCs and SVOCs), methane, polychlorinated biphenyls (PCBs), and other substances deemed hazardous or toxic by the United States Environmental Protection Agency (USEPA) and/or New York State Department of Environmental Conservation (NYSDEC). Consistent with the guidance presented in the *CEQR Technical Manual*, the hazardous materials assessment evaluates whether past activities on or in the vicinity of the site would have resulted in the presence of hazardous materials at the project site. Such activities could include land uses known to require the use of such materials, the presence of leaking underground storage tanks, or a history of past spill activity.

A Phase I Environmental Site Assessment (ESA), which includes site observations, a historical review, and records database search, was originally conducted in December 2004 (revised in December 2005) to determine the potential for hazardous materials impacts as a result of construction at the preferred Shaft Site. The results of the Phase I ESA are summarized in this Section. A Phase II ESA, which involves environmental testing of soil and groundwater in the areas of potential disturbance to determine the presence, type and levels of contaminants that may be present, was also conducted at the site.

4.14.2 Existing Conditions

Current Site Conditions

The preferred Shaft Site is located at the intersection of E. 59th Street and First Avenue adjacent to the Queensboro Bridge. During construction, the footprint of the area of excavation would be approximately 2,800 square feet. The site is immediately bordered by the Queensboro Bridge (Bridge) to the north, E. 59th Street to the south, First Avenue to the east, and the multi-use area to the west.

The following conditions were observed at the preferred Shaft Site during the preparation of the Phase I ESA:

- The preferred Shaft Site contains no structures and is covered by pavement, asphalt, curbing, and sidewalks.
- The site is currently being used as a construction staging area for on-going Queensboro Bridge rehabilitation and as a parking area for New York City Department of Transportation (NYCDOT) vehicles.

- There are underground electrical utilities serving lamp posts and traffic signals in the area.
- The multi-use area continues to the west of the site.

The preferred Shaft Site is immediately adjacent to a number of heavily traveled roadways including the Queensboro Bridge. As a result, historic deposition of lead from vehicle exhausts is likely to have occurred at the site. In this area, it is also common to find historic fill that contains contaminants such as polycyclic aromatic hydrocarbons (PAHs) from coal ash or other sources of fill material.

Adjacent and Vicinity Land Uses

The preferred Shaft Site is located in an area of mixed business, commercial, residential and public transportation uses. Land uses immediately adjacent to the Site include the Queensboro Bridge, a multi-use area used for Bridge maintenance that is also accessible to the public, and under the Bridge, a NYCDOT welding shop, the Bridge Engineer's office, and a lunch room used by the New York City Department of Sanitation (DSNY) and NYCDOT. The closest properties to the Shaft Site are primarily four- to five- story structures with commercial storefronts at street level and residential space above located across E. 59th Street, and a courtyard area and commercial properties across First Avenue.

Other uses in the vicinity and south of the preferred Shaft Site include a health club, clothing store, home furnishings and decorating stores, a parking garage and small restaurants at street level with residential apartments above. Other uses to the east of the site include a Food Emporium and Terence Conran Shop and a landscaped public plaza.

Geology and Hydrogeology

Recent geotechnical borings completed in the area of the preferred Shaft Site show that bedrock is encountered at approximately 23 feet below ground level. Groundwater was encountered from 10 to 15 feet below grade and the general direction of groundwater flow was from west to east towards the East River. Based on topographic maps of the area, the overland flow of water (i.e. storm water and environmental releases) would also flow in a west to east direction.

Records Search

A listing of Federal and State environmental enforcement sites in the area of the preferred Shaft Site was obtained. The search was conducted to evaluate past and present activities involving hazardous materials on and in the vicinity of the site. The database search identified incident locations or facilities where hazardous materials may be present and are either known to have been released to the environment (e.g., spills, leaks) or may be sources of future releases.

An environmental database search for the preferred Shaft Site did not reveal any on-site uses of hazardous materials. The environmental database did identify leaking underground storage tanks (LUSTs), reported spills (mostly petroleum products), and environmental releases including 1,1,1-trichloroethylene and asbestos, all within 0.25 miles of the preferred Shaft Site, but no direct spills or releases at the site. Many of these incidents are identified as having been closed or

mitigated. Although there is no history of hazardous materials use at the preferred Shaft Site, off-site sources of hazardous materials from adjacent properties and the surrounding area may have migrated onto the preferred Shaft Site. Results of the records search for the area within a 0.25 mile radius are provided below.

