



Prepared for:
PPG
Jersey City, New Jersey

Prepared by:
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Project #: 60616701
September 2020

Remedial Investigation Report/Remedial Action Work Plan (Soil) – Caven Point Avenue and Pacific Avenue Roadways (AOC CPA-1A) Final, Revision 1

Addendum to the Final Revision 1 Supplemental Soil Remedial
Investigation Report – Soil and the Final Remedial Action Work Plan
(Soil) Rev. 4 for Garfield Avenue Group Sites

NJDEP Program Interest Number: G000005480

PPG Garfield Avenue Group
Hudson County Chromate Sites
Jersey City, New Jersey

Regulatory Forms

- Case Inventory Document (CID)
- Cover/Certification Form
- Receptor Evaluation

Case Name: Roadways
 PI #: G000005480

IMPORTANT: 1) Do not delete or copy and paste across multiple columns because it can disrupt hidden equations.
 2) If pasting from a Word document, use the Paste option: **Match Destination Formatting**
 3) If the text turns **red** you have exceeded the character limit for that column

Case Inventory Document Version 1.4 02/23/17

AOC ID	AOC Type	AOC Description	Confirmed Contamination	AOC Status	Status Date	Incident #	DEP AOC Number	Contaminated Media	Contaminants of Concern	Additional Contaminants of Concern	Additional Contaminants of Concern	Applicable Remediation Standard	Exposure Route	Additional Exposure Route	RA Type	Additional RA Type	Additional RA Type	Was an Order of Magnitude Evaluation Conducted?	Activity
CPA-1A	Environmental media - Media Soil, including soil vapor pore spaces	Chromate Chemical Production Waste (CCPW)- impacted material	Yes	RAW	12/31/2019			Soil	Metals			AOC Specific ARS and Remediation Standards	Ingestion/Dermal	Inhalation	Institutional Control	Capping			<p>This Area of Concern (AOC) covers the portion of Caven Point Avenue between just east of Garfield Avenue to Pacific Avenue, and the portion of Pacific Avenue between Caven Point Avenue and Carteret Avenue. Chromate Chemical Production Waste (CCPW) and CCPW-related constituents (hexavalent chromium [Cr+6] and antimony, chromium, nickel, thallium, and vanadium) are the constituents of concern (COCs) in the area. Remedial investigation of the Caven Point Avenue and Pacific Avenue Roadways and adjacent properties was documented in the 2018 Supplemental Soil Remedial Investigation Report (SSRIR) and in this Remedial Investigation Report/Remedial Action Work Plan (Soil) – Caven Point and Pacific Avenue Roadways (AOC CPA-1A), Final submittal. Delineation is complete for CCPW, Cr+6, and CCPW metals.</p> <p>For the Garfield Avenue (GA) Group Sites (including Caven Point Avenue and Pacific Avenue Roadways), the New Jersey Department of Environmental Protection (NJDEP) has approved an Alternative Remedial Standard (ARS) for vanadium (V) of 390 milligram per kilogram (mg/kg) for use in place of the Residential Direct Contact Soil Remediation Standard (RDSCRS). Synthetic Precipitation Leaching Procedure (SPLP) was used to calculate site-specific Impact to Groundwater Soil Remediation Standards (IGWSRS) for antimony (Sb) and nickel (Ni), as approved by NJDEP on October 22, 2018. The site-specific IGWSRS for Sb and Ni are 62.7 mg/kg and 170 mg/kg, respectively.</p> <p>This Remedial Investigation Report/Remedial Action Work Plan (Soil) – Caven Point and Pacific Avenue Roadways (AOC CPA-1A), Final submittal presents the plan for preventing direct contact with, ingestion of, and inhalation of CCPW impacts through the use of engineering controls, institutional controls, and a corresponding Remedial Action Permit (RAP) within this area. The proposed engineering control (Restricted Area A) is the Existing Asphalt Cap. The existing asphalt roadway surface will serve as an engineering control (existing asphalt cap) to restrict access to soil with CCPW-related impacts at concentrations greater than the Non-Residential Direct Contact Soil Remediation Standard (NRDCRS). PPG will monitor the existing asphalt cap to confirm the protectiveness of the remedy, in accordance with the requirements of the remedial action permit. PPG will not be responsible for repairing or maintaining the asphalt roadway surface, as maintaining the roadway is currently the responsibility of the City. PPG will inform the City when maintenance of the asphalt cap is required. The northeastern-most portion of the site (Restricted Area B) requires institutional controls only (no engineering controls) because the CCPW-related impacts are less than the NRDCRS and the current use of the site is non-residential. Restricted Area B is for antimony only as it relates to exceedance of residential, but not non-residential, remedial standards. The two restricted areas (Restricted Area A with engineering controls and Restricted Area B without) are depicted in Appendix D (Notice in Lieu of Deed Notice) of this Remedial Investigation Report/Remedial Action Work Plan (Soil) – Caven Point and Pacific Avenue Roadways (AOC CPA-1A), Final submittal.</p>



New Jersey Department of Environmental Protection
 Site Remediation and Waste Management Program

COVER/CERTIFICATION FORM

(Submit with Remedial Phase Report, Receptor Evaluation, and CEA Forms)

Date Stamp
(For Department use only)

SECTION A. SITE INFORMATION

Site Name: Hudson County Chromate - Caven Point Avenue and Pacific Avenue Roadways

AKAs: _____

Street Address: Caven Point Ave btwn Garfield Ave & Pacific Ave; Pacific Ave btwn Caven Point Ave & Carteret Ave.

Municipality: Jersey City (Township, Borough or City)

County: Hudson Zip Code: 07035

Program Interest (PI) Number(s): G000005480

Case Tracking Number(s) for this submission: _____

Date Remediation Initiated Pursuant to N.J.A.C. 7:26C-2: 07/19/1990

State Plane Coordinates for a central location at the site: Easting: 610823 Northing: 681974

List current Municipal Block and Lot Numbers of the Site: Site is a municipal roadway and does not have a block and lot.

Block # _____ Lot #(s) _____ Block # _____ Lot #(s) _____

Block # _____ Lot #(s) _____ Block # _____ Lot #(s) _____

Block # _____ Lot #(s) _____ Block # _____ Lot #(s) _____

Block # _____ Lot #(s) _____ Block # _____ Lot #(s) _____

SECTION B. SUBMISSION STATUS

1. Indicate how the Electronic Data Deliverable (EDD) for this submission is being provided to the NJDEP:

- Via Email at srpedd@dep.nj.gov (attach NJDEP confirmation email); or
- CD (attach to this submission)
- Not Applicable – No EDD

Note that the EDD will be submitted following NJDEP comments on the RIR/RAWP.

