# Chapter 16: Contaminated Materials

## 16.1 INTRODUCTION

This chapter assesses the potential presence of subsurface (i.e., soil and groundwater) contamination on the Project site and immediate vicinity and the potential presence of contaminated materials in current (or debris from former) structures that could be affected by the construction and operation of the Preferred Alternative. This includes the new Hudson River Tunnel and rehabilitation of the North River Tunnel. The Project site evaluated is shown in Chapter 4, "Analysis Framework." However, the sediments of the Hudson River that would be encountered during in-water work in the river are addressed in Chapter 11, "Natural Resources" rather than this chapter.

The potential for impacts related to hazardous materials can generally occur when elevated levels of contaminated materials (i.e., above applicable standards or guidance values) exist on a site and an action would create pathways (particularly during construction) for exposure to either humans or the environment.

Contaminated materials include any substance posing a threat to human health or to the environment. Examples of such substances include heavy metals, including lead commonly found in older paint and mercury commonly found in gauges and electrical switches; volatile organic compounds (VOCs), commonly found in solvents, automotive fluids, paints, and petroleum distillates; semi-volatile organic compounds (SVOCs), commonly found in petroleum products, combustion by-products, and tars; polychlorinated biphenyls (PCBs), historically associated with electrical oil-filled transformers and building materials; and pesticides, typically associated with the application of pest control products to indoor and outdoor environments.

Various other building materials can also contain contaminated materials, such as creosote for wood preservation (e.g., for railroad ties) and asbestos-containing materials (ACM), historically used in a wide range of insulation, fireproofing, and other products.

The presence of contaminated materials does not necessarily indicate a direct threat to human health and/or the environment. For a threat to exist there must also be both an exposure pathway to a receptor, and an unacceptable dose (i.e., the concentration of the contaminant material and duration of exposure). Construction activities can create a route for human exposure to the various contaminated materials, including inhalation (especially of vapors or dust) and ingestion or dermal absorption (especially of contaminated materials that soil-disturbing activities release, such as during excavation of soil and extraction of groundwater).

This chapter contains the following sections:


16.1 Introduction
16.2 Analysis Methodology
  16.2.1 Regulatory Context
  16.2.2 Analysis Techniques
  16.2.3 Study Area
16.3 Affected Environment: Existing Conditions
  16.3.1 New Jersey
  16.3.2 Hudson River
  16.3.3 New York

16.4 Affected Environment: Future Conditions
16.5 Impacts of No Action Alternative
16.6 Construction Impacts of the Preferred Alternative
16.6.1 Overview
16.6.2 New Jersey
16.6.3 Hudson River
16.6.4 New York
16.7 Permanent Impacts of the Preferred Alternative
16.8 Measures to Avoid, Minimize, and Mitigate Impacts

## 16.2 ANALYSIS METHODOLOGY

During development of this Environmental Impact Statement (EIS), the Federal Railroad Administration (FRA), and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of contaminated materials are summarized in this chapter.

### 16.2.1 REGULATORY CONTEXT

A number of Federal, New Jersey and New York State, and New York City laws and regulations govern treatment, handling, and remediation of hazardous materials. Other regulations and guidance set forth methodologies for the analysis of hazardous materials. The relevant laws, regulations, and guidance for this analysis including the following:

- U.S. Environmental Protection Agency (EPA) – Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC § 9601 et seq. (1980).
- EPA – Resource Conservation and Recovery Act, 42 USC § 321 et seq. (1976).
- EPA – Safe Drinking Water Act, 42 USC § 300(f) et seq. (1974).
- EPA – Toxic Substances Control Act (TSCA), 15 USC § 2601 et seq. (1976).
- EPA - Clean Air Act - 42 USC § 7401 et seq. (1970)
- EPA – Asbestos Hazardous Emergency Response Act (AHERA) 15 USC § 2651 (1986).
- U.S. Department of Labor - Occupational Safety and Health Act of 1970 (OSHA) 29 USC § 651 et seq. (1970)
- New Jersey Underground Storage of Hazardous Substances Act, NJSA 58:10A-21.
- New Jersey Spill Compensation and Control Act, NJSA 58:10-23.11.
- New Jersey Solid Waste Management Control Act, NJSA 13:1E-1 et seq.
- New Jersey Brownfields and Contaminated Site Remediation Act, NJSA 58:10B.
- New Jersey Department of Environmental Protection (NJDEP) Administrative Requirements for the Remediation of Contaminated Sites, NJAC 7:26C.
- NJDEP Technical Requirements for Site Remediation, NJAC 7:26E.
- NJDEP Solid Waste Regulations, NJAC 7:26.
- NJDEP Hazardous Waste Regulations, NJAC 7:26G.
- NJDEP Discharge of Petroleum and Other Hazardous Substances, NJAC 7:1E.
- NJDEP Underground Storage Tank Regulations, NJAC 7:14B.
- NJDEP Soil Remediation Standards, NJAC 7:26D.
- NJDEP Surface Water Quality Standards, NJAC 7:9B.

