The Port Authority of New York and New Jersey

SITE MANAGEMENT PLAN

Site 1 (VCP Site 00615-2)

HHMT – Port Ivory Facility

April 2012

40 Western Avenue, Staten Island, New York

HHMT – Port Ivory Facility
Site 1

40 Western Avenue, Staten Island, New York

Site Management Plan

NYSDEC VCP Site Number: 00615-2

Prepared by:

The Port Authority of New York and New Jersey

THE PORT AUTHORITY
OF NY & NJ

Revisions to Final Approved Site Management Plan:

Revision #	Submitted Date	Summary of Revision	DEC Approval Date

April 2012

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1.0 EXECUTIVE SUMMARY

This Site Management Plan (SMP) was prepared for Voluntary Cleanup Program (VCP) Site 1 (the site), which is a portion of the Howland Hook Marine Terminal (HHMT)-Port Ivory Facility located at 40 Western Avenue, Staten Island, Richmond County, New York. Site 1 constitutes 14.95 acres of the 123.75-acre HHMT-Port Ivory Facility. The Remedial Action for Site 1 required the removal of mobile light, non-aqueous phase liquid (LNAPL), the construction of a site-wide environmental cap, and the establishment of a site-wide Deed Restriction. The Remedial Action has been implemented and the Deed Restriction is provided in Appendix B of this SMP.

This SMP is necessary to ensure that the environmental cap, an engineering control (EC) and the Deed Restriction, an Institutional Control (IC), remain protective of human health and the environment given remaining soil and groundwater impacts at the site. In addition to documenting the EC and proposing the IC, this SMP summarizes the site setting, regulatory history, and remedial actions completed at the site to date; documents the remaining impacts at the site; describes the post-remedial monitoring at the site; and, requires certain actions to be taken in the event that the EC is temporarily breached.

The site is situated in a portion of Staten Island that is currently, and historically has been, used for industrial and commercial purposes. Proctor and Gamble (P&G), the former site owner, reclaimed the site from marshland and used the site for the production of edible oils, baking mixes, orange juice and other foodstuff, soap and cleaning products, the storage of petroleum and non-petroleum oils, and the burning of wood chips for fuel. As a result of this land use, soil and groundwater were impacted by metals and organic compounds.

The EC consists of at least one foot of crushed stone, concrete, or asphalt. The IC will restrict disturbance of the EC and will limit the use of groundwater at the site. To ensure that the EC and IC remain protective of human health and the environment, periodic groundwater and surface water monitoring and periodic inspections of the EC will be conducted. The periodic monitoring and inspections will continue until the NYSDEC notifies The Port Authority in writing that it is no longer needed. Additionally, the SMP requires that The Port Authority take certain actions if the EC is disturbed during site improvement activities. Except for emergency repairs, the NYSDEC shall be notified prior to all intrusive work. All wastes will be managed and disposed of in accordance with the Excavation Work Plan (EWP), incorporated in this SMP. All parties conducting intrusive work shall implement a health and safety plan to limit exposure of on-site personnel and persons passing by the site. Upon completion of the work, including emergency repairs, the cap shall be restored and the NYSDEC shall be notified.

2.0 INTRODUCTION

This document is required as an element of the remedial program at Site 1 of the Howland Hook Marine Terminal-Port Ivory Facility (HHMT-Port Ivory Facility or Facility) under the New York State (NYS) Voluntary Cleanup Program (VCP) administered by the New York State Department of Environmental Conservation (NYSDEC). Site 1 (the site) was remediated in accordance with the Voluntary Cleanup Plan (VCP) under Voluntary Cleanup Agreement (VCA) number W2-0957-02-07 for Site Number V-00615-2. The VCA was executed on June 18, 2004 and has not been amended.

2.1 General

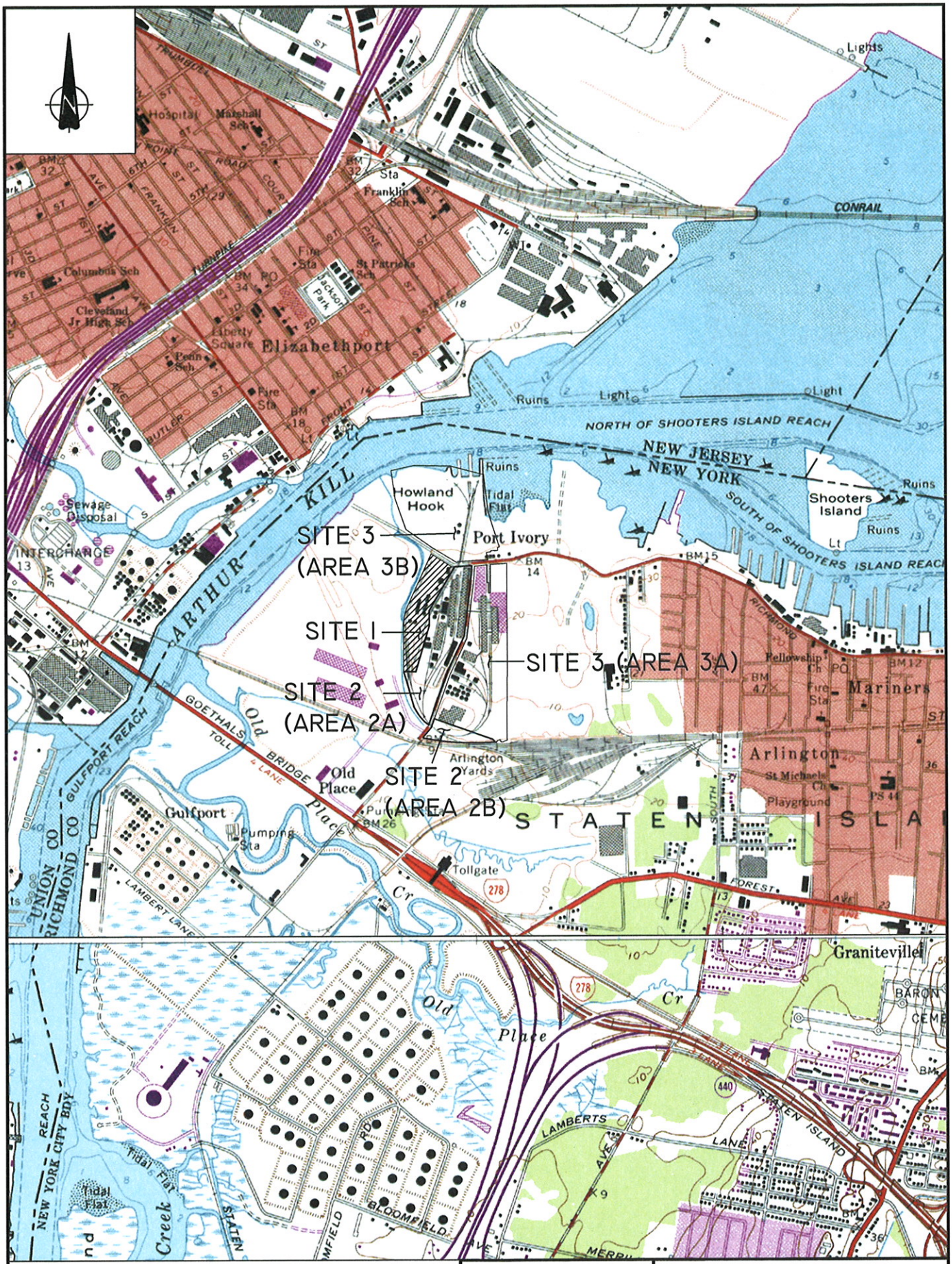
The Port Authority of New York and New Jersey (The Port Authority) entered into a VCA with the NYSDEC to remediate a 14.95-acre portion of the HHMT-Port Ivory Facility. The VCA required The Port Authority to investigate and remediate contaminated media at Site 1 (the site). Figure 1 shows the site location and Figure 2 shows the site boundaries, including the Site 1 Metes and Bounds description.

After completion of four interim remedial measures (IRMs) described in Sections 3.1.1 through 3.1.4 and the work described in the Remedial Action Work Plan (RAWP), as described in Section 3.1.5, some impacted soil and groundwater was left in the subsurface at the site. This SMP was prepared to manage remaining impacts at the site while the Deed Restriction remains in place. All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

This SMP was prepared by The Port Authority and in accordance with the requirements in NYSDEC DER-10 (Technical Guidance for Site Investigation and Remediation) dated December 2002 and the guidelines provided by the NYSDEC and the New York State Department of Health (NYSDOH). This SMP summarizes IRMs conducted to date, the remedial actions conducted as per the RAWP, and the remaining impacts at the site and addresses the means for implementing the IC and EC that are required for the site.

2.2 Purpose

The site contains impacted soil and groundwater left after completion of the IRMs and remedial action. ECs have been incorporated into the site remedy to control exposure to these impacts during the use of the site and to ensure protection of public health and the environment. A Deed Restriction is the established



SOURCE:
UNITED STATES GEOLOGICAL SURVEY
7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLES
ELIZABETH AND ARTHUR KILL, NY-NJ,
1967, PHOTOREVISED 1981

NOTES:
HHMT – PORT IVORY FACILITY
CONSISTS OF SITES 1 THROUGH 3.

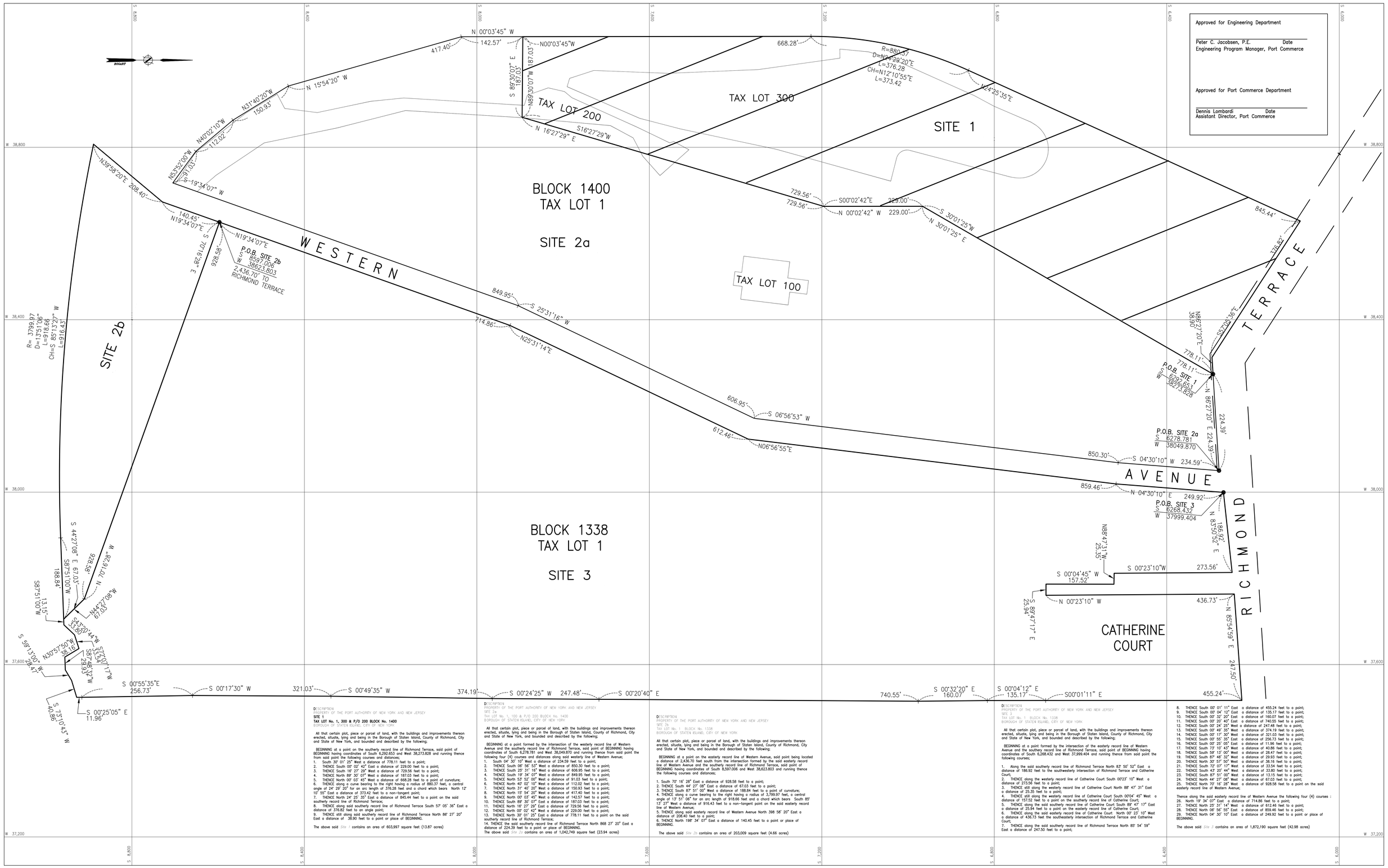
2000 0 2000 4000
SCALE IN FEET
1" = 2000'
CONTOUR INTERVAL = 10 FEET

THE PORT AUTHORITY
OF NY & NJ

HHMT - PORT IVORY FACILITY

SITE LOCATION MAP
FIGURE 1

Date FEB. 2012



DESCRIPTION
PROPERTY OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
SITE 1
TAX LOT No. 1, 300 & P/O 200 BLOCK No. 1400
BOROUGH OF STATEN ISLAND, CITY OF NEW YORK

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Staten Island, County of Richmond, City and State of New York, and bounded and described by the following;

BEGINNING at a point on the southerly record line of Richmond Terrace, said point of BEGINNING having coordinates of South 6,292.653 and West 38,273.828 and running thence from said point the following courses and distances;

1. South 30° 01' 25" West a distance of 778.11 feet to a point;
2. THENCE South 00° 02' 42" East a distance of 229.00 feet to a point;
3. THENCE South 16° 27' 29" West a distance of 729.56 feet to a point;
4. THENCE North 89° 30' 07" West a distance of 187.03 feet to a point;
5. THENCE North 00° 03' 45" West a distance of 668.28 feet to a point of curvature;
6. THENCE along a curve bearing to the right having a radius of 880.37 feet, a central angle of 24° 29' 20" for an arc length of 376.28 feet and a chord which bears North 12° 10' 55" East a distance of 373.42 feet to a non-tangent point;
7. THENCE North 24° 25' 35" East a distance of 845.44 feet to a point on the said southerly record line of Richmond Terrace;
8. THENCE along said southerly record line of Richmond Terrace South 57° 05' 36" East a distance of 376.82 feet to an angle point;
9. THENCE still along said southerly record line of Richmond Terrace North 86° 27' 20" East a distance of 38.90 feet to a point or place of BEGINNING.

The above said *Site 1* contains an area of 603,997 square feet (13.87 acres)

DESCRIPTION
PROPERTY OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
SITE 2a
TAX LOT No. 1, 100 & P/O 200 BLOCK No. 1400
BOROUGH OF STATEN ISLAND, CITY OF NEW YORK

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Staten Island, County of Richmond, City and State of New York, and bounded and described by the following;

BEGINNING at a point formed by the intersection of the westerly record line of Western Avenue and the southerly record line of Richmond Terrace, said point of BEGINNING having coordinates of South 6,278.781 and West 38,049.870 and running thence from said point the following four (4) courses and distances along said westerly line of Western Avenue;

1. South 04° 30' 10" West a distance of 234.59 feet to a point;
2. THENCE South 06° 56' 53" West a distance of 850.30 feet to a point;
3. THENCE South 25° 31' 16" West a distance of 606.95 feet to a point;
4. THENCE South 19° 34' 07" West a distance of 849.95 feet to a point;
5. THENCE North 53° 52' 00" West a distance of 91.03 feet to a point;
6. THENCE North 40° 02' 10" West a distance of 112.02 feet to a point;
7. THENCE North 31° 40' 20" West a distance of 150.93 feet to a point;
8. THENCE North 15° 54' 20" West a distance of 417.40 feet to a point;
9. THENCE North 00° 03' 45" West a distance of 142.57 feet to a point;
10. THENCE South 89° 30' 07" East a distance of 187.03 feet to a point;
11. THENCE North 16° 27' 29" East a distance of 729.56 feet to a point;
12. THENCE North 00° 02' 42" West a distance of 229.00 feet to a point;
13. THENCE North 30° 01' 25" East a distance of 778.11 feet to a point on the said southerly record line of Richmond Terrace;
14. THENCE the said southerly record line of Richmond Terrace North 868 27' 20" East a distance of 224.39 feet to a point or place of BEGINNING.

The above said *Site 2a* contains an area of 1,042,749 square feet (23.94 acres)

DESCRIPTION
PROPERTY OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
SITE 2b
TAX LOT No. 1 BLOCK No. 1338
BOROUGH OF STATEN ISLAND, CITY OF NEW YORK

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Staten Island, County of Richmond, City and State of New York, and bounded and described by the following;

BEGINNING at a point on the easterly record line of Western Avenue, said point being located a distance of 2,436.70 feet south from the intersection formed by the said easterly record line of Western Avenue and the southerly record line of Richmond Terrace, said point of BEGINNING having coordinates of South 8,597.006 and West 38,623.803 and running thence the following courses and distances;

1. South 70° 16' 28" East a distance of 928.58 feet to a point;
2. THENCE South 44° 27' 08" East a distance of 67.03 feet to a point;
3. THENCE South 87° 51' 00" West a distance of 188.84 feet to a point of curvature;
4. THENCE along a curve bearing to the right having a radius of 3,799.97 feet, a central angle of 13° 51' 06" for an arc length of 918.66 feet and a chord which bears South 85° 13' 27" West a distance of 916.43 feet to a non-tangent point on the said easterly record line of Western Avenue;
5. THENCE along said easterly record line of Western Avenue North 398 58' 20" East a distance of 208.40 feet to a point;
6. THENCE North 198° 34' 07" East a distance of 140.45 feet to a point or place of BEGINNING.

The above said *Site 2b* contains an area of 203,009 square feet (4.66 acres)

DESCRIPTION
PROPERTY OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
SITE 3
TAX LOT No. 1 BLOCK No. 1338
BOROUGH OF STATEN ISLAND, CITY OF NEW YORK

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Staten Island, County of Richmond, City and State of New York, and bounded and described by the following;

BEGINNING at a point on the easterly record line of Western Avenue and the southerly record line of Richmond Terrace, said point of BEGINNING having coordinates of South 6,268.432 and West 37,999.404 and running thence from said point the following courses;

1. Along the said southerly record line of Richmond Terrace North 83° 50' 52" East a distance of 186.92 feet to the southwesterly intersection of Richmond Terrace and Catherine Court;
2. THENCE along the westerly record line of Catherine Court South 00°23' 10" West a distance of 273.56 feet to a point;
3. THENCE still along the westerly record line of Catherine Court North 88° 47' 31" East a distance of 25.35 feet to a point;
4. THENCE still along the westerly record line of Catherine Court South 00°04' 45" West a distance of 157.52 feet to a point on the southerly record line of Catherine Court;
5. THENCE along the said southerly record line of Catherine Court South 89° 47' 17" East a distance of 25.94 feet to a point on the easterly record line of Catherine Court;
6. THENCE along the said easterly record line of Catherine Court North 00° 23' 10" West a distance of 436.73 feet the southeasterly intersection of Richmond Terrace and Catherine Court;
7. THENCE along the said southerly record line of Richmond Terrace North 85° 54' 59" East a distance of 247.50 feet to a point;
8. THENCE South 00° 01' 11" East a distance of 455.24 feet to a point;
9. THENCE South 00° 04' 12" East a distance of 135.17 feet to a point;
10. THENCE South 00° 32' 20" East a distance of 160.07 feet to a point;
11. THENCE South 00° 20' 40" East a distance of 740.55 feet to a point;
12. THENCE South 00° 24' 25" West a distance of 247.48 feet to a point;
13. THENCE South 00° 49' 35" West a distance of 374.19 feet to a point;
14. THENCE South 00° 17' 30" West a distance of 321.03 feet to a point;
15. THENCE South 00° 55' 35" East a distance of 256.73 feet to a point;
16. THENCE South 00° 25' 05" East a distance of 11.96 feet to a point;
17. THENCE South 73° 10' 43" West a distance of 40.86 feet to a point;
18. THENCE South 59° 13' 00" West a distance of 28.47 feet to a point;
19. THENCE South 87° 48' 32" West a distance of 29.93 feet to a point;
20. THENCE North 30° 57' 50" West a distance of 38.16 feet to a point;
21. THENCE South 73° 07' 17" West a distance of 33.54 feet to a point;
22. THENCE South 43° 20' 44" West a distance of 33.80 feet to a point;
23. THENCE South 87° 51' 00" West a distance of 13.15 feet to a point;
24. THENCE North 44° 27' 08" West a distance of 67.03 feet to a point;
25. THENCE North 70° 16' 28" West a distance of 928.58 feet to a point on the said easterly record line of Western Avenue;

Thence along the said easterly record line of Western Avenue the following four (4) courses :

26. North 19° 34' 07" East a distance of 714.86 feet to a point;
27. THENCE North 25° 31' 14" West a distance of 612.46 feet to a point;
28. THENCE North 06° 56' 55" East a distance of 859.46 feet to a point;
29. THENCE North 04° 30' 10" East a distance of 249.92 feet to a point or place of BEGINNING.

The above said *Site 3* contains an area of 1,872,190 square feet (42.98 acres)

THE PORT AUTHORITY OF NY & NJ

Port Ivory Facilities
Staten Island, New York

IMPORTANT NOTE :
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I hereby certify to The Port Authority of New York and New Jersey and The New York State Department of Environmental Conservation that this map indicates the conditions existing as of the date indicated hereon to the best of my professional knowledge.

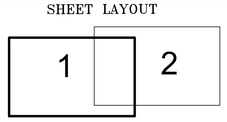
William Spiezia, L.S. New York State Lic. # 050106

Title

Figure 2

Boundary Survey of Blocks 1309, 1338 and 1400 Situate in Borough of Staten Island County of Richmond, City and State of New York Showing Sites 1, 2, 3 & 4 to be Addressed Under NYSDEC's Voluntary Cleanup Program

SHEET LAYOUT



GRAPHIC SCALE

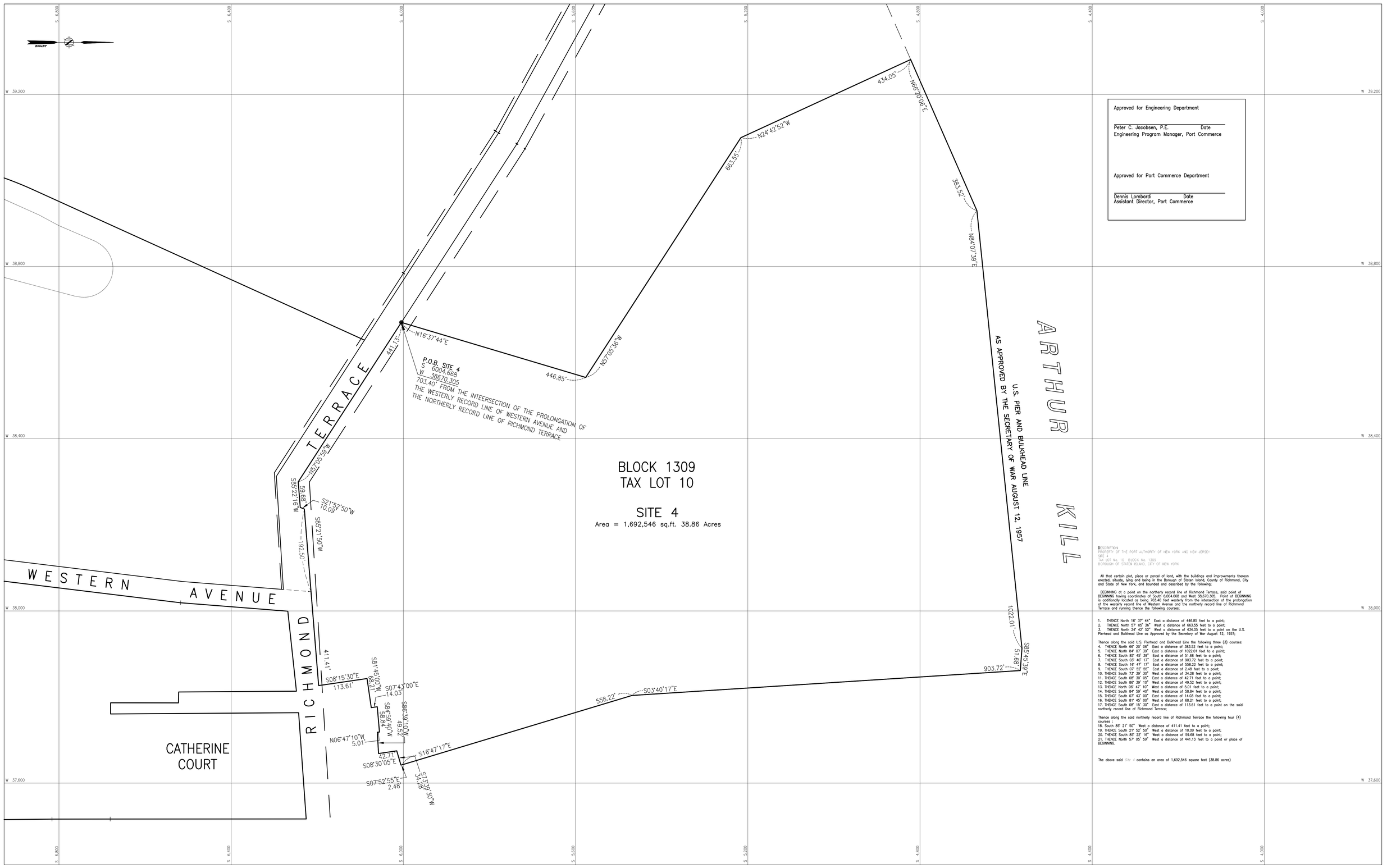
150 0 75 150 300 600
(IN FEET)

COORDINATES ARE BASED ON A RECTANGULAR SYSTEM, THE NORTHERLY AXIS OF WHICH IS COINCIDENT WITH THE TRUE MERIDIAN THROUGH THE NATIONAL OCEAN SURVEY STATION "BOGART" ON TODT HILL, STATEN ISLAND AND ITS ORIGIN SO CHOSEN AS TO MAKE "BOGART" SOUTH 20,350' WEST 20,250'.

SITE BOUNDARIES WERE DELINEATED ON THE BASIS OF GEOTECHNICAL DATA AND THE DEVELOPMENT SCHEDULE OF THE INTERMODAL FACILITY AS DETERMINED BY THE PORT AUTHORITY ENGINEERING DEPARTMENT AND PORT COMMERCE DEPARTMENT.

ROGERS SURVEYING, PLLC
1632 Richmond Terrace, Staten Island, NY 10310
(718) 447 7311 Fax (718) 273 3560

Date 12/7/00 (REVISED 9/20/03 SITES) Scale 1" = 150'
REVISED 12/22/00 LOTS 100, 200, 300 ADDED
REVISED 9/20/03 METES & BOUNDS FOR CLEANUP SITES
Contract Number Drawing Number



BLOCK 1309
TAX LOT 10

SITE 4
Area = 1,692,546 sq.ft. 38.86 Acres

Approved for Engineering Department

Peter C. Jacobsen, P.E. Date
Engineering Program Manager, Port Commerce

Approved for Port Commerce Department

Dennis Lombardi Date
Assistant Director, Port Commerce

DESCRIPTION
PROPERTY OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
SITE 4
TAX LOT No. 10 BLOCK No. 1309
BOROUGH OF STATEN ISLAND, CITY OF NEW YORK

All that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Staten Island, County of Richmond, City and State of New York, and bounded and described by the following:

BEGINNING at a point on the northerly record line of Richmond Terrace, said point of BEGINNING having coordinates of South 6,004.668 and West 38,670.305. Point of BEGINNING is additionally located as being 703.40 feet westerly from the intersection of the prolongation of the westerly record line of Western Avenue and the northerly record line of Richmond Terrace and running thence the following courses;

1. THENCE North 16° 37' 44" East a distance of 446.85 feet to a point;
2. THENCE North 57° 05' 36" West a distance of 663.55 feet to a point;
3. THENCE North 24° 42' 52" West a distance of 434.05 feet to a point on the U.S. Pierhead and Bulkhead Line as Approved by the Secretary of War August 12, 1957;

Thence along the said U.S. Pierhead and Bulkhead Line the following three (3) courses:
4. THENCE North 66° 20' 08" East a distance of 383.52 feet to a point;
5. THENCE North 84° 07' 39" East a distance of 1022.01 feet to a point;
6. THENCE South 85° 45' 39" East a distance of 51.68 feet to a point;
7. THENCE South 03° 40' 17" East a distance of 903.72 feet to a point;
8. THENCE South 16° 47' 17" East a distance of 558.22 feet to a point;
9. THENCE South 07° 52' 55" East a distance of 2.48 feet to a point;
10. THENCE South 73° 59' 30" West a distance of 34.28 feet to a point;
11. THENCE South 08° 30' 05" East a distance of 42.71 feet to a point;
12. THENCE South 86° 39' 10" West a distance of 49.52 feet to a point;
13. THENCE North 06° 47' 10" West a distance of 5.01 feet to a point;
14. THENCE South 84° 59' 40" West a distance of 58.84 feet to a point;
15. THENCE South 07° 43' 00" East a distance of 14.03 feet to a point;
16. THENCE South 81° 45' 00" West a distance of 68.21 feet to a point;
17. THENCE South 08° 15' 30" East a distance of 113.61 feet to a point on the said northerly record line of Richmond Terrace;

Thence along the said northerly record line of Richmond Terrace the following four (4) courses :
18. South 85° 21' 50" West a distance of 411.41 feet to a point;
19. THENCE South 21° 52' 50" West a distance of 10.09 feet to a point;
20. THENCE South 85° 22' 16" West a distance of 59.68 feet to a point;
21. THENCE North 57° 05' 59" West a distance of 441.13 feet to a point or place of BEGINNING.

