Chapter 16: Contaminated Materials

16.1 INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) presents the assessment the Federal Railroad Administration (FRA) and the New Jersey Transit Corporation (NJ TRANSIT) conducted of 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 Port Authority of New York and New Jersey (PANYNJ), in its role as Project Sponsor, has accepted and relied on the evaluations and conclusions of 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 miscellaneous products. Serpentinite rock with naturally occurring asbestos (NOA) may be encountered during tunnel boring and/or excavation activities.

The presence of contaminated materials does not alone 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 ground-disturbing activities release, such as during excavation of soil/rock and extraction of groundwater).

This chapter reflects the following changes made since the Draft Environmental Impact Statement (DEIS) for the Hudson Tunnel Project:

- The chapter incorporates updates to reflect current regulations and guidance related to contaminated materials.

- The chapter includes an expanded discussion of measures that the Project Sponsor will implement to protect the public and workers from potential exposure to contaminated and hazardous materials during construction, including construction activities on sites where contaminated soils or groundwater may be present and trucking of excavated soils that may include contaminants or hazardous materials.

This chapter contains the following sections:

16.2 ANALYSIS METHODOLOGY

During development of this EIS, 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.

Following completion of the DEIS, the PANYNJ became the Project Sponsor for the Hudson Tunnel Project (see Chapter 1, "Purpose and Need," Section 1.1.2, for more information). Consistent with the roles and responsibilities defined in Section 1.1.1, as the current Project Sponsor, the PANYNJ will comply with mitigation measures and commitments identified in the Record of Decision (ROD).

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 et seq. (1986).
- EPA - CFR: Title 40. Protection of Environment.
- U.S. Department of Labor - Occupational Safety and Health Act of 1970 29 USC § 651 et seq. (1970).
- U.S. Department of Labor - Occupational Safety and Health Administration Regulations, 29 CFR et seq.
- New Jersey Underground Storage of Hazardous Substances Act, NJSA 58:10A-21 et seq.
- New Jersey Spill Compensation and Control Act, NJSA 58:10-23.11 et seq.
- New Jersey Solid Waste Management Act, NJSA 13:1E-1 et seq.
- New Jersey Brownfields and Contaminated Site Remediation Act, NJSA 58:10B et seq.
- New Jersey Site Remediation Reform Act (SRRA), NJSA 58:10C et seq.
- New Jersey Industrial Site Recovery Act, NJAC 7:26B et seq.
- New Jersey Administrative Requirements for the Remediation of Contaminated Sites, NJAC 7:26C et seq.
- New Jersey Technical Requirements for Site Remediation, NJAC 7:26E et seq.
- New Jersey Solid Waste Regulations, NJAC 7:26 et seq.
- New Jersey Hazardous Waste Regulations, NJAC 7:26G et seq.
- New Jersey Discharge of Petroleum and Other Hazardous Substances, NJAC 7:1E et seq.
- New Jersey Underground Storage Tank Regulations, NJAC 7:14B et seq.
- New Jersey Soil Remediation Standards, NJAC 7:26D et seq.
- New Jersey Surface Water Quality Standards, NJAC 7:9B et seq.
- New Jersey Ground Water Quality Standards, NJAC 7:9C et seq.
- New Jersey New Jersey Pollutant Discharge Elimination System, NJAC 7:14A et seq.
- NJDEP Site Remediation Program (SRP) Technical and Administrative Guidance documents at https://www.nj.gov/dep/srp/guidance, as applicable.
- New York State Soil Cleanup Objectives (SCOs) as detailed in 6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives.
- New York State Water Quality Regulations for Surface Waters and Groundwater as detailed in 6 NYCRR Parts 700-705 et seq.
- 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 (with updates through May 2017).
- 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, August 1992.
- 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* (2020), 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, such as subsurface investigation reports) for properties located within the Project site and immediate vicinity. As part of the 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 properties to be interviewed. Observations with 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), broadly "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property", identified along the Preferred Alternative alignment and permanent property interests that may be affected by the Preferred Alternative was evaluated in an attempt to assess the likely presence, type, concentration, 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 preliminarily identified. Additionally, environmental records were reviewed to identify potential vapor encroachment/intrusion issues for the fan plant locations, tunnel ventilation locations, 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 included 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;

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

- 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 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 findings were summarized in the Limited Phase I Environmental Site Assessment. (Additional investigation will need to occur at certain 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 Sections 16.6, and 16.7.)