2. Complete the following Submission and Permit Status Table:

Remedial Phase Documents	N/A	Included in this Submission	Previously Submitted	Date of Submission	Date of Revised Submission	Date of Previous NJDEP Approval	Date of Document Withdrawal
Preliminary Assessment Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Site Investigation Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Remedial Investigation Report	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	02/27/2012	08/30/2018	10/22/2018	
Remedial Action Work Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12/05/2014	09/27/2018	11/09/2018	
Remedial Action Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Response Action Outcome	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
RIR/RAWP Caven-Pacific		<input checked="" type="checkbox"/>		06/18/2020	09/24/2020		
Other Submissions							
Alternative Soil Remediation Standard and/or Screening level Application Form	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12/06/2016		12/28/2016	
Case Inventory Document		<input checked="" type="checkbox"/>					
Classification Exception Area / Well Restriction Area (CEA/WRA)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Discharge to Ground Water Permit by Rule Authorization Request	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

IEC Engineered System Response Action Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Immediate Environmental Concern Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
LNAPL Interim Remedial Measure Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Public Notification	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Receptor Evaluation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
Technical Impracticability Determination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Vapor Concern Mitigation Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Permit Application – list:	<input type="checkbox"/>						
Water Allocation Permit (WAP)		<input type="checkbox"/>	<input checked="" type="checkbox"/>	05/12/2019			
Emergency Diversion Request		<input type="checkbox"/>	<input checked="" type="checkbox"/>	05/20/2019		05/28/2019	
		<input type="checkbox"/>	<input type="checkbox"/>				
		<input type="checkbox"/>	<input type="checkbox"/>				
Radionuclide Remedial Action Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Radionuclide Remedial Action Workplan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Radionuclide Remedial Investigation Report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Radionuclide Remedial Investigation Workplan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

SECTION C. SITE USE

Current Site Use: (check all that apply)

- Industrial
- Residential
- Commercial
- School or child care
- Other: Roadway
- Agricultural
- Park or recreational use
- Vacant
- Government

Intended Future Site Use, if known: (check all that apply)

- Industrial
- Residential
- Commercial
- School or child care
- Other: Canal Crossing Redevelopment Plan**
- Park or recreational use
- Vacant
- Government
- Future site use unknown

SECTION D. CASE TYPE: (check all that apply)

- Administrative Consent Order (ACO)
- Brownfield Development Area (BDA)
- Child Care Facility
- Chrome Site (Chromate chemical production waste)
- Coal Gas
- Due Diligence with RAO
- Hazardous Discharge Remediation Fund (HDSRF) Grant/Loan
- ISRA
- Landfill (SRP subject only)
- Regulated Underground Storage Tank (UST)
- Remediation Agreement (RA)/Remediation Certification
- School Development Authority (SDA)
- School facility
- Spill Act Defense – Government Entity
- Spill Act Discharge
- UST Grant/Loan
- Other: _____

Federal Case (check all that apply)

- RCRA GPRA 2020
- CERCLA/NPL
- USDOD
- USDOE

1. Is the party conducting remediation a government entity? Yes No
 If "Yes," check one: Federal State Municipal County

SECTION E. PUBLIC FUNDS

Did the remediation utilize public funds? Yes No

If "Yes," check applicable:

- UST Grant
- HDSRF Grant
- Spill Fund
- UST Loan
- HDSRF Loan
- Schools Development Authority
- Brownfield Reimbursement Program
- Landfill Reimbursement Program
- Environmental Infrastructure Trust

SECTION F. LICENSED SITE REMEDIATION PROFESSIONAL INFORMATION AND STATEMENT

LSRP ID Number: _____

First Name: _____ Last Name: _____

Phone Numbers: _____ Ext.: _____ Fax: _____

Mailing Address: _____

Municipality: _____ State: _____ Zip Code: _____

Email Address: _____

This statement shall be signed by the LSRP who is submitting this notification in accordance with N.J.S.A. 58:10C-14, and N.J.S.A. 58:10B-1.3b(1) and (2).

(1) *I certify, as a Licensed Site Remediation Professional authorized pursuant to N.J.S.A. 58:10C-1 et seq. to conduct business in New Jersey, that for the remediation described in this submission, and all attachments included in this submission, I personally: Managed, supervised, or performed the remediation conducted at this site that is described in this submission, and all attachments included in this submission; and/or periodically reviewed and evaluated the work performed by other persons that forms the basis for the information in this submission; and/or completed the work of another site remediation professional, licensed or not, after having: (1) reviewed all available documentation on which I relied; (2) conducted a site visit and observed the then-current conditions and verified the status of as much of the work as was reasonably observable; and (3) concluded, in the exercise of my independent professional judgment, that there was sufficient information upon which to complete any additional phase of remediation and prepare workplans and reports related thereto.*

(2) *I certify:*

- *That I have read this submission and all attachments to this submission;*
- *That in performing the professional services as the licensed site remediation professional for the entire site or each area of concern, I adhered to the professional conduct standards and requirements governing licensed site remediation professionals provided in N.J.S.A. 58:10C-16;*
- *That the remediation conducted at the entire site or each area of concern, that is described in this submission and all attachments to this submission, was conducted pursuant to and in compliance with the remediation requirements in N.J.S.A. 58:10C-14.c;*
- *That the remediation described in this submission, and all attachments to this submission, was conducted pursuant to and in compliance with the regulations of the Site Remediation Professional Licensing Board at N.J.A.C. 7:26I; and*
- *That the information contained in this submission and all attachments to this submission is true, accurate, and complete.*

(3) *I certify, when this submission includes a response action outcome, that the entire site or each area of concern has been remediated in compliance with all applicable statutes, rules, and regulations and is protective of public health and safety and the environment.*

(4) *I certify that no other person is authorized or able to use any password, encryption method, or electronic signature that the Board or the Department have provided to me.*

(5) *I certify that I understand and acknowledge that:*

- *If I knowingly make a false statement, representation, or certification in any document or information I submit to the Department I may be subject to civil and administrative enforcement pursuant to N.J.S.A. 58:10C-17.a.1(a)through (f) by the Board, including but not limited to license suspension, revocation, or denial of renewal; and*
- *If I purposely, knowingly, or recklessly make a false statement, representation, or certification in any application, form, record, document or other information submitted to the Department or required to be maintained pursuant to the Site Remediation Reform Act, I shall be guilty, upon conviction, of a crime of the third degree and shall, notwithstanding the provisions of subsection b. of N.J.S.2C:43-3, be subject to a fine of not less than \$5,000 nor more than \$75,000 per day of violation, or by imprisonment, or both.*

(6) *I certify that I have read this certification prior to signing, certifying, and making this submission.*

LSRP Signature: _____

Date: _____

LSRP Name: _____

Company Name: _____

SECTION G. PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: PPG

Representative First Name: Mark Representative Last Name: Terril

Title: Corporate Director, Environmental Affairs

Phone Number: (412) 434-2708 Ext.: _____ FAX: _____


Mailing Address: One PPG Place

Municipality: Pittsburgh State: PA Zip code: 15222

Email Address: terril@ppg.com

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature:  Date: September 24, 2008

Name/Title: Mark Terril/Corporate Director, Environmental Affairs

For CEA Submissions:

Check this box if the person above is also the property owner of the site or their representative. If this person is not the site property owner, please ensure the site property owner's name and address is in the first line of the table in Section E.2 of the Classification Exception Area / Well Restriction Area (CEA/WRA) Fact Sheet Form.

