Chapter 12: Hazardous Materials

A. INTRODUCTION

This chapter assesses the potential for the presence of hazardous materials in the Willets Point Development District and on adjacent Lot B. It examines the potential for both human and environmental exposure to hazardous materials in the current condition, the future without the proposed Plan, the future with the proposed Plan (during and following construction), and outlines specific measures that would be employed to protect public health, worker safety, and the environment. "Hazardous materials" are generally defined as any substances that pose a threat to human health or the environment. The term is often used interchangeably with "contaminated material," but should not be confused with the term "hazardous waste," which is a regulatory term.[1] Assessment methodologies are based upon available guidance, including:

- American Society for Testing and Materials (ASTM), Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E 1527-05);
- 2001 *City Environmental Quality Review (CEQR) Technical Manual*, Chapter J. Hazardous Materials, and Hazardous Materials Appendices;
- Draft DER-10 Technical Guidance for Site Investigation and Remediation, New York State Department of Environmental Conservation (DEC), December 2002;
- Final Brownfield Cleanup Program (BCP) Guide, DEC, December 2006;
- General Remedial Program Requirements, 6 NYCRR Subpart 375-1, effective December 14, 2006;
- New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006); and
- DER-13/Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York, DEC Program Policy, October 18, 2006.

Pursuant to CEQR, certain types of industrial, manufacturing, and commercial facilities and their activities (listed in "Hazardous Materials Appendix 1" of the *CEQR Technical Manual*) require assessment for hazardous materials. These facility categories include: automobile wrecking establishments; automobile service stations; dumps; filling stations; garbage incineration, storage or reduction; gasoline service stations; junkyards; office equipment or machinery repair shops; oil storage; petroleum or petroleum products storage and handling; pumping stations; sewage; and welding shops.

[1] "Hazardous waste" is defined in both the U.S. Environmental Protection Agency (EPA) regulations (40 CFR Part 261) and New York State regulations (6 NYCRR Part 371) and refers to a subset of solid wastes that are either specific wastes listed in the regulations (listed wastes) or solid wastes possessing the characteristic of ignitability, reactivity, corrosivity or toxicity (characteristic wastes).

As described in Chapter 1, "Project Description," the Willets Point peninsula and surrounding area were used for the disposal of incinerator ash and garbage from around 1900 through the mid 1930s. During this time, approximately 50 million cubic yards of material filled the area with varying thickness of ash and waste. This entire fill area, much of which now comprises Flushing Meadows-Corona Park, was the site of the 1939 New York World's Fair. The street grid in the District, including Willets Point Boulevard, was put in place around the time of the 1964-1965 World's Fair.

Following its period of use as a disposal site, the District was occupied by a dense cluster of industrial, automotive, manufacturing, and commercial businesses. As a result of this history, evidence of contaminants on the site included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), heavy metals, pesticides, herbicides and rodenticides, as well as asbestos and lead-based paint (LBP), based on the age of many of the buildings. Soil and groundwater have been impacted in varying degrees throughout the District, possibly resulting in vapor intrusion issues within the buildings. Recent subsurface sampling has been limited to the streets/sidewalks, as other areas are private property. Although this sampling did not identify evidence of petroleum contamination in soil samples (the sampling results were consistent with those usually found in fill materials in New York City), groundwater sampling did indicate evidence of petroleum contamination, consistent with suspected releases from private properties within the District.

Development within the District under the proposed Plan would involve the complete demolition of the existing structures, roadways, and specific existing above- and below-ground utilities. New construction would require excavation, disturbance, redistribution, and potential removal of existing fill material. To reduce or eliminate areas of contamination, removal of material for off-site treatment or disposal may also be necessary.

The presence of hazardous materials threatens human health only when exposure to those materials can occur. Human exposure is most likely to occur through inhalation of VOCs, SVOCs, or particulate-laden air released during demolition, excavation, and construction activities; direct contact with contaminated material during and after construction; and ingestion of contaminated material (fill/soil or groundwater) during and after construction. Construction of the proposed Plan would include remedial strategies (such as removal and/or capping of contaminated soils) and engineering/institutional controls (such as performing work under appropriate health and safety procedures and installing vapor barriers under new buildings) to reduce or eliminate these exposure pathways.

PRINCIPAL CONCLUSIONS

As described below, a Phase I Environmental Site Assessment (ESA) identified the potential for contamination in the District due to current and past usage. Sampling undertaken as part of a Phase II ESA confirmed that contamination is present. Although sampling did not identify petroleum contamination in soil samples (the samples were only from streets and sidewalks, and soil sampling results were consistent with those usually found in fill materials in New York City), groundwater sampling did indicate evidence of petroleum contamination, consistent with releases from private properties within the District. Given the presence of this groundwater contamination and the historic uses within the District, other potential contamination is expected to be widespread on private properties. In addition, with respect to the proposed Lot B redevelopment, based on environmental investigations performed in 2006 in preparation for the development of Citi Field, contaminant levels were typical of urban fill materials, though

methane levels were significantly elevated with levels in soil gas above the 5 percent lower explosive limit (LEL) in half the locations sampled[1]. The methane is believed to be attributed to the historic swamp that was buried during the landfilling period. By implementing remediation measures and engineering/institutional controls, it is expected that no potential exposure or significant adverse impacts related to hazardous materials would occur during or after construction of the proposed Plan or the No Convention Center Scenario. E-designations would be placed on all lots within the District. The E-designation would require that, prior to the New York City Department of Buildings (DOB) issuing permits associated with redevelopment, the property owner conduct Phase I and Phase II ESAs, and remediation where appropriate, to the satisfaction of the New York City Department of Environmental Protection ([DEP] pursuant to Section 11-15 of the Zoning Resolution—Environmental Requirements). The E-designation also requires mandatory construction-related health and safety plans (HASPs), which must also be approved by DEP. As properties are acquired by the City, it is anticipated that a Restrictive Declaration would be placed on them, which would supersede the E-designation, but require implementation of the same measures.