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. Sites identified by the ASTM searches that would be affected by or were adjacent to the Preferred Alternative were particularly noted and where possible available prior reports were reviewed. 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 and in rock, and thus 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 sediments that would be affected by the in-river construction work were not evaluated in this chapter but the effects of disturbing the river bottom on aquatic resources are addressed in Chapter 11, "Natural Resources."

The rehabilitation of the existing North River Tunnel would not involve any ground disturbance; 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. As described in more detail below, the Project area in New Jersey and New York were both found to have known and suspected contamination resulting from historical industrial uses, and/or from historical fill, which could include dredged material, construction and demolition waste, other solid wastes (including municipal garbage), and ash. These types of historical fill material could contain heavy metals, PCBs, pesticides, SVOCs, VOCs, and potentially other hazardous materials. These fill materials were placed at the various properties in the Project area as a result of historical on-site activities, illegal dumping, and/or landfilling activities before current environmental regulations. As a result, most of the parcels in the Project study area will require additional study (in New York, Phase II Subsurface Investigations, and in New Jersey, Limited

Preliminary Assessment/Site Investigation) to more fully identify and characterize on-site contamination that may be encountered during Project construction.

16.3.1 NEW JERSEY

16.3.1.1 COUNTY ROAD TO TONNELLE AVENUE

All of the upland properties within the Meadowlands portion of the Project site have historically been filled as this area was once all a part of the New York – New Jersey Harbor Estuary. The fill could include industrial wastes, dredged material, construction and demolition waste, other solid wastes (including municipal garbage), and ash. As such, fill in this area 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 particular 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, New Jersey: former landfill with known soil (including SVOCs, PCBs, pesticides, and metals) and groundwater contamination (SVOCs, pesticides, and metals) with Classification Exception Area (CEA).
- 801 Penhorn Avenue, Secaucus, New Jersey: 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. A deed notice and CEA is in place to address soil and groundwater impacts, respectively.
- 401 Penhorn Avenue, Secaucus, New Jersey: 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). The site has a deed notice and 2 feet of clean fill beneath the paved area serves as an engineering control/cap.
- 301 Penhorn Avenue, Secaucus, New Jersey: potential for historical fill, soil impacts (VOCs and metals), as well as potential groundwater contamination (VOCs, PAHs, metals).
- 201 Penhorn Avenue, Secaucus, New Jersey: potential for historical fill, soil impacts (metals).
- Keystone Freight Corporation, 2806 Secaucus Road in North Bergen, New Jersey: KCSL site, historical fill.
- 2820 16th Street, North Bergen, New Jersey: KCSL site, historical fill, soil impacts (petroleum, VOC, PAHs, PCBs, and lead) and groundwater impacts (VOC, PAHs and metals), and CEA for VOCs.
- 2400 16th Street, North Bergen, New Jersey: Historical fill, potential soil impacts (PAHs and metals), known petroleum contamination.
- PSE&G, Conrail, and New York, Susquehanna & Western Railway (NYSW) rights-of-way (Secaucus and North Bergen, New Jersey): 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.

[2] https://www.njsea.com/history/, accessed March 22, 2021.