Completed forms should be sent to:

Bureau of Case Assignment & Initial Notice
Site Remediation Program
NJ Department of Environmental Protection
401-05H
PO Box 420
Trenton, NJ 08625-0420



New Jersey Department of Environmental Protection
 Site Remediation and Waste Management Program

RECEPTOR EVALUATION (RE) FORM

Date Stamp
 (For Department use only)

SECTION A. SITE

Site Name: Garfield Avenue Group Chrome Sites - Caven Point Avenue and Pacific Avenue Roadways

Program Interest (PI) Number(s): G000005480

Communication Center Number(s) and/or ISRA number(s) for this submission: *(as many as will fit in the space provided)*

**This form must be attached to the Cover/Certification Form
 if not submitted through a Remedial Phase Online Service**

Indicate the type of submission:

Initial RE Submission

Updated RE Submission

Indicate the reason for submission of an updated RE form

Submission of an Immediate Environmental Concern (IEC) source control report;

Submission of a Remedial Investigation Report;

Submission of a Remedial Action Report;

Check if included in updated RE

The known concentration or extent of contamination in any medium has increased;

A new AOC has been identified;

A new receptor is identified;

A new exposure pathway has been identified.

SECTION B. ON SITE AND SURROUNDING PROPERTY USE Refer to Attachment 1

1. Identify any sensitive populations/uses that are currently on-site or surrounding property usage within 200 feet of the site property boundary *(check all that apply)*:

	On-site	Off-site
None of the following	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Residences or residential property	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Public or Private Schools Grades K-12	<input type="checkbox"/>	<input type="checkbox"/>
Child care centers	<input type="checkbox"/>	<input type="checkbox"/>
Public parks, playgrounds or other recreation areas	<input type="checkbox"/>	<input type="checkbox"/>
Other sensitive population use(s) Explain _____	<input type="checkbox"/>	<input type="checkbox"/>

If any of the above applies, attach a list of addresses, facility names, type of use, and a map depicting each location relative to the site.

2. Current site uses *(check all that apply)*:

- | | | |
|---|---------------------------------------|--|
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Residential | <input type="checkbox"/> Commercial |
| <input type="checkbox"/> School or child care | <input type="checkbox"/> Government | <input type="checkbox"/> Park or recreational use |
| <input type="checkbox"/> Vacant | <input type="checkbox"/> Agricultural | <input checked="" type="checkbox"/> Other: <u>Roadways</u> |

3. Planned future on-site uses and off-site uses within 200 feet of the site boundary *(check all that apply)*:

<u>On-Site</u>	<u>Off-Site</u>	<u>On-Site</u>	<u>Off-Site</u>	<u>On-Site</u>	<u>Off-Site</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Industrial	Residential	Residential	Commercial	Commercial	Commercial
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School or child care	Government	Government	Park or recreational use	Park or recreational use	Park or recreational use
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vacant	Agricultural	Agricultural	Other: <u>Canal Crossing</u>	Other: <u>Canal Crossing</u>	Other: <u>Canal Crossing</u>

Provide a map depicting the location of the proposed changes in land use. Redevelopment (See Note 1 below)

SECTION C. DESCRIPTION OF CONTAMINATION

1. Identify if any of the following exist at the site:

Yes No

Free product [N.J.A.C. 7:26E-1.8] identified is LNAPL* or DNAPL**.

Date identified: _____

Residual product [N.J.A.C. 7:26E-1.8]

Other primary source materials not identified above (e.g., buried drums, containers, unsecured friable asbestos). See form instructions for additional information.

Explain: _____

* LNAPL – measured thickness of .01 feet or more

**DNAPL – See *Ground Water Technical Guidance and USEPA Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Sites* (attached as Appendix A of the NJDEP GW Guidance) available at: http://www.nj.gov/dep/srp/guidance/#pa_si_ri_gw. Also, see US EPA DNAPL Overview available at: [http://clu.in.org/contaminantfocus/default.focus/sec/Dense_Nonaqueous_Phase_Liquids_\(DNAPLS\)/cat/Overview](http://clu.in.org/contaminantfocus/default.focus/sec/Dense_Nonaqueous_Phase_Liquids_(DNAPLS)/cat/Overview)

2. Soil Migration Pathway

Has soil contamination been delineated to the applicable Direct Contact Soil

Remediation Standard pursuant to N.J.A.C. 7:26E-4.2? Yes No

Are all soils either below the applicable Direct Contact Criteria or under an institutional control (i.e. deed notice)?

Yes No

3. If this evaluation is submitted with a technical document that includes contaminant summary information, proceed to Section D. Otherwise, attach a brief summary of all currently available data and information to be included in the site investigation or remedial investigation report. Included with the Remedial Investigation Report.

SECTION D. GROUND WATER USE

1. Have all potentially contaminated areas of concern been evaluated to determine if there is a potential that ground water is contaminated pursuant to N.J.A.C. 7:26E-3.5? Yes No

If "No," proceed to Section E.

2. Is a ground water investigation required? Yes No

If "No," proceed to Section E.

3. Has a groundwater investigation been conducted? Yes No

If "Yes":

Has the laboratory data package been received? Yes No

If the laboratory data package has not been received, provide the expected due date for data: _____ and proceed to Section E.

If "No":

Proceed to Section E.

4. Is ground water contaminated above the Ground Water Remediation Standards [N.J.A.C. 7:9C]? Yes No

See Note 2 below.

If "Yes": Provide the date that the laboratory data package was available and confirmed contamination was identified above the Ground Water Remediation Standards. Date: _____

If "No": Proceed to Section E.

5. Has ground water contamination been delineated to the applicable Remediation Standard pursuant to N.J.A.C 7:26E-4.3? Yes No

6. What is the ground water classification for this site as per N.J.A.C. 7:9C? (check all that apply)

- Class I-A Class II-A
- Class I-PL Pinelands Protection Area Class III-A
- Class I-PL Pinelands Preservation Area Class III-B

7. Has a well search been completed? Yes No
 Date of most recent or updated well search: _____
8. Is a completed Well Search Spreadsheet or historical well search table attached and has an electronic copy of the spreadsheet been submitted to srpgis_wrs@dep.nj.gov. Yes No
Note: Redacted wells must be excluded from all non-confidential documents including maps, tables, etc. (see RE Instructions).
 If "No," explain: _____
9. Are any potable or irrigation wells located within ½ mile of the currently known extent of contamination? Yes No
 If "Yes,":
- A door to door survey is required in accordance with [N.J.A.C.7:26E-1.14(a)ii]. Attach results of the door to door survey.
 - Identify if any of the following conditions exist based on the well search and door to door survey [N.J.A.C.7:26E-1.14(a)]:
- | <u>Yes</u> | <u>No</u> | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Potable wells located within 500 feet from the downgradient edge of the currently known extent of contamination. |
| <input type="checkbox"/> | <input type="checkbox"/> | Potable wells located 250 feet upgradient or 500 feet side gradient of the currently known extent of contamination. |
| <input type="checkbox"/> | <input type="checkbox"/> | Ground water contamination from the discharge is located within a Tier 1 wellhead protection area (WHPA). |
10. Has sampling been conducted of potable well(s) and /or non-potable use well(s)? Yes No
 If "No," provide justification then proceed to Question 12.

