Appendix G

Example Draft Deed Notice

Sample Draft Deed Notice

AECOM has prepared a Draft Deed Notice on behalf of PPG Industries, Inc. (“PPG”) for the Jersey City Redevelopment Agency (“JCRA”) owned properties of Site 114, hereafter called the “Restricted Area,” which includes Block 21501, Lots 16, 17, 18, and 19 of the former PPG Industries facility, now designated as part of the Canal Crossing Redevelopment Plan.

This deed notice is being submitted to address remaining soil impacts within the Restricted Area as detailed in the Remedial Action Report (“RAR”) (*to be submitted upon completion of the remedial activities outlined in the RAWP and TEPs)*.

DRAFT DEED NOTICE

Block 21501 Lots 16, 17, 18, and 19
Former PPG Industries, Inc. Facility – Site 114 – Jersey City, New Jersey

IN ACCORDANCE WITH N.J.S.A. 58:10B-13, THIS DOCUMENT IS TO BE RECORDED IN THE SAME MANNER AS ARE DEEDS AND OTHER INTERESTS IN REAL PROPERTY.

Prepared by: _____
[Signature]

_____
[Print name below signature]

Recorded by:

_____
[Signature, Officer of County Recording Office]

_____
[Print name below signature]

DEED NOTICE

This Deed Notice is made as of the _____ day of _____, ____, by *Jersey City Redevelopment Agency* of 30 Montgomery Street, Jersey City, NJ (together with their successors and assigns, collectively "Owner").

1. THE PROPERTY. *Jersey City Redevelopment Agency* of 30 Montgomery Street, Jersey City, NJ is the owner in fee simple of certain real property designated as Block 21501 Lots 16, 17, 18, and 19, on the tax map of the City of Jersey City, Hudson County; the New Jersey Department of Environmental Protection Program Interest Number (Preferred ID) for the contaminated site which includes this property is G000008791 and G000005480; and the property is more particularly described in Exhibit A, which is attached hereto and made a part hereof (the "Property").

2. DEPARTMENT'S ASSIGNED BUREAU. The Site Remediation Program was the New Jersey Department of Environmental Protection program that was responsible for the oversight of the remediation of the Property. The matter was Case No. G000008791 and G000005480.

3. SOIL CONTAMINATION. PPG Industries, Inc .has remediated contaminated soil at the Property, and the New Jersey Department of Environmental Protection approved a remedial action on [Insert date of Department's approval], such that soil contamination remains in certain areas of the Property which contains contaminants in concentrations that do not allow for the unrestricted use of the Property; this soil contamination is described, including the type, concentration and specific location of such contaminants, in Exhibit B, which is attached hereto and made a part hereof. As a result, there is a statutory requirement for this Deed Notice [include if appropriate: and engineering controls] in accordance with N.J.S.A. 58:10B-13.

4. CONSIDERATION. In accordance with the New Jersey Department of Environmental Protection's approval of the remedial action work plan for the remediation of the site which included the Property, and in consideration of the terms and conditions of that approval, and other good and valuable consideration, Owner has agreed to subject the Property to certain statutory and regulatory requirements which impose restrictions upon the use of the Property, to restrict certain uses of the Property, and to provide notice to

subsequent owners, lessees and operators of the restrictions and the monitoring, maintenance, and biennial certification requirements outlined in this Deed Notice and required by law, as set forth herein.

5A. RESTRICTED AREAS. Due to the presence of these contaminants, the Owner has agreed, as part of the remedial action for the Property, to restrict the use of certain parts of the Property (the "Restricted Areas"); a narrative description of these restrictions, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C, which is attached hereto and made a part hereof. The Owner has also agreed to maintain a list of these restrictions on site for inspection by governmental enforcement officials.

[Insert the following paragraph when engineering controls are also implemented at the site:

5B. ENGINEERING CONTROLS. Due to the presence and concentration of these contaminants, the Owner has also agreed, as part of the remedial action for the Property, to the placement of certain engineering controls on the Property; a narrative description of these engineering controls, along with the associated monitoring and maintenance activities and the biennial certification requirements are provided in Exhibit C.]

6A. ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES.

i. Except as provided in Paragraph 6B, below, no person shall make, or allow to be made, any alteration, improvement, or disturbance in, to, or about the Property which disturbs any engineering control at the Property without first obtaining the express written consent of the Department of Environmental Protection. Nothing herein shall constitute a waiver of the obligation of any person to comply with all applicable laws and regulations including, without limitation, the applicable rules of the Occupational Safety and Health Administration. To request the consent of the Department of Environmental Protection, contact:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413

ii. Notwithstanding subparagraph 6A.i., above, the Department of Environmental Protection's express written consent is not required for any alteration, improvement, or disturbance provided that the owner, lessee or operator:

(A) Notifies the Department of Environmental Protection of the activity by calling the DEP Hotline, at 1-877-WARN-DEP or 1-877-927-6337, within twenty-four (24) hours after the beginning of each alteration, improvement, or disturbance;

(B) Restores any disturbance of an engineering control to pre-disturbance conditions within sixty (60) calendar days after the initiation of the alteration, improvement or disturbance;

(C) Ensures that all applicable worker health and safety laws and regulations are followed during the alteration, improvement, or disturbance, and during the restoration;

(D) Ensures that exposure to contamination in excess of the applicable remediation standards does not occur;

E) Submits a written report, describing the alteration, improvement, or disturbance, to the Department of Environmental Protection within sixty (60) calendar days after the end of each alteration, improvement, or disturbance. The owner, lessee or operator shall include in the report the nature of the alteration, improvement, or disturbance, the dates and duration of the alteration, improvement, or disturbance, the name of key individuals and their affiliations conducting the alteration, improvement, or disturbance, a description of the notice the Owner gave to those persons prior to the disturbance, the amounts of soil generated for disposal, if any, the final disposition and any precautions taken to prevent exposure. The owner, lessee, or operator shall submit the report to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413

[Insert the following paragraph when engineering controls are also implemented at the site:

6B. EMERGENCIES. In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, any person may temporarily breach any engineering control provided that that person complies with each of the following:

i. Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

ii. Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

iii. Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;

iv. Notifies the Department of Environmental Protection when the emergency has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;

v. Restores the engineering control to the pre-emergency conditions as soon as possible, and provides a written report to the Department of Environmental Protection of such emergency and restoration efforts within sixty (60) calendar days after completion of the restoration of the engineering control. The report must include all information pertinent to the emergency, potential discharges of contaminants, and restoration measures that were implemented, which, at a minimum, should specify: (a) the nature and likely cause of the emergency, (b) the potential discharges of or exposures to contaminants, if any, that may have occurred, (c) the measures that have been taken to mitigate the effects of the emergency on human health and the environment, (d) the measures completed or implemented to restore the engineering control, and (e) the changes to the engineering control or site operation and maintenance plan to prevent reoccurrence of such conditions in the future. The owner, lessee, or operator shall submit the report to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413]

7A. MONITORING AND MAINTENANCE OF DEED NOTICE, AND PROTECTIVENESS CERTIFICATION. The persons in any way responsible, pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11a et seq., for the hazardous substances that remain at the Property, the persons responsible for conducting the remediation, the Owner, and the subsequent owners, lessees, and operators, shall monitor and maintain this Deed Notice, and certify to the Department on a biennial basis that the remedial action that includes this Deed Notice remains protective of the public health and safety and of the environment. The subsequent owners, lessees and operators have this obligation only during their ownership, tenancy, or operation. The specific obligations to monitor and maintain the deed notice shall include all of the following:

i. Monitoring and maintaining this Deed Notice according to the requirements in Exhibit C, to ensure that the remedial action that includes the Deed Notice continues to be protective of the public health and safety and of the environment;

ii. Conducting any additional remedial investigations and implement any additional remedial actions, that are necessary to correct, mitigate, or abate each problem related to the protectiveness of the remedial action for the site prior to the date that the certification is due to the Department pursuant to iii, below, in order to ensure that the remedial action that includes this Deed Notice remains protective of the public health and safety and of the environment.

iii. Certify to the Department of Environmental Protection as to the continued protectiveness of the remedial action that includes this Deed Notice, on a form provided by the Department and consistent with N.J.A.C. 7:26C-1.2 (a)1, every two years on the anniversary of the date stamped on the deed notice that indicates when the deed notice was recorded;

[Insert the following paragraph if the soil remedial action included any engineering controls at the site:

7B. MONITORING AND MAINTENANCE OF ENGINEERING CONTROLS, AND PROTECTIVENESS CERTIFICATION. The persons in any way responsible, pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11a et seq., for the hazardous substances that remain at the Property, the person responsible for conducting the remediation, and, the Owner, and the subsequent owners, lessees, and operators, shall maintain all engineering controls at the Property and certify to the Department on a biennial basis that the remedial action of which each engineering control is a part remains protective of the public health and safety and of the environment. The subsequent owners, lessees and operators have this obligation only during their ownership, tenancy, or operation. The specific obligations to monitor and maintain the engineering controls shall include the following:

i. Monitoring and maintaining each engineering control according to the requirements in Exhibit C, to ensure that the remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment;

ii. Conducting any additional remedial investigations and implement any additional remedial actions, that are necessary to correct, mitigate, or abate each problem related to the protectiveness of the remedial action for the Property prior to the date that the certification is due to the Department pursuant to iii, below, in order to ensure that the remedial action that includes the engineering control remains protective of the public health and safety and of the environment.

iii. Certify to the Department of Environmental Protection as to the continued protectiveness of the remedial action that includes the engineering control, on a form provided by the Department and consistent with N.J.A.C. 7:26C-1.2 (a)1, every two years on the anniversary of the date stamped on the deed notice that indicates when the deed notice was recorded.

8. ACCESS. The Owner and the subsequent owners, lessees and operators agree to allow the Department, its agents and representatives access to the Property to inspect and evaluate the continued protectiveness of the remedial action that includes this Deed Notice and to conduct additional remediation to ensure the protection of the public health and safety and of the environment if persons responsible for monitoring the protectiveness of the remedial action, as described in Paragraph 7, above, fail to conduct such remediation pursuant to this Deed Notice as required by law. The Owner, and the subsequent owners and lessees, shall also cause all leases, subleases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring that all holders thereof provide such access to the Department.

9. NOTICES.

i. The Owner and the subsequent owners and lessees, shall cause all leases, grants, and other written transfers of an interest in the Restricted Areas to contain a provision expressly requiring all holders thereof to take the Property subject to the restrictions contained herein and to comply with all, and not to violate any of the conditions of this Deed Notice. Nothing contained in this Paragraph shall be construed as limiting any obligation of any person to provide any notice required by any law, regulation, or order of any governmental authority.

ii. Owner and all subsequent owners and lessees shall notify any person intending to conduct invasive work or excavate within the Restricted Areas at the Property, including, without limitation, tenants, employees of tenants, and contractors of the nature and location of contamination in the Restricted Areas, and, of the precautions necessary to minimize potential human exposure to contaminants.

iii. The Owner and the subsequent owners shall provide written notice to the Department of Environmental Protection at least thirty (30) calendar days before the effective date of any conveyance, grant, gift, or other transfer, in whole or in part, of the owner's interest in the Restricted Area.

iv. The Owner and the subsequent owners shall provide written notice to the Department within thirty (30) calendar days following the owner's petition for or filing of any document initiating a rezoning of the Property. The Owner and the subsequent owners shall submit the written notice to:

Department of Environmental Protection
Division of Remediation Management and Response
Bureau of Operation, Maintenance, and Monitoring
Deed Notice Inspection Program
P.O. Box 413
401 E. State Street
Trenton, NJ 08625-0413.

10. ENFORCEMENT OF VIOLATIONS.

i. This Deed Notice itself is not intended to create any interest in real estate in favor of the Department of Environmental Protection, nor to create a lien against the Property, but merely is intended to provide notice of certain conditions and restrictions on the Property and to reflect the regulatory and statutory obligations imposed as a conditional remedial action for this site.

ii. The restrictions provided herein may be enforceable solely by the Department against any person who violates this Deed Notice. To enforce violations of this Deed Notice, the Department may initiate one or more enforcement actions pursuant to N.J.S.A. 58:10-23.11u and require additional remediation and assess damages pursuant to N.J.S.A. 58:10-23.11g.

11. SEVERABILITY. If any court of competent jurisdiction determines that any provision of this Deed Notice requires modification, such provision shall be deemed to have been modified automatically to conform to such requirements. If a court of competent jurisdiction determines that any provision of this Deed Notice is invalid or unenforceable and the provision is of such a nature that it cannot be modified, the provision shall be deemed deleted from this instrument as though the provision had never been included herein. In either case, the remaining provisions of this Deed Notice shall remain in full force and effect.

12. SUCCESSORS AND ASSIGNS. This Deed Notice shall be binding upon Owner and upon Owner's successors and assigns, and subsequent owners, lessees and operators while each is an owner, lessee, or operator of the Property.

13. MODIFICATION AND TERMINATION.

i. Any person may request in writing, at any time, that the Department modify this Deed Notice where performance of subsequent remedial actions, a change of conditions at the Property, or the adoption of revised remediation standards suggest that modification of the Deed Notice would be appropriate.

ii. Any person may request in writing, at any time, that the Department terminate this Deed Notice because the conditions which triggered the need for this Deed Notice are no longer applicable.

iii. This Deed Notice may be revised or terminated only upon filing of an instrument, executed by the Department, in the office of the [Insert as appropriate the County Clerk/Register of Deeds and Mortgages] of Hudson County, New Jersey, expressly modifying or terminating this Deed Notice.

14A. EXHIBIT A. Exhibit A includes the following maps of the Property and the vicinity:

i. Exhibit A-1: Vicinity Map - A map that identifies by name the roads, and other important geographical features in the vicinity of the Property (for example, Hagstrom County Maps);

ii. Exhibit A-2: Metes and Bounds Description - A metes and bounds description of the Property, including reference to tax lot and block numbers for the Property;

iii. Exhibit A-3: Property Map - A scaled map of the Property, scaled at one inch to 200 feet or less, and if more than one map is submitted, the maps shall be presented as overlays, keyed to a base map; and the Property Map shall include diagrams of major surface topographical features such as buildings, roads, and parking lots.

14B. EXHIBIT B. Exhibit B includes the following descriptions of the Restricted Areas:

i. Exhibit B-1: Restricted Area Map - A separate map for each restricted area that includes:

(A) As-built diagrams of each engineering control, including caps, fences, slurry walls, ground water monitoring wells, and ground water pumping system;

(B) As-built diagrams of any buildings, roads, parking lots and other structures that function as engineering controls; and

(C) Designation of all soil and sediment sample locations within the restricted areas that exceed any soil or sediment standard that are keyed into one of the tables described in the following paragraph.

ii. Exhibit B-2: Restricted Area Data Table - A separate table for each restricted area that includes:

(A) Sample location designation from Restricted Area map (Exhibit B-1);

(B) Sample elevation based upon mean sea level;

(C) Name and chemical abstract service registry number of each contaminant with a concentration that exceeds the unrestricted use standard;

(D) The restricted and unrestricted use standards for each contaminant in the table; and

(E) The remaining concentration of each contaminant at each sample location at each elevation (or if historic fill, include data from the Department's default concentrations at N.J.A.C. 7:26E-4.6, Table 4-2).

14C. EXHIBIT C. Exhibit C includes narrative descriptions of the institutional controls [Insert as appropriate: and engineering controls] as follows:

i. Exhibit C-1: Deed Notice as Institutional Control: Exhibit C-1 includes a narrative description of the restriction and obligations of this Deed Notice that are in addition to those describe above, as follows:

(A) General Description of this Deed Notice:

(1) Description and estimated size of the Restricted Areas as described above;

(2) Description of the restrictions on the Property by operation of this Deed Notice; and

(3) The objective of the restrictions.

(B) Description of the monitoring necessary to determine whether:

(1) Any disturbances of the soil in the Restricted Areas did not result in the unacceptable exposure to the soil contamination;

(2) There have been any land use changes subsequent to the filing of this Deed Notice or the most recent biennial certification, whichever is more recent;

(3) The current land use on the Property is consistent with the restrictions in this Deed Notice;

(4) Any newly promulgated or modified requirements of applicable regulations or laws apply to the site; and

(5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) Land use at the Property is consistent with the restrictions in this Deed Notice; and

(3) The remedial action that includes this Deed Notice continues to be protective of the public health and safety and of the environment.