Resource Conservation and Recovery Information System (RCRIS)

A number of registered hazardous waste generators in the USEPA database are located within 0.25 miles of the Shaft Site, including:

- Four RCRIS Large Quantity Generators
- 17 RCRIS Small Quantity Generators
- 14 RCRIS Conditionally Exempt Small Quantity Generators
- 14 RCRIS Sites with no available information
- One RCRIS Transporter

NYSDEC Registry of Inactive Hazardous Waste Disposal Sites

There were 23 spills within 0.15 miles and another 29 spills within 0.25 miles of the preferred Shaft Site in the records database updated in December 2004. These spills included:

- Gasoline
- Diesel Fuel
- Motor Oil
- Unknown Petroleum Products
- # 2, #4 and #6 Fuel Oil
- Transformer Oil
- Ethylene Glycol
- A Non-Petroleum Hazardous Material
- Dielectric Fluid
- Asbestos

Emergency Response Notification System (ERNS)

There is one ERNS site indicated in the USEPA database of response action to emergency spill incidents that is located within 0.15 miles of the site. The material reported was asbestos. A second site was located within 0.25 miles of the preferred Shaft Site and the reported material was also asbestos.

There was one air and surface water reported release site within 0.15 miles and another nine reported release sites within 0.25 miles of the preferred Shaft Site. These sites are a subset of the ERNS database which has impacted only air or surface water. The following materials were reported:

- Asbestos

- Dielectric Fluid
- Diesel Fuel
- Transformer Oil
- Unknown Material

Toxic Release Inventory System (TRIS)

USEPA's database of all facilities that have had or may be prone to toxic material releases indicates two TRIS sites within 0.25 miles of the Site. 1,1,1-Trichloroethane was the material reported at one site. The database did not have any information on the second TRIS site.

Hazardous Materials Incident Response System (HMIRS)

There are eight HMIRS sites in the U.S. Department of Transportation's database that are located within 0.25 miles of the site; one of these is within 0.15 miles of the site. The following materials were reported:

- #1, #2, #4, #5, and #6 Fuel Oils
- Gasoline
- Three unknown products having ID's: 84093, 24104 and 14196

Regulated Underground and Aboveground Storage Tanks (UST/AST)

There are 23 Regulated UST/AST sites in the NYSDEC database that are located within 0.15 miles of the preferred Shaft Site and an additional 23 within 0.25 miles of the preferred Shaft Site. There are seven LUST sites within 0.15 miles and another 10 within 0.25 miles of the preferred Shaft Site. The following materials were reported:

- #2, #4, and #6 Fuel Oils
- Gasoline
- Natural Gas
- Diesel Fuel

Historical Uses of the Preferred Shaft Site and Adjacent Properties

The following sources were reviewed to obtain information on the history of the preferred Shaft Site from 1892 to the present:

- Sanborn/Fire Insurance Maps
- Aerial Photographs

Sanborn maps are used by the insurance industry to list properties for emergency or claims purposes. As a result, the maps identify properties (e.g., company name, generic title such as filling station, etc.), but generally do not provide detail on the nature of operations that were performed at that location. Nonetheless, since these maps go back as far as the late 1800's for

older, more established communities, they are useful for identifying potential hazardous material sites, particularly prior to the era of current environmental regulations.

A total of 17 Sanborn maps were obtained dating from 1892 to the most recent map published in 2003. Review of these maps indicates that prior to construction of the Bridge, City Block No. 1434 (E. 59th to E. 60th Street between First and Second Avenue) consisted primarily of small, residential/commercial buildings. The block was cleared to construct the Queensboro Bridge. Although the Queensboro Bridge was constructed in the early 1900s, Sanborn maps were not available from 1907 to 1951, which includes the construction of the Queensboro Bridge. Other development in the area included construction of several high-rise apartment buildings.

The conclusions of the historical review indicate that there was no evidence of hazardous materials issues in connection with the history of the site. The Phase I ESA also concludes that although there is no history of hazardous materials use at this Shaft Site, off-site sources of hazardous materials from adjacent properties and the surrounding area may have migrated onto the site.

