



December 18, 2017

Mr. Martin Judd
New Jersey Transit
One Penn Plaza East
Newark, New Jersey 07105-2246

Re: Updated Environmental Report for Property Acquisition (ERPA)
Union Dry Dock Property – 901 Sinatra Drive, Hoboken, New Jersey

Dear Mr. Judd:

At your request, Roux Associates, Inc. (Roux Associates) has prepared this updated Environmental Report for Property Acquisition (ERPA) for the Union Dry Dock & Repair (Union Dry Dock) property, located at 901 Frank Sinatra Drive in Hoboken, New Jersey (hereinafter referred to as Site). A Site Location Map is provided as Figure 1. The purpose of this ERPA is to document known environmental conditions and projected remediation costs associated with the upland portion of the Site. It is Roux Associates understanding that NJ Transit is evaluating the future use of the Site as a ferry maintenance facility, and as such, this ERPA contemplates a non-residential future use scenario.

Roux Associates had previously completed an ERPA for this Site in December 2011. The initial ERPA was prepared using the following available key documents available for the Site: a) a December 2011 Phase I Environmental Site Assessment (Phase I ESA) and Preliminary Assessment Report (PA Report) prepared by Roux Associates; b) an April 2009 PA Report and an April 2009 Site Investigation/Remedial Action Work Plan (SI/RAWP) prepared by Dresdner Robin (DR); and c) a 2005 PA Report prepared by TRC Raviv.

Additionally, based on the collective findings of these environmental reports, Roux Associates had conducted supplemental site investigation activities to further assess subsurface conditions on November 16 through 18, and 30, 2011. Since the preparation of the ERPA the following additional key documents have been reviewed as part of this updated ERPA: a) an October 11, 2011 Preliminary Assessment/Remedial Investigation Workplan prepared by Bell Environmental Consultants, Inc. (Bell Environmental)¹, b) July 14, 2016 DR memorandum on Limited Site Investigation (Sediment); c) August 23, 2016 Roux Associates Summary of the Union Dry Dock Background Sediment Investigation; d) May 2017 EcolSciences, Inc. (EcolSciences) Phase I ESA/PA; and e) August 15, 2017 EcolScience Phase II Sampling Report/File Review.

Roux Associates has used all of the aforementioned documents to prepare this updated ERPA for the Site. A Site description, summary of previous environmental

¹ The October 11, 2011 PA/RIWP, prepared by Bell Environmental was not available to Roux Associates during the previously completed ERPA.

activities, proposed remedial action approach and cost summary are provided below.

Site Description

The Site is currently owned by New York Waterway and is being operated as the Union Dry Dock & Repair Co., a barge repair and maintenance facility situated along the western shore of the Hudson River. The Site is shown as Block 259, Lot 1 on the Hoboken Tax Map. The Site is approximately 8.5 acres, and is improved with several buildings and trailers, material storage, three piers, two dry-docks, mooring bells, and a paved parking lot. In 1984, a 2-inch layer of crushed stone was placed over upland areas that are not paved or covered with concrete. A significant portion of the Site (approximately 55%) extends into and encompasses a portion of the Hudson River. The grade at the Site slopes slightly downward to the east towards the Hudson River. The elevation of the Site is approximately 10-15 feet above mean sea level, as shown in the USGS 7.5 Minute Series Passaic Quadrangle Topographic Map (see Figure 1).

The Site is surrounded by a mix of predominantly residential, academic, and public use properties. Specifically, the Site is bound to the north by a public park and a new residential development (Maxwell House), to the west by Sinatra Drive, Stevens Institute of Technology, and residential row-houses, to the south by a public skate park, public soccer field, and Stevens Institute of Technology Operation Plant, and to the east by the Hudson River.

According to previous investigations conducted by others, and a review of published information, the entire Site is immediately underlain by historic fill to depths ranging from 9 feet below land surface (ft bls) to a maximum depth of 21 ft bls. Historic fill consists of a mix of anthropogenic materials, gravels, cobbles, and sand. Immediately underlying this historic fill is a mix of fluvial sediments consisting of peat, clay, and silt. Serpentinite bedrock is likely present beneath unconsolidated sediments at varying depths across the Site. This rock is noted by its distinctive yellowish green color and is known to be naturally asbestos containing. Adjacent to the Site (across Sinatra Drive) is an outcrop of this serpentinite rock.

Groundwater occurs beneath the Site at depths of 6 ft bls to 9 ft bls depending on proximity to the Hudson River. Groundwater is assumed to flow in an easterly direction towards the Hudson River with groundwater elevation and flow direction potentially influenced by tidal conditions and the presence of shallow bedrock. In addition, localized groundwater flow direction may also be influenced by utilities and other subsurface variations in geology.