Two potentially contaminated sites on the NJDEP KCSL are also located in the study area but the Project would not require their use and it is not anticipated that either would affect the dewatering for the Project due to the nature of the contaminants. 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 and 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 new tunnel alignment would be very deep, and encountering contaminated materials would not be a concern other than for excavated materials (spoils) removed from the tunnel. Tunnel spoils are discussed later in this chapter in Section 16.6. Therefore, this section is limited to the portion of the study area where surface construction activities would occur, at the Hoboken staging area. At the Hoboken staging area, properties that would be affected 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, and metals) contamination. NJ TRANSIT, as property owner, conducted remediation at this site in 2019 to remove TSCA levels of PCBs under an EPA self-implementing plan.
- The former Carmine Franco & Co. property in Hoboken: historical fill, with known soil (petroleum, VOCs, SVOCs, PCBs, pesticides, and metals) and groundwater (SVOCs, PCBs, and metals) contamination. NJ TRANSIT, as property owner, conducted remediation at this site in 2019 to remove TSCA levels of PCBs under an EPA self-implementing plan.

- The Willow Avenue Enterprises, LLC property in Hoboken: soil and groundwater contamination with PAHs and metals, consistent with historical fill identified in the former ARC Project investigation.

These properties are also all documented to have historical fill that may have introduced contaminated soils to the sites. NJ TRANSIT acquired both the Block 144 Development LLC and former Carmine Franco & Co. properties as part of the former ARC Project and subsequently demolished their former buildings and associated structures.

Serpentinite rock with naturally occurring asbestos (NOA) may be encountered during tunnel boring and/or excavation activities. As discussed in more detail in Chapter 15, "Geology and Soils," 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 a federal NPL (also known as Superfund) site (and on many other databases) due to contamination with PCBs, resulting from discharges upriver (north of Albany, 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 in the Hudson River for that project, three samples were collected from each geotechnical boring: one at the sediment surface, one just above bedrock, and one intermediate sample (mid-point of the boring). In anticipation of potential reuse of any sediment removed for construction, analytical results were compared to the NYSDEC unrestricted use Soil Cleanup Objectives (6 NYCRR Part 375), and the NJDEP Soil Cleanup Criteria (N.J.A.C. 7:26D). 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 samples.

In addition, serpentinite rock with NOA may be encountered during tunnel boring.

16.3.3 NEW YORK

The site conditions of the Project site in Manhattan are as follows; in addition to the information provided here, the Project site in Manhattan also contains fill material that could contain contaminated materials:

- Block 675 is located east of Twelfth Avenue between West 29th and West 30th Streets. Lot 1 is currently vacant. The remainder of the block was until recently occupied by an auto repair shop, 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 (PAHs, a category of SVOC, most commonly associated with fill material) were above NYSDEC's Commercial/Industrial Restricted Use Soil Cleanup Objectives (calculated assuming long term exposed soils). The VOC 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.

Former Lot 12, located at 603 to 613 West 29th Street, was until recently occupied by multiple tenants including the New York City Department of Sanitation, Jeff Koons LLC art studio, a parking garage, and a paved surface parking area. This property is now part of a construction site for a new residential building. The western portion of the property fronting on West 29th Street adjacent to the Twelfth Avenue fan plant site would be used for construction staging for the duration of the tunnel construction. Several RECs have been identified on the property including historical fill, historical industrial operations, multiple underground storage tanks, and potential petroleum impacts from an adjacent gas station on Block 675.

- 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. In addition, a number of geotechnical/environmental borings were advanced during the ARC Project that indicated detectable concentrations of NOA in rock and soil (1 - 5 percent actinolite/tremolite). In January 2021, Amtrak conducted an environmental site investigation at the West 30th Street Heliport. It consisted of a geophysical survey and the collection and laboratory analysis of soil and groundwater samples. The geophysical survey identified the likely location of former underground fuel storage tanks and the samples found evidence of both historical fill material and, in the vicinity of the former tanks, petroleum contamination.
- Block 729 is 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; the eastern portion of the block includes recently completed high-rise residential and office as well as ongoing construction for additional mixed-use. Fuel oil is stored on the block and spills of unknown chemicals have been reported. At track level, there is documentation of PCB contamination of the ballast/soils.
- Roadways are part of the Project site (Twelfth Avenue/Route 9A, West 30th Street, and Tenth Avenue). Given the historical industrial activities that occurred in this area of Manhattan and on nearby properties, contamination from industrial activities and fuel storage is likely.