11. Has contamination been identified in potable well(s), **not attributed to background conditions**, above the Class II Ground Water Remediation Standards or State Safe Drinking Water levels, N.J.A.C 7:1E, whichever is applicable? Yes No
 If "Yes":
- Provide the date laboratory data package was received: _____
 - Follow the **IEC** Guidance Document at <http://www.nj.gov/dep/srp/guidance/IEC/index.html> for required actions and answer the following:
 - Has an engineered system response action been completed on all impacted receptors? Yes No
 Provide a brief narrative description:
- Date completed: _____ NJDEP Case Manager: _____
12. Has contamination been identified in non-potable well(s), **not attributed to background conditions**, above the Class II Ground Water Remediation Standards? Yes No
 If "Yes," provide the date laboratory data package was received: _____
13. Has the ground water use evaluation been completed pursuant to N.J.A.C. 7:26E-1.14? Yes No

SECTION E. VAPOR INTRUSION (VI) Refer to Note 3 below.

1. Indicate if any of the following conditions exist that trigger a Vapor Intrusion investigation. For each condition checked "Yes", provide the date the condition was first identified (e.g. date laboratory data package was available). (see NJDEP Vapor Intrusion Technical Guidance)

<u>Yes</u>	<u>No</u>	<u>Date Condition First Identified</u>
<input type="checkbox"/>	<input type="checkbox"/>	Ground water contamination in excess of the NJDEP Vapor Intrusion Ground Water Screening Levels (VIGWSL) and within 30 feet of a building for Petroleum Hydrocarbon Compounds (PHC) or 100 feet for non-PHC compounds .. _____
<input type="checkbox"/>	<input type="checkbox"/>	Free product within 30 feet of a building for PHC or 100 feet for non-PHC compounds .. _____
<input type="checkbox"/>	<input type="checkbox"/>	Soil gas contamination detected at concentrations that exceed the Soil Gas Screening Levels (SGSL) .. _____
<input type="checkbox"/>	<input type="checkbox"/>	Indoor air contamination that exceeds the Indoor Air Screening Levels..... _____
<input type="checkbox"/>	<input type="checkbox"/>	Wet basement or sump containing free product or ground water containing detectable concentration of volatile organic contaminants..... _____
<input type="checkbox"/>	<input type="checkbox"/>	Methane generating conditions causing oxygen deficient or explosion concern..... _____
<input type="checkbox"/>	<input type="checkbox"/>	Other human or safety concern from the VI pathway (i.e. elemental mercury, unsaturated soil contamination), <i>explain below:</i> .. _____

If you checked "No" to all boxes in Question 1., proceed to Section F, "Ecological Receptors", otherwise complete the rest of this section.

2. Has ground water contamination been delineated to the applicable Vapor Intrusion Ground Water Screening Levels pursuant to N.J.A.C 7:26E-4.3? Yes No

3. Was a site-specific screening level, modeling or other alternative approach employed for the VI pathway? Yes No

4. Identify and locate, on a scaled map, any buildings/sensitive populations that exist within the following distances from ground water contaminant concentrations above the Vapor Intrusion Ground Water Screening Levels or other specific triggers noted in Question 1 above.:

<u>Yes</u>	<u>No</u>	
<input type="checkbox"/>	<input type="checkbox"/>	30 feet of petroleum free product or dissolved petroleum hydrocarbon contamination in ground water
<input type="checkbox"/>	<input type="checkbox"/>	100 feet of any non-petroleum free product (e.g. chlorinated hydrocarbons) or any non-petroleum dissolved volatile organic ground water contamination
<input type="checkbox"/>	<input type="checkbox"/>	Other specific triggers
<input type="checkbox"/>	<input type="checkbox"/>	No buildings exist within the specified distances or other specific triggers

5. Is the vapor intrusion pathway a concern at or adjacent to the site? (if "No," attach justification) Yes No

6. Has soil gas sampling of the building(s) been conducted? Yes No

If "Yes," has the laboratory data package been received? Yes No

If the data package was received, did constituents exceed the Soil Gas Screening Levels? Yes No

If "No," attach technical justification consistent with the NJDEP Vapor Intrusion Technical Guidance.

7. Has indoor air sampling been conducted at the identified building(s)? Yes No

If "Yes," has the laboratory data package been received? Yes No

If the data package has been received, did constituents exceed the Indoor Air Screening Levels? .. Yes No

If "No," or awaiting indoor air laboratory data package, proceed to Question 12.

8. Has indoor air contamination been identified but not suspected to be from a discharge?
(if "Yes," attach justification) Yes No
9. Were indoor air results above the NJDEP's Rapid Action Levels?..... Yes No
If "Yes":
- Provide the date laboratory data package was received: _____
 - Follow the IEC Guidance Document at <http://www.nj.gov/dep/srp/guidance/index.html#iec> for required actions and answer the following:
 - Was the IEC engineering system response for control implemented for all impacted structures? Yes No
Date implemented: _____ NJDEP Case Manager: _____
10. Were the results of indoor air sampling above the NJDEP's Indoor Air Screening Levels but at, or below, the Rapid Action Levels..... Yes No
If "Yes," answer the following:
- Provide the date laboratory data package was received: _____
 - Has the Vapor Concern (VC) Response Action Form notifying the NJDEP of the exceedances been submitted? Yes No
Date: _____
 - Has a plan to mitigate and monitor the exposure been submitted? Yes No
Date: _____
 - Has the Mitigation Response Action Report been submitted? Yes No
Date: _____
11. Do one or more buildings have an Indeterminate VI Pathway status? Yes No
If "Yes," attach a list of the building(s) with address(s) and block/lot(s)
12. Has the vapor intrusion investigation been completed? Yes No
If "No", is the vapor intrusion investigation stepping out as part of the site investigation or remedial investigation. (If "No," attach justification)..... Yes No

SECTION F. ECOLOGICAL RECEPTORS

1. Has an Ecological Evaluation (EE) been conducted? [N.J.A.C. 7:26E-1.16] Yes No
Date conducted: March 3, 2011
2. Are any site-related contaminants above any Ecological Screening Criteria? Yes No
3. Are there any Environmentally Sensitive Natural Resources (ESNRs) on or adjacent to the site, or potentially impacted by site related contamination? [N.J.A.C. 7:26E-1.16] Yes No
4. Do any potential or complete migration pathways exist between Contaminant of Potential Ecological Concern (COPECs) and ESNRs, or did historic migration pathways exist? Yes No

If You answered "No" to Questions 2, 3, or 4, above Stop Here (form is complete).