The above said Site 4 contains an area of 1,692,546 square feet (38.86 acres)

THE PORT AUTHORITY OF NY & NJ

Port Ivory Facilities
Staten Island, New York

IMPORTANT NOTE :
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William Spiezia, L.S. New York State Lic. # 050106

Title

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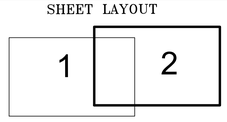
SHEET LAYOUT



GRAPHIC SCALE

150 0 75 150 300 600
(IN FEET)

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Date 12/7/00 (REVISED 9/20/03 SITES) Scale 1" = 150'
REVISED 12/22/00 LOTS 100, 200, 300 ADDED
REVISED 9/20/03 METES & BOUNDS FOR CLEANUP SITES
Contract Number Drawing Number

IC. The IC and this SMP place restrictions on site use and mandate operation, maintenance, monitoring, and reporting measures for the EC. The EC for the site includes at least one foot of crushed stone (approximately 63.7% of the site), concrete (1.9% of the site), and asphalt (34.4% of the site). This SMP has been approved by the NYSDEC, and compliance with this SMP is required until the NYSDEC confirms in writing that complying with the SMP is no longer necessary. Additionally, this SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage soil and groundwater impacts remaining at the site after completion of the IRMs and remedial actions. Such procedures include the following: 1) implementation and management of all EC and IC; 2) monitoring of environmental media; 3) operation and maintenance of all recovery systems; 4) performance of periodic inspections, certification of inspection results, and submittal of a Periodic Review Report (PRR); 5) defining criteria for termination of recovery system operations; and 6) completion of investigations and/or remedial actions if mobile LNAPL is encountered during future repairs or upgrades at the Site. The periodic monitoring and inspections will continue until the NYSDEC notifies The Port Authority in writing that it's no longer needed.

These procedures are detailed in the three plans included as part of the overall SMP: an EC/IC Plan (Section 5); a Monitoring Plan (Section 6); and, an Operation and Maintenance Plan (Section 7) for recovery systems. The SMP also includes a description of the PRR for the periodic submittal of data, information, recommendations, and certifications to the NYSDEC. It is important to note that failure to properly implement this SMP could result in NYSDEC not providing a release letter. This is a violation of the VCA (Agreement number W2-0957-02-07 and Site number V-00615-2) for the site, and thereby The Port Authority may be subject to applicable penalties.

2.3 Revisions

Revisions to this SMP will be proposed in writing to the NYSDEC's project manager for the site, currently Ms. Sally Dewes of NYSDEC, Division of Environmental Remediation and the NYSDOH's project manager, Ms. Stephanie Selmer. The NYSDEC will approve any changes to the SMP in writing.

2.4 Site Location and Background

The site is a portion of the HHMT-Port Ivory Facility, which is located at 40 Western Avenue, Staten Island, Richmond County, New York. The HHMT-Port Ivory Facility consists of three parcels; Block

1309, Lot 10; Block 1338, Lot 1; and Block 1400, Lot 1, which were purchased from Proctor and Gamble (P&G) in 2000. Public roadways separate the three parcels: Western Avenue separates Block 1400, Lot 1 from Block 1338, Lot 1 and Richmond Terrace separates Block 1309, Lot 10 from Block 1338, Lot 1 and Block 1400, Lot 1. As shown on Figure 1, the HHMT-Port Ivory Facility is bordered by Bridge Creek to the west, the Arthur Kill to the north, wetlands and undeveloped land to the east, and railroad tracks to the south.

The Port Authority is in the process of redeveloping the HHMT-Port Ivory Facility for a commercial end use; specifically, The Port Authority intends to utilize the Facility as an intermodal facility. With regard to the HHMT-Port Ivory Facility, an intermodal facility is defined as a facility where cargo transported by ship is transferred to intermediate and final destinations via rail or truck.

As part of the HHMT-Port Ivory Facility redevelopment, The Port Authority entered into the NYSDEC Voluntary Cleanup Program (VCP) in June 2004. The Port Authority's objective for entering into the VCP was to investigate and remediate (if necessary) metals and organic compounds in soil, surface water, sediment, and/or groundwater with NYSDEC oversight. The presence of these substances is attributable to prior Facility operations by P&G that were/are unrelated to The Port Authority. The Port Authority has established different redevelopment schedules for different areas at the HHMT-Port Ivory Facility, and the NYSDEC agreed to expedite the review of information pertaining to these areas. Thus, The Port Authority agreed to establish three VCP Sites at the Facility and to present assessment, investigation, and remedial action information/documentation for each site. The sites have been defined as follows: Site 1 consists of the northwestern portion of Block 1400, Lot 1; Site 2 consists of the eastern and southern portions of Block 1400, Lot 1 (Area 2A) and the southern portion of Block 1338, Lot 1 (Area 2B); Site 3 consists of the central and northern portions of Block 1338, Lot 1 (Area 3A); and Block 1309, Lot 10 (Area 3B). The VCP agreement for Site 3 (Area 3A) formerly known as Site 3 (VCP agreement for Site V-00675-2, VCP Index Number W2-0987-02-04) was revised to incorporate Site3 (Area 3B), formerly known as Site 4 on January 4, 2007. Figure 1 depicts the locations of the three sites. Figure 2 shows the boundaries, including the Metes and Bounds description for the site.

2.4.1 Site Description

The site constitutes 14.95 acres of the 123.75-acre HHMT-Port Ivory Facility. The site is bordered by VCP Site 2 (Area 2A) to the east and south, Richmond Terrace to the north, and Bridge Creek to the west. Vehicular access to the northern portion of the site is provided from Richmond Terrace, while access to the southern portion of the site is provided by two paved access roads originating at Western Avenue. A

paved roadway oriented east-west is located on the central portion of the site and provides access to the New York Container Terminal (NYCT) property, which is situated across Bridge Creek from (i.e., to the west of) the site. Paved areas are also present on the eastern portion of the site that borders Site 2 (Area 2A). No structures are currently located at the site. The site generally consists of flat and unvegetated land. However, a soil stockpile is located at the northern portion of the site. This soil pile was used for surcharging purposes and will be regraded or transported off site during redevelopment of the site. With the exception of the area where the surcharge soil is stockpiled, Site 1 is currently used for the storage of containers by NYCT. Figure 2 shows the Site 1 boundary, including Metes and Bounds.

2.4.2 Site Specific Hydrogeology and Groundwater Conditions

Overburden materials at the site, as well as at the remainder of the HHMT-Port Ivory Facility, include a complex of stratified drift, glacial till, tidal marsh deposits, and anthropogenic fill. Based on the results of the investigations, the following strata have been encountered (strata are listed from the land surface downwards): (1) fill consisting of sand, silt, clay, and gravel in a generally loose condition mixed with carbonaceous material and/or vegetative, wood, brick, concrete, and glass debris that is present throughout Site 1 with a maximum thickness of about 19.5 feet; (2) meadowmat substratum consisting of organic clays and peat comprised of tidal marsh deposits, to a maximum thickness of approximately 27 feet; (3) sand deposits consisting of loose to medium dense sand from marine or glacio-fluvial deposits ranging in thickness from 5 to 16 feet; (4) glacial clay and silt deposits with lenses of sand and gravel ranging in thickness from less than 10 to approximately 60 feet; and, (5) weathered shale. The Comprehensive Remedial Investigation Report (CRIR) dated July 2007 confirmed that unconsolidated materials at Site 1 are consistent with documented regional conditions.

Based on the CRIR, the general hydrogeologic regime in overburden saturated zones consists of two components: an upper water bearing zone (WBZ), comprised of unconsolidated materials (indigenous granular soils, operational by-product fill, and/or non-indigenous fill materials) and a deeper WBZ comprised of native glacio-fluvial sediments (i.e., gravel, sand, silt and clay). A discontinuous meadowmat (i.e., peat) layer, the top of which occurs at approximately 10 to 23 feet below the ground surface (bgs) separates these WBZs. This meadowmat layer was encountered in the majority of the soil borings installed at Site 1.

The shallow WBZ exhibits a hydraulic gradient of variable orientation and magnitude, reflecting the heterogeneous nature of the fill materials. The shallow groundwater elevation contour map (Figure 3) indicates that the horizontal component of the hydraulic gradient varies in magnitude from 0.0011 to

Legend

- VCP Site Boundary
- Existing Building
- Former Structure
- 8.5 — Groundwater Elevation Contour
- Groundwater Flow Direction
- 10.32 — Shallow Groundwater Elevation
- PG-RS-2 — Shallow Monitoring Well Gauged during the Site Investigation

Notes:

(1) Building No. 40 has been demolished. Trailers mounted on piers have been constructed in the footprint of former Building 40.
(2) VCP – Voluntary Cleanup Program
(3) Elevation in feet above mean sea level (Bogart System).
(4) Contour interval = 0.5 feet
(5) Shallow wells do not have a "D" suffix and are screened above the meadowmat unit.
(6) The contour lines shown are based on groundwater elevation data from wells at VCP Site 1 and other VCP Sites at the Howland Hook Marine Terminal (HHMT) – Port Ivory Facility. The interpretal groundwater flow direction is shown only for VCP Site 1.
(7) Groundwater elevation data are from November 2000.

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ENGINEERING PROGRAM MANAGER

No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HHMT-PORT IVORY FACILITY SITE 1

Title

Shallow Groundwater Elevation Contour Map

Designed by	RGM
Drawn by	GCK
Checked by	
Date	MARCH 2010
Contract Number	
Drawing Number	FIGURE 3

0.0406 ft/ft. The direction of the horizontal component of the hydraulic gradient is to the north, west, and southwest, with a groundwater flow divide oriented from northwest to southeast. The groundwater flow direction in the upper aquifer across Site 1 is generally from the east to the west flowing towards Bridge Creek, though in the northern portion of the site, groundwater also flows towards the Arthur Kill and marshes along the Arthur Kill. Groundwater elevations range from 2.74 feet above mean sea level (AMSL) at the northwestern portion of the site to 12 feet AMSL at the northeastern portion of the site.

As shown on Figure 4, the horizontal component of the hydraulic gradient in the deeper WBZ is more uniform, extending from the southern and eastern portions of the site to the west (i.e., towards Bridge Creek) and north (i.e., towards the Arthur Kill). An average hydraulic gradient of 0.0021 ft/ft across was calculated across the site. The vertical component of the hydraulic gradient is downwards at both pairs (PG-PA-MW-1 & 1D and PG-PA-MW-6 & 6D) of wells at the site. The magnitude of the vertical hydraulic gradient was approximately 0.17 ft/ft at wells PG-PA-MW-1 & 1D and 0.0113 ft/ft at wells PG-PA-MW-6 & 6D. The difference in the magnitude of the vertical hydraulic gradient is likely due to the fact that wells PG-PA-MW-6 & 6D are closer to Bridge Creek, where groundwater flow will be horizontal or upwards towards Bridge Creek. The relatively high vertical hydraulic gradient at wells PG-PA-MW-1 & 1D confirms that the meadowmat layer is acting as an aquitard by limiting vertical groundwater movement from the shallow WBZ to the deeper WBZ.

Legend

- VCP Site Boundary
- Existing Building
- Former Structure
- 4.2 — Groundwater Elevation Contour
- Groundwater Flow Direction
- 4.85 — Groundwater Elevation
- PG-PA-MW-7D — Deep Monitoring Well Gauged during the Site Investigation

Notes:

(1) Building No. 40 has been demolished. Trailers mounted on piers have been constructed in the footprint of former Building 40.
(2) VCP – Voluntary Cleanup Program
(3) Elevation in feet above mean sea level (Bogart System).
(4) Contour interval = 0.2 feet
(5) Deep wells have a "D" suffix and are screened below the meadowmat unit.
(6) The contour lines shown are based on groundwater elevation data from wells at VCP Site 1 and other VCP Sites at the Howland Hook Marine Terminal (HHMT) – Port Ivory Facility. The interpretal groundwater flow direction is shown only for VCP Site 1.
(7) Groundwater elevation data are from November 2000.

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HHMT-PORT IVORY FACILITY SITE 1

Title

Deep Groundwater Elevation Contour Map

Designed by	Drawn by	Checked by
	RGM	GCK

Date MARCH 2010

Contract Number

Drawing Number FIGURE 4

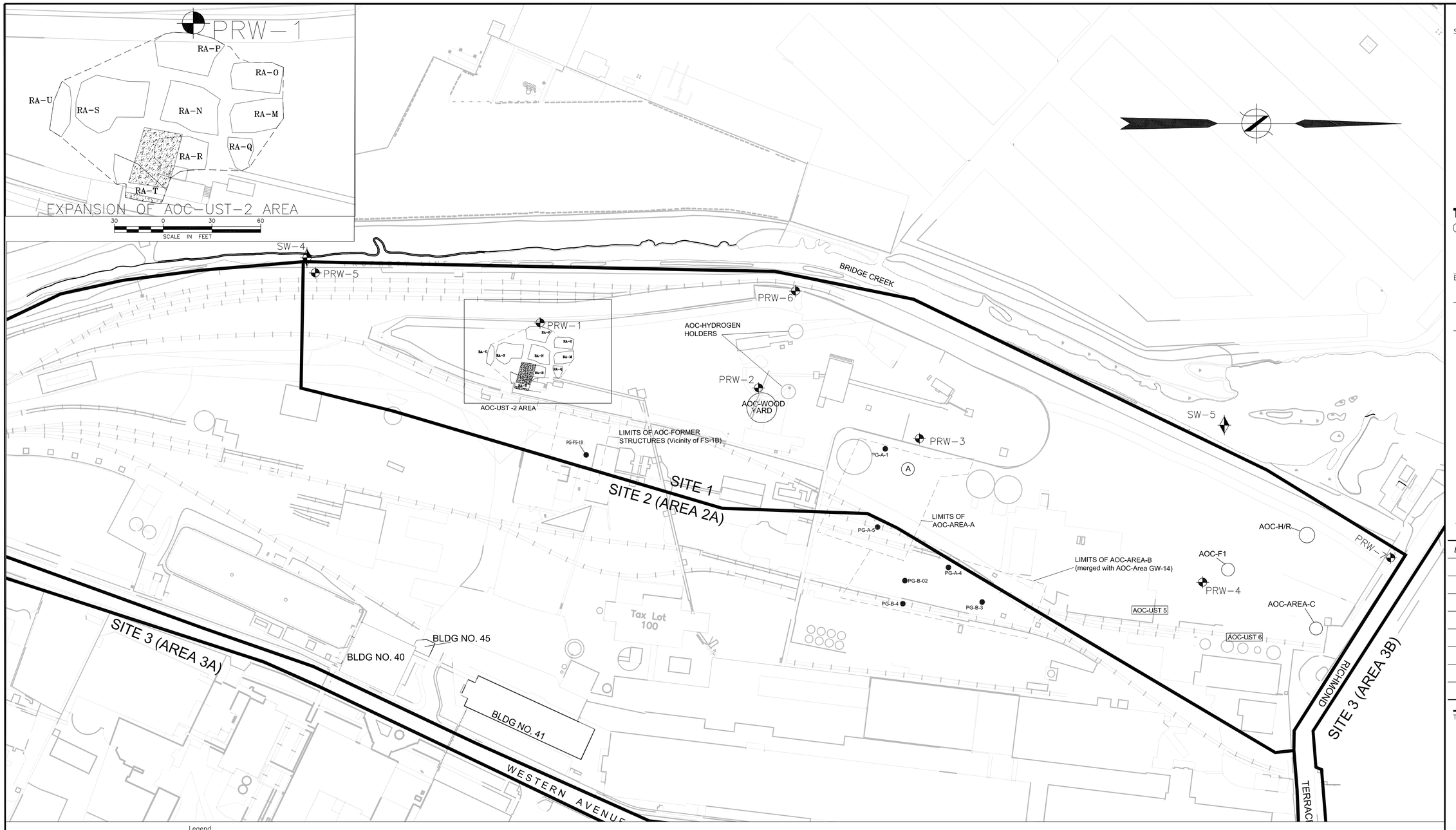
3.0 SITE HISTORY AND SUMMARY OF ENVIRONMENTAL INVESTIGATIONS

The Port Authority purchased the HHMT-Port Ivory Facility from Proctor and Gamble (P&G) in 2000. P&G used the Facility for the manufacture, warehousing, and distribution of edible oils, baking mixes, orange juice, and other foodstuffs; manufacture, warehousing, and distribution of soaps and cleaning products; and, burning of wood chips for fuel. In addition, numerous easements were established by various energy companies for underground pipelines that conveyed petroleum products. Operations at the HHMT-Port Ivory Facility began in or about 1908 and continued through approximately 1990.

The site was developed in 1906-1907 based on information provided by P&G, and was used primarily for the manufacture and transport of soaps and cleaning products. Wood chips were stockpiled in the southern portion of the site (see AOC-Wood Yard) on Figure 5, prior to being burned for fuel. Eight buildings were situated at the site. These buildings were used for wood processing, storage, as offices, as a machine shop, and for soap manufacturing. Numerous railroad spurs extended approximately north-south through portions of the site. The following materials were stored in ASTs located at Site 1: caustics, various vegetable and fish oils, fuel oil, waste oil, soap, spent acids, spent nickel catalyst, grease, coke, hydrogen, and rosin. USTs were located in at least three areas at Site 1. The tank contents included petroleum and non-petroleum oils, alcohols, and toluene. Additional details regarding former land use and operational history at the site are provided in the Comprehensive Remedial Investigation Report, (CRIR).

After cessation of P&G operations at the site, The Port Authority purchased the property and removed most of the remaining infrastructure at Site 1, including the majority of the stockpiled wood chips. Please note, a thin layer of wood chips remained at and immediately below land surface, where the wood chips had pushed into the underlying soil. The Port Authority retained Hatch Mott McDonald (HMM) to conduct the necessary environmental investigations. HMM's environmental evaluation efforts at the site included the performance of a Phase I Environmental Site Assessment (Phase I ESA) with a supplemental file review, an SI, a Remedial Investigation (RI), a Supplemental Remedial Investigation (SRI) and a Focused Supplemental Remedial Investigation (FSRI). The results of these investigations are summarized in the CRIR dated July 2007.

The Phase I ESA was conducted prior to The Port Authority's purchase of the Facility in December 2000, while the SI, RI and SRI were conducted subsequent to the transfer of the property from P&G to The Port Authority. The RI and SRI were conducted to characterize the nature and extent of impacts in environmental media at and immediately adjacent to the site. Based on the results of the RI and SRI, The



Legend

- VCP Site Boundary
- Existing Building
- Former Structure
- Extend of Remedial Action
- Concrete
- SW-1 Proposed Surface Water Monitoring Location
- PRW-5 Proposed Groundwater Monitoring Well Location
- FS-1B Soil Sampling Location

Notes:
(1) Building No. 40 has been demolished. Trailers mounted on piers have been constructed in the footprint of former Building 40.
(2) VCP – Voluntary Cleanup Program

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No.	Date	Revision	Approved

ENGINEERING DEPARTMENT

HHMT-PORT IVORY FACILITY SITE 1

Title

Areas of Concern Map

Designed by	Drawn by	Checked by
	RGM	GCK

Date March 2010

Contract Number

Drawing Number FIGURE 5

Port Authority identified 18 AOCs at Site 1. The locations of the 18 AOCs are shown on Figure 5. Table 1 describes previous structures and land uses at each AOC, summarizes the scope and results of the environmental investigations at each AOC, and provides the rationale for closing each AOC.

3.1 Interim Remedial Measures (IRMs) and Remedial Actions Completed

The Port Authority completed IRMs at four AOCs and a remedial action (removal of mobile LNAPL) at one AOC (AOC-UST2), as proposed in the RAWP. The IRMs and remedial action consisted of soil excavation, and/or off-site disposal of LNAPL and/or soil. The IRMs were completed to address petroleum impacts at AOC-Area A, AOC-Area B, and AOC-Former Structures (FS-1B), and non-petroleum impacts at AOC-Wood Yard. IRM results are detailed in the CRIR and are summarized below in Sections 3.1.1 through 3.1.4. Results of the remedial action conducted at AOC-UST2 have not been documented in previous reports. As a result, Section 3.1.5 is more detailed than Sections 3.1.1 through 3.1.4.

The limits of the excavations are shown on Figure 5. All excavations were backfilled using onsite materials. Soil that did not appear to be stained, or exhibit elevated volatile organic vapors as measured using a photoionization detector, was reused as backfill. All soil containing LNAPL was transported offsite for disposal.

In addition to soil excavation, The Port Authority has constructed an EC and has established an IC throughout Site 1. The EC and IC are discussed in Section 3.1.6.

3.1.1 AOC–Area A

AOC-Area A is located to the southwest of former Building #16 and in the vicinity of several former ASTs. During the initial (SI-phase) investigation of AOC-Area A, petroleum impacts were encountered at two locations (A-1 and A-5). In 2003, The Port Authority excavated 3,306 cubic yards of petroleum-impacted soil from a 28,000-square-foot area at AOC-Area A. The excavation area extended from Site 1 to Site 2A, though the majority (77%, or approximately 21,650 square feet) was at Site 1. The excavation extended to groundwater, which was encountered approximately 3.5 feet below surface grade (bsg). Excavated soil was sent off site for disposal.

Eight post-excavation soil samples were collected to document the environmental quality of soil left in place. With the exception of one soil sample (A5-5) which contained benzo(a)pyrene at a concentration

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Potential USTs UST 2	UST(s) shown on Sanborn Maps. The SI, revealed petroleum impacts at soil boring locations UST2-1, UST2-1A, UST2-2, and TMW-02. The RI and SRI delineated petroleum impacts at UST-2. The FSRI attempted to delineate mobile (i.e., free) LNAPL at UST2-4.	Geophysical survey (GPR/EM) performed to presence or absence of USTs. Results inconclusive. Ten soil samples collected from five borings during the SI. One temporary monitoring well (TMW-02) installed and sampled. During the RI, nine soil samples collected from 12 soil borings. Excavation of LNAPL-impacted soil in 2005; however, the area was greater than anticipated and excavation activities suspended. During SRI, delineated LNAPL-impacted soil within a 30,750-square-foot area. 17 soil samples collected from 14 borings. Soil impacted by PAH compounds at one location; elsewhere, impacts primarily by metals and PAH compounds attributable to historic fill. Six of the borings were converted to temporary monitoring wells. Groundwater impacts at two locations determined to be unrelated to LNAPL-impacted soil at AOC-UST2. During the FSRI, six test pits excavated in the vicinity of UST2-4 to delineate mobile (i.e., free) LNAPL. Delineation complete to the south, west, and north. Delineation to the east could not be completed because of sidewall collapse. Footprint of mobile LNAPL area at least 6,550 square feet.	SI, RI, SRI, FSRI	UST(s) not encountered. Mobile LNAPL has been removed. See Notes 1 and 2.
USTs UST 5	UST(s) shown on Sanborn Maps.	Geophysical survey (GPR/EM) performed to presence or absence of USTs. Results inconclusive. Therefore, the Port Authority excavated test pits. One soil sample collected from one soil boring. One UST, apparently associated with an oil/water separator, measuring approximately 15 feet long by eight feet in diameter, was encountered. Field observations did not identify petroleum-impacted soil.	SI, RI	UST removed and no petroleum-impacted soil was encountered. No petroleum impacts were noted on groundwater. See Notes 1 and 2.
UST 6	UST(s) shown on Sanborn Maps.	Geophysical survey (GPR/EM) performed to presence or absence of USTs. Results inconclusive. Therefore, the Port Authority excavated test pits. Five soil samples collected from two soil borings. During demolition of Building #17, a former toluene tank, which previously had been closed in place, was encountered. Field observations did not identify petroleum-impacted soil.	SI, RI	UST removed and no petroleum-impacted soil was encountered. No petroleum impacts were noted on groundwater. See Notes 1 and 2.

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Precipitate at Bridge Creek	Investigative efforts by P&G identified the presence of a precipitate material along the banks of Bridge Creek.	The portion of Bridge Creek located along the western side of the site was visually reviewed during two low tide and two high tide periods. Sediment/precipitate samples and surface water samples were collected and submitted to the laboratory for analysis. Precipitate material recently has not been observed along the banks of Bridge Creek. Two surface water monitoring events, each including collection of five samples, conducted during a Surcharge Pilot Study. Surface water quality not affected by surcharging activities.	SI, Surcharge Study	No contaminant gradient was identified. The environmental quality of Bridge Creek is considered typical given the urban nature of the stream corridor. Re-development of the site is expected to continue to enhance the quality of Bridge Creek. NFA is warranted with respect to surface water or sediment at this AOC.
Area A West Tank Field (Southwest of Building 16) /Block 1400	P&G AOCs (Note 3)	Six soil samples collected from four borings during the SI. Based on the results, petroleum-impacted soil at locations A-2 and A-5 investigated during the RI. During the RI, seven soil samples were collected from five borings in the vicinity of A-2 and eight soil samples were collected from 18 soil borings in the vicinity of A-5. Note: location A-5 is located at Site 2; however, the RI borings to the north, south, and west are situated at Site 1. Based on the results of the RI, soil excavation proposed.	SI, RI	Soil excavation conducted in an area of approximately 25,500 square feet (75% of that area was located in Site 1). Approximately 3,306 cubic yards of soil were excavated and removed. Eight post-excavation soil samples were collected and indicated minimal impacts. See Notes 1 and 2.
Area B Former Raw Product and By-product AST Areas/Block 1400	P&G AOCs (Note 3)	The SI at Site 2 identified petroleum-impacted soil at locations B-2 and B-3 (Site 2). Impacts were delineated during the RI. The impacts extended onto Site 1. One soil boring was installed at Site 1 to delineate petroleum-impacted soil at B-3. No soil samples were collected given the close proximity to soil samples associated with delineation of impacts at GW-14 (Site 2). Note: A UST measuring eight feet long by six feet in diameter was encountered. The UST appeared intact and no visually impacted soil appeared to be associated with the UST.	RI	LNAPL-impacted soil excavated in an area of approximately 33,550 square feet (25% of that area was located at Site 1). Approximately 4,349 cubic yards of soil were excavated and removed. Twelve post excavation soil samples were collected from this AOC and exhibited minimal impacts. See Notes 1 and 2.
Area C Former Oleum AST and Acid Wastewater Area/Block 1400	P&G AOCs (Note 3)	Two soil borings were drilled and three soil samples were submitted for laboratory analysis**.** No impacts except those detected across the HHMT-Port Ivory Facility and attributable to historic fill.	SI	See Notes 1 and 2.

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Area F1 Spent Nickel Catalyst Drum Storage Area/Block 1400	P&G AOCs (Note 3)	Reportedly, P&G previously excavated and disposed of 150 cubic yards of PCB-impacted soil. P&G post-excavation soil sampling results indicated the concentrations of PCBs to be either non-detect or detectable but below the RSCO. The Port Authority confirmed that the concentration of PCBs in remaining soil was below the RSCO by collecting two soil samples from one soil boring.	SI	See Notes 1 and 2.
Area H Former Rosin Storage Area/Block 1400	P&G AOCs (Note 3)	Six soil samples collected from three soil borings. No impacts except those detected across the HHMT-Port Ivory Facility and attributable to historic fill.	SI	See Notes 1 and 2.
Area R Northwest Corner of Soap Manufacturing Area (suspected calcium carbonate fill area)/Block 1400	P&G AOCs (Note 3)	Evaluation of this area was included with Area H. Six soil samples collected from three soil borings. No impacts except those detected across the HHMT-Port Ivory Facility and attributable to historic fill.	SI	See Notes 1 and 2.
Wood Yard	P&G AOCs (Note 3)	During the SI, five soil borings were drilled and 11 soil samples were collected from four of the soil borings. The SI identified potential oil and grease (i.e., non-petroleum LNAPL) impacts at soil boring Wood-5. Sheen observed in temporary well PG-TMW-2, but groundwater not impacted by VOCs or SVOCs. During the RI, 11 soil samples were collected from four delineation soil borings drilled to the north, east, west, and south of Wood-5. Remedial Action 1 (described at right) completed. During 2004, the Port Authority completed Remedial Action 2 (described at right). As documented in the SRI, the remaining soil was not significantly impacted. Groundwater in the vicinity of the Wood Yard is impacted by arsenic, but these impacts should attenuate naturally following Remedial Action 2. It does not appear that the groundwater impacts have impacted surface water or sediment in Bridge Creek.	SI, RI, SRI	Remedial Action 1: Approximately 117 cubic yards of soil excavated from a 900-square-foot area in the vicinity of Wood-5. This Remedial Action addressed non-petroleum LNAPL impacts. Remedial Action 2: Wood chips and underlying surface soil removed from the Wood Yard in 2004. Six post-excavation soil samples were collected. No impacts in soil beyond those detected across the HHMT-Port Ivory Facility and attributable to historic fill. See Notes 1 and 2.
Railroad Tracks and Sidings	Visual inspection of the site identified the presence of railroad tracks, sidings and equipment throughout the subject site.	12 soil samples collected from six soil borings. Soil impacts by arsenic potentially attributable to the presence and/or former use of the railroad spurs. Impacts similar to those detected across the HHMT-Port Ivory Facility and attributable to historic fill.	SI	See Notes 1 and 2.

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Pits and Drains	Pits and drains, some sealed with gravel, were noted at both interior and exterior site locations. In addition, reports identify the presence of oil/water separator systems.	A visual inspection was performed, as feasible, to assess conditions at pits and drains. 11 soil samples were collected from six soil borings. A few contaminants (toluene, dieldrin, endrin, and heptachlor epoxide) were detected at concentrations above their respective RSCOs at soil boring PD-8. These impacts are not site-wide and are not believed to be attributable to historic fill. Groundwater at downgradient PG-PA-MW-1 and PG-PA-MW-1D not impacted by VOCs or pesticides.	SI	The non-fill related contaminants present at PD-8 were present at low concentrations and did not impact groundwater. See Notes 1 and 2.
Former Structures	Review of Sanborn Maps and aerial photographs reveal the presence of former structures, ASTs, railroad tracks and sidings, at various locations throughout the subject site. Review of some of the historical sources also revealed the presence of discolored areas and/or debris piles.	Soil borings drilled at areas formerly occupied by structures, debris piles, and discolored areas. 25 soil samples collected from nine soil borings. All soil samples and soil borings were also evaluated as part of the investigations of other AOCs. Soil impacted by VOCs and pesticides at PD-8 (see Pits and Drains, above). Soil impacted by oil and grease at locations Wood-5 (see Wood Yard, above) and FS-1B. Soil in the vicinity of FS-1B (within a footprint of 8,300 square feet) was delineated during the RI. The majority of the area was located in Site 1; however, a small portion of this area was located at Site 2. Groundwater at PG-EW-3, the nearest downgradient well, exhibited concentrations of oil & grease and TPHC similar to those in other Site 1 wells. Groundwater impacts by low concentrations of PAH compounds anticipated to attenuate following Remedial Action (described to right).	SI, RI	Approximately 1,540 cubic yards of soil in the vicinity of location FS-1B were excavated to the groundwater table to address (petroleum and non-petroleum) LNAPL-impacted soil. The soil was transported off site for disposal. Eight post-excavation soil samples were collected. Concentrations of VOCs and SVOCs in these soil samples were similar to those throughout Site 1 and are attributable to the presence of historic fill. See Notes 1 and 2.
Historic Fill Material	P&G placed a variety of fill material at the subject site. The fill materials present at the site include soil/sand, construction debris (wood, bricks, glass, concrete), ash from boiler operations, slag, vegetative debris and by-products from production activities (calcium carbonate, spent diatomaceous filter earth, and spent carbonaceous filter material).	Soil borings were installed, and soil samples were collected, throughout Site 1 to characterize the type and extent of fill material. As P&G reclaimed Site 1 from marshland through filling, all soil borings at the site were drilled through fill materials. Most of the soil samples were collected from fill materials. In addition to the soil samples and soil borings used to characterize other AOCs, five soil samples collected from two soil borings to characterize the fill materials AOC specifically. The soil samples exhibited metals, TPHC, and SVOCs at varying concentrations, some above their RSCOs. The concentration of total PCBs in subsurface soil at location PG-Fill-8 slightly exceeded its RSCO. As the historic fill material was encountered throughout Site 1, groundwater impacts attributable to this AOC were evaluated on a site-wide basis (see below).	SI, RI, SRI	Except by-product fill, which is innocuous, the historic fill contains organic compounds and metals at concentrations above their respective RSCOs. Therefore low-level soil impacts have been detected throughout Site 1. These impacts warrant a remedial action, likely construction of a cap and/or establishment of an Environmental Easement, which will be specified in the Site 1 RAWP.