Although the Project alignment would traverse the Metropolitan Transportation Authority (MTA) Long Island Rail Road (LIRR) John D. Caemmerer West Side Yard, Amtrak has already constructed a portion of the Hudson Yards Right-of-Way Preservation Project beneath this area to reserve space for a future rail-right-of way and intends to construct the final segment of the Hudson Yards Right-of-Way Preservation Project as a separate initiative from the Preferred Alternative (see Chapter 4, "Analysis Framework," Section 4.3.3). 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 any existing subsurface contamination in this area.

16.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

In the future, in the absence of the Preferred Alternative, 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.

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 authority, 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. 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

Construction of the proposed new rail tunnel, surface tracks, and associated structures such as retaining walls, buildings, and viaduct foundations would result in subsurface disturbance. 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 and commercial, transportation (including railroad) 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 shallow soil encountered in developed areas of New Jersey and New York, including urban portions of the study area and the Meadowlands, comprise urban fill, which typically contains elevated levels of metals and organic compounds, especially those from partially combusted coal or petroleum-derived products, such as coal ash. The most likely routes of exposure are breathing of volatile and semi-volatile 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, acute effects can sometimes be a concern.

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, the Project Sponsor will implement measures to avoid adverse impacts. These measures are set out in more detail below. The Project Sponsor would implement these measures during construction as an integral part of contract construction requirements and documents, with procedures to ensure compliance. The lead Federal agency

will be responsible for ensuring that the Project Sponsor implements these measures, which will be identified in the ROD. In addition, construction activities in New Jersey will be conducted under oversight by a Licensed Site Remediation Professional pursuant to the NJDEP Linear Construction Technical Guidance.

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. During tunnel rehabilitation, the Project Sponsor would conduct all required/appropriate monitoring during disturbance/removal and manage all materials requiring disposal from the tunnel, including materials potentially contaminated with ACM, lead-based paint, electrical equipment containing PCBs (e.g., transformers and ballasts), and other contaminated materials in accordance with all applicable regulations relating to monitoring, characterization, containerizing, labeling, manifesting, transportation, and disposal facilities.

Tunnel boring under the Palisades ridge would occur at least 150 feet beneath the surface through competent bedrock where contamination from surface activities is highly unlikely. Excavated rock and soils (referred to as “spoils”) from TBM operations would be characterized prior to disposal or reuse. Some of the rock may include serpentinite with NOA. 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. Nevertheless, measures to mitigate worker and public exposure to NOA would be implemented as part of a Project-wide Soils and Materials Management Plan (SMMP). 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. In addition, 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.

The staging area at Tonnelle Avenue in North Bergen, New Jersey, would include areas for storing tunnel spoils until they can be trucked from the site for disposal, including a possible temporary spoils storage area on the west side of Tonnelle Avenue that could extend to a depth of approximately 30 feet below grade to allow for the storage of a larger volume of spoils. If the Project contractor chooses to implement such a pit, the pit would likely be lined to reduce groundwater inflow into it and to reduce the flow from wet spoils out of the pit. This would limit the potential for contamination to flow either into or out of the spoils storage area.

The measures to avoid impacts are described in Section 16.8. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements these measures, which will be identified in the ROD.

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 measures to avoid, minimize, or mitigate any potential adverse effects from contaminated materials during construction of the Preferred Alternative. The lead Federal agency will be responsible for ensuring that the Project Sponsor implements these measures, which will be identified in the ROD.

16.8.1 PROJECT-WIDE MEASURES

Based on the findings and recommendations of the Limited Phase I Environmental Site Assessment, the Project Sponsor will conduct additional Site Investigations (New Jersey sites) or Phase II Subsurface Investigations (for New York sites). This will include soil and groundwater sampling activities, as well as testing buildings and structures for hazardous materials, at certain locations along the Project site where existing information is insufficient and/or where the potential for contamination exists based on available data, and where Project construction could encounter the contamination. The Project Sponsor will determine the specific sites that will be subject to further investigation as Project engineering and design advances. The Site Investigations and Phase II Subsurface Investigation activities will determine the presence or absence of contaminants, and assess their chemical and physical characteristics to determine the exposure potential and extent, if any, associated with the work to be performed, and thus any corollary health and environmental hazards. Property Acquisition Environmental Cost Estimate (PAECE) reports will be prepared in coordination with property acquisition in New Jersey that will assist with assessing potential environmental concerns. Based on the findings of these initial investigations, additional investigations may be undertaken to further determine the extent and levels of contamination at affected properties.