Based on interviews conducted during Roux Associates' 2010 Phase I ESA, the buildings that formerly existed while the Site was under previous ownership, prior to occupancy by the current owner, were demolished with a majority of the building material debris left in place. Prior to construction of the current facility, Union Dry Dock & Repair Co. imported approximately 1,800 cubic yards of virgin stone to serve as a 2-inch cover across all land portions of the Site in 1984.

Previous Environmental Activities

A summary of key environmental documents related to the Site is provided below.

2009 DR PA Report

As discussed above, a PA Report was completed by DR for the Site, dated April 2009. This document was prepared as part of a previous NJDEP Industrial Site Recovery Act (ISRA) filing due to the proposed sale of the Site by Union Dry Dock to Bijou Properties LLC (this property transaction never occurred). The PA Report identified 18 potential areas of concern (AOCs), including above ground storage tanks (ASTs), drum storage areas, the surface water and sediments in the Hudson River, historic fill used to grade the Site, electric transformers, observed stained areas, air compressor vent discharges, and investigation of potential offsite contamination from adjacent properties. DR recommended further investigation for 11 of these 18 potential AOCs.

2009 DR SI/RAWP

Subsequent to identifying the potential AOCs, DR conducted site investigation activities at the 11 AOCs in which further investigation was recommended in the PA Report, and documented the results in an SI/RAWP dated April 2009. As part of this investigation, DR conducted a geophysical survey, and completed 16 soil borings, three piezometers, and 24 sediment cores. Results of the investigation indicated that soils at the Site contained concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) above their respective NJDEP Residential Direct Contact Soil Remediation Standards (RDCSR), Non-Residential Direct Contact Soil Remediation Standards (NRDCRS), and/or the Default Impact to Groundwater Soil Screening Levels (IGWSSLs). Additionally, in one location naphthalene was identified in soil above the RDCSR. The exceedances of metals and PAHs (except naphthalene) in Site soils were attributed to historic fill. The source of the naphthalene exceedance in soil was not determined. The DR SI/RAWP indicated that the extent of the historic fill at the Site has been delineated to depths of 9 up to 21 ft bls, across the entire Site.

Results of the groundwater investigation concluded that concentrations of various PAHs and Metals were detected above NJDEP Class IIA Groundwater Quality Standards (GWQS). These exceedances were also attributed to historic fill. In addition, one groundwater sample, collected from a temporary well point², contained the volatile organic compound (VOC) trichloroethene (TCE) at a concentration above GWQS, of which the source was unknown.

Results of the sediment screening from within the Hudson River indicated the presence of metals in near-Site samples at concentrations higher than the concentration of the background samples collected upstream of the Site. Specifically, results identified several metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) that exceeded NJDEP Marine/Estuary Sediment Screening Guidelines Effects Range. As part of the SI/RAWP, DR conducted a 28-day toxicity test on the river sediments. Based on this toxicity test, DR concluded that near-Site sediment samples are not toxic, despite the elevated concentrations of several elements, therefore, DR recommended no further action related to river sediments.

² DR collected groundwater samples from temporary well points as opposed to permanent, properly developed monitoring wells. Groundwater samples, collected from temporary well points, may be prone to elevated turbidity from suspended solids.

The DR SI/RAWP recommended additional investigation be conducted to delineate the vertical and horizontal extent of the naphthalene exceedance in soil as observed in one sample (boring DR-2) in the area adjacent to the parking lot. Additionally, to confirm the presence of TCE in groundwater, Dresdner Robin concluded that one monitoring well should be installed at the location of former temporary well point PZ-5 (near the hazardous materials storage barge).

2010 Roux Associates Phase I ESA

Roux Associates prepared a Phase I ESA report for the Site dated March 31, 2010. Since this Phase I ESA is greater than one year old, in accordance with ASTM E1527-05, Section 4.6, Roux Associates prepared a new Phase I ESA dated December 2011. Both Phase I ESAs were conducted in accordance with the USEPA AAI Rule (40 CFR Part 312, Standards and Practices for All Appropriate Inquiries, Final Rule) as defined in ASTM Standards E1527-05 and E2247-08. Both Phase I ESA reports identified the following Recognized Environmental Concerns (RECs):