Phase II Environmental Site Assessment

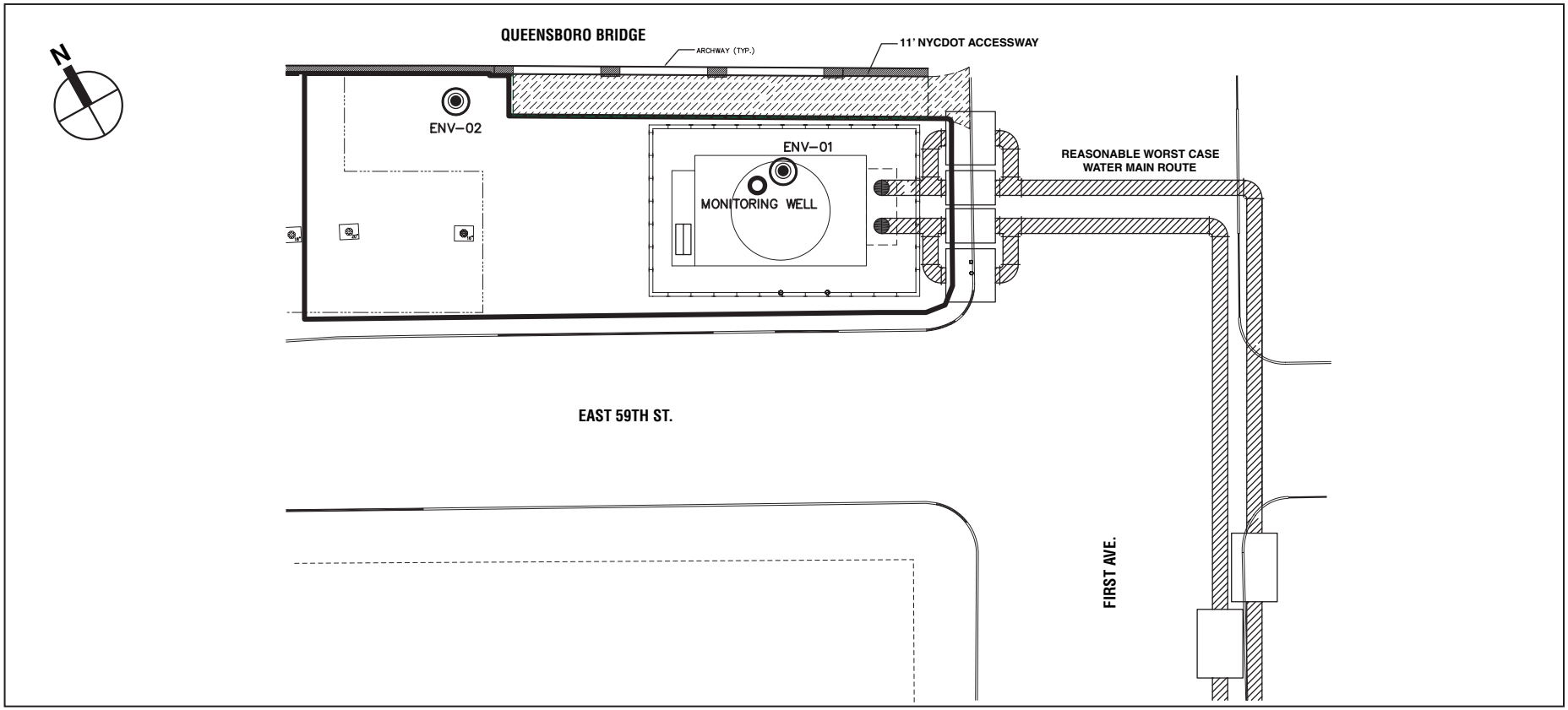
Based on the results of the Phase I ESA, a Phase II ESA was conducted for the preferred Shaft Site. A Phase II ESA involves environmental testing of soil and groundwater in the areas of potential disturbance to determine the presence, type, and levels of contaminants that may be present. The results and conclusions of the Phase II ESA are presented below.

Soil Sampling Results

Subsurface investigations were conducted at the site on June 20 and June 21, 2005. As shown in Figure 4.14-1, two environmental soil borings were taken on the site, ENV-01 and ENV-02. Six composite samples were taken at each boring location and analyzed in a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory.

The soil sample results are summarized in Table 4.14-1. The summary tables present those compounds that were detected at the site. Compounds detected were compared to NYSDEC's recommended soil cleanup objectives in "Technical and Administrative Guidance Memorandum" (TAGM) #4046. Those that exceeded the TAGM levels are highlighted in bold on the tables.

The soils organic analysis data for both ENV-01 and ENV-02 show that many of the organic compounds detected are mainly PAHs. PAHs are common contaminants in urban environments and are often associated with asphalt and oil based products. For ENV-01, the metals detected in the soils—beryllium, chromium, copper, iron, lead, mercury, nickel, and zinc—all exceeded TAGM soil cleanup objectives at depths down to 20 feet below grade. Arsenic and selenium also exceeded TAGM objectives at the 3 to 5 foot sampling interval. Many of the compounds, however, are within the typical range of Eastern US background levels for soils. Soil sample results for ENV-02 are similar to those of ENV-01 with PAHs and metals being the primary contaminants.



