Chapter 11: Hazardous Materials

A. INTRODUCTION

This chapter assesses the potential for hazardous materials impacts due to the proposed project. It has been prepared as an analysis of hazardous materials from the perspective of an environmental impact statement and uses the methodologies and standards of the *New York City Environmental Quality Review (CEQR) Technical Manual* for the purposes of defining the hazardous materials issues and potential impacts from a proposed project.

The proposed Fresh Kills Park is a long-term project, but upon completion (which is not assumed until 2036) will be approximately 2,163 acres in size and provide a variety of cultural, athletic, and educational facilities. The park plan is the culmination of an extensive planning and community participation process. In March 2006, DCP, in collaboration with other City agencies, released a Draft Master Plan (DMP) for the Fresh Kills Park project. Subsequently, in August 2006, DCP and the New York City Department of Parks and Recreation (DPR) also released the Final Scope of Work to prepare a Draft Generic Environmental Impact Statement (DGEIS) for the Proposed Fresh Kills Park, which presented a reasonable worst-case development scenario (RWCDS) for the analysis of project impacts.

This chapter has been prepared in accordance with the guidelines of the *CEQR Technical Manual* (December 2001), the *Fresh Kills Park Final Scope of Work to Prepare a Generic Environmental Impact Statement (GEIS)* (August 2006), and the *Fresh Kills Park Draft GEIS Hazardous Materials Technical Memorandum* (January 23, 2007) which was prepared as a technical supplement to the final scope of work. As described in the *CEQR Technical Manual*, the goal of an EIS hazardous materials assessment is to determine whether a proposed project or action could result in potential increased releases or exposure to hazardous materials that could cause public health or environmental impacts. Hazardous materials, as defined in the *CEQR Technical Manual*, are substances that pose a threat to human health and the environment including, but not limited to: heavy metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), methane, polychlorinated biphenyls (PCBs), pesticides, and other wastes, including hazardous wastes. Hazardous wastes are defined under the Federal and State regulations promulgated by the federal Resource Conservation and Recovery Act (RCRA) and the definitions provided by New York State regulations (6 NYCRR Part 371.4), which include specific "listed" wastes, as well as wastes that meet at least one of four characteristics: ignitability, corrosivity, reactivity, and/or toxicity.

The *CEQR Technical Manual* acknowledges that many sites in urban areas have soils and/or groundwater that are contaminated with hazardous materials. Many activities, industrial and otherwise, that were once common in New York City and other urbanized locations impacted the environment and left contaminants in the soil or groundwater. As a result, hazardous materials are present in the site soils, groundwater, or buildings. In addition to historical uses, hazardous materials can result from soils brought to the site as fill material; can migrate to the site via groundwater; or could be a component of the site structure (e.g., asbestos or lead paint used in buildings).

The *CEQR Technical Manual* provides a list of facilities, activities, and conditions that typically require a hazardous materials impact assessment as part of an EIS. Among them are development on or adjacent to a solid waste landfill site or a site where the storage or reduction of solid waste has occurred, as well as manufacturing operations, gasoline storage or service (i.e., underground storage tanks), and import of fill material of an unknown origin. These are uses and activities that have occurred on the Fresh Kills Park project site or in the surrounding area. Thus, an analysis of impacts due to hazardous materials for the proposed project is appropriate.

This chapter provides a background history for the project site and surrounding area, and also discusses the current project site conditions relative to the uses and activities that are typically associated with hazardous materials. The background data provide the basis for the conclusions of the potential impacts from the proposed park project. The Fresh Kills Landfill solid waste sections occupy about 995 acres of the project site and with a total project area of about 2,200 acres; the balance of the site covers about 1,205 acres. About 210 of these acres are the waters of Great Fresh Kills, Little Fresh Kills, Main and Richmond Creeks. An analysis of surface water and sediment quality is provided in Chapter 21, "Public Health," with respect to public access issues. Much of this analysis focuses on the approximately 1,000 acres of project area where the history of uses is not as well documented as it is within the landfill sections. The analysis therefore seeks to establish how these areas may also have been impacted either directly or indirectly by hazardous materials.

The chapter also provides a summary of the environmental controls and the monitoring and maintenance programs that are part of the landfill closure program now being implemented by the New York City Department of Sanitation (DSNY). A more detailed discussion of these systems is provided in Chapter 1, "Project Description."

B. METHODOLOGY

According to the *CEQR Technical Manual*, the methodology for a hazardous materials assessment for an EIS is two-fold. As the first step, an area-wide inventory is prepared of historical, topographical, geological and hydrogeological conditions. In accordance with the guidelines of the *CEQR Technical Manual*, this analysis of baseline conditions included the project site and the area within 400 feet (see Figure 11-1). As the second step, in order to determine the potential impacts, individual "areas of disturbance" under the proposed project are examined to determine whether current or historic hazardous materials conditions may have affected these areas. Factors that are considered when making these determinations include the severity and probability of the potential hazardous materials condition within the area of disturbance, as well as geological or hydrogeological conditions that may have affected the migration of hazardous materials. The specific steps in this analysis were as follows:

- Evaluate the study area land use history based on historic Sanborn fire insurance maps, historical topographic maps and historical aerial photographs. The Sanborn map coverage included the years 1910, 1917, 1937-38, 1951, 1962, 1983, and 1990 (recognizing that there are gaps in coverage for certain years). The topographic map coverage included United States Geological Survey (USGS) maps from 1891, 1898, 1947, 1966 and 1981, and a Bureau of Richmond Topographical Survey from 1911-1913. The historical map review consisted of identifying changes in topography, development and land use patterns, and other mapped features. Aerial photograph coverage included 1955, 1960, 1966, 1978, 1984, 1988, 1992 and 1996. The aerial photographs were used to identify off-mound areas with larger-scale soil disturbance, which may be indicative of past filling activities.