- NJDEP Ground Water Quality Standards, NJAC 7:9C.
- NJDEP New Jersey Pollutant Discharge Elimination System, NJAC 7:14A.
- NJDEP New Jersey Industrial Site Recovery Act, NJAC 7:26B.
- NJDEP Guidance Document for Development of Impact to Ground Water Soil Remediation Standards using Soil-Water Partition Equation, Version 2.0, November 2013.
- NJDEP Linear Construction Technical Guidance, dated January 2012.
- NJDEP Fill Material Guidance for Site Remediation Program Sites, April 2015.
- NJDEP Site Remediation Program (SRP) Guidance.
- Soil Cleanup Objectives (SCOs) as detailed in 6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives.
- Water Quality Regulations for Surface Waters and Groundwater as detailed in 6 NYCRR Parts 700-705.
- New York State Department of Environmental Conservation (NYSDEC) DER-10, Technical Guidance for Site Investigation and Remediation.
- New York State Department of Health, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.
- New York State Environmental Conservation Law, Article 12 – Oil Spill Prevention, Control, and Compensation, Article 15 – Protection of Waters Program, Article 17 – State Pollutant Discharge Elimination System (SPDES) Permit Program.
- NYSDEC – CP-51 / Soil Cleanup Guidance, October 21, 2010.
- NYSDEC – Spill Technology and Remediation Series (STARS) Memo No. 1, Petroleum-Contaminated Soil Guidance Policy.
- NYSDEC – Division of Water, Spill Response Guidance Manual, January 1990.
- NYSDEC – Division of Water, Sampling Guidelines and Protocols, March 1991.
- 6 NYCRR Part 364, Waste Transporter Permits.
- 6 NYCRR Part 371, Identification and Listing of Hazardous Waste.
- 6 NYCRR Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.
- *City Environmental Quality Review (CEQR) Technical Manual* (2014), Chapter 12: Hazardous Materials.

### 16.2.2 ANALYSIS TECHNIQUES

To assess the potential for contaminated materials to be present, FRA and NJ TRANSIT performed a limited Phase I Environmental Site Assessment (ESA) for the Project corridor.[1] This involved the review of records relating to past and current site uses, spills, and other relevant information (including available prior environmental reports) for properties located within the Project site and immediate vicinity. As part of the limited Phase I ESA, a site reconnaissance was performed along the entire upland portion of the alignment. However, comprehensive inspections of specific individual properties were not always possible due to lack of access or unavailability of current owners or occupants of buildings to be interviewed. Observations with

[1] Dewberry Engineers Inc., Hudson Tunnel Project Limited Phase I Environmental Site Assessment, June 2017.

regard to the potential for contamination on adjoining properties were rendered, to the extent possible, from publicly accessible sources prior to determining the need for a site-specific reconnaissance. The environmental history and regulatory status for the Preferred Alternative alignment was reviewed. Each Recognized Environmental Condition (REC) identified along the Preferred Alternative alignment and permanent property interests that may be affected by the Preferred Alternative was investigated to assess the presence, type, level, and approximate extent of subsurface contamination, and to evaluate potential contamination transport mechanisms through soil, groundwater, and other media. Remedial options were evaluated for permanent property interests, as warranted, including excavation and off-site disposal, on-site reuse, in-situ stabilization and treatment, etc. In addition to evaluating remedial options, appropriate health and safety measures to be employed during construction (to protect workers and the public) and to support potential property acquisition were identified. Additionally, environmental records were reviewed to identify potential vapor encroachment/intrusion issues for the fan plant locations, tunnel ventilation, and any other enclosed structures that may be affected by contaminated materials as a result of implementing the Preferred Alternative.

In summary, a Phase I ESA assesses the potential for contaminated materials based on current and historical uses (both at the location and nearby), sites known to regulatory agencies (including sites within specified distances), and visual inspection. Due to the lack of access to private properties, the assessment conducted is considered "limited." Otherwise, however, the guidelines of the American Society for Testing and Materials (ASTM) Standard E1527-13, which describes the process to follow to conduct a Phase I ESA, were followed.

Data sources including the following:

- Federal National Priorities List (NPL) site list for sites within 1 mile of the Project site;
- Federal Resource Conservation and Recovery Act (RCRA) Treatment, Storage and Disposal (TSD) list for sites within one-half mile of the Project site;
- Environmental Data Resources, Inc. (EDR) Radius Search DataMap Report;
- Historical Sanborn Fire Insurance Maps, aerial photographs, and topographic maps for the Project site (not including the North River Tunnel);
- NJDEP NJ-GeoWeb databases (including Known Contaminated Sites List (KCSL) properties, Deed Notice areas, Classification Exception Areas (CEA), the Hudson County Chromate Site List, historical fill areas, dry cleaners and underground storage tank (UST) facilities);
- Files from NJ TRANSIT and Licensed Site Remediation Professionals (LSRPs) with site remediation oversight for the Project site in New Jersey;
- NYSDEC databases;
- New York City listed E-designated sites; and
- Information gathered for the Access to the Region's Core (ARC) Project Final Environmental Impact Statement (FEIS).

