Chapter 11: Hazardous Materials

A. INTRODUCTION

This chapter assesses the potential for the presence of hazardous materials within the Fresh Creek Urban Renewal Area (FCURA), the potential for exposure to hazardous materials during and following construction, and the specific measures that would be employed to protect public health, worker safety, and the environment. A "hazardous material" is generally defined as any substance that poses a threat to human health or the environment. It is often used interchangeably with "contaminated material," but should not be confused with the term "hazardous waste," which is a regulatory term.[1]

The FCURA has a history of controlled and uncontrolled filling. Based on the site history, contaminants on the Project Site would be expected to include subsurface contamination (in historic fill, soil, soil gas, and/or groundwater) and several prior subsurface investigations have confirmed its presence.

New construction within the FCURA would involve excavation, disturbance, and potential removal for off-site disposal of some of the existing fill/soil. Based on the proposed development, dewatering of groundwater is not anticipated for the structure; however, groundwater may be encountered in some areas during infrastructure (e.g., sewer) construction. If dewatering is necessary for construction in any area, the discharge water would meet the New York City Department of Environmental Protection (NYCDEP) criteria for effluent to municipal sewers, in accordance with NYCDEP Bureau of Wastewater Treatment (BWT) Wastewater Quality Control Permit. Groundwater would be tested for sewer discharge criteria and pre-treated, if necessary, prior to discharge to the city's sanitary sewer system. The presence of hazardous materials threatens human health or the environment only when exposure to those materials can occur. The most likely route of human exposure is through breathing volatile and semi-volatile compounds or particulate-laden air released during demolition, excavation, and construction activities (these routes of exposure could also occur during excavation after construction of the Proposed Project, e.g., for utility repair work). A variety of measures would be implemented as part of the Proposed Project, including a construction-specific Health and Safety Plan (HASP) such that its construction would not result in significant adverse impacts from exposure to hazardous materials.

Following construction of the Proposed Project, the principal potential pathway of concern would be the intrusion of vapors into buildings from any methane or other volatile contamination

[1] "Hazardous waste" is defined in both the 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).

remaining in the subsurface. To avoid the potential for impacts from subsurface vapors, mitigation would be provided within new buildings as described in Chapter 22, "Mitigation."

B. METHODOLOGY

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

A Phase I Environmental Site Assessment (ESA) for the entire Project Site was prepared in June 2007 by Langan Engineering and Environmental Services, P.C. (Langan) to assess the potential for contaminated materials in the subsurface from past or present uses. The Phase I ESA study included a reconnaissance of the entire Project Site, interviews with persons knowledgeable about the site, and a review of historic maps, regulatory records, available topographic and geologic/hydrogeologic/subsurface data (including prior environmental studies) for the Project Site and surrounding area.

The Phase I ESA was conducted in accordance with the American Society for Testing and Materials (ASTM) Standard E1527-05 (Standard Practice for ESA: Phase I ESA Process) which includes the United States Environmental Protection Agency (USEPA) requirements. All Appropriate Inquiry (AAI) Rule, and the following research was conducted:

- A visual inspection of the property to identify current uses and assess existing conditions;
- A visual inspection, from public rights-of-way, of adjacent properties;
- An evaluation of land use history using available historical fire insurance maps, topographic maps, and city directories;
- A review of federal and state databases regarding hazardous materials for sites within the Project Site and for the surrounding area;
- A review of electronic New York City Department of Buildings (DOB) files for pertinent information, including historic and current petroleum tanks;
- An Environmental Lien search;
- A review of previous studies completed, whenever possible; and
- A review of available geologic, hydrologic, hydrogeologic, and topographic information from existing data sources.

PHASE II ENVIRONMENTAL SITE INVESTIGATION (ESI)

A Phase II ESI (Langan, February 2008) consisting of: a geophysical survey for potential subsurface structures; installation of 58 test pits and 7 Geoprobe soil borings was conducted. It included the collection and laboratory analysis of 128 soil and 10 groundwater samples.

C. EXISTING CONDITIONS

At the time of the Phase I ESA site visit, the Project Site primarily consisted of undeveloped, vacant land, except for 1) ongoing construction of the Nehemiah housing units at the northern / northeastern portion of the site; 2) rough graded areas on the eastern portion of the site, just south of Vandalia Avenue; 3) a truck parking lot on the southeast portion of the site, and 4) on-site, paved roadways of Gateway Drive, Vandalia Avenue, and the continuation of Elton Street.