- Develop a database of activities and regulated activities for the study area based on USEPA and New York State Department of Environmental Conservation (DEC) information that identifies the use, generation, storage, treatment and/or disposal of hazardous material and chemicals, or releases of such materials that may have impacted the project site. This review included, but was not limited to, the following:
  - The federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) which is a compilation of known or suspected, uncontrolled or abandoned hazardous waste sites which the USEPA has investigated, or plans to investigate, for a release or threatened release of hazardous substances pursuant to the Superfund Act of 1980 (CERCLA).
  - CERCLIS No Further Remedial Action Planned (NFRAP) sites which is a listing of properties that have been removed from CERCLIS. These include sites where, following an investigation, no contamination was discovered, or contamination was removed quickly or was not serious enough to require Federal action.
  - The federal Permit Compliance System of Toxic Wastewater Discharges (WWD) which contains a listing of sites which discharge wastewater containing potentially hazardous chemicals.
  - The New York SPILLS database which includes a list of releases reported to DEC, including those attributed to tank test failures and tank failures. This database also lists spills that occur during the transportation of chemicals.
  - Resource Conservation and Recovery Act (RCRA) Notifiers Listing which includes facilities that have filed notification forms regarding hazardous waste activity. These sites include treatment, storage and disposal facilities; small-quantity and large-quantity generators; and transporters of hazardous waste regulated under RCRA.
  - The Chemical Bulk Storage (CBS) Database which is a list of facilities that store regulated non-petroleum substances in aboveground storage tanks with capacities greater than 185 gallons and/or in underground tanks of any size.
  - The Petroleum Bulk Storage (PBS) Database which lists commercial facilities with registered petroleum tanks located either above or below ground in excess of 1,100 gallons and less than 400,000 gallons.
  - The State Inactive Hazardous Waste Disposal Site Registry (SHWS) which is a registry of information that aids decision-making regarding the investigation and clean-up of hazardous waste disposal sites.
  - The State Hazardous Substance Waste Disposal Site Study (SHSWDS) which tracks waste disposal sites that may pose threats to public health or the environment, but that cannot be remediated using monies from the Hazardous Waste Remediation Fund.
  - The Air Discharge Facilities Index (ADF) which is a listing of permitted air emissions sites tracked by the State.
  - The State Brownfield Cleanup Program (BCP) database which includes sites where redevelopment is being contemplated in conjunction with liability releases and tax credits for sites remediated through the program. Some sites in this program have known extensive contamination, whereas others have more limited contamination or have not had sufficient investigation to determine whether or not contamination is present.
- Review previously prepared reports for the project site that contain data relative to surface and subsurface conditions, including the Final Facilities Condition Survey reports for Fresh

Kills Landfill Plant 1 (January 2007) and for Fresh Kills Landfill Plant 2 (February 2007), both prepared by Weston Solutions of New York, Inc. (Weston); the "Preliminary Fresh Kills Landfill Conceptual Design Report, Subtank 3.2 Mapping and Assessment of Natural Areas (SCS Engineers, April 1990); and "Site Investigation for Owl Hollow Soccer Fields Site," (LiRo Engineers, July 7, 2007). In addition, the Fresh Kills Landfill 2006 Annual Groundwater Monitoring Report, Environmental Monitoring Program (Shaw Environmental, September 6, 2007) and the Fresh Kills Landfill 2005 Annual Groundwater Monitoring Report (Shaw Environmental 2005) were reviewed with respect to groundwater. (A bibliography of references used in this analysis is provided at the end of this chapter.)

- Perform field reconnaissance at designated areas of disturbance for individual short-term projects (e.g., North Park, Phase A). This visual inspection identified current uses and existing conditions at the project site.
- Review existing plans and reports for closure of the Fresh Kills Landfill (these plans are described in Chapter 1 Project Description"). This includes a review of documentation related to completed and future landfill construction, operation and post-closure environmental monitoring and maintenance plans, and the nature and location of past and current uses. The available specifications, maps and analyses regarding capping materials, leachate collection system and gas collection and venting system were also reviewed.
- Determine conclusions based on the above data review and field reconnaissance and recommend further investigation and mitigation (e.g., impact avoidance, soil testing, remediation, construction health and safety protection), as necessary.

C. EXISTING CONDITIONS

TOPOGRAPHY AND HYDROGEOLOGY

Based on USGS maps and DSNY topography for the site, elevations at the Fresh Kills Park project site range from sea level (the Arthur Kill) to approximately 225 feet above mean sea level on Landfill Section 1/9. Groundwater is likely near the ground surface along the waterfront and shoreline edges. It is also expected that groundwater feeds the on-site creeks, which, although tidally influenced, have a net outflow in a westerly direction towards the Arthur Kill. (Another source of freshwater flow is the runoff that feeds Richmond Creek and Main Creek.) Actual groundwater flow in select areas of the project site and surrounding area may have been affected by current or past pumping from wells, or other factors, including historical filling, leachate control systems, underground utilities, and other subsurface openings or obstructions.

Based on information in previously published documents, including the DSNY Draft EIS (March 1996), the subsurface geology of Fresh Kills Landfill consists of municipal solid waste and other fill materials, underlain by peat, silts and clays, which are in turn underlain by fine-grained glacial deposits (sand, silt, clay, boulders and cobbles). The site is also known for a thick subsurface clay layer. DSNY boring logs show a clay/silt layer up to 100 feet thick beneath Fresh Kills Landfill. Siltstone, shale or serpentinite bedrock generally occurs at elevations greater than 100 feet below sea level; however, bedrock has been identified at about elevation 50 feet below sea level in the area of Landfill Section 6/7. It is noted that stratigraphic thickness and composition of subsurface varies across the project site.

CURRENT AND HISTORICAL CONDITIONS

FRESH KILLS LANDFILL

Facility Overview

The project site is approximately 2,163 acres in size. Approximately 995 acres, or 45 percent of this area is contained within four delineated SWMUs that are regulated by DEC with respect to prior municipal landfilling activities and the closure construction. The four SWMUs and other elements of the Fresh Kills Landfill complex are shown on Figure 11-2. DEC-approved landfill closure has been completed at Landfill Sections 3/4 and 2/8, and is underway at two others (Landfill Sections 6/7 and 1/9). SWMU 2/8 has a north and south component. In addition, SWMU 1/9 includes the Old Muldoon Avenue landfill (see the discussion below) and also encompasses major landfill facilities such as the landfill gas recovery facility and the leachate treatment plant. There are also the Plant 1 and Plant 2 areas that contained the supporting structures and facilities when Fresh Kills was operating as a municipal solid waste facility. All the components of the landfill infrastructure, including the landfill section final cover, leachate containment and collection, groundwater and gas monitoring wells, and the landfill gas collection systems, are within the environmental compliance boundary for the site and are maintained by DSNY as part of the DEC closure requirements. These infrastructure and monitoring facilities are located throughout the Fresh Kills Landfill property. A more detailed description of these systems is provided in Chapter 1, "Project Description".

Summary of the Fresh Kills Post Closure Monitoring and Maintenance Operations Manual

There is an in-place monitoring and maintenance program for Fresh Kills Landfill. As described in greater detail in Chapter 1 Project Description," the DSNY's Fresh Kills Landfill Post-Closure Monitoring and Maintenance Operations Manual (December 2002) is a detailed protocol for the management of the landfill over the post-closure period and is expected to be in-place for at least 30 years. The Manual establishes the performance standards and requirements under which the monitoring, maintenance, and reporting practices are to be performed at Fresh Kills Landfill.