Where Phase II investigations previously conducted for other projects (i.e., collection and laboratory analysis of soil, groundwater, or soil vapor samples) were available for review, these were considered in developing the Phase I ESA and the the findings were summarized in the limited Phase I ESA. (Additional investigation will need to occur at selected portions of the Project site where the Preferred Alternative would result in ground disturbance; this work will be done in the future, as discussed in Section 16.8.)

### 16.2.3 STUDY AREA

The study area for this analysis generally consisted of the area within 500 feet (measured horizontally) of the Project site (excluding the Hudson River itself) where ground disturbance is most likely to occur—i.e., the full Project site excluding the rehabilitation of the North River Tunnel. Any site identified by the ASTM search that has potential to contain contaminated materials that would be affected by the Preferred Alternative was assessed for horizontal and vertical delineation of the contaminated materials present to determine the nature and extent of contamination present. Database searches were conducted for various distances, up to 1 linear mile, all of which are consistent with ASTM Standard E1527-13.

The Project site beneath the Palisades would generally be at least 150 feet below the surface in rock, and is unlikely to have been adversely affected by contamination from activities on the surface. Therefore, the tunnel portion of the Project site was not included in the study area. In addition, as noted above, the Hudson River soils that would be affected by the in-river construction work were not evaluated.

In addition, no ground disturbance is anticipated from the rehabilitation of the existing North River Tunnel; therefore, this portion of the Project area was not included in the study area. The potential impacts related to rehabilitation of the North River Tunnel are described later in this chapter.

## 16.3 AFFECTED ENVIRONMENT: EXISTING CONDITIONS

The results of the database review for the Project, as described in Section 16.2 are summarized in this chapter.

### 16.3.1 NEW JERSEY

#### *16.3.1.1 COUNTY ROAD TO TONNELLE AVENUE*

All of the properties within the Meadowlands portion of the Project site are mapped as having historical fill, which could include dredged material, construction and demolition waste, other solid wastes (including municipal garbage), and ash. As such, historical fill material can contain heavy metals, PCBs, pesticides, SVOCs, VOCs and other hazardous materials. For much of the 20th century, unregulated dumping of solid waste took place in the Meadowlands, with extensive filling of wetlands with no oversight.[2] This suggests the potential for contamination. Properties identified in this area with the potential for contaminated materials, including historical fill and other issues related to past uses at or near the property (e.g., storage of petroleum), include the following:

- 1 County Road site, Secaucus, NJ: former landfill with known soil (including SVOCs, PCBs, pesticides, and metals) and groundwater contamination (SVOCs, pesticides, metals) with Classification Exception Area (CEA).
- 801 Penhorn Avenue, Secaucus, NJ: former landfill (McKays Landfill) and KCSL site (Hudson County Chromium Site 40) with known soil and groundwater contamination (including VOCs, polycyclic aromatic hydrocarbons (PAHs), PCBs, pesticides, and metals) and chromite ore processing residue (COPR). This property has an active gas collection and venting system installed on the site; the buildings and paved parking areas are part of the site's approved engineering control and cap system CEA for VOCs in groundwater.

[2] http://www.njsea.com/njmc/about/district/history.html, accessed April 7, 2017.

- 401 Penhorn Avenue, Secaucus, NJ: KCSL site with known petroleum, PAHs, and PCBs, which are known carcinogens, and metals in soils, as well as groundwater contamination (VOCs, SVOCs, and metals); 2 feet of clean fill beneath the paved area serves as an engineering control/cap.
- 301 Penhorn Avenue, Secaucus, NJ: potential for historical fill, soil impacts (VOCs, metals).
- 201 Penhorn Avenue, Secaucus, NJ: potential for historical fill, soil impacts (metals).
- Keystone Freight Corporation, 2806 Secaucus Road in North Bergen, NJ: KCSL site, historical fill.
- 2820 16th Street, North Bergen, NJ: KCSL site, historical fill, soil impacts (petroleum, VOC, PAHs, PCBs, lead) and groundwater impacts (VOC, PAHs and metals), and CEA for historical fill.
- 2200 Secaucus Road, North Bergen, NJ: Historical fill, potential soil impacts (PAHs, metals), known petroleum contamination.
- PSE&G, Conrail, and New York, Susquehanna & Western Railway (NYSW) rights-of-way (Secaucus and North Bergen, NJ): Historical fill, sampling data collected as part of the former ARC Project indicated soil contamination with PAHs, PCBs, and metals, and groundwater contamination with SVOCs, PCBs, pesticides, and metals.

Two potentially contaminated sites on the NJDEP KCSL are also located in the study area but the Project would not require their use or acquisition and it is not anticipated that either would affect the dewatering for the Project. These are 701 Penhorn Avenue and the Conrail Croxton Yard.