NOT TO SCALE

Legend:

- *Site Boundary*
- *Curbline*
- *Building Line*
- *Multi-Use Area*
- *Cofferdam*
- *Environmental Soil Boring Locations*
- *Monitoring Well*

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

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

ENVIRONMENTAL SAMPLING LOCATIONS

FIGURE 4.14-1

Table 4.14-1
Preferred Shaft 33B Site Soil Sampling Results- Compounds Detected

(SB33B-01)			Environmental Boring ENV-01					
			Composite Depth of Sampling Intervals, Feet					
TAGM #4046			1 - 3	3 - 5	5 - 7	7 - 11	11 - 15	15 - 20
PARAMETER	UNITS	VALUE	E-02-1-3	E-04-3-5	E-06-5-7	E-08-7-1	E-10-11-15	E-12-15-20
ORGANICS - µg/Kg								
Acetone	mg/Kg	0.2	ND	6.2	ND	ND	ND	ND
Acenaphthylene	mg/Kg	41	67	170	220	ND	ND	ND
Anthracene	mg/Kg	50	ND	320	200	ND	ND	ND
Benzo(a)anthracene	mg/Kg	0.224	**340**	**620**	**1200**	ND	ND	ND
Benzo(b)fluoranthene	mg/Kg	1.1	490	520	**1500**	ND	ND	ND
Benzo(k)fluoranthene	mg/Kg	1.1	210	240	630	ND	ND	ND
Benzo(a)pyrene	mg/Kg	0.061	**410**	**480**	**1300**	ND	ND	ND
Benzo(g,h,i)perylene	mg/Kg	50	270	280	780	ND	ND	ND
bis(2-Ethylhexyl)phthalate	mg/Kg	50	210	ND	72	ND	ND	ND
Carbazole	mg/Kg	N/A	ND	73	130	ND	ND	ND
Chrysene	mg/Kg	0.04	**340**	**660**	**1300**	ND	ND	ND
Dibenz(a,h)anthracene	mg/Kg	0.014	ND	ND	**66**	ND	ND	ND
Dibenzofuran	mg/Kg	6.2	ND	71	110	ND	ND	ND
Flouranthene	mg/Kg	50	640	1300	3200	ND	ND	ND
Fluorene	mg/Kg	50	ND	120	96	ND	ND	ND
Indeno(1,2,3-cd)pyrene	mg/Kg	3.2	210	210	700	ND	ND	ND
Naphthalene	mg/Kg	13	ND	70	88	ND	ND	ND
Phenanthrene	mg/Kg	50	90	1700	2000	ND	ND	ND
Pyrene	mg/Kg	50	640	1500	2800	ND	ND	ND
METALS - mg/Kg								
Aluminum	mg/Kg	SB	5640	7250	7280	9450	6760	6920
Antimony	mg/Kg	SB	7.14	79.3	ND	2.42	ND	ND
Arsenic	mg/Kg	7.5 or SB	5.53	**14.7**	6.65	0.132	0.892	0.91
Barium	mg/Kg	300 or SB	93.2	91.4	151	107	73.9	72.1
Beryllium	mg/Kg	0.16 or SB	**0.23**	**0.223**	**0.332**	**0.441**	**0.334**	**0.341**
Cadmium	mg/Kg	1 or SB	ND	0.223	0.111	ND	**31.4**	ND
Calcium	mg/Kg	SB	48000	46600	44700	7570	2420	2320
Chromium	mg/Kg	10 or SB	**15.2**	**24.2**	**32**	**21.3**	**16.5**	**15.6**
Cobalt	mg/Kg	30 or SB	5.18	19	16.3	11	8.7	8.87
Copper	mg/Kg	25 or SB	**118**	**1000**	**163**	**28.6**	**31.4**	**26.8**
Iron	mg/Kg	2000 or SB	**16400**	**41400**	**19000**	**19200**	**15500**	**15600**
Lead	mg/Kg	SB(200-500)	234	**753**	**526**	21.8	15.1	6.03
Magnesium	mg/Kg	SB	4290	13000	13900	4790	3430	3460
Manganese	mg/Kg	SB	259	1020	817	430	254	341
Mercury	mg/Kg	0.1	**2**	**5.9**	**5.3**	**0.226**	**0.129**	**0.23**
Nickel	mg/Kg	13 or SB	**16.6**	**126**	**30.7**	**21.7**	**17.6**	**17.6**
Potassium	mg/Kg	SB	874	1280	1300	4880	3190	3260
Selenium	mg/Kg	2 or SB	1.61	**2.34**	1.55	0.661	1	0.455
Silver	mg/Kg	SB	ND	1.11	0.554	ND	ND	ND
Sodium	mg/Kg	SB	526	649	572	156	265	371
Thallium	mg/Kg	SB	1.15	ND	ND	ND	0.78	ND
Vanadium	mg/Kg	150 or SB	18.5	55.4	24.8	31.7	24.3	26.3
Zinc	mg/Kg	20 or SB	**73.4**	**161**	**280**	**87.2**	**51**	**40.8**