- The presence of soil and groundwater contamination was documented in Site investigations previously conducted by others. Soil contamination documented onsite includes semi-volatile organic compound (SVOCs) and metals contamination attributed by others to historic fill that is distributed throughout the Site, and naphthalene contamination in soil observed in the vicinity of the parking lot. The extent of the naphthalene contamination in soil is unknown. Groundwater contamination onsite includes the presence of TCE observed in the vicinity of the material storage area. The extent and source of the TCE contamination in groundwater is unknown.
- The presence of Hudson River sediment contamination (a portion of the Site is underwater and in connection with the Hudson River) as documented in previously conducted Site investigations. The sediment was analyzed and determined to contain detectable levels of polychlorinated biphenyls (PCBs), and metals. PCBs were historically used in marine paints. Recent stormwater discharge permit modifications suggest that the NJDEP is concerned with the potential for contaminants resulting from Site activities to impact Hudson River sediments.
- The material threat of a release of hazardous substances into the environment due to inadequate storage of hazardous substances including diesel fuel and oils, and poor management of spent blasting grit, and waste potentially containing paint chips. These concerns were evident by staining observed on cracked pavement and soils in areas of hazardous material storage.
- The material threat of contamination posed by previous activities conducted at the Former Pennsylvania Rail Road repair shop that was in operation at the Site from early 1900s to 1976. This repair shop performed repair of barges and other vessels, and included fuel oil storage, a power station, a boiler room, a pitch kettle, paint mixing, material storage/sheds, independent electric shop, and a blacksmith shop.

Foundations related to historical structures at the Site were encountered at soil borings completed during previous investigations.

December 2011 Roux Associates PA Report

Roux Associates conducted a PA in accordance with N.J.A.C. 7:26E (The Technical Requirements for Site Remediation). Roux Associates prepared a PA Report dated December 2011, which presented similar conclusions and findings as the Phase I ESAs.

2011 Supplemental Site Investigation Activities

In November 2011, Roux Associates conducted supplemental investigation activities at the Site. Based on review of previous environmental documents, and completion of a Phase I ESA and PA Reports, Roux Associates concluded that the following additional investigation activities were warranted.

1. Based on DR's recommendations in the SI/RAWP, Roux Associates concurred that the following investigation activities were warranted:
 - Installation of a permanent monitoring well and collection of a groundwater sample to confirm the presence of TCE, PAHs and metals in groundwater in the location of former temporary well PZ-5.
 - Vertical and horizontal delineation of the naphthalene exceedance in soil at boring DR-2.
2. During Roux Associates site visit/reconnaissance conducted on February 5, 2010, staining was observed near cracks in the concrete floor of the Plate Shop. Several 55-gallon drums were also observed to be stored on wooden pallets in this area, without secondary containment. Based on this observation, Roux Associates investigated soil in this area, beneath the floor slab.

Roux Associates conducted these supplemental investigation activities from November 16 through 18, and 30, 2011. The results of the investigation were presented in Roux Associates November 2011 ERPA. A summary of the findings is presented below.

Delineation of Naphthalene

Roux Associates completed soil borings SB-1 through SB-5 to complete delineation of naphthalene in soil. The first soil boring (designated SB-1) was completed in approximately the same location as DR's soil boring DR-2 (naphthalene was detected in this boring in excess of the RDCSRS in the 7.5 to 8 ft bls interval). Roux Associates collected a soil sample from the 8.5 to 9 ft bls interval (below the interval in which DR detected the exceedance of the RDCSRS). Naphthalene was not detected in sample SB-1/8.5 to 9 ft bls, completing vertical delineation for naphthalene.

Soil borings SB-2 through SB-5 were completed 10 feet on center, radially around SB-1 to the northwest, northeast, southeast, and southwest. Soil samples were collected from each boring from the 7.5 to 8 ft bls interval (comparable to the initial naphthalene exceedance in

boring DR-2). The highest naphthalene detection was 0.21 milligrams per kilogram (mg/kg), which was detected in sample SB-4/7.5 to 8 ft bls. All results were significantly below the RDCSRS of 6 mg/kg (i.e., the most stringent SRS); therefore, vertical and horizontal delineation of naphthalene was deemed complete.

Soil Boring Through Plate Shop Slab

Roux Associates completed one soil boring (designated SS-SB-1) through the concrete floor slab of the Plate Shop, in the vicinity of the cracks and staining observed during the February 5, 2011 Site reconnaissance. One soil sample was collected from the 0 to 0.5 ft bls interval and was submitted for laboratory analysis for Priority Pollutant compounds with a library search (PP+40). This sample did not exceed any SRS for VOCs, SVOCs, PCBs, Pesticides, or phenols. Nickel was the only metal identified in excess of a SRS. Specifically, nickel exceeded the NJDEP Default IGWSSL of 48 mg/kg in this sample with a concentration of 550 mg/kg. This concentration is below the RDCSRS of 1,600 mg/kg for nickel, and is consistent with other detections of nickel found in the historic fill throughout the Site.

Groundwater Quality

Roux Associates installed a permanent monitoring well (designated MW-1) near the former location of DR's temporary well PZ-5. The monitoring well was constructed with screen from 4 ft bls to 19 ft bls. On November 30, 2011, a groundwater sample was collected from MW-1 using low flow groundwater sampling methods. The groundwater sample was analyzed for VOCs, SVOCs, and metals.

TCE was not detected in this groundwater sample. Furthermore, there were no exceedances of the GWQS for any VOCs, SVOCs or metals.