#### *16.3.1.2 TONNELLE AVENUE AREA*

The sites that would be directly affected by construction of the Preferred Alternative in the Tonnelle Avenue portion of the Project site, all in North Bergen, New Jersey, include the following:

- 2001 Tonnelle Avenue: historical fill (PAHs, metals), ongoing remediation to address residual petroleum (fuel oil) contamination in soil, Light Non-Aqueous Phase Liquid (LNAPL), and benzene in groundwater.
- 1801 Tonnelle Avenue: KCSL site with known soil PAH and arsenic contamination related to historical fill, deed notice with engineering controls/cap.
- Amtrak Substation 42: site with known historical fill, SVOCs, PCBs, pesticides and metals in soil and groundwater based on former ARC investigation.
- 2126 Tonnelle Avenue: Staging area, previously occupied by a McDonald's: once a filling station; one tank and petroleum-impacted soil have been removed; historical fill related PAHs and metals in soil and groundwater.
- 2100 Tonnelle Avenue: Staging area previously occupied by a public storage self-storage business: KCSL site with closed-in-place and removed USTs, historical fill related PAHs and metals in soil and groundwater.

With the exception of Amtrak Substation 42, these properties were acquired by NJ TRANSIT as part of the former ARC Project and are mapped as having historical fill. The former buildings and other associated structures have been demolished at 2001 Tonnelle Avenue, the former McDonald's property, and the former Public Storage property. At 2001 Tonnelle Avenue, the building foundation slab remains in place and is used for storage. Further remedial investigation (and likely remediation) is needed to address potential areas of concern below the slab.

#### *16.3.1.3 EAST OF THE PALISADES*

In this part of the new alignment, the tunnel boring machines (TBMs) would be very deep. Therefore, this section discusses the shallower new tunnel construction activities that would affect surface parcels in the study area, including the staging area and the New Jersey ventilation shaft site in Hoboken. The sites that would be directly affected by construction of the Preferred Alternative in New Jersey east of the Palisades include the following:

- The former Block 144 Development LLC/former Singer property, located largely in Hoboken with small portions in Weehawken and Union City: KCSL site with former railroad operations, historical fill, and with known soil (PAHs, PCB and metals including lead) and groundwater (SVOCs, PCBs, metals) contamination. Remedial investigations ongoing. Remedial action (excavation) is planned to remove TSCA levels of PCBs under a USEPA self-implementing plan.
- The former Carmine Franco & Co. property in Hoboken: historical fill, with known soil (petroleum, VOCs, SVOCs, PCBs, pesticides, metals) and groundwater (SVOCs, PCBs, metals) contamination. Remedial action (excavation) is planned to remove TSCA levels of PCBs under a USEPA self-implementing plan.
- The Willow Avenue Enterprises, LLC property in Hoboken: soil and groundwater contamination with PAHs and metals, consistent with historical fill per former ARC project investigation.

These properties are also all documented to have historical fill that may have introduced contaminated soils to the sites. Both the Block 144 Development LLC and former Carmine Franco & Co. properties were acquired by NJ TRANSIT as part of the former ARC Project and their former buildings and associated structures have been demolished. The Block 144 property is currently leased to PSE&G for a storage yard that is capped with a geotextile and stone as a protective measure.

Serpentinite rock with naturally occurring asbestos (NOA) may be encountered during tunnel boring. NOA occurs in rocks and soil as a result of natural geological processes. Natural weathering and human activities may disturb NOA-bearing rock or soil and release mineral fibers into the air, which pose a greater potential for human exposure by inhalation.

### 16.3.2 HUDSON RIVER

Available online records indicate the Hudson River (from Hudson Falls to the Battery) is listed as an NPL (also known as Superfund) site (and on many other databases) due to contamination with PCBs (which are known carcinogens), the sources of which were located upriver in the vicinity of Fort Edward and Hudson Falls, New York. The ARC FEIS indicated that sediment quality data was obtained from the National Sediment Inventory (NSI) for two sampling stations located near the Project site and additional stations to the north and south (see EPA 2002). Detectable concentrations of PCBs, heavy metals, SVOCs, and pesticides were noted. No data was available from the NSI regarding dioxin concentrations.

The ARC FEIS indicated that during the Preliminary Engineering geotechnical investigation for that project in Hudson River, three samples were collected from each geotechnical boring: one at the surface, one at the interval above bedrock, and one intermediate sample (mid-point of the boring). In anticipation of potential reuse of any sediment removed as a result of construction, analytical results were compared to the NYSDEC unrestricted use SCOs, and the NJDEP Soil Cleanup Criterion (SCC). The analytical results generally indicated exceedances of these criteria for metals, SVOCs, and PCBs. These exceedances were typically more frequent in the shallow versus the deeper soil samples.

Serpentinite rock with NOA may be encountered during tunnel boring.