[Insert the following if engineering controls are part of the remedial action for the site:

ii. Exhibit C-2: [Insert the name of the first engineering control]: Exhibit C-2 includes a narrative description of [Insert the name of the first engineering control] as follows:

(A) General Description of the engineering control:

(1) Description of the engineering control;

(2) The objective of the engineering control; and

(3) How the engineering control is intended to function.

(B) Description of the operation and maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness;

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment;

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control;

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment;

(5) A record of the self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control. Sampling, for example, may be necessary if it is not possible to visually evaluate the integrity/ performance of this engineering control; and

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice;

(2) The engineering controls continue to operate as designed; and

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment.

Repeat the contents of Exhibit C-2, renumbering accordingly, for each separate engineering control that is part of the remedial action for the site.]

15. SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Deed Notice as of the date first written above.

ATTEST: Jersey City Redevelopment Agency

_____ By_____

_____ _____
[Print name and title] [Signature]

[If Owner is a general or limited partnership]

WITNESS:

_____

_____ By_____, General
[Signature] [Print name] Partner

STATE OF NEW JERSEY
COUNTY OF HUDSON

I certify that on _____, 20__, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the [secretary/assistant secretary] of [Owner], the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [president/vice president] of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

_____
[Signature]

_____
[Print name and title of attesting witness]

Signed and sworn before me on _____, 20__

_____, Notary Public

_____
[Print name and title]

[If Owner is a partnership]

STATE OF [State where document is executed] SS.:
COUNTY OF [County where document is executed]

I certify that on _____, 20__, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person:

(a) is a general partner of [Owner], the partnership named in this document;

(b) signed, sealed and delivered this document as his or her act and deed in his capacity as a general partner of [owner]; and

(c) this document was signed and delivered by such partnership as its voluntary act, duly authorized.

_____
[Signature]

_____, General Partner
[Print Name]

_____, Notary Public

_____
[Print name and title]

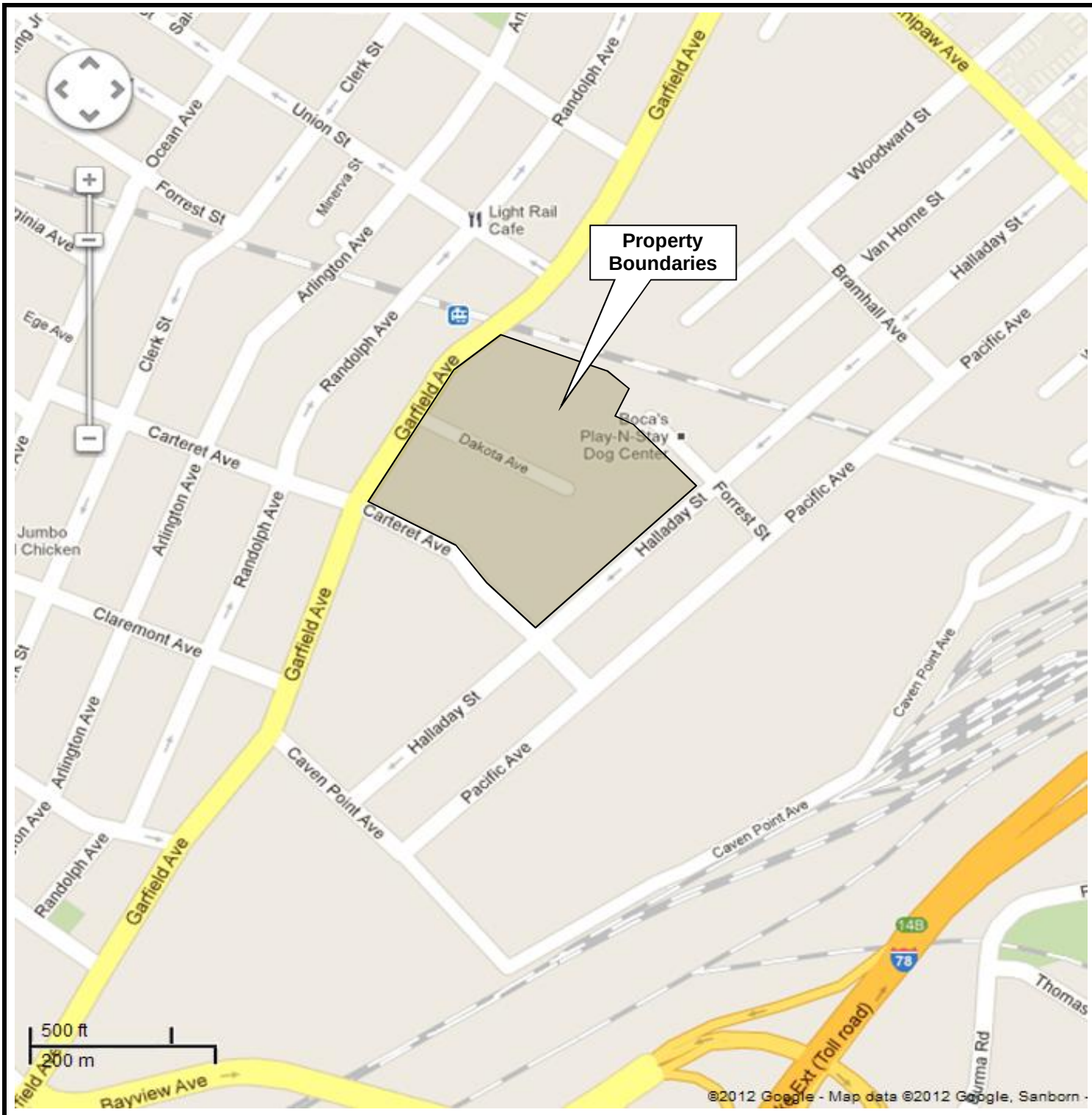
EXHIBIT A

Property Maps and Boundaries

Exhibit A-1: Vicinity Map

Exhibit A-2: Metes and Bounds Description
(To be provided upon completion of remedial activities and modified based on final subdivision approval and survey)

Exhibit A-3: Property Map



N Source: © 2012 Google Map Data © 2012 Google, Sanborn	Client: **PPG Industries, Inc.** Design/Review: HQ/KW Scale: 1:24,000 Date: April 2012	**EXHIBIT A-1** **Vicinity Map** HCC Site 114 Soil RAWP Project No.: 60240740.GA.DE	AECOM

\\Uspsw2vfp001\data_uspsw2vfp001\Environment\Piscataway\Project\PPG-NJCProgram\7-Deliverables\7.1B-GAGroup\2011-2012_Soil RAWP\Revison 2\Appendices\App H - Draft Deed Notice and PRMP\A-1.xls

NOTES:

1. PROPERTY LINES AND SUBDIVISION LINES SHOWN HEREIN ARE BASED ON A DRAWING ENTITLED "BOUNDARY MAP; TAX MAP LOTS 1, 2A, 3A, & A IN BLOCK 2026.1; PPG INDUSTRIES SITE 114; THE CITY OF JERSEY CITY, HUDSON CO., NEW JERSEY," PREPARED BY BORBAS SURVEYING & MAPPING, LLC, DRAWING # 051201 2011-06-01, DATED JUNE 1, 2011.

2. THE PROPERTIES REFERENCED IN THE DEED NOTICE ARE BLOCK 21501, LOT 16; BLOCK 21501, LOT 17; BLOCK 21502, LOT 18; BLOCK 21501, LOT 19.

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AECOM

AECOM
30 KNIGHTSBRIDGE ROAD, SUITE 520
PISCATAWAY, NEW JERSEY
www.aecom.com

PPG INDUSTRIES
GARFIELD AVENUE SITES
JERSEY CITY, HUDSON COUNTY, NEW JERSEY

PROJ. NUMBER: 60240740
DATE: 04/11/2012

PROPERTY MAP
BLOCK 21501, LOT 16; BLOCK 21501, LOT 17; BLOCK 21502, LOT 18; BLOCK 21501, LOT 19

DEED NOTICE

EXHIBIT NUMBER: A-3
SHEET NUMBER: 1 OF 1
REVISION

Exhibit B

Description of Restricted Area

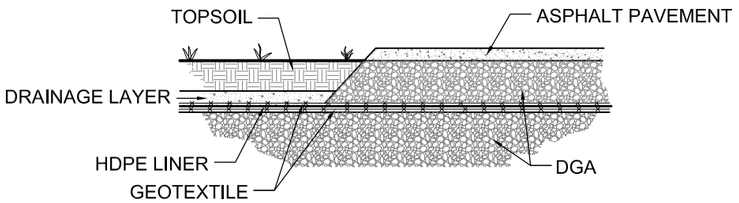
Exhibit B-1: Map of Areas of Concern

(To be provided completion of remedial activities)

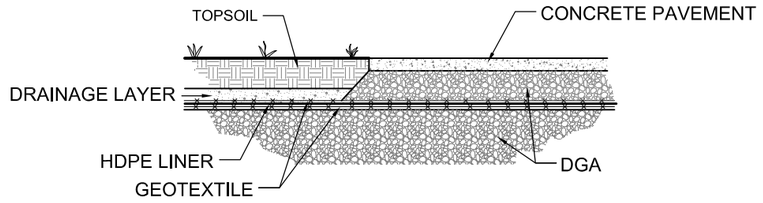
Exhibit B-2: Cross-Sections of Proposed Engineering Controls

Exhibit B-3: Restricted Area Analytical Results Summary Table

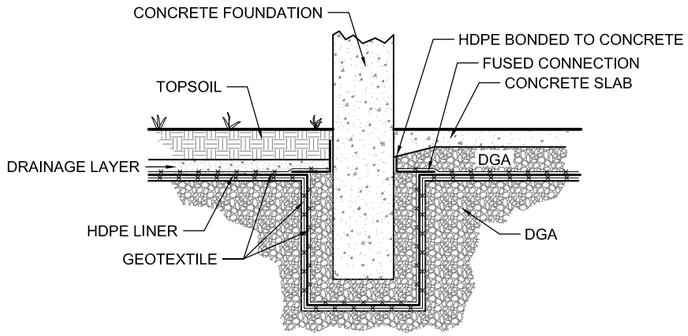
(To be provided completion of remedial activities)



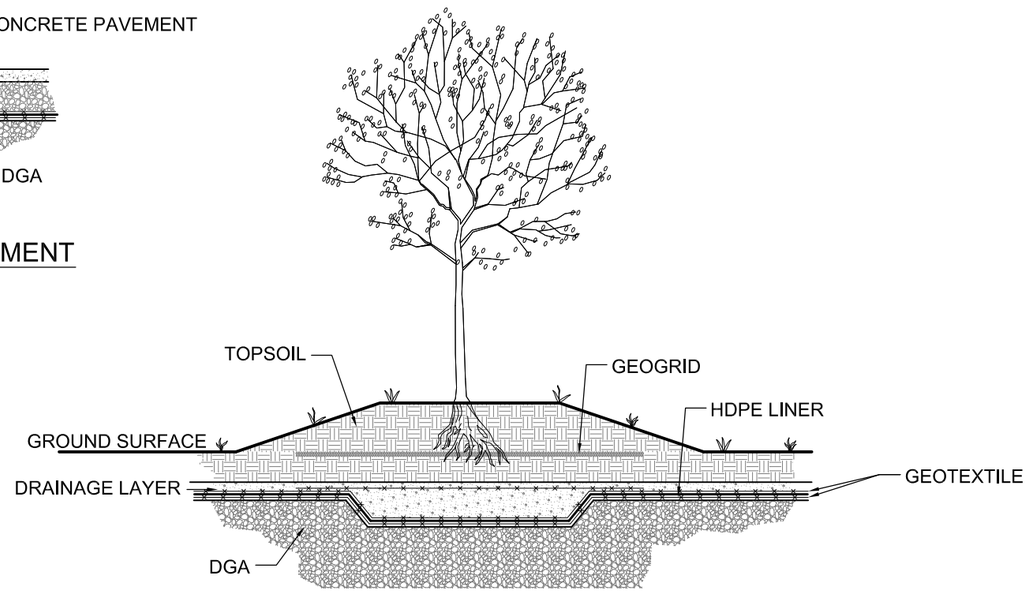
TYPICAL ASPHALT PAVEMENT
NOT TO SCALE



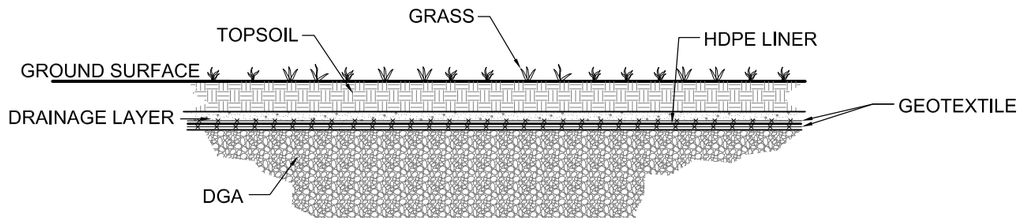
TYPICAL CONCRETE PAVEMENT
NOT TO SCALE



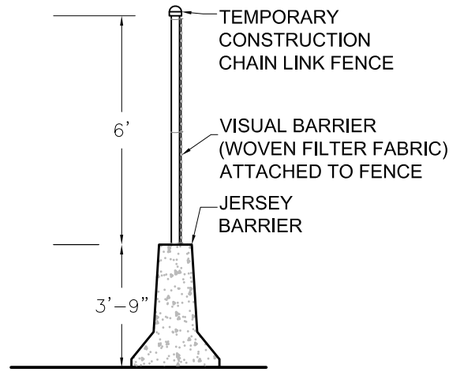
TYPICAL FROSTWALL FOUNDATION
NOT TO SCALE



TYPICAL VEGETATION BED
NOT TO SCALE



TYPICAL LIMITED VEGETATION BED
NOT TO SCALE



TYPICAL FENCING
NOT TO SCALE

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PPG INDUSTRIES
GARFIELD AVENUE SITES
JERSEY CITY, HUDSON COUNTY, NEW JERSEY

PROJ. NUMBER: 60240740

DATE: 04/13/2012

CROSS-SECTION
TYPICAL ENGINEERING CONTROLS

DEED NOTICE & INSTITUTIONAL CONTROLS

FIGURE NUMBER: B-2

SHEET NUMBER: 1 OF 1

REVISION

Exhibit C

Narrative Descriptions of Institutional and Engineering Controls

Exhibit C-1: Deed Restriction as Institutional Control

Exhibit C-2: Capillary Break and Gravel Cap

Exhibit C-3: Capillary Break and Surface Soil Cover

Exhibit C-4: Vegetative Control

Exhibit C-5: Concrete/Asphalt Cap

Exhibit C-6: Security Fencing

Exhibit C-7: Post-Remediation Management Plan

Exhibit C-1

Deed Notice as Institutional Control

(A) General Description of this Deed Notice

(1) Description and estimated size of the Restricted Area:

Block 21501, Lots 16, 17, 18, and 19 (hereinafter referred to as the "Property"), of the former Chromate Chemical Production Facility, located in Jersey City, New Jersey, is described in metes and bounds terms in Exhibit A-2 of this Deed Notice, as well as described in general terms below. The Property is approximately 13.5 acres in size, as recorded by the Jersey City Tax Assessor's Office; last revised February 4, 2012. The Jersey City Redevelopment Agency is the owner of Block 21501, Lots 16, 17, 18, and 19.

The "Restricted Area" consists of the entire aerial extent of the Property. Presently, the Property is undergoing environmental remediation. The Deed Notice covers the Restricted Area. Additional investigations are continuing in the remaining areas of the Property and additional restrictions and engineering controls may be warranted.

The contaminants of concern identified in the groundwater in the Restricted Area include hexavalent chromium (Cr^{+6}), benzene, toluene, ethylbenzene, xylenes ("BTEX"), chlorinated volatile organic compounds ("CVOCs"), semi-volatile organic compounds ("SVOCs"), United States Environmental Protection Agency ("USEPA") Target Analyte List ("TAL") metals, and cyanide.