B. METHODOLOGY

POTENTIAL AREAS AND CONTAMINANTS OF CONCERN

Soil and groundwater can become contaminated as a result of past or current activities on a project site or in adjacent areas. Many commercial and industrial activities use, store, or generate materials that can be spilled, dumped, or buried nearby, causing contamination. Other activities common in mixed-use neighborhoods—such as gas stations and auto repair shops—can also result in contamination due to improper management of raw product and/or waste materials, or inadvertent spills. Furthermore, since the District does not have a sanitary sewer system, there is a potential that inappropriate industrial discharge to septic tanks could have occurred. Common categories of contaminants are listed below:

- Volatile organic compounds (VOCs): These include aromatic compounds—such as benzene, toluene, ethylbenzene, xylene (BTEX), and methyl tertiary butyl ether (MTBE), which are found in petroleum products (especially gasoline)—and chlorinated compounds, such as tetrachloroethene (also known as perchloroethylene or "perc") and tricholoroethene, which are common ingredients in solvents, degreasers, and cleansers that are often used in automotive repair. VOCs represent the greatest potential for exposure since, unlike most other contaminants, they can also generate vapors that can migrate from the subsurface into buildings if proper controls are not present.
- Semivolatile organic compounds (SVOCs): The most common SVOCs in urban areas are polycyclic aromatic hydrocarbons (PAHs), which are constituents of partially combusted coal- or petroleum-derived products, such as coal ash and fuel oil. PAHs are commonly found in New York City urban fill material, which likely underlies much of the District. In addition, petroleum-related SVOCs—associated with automotive fluids (including fuels) and former or current above-ground storage tanks (ASTs) and/or underground storage tanks (USTs)—could be present.

[1] Five percent methane (and 95 percent air) is the lowest proportion that can support combustion or explosion and is known as the lower explosive limit (LEL).

- Polychlorinated biphenyls (PCBs): Commonly used as a dielectric fluid in transformers, some underground, high-voltage electric pipelines, and hydraulically operated machinery, PCBs are of special concern at maintenance locations where leakage into soil may have occurred. PCBs and/or PCB-containing materials were once widely used in manufacturing and industrial applications (e.g., hydraulic lifts, transformers, light ballasts, and plastics manufacturing). PCBs tend to travel only short distances in soil, except under unusual circumstances (e.g., large spills of PCB-containing oils over many years), and are not generally found in significant concentrations in groundwater.
- Pesticides, herbicides, and rodenticides: These are commonly used to control rodents and/or insects and vegetation in vacant structures or in vegetated lots.
- Metals (including lead, arsenic, cadmium, chromium, and mercury): Metals are often used in smelters, foundries, and metal works, and are found as components in paint, ink, petroleum products, and coal ash. Metals are also associated with the handling of building materials (e.g., mercury thermostats and pressure-treated wood), lead acid automotive batteries, and other areas associated with scrap metal recycling. Metals tend not to migrate far in soil; therefore, they would be of greatest concern at or near the site where they were handled. Metals at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.
- Fuel oil, waste oil, and gasoline from storage tanks: Numerous businesses within the District currently have, or once had, both known and undocumented ASTs and/or USTs for fuels, including heating oil, waste oil, motor oil, and gasoline. Some of these tanks may have been removed; others, although no longer in use, may remain buried in place. Some of the tanks are known to have leaked, and others have possibly leaked despite no record of a spill. Some of the spills have been cleaned up in accordance with state regulations but others have not, either because they have not yet been discovered or because cleanup, which can take several years, is ongoing.
- Fill materials of unknown or historic origin: In the past, waste materials, including coal and incinerator ash, demolition debris, and industrial wastes, were commonly used as fill in urban areas. Even fill material consisting primarily of soil may exhibit elevated levels of PAHs, metals, PCBs, and other contaminants. Such materials are potentially present throughout the District.
- Methane: Methane is formed from the decomposition of organic materials—both natural organic deposits (e.g., peat) and/or municipal wastes. Methane represents a concern since it can migrate through the subsurface into buildings, causing an explosion hazard.
- Asbestos: Because of the age of many of the buildings in the District, asbestos-containing materials (ACMs) are likely to be present. Asbestos is a common component of building materials, including insulation, fireproofing, tile flooring, plaster, sheetrock, tile ceiling, mastic, and roofing materials, and was widely used before 1980. In addition to materials within structures, subsurface utility lines may be coated with asbestos or encased in an ACM known as “transite.”
- Lead-based paint (LBP): Because of the age of many of the buildings in the District, LBP is likely to be present. The use of LBP in non-residential New York City buildings and outdoors was severely restricted by the Consumer Products Safety Commission in 1977. LBP that is released as dust (or as fumes, if heated) is potentially harmful, especially to children.

Excavation, earthmoving, dewatering, and other construction activities can expose subsurface contaminants and provide a pathway of exposure. If such contaminants are not properly managed they can introduce potential risk to construction workers and others nearby. Demolition of existing structures that have ACMs, LBP, or PCB-containing equipment also has the potential to release contaminants if these materials are not properly managed.

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)—DISTRICT

As a first step in the hazardous materials assessment process, a Phase I ESA was prepared in accordance with ASTM Standard Practice E1527-00 by Metcalf & Eddy, Inc., February 2005. This Phase I ESA assessed the potential for contaminated materials in buildings or the subsurface from past or present uses. The scope of the Phase I ESA included: a reconnaissance of the entire Willets Point Development District from public rights-of-way (but with no access to private property); interviews with available site owners, tenants, or staff, whenever possible; a review of historic maps; federal and state regulatory records; and available topographic and geologic/hydrogeologic data for the District and the surrounding area.

The Phase I ESA was conducted for each of the tax block and lots included in the District. Each lot, regardless of site access, was studied to determine whether current or historical hazardous materials conditions may have affected the lot. Factors that were considered when making these determinations included the probability and probable severity of the potential hazardous materials conditions, as well as physical, geological, or hydrogeological (groundwater) conditions that may have affected the migration of hazardous materials. Information was then applied to assess an area's potential for impacts and contamination.

PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)—DISTRICT

Based on the findings of the Phase I ESA and noting the identified contaminants of concern, further study in the form of intrusive, subsurface investigation—the Phase II ESA—was conducted by HDR|LMS (Henningson, Durham & Richardson, Architecture and Engineering, P.C. in association with HDR Engineering, Inc.). The scope of work included collection and laboratory analysis of 22 soil samples and seven groundwater samples from over 45 soil boring locations, 42 of which were within the District, where the results of the Phase I ESA indicated potential concern. (The approximate locations of subsurface sampling are shown in Figure 12-1.) All site activity was conducted from public-rights-of-way, along street and sidewalk areas; permission was not obtained for access to the privately owned sites. LBP, ACMs, and PCB ballasts were not observed or sampled for chemical analysis.

LOT B

Information presented for Lot B is based on a preliminary subsurface investigation conducted by Mueser Rutledge Consulting Engineers in July 1998 and on subsequent environmental investigations relating to the development of Citi Field. In 2006, two soil borings (retrofitted with groundwater monitoring wells) and 12 soil gas (methane) sampling locations were completed within the Lot B site boundary. This work was conducted in accordance with a December 2001 Phase II Environmental Site Investigation Work Plan submitted to DEP.