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Groundwater	P&G reports identified dissolved-phase groundwater impacts and elevated pH (i.e., alkaline conditions) in groundwater at Site 1 monitoring wells. Groundwater quality was also investigated due to the soil impacts identified by P&G and during the SI.	Five monitoring wells (PAMW-1, PAMW-1D, PAMW-5**,** PAMW-6, and PMW-6D) and a temporary well (TMW-02) were installed at Site 1 during the initial stages of the SI. One groundwater sample was collected at each of these locations during the SI. In addition, one groundwater sample was collected at each of the following Site 1 monitoring wells installed by P&G prior to the SI: PG-CS-7, PG-EW-3, PG-EW-6, PG-RS-1, and PG-RS-2. Sheen was observed on groundwater in temporary well TMW-02. Neither LNAPL nor sheen were encountered at any other well sampled during the SI. Analytical results indicated elevated levels of 2 VOCs at PG-CS-7; 2 PAH compounds at PG-EW-3; and, cadmium at PG-RS-2. Elevated concentrations of phenol are believed to be attributable to the decay of naturally occurring organic matter in the meadowmat. Elevated concentrations of butylbenzylphthalate are believed to be attributable to laboratory contamination of the sample. Elevated concentrations of arsenic are believed to be attributable to the Wood Yard AOC and are anticipated to attenuate naturally. Elevated concentrations of iron, magnesium, manganese, and sodium are believed to be attributable to the presence of historic fill and/or background conditions. Additional groundwater samples were collected during the Surcharge Study, conducted to determine the effect (if any) of surcharging activities on groundwater impacts. Surcharging activities were proposed as part of Site 1 redevelopment. The impacts detected were similar to those detected during the SI. The same VOCs were detected at location PG-CS-7, albeit at significantly lower concentrations. Elevated levels of antimony, beryllium, nickel, and thallium were detected during the Surcharge Study but not the SI; these impacts are believed to be attributable to the historic fill. Elevated levels of cadmium detected during the SI but not the Surcharge Study.	SI, RI, SRI	TMW-02 located in AOC-UST-2 (see above) and has been included in the investigation and proposed Remedial Action at AOC-UST2. Except for those attributable to background conditions, the minor groundwater impacts outlined to the left are anticipated to attenuate naturally given the source area removals conducted to date, construction of a cap proposed in the Site 1 RAWP, and previous concentration trends. The Site 1 RAWP further proposes to monitor groundwater quality following the construction of the cap. Beyond the actions proposed in the RAWP for Site 1, Note 1 applies.

Table 1
Summary of Areas of Concern (AOCs)
HHMT Port Ivory Facility-Site 1

AOC	Description of AOC	Scope of Investigative Activities Performed and Summary of Results	Phase Inv.	Remedial Action/ Closure
Area GW-14	Sheen observed on the groundwater surface in monitoring well GW-14 during the SI. Well GW-14 is located in Site 2; however, the investigation of soil quality in the vicinity of this well extended into Site 1.	At Site 1, 1 soil sample was collected from 4 soil borings to evaluate this AOC. Please note, additional soil borings were drilled, and additional soil samples were collected, at Site 2; these results are not reported herein. The soil sample collected at Site 1 exhibited organic compounds at concentrations similar to those detected throughout Site 1 and attributable to historic fill.	SI, RI	This AOC addressed in conjunction with soil excavation and removal activities at Area B (described above).
Hydrogen Holders	Former ASTs and associated appurtenant equipment were used to store hydrogen. The hydrogen was likely stored in liquid form and used for the hydrogenation of oils and fats for processing food products by P&G.	This AOC was identified subsequent to the SI and RI; however, the analytical data collected from the SI was used to characterize this AOC as described in the SRI. 17 soil samples were collected from five soil borings during the SI. Soil impacts include Benzo(b)fuoranthene, phenol, and various metals. Except for arsenic and phenol, the soil impacts are believed to be attributable to historic fill. The arsenic may be related to the Wood Yard AOC (see above). The phenol is believed to be due to the decay of naturally occurring organic compounds in the meadowmat unit. Groundwater downgradient of the hydrogen holders impacted by arsenic and phenol; the sources of these chemicals are likely the same as those for arsenic and phenol in the soil.	SI, SRI	Based on analytical results, soil and groundwater impacts do not appear related to the hydrogen holders. See Note 1.

Notes and Abbreviations:

SI= Site Investigation
RI= Remedial Investigation
SRI= Supplemental Remedial Investigation
UST=Underground storage tank
PAH=Polycyclic aromatic hydrocarbon
AOC= Area of Concern
TPHC= Total petroleum hydrocarbons
P&G= Proctor and Gamble
RAWP= Remedial Action Work Plan
RSCO= Recommended Soil Cleanup Objective as published in the New York Technical and Administrative Guidance Memorandum #4046, dated January 1994.

1) No further action (NFA) is warranted with respect to soil and groundwater at this AOC.
2) Based on analytical results, metals and/or regulated organic compounds have been detected at concentrations similar to those detected at other portions of the HHMT-Port Ivory Facility. The impacts are attributable to historic fill materials placed by P&G.
3) P&G reports identified AOCs at the HHMT-Port Ivory Facility. Media at the AOCs were characterized to varying degrees.
4) Many samples and soil borings listed in this table were used to characterize multiple AOCs. Therefore, this table should **not** be utilized to calculate the total number of samples collected.

(0.14 milligrams per kilogram, or mg/kg) above its RSCO (0.002 mg/kg), no VOCs or SVOCs were detected at concentrations above the applicable standards.

3.1.2 AOC–Area B

An AST was formerly located at AOC-Area B (Site 2A). During the initial investigation at AOC-Area B, petroleum-impacted soil was identified at soil boring locations B-2 and B-3. In 2003, The Port Authority excavated 4,350 cubic yards of soil from a 33,550-square foot area at this AOC. The excavation area, which merged with an excavation area for adjacent AOC-Area GW-14, included portions of both Site 1 and Site 2A. The excavation extended 3.5 feet bsg. Only 8,390 square feet (approximately 25%) of the excavation was at Site 1. Excavated soil was sent off site for disposal.

Twelve post-excavation soil samples were collected from the 0.5-foot depth interval immediately above groundwater, which was encountered at approximately 3.5 feet bsg along the excavation sidewalls. Benzo(a)pyrene and benzo(a)anthracene were the only compounds detected at concentrations above their respective RSCOs in any post-excavation samples. Concentrations of these two PAH compounds were similar to those for soil samples collected at other portions of the HHMT-Port Ivory Facility. The presence of these compounds is therefore attributable to fill material previously emplaced at the HHMT-Port Ivory Facility, and no further investigative or remedial actions were deemed warranted at AOC-Area B.

3.1.3 AOC–Wood Yard

AOC-Wood Yard is located at the southern portion of Site 1, which is the area where P&G formerly staged wood chips prior to burning them as fuel. Environmental investigations at this AOC concluded that surface soil was impacted by arsenic and indications (elevated oil and grease concentrations and sheen on the groundwater surface) of potential petroleum impacts were detected/observed in subsurface soil. Materials excavated from AOC-Wood Yard included wood chips remaining from P&G's operations and 120 cubic yards of soil. Based on field observations and soil sampling analytical results, soil remaining in this AOC contains metals at concentrations similar to those throughout the remainder of the HHMT-Port Ivory Facility. The presence of these compounds is therefore attributable to fill material previously emplaced at the HHMT-Port Ivory Facility, and no further investigative or remedial actions were deemed warranted at AOC-Wood Yard.

3.1.4 AOC–Former Structures (Vicinity of FS–1B)

Review of Sanborn Maps and aerial photographs identified former structures at various locations throughout Site 1. Soil samples were collected near the former structures during the SI in order to identify if soil had been impacted by P&G's former industrial/commercial activities at the structures. Petroleum impacted soil was encountered at soil boring location FS-1B, which was drilled adjacent to Buildings Nos. 12 and 13. In November and December 2002, approximately 1,500 cubic yards of petroleum-impacted soil were removed from an 8,300-square-foot area surrounding FS-1B. The excavation extended to groundwater, encountered at approximately 5 feet bsg. The excavation area extended from Site 1 to Site 2A, though the majority (approximately 75%, or 6,225 square feet) was at Site 1. Excavated soil was sent off site for disposal.

Eight post-excavation soil samples were collected following soil excavation. The only compounds detected at concentrations greater than their respective RSCOs in the post-excavation soil samples were four PAH compounds (benzo(a)pyrene, benzo(a)anthracene, benzo(b)flouranthene, and chrysene). The PAH compounds were detected at concentrations similar to those at other areas of the HHMT-Port Ivory Facility. The presence of these compounds is therefore attributable to fill material previously emplaced at the HHMT-Port Ivory Facility, and no further investigative or remedial actions were deemed warranted at AOC-Former Structures (Vicinity of FS-1B).

3.1.5 AOC–UST2

AOC-UST2 is located in the southern portion of Site 1 in the vicinity of where a former UST was identified on a Sanborn Map. To confirm the presence or absence of the UST, a geophysical survey was completed, but the results were inconclusive. Field observations and soil sampling analytical results at subsequent soil borings drilled in this AOC indicated the presence of LNAPL-impacted soil. Except to the east, where a stockpile of surcharge material was staged, The Port Authority delineated the extent of the LNAPL-impacted soil at AOC-UST2 during the RI and SRI. The presence of mobile LNAPL was confirmed in AOC-UST2 during the RI. The RAWP proposed the removal of mobile LNAPL.

The Port Authority conducted a remedial action to remove mobile LNAPL in the vicinity of AOC-UST2 in December 2009 through May 2010. Since previous investigations indicated that the footprint of the area containing mobile LNAPL could be as large as 30,700 square feet but the precise extent of mobile LNAPL in the vicinity of UST2-4 was unknown, The Port Authority began the remedial action by

excavating nine Removal Areas (Removal Areas M through U, as shown on Figure 5). Excavating soil in the Removal Areas allowed for a more manageable dewatering effort and allowed a rapid determination of the extent of mobile LNAPL. Upon excavating each Removal Area, any LNAPL that accumulated on the water surface was removed via vactor truck. The groundwater in the Removal Area was lowered at least one foot to induce re-accumulation of LNAPL. Excavated soil that appeared to be clean was stockpiled for re-use, while LNAPL-impacted soil was stockpiled pending removal and off-site disposal. Once the Removal Areas had remained open for 30 days without re-accumulation of LNAPL, the excavations were backfilled and the contaminated soil that remained between the Removal Areas was excavated. Approximately 3,700 tons of LNAPL-impacted soil was excavated from an area encompassing approximately 10,000-square-foot area at AOC-UST2. Excavated soil was sent to Clean Earth for disposal. LNAPL and groundwater were disposed of at Lorco Petroleum Services Inc. (LPS).

Please note, LNAPL-impacted soil situated beneath an 800-square-foot concrete slab, the top of which was encountered at a depth of six feet bsg, could not be removed without breaking the pad. The Facility required the concrete pad to remain in place to prevent subsidence in this area, which is used for storing shipping containers with typical net weights of 2.5 (empty) to 24 (max weight) tons. Attempts were made to remove mobile LNAPL beneath the pad. The water level in Removal Area T, located adjacent to the concrete pad, was lowered at least once per day for a period of seven days, and the LNAPL that flowed into the Removal Area was removed. The NYSDEC has requested that a monitoring well be installed downgradient of the concrete pad. If LNAPL is encountered in the well during post-remedial monitoring, additional wells will be installed for LNAPL delineation and removal, as detailed in Section 7.

A total of 27 post-excavation soil samples, including 14 from excavation sidewalls and 13 from the base of the excavation, were collected to document the environmental quality of soil that was left in place. The analytical results indicate soil impacts similar to those detected at other portions of the HHMT-Port Ivory. Therefore, the remaining impacts are attributable to fill material previously emplaced at the HHMT-Port Ivory Facility, and no further investigative or remedial actions were deemed warranted at AOC-UST2. The remedial action of AOC-UST2 is documented in the Site 1 Final Engineering Report.

3.1.6 Engineering Control (EC) and Institutional Control (IC)

Following excavation of soil and removal of LNAPL in all “hot spots,” impacted soil and groundwater remains beneath the site. As a result, an EC and an IC are required to protect human health and the

environment. The Port Authority constructed an environmental cap throughout the site as an EC and established a site-wide Deed Restriction as an IC. The environmental cap is an EC to prevent exposure to underlying impacted soil.

The IC, in the form of a site-wide Deed Restriction, was established to (1) implement, maintain and monitor the EC; (2) prevent future exposure to remaining impacts by controlling disturbances of the subsurface impacts; (3) prevent groundwater usage without treatment; and, (4) limit the use and development of the site to industrial and/or commercial uses only. The recorded Deed Restriction is attached in Appendix B.

Additional details related to the EC and IC established at the site are provided in Section 5, the EC/IC Plan.

4.0 Remaining Impacts

The following environmental media have been investigated at and adjacent to the site: soil, groundwater, surface water in Bridge Creek, and, sediments along the eastern bank/bed of Bridge Creek. As Bridge Creek is located outside the limits of Site 1 the surface water and sediment impacts documented in Sections 4.3 and 4.4 are for completeness only. As there neither are nor will be any buildings at the site, indoor air was not sampled and is not considered a concern. Sections 4.1 through 4.4 document the regulated organic compounds and metals that remain in environmental media at concentrations greater than applicable NYSDEC guidance values.

4.1 Soil

The analytical results for soil indicate that six VOCs, various SVOCs, various metals, three pesticides, and total polychlorinated biphenyls (PCBs) are present in soil at concentrations greater than their respective RSCOs. These contaminants are attributable primarily to the presence of historic fill. The historic fill extends from one foot below grade, the bottom of the environmental cap, to the meadowmat unit, the top of which is approximately 10 to 23 feet bsg at Site 1. Table 2 provides the minimum and maximum concentrations for all metals and organic compounds detected in soil at concentrations above their RSCOs.

4.2 Groundwater

For this project, the groundwater analytical results have been compared to current Ambient Water Quality Standards and Guidance Values (AWQSGVs) for class GA groundwater (i.e., groundwater with potable use). Given that groundwater is saline beneath (at a minimum) portions of the HHMT-Port Ivory Facility, groundwater at the site cannot be developed for potable purposes and the class GA AWQSGVs are not appropriate for use at the site. However, at this time, these represent the only guidance available for ambient groundwater. Reference to these standards in this report does not represent any agreement or concurrence that the same are appropriate for use at the site. The analytical results for groundwater indicate that metals and organic compounds in the following contaminant classes are present in groundwater at concentrations greater than their respective AWQSGVs: two VOCs, five SVOCs, total phenolics (one location) and seven metals. Table 2 provides the minimum and maximum concentrations for all metals and organic compounds detected in site soils at concentrations above their AWQSGVs.

Table 2
Remaining Impacts
Howland Hook Marine Terminal-Port Ivory Facility-Site 1
40 Western Avenue
Staten Island, New York

VOLATILE ORGANIC COMPOUNDS (VOCS)				SEMIVOLATILE ORGANIC COMPOUNDS (SVOCS)				PESTICIDES AND PCBs				METALS				CYANIDE AND TOTAL PHENOLICS			
MEDIA/ COMPOUND	**SCGs**	**MINIMUM CONC.**	**MAXIMUM CONC.**	**COMPOUND**	**SCGs**	**MINIMUM CONC.**	**MAXIMUM CONC.**	**MEDIA/ COMPOUND**	**SCGs**	**MINIMUM CONC.**	**MAXIMUM CONC.**	**MEDIA/ COMPOUND**	**SCGs**	**MINIMUM CONC.**	**MAXIMUM CONC.**	**MEDIA/ COMPOUND**	**SCGs**	**MINIMUM CONC.**	**MAXIMUM CONC.**
SOIL																			
DICHLOROMETHANE	0.1	ND	0.22	4-CHLORO-3-METHYLPHENOL	0.24	ND	0.27	DIELDRIN	0.044	0.0038	0.054	ARSENIC	7.5	ND	310	NONE			
M&P-XYLENES	1.2	ND	0.8	4-NITROPHENOL	0.1	ND	1.5	ENDRIN	0.1	0.0038	0.39	BARIUM	300	1.5	890				
METHYLBENZENE	1.5	ND	3.3	BENZO[A]ANTHRACENE	0.224	ND	11	HEPTACHLOR EPOXIDE	0.02	0.0038	0.09	BERYLLIUM	0.16	ND	5.3				
O-XYLENE	1.2	ND	0.44	BENZO[A]PYRENE	0.061	ND	5.9	TOTAL PCBs	Note 1	ND	1.5	CADMIUM	1	ND	14				
METHYLENE CHLORIDE	0.1	0.0096	0.19	BENZO[B]FLOURANTHENE	1.1	ND	6.8					CALCIUM METAL	35000	ND	400000				
TRANS-1,2-DICHLOROETHENE	0.3	ND	0.62	DIBENZO[A,H]ANTHRACENE	0.014	ND	0.24					CHROMIUM	10	ND	270				
				PHENOL	0.03	ND	1.3					COPPER	25	ND	670				
				CHRYSENE	0.4	ND	2.3					IRON	2000	ND	82000				
				BENZO[K]FLOURANTHENE	1.1	ND	2.3					LEAD	200-500	ND	18000				
												MAGNESIUM	100-5000	ND	58000				
												MERCURY	0.1	ND	1				
												NICKEL	13 or 0.5-25	ND	200				
												SELENIUM	2	ND	5.2				
												SODIUM	8000	ND	73000				
												ZINC	20 or 9-50	ND	4500				
GROUNDWATER																			
ETHYLBENZENE	5	0.63	6.7	CHRYSENE	0.002	0.3	1.2	NONE				ANTIMONY	3	ND	75	TOTAL PHENOLS	1	ND	33
M&P-XYLENES	5	1.1	18	BENZO[A]ANTHRACENE	0.002	0.2	1.2					ARSENIC	25/NG	ND	83				
				BIS(2-ETHYLHEXYL)PHTHALATE	5	0.37	8.2					CADMIUM	5/NG	ND	16				
				PHENOL	1	ND	33					IRON	300	120	20000				
				NAPHTHALENE	10	ND	23					MAGNESIUM	NS/35000	ND	430000				
												MANGANESE	300/NG	ND	12000				
												SODIUM	20000/NG	25000	4000000				
SURFACE WATER																			
NOT ANALYZED				NOT ANALYZED				NOT ANALYZED				COPPER	7.9	ND	140	NOT ANALYZED			
												LEAD	204	ND	3800				
												NICKEL	74	ND	140				
												ZINC	95	ND	2500				
												MERCURY (245.1)	0.0026	ND	0.93				
SEDIMENT																			
NOT ANALYZED				NOT ANALYZED				NOT ANALYZED				ARSENIC	6.0/33	ND	19	NOT ANALYZED			
												CADMIUM	0.6/9	ND	0.64				
												CHROMIUM	26/110	49	82				
												IRON (%)	20000/40000	ND	25000				
												LEAD	31/110	160	380				
												MERCURY	0.2/1.3	1.1	92				
												NICKEL	16/50	33	90				
												SILVER	1/2.2	ND	4.3				
												ZINC	120/270	510	650				

Notes and Abbreviations:
SCGs= Standards, Criteria, or Guidance
None= None detected above the applicable SCGs
ND= Not detected
PCBs= Poly chlorinated biphenyls
1) The SCG for PCBs in soil is 1 mg/kg for surface soil, and 10 mg/kg for subsurface soil.
2) All SCGs and concentrations for soil and sediment are reported in milligrams per kilogram (mg/kg) and all SCGs and concentrations for groundwater and surface water are reported in micrograms per liter (ug/L).
3) The SCG for soil is the Recommended Soil Cleanup Criteria from the Technical and Admistrative Guidance Manual #4046.
4) The SCG for groundwater is the Ambient Water Quality Standards and Guidance Values for class GA groundwater
5) The SCG for surface water is the Ambient Water Quality Standards and Guidance Values for class SD surface water.
6) The SCG for sediemnt is the New York Sediment Screening criteria. The concentrations are compared to the NYSDEC Lowest Effect Level and the Severe Effect Level.

4.3 Surface Water

Surface water samples collected from Bridge Creek contained Target Analyte List (TAL) metals at concentrations above the AWQSGVs for Class SD surface water. Specifically, copper, lead, mercury, nickel, and zinc were detected above applicable standards in at least one surface water sample. The NYSDEC has classified Bridge Creek and its tributaries as SD, which indicates that the stream is saline with a best use for surface water of fish survival and limited fishing. See Table 2 for concentration data.

4.4 Sediment

Sediment samples collected from Bridge Creek contained one or more of the following metals at concentrations greater than their respective NYSDEC Lower Effects Levels (LELs): arsenic, cadmium, chromium, iron, lead, nickel, silver, zinc and mercury. Six of these metals (chromium, lead, mercury, nickel, silver and zinc) were detected at concentrations greater than their respective Severe Effects Levels (SELs).

Sediment sampling analytical results do not exhibit a pattern of increasing or decreasing concentration in a downstream direction in Bridge Creek for any metal analyzed. Potential sources for the impacted sediments include on-site sources (e.g. historic fill), upstream off-site sources (e.g., the area upstream of the site where the NYSDEC is performing a wetlands restoration effort), stormwater runoff from neighboring properties, or public roadways. In fact, the NYSDEC has determined that sediment impacted by pesticides and metals exists at several locations along Bridge Creek to the south of the site (i.e., upstream of the site at low tide). These sediments are potential sources for the impacted sediments in Bridge Creek adjacent to Site 1. Table 2 provides the minimum and maximum concentrations for all metals detected in sediment in Bridge Creek at concentrations above their LELs and/or SELs.

5.0 Engineering Control/Institutional Control (EC/IC) Plan

Since impacted soil and groundwater remain beneath the site following completion of the IRMs and the remedial action described in Sections 3.1.1 through 3.1.5, an EC and an IC are required to protect human health and the environment. This EC/IC Plan describes the procedures for the implementation and management of the EC and the IC for the site, which were proposed in the NYSDEC-approved RAWP. The EC and the IC have been established at the site.

The EC/IC Plan represents one component of the SMP. This EC/IC Plan provides:

- A description of the EC and IC for the site;
- The basic implementation and intended role of the EC and IC;
- A Deed Restriction (IC) for the site;

In addition this section of the SMP introduces:

- Required frequency for periodic inspections of the EC and requirements for conducting the inspections;
- A description of plans and procedures to be followed for implementation of the EC, such as the implementation of the Excavation Work Plan, (EWP) for the proper handling of LNAPL, impacted soil, and impacted groundwater that may be disturbed during emergency repairs, maintenance or redevelopment work at the site; and,
- All other provisions necessary to identify or establish methods for implementing the required EC/ICs.

Additional details are described in subsequent sections.

The EC and IC are described in Sections 5.1 and 5.2, respectively. The EWP is discussed in Section 5.3. Inspections and Notifications are discussed in Sections 5.3 and 5.4, respectively. A Contingency Plan for emergency responses is discussed in Section 5.6. Please note while the EWP is discussed in Section 5.3, the complete document is included in Appendix A.

5.1 Engineering Control (EC)

As required in the RAWP, exposure to impacted soil and groundwater beneath the site is prevented by an environmental cap placed above the impacted soil. The environmental cap is comprised of a minimum of 12 inches of crushed stone, concrete, or asphalt. The crushed stone was placed throughout approximately 63.7% of the site, the concrete was placed throughout 1.9% of the site, and the asphalt was placed throughout the remaining 34.4% of the site. Figure 6 shows the extent of each type of cap. Please note, the RAWP indicates that a demarcation barrier should be placed between the environmental cap and the underlying soil. However, the stone, concrete, and asphalt differ significantly from the underlying soil such that no demarcation was deemed necessary at Site 1. Areas covered with impervious cover (i.e., concrete/asphalt) will remain in the future. Areas covered with pervious surfaces (i.e., stone) will remain

covered with stone or will be upgraded to asphalt or concrete. All other cover material will be approved by the NYSDEC.

The EWP (Appendix A) outlines the procedures required to be implemented in the event the environmental cap is breached, penetrated, or temporarily removed. The environmental cap is a permanent control, and its integrity will be inspected unless and until the NYSDEC confirms in writing that the site-wide Deed Restriction is no longer necessary. Procedures for the inspection and monitoring of the environmental cap are provided in the Monitoring Plan (Section 6).

5.2 Institutional Control (IC)

The IC is required by the RAWP to (1) implement, maintain, and monitor the EC, (2) prevent future exposure to impacted soil and groundwater remaining beneath the site; and, (3) limit the use and development of the site to industrial and commercial uses only. The IC for the site is a Deed Restriction, which The Port Authority recorded at the Richmond County Courthouse. The recorded Deed Restriction is included in Appendix B.

General provisions of the Deed Restriction include the following:

- Compliance with the Deed Restriction and the NYSDEC-approved SMP;
- Limiting the use and development of the property to industrial/commercial uses only;
- Restricting disturbance of the environmental cap unless in accordance with the SMP;
- Restricting the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH;
- Requiring the operation and maintenance of the EC as specified in this SMP; and,
- Requiring the inspection of the EC at a frequency and in a manner defined in the SMP.

The Deed Restriction will notify future property owners of the impacts at the site. The Deed Restriction will remain until the NYSDEC informs The Port Authority in writing that the Deed Restriction is no longer needed.

5.3 Excavation Work Plan (EWP)

The RAWP proposed construction of an environmental cap throughout the site. The environmental cap, consisting of at least one foot of crushed stone, concrete, or asphalt, has been constructed. The environmental cap is an EC that prevents exposure to impacted soil and groundwater beneath the site. Future site improvements and infrastructure upgrades may require disturbance of the environmental cap. Any future intrusive work that may breach, penetrate, or temporarily remove the environmental cap could potentially lessen the effectiveness of this EC. Therefore, an EWP is necessary to minimize exposure to impacted soil and groundwater beneath the site during and after any disturbance of the environmental cap.

Any future intrusive work that will penetrate the environmental cap, or encounter or disturb the impacted soil and/or groundwater below the site, including any modifications or repairs to the existing environmental cap, will be performed in compliance with the EWP that is attached as Appendix A to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the site. The approved HASP and CAMP are attached as Appendix D. If state and federal health and safety requirements change, the HASP and CAMP will be updated and re-submitted with the notification provided in Section 2.0 of the EWP. The HASP, but not the CAMP, will also be updated and re-submitted should contractors conduct future work that is not within the scope of the HASP. Any intrusive work will be performed in compliance with the EWP, HASP, and CAMP, and will be summarized in the PRR (See Section 8.0).

The Port Authority and its subcontractors are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, the proper disposal of groundwater pumped from an excavation, control of runoff from open excavations, and for the integrity of structures (such as building foundations and bridge footings) that may be affected by excavations. The Port Authority will ensure that site development activities will not interfere with, or otherwise impair or compromise, the environmental cap described in this SMP.

Please note, the construction work completed as described in the EWP by The Port Authority or its contractor will not be considered a remedial action. Consequently, there is no requirement to excavate soil beyond the construction area or to collect post-excavation soil samples.

In the event LNAPL is encountered during construction, The Port Authority's Environmental Engineering Department will prepare a work plan detailing the investigative activities to determine whether the LNAPL is mobile. Remedial work will be proposed only if The Port Authority confirms that the LNAPL is mobile. The removal of mobile LNAPL (See Appendix A) is a remedial goal for Site 1.

5.4 Inspections of the Engineering Control (EC)

Inspections of the environmental cap will be conducted to ensure that the cap continues to limit exposure to underlying impacted soil and groundwater. A qualified environmental professional (QEP) or his/her designee retained by The Port Authority and approved by the NYSDEC will conduct periodic inspection of the environmental cap and EC. The initial inspection will be completed in May of the first year of monitoring, simultaneous with the first groundwater and surface water monitoring event (Section 6.0), and the second inspection will be completed six month later. After the first year, the frequency of the periodic inspection of the EC will be agreed upon by the NYSDEC and The Port Authority. The periodic inspections will continue until NYSDEC notifies The Port Authority that they are no longer needed.

During each inspection, the QEP or his/her designee will ensure that asphalt and concrete are intact and that the thickness of the crushed stone cap remains at least one foot thick. Photographs will be taken to document the integrity of the environmental cap. Should any areas of the cap be damaged, the QEP or his/her designee will note the affected area on a site map and The Port Authority shall promptly repair the environmental cap.

In addition to documenting the integrity of the environmental cap, the QEP or his/her designee will document facility operations throughout the site. If operations have the potential to damage the environmental cap, the QEP or his/her designee will notify The Port Authority in writing.

In addition to the periodic inspections by the QEP or his/her designee, The Port Authority personnel will periodically inspect the EC to ensure that they remain in place between the monitoring periods. The Port Authority will notify the NYSDEC of any damage to the environmental cap and will promptly make the necessary repairs. Procedures for the inspection and monitoring of the environmental cap are provided in the Monitoring Plan (Section 6). If an emergency, such as a natural disaster or an unforeseen failure of the EC occurs, an inspection of the site will be conducted by the QEP within 5 days of the event to verify the EC/IC remains in place.

5.5 Notifications

The Port Authority will notify the NYSDEC of planned ground-intrusive work (i.e., non-emergency work) at least 15 days in advance. The Port Authority will provide to the NYSDEC written notice within 45 days of completion of subsurface activities and restoration of the environmental cap. Any disturbance below the bottom of the cap will require notification. Any disturbance above the bottom of the cap does not require notification as long as the cap is restored.

It will not be practical for The Port Authority to provide advance notice of emergency repairs. However, The Port Authority will submit verbal notice by noon of the following day of any unforeseeable incident or emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of the EC, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the EC. If the damage is not an emergency, NYSDEC should be notified within 5 days of the inspection. At any time, if The Port Authority identifies that the EC/IC is no longer effective, NYSDEC should be notified and a Corrective Measures Plan (Section 8.0) be submitted for review.