The property owner agreed to the institutional controls for the Restricted Area in a letter, dated XXX.

(2) Description of the restrictions on the Property by operation of this Deed Notice:

The proposed future use of the Property will be mixed commercial-residential with a linear park along the former Morris Canal. The Post-Remediation Management Plan (provided herewith in Exhibit C-7) for the Property includes the installation of a capillary break at approximately a depth of 1 foot below ground surface across the entire area of the site. The capillary break will consist of a 40 MIL high-density polyethylene ("HDPE") membrane liner between two layers of geotextile fabric. The purpose of the capillary break is to prevent the upward migration of impacted groundwater towards the ground surface. Utility, construction, and maintenance crews and their subcontractors are required to contact PPG during the planning phases of any activity that involves excavation work deeper than 2 feet; work that may puncture or otherwise impact the capillary break; work that involves the pumping or handling of groundwater; or any other invasive activities. Subsurface work on the Property will be conducted with adherence with the 2012 *Interim Post-Remediation Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey*, which has been developed by AECOM on behalf of PPG Industries, Inc.

(3) The objective of the restrictions:

The restrictions in this Deed Notice are being implemented in order to prevent direct contact and prevent public health and the environment from known or suspected contamination in the

Property's subsurface soil. The Deed Notice and engineering controls are the means necessary to ensure the objective of the restrictions on the Property are met.

(B) Description of the monitoring necessary to determine whether:

(1) Any disturbances of the soil in the Restricted Area did not result in the unacceptable exposure to the soil contamination: Periodic monitoring of conditions across the site will be conducted to ensure that soils have not been disturbed by either human or environmental mechanisms. Specifically, the Property will be visually inspected to verify that the capillary break has not been exposed or impacted by either human or environmental mechanisms. This proposed monitoring will ensure that no disturbance of soil in the Restricted Areas result in unacceptable exposure to soil contamination. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) There have been any land use changes subsequent to the filing of this Deed Notice or the most recent biennial certification, whichever is more recent: Annual monitoring will include a description of site use including the appropriate SIC or NAICS code which the current owner is operating the site or subdivisions. Additionally, a windshield survey will be conducted of neighboring properties to assess changes in land use in the immediate vicinity of the Property. This proposed monitoring will ensure that no land use changes have occurred subsequent to the filing of the Deed Notice or the most recent biennial certification.

(3) The current land use on the Property is consistent with the restrictions in this Deed Notice: As described in (B)(2) above, annual monitoring will include a review of SIC or NAICS codes associated with each operation within the confines of this Deed Notice. This proposed monitoring will ensure that the current land use on the site is consistent with the restrictions in the Deed Notice.

(4) Any newly promulgated or modified requirements of applicable regulations or laws apply to the site: During the biennial certification process, a regulatory review will be conducted to determine if newly promulgated or modified requirements exist in relation to the maintenance of this Deed Notice. This proposed monitoring will ensure that newly promulgated or modified requirements of applicable regulations or laws that apply to the Property are applied to the Deed Notice or the most recent biennial certification.

(5) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the Deed Restrictions and Engineering Controls placed over the Restricted Area remain sufficient to maintain the objectives of the Deed Notice as described in (A)(3) above. This proposed monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(2) Land use at the Property is consistent with the restrictions in this Deed Notice: A statement that the land-use at the Property is consistent with the restrictions in this Deed Notice.

(3) The remedial action that includes this Deed Notice continues to be protective of the public health and safety and of the environment: A statement that the remedial action, including this Deed Notice, continues to be protective of the public health and safety and of the environment.

EXHIBIT C-2

Capillary Break and Gravel Cover

(A) General Description of Engineering Control

(1) Description of the engineering control: A capillary break will be installed across the entire site to a depth of at least 12 inches and covered with ¾" washed gravel. The capillary break will consist of a 40 MIL high-density polyethylene ("HDPE") membrane liner between two layers of geotextile fabric. The purpose of the capillary break is to prevent the upward migration of impacted groundwater towards the ground surface. The capillary break will also be place below utility and landscaping corridors. The gravel cover is used to anchor the capillary break and to minimize dust generation. The property owner agreed to the engineering controls for the Restricted Area in a letter, dated XXX.

(2) The objective of the engineering control: The purpose of the capillary break and gravel cover is to serve as a physical barrier between the contaminated subsurface soil and the ground surface.

(3) How the engineering control is intended to function: The capillary break and gravel cover is intended to prevent direct exposure of public health and the environment to potentially impacted soil.

(B) Description of the Operation and Maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness: The property owner will conduct monitoring of the cover caps consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The schedule of inspection is presented on Table 1. Gravel capped areas shall be routinely evaluated and maintained. Inspection and maintenance of the gravel cover will be conducted in accordance with Table 1. Inspections will be documented and any potential faults in the cap will be photo-documented. All damage that has the potential to undermine the cap's effectiveness shall be repaired. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment: Periodic monitoring as described in (B)(1) will ensure that the gravel cover continue to function as designed and intended to protect the public health and safety and the environment by preventing direct contact with the underlying soil.

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control: Any alteration, excavation, or disturbance of the capillary break and gravel cover will occur in a timely manner and will be addressed appropriately so as to maintain the integrity of the engineering control. Specifically, any earthwork planned in the Restricted Area will be conducted in accordance with this Deed Notice and the 2012 Post-Remediation Management Plan entitled *Interim Post-Remediation Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey*, developed by AECOM on behalf of PPG Industries.

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment: Through the implementation of above inspection and maintenance, the gravel cap will maintain its integrity and will remain protective of the public health and safety and of the environment by preventing direct contact with the underlying soil.

(5) A record of self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control: The results of all inspections and maintenance and any disturbances of the controls shall be documented in a logbook, which will be made available to the NJDEP upon request. The logbook shall contain the self-inspection dates, name of the inspector, and the results of the inspection and condition of the gravel cap with photo-documentation as appropriate.

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the engineering control placed over the Restricted Area remains sufficient to maintain the objectives of the Deed Notice as described in (A)(2) above. This monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the site specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes the specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(2) The engineering controls continue to operate as designed: A statement that the engineering controls continue to operate as designed, based on an evaluation of the actual conditions of the engineering controls compared to the intended design.

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment: A statement that the remedial action, including the gravel cap, continues to be protective of the public health and safety and of the environment.

EXHIBIT C-3

Capillary Break and Surface Soil Cover

(A) General Description of Engineering Control

(1) Description of the engineering control: A capillary break and surface soil cover will be present on the Property. Concrete building foundations and sidewalks of varying depths will be emplaced on the property and serve as concrete caps. Where concrete, bituminous asphalt, or gravel caps are not present, surface soil cover to a depth of at least 3 feet below ground surface will be present. These barriers will prevent direct contact to and ingestion of the underlying soils by providing a solid barrier between the surface and potentially impacted soil. The property owner agreed to the engineering controls for the Restricted Area in a letter, dated XXX.

(2) The objective of the engineering control: The purpose of the capillary break and surface soil cover is to serve as a physical barrier between the contaminated subsurface soil and the ground surface. The vegetation of the surface soil cover serves as an erosion prevention feature to prevent the forces of the stormwater runoff and wind from eroding the protective soil cover.

(3) How the engineering control is intended to function: The capillary break and surface soil cover is intended to prevent direct contact to the underlying contaminated soil by onsite workers or others present at the Restricted Area.

(B) Description of the Operation and Maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness: The property owner will conduct monitoring of the surface soil cover consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The schedule of inspection is presented on Table 1. Soil capped areas shall be routinely evaluated for erosion, stressed vegetation, etc. Mowing, maintenance of vegetative growth, fertilizing, and reseeding will be conducted in accordance with Table 1. Inspections will be documented and any potential faults in the cap will be photo-documented. All damage that has the potential to undermine the cap's effectiveness shall be repaired. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment: Periodic monitoring as described in (B)(1) will ensure that the capillary break and surface soil cover continues to function as designed and intended to protect the public health and safety and the environment by preventing direct contact with the underlying soil.

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control: Any alteration, excavation, or disturbance of the capillary break and surface soil cover will occur in a timely manner and will be addressed appropriately so as to maintain the integrity of the engineering control. Specifically, any earthwork planned in the Restricted Area will be conducted in accordance with this Deed Notice and the 2012 Post-Remediation Management Plan entitled *Interim Post-Remediation Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey*, developed by AECOM on behalf of PPG

Industries. The Post-Remediation Management Plan was developed in an effort to mitigate potential exposure of public health and the environment to impacted soil and groundwater in the Property's subsurface.

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment: Through the implementation of above inspection and maintenance, the capillary break and surface soil cover will maintain its integrity and will remain protective of the public health and safety and of the environment by preventing direct contact with the underlying soil.

(5) A record of self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control: The results of all inspections and maintenance and any disturbances of the controls shall be documented in a logbook, which will be made available to the NJDEP upon request. The logbook shall contain the self-inspection dates, name of the inspector, and the results of the inspection and condition of the capillary break and surface soil cover with photo-documentation as appropriate.

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the engineering control placed over the Restricted Area remains sufficient to maintain the objectives of the Deed Notice as described in (A)(2) above. This monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the site specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes the specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(2) The engineering controls continue to operate as designed: A statement that the engineering controls continue to operate as designed, based on an evaluation of the actual conditions of the engineering controls compared to the intended design.

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment: A statement that the remedial action, including the capillary break and surface soil cover, continues to be protective of the public health and safety and of the environment.

EXHIBIT C-4

Vegetated Control

(A) General Description of Engineering Control

(1) Description of the engineering control: A vegetated control will be in place in portions of the Property. The vegetated control will serve as a barrier to prevent direct contact to and ingestion of underlying soils, and reduces the potential for soil erosion. The property owner agreed to the engineering controls for the Restricted Area in a letter, dated XXX.

(2) The objective of the engineering control: The purpose of the vegetated control is to serve as a barrier to prevent direct contact to and ingestion of underlying soils, and reduce the potential for soil erosion. The vegetated control is augmented with a chain-link security fence around the perimeter of the Restricted Area to prevent unauthorized access.

(3) How the engineering control is intended to function: The vegetated control is intended to prevent direct contact to the underlying contaminated soil by onsite workers, or others present at the Restricted Area.

(B) Description of the Operation and Maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness: The property owner will conduct monitoring of the vegetated control, consisting of inspection and evaluation of the vegetative control to determine its integrity, operability, and effectiveness. The schedule of inspection is presented on Table 1. Areas containing the vegetated control shall be routinely evaluated for erosion, stressed vegetation, etc. Mowing, maintenance of vegetative growth, fertilizing, and reseeding will be conducted in accordance with Table 1. All inspections will be documented, including photo-documentation. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment: Periodic monitoring as described in (B)(1) will ensure that the vegetated control continues to function as designed and intended to protect the public health and safety and the environment by preventing direct contact with the underlying soil.

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control: Any alteration, excavation, or disturbance of the vegetated control and/or capillary break will occur in a timely manner and will be addressed appropriately so as to maintain the integrity of the engineering control. Specifically, any earthwork planned in the Restricted Area will be conducted in accordance with this Deed Notice and a the 2012 Post-Remediation Management Plan entitled *Interim Post-Remediation Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey*, developed by AECOM on behalf of PPG Industries.

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment: Through the implementation of above inspection and maintenance, the vegetated

control will maintain its integrity and will remain protective of the public health and safety and of the environment by preventing direct contact with the underlying soil.

(5) A record of self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control: The results of all inspections and maintenance and any disturbances of the controls shall be documented in a logbook, which will be made available to the NJDEP upon request. The logbook shall contain the self-inspection dates, name of the inspector, and the results of the inspection and condition of the vegetated control with photo-documentation as appropriate.

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the engineering control placed over the Restricted Area remains sufficient to maintain the objectives of the Deed Notice as described in (A)(2) above. This monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(C) Description of the following items that will be included in the biennial certification:

(1) A monitoring report that describes the site specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes the specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(2) The engineering controls continue to operate as designed: A statement that the engineering controls continue to operate as designed, based on an evaluation of the actual conditions of the engineering controls compared to the intended design.

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment: A statement that the remedial action, including the vegetated control, continues to be protective of the public health and safety and of the environment.

EXHIBIT C-5

Concrete and Asphalt Caps

(A) General Description of Engineering Control

(1) Description of the engineering control: The Property will contain concrete slab foundations, concrete sidewalks, and access ways paved with bituminous asphalt over a capillary break and will serve as physical barrier/caps. These barriers will prevent direct contact to and ingestion of the underlying soils by providing a solid barrier between the surface and potentially impacted soil. The property owner agreed to the engineering controls for the Restricted Area in a letter, dated XXX.

(2) The objective of the engineering control: The purpose of the concrete and asphalt caps is to serve as a physical barrier between the contaminated subsurface soil and the ground surface.

(3) How the engineering control is intended to function: The concrete and asphalt caps are intended to prevent direct exposure of public health and the environment to potentially impacted soil.

(B) Description of the Operation and Maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness: The property owner will conduct monitoring of the cap consisting of inspection and evaluation of the cap to determine its integrity, operability, and effectiveness. The schedule of inspection is presented on Table 1. Concrete capped areas including concrete surfaces, building foundations and sidewalks and asphalt capped areas including paved parking areas, roads and asphalt walkways shall be routinely evaluated and maintained. Inspection and maintenance of the cap will be conducted in accordance with Table 1. Inspections will be documented and any potential faults in the cap will be photo-documented. All damage that has the potential to undermine the cap's effectiveness shall be repaired. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment: Periodic monitoring as described in (B)(1) will ensure that the asphalt and concrete caps continue to function as designed and intended to protect the public health and safety and the environment by preventing direct contact with the underlying soil.

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control: Any alteration, excavation, or disturbance of the asphalt and concrete caps and/or capillary break will occur in a timely manner and will be addressed appropriately so as to maintain the integrity of the engineering control. Specifically, any earthwork planned in the Restricted Area will be conducted in accordance with this Deed Notice and the 2012 Post-Remediation Management Plan entitled *Interim Post-Remediation Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey*, developed by AECOM on behalf of PPG Industries.

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the

environment: Through the implementation of above inspection and maintenance, the asphalt and concrete caps will maintain its integrity and will remain protective of the public health and safety and of the environment by preventing direct contact with the underlying soil.

(5) A record of self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control: The results of all inspections and maintenance and any disturbances of the controls shall be documented in a logbook, which will be made available to the NJDEP upon request. The logbook shall contain the self-inspection dates, name of the inspector, and the results of the inspection and condition of the asphalt and concrete caps with photo-documentation as appropriate.

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the engineering control placed over the Restricted Area remains sufficient to maintain the objectives of the Deed Notice as described in (A)(2) above. This monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(D) Description of the following items that will be included in the biennial certification:

(4) A monitoring report that describes the site specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes the specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(5) The engineering controls continue to operate as designed: A statement that the engineering controls continue to operate as designed, based on an evaluation of the actual conditions of the engineering controls compared to the intended design.

(6) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment: A statement that the remedial action, including the asphalt and concrete cap, continues to be protective of the public health and safety and of the environment.

EXHIBIT C-6

Security Fencing

(A) General Description of the Engineering Control

(1) Description of the engineering control: Security fencing currently surrounds the entire Property, together with an adjacent lot (block 21501, lot 20), which is undergoing concurrent environmental remediation. The security fencing prevents unauthorized access to the impacted soil areas. The length, type, and placement of security fencing are subject to change once the Property is converted to mixed commercial-residential use according to the 2009 Canal Crossing Redevelopment Plan, developed by the Jersey City Division of City Planning. The property owner agreed to the engineering controls for the Restricted Area in a letter, dated XXX.

(2) The objective of the engineering control: The purpose of the security fencing is to act as a physical barrier to contact of soils within the perimeter of the fence and to deter unauthorized personnel from entering the fenced portions of the Property.

(3) How the engineering control is intended to function: The security fencing is intended to prevent direct contact to soil located within the fenced area by onsite workers, or others present at the Restricted Area.