The post-closure monitoring and maintenance requirements are being implemented by DSNY under the regulatory oversight of DEC. The environmental control systems at Fresh Kills Landfill, such as the gas collection and leachate collection and treatment systems, have been installed in accordance with designs approved by DEC. They are in-place to ensure that no impacts occur to the local environment, specifically with respect to the ambient air, surface water, and groundwater resources. The operational period for these systems is a minimum of 30 years, or until it is determined by DEC that the landfill environmental control systems and monitoring are no longer necessary. During this period, the biodegradable materials in the landfill sections will have substantially decomposed and settled, and landfill gas production will continually diminish. Three decades from now it is expected that most of the biodegradable material will be decomposed, and both settlement and landfill gas production will be minimal. However, until this time, or as long as it is deemed necessary, it is the principal objective of the Fresh Kills environmental control systems and monitoring program to protect the environment of the landfill site, the surrounding environment, and the local residential communities.

The Fresh Kills environmental monitoring plan is comprehensive and requires regular sampling of many environmental conditions at the landfill. Among the requirements of the post closure maintenance and monitoring program are monitoring and maintenance of the final cover and stormwater control systems, the landfill gas control and management systems, and the leachate

control systems. There is also an ongoing environmental monitoring program with environmental sampling, analysis, evaluation, record keeping and reporting for groundwater, surface water and sediment, leachate, landfill gas condensate, landfill gas surface emissions, landfill gas flare stack emissions, landfill gas migration, wastewater discharges; and contingency plan actions in the event of exceedances of thresholds.

Groundwater monitoring data are collected at Fresh Kills to detect any landfill-based groundwater contamination. To this end, shallow groundwater/refuse monitoring wells are installed at intervals of about 500 feet around each landfill section and intermediate, deep monitoring wells are installed at intervals of approximately 750 feet along the downgradient and cross gradient perimeters of the landfill sections and intermediate and deep monitoring wells are installed at intervals of 1,500 feet around the upgradient perimeter of each landfill section. In total, there are 238 groundwater monitoring wells at Fresh Kills, 116 of which are shallow wells, 61 of which are intermediate depth wells, and 61 of which are deep wells. Groundwater sampling is performed quarterly on a rotating landfill basis for analysis of routine or baseline plus previously detected analytes. The analyte list includes field, leachate indicator, inorganic, and organic parameters. If a landfill-based impact is detected, the data is then used to determine whether a leachate release has occurred, or if other sources were the cause. The groundwater monitoring data also provide trend data for comparing and updating water quality conditions.

The surface water and sediment monitoring program provides a means of monitoring and evaluating surface water quality in the waterbodies at Fresh Kills. This monitoring plan includes all surface water bodies that could be potentially impacted by a release from the landfill and includes monitoring points that would be useful in characterizing the nature and extent of a release, should it occur. Monitoring is performed in the Arthur Kill and Fresh Kills, Main and Richmond Creeks within the project site boundaries. Surface water and sediment sampling is performed at a total of 14 sampling stations. Four of these stations are also monitored for benthic ecology in both the intertidal and subtidal zones. The monitoring program includes an annual surface water monitoring program and a biennial monitoring program for sediment quality and benthic ecology.

Ongoing monitoring of discharges from the leachate treatment plant to the Arthur Kill is also therefore performed in accordance with SPDES permit requirements. Monitoring is performed on a regular basis to ensure that the discharges are protective of the environment as stipulated by the SPDES permit. If levels exceed SPDES permitted discharge limitations, the data is evaluated and adjustments are made to the treatment plant operations (as necessary) in order to keep the landfill in regulatory compliance. In addition to groundwater and surface water/sediment monitoring, the landfill perimeter is also monitored quarterly for any potential landfill gas migration. Monitoring consists of the measurement of subsurface pressure and concentration of methane, oxygen, and carbon dioxide as a percent of the landfill gas at the monitoring wells located around the perimeter of the landfill.

HISTORICAL CONDITIONS

Landfill operations at Fresh Kills, which began in 1948, predated the existence of Federal and State regulations pertaining to the design and operation of solid waste landfills. In New York State, these solid waste landfill management regulations are contained in Part 360 of Title 6 of the New York State Codes, Rules and Regulations, “Solid Waste Management Facilities.” Because the operation of Fresh Kills Landfill commenced before these regulations were promulgated, Fresh Kills Landfill is managed under a consent order between DEC and the City of New York (April 24, 1990, as modified DEC Case D2-9001-89-03), which governs landfill

closure at the site. Landfill closure is therefore being completed in accordance with a DEC-approved Closure Plan under the Consent Order. As stated above, final closure construction was completed at Landfill Sections 3/4 and 2/8 in the mid 1990s; closure construction at Landfill Sections 6/7 and 1/9 is currently underway in accordance with a DEC approved plan.

Research indicates that creation of Fresh Kills Landfill involved flattening the natural coastal hills on the site and using that material to fill in the marsh/low-lying areas (additional historical data is presented in greater detail in Chapter 7, "Historic Resources"). According to historical maps and site documents, prior to the opening of the Fresh Kills Landfill in 1948, the project site was largely undeveloped land, tidal marshland, or lands under water, with some areas at the site developed with residential, agricultural and industrial uses. The topographic changes documented over time indicate that there was also historical filling of portions of the project site in the 1950s through 1960s outside of the delineated landfill sections. In addition to the municipal solid waste landfilling operations, past uses of potential environmental concern identified on the project site include the following:

- Up to three brick-making facilities were located on the project site from 1898 to at least 1917. Each facility included boiler rooms and/or engine rooms, which indicate potential storage and use of petroleum products and other maintenance chemicals. These manufacturing facilities were located within and at the perimeter of the current locations of Landfill Sections 1/9 and 2/8.
- In 1917, Lake's Island Garbage Disposal Plant was located at the current location of Plant 1.
- From 1898 to 1917, up to three segments of railroad tracks were located at the current location of Landfill Section 1/9.
- Other historic uses of environmental concern include blacksmiths (1859 to 1887), a paint shop (1874), and a gasoline station (1937 to 1962).
- Aboveground storage tanks (ASTs), underground storage tanks (USTs), equipment and vehicle maintenance, vehicle fueling and electrical transformers were located at Plants 1 and 2 on the project site.
- The project site has a history of chemical storage and spills documented by the Federal and State regulatory databases. These databases do not generally identify exact locations of the activity and where addresses are noted, given the absence of streets, they might not be accurate. The listings for the project site include the following: 81 petroleum spills (61 of which may have impacted the soil and/or groundwater on the site); 63 petroleum USTs (33 in-service); 12 petroleum ASTs (11 in-service); 5 chemical ASTs (all in-service); 6 solid waste disposal site permits consistent with current landfill management; 10 hazardous waste generator identification numbers; 2 pollution control wastewater discharges; and 2 listings on the CERCLIS database, both with No Further Remedial Action Planned (NFRAP) status. The project site was also listed on the Inactive Hazardous Waste Substance Disposal Site database as a delisted site. It was also listed twice on the Hazardous Substance Waste Disposal Site database; however, because the site was remediated or being actively managed as a landfill, both listings indicate that the site did not qualify for the hazardous substance inventory. <u>As such, the ongoing landfill closure is not managed under the hazardous waste site program, but is addressed under a Consent Order between DEC and the City of New York.</u>
- Topographic changes documented prior to opening of the Fresh Kills Landfill and during landfill operations indicate that some type of fill material may have been placed on the subject site, outside of the landfill mounds (see also the discussion below).