October 11, 2011 Bell Environmental Preliminary Assessment/Remedial Investigation Workplan

Bell Environmental submitted the April 2009 PA/SI prepared by DR, along with NJDEP LSRP forms (Preliminary Assessment/Site Investigation, Receptor Evaluation, Annual Remediation Fee, and Case Inventory Document), on behalf of Union Dry Dock & Repair Company to the NJDEP with a cover letter supplementing the DR prepared documents. In the RIWP Bell Environmental proposed the following additional investigation activities: delineation of naphthalene in the area of soil sample DR-2; evaluation of mercury in soils which had been detected above the NJDEP's default IGW SSL at three soil sample locations; and the installation of additional monitoring wells in the area of temporary well point PZ-5 for the evaluation for TCE and soil borings DR-7, DR-10 and DR-15 for the evaluation of metals and PAHs.

July 14, 2016 Dresdner Robin Memo Limited Site Investigation (Sediment)

On June 26 and 27, 2016, DN collected a total of 18 sediment samples in the vicinity of the Site as well as background locations to the north and south of the Site. Six of the sediment samples were collected within the limits of the Site. All of the samples were analyzed for PCBs, total organic carbon (TOC) and grain-size. PCB concentrations exceeded the NJDEP Ecological Screening Criteria, Marine/Estuarine Sediment Screening Guidelines Effects Range – Low (ER-L) and Medium (ER-M). DR stated that “concentrations of PCBs

detected at the Site are generally consistent with concentrations detected in background samples collected to the north and to the south.” DR concluded that “the PCBs detected at the Site do not appear to be indicative of discharges from Site operations.”

August 23, 2016 Roux Associates, Inc. Summary of the Union Dry Dock Background Sediment Investigation

Roux Associates performed a statistical analysis of the background sediment investigation conducted by DR at the Site. Roux Associates analyzed the 18 sediment samples collected by DR to perform a “site” versus “background” comparison of the collected data. The United States Environmental Protection Agency’s ProUCL software (version 5.0), which utilizes two-sample hypotheses tests (Student’s t-test, WMW test, Gehan test, T-W test) to perform site versus background comparisons, is a recommended method for analyzing background data sets in the NJDEP Ecological Guidance and was utilized by Roux Associates in this analysis. The aforementioned two-sample hypotheses approaches are used when the site parameters (e.g., mean, shape, distribution) are being compared with the background parameters (e.g., mean, shape, distribution).

The results of the two-sample hypothesis tests presented no statistical difference between the onsite and background sediment sample sets. In addition, the grain size data was found to be statistically comparable between the two data sets which ensures a “like-for-like” statistical analysis, as finer grain sediments have a tendency to correlate with higher contaminant concentrations.

As presented by the data, it can be interpreted that the onsite sediments are statistically similar, if not partially or totally impacted, by off-site, regional impacts found along this southern stretch of the Hudson River. Accordingly, there is no obvious evidence that Site related operations have impacted the Hudson River.

May 2017 EcolSciences, Inc. Phase 1 ESA/PA

EcolSciences, Inc. (EcolSciences) prepared a Phase 1 ESA/PA for the Site. EcolSciences identified the following AOCs and recommended additional investigation for each:

- AOC-1/AOC-A/AOC-B/AOC-D/AOC-E: Above Ground Storage Tanks;
- AOC-2/AOC-F: Underground Storage Tanks
- AOC-3/AOC-J/AOC-K/AOC-L/AOC-N: Storage Pad including Drums and/or Waste Storage
- AOC-9/AOC-I: Electrical transformer
- AOC-10: Discolored soil
- AOC-12/AOC-M: Compressor Vent Discharges
- AOC-14: Former Boiler Room/AOC-15: Previous Site Operations

August 15, 2017 EcolSciences, Inc. Phase II Sampling Report/File Review

AOC-1: ASTs - EcolSciences performed eight soil borings around the perimeter of the former AST containment area and samples were analyzed for Category 2 Extractable Petroleum Hydrocarbons (EPH) and VOCs with contingent analysis of SVOCs, metals and

PCBs. Two of the samples were analyzed for full Target Compound List/Target Analyte List (TCL/TAL) parameters. No VOCs, PCBs or pesticides were detected above the RDCSRS. While EPH was detected in six of the eight samples, the concentrations were well below the EPH Soil Remediation Criterion (SRC). PAHs and metals were detected in two samples exceeding the RDCSRS which EcolSciences attributed to the presence of historic fill. One soil boring was completed adjacent to both diesel fuel ASTs with samples analyzed for Category 1 EPH. EPH was not detected in either sample.

AOC-2/AOC-F: USTs – EcolSciences performed a site-wide geophysical survey to identify any additional USTs or piping and found no anomalies indicative of USTs or piping.

AOC-3: Storage Pad including Drums and/or Waste Storage – EcolSciences completed a total of seven soil borings and analyzed one soil sample from each boring for Category 2 EPH and VOCs with contingent TCL/TAL analysis.