(B) Description of the Operation and Maintenance necessary to ensure that:

(1) Periodic inspections of each engineering control are performed in order to determine its integrity, operability, and effectiveness: The property owner will conduct monitoring of the security fencing, consisting of inspection and evaluation of the security fencing to determine its integrity, operability, and effectiveness. The schedule of inspection is presented on Table 1. The Jersey barrier with 6-foot metal security fencing located around the perimeter of the Restricted Area shall be routinely evaluated for breeches and damage and for assurance that access is limited and gates are secured. Inspections will be documented and potential faults in the engineering control will be photo-documented. All damage that undermines the effectiveness of the control will be repaired. Inspections will be documented and any potential faults in the security fence will be photo-documented. All damage that has the potential to undermine the effectiveness of these engineering controls shall be repaired. Table 1 of this Deed Notice provides a schedule and checklist for the operation, maintenance, and inspection of the engineering controls.

(2) Each engineering control continues as designed and intended to protect the public health and safety and the environment: Periodic monitoring as described in (B)(1) will ensure that the security fencing continues to function as designed and intended to protect the public health and safety and the environment by preventing direct contact with the impacted soil.

(3) Each alteration, excavation or disturbance of any engineering control is timely and appropriately addressed to maintain the integrity of the engineering control: Any alteration, excavation, or disturbance of the security fencing will occur in a timely manner and will be addressed appropriately so as to maintain the integrity of the engineering control. Specifically, any earthwork planned in the Restricted Area will be conducted in accordance with this Deed Notice and the 2012 Post-Remediation Management Plan entitled *Interim Post-Remediation*

Management Plan, Garfield Avenue Group – Sites 114, 132, 133, 135, 137, and 143, Jersey City, Hudson Country, New Jersey, developed by AECOM on behalf of PPG Industries.

(4) This engineering control is being inspected and maintained and its integrity remains so that the remedial action continues to be protective of the public health and safety and of the environment: Through the implementation of above inspection and maintenance, the security fencing will maintain its integrity and will remain protective of the public health and safety and of the environment by preventing direct contact with the impacted soil.

(5) A record of self-inspection dates, name of the inspector, results of the inspection and condition(s) of this engineering control: The results of all inspections and maintenance and any disturbances of the controls shall be documented in a logbook, which will be made available to the NJDEP upon request. The logbook shall contain the self-inspection dates, name of the inspector, and the results of the inspection and condition of the security fencing with photo-documentation as appropriate.

(6) Any new standards, regulations, or laws apply to the site that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action which includes this Deed Notice, and conduct the necessary sampling: During the biennial certification an evaluation will be conducted to determine if any newly adopted or modified regulations have caused impacted soils to be present at unallowable concentrations. This evaluation will include, but not limited to an order of magnitude analysis of analytical data. Based on this analysis an additional review will be conducted to assess the need to further delineate impacts in the Restricted Area and to determine if the engineering control placed over the Restricted Area remains sufficient to maintain the objectives of the Deed Notice as described in (A)(2) above. This monitoring will ensure that if any new standards, regulations, or laws apply to the Property that might necessitate additional sampling in order to evaluate the protectiveness of the remedial action (including this Deed Notice), the necessary sampling will be conducted.

(B) Description of Items to be Included in the Biennial Certification

(1) A monitoring report that describes the site specific activities, pursuant to (A) and (B), above, conducted in support of the biennial certification of the protectiveness of the remedial action that includes this Deed Notice: A monitoring report that describes the specific operation and maintenance activities will be prepared in support of the biennial certification of the protectiveness of the remedial action (including this Deed Notice). The monitoring report will include a summary of all routine inspections conducted during the 2 years from the previous biennial certification report.

(2) The engineering controls continue to operate as designed: A statement that the engineering controls continue to operate as designed, based on an evaluation of the actual conditions of the engineering controls compared to the intended design.

(3) The remedial action that includes the engineering control continues to be protective of the public health and safety and of the environment: A statement that the remedial action continues to be protective of the public health and safety and of the environment.

EXHIBIT C-7

Post Remediation Management Plan

AECOM Environment

Submitted to:
PPG Industries
Allison Park, Pennsylvania

Submitted by:
AECOM
Piscataway, New

60240739.GA.RA
April 2012

Interim Post-Remediation Management Plan

Garfield Avenue Group - Sites 114,132, 133, 135, 137, and 143
Jersey City, Hudson County, New Jersey

Draft

AECOM Environment

Submitted to:
PPG Industries
Allison Park, Pennsylvania

Submitted by:
AECOM
Piscataway, New

60240739.GA.RA
April 2012

Interim Post-Remediation Management Plan

Garfield Avenue Group - Sites 114,132, 133, 135, 137, and 143
Jersey City, Hudson County, New Jersey
Draft

_____

Prepared By
Randall Twiss

_____

Lead Engineer
Craig MacPhee, P.E.

_____

Reviewed By
Kathleen Whooley, QA Reviewer

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The purpose of this plan is to alert utility, construction, and maintenance crews and their contractors that there are environmental conditions at the Garfield Avenue Group of Sites ("the properties") that may impact invasive subsurface activities. Invasive work would include activities such as excavation, pumping of groundwater, driving support pilings, or otherwise disturbing soil. When planning and implementing invasive activities, sufficient precautions must be undertaken to protect workers, the public, and the environment. Invasive work at the properties has the potential to lead to contact with chromium-impacted materials. Utility, construction, and maintenance crews and their contractors performing subsurface work are encouraged to contact PPG during the planning phases of any activity that involves excavation of soil, pumping or other management of groundwater, or other invasive activities. This plan describes conditions that will be present at the conclusion of remedial action for soil. A barrier (capillary break) will be in place approximately 1 feet below ground surface. At the conclusion of remedial action for soil, surface soil above a capillary break will not be impacted with chromium materials. Application of the precautions described in this plan is recommended for work to continue on the properties as described in **Section 1** and depicted in **Figure 1-2**. This plan will be modified as appropriate to address future remedial actions or other changes at the properties.

1.0 Introduction

On behalf of PPG Industries, Inc. ("PPG") of Pittsburgh, Pennsylvania, AECOM has prepared this Interim Site Management Plan ("SMP") to alert utility, construction, and maintenance crews and their contractors about certain environmental conditions at the Garfield Avenue Group or GA Group sites (Sites 114, 132, 133, 135, 137, and 143 and surrounding roadways) in Jersey City, Hudson County, New Jersey ("the properties") that may impact invasive subsurface activities. The locations of these properties are depicted on **Figures 1-1** and **1-2**. Work at the property has the potential for contact with chromium-impacted materials. Other materials, including Manufactured Gas Plant ("MGP") material may also be encountered. This plan describes general procedures to be implemented before and during invasive subsurface activities to prevent potential hazards to workers, the public, or the environment. This preliminary plan describes conditions that will exist after the planned soil remediation is complete. The plan will be updated with a drawing depicting as-built conditions when the remedial work is complete. Groundwater remedial actions are also planned. A subsequent management plan will be prepared when the groundwater remediation is completed.

A chromium ore processing facility was present on one of the properties (Site 114) from the early 1900's until the 1970's. Chromium processing residuals were placed on Site 114 as well as some of the surrounding properties. The area of the chromium processing plant is depicted in **Figure 1-2**. Soil and groundwater on the properties are impacted primarily with hexavalent chromium. Trivalent chromium, vanadium, arsenic, and other metals are also present at elevated concentrations in some areas. Remedial actions planned for soil include:

- Excavation and off-site disposal of soil: Soil excavation depths will range from 5 feet to 35 feet below ground surface ("bgs"). All Chromate Chemical Production Waste ('CCPW") will be removed regardless of depth as will all soil impacted by hexavalent chromium to a depth of twenty feet or to the surface of the meadow mat if present and competent.

- Placement of clean backfill: Certified clean backfill will be placed in the excavation areas to return the areas to approximately the same ground elevation prior to excavation.

- Placement of a capillary break: A capillary break will be installed approximately 1 foot below the ground surface. The capillary break will consist of a high-density polyethylene ("HDPE") membrane liner material. Geotextile materials will also be used to prevent unintentional puncturing of the liner while increasing lateral drainage of stormwater. The purpose of the capillary break is to prevent hexavalent chromium in groundwater from migrating to the ground surface.

- Amended backfill: In some areas of the properties, a low dose of an amendment will be blended with the clean backfill to treat groundwater that has been impacted by hexavalent chromium.

- Institutional Controls: Following soil remediation, the properties will be available for reuse. Due to the continued presence of impacted groundwater, restrictions of certain invasive activities are necessary. The restrictions are necessary to prevent workers and/or public exposure to chromium and to prevent damage to the capillary break. This plan describes the controls in detail.

- Future Groundwater Remediation: Groundwater remedial actions will be conducted following the completion of the soil remedial action. Details of the groundwater remedial action are not known at this time. A general discussion of site management issues related to the future groundwater work is provided in this plan.

An MGP was also present on a portion of Site 114 from the late 1800's to the early 1900's. MGP provided a major source of fuel for heating and lighting prior to the introduction of interstate natural gas pipelines. The MGP process generated several by-products and residual MGP materials are present on the property. Residuals include coal, products of coal combustion, coal tar, and filter media residuals. Residuals are present in soil and in groundwater on the property. Former MGP building foundations, gas holders, and piping are also present beneath the ground surface. The area of the MGP is depicted in **Figure 1-2**. PPG is working with the MGP responsible party (Public Service Electric and Gas Company ("PSE&G")) on the remediation of the MGP area. In general, the MGP soil remediation will be similar to that of the chromium remediation. MGP impacted soils will be excavated for off-site disposal. Excavated areas will be replaced with clean fill. The MGP remediation and post-remediation controls are presented conceptually in this plan.

This plan was prepared to support utility, construction, and maintenance workers that may be conducting utility installation/repairs, fence repairs, tree planting, construction, building renovation affecting the basement floor, and any activity that would disturb subsurface soils. The location of the properties and specific areas covered by this plan are depicted in **Figures 1-1** and **1-2**, respectively. **Table 1-1** presents the current location and ownership information for the Garfield Avenue Group sites.

Table 1-1 Non-Residential Chromium Chemical Production Waste Site Property Owners

Site Number	Site Name	Location	Property Owner	Former		Current	
				Block	Lot	Block	Lot
114	Former MGP facility and COPR stockpile area	Southwest and Eastern portions of Site 114, including 880 Garfield Ave. and 2 Dakota St.	City of Jersey City	2026.A 2026.1	3.A 2A,3B, 4A	21501	16, 17, 18, 19
	Former Chromate Chemical Production Facility	Northwest portion of Site 114, 900 Garfield Ave.	900 Garfield Ave,% Ryann LLC	2026.A	1	21501	20
132	Town & Country Linen (former name)	824 Garfield Ave.	City of Jersey City	2006.A	2	21510	2
133	Ross Wax	15 Halladay St.	PPG Industries, Inc.	2016	47	21510	5
	Ross Wax (former name)	22 Halladay St.	PPG Industries, Inc.	2017	PLOT. H	21509	1
135	Vitarroz (former name)	51-99 Pacific Ave.	Narula Real Estate Assoc., LLC	2017	69	21509	2

Source: http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=glou&passwd=data&district=0801&mode=11

Table 1-1 Non-Residential Chromium Chemical Production Waste Site Property Owners – continued

Site Number	Site Name	Location	Property Owner	Former		Current	
				Block	Lot	Block	Lot
137	TSI City Carriers (now known as 25 Halladay St., LLC)	25 Halladay St.	PPG Industries, Inc.	2016	A.1	21510	4
	Rudolf Bass, Inc.	45 Halladay St.	PPG Industries, Inc.	2016	A.2	21510	3
143	F. Talarico Auto	846 Garfield Ave.	PPG Industries, Inc.	2007	21A	21510	1
	Carteret Avenue	Carteret Avenue	City of Jersey City	N/A	N/A	N/A	N/A
	Forrest Street	Forrest Street	City of Jersey City	N/A	N/A	N/A	N/A
	Garfield Avenue	Garfield Avenue	City of Jersey City	N/A	N/A	N/A	N/A
	Halladay Street	Halladay Street	City of Jersey City	N/A	N/A	N/A	N/A
	Hudson-Bergen Light Rail (HBLR)	Jersey City, NJ	New Jersey Transit	N/A	N/A	N/A	N/A

Source: http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=glou&passwd=data&district=0801&mode=11

The primary goal of this document is to assure that workers are informed of the potential presence of chromium residuals and that work is completed in such a manner to prevent worker and general public exposure to chromium residuals. Following soil remediation, chromium residuals will not be present in any material above the capillary break. Also, for portions of the sites, there may be no significant chromium impacts at any depth in soil or groundwater. Nevertheless, the planning and notification recommendations and precautions described herein should be exercised during any invasive work anywhere on the properties.

This Interim SMP will be updated at the following milestones:

- When the soil remediation is complete, as-built drawings depicting the excavation areas and locations of amendment backfill will be added. Based on results of the soil remediation, certain properties or certain areas of properties may be designated for fewer restrictions.
- When the groundwater remediation is complete. Reductions in the concentrations of hexavalent chromium in groundwater are expected to allow fewer restrictions on site use.
- Although a review every five years following completion of remedial activities is common, the minimum review and revision period specified by the NJDEP will be met.

2.0 Planning and Notification

This plan will be kept on file with PPG, NJDEP and the site owner(s).

Prior to commencing invasive activities, the contractor or other party conducting the work should contact PPG. Invasive activities include but are not limited to the following:

- Any excavation work deeper than 1 feet.
- Any work that may puncture or otherwise impact the capillary break.
- Any work that involves the pumping or handling of groundwater.

The party conducting the work should provide PPG with the following: 1) a map showing the areas to be disturbed, 2) a description of work to be performed, including depth of excavation (if applicable), and 3) a schedule of the proposed work. Notification to PPG should be made at least two weeks in advance of the planned work, if possible. PPG will contact the NJDEP (or site Licensed Site Remediation Professional ("LSRP"), if applicable) if the activities have the potential to uncover chromium impacted soil and/or groundwater.

Following the completion of remedial activities, chromium impacted soils will be located deeper than one foot and will be below the capillary break. Therefore, the activities involving intrusive activities above the capillary break, such as paving, sidewalk installation/repair, landscape maintenance and mowing, will not come into contact with chromium materials or the capillary break. However, workers should be made aware of the potential to encounter chromium impacted materials. If chromium impacted materials are encountered, regardless of depth or location, the notification and handling procedures in this plan should be followed.

The approach to each invasive project will be determined based on a review of the proposed work by PPG. If work is planned in areas known to contain chromium residuals above the NJDEP Soil Clean-up Objectives effective at the time of the work, or is expected to require groundwater management, then use of workers that are trained in the handling of hazardous waste (Occupational Safety and Health Administration ("OSHA") Hazardous Work Operations and Emergency Response ("HAZWOPER")) may be required. For work in shallow soils (less than two feet) and areas with no identified chromium residuals present, HAZWOPER training for workers is not necessary.

A soil management plan will be required for projects that will generate excavated soil from below the capillary break. The soil management plan will specify methods for storing soil on site, screening soil, testing soil for disposal or reuse and transportation/off-site disposal of soil. Off-site disposal facilities and transportation companies for impacted materials (soil and groundwater) should be identified and pre-approved by PPG in the project planning stage. Additional details on the soil management plan are provided in **Section 5**. Similarly, projects that involve management of groundwater will require a groundwater management plan (refer to **Section 5**). Projects that involve cutting through or potentially damaging the capillary break will require a specific plan to repair the capillary break (refer to **Section 5.3.1**).

A communication plan consisting of the procedures and timing of notification telephone calls, emails or site visits should be developed prior to the start of work to keep all stakeholders informed.

As discussed previously, the approach to an invasive project will depend on the location of the work and the nature of the work. Project planners are encouraged to review the most recent revisions of the Remedial Investigation Report ("RIR") (AECOM, 2011a), the Remedial Action Work Plan ("RAWP") (AECOM, 2011b) and remedial action completion report (when available) to develop an understanding of the nature and extent of chromium impacts. Based on an understanding of the location of chromium impacts, appropriate precautions for each project can be implemented.