TOPOGRAPHY

The FCURA was originally tidal wetlands and, therefore, is underlain by natural peat and organic matter. The general subsurface stratigraphy consists of a layer of fill, underlain by organic materials overlying sand. The fill stratum can be delineated into two layers: hydraulic sand fill and miscellaneous building debris. The overall thickness of the fill layer ranges from about 2 to 22 feet. The organic layer underlying the fill strata varies in thickness from about 1.5 feet to 11 feet and consists of dark gray to black organic clay, silt, peat, and fine sand.

Groundwater is expected to be encountered within the fill material at about 10 feet below surface and generally flows south and southeast toward Jamaica Bay. Groundwater in Brooklyn is not used as a source of potable water (all potable water originates in upstate reservoirs), though both Brooklyn and Queens are included within an EPA-designated sole source aquifer.

SITE HISTORY AND CONTAMINANTS OF CONCERN

In the early 1900s, the site was still tidal wetlands. Based on Sanborn fire insurance maps, development at the site began about 1908. By 1908, a 2-story dwelling, stable, coop, and shed were located near the current intersection of Vandalia Avenue and Elton Street (most likely built on fill materials of unknown origin); the other portions of the site remained undeveloped. By 1954, apparent soil disturbance had occurred on the entire site. On-site structures had been demolished by 1968 and Vandalia Avenue and Elton Street were constructed as paved roads by 1984. The site has largely remained vacant and undeveloped since then.

Based on the prior subsurface investigations, the site was filled first with refuse containing ash, wood, metal, glass, concrete, brick, and auto parts. Subsequently, the site was filled with hydraulic sand, bringing it to the current elevation. Based on the prior investigations, contaminants of concern are as follows.

- ***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"), which are common ingredients in solvents, degreasers, and cleansers. When present, VOCs (and methane, see below) can represent a greater potential for adverse effects because, in addition to soil and groundwater contamination, they can generate vapors that migrate into (future) buildings.
- ***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 fill material.
- ***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 at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.
- ***Fuel oil and gasoline from storage tanks*:** Residences and businesses in the vicinity of (and possibly historically within) the Project Site currently have, or likely once had, both known and undocumented above-ground storage tanks and/or underground storage tanks for fuels, including heating oil and gasoline. Some of these tanks may have been removed, and 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 to date.

- ***Methane:*** Methane is a gas formed from decomposition of organic materials. Both natural deposits (e.g., peat) and man-made fill materials at the Project Site are potential sources of methane. Though not a concern for its toxicity, if not controlled methane can migrate into excavations or future buildings. At elevated levels, methane can result in the potential for explosive conditions.

The preceding list provides a summary of categories of contaminants and is not a comprehensive list of all contaminants that may be encountered. Excavation, earthmoving, dewatering (if required), and other construction activities can expose contaminants, provide a pathway of exposure and, if such contaminants are not properly managed, introduce potential risk to construction workers, the surrounding communities, and natural resources.

SUBSURFACE INVESTIGATION FINDINGS

Consistent with the Phase I ESA projections, the Phase II ESI confirmed that the entire Project Site has a sand and gravel layer extending from the ground surface to a depth of 2.5 to 18.5 feet. Both the ESI and previous investigations conducted at the site in 1988, 1992, 2005, and 2007 identified concentrations of VOCs, SVOCs, and metals in soil (especially beneath the sand and gravel layer) and groundwater above New York State Department of Environmental Conservation (NYSDEC) Technical and Administrative Guidance Memorandum #4046 (TAGM) Recommended Soil Cleanup Objectives (RSCO) in soil and Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards (AWQS) in groundwater. However, these criteria were developed based on exposure scenarios that do not currently exist at the Project Site and/or would not exist for the Proposed Project. For example, the groundwater criteria are drinking water standards, but groundwater at the site is not and would not be used for potable water supply, notwithstanding the EPA sole-source aquifer designation. Thus, exceedance of a particular criterion does not necessarily represent a concern.

The subsurface investigation conducted in 2005 identified leachable lead level exceeding the threshold for classification as a hazardous waste in one composite sample collected from the northern portion of the site, near the intersection of Vandalia Avenue and Elton Street. One of the 128 Phase II ESI samples (SB-59 in the east/southeastern portion of the Site) exceeded the hazardous waste threshold. Soils exceeding the lead hazardous waste threshold were also encountered and removed during construction of the Nehemiah housing units at the northern/northeastern portion of the site.

The investigations conducted in 1992 and 2005 noted that methane levels in soil gas samples are likely from decomposition of natural peat and organic matter (typically found in wetlands) and buried refuse at the Project Site. In addition, tetrachloroethene was detected at one soil gas location in the northwestern portion of the site. These subsurface conditions, though typical of those found in urban areas, especially in areas where filling occurred, represent a potential current concern, particularly to utility workers. The primary concerns for the Proposed Project, related to potential contaminants, are worker and community health and safety, and managing the products of excavation in an appropriate manner. The preventive measures that would be employed to address these concerns are discussed below in Section E, “2011 Probable Impacts of the Proposed Action.