Four soil borings were completed within the drum storage building biased towards a stained area. VOCs were not detected above the RDCSRS in any of the soil samples. EPH was detected in three soil samples at concentrations between 100 mg/kg and 360 mg/kg and all three samples were subsequently analyzed for TCL/TAL parameters. PAHs and metals were detected in three samples exceeding their respective SRS. Pesticides and PCBs were not detected in any of the samples.

Two soil borings were completed in the plate shop biased towards stained concrete. VOCs were not detected above the RDCSRS in either of the soil samples. EPH was detected in one soil sample at a concentration of 680 mg/kg and thus the sample was subsequently analyzed for TCL/TAL parameters. PAHs and metals were detected in the sample exceeding their respective SRS. Pesticides and PCBs were not detected in any of the samples.

One soil boring was completed in the compressor room biased towards a stained area. VOCs were not detected above the RDCSRS in the sample. EPH was detected in the sample at a concentration of 360 mg/kg and the sample was subsequently analyzed for TCL/TAL parameters. PAHs and metals were detected in three samples exceeding their respective SRS. Pesticides and PCBs were not detected in any of the samples.

EcolSciences attributed the elevated concentrations of PAHs and metals to the presence of site-wide historic fill.

AOC-9: Electrical Transformer – One soil sample was collected on the western side of the transformer pad in a small area of asphalt and analyzed for EPH and PCBs, with contingent analysis for PAHs. PCBs were not detected. EPH was detected at a concentration of 47 mg/kg and thus the sample was analyzed for PAHs. Elevated concentrations of PAHs were detected above the RDCSRS which EcolSciences attributed to the presence of site-wide historic fill.

AOC-10: Discolored Soils – Four soil borings were completed in areas of surficial staining throughout the gravel yard and within the buildings/shed. Two samples were collected from

each boring such that eight samples were analyzed for Category 2 EPH and VOCs with contingent TCL/TAL analysis. VOCs were not detected above the RDCSRS in any of the soil samples. EPH was detected in two soil samples at concentrations of 130 mg/kg and 430 mg/kg and both samples were subsequently analyzed for TCL/TAL parameters. PAHs and metals were detected in three samples exceeding their respective SRS which EcolSciences attributed to the presence of site-wide historic fill. Pesticides and PCBs were not detected in any of the samples.

AOC-12: Compressor Vent Discharges – One soil sample was collected from an area of stained soil on the unpaved surface under the compressor vent discharge. The sample was analyzed for Category 2 EPH with contingent PAH analysis. EPH was detected at 190 mg/kg but no PAHs were detected above the RDCSRS.

AOC-14: Former Boiler Room/AOC-15: Previous Site Operations - Four soil borings were completed in the footprint of the former buildings in the central portion of the Site. Two samples were collected from each boring such that eight samples were analyzed for Category 2 EPH and VOCs with contingent TCL/TAL analysis. VOCs were not detected above the RDCSRS in any of the soil samples. EPH was detected in six soil samples at concentrations ranging between 64 mg/kg and 510 mg/kg and all six samples were subsequently analyzed for TCL/TAL parameters. PAHs and metals were detected in three samples exceeding their respective SRS which EcolSciences attributed to the presence of site-wide historic fill. Pesticides and PCBs were not detected in any of the samples.

Site-Wide Geophysical Survey – A site-wide geophysical survey using ground penetrating radar (GPR) and electromagnetic (EM) techniques and a metal detector were conducted in the accessible areas around the perimeter of the onsite buildings. No anomalies indicative of tanks or other underground structures were identified.

EcolSciences concluded that the results of their Phase II soil sampling did not identify any previously unknown soil contamination in any of the AOCs investigated.

Remedial Approach

The remedial selection process is based on an evaluation of the documented environmental concerns identified at the Site, which have been determined to include soil impacts attributed to historic fill. Additionally, groundwater may have minimal impacts attributed to the historic fill. Roux Associates understands that NJ Transit is evaluating the use of the Site as a barge maintenance facility and potential future ferry maintenance facility. Therefore, the remedial approach contemplated in this ERPA is for non-residential future use. Any future remedial activities at the Site would require that the owner enter into the NJDEP's Licensed Site Remediation Professional (LSRP) program.

Roux Associates retained the most cost effective remedial approach to address environmental impacts at the Site, leaving the Site suitable for a non-residential future use scenario. This remedial approach includes the following key components:

- Preparation of a Remedial Action Work Plan;
- Excavation and Off-site Disposal of Soil Impacted with Naphthalene above the NJDEP RDCSRS;
- Construction of Engineered Cap to Address Historic Fill Contaminants in Soil;
- Implementation of a Deed Notice and Associated Fees, ISRA Costs, other NJDEP documentation and Fees, and Biennial Deed Notice Certification Reports; and
- Establishment of Groundwater CEA and Associated Fees.