For projects that are known or very likely to encounter chromium impacted materials, planning must include specific elements. The work area should be set up to minimize the exposure to workers and the general public to chromium. This may include setting up temporary fencing with screening to isolate the work area from the public; providing personnel protective equipment ("PPE") to workers; providing for a means of personnel and equipment decontamination; providing for worker and community air monitoring; providing dust control; segregation of impacted and non-impacted soils; implementing a plan for soil handling, storage, and disposal; keeping work areas clean and free of debris; planning for the handling, storage, and disposal of groundwater; repairing any damage to the capillary break; and providing a clean media cover for excavated areas. These provisions will be revised based on actual conditions at the completion of the RAWP. These provisions are discussed in more detail in the remainder of this document.

3.0 Identification of Impacted Materials

The purpose of this section is to provide descriptions of chromium impacted materials and of MGP impacted materials. These descriptions are not intended to be a replacement for inspection by an environmental professional or as a replacement for laboratory analysis.

Appropriate PPE should be worn when inspecting soil or groundwater. See **Section 6** for development of a health and safety plan.

3.1 Chromium Impacted Materials

While every effort has been made to identify and remove all CCPW from the site, the possibility exists that small quantities still remain. Visual observations can be a useful tool in identifying situations where chromium may be present and where sampling should be considered. However, the only definitive way to determine if chromium is present at a level that poses a health concern is to submit samples for laboratory analysis.

During excavation, it is the responsibility of the contractor/property owner representative to identify potentially impacted materials. The contractor/property owner may contact PPG during site work to assist in assessing the material that may contain chromium impacts. Chromium exists in several valence states. The two valence states most relevant to the properties are trivalent chromium ("Cr^{+3}") and hexavalent chromium ("Cr^{+6}"). The most common state is Cr^{+3}. Cr^{+3} is an essential nutrient. The current NJDEP remedial clean-up goal for Cr^{+3} is 120,000 milligrams per kilogram ("mg/kg"). Cr^{+6} is also present at the site and is the primary reason for the conducting the soil and groundwater remedial actions. Cr^{+6} is potentially toxic to humans and ecological receptors. The NJDEP remedial clean-up goal for Cr^{+6} is 20 mg/kg.

Soil impacted with chromium may have a yellow to green coloration. Soil with elevated chromium may also have a reddish coloration. Soils, crushed stone, or other fill materials may become impacted with Cr^{+6} by contact with impacted groundwater or by indirect contact with groundwater by capillary action. Fill materials impacted by chromium contaminated groundwater may have a green dust like or green crystal covering.

Although it is considered unlikely following the extensive investigation and remediation that will have been completed, nodules of chromium ore processing residue ("COPR") may also be encountered. The nodules are typically rounded marble size particles. COPR nodule sizes vary from golf ball size to less than ¼ inch. The color of the nodules is typically brown. Another chromium impacted material that could be encountered is green-gray mud ("GGM"). GGM is typically a muddy or paste-like material that ranges in color from bright green to a light gray. Sample photographs of soil impacted with Cr^{+3}, Cr^{+6}, COPR and GGM are provided in **Appendix A**. In some cases, soils impacted above the NJDEP criteria of 20 mg/kg of Cr^{+6} may show no visible sign of chromium impacts.

Cr^{+6} can penetrate porous materials such as concrete. The chromium impacts typically appear as a green coloration in the concrete.

Any groundwater encountered at the properties should be assumed to be impacted with chromium. Laboratory analysis can be used to confirm or deny the presence of chromium in groundwater. The strictest NJDEP criterion for chromium in groundwater is 70 micrograms per liter ("ug/l"). This criterion is based on

total chromium (not just Cr^{+6} or Cr^{+3}), but the combined total of chromium present. Groundwater impacted with chromium most often has a yellow or green discoloration. In some cases, groundwater impacted with chromium has a reddish color. In most circumstances at these properties, impacted groundwater has a high pH (11 to 12); however, this is not always the case.

3.2 MGP Impacted media

MGP impacted media is not the focus of this plan. A brief description of MGP materials is provided herein for reference. MGP impacts typically consist of soil and/or groundwater impacted with volatile organic compounds ("VOCs"), polycyclic aromatic hydrocarbons ("PAHs"), metals, and in some cases cyanide. One of the primary by-products of MGP operations is coal tar, which is similar in composition to asphalt. Coal tar typically has a high viscosity, may be solid or semi-solid (mayonnaise like consistency) and may be heavier or lighter than water. Tar is usually brown or black but may also have a reddish tint. Cinders/ash from coal combustion may also be present in some areas. Filter materials such as lime (white/grey material) may be present in some areas. Other filter materials such as wood chips and oxides may be present. Potential colors for filter materials include white, blue, and orange. Cinders, lime, and other filter materials may have elevated levels of metals. Lime may exhibit a high pH. MGP impacts at the site range from soil/groundwater impacted with free phase coal tar to minor soil impacts.

There are several typical signs of the potential presence of MGP residuals within an open excavation, including:

- soil that is stained (black or bright blue),
- a rainbow sheen on the surface of the groundwater, and/or
- a characteristic odor, which has been described as mothball-like.

It may take a few hours or overnight for MGP impacted soil to exhibit a blue color. To be identified as MGP impacted, soil should exhibit both visual and olfactory (sense of smell) signs. Also, soil can be placed in a glass jar or zip-lock bag and the headspace tested with a Photo-Ionization Detector ("PID"). While PID results may exceed 100 parts per million when MGP residuals are present, low PID readings should not be interpreted as an absence of MGP residuals. Soil should be placed on plastic sheeting if it appears to be impacted. Laboratory testing would then be used to confirm the presence of MGP materials.

4.0 Public Safety

Several steps need to be taken in order to protect the public and minimize their exposure to impacted materials potentially present on the site.

Where excavation in areas known to contain chromium residuals is planned, a fence with a dust screen should be set up to isolate the work area from the general public. The excavation should be covered in plastic and secured when work is not being performed. Dust screens may be removed during periods of high winds as long as the work area is secure so that the fence will not blow over. Dust screens should be replaced when weather conditions permit.

Personnel and equipment decontamination areas (consisting of a wash and rinse) should be in place prior to soil disturbance to prevent soil from being tracked by workers or equipment out of the work area. Appropriate housekeeping procedures need to be implemented to ensure that public spaces are clear of soil and debris related to excavation work, whether the soil or debris is thought to be impacted or not.

Dust control measures, such as water misters, must be in place and used during excavation into areas of soil impacted with chromium. Excavated soil should be placed on plastic or directly into roll-off boxes in order to prevent cross contamination. Soil piles and roll-off boxes should be covered to help mitigate excessive dust. If soil is visibly or olfactory impacted with chromium or MGP, as discussed in the previous section, the soil should be placed in appropriate containers (steel drums or roll offs depending on the quantity). A sample of this material should be sent for laboratory analysis and then disposed of at an appropriate off-site facility (see **Section 5**). Soils with visible or olfactory indications of impact should not be reused on site. When backfilling a completed excavation, the media above the capillary break must be clean (either from an off-site source or reuse of site material known to be clean).

Air monitoring must be performed prior to and during invasive activities that are known to involve impacted materials. The development on an Air Monitoring Plan is required in order to monitor the public's potential exposure to dust from impacted soil. The Air Monitoring Plan will establish monitoring requirements, methods and allowable limits. Air monitoring should include, at a minimum, real-time monitoring for particulates. Air monitoring laboratory analysis for hexavalent chromium may also be required depending on the proximity of work to public areas, nature of the intrusive work, and levels of chromium in the soil. If MGP is also present, air monitoring should also include monitoring for VOCs. Air monitoring for VOCs is usually performed by a PID equipped with a 10.2 or 10.6 eV lamp and a portable particulate monitor. Air monitoring locations set ups are usually positioned upwind and downwind of the work area.

A variety of odor, vapor and dust control techniques may be used. Reducing the exposed impacted area through sequenced excavation or plastic sheeting should be evaluated. In addition, commercially available odor/vapor suppressant foams and sprays may be used if airborne VOCs are found to be above acceptable levels. Dust suppression methods may consist of water misting provided this does not cause a slipping hazard. Runoff shall be contained with water absorbent pads, portable berms and/or similar methods.

As discussed in detail elsewhere in this document, there are several work practices that can be employed to mitigate the public's exposure to impacted soil and water. The work area should be swept clean of dirt and debris. Pathways and roads should be kept free of soil, regardless of the level of impact, (i.e., keep the site clean). The contractor should ensure that groundwater seeping from excavated soil is appropriately

managed and potentially impacted water is contained. Groundwater pumped from an excavation into a tank shall be monitored for leakage, sampled for offsite disposal. Soils with visible and/or olfactory evidence of impacts shall not go back in the ground.

5.0 Invasive activities

Invasive activities include, but are not limited to:

- Any excavation work deeper than 1 foot;
- Any work that may puncture or otherwise damage the capillary break; and
- Any work that involves pumping or handling of groundwater.

For all invasive projects, site workers and managers shall be informed of the possible presence of chromium and MGP related materials and provided with instructions on identification of these materials (see **Section 3** herein). Based on the location and nature of the work planned, the site owner will determine if an OSHA-trained Site Supervisor and HAZWOPER workers are needed to complete the work. PPG will be available for consultation.

5.1 Shallow Excavations (work above capillary break)

Excavation activities in the shallow (upper 1-foot) soil can be conducted with minimal concern relative to the possible presence of chromium impacted materials. These soils are clean fill. The capillary break, located approximately one foot below ground surface, provides a clear marker between clean fill and potentially impacted fill.

The following precautions are recommended for shallow excavations:

- Notify workers of the presence of the capillary break and instruct them not to cut through, puncture or otherwise damage the capillary break.
- Notify workers to stop work is visual signs of chromium impacts are encountered (see Section 3)

The following precautions **are not required** for shallow excavations above the capillary break:

- Notification of PPG;
- Oversight by environmental professional;
- HAZWOPER training for workers
- A health and safety plan;
- Dust and odor control;
- Air monitoring; or
- Soil Management Plan.

5.2 Deep Excavations (work extending through capillary break)

The following precautions **must be taken** for excavation activities that extend below the capillary break (approximately 1 foot below ground surface).

- Notification of PPG;
- Planning and oversight by environmental professional;
- HAZWOPER training for workers (if potential for impact with soil below capillary break exists);
- A health and safety plan;

- Dust and odor control;
- Air monitoring; and
- Soil Management Plan (if soils below the capillary break will be excavated or disturbed).

In this context, excavation includes any activity that pierces the capillary break. This includes soil excavation to below 1-foot beneath the capillary break with an excavator or hand tools, drilling, and driving pilings or sheets.

As discussed in **Section 4**, excavation of potentially impacted soils shall include measures to protect the public. These include restricting access to the excavation area, dust and odor controls, limiting access to the work area, covering of soil piles, and implementation of an air monitoring program.

As discussed in **Section 2**, the likelihood of encountering chromium or MGP materials during an excavation project should be determined during the planning phase of the project. Based on the assessment in the planning phase, personnel with the appropriate training and the necessary equipment should be deployed to conduct the project. Excavated soil should be examined for visual and olfactory evidence of impacts on a continuous basis as the work proceeds.

If it is anticipated that impacted soil will be encountered, a Soil Management Plan should be prepared by an environmental professional. The Soil Management Plan should include, at a minimum, the following:

- Description of the project;
- Design and location of soil stockpile areas;
- Inspection and maintenance of soil stockpiles;
- Sampling requirements for waste classification of soil designated for off-site disposal;
- Loading and transportation procedures for off-site disposal;
- Decontamination procedures for trucks and equipment;
- Groundwater (if encountered) and decontamination water management plan; and
- Designation of disposal facilities for soil being removed from the site.

The contractor should plan on placing all excavated soil directly on plastic sheeting and covering soil piles with plastic at the end of each day. Even if the soil is not impacted, this inexpensive precaution will prevent mixing of soil, reduce dust, and prevent erosion during rainfall events. If soil is known to be impacted or will be shipped off site regardless, placement of excavated soil directly in drums or roll-off containers should be considered to reduce handling and exposure to soil.

For soil that is known to be impacted or that exhibits evidence of chromium impacts, reuse of soil on-site is likely prohibited and must be approved by NJDEP. Shipping containers should be clearly labeled and maintained in a secure area until removed from the project area. The contractor/property owner is responsible for arranging appropriate off-site transport and disposal of impacted soil and contained groundwater or decontamination water. PPG should be notified in advance which disposal facilities and transporters will be used. PPG may provide to the contractor/property owner a list of pre-approved facilities and transporters as part of the project planning phase.

Impacted or potentially impacted soil should be sampled prior to disposal or on-site reuse. The contractor/property owner is responsible for sample collection and analysis. The sampling frequency and

specific analytical testing parameters will be determined by the receiving disposal facility. A sample list of laboratory parameters is provided as **Table 5-1**. If material suspected of containing chromium residuals is being considered for on-site reuse, then the NJDEP soil remediation criteria for chromium and other constituents for residential exposures in effect at the time of the project should be applied. Soils must be sent off site to an appropriate facility if the remediation criteria are exceeded.

The contractor shall conduct air monitoring during excavation activities. An Air Monitoring Plan should be prepared by an environmental professional and include, at a minimum:

- Description of the excavation project, including limits and depths of excavation;
- Description of contaminants likely to be encountered in soil and groundwater (this would be based on a review of the Remedial Investigation Report ("RIR"), Remedial Action Work Plan ("RAWP") and other available documents);
- Action levels for dust in the work zone and at the fenceline (perimeter of the work area);
- If appropriate based on evaluation of soil data, air monitoring action levels for Cr^{+6};
- Threshold levels of corrective measures and for stopping work; and
- Corrective measures to be taken.

Backfilling of excavation areas must be conducted in a manner to assure that surface soils do not come in contact with potentially impacted materials below the capillary break. Surface soils must be stockpiled separately from soils excavated from below the capillary break. Soil placed above the capillary break must not contain Cr^{+6} above the NJDEP criteria (currently 20 mg/kg). If impacted or potentially impacted soils are excavated from below the capillary break (see **Section 5.2**) these soils may be replaced below the capillary break at approximately the same elevation as they were removed. If amended soil is encountered (see **Section 5.4**) it should be replaced at the same depth from which it was removed.

To assure that replacement surface soils do not contain chromium residuals, surface soils may be obtained from an off-site source. Alternatively, on-site soils excavated from above the capillary break and showing no visual impacts may be re-used as backfill.

In addition to encountering chromium impacted soil, excavation may encounter concrete or other debris impacted or potentially impacted with chromium. Any residual chromium impacts present on excavated structural materials should be tested prior to shipment off-site and sent to an appropriate disposal facility.

5.3 Capillary Break

The remedial design includes installation of a capillary break. The purpose of the capillary break is to prevent the upward migration of impacted groundwater towards the ground surface. A typical design for the capillary break is depicted in **Figure 5-1** (this is the interim design prior to redevelopment). The depths and exact design of the capillary break may vary across the properties. The capillary break design consists of a 40 millimeter HDPE membrane liner. The liner is protected from puncture by geotextile layers both underneath and on top of the plastic sheet. The backfill above and below the plastic sheet is also designed to provide a stable base for traffic or structures while preventing punctures to the sheeting. This specific design was selected because of the demonstrated effectiveness, relative ease of installation, compatibility with redevelopment, and ease of repair. Media above the capillary break may be modified during redevelopment phases. Future designs will incorporate materials that will not compromise the capillary break. The capillary break is designed to be located above the water table.

This section provides general guidelines for activities that could potentially compromise the capillary break, measures to prevent damage to the capillary break and repair of the capillary break.

Any work that will affect the capillary break must be designed and overseen by an environmental professional.

5.3.1 Penetrations through the Capillary Break

Figure 5-2 (these designs incorporate potential surface finishes above the capillary break for future redevelopment) depicts a typical repair necessary when excavation work continues through the capillary break. The excavation area would typically be over-excavated horizontally by 2 to 3 feet on every side. Geotextile and plastic layers must be completely exposed and then cleanly cut with a knife or by other means. Ripping thorough these layers with the excavator may make repairs much more difficult. When excavation is complete, the area must be backfilled and compacted to approximately the same grade. All three geotextile layers are to be replaced with the same or equivalent geotextile. For the geotextile, the replacement piece must follow manufacturers' installation instructions and overlap a minimum of at least 1 foot on every side. The HDPE plastic liner replacement must overlap at least one foot on every side and be welded by a certified operator. Each HDPE patch must be leak tested (leak testing to be consistent with landfill testing requirements) for water tightness.