Other notifications are needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the VCA, 6NYCRR Part 375, and/or Environmental Conservation Law.
- Notice within 48-hours of any damage or defect to the foundations of structures that reduces the effectiveness of the EC and likewise any action to be taken to mitigate the damage or defect.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the Voluntary Cleanup Agreement (VCA), and all approved work plans and reports, including this SMP. This includes a copy of the approved SMP with any updates; all previously approved PRRs; and the IC/EC certification to be completed for the next periodic review.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing.

Please note the date of change of use notification to DER, and the date of the document transfer to the new owner are to be reported in the PRR (Section 7.0) for the review in which the transfer occurs.

5.6 Contingency Plan

Given the nature of the soil and groundwater impacts at the site and the fact that the impacted media are situated beneath and environmental cap, it is unlikely that remaining impacts will cause emergency situations.

Limited contact with impacted soil and groundwater could occur during intrusive activities. Contractors and subcontractors will conduct construction activities in accordance with this SMP, the EWP, HASP, and CAMP (see Appendices A and D) to lessen the likelihood of personnel exposure to impacted environmental media and to take appropriate actions in the event of an exposure.

In the event of an emergency, including a fire or explosion at the site or an environmental release, The Port Authority or its representatives shall contact the appropriate party from the contact list below, (Table 3). At the time of contact, The Port Authority or its representative shall provide the responding agency with information pertaining to the impacted soil and groundwater at the site. After the incident is reported to the appropriate responders, the QEP should be notified promptly. Directions to the nearest hospital are included in Appendix C

Table 3: Emergency Contact Numbers

The Port Authority of New York and New Jersey Medical, Fire, and Police:	(800) 828-7273
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362
HHMT-Port Ivory Facility, Resident Engineer Pam Dunne	(718) 551-9219
NYSDEC Case Manager Sally Dewes	(518) 402-9768
NYSDOH Case Manager Stephanie Selmer	(518) 402-7860
The Port Authority of New York and New Jersey-Engineering and Architecture and Design Department (QEP) Ed Aldrich	(973) 565-7553
The Port Authority of New York and New Jersey-New York Marine Terminals Rebecca Economos Tim Gard	 (718) 330-2976 (718) 330-2975

6.0 MONITORING PLAN

This Monitoring Plan describes the measures for evaluating the performance and effectiveness of the environmental cap and to ensure that groundwater impacts at the site are not impacting surface water quality in Bridge Creek. Two types of monitoring will be conducted: 1) periodic inspection of the EC and 2) periodic groundwater and surface water monitoring. The periodic monitoring and inspections will continue until the NYSDEC notifies The Port Authority it is no longer needed.

All monitoring results will be reported to the NYSDEC in a PRR. This PRR will include a certification that the EC and IC are still in place and that nothing has occurred that would impair the ability of these controls to protect human health or the environment, or constitute a violation or failure to comply with the SMP. Inspection of the environmental cap is discussed in Section 6.1. Groundwater and surface water monitoring requirements are detailed in Section 6.2.

6.1 Inspection of the Engineering Control

Inspection of the EC will be completed by the QEP or his/her designee. The tasks of the inspection will include:

- Ensuring compliance with the IC, including site usage;
- Evaluating the conditions and continued effectiveness of the EC; and,
- Documenting general site conditions at the time of the inspection.

The inspection of the EC will consist of an inspection of the entire site as well as the site perimeter. The QEP or his/her designee will ensure that the EC is intact and continues to provide a barrier to limit contact with impacted soil and groundwater. Any observations of damage or disruption to the environmental cap will be noted. The QEP or his/her designee will check for cracks in the impervious services and areas where the crushed stone has been eroded. If the environmental cap was disturbed since the last monitoring event, the QEP or his/her designee will inspect these areas to ensure that the areas were properly restored in accordance with the EWP. The QEP or his/her designee will note any changes of site usage since the last monitoring event. Photographs will be taken to document the conditions of the environmental cap at the time of the inspection. A summary of the inspection will be provided in the PRR. In addition, the QEP will provide the NYSDEC with certification indicating that the EC remains in place and are continues to be effective. The required PRR format and certification are provided in Section 8.0.

6.2. Media Monitoring

Groundwater and surface water will be monitored as part of post-remedial monitoring activities. Monitoring wells will be installed upon NYSDEC approval of this SMP and will be gauged and sampled as part of a groundwater monitoring program. Surface water monitoring stations will be established along Bridge Creek upon NYSDEC approval of this SMP and surface water sampling will be included in a periodic surface water monitoring program. Sediment sampling will be if groundwater and surface water monitoring results indicate that groundwater impacts are affecting surface water quality in Bridge Creek. Groundwater and surface water monitoring requirements are detailed in Sections 6.2.1 and 6.2.2, respectively. Sediment sampling is discussed in Section 6.2.3.

6.2.1 Monitoring Well Installation and Groundwater Monitoring

Post-remedial monitoring will include the verification of the absence of LNAPL, the measurement of depth to groundwater, and the collection of groundwater samples at seven monitoring wells. The purpose of the groundwater monitoring program is to confirm that LNAPL is not present at Site 1 and that the remaining groundwater impacts do not degrade the environmental quality of Bridge Creek.

Monitoring Well Installation

Three of the wells (PRW-1 through PRW-3) will be installed at the downgradient edge of selected Site 1 AOCs (AOC-UST2, AOC-Wood Yard, and AOC-Area A, respectively), where groundwater monitoring is warranted. Well PRW-4 is proposed for monitoring groundwater quality in the northern portion of the site. Wells PRW-5 through PRW-7 will be installed along the western property border of Site 1 (i.e., along Bridge Creek). Upgradient groundwater quality will be established by monitoring wells installed along the Site 2 (Area 2A) – Site 1 boundary. The proposed locations and names of these wells will be identified in an SMP for VCP Site 2. The proposed locations of wells PRW-1 through PRW-7 are shown on Figure 5.

The soil column at each monitoring well location will be advanced using manual and hollow stem auger drilling techniques. In accordance with The Port Authority's underground utility clearance policy, the boring will be advanced to a depth of six feet bsg using manual methods. Soil will be recovered in 0.5-foot depth intervals using post-hole diggers. The borehole will be advanced from six feet bsg to its completion depth using hollow stem auger drilling methods. The auger, rods, and center plug will be advanced to six feet bsg, the plug will be removed, the rods will be connected to a split spoon, and the split spoon will be advanced to a depth of eight feet bsg. The split spoon will be recovered and the soil

within the spoon will be logged for, at a minimum, color, texture, moisture content, and indications of potential impacts. The split spoon will be removed; the plug will be reattached to the center rods, and the auger will be advanced to a depth of eight feet. This process will continue until the borehole is advanced to the proposed well depth or to the depth of auger refusal. Please note, in the event of split spoon refusal, the spoon will be removed and the driller will attempt to auger past the obstruction. Once past the obstruction, the split spoon will be reattached to the rods and the drilling process described above will continue.

Upon advancing the borehole to the completion depth, the PVC well, sand pack, seal, and grout will be installed through the augers as the augers are removed. The well will be screened to a depth two feet above the water table and extend to immediately above the top of the meadowmat unit. It is anticipated that the screen length will not be more than 10 feet in length. The well will consist of threaded, four-inch-diameter PVC riser and 0.020-inch slotted screen. The sand pack will consist of #2 Morie sand or equivalent and will be installed to a depth one foot above the screened interval. The seal will consist of one foot of hydrated bentonite pellets. A cement-bentonite grout will be mixed and poured into the borehole to a depth of at least one foot below surface grade. Concrete will be mixed and poured above the grout and a five-foot standpipe will be set in the concrete. All wells will be fitted with a spin-lock cap and a padlock to prevent unauthorized access.

Well completion depths will depend on the depth to the meadowmat stratum. The bottom of the well will be set immediately above the top of the meadowmat stratum. The bottom of the borehole will not penetrate the meadowmat unit, which is composed of organic silts/clays and peat. The meadowmat substratum acts as an aquitard, limiting the vertical migration of contaminants into the subsurface.

Following installation, the wells will be developed to remove sediment from the sand pack. Water will be evacuated from the well using a submersible pump and dedicated tubing. Development water will be monitored for clarity, color, pH, temperature, conductivity, turbidity, dissolved oxygen, and oxidation/reduction potential. These groundwater chemistry measurements will be recorded. Well development will continue until turbidity readings are within 10 percent for three consecutive readings.

The locations and elevations of the monitoring wells will be surveyed. Horizontal locations will be surveyed to within three feet relative to the North American Datum of 1983 (NAD ’83). The elevation of

the top of the inner casing will be determined to within 0.01 feet relative to North American Vertical Datum of 1988 (NAVD '88).

Well Gauging

As noted above, gauging the wells is part of the annual groundwater monitoring event. The QEP will measure the thickness of petroleum product (if any), and measure the depth to water at each well relative to the surveyed reference. All measurements will be made using an oil/water interface probe or equivalent.

The presence of petroleum product in any well will trigger the response in Section 7.0. The product thickness and depth to groundwater measurements will be used to calculate groundwater elevation. The depth to water at wells within fifty feet of Bridge Creek will be monitored twice per day: once at low tide and once at high tide. All other wells will be gauged once.

Groundwater Sampling

Groundwater sampling will be conducted during each groundwater monitoring event. The first groundwater monitoring will be in May for the first year. After the first year, the frequency of the periodic groundwater monitoring will be agreed upon by the NYSDEC and The Port Authority. All groundwater samples will be collected using low flow purging and sampling techniques. As the samples will be analyzed for VOCs, in addition to other parameters, all purging and sampling activities will be conducted using bladder pumps with dedicated Teflon bladders equipped with ¼-inch polyethylene air line and 3/8-inch water line. The water line will be either Teflon or polyethylene with an inner Teflon liner. The target pump intake depth will be (in order of decreasing importance) the depth interval exhibiting the greatest indications of potential impacts, the depth interval with the coarsest grain size, or the center of the saturated screen.

The pump intake will be slowly lowered to the target depth. The air line will be connected to an air compressor, which in turn is connected to a control box. The water line will be connected to a flow through cell containing the groundwater chemistry meters. Purging will be initiated; once the purge rate is set at a velocity between 100 and 250 milliliters per minute (mL/min), initial groundwater chemistry measurements, depth to water, and flow rate will be recorded. The measurements will be recorded every five minutes thereafter. Purging will continue until the parameters have stabilized to within the following limits for three consecutive measurements:

- pH……..……+/- 0.1 unit
- Specific Conductance……..…… +/- 3%
- Temperature……..……+/- 3%
- Dissolved Oxygen (DO). ……..…….+/- 10%
- Turbidity……+/- 10% for values greater than 1 NTU
- ORP/Eh……..……+/- 10 millivolts (mV)

Once the purge is completed, the groundwater sample will be collected. The flow through cell will be disconnected. The groundwater will be pumped directly from the water line into laboratory-prepared sampling jars. All groundwater samples will be transported to a New York certified laboratory and analyzed for Priority Pollutant metals and organic compounds with a 40-compound library search (PP+40). PP+40 analysis includes VOC+15, PP SVOC+25, PP Metals, pesticides, PCBs, and total cyanide. After the first groundwater monitoring event and subsequent events, the need to reduce the sampling parameters will be evaluated by The Port Authority, which may then petition the NYSDEC for a reduction. Groundwater monitoring will continue until the NYSDEC notifies The Port Authority in writing that the monitoring is no longer required. Groundwater monitoring data will be documented in the PRR for Site 1 (see Section 8.0).

6.2.2 Surface Water Monitoring

Post-remedial monitoring will include a surface water monitoring program. Together with the groundwater monitoring data, the surface water monitoring data will be assessed to evaluate whether the remaining groundwater impacts are impacting (relative to the AWQSGVs for Class SD surface water) the environmental quality of Bridge Creek relative to SWQS.

Establishing Surface Water Monitoring Locations

Two surface water sampling stations will be established along the eastern bank of Bridge Creek. The upstream station (SW-4) will be established at the southwestern corner of Site 1, while the downstream station (SW-5) will be established at the furthest downstream location along Bridge Creek that is accessible and adjacent to the site. The locations of the surface water monitoring stations are shown on Figure 5.

After the collection of the surface water sample at each location, surface water chemistry measurements will be recorded. The surface water chemistry will be measured using field instruments. Surface water

chemistry parameters that will be measured are as follows: pH, temperature, specific conductance, salinity, oxidation-reduction potential, dissolved oxygen, and turbidity.

The measurement of surface water chemistry and the collection of surface water samples will be conducted at low tide. Surface water samples and chemistry measurements will be collected at mid-depth at the center of Bridge Creek, assuming that there is a sufficient depth of water at low tide; otherwise, the samples and measurements will be collected from the most appropriate depth interval based on practical considerations. Chemistry measurements will be made by submerging the meters in the stream and recording the measurements after the readings stabilize.

Collection of surface water samples for laboratory analysis will be conducted as described below. The downstream sample will be collected first. A dedicated amber glass jar will be submerged in Bridge Creek with care taken to minimize sediment suspension. The water will be transferred directly into laboratory-prepared sampling jars. The surface water samples will be transported to a New York certified laboratory with instructions to be analyzed for PP+40. After the first surface water monitoring event, the need to reduce the surface water sampling parameters will be evaluated by The Port Authority which may then petition the NYSDEC for a reduction. Surface water monitoring will continue until the NYSDEC notifies The Port Authority in writing that the monitoring is no longer required. The data gathered during the surface water monitoring program will be documented in the annual PRR (see Section 7.0).

Determining Surface Water Elevations

The surface water elevation in Bridge Creek adjacent to Site 1 will be measured at one gauging station. The gauging station will be located at the bridge that crosses Bridge Creek to the northwest of Site 1. A reference point at the gauging station will be surveyed for horizontal location and elevation. The survey will be completed to the same accuracy and relative to the same datum as the monitoring well survey described in Section 6.2.1. Additional surface water gauging stations are not needed adjacent to Site 1 as other locations along Bridge Creek and its unnamed tributary will be established for VCP Site 2. For information specific to these surface water gauging stations please see the Site 2 Site Management Plan.

During each surface water monitoring event, the surface water elevation will be determined at the surface water gauging station. The depth from the reference point to the surface water elevation will be measured at both low and high tides.

6.2.3 Sediment Monitoring

Sediment sampling conducted to date is insufficient to conclude that the site has impacted or will impact Bridge creek. In fact, the existence of upstream (at low tide) sediment impacts has been confirmed; the metals and organic compounds detected in the sediment samples collected in Bridge Creek are substantially the same as those detected at an upstream (at low tide) NYSDEC wetlands mitigation site. Therefore, sediment sampling will only be performed as part of the post-remedial monitoring if surface water quality has been degraded, relative to the SWQS or SWQGV, by groundwater discharge from Site 1. If sediment sampling is incorporated into the post-remedial monitoring, samples will be collected upstream, at, and downstream of the area where the groundwater discharge is known or suspected. Additional (i.e., beyond those collected at the surface water sampling stations described in Section 6.1.2) surface water samples will be collected at the sediment sampling locations. Sediment samples will be collected from the top 6 inches of the streambed at depositional areas and will be analyzed only for the metal(s) and/or organic compound(s) that impacted surface water.

6.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) samples will be prepared during groundwater and surface water monitoring. One duplicate groundwater or surface water sample will be collected during each annual monitoring event. Additionally, a sufficient volume of groundwater will be collected to allow the analytical laboratory to prepare and analyze a matrix spike and matrix spike duplicate samples using water from the site. The MS/MSD results will be assessed for matrix interference and the accuracy and reproducibility of laboratory analytical procedures.

A trip blank sample will be prepared by the laboratory and will accompany the sampling jars from the laboratory to the field and the samples back to the laboratory. The trip blank sample will be analyzed for PP VOC+15 only. A field blank sample will be collected by running laboratory grade DI water over the sampling equipment and collecting the runoff in laboratory provided sampling jars. The field blank sample will be analyzed for PP+40. Trip blank results will be assessed for cross-contamination during sample transport and field blank samples will monitor the effectiveness of field decontamination procedures.

All water quality meters will be calibrated in the field prior to use. All tubing and sampling equipment will be dedicated to a well.

Validation of the laboratory analytical data set will be provided in a Data Usability Summary Report (DUSR). The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. The DUSR will be submitted to the NYSDEC in the PRR (see Section 8.).

7.0 OPERATION AND MAINTENANCE PLAN

The site does not rely on any mechanical systems to protect public health and the environment. However, mobile phase petroleum product may potentially be present, particularly at AOC-UST2. Among the remedial goals established for the site is the removal of mobile petroleum product. This section specifies the actions to be taken if mobile product is encountered in any well during the post-remedial monitoring period. The actions will be taken if necessary to remove the LNAPL.

Petroleum-impacted soil is known to remain beneath a concrete slab, the top of which was encountered at a depth of approximately 6 feet bsg, at AOC-UST2. Removing the concrete slab would potentially have caused increased subsidence in an area where shipping containers, typically weighing 2.5 (empty) to 24 maximum weight) tons, are staged. Although the soil beneath the slab is known to be impacted and could not be removed, an aggressive pumping program was conducted to remove mobile LNAPL from below the slab. Following the pumping effort, mobile product did not re-accumulate in the excavation on the downgradient edge of the slab. Nonetheless, AOC-UST2 is considered the Site 1 AOC most likely to contain mobile LNAPL. Therefore, well PRW-1 will be installed at the downgradient edge of AOC-UST2. Encountering mobile LNAPL at AOC-UST2 or any other Site 1 AOC will trigger the actions provided in Section 7.2.

7.1 O&M Monitoring Frequency

The post-remedial monitoring wells (PRW-1 through PRW-7) will be gauged in May of the first year of groundwater monitoring. After the first year, the wells will be gauged periodically and coincide with the periodic groundwater monitoring. If LNAPL is encountered in any well, the LNAPL will be considered mobile and the O&M and LNAPL removal procedures documented in Section 7.2 will commence.

7.2 O&M Monitoring and LNAPL Removal Procedures

Mobile LNAPL will be removed from the surface of any well where it is encountered using a vactor truck. During removal activities, the water level in the well will be lowered at least one foot to allow LNAPL to re-accumulate. This process will continue until all recoverable LNAPL has been removed from the well. The depth to LNAPL and the depth to groundwater will be recorded before and after product removal. The vactor truck will dispose of all fluids in accordance with Federal, State, and local regulations. At each well where the removal action was performed, the mass of LNAPL and groundwater in contact with the product that was disposed of offsite shall be recorded in the PRR.

The Port Authority will inspect the well(s) where removal actions were conducted one month later. If LNAPL is encountered, removal procedures will be repeated. The monthly inspections will continue until mobile LNAPL does not re-accumulate within any well for three months.

If LNAPL remains in any well despite removal efforts, an additional well will be installed downgradient of where the removal was conducted. The purpose of this well will be to assess whether mobile LNAPL could migrate to Bridge Creek. If it is determined that mobile LNAPL may migrate to Bridge Creek, The Port Authority will prepare a corrective measures plan to prevent LNAPL from reaching Bridge Creek. If the mobile petroleum will not reach Bridge Creek, the gauging and removal efforts will continue. In lieu of removing LNAPL via a vactor truck, The Port Authority may recommend other methods to recover the LNAPL.

The results of the O&M including the actions taken and data collected will be summarized in the PRR discussed in Section 8.0.

8.0 PERIODIC REVIEW REPORT

All information collected pursuant to this SMP will be kept on file at the site. All reports, forms, and other relevant information generated will be available to the NYSDEC upon request. In addition, the PRR will be submitted to the NYSDEC at least 45 days prior to the end of the certification period, as determined by NYSDEC. All PRRs will be submitted to the NYSDEC electronically in the approved format.

The PRR will include the following:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site;
- Results of the required periodic site inspections and severe condition inspections, if applicable;
- All applicable inspection forms and other records generated for the site during the reporting period in electronic format;
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, surface water), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format;
- Summary of O&M activities completed during the monitoring period; and
- A site evaluation, which includes the following:
    - The compliance of the remedy with the requirements of the site-specific RAWP;
    - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
    - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
    - The overall performance and effectiveness of the remedy.

As indicated above the PRR will include certification of the EC and IC. The QEP will provide the following certification.

For each IC or EC identified for the site, I certify that all of the following statements are true:

- The inspection of the site to confirm the effectiveness of the IC and EC required by the remedial program was performed under my direction;
- The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;
- Nothing has occurred that would impair the ability of the control to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with the SMP;
- Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;
- Use of the site is compliant with the Deed Restriction;
- To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the VCP;
- The information presented in this report is accurate and complete; and
- I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] for the site.

The signed certification will be included in the PRR.

9.0 CORRECTIVE MEASURES PLAN

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed until the corrective measures plan is approved by the NYSDEC.

Appendix A
Excavation Work Plan

1.0 INTRODUCTION

The Remedial Action Work Plan (RAWP), which was approved by the New York State Department of Environmental Conservation (NYSDEC) for Site 1 (the site) included the construction of a site-wide environmental cap as an Engineering Control (EC). The environmental cap is comprised of a minimum of one foot of crushed stone, concrete, or asphalt. The required environmental cap has been constructed at the site.

This Excavation Work Plan (EWP) outlines the procedures required to be implemented in the event the environmental cap is breached, penetrated, temporarily removed, or otherwise disturbed. The environmental cap will be disturbed as necessary for maintenance or repair of subsurface structures, site improvements, or upgrading infrastructure.

2.0 NOTIFICATIONS

The following describes required notifications by the contractor performing intrusive work and by The Port Authority. Except for emergency repairs, the contractor shall submit to The Port Authority's Resident Engineer (RE) the HASP, if necessary (see list below), and/or a detailed work plan indicating how the contractor will comply with this EWP. The RE shall review the document(s) and either accept them or require the contractor to make revisions. If required to make revisions, the contractor shall promptly revise and resubmit the HASP and/or work plan. Once final, the RE shall make the document(s) available to The Port Authority's Environmental Engineering Department for concurrence. For emergency repairs, the contractor shall comply with this EWP without compromising the emergency repair work. Upon conclusion of the emergency work, the contractor shall submit to The Port Authority's RE a report detailing the work, documenting results of any air monitoring or other health and safety monitoring, and documenting any non-compliance with this EWP.

The Port Authority will notify the NYSDEC of planned ground-intrusive work (i.e., non-emergency work) at least 15 days in advance. The Port Authority will provide to the NYSDEC written notice within 45 days of completion of subsurface activities and restoration of the environmental cap. Any disturbance below the bottom of the cap will require notification. Any disturbance above the bottom of the cap does not require notification as long as the cap is restored.

It will not be practical for The Port Authority to provide advance notice of emergency repairs. However, The Port Authority will submit verbal notice by noon of the following day of any unforeseeable incident or emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of the EC, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact, if any, to the environment and the public. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the EC. If the damage is not an emergency, NYSDEC should be notified within 5 days of the inspection. At any time, if the Port Authority identifies that the EC/IC is no longer effective, NYSDEC should be notified and a Corrective Measures Plan (Section 9.0) be submitted for review.

Other notifications are needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the VCA, 6NYCRR Part 375, and/or Environmental Conservation Law.

- Notice within 48-hours of any damage or defect to the foundations of structures that reduces the effectiveness of the EC and likewise any action to be taken to mitigate the damage or defect.

At a minimum the NYSDEC Division of Environmental Remediation Case Manager and the QEP will be notified of any planned activities or emergency repairs.

Written notice of planned activities or emergency repairs that will penetrate the environmental cap shall include the following elements:

- A detailed description of the work to be performed, including the location and the limits of the work, details of the intrusive activities to be completed, estimated volumes of contaminated soil and groundwater to be handled and/or disposed of, actions to be taken to minimize the potential impact to human health and the environment, and restoration activities to repair the Engineering Controls;
- A summary of environmental conditions anticipated in the work areas;
- A schedule of the proposed work,
- A statement that the work will be performed in compliance with the Site Management Plan (SMP) and 29 CFR 1910.120;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the site-specific HASP provided in Appendix D of this document,
- A statement that the contractor will monitor concentrations of volatile organic vapors and airborne dust, and will implement vapor and/or dust control measures, as specified in the site-specific Community Air Monitoring Plan (CAMP), included in Appendix D;
- Identification of disposal facilities for potential waste streams, if available; and,
- Identification of offsite sources of any anticipated backfill, along with documentation showing the backfill is certified clean fill or meets applicable 6 NYCRR Part 375 criteria for a Track 2 (restricted use with generic soil cleanup objectives) cleanup. The applicable criteria will be the lowest of the Protection of Public Health Objectives for commercial sites, Protection of Public Health Objectives for industrial sites, and Protection of Groundwater Objectives.

Regardless of whether the work was planned or was an emergency repair, The Port Authority will provide to the NYSDEC written notice within 45 days of completion of subsurface activities and restoration of the environmental cap. Written notice confirming that emergency repair or planned work was completed shall include the following elements:

- A detailed description of the work that was performed, including the beginning and completion dates, the location and the limits of the work, actions to be taken to minimize the potential impact to human health and the environment, and restoration activities to repair the environmental cap. Please note, if the work was conducted in accordance with the written notice provided to the NYSDEC prior to initiation of the work, a statement to that effect shall be provided and a second detailed description is unnecessary;
- A summary of environmental conditions encountered in the work areas;
- A statement that the work was performed in compliance with the SMP and 29 CFR 1910.120,
- Any air monitoring results or other data that confirm the effectiveness of efforts to minimize impacts to human health or the environment. Such data may include but are not necessarily limited to pre-treatment and post-treatment (i.e., influent and effluent) samples in the event that treated water is discharged at the site, measurements of organic vapors and/or respirable dust concentrations, waste classification sampling results, etc.;
- Documentation of disposal of all waste streams; and,

Identification of offsite sources of backfill, including that placed to re-establish the environmental cover, along with documentation showing the backfill is certified clean fill or meets applicable 6 NYCRR Part 375 criteria for a Track 2 (restricted use with generic soil cleanup objectives) cleanup. The applicable criteria will be the lowest of the Protection of Public Health Objectives for commercial sites, Protection of Public Health Objectives for industrial sites, and Protection of Groundwater Objectives.

3.0 POTENTIAL WASTE STREAMS

Depending on the nature of the work, soil, solid wastes other than soil, and/or groundwater waste streams may be generated at Site 1. All solid wastes will be stockpiled, sampled, and either reused at the Site or will be transported off site for recycling or disposal. Liquid wastes will either be staged in vessels or transported off-site for disposal. All storage, handling, and disposal of wastes will be in accordance with the Resource Conservation and Recovery Act (RCRA) and any other pertinent federal, state, and local laws and regulations. Requirements for handling and disposal of potential waste streams are discussed in Sections 3.1 through 3.5.

3.1 Soil Excavation and Screening Methods

During excavation, the soil will be field screened for impacts. The excavated soil will be considered impacted if it is grossly contaminated (contains LNAPL, exhibits strong petroleum odors, or exhibits elevated concentrations of volatile vapors as measured using a photoionization detector). Soil considered to be impacted based on the field indicators mentioned above will be stockpiled separately from soil that appears to be clean. All soil that does not exhibit petroleum impacts, such as historic fill (i.e., cinders and slag), can be stockpiled with soil that appears clean.

Since the environmental cap has been established to limit the exposure to contaminants at the site, only impacted soil within the limits of the planned/actual excavation will be remediated. No post-excavation soil sampling is necessary.

3.2 Stockpiling of Soil

Soil that is considered to be impacted as defined in Section 3.1 will be staged on two sheets of 10-mil (minimum) plastic that is elevated at least one foot at the edges and will be covered with plastic secured using sand bags or equivalent. The soil stockpile will be stored in accordance with all applicable rules and regulations and remain covered until it is transported offsite for disposal. Soil that does not appear to be grossly impacted, based on the criteria identified above, does not require special handling and will be used below the cap.

3.3 Removal of LNAPL (Prior to Groundwater Removal)

If groundwater is encountered in the planned excavation and visual LNAPL is observed on the water surface in the excavation, the LNAPL must be removed from the surface using a vactor truck before any dewatering activities can be initiated. Dewatering activities are discussed in Section 3.4. Any LNAPL pumped into the vactor truck should be transported offsite for disposal in accordance with local, state, and federal regulations. The Port Authority shall obtain waste disposal documentation.

Please note, the construction work completed by The Port Authority or its contractor will not be completed for the sole purpose of removing mobile LNAPL beyond the limits of the intended planned excavation or the action described above and in Section 3.1. Consequently, there is no requirement to excavate soil beyond the construction area, to collect post-excavation soil samples, or to assess whether the LNAPL is mobile or immobile. However, the contractor may take these or other actions as necessary to complete the construction activities. The removal of mobile LNAPL, considered to be a remedial action, will be overseen and directed by The Port Authority's Environmental Engineering Department. The remedial action may be completed as part of planned construction activities or as a separate activity. Any mobile LNAPL encountered will be removed, which is the remedial goal for Site 2. The remedial action will be proposed in a work plan that The Port Authority's Environmental Engineering Department will prepare and submit to the NYSDEC (see Section 5).

3.4 Pumping of Groundwater, Storage, and Disposal

If groundwater is encountered in the planned excavation and dewatering is required, the water must be pumped into an appropriate storage container (i.e., fractionation tank or vactor truck) until disposal. Since groundwater at Site 1 contains regulated organic compounds and metals above the New York AWQSGVs, untreated groundwater cannot be discharge directly to the ground surface.

Groundwater stored in fractionation tank(s) or a vactor truck(s) may be transported off site for disposal in accordance with local, state, and federal regulations or will be treated and disposed of on site. If the water will be disposed of offsite, it is The Port Authority's responsibility to obtain waste disposal documentation.

To dispose of the water at the site, certain requirements apply. Through sampling, it will be demonstrated that treated groundwater meets all AWQSGVs for groundwater and surface water, as appropriate. The

Port Authority will submit a groundwater treatment plan to the NYSDEC for approval. Treated groundwater will not be discharged at the site in the absence of influent and effluent sampling results and an NYSDEC-approved treatment plan.

3.5 Soil Disposal

Prior to disposal, soil samples will be collected from the contaminated soil stockpile for waste classification purposes. The frequency and number of samples to be collected will depend on the disposal facility requirements and the quantity of soil generated. The purpose of the sampling is to demonstrate that the soil meets the disposal facility's requirements and to classify the soil as non-hazardous or hazardous. The disposal facility will generate an acceptance letter indicating that the facility will accept the soil for disposal. It is The Port Authority's responsibility to obtain waste disposal documentation.

Solid wastes (other than soil) that appear to be impacted will be handled similarly to impacted soil. Such materials may be transported offsite for recycling or disposal only after appropriate sampling results are available and the receiving facility has issued a letter approving the material.