5. If site-related free or residual product is/was present, does/did a potential or complete migration pathway exist to an ESNR?..... Yes No
6. Do the results of an EE trigger a remedial investigation of ecological receptors? [N.J.A.C. 7:26E-4.8]..... Yes No
If "Yes", has a remedial investigation of ecological receptors been conducted? Yes No
Date conducted: _____

7. Do available data indicate an impact (COPECs above Ecological Screening Criteria in ESNRs) to Ecological Receptor(s), Surface water, or Sediment? Yes No

If "Yes,"

a) Check all ESNRs or media that apply:

Surface water Sediment Soil Wetlands

b) If this information is not submitted with an ecological evaluation that includes contaminant summary information, attach a brief summary of all currently available data and a description of all actions to be taken to mitigate exposure.

8. Have COPECs been fully delineated to the Ecological Screening Criteria [N.J.A.C. 7:26E-4.8(a)] in:

a) Migration pathways Yes No

b) ESNR Yes No

9. Has an Ecological Risk Assessment been conducted? Yes No

10. Provide the following information for any on-site and/or off-site surface water body, which is potentially impacted by the site related discharges:

Surface Water Body Name	Stream Classification	Antidegradation Designation	Trout Production	Trout Maintenance
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>

11. Has a Program Interest (PI) or Permit number been issued for any regulated areas by the Division of Land Use Regulation? (e.g. wetlands, transition areas, flood hazard areas, coastal areas, tidelands, etc.) Yes No

If "Yes,":

Identify the type(s) of regulated areas: _____

Provide the Land Use Regulation Program (LURP) PI or Permit number(s) for the site:

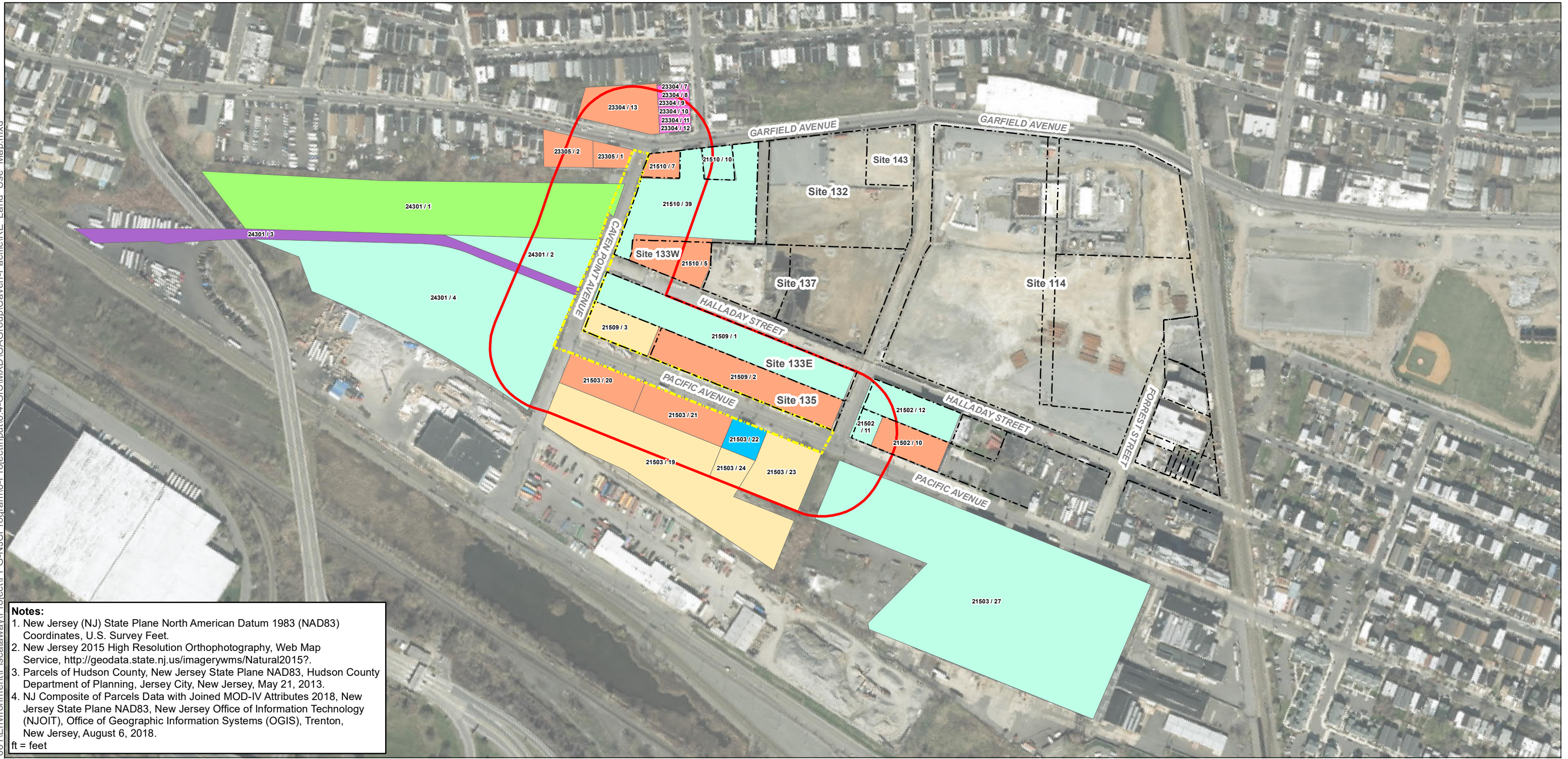
12. Are there any **pending** applications for LURP jurisdiction letters or approvals under review by the NJDEP for the remediation? Yes No

13. Are there any **valid** LURP jurisdiction letters or approvals issued for the remediation? Yes No

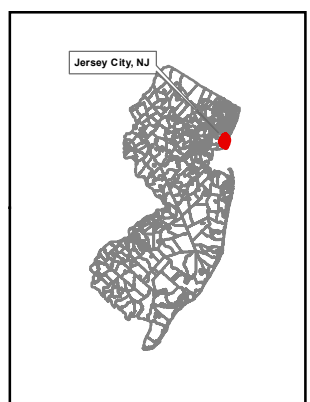
Completed forms should be sent to the municipal clerk, designate health department, and:

Bureau of Case Assignment & Initial Notice
 Site Remediation Program
 NJ Department of Environmental Protection
 401-05H
 PO Box 420
 Trenton, NJ 08625-0420

Path: \\uspsw2\bfpsw001\1Data\Data_USPSW2\FP001\Environment\Pliscataway\Project\PPG-NJC\Program6-ProjectInput\6-4-GIS\IMXD\GAGroup\Caven-Pacific\RE_Land_Use_Map.mxd