SOIL CONDITIONS - OFF-MOUND INVESTIGATIONS AT THE PROJECT SITE

The documents reviewed for this analysis included a 1990 natural resources mapping assessment of the project site (*Preliminary Fresh Kills Landfill Conceptual Design Report*, Subtask 3.2, Mapping and Assessment of Natural Areas, prepared by SCS Engineers, April 1990). That document identifies a number of inactive waste disposal cells within the project site, in addition to the four delineated landfill sections (SWMUs). Those waste cells are identified as:

- Travis Landfill;
- West Shore Expressway Landfill;
- Arden Avenue Landfill; and
- Landfill Section 2/8 base fill.[1]

The 1990 report describes the former Travis Landfill as historically (pre-1950) a tidal marshland. By 1960, the area appears to have undergone earthwork operations (assumed to be landfilling with municipal waste), and a drainage swale and berm were constructed parallel to the landfill. The cover at the site based on the 1990 field observations at this location was found to be vegetated.

The West Shore Expressway and Arden Avenue Landfills cells were identified based on historic aerial photography. It was concluded in the 1990 report that ground disturbance for these areas occurred at about the same time as the Travis Landfill. Prior use in these areas appeared to be farming and meadow or woodland based on historical mapping. Landfilling appears to have occurred between 1951 and 1970. There was also the filling of a stream and realignment of drainage. At the time of the field inventory in 1990, the Arden Avenue Landfill and West Shore Expressway Landfill areas were vegetated. The 2/8 base fill is identified as a small waste cell southeast of Landfill Section 2/8.

Site-specific soil investigations were performed at the identified Arden Avenue Landfill area as part of the *Owl Hollow Park Project Environmental Assessment Statement.* These investigations included soil borings performed in May 2006 and June 2006 and test pits in February 2007. These investigations were undertaken for the purposes of determining the geophysical and chemical conditions of the soils at the site of the Owl Hollow Park project. Conditions at the site are summarized in the *Site Investigation Report for Owl Hollow Soccer Fields Site* (July 2007). These current investigations confirmed a solid waste layer exists at varying depths beneath a cover material composed of silt and clay. The cover material thickness was generally two feet or more. Soil samples of both cover material and subgrade fill material were collected for laboratory analysis from 24 test pit locations and three soil piles. The results showed varying concentrations of SVOCs, PCBs, pesticides and metals. No VOCs above the DEC 6 NYCRR Part 375 Soil Cleanup Objectives for Restricted-Residential Use were identified. Lower level (less than 5 ppm) PCB and metals concentrations were widespread across the site. A higher level PCB concentration was identified in one test pit soil sample with a PCB concentration of 120 ppm, greater than the hazardous waste level of 50 ppm. The remainder of the PCB sample concentrations were less than 8 ppm.

[1] In addition to these waste cells, Old Muldoon Landfill and the North 2/8 landfill were identified on the project site. Old Muldoon Landfill is within the Landfill Section 1/9 SWMU and the North 2/8 Landfill is within the Landfill Section 2/8 SWMU.

Methane gas testing performed as part of these investigations indicated the presence of methane in soil gas along the southern boundary of the Owl Hollow Park site. However, the concentrations and distribution identified in the overall methane testing program at the site, in conjunction with regular monitoring data gathered by DSNY for seven gas monitoring wells at the Owl Hollow Park site, indicate a methane source other than the Fresh Kills Landfill.

GROUNDWATER CONDITIONS

Because of the project site's history as a municipal solid waste disposal facility, as discussed above, groundwater monitoring is performed in accordance with the DSNY environmental compliance and monitoring program for Fresh Kills. Beginning in 1997, corrective measures, including a leachate control system, were installed at all four landfill sections. Along with the installation of a final landfill over, the leachate collection and containment systems control leachate discharges to local surface water or groundwater. For the period after the installation of the environmental control systems (e.g. leachate containment and treatment), or the groundwater sampling period from 1998 to 2006, the majority of the statistical data identified decreasing pollutant concentration trends (Shaw, 2007). While there is an improvement trend, groundwater analytical results from 2006 indicated concentrations for leachate indicator parameters, such as VOCs, SVOCs PCBs, pesticides and/or metals greater than the groundwater protection standards (TOGS Ambient Water Quality Standards and Guidance Values). These results were found in the shallow/refuse monitoring zone, intermediate depth monitoring zone and the deep (bedrock) monitoring zone (Shaw, 2007). As described above, post-closure groundwater sampling will continue to be performed at the site in order to monitor groundwater conditions and effectiveness of the environmental control measures undertaken by DSNY as part of the DEC requirements.

SUMMARY OF BASELINE CONDITIONS

AREAS OF CONCERN

Based on the above research, areas of potential concern for hazardous materials have been identified both on the project site and within the 400 foot study area. In addition to the four landfill sections and the Plant 1 and 2 facilities, these identified areas of concern are based on historical uses and database listings are listed in Table 11-1 and depicted on Figure 11-3 (as noted, these are generally mapped and not to scale). In addition to the four identified landfill sections and the Plant 1 and 2 areas, the areas of environmental concern at the project site include:

- Historic manufacturing operations such as blacksmiths, paint shops, an asphalt plant, brickmaking, a linoleum plant and rail lines;
- Lakes Island Garbage disposal;
- Numerous buried tanks and associated spills;
- Utility facilities for Consolidated Edison; and
- Waste cells.

Specific information regarding each of these listings, including tank details and spill closure dates, is included within the table.

Off-site uses with the potential to impact the site soil and/or groundwater include the following (see also listings in Table 11-1 and depicted on Figure 11-3):

- A property northwest of the project site was used for heavy industrial purposes.
- Several properties east-adjacent and south-adjacent to the project site that were formerly and/or are currently gasoline stations, auto repair facilities, bulk oil/gasoline storage facility, or dry cleaners with listed storage tanks and spills.
- Nearby inactive landfills, including Victory Complex Landfill (northwest-adjacent), Richmond Avenue Landfill (east-adjacent), and Brookfield Avenue Landfill (east).