Based on investigation data, appropriate remedial actions, such as engineering controls, would be developed and implemented to avoid the potential for adverse impacts to construction workers, surrounding communities and the environment. Remedial actions or measures may include excavation or in-situ treatment of contaminated soil, and off-site 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 established in documents (which would be subject to NJDEP or NYSDEC review should a reportable condition be encountered or if the site is already subject to agency oversight) and would address the procedures for monitoring/oversight to ensure the remedial measures are properly implemented.

A Project-wide 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. The SMMP would set out how regulatory compliance (Federal, state, and local) would be achieved with respect to the management of excavated materials and hazardous waste, petroleum-contaminated materials, and other materials during construction, including NOA, and provide protocols for the protection of workers, contingencies for community air monitoring, and other procedures that should be implemented to

protect public health and the environment. In addition, a site-specific Soil Reuse and Alternative Fill Management Plan would be developed for management of contaminated soil. Materials handling and results on construction sites in New Jersey will be conducted under oversight by a Licensed Site Remediation Professional pursuant to the NJDEP Linear Construction Technical Guidance.

The transportation and disposal of contaminated material and soil 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 transportation companies/vehicles and disposal facilities. All waste would be transported on designated truck routes using 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.

There is the potential to encounter NOA serpentinite rock during construction of the Preferred Alternative, especially during excavation and tunneling operations. As a result, measures to mitigate exposure to NOA would be implemented as part of the SMMP, consistent with asbestos standards of the U.S. Occupational Safety and Health Administration (OSHA).[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] Any beneficial reuse or off-site disposal of NOA-containing rock would be conducted in accordance with Federal and state regulations. Measures to mitigate exposure to NOA would be implemented as part of the SMMP.

In addition, the Project Sponsor will develop a Project-specific Health and Safety Plan (HASP) prior to earth-disturbing activities to protect workers and the public from potential exposure to 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 from potential exposure. The HASP will set out procedures for handling contaminated materials, conditions triggering personal protective equipment (PPE), response plans, designation and training of appropriate personnel, and 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). The HASP will also set out procedures to minimize dust generation, such as dust and air monitoring of the work area, the use of water spray, dust retardants, and/or truck wheel wash, during soil disturbance and excavation activities.

The HASP will include the following:

- Identify key personnel responsible for site safety, including name and qualifications of the dedicated site Safety Officer.
- Address levels of PPE to be utilized during work.
- Designate work area exclusion zone(s) and decontamination zone(s) as defined by OSHA.
- Establish site emergency procedures and describe emergency equipment, and its operation, to be made available on site.
- Identify, provide location of, and list arrangements with the nearest medical facility.

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[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] EPA, https://archive.epa.gov/region9/toxic/web/html/basic.html.

- Dust control measures to limit soil disturbance and airborne 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 control measures, the construction contract would contain requirements for ambient air monitoring around work areas.
- The monitoring requirements would take into consideration the data on known or suspected soil/rock contaminants from the Limited Phase I Environmental Site Assessment, and all subsequent investigations, the locations of potential human and environmental receptors and other information, to assure that the dust control measures (noted above) are preventing unacceptable exposure to workers, 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 historical 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 and followed 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 worker personal protection against airborne contaminants.
- Set forth procedures for decontamination of personnel, materials, and equipment and procedures to prevent dust being tracked off-site (e.g., on truck tires) into surrounding areas.

During construction, whenever contaminated soils or groundwater or hazardous vapors or new areas of concern are encountered (e.g., discovery of unknown storage tanks), appropriate site remediation techniques or other measures to prevent exposure will be implemented, based on the procedures set forth in the SMMP and, if necessary, other materials management and safety plans. 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.