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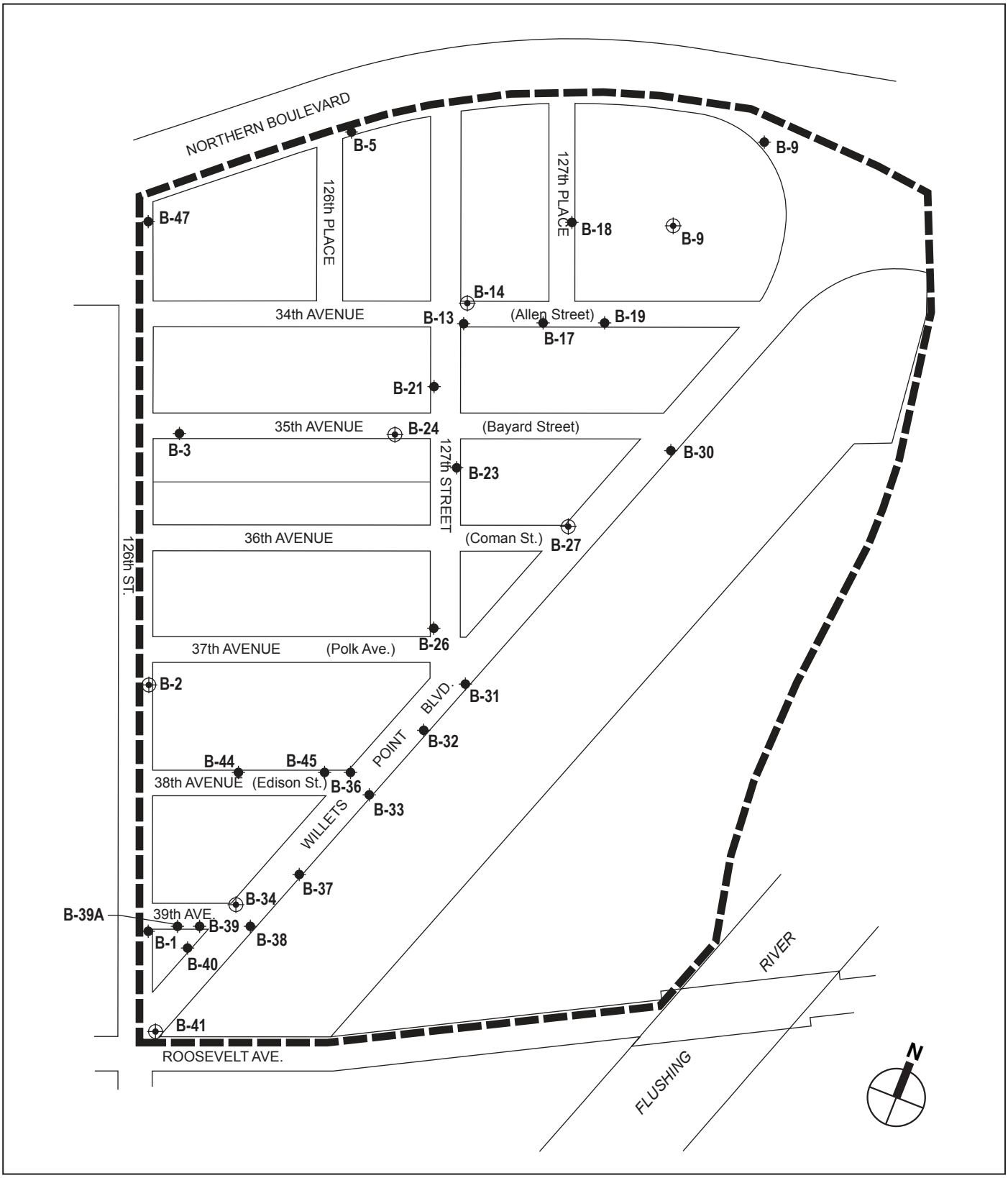

Study Area Boundary

Soil Boring and Groundwater Well Sampling Location

Soil Boring Sampling Location

Figure 12-1

Soil Boring and Groundwater Well Sampling Locations

C. EXISTING CONDITIONS

TOPOGRAPHY, GEOLOGY, AND GROUNDWATER

The Willets Point Development District and Lot B are located in the Willets Point area of Flushing, Queens County, New York, near the westernmost end of Long Island. The regional stratigraphy of Long Island, including the aquifers and confining layers, was formed from glacial tills and outwash sands of the Pleistocene Epoch. There is approximately 1,000 feet of sand, silt, gravel, and clay above the bedrock in this area. The entire District is relatively level, with several feet of topographic change. All of the area is filled in; therefore, the original land surface cannot be determined. However, since the Willets Point peninsula and surrounding area was once a swamp and marshland, it can be assumed to be 5 to 15 feet higher after the filling and original development. Groundwater across the District and Lot B is shallow and is found generally at approximately five feet below grade. Based on typical groundwater flow, it would be expected that groundwater in the District flows outward into the Flushing River and Flushing Bay.

DISTRICT HISTORY AND CURRENT CONDITIONS

Former and existing uses on the various project blocks are detailed in Chapter 3, "Land Use, Zoning, and Public Policy." Historic uses are also discussed in Chapter 8, "Historic Resources."

DISTRICT HISTORY

As described above in "A. Introduction," the District—originally a tidal marsh—was used for the disposal of incinerator ash and garbage from around 1900 through the mid 1930s. The site was filled by the time of the 1939 World's Fair, and streets were developed by the time of the 1964-1965 World's Fair.

The origins of subsurface hazardous materials that are expected to be present in the District can be broken down into two general, successive categories:

- Placement of historic fill, beginning in the mid- to late-1800s, and continuing through the early-20th century; and
- Releases of petroleum products and chemicals from existing and historic commercial and industrial facilities.

Before the 1850s, the District was a tidally-influenced wetland and existed within the tidal zone very close to sea level. Toward the end of the 19th century, a large portion of the area had already been filled with a combination of coal ash and garbage, and "made land" had been created. Historic fill found along waterfronts typically consists of both dredged material and non-indigenous fill from a variety of sources, including solid waste, such as incinerator ash, and construction and demolition debris. Fill material may be found throughout the majority of the District from near-surface to several feet below the surface and extending to varying depths below the surface. The general fill layer is approximately 10 to 12 feet thick. Fill material represents a recognized environmental condition as defined by ASTM Standard Practice E1527-05, as it is frequently contaminated with SVOCs and heavy metals, and has been found in some areas to also contain polychlorinated biphenyls (PCBs).