### 16.3.3 NEW YORK

Construction of the Preferred Alternative would directly affect the following sites in New York City:

- Block 675 (primarily on Lot 1), located east of Twelfth Avenue between West 29th and West 30th Streets. Lot 1 is currently occupied by a Port Authority of New York & New Jersey (PANYNJ) parking lot and associated facility, partially leased to Greyhound Lines for bus parking. The remainder of Block 675 includes an auto repair shop, Mobil gas station, New York City Department of Sanitation facility, and another commercial building. Historically, this block included a truck terminal, filling station, repair garages, and an asbestos construction company. Lot 1 is listed on the New York Spill database and subsurface contamination is anticipated. Matrix New World Engineering, Inc. conducted a Site Investigation of Lot 1 in 2009 for the ARC Project, which included collection and laboratory analysis of samples of soil, groundwater and sediment (from catch basins). In some of the soil and catch basin samples levels of several metals including arsenic and lead, and/or several polycyclic aromatic hydrocarbons (PAHs, a category of semivolatile organic compounds, most commonly associated with fill material) were above NYSDEC's Commercial/Industrial Restricted Use Soil Cleanup Objectives (calculated assuming long term exposed soils). The volatile organic compound 1,2,4-trimethylbenzene (typically associated with gasoline) was noted in one groundwater sample at a concentration above NYSDEC's Class GA Groundwater Quality Standards (which are calculated assuming use as a drinking water source, a situation that does not and will not occur at this location). Similarly several metals and chloride were identified in groundwater samples above drinking water standards and the level of “total suspended solids” exceeded the NYCDEP Effluent Limitations for discharge to the sewer system. The groundwater analytical results can be attributed to sample turbidity, but suggest that pretreatment may be required prior to discharge of groundwater to the sewer system.
- Hudson River Park, including the West 30th Street Heliport and a paved walkway and bicycle path. Given the historically industrial activities that have occurred in this area of Manhattan and on nearby properties, contamination from industrial activities and fuel storage is likely, as is the presence of historical fill material. The heliport stores petroleum and has reported petroleum spills.
- Block 729, located between Ninth and Tenth Avenues and West 31st and West 33rd Streets. This block is constructed entirely over the existing railroad tracks at A Yard within the Penn Station complex. The western portion of the block is occupied by the building at 450 West 33rd Street referred to as the Lerner Building; the eastern portion of the block is an active construction site where several mixed-use buildings are being developed over the tracks. Fuel oil is stored on the block and spills of unknown chemicals have been reported.
- Roadways included as part of the Project site (Twelfth Avenue (Route 9A), West 30th Street, and Tenth Avenue). Given the historically industrial activities that have occurred in this area of Manhattan and on nearby properties, contamination from industrial activities and fuel storage is likely.

These properties also have historical fill.

Although the Project alignment would traverse the Metropolitan Transportation Authority (MTA) Long Island Rail Road (LIRR) John D. Caemmerer West Side Yard, Amtrak is currently constructing the Hudson Yards Right-of-Way Preservation Project through this area to reserve space for a future rail-right-of way. The Preferred Alternative would use this preserved right-of-way, which would involve installing tracks and railroad systems within the completed concrete

tunnel box. Therefore, there would be no potential for the Preferred Alternative to affect subsurface conditions or encounter existing subsurface contamination in this area.

## 16.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

In the future, cleanup of sites already in regulatory programs (such as the various state-listed sites in New Jersey) will continue, albeit perhaps at a slower pace or in a different manner than with the Preferred Alternative; this would be determined by the appropriate regulatory agencies subject to any redevelopment proposals for the individual properties comprising the Project site. For sites in New York that are part of the Project site, no disturbance would occur in the future except to the extent individual parcels were to be otherwise developed or if cleanup were to be required by a regulatory agency.

## 16.5 IMPACTS OF NO ACTION ALTERNATIVE

Under the No Action Alternative, the Project site would not be disturbed by construction activities (except to the extent individual parcels were to be otherwise developed or if cleanup were to be required by a regulatory agency, per Section 16.4 above). With the Preferred Alternative, the existing North River Tunnel would not be rehabilitated and the new Hudson River Tunnel would not be constructed and as a result, there would be no potential for Project-related adverse impacts related to contaminated materials from the No Action Alternative.

## 16.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

### 16.6.1 OVERVIEW

Construction of the proposed new rail tunnel, surface tracks, and associated structures such as embankments, retaining walls, buildings, and viaduct foundations would result in subsurface disturbances. Demolition of existing structures or equipment and rehabilitation of the existing tunnel, potentially contaminated with asbestos-containing materials, lead-based paint, electrical equipment containing PCBs (e.g., transformers and ballasts), and other contaminated materials, would also occur. Current and historical uses along the Project site include industrial, commercial, transportation (including railroad), and residential uses. Contaminated soil and groundwater resulting from these uses is likely to be encountered at various locations during construction. Contaminated materials can cause physical harm following exposure, either by direct contact, inhalation as vapor or particles in the air, and/or ingestion of contaminated soil or groundwater. The effect of these materials on human health is dependent upon the nature and toxicity of the contaminant and the extent of exposure.