4.0 SITE RESTORATION

All excavations will be backfilled with soil from the site that appears to be clean (see Section 3.1 for specific criteria) or with backfill imported to the site. Imported backfill will be accompanied by a letter certifying that the material is clean fill or virgin material or will meet applicable 6 NYCRR Part 375 criteria for a Track 2 (restricted use with generic soil cleanup objectives) cleanup. The applicable criteria will be the lowest of the Protection of Public Health Objectives for commercial sites, Public Health Objectives for industrial sites, and Protection of Groundwater Objectives (see Table 2 at the end of Appendix). The excavation will be filled to one foot below grade. The remaining one foot below grade will consist of re-establishment of the environmental cap.

Please note, this section does not address geotechnical qualities of the soil, backfilling methods, or compaction requirements. Specifications for backfilling will be developed outside the SMP and this EWP.

5.0 REPORTING

As many as four types of reports may be required, depending upon the type of construction work and field observations made during construction. While any disturbances to the environmental cap must be

summarized in the annual Periodic Review Report (see Section 8.0 of the SMP), this report is required even if no subsurface/intrusive work is performed at the site during the periodic review period. Therefore, the Periodic Review Report is not discussed further in this section.

- Pre-notification - Except for emergency repairs, The Port Authority must notify the NYSDEC in advance of the work. For emergency repairs, The Port Authority must give the NYSDEC verbal notice by noon of the following day of any emergency, with written confirmation within 7 days. Both types of pre-notice are detailed in Section 2.

- Post-notification – Within 45 days of completing subsurface/intrusive work and restoring the environmental cap, the Port Authority must document the scope of the work and final conditions in a written notice to the NYSDEC. This notice is required regardless of whether planned work or emergency repairs were completed. Requirements for the post-notification are detailed in Section 2.

- Corrective Measures Plan – If the periodic certification cannot be provided due to the failure of an IC or EC, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure.

- Work Plan – In the event LNAPL is encountered during construction, The Port Authority's Environmental Engineering Department will prepare a letter report to document the conditions and propose additional investigative actions to determine whether the LNAPL is residual or mobile. The letter report will also propose actions to remove any mobile LNAPL. To be consistent with the IRM conducted at AOC-Southern Area (Site 2, Area 2B), remedial work will be proposed only in the event that The Port Authority confirms that the LNAPL is mobile. The remedial work will be to remove the mobile LNAPL, which is the remedial goal for Site 2.

Based on previous work at Site 2, The Port Authority anticipates that the proposed remedial activities documented in the letter report will generally include the following:

- All mobile LNAPL will be removed from excavations that will hereinafter be referred to as "removal areas."

- Soil will be removed along sidewalls where LNAPL is observed or suspected to flow into the removal area.
- When all soil containing mobile LNAPL is excavated, the removal area will remain open for 30 days.
- If LNAPL flows into the removal area, the removal area will be expanded via additional soil excavation. If no LNAPL flows into the removal area during this 30-day period, post-excavation soil samples will be collected and the excavation will be backfilled (see Section 3.1 for environmental requirements for backfill material).
- Post-excavation soil samples will be collected at the rate of one per 30 linear feet of removal area sidewall and one per 900 square feet of removal area base. The post-excavation soil samples will be analyzed for Priority Pollutant (PP) volatile organic compounds with a 15-compound library search (VOC+15) and PP semivolatile organic compounds with a 25-compound library search (SVOC+25). The analytical laboratory will be required to provide Level B data deliverables, which will undergo data validation as documented in a Data Usability Summary Report. All post-excavation sampling locations will be biased based on field observations and field screening results.
- The results of the investigation and/or remedial action will be documented in a report that will be submitted to the NYSDEC.

Appendix B

Deed Restriction

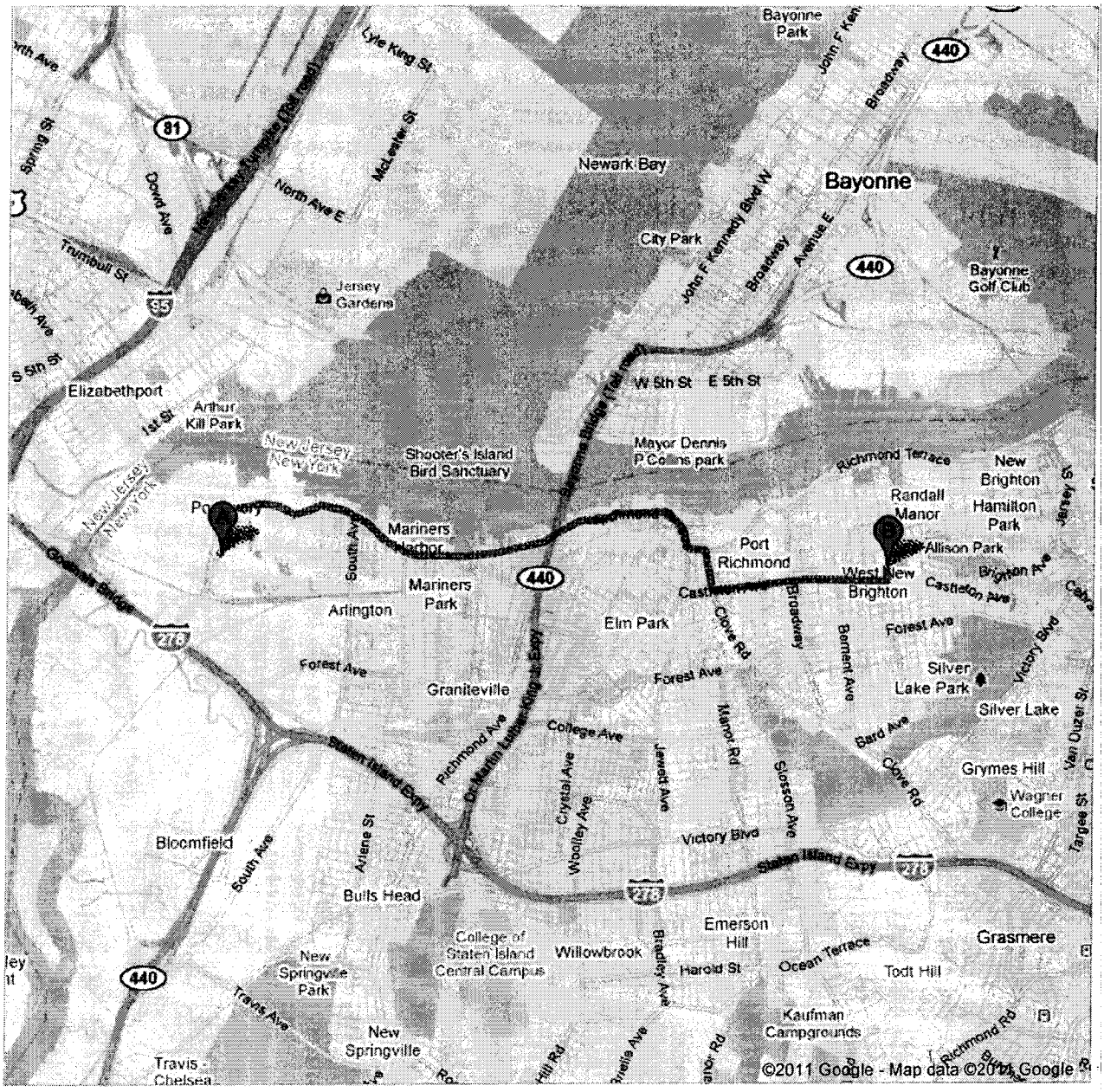
Deed Restriction will be filed by the Port Authority upon completion of editing as required by NYSDEC.

Appendix C

Directions to Hospital

Google maps

Directions to Richmond University Medical Center
355 Bard Avenue, NY 10310 - (718) 818-1234
4.7 mi – about **12 mins**



40 Western Ave, Staten Island, NY 10303

1.	Head **northeast** on **Western Ave** toward **Richmond Terrace**	go 0.3 mi total 0.3 mi
2.	Turn right at **Richmond Terrace** About 6 mins	go 3.0 mi total 3.2 mi
3.	Turn left to stay on **Richmond Terrace**	go 495 ft total 3.3 mi
4.	Take the 2nd right onto **Clove Rd**	go 0.2 mi total 3.6 mi
5.	Take the 2nd left onto **Castleton Ave** About 3 mins	go 1.0 mi total 4.6 mi
6.	Turn left at **Bard Ave**	go 381 ft total 4.7 mi

Richmond University Medical Center
355 Bard Avenue, NY 10310 - (718) 818-1234

Appendix D

HASP and CAMP

The Port Authority of New York and New Jersey

Revised Site Specific Health and Safety Plan

HHMT – Port Ivory Facility

November 2006

40 Western Avenue, Staten Island, New York

HMM 219559

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(all tables are provided in text in order of first reference; not all numbers are used since the tables are from the Conti SSHP and not all tables in that document pertain to this SSHP)

1.0 INTRODUCTION

This Site Specific Health and Safety Plan (SSHP) establishes guidelines and requirements for protecting the safety of personnel during the implementation of all subsequent investigative and/or remedial actions at the Howland Hook Marine Terminal (HHMT)-Port Ivory Facility located at 40 Western Avenue, Staten Island, New York. The additional investigations and/or remedial actions will be performed as part of the overall redevelopment effort of the Port Authority of New York and New Jersey (Port Authority) to construct an intermodal Facility at the HHMT-Port Ivory Facility. The portion of the Port Authority's redevelopment effort that involves environmental investigation and remediation is subject to New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) oversight in accordance with the Voluntary Cleanup Program (VCP). The VCP requires that a SSHP and a Community Air Monitoring Plan (CAMP) be submitted prior to beginning work proposed in the Site Investigation Workplan (SIWP) or Remedial Action Work Plan (RAWP). This SSHP is being submitted to meet that requirement with respect to all subsequent workplans that propose investigative or remedial efforts at the HHMT-Port Ivory Facility; the required CAMP is included as Appendix A to this SSHP. No activity related to additional investigations and/or remedial actions will be initiated prior to the Port Authority's receipt of approval of this SSHP and the CAMP, included in Appendix A.

Investigative activities at the HHMT-Port Ivory Facility are anticipated to include the following: drilling soil borings; collecting soil samples; excavating test pits and trenches; installing temporary and permanent monitoring wells; collecting groundwater samples; and, collecting light, non-aqueous phase liquid (LNAPL) samples. Subsequent remedial activities at the HHMT-Port Ivory Facility are anticipated to include the following general components: excavation of removal areas/trenches; pumping of water and/or LNAPL out of the removal areas/ trenches; temporarily staging the water and LNAPL at the HHMT-Port Ivory Facility; installing permanent monitoring wells; collecting soil, water, and LNAPL samples; disposing of the water and/or LNAPL; stockpiling of excavated soils; disposal of impacted soils; and, site restoration. While Port Authority personnel may complete some of the proposed activities, the bulk of the proposed activities will be completed by environmental contractor(s) retained by the Port Authority for completion of intrusive activities associated with the site. Hatch Mott MacDonald (HMM), an environmental consultant retained by the Port Authority, will assist the Port Authority with oversight and reporting requirements associated with the proposed activities.

HMM and other Port Authority subcontractors are required to adopt this SSHP or provide the Port Authority with a more stringent SSHP (contractor's SSHP) that addresses all hazards identified in this SSHP. While the Port Authority has a policy that includes health and safety provisions for its personnel at the HHMT-Port Ivory Facility, subcontractors of the Port Authority are not specifically addressed by the Port Authority's policies. Therefore, if, based on the Port Authority's review, the contractor's SSHP is insufficient for mitigation of any hazard, the Port Authority may reject the contractor's SSHP. The adoption of this SSHP does not relieve any contractor and its subcontractors of any obligations to provide a safe working environment in accordance with all applicable federal, state and local requirements including, but not limited to, Occupational Safety and Health Administration (OSHA) Regulations 29 CFR 1910 and 1926. All personnel covered by this SSHP are required to read the SSHP, sign the Compliance Agreement included in Appendix B, and abide by the provisions of the SSHP. As noted above, the Port Authority will maintain separate health and safety protocols for their own personnel.

An SSHP prepared by Conti Enterprises, Inc. and dated February 19, 2002 (Conti SSHP) forms the basis for this SSHP. The Conti SSHP was written for the demolition and remediation work previously conducted at the HHMT-Port Ivory Facility, and identifies many physical and chemical hazards that may potentially be encountered during performance of the proposed activities. This SSHP was prepared by selecting the hazards that were identified in the Conti SSHP and that apply to the proposed activities, and by appending to the list of hazards in the Conti SSHP any hazards that may potentially be encountered during implementation of the proposed activities. In addition, the health and safety activities required by the Conti SSHP for mitigation of each listed hazard are included with only minimal changes. Because the Conti SSHP was approved by the Port Authority's Risk Management Group and the hazards and health and safety activities in the Conti SSHP were modified only slightly in this SSHP, this SSHP will not require review by the Port Authority's Risk Management Group. Please note, Appendix C includes the entire Conti SSHP for comparison purposes. In addition, a statement is made in Sections 3 and 5 through 8

regarding the degree to which the Conti SSHP has been modified or supplemented by additional information. Sections 1, 2, and 4 contain project-specific information, and most information provided in these sections is not derived from the Conti SSHP.

The health and safety guidelines and requirements presented herein are based on a review of available information and an evaluation of potential hazards. Because of the variety of possible work activities and site conditions which may be encountered, and the potential for substances to be present in soil or groundwater at concentrations above those previously detected, the procedures in this SSHP are considered the minimum procedures that should be followed by applicable entities. While the identification of additional procedures is the responsibility of the Site Safety and Health Officer (see below), any personnel at the site may suggest such procedures to the Port Authority and/or to the Site Safety and Health Officer. Before a new procedure is put in place, it shall be summarized in a addendum to this SSHP and will be approved by the Port Authority.

Site Background information is provided in Section 2. Section 3 lists key health and safety personnel and their responsibilities with regard to worker health and safety during implementation of the Project. Each component of work that is anticipated to be implemented during future investigative or remedial activities is described in more detail in Section 4, including a listing of the specific physical and chemical hazards associated with that work. Procedures and requirements that are not task-specific but are designed to reduce the health and safety hazards for all personnel working in, and visitors to, the exclusion zone are provided in Section 5. Procedures for mitigating the physical and chemical hazards that are identified for each task are identified in Section 6. Section 7 summarizes measures designed to protect public health and safety during the Project. Section 8 is an emergency response plan.

2.0 BACKGROUND AND SITE INFORMATION

As noted above, all environmental investigations and remedial efforts at the HHMT-Port Ivory Facility are being conducted under the auspices of the NYSDEC VCP. The HHMT-Port Ivory Facility is a 124.3-acre property that is located at 40 Western Avenue, Staten Island, New York that is currently being redeveloped by the Port Authority. As part of the overall site redevelopment, the Port Authority entered into the NYSDEC VCP in July 2004. The Port Authority's objective for entering into the VCP program with NYSDEC is to address the presence of contamination due to prior site activities unrelated to the Port Authority. Based on the Port Authority's schedule for redevelopment, the HHMT-Port Ivory Facility was partitioned into three Sites designated as Site 1, Site 2A/2B, and Site 3A/3B for the purpose of the VCP. Please note, the VCP agreement for Site 3A (formerly Site 3) was revised to include Site 3B (formerly Site 4) in January 2007. This SSHP will cover subsequent investigative and remedial work at all three sites. Figure 1 depicts the location of the HHMT-Port Ivory Facility including the individual boundaries of the three Sites.

On behalf of the Port Authority, HMM has performed environmental assessment and investigation activities to characterize site conditions and delineate historic fill material and contaminants in environmental media at the HHMT-Port Ivory Facility. HMM's environmental investigation efforts have included the performance of a Phase I Environmental Site Assessment with an additional file review (Phase I ESA), Site Investigation (SI), Remedial Investigation (RI), and Supplemental Remedial Investigation (SRI) at each of the Sites. Based on the results of these investigations, further investigative efforts are required at only a limited number of areas of concern (AOCs), all of which are associated with the presence of petroleum-based LNAPL and/or petroleum-impacted soil. In addition, remedial actions are warranted at locations where soil contains mobile LNAPL, where LNAPL-impacted soil is acting as a source area for offsite groundwater impacts, or where concentrations of benzene and 2-butanone in soil exceed their Recommended Soil Cleanup Objectives and this exceedance has resulted in groundwater impacts. Where required, remedial actions are anticipated to consist of the following components: the excavation of impacted soil; the pumping of groundwater and/or mobile LNAPL; temporary staging of the impacted soil, groundwater, and LNAPL; the collection of soil, groundwater, and LNAPL samples; and, the disposal of the impacted soil, groundwater, and LNAPL. These actions are described further in Section 4.0. Contact with impacted soil that remains in place will be controlled by engineering controls such as the construction of impervious surfaces and administrative controls such as site-wide environmental easements. Although construction of the impervious surfaces is considered to be part of the remedial action, this effort is not

subject to this SSHP. The establishment of the administrative controls will not require any field activity, and is not a remedial activity subject to this SSHP. The protectiveness of these engineering and administrative controls will be monitored on an annual basis after the remedial actions have been completed; these post-remedial monitoring activities are addressed in this SSHP.

The presence of the LNAPL in AOCs located at Site 2B, and Site 3 appears to be attributable to inactive pipelines believed to be situated within an easement previously owned by Tidewater Pipe Co., Ltd. and/or an easement formerly owned by Exxon Mobil and currently owned by Tosco. The easement information is based upon a drawing prepared by Anthony LoBianco, entitled "Map of Survey of Property in Borough of Staten Island, Richmond County, New York, N.Y.," and dated August 14, 1991 as amended September 23, 1991. The source for the LNAPL encountered at Site 1 is not currently known. No LNAPL remains at Site 2A and no AOC located at Site 2A is believed to warrant additional investigation.

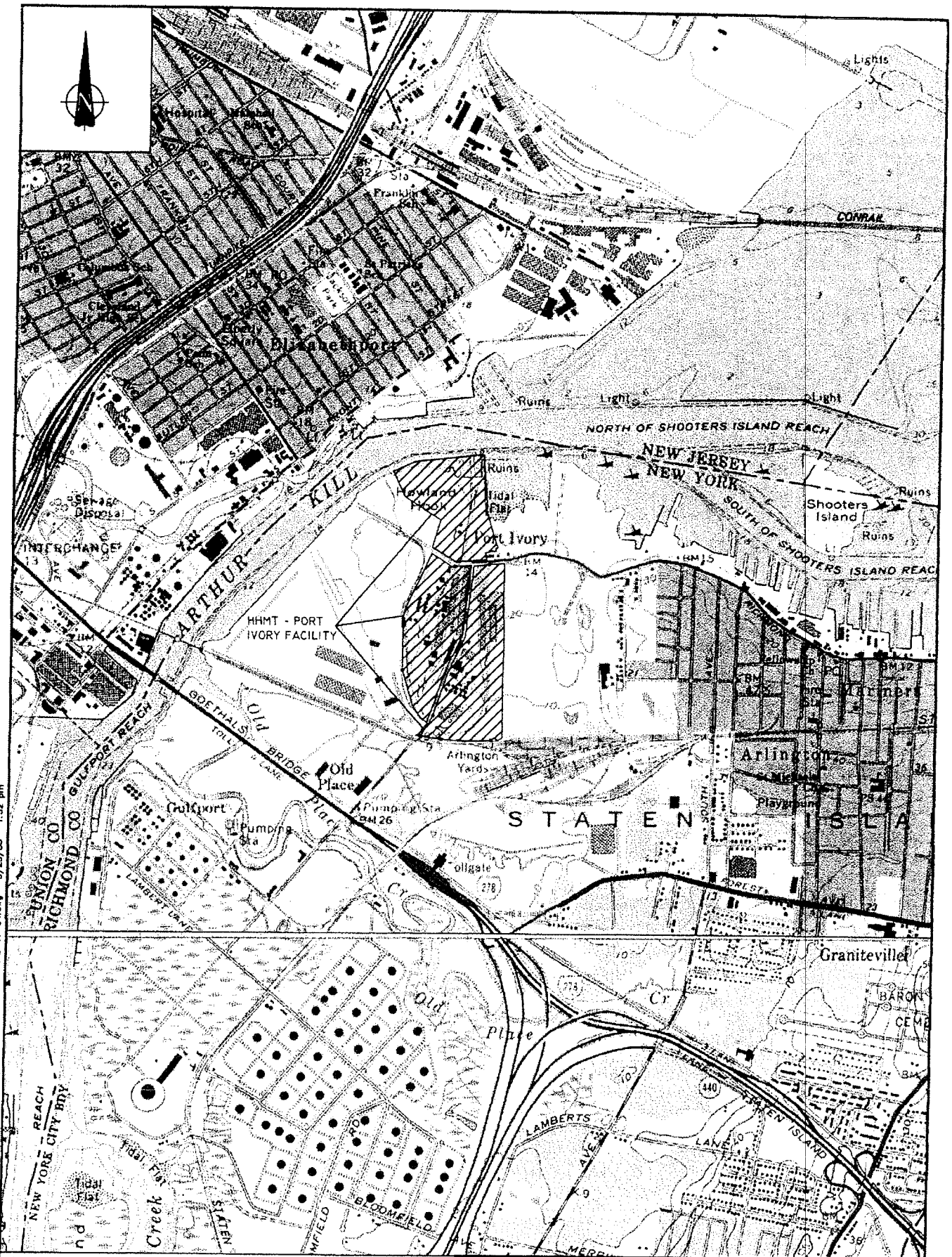
Based on analytical data from environmental investigations previously completed at the Site, the presence of LNAPL and/or petroleum impacted soil has not significantly impacted soil or groundwater quality with respect to regulated substances. Soil and groundwater impacts have been detected at the HHMT-Port Ivory Facility, but these impacts are believed to be attributable to the former placement of fill at the HHMT-Port Ivory Facility by the previous owner/operator, P&G. The impacts that may potentially be encountered include those attributable to organic compounds and/or metals in the following contaminant classes that are adsorbed to soil, dissolved in groundwater, present in vapor or mist form in air, or components of the LNAPL: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and herbicides. In general, workers may be exposed to these contaminants via the following exposure pathways: inhalation, ingestion, or contact. As described in Section 4, personnel involved in certain components of future investigative or remedial activities may become exposed to the above-mentioned substances. The potential hazards associated with exposure to these substances, along with the procedures that should be followed to mitigate these potential hazards, are summarized in Section 6.2.

3.0 HEALTH AND SAFETY RESPONSIBILITIES OF KEY PERSONNEL

The following is a list of key personnel types and responsibilities relating to health and safety activities. The Port Authority personnel with the overall responsibility for the proposed activities can stop work at any time and/or require the replacement of any personnel covered by this SSHP who are not complying with this SSHP. Please note, the titles and responsibilities for each of the following employees are from the Conti SSHP, with the exceptions of the Air Monitoring personnel (added in this SSHP). The Conti SSHP included additional personnel that will not be utilized in this Project. Please also note, for most subsequent investigations and minor remedial actions (i.e., remedial actions that can be completed by the Port Authority and/or HMM without the assistance of additional contractors), many of the roles and responsibilities below may reside in one individual.

Health and Safety Manager (H&SM)

- Be responsible for the development, implementation, oversight and enforcement of the SSHP.
- Conduct initial site-specific training.
- Be present onsite during the first day of remedial activities at the startup of each new major phase.
- Visit the site as needed and at least once per month for the duration of activities, to audit the effectiveness of the SSHP.
- Be available for emergencies.
- Provide onsite consultation as needed to ensure that the SSHP is fully implemented.
- Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the Resident Engineer.
- Provide continued support for upgrading/downgrading of the level of personal protection.
- Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.



SOURCE:
UNITED STATES GEOLOGICAL SURVEY
7.5 MINUTE SERIES TOPOGRAPHIC QUADRANGLES
ELIZABETH AND ARTHUR KILL, NY-NJ
1967, PHOTOREVISED 1981

NOTE:
1) HHMT = HOWLAND HOOK MARINE TERMINAL

2000 0 2000 4000
SCALE IN FEET
1" = 2000'
CONTOUR INTERVAL = 10 FEET

Hatch Mott MacDonald
Certificate No. 24GA28075000
27 Bleeker Street
Millburn, New Jersey 07041

PORT AUTHORITY OF NY AND NJ
40 WESTERN AVENUE, STATEN ISLAND, NY

FIGURE 1
SITE LOCATION MAP
HHMT - PORT IVORY FACILITY

Designed	Drawn	Checked	Approved	Date

P:\232952\mxd\Operable Unit Reports\Operable Unit 4\Figures\Figure 1-Site Location Plan 8-11-04.dwg 5/25/05 1:32 pm

Site Safety and Health Officer (SSHO)

Under the direction of the Safety and Health Manager, the SSHO shall be responsible for the implementation of this SSHP and for the daily coordination of safety activities with the Project Superintendent to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will submit to the Resident Engineer the Certificates of Worker/Visitor Acknowledgements for site personnel prior to initial entry into a contamination reduction or exclusion zone. He will maintain a complete copy of this plan (and its supplements and addenda) at the site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The Site Safety and Health Officer will:

- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted SSHP.
- Be assigned to the site on a full time basis for the duration of intrusive activities. The SSHO will have no duties other than Safety and Health related duties.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations and all aspects of the SSHP. This includes, but is not limited to: activity hazard analyses, air monitoring; use of PPE, decontamination site control; standard operating procedures used to minimize hazards; safe use of engineering controls; the emergency response plan; confined space entry procedures; spill containment program; and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.
- Stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the SSHP with the Safety and Health Manager, and the Site Superintendent.
- Conduct accident investigations and prepare accident reports.
- Review results of daily quality control inspections and document safety and health findings in the Daily Safety Inspection Log.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

Air Monitoring Personnel

The Port Authority or SSHO will designate personnel for the monitoring of air quality in accordance with Section 6 of this SSHP. This individual/these individuals will have the following responsibilities:

- Monitor air quality in the breathing zone of the Exclusion Zone (EZ).
- Monitor air quality at the downwind and upwind perimeters of the EZ.
- Record all air quality measurements.
- Maintain all air quality measurement records at the jobsite.
- Know the action levels with respect to air quality.
- Alert the Site Safety and Health Officer if an action level has been exceeded.

4.0 ANTICIPATED FUTURE ACTIVITIES/COMPONENTS OF WORK

As previously stated, the Conti SSHP was prepared for a different project component of the overall HHMT-Port Ivory Site redevelopment. This Section relates specifically to anticipated investigative and remedial activities and therefore, has been prepared independently of the Conti SSHP. The goal of the proposed investigative activities is to confirm the presence or absence of a "hot spot" at any AOC that has not been fully characterized to date. The goal of the proposed remedial activities is to remove "hot spot" areas of contamination, prior to constructing engineering controls and establishing administrative controls. As indicated above, a "hot spot" consists of soil containing free (i.e., mobile) LNAPL, PAH compounds at a total concentration of more than 500 mg/kg, and/or other metals or compounds at concentrations significantly above those attributable to the prior placement (by P&G) of fill materials throughout the HHMT-Port Ivory Facility.

The following Subsections provide the following information regarding each of the proposed activities: methods to be followed, equipment to be used, and specific potential physical and chemical hazards associated with the activity. All work detailed below shall be performed in a safe and professional manner so that no existing structures that are scheduled to remain are damaged and so that the health and safety of construction workers and on-site personnel are protected. Because there is no residential neighborhood adjacent to the HHMT-Port Ivory Facility, it is not anticipated that the public will be exposed to vapors, except potentially to nuisance odors as they drive along Western Avenue and Richmond Terrace.

4.1 General Description of the Proposed Investigative and Remedial Actions

As noted above, the investigative activities that are anticipated to be performed at a limited number of AOCs at the HHMT-Port Ivory Facility are the following: drilling soil borings, collecting soil samples, excavating test pits and test trenches, installing temporary and permanent monitoring wells, collecting groundwater samples, and collecting LNAPL samples. Components of the remedial activities include the following: excavating removal areas/trenches, pumping groundwater and/or LNAPL from the trenches, stockpiling excavated soil, collecting soil samples, disposing impacted soil, temporarily storing the water and/or LNAPL, collecting water and/or LNAPL samples, disposing of the water and/or LNAPL, and restoring the site to its original conditions. In addition, following these remedial actions, engineering controls will be constructed, administrative controls will be established, and the protectiveness of these controls will be evaluated periodically thereafter. The construction of the engineering controls and the establishment of the administrative controls are not subject to the provisions of this SSHP. However, the groundwater monitoring activities that will be conducted periodically subsequent to the construction of the engineering controls and establishment of the administrative controls are subject to this SSHP. The groundwater monitoring activities are anticipated to include the following: monitoring well installation, measurement of the depth to groundwater, and collection of groundwater samples. Each of these activities is described below. Specifically, excavation, sampling, and well installation activities are anticipated to be completed during both investigative and remedial efforts, but there are no significant differences between the hazards associated with these activities during different phases of work. Therefore, these tasks will be described only once.

Please note, some physical hazards are not associated with any particular activities, but rather with outdoor work in general. These hazards include exposure to high/low ambient temperatures and the use of hand/power tools, which may be used to complete portions of almost every component of the proposed work. Procedures that should be followed to mitigate these physical hazards are provided in Section 6.1.

4.1.1 Drilling Soil Borings

The drilling of soil borings may be conducted during soil quality investigations. Due to the heterogeneous nature of the fill material placed at the HHMT-Port Ivory Facility by P&G and the generally soft weathered zone in the upper portions of the underlying shale bedrock, hollow stem auger methods will likely be used for the drilling of soil borings. Alternatively, relatively shallow soil borings may be drilled using direct push methods or manual methods.

Except for drilling conducted using manual methods, equipment used for drilling has the potential to contact and/or damage underground or overhead utility lines; depending upon the type of utility line encountered, contact with and/or damage to the line may create a hazard. For example, drilling into a high pressure natural gas utility line may potentially cause an explosion. In addition, depending upon the voltage of overhead electric lines, electricity can potentially arc from an overhead line and discharge into a nearby metal drill rig.

Drilling is generally a noisy activity, and exposure to high noise levels is a hazard often associated with drilling. Certain parts of a drill rig are subject to breaking due to high pressures and/or forces. For example, a cable that is being used to support steel casing or augers could potentially snap. As a result, flying debris is a potential hazard associated with the drilling of soil borings.

Drilling involves the use of heavy equipment such as drill rods, augers, casing, etc. Although this equipment can often be moved using cables or other automated portions of a drill rig, sometimes this heavy equipment must be moved manually. In addition, the drill rods, augers, casing often must be placed on the

ground in the vicinity of the drill rig. Drill cuttings are also managed in the vicinity of the drill rig. Therefore, handling heavy objects/material and walking/working surface are hazards associated with the drilling of soil borings.

In some instances, soil borings may be drilled in areas where LNAPL or other substances are present in surface soil, subsurface soil, and/or groundwater. Drilling activities are likely to disturb surface soil and bring subsurface materials to the land surface where personnel working in the vicinity of the drill rig may be exposed to LNAPL and/or other substances. Therefore, chemical hazards are also associated with drilling activities.