Notes:
 1. New Jersey (NJ) State Plane North American Datum 1983 (NAD83) Coordinates, U.S. Survey Feet.
 2. New Jersey 2015 High Resolution Orthophotography, Web Map Service, <http://geodata.state.nj.us/imagerywms/Natural2015?>
 3. Parcels of Hudson County, New Jersey State Plane NAD83, Hudson County Department of Planning, Jersey City, New Jersey, May 21, 2013.
 4. NJ Composite of Parcels Data with Joined MOD-IV Attributes 2018, New Jersey State Plane NAD83, New Jersey Office of Information Technology (NJGIT), Office of Geographic Information Systems (OGIS), Trenton, New Jersey, August 6, 2018.
 ft = feet



LEGEND
 - - - - GARFIELD AVENUE GROUP PROPERTY LINE
 [Yellow dashed box] SITE BOUNDARY
 [Red solid box] 200 FT BUFFER

PROPERTY CLASSES
 [Yellow box] 1 - VACANT LAND
 [Pink box] 2 - RESIDENTIAL (SENSITIVE)
 [Orange box] 4A - COMMERCIAL
 [Light blue box] 4B - INDUSTRIAL
 [Purple box] 5B - CLASS II RAILROAD
 [Green box] 15C - EXEMPT PUBLIC
 [Blue box] 15D - EXEMPT CHARITABLE



PPG
 GARFIELD AVENUE GROUP
 JERSEY CITY, NEW JERSEY
 60616701
 DATE: 12/18/2019 | DRAWN BY: SR | CHECKED BY: CKS

ATTACHMENT 1A
 PROPERTIES WITHIN 200-FT
 OF THE PROJECT AREA

Attachment 1B

Properties Within 200 Feet of the Project Area
Caven Point Avenue and Pacific Avenue Roadways



BLOCK	LOT	PROPERTY CLASS	PROPERTY LOCATION	PROPERTY CITY, STATE	OWNER	OWNER STREET ADDRESS	OWNER CITY, STATE	ZIP CODE
21502	10	4A - COMMERCIAL	107 PACIFIC AVE.	JERSEY CITY CITY, NJ	107-123 & 127 PACIFIC AVE.ASSOC,LLC	130 NORTH MAIN ST.#ST 201	NEW CITY, N.Y.	10956
21502	11	4B - INDUSTRIAL	105-101 PACIFIC AVE.	JERSEY CITY CITY, NJ	ONEONE PACIFIC AVE, LLC	415 NEWARK ST #6B	HOBOKEN, NJ	7030
21502	12	4B - INDUSTRIAL	78 HALLADAY ST.	JERSEY CITY CITY, NJ	PPG INDUSTRIES, INC.	ONE PPG PLACE	PITTSBURGH, PA	15272
21503	19	1 - VACANT LAND	34 CAVEN POINT AVE.	JERSEY CITY CITY, NJ	CAVEN POINT PARTNERS LLC	418 WEST SIDE AVE.	JERSEY CITY, N.J.	7305
21503	20	4A - COMMERCIAL	2-22 PACIFIC AVE.	JERSEY CITY CITY, NJ	ANTONUCCI,ALAN	P.O. BOX 6466	JERSEY CITY, N J	7306
21503	21	4A - COMMERCIAL	24-46 PACIFIC AVE.	JERSEY CITY CITY, NJ	ANTONUCCI, ALAN & CHRISTOPHER	P.O. BOX 6466AVE.	JERSEY CITY, N.J.	7306
21503	22	15D - EXEMPT CHARITABLE	74-80 PACIFIC AVE.	JERSEY CITY CITY, NJ	SPECTRUM HEALTH CARE INC.ATT:SIMON	74-80 PACIFIC AVENUE	JERSEY CITY, NJ	7304
21503	23	1 - VACANT LAND	33-47 CARTERET AVE.	JERSEY CITY CITY, NJ	EDEN WOOD REALTY, LLC	47 PARSIPANNY ROAD	WHIPPANY, N.J.	7981
21503	24	1 - VACANT LAND	CENTRAL R R INS	JERSEY CITY CITY, NJ	EDEN WOOD REALTY, LLC	47 PARSIPANNY ROAD	WHIPPANY, N.J.	7981
21503	27	4B - INDUSTRIAL	150 PACIFIC AVE.	JERSEY CITY CITY, NJ	EDEN WOOD REALTY, LLC	47 PARSIPANNY ROAD	WHIPPANY, N.J.	7981
21509	1	4B - INDUSTRIAL	22 HALLADAY ST.	JERSEY CITY CITY, NJ	PPG INDUSTRIES, INC.	ONE PPG PLACE	PITTSBURGH, PA	15272
21509	2	4A - COMMERCIAL	51-99 PACIFIC AVENUE	JERSEY CITY CITY, NJ	PPG INDUSTRIES, INC.	ONE PPG PLACE	PITTSBURGH, PA	15272
21509	3	1 - VACANT LAND	33 PACIFIC AVE.	JERSEY CITY CITY, NJ	NJEDA,C/O A.SMITH MOVING & FURN	33 PACIFIC AVE.	JERSEY CITY, N.J.	7304
21510	5	4A - COMMERCIAL	15 HALLADAY ST.	JERSEY CITY CITY, NJ	PPG INDUSTRIES, INC.%TAX ADMIN.DEPT	ONE PPG PLACE	PITTSBURGH, PA	15272
21510	7	4A - COMMERCIAL	784 GARFIELD AVE.	JERSEY CITY CITY, NJ	MICHAEL, JOHN	344 PRINCETON AVE.	JERSEY CITY, N.J.	7305
21510	10	4B - INDUSTRIAL	802 GARFIELD AVE.	JERSEY CITY CITY, NJ	PACE, CLEMENT	1120 HECKEL AVE.	MOUNTAINSIDE, NJ	7092
21510	39	4B - INDUSTRIAL	800 GARFIELD AVE.	JERSEY CITY CITY, NJ	PPG INDUSTRIES INC.	ONE PPG PLACE	PITTSBURG, PA	15272
23304	7	2 - RESIDENTIAL (SENSITIVE)	15 CLAREMONT AVE.	JERSEY CITY CITY, NJ	KELLER, ROBBIN	15 CLAREMONT AVE.	JERSEY CITY, N.J.	7305
23304	8	2 - RESIDENTIAL (SENSITIVE)	11 CLAREMONT AVE.	JERSEY CITY CITY, NJ	GG MEDINA	11 CLAREMONT AVE.	JERSEY CITY, NJ	7305
23304	9	2 - RESIDENTIAL (SENSITIVE)	9 CLAREMONT AVE.	JERSEY CITY CITY, NJ	RAY, THERESA	9 CLAREMONT AVE.	JERSEY CITY, NJ	7304
23304	10	2 - RESIDENTIAL (SENSITIVE)	5 CLAREMONT AVE.	JERSEY CITY CITY, NJ	YELDELL, DION	7 JUNEGRASS WAY	HACKETTSTOWN, NJ	7840
23304	11	2 - RESIDENTIAL (SENSITIVE)	3 CLAREMONT AVE.	JERSEY CITY CITY, NJ	3 CLAREMONT AVE, LLC.	1068 40TH ST	BROOKLYN, NY	11219
23304	12	2 - RESIDENTIAL (SENSITIVE)	1 CLAREMONT AVE.	JERSEY CITY CITY, NJ	JACOB KING LLC.	1 CLAREMONT AVE.	JERSEY CITY, NJ	7305
23304	13	4A - COMMERCIAL	783 GARFIELD AVE	JERSEY CITY CITY, NJ	ANTHONY RICCARDI, JR., L.L.C.	783 GARIFELD AVE.	JERSEY CITY, NJ	7305
23305	1	4A - COMMERCIAL	770 GARFIELD AVE.	JERSEY CITY CITY, NJ	T & C INVESTMENTS, L.L.C.	770 GARFIELD AVE.	JERSEY CITY, N.J.	7305
23305	2	4A - COMMERCIAL	758 GARFIELD AVE.	JERSEY CITY CITY, NJ	T AND C INVESTMENTS, LLC.	758 GARFIELD AVE.	JERSEY CITY, N. J.	7305
24301	1	15C - EXEMPT PUBLIC	20 COMMERCIAL ST.	JERSEY CITY CITY, NJ	CITY OF JERSEY CITY	280 GROVE ST.	JERSEY CITY, N.J.	7302
24301	2	4B - INDUSTRIAL	55 CAVEN POINT AVE.	JERSEY CITY CITY, NJ	SUDYLO, ANDREW & JULIA	534 RIDGE ROAD	PHILLIPSBURG, N.J.	8865
24301	3	5B - CLASS II RAILROAD	CAVEN POINT AVE.	JERSEY CITY CITY, NJ	CONSOLIDATED RAIL	P. O. BOX 8499	PHILADELPHIA, PA	19101
24301	4	4B - INDUSTRIAL	21 CAVEN POINT AVE.	JERSEY CITY CITY, NJ	NEWARK INDUST.ASSOC.C/O C.DANIELS	501 SEVENTH AVE #400	NEW YORK, NY	10018