This ERPA assumes that the existing site improvements, including building slabs, paved areas, and concrete walkways will remain as part of the future use of the Site. Note that asbestos and lead base paint was not evaluated as part of this ERPA, and if present, may need to be addressed as part of site redevelopment.

These remedial approach components are described below.

Preparation of a Remedial Action Work Plan

The preparation of a Remedial Action Work Plan is required to be submitted to the NJDEP which presents the proposed remedial activities discussed below. Since the current regulatory status of the Site is unknown with respect to ISRA we have assumed that a complete ISRA filing will be required due to the transfer of ownership of the Site. Consequently, the submission of a Preliminary Assessment Report and Remedial Investigation Report along with the required NJDEP forms and submissions will be performed as part of this task.

Excavation of Soil Impacted with Naphthalene above the NJDEP RDCSRS

As described above, soils impacted with naphthalene (initially identified in DR's boring designated DR-2) have been delineated both in the vertical and horizontal directions. Soil containing naphthalene above the RDCSRS is limited to a 400 square feet (sf) area, and to a depth of 8.5 feet bls. The naphthalene hot spot (approximately 125 cubic yards in volume) would be excavated and disposed off site. Following soil excavation activities, post-excavation samples would be collected in accordance with the Technical Requirements for Site Remediation (7:26E et seq. "Tech Regs") to confirm clean excavation endpoints were obtained. Once clean end points are confirmed, the excavation would be backfilled with certified clean fill material.

Engineered Cap

The construction of an Engineered Cap over the upland portion of the Site would be required to address the historical fill impacts identified in soil. Since Site improvements such as building slabs, paved areas, and concrete walkways will remain, these would be incorporated in the design of the Engineered Cap. Note that when calculating estimated costs for the Engineered Cap as part of this remedial approach, only permanent structures such as buildings, parking lots, etc. were considered viable components of the cap (i.e.,

office trailers and locker room trailers that can be relocated were not considered to be included as part of the cap design). Furthermore, the 2-inches of stone placed by the Union Dry Dock & Repair Co. in 1984 does not qualify as a sufficient cap, so all of these areas are included in the design of this cap.

A barrier consisting of a minimum of 1 foot of clean fill will be placed over all areas of the Site that are not covered with buildings, pavement or concrete. A geotextile fabric demarcation layer will be placed under this cap. Inspections of this cap would be completed on a semi-annual basis, and reported on a biennial basis.

Preparation of Remedial Action Report, filing of a Deed Notice and Associated Fees, ISRA Costs, other NJDEP Documentation and Fees, and Biennial Deed Notice Certification Reports

Once remedial actions described above have been completed a Remedial Action Report will be prepared to memorialize those activities. The submission of a Classification Exception Area/Well Restriction Area will be submitted for the elevated concentrations of PAHs and metals associated with the presence of historic fill across the Site.

In accordance with the Technical Requirements for Site Remediation (7:26E et seq. “Tech Regs”), a property owner is required to submit a Deed Notice to NJDEP when the proposed remedial action for the property includes contamination remaining above the RDCSRS. Since there are soil exceedances of the RDCSRS associated with historic fill that will remain on-site, a Deed Notice would be required to document the extent of the remaining contamination and the engineering control (i.e., Engineered Cap). Upon issuance of a Deed Notice for the property, an application for a Remedial Action Permit for Soils (RAP-Soils) will be submitted to the NJDEP.

Once the RAP-Soils has been issued the NJDEP requires biennial reporting which includes: an inspection of the property to document the condition of the institutional controls and overall site conditions; inspection of the County records to confirm that the Deed Notice for the property is on file, the determination of the current or proposed zoning for the property; and completion of a NJDEP biennial report checklist. Additionally, annual RAP-Soil permit fees, the cost for annual inspection/monitoring of the cap (engineering control), and the preparation of the required Remedial Action Protectiveness/Biennial Certification-Soils form is also included in this task.

Cost Summary

The cost estimate for this remedial approach, as described above, is summarized on Table 1. The costs identified for the remediation of the Site presented herein represents costs that NJ Transit would likely incur for occupancy and use of the Site for barge maintenance or a proposed ferry maintenance terminal.

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December 18, 2017
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Should you have any questions regarding the findings of this ERPA, do not hesitate to contact either of the undersigned at (856) 423-8800.

Sincerely,

ROUX ASSOCIATES, INC.