In summary, the following physical hazards are associated with drilling activities: underground or overhead utilities; exposure to high noise level; flying debris; handling heavy objects/materials; and, walking/working surface. Procedures that should be followed in order to mitigate these physical hazards are identified in Section 6.1. Chemical hazards due to environmental media are also associated with drilling activities. Procedures that should be followed to mitigate the chemical hazards are provided in Section 6.2.

4.1.2 Collecting Soil Samples

Soil samples may be collected during soil quality investigations or during remedial actions for waste characterization or post-excavation purposes. The methods and equipment used for collecting soil samples will vary depending upon the purpose of the soil sampling. However, regardless of the purpose of the soil sampling, the soil being sampled may potentially contain LNAPL and/or other substances. Soil samples may contain groundwater that may in turn contain chemical substances. In addition, soil sampling equipment will either be disposed of or decontaminated between uses. Decontamination typically involves the use of chemicals such as dilute nitric acid and organic solvents. Therefore, chemical hazards due to environmental media and operational chemicals are associated with soil sampling activities. Procedures that should be followed to mitigate these chemical hazards are provided in Section 6.2.

Soil sampling methods used during implementation of investigative activities or remedial activities, for the purpose of post-excavation soil samples, are essentially the same. In these instances, soil samples will be collected by transferring soil from the sampling device into laboratory-prepared sampling jars using a stainless steel sampling trowel or scoop. The sampling device is typically a hand auger or split spoon (if soil samples are collected at a soil boring location) or a backhoe or excavator bucket (if the soil sample is collected at a test pit or test trench location). Physical hazards associated with drilling and excavation activities are addressed separately in Sections 4.1.1 and 4.1.3, respectively. No physical hazards have been identified with respect to the collection of soil samples during soil quality investigations or during remedial activities for post-excavation purposes.

Soil samples collected for waste classification purposes and during the implementation of remedial activities will generally be collected from soil stockpiles. While the same sampling equipment will be used, the collection of soil samples from these stockpiles may result in two physical hazards. The surface of soil stockpiles is typically uneven, and, during precipitation events or cold conditions, may be unstable or slippery. In addition, fill materials, that may include metal debris, may be present at the surface of soil stockpiles. Therefore, physical hazards associated with the collection of soil samples from a soil stockpile include walking/working surface and contact with sharp objects/material. The procedures that should be followed in order to mitigate these potential hazards are provided in Section 6.1.

4.1.3 Excavating Test Pits and Test Trenches

The excavations of test pits and/or test trenches may be conducted during soil quality investigations. In addition, removal areas/trenches may be excavated during the implementation of remedial activities. Since the difference between test pits/test trenches and removal areas/trenches is primarily semantic, the excavation of these features will be discussed together in this section. Excavation of test pits, test trenches, and removal areas/trenches will be accomplished utilizing backhoes or excavators.

The backhoe or excavator has the potential to contact and/or damage underground or overhead utility lines; depending upon the type of utility line encountered, contact with and/or damage to the line may create a hazard. For example, severing a high pressure natural gas utility line may potentially cause an explosion.

In addition, depending upon the voltage of overhead electric lines, electricity can potentially arc from an overhead line and discharge into a nearby metal backhoe or excavator.

Excavating and disposing of soil are generally noisy activities, and exposure to high noise levels is a potential hazard associated with these activities. The use of hearing protection or exposure to loud noises for prolonged periods of time may create a situation in which an operator may not be able to hear verbal commands from personnel working in the vicinity of the machinery. Therefore, heavy equipment/vehicle traffic and noise are hazards associated with stockpiling soils.

In some instances, excavation activities may be conducted where LNAPL or other substances are present in surface soil, subsurface soil, and/or groundwater. Excavation activities are likely to disturb surface soil and bring subsurface materials to the land surface where personnel working in the vicinity of the excavation may be exposed to LNAPL and/or other substances. Therefore, chemical hazards are also associated with excavating activities.

Procedures that should be followed in order to mitigate underground and overhead utility hazards are identified in Section 6.1. As noted above, chemical hazards due to environmental media are also associated with drilling activities. Procedures that should be followed to mitigate the chemical hazards are provided in Section 6.2.

4.1.4 Installing Temporary and Permanent Monitoring Wells

Temporary or permanent wells will be installed at selected soil boring locations. Both temporary and permanent monitoring wells will be constructed of PVC riser and screen, a PVC bottom cap, a plastic spin-lock top cap, a #1 or #2 sand filter pack, and a bentonite or #00 sand seal. Deep wells may also involve the placement of permanent steel casing. At permanent monitoring well locations, the borehole will be grouted to land surface with a cement-bentonite mix and a concrete well box will be installed. The grout will be mixed in a drum by jetting water into the drum and mixing in the cement and bentonite; as the mixture becomes thicker, it will be pulled through the pump mounted on the side of the drill rig. Temporary wells may be installed in soil borings drilled exclusively by hand or through hollow stem augers. If installed in boreholes drilled exclusively by hand, the well diameter will be two inches. Wells installed in boreholes advanced using hollow stem auger methods may be either two or four inches in diameter. Please note, this section includes only those hazards associated with the installation of monitoring wells; hazards associated with the drilling of soil borings are discussed in Section 4.1.1, above.

During installation of steel casing or during the removal of the hollow stem augers, cables that are used to support the casing or augers may break. As a result, flying debris is a potential physical hazard associated with the installation of temporary or permanent monitoring wells.

Well installation involves the use of heavy equipment such as casing and augers. Although this equipment can often be moved using cables or other automated portions of a drill rig, sometimes this heavy equipment must be moved manually. In addition, the casing and augers often must be placed on the ground in the vicinity of the drill rig. Therefore, handling heavy objects/material and walking/working surface are hazards associated with the drilling of soil borings for temporary or permanent monitoring wells.

During monitoring well installation, fluids, including water and LNAPL (if present), that accumulated in the borehole are often displaced as the well, sand pack, and seal are inserted. Depending on the depth to water, these fluids can potentially flow out the top of the borehole to land surface. Workers may thereby come into contact with LNAPL and/or water containing potentially hazardous substances.

Procedures that should be followed in order to mitigate the following physical hazards are identified in Section 6.1: flying debris; handling heavy objects/material; and, walking/working surface. As noted above, chemical hazards due to environmental media are also associated with drilling activities. Procedures that should be followed to mitigate the chemical hazards are provided in Section 6.2.

4.1.5 Collecting Groundwater and/or LNAPL Samples

Because groundwater and LNAPL are both fluids, the collection of groundwater and LNAPL samples will be discussed together in this section. Groundwater and LNAPL samples may be collected during

groundwater quality investigations or during remedial actions for waste characterization purposes. The methods and equipment used for collecting these samples will vary depending primarily upon the size of the well or test pit from which the sample is to be collected and upon the depth to groundwater. In some cases, groundwater and LNAPL samples can be collected using a dedicated bailer or a decontaminated pond sampling apparatus. In these cases, the groundwater or LNAPL must be poured from the bailer or pond sampling apparatus into the laboratory-supplied sampling jars. In other instances, a pump may be used to purge the well prior to sample collection. The sample may be collected directly from the pump effluent tubing or using a bailer. The type of pump used will vary primarily based on the depth to water. If groundwater is relatively shallow, a negative pressure (i.e., vacuum) pump can be used. Otherwise, a positive pressure pump should be used. Some pumps are powered by generators, and some are powered by car battery.

If a pump is utilized in purging or sample collection, and if the pump is powered using a generator, exposure to high noise levels is a potential physical hazard. In addition, depending upon the amount of instrumentation used in the sampling and placed on the ground near the well, the walking/working surface may become a physical hazard.

Purging and sampling efforts hold the potential for workers to contact LNAPL or chemical substances in groundwater. Therefore, chemical hazards due to environmental media are associated with groundwater and LNAPL sampling.

In some cases, groundwater chemical parameters are measured and recorded during groundwater purging and sampling efforts. The meters used for the measurement of these parameters require calibration at least once per day. Components of the sampling apparatus (pumps, e.g.) may require decontamination between sample collection points. The decontamination process involves the use of chemicals such as dilute nitric acid and organic solvents. In addition, the generator runs on gasoline and requires oil periodically. Therefore, chemical hazards due to operational chemicals are also associated with the sampling of groundwater and LNAPL.

Therefore, physical hazards associated with the collection of groundwater and/or LNAPL samples include exposure to high noise levels and a cluttered walking/working surface. The procedures that should be followed in order to mitigate these potential hazards are provided in Section 6.1. Chemical hazards associated with the collection of groundwater and LNAPL samples include potential contact with both environmental and operational chemicals.

4.1.6 Pumping Groundwater or LNAPL

Groundwater or LNAPL may be pumped from trenches or test pits (trenches) during soil and groundwater quality investigations or during remedial actions. The methods and equipment used to pump groundwater from trenches includes the use of a 2 or 4-inch diameter high-volume positive pressure pumps utilizing 2 or 4-inch diameter hose, or, a vacuum truck.

If positive pressure pumps are used to pump water/LNAPL, and if the pump is powered using a generator, exposure to high noise levels is a potential physical hazard. In addition, power cords and larger diameter pump hoses may create a walking/working surface hazard. Certain types of high volume pumps and generators can be heavy and cumbersome. Therefore, handling heavy objects/materials also may present a potential hazard.

Vacuum trucks are typically large and operators may have limited visibility while approaching trenches. As a result, heavy equipment/vehicle traffic is a potential hazard. Also, the distance between the vacuum truck and the excavation is limited by the length of the hose, and the vacuum truck is often situated within 20 feet of the test pit or test trench. Therefore, the potential for trench collapse (excavation safety) is a potential hazard.

Chemical hazards due to environmental media may be associated with pumping groundwater and/or LNAPL. Personnel have the potential to contact LNAPL or chemical substances in groundwater while pumping these fluids. LNAPL and/or chemical substances in groundwater may adhere to the hose and/or

may be present in fluids within the pump; personnel therefore have the potential to contact LNAPL and/or chemicals in groundwater even after pumping has been completed.

The pumps may be powered by generators, which require gasoline and oil in order to run effectively. Therefore, chemical hazards due to operational chemicals are also associated with pumping groundwater or LNAPL.

Procedures that should be followed to mitigate the following physical hazards are identified in Section 6.1: exposure to high levels of noise; walking/working surfaces; handling heavy objects/materials; heavy equipment/vehicle traffic; and, excavation safety. Chemical hazards due to environmental media and operational chemicals are also associated with drilling activities. The procedures that should be followed in order to mitigate these potential chemical hazards are provided in Section 6.2.

4.1.7 Storage of Water and/or LNAPL

Groundwater and/or LNAPL pumped from excavations or wells cannot be discharged directly to the ground surface and must be stored for disposal or post-sampling discharge. Because groundwater and/or LNAPL may be pumped during soil and groundwater quality investigations as well as during remedial actions, these fluids may be stored during implementation of either investigative or remedial actions. The methods and equipment used for storing water and LNAPL may be pumped into various storage containers to be determined by the volume of fluid to be pumped. Storage containers may include 55 gallon drums, larger volume polyethylene Frac tanks, or in a vacuum truck.

Prior to pumping fluids into 55-gallon drums, the drums need to be moved to the vicinity of excavations or wells. The drums are heavy, cumbersome, and typically moved by hand. Therefore, handling heavy objects/materials is a potential hazard. Exposure to heat or high ambient temperatures may also present a potential hazard.

Frac tank storage systems may be small or large and are typically transported on specialized vehicles. Operators of these vehicles may have limited visibility while offloading tank systems. Therefore, heavy equipment/vehicle traffic may present a hazard.

When closed containers such as 55-gallon drums are used for the storage of water and/or LNAPL, the pressure of vapors within the container may increase to dangerous levels. While the pressure within a container is unlikely to cause the container to explode, threaded lids may potentially explode off the container as they are loosened. Therefore, flying debris may present a hazard.

Similarly, when a pressurized container is opened, vapors may explode out of the container to equalize internal and external pressure. As such, inhalation of these vapors is a potential chemical hazard.

Procedures that should be followed to mitigate the following physical hazards are identified in Section 6.1: handling heavy objects/materials; heat exposure/exposure to high ambient temperatures; heavy equipment/vehicle traffic; and, flying debris. Chemical hazards due to environmental media are also associated with storing water and/or LNAPL. The procedures that should be followed in order to mitigate these potential chemical hazards are provided in Section 6.2.

4.1.8 Stockpiling and Disposing of Soil

The stockpiling of soil excavated from test pits and test trenches may occur during soil quality investigations and during remedial actions. Soil that is determined to be impacted will be staged on, and covered by plastic sheeting. The plastic sheeting will be weighted down using sand bags or equivalent. Once stockpiled, the soil may be moved or loaded onto trucks for disposal using backhoes, excavators, or front end loaders. The disposal of any soil will be completed in accordance with local, state, and federal regulations and will be properly documented on manifests or bills of lading. Please note, this section does not address the hazards associated with soil excavation, which are listed in Section 4.1.3; however, the hazards that are associated with work in the vicinity of construction equipment, as identified in Section 4.1.3, are identified in this section also, as appropriate.

Excavating and disposing of soil are generally noisy activities, and exposure to high noise levels is a potential hazard associated with these activities. The use of hearing protection or exposure to loud noises for prolonged periods of time may create a situation in which an operator may not be able to hear verbal commands from personnel working in the vicinity of the machinery. Therefore, heavy equipment/vehicle traffic and noise are hazards associated with stockpiling soils.

The disposal of soil involves transferring the soil from a stockpile into the bed of a truck using construction equipment. During the transference of soil, there is the potential for soil to be dropped from the backhoe, excavator, or front end loader bucket, creating a potential flying debris hazard.

Stockpiling of soils involves the handling and placement of heavy and cumbersome rolls of plastic sheeting and sandbags (or equivalent) for securing sheeting. Large rolls of plastic sheeting may weigh as much as 90 pounds. Also, soil stockpiles generally have uneven walking/working surfaces.

Therefore, handling heavy objects/material, exposure to heat/high ambient temperatures, and walking/working surface are hazards associated with the stockpiling soil.

Soil that was excavated in areas where LNAPL or other substances are present in surface soil, subsurface soil, and/or groundwater may need to be stockpiled and disposed of. Therefore, chemical hazards due to environmental media are also associated with the stockpiling and disposal of soil.

Procedures that should be followed to mitigate the following physical hazards are identified in Section 6.1: handling heavy objects/materials; exposure to high noise levels; heavy equipment/vehicle traffic; and, flying debris. Chemical hazards due to environmental media are also associated with the stockpiling and disposal of soil. The procedures that should be followed in order to mitigate these potential chemical hazards are provided in Section 6.2.

4.1.9 Disposing of Water and/or LNAPL

Groundwater and LNAPL may be disposed of during soil and groundwater quality investigations or during remedial actions. Water and/or LNAPL may be transferred from wells or excavations and into various containers (55-gallon drums, Frac tanks, vacuum tank hopper) using bailers or pumps. Subsequently, the containerized fluid will need to be transported off site for disposal via vacuum trucks or tanker trucks. Alternatively, if the container is sufficiently small (e.g., a 55-gallon drum), the water could be transported off site in the container. The disposal of all water and LNAPL will be completed in accordance with local, state, and federal regulations and will be properly documented on manifests or bills of lading.

Vacuum trucks can be loud while in operation. The potential for exposure to high noise levels exists during their operation. In addition, the size of the tanker trucks and vacuum trucks results in restricted range of sight. Therefore, heavy equipment/vehicle traffic is a potential hazard for the disposal of water and/or LNAPL using vacuum trucks or tanker trucks.

When closed containers such as 55-gallon drums are used for the storage of water and/or LNAPL, the pressure of vapors within the container may increase to dangerous levels. While the pressure within a container is unlikely to cause the container to explode, threaded lids may potentially explode off the container as they are loosened. Therefore, flying debris may present a hazard.

Similarly, when a pressurized container is opened, vapors may explode out of the container to equalize internal and external pressure. Inhalation of these vapors is a potential chemical hazard.

Contact with the LNAPL or chemicals that may be dissolved in the water is also a potential chemical hazard. Contact with these substances could occur when a container is opened during water or LNAPL disposal activities.

Procedures that should be followed to mitigate the following physical hazards are identified in Section 6.1: handling heavy objects/materials; exposure to high noise levels; heavy equipment/vehicle traffic; and, flying debris. Chemical hazards due to environmental media are also associated with the disposal of water

and/or LNAPL. The procedures that should be followed in order to mitigate these potential chemical hazards are provided in Section 6.2.

4.1.10 Restoring the Site to its Original Condition

The restoration of the site to its original condition will be conducted following the completion of intrusive soil investigation, groundwater investigation, and remedial actions. Site restoration may involve a number of activities, including but not limited to the following: well abandonment, grouting soil borings, demobilizing equipment, grading, and repaving. Grading may involve net cut or net fill, and soil may need to be transported to the site if grades cannot be achieved with the soil currently present at the site. Due to the wide variety of potential site restoration activities, it is impossible to provide a comprehensive list of physical and chemical hazards.

However, in general, the physical hazards will include excavation safety, underground and overhead utilities, exposure to high noise levels, and working in the vicinity of heavy equipment/vehicle traffic (for grading activities, e.g.); the handling of heavy objects such as bags of concrete; flying debris and the operation of hand tools/power tools (when using stand-alone grout mixers or vibrating plate compactors, e.g.); and, walking/working surface (for any activity where equipment is temporarily staged on the ground or where grading activities will occur). Please note, the above is not an exhaustive list, and each newly initiated activity should be evaluated for additional hazards prior to its implementation. See Section 6.1 for a list of procedures that should be followed to mitigate these potential physical hazards.

Chemical hazards, attributable to both environmental media and operational chemicals, are also possible during completion of site restoration activities. Section 6.2 provides a list of procedures that should be followed to mitigate the potential chemical hazards.

5.0 GENERAL HEALTH AND SAFETY ACTIVITIES/REQUIREMENTS

While the health and safety activities that should be followed to mitigate physical and chemical hazards associated with specific tasks or activities are identified in Section 6.0 et sequential, this section lists general procedures and requirements that are either not associated with any proposed activity or are associated with the performance of all proposed activities. Following the procedures and meeting the requirements outlined below is anticipated to have a positive effect on the overall health and safety of the personnel working at the site. The activities and requirements provided below are from the Conti SSHP without modification, although these activities and requirements were, in some cases, in different sections of the Conti SSHP. The general health and safety activities and requirements include heat and cold stress prevention and treatment, training requirements for all workers, site security, health and safety meetings, recording injuries, and reading, signing, and complying with this SSHP. All records, including but not limited to the SSHP, workers' training records, and daily monitoring, log, and inspection records, that are identified within this SSHP will be maintained in files located at the field office. These activities and requirements are discussed in subsections 5.1 through 5.6, below.

Please note, references to Conti's medical surveillance program have been removed from this section. References to"Conti" in the following discussion should be construed as referring to any environmental contractor retained by the Port Authority to perform specific site work tasks.

5.1 Exposure to High/Low Ambient Temperatures

The Conti SSHP specified pulse monitoring only when the following two conditions are both met: 1) the ambient temperature reached 72.5° Fahrenheit and 2) the workers were in Level C PPE (see Section 6.2.1). It is not anticipated that workers will be required to wear Level C PPE; however, activities may be performed during the summer months when temperatures exceed 72.5 degrees Fahrenheit; therefore, workers may be exposed to high ambient temperatures. Heat stress monitoring/pulse monitoring program is anticipated to be required for the proposed activities. The subsection of Conti SSHP discussing heat stress monitoring/pulse monitoring is included below without revisions.

An ambient temperature of 72.5° F when workers are in Level C or higher, will be used as an action level to implement pulse monitoring, oral temperatures and administrative controls, including rest breaks and work rotation, to prevent employees from experiencing heat-related health effects including weight loss. The guidance for workers wearing permeable clothing is specified in the current version of the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values for Heat Stress. If actual Clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. ***Table 2 – "Frequency of Physiological Monitoring"*** provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

The following parameters should be used when monitoring workers:

Heart rate - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

Table 2 - Frequency of Physiological Monitoring

Adjusted Temperature Calculation	Normal Work Clothing	Impermeable Clothing
90 F (32.2 C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 - 90.0 F (30.8 - 32.2 C)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 F (28.1 - 30.8 C)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 F (25.3 - 28.1 C)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 F (22.5 - 25.3 C)	After each 150 minutes of work	After each 120 minutes of work

Oral Temperature - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6 F (37.6 C), shorten the next work cycle by one-third, without a change to the rest period. If the oral temperature still exceeds 99.6 F (37.6 C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semipermeable or impermeable garment if the oral temperature exceeds 100.6 F (38.1C). Ear canal readings are a valid method to monitor the temperature of workers who remain in the contamination reduction zone.

The oral temperature shall not exceed 100.4° F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate (0.7(220-AGE)), and/or the oral temperature exceeds 100.4° F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vest; portable fans and breaks in air-conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, i.e., the Web Bulb Globe Temperature, duration and type of activities performed.

A worker who becomes irrational or confused or collapses on the job should be considered a heat stroke victim, and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work.

Cool water or a sports drink that replaces electrolytes, such as Gatorade, will be made available to workers and encourage them to drink small amount frequently, e.g., one cup every 20 minutes. Ample supplies of liquids will be placed close to the work area.

The proposed activities may be performed during the winter months; therefore, workers may be exposed to low ambient temperatures. The subsection of the Conti SSHP discussing precautions to be taken in cold temperatures is included below without any revisions.

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked. The windchill factor is the cooling effect of any combination of temperature and wind velocity or air movement. ***Table 3 – Windchill Index*** should be consulted when planning for exposure to low temperatures and wind. The windchill index does not take into account the specific part of the body exposed to cold, the level of activity, which affects body heat production, or the amount of clothing being worn.

Table 3 - Wind Chill Index

Wind (mph)	Actual Temperature (° F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (° F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)
T = Air Temperature (°F)
V = Wind Speed (mph)

Frostbite occurs in 15 minutes or less

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that will cause heavy sweating that will result in wet clothing must also be monitored. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, i.e., the Wind Chill Temperature, duration and type of activities performed.

Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures gives the recommended time limits for working in various low temperature ranges.

Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures	
Temperature Range (F)	**Maximum Daily Exposure**
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table – 5 Work/Warm-up Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement): apply schedule one step lower. For example, at -35° C (-30° F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

Table 5 - Work/Warm-up Schedule											
Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
°C (approx.)	°F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should Cease			
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-Emergency Work Should Cease					
-40° to -42°	-40° to -44°	30 min	5	Non-Emergency Work Should Cease							
-43° & below	-45° & below	Non-Emergency Work Should Cease									

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personal decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

5.2 Required Training

Except as noted above, this subsection is from the Conti SSHP without modification.

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all Site personnel who will be performing remedial activities, intrusive sampling, emergency response operations, or come in contact with contaminated material are required to be trained in accordance with the standard.

Prior to arrival on-site, Conti will be responsible for certifying that the employees meet the requirements of preassignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). Conti will provide documentation certifying that each general Site worker has received a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. All personnel must also receive 8 hours of refresher training annually. At no time should anyone be working on-site without the minimum training requirements. Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as Site Supervisors require an additional 8 hours of training.

5.3 Site Security

This subsection is from the Conti SSHP without modification. Please note that the following pertains not only to those personnel who will work in the exclusion zone, but also to all individuals covered by this SSHP who enter the exclusion zone. The Safety and Health Forms for the Site Entry and Exit Log are included in Appendix B.

All site personnel on this project will undergo safety orientation by the SSHO prior to starting work at the site. This training will include general site safety rules, hazardous locations, personal protective equipment guidelines, and onsite emergency procedures. All site personnel will satisfy the following requirements before initiating work onsite within the Exclusion or Contamination Reduction Zones:

- Receive and pass a physical examination, including certification of ability to wear respiratory protection.
- Receive adequate hazardous waste training according to 29 CFR 1910.120 or 29 CFR 1926.65.
- Receive a briefing on all aspects of the SSHP.
- Are properly dressed, equipped, and trained in accordance with all personal protective guidelines.
- Are thoroughly trained regarding decontamination procedures.
- All personnel performing tasks when respiratory protection is needed will comply with the requirements of this plan

All personnel entering and exiting the Exclusion and Contamination Reduction Zones will sign in and out through the Support Zone. The log will indicate the date and time entering and exiting, the location entered, personal protective equipment utilized and decontamination procedures, refer to ***Attachment 3 – Safety and Health Forms for the Site Entry and Exit Log.***

5.4 Health and Safety Meetings

This subsection is from the Conti SSHP without modification.

A well-ordered flow of information is essential to a good safety program. Conti, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation.The SSHO shall conduct daily safety meetings with ALL on-site personnel. An opportunity shall be provided for employees to voice safety-related concerns. The SSHO will submit a synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items and a signed attendance list.

Prior to commencement of onsite field activities, all site employees will attend a site-specific safety and health training session. This session will be conducted by the Site Safety and Health Officer to ensure that personnel are familiar with the requirements of this Site-Specific Safety and Health Plan. The initial session will consist of the contents of this SSHP and specific procedures developed for the project. The SSHO shall also provide initial site-specific training for replacement employees.

As a minimum the site-specific training will include:

- Explanation of the Overall Site HASP.
- Health and Safety Personnel and Organization.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination.
- Respirator facepiece fit testing.
- PPE fitting to determine proper size for individuals.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication and the "Buddy System".
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Review applicable Conti Standard Operating Procedures.
- Site Specific Hazard Communication.

Preparatory meetings will be conducted by the SSHO for site personnel prior to their initiating any new or differing site activities. At the Preparatory meetings, the SSHO will ensure that site personnel are knowledgeable of the SSHP and understand the hazards and controls of the activity to be performed (review Activity Hazard Analysis).

5.5 Recording Injuries

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the occupation physician to advise the type of test required to accurately monitor for exposure effects.

Any employee, who develops a time loss illness exceeding one working day, or injury during the period of the contract, must be evaluated by the occupational physician. A written statement indicating the employee's fitness, signed by the occupational physician must be submitted prior to the employee entering the work site.

5.6 Reading, Signing, and Complying with this SSHP

The following discussion is based on the Conti SSHP, except that references to the Conti medical surveillance program were removed.

All workers and visitors covered under this SSHP who enter the contamination reduction zone or the exclusion zone will be required to read and verify (i.e., sign the SSHP signature page) compliance with the provisions of this SSHP and appropriate appendices. In the event that any worker or visitor covered under this SSHP does not adhere to the provisions of this SSHP, he/she will be requested to leave the project area. All nonconformance incidents will be recorded in the Daily Safety and Inspection Log in Appendix B.

6.0 HAZARD ASSESSMENT

Hazardous material sites can cause a multitude of health and safety concerns any of which can result in serious injuries and/or illnesses of workers. Some hazards are a function of the physical, biological or chemical nature of the site itself. Others are a direct result of the construction being done. Based upon the information provided regarding the primary historical uses of the property and the knowledge of the current conditions, the overall Safety and Health hazard assigned to the contemplated activities at the Site is determined to be low to moderate.

This section provides procedures for mitigating potential physical and chemical hazards that have been associated with the specific proposed activities described in Section 4. Procedures and requirements that are anticipated to ensure the overall health and safety of workers, but that are associated with either all or none of the proposed activities listed in Section 4, are listed above in Section 5.

The procedures listed below are associated with hazards have been divided into two categories: physical and chemical hazards. Biological hazards are considered unlikely because the HHMT-Port Ivory Facility is generally not vegetated in the areas where work will occur and because of the low frequency of pedestrian and vehicular traffic at the HHMT-Port Ivory Facility. Section 6.1 addresses physical hazards, while Section 6.2 addresses chemical hazards.

6.1 Physical Hazards

Physical hazards that may potentially be encountered during implementation of the proposed activities include the following hazards identified in the Conti SSHP: heavy equipment/vehicle traffic, contact with sharp objects/material, exposure to high noise levels, flying debris, hand/power tools, handling heavy objects/material, walking/working surface, excavation, and underground and overhead utilities. For the purposes of this SSHP, the following physical hazards identified in the Conti SSHP Activity Hazard Analysis tables are considered to be included in the heavy equipment/vehicle traffic hazard: caught in/between moving parts, exposed to vehicle traffic, and struck by/against heavy equipment (Section 6.1.1).

Please note, the following physical hazards were identified in the Conti SSHP, but were deemed not applicable for the Project and therefore are not included in this SSHP: fall from different level, fire/explosion, welding and cutting, and overhead activities. The fall from a different level hazard address

falls from a height of at least six feet; it is not anticipated that workers will be on platforms elevated more than six feet above grade. The fire/explosion was written for hot work (e.g., welding, cutting using an acetylene torch, etc.), and the performance such hot work is not anticipated during additional investigations and/or remedial actions. The welding and cutting hazard also does not apply because hot work is not anticipated during additional investigations and/or remedial actions. Except for the machine operators, personnel are not anticipated to work above ground surface; therefore, no overhead activities are anticipated. Please note, if any of these potential hazards are encountered during additional investigations and/or remedial actions, the appropriate section in the Conti SSHP will be referred to until the environmental contractor's Site Safety and Health Officer can modify the SSHP and until the modification is approved by the Port Authority. The potential hazard will be discussed at the next day's toolbox meeting.

The subsections below describe the general health and safety actions that are required for work associated with the proposed activities in order to mitigate the potential hazards.

6.1.1 Heavy Equipment/Vehicle Traffic

This subsection is consistent with the Conti SSHP without edits. Please note, the Equipment Checklist, included in the Conti SSHP as Attachment 3, is included in Appendix C to this SSHP.

Considerations for controlling the movement of personnel and equipment in a construction area are vitally important to any project, as injuries may occur while working with or adjacent to such equipment. This category includes all operations, which utilize moving heavy equipment: excavators, loaders, graders, dozers, and trucks. Conti will take every precaution necessary to ensure the safety of the residents and the on-site personnel during traffic movement operations.

All workers will adhere to all applicable standards and regulations while operating heavy equipment at the site. Operators will be trained and experienced in the use and maintenance of the equipment they are operating. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Inspections will be documented using the Equipment Checklist, refer to ***Attachment 3 – Safety and Health Forms***. Any unsafe equipment will be removed from service until safety defects can be corrected. Equipment operators will not leave their machine unattended while it is running. Each piece of equipment will be equipped with a 5 lb ABC fire extinguisher. No vehicles or equipment will be operated in a careless or unsafe manner. Personnel will wear high visibility reflective vests when working around equipment/vehicles. All personnel will stay a minimum of 4 ft clear of the operational area of the equipment.