POTENTIAL CONTAMINANTS OF CONCERN

As stated above, soil and groundwater can become contaminated as a result of past or current activities on the project site or on adjacent areas. Subsurface soil and groundwater contamination may remain undetected without posing a threat to local workers or residents. Excavation, earthmoving, dewatering, and other construction activities can, however, expose the contaminants, provide a pathway of exposure and, if such contaminants are not properly managed, introduce potential risk to construction workers and others nearby. Demolition of existing structures that have asbestos-containing materials, lead based paint or PCB-containing electrical equipment also has the potential to release contaminants, if these materials are not properly handled and disposed.

Based on the types of contaminants that are typically found in New York City and the uses identified above, as well as the pollutants that are typically associated with solid waste landfills, potential contaminants of concern for the project site would include the following:

- 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. VOCs can also generate organic vapors that migrate.
- 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 project site. In addition, petroleum-related SVOCs could be present from current or former petroleum storage on the project site.
- 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 electrical transformer yards and rail yard/train 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, and plastics manufacturing). PCBs tend to travel only short distances in soil, except in unusual circumstances (e.g., large spills of PCB-containing oils over many years).

Table 11-1
Summary of Historic Uses and Database Listings for Areas of Environmental Concern (Hazardous Materials)

Figure 11-3 Map ID No.	Resource Date(s)	Resource Description	Notes	Current Location
1a	1859	Historic Resources - Walling Map	Blacksmith and woodworking	On-site, off-mound
1b	1874	Historic Resources - Beers Map	Blacksmith and paint shop	
2	1874 and 1887	Historic Resources - Beers Maps	Blacksmith	On-site, off-mound
3a	1937-38	Sanborn Fire Insurance Map	Vanbro Construction asphalt plant with 1 gasoline tank and 3 fuel oil tanks	On-site, off-mound
3b	1951	Sanborn Fire Insurance Map	1 gasoline tank and 2 fuel oil tanks	
3c	1962	Sanborn Fire Insurance Map	1 gasoline tank	
4a	1874	Historic Resources - Beers Map	Brick manufacturer	On-site, within and east-adjacent to mound 2/8
4b	1911-13	Borough of Richmond Topographical Survey	Brick manufacturer with boiler room and engine room	
5	1891 1898 1917	Historic Resources - Bien and Vermule Map Historic Resources - Robinson Map Historic Resources - Bromley Map	Railroad tracks	On-site, within mound 1/9
6	1917	Historic Resources - Bromley Map	Rossville Brick Co. with engine house	On-site, within mound 1/9
7	1917	Historic Resources - Bromley Map	Railroad tracks	On-site, within mound 1/9
8a	1911-13	Borough of Richmond Topographical Survey	Richmond Brick Co. with machine shop, engine house, ash heap and railroad tracks	On-site, within and north-adjacent to mound 1/9
8b	1917	Historic Resources - Bromley Map	Richmond Brick Co. with railroad tracks	
9a	1917	Historic Resources - Bromley Map	Lakes Island Garbage Disposal Plant	On-site at Plant 1, north-adjacent to mound 1/9
9b	2007	Weston Phase I Report - inspection	ASTs, USTs, equipment and automobile maintenance, vehicle fueling area, transformers	
10	2007	Weston Phase I Report - inspection	ASTs, former USTs, equipment maintenance, vehicle fueling area, transformers, truck washing	On-site at Plant 2, south-adjacent to mound 3/4
11a	1937 to 1962	Sanborn Fire Insurance Maps	Gasoline filling station with 2 gasoline tanks	On-site, northeast-adjacent to mound 6/7
11b	1990	Sanborn Fire Insurance Map	Water pollution control building	
12	various	Toxics Targeting Regulatory Databases	Closed spill	Mapped location within landfill property not confirmed
13a	various	Toxics Targeting Regulatory Databases	Closed spill	Mapped location on Isle of Meadows not confirmed
13b	1955	Aerial photographs	Areas of apparently disturbed soil	On-site, Isle of Meadows
14	various	Toxics Targeting Regulatory Databases	CERCLIS NFRAP, hazardous substance waste disposal site (remediated, removed from the hazardous substance inventory), closed spills	Mapped location within landfill property not confirmed
15	various	Toxics Targeting Regulatory Databases	Closed spills	Mapped location within landfill property not confirmed

Table 11-1 (cont'd)
Summary of Historic Uses and Database Listings for Areas of Environmental Concern (Hazardous Materials)

Figure 11-3 Map ID No.	Resource Date(s)	Resource Description	Notes	Current Location
16	various	Toxics Targeting Regulatory Databases	CERCLIS NFRAP, inactive haz waste disposal site (delisted), hazardous substance waste disposal site (actively managed, removed from the hazardous substance inventory), solid waste facilities (6), in service (11) and closed (1) ASTs, in service (33) and closed (15) USTs, active and closed spills (52), hazardous waste generators (10), wastewater dischargers (2), air dischargers (6)	Mapped location within landfill property not confirmed
17	various	Toxics Targeting Regulatory Databases	Closed USTs, active spill, closed spills	
18a	1874 1891 1907	Historic Resources - Beers Maps Historic Resources - Bien and Vermule Map Historic Resources - Robinson Map	Industrial use (linoleum mfg)	Off-site (north)
18b	1917 to 1951	Sanborn Fire Insurance Maps	Industrial use (linoleum and linseed oil mfg), included paint shop, boiler room, gasoline tanks, benzene tanks, other unlabeled tanks	
18c	1962 to 1990	Sanborn Fire Insurance Maps	Consolidated Edison coal and equipment storage	
19	1951	Sanborn Fire Insurance Map	Staten Island Oil Co. with 3 fuel oil tanks and 2 gasoline tanks	Off-site (northwest-adjacent)
20	1937 to 1951	Sanborn Fire Insurance Maps	Gasoline filling station with 2 gasoline tanks	Off-site (northeast-adjacent)
21a	1911-1913	Borough of Richmond Topographical Survey	Blacksmith	Off-site (northeast-adjacent)
21b	1962 to 1990	Sanborn Fire Insurance Maps	Gasoline filling station	
21c	various	Toxics Targeting Regulatory Databases	ASTs, in service and closed USTs, active and closed spills, hazardous waste generator	
22a	1962	Sanborn Fire Insurance Map	Auto repair	Off-site (northeast-adjacent)
22b	1990	Sanborn Fire Insurance Map	Dept. of Sanitation garage	
23	1983	Sanborn Fire Insurance Map	Auto repair	Off-site (east-adjacent)
24a	1983 to 1990	Sanborn Fire Insurance Maps	Auto repair	Off-site (east-adjacent)
24b	various	Toxics Targeting Regulatory Databases	In service and closed USTs, active and closed spills, hazardous waste generator	
25	various	Toxics Targeting Regulatory Databases	In service USTs, closed spill, hazardous waste generator	Off-site (east-adjacent)
26a	1962 to 1990	Sanborn Fire Insurance Maps	Gasoline filling station and auto repair	Off-site (southeast-adjacent)
26b	various	Toxics Targeting Regulatory Databases	In service and closed USTs, closed spills, hazardous waste generator	