Groundwater was encountered at relatively shallow depths of between 4 to 9 feet below grade, generally within the historic ash landfill material. Although groundwater flow in this type of material varies and may be tidally influenced in some areas, the overall flow is expected to be toward Flushing Bay and Flushing River to the north and east of the District.

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)—DISTRICT

As reported in the February 2005 Phase I ESA, a total of 14 active storage tanks (either USTs or ASTs) were registered at eight property addresses; however, it is possible that other unregistered tanks are also present. In addition, 32 petroleum spills reported to the State still had an open status (i.e., had not been cleaned up). In addition, other spills may have occurred and not been reported to the State. An updated database search and a DEC Region 2 Spills Division Freedom of Information Act request were conducted in December 2007.

As indicated in the December 2007 database search, the total number of registered active storage tanks had increased to 84 ASTs on 47 properties and 10 USTs on six properties. Conversely, the total number of open petroleum spills had decreased to three. The properties with active petroleum spill numbers on file with DEC are:

- Crown Container Transfer Station, located on Block 1822, Lots 17 (partial lot) and 23;
- Eighteen Auto Parts, Inc., located on Block 1833, Lot 192 (partial lot); and
- Flushing Auto Salvage, located on Block 1822, Lot 17.

As a result of the DEC Region 2 Spills Division Freedom of Information Act request, limited information was provided pertaining to site investigation and remediation activities on the 67 closed and three open spill files in the District. The following is a summary of remedial activities described in the documents provided in response to the request:

- Three applications of in-situ bioremediation techniques were applied to the site address of 126-02 Northern Boulevard (Block 1820, Lot 1) in relation to a gasoline plume detected in the former location of a UST. Follow-up groundwater sampling indicated elevated levels of volatile organic compounds (VOCs) remain on the site. DEC closed the spill file on July 21, 2000. There was no documentation provided indicating that the elevated levels of VOCs in the groundwater had been addressed.
- Soil removal has been mentioned as taking place on the Crown Container Transfer Station property (Block 1822, Lots 17 and 23) in relation to one of the four spill files registered to the company. DEC has requested that remedial action documentation be submitted for agency review; however, nothing has been transmitted since the regulatory request.
- Ten 55-gallon drums were noted as being filled with excavated petroleum-contaminated soils. The remedial excavation was conducted in response to several storage drums noted as leaking hydraulic oil into the surface and subsurface soils on tax Block 1825, Lot 46. Following the remedial excavation, DEC closed the spill file on November 17, 2003.
- Petroleum-impacted soils were discovered to exist up to eight feet below the ground surface on Block 1829, Lot 40. The impacted soils were determined to originate from the improper closure of 14 USTs. Following the on- and off-site investigation, a total of 42 in-situ bioremediation injection wells were installed, and two applications were made to the site before DEC closed the spill file on February 18, 2005.
- Three spill numbers were associated with Best Buy Auto and A to Z Auto Parts (affecting Block 1830, Lots 1, 9 and 10). Following the site investigative activities, two areas were identified for remedial excavation. Approximately 50 tons of petroleum-impacted soil was excavated and disposed of off-site. DEC closed the spill files between 2005 and 2006.
- Block 1833, Lot 120 had a total of eight DEC spill files registered to the site, mostly associated with the former operations of Queens Scrap Metal, Sunrise Auto Parts, and F&F Auto Salvage. Five of the spills were consolidated into a 2001 spill file, for which approximately 6,400 tons of petroleum-impacted soil was excavated and disposed of off-site. Several groundwater monitoring wells were additionally installed on the site and underwent

quarterly monitoring until the spill files were closed between 2005 and 2006. Additional remedial excavation of 450 tons of on-site soil was conducted. The adjacent Metropolitan Transportation Authority (MTA)-owned parcel (Block 1833, Lot 1) independently conducted site investigative and remedial activities, leading to the excavation and off-site disposal of approximately 30 tons of petroleum-impacted soil.

- Similarly, Block 1833, Lots 155 and 158 underwent remedial excavation due to the former Queens Scrap Yard operations. Six truckloads of petroleum-impacted soils were removed from the site and disposed of off-site as per the DEC-approved remedial work plan. DEC closed the spill file on February 8, 2005.
- Turbo Auto Sales (Block 1833, Lot 180) underwent site investigation and remediation between 2004 and 2007 in relation to petroleum-impacted soils and the observation of up to 12-inches of free product on top of the groundwater. Several localized areas underwent remedial excavation of the petroleum-impacted soils for off-site disposal, and additional groundwater monitoring wells were installed for quarterly monitoring events. DEC closed the spill file on September 27, 2007.

Table 12-1 lists the types of industries and facilities present in the District, as well as associated contaminants and contaminated material typically associated with such uses.

PHASE II ENVIRONMENTAL SITE ASSESSMENT (ESA)—DISTRICT

Due to the lack of access to private properties, the extent of contamination on private properties could not be accurately assessed. The soil sampling from streets and sidewalks did not identify petroleum contamination (the results were consistent with those usually found in fill materials in New York City), but groundwater sampling did indicate evidence of petroleum contamination, consistent with releases from private properties within the District. Given the presence of this groundwater contamination and the findings of the Phase I ESA, petroleum and potentially other contamination is expected to be widespread on private properties within the District. The following section describes the Phase II findings in more detail.

Soil analysis results were initially compared with the DEC Technical and Administrative Guidance Memorandum No. 4046 (TAGM 4046). However, following the issuance of the final DEC Part 375 regulations in December 2006, comparisons were made with the Restricted Residential Soil Cleanup Objectives (SCOs) in Table 375-6.8(b). These SCOs are based on a prescribed end use that incorporates institutional or engineering controls to manage exposure to any contamination remaining following performance of the clean-up or remediation measures. While several compounds were detected, no exceedances of the Part 375 SCOs were found for VOCs, pesticides, herbicides, or PCBs. However, exceedances of the Part 375 SCOs did occur in five of the 22 soil samples for SVOCs (including benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene), though no SCO exceedance was greater than threefold, and in four of the 22 soil samples for metals (including arsenic, barium, cadmium, copper, lead, and nickel), though no SCO exceedance was greater than fivefold. Although tests were not performed to indicate if material is a hazardous waste (as per federal or state regulations), contaminants were not found at levels that would be expected to exceed the regulatory thresholds. In general, soil conditions were consistent with those typically found in fill samples in New York City and did not show petroleum impacts.