The local municipalities, as well as county and state agencies and OSHA, will always have the ability to inspect a construction site to determine the level of compliance with established safety regulations and Project construction commitments. Any chemicals used or stored at construction staging areas would be required to have the corresponding Safety Data Sheets available for inspection by workers and other on-site personnel at the local construction office.

16.8.1.1 TUNNEL SPOILS AND OTHER EXCAVATED MATERIALS

As discussed in Chapter 3, "Construction Methods and Activities," Sections 3.3.1.5, 3.3.2.4, 3.3.3.2, and 3.3.4.6, material excavated for construction of elements of the surface alignment would be removed from the excavation sites, while tunnel spoils would be removed from the tunnel at the rear of the TBM in New Jersey, and brought out of the tunnel primarily at the Tonnelle Avenue staging site. The Project Sponsor, working with the Project contractor, will be responsible for finding a suitable location for reuse (e.g., where grades need to be raised along the alignment, or at other locations where fill is needed) or off-site disposal of spoils from the tunnel mining. Spoils will not be disposed in areas within the jurisdiction of the U.S. Army Corps of Engineers (USACE).

The Project Sponsor will develop protocols during final design 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 generally be reused at other locations (e.g., where grades need to be raised along the alignment or at other locations where fill is needed). The crushed rock is not likely to be contaminated because of both its depth and impermeability—although there is a possibility that some could contain NOA materials, which would limit the use of that portion of the spoils.

During construction, the Project Sponsor would characterize excavated material for onsite reuse, offsite "beneficial use" or for off-site 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. Procedures for characterizing excavated material for reuse (including any required laboratory analysis) might require consultation with NJDEP or NYSDEC, but in all cases would prohibit reuse of material meeting the definition of hazardous waste or subject to EPA land disposal restrictions. Reuse of excavated materials in New Jersey will be conducted under oversight of a Licensed Site Remediation Professional. The SMMP would set out the required testing procedures to comply with applicable regulatory requirements and guidelines. Testing is most frequently conducted on stockpiles of excavated material, but can sometimes be conducted "in situ", i.e., in the ground prior to excavation.

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 of the new surface alignment. Other off-site reuse opportunities for uncontaminated rock could include filling abandoned mines, 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.

The Project Sponsor will develop protocols for the transport of spoils from the construction sites in accordance with all applicable Federal, state, and local regulations to ensure the safe handling of these materials; these protocols will include procedures to secure the material from spilling off trucks, truck routes, 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, including permitted soil receiving facilities and sites with a State-issued Beneficial Use Determination (BUD), depending upon the type of material and following proper waste characterization in accordance with the intended receiving facility permits. These facilities are required to meet all applicable regulations and typically process soils and dredge materials to recycle or beneficially reuse them.

Groundwater generated during dewatering activities would be managed in accordance with applicable permits from NJDEP in New Jersey and from NYCDEP and/or NYSDEC in New York, depending on the location of discharge. Potential methods for handling the disposal of groundwater from dewatering activities include: discharges to surface water following any necessary and permitted pre-treatment; discharge to stormwater or combined sewer systems following any necessary and permitted pre-treatment; on-site treatment and discharge; and/or off-site disposal. More detail on the required permits for the disposal of groundwater from dewatering activities during construction of the Preferred Alternative and an explanation of how groundwater issues are dealt with can be found in Chapter 11, Natural Resources," see Section 11.6.2.3 and Section 11.6.4.3 in New Jersey and New York, respectively.

16.8.1.2 DUST CONTROL

To minimize fugitive dust emissions from construction activities, the Project Sponsor will require a fugitive dust control plan, including a robust watering program as part of contract specifications. The Project Sponsor and Project contractor will be required to meet all applicable Clean Water Act, National Pollutant Discharge Elimination System (NPDES), and corresponding State (SPDES) requirements, and follow best management practices to prevent unacceptable run-off. For example, as a part of the dust control plan, all trucks hauling loose material will be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the construction site,

and dust suppression techniques (e.g., spraying with water, surfactants) will be used to minimize dust for all excavation and transfer of soils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. Loose materials will also be dampened or covered.