Notes:

- Parcel information obtained from NJ Composite of Parcels Data with Joined MOD-IV Attributes 2017, NJ State Plane NAD83, NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Trenton, New Jersey, July 20, 2017.
NAD83 - North American Datum of 1983
NJ - New Jersey

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List of Acronyms/Definitions

The following acronyms and definitions apply to this document:

ACO	Administrative Order on Consent
ARS	alternative remediation standard
ASM	AI Smith Moving
bgs	below ground surface
CCPW	Chromate Chemical Production Waste, a by-product generated from the production of sodium bichromate, including Chromite Ore Processing Residue (COPR), green-gray mud, and fill mixed with COPR or green-gray mud.
chromium (Cr)	An element found in nature that is commonly used in manufacturing activities. Chromium may be present in soil or water as trivalent chromium (Cr ⁺³) and hexavalent chromium (Cr ⁺⁶). Cr ⁺³ is an essential nutrient at trace concentrations. Cr ⁺⁶ can be present in many forms, some of which are carcinogenic at high concentrations. Total chromium, as measured in soil or groundwater, is the sum of Cr ⁺³ and Cr ⁺⁶ .
COC	constituent of concern
COPR	Chromite Ore Processing Residue
CrSCC	Chromium Soil Cleanup Criteria
Cr ⁺³	trivalent chromium
Cr ⁺⁶	hexavalent chromium
DGA	dense-graded aggregate
DIGWSSL	Default Impact to Ground Water Soil Screening Level(s)
EI.	elevation
ft	foot or feet
FSP-QAPP	Field Sampling Plan – Quality Assurance Project Plan
GA	Garfield Avenue
groundwater	The supply of fresh water found beneath the Earth's surface, which can be extracted by wells or through natural springs.
HSS	Halladay Street South
IGW	Impact to Groundwater
IGWSRS-GAG	Impact to Ground Water Soil Remediation Standard – Garfield Avenue Group

JCO	Judicial Consent Order
LCS	laboratory control sample(s)
LCSD	laboratory control sample duplicate(s)
LSRP	Licensed Site Remediation Professional
mg/kg	milligram(s) per kilogram
MGP	manufactured gas plant
MS	matrix spike
MSD	matrix spike duplicate
NAVD88	North American Vertical Datum of 1988
Ni	nickel
NILODN	notice in lieu of deed notice
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NRDCSRS	Non-Residential Direct Contact Soil Remediation Standard(s)
PI	Program Interest
PSEG	Public Service Electric and Gas Company
QA	quality assurance
QC	quality control
RA	remedial alternative
RAP	Remedial Action Permit
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
RDCSRS	Residential Direct Contact Soil Remediation Standard(s)
RE	receptor evaluation
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
remediation	Actions to reduce, isolate, or remove contamination with the goal of mitigating impacts to human health and the environment.
ROWS	right-of-ways

RPD	relative percent difference
Sb	antimony
soil	Solid material (other than CCPW). Exceptions to this definition are specifically noted in the text.
SOP	standard operating procedure
SPLP	Synthetic Precipitation Leaching Procedure
SRP	Site Remediation Program
SRS	Soil Remediation Standard(s)
SSL	Soil Screening Level(s)
SSRIR	Supplemental Soil Remedial Investigation Report
the City	the City of Jersey City, New Jersey
TOC	total organic carbon
USEPA	United States Environmental Protection Agency
V	vanadium

Executive Summary

On behalf of PPG, AECOM has prepared this combined Soil Remedial Investigation Report (RIR)/Remedial Action Work Plan (RAWP) to present the results of the Remedial Investigation (RI) and the proposed Remedial Action approach for soils within Caven Point Avenue and Pacific Avenue Roadways (the Site), part of the Garfield Avenue (GA) Group Sites (Sites 114, 132, 133, 135, 137, and 143; Phase 4 Roadways; and Phase 5 Off-Site Properties), located in Jersey City, New Jersey (NJ) (**Figure 1-1**). Site 114 is the former location of a chromite ore processing facility previously owned by PPG, and the former Halladay Street Gas Works manufactured gas plant (MGP) previously owned by Public Service Electric and Gas Company (PSEG). Caven Point Avenue and Pacific Avenue Roadways is tracked under the New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program (SRP) Program Interest (PI) number G000005480 for Site 114.

Caven Point Avenue and Pacific Avenue are municipal roadways owned by the City of Jersey City (the City). Caven Point Avenue and Pacific Avenue Roadways comprise the southwest and southeast terminus of land impacted by historical operations at Site 114. Remedial excavation has been completed at the adjacent Site 135, the Al Smith Moving property, the majority of Site 133 East, and the majority of Halladay Street South (HSS). Additional remedial excavation is planned adjacent to Caven Point Avenue, in the southern portion of Site 133 East, in the southern portion of HSS, at Site 133 West, and at Ten West Apparel.