Table 4.14-1 (cont'd)
Preferred Shaft 33B Site Soil Sampling Results

(SB33B-02)			Environmental Boring ENV-02					
			Composite Depth of Sampling Intervals, Feet					
TAGM #4046			1-3	3 - 5	5 - 7	7 - 9	9 - 15	15 - 20
PARAMETER	UNITS	VALUE	E-02-1-3	E-04-3-5	E-06-5-71	E-08-7-9	E-10-9-15	E-12-15-20
ORGANICS - µg/Kg								
Acetone	mg/Kg	0.2	9.8	34	35	5.4	65	23
Benzo(a)anthracene	mg/Kg	0.224	**3000**	ND	ND	**4200**	**1300**	ND
Benzo(b)fluoranthene	mg/Kg	1.1	**2700**	ND	ND	**4100**	**1500**	ND
Benzo(a)pyrene	mg/Kg	0.061	ND	ND	ND	**3200**	**1100**	ND
2-Butanone	mg/Kg	4.5	ND	4.2	4.3	ND	ND	ND
Chloroform	mg/Kg	31	ND	ND	1.4	6	ND	ND
Chrysene	mg/Kg	0.04	ND	ND	ND	**3500**	**1100**	ND
Flouranthene	mg/Kg	50	2900	6900	3100	11000	3400	ND
Phenanthrene	mg/Kg	50	3400	ND	ND	13000	2600	ND
Trichlorofluoromethane	mg/Kg	N/A	ND	1.5	1.4	ND	ND	ND
Pyrene	mg/Kg	50	5600	ND	ND	8200	2500	ND
METALS - mg/Kg								
Aluminum	mg/Kg	SB	6810	5120	7370	6270	8560	7170
Antimony	mg/Kg	SB	ND	ND	ND	ND	4.76	ND
Arsenic	mg/Kg	7.5 or SB	3.25	2.5	2.95	2.34	2.32	ND
Barium	mg/Kg	300 or SB	69.8	48	74.6	67.7	89.2	73.7
Beryllium	mg/Kg	0.16 or SB	**0.433**	**0.217**	**0.328**	**0.223**	**0.348**	**0.447**
Cadmium	mg/Kg	1 or SB (200–500)	0.108	ND	ND	ND	ND	**1.34**
Calcium	mg/Kg	SB	40500	38000	43700	43700	24700	17.4
Chromium	mg/Kg	10 or SB	**18**	**15.9**	**19.9**	**15.2**	**20.5**	**17.4**
Cobalt	mg/Kg	30 or SB	7.14	4.67	6.89	6.36	9.86	9.27
Copper	mg/Kg	25 or SB	**36.7**	23.1	**42.4**	**33.4**	**38.9**	23.4
Iron	mg/Kg	2000 or SB	**14400**	**11900**	**13400**	**12200**	**176000**	**14400**
Lead	mg/Kg	SB	45.1	29.1	36.4	34.3	25.5	5.58
Magnesium	mg/Kg	SB	10200	13300	8750	6270	9760	3280
Manganese	mg/Kg	SB	226	176	231	207	328	247
Mercury	mg/Kg	0.1	**0.222**	**0.213**	**0.206**	**0.162**	0.091	0.033
Nickel	mg/Kg	13 or SB	**18.2**	12.6	**15.2**	**14**	**19.7**	**15.6**
Potassium	mg/Kg	SB	1780	1340	1930	1670	3750	3660
Sodium	mg/Kg	SB	461	245	356	384	247	140
Vanadium	mg/Kg	150 or SB	37.3	29.4	33.4	38.5	38.1	25.2
Zinc	mg/Kg	20 or SB	**139**	**87.7**	**102**	**92.3**	**74.1**	**36.3**

Notes: µg/Kg = micrograms per kilogram
mg/Kg = milligrams per kilogram
N/A = Not Applicable
SB = Site Background
ND = Non Detect

Groundwater Sampling Results

One groundwater sample was taken at the site. The results for the one groundwater sample taken are summarized in Table 4.14-2 (see Figure 4.14-1 for the location of the well). The summary table presents those compounds that were detected at the site. Compounds detected were compared to NYSDEC's Region 2 Dewatering Sampling and Testing Requirements and NYCDEP Limitations

for Effluent to Sanitary or Combined Sewers. Those that exceeded the applicable levels are highlighted in bold on the table.

The data revealed that two parameters exceeded NYCDEP limits. PCB (AROCLOR 1016) was detected at 5.50 µg/L (NYCDEP limit, 1µg/L total PCBs). The groundwater total suspended solids (TSS) of 8,500 mg/L also exceeded the NYCDEP limit of 350 mg/L.