Much of the soil encountered in developed areas of New Jersey and New York, including urban portions of the study area, comprise urban fill, which typically contains elevated levels of metals and organic compounds, some of which are constituents of partially combusted coal or petroleum-derived products, such as coal ash and fuel oil. The most likely routes of exposure are breathing of volatile and semivolatile compounds or particulate-laden air released during soil disturbing activities, dermal contact, and accidental ingestion. The potential adverse health effects from these detected contaminants are diverse. Many of these compounds are known or suspected to result in chronic illness from long-term exposures. However, depending upon the contaminant, some acute effects are a potential concern. Therefore, all excavated material would be characterized for “beneficial use” or for disposal, as appropriate. Beneficial use refers to the reuse of a contaminated soil or other material exhibiting elevated concentrations of

contaminants (above the most restrictive standards or guidance values) as backfill and/or capping material.

Without proper controls, the contaminated materials encountered during construction of the new tunnel and/or rehabilitation of the existing North River Tunnel could result in adverse impacts to human health and the environment; therefore, construction of the Preferred Alternative would incorporate measures to avoid adverse impacts. These measures are set out in more detail below, and would be implemented as an integral part of contract construction requirements and documents, with procedures to ensure compliance.

While the rehabilitation of the North River Tunnel is not anticipated to disturb or affect soils in the surrounding area, there are potentially hazardous materials (including petroleum and/or PCBs) associated with the ballast that would be removed and replaced, as well as, lead-based paint and asbestos-containing materials found in the tunnel. All materials requiring disposal from the tunnel, including materials potentially contaminated with asbestos-containing materials, lead-based paint, electrical equipment containing PCBs (e.g., transformers and ballasts), and other contaminated materials would be managed in accordance with all applicable regulations relating to containerizing, labeling, manifesting, and disposal facilities.

Tunnel boring under the Palisades ridge would occur at least 150 feet beneath the ground surface through competent bedrock that is not anticipated to have been affected by contamination from surface activities; therefore, sites on top of the Palisades were not evaluated in detail. Excavated rock and soils (spoils) from TBM operations would be characterized prior to disposal or reuse. Some of the rock may include serpentinite with NOA. Naturally occurring asbestos is not subject to the same framework of Federal, state, and local regulations and requirements as asbestos-containing building materials, which are products, such as insulation materials, made from NOA. Any beneficial reuse or off-site disposal of any such asbestos-containing rock which would, at a minimum, be conducted in accordance with Federal and state regulations. There is no specific New Jersey or New York State guidance for the handling of NOA: however, since NOA can be harmful to human health, implementing prudent measures to avoid/reduce exposure, as would be appropriate for ACM, is common practice.

### 16.6.2 NEW JERSEY

Proposed construction in New Jersey would be completed in accordance with the NJDEP Linear Construction Technical Guidance, dated January 2012 (latest version prevails). Construction would be completed as a Linear Construction Project (LCP) under the oversight of an assigned Licensed Site Remediation Professional (LSRP). The LSRP would prepare a site-specific soil reuse and alternative fill management plan for the management of contaminated soil and would oversee the reuse or disposal of all Project-related contaminated materials. In addition, certified clean fill would be used on site in accordance with the NJDEP Fill Material Guidance for SRP Sites. Additionally, a Soil Erosion and Sediment Control Plan would be submitted to the Hudson-Essex-Passaic Soil Conservation District for proposed construction activities and appropriate approvals and permits would be obtained from the New Jersey Sports and Exhibition Authority. The analysis summarized in Section 16.3.1 above identified properties where construction would likely encounter contaminated soil and/or groundwater. Coordination with NJDEP and other agencies would be required prior to any work disturbing the existing engineering controls at these sites. Following construction, engineering controls would be restored.

As discussed in Chapter 3, “Construction Methods and Activities,” Sections 3.3.2.4 and 3.3.4.5, excavated rock and soil (referred to as “spoils”) would be removed from the tunnel at the rear of the TBM in New Jersey, and brought out of the tunnel at the Tonnelle Avenue and Hoboken staging sites. The tunnel contractor would be responsible for finding a suitable location for reuse

or disposal of spoils from the tunnel mining. For rock to be reused, the use of a rock crusher would be required to meet the necessary rock size and grading.

Protocols developed during final design would be followed to identify spoils that may contain contaminated materials, so that they can be handled appropriately and disposed of at a suitable location. Most of the excavated material would be clean, crushed rock, which can be reused beneficially at other locations. The rock is not likely to be contaminated because of both its depth and impermeability—although there is a possibility that some of the excavated rock could contain NOA materials, which would limit the use of that portion of the spoils. The inhalation of asbestos fibers can cause fibrotic lung disease (i.e., asbestosis) and changes in the lining of the chest cavity (pleura). Therefore, excavated material would be tested prior to any beneficial reuse or off-site disposal, which would be conducted in accordance with Federal, state, and local regulations. Asbestos wastes must go to landfills certified to receive such wastes.