D. 2011 THE FUTURE WITHOUT THE PROPOSED ACTION

Without the Proposed Action, development of the FCURA would occur consistent with the 1996 Plan. By 2011, this would include construction of residential buildings adjacent to the Thomas Jefferson High School Athletic Fields. As such, per the 1996 *Gateway Estates Final Environmental Impact Statement* (1996 FEIS), the following measures would be required during construction (as is currently occurring during the Nehemiah Program construction):

- Implementation of an environmental HASP;
- Testing (and pretreatment, if needed) of groundwater from any dewatering necessary for development;
- Installation of clean cover materials [meeting NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 guidelines] consisting of at least two feet deep in any locations on the Project Site not currently covered by clean fill material, in areas not covered by buildings, pavement, or other impervious surfaces.
- Installation of active methane gas venting systems in all new buildings.

Overall, without the Proposed Action, there would be a similar potential for disturbance of hazardous materials, but potentially in different areas of the site.

E. 2011 PROBABLE IMPACTS OF THE PROPOSED ACTION

The presence of hazardous materials threatens human health or the environment only when exposure to those materials occurs and, even then, a health risk requires both a complete exposure pathway to the contaminants and a sufficient dose to produce adverse health effects. Construction of the Proposed Project would involve a variety of earthmoving/excavating activities that would encounter contamination within the fill. Groundwater is not expected to be widely encountered, but may be encountered in some areas during infrastructure (e.g., sewer) construction.

In order to prevent potential risks and thereby avoid the potential for significant adverse impacts related to hazardous materials, the Proposed Action would include appropriate health and safety and remedial measures (conducted in compliance with all applicable laws and regulations and conforming to appropriate engineering practice) that would govern both soil disturbance activities and subsequent construction at the site. These measures include development of a Remedial Action Plan (RAP) and environmental HASP for soil disturbance that would include detailed procedures for managing both known contamination issues (e.g., fill) and any unexpectedly encountered contamination issues. When the project design has progressed sufficiently to determine the areas of proposed soil disturbance and details of foundation construction (with sufficient additional soil, soil gas and/or groundwater testing both to characterize the materials that would be disturbed and to design the required methane gas venting systems), the RAP and HASP would be sent to NYCDEP for review and approval. The HASP would include procedures for avoiding the generation of dust that could affect the surrounding community and any monitoring necessary to ensure that no such impacts would occur. The RAP would include design and installation of methane gas venting systems in all new buildings and would ensure that in areas not otherwise capped by buildings, pavements, or other impervious materials that surface soil (at least two feet deep) meets applicable guideline requirements for their respective, commercial, or residential uses. All work would be performed

in accordance with applicable city, state, and federal requirements. Chapter 22, "Mitigation," further describes the provisions of the HASP and RAP.

As discussed above, soil gas sampling identified methane at many locations. As such, mitigation (active methane-venting systems) would be provided within any new buildings on the Project Site to alleviate any potential significant adverse impacts from methane gas (see Chapter 22, "Mitigation").

F. 2013 THE FUTURE WITHOUT THE PROPOSED ACTION

As with the future without the Proposed Action in 2011, by 2013 development of the Project Site could occur consistent with the 1996 Plan. This would be undertaken in accordance with the following measures to be implemented during construction:

- Implementation of an environmental HASP;
- Testing (and pretreatment, if needed) of groundwater from any necessary dewatering;
- Installation of clean cover materials (at least two feet in any locations on the Project Site not currently covered by clean fill material) in areas not covered by buildings, paving, or other impervious surfaces; and
- Installation of active methane gas venting systems in all new buildings.

Overall, without the Proposed Action, there would be a similar potential for disturbance of hazardous materials, but potentially in different areas of the site.

G. 2013 PROBABLE IMPACTS OF THE PROPOSED ACTION

Construction of the elements of the Proposed Project that would be undertaken between 2011 and 2013 would involve a variety of earthmoving/excavating activities that would encounter contamination within the fill. The construction health and safety measures that would be undertaken would be the same as those outlined in "2011 Probable Impacts of the Proposed Action" and Chapter 22, "Mitigation," and the Proposed Project would not result in significant adverse construction-period impacts from exposure to hazardous materials.

As discussed above, soil gas sampling identified methane at many locations. As such, mitigation would be provided within any new buildings on the Project Site to alleviate any potential significant adverse impacts from methane gas (see Chapter 22, "Mitigation"). ✷