Table 11-1 (cont'd)
Summary of Historic Uses and Database Listings for Areas of Environmental Concern (Hazardous Materials)

Figure 11-3 Map ID No.	Resource Date(s)	Resource Description	Notes	Current Location
27	various	Toxics Targeting Regulatory Databases	In service AST, in service UST, closed spill, hazardous waste generator	Off-site (south-adjacent)
28	various	Toxics Targeting Regulatory Databases	CERCLIS NFRAP, delisted inactive hazardous waste site, delisted haz waste disposal site, hazardous waste generator	Off-site (south-adjacent)
29	1937 to 1983	Sanborn Fire Insurance Maps	1 gasoline tank	Off-site (south-adjacent)
30a	1983 to 1990	Sanborn Fire Insurance Maps	1 (1983) or 2 (1990) filling stations	Off-site (south-adjacent)
30b	various	Toxics Targeting Regulatory Databases	2 gas stations and a dry cleaners - in service ASTs, in service and closed USTs, active and closed spills, hazardous waste generator IDs (3), air discharge facility	
31a	1983 to 1990	Sanborn Fire Insurance Maps	Concrete sludge basins	Off-site (south-adjacent)
31b	various	Toxics Targeting Regulatory Databases	Closed chemical bulk storage AST, wastewater discharge permit	
32	various	Toxics Targeting Regulatory Databases	In service AST, closed USTs, closed spills, toxic release (TRIS)	Off-site (south-adjacent)
33	1960 to 1970	SCS Assessment	Inactive solid waste landfill (Richmond Avenue Landfill)	Off-site (east-adjacent)
34	1970 to 1982	SCS Assessment	Inactive solid waste landfill (Brookfield Avenue Landfill)	Off-site (east)
35	1957 to 1970	SCS Assessment	Identified waste cell (Arden Avenue Landfill)	On-site, off-mound at Oak Hollow Park Site
36a	1940 to 1957	SCS Assessment	Inactive landfilling of dredge spoils (Victory Complex Landfill)	Off-site (northwest-adjacent)
36b	1955	Aerial photograph	Area of apparently disturbed soil	Off-site (northwest-adjacent)
37a	1940 to 1961	SCS Assessment	Identified waste cell (Travis Landfill)	On-site, off-mound (north of SWMU 3/4)
37b	1966	Aerial photograph	Area of apparently disturbed soil	On-site, off-mound (north of SWMU 3/4)
38	1940 to 1961	SCS Assessment	Identified waste cell(West Shore Expressway Landfill)	On-site, off-mound (west of SWMU 2/8)
39	1940 to 1961	SCS Assessment	Identified waste cell (2/8 Base fill)	On-site, off-mound (east of SWMU 2/8)
40	1984	Aerial photograph	Area of apparently disturbed soil	On-site, off-mound (west of SWMU 6/7)
41	1955-1978	Aerial photographs	Area of apparently disturbed soil	On-site, off-mound (east of SWMU 6/7)

Sources:
Sanborn Fire Insurance Maps (ca. 1900-2000)
Toxics Targeting Environmental Reports; January 31 and February 1, 2007.
Weston Solutions of New York, Inc. Facilities Condition Surveys for Plant 1 (January 2007) and Plant 2 (February 2007).
SCS Engineers Preliminary Landfill Conceptual Design Report, Subtask 3.2, April 1990.
Aerial photographs (ca. 1955-1996)

Notes:
For clarity, the regulated SWMUs and general historic filling are not included in this table. The defined locations of the SWMUs are shown on Figure 11-2.
Actual locations of reported database listings within the site were not confirmed for boundaries. Site inspections or testing may provide more accurate locations.

- 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. These metals tend not to migrate far in soil; therefore, they would be of greatest concern at the site where they were generated. Metals at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.
- Fill materials of unknown 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 off-mound throughout the project site.
- It is anticipated that soils currently over the closed landfill sections would not meet DEC criteria for public access. DSNY completed closure of the north and south mounds (Landfill Sections 3/4 and 2/8) in the mid-1990s. At that time, public access to these areas was not programmed. In accordance with the design plans at that time, soils meeting the analytical criteria for industrial use were used for closure construction final cover. Topsoil and subsoil recommendations were based strictly on engineering parameters and topsoil was required only to meet criteria for organic matter (five percent or greater) and general limitations with respect to toxic substances.
- In addition to the above conditions which would relate to soils and groundwater, older (pre-1980) building on the site are expected to contain asbestos and lead paint. For example, friable asbestos materials would be expected in certain structures within the Plant 1 and 2 complexes. Asbestos is a common component of building materials, especially insulation, fireproofing, tile flooring, plaster, sheetrock, tile ceiling, mastic, and roofing materials. In addition to materials within existing structures, subsurface utility lines may be coated with asbestos or encased in "transite," an asbestos-containing material (ACM). In addition, lead based paint is likely to be present in older building on the site. The use of lead based paint in non-residential buildings and outdoors was severely restricted by the Consumer Products Safety Commission in 1977. Lead based paint can be released as dust (or as a fume if heated) and is potentially hazardous, especially to children. Older buildings in the project site are likely to contain lead based paint.

D. THE FUTURE WITHOUT THE PROPOSED PROJECT: 2016 AND 2036

In the future without the proposed project, it is assumed that landfill closure will be completed by DSNY in accordance with approved closure plans with oversight by DEC. It is expected that closure construction at Landfill Sections 6/7 and 1/9 will be completed by 2016. The environmental control systems including the leachate collection and containment systems and the landfill gas management system will continue to operate as required by DEC. The leachate collection and containment system and landfill gas management system will continue to operate after landfill closure as required by DEC under 6NYCRR Part 360-2.15 regulations related to closure and post-closure criteria. The leachate and landfill gas collection and treatment infrastructure, and the environmental monitoring systems are integral to the protection of public health and the environment around the landfill into the indefinite future, and must remain through at least 2036. These key landfill facilities (e.g., the leachate treatment plant, the landfill gas collection system and purification plant) now are expected to remain operational for at least 30

years or until they are deemed no longer necessary by DEC. It is also assumed that the environmental monitoring and maintenance program would continue to be implemented by DSNY for at least 30 years. In the future without the proposed project, no other activities are expected on the project site through the 2016 and 2036 analysis years. It is also recognized that as the biodegradable materials in the landfill decompose and settle, landfill gas emissions will decline and there may be amendments to the monitoring and maintenance practices. Thus, there would be a low potential for disturbance of any on-site hazardous materials and no on site public access would be permitted that would increase exposure pathways.