Depending on the gradation (i.e., particle size) of the excavated material, and the timing of its removal, some of the rock could be used to fill the embankment areas between Allied Interlocking and Tonnelle Avenue. Other reuse opportunities for uncontaminated rock could include filling abandoned mines, building artificial offshore reefs, reinforcing bulkheads, or use in road-paving materials, depending on the consistency of the spoils materials. For example, crushed rock from the large water tunnel that New York City is constructing is being transported by rail to Long Island, where it is being used as base material for road construction, and by truck to Staten Island, where it is being used as cover for the Fresh Kills Landfill.

Protocols for the transport of spoils from the construction sites would be developed to ensure the safe handling of these materials and would include procedures to secure the material from spilling off trucks, as well as for any inadvertent or accidental spills of materials falling from trucks removing this material from the staging sites.

For spoils that cannot be reused, commercial disposal sites may be appropriate. These facilities are required to meet all applicable regulations and typically process soils and dredge materials to recycle or beneficially reuse them.

### 16.6.3 HUDSON RIVER

The Hudson River sediment may have PCB contamination. Exposure to PCBs has been linked to certain types of cancer, particularly liver cancer. Therefore, excavated material would be tested prior to any beneficial reuse or off-site disposal, which would be conducted in accordance with Federal, state, and local regulations. PCB-containing sediments can require incineration. However, there are some conditions under which low levels of PCBs can be disposed of in a landfill.

### 16.6.4 NEW YORK

In New York, any beneficial use of the excavated material would be conducted in accordance with NYSDEC requirements in 6 NYCRR Part 360, which sets out conditions under which excavated materials can be reused. Analytical testing of the excavated material would be used to determine if and how it could be beneficially reused (i.e., as construction backfill, for landscaping, etc.). Where material is surplus or not suitable for beneficial use, the results of laboratory analysis of samples (collected either before or after it were excavated) would be used to determine appropriate disposal facilities. The requirements of these facilities are generally set out by the state in which the facility is located.

## 16.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

Once constructed, operation of the Preferred Alternative would not be expected to have any adverse impacts related to contaminated materials because it would not involve any activities (i.e., ground disturbance) that would disturb and expose such materials. The impacts related to contaminated materials from soil disturbance would all occur during construction, including the potential exposure for workers and passersby to contaminated materials, which all would be temporary, ceasing with the end of construction activities.

## 16.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

The Project Sponsor will implement the following measures to avoid, minimize, or mitigate any potential adverse effects from contaminated materials during construction of the Preferred Alternative:

- Phase II Site Investigation (SI) soil and groundwater sampling activities, as well as hazardous materials building investigations, will be performed at selected sites along the Project site where the potential for contamination exists. The specific sites that will be subject to further investigation will be determined as Project engineering and design advances. The Phase II SI activities will determine the presence or absence of contaminants, and assess their chemical and physical characteristics to determine the potential exposure associated with the work to be performed, and thus any corollary health hazards. Property Acquisition Environmental Cost Estimate (PAECE) reports will be prepared in coordination with property acquisition in New Jersey. Based on the findings of these initial investigations, additional investigations may be undertaken to further determine the extent and levels of contamination at the affected properties.
- With sufficient investigation data, appropriate remedial actions can be selected to avoid the potential for adverse impacts to construction workers, surrounding communities and the environment. Remedial measures may include excavation or in-situ treatment of contaminated soil, and disposal or treatment of contaminated groundwater or liquid from dewatering. Institutional and engineering controls, such as deed notices, capping, and/or vapor barriers or other mitigation for soil vapors, are also sometimes used to avoid the potential for post-construction impacts. The specifications for the remedial measures would be set out in documents (typically subject to state agency review) and would address the procedures for monitoring/oversight to ensure the remedial measures are properly implemented.
- A Project-specific Health and Safety Plan (HASP) will be developed prior to earth-disturbing activities. Since construction could expose workers to a variety of contaminated materials, the HASP will be developed during final design in accordance with OSHA requirements, including 29 CFR § 1910.120 (Hazardous Waste Operations and Emergency Response), to protect construction workers (and the public) from potential exposure. The HASP will set out procedures for handling of contaminated materials and response plans and appropriate personnel training and monitoring, and is expected to include designation and training of appropriate personnel, monitoring for the presence of contamination (e.g., buried tanks, drums or other containers, sludges, or soil which shows evidence of potential contamination, such as discoloration, staining, or odors) and appropriate response plans.. The HASP will also set out procedures to minimize dust generation (e.g., dust and air monitoring of the work area), such as spraying of the work area using water and street sweeping.