5.3.2 Drilling, Installation of Pilings, or Other Vertical Features through the Capillary Break

Figure 5-3 (these designs incorporate potential surface finishes above the capillary break for future redevelopment) depicts a typical installation of a vertical shaft or pile support installed through the capillary break. Geotextile and plastic layers will be exposed and cleanly cut to the required diameter. A water tight boot or other means featured will be installed to provide a water tight seal around the vertical feature. A sealant within the water tight boot and around the vertical feature is also recommended.

If porous materials, such as concrete, will vertically pass thorough the capillary break, then measures to prevent migration of Cr^{+6} within the porous matrix are recommended. The concrete or other porous material should be coated on the outside, enclosed in a non porous material (such as steel or plastic), or a low porosity formulation used. Use of ferrous sulfate as an additive to concrete is a possible means of preventing Cr^{+6} migration in concrete structures.

5.3.3 Utility Corridors

Ideally, buried utility corridors would be entirely above the capillary break. However, this may not always be the case. **Figure 5-3** depicts a typical utility corridor installed below the capillary break. The corridor is enclosed on all sides, top and bottom in HDPE of other non-porous material. Use of rigid materials and providing easy access for maintenance or installation of new utilities is sometimes advantageous. This allows utility workers access to the utilities without the potential of coming into contact with impacted soil or groundwater.

5.3.4 Subsurface Building Features

In addition to vertical features such as support pilings, subsurface building features may include footings, basements or other features. **Figure 5-3** depicts a typical installation for a building designed to prevent Cr^{+6} migration to the surface. These installations are to be essentially underlain by sealed plastic sheeting that ties into the surrounding capillary break.

5.3.5 Vegetative Cover

The design and installation of trees and other plantings must consider both the potential to damage the capillary break and the ability of the plantings to thrive with the capillary break. In some cases is may be necessary to create deeper pockets in the capillary break to make room for root balls during initial planting and for root growth. With the capillary break, localized drainage may not be adequate unless the soil type or other features are adjusted to improve drainage. Vegetative cover should be designed by professional with a clear understand of the design of the capillary break.

5.3.6 Drainage

The site remediation plan includes plans for drainage of storm water. The design is intended to assure that storm water does not become co-mingled with groundwater on the properties. Storm water collection is designed to drain water from above the HDPE liner that forms the capillary break. Storm drain lines that must go beneath the capillary break to create the needed slope will be water tight and sealed where they pass thorough the capillary break. New storm water features or repairs to storm water features must also be water tight if they are below the water table.

5.4 Amended Soil

In order to prevent recontamination of clean backfill from contact with impacted groundwater and to accelerate the groundwater remediation, blending of clean backfill with an amendment will be conducted in certain areas (these areas will be identified in a subsequent Site Management Plan after soil remediation is complete). The amendment material contains a low dose (0.15% by weight ferrous sulfide (“FeS”) and a low dose (0.02% by weight) of sodium hydrosulfide (“NaSH”). The NaSH is soluble in water and designed to be short-lived (less than five years). FeS and related reduced iron compounds have a low solubility in water and are designed to remain for many years (decades).

A more detailed presentation of the amendment concentrations and comparison to natural soils is shown in **Table 5-2.**

The amended soil will only be installed at depths below the capillary break. Other than potentially having an elevated pH (9-11) the amended soil poses no unique hazards to workers. The amendment contains very low levels sulfur compounds. While theoretically possible, generation of hydrogen sulfide has not been observed with use of the amendment in these low doses. Amended soil will have a dark grey or black appearance upon excavation. When exposed to the air and moisture, the amended soil may develop an orange appearance on exposed surfaces. The orange color is rusting iron and poses no hazard. The soil handling procedures discussed in **Section 5-2** would also apply to amended soil. To the extent practical, amended soil that is excavated should be returned to the excavation at a depth below the capillary break.

5.4.1 Compatibility of Amendment with Construction Materials

The purpose of this section is to describe site conditions expected if the backfill amendment is applied in the terms that would help those involved in the redevelopment assess the scope of any measures that may be necessary to prevent premature degradation of subsurface materials. This discussion is not a replacement for proper selection and design of subsurface features by qualified engineers or material scientists.

As discussed in the geochemical section, use of the amendment will create reducing conditions that mimics natural reducing conditions present in marine sediments. Additionally, the pH is expected to be elevated, at least in the short term. Specific conditions that may affect construction materials include:

- Presence of low concentrations of sulfur compounds including FeS, sulfate ("SO_4^{-2}"), and trace hydrogen sulfide ("H_2S") - Note: these conditions will exist at the meadow mat[1] layer whether the amendment is used or not.
- pH in the range of 8.5-11 - Note: this condition will exist whether the amendment is used or not, however, the amendment may push pH to upper end of the range, at least in the short-term.
- Saline conditions (Cl^- and Na^-) - Note: this condition will exist whether the amendment is used or not.

These are not unusual conditions. Extensive literature is available on the compatibility of various building materials under these conditions. The amendment will only be applied below the water table and thus structures completed above the water table will not likely be impacted by conditions created by the amendment.

A very brief discussion of major groups of building materials is provided below.

Plastics: Plastics (including but not limited to polyvinyl chloride ("PVC") and HDPE) are generally compatible with the groundwater and soil conditions expected. In fact, plastics are routinely used to convey and store the concentrated FerroBlack-H[2]. Sulfides, particularly at the low levels present do not affect plastic material. The high pH does not affect most plastics. Selection of plastic compatible in marine environments should be considered.

Concrete: Sulfate and chloride can attack and degrade improperly designed concrete structures (Portland Cement Association, Fact Sheet on Durability of Concrete). Testing and development by industry and government agencies of concrete formulations and coatings to survive in marine environments has been extensive. Concrete formulations specifically designed for sulfate are available (for example ASTM C150 Type II and Type V Portland cement) (Alternative Cements for Durable Concrete in Offshore Environments, ShawCor Ltd, March 2007). Elevated pH (less than 12.5) does not generally have an adverse effect on concrete (Portland Cement Associate, Fact Sheet on Durability of Concrete).

Metals: Stainless and carbon steel are not expected to be affected by site conditions. Certain copper alloys and other alloys should be evaluated on a case-by-case basis. Aluminum is known to pit and corrode in the presence of reduced sulfur compounds. Aluminum may not be a suitable material for use below the water table.

Existing Utilities: If groundwater or other water influenced by the amendment got into the combined sewer system, it would have no impact on the transfer lines, waste water plant or receiving waters. The concentration of reduced sulfur compounds that can be mobilized in groundwater is far below that already present in the combined sewer. Use of the amendment in streets or other locations where old utilities will not be removed must be evaluated with caution. Use of the amendment in direct contact with existing concrete or metal utilities of unknown composition and integrity should be evaluated further. The solid

[1] Meadow mat - A naturally occurring organic estuarine deposit located at approximately 13 to 20 feet below the ground surface, pre-excavation.

[2] FerroBlack-H – A black liquid that is a ferrous sulfide solution with a pH between 9.5 and 12.3. Used as a backfill amendment designed to prevent re-contamination of soil by groundwater and to start the groundwater treatment process. The primary treatment reagent is ferrous sulfide.

phase FeS is long lasting, and if it is in direct contact with already weakened concrete or low carbon steel it could have a long-term adverse impact.

5.5 Groundwater

The contractor/site owner should assume that any groundwater encountered at the site is impacted and follow the precautions discussed in this section.

The depth from ground surface to groundwater after soil remediation is complete is expected to range from 3 to 8 feet bgs. Groundwater may be impacted with chromium as well as volatile organic compounds (primarily naphthalene, benzene, toluene, and xylenes), semi-volatile compounds, and low levels of other metals. In some locations, a separate-phase oily liquid may be encountered. Soil excavation into the water table or other work that requires management of groundwater will require a groundwater management plan. Prior to the start of invasive work, the property owner/contractor must determine how groundwater will be extracted (pumps and transfer lines), how groundwater will be stored on site, and how groundwater will be disposed of off-site. The proposed extraction system must be designed to minimize the potential for spills. Tanks used to store extracted water must be staged in a secure location, inspected for leaks, and include spill containment. For most projects, water will be stored on site, tested, and sent for off-site disposal. The property owner/contractor is responsible for arranging appropriate off-site transport and disposal of impacted water.

Water cannot be discharged to the sanitary sewer, storm drain, or directly to the ground without a permit and without prior testing to confirm permit conditions are met. The property owner/contractor would be responsible for obtaining and complying with the required discharge permit.

Table 5-1 Waste Characterization Sample Requirements

Parameter	EPA Method		Preservation for Liquid	Holding Time (days)
	Solid Waste	Liquid Waste		
TCLP, Volatiles	SW846 1311/8260	SW846 1311/8260	No headspace, Cool to 4 deg C	14
TCLP, Semivolatiles	SW1311/8270	SW1311/8270	Cool to 4 deg C, Oil Sample: None	14
TCLP, Metals, RCRA	SW846 1311/3010/6010 and/or 6020, and 7470	SW846 1311/3010/6010 and/or 6020, and 7470	Liquid and Solid Sample: None	180, 28 for mercury
TCLP, Hexavalent Chromium	SW846 1311/3010 and 7196	SW846 1311/3010 and 7196	Cool to 4 deg C, Solid Sample: None	180
Reactivity	EPA 7.3.3.2/7.3.4.2	EPA 7.3.3.2/7.3.4.2	Cool to 4 deg C	ASAP
Ignitability	EPA 1030	N/A	Solid Sample: No Headspace	ASAP
PCB	EPA 8082/8270	EPA 8082/8270	Cool to 4 deg C, Oil Sample: None	7
pH (Corrosivity)	EPA 9045	EPA 9040B/9041A/9045	None	ASAP
TPH, Dielectric Range Organics	EPA 8100 (Mod)	N/A	Cool to 4 deg C, Oil Sample: None	7
TPH, Diesel Range Organics	EPA 8100 (Mod)	N/A	Cool to 4 deg C, Oil Sample: None	7
TPH, Gasoline Range Organics	EPA 8015 (Mod)	N/A	No headspace, Cool to 4 deg C	7

Notes: TCLP – Toxicity Characteristics Leaching Procedure
RCRA – Resource Conservation and Recovery Act
PCB – Polychlorinated Biphenyls
TPH – Total Petroleum Hydrocarbons
NA – Not Applicable

Table 5-2 Comparison of Amended Fill Chemistry to Chemistry of Natural Marine Sediments

Information Collected from the Backfill Amendment Pilot Test
Garfield Avenue Sites
PPG Industries
Jersey City, Hudson County, New Jersey

	Amendment Contribution [a]	Backfill Prior to Amendment [b]	Total Amendment and Backfill [c]	Typical for Marine Sediments/Observed value under test cell
Elements				
Fe (Iron)	0.07%	1.80%	1.6-2.1%	3% [d] /1.7% [g]
S (Sulfur)	0.10%	Not Measured	Not Measured	0.35-1% [e]
Na (Sodium)	0.10%	0.02%	0.24-0.30%	0.01-0.2%/0.185% [g]
Anion/Cations/Compounds				
FeS (Iron Sulfide)	0.15%	None expected	Max 0.15%	00.014-0.27% [e]
Fe^{+2} (Ferrous Iron)	0.07%	None expected	Max 0.07%	Median 1.6% [f]
Fe^{+3} (Ferric Iron)	Minimal	1.80%	1.80%	Median 1.4% [f]
H_2S (Hydrogen Sulfide)	Minimal	None expected	None expected	0..01-0.10% [e]
Na^{+} (Sodium Ion)	0.07%	0.02%	0.24-0.30%	0.01-0.2%/0.185% [g]
Other Properties				
ORP (Oxidation Reduction Potential or Eh)	Reducing	408	290-354	-290/570 [g]
pH	Alkaline (10-11)	9.05	8.6-11.0	7.9-8.2/8.5 [g]

Notes:

a. Quantitative analysis of September batch of FerroBlack-H basis for elemental results. Based on an average blend 2% amendment added to soil

b. Based on laboratory analysis of backfill delivered during pilot test

c. Laboratory analysis of soil within the test cell, except as noted. Iron and sodium and pH levels influenced by presence of these elements/properties in the groundwater.

d. NOAA National Status and Trends Program, Fifth Round Intercomparison Exercise Results for Trace metals in Marine Sediments and Biological Tissue, IECNRC of Canada, 1991

e. The Sulfur Cycle in Coastal Marine Sediment, Bo Barker Jorgensen, 1977

f. The Chemical States of Iron in Marine Sediments by Means of Mossbauer Spectroscopy in Combination with Chemical Leachings, S.Y. Chen et al, 1996

g. A sample of the meadow mat was collected from immediately below the pilot test cell.

6.0 Health and Safety

The contractor/property owner representative shall develop and utilize site health and safety protocols based on the specific project requirements and consistent with OSHA requirements. A suggested table of contents for a Health and Safety Plan ("HASP") is provided as **Appendix B**. The intent of the health and safety program is to protect the public, site workers and the environment during execution of project work at the properties.

The Site Management Plan and the example HASP outline were developed primarily for activities that involve excavation, (i.e., replacement/inspection of utilities, etc.). While comprehensive, this Site Management Plan and example HASP outline can not anticipate all potential future scenarios for invasive work at the site. The party performing the work (site owner/contractor) is responsible for evaluating their specific project needs and developing a specific HASP. As discussed in the planning and notification section, the site owner/contractor is encouraged to contact PPG in the early phases of project planning. This timely coordination will assure that issues related to chromium materials are safely and efficiently addressed.

7.0 NJDEP Requirements for Engineering and Institutional Controls

The engineering controls and remedial actions for the properties will be implemented under a Deed Notice (institutional control), which will provide for their long-term protection.

Post-construction operation, maintenance, and inspections ("OM&I") are required for the capillary break across the properties to ensure the engineering controls continue to function as designed and meet their intended purpose of preventing direct contact with the underlying contaminated soils. The OM&I tasks will consist, at a minimum, of the following activities:

- Inspection of all temporary and permanent soil erosion and sediment controls. Repairing or replacing defective soil erosion and sediment controls;
- Inspection of cap for signs of erosion, including rills and gullies, or sloughing of side slopes. Repairing erosion with one or a combination of geosynthetic fabrics, riprap, or crushed stone.
- Inspection of the cap for signs of rodent burrows;
- Vegetative maintenance to prevent the growth of vegetation that may jeopardize the integrity of the cap or cap components in non-dedicated vegetation corridors, (i.e., weeds, trees);
- Inspection of monitoring wells within the footprint of the cap for damage;
- Removal of any vegetation (outside dedicated vegetative corridors) or objects that may hinder the visual observation of the wells and create a safety hazard for a pedestrian or someone driving a vehicle on the cap;
- Removal of indigenous weeds, plants, or trees taking root in the cap or stormwater management and control features before they reach a height of 12-inches (outside dedicated vegetative corridors);
- Inspection of cap for signs of subsidence;
- Inspection of geosynthetic fabrics for signs of wear. Replace or repair, as needed;
- Inspection of stormwater features for signs of blockage from any objects or vegetation; and
- Reseed (if applicable) where vegetative cover is inadequate based on visual observation.

Table 7-1 provides a more comprehensive Operation, Maintenance, and Inspection Checklist. Operation, maintenance, and inspections of the engineering controls will be performed by PPG until receipt of a No Further Action ("NFA") or Response Action Outcome ("RAO") letter from NJDEP for closure of the properties, at which time the property owner will become responsible for all future operation, maintenance, and inspections (as well as biennial certifications) to maintain compliance with applicable NJDEP regulations. Property owner assumption of responsibility for operation, maintenance and monitoring is defined in contract documents between the property owner and PPG.

7.1 Draft deed notice

Since impacted soil will remain under the engineering controls of the properties, a deed notice is necessary to protect human health and the environment from contact with these soils impacted above their respective remediation standard. It is anticipated that final deed notices will be developed for the properties separately by ownership.