Table 4.14-2
Preferred Shaft 33B Site Groundwater Sampling Results

NYCDEC REGION 2 Dewatering Sampling & Testing Requirements	NYCDEP Bureau of Wastewater Treatment			Groundwater Results Sample Locations	
Parameter	**Parameter**	**Daily Limit**	**Units**	**GW 33B-01**	**Units**
	Non-polar Material[a]	50	mg/1	5.2	mg/l
pH	pH	5-11	SUs	7.4	SUs
	Flash Point	>140	Degrees F	>100	Degrees C
	Chromium (VI)	5	mg/1	23	µg/l
	Copper	5	mg/1	2	µg/l
	Lead	2	mg/1	2	µg/l
	Nickel	3	mg/1	19	µg/l
	Zinc	5	mg/1	60	µg/l
	MTBE (Methyl-Tert-Butyl-Ether)	50	ppb	21	µg/l
	Napthalene	47	ppb	2	µg/l
	Tetrachloroethylene (Perc)	20	ppb	0.67	µg/l
	1, 1, 1 Trichloroethane	ND	ND	0.37	µg/l
PCBs	PCBs (Total)	1	ppb	5.5	µg/l
Total Suspended Solids	Total Suspended Solids (TSS)	350	mg/1	8500	mg/l
	CBOD[b]	N/A	N/A	13	mg/l
BOD_6		N/A	N/A	16	mg/l
Chloride[b]	Chloride[b]	N/A	N/A	860	mg/l
	Total Nitrogen[b]	N/A	N/A	0.599	mg/l
	Total Solids[b]	N/A	N/A	8500	mg/l
Fecal Coliform		N/A	N/A	30	mg/l
Nitrate/Nitrite		N/A	N/A	1.49	mg/l
Oil & Grease		N/A	N/A	5.4	mg/l
Pesticides		N/A	N/A	ND	mg/l
Settleable Solids		N/A	N/A	90	mg/l/hr

Notes:
mg/l = milligrams per liter
ppb = parts per billion
µg/l = micrograms per liter
mg/l/hr = milligrams per liter per hour
CBOD = Carbonaceous Biochemical Oxygen Demand
SUs = Significant Units
N/A = Not Applicable
ND = Non Detect
BOD = Biochemical Oxygen Demand

a. Analysis for non-polar materials must be done by EPA method 1664 Rev. A. Non-polar Material shall mean that portion of the oil and grease that is not eliminated from a solution containing N-Hexane, or any other extraction solvent the EPA shall prescribe, by silica gel absorption.

b. Analysis for Carbonaceous Biochemical Oxygen Demand (CBOD), Chloride, Total Solids and Total Nitrogen are required if proposed discharge > 10,000 gallons per day.

4.14.3 Future Conditions Without the Project

Currently, the soils left undisturbed on the preferred Shaft Site do not represent a health or environmental concern in terms of hazardous material exposure to the public at or in the vicinity of the site based on information obtained and reviewed for the Phase I ESA and Phase II ESA. There are no visible signs of surface contamination that would suggest that incidental contact with the preferred Shaft Site soils would result in human health issues or diminish the environmental quality of the site or surrounding environment. This is also supported by the apparent healthy condition of the honey locust trees immediately adjacent to the site on its west boundary. Since there are no other planned construction or related activities that would directly affect the preferred Shaft Site, the subsurface conditions should remain undisturbed in the Future Without the Project. Therefore it is expected that the present conditions at the site would be essentially the same without the project.

4.14.4 Future Conditions With the Project

Construction

During construction, subsurface soils would be excavated from the preferred Shaft Site. The subsurface soils 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. Therefore, a number of preventative measures will be implemented to minimize exposure to potentially contaminated soils and groundwater during construction as discussed below. There are no substantive differences between the base configuration and alternate site configuration with regard to hazardous materials impacts and, therefore, the measures presented below would apply to both. The amount of soils disturbed and excavated would be the same under both configurations.

Soil Excavation and Remediation

As discussed above under "Existing Conditions," the Phase II ESA soil testing results show numerous compounds exceeding TAGM clean-up levels. However, the concentrations of the compounds found also suggest that samples taken during construction to determine disposal methods would most likely not exceed Toxicity Characteristics Leaching Procedure (TCLP) limits. Therefore, based on the Phase II ESA soil samples taken to date, it is expected that the preferred Shaft Site soils would not be classified as 'Hazardous Waste' for disposal purposes. Prior to disposal, additional sampling and laboratory analysis will be completed to determine disposal options. Any additional testing will be performed in accordance with a sampling protocol and Health and Safety Plan (HASP) to be submitted to and approved by the NYCDEP Bureau of Environmental Planning and Assessment (BEPA) prior to any field activity.

When construction begins, all contaminated soils in the areas to be excavated for construction will be removed and disposed of in accordance with all applicable Federal, State, and local regulations. Soil removed from the excavation areas will be transferred into dump trucks for transportation and off-site disposal. The site cannot accommodate on-site storage. All

remediation at the site will be performed in accordance with a Remedial Action Plan (RAP) to be submitted to and approved by NYCDEP BEPA prior to any construction activity. The RAP would not be finalized until all disposal testing is completed and any applicable engineering controls for dewatering are determined (see "Groundwater Dewatering and Remediation" below).