In addition, the Project Sponsor will implement a SMMP to minimize and control the potential for airborne soil particles from stockpiled materials. The SMMP will establish temporary stockpile locations, construction and management requirements. Stockpiles will be covered with a heavy duty plastic at the end of the work day and will be bermed to contain water that drains from the soil which will be collected and containerized for disposal as needed.

The Project Sponsor will institute proactive controls to reduce the potential for dust generation during site activities, including maintaining slow travel speeds, stabilization and monitoring of truck entry and exit ways, and the application of a water spray or dust suppressant to control dust generation to prevent exposure of the public and the environment to respirable particulates and other contaminants of concern. Soil attached to the wheels and body of trucks and equipment will be removed at a wash station (with treatment/management of the wash water in accordance with NJDEP/NYSDEC requirements) prior to leaving the site to reduce the potential for trucks to deposit material outside of the project site. Water generated by equipment and truck decontamination activities will be collected and containerized onsite for permitted treatment or offsite disposal.

In addition to these dust containment controls, the Project Sponsor will include specifications in the construction contracts for monitoring ambient air around Project construction/staging areas to prevent exposure of workers, the public, and the environment to respirable particulates and other contaminants of concern. 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. At each construction work zone, the Project Sponsor will conduct air monitoring to alert when dust levels have exceeded the pre-determined action levels, which would be based on applicable law and guidance. The air monitoring will be conducted with fixed monitoring stations and/or portable equipment, as warranted, capable of displaying real-time levels of particulate matter. If triggered, work practices and localized engineering controls will be evaluated and corrected (as needed). If exceeded for specified periods of time, additional measures would be implemented, such as limiting the extent of areas of exposed soil, increasing the application of dust control measures, or ceasing work until levels have fallen below the action levels.

16.8.2 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. The Licensed Site Remediation Professional 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 Site Remediation Program 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 Exposition 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.

The staging area at Tonnelle Avenue in North Bergen, New Jersey, would include areas for storing tunnel spoils until they can be trucked from the site for disposal, including a possible temporary spoils storage area on the west side of Tonnelle Avenue that could extend to a depth of approximately 30 feet below grade to allow the storage of a larger volume of spoils. If the Project contractor chooses to implement such a pit, the below-grade area would be lined or otherwise managed to reduce groundwater inflow into the pit and to minimize the potential for discharge to groundwater. This would limit the potential for contamination to flow either into or out of the spoils storage area.

The Hoboken staging area is a site with documented contamination. The Project Partners conducted soil borings and installed groundwater wells for soil and groundwater sampling at the Hoboken staging area as part of the environmental studies for the preliminary design of the Preferred Alternative, which allowed them to characterize the contamination on the site. As an interim measure, in 2019 NJ TRANSIT completed the remediation of PCB contamination at the Hoboken staging area. During construction for the Preferred Alternative on the Hoboken staging area, contaminated soil within the portion of the site where the new ventilation shaft and fan plant are proposed would be excavated, placed in dump trucks or roll-off containers, and transported to appropriate disposal sites. Trucks will be covered to contain the contaminated materials being transported.

16.8.3 HUDSON RIVER

The Project Sponsor would treat any sediment or mixture of sediment and grout removed from the river as contaminated; this material would be characterized for potential reuse offsite or disposal at a suitably permitted facility, after dewatering.

As noted in Section 16.3.2, the Hudson River is listed as an NPL (also known as Superfund) site and sediment may have PCB contamination. Therefore, material to be excavated would be tested in accordance with Federal, state, and local regulations before it is excavated, to determine beneficial reuse or off-site disposal options. Depending on the PCB levels, PCB-containing sediments can require incineration. However, there are some conditions under which low levels of PCBs can be disposed of in a landfill.

16.8.4 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. The Project Sponsor would use analytical testing of the excavated material to determine if and how the material could be beneficially reused offsite or onsite (e.g., as construction backfill or for landscaping). Where material is surplus or not suitable for reuse, 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. ✷