William B. Gilchrist, LSRP
Principal Hydrogeologist



Matthew G. DeMaio, LSRP
Principal Scientist/Office Manager

Table 1. Remedial Cost Estimate (Gravel Cap) Union Dry Dock, Hoboken, New Jersey

COST TO CLOSURE ESTIMATE				
TASK	Quantity	Unit	Unit Cost	Total Cost
Naphthalene Soil Excavation				
<i>Removal of naphthalene soil hot spot (i.e., naphthalene over RDCSRs)</i>				
Contractor Mobilization	1	LS	█	█
Excavate and Stockpile Soil	125	CY	█	█
Backfill and Compaction	125	CY	█	█
Disposal of Non-Hazardous Soil	188	Tons	█	█
Transportation of Non-Hazardous Soil	188	Tons	█	█
Waste Characterization Sampling	1	Each	█	█
Post excavation Sampling	5	each	█	█
Subtotal				█
Septic System Removal				
<i>Removal of Existing Septic System</i>				
Vac Truck Rental and sludge disposal	4	hr.	█	█
Break Tank and Backfill Hole	1	LS	█	█
Subtotal				█
Well Abandonment				
<i>Abandon 5 Monitoring Wells</i>				
Driller Mobilization and Expenses	1	EA	█	█
2" Diameter Well (5 wells - 35-ft Deep)	175	feet	█	█
Subtotal				█
Construction of Engineered Gravel Cap				
<i>Construction of 1 ft. Gravel Cap over all upland areas of the Site.</i>				
Site Surveying	1	LS	█	█
Site Modification/Preparation for Cap	1	LS	█	█
Construction of 1-ft Clean Fill Engineered Cap	3,400	CY	█	█
Geotextile subsurface demarcation layer	91,800	SF	█	█
Subtotal				█
Preparation of Deed Notice, ISRA Costs, and other NJDEP Documentation and Fees				
<i>Preparation of Deed Notice (and Associated NJDEP Fees), ISRA Costs, Remedial Action Report, LSRP Application and Forms, Including Public Outreach and</i>				
Preparation of Deed Notice (Includes NJDEP Fee)	1	LS	█	█
Preparation of RIR/RAWP	1	LS	█	█
Preparation of Remedial Action Report	1	LS	█	█
NJDEP Annual Remediation Fee (assume for 1 year prior to issuance of Deed Notice and CEA)	1	LS	█	█
Flood Hazard Area/Waterfront Development Permit	1	LS	█	█
Preparation of Groundwater CEA (Includes NJDEP fee)	1	LS	█	█
Subtotal				█
<i>Subtotal Direct Costs</i>				█
<i>Contingency (20%)</i>				█
Total Direct Costs				█
<i>Project Management (6%)</i>				█
<i>Remedial Design (10%)</i>				█
<i>Construction Management (8%)</i>				█
Total Indirect Costs				█
Total Remediation Costs				█

Financial Assurance				
Biennial Certification and Cap Maintenance	1	LS	\$ [REDACTED]	\$ [REDACTED]
Financial Assurance Reserve	1	LS	\$ [REDACTED]	\$ [REDACTED]
Subtotal				\$ [REDACTED]

Assumptions:

Total Remediation Costs with Financial Assurance

\$ [REDACTED]