All excavated material will be sampled by the contractor in accordance with the approved protocol discussed above to determine if the material is hazardous waste, industrial waste, petroleum-contaminated waste or construction and demolition debris. Based on the analytical results of the characterization soil samples, the soils will be disposed of as follows:

- If the soils do not exhibit the characteristics of a hazardous waste, the soils could be disposed of at a permitted solid waste facility or transported to a soil recycling facility or asphalt batch plant for treatment provided that such disposal, recycling or treatment is in accordance with Federal, State, and local regulations and requirements; or
- If the soils exhibit the characteristics of a hazardous waste, the soils would have to be disposed of at a RCRA-permitted hazardous waste disposal facility.

The contractor's Field Sampling Plan will include an indication of the specific frequency of in-situ samples per unit volume to be collected as required by the approved disposal facility, but not fewer than one composite sample for each 500 cubic yards of material to be excavated. Parameters analyzed will be at a minimum of full RCRA characteristics and TCLP VOCs, SVOCs, Metals, Pesticides/Herbicides, and all other required disposal facility criteria.

All material will be classified prior to excavation, following receipt of in-situ soil sampling results and before being transported off-site for disposal at a licensed facility that can accept the excavated material. The materials will be handled within a fenced construction site; therefore, the public would not be come into direct contact with these materials. Excavation will be performed in accordance with the contractor's approved site-specific Construction Health and Safety Plan (CHASP) (see below) to ensure adequate protection of on-site workers and the public from potential chemical contaminants in soils.

During the final stage of construction, the site will be filled with certified clean fill that meets all NYSDEC recommended soil cleanup objectives in TAGM #4046 and capped with an impervious surface.

Groundwater Dewatering and Remediation

As discussed above under "Existing Conditions," the Phase II ESA groundwater testing data show that groundwater contaminants, including PCBs, may be encountered during construction dewatering activities. Dewatering during construction may require treatment of the groundwater prior to discharge to the New York City sewer system. If the groundwater exceeded the local sewer use limitations, the water will be treated (by readily available technologies) prior to its discharge to the sewer system. An appropriate testing program will be developed as part of the project's dewatering permit(s), which will be sought from NYCDEP Bureau of Water and Sewer

Operations, if required. Treatment will be to the levels specified in NYCDEP sewer regulations (for sewer discharges).

Prior to obtaining NYCDEP discharge permits, if required, groundwater will be sampled in any areas where dewatering would occur and analyzed to characterize its physical and chemical properties. Depending on the results of the analyses, the type of treatment prior to discharge, if required, would be determined. If treatment were required, the contractor will be required to submit to NYCDEP BEPA a Dewatering Plan for review and approval prior to any dewatering activities. The plan will have dewatering and treatment components and geotechnical components, and will address procedures for handling groundwater encountered during construction. The Dewatering Plan will provide a description of the methods used to collect, store, and dispose of contaminated water generated during dewatering activities and any applicable engineering controls. Additionally, the Dewatering Plan will identify the permits required from the NYCDEP to discharge the water into the New York City's sewer system.

NYCDEP permits require that contaminated sediments suspended in groundwater be removed prior to discharge. This will be achieved, for example, through the use of settling tanks and the injection of a flocculent[1] that would cause suspended sediments to settle out of the water. The sediments will be analyzed to determine whether contaminants were present and an appropriate disposal option will be selected.

If the groundwater contained VOCs, additional treatment will be performed on-site after the settling process and prior to discharge. The treatment could include air stripping or the use of carbon filtration. Air stripping extracts VOCs from the water by inducing them to partition into air and is generally accomplished by forcing air through the water column. Once the air passes through the water column, it is collected and filtered with carbon to assure that VOCs are not released to the surrounding environment. The VOCs then adsorb to the carbon and when the filters are spent, they are collected and transported to and disposed of at a licensed, permitted facility. Air strippers used for dewatering operations are considered "temporary" or "short term usage" and do not need to be permitted. Alternatively, groundwater subject to VOC or PCB contamination could be filtered through carbon for treatment. This treatment utilizes a sealed container containing carbon, and VOCs and PCBs are removed as the water passes through the carbon.

The collection of any contaminated groundwater will be handled within a fenced construction site; therefore, the public would not be come into direct contact with these materials. Groundwater pumping wells, the dewatering treatment system, discharge location, and associated piping are all closed systems and would not have the potential to affect workers or the surrounding population.

[1] A flocculent is a chemical or physical agent added to a volume of fluid to induce suspended particles to coalesce and settle to the bottom

Construction Health and Safety Plan

CHASPs would be developed for the various construction activities associated with the project. Each CHASP, in part, will include the means and methods necessary to reduce the potential for worker or public contact with contamination found in either the soil or groundwater. These plans would address the potential exposure pathways. In addition to addressing issues related to site contamination, the CHASP addresses other safety concerns associated with a variety of construction methods. Each CHASP would address both the known contamination issues as well as contingency items (e.g., if unknown contamination is encountered). The CHASP would be developed in accordance with U.S. Occupational Health and Safety Administration (OSHA) regulations and guidelines and include any additional contaminants that are identified during the contractor's field sampling program.

All construction at the site will be performed in accordance with a CHASP to be submitted to and approved by the NYCDEP prior to any construction activity. The CHASP would not be finalized until all disposal testing is completed and any applicable engineering controls for dewatering are determined.

The CHASP would be the primary measure used to safeguard construction workers and nearby residents during construction work. This document would describe in detail planned response to air, soil, and water monitoring data that will be taken during construction, personal protective equipment (PPE) and respiratory protection to be used by workers in various parts of the excavation, dust and vapor control measures, proper decontamination routines, and emergency procedures. The CHASP would also describe medical surveillance and training requirements, site personnel responsibilities, and anticipated potential hazards. The document would include requirements to notify appropriate regulatory agencies as well as procedures to quickly and safely address the various issues. The CHASP would also generally include routine monitoring requirements of both air and soil/rock (in place and/or as spoils). Routine monitoring would include many parameters, including methane.

The provisions of the CHASP would be mandatory for the contractors and subcontractors engaged in any construction activities that have the potential to expose their personnel to the existing soils or groundwater on the Site. In addition, all on-site personnel would be required to follow all applicable local, state, and OSHA construction codes and regulations.

Engineering controls, such as dust suppression during excavating and grading activities, will be implemented or work activities would be temporarily ceased to mitigate the potential for off-site migration of airborne constituents. The off-site community will also be protected through other measures designed to limit direct contact with on-site materials. Such measures will include appropriate access controls (e.g., fencing) and proper management of all waste streams generated during on-site activities through the implementation of soil and groundwater management plans.

Storage of Hazardous Materials During Construction

No significant quantities of hazardous materials would be stored onsite during the construction period. It is possible that small quantities of lubricating oils would be kept at the site. These

materials would be stored and used in accordance with applicable regulations and would not be anticipated to represent a potential risk to workers or the surrounding population. A CHASP will be in place to address emergency response in the case of worker exposure, or a spill. The site would be fenced and secured; therefore, the public would not be come into direct contact with these materials.

Conclusions

With implementation of the measures discussed above, there would be no potential significant adverse hazardous materials impacts from construction of the shaft. An assessment of the potential for significant adverse hazardous materials impacts from construction of Shaft 33B at the preferred Shaft Site and its water main connections is presented in Section 5.14, "Hazardous Materials" in Chapter 5, "Water Main Connections."

Activation and Operation

As described in Chapter 2, "Purpose and Need and Project Overview," activating the shaft includes the shaft disinfection process. During the disinfection step, chlorinated water would flow into the shaft from Tunnel No. 3 and be discharged to the local sewer system until a required chlorine residual was achieved within the shaft; no chlorine would be stored at the preferred Shaft Site. However, prior to discharging the chlorinated water to local sewers, the water may need to be dechlorinated. Treatment of chlorinated water at the preferred Shaft Site would require a maximum of one delivery of sodium bisulfite per day for a period of approximately three to five days.

OSHA considers sodium bisulfite a hazardous chemical under 29 CFR 1910.1200 and 29 CFR 1910.1450. This is because it is listed by the American Conference of Industrial Hygenists (ACGIH) as having a Threshold Limit Value (TLV) of 5 milligrams per cubic meter (mg/m^3) to protect skin and mucous membranes from irritation (ACGIH "Documentation of TLVs," 2001). A Material Safety Data Sheet (MSDS) must be developed by the manufacturer and provided to users for sodium bisulfite. As this material is a Food and Drug Administration (FDA) approved food additive, only mild gastric irritation has been reported from acute ingestion exposures.

A CHASP will be in place to address emergency response in the case of worker exposure, or a spill. According to the National Institute for Occupational Safety and Health (NIOSH), exposure to sodium bisulfite via direct ingestion, contact with eyes or inhalation from virgin material represents the greatest cause for health concerns. Recommended first aid for direct contact with eyes is to irrigate immediately and for inhalation to seek fresh air. If sodium bisulfite is ingested, it is recommended to seek immediate medical attention. Sodium bisulfite decomposes naturally. In the event there was a spill during transport or delivery a spill incident report would be required. A spill of sodium bisulfite would be captured and removed from the location at which the spill occurred. Residual sodium bisulfite remaining after clean-up would slowly oxidize on exposure to air.

Operation of the shaft would not require the use of chemicals. Short-term maintenance and repair activities would routinely occur at the site, as discussed in Chapter 2, but are not anticipated to involve the use of hazardous materials. Based on the nature of sodium bisulfite, the protective measures that would be in place during its use, and the lack of any further chemical use on-site after activation, no potential significant adverse hazardous materials impacts would be anticipated to occur during activation and operation of the shaft.

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