E. THE FUTURE WITH THE PROPOSED PROJECT: 2016 AND 2036

INTRODUCTION

An assessment of potential for hazardous material impacts related to the proposed project for the 2016 and 2036 analysis years is provided below. As described in Chapter 1, "Project Description," the proposed short-term projects are listed below in Table 11-2). Other elements of the park are assumed to be completed by 2036.

Table 11-2
Park Projects for Analysis: 2016

Project Phase	Estimated Completion Date
"Digger" relocation project and signage	**2009**
North Park (Phase A) Travis Neighborhood Park—arc trail to Main Creek, bird observation tower, plant nursery, seed farm overlook deck, off-mound upland landscape enhancement (about 20 acres), parking, signage, and lighting.	**2010**
North Park Multi-Use Path and Wetland Enhancement—parade grounds (lawn, softball field and picnic area) 2 tennis courts, grassy play mounds, picnic woods (about 12 acres), freshwater wetland enhancement, stormwater basin enhancement (about 4 acres), outdoor eco-classroom, visitor center, 3 comfort stations, café, recreational multi-use path (about two miles) around landfill section 3/4, tidal wetland enhancement along Main Creek, fishing pier, parking, signage and lighting, flare station fence/enclosure, DPR maintenance and operations (secondary).	**2013**
North Park Landfill Section 3/4 Landscape Enhancement and Public Access—enhancements of existing landfill cover for landscape enhancement, public access on footpath trails and hilltop field (about 10 acres), parking.	**2014/2015**
South Park Arden Heights Neighborhood Park and Wetland Enhancement—entrance and parking, information center, enhancement of freshwater wetland (about 2 acres), playground, berm overlooks, picnic area (about 4 acres), berm overlook and footpaths (about 1.4 acres), signage, lighting, DPR maintenance and operations (secondary), plant nursery/seed farm., comfort stations, and recreational fields	**2010**
South Park Multi-use Paths and Recreation Facilities— recreational multi-use path (about eight miles) around landfill section 2/8, including pedestrian and high-speed bikeways, equestrian center and stable (about 5 acres), open meadow (about 15 acres), horseback riding trails, indoor track and field facility and sports barn, tennis center and associated facilities (about 12 acres), café, comfort stations, entrance and parking, signage and lighting.	**2010/2014**
South Park Landfill Section 2/8 Enhancement—enhancements of existing landfill cover for landscape enhancement and public access on top landfill section 2/8, hilltop meadow (about 7 acres) with mountain biking, and pedestrian trails, hilltop overlook deck.	**2010/2011**
Confluence—the Marsh, Terrace, and Sunken Forest—freshwater wetland improvements and possible tidal wetland enhancement within two stormwater basins at the Marsh—the Sunken Forest (2 acres) with boardwalk pedestrian and bike paths; and a freshwater pond/emergent wetland (2 acres), and freshwater wetlands developed within a stormwater basin at the Terrace (1 acre).	**2012**
Confluence—Creek Landing—activities on existing built surfaces and reuse of existing bulkhead for market roof area of private concessions including boathouse, kayak and canoe rental, café, and cultural space; lawn; possible tidal wetland creation in areas of bulkhead deterioration (about 1 acre of enhancement), parking, DPR maintenance and operations (secondary), and lighting.	**2016**
Commercial Wind Turbine Systems—concrete pads with wind turbines on landfill sections within North, South and East Parks.	2016
Proposed Park Roads and West Shore Expressway Connections—Forest Hill Road connection extending from Forest Hill Road/Richmond Avenue to Confluence Loop Park Road; the south, east, and north legs of Confluence Loop Park Road, including modifications to Richmond Creek Bridge and Main Creek Bridge and access improvements along the West Shore Expressway, including extensions of the service roads.	**2016**
Sources: Fresh Kills Park Final Scope of Work to Prepare a GEIS, New York City Department of City Planning and New York City Department of Parks and Recreation, August 2006; Fresh Kills Park: Lifescape, Staten Island New York, Draft Master Plan, prepared by Field Operations for the City of New York, March 2006; Fresh Kill Park development team, November 2007.	

CEQR IMPACT METHODOLOGY

In order to determine whether a proposed project has the potential to result in significant adverse impacts due to hazardous materials, the *CEQR Technical Manual* suggests the following potential concerns be addressed:

- Increased human exposure to contaminants that originate either on- or off-site, including both present and future site occupants or users as well as persons off-site that could be exposed to dust or indirect impacts.
- Contaminated sites that are not covered or capped by structures, pavements, or clean fill.
- Soil gas that could potentially migrate into buildings on the project site or the surrounding area or that could collect under impervious surfaces and result in potentially explosive concentrations.
- Environmental exposure to contaminants that could include impacts to natural resources (e.g., groundwater or surface water quality, wildlife and animals).
- Worker exposure during site preparation, excavation, and construction.
- Operations at the site that could result in increased hazardous material exposure to current site users or local residents.

Based on the above, hazardous materials impacts are assumed to occur when: (a) elevated levels of hazardous materials exist on a site; (b) a proposed project increases pathways of exposure; or (c) a proposed action would introduce new processes introducing hazardous materials and increasing the risk of human or environmental exposure. Both (a) and (b) apply to the proposed project relative to the increase in human exposure.

As described in the *CEQR Technical Manual*, a determination regarding significant adverse impacts should be made on a site-specific, project-specific basis, considering all available information. However, the manual also suggests that for a programmatic (generic) EIS, more general conclusions can be drawn regarding the type of impacts that could be expected. Since the analysis methodology for this project is a Generic EIS, the conclusions below provide steps for additional future investigations as specific project phases move forward through the 2016 and 2036 analysis years.

CONCLUSIONS

As described above, areas of environmental concern for hazardous materials have been identified on the project site. Given the size of the project site and that the proposed project would be constructed in multiple phases over a number of decades, it is recommended that as each individual project phase moves forward conditions at the project site with respect to hazardous materials should be established and finalized before park or road construction proceeds. This assessment would be performed, as follows:

- Review of documentation related to the individual project site and with respect to completed or underway landfill closure construction; monitoring, maintenance, and requirements for continued landfill environmental management; the nature and location of past and current uses; and nature of planned future uses, including final cover types (e.g., natural or synthetic turf, drainage structures, and pavement utility connections). The criteria for soil cover material in each area would be determined using 6NYCRR Part 375 Soil Cleanup Objectives with consideration of human and ecological exposure pathways relative to the planned use at each individual project site.