7.2 Alterations, Improvements, and Disturbances to Engineering Controls

The contractor (utility, construction, and maintenance crews and their contractors)/property owner is responsible for making notification to NJDEP for any alteration, improvement, or disturbance in, to, or about the properties which disturbs any engineering control (including the capillary break or below the capillary break) at the properties without first obtaining the express written consent of the NJDEP. The contractor/property owner is required to do the following in accordance with the Deed Notice requirement under 6A:

- Notify the NJDEP by calling the DEP Hotline at 1-877-WARN-DEP or 1-877-927-6337 within 24 hours after the beginning of each alteration, improvement or disturbance;
- Restore any disturbance of the engineering control to pre-disturbance conditions;
- Ensure that applicable worker health and safety laws and regulations are followed;
- Ensures that exposure to contamination in excess of the remedial standard does not occur; and
- Submits a written report to the NJDEP.

In the event of an emergency which presents, or may present, an unacceptable risk to the public health and safety, or to the environment, any person may temporarily breach any engineering control provided that that person complies with each of the following in accordance with the Deed Notice requirement under 6B:

- Immediately notifies the Department of Environmental Protection of the emergency, by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337;
- Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;
- Implements all measures necessary to limit actual or potential, present or future risk of exposure to humans or the environment to the contamination;
- Notifies the Department of Environmental Protection when the emergency has ended by calling the DEP Hotline at 1-877-WARNDEP or 1-877-927-6337; and
- Restores the engineering control to the pre-emergency conditions as soon as possible, and provides a written report to the NJDEP within sixty (60) calendar days after completion of the restoration of the engineering control.

7.3 Property Inspections

Property inspection will be conducted at least once every other year. Inspections will be conducted by an environmental professional. The environmental professional will become familiar with site conditions by reviewing available documentation (RI, RAWP, and Remedial Action Completion Report (when available)). The purpose of the inspection is to determine if the site owner is familiar with requirements of the Site Management Plan and to determine if the Site Management Plan is being followed. The environmental professional will inspect the properties to assess whether provisions of the Site Management Plan have been followed.

Table 7-1 Anticipated Operation, Maintenance, and Inspection Schedule

Period[1]	Inspection Schedule	Inspection Coverage
Monthly	Monthly inspections if sensitive populations are within 0 - 100' of the engineering control. This excludes engineering controls with asphalt caps.	Soil erosion, stormwater controls, vegetative cover, and other.
Quarterly	Quarterly inspections if sensitive populations are within 101 - 500' of the engineering control. This excludes engineering controls with asphalt caps.	Same as above
Semi Annual	Semi-annual if engineering controls consist of fencing, soil, or vegetative caps.	Same as above
Annual	Annual if engineering controls consist of asphalt/concrete or impervious material.	Same as above
Biennial Certifications[2]	Every 2 years from the date the final Deed Notice is recorded with the County Clerk.	Same as above and required Deed Notice information listed on Biennial Certification Monitoring Report Form[3]

Notes:
1. Period indicated is the time from the completion of the construction activities
2. Biennial certification report forms must be submitted every 2 years on the anniversary of the recording of the final Deed Notice
3. Available at http://www.state.nj.us/dep/srp/forms/deed_notice/

8.0 Project-Specific Health and Safety

A Site HASP has already been approved as part of the Interim Remedial Measures ("IRM") and Feasibility Studies and is currently in place. The HASP includes and addresses health and safety related to RAWP and Technical Execution Plans ("TEPs") for excavation and backfilling activities. The HASP also addresses site-wide hazards to ensure the safety of the workers. The amended HASP is provided as Appendix E of the RAWP (AECOM, 2012).

Requirements such as training program protocols, medical surveillance program, equipment maintenance programs, personal hygiene practices, and other requirements of a non-site specific nature are included in the HASP. The HASP has been and will continue to be updated as needed to reflect new information, changes in site personnel, etc. Additional HASP(s) developed by the excavation contractor for remedial action field activities will be forwarded to NJDEP as an addendum.

The HASP contains Task Hazard Analyses ("THAs") that addresses the TEP activities to alert site workers to potential associated hazards and provide guidance on how to avoid/control them. Note: THA, Job Hazard Analysis ("JHA"), Job Safety Analysis ("JSA"), etc. are equivalent terms for identifying task hazards and mitigation measures.

The HASP designates an AECOM project-specific safety officer ("SSO") who will be on site at all times during the field work and responsible for monitoring a variety of exposure hazards to ensure the safety of the workers within (and outside of) the TEP work area. The hazards that the SSO will monitor are summarized below. This will be supplemented by routine site-wide safety monitoring conducted by AECOM (perimeter and area air monitoring for H_2S, total volatile organic compounds ("TVOCs"), and dust monitoring) designed to maintain the safety of the surrounding community. The following parameters will be monitored as exposure hazards:

- Particulate Dust/Hexavalent Chromium
- Heat or cold stress
- Volatile organic compounds ("VOCs")
- Carbon Monoxide ("CO")
- Carbon Dioxide ("CO_2")
- Lower explosive limit ("LEL")
- Hydrogen sulfide ("H_2S")
- Oxygen ("O_2")
- Strong Odors

If any of the above exposure hazards are present above their action levels, the responses are outlined in the HASP, including the actions to take and reporting structure to follow.

In the event of a medical emergency, the HASP identifies the actions to be taken and the communication chain to be followed. The Contingency and Communication Plan (AECOM, 2010d) prepared for Site activities will be followed in the event of an environmental emergency.

9.0 References

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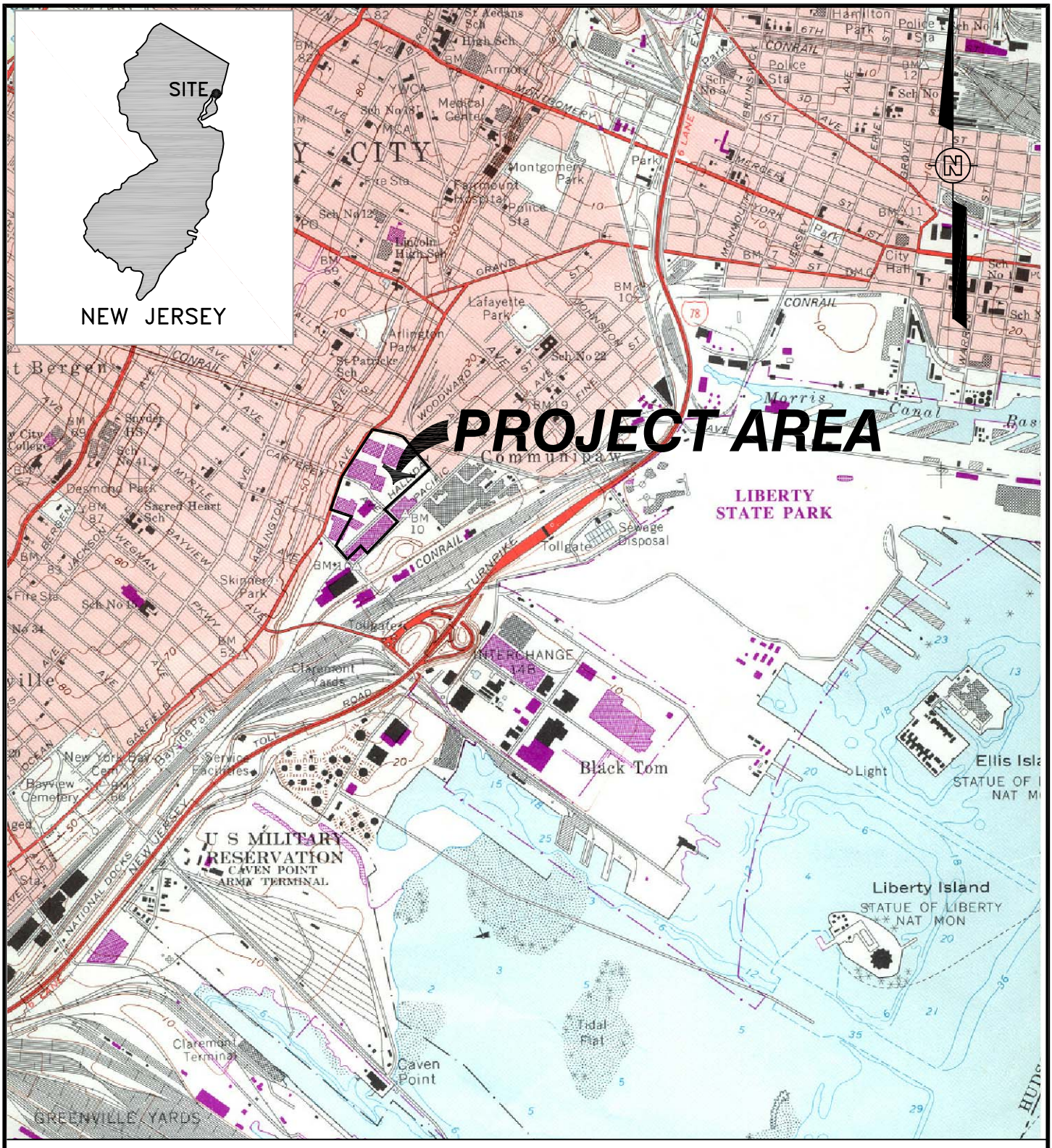
Figures



2000 1000 0 2000

Scale in Feet

SOURCE: U.S.G.S. 7.5 MIN TOPOGRAPHIC MAP OF JERSEY CITY, NEW JERSEY DATED 1967, PHOTOREVISED 1981.

AECOM

USGS SITE LOCATION MAP - 1981

PPG INDUSTRIES – GARFIELD AVENUE
PROJECT AREA, JERSEY CITY
HUDSON COUNTY, NEW JERSEY

FIGURE NUMBER: **1-1**

DRAWN BY:	DATE:	PROJECT NUMBER:	SHEET NUMBER:
/jk	05/03/11	60240740	1 of 1

AECOM
30 Knightsbridge Road, Suite 520
Piscataway, NJ 08854
Web: http://www.aecom.com

J:\Rem_Eng\Project Files\PPG Industries\Garfield Avenue\30% Design\CADD\RAWP\Figure 1-1 - Site Location 1981.dwg

LEGEND

- UTILITY POLE
- OVERHEAD WIRES
- PROPERTY LINE
- EDGE OF PAVEMENT
- CURB
- DEPRESSED CURB
- FIRE HYDRANT
- CATCH BASIN INLET
- MANHOLE
- B BOLLARD
- CHAIN LINK FENCE
- RAILROAD TRACKS
- 15 GROUND SURFACE ELEVATION
- LOT BOUNDARY
- EXISTING BUILDING
- 21510/5 BLOCK/LOT NUMBERS
- AREA OF FORMER CHROME OPERATIONS
- AREA OF FORMER MGP OPERATIONS

NORTH

NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 83

GARFIELD AVENUE

A. F. TALARICO AUTO
SITE 143
21510/1

TOWN & COUNTRY LINEN WAREHOUSE
SITE 132
21510/2

CARTERET AVENUE

880 GARFIELD AVE
21501/18

900 GARFIELD AVE
21501/20

CONRAIL

ROSS WAX
SITE 133
21510/5

TSI CARRIERS
BLDG.
21510/4

SITE 137

RUDOLPH BASS
BLDG.
21510/3

SITE 114

HALLADAY STREET

ROSS WAX
SITE 133
21509/1

GIVEN POINT AVENUE

VITARROZ
SITE 135
21509/2

PACIFIC AVENUE

884 GARFIELD AVE
21501/19

2 DAKOTA STREET
21501/16

70 CARTERET AVE
21501/17

FOREST STREET

70 0 140
SCALE IN FEET

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PPG INDUSTRIES
GARFIELD AVENUE SITES
JERSEY CITY, HUDSON COUNTY, NEW JERSEY

PROJ. NUMBER: 60240740

DATE: 03/12/12

SITE PLAN

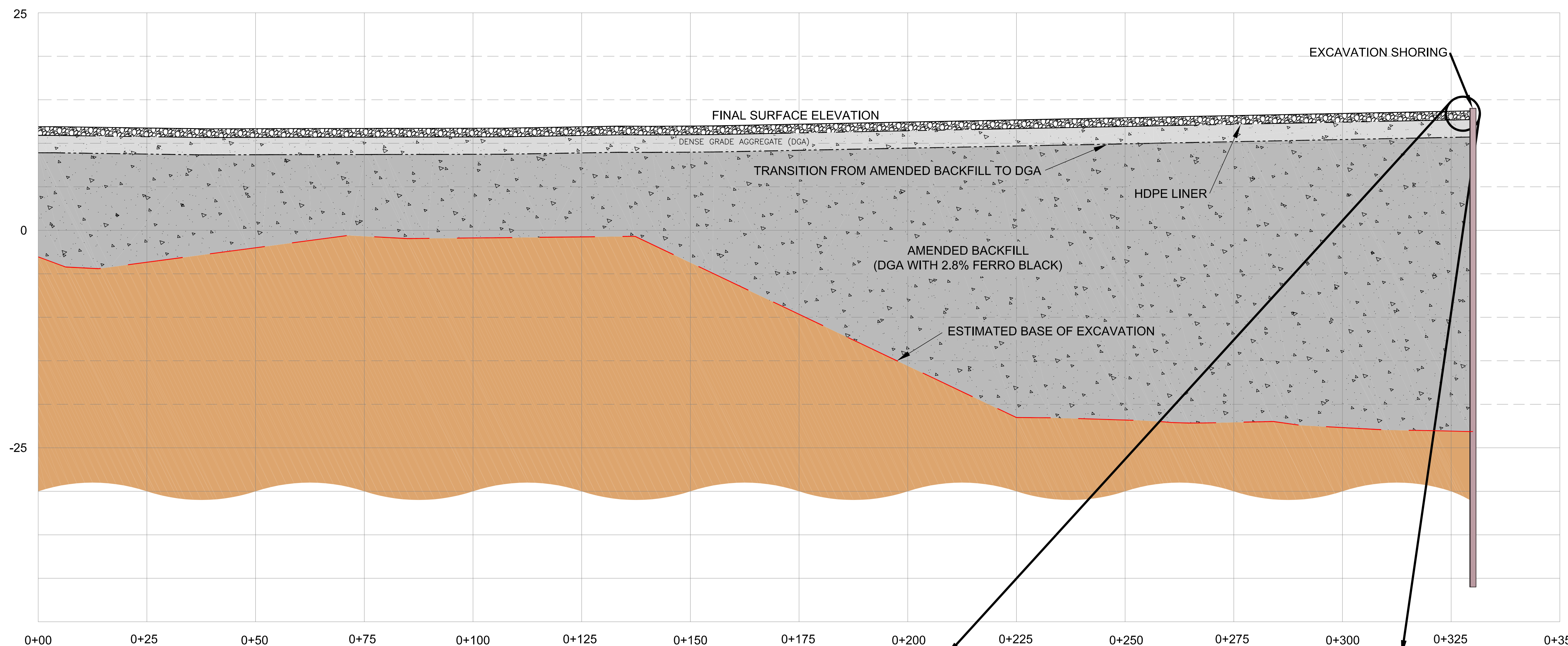
INTERIM SITE MANAGEMENT PLAN

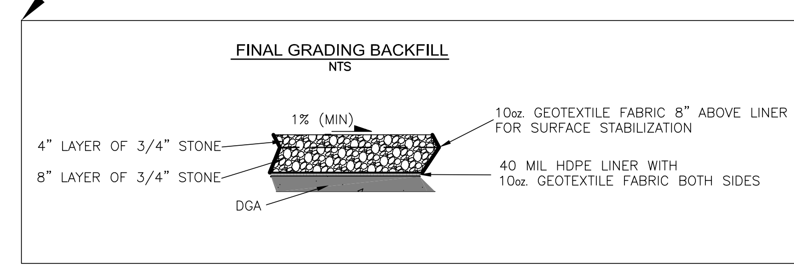
FIGURE NUMBER: 1-2

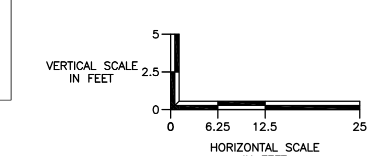
SHEET NUMBER: 1 OF 1

REVISION

TYPICAL CROSS-SECTION
RESTORATION







NOTES:
1) BASE OF EXCAVATION ELEVATION IS ESTIMATE. ESTIMATED BASE OF EXCAVATION ELEVATION ACCURACY WILL IMPROVE AS PRE–EXCAVATION BORING ACTIVITIES CONTINUE.
2) ELEVATIONS ARE IN NAVD88.
3) VERTICAL EXAGGERATION 2:1.