This RIR/RAWP addresses only the soil impacts for which PPG is responsible under the *Administrative Consent Order (ACO)* (NJDEP, 1990) and the *Partial Consent Judgment Concerning the PPG Sites* (Judicial Consent Order [JCO]) (Superior Court of New Jersey Law Division – Hudson County, 2009). PPG is responsible for Chromate Chemical Production Waste (CCPW) and CCPW-related impacts. At Caven Point Avenue and Pacific Avenue Roadways, these constituents include:

- CCPW;
- Hexavalent chromium (Cr⁶⁺); and
- CCPW metals (antimony, total chromium, nickel, thallium, and vanadium).

PPG is not responsible for other constituents exceeding the NJDEP Soil Remediation Standards (SRS) or Default Impact to Groundwater Soil Screening Levels (DIGWSSL) that may be present at the Site. Delineation and remediation of non-CCPW-related constituents, including those associated with historic fill remaining at the Site, is the responsibility of the property owner under the Licensed Site Remediation Professional (LSRP) program.

This RIR is an addendum to the *Supplemental Soil Remedial Investigation Report – Soil, Garfield Avenue Group Non-Residential Chromate Chemical Production Waste Sites – 114, 132, 133, 135, 137, 143, and Adjacent Properties and Roadways (Final Revision 1)* (SSRIR) (AECOM, 2018b), which reported on the RI conducted primarily around the perimeter of the GA Group Sites to refine delineation of the constituents of concern (COCs) identified during the initial RI work. The primary objective of this additional soil RI was to complete the delineation of the horizontal and vertical extent of CCPW and CCPW-related impacts to soil within the vicinity of the Site, specifically Cr⁶⁺ and antimony (Sb) exceedances observed in the Caven Point Avenue and Pacific Avenue Roadways Right-of-Ways (ROWs) during RI, pre-design investigation activities, or remedial excavation activities. As a result of this additional investigation, the CCPW and CCPW-related impacts have been

delineated with respect to Caven Point Avenue and Pacific Avenue Roadways and no further soil RI work is recommended.

This RAWP is an addendum to the *Final Remedial Action Work Plan (Soil) Rev. 4, Garfield Avenue Group Sites, Jersey City, Hudson County, New Jersey* (GA Group RAWP) (AECOM, 2018c). This RAWP presents site-specific details pertaining to the remedial approach to be implemented at the Site. Elements of the GA Group RAWP that are not specific to, and remain accurate for, the Site (e.g., site history, hydrology) have not been resubmitted herein.

The recommended remedial alternative (RA) for Caven Point Avenue and Pacific Avenue Roadways is engineering controls (existing asphalt cap) and institutional controls (notice in lieu of deed notice [NILODN] and implementation of the measures in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol).

1.0 Introduction

On behalf of PPG, AECOM has prepared this combined Soil Remedial Investigation Report (RIR)/Remedial Action Work Plan (RAWP) to present the results of the Remedial Investigation (RI) and the proposed Remedial Action approach for the soils within Caven Point Avenue and Pacific Avenue Roadways (the Site), part of the Garfield Avenue (GA) Group Sites (Sites 114, 132, 133, 135, 137, and 143; Phase 4 Roadways; and Phase 5 Off-Site Properties), located in Jersey City, New Jersey (NJ). Site 114 is the former location of a chromite ore processing facility previously owned by PPG, and the former Halladay Street Gas Works manufactured gas plant (MGP) previously owned by Public Service Electric and Gas Company (PSEG). Caven Point Avenue and Pacific Avenue Roadways is tracked under the New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program (SRP) Program Interest (PI) number G000005480 for Site 114. The Site is depicted in **Figures 1-1** and **1-2**.

PPG is conducting remediation of Chromate Chemical Production Waste (CCPW)-related impacts in soil within Caven Point Avenue and Pacific Avenue Roadways in accordance with PPG's obligation under the *Administrative Order on Consent in the Matter of Hudson County Chromate Chemical Production Waste Sites and PPG Industries, Inc.* (ACO), July 19, 1990 (NJDEP, 1990) and the *Partial Consent Judgment Concerning the PPG Sites* (Judicial Consent Order [JCO]), June 26, 2009 (Superior Court of New Jersey Law Division – Hudson County, 2009).

This RIR/RAWP has been prepared as an Addendum to the *Supplemental Soil Remedial Investigation Report – Soil, Garfield Avenue Group Non-Residential Chromate Chemical Production Waste Sites – 114, 132, 133, 135, 137, 143, and Adjacent Properties and Roadways (Final Revision 1)* (SSRIR) (AECOM, 2018b) and the *Final Remedial Action Work Plan (Soil) Rev. 4, Garfield Avenue Group Sites, Jersey City, Hudson County, New Jersey* (GA Group RAWP) (AECOM, 2018c). This RIR/RAWP presents site-specific details pertaining to the remedial action approach to be implemented at the Site. Elements of the SSRIR and the GA Group RAWP that are not specific to, and remain accurate for, the Site (e.g., site history, hydrology) have not been resubmitted herein.

The remainder of this RIR/RAWP is organized as follows:

- **Section 2** provides background information;
- **Section 3** provides a summary of the RI results;
- **Section 4** presents the updated Receptor Evaluation;
- **Section 5** presents the remedial alternatives (RAs) evaluation;
- **Section 6** provides a summary of the selected remedial actions;
- **Section 7** includes a schedule for Caven Point Avenue and Pacific Avenue Roadways remedial action;
- **Section 8** presents the conclusions and recommendations; and
- **Section 9** provides a list of references.

2.0 Background Information

This section provides a site description and identifies the constituents of concern (COCs) for Caven Point Avenue and Pacific Avenue Roadways.

2.1 Site Description

Caven Point Avenue and Pacific Avenue Roadways is part of the GA Group Sites (Sites 114, 132, 133, 135, 137, and 143; Phase 4 Roadways; and Phase 5 Off-Site Properties), located in Jersey City, NJ. Caven Point Avenue and Pacific Avenue Roadways includes the portion of Caven Point Avenue located between Garfield Avenue and Pacific Avenue and the portion of Pacific Avenue between Caven Point Avenue and Carteret Avenue, and is located within Phase 4 Roadways of the GA Group Sites. The Site is depicted in **Figures 1-1** and **1-2**.

Caven Point Avenue and Pacific Avenue are municipal roadways owned by the City of Jersey City (the City). Caven Point Avenue and Pacific Avenue Roadways comprises the southwest and southeast terminus of land impacted by historical operations at Site 114. These active urban roadways abut the GA Group Sites located to the north, including Site 135, the Al Smith Moving property, Halladay Street South (HSS), Site 133 West, and Ten West Apparel. Utilities located within the roadways' footprint include four water lines (a 6-inch diameter line and a 20-inch diameter line in Caven Point Avenue and a 16-inch diameter line and an 8