During remedial activities, it is often necessary to have a worker direct the operator. In these cases, close communication between the operator and the laborer is of critical importance. One designated person will give signals to the operator of both equipment and vehicles in the work area. Workers should not take any action unless they have made eye contact with the operator and clearly communicated their intentions. In addition, all machines are equipped with back-up alarms, which are checked daily and repaired immediately. Truck traffic will be controlled by a flagger/spotter, as required.

Maintenance and inspection of vehicles and heavy equipment is a vital part of the overall safety program. Conti has a fully staffed equipment maintenance shop that handles all preventative and overhaul work for our entire vehicle and equipment fleet. As part of the preventative maintenance, all equipment is checked for properly functioning safety devices (e.g., backup alarms, brakes, lights, fire extinguishers, etc.) Before each piece of equipment leaves the shop it must pass a safety checklist. All rental equipment is subjected to a similar inspection when delivered to the job site. Any piece of rental equipment that fails the inspection must be repaired by the vendor before it is accepted for use. In addition, all equipment is inspected in the field prior to the start of each day's activities. If a superintendent, operator, or safety officer detects a defect, a properly qualified mechanic is dispatched from the shop to make the repairs on-site.

6.1.2 Contact with Sharp Objects/Material

This hazard was not included in the Conti SSHP. Contacting the exposed ends of sharp objects/materials can potentially puncture the skin of workers not using appropriate personal protective equipment (PPE). In addition to sustaining a wound, the worker may become infected by tetanus infection, commonly called lockjaw. Tetanus is a bacterial disease that affects the nervous system. Infection with tetanus causes severe muscle spasms, leading to "locking" of the jaw so the patient cannot open his/her mouth or swallow, and may even lead to death by suffocation.

Sharp objects/materials shall be capped when possible so that the formerly sharp edge is covered with a blunt object that cannot produce a puncture wound. Objects that cannot be capped should be moved out of the work area when possible, marked with high-visibility surveying tape or equivalent, and identified as potential hazards in the daily toolbox safety briefing. All personnel sustaining puncture wounds shall receive tetanus shots as soon as possible following their doffing of PPE and overall decontamination.

6.1.3 Exposure to High Noise Levels

This subsection is consistent with the Conti SSHP without modification or edit. However, references to Conti's health monitoring program were removed from the discussion. The Site Safety and Health Officer for the environmental contractor conducting the work will make PPE that protects hearing available to all personnel covered by this SSHP.

Noise is found during remedial activities in such operations as transportation of materials and operation of heavy construction equipment. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. The OSHA standard allows 90 dB (A) for a full 8 hours and for a lesser time when the levels exceed 90 db (A). It is usually safe to assume that if you need to shout to be heard at arms length, the noise level is at 90 dB (A) or above. Personnel operating or working around construction equipment or power tools will utilize hearing protection.

6.1.4 Flying Debris

This potential hazard was identified in the Conti SSHP, but was not explicitly described. Thus, the ensuing description of this potential hazard is new, although it is based on text in the Conti SSHP. The health and safety activities used to mitigate the hazard are consistent with those outlines in the Conti SSHP.

As described in the Conti SSHP, flying debris includes anything that becomes airborne due to the force applied to it. Objects that may potentially become airborne during implementation of the proposed activities include pieces of machines or hand tools, fragments of building materials that may be encountered during excavation, and soil. Soil may become airborne as dust during general construction activities or as clumps of soil during decontamination activities. Please note, the following health and safety activities address only the physical aspects of flying debris. Depending on the environmental quality of the soil, the airborne soil may also have associated chemical hazards.

Safety precautions that are required include checking the guards on equipment prior to each use, being aware of the materials encountered during excavation, and wearing appropriate PPE (i.e., at a minimum, hard hat and safety glasses/goggles/face shields). Dust can be controlled through misting with potable water.

6.1.5 Hand/Power Tools

This subsection is consistent with the Conti SSHP without modification or edit.

Hand and power tools are used for various site activities. Procedures for using hand and power tools are as follows:

- Persons using power tools shall be trained in their use.
- Ground Faults must be present on all electrical tools.
- Only tools in good condition shall be used.
- Tools shall be kept clean.
- Guards and shields shall be kept on all tools.
- Air couplings shall be secured.
- Non-sparking tools shall be used in hazardous areas.
- Proper eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. Where appropriate, full-face shields will be utilized in addition to the glasses.

6.1.6 Handling Heavy Objects/Material

This hazard is referred to as "Material Handling" in portions of the Conti SSHP, and is referred to as "Handling Heavy Objects/Material" in the Activity Hazard Analysis tables. Although both terms are used

in the Conti SSHP, these terms appear to refer to the same hazard. The description of the hazard and the health and safety activities that are required in order to mitigate the hazard are consistent with the Conti SSHP without modification or edit.

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. Multiple employees or the use of mechanical lifting devices are required for heavy objects.
- The anticipated path to be taken by the lifter should be considered for the presence of slip, trip, and fall hazards.
- The feet shall be placed far enough apart for good balance and stability (typically shoulder width).
- The worker shall get as close to the load as possible. The legs shall be bent at the knees.
- The back shall be kept as straight as possible and abdominal muscles should be tightened.
- Twisting motions should be avoided when performing manual lifts.
- To lift the object, the legs are straightened from their bending position.
- A worker shall never carry a load that cannot be seen over or around.

When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered. When two or more workers are required to handle the same object, workers shall coordinate the effort so that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, shall face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines shall be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves shall be used if necessary.
- The hands and object shall be free of oil, grease, and water which might prevent a firm grip, and the fingers shall be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- The item shall be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

6.1.7 Walking/Working Surface

This hazard identified in the Conti SSHP appears to be a compilation of the slip/hit/trip/fall hazard identified in that document and a "housekeeping" hazard. Therefore, the description of this hazard and the health and safety activities that are required in order to mitigate the hazard are from all applicable sections of the Conti SSHP without modification. Please see also Section 6.1.7, which addresses tripping hazards and housekeeping while carrying heavy objects/material.

In terms of slip, hit, trip, or fall hazards, the Conti SSHP provides the following.

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but all injuries can be prevented by the following prudent practices:

- Spot-check the work area to identify hazards.
- Establish and utilize a pathway, which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads, that you can see over.
- Keep work areas clean and free of clutter; especially in storage rooms and walkways.
- Communicate hazards to on-site personnel
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools.
- Workers must take particular care when walking on the geotextile-working mat.

In terms of housekeeping and general safety issues in the work area, the Conti SSHP requires that workers avoid walking on any stockpile, watch footing when entering an excavation, keep walkways and work areas clear of hoses, cords, other equipment, and clutter, restrict work area access to essential personnel, and wear appropriate footwear (i.e., steel-toe boots).

6.1.8 Excavation

The description of the hazard and the health and safety activities that are required in order to mitigate the hazard are consistent with the Conti SSHP without modification except that chemical hazards are discussed in Section 6.2. Please note, however, that the barricades used around the excavations will be high-visibility safety fencing with appropriate signs that read "KEEP OUT – SOIL EXCAVATION AREA."

The hazard associated with excavation is low to moderate. In general, the hazards encountered during soil excavation are: cave in of excavation sides with possible burial or crushing of workers. Causes of cave ins may include: (a) absence of shoring, (b) misjudgment of stability, (c) defective shoring, and (d) undercut sides. Other potential hazards are: falling during access/egress, while monitoring or dismounting equipment, or stumbling into excavation. An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation. Flammable atmospheres may also be encountered in excavation.

During excavation, chemicals/hazardous substances may be encountered. See Section 6.2 regarding health and safety activities that are required to mitigate chemical hazards.

Conti will provide adequate shoring or sloping of sides of the excavation. Excavation/trenches will be inspected daily for changing conditions. Air monitoring for airborne contaminants shall be performed in areas where contaminated soils are encountered.

Excavation spoils will be directly loaded into transportation containers or stockpiled and covered at a designated area away from the work area. Excavation/trenches, regardless of the depth or width, shall be barricaded. The use of raised berms, caution signs and caution tape will be instituted to protect both the public and other personnel on the site. The excavation area will be delineated with caution tape during operations and barricaded/secured with safety fence at the end of each workday. Adequate means of exit, such as ladders, steps, ramps or other safe means of egress, will be provided and be within 25 feet of lateral travel.

Where personnel are required to enter excavations over 4 ft) in depth, sufficient stairs, ramps, or ladders will be provided to require no more than 25 ft. of lateral travel. At least two means of exit shall be provided for personnel working in excavations, where the width of the excavation exceeds 100 ft, two or more means of exit shall be provided on each side of the excavation.

6.1.9 Underground and Overhead Utilities

Caution will be exercised whenever the possibility of encountering unexpected subsurface obstructions exists while drilling. Before beginning intrusive activities, the ground surface area will be searched for evidence of potentially buried objects and all readily available sources of information (e.g. site utility drawings, public utility drawings, construction drawings, etc.) will be reviewed. If the proposed sampling location is not considered safe, the location will be modified to address safety issues. Markouts for underground utilities shall be maintained during all periods of intrusive work. To prevent disturbing potentially shallow underground utilities and buried objects, the Port Authority requires using manual equipment to drill/dig from the ground surface to approximately six feet below the ground surface. If no obstructions are encountered, the soil boring, test pit, or test trench will be completed by competent personnel using conventional methods.

Safety concerns will be adhered to during drilling activities. Personnel operating the drilling equipment should wear required personal protective equipment. Drilling activities should not commence within 10 feet of overhead electrical power lines or at a distance where in the event of equipment failure a portion of the drilling equipment would contact overhead electrical power lines. As noted in the Conti SSHP, the minimum distance of 10 feet will vary according to voltage the greater the voltage, the greater the distance between the lines and the equipment. Table 1 below from the Conti SSHP describes minimum clearance from energized overhead electrical lines.

Table 1 - Minimum Clearance From Energized Overhead Electrical Lines

Nominal System Voltage	Minimum Rated Clearance
0 to 50 kV	10 Feet (3 m)
51 to 200 kV	15 Feet (4.5 m)
201 to 300 kV	20 Feet (6 m)
3001 to 500 kV	25 Feet (7.5 m)
501 to 750 kV	24 Feet (10.5 m)
751 to 1000 kV	31 Feet (13.5)

6.2 Chemical Hazards

Based on analytical data from the environmental investigations performed to date, the chemical hazards that may be encountered during additional investigations and/or remedial actions are related to the inhalation, ingestion, and dermal contact with VOCs, SVOCs, PCBs, pesticides and herbicides, and metals. In addition to the chemical hazards that may potentially arise due to the presence of LNAPL, impacted soil, and impacted groundwater, it is anticipated that an environmental contractor and/or a subcontractor may bring materials (Operational Chemicals) into the project area that may pose chemical hazards if used improperly. Section 6.2.1 discusses the potential chemical hazards associated with the presence of LNAPL, impacted soil, and impacted groundwater (Contaminants of Concern) in the project area. Section 6.2.2 discusses the potential chemical hazards associated with Operational Chemicals. Both subsections describe the general health and safety actions that are required for additional investigations and/or remedial actions in order to mitigate the potential hazards.

6.2.1 Chemical Hazards Related to Contaminants of Concern

As noted in the Conti SSHP, the greatest potential for exposure to Contaminants of Concern will be during intrusive activities (i.e., excavation and drilling). Exposure may also occur when handling waste materials such as excavated soil or pumped groundwater or LNAPL. As noted above, the anticipated routes of exposure are inhalation, ingestion, and direct contact. Based upon the analytical data generated from previous environmental investigations performed at the HHMT-Port Ivory Facility, the Contaminants of Concern include VOCs, SVOCs, PCBs, pesticides and herbicides, and metals. The following is a summary of what health and safety activities will be performed to mitigate the chemical hazards associated with the Contaminants of Concern. The summary is from the Conti SSHP without revision. A description of the air monitoring to be performed and associated action levels is provided in the Community Air Monitoring Plan, incorporated in Section 7 by reference. PPE is addressed below, and the initial levels of PPE to be worn are summarized in Table 7. References to "Conti" in the discussion below should be construed as references to an environmental contractor retained by the Port Authority to perform specific site work tasks.

General Procedures

A primary exposure route of concern at the site is direct contact of the skin and eyes with contaminated material. Air monitoring, using direct reading instruments, for particulate shall be performed during work activities. To protect workers against dermal contact, they will wear specified protective clothing, respirators and safety glasses for operations involving potential exposure to hazardous materials. Proper personal decontamination procedures will be emphasized during remedial construction activities.

Although ingestion should be the least significant route of exposure, employees will be made aware of ways in which this type of exposure can occur and methods to avoid such exposure. Deliberate ingestion of chemicals is unlikely. Personal hygiene habits that provide a route of entry for chemicals will be restricted. Proper decontamination procedures will reduce/eliminate potential of ingesting hazardous materials. Site personnel will wash their hands, face and other exposed parts of their skin before eating or smoking.

The use of engineering controls for the protection of personnel is the first means of mitigation. This involves the elimination of hazards and the isolation of the workers from the hazards. Implementation of engineering controls can reduce the need for personal protective equipment by separating the worker from the contaminated material. During remedial activities, dust and vapor may be generated. The SSHO will be constantly alert to the possibility of unacceptable dust and vapor levels.

Control measures will be implemented for all operations where dust is likely to be generated. Potential dust concentrations will be reduced primarily by careful planning and implementation of controls. There are a number of specific construction practices, which will reduce levels of airborne particulates. These include:

- Providing for a misting spray during excavation activities
- Applying water on and sweeping haul roads.
- Wetting and smashing equipment and building faces.
- Spraying mist on buckets during material handling and dumping.
- Hauling materials in properly tarped or watertight containers.
- Reducing the active work area surface and limiting the number of concurrent operations.
- Regular washing of contaminated equipment.

Designated Work Zones

Except for the definition of the Exclusion Zone, which is based upon the Conti SSHP, this section is consistent with the Conti SSHP without modification.

This section outlines site control measures to be implemented to minimize potential exposure to and accidental spread of hazardous substances during remedial activities. Listed below are the work zones that shall be established. The zone boundaries may be modified as necessary as new information becomes available.

The Site will be divided into the Exclusion Zone (EZ), Contamination Reduction Zone (CRZ), and Clean Zone. It should be recognized that the Site control zones will be modified continually. A map showing the work zones will be updated daily and posted in the Site office, if any, or on the outside of the company vehicle, if no office has been established. The SSHO will review the location of work zones at the daily safety briefing.

The Exclusion Zone (EZ) for the Project will consist of the following areas: areas where intrusive activities are actively occurring; areas where soil borings or excavations have been completely drilled or excavated but the boreholes or excavations remain open; areas where construction vehicles (e.g., excavators, drill rigs, trucks, construction equipment, etc.) are staged; areas within 5 feet of any monitoring well being sampled; and, areas of soil stockpiles.

The CRZ is where workers and equipment shall be decontaminated to minimize the spread of contaminants from the EZ into clean areas at the Site. The CRZ will consist of the area located in front of or next to the EZ so the personnel or equipment leaving the EZ can be decontaminated and all PPE can be removed. Emergency equipment to be located in this area will include first aid kits and other appropriate equipment.

The zone known as the Clean Zone is considered to be uncontaminated. This area shall be used as a storage area for operations equipment.

Appropriate PPE

This section provides an outline of the PPE and guidelines that will be implemented to minimize chemical, physical, and biological exposures and accidents during remedial activities. Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear PPE.

These include items such as, hard hats, face shields, safety goggles, glasses, hearing protection, foot guards, gloves etc. The SSHO will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use, to prevent damage or loss.
- It will be kept clean, fully functional and sanitary.
- Must meet all applicable ANSI standards.

Personal clothing and jewelry can present additional safety hazards. Supervisors will ensure that workers wear appropriate clothing, which will not interfere with the PPE. All PPE will be selected in accordance with 29 CFR 1910.132. Conti will provide proper PPE to all employees. All protective clothing will be properly used, stored, selected, and maintained.

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, routes of potential exposure to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and clothing seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work duration.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

- **Level A:** The highest level of skin, eye, and respiratory protection (Level A PPE is not anticipated on this project).

Level B equipment, used as appropriate, is as follows:

- Positive pressure, full facepiece self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel-toed safety boots
- Hard hat

Level C equipment, used as appropriate, is as follows:

- Full-face, air purifying, cartridge-equipped respirators (NIOSH-approved) utilizing Organic Vapor/Acid Gas and HEPA filters (half-face if approved by SSHO). Cartridges and/or filters must be replaced as needed and, as a minimum, changed weekly.
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex).
- Outer gloves: leather, cotton, neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots
- Steel-toed safety boots
- Hard hat
- Safety glasses (if half-mask is utilized)
- Splash guards (worn during high pressure washing activities)

Modified Level D equipment, used as appropriate, is as follows:

- Regular Tyvek coveralls (Polycoated Tyvek as required)
- Outer gloves: leather, cotton, neoprene or nitrile
- Inner gloves: latex or nitrile (doubled)
- Chemical resistant or disposable overboots
- Steel-toed safety boots
- Hard hat
- Safety glasses
- Splash guards (worn during high pressure washing activities)

Level D equipment, used as appropriate, is as follows:

- Work uniform (Long pants and Shirt)
- Hard hat
- Steel-toed safety boots (with disposable overboots, as required)
- Safety glasses
- Leather or heavy cloth gloves (as needed)

Table 7 – Initial Levels of Protection

Task	Required PPE
Drilling soil borings, Collecting Soil Samples, Excavating test pits/trenches	Modified Level D
Installing Temporary and Permanent Monitoring Wells, Collecting Groundwater and/or LNAPL Samples, Pumping Groundwater or LNAPL, Storing Groundwater or LNAPL	Modified Level D, Evaluate need for poly-coated Tyvek suits
Stockpiling and Disposing of Soil	Modified Level D
Restoring Site to its Original Condition	Level D

Notes:

1) The SSHO will determine the need for poly-Tyvek suits to be worn.
2) Level D and Modified Level D PPE as described in Section 6.2.2.
3) PPE = Personal Protective Equipment.

Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound work practices.

All personnel shall wear a hard hat that meets the requirements and specifications in ANSI Safety Requirements for Industrial Head Protection Z89.1-1969. Exceptions to this requirement are personnel in the site office and rest and eating areas.

Outer gloves used on the Site for remedial activities shall be either chemical resistant or general purpose. The appropriate glove shall be determined by the SSHO for a specific work task. Chemical resistant gloves shall be selected using appropriate chemical degradation guides. Cotton work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects.

Welder's gloves or any other special type of gloves are considered outer gloves and are to be worn over inner gloves. These special outer gloves shall be stored on-site and shall be disposed of properly as PPE waste. Inner gloves shall always be chemical resistant, shall be selected using appropriate chemical degradation guides and shall be disposed of as PPE waste.

No contact lenses are allowed in the Exclusion Zone (EZ) and Contamination Reduction Zone (CRZ). Eye/Face protection shall be worn by all personnel in the CRZ and EZ. Double eye protection will be required when power-washing equipment during decontamination. All eye/face protection provided shall be ANSI Z87-1989 approved.

Footwear will be steel-toed safety boots. Chemical-resistant outer boot covers are to be worn in the Exclusion Zone, Contamination Reduction Zone. Boot racks will be provided in the CRZ for drying of outer boots.

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, dust suppression). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection shall be used. A respiratory protection program will be implemented that is compliant to the requirements of 29 CFR 1910.134 "Respiratory Protection." Respiratory protection equipment shall be NIOSH-approved and respirator use will conform to American National Standards Institute (ANSI) Z88.2.

Respirators shall be provided when such equipment is necessary to protect the health of the employee. Conti shall:

- Provide the respirators to Conti personnel, which are applicable and suitable for the purpose intended.
- Be responsible for the maintaining a written Respiratory Protective Program, in accordance with 29 CFR 1910.134 The employee shall use the provided respiratory protection in accordance with instructions and training received.
- Respirators shall be selected on the basis of hazards to which the worker is exposed.
- The user shall be instructed and trained in the proper use of respirators and their limitations.

- Respirators shall be regularly cleaned and disinfected.
- Respirators shall be stored in a convenient, clean, and sanitary location.
- Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use, such as self-contained devices, shall be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.
- There shall be regular inspections and evaluations to determine the continued effectiveness of the program.
- Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician shall determine whether an individual is physically fit to wear a respirator. The physician's clearance allows the worker to don a respirator and work in conditions of high ambient temperatures. Heat stress will be closely monitored by the SSHO.

Each respirator shall be individually assigned and not interchanged between workers without cleaning and sanitizing. The cartridges/filters shall be changed at the first sign of breakthrough based on contaminant warning properties or if the user experiences excessive breathing resistance. The SSHO will make final determination of the frequency of respirator cartridge/filter change-out. Respirators shall be cleaned and stored in an uncontaminated atmosphere after each use. Used cartridges will be disposed of with spent PPE. Self-contained breathing apparatus/supplied-air respirators shall be inspected before and after use and at least once monthly, if in storage for emergency use.

All employees working at the Site during remedial activities who have the potential of wearing a respirator shall be fit-tested to ensure they utilize the proper size respirator. Conti shall arrange for fit testing. Sub-contractors will provide the SSHO with fit-test documentation. The fit test is conducted according to the manufacturer's suggestions. The test shall consist of a taste and odorous vapor qualitative test. As per OSHA regulations, personnel that are unable to pass a fit test shall not enter a work area when respiratory protection is required. In addition, facial hair is prohibited from the respirator seal area. Any person with facial hair will not be permitted to enter a work area where respiratory protection is required, regardless of the fit test results. Documentation of the fit testing will be maintained on-site.

6.2.2 Chemical Hazards Related to Operational Chemicals

This subsection is consistent with the Conti SSHP without modification, although it is a compilation of several sections from the Conti SSHP.

Operational chemicals may be brought to the project-site for use in activities supporting the remedial activities. These chemicals are used for fuels in operating heavy equipment, glues for welding pipes, painting, etc. The use of operational chemicals is regulated by OSHA under the Hazard Communication Standard (29 CFR 1910.1200). MSDSs for operational chemicals are kept on file in the project office trailer. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the project will be maintained at the site and updated as new material is received.

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. Conti provides employees with information and training on hazardous chemicals at their work site at the time of their initial assignment, annually, and whenever a new chemical is introduced into their work site that could present a potential hazard. Personnel are briefed on the general requirements of the OSHA hazard communication standard and duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site are also briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

7.0 COMMUNITY PUBLIC HEALTH PRESERVATION

Although no residential properties are situated adjacent to the project area, there is regular vehicle traffic and occasional pedestrian traffic along Western Avenue and Richmond Terrace, and there are tenant companies at the HHMT-Port Ivory Facility. During excavation and drilling, the presence of LNAPL, impacted soil, and impacted groundwater may generate chemical hazards (i.e., vapors and dust) that may migrate off site unless measures are taken to prevent this. The vapors and dust may potentially create health hazards for the pedestrians and drivers on Western Avenue and Richmond Terrace, and the tenants at the HHMT-Port Ivory Facility. Please note, these individuals are not covered under any portion of this HHSP; the community public health protection measures are aimed at preventing these individuals from being exposed to potential chemical hazards rather than requiring the individuals to take any actions.

Community public health preservation measures consist of the application of a Community Air Monitoring Plan (CAMP) and of site security measures. The site security measures are identified in Section 5.2, above. The CAMP, which is provided in Appendix A, was prepared by HMM in accordance with requirements of the NYSDOH and is dated June 2006. The CAMP shall be maintained at the jobsite by the environmental contractor.

The CAMP provides for air quality monitoring for volatile organic vapors and dust, specifies action levels for increasing concentrations of these vapors and dust, and identifies actions that must be taken when each action level is exceeded. Please see the CAMP provided in Appendix A for more information.

8.0 EMERGENCY ACTIONS AND CONTACTS

This section is consistent with the Conti SSHP without modification except that the emergency plan responsibilities designated to the Project Superintendent and Resident Engineer in the Conti SSHP are designated to the environmental contractor in this SSHP. All references to "Conti" should be construed as an environmental contractor.

This section describes the emergency response plan that shall be implemented by Conti employees to handle emergencies. The nature of the project, the contaminants present and the activities planned for the site are such that there is little potential for an emergency, which would result in a significant release of hazardous substances, and in any way threaten the adjoining community. However, there is always the potential at any construction site for emergency situations to occur which threaten the on-site workers. Possible examples of emergency situations during remedial activities include equipment fires, or contact of equipment with overhead power lines. In all of these cases, procedures will be implemented to minimize the possibility of an emergency situation. The procedures outlined below are designed to ensure that the workforce reacts quickly and appropriately to emergency situations, thereby protecting the health and well being of the individual workers. It is expected that modifications may be necessary upon actual site set-up and conditions. Furthermore, Conti Enterprises's Corporate Safety, Health and Environmental Program and Procedures Manual include Conti's Corporate Emergency Action Plan Policy and Guideline for Handling Emergencies.

During the site safety briefings held daily, all employees will be informed of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes to be used during an emergency.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency.

In the case of a medical emergency, the SSHO has the responsibility to coordinate directly with 911. As soon as possible thereafter, the SSHO will notify the Port Authority Resident Engineer of the emergency and the response. In the case of a non-medical emergency, the SSHO has the responsibility to evacuate all personnel to a designated safe location at the Site. The signal to evacuate may be given via air horn, so long as an emergency signal has been established, or radio. As soon as the evacuation is underway, the SSHO is responsible for notifying the Port Authority Resident Engineer of the nature and severity of the emergency. The Port Authority Resident Engineer will assume command of the response and will be responsible for apprising appropriate emergency personnel of the situation.

Decontamination of an injured or exposed worker will be performed if decontamination does not interfere with essential treatment. The objective is to successfully administer first aid without exposing rescue workers and the victim to contaminants. Project personnel will meet with the local hospital to discuss the possibility of having to treat injured personnel from the site.

If the hazards are low and decontamination can be performed, then a wash, rinse and removal of protective clothing will be performed.

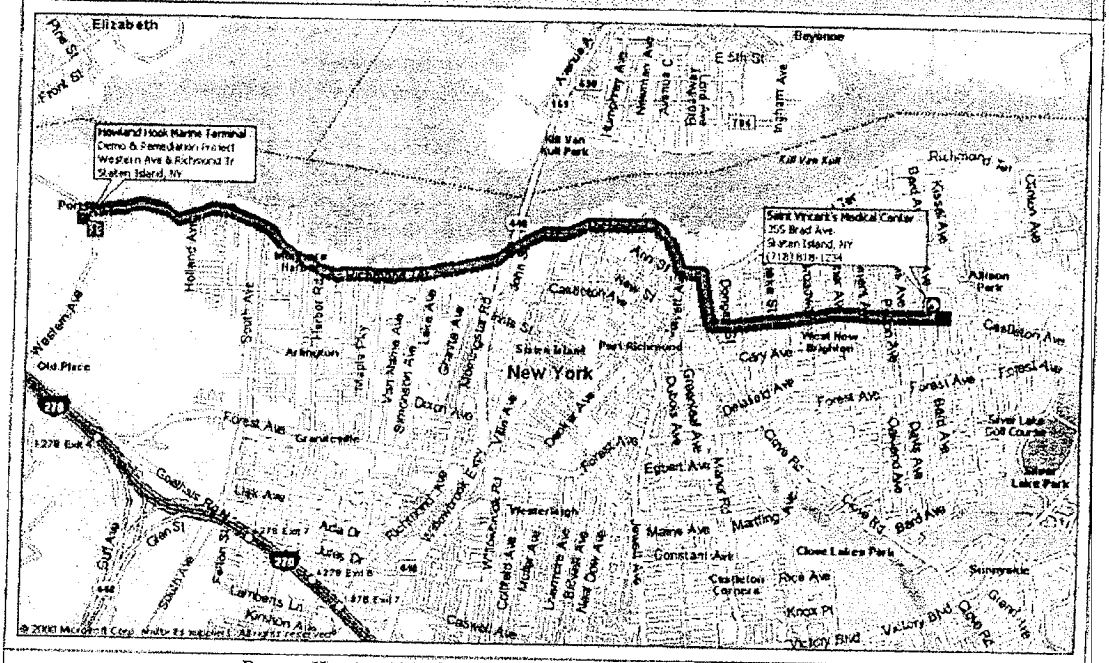
If the hazards are high and decontamination cannot be done, then the following procedures will be performed:

- Wrap the victim in blankets or plastic sheeting to reduce contamination of rescue workers or other personnel.
- Alert emergency and medical personnel to potential contamination. Emergency entry into the exclusion zone will be controlled by the SSHO. The SSHO will determine if the victim can be moved from the exclusion zone. If entrance into the exclusion zone is required, the SSHO will ensure that the emergency workers don the proper PPE.
- If required, arrange to have the SSHO, who is familiar with the site to accompany the victim to the hospital if required.

Both the Site Superintendent and the Site Safety and health Officer are trained in CPR and First Aid and have first aid kits for use in a medical emergency. First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) shall be notified immediately if their resources are needed on site.

If necessary, the injured or sick party shall be taken to Saint Vincent's Medical Center – Please refer to ***Figure 2 – "Route to Hospital Map*** for directions to the area hospital. Route to the area hospital will be posted and easily visible at all times.

Figure 2 - Route to Hospital Map



Depart Howland Hook Marine Terminal on Local road(s) (North),
Turn RIGHT (East) onto Richmond Ter
Turn RIGHT (South) onto Clove Rd
Turn LEFT (East) onto Castleton Ave
Turn LEFT (North) onto Bard Ave
Arrive St Vincent's Medical Center [355 Bard Ave, Staten Island, NY 10310, Tel: (718) 876-1234]

When any emergency occurs on-site, the on-site SSHO and Project Superintendent shall be notified immediately. The Project Superintendent or the SSHO shall notify the client and his representatives. Please refer to the ***Table 11 – "Emergency Telephone Numbers"*** for emergency telephones. Emergency Telephones will be posted and easily visible at all times.

To notify any site workers of an emergency, workers can be signaled by way of hand held or mobile two-way radios or as a backup, the use of an emergency alarm (portable air horn). Any audible pattern of blasts from a portable air horn becomes difficult to interpret due to distance and the inhibitory effects of a respirator.

Table 11 – Emergency Telephone Numbers	
Police Department: Emergency Police Department	911 718-876-8500
Fire Department: Emergency Fire Department/Ambulance Service	911 718-727-1100
Hospital: Saint Vincent's Medical Center 355 Bard Ave, Staten Island, NY	718-818-1234
Occupational Physician: Environmental Occupational Specialist (EOSI) Dr. Robert MacMillan	508-698-0444
Port Authority of NY & NJ Mike Wallace, Resident Engineer	718-442-8972 973-390-5519 (Cell)
NYS Department of Environmental Conservation Emergency Spill Hotline Phone Number	800-457-7362
National Response Center	800-424-8802
CHEMTREC	800-424-9300

All emergency communications will flow through the radio network. Outside emergency services will be notified, as necessary. The site evacuation alarm consists of one long blast on a horn, every 10 seconds. Any time the alarm system is activated; on site personnel will be notified immediately. Personnel will extinguish any nearby ignition source and prepare for emergency response activities. This alarm will also be used to alert personnel of a sudden release of hazardous materials.