Table 12-1
Potential Media Impacts and Potential Contaminants by Industry Type

District Area Industry Type	Potential Media Impacted by Industry Type[1]	Potential Contaminants by Industry Type[2]
Automotive Body	Surface Soil, Soil Vapor, Groundwater	Petroleum-Derived VOCs, Chlorinated VOCs, Metals
Automotive Interior	No Media Impacts Anticipated [3]	No Media Impacts Anticipated [3]
Automotive Parts	Surface Soil	Petroleum-Derived VOCs, Metals, Ethylene Glycol
Automotive Repair	Surface Soil, Subsurface Soil, Groundwater, Soil Vapor	Petroleum-Derived VOCs, Chlorinated VOCs, SVOCs, Ethylene Glycol
Automotive Sales	No Media Impacts Anticipated	No Media Impacts Anticipated
Automotive Wrecking	Surface Soil, Subsurface Soil, Groundwater, Soil Vapor	Petroleum-Derived VOCs, Ethylene Glycol, Metals, Leachable Metals
Automotive Salvage	Surface Soil, Subsurface Soil, Groundwater, Soil Vapor	Petroleum-Derived VOCs, Ethylene Glycol, Metals, Leachable Metals
Automotive Junkyard	Surface Soil, Subsurface Soil, Groundwater, Soil Vapor	Petroleum-Derived VOCs, Ethylene Glycol, Metals
Automotive Wash	Surface Soil	General Surficial Housekeeping (petroleum: oil and grease)
Gasoline Station	Surface Soil, Subsurface Soil, Groundwater, Soil Vapor	Petroleum-Derived VOCs, SVOCs, MTBE
Misc. Retail	No Media Impacts Anticipated (but dependent upon specific use)	Dependent upon specific materials used
Heavy Equipment Storage/Sales	Surface Soil	SVOCs
Metal Fabrication	Surface Soil	Metals
Misc. Industrial	No Media Impacts Anticipated (dependent upon specific use)	No Media Impacts Anticipated (dependent upon specific use)
Misc. Material Storage	Surface Soil	VOCs, SVOCs, Metals
Private Waste Transfer Station	Surface Soil	General Surficial Housekeeping (such as runoff, waste)
Recycling/Processing Station	Surface Soil	SVOCs, Metals
Restaurant	Surface Soil	General Surficial Housekeeping (such as animal fat, vegetable oil)

Notes:
[1] "Potential Media Impacted by Industry Type" includes surface soil, subsurface soil, groundwater and soil vapor.
[2] "Potential Contaminants by Industry Type" includes petroleum-derived VOCs, chlorinated VOCs, SVOCs, metals, ethylene glycol, MTBE, pesticides, herbicides, PCBs and general surficial housekeeping issues.
[3] "No Media Impacts Anticipated" indicates high concentrations of contaminants are not anticipated. Trace concentrations and/or low threshold accidences may occur. In instances where specialized site usage exists, the potential media impacted by industry type and type of contamination cannot be estimated for the site.
VOCs - Volatile organic compounds
SVOCs - Semivolatile organic compounds
PCBs - Poly-chlorinated biphenyls
MTBE - Methyl tert butyl ether

Groundwater analysis results were compared with the DEC Groundwater Class GA Drinking Water Standards (though groundwater in this part of Queens is not and cannot legally be used as a source of drinking water). All but one of the groundwater samples showed evidence of likely petroleum contamination. Four of the seven samples contained VOC concentrations exceeding the Groundwater Class GA Standards for varying combinations of benzene, isopropylbenzene, methyl tert butyl ether (MTBE), naphthalene, n-butylbenzene, and n-propylbenzene. (These compounds are typical of gasoline and are not typically associated with historic fill.) Exceedances of GA standards varied from less than twofold to up to 14 times the standard. Two of the seven samples contained SVOC concentrations exceeding the Groundwater Class GA Standards for varying combinations of total SVOCs, 2-methylnapthalene, naphthalene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(k)fluoranthene, and indeno(1,2,3-cd)pyrene.

(These compounds can be associated with historic fill materials, but at the levels found are also potentially indicative of petroleum contamination.) Exceedances of GA standards were up to twelvefold for all parameters except for four of the individual SVOCs in one sample where the detected levels (5 to 7 µg/l) were much higher than the standard 0.02 µg/l, though this level of exceedance is far from unusual in petroleum-impacted groundwater.

Given that no samples were collected from private properties, the findings of the Phase I ESA and the Phase II sampling suggest that petroleum contamination (and potentially other contamination—e.g., from use of solvents) is expected on private properties within the District.

LOT B EXISTING CONDITIONS

Based on a preliminary subsurface investigation done by Mueser Rutledge Consulting Engineers in July 1998, subsurface materials in the vicinity of Shea Stadium/Citi Field consist of layers (placed between 1910 and 1916) of coarse-to-fine sand and gravel, silt, mica, cinders, wood, roots, glass, brick, metal, and asphalt overlying the Flushing Meadow marshlands.

In 2006, during the investigations relating to Shea Stadium redevelopment, two soil borings (retrofitted with groundwater monitoring wells) and 12 soil gas (methane) sampling locations were completed within the Lot B site boundary. This work was conducted in accordance with a December 2001 Phase II Environmental Site Investigation Work Plan submitted to DEP.

Soil Sampling Results

In the soil borings, fill materials (including asphalt and cinders) were found throughout the 10-foot depth. In terms of laboratory analysis of soil samples, the only VOC detected at concentrations above the DEC recommended soil cleanup objective (RSCO) was acetone (but since acetone was also detected in one of the quality assurance blanks, it was likely a laboratory artifact). SVOCs were found above RSCOs, but the compounds detected—primarily PAHs—are present in asphalt and ash, and are often found at such levels in urban fill materials. Similarly, consistent with the presence of fill material, levels of calcium, chromium, copper, iron, magnesium, mercury, and zinc were detected exceeding the upper background range in the Eastern United States as outlined in DEC TAGM 4046.

Groundwater Sampling Results

The water table was approximately three feet below the ground surface in the two monitoring wells. The groundwater sampling identified methylene chloride (a VOC) in both groundwater samples as exceeding the New York State Ambient Water Quality Guidance Values (AWQV). However, since methylene chloride was also detected in the quality assurance blank, it suggests that it is a laboratory artifact. No SVOCs were detected in either groundwater sample. The following metals were detected at total concentrations exceeding AWQVs: aluminum, cobalt, iron, lead, magnesium, manganese, and sodium. Following filtration, the following dissolved metals were still present at levels exceeding the AWQV: iron, magnesium, manganese, and sodium. Due to the nature of the fill underlying the site and the presences of a shallow water table, elevated levels of metals were expected to be present in the groundwater samples.