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
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6							
5							
4							
3							
2							
1							
0							

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PROJ. NUMBER: 60240740
DATE: 03/12/12

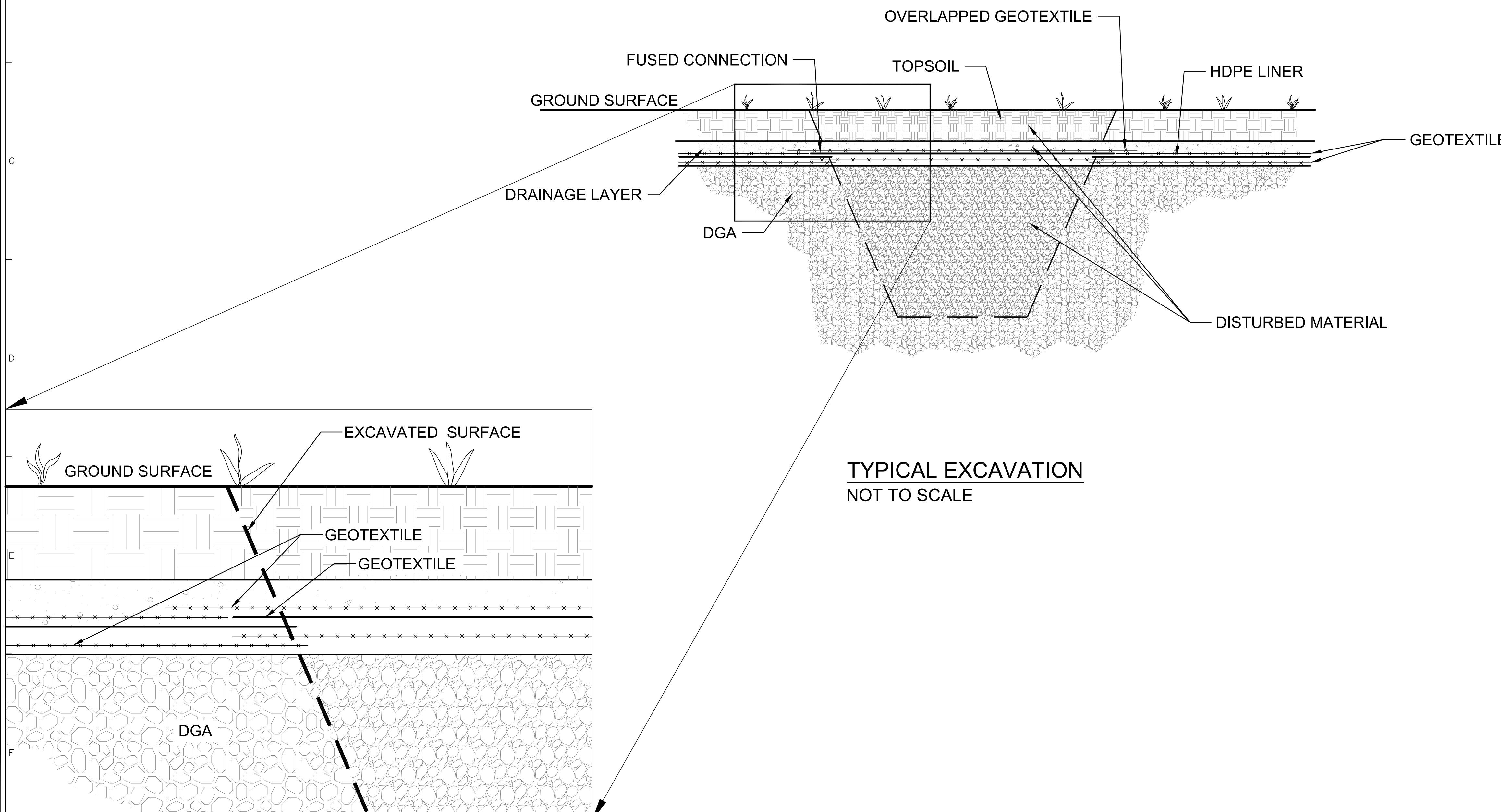
RESTORATION PLAN
TYPICAL CROSS SECTION

INTERIM SITE MANAGEMENT PLAN

FIGURE NUMBER: 5-1

SHEET NUMBER: 1 OF 1

REVISION



TYPICAL EXCAVATION
NOT TO SCALE

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6							
5							
4							
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2							
1							
0							

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PROJ. NUMBER: 60240740

DATE: 03/12/12

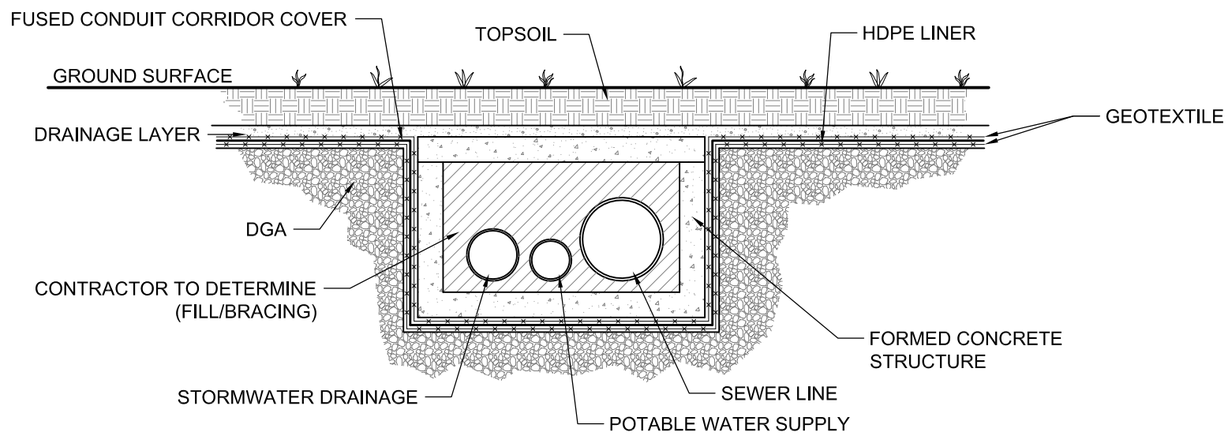
TYPICAL CAPILLARY BREAK PENETRATIONS

INTERIM SITE MANAGEMENT PLAN

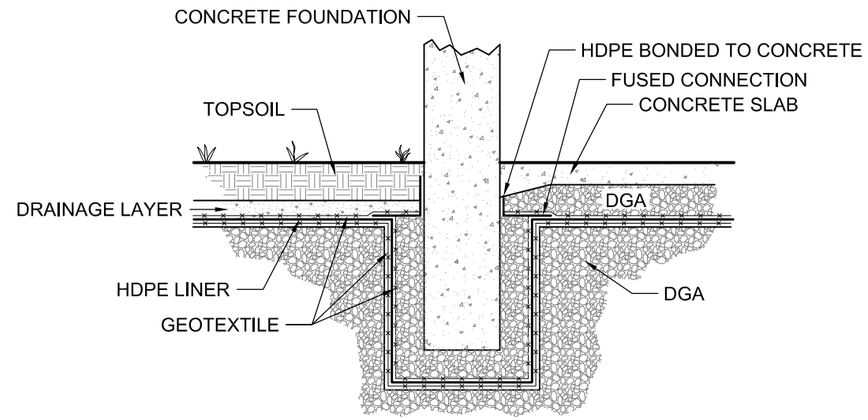
FIGURE NUMBER: 5-2

SHEET NUMBER: 1 OF 2

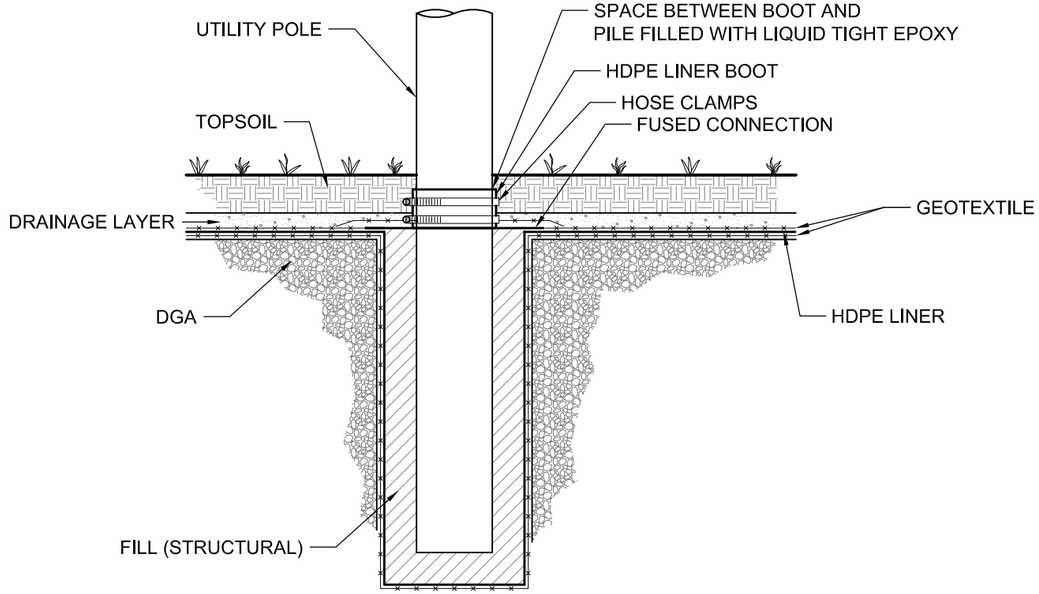
REVISION



TYPICAL UTILITY CORRIDOR
NOT TO SCALE



TYPICAL FROSTWALL FOUNDATION
NOT TO SCALE



TYPICAL UTILITY POLE PENETRATION
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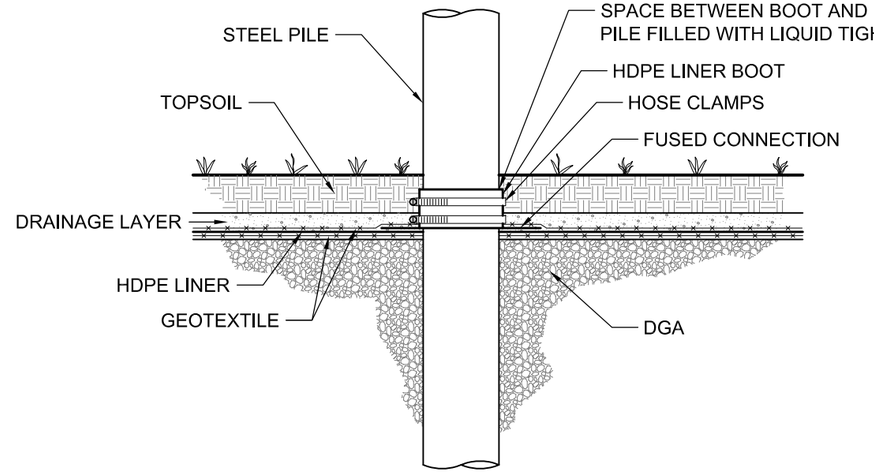

TYPICAL PILE PENETRATION
NOT TO SCALE

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PPG INDUSTRIES
GARFIELD AVENUE SITES
JERSEY CITY, HUDSON COUNTY, NEW JERSEY

PROJ. NUMBER: 60240740

DATE: 03/12/12

TYPICAL CAPILLARY BREAK PENETRATIONS

INTERIM SITE MANAGEMENT PLAN

FIGURE NUMBER: 5-3

SHEET NUMBER: 2 OF 2

REVISION

Appendix A

Photos

AECOM

Client Name: PPG Industries, Inc.	Site Location: 900 Garfield Avenue, Jersey City, NJ	Project No. 60240740.GA.DE

Photo No.	Date:
1	11/14/11

Direction Photo Taken:

Southwest

Description:

View of groundwater samples collected during the first performance testing sampling round on November 14, 2011. Samples are from the north of the test cell well, test cell well and south of the test cell (left to right).

Photo No.	Date:
2	12/14/09

Direction Photo Taken:

Description:

View of chromium impacted groundwater in base of test pit excavation. Note: green-gray mud is present in this view.

AECOM

Client Name: PPG Industries, Inc.	Site Location: 900 Garfield Avenue, Jersey City, NJ	Project No. 60240740.GA.DE

Photo No.	Date:
3	12/14/09

Direction Photo Taken:

Description:

View of green-gray mud impacted soil from a test pit on Site 114.

Photo No.	Date:
4	12/14/09

Direction Photo Taken:

Description:

View of test pit excavation. Note: green-gray mud and COPR (red streaks), along with other fill materials (brick) visible in test pit sidewall.

AECOM

Client Name: PPG Industries, Inc.	Site Location: 900 Garfield Avenue, Jersey City, NJ	Project No. 60240740.GA.DE

Photo No.	Date:
5	3/21/10

Direction Photo Taken:

Description:

View of green-gray mud collected from a split spoon sampler.

Photo No.	Date:
6	3/21/10

Direction Photo Taken:

Description:

View of COPR nodules.

AECOM

Client Name: PPG Industries, Inc.	Off Site Examples	Project No. 60240740.GA.DE

Photo No.	Date:
7	N/A

Direction Photo Taken:

Not Applicable

Description:

View of chromium blooms on soil

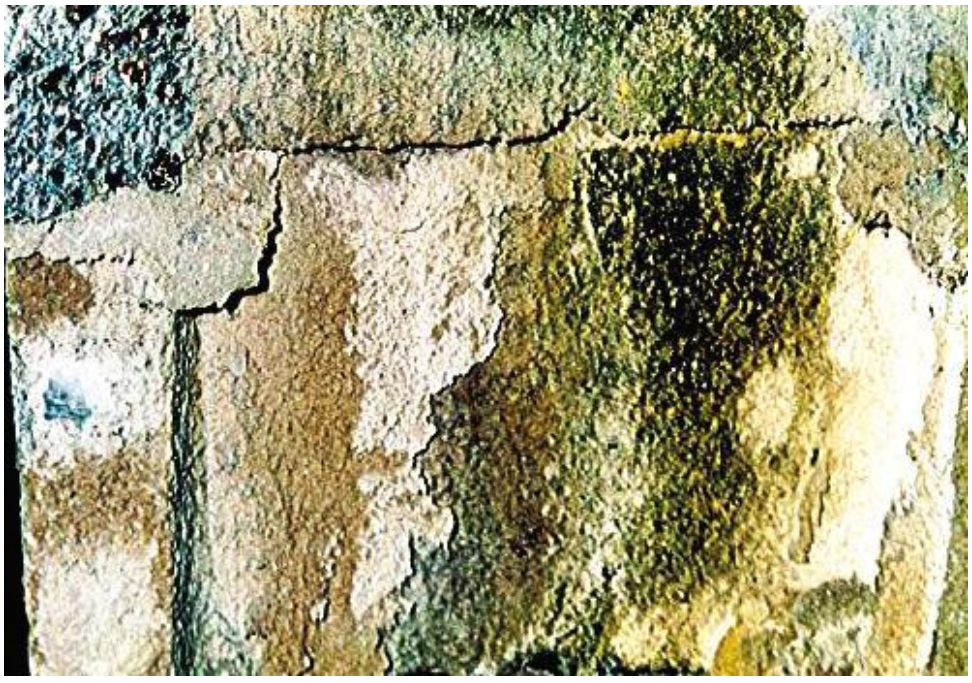
Photo No.	Date:
8	N/A

Direction Photo Taken:

Not Applicable

Description:

View of chromium bloom on masonry



AECOM

Client Name: PPG Industries, Inc.	Off Site Examples	Project No. 60240740.GA.DE

Photo No.	Date:
9	N/A

Direction Photo Taken:

Not Applicable

Description:

View of COPR beneath a concrete floor

Photo No.	Date:
10	N/A

Direction Photo Taken:

Not Applicable

Description:

View of COPR after saturation.

Appendix B

Suggested HASP Table of Contents