- Determine potential hazardous materials impacts based on grading plans and areas of soil disturbance (both horizontal and vertical disturbance from grading and filling) and the need for fill material under the proposed project's "Soil Management Plan" (see Chapter 1, "Project Description") This would also include an assessment of potential need for any dewatering or vapor protection for structures.
- Prior to any soil disturbance, perform Phase I and II site investigations (as necessary) with subsurface testing and remediation, where appropriate. Site testing would disclose the need for any project-specific remediation, incorporate the objectives of the project's "Soil Management Plan" and include a Construction Health and Safety Plan, as appropriate. All of the above would be prepared for implementation prior to undertaking any invasive site construction work in order to ensure proper handling of excavated material and protection of worker and community health and safety.
- Remediate any potential impacts to existing landfill infrastructure. In areas where existing landfill infrastructure may be impacted with such materials as paving, synthetic field, lawn, and planting, it would need to be avoided or replaced in order to avoid any potential exposure impacts or residual contamination issues for future users of the park.

The above measures are based on the prior investigation that was performed at the Owl Hollow Park project which is an area of concern recognized as the Arden Avenue Landfill (see the discussion above). Similar conditions are expected on the project site in the early phases of North Park (Phase A) which has been identified as in the area of the former Travis Landfill. In addition, these measures would apply to other areas of the proposed park given the potential for most areas of the project site to have hazardous materials. With these measures incorporated into the project design, potential impacts from hazardous materials would be avoided for the future Fresh Kills Park projects.

BUILDING DEMOLITION OR REUSE

In addition to site development, prior to renovation or demolition of any existing building, a comprehensive environmental survey including an assessment for asbestos should be performed in each building to confirm the presence or absence of asbestos, lead-based paint, or other hazardous materials. If the investigation finds that a structure contains asbestos, it would need to be properly removed and disposed of in accordance with all City, State and Federal regulations by a licensed asbestos abatement contractor.

In addition, any renovation or demolition activities with the potential to disturb lead-based paint must be performed in accordance with the applicable Occupational Safety and Health Administration regulation (OSHA 29 CFR 1926.62—Lead Exposure in Construction). If disposal of suspect mercury-containing or suspect PCB-containing lighting or electrical fixtures is required, unless there is labeling or test data that indicates that these fixtures are not mercury- and/or PCB-containing, it would be performed in accordance with applicable federal, state, and local regulations and guidelines.

CONCLUSIONS

According to the *CEQR Technical Manual*, soil and groundwater conditions can become impacted by hazardous materials as a result of historical or current uses and activities on a project site or in adjacent areas (generally defined as within 400 feet of the project site boundary). Subsurface soil and groundwater contamination may remain undetected for many years without posing a threat to local workers or residents. However, grading and excavation, dewatering, and other construction activities can release contaminants that create a human exposure pathway. If these contaminants are

not properly identified and handled development activities can create a health risk to construction workers and residents. In addition, demolition of older structures that have asbestos-containing materials is another example of a hazardous materials concern since this also has the potential to release contaminants to the environment if not properly managed.

For the proposed Fresh Kill Park project, based on an extensive review of published reports and literature as well as historical aerial photography and topographic maps, available site testing data and field walkovers, it is concluded that the project site soils and groundwater are likely to have been affected by hazardous materials or pollutants from a variety of on- and off-site sources. These sources include the four solid waste landfill sections that have been used for the landfilling of municipal solid waste, the Plant 1 and 2 areas where there are substantial structures and facilities that were used by DSNY when Fresh Kills was operating as a landfill (these facility areas include underground and above ground storage tanks as well as building and other accessory structures), and waste cells where solid waste has been identified at locations outside of the solid waste management unit area boundaries and not formally closed. There are also off-site industrial uses in the surrounding area that may have affected the project site.

Based on the research performed for this analysis, the types of contaminants that are typically found in urbanized areas (such as New York City) as well as in and around municipal solid waste landfills would be expected. Some of the potential contaminants of concern at the project site include: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) polychlorinated biphenyls (PCBs), metals (including lead, arsenic, cadmium, chromium, and mercury) constituents associated with fill materials of unknown origin; and asbestos and lead-based paint in older buildings.

The proposed project would affect soils in two ways. Soils would be imported to the project site for the purposes of creating new park areas and enhanced ecological habitats. Engineering soils would also be used as a base for the proposed roads, structures, and parking areas. As described in greater detail in Chapter 1 "Project Description," it is the objective of the proposed project to ensure that the previously closed landfill sections and the off-landfill sections that would be publicly accessible have two feet of clean soil cover. It is the objective of the City to provide soil cover meeting criteria approved by DEC for the purposes of providing a healthy environment and to protect public health, safety, and the environment at open spaces proposed in the park (see also Chapter 21, "Public Health"). Given the diversity of existing conditions on the site, varying hydrology of wetland habitat areas, and the wide range of uses proposed with the proposed park, project-by-project review of soil criteria is expected to include the selection of various soils, largely driven by proposed programming and the individual capital projects.

In addition to providing this soil cover, certain elements of the proposed project are expected to require excavation for the purposes of installing new utilities such as electricity, water and sewer connections as well as foundations for the proposed structures. These excavation areas, however, in the context of the overall project, are limited and the majority of the proposed project activities would occur at or above the existing grade (i.e., on the added cover soil). It is also not expected that the majority of site-specific projects would require activities or new structures that would extend into shallow or deep groundwater at most locations. However, to the extent any dewatering activities are necessary during construction the appropriate approvals would be obtained from NYCDEP and DEC.

It is the conclusion of this analysis that nearly the entire project site has the potential to have been impacted by hazardous materials as defined under CEQR. Therefore, for site-specific capital project areas where soil and/or groundwater disturbance is proposed (e.g., excavation), significant adverse impacts could occur due to hazardous materials. As stated above, the

proposed project would be built in multiple phases over a number of decades. Therefore, recommendations for individual project-specific subsurface investigation and, if necessary, remediation, are proposed to avoid this impact. This conclusion is also presented in Chapter 20, "Construction Impacts," and Chapter 23, "Impact Avoidance and Environmental Protection Measures" (Chapter 21, "Public Health," also addresses hazardous materials issues). As discussed below, with this individual project site investigation and testing program, any impacts due to hazardous materials would therefore be avoided during project implementation. In addition, in accordance with local, state, and federal laws, the demolition or reuse of any buildings would need to comply with environmental regulations relative to the handling and disposal of asbestos and lead paint. ✷