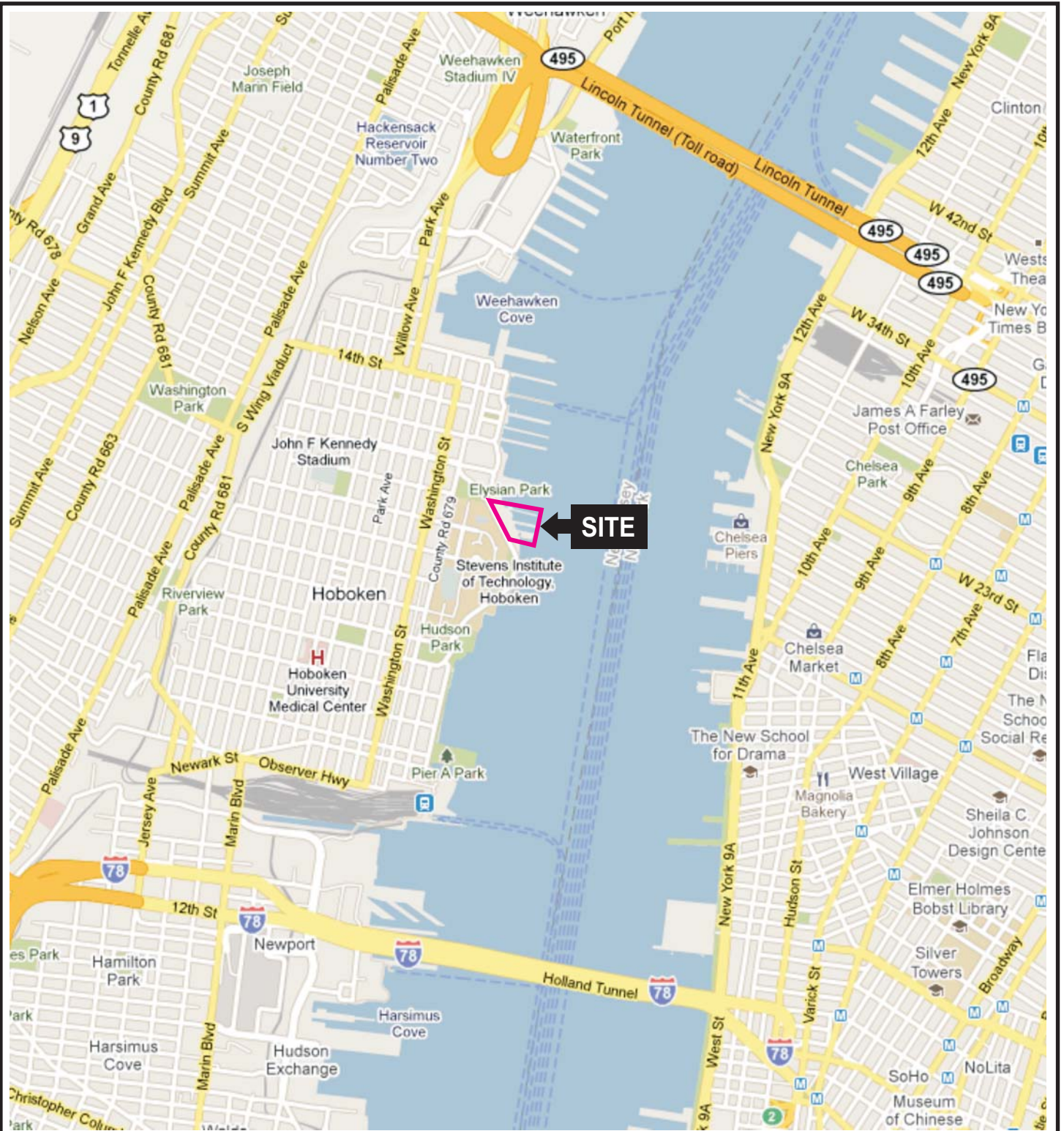
1. Naphthalene Excavation can be completed without dewatering.
2. Existing asphalt and concrete cap areas have been maintained and are suitable for use as a cap for historic fill.
3. An average interest rate of 2.3% has been used for the NPV calculation used to develop 30-year bi-annual certification costs.
4. No asbestos abatement is included in these costs.
5. No disposal of wastes currently located on the property are included in these costs (e.g., paint, ASTs, drums, etc.)
6. No demolition or removal of existing above grade buildings are included in this costs (e.g., trailers, buildings, etc.)
7. ISRA Documentation (e.g., NJDEP Forms) are included in the report preparation.
8. The proposed 1-foot gravel cap is not a presumptive remedy and therefore will require restricted site access. Roux assumes that the existing fencing will be maintained.
9. The proposed 1-foot gravel cap assumes that future site development will meet presumptive remedy requirements prior to use.
10. This assumes that future development will be built up and will not generate excess soil that would require characterization/disposal.
11. Cost do not include removal of existing transformer and any associated sampling required.

**Table 2. Net Present Value Calculation for Estimated Remedial Costs (Gravel Cap),
Union Dry Dock, Hoboken, New Jersey.**

Year	Biennial Certification of Deed Notice	Cap Maintenance
1	⌘	⌘
2	⌘	⌘
3	⌘	⌘
4	⌘	⌘
5	⌘	⌘
6	⌘	⌘
7	⌘	⌘
8	⌘	⌘
9	⌘	⌘
10	⌘	⌘
11	⌘	⌘
12	⌘	⌘
13	⌘	⌘
14	⌘	⌘
15	⌘	⌘
16	⌘	⌘
17	⌘	⌘
18	⌘	⌘
19	⌘	⌘
20	⌘	⌘
21	⌘	⌘
22	⌘	⌘
23	⌘	⌘
24	⌘	⌘
25	⌘	⌘
26	⌘	⌘
27	⌘	⌘
28	⌘	⌘
29	⌘	⌘
30	⌘	⌘
Non-NPV Subtotal	⌘	⌘
NPV for Future Costs	⌘	⌘
Total Maintenance Costs for the Cap		⌘
Total Financial Assurance Reserve Costs (Required by NJDEP)		⌘

Assumptions:

1. Replace 5% of the gravel every 5 years due to erosion
2. Annual costs are escalated 2.3% per year.
3. Present value calculated at 2.3% per year.



Title:

SITE LOCATION MAP

UNION DRY DOCK & REPAIR CO.
HOBOKEN, NEW JERSEY

Prepared for:

NEW JERSEY TRANSIT

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: C.R.	Date: 14DEC11
Prepared by: J.A.D.	Scale: AS SHOWN
Project Mgr.: R.S.K.	Project No.: 0532.0079Y000
File: 0532.0079Y108.01.CDR	

FIGURE

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