Soil Gas Sampling Results

Methane levels were significantly elevated, with levels in soil gas above 5 percent in half of the locations sampled. Five percent methane (and 95 percent air) is the lowest proportion that can support combustion or explosion and is known as the lower explosive limit (LEL). This is

believed to be attributable to the swamp deposits and material buried during the landfilling period.

D. FUTURE WITHOUT THE PROPOSED PLAN

Without the proposed Plan, the District is not anticipated to experience substantial change. In the event that projects independent of the proposed Plan were to occur on any lot that has the potential for hazardous material contamination, such development could result in the exposure of construction workers and nearby residents to hazardous materials. No change is currently proposed to occur on Lot B in the future without the proposed Plan.

In the future without the proposed Plan, and with change of land use through redevelopment, the District is expected to have continued DEC involvement related to enforcement actions and property transfers.

A summary of remedial activities reported during the DEC Region 2 Spills Division Freedom of Information Act submitted in December 2007 is presented in Section C, "Existing Conditions."

The extent of remediation on these affected properties would likely be less than with the proposed Plan, as soil removal underneath roadways and adjacent properties that might have been affected by the spills is not usually required as part of site cleanups. The remediation of contamination at other sites would likely take place only if such sites were to be redeveloped, though little or no redevelopment is anticipated without the proposed Plan.

Overall, in the future without the proposed Plan, there would be some clean-up of hazardous materials within the District, but to a lesser extent than with the proposed Plan. It is also possible that without the proposed Plan some construction could occur in the District, potentially without the safeguards—such as HASPs or vapor barriers—that would be in place with the proposed Plan.

E. PROBABLE IMPACTS OF THE PROPOSED PLAN

PROPOSED PLAN

Construction of the proposed Plan would involve both demolition of all existing structures (some of which are believed to contain LBP, ACMs, and PCB-containing electrical components) and a variety of earthmoving/excavating activities that would encounter subsurface contamination (e.g., petroleum, solvents, etc.). All lots in the District would have E-designations placed on them. The E-designation would require that, prior to DOB issuing permits associated with redevelopment, the property owner conduct Phase I and Phase II ESAs, and remediation where appropriate, to the satisfaction of DEP (pursuant to Section 11-15 of the Zoning Resolution—Environmental Requirements). The E-designation also requires mandatory construction-related HASPs, which must also be approved by DEP. As properties are acquired by the City, it is anticipated that a Restrictive Declaration would be placed on them, which would supersede the E-designation, but require implementation of the same measures. Any potential approval of development on Lot B would, consistent with standard City practices, be conditioned upon DEP review and approval or any necessary remedial plan.

The presence of hazardous materials threatens human health only when exposure to those materials occurs; even then, a health risk requires both an exposure pathway to the contaminants and sufficient exposure to produce adverse health effects. To prevent such exposure and

exposure pathways, the proposed Plan would include appropriate health and safety and investigative/remedial measures that would precede or govern both demolition and soil disturbance activities. These measures would be conducted in compliance with all applicable laws and regulations and would conform to appropriate engineering practices. Also, given that some subsurface contamination would likely remain after completion of construction (e.g., in deeper soils and groundwater), new buildings would require engineering controls, which could include vapor barriers and passive or active venting systems. Institutional controls to prevent future exposure during intrusive work and subsurface utility repairs would be necessary. Measures would include:

- Procedures for pre-demolition removal of asbestos and appropriate management of LBP and PCB-containing equipment.
- Additional subsurface investigation, both to District sites and areas not yet investigated, to better characterize soils to be removed for excavation.
- Development of a construction health and safety plan (CHASP) and Site Management Plan (SMP) for site remediation, excavation, and redevelopment that would include detailed procedures for managing both known contamination issues (e.g., tank removal, and soil and groundwater remediation of existing petroleum spills, excavation, and removal of existing septic tanks or fields, floor drains, and historic fill) and any unexpectedly encountered contamination issues. The CHASP would also include procedures for avoiding the generation of dust that could affect the surrounding community, as well as the monitoring necessary to ensure that no such impacts occur.
- Requirements for vapor barriers and sub-slab venting systems in new buildings, where remaining subsurface contamination could otherwise lead to unacceptable exposure inside buildings, would be consistent with all applicable laws and regulations.
- Institutional controls, through E-designations and/or subsequent Restrictive Declarations, to require implementation of the above measures and any necessary post-construction measures, e.g., implementation of health and safety procedures during subsurface utility repair.

Methods for guaranteeing the continued effectiveness of these controls could include annual or semi-annual certification and reporting requirements.

Potential health and safety and investigative/remedial measures for the anticipated development of Lot B are discussed separately, following the discussion of on-site remediation within the District.

SITE REMEDIATION

Existing Structures

Asbestos-Containing Materials (ACM) Management Plan

Proper handling, removal and disposal of ACM is governed by federal requirements (U.S. Occupational Safety and Health Administration [OSHA] 29 CFR 1926.1101, Department of Transportation 49 CFR 171-173, and EPA 40 CFR 61), New York State requirements (Labor Law Article 30 - Asbestos or Products Containing Asbestos Licensing and 12 NYCRR Part 56 Asbestos Regulations) and New York City requirements (Rules of the City of New York Title 15—Handling and Disposal of Asbestos). Appropriate engineering controls (e.g., wetting and

other dust control measures) to minimize asbestos exposure are required to be implemented prior to and throughout demolition/renovation.

Lead-Based Paint (LBP) Management Plan

If lead-coated surfaces are present, and depending upon the type and method for removing and demolishing existing structures, an exposure assessment may be needed to determine whether lead exposure would occur during the demolition. If the exposure assessment were to indicate the potential to generate airborne dust or fumes with lead levels exceeding health-based standards, a higher personal protection equipment standard would be employed to counteract the exposure. In all cases, appropriate methods to control dust and air monitoring, as required by the appropriate OSHA regulations, would be implemented during demolition activities.

PCB-Containing Equipment

Suspected PCB-containing equipment (e.g., transformers, electrical feeder cables, hydraulic equipment, and fluorescent light ballasts) may need to be surveyed and evaluated prior to building demolition or utility relocation. PCB-containing equipment that would be disturbed by the work would be removed and disposed of in accordance with applicable federal (40 CFR Part 761), state (6 NYCRR Parts 360 – 376), and local regulations. Unless suspected PCB-containing equipment is labeled to be "non-PCB," it must be tested or assumed to be PCB-containing and disposed of at properly licensed facilities.