The observer of the emergency condition will brief the responding personnel as to the nature and location of the incident. When they have assessed the situation, a decision whether or not to implement these procedures will be made. If these Emergency Contingency Procedures are not implemented, the "All Clear" will be given verbally by supervisory personnel. The "All Clear" will be used to indicate a return to normal (non-emergency) conditions following emergency response activities. The alarm signals will be prominently posted at the site. The audible alarm system will be discussed with each resident within hearing range of the alarm system.

There is a logical sequence of steps to follow in responding to emergencies, which should be followed by site personnel. This sequence involves identifying the emergency, investigating the extent of the emergency, deciding on the proper initial course of action, taking corrective action to rectify the situation, and following up with a post-emergency investigation.

Equipment breakdowns, power failures, injuries and natural disasters are usually rather dramatic and will capture the individual's attention immediately upon occurrence. In other cases, the individual may have prior warning of impending emergencies through weather reports in the case of natural disasters and trends in equipment performance in the case of some breakdowns.

Some emergency situations exist long before the operator is aware that an emergency exists. These cases may produce situations, which then become immediate and obvious. For example, unattended equipment may have minor breakdowns which go unnoticed; further operation thus leading to complete breakdown of the equipment resulting in possible injury to the unwary bystander.

In the event of a fire, explosion, accidental material release, or any other emergency, response activities will be initiated following the evaluation of the event. An assessment of the situation will be performed by the SSHO immediately upon notification. The Superintendent/SSHO is authorized to commit resources to the extent detailed in this plan. If it is determined that an emergency situation exists, he will then implement the appropriate emergency response activities.

In the event that a medical emergency or accident occurs in the Exclusion Zone, all personnel responding to the emergency should be outfitted in the Personal Protective Equipment appropriate for the situation. As a general rule, personnel should not enter the Exclusion Zone without donning the minimal level of PPE required. In the event that a worker is overcome or disabled for an unknown reason, the Superintendent/SSHO must make a determination as to the level of respiratory protection, which is appropriate. Specifically, a determination must be made as to whether Supplied Air Respirators are necessary for the protection of the responders.

The contingency plan will be activated by the Superintendent/SSHO immediately, in the event of a fire or explosion, or emissions of toxic chemicals in excess of limits set forth by Federal, State, and local agencies. In the event of a spill or material release, it will be up to the Superintendent/SSHO to make a determination as to when emergency conditions exist, as opposed to routine maintenance of the site. His determination will depend upon the location of the spill, the size of the spill, weather conditions and the proximity of the release to workers, the community and environmental receptors.

Once it becomes apparent that an emergency situation exists or that a disaster is impending, the Project Superintendent or his designee should immediately be notified and an immediate investigation conducted. Assessment of the emergency should include assessing the severity of the situation and collecting enough information to make an initial action decision.

Assessing the emergency should include identifying injured persons (if any), damage to buildings and equipment, noting potential impending damage if corrective action is not taken immediately, and itemizing resources required to correct the situation.

Although the potential for fire or explosion is minimal, sources of risk do exist. These sources include welding gases, gasoline for portable equipment, diesel fuel for the heavy equipment and combustible debris. In the event of an explosion, possible emergency conditions would exist. Unless extinguished immediately, a fire or explosion will trigger implementation of these procedures.

Material Spills could occur during truck loading and from vehicle accidents. Additionally, equipment fueling operations could produce spills. Ultimately, a spill could contaminate receiving surface water or cause a release of vapors to the air. A spill of fuel could also ignite. A small spill should be cleaned up immediately, but should not trigger activation of these procedures. Should an on site spill occur, the immediate response will include closing off the source of the spill, if possible, application of the sorbent material or sand bagging, and street sweeping, as appropriate. Any spill that results in a discharge to off site surface water will be contained with sorbent booms as needed. All spills will be investigated, and a written report will be provided to the regulatory agencies in accordance with applicable regulations.

In the event of severe weather, the Site Superintendent and/or the HSO have the authority to stop operations and direct evacuation procedures, if conditions warrant. All equipment will be secured and grounded. After the storm, a visual inspection will be performed by the Superintendent and/or the HSO to check for damage and hazards. These will be performed before any work is resumed. If damage or hazards are noted, the designated or other Conti personnel will evaluate the conditions and implement corrective actions to repair the damage or eliminate the hazard. These actions will begin as soon as possible and will take precedence over other site activities.

Once the extent of the emergency is known, the Superintendent and the SSHO will make an immediate decision as to what initial steps should be taken to remedy the emergency situation. This first action, in the case of large-scale emergencies, usually consists of notifying responsible authorities and/or calling for the necessary assistance in order of priority.

The individual(s) should not unduly endanger him or herself or others by attempting tasks for which the proper equipment is not available or with which he or she is unfamiliar. In all cases, if in doubt, wait until qualified help arrives before taking action.

When help arrives, the site superintendent/SSHO should immediately inform those called of the pertinent details of the situation. Corrective action should be continued until the situation is either under control or completely rectified. If corrective actions will take considerable time, a long-term effort to complete the task should be developed.

After the situation is corrected, the cause of the emergency event is to be determined and review of the corrective actions taken, etc. In the case of equipment failure, if negligence was not a factor, then revising maintenance procedures would be the most likely first preventive step. For natural disasters that cannot be prevented from recurring, the procedures followed in dealing with them can be reviewed to develop more effective action plans. The entire event, along with all of the responses, will be thoroughly documented for review by management and project supervisory personnel.

The purpose of this section is to define practices and procedures for the prevention, containment and cleanup of accidental discharges of hazardous substances during the project. These substances include both the contaminated material managed as a result of the remedial project, such as contaminated soils and

decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.
- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site: oil sorbent booms, rolls and pillows, universal towels and sheets and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container shall be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or Site Safety and Health Officer.
- The Project Superintendent or Safety and Health Officer will immediately notify the Resident Engineer Representative regardless of the size of the spill.
- Conti, and the Resident Engineer will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- The Resident Engineer will have primary responsibility for notifying the regulatory agencies. Conti will have follow-up responsibility to verify that the notification is made in a timely manner.
- If a reportable spill occurs and the Resident Engineer cannot be immediately reached, Conti will primary responsibility to report the spill to the regulators (reportable spills will be called into the NYSDEC spill hotline within two hours of the incident and a spill number obtained).
- A full list of emergency contacts and telephone numbers is included this plan. This list includes Conti personnel as well as federal, state and local authorities. This list will be posted in all trailers on-site.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Resident Engineer within 48 hours of the incident.

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Conti will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks.

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The Site Safety and Health Officer will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision should be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, shall be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) should be implemented.

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment if feasible. Supervisory personnel will determine the appropriate cleanup methods. The Site Safety and Health Officer will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered and residual contaminated soil will be shoveled into 55-gallon drums, placed in the drum storage area and sampled and analyzed for waste characterization and disposal.
- Once containerized, Conti Enterprises will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles and manifests will be provided to the Construction Representative for review.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-remedial sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved Site Safety and Health Plan.

A written report shall be made within 24 hours of incident resolution. The Resident Engineer will be provided with a copy. In addition, all key personnel will have a meeting within 48 hours of the incident to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned.

APPENDIX A

COMMUNITY AIR MONITORING PLAN (CAMP)

COMMUNITY AIR MONITORING PLAN

1.0 INTRODUCTION AND SCOPE OF PROGRAM

This Community Air Monitoring Plan (CAMP) establishes guidelines and requirements for protecting the health of the general public near, and of non-Port Authority personnel at, the Howland Hook Marine Terminal-Port Ivory (HHMT-Port Ivory) Facility during implementation of any environmental investigation or remedial effort. Such environmental investigations and remedial efforts are part of the overall redevelopment effort of the Port Authority of New York and New Jersey (Port Authority) to construct an intermodal facility at the HHMT-Port Ivory Facility and are subject to New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) oversight in accordance with the Voluntary Cleanup Program (VCP). The VCP requires that a Site-specific Health and Safety Plan and a CAMP be submitted prior to beginning work proposed in any Site Investigation or Remedial Action Work Plan. This CAMP is being submitted to meet that requirement. No activity related to additional environmental investigations and/or remedial actions will be initiated prior to the Port Authority's receipt of approval of this CAMP.

It is anticipated that intrusive activities will be performed from time to time during the environmental investigation and remediation of the HHMT-Port Ivory Facility. The implementation of intrusive activities potentially may mobilize any volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides and herbicides, polychlorinated biphenyls (PCBs), and metals that have been detected in the impacted soil and groundwater as well as the light, non-aqueous phase liquid (LNAPL) at the HHMT-Port Ivory Facility. Therefore, air quality monitoring activities are required in order to protect potential receptors, generally the public, tenants of the Port Authority, and non-Port Authority personnel who may be involved in the environmental investigation/remediation.

The HHMT-Port Ivory Facility is located in a portion of Staten Island that is dominated by industrial or commercial properties. Except for the residential property located along Richmond Terrace to the east ofSite 3, there are no residential properties adjacent to the Facility. Nevertheless, Western Avenue and Richmond Terrace, both public roadways, run through the HHMT-Port Ivory Facility. This CAMP will be protective with regard to the health of people who may be present at the residential property referenced above, pedestrians walking along these roadways, and people driving along these roadways.

The Port Authority leases some of the buildings and land at the HHMT-Port Ivory Facility. This CAMP will be protective with regard to the health of the tenants.

While the Port Authority has a policy that includes health and safety provisions for its personnel at the HHMT-Port Ivory Facility, subcontractors of the Port Authority are not specifically addressed by the Port Authority's policies. Therefore, this CAMP covers all subcontractors who are covered by the Site-specific Health and Safety Plan applicable for the environmental investigation and/or remedial efforts addressed by that document.

This CAMP was prepared in accordance with applicable NYSDOH guidelines. All information required by the NYSDOH has been provided in this CAMP.

2.0 BACKGROUND AND SITE INFORMATION

As noted above, the Project is being conducted under the auspices of the NYSDEC VCP. The HHMT-Port Ivory Facility is a 124.3-acre property that is located at 40 Western Avenue, Staten Island, New York. See Figure 1 of the Site-specific Health and Safety Plan for the location of the HHMT-Port Ivory Facility.

As part of the overall site redevelopment, the Port Authority entered into the NYSDEC VCP in July 2004. The Port Authority's objective for entering into the VCP program with NYSDEC was to address the presence of contamination due to prior site activities unrelated to the Port Authority. Based on the Port Authority's schedule for redevelopment, the HHMT-Port Ivory Facility was partitioned into three Sites for the purpose of the VCP. Environmental investigation and/or remediation has or will be completed on all three Sites. The Sites have been designated as Site 1, Site 2A/2B, and Site 3A/3B.

On behalf of the Port Authority, Hatch Mott MacDonald (HMM) has performed environmental assessment and investigation activities to characterize site conditions and delineate historic fill material and contaminants in environmental media at the HHMT-Port Ivory Facility. Although the investigations are completed at Sites 1 and 2, additional investigative activities including intrusive work are necessary at Site 3. During the investigative activities HMM encountered LNAPL at several locations across the site. Mobile LNAPL has and will be removed as part of the remedial actions for the site.

Based on analytical data from the previous environmental investigations, soil and groundwater impacts exist at the HHMT-Port Ivory Facility. The impacts that may potentially be encountered include those attributable to organic compounds and/or metals in the following contaminant classes: VOCs, SVOCs, pesticides and herbicides, PCBs, and metals. These organic compounds and metals are adsorbed to soil, dissolved in groundwater, present in vapor or mist form in air, or components of the LNAPL encountered at the HHMT-Port Ivory Facility. In general, workers may be exposed to these contaminants via the following exposure pathways: inhalation, ingestion, or contact. Many of the potential hazards associated with these contaminants and pathways are discussed in the Site-specific Health and Safety Plan. This CAMP addresses only those hazards associated with contaminants that may be transported to receptors through the air via vapor and/or dust migration; in addition, this CAMP addresses exposure primarily via the inhalation pathway.

The Port Authority proposed "hot spot" removal, the construction of an environmental cap as an Engineering Control, and the establishment of a Deed Restriction as an Institutional Control as the appropriate Remedial Actions for the Site. These activities

include the removal of "hot spots" where mobile LNAPL is present, where LNAPL-impacted soil is acting as a source area for offsite groundwater impacts, or where concentrations of benzene and 2-butanone in soil exceed their Recommended Soil Cleanup Objectives and this exceedance has resulted in groundwater impacts. The Deed Restriction and environmental cap allows for background levels of impacted soil to remain at the site without negatively impacting human or ecological/environmental receptors. The Deed Restriction would limit the disturbance of soil and create a method to ensure the integrity of the environmental cap. As of 2011, the Remedial Actions have been completed for Sites 1 and 2; however, the Final Engineering Reports have not been approved by the NYSDEC. The Remedial Action Work Plan for Site 3 has not been approved by the NYSDEC. For a detailed description of the Remedial Actions to be performed at the Site, please see the site-specific Health and Safety Plan. Following the completion of the Remedial Actions, a post-remedial monitoring program will be implemented in accordance with the NYSDEC-approved Site Management Plan.

3.0 AIR QUALITY MONITORING FREQUENCY

Air quality will be monitored on either a continuous or a periodic basis. Continuous air quality monitoring for VO vapors will be conducted at the Exclusion Zone (EZ) boundaries where ground intrusive activities are actively being implemented. The purpose of the continuous monitoring under these conditions is to document that changing subsurface conditions have not resulted in the release of volatile organic vapors at concentrations that could adversely affect air quality. Intrusive activities include, but are not limited to, the excavation of test pits or trenches, the drilling of soil borings, and the installation of monitoring wells.

Periodic air quality monitoring will be conducted at all EZ boundaries where continuous air monitoring is not conducted. Periodic air quality monitoring for VO vapors will be conducted where intrusive activities have been completed but the area has not been completely restored to preexisting conditions. For example, periodic air monitoring for VO vapors will be required during the collection of groundwater samples from existing monitoring wells. The frequency of periodic air quality monitoring for VO vapors will depend upon the nature of the work being conducted in the EZ. As a general guidance, the more likely that changing conditions will cause the air quality to change at the EZ boundary, the more frequent the periodic measurements must be. For example, the concentration of VO vapors volatilizing from a test trench that was previously excavated but that remains open is unlikely to change significantly (except to decrease with time). Periodic monitoring of VO vapors that may potentially volatilize from the test pit may therefore be conducted at the beginning and end of each work day unless action levels are exceeded, in which case the actions taken may include a more frequent periodic monitoring for VO vapor concentration. However, the concentration of VO vapors volatilizing from the water in a well may change during groundwater purging if impacted groundwater is drawn into the well. Therefore, periodic air quality monitoring during groundwater sample collection might reasonably consist of measuring VO vapor concentration upon arrival at a monitoring well, measuring the concentration every fifteen minutes throughout the purge period, measuring the concentration during sample

collection (assuming a bailer is used), and measuring the concentration after closing the monitoring well.

Periodic air quality monitoring for airborne particulate matter will be conducted where the soil disturbance has occurred and the disturbed, impacted soil is staged uncovered above grade. Although stockpiles of impacted soil will be covered, periodic air monitoring for airborne particulate matter will be conducted at the boundaries of an EZ in the event that a stockpile of impacted soil within the EZ is temporarily uncovered. In this case, air quality monitoring for airborne particulate matter will be conducted at the beginning and end of each work day unless action levels are exceeded, in which case the actions taken may include a more frequent periodic monitoring for airborne particulate matter.

Please note, activities that would normally require only periodic air quality monitoring will be monitored continuously during the work day if such is justified by proximity to potential receptors. Locations where continuous air quality monitoring of VO vapors and/or airborne particulate matter may be justified include portions of the HHMT-Port Ivory Facility that are proximal to (within 20 feet of) Western Ave and/or Richmond Terrace, near the residential property located along Richmond Terrace to the east of Future Site 4, and near any building occupied by a tenant of the Port Authority.

4.0 LOCATIONS OF AIR QUALITY MONITORING STATIONS

The locations where air quality monitoring will be conducted at the HHMT-Port Ivory Facility will be determined based primarily on the locations and extent(s) of the EZ(s). At the Site, the EZ(s) will include all of the following areas:

- Areas where intrusive activities occur;
- Areas where excavations, borings or test pits are open and active;
- Areas where soil and/or groundwater is being handled for sampling purposes, on-Site storage, or off-Site disposal; and,
- Areas maintaining machinery such as excavators, drill rigs, trucks, construction equipment, etc that have not been thoroughly decontaminated.

At a minimum, two air quality monitoring stations will be established at each EZ where intrusive activities are being actively conducted. One air quality monitoring station will be established on the upwind boundary of the EZ. The second air quality monitoring station will initially be established on the downwind boundary of the EZ. The second air monitoring station may be moved away from the EZ boundary in a downwind direction if required based on an exceedance of the most stringent action level (see Table A for the action levels and required mitigative actions). Please note, the air monitoring personnel shall determine the wind direction based on a wind sock or similar equipment and shall move the air quality monitoring stations if wind direction changes for at least 30 minutes.

For intrusive activities conducted within 20 feet of the residence located along Richmond Terrace to the east of Future Site 4/2C, an air monitoring station will be established at the

EZ boundary closest to the residence. Depending on the wind direction, the upwind or downwind station may also be the station located along the EZ boundary closest to the residence. Therefore, for activities conducted within 20 feet of the residence, either two or three air quality monitoring stations will be required.

The air monitoring personnel shall carry the same equipment in order to monitor the air quality within the breathing zone immediately adjacent to the area where intrusive activities are being performed (i.e., work area). The concentrations of VO vapors and/or particulate matter measured within or immediately adjacent to the work area will represent the worst-case exposure. These measurements will also be used to identify the source of any VO vapor emission that may be detected at the downwind EZ boundary.

5.0 AIR QUALITY MONITORING EQUIPMENT

As noted above, based on the types of organic and metal contaminants that have been detected in groundwater, soil, and LNAPL at the HHMT-Pot Ivory Facility, air quality will be monitored for both VO vapors and particulate matter. The instruments utilized will be capable of detecting VO vapors and particulate matter at concentrations below the most stringent action levels (see Table A). In addition, the instruments utilized will be equipped with audible and visual alarms that will sound/be visible when an action level is exceeded.

It is anticipated that the monitoring instruments utilized for measuring the concentration of VO vapors will be photoionization detectors (PIDs). The PID will be capable of calculating 15-minute running average concentrations. Methane, ethane, and the major components of air are not detectable by a PID. The PID will be equipped with a lamp with an ionization potential suitable for detecting the VO vapors anticipated to be present in the area where intrusive activities are to be performed. The PID will be calibrated at the HHMT-Port Ivory Facility on a daily basis using a suitable gas of known concentration.

It is anticipated that the concentration of airborne particulate matter will be measured using a MiniRAM dust monitor or its equivalent. The MiniRAM dust monitor or its equivalent will be capable of calculating a running 15-minute (or less) average concentration. The instrument utilized will be capable of detecting particulate matter less than 10 micrometers in size. The instrument will be zeroed at the HHMT-Port Ivory Facility on a daily basis.

Please note that radiological contamination is not a concern at this Site. No additional monitoring will be required for such.

6.0 ACTION LEVELS AND REQUIRED RESPONSES

Action levels for concentrations of VO vapors are provided below in narrative format and are summarized in Table A. Please note, the actions to be taken if the action level(s)

is/are exceeded at the northern monitoring station are the same as those listed below for an exceedance at the downwind station. The following are the action levels and required responses for all intrusive activities conducted more than 20 feet away from the residential property located along Richmond Terrace to the east of Future Site 4.

- If the ambient air concentration of VO vapors in or adjacent to the work area or at the downwind EZ boundary exceeds 5 parts per million (ppm) above background but is less than 25 ppm above background for any 15-minute running average, work activities must be temporarily halted and monitoring continued. Work activities can continue when either of the two following conditions occurs:

    - The concentration of VO vapors in or adjacent to the work area or at the downwind EZ boundary is less than 5 ppm. Or,

    - Corrective actions have been taken to abate emissions and the concentration of VO vapors at a downwind location and in or adjacent to the work area is less than 5 ppm for a 15-minute average. The downwind location will be 200 feet downwind of the EZ or half the distance to the nearest potential receptor or commercial structure, whichever is less – but in no case less then 20 feet. The corrective actions may include one or more of the following: venting, covering or application of foam. Potential receptors include people walking or driving along Western Avenue or Richmond Terrace and tenants of the Port Authority. Therefore, the nearest public roadway or occupied building will be considered to be the receptor.

- If the concentrations of VO vapors in or adjacent to the work area or at the downwind EZ boundary are greater than 25 ppm above background, work activities must be halted. One or more of the corrective actions identified above must be implemented. Work may resume when the work plan has been modified to include activities designed to prevent the emission of VO vapors at concentrations greater than 5 ppm at the monitoring stations specified above.

The following are the action levels and required responses for all intrusive activities conducted within 20 feet of the residential property located along Richmond Terrace to the east of Future Site 4.

- If the ambient air concentration of VO vapors at the EZ boundary located closest to the residence exceed 1 ppm above background but is less than 25 ppm above background for any 15-minute running average, work activities must be temporarily halted, engineering controls (e.g., covering the source of the emissions and/or the application of vapor-suppressing foam) must be implemented, and monitoring must be continued. Work activities can continue when the ambient air concentration of VO vapors at the EZ boundary located closest to the residence are less than 1 ppm above background for a 15-minute average.

- If the concentrations of VO vapors in or adjacent to the work area, at the downwind EZ boundary, or at the EZ boundary closest to the residence are greater than 25 ppm above background, work activities must be halted. One or more of the corrective actions identified above must be implemented. Work may resume when the work plan has been modified to include activities designed to prevent the emission of VO vapors at concentrations greater than 1 ppm at the downwind EZ boundary and the EZ boundary closest to the residence.

Action levels for concentrations of airborne particulate matter are provided below in narrative format and are summarized in Table A. Please note, the visible emission of dust from the EZ is unacceptable, regardless of the concentration of airborne particulate matter measured using the MiniRAM dust meter or equivalent instrumentation. Therefore, visible dust emission is itself an action level as indicated below.

- If the 15-minute average concentration of airborne particulate matter in or adjacent to the work area or at the downwind EZ boundary exceeds 100 micrograms per cubic meter (mcg/m^3) above the background concentration or if airborne dust is observed leaving the work area, then dust suppression techniques, including misting soil with water from a certified clean water source such as a fire hydrant, if available, will be initiated. Work will continue with dust suppression techniques implemented periodically and/or as needed provided that the 15-minute average concentration of airborne particulate matter in or adjacent to the work area and at the downwind EZ boundary does not exceed 150 mcg/m^3 above the background concentration and provided that no visible dust is observed to be migrating from the EZ.

- If, after implementation of dust suppression techniques, the 15-minute average concentration of airborne particulate matter in or adjacent to the work area or at the downwind EZ boundary is greater then 150 mcg/m^3 above background, work will be stopped and a re-evaluation of activities will be initiated. Work will resume when dust suppression measures and other controls are successful in reducing the 15-minute average concentration in or adjacent to the work area and at the downwind EZ boundary to 150 mcg/m^3 or less above background and when no visible dust is observed to be migrating from the EZ.

7.0 AIR MONITORING RECORDS

The air monitoring personnel will be responsible for maintaining a daily log of the VO vapor and dust concentrations at each station in or adjacent to the work area. In addition, for the log of air quality measurements made in or adjacent to the work area, the air monitoring personnel will describe the location where the measurement was made, the activity being conducted, the distance from where the activity was conducted, and the approximate wind direction. For continuous air quality monitoring, VO vapor and airborne particulate matter concentrations measured at the downwind EZ boundary or the EZ boundary closest to the residential property located along Richmond Terrace shall be

recorded at 15-minute intervals throughout the workday. Background air quality data, i.e., data measured at the upwind EZ boundary, will be recorded prior to the initiation of work and every one hour thereafter. The hand-held air quality monitoring equipment will be used to measure instantaneous air quality within or immediately adjacent to the work area once per 30 minutes and whenever an exceedance is detected at the downwind EZ boundary.

Periodic air quality monitoring data must be recorded at a frequency approved by the Site Safety and Health Officer (SSHO) designated in the Port Authority-approved Site Specific Health and Safety Plan.

All air quality monitoring logs will be maintained at the HHMT-Port Ivory Facility and in a location accessible to both the SSHO and the air monitoring personnel. The logs will be provided to NYSDEC and/or NYSDOH officials upon request.

It is not anticipated that the jobsite will be staffed outside of the standard work day, on weekends, or on holidays. Therefore, the air quality monitoring log will not be maintained on these days, and actions will be taken to reduce the likelihood of an emission of VO vapors or airborne particulate matter at these times. Such actions may include temporarily covering all boreholes, test pits, test trenches, soil stockpiles, and other areas where wastes are stored to the extent practicable. All open test pits, test trenches, and boreholes will also be demarcated using high visibility plastic fencing or the equivalent. These precautions will also be recorded.

Table A – Action Levels and Required Responses for VO Vapor Concentrations

*VO Vapor Concentration (ppm) – Locations > 20 feet from Residence	RESPONSE
< 5 (15-minute average concentration and relative to background)	Monitor as specified in CAMP
Between 5 and 25 (15-minute average concentration and relative to background)	Work activities temporarily halted. Continue monitoring as specified in CAMP. Take corrective actions (let vent, cover, and/or apply foam) if VO vapor concentration remains greater than 5 ppm. Continue work when the VO vapor concentration is less than 5 ppm at either the downwind EZ boundary or at a downwind location as specified in the narrative.
> 25 (15-minute average concentration and relative to background)	Cease work and take corrective actions (let vent, cover, and/or apply foam).
***VO Vapor Concentration (ppm) – Locations within 20 feet of Residence**	**RESPONSE**
< 1 (15-minute average concentration and relative to background)	Monitor as specified in CAMP
Between 1 and 25 (15-minute average concentration and relative to background)	Work activities temporarily halted. Continue monitoring as specified in CAMP. Take corrective actions (cover and/or apply foam) if VO vapor concentration remains greater than 1 ppm. Continue work when the VO vapor concentration is less than 1 ppm at the downwind EZ closest to the residence.
> 25 (15-minute average concentration and relative to background)	Cease work and take corrective actions (cover and/or apply foam). Reevaluate work plan prior to resuming work.
***Airborne Particulate Matter Concentration (mcg/m^3)**	**RESPONSE**
<100 (15-minute average concentration and relative to background), no visible dust emissions from EZ	Monitor as specified in CAMP
Between 100 and 150 (15-minute average concentration and relative to background), no visible dust emissions from EZ	Apply dust suppression techniques. Continue monitoring as specified in CAMP.
> 150 (15-minute average concentration and relative to background) or visible dust emissions from EZ	Cease work and re-evaluate methods. Apply dust suppression techniques. Continue work when airborne particulate matter concentrations decrease to below 150 mcg/m^3.

APPENDIX B

HEALTH AND SAFETY FORMS

COMPLIANCE AGREEMENT

All personnel covered by this SSHP (See Section 1) must read this SSHP or have all components of the SSHP summarized by the Site Health and Safety Officer.

SSHP COMPLIANCE AGREEMENT:
By signing, you are indicating that you are familiar with all components of this SSHP, either because you read them or they were explained to your satisfaction. You are further indicating that you agree to abide by all requirements of this SSHP and have received an orientation to the Project worksite.

Name	Signature	Date

SITE ENTRY AND EXIT LOG

Project Number:	Project Name:	Project Supervisor:

Employee Name	Company	Task	Time In	Time Out

Equipment Inspection Form

Date:	Project Name.:	Project No.:
Equipment Make & Model:	Equipment No:	Equipment Hours:

This form is to be used for the initial equipment inspection upon arrival at the project and Daily inspection during use. Corrective actions are required for all deficiencies noted during the inspections.

EQUIPMENT CHECKLIST

Inspection Item	*Yes*	*No*	*Comment/Corrective Action*
Fluid Level?			
Horn Operable?			
Emergency/Parking Brake System?			
Hydraulic System Operable w/No leaks?			
Engine and Transmission			
Parking Brake System?			
Headlights Operable?			
Taillights Operable?			
Brake Lights Operable?			
Audible (Reverse) Alarm System?			
Unobstructed rear View?			
Windshields?			
Windshield Wipers and Washer Fluid?			
Defroster/Defogger?			
Cab Shield or Canopy?			
Seatbelts Available and Used?			
Fire Extinguishers?			
Rear View Mirror?			
Fender/Mud Flaps?			

Comments

Inspection Performed By:	Date:	Time:

Tool-Box Safety Briefing Sheet

Date:	Project:

Topics of Toolbox Safety Meeting

- ☐ Hardhats and Safety Shoes
- ☐ Eye & Ear Protection
- ☐ Work Zones and Site Control
- ☐ Heat and Cold Stress
- ☐ Designated Smoking Zone
- ☐ Review Previous Accidents
- ☐ Accident Reporting/Investigation
- ☐ Activity Hazard Analysis _____
- ☐ Activity Hazard Analysis _____
- ☐ Ladder for Excavation
- ☐ Entering Excavation
- ☐ Confined Space Entry
- ☐ Ground Fault Interrupters
- ☐ First Aid and Fire Protection
- ☐ Hazardous Communication
- ☐ Fall Protection (6 Foot Rule)
- ☐ Activity Hazard Analysis _____
- ☐ Other _____

Site Specific Hazards

Attendees

Conti Employees	Subcontractors & Visitors

Daily Operations

Site Safety and Health Officer:

Daily Air Monitoring Report

Project Number:	Project Name:	Project Supervisor:
Date:	**Duration of Monitoring**	

Work Location and Task:

Instrument:		**Instrument:**		**Instrument:**	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		**Calibration:**		**Calibration:**	

Perimeter Samples Collected:

Personnel Samples Collected:

Perimeter and Personnel Sample Results From Previous Day (Provide Data when Received):

Comments:

Name:	Title:
Signature:	Date:

Daily Air Monitoring Report (Cont.)

Project Number:	Project Name:	Project Supervisor:

Instrument:		Instrument:		Instrument:	
Reading	**Time**	**Reading**	**Time**	**Reading**	**Time**
Calibration:		**Calibration:**		**Calibration:**	

Signature:	Date:

Daily Safety and Inspection Log

Project Number:	Project Name:	Project Supervisor:
Date:	**Weather Condition:**	
Summary of Day's Work Activity:		
Violations of the Site Safety and Health Plan:		
Protective Clothing and Equipment Being Used by Task:		
Physical Condition of Workers (any heat or cold stress or other medical problems):		
Accidents or Breach of Procedures:		
Description of Monitoring and Air sampling Taken:		
Miscellaneous:		
Name:	Title:	
Signature:	Date:	