  The HASP will include the following:

- Identify key personnel responsible for site safety, including name and qualifications of Safety Officer.
- Address levels of personal protection to be employed during work.
- Designate work area exclusion zone(s) and decontamination zone(s) as defined by OSHA.
- Establish site emergency procedures and describe emergency equipment to be made available on site.
- Identify, provide location of, and list arrangements with the nearest medical facility.
- Dust control measures to restrict soil disturbance and air borne emissions such as water spray, dust retardant and/or truck wheel wash, will be implemented during soil disturbance or excavation activities. In addition to these dust containment controls, the construction contract would contain provisions for perimeter ambient air monitoring around a work area if determined to be necessary.
- The need for such monitoring would take into consideration any data on known or suspected soil contaminants, the Phase I ESA, the Phase I SIs, the locations of potential human and environmental receptors and other information, to assure that the dust control measures (noted above) are preventing exposure of the public and the environment to respirable particulates and other contaminants of concern. In this regard, it should be noted that the principal contaminants of concern in historic fill – metals and PAHs – are adsorbed onto soil particles, and thus real-time dust monitoring would address potential exposure to these contaminants. Appropriate action levels, based on applicable law and guidance, would be established that, if exceeded for specified periods of time, would necessitate additional measures, such as limiting the extent of areas of exposed soil and increasing the application of dust control measures.
- Provide action levels based on air monitoring to upgrade personal protection against airborne contaminants.
- Set forth procedures for decontamination of personnel, materials, and equipment.

- During construction, whenever contaminated soils or groundwater or hazardous vapors or new areas of concern are encountered (e.g., unknown tanks), appropriate site remediation techniques or other measures to prevent exposure would be implemented, likely based on the procedures set forth in the HASP. Following construction, all disturbed areas will be restored using engineering controls that would prevent direct human exposure. Construction staging areas will be restored to preconstruction conditions or capped.
- A Project-wide Soils and Materials Management Plan (SMMP) will be developed to manage contaminated materials encountered during construction. The SMMP would provide procedures for materials handling during construction activities including Best Management Practices (BMPs) to be implemented during construction, such as procedures for stockpiled or containerized material and testing procedures for sampling material prior to off-site disposal or on-site reuse. In addition, a site-specific Soil Reuse and Alternative Fill Management Plan would be developed for management of contaminated soil. The SMMP would set out how regulatory compliance (Federal, state, and local), would be achieved, e.g., the need for hazardous waste management and for management of petroleum-contaminated materials, historical fill material, etc. The transportation and disposal of contaminated material would be conducted in accordance with Federal, state, and local regulations—e.g., regarding proper containers, signage, placards, manifests (waste tracking system), and use of appropriately permitted disposal facilities. Any sediment or mixture of sediment and grout removed from the river would be treated as contaminated soil and would be characterized for potential reuse offsite or disposal at a suitably permitted facility, after dewatering. All waste would be transported via licensed transporters for disposal at an

appropriately licensed facility. Each container or load would be accompanied by an applicable non-hazardous or hazardous waste manifest.

- NOA is not subject to the same framework of Federal, state, and local regulations and requirements as asbestos-containing building materials, which are products, such as insulation materials, made from NOA. However, any beneficial reuse or off-site disposal of any such asbestos-containing rock would, at a minimum, be conducted in accordance with Federal and state regulations. There is no specific New Jersey or New York State guidance for the handling of NOA: however, since NOA can be harmful to human health, implementing prudent measures to avoid and reduce exposure, as would be appropriate for ACM, is common practice. Because there is the potential to encounter NOA serpentinite minerals during construction of the Preferred Alternative, especially during excavation and tunneling operations, measures to mitigate exposure to NOA would be implemented as part of the SMMP, consistent with OSHA Asbestos standards.[3]
- Approaches for reducing NOA exposure are similar to practices used for ACM in commercial applications. Typical engineering controls involve the use of covers and caps, vegetation, fencing, landscaping, and in some conditions, the application of water to suppress dust. Common work practices include limiting activities on NOA-containing areas, reducing driving speed on unpaved roads that may contain NOA, and cleaning vehicles driven over NOA. Worker health and safety measures that include respiratory protection may also be warranted.[4]
- Groundwater generated during dewatering activities would be managed in accordance with applicable permits; discharge to surface water following any necessary pre-treatment; discharge to sewer systems; on-site treatment and discharge; and/or off-site disposal.
- Following construction, disturbed areas would be restored using engineering controls that would prevent direct human exposure, and construction staging areas would be restored to preconstruction conditions or capped.
- Proposed construction in New Jersey would be completed in accordance with the NJDEP Linear Construction Technical Guidance, and a Soil Erosion and Sediment Control Plan. ✷

[3] *Occupational Safety and Health Administration Asbestos Standards for the General Industry and Asbestos Standards for the Construction Industry* (http://www.osha.gov/SLTC/asbestos/hazards.html).

[4] USEPA, (https://archive.epa.gov/region9/toxic/web/html/basic.html)