Subsurface Disturbance

Based on the findings of the Phase I and Phase II ESAs, the entire District has a high potential for the presence of subsurface hazardous materials to be present. Detailed procedures would be incorporated into the proposed Plan's construction documents and made binding on any future developers through E-designations and/or subsequent Restrictive Declarations, to govern testing and development of and adherence to appropriate procedures for petroleum tank removal, excavation, movement, stockpiling, and other activities that would entail subsurface disturbance. The types of commitments that would be included in the specifications (both to meet all applicable legal requirements and to minimize potential impacts) for the various types of materials (e.g., petroleum-contaminated soils, historic fill, or native materials) are described below. Preventive measures would be undertaken to protect the safety of the public, community residents, and construction workers, as well as the larger environment. All work would be performed in accordance with applicable City, state, and federal requirements. Applicable permits for the excavation, handling, removal, and disposal of this fill material would also be required. It should be noted that all required procedures are frequently and readily implemented as part of construction at many sites in New York City.

Sites Not Yet Investigated

As access becomes available, site-specific Phase I ESAs would be conducted to supplement the initial site-wide Phase I ESA, which did not include any inspections of private property. This information would be used to determine the scope of Phase II ESA subsurface sampling, to assist in preparation of remedial plans and health and safety procedures. A summary report would be prepared following the completion of each Phase II ESA sampling event. The report would document field activities, present field and laboratory data, and present conclusions and recommendations drawn from the results of the investigation. The report would compare the analytical results with appropriate City, state, and federal standards and guidelines. Further investigation and/or remediation would occur as necessary, prior to and/or during construction.

The protocols for further investigation and/or remediation would be presented in site specific sampling and/or Remediation Plans, as necessary, which would include HASPs. Typical measures, which are performed at many sites throughout the City and are readily implemented, include removal of petroleum storage tanks and associated contaminated liquids and soil. Other techniques are often used in addition to or instead of removal of contaminated soil, such as soil vapor extraction or oxidation, which are sufficient to eliminate the potential for exposure once the site is capped with buildings, paving and/or imported soil. Sub-slab systems typically consisting of vapor barriers and/or depressurization systems are also frequently required at sites where residual subsurface contamination will or may be present following remediation that could result in soil vapor intrusion.

Construction Health and Safety Plan

Prior to site excavation, a CHASP would be prepared to address both the known contamination issues (based on the Phase I and Phase II studies) and contingency items (e.g., the discovery of unexpected petroleum storage tanks, petroleum-contaminated soil, free liquids, or solvent-contamination). The CHASP would describe in detail the health and safety procedures that are recommended or proposed to minimize exposure of workers and the public to hazardous materials. Regardless of the procedures for reducing exposure, the CHASP will indicate what levels would require specific actions or termination of work. The hazards throughout the District would be evaluated by determining the subsurface contaminants of concern, their chemical and physical characteristics, and health hazards in relation to the various actions and construction efforts that would take place in this area.

Appropriate personnel would be designated to ensure that all requirements of the CHASP were implemented, including a Health and Safety Officer (HSO) and an on-site Site Safety Officer (SSO). The HSO would oversee the SSO and be responsible for coordinating and reporting all health and safety activities. The HSO would have completed a 40-hour training course, supervisory training and updated annual refresher courses that meet OSHA requirements codified in 29 CFR Part 1910, Occupational Safety and Health Standards. The SSO would be a competent person responsible for the implementation of the CHASP, who would have completed either the 24-hour training course for an Occasional Hazardous Waste Site Worker or the 40-hour training course for the Hazardous Waste Operations Worker that meets OSHA requirements codified in 29 CFR Part 1910. The SSO would have stop-work authorization, which he/she would execute on his/her determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the SSO is to be absent from the site, he/she would designate a suitably qualified replacement who is familiar with the CHASP.

The CHASP would require that on-site personnel are qualified and have received the required training. All those who enter the work area while intrusive activities are being performed must receive instruction regarding the potential hazards to health and safety. All construction personnel upon entering the site must first attend a training meeting to:

- Make workers aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make workers aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the construction crew would be instructed in these objectives before he/she begins working on the site. The HSO, SSO, or other suitably trained individuals would be responsible for conducting the training program. Others who enter the site must be accompanied by a suitably trained construction worker.

The CHASP would include contingency response plans. All excavation would be monitored for the presence of buried tanks, drums, or soil that shows evidence of potential contamination, such as discoloration, staining, or odors. If any of these were detected, specific procedures would be outlined for the situation, and appropriate personnel would be notified, including the HSO. All contingency response actions would be carried out in accordance with special contingency health and safety procedures.

An emergency response plan would also be included in the event that monitoring data indicate a potential major hazard, and protocols for reporting spills or other concerns to relevant governmental agencies would be defined.

To prevent the potential off-site transport of dust, dust control measures would be implemented during all earth-disturbing operations. Water would be available on-site for sprinkling/wetting to suppress dust in dry weather or as necessary. Water would be used to suppress dust on haul roads and to wet equipment and excavation faces if that was found to be an issue. Stockpiled excavated material would be securely covered with tarps or plastic sheeting to prevent dust or run-off. Given the size of the proposed Plan, a Storm Water Pollution Prevention Plan (SWPPP) would be required to address the control of erosion and stormwater runoff from the Plan. This would be submitted to DEC for review and approval to allow the significant disturbance across the site. Importation and export of large volumes of fill to and from the District would also require a New York City Department of Sanitation (DSNY) Fill Management Operations Permit (FMO).

In accordance with New York City requirements, air monitoring would also be performed during all abatement of friable ACMs. Air monitoring for asbestos is performed by an independent third-party monitor not associated with the abatement contractor. All monitoring must be performed by New York State-licensed asbestos project air sampling technicians. Air monitoring is generally performed before, during, and after abatement activities. Pre-abatement monitoring establishes baseline background levels. Monitoring during abatement is intended to detect any airborne asbestos which escapes from the containment systems used to enclose the abatement area. If asbestos concentrations exceeding action levels are detected, work is stopped while barriers are inspected and restored, and any surfaces impacted by fugitive asbestos are cleaned. Post-abatement monitoring is performed to confirm that no airborne asbestos is present prior to the start of demolition work.

Community air monitoring for lead is not currently required during building demolition. During demolition (unlike lead abatement work), LBP is generally not stripped from surfaces. Structures are disassembled or broken apart with most of the paint still intact. Normal dust control measures (e.g., spraying the building with water) would be used during demolition. The lead content of any resulting dust would therefore be expected to be low, and normal dust control measures would be sufficient to prevent off-site impacts. Work-zone air monitoring for lead may be performed during certain demolition activities with a high potential for releasing airborne lead-containing particulates in the immediate work zone, such as manual demolition of walls with lead paint, or cutting of steel with lead-containing coatings. This monitoring would be intended to ensure that workers performing these activities are properly protected against lead exposure.

Site Management Plan (SMP) and Waste Management

An SMP would be created with the objective to set guidelines for the management of soil and fill materials during the site redevelopment process and any future activities which would breach the surficial cap (engineering control or cover system) at the site after construction of the facility has been completed. This SMP would address environmental concerns related to management of fill importation. The SMP would also address procedures for stockpiling, testing, loading, transporting (including truck routes), and properly disposing of all excavated material. In some situations, it is possible that some material would be characterized "in-situ," i.e., sufficient sampling would be performed to classify the material (e.g., as petroleum-contaminated wastes, historic fill containing construction/demolition debris, or uncontaminated native soils) before it is excavated. Other work could involve stockpiling and sampling material.

The SMP would also set requirements for: quality, testing, and documentation of importation of material; the future maintenance of the site capping system; and, in the event of upgrades, repairs or modifications that penetrate into contaminated material remaining at the site.

Based on testing performed to date, no soils meeting the regulatory definition of hazardous waste were identified; however, should hazardous wastes be identified in the future, they would require special handling, storage, transportation, and disposal. Depending on the nature of the material, regulations require the use of special containers or stockpiling practices and additional requirements for transportation. Facilities that receive hazardous wastes must have the required permits, and generally require that specific representative waste sampling (laboratory analysis) be conducted prior to accepting material for disposal.

Petroleum Storage Tanks

All known and other tanks discovered either above ground or below ground would be removed in order to complete the proposed Plan. The removal is regulated by DEC (6 NYCRR Section 613.9), which requires that tanks no longer in use be closed in place or removed according to specific requirements. Contaminated soils surrounding the tanks, separate phase product on the water table, or contaminants dissolved in the groundwater are also subject to DEC regulations (6 NYCRR Section 611.6). Article 12 of the New York Navigation Law provides notification and management requirements for spills.

The properties listed below have (as of December 2007) active petroleum spill numbers on file with DEC:

- Crown Container Transfer Station, located on Block 1822, Lots 17 (partial lot) and 23
- Eighteen Auto Parts, Inc., located on Block 1833, Lot 192 (partial lot)
- Flushing Auto Salvage, located on Block 1822, Lot 17

Remediation and subsequent closure of these spills would be completed (with all work performed under appropriate HASPs, including air monitoring), all USTs would be removed, and all documentation would be provided to properly "close" these spills with DEC.

Groundwater and Vapor Control

As discussed above in Section C, "Existing Conditions," groundwater sampling indicated a range of contaminants, including petroleum-related VOCs and chlorinated VOCs. Although groundwater is not used as a source of drinking water in this portion of Queens, the potential concern associated with this contamination is that VOCs could migrate in the groundwater to the adjacent Flushing River surface water, as well as volatilizing and migrating through the fill

material up through the subsurface into the proposed buildings. The proposed buildings would incorporate elements that provide safeguards against such migration. Safeguards would be consistent with all applicable laws and regulations. In addition, initial remediation would remove local VOC hot spot contamination that could migrate to nearby surface water bodies. These safeguards could include passive and active vapor systems beneath buildings and other means for vapor removal and control.

In addition to the safeguards incorporated into the proposed buildings' design, it is anticipated that levels of petroleum-related VOCs would decline over time as the on-site sources of groundwater contamination (e.g., petroleum storage tanks and much of the contaminated soil/fill) would be removed.

LOT B

Future development at Lot B would need to be performed under a Remedial Action Plan (RAP)/CHASP to address: handling and disposal of all materials requiring off-site disposal, including historic fill materials and any unexpectedly encountered contaminated materials. The RAP/CHASP would also include provisions for air monitoring (for volatile organics, methane, and particulates) during construction and the installation of appropriate systems to prevent the migration of methane into any newly constructed buildings. The RAP would be enforced at a minimum by DEP and, if required by applicable laws and regulations, by DEC.

The CHASP would include contingency response plans for Lot B. All excavation would be monitored for the presence of buried tanks, drums, or soil that shows evidence of potential contamination, such as discoloration, staining, or odors. If any of these were detected, specific procedures would be outlined for the situation, and appropriate personnel would be notified, including the HSO. All contingency response actions would be carried out in accordance with special contingency health and safety procedures.

An emergency response plan would also be included in the event that monitoring data indicate a potential major hazard, and protocols for reporting spills or other concerns to relevant governmental agencies would be defined.

To prevent the potential off-site transport of dust, dust control measures would be implemented during all earth-disturbing operations. Water would be available on-site for sprinkling/wetting to suppress dust in dry weather or as necessary. Water would be used to suppress dust on haul roads and to wet equipment and excavation faces if that was found to be an issue. Stockpiled excavated material would be securely covered with tarps or plastic sheeting to prevent dust or run-off. Given the size of the Lot B site, a SWPPP would be required to address the control of erosion and stormwater runoff from construction. Import and export of large volumes of fill to and from Lot B would also require a DSNY FMO.

NO CONVENTION CENTER SCENARIO

Health and safety and investigative/remedial measures prescribed under the No Convention Center Scenario would be the same as described above.

CONCLUSIONS

Contamination in the subsurface within the District has been identified through Phase II ESAs. This contamination is likely to be related primarily to the automotive-related businesses located throughout the District. Additionally, asbestos-, LBP-, and PCB-containing equipment are likely

to be present inside buildings throughout the District. However, with the implementation of a variety of measures, as described above in "Site Remediation," no significant adverse impacts related to hazardous materials would be expected to occur as a result of construction or operation of the proposed Plan or the No Convention Center Scenario. To ensure these measures would be implemented, they would be made binding on all site developers through E-designations placed on each lot and/or subsequent Restrictive Declarations. Contamination in the subsurface within Lot B has been identified (both typical historical urban fill materials and elevated methane levels). Although some hazardous materials would likely still remain in the subsurface following construction of the proposed Plan and following development of Lot B, with the building vapor control measures outlined above for both the District and Lot B, there would be no exposure pathways and thus no further potential for significant adverse impacts. Following completion of remediation and implementation of engineering and institutional controls as needed, the District and Lot B would be safe for all uses permitted under the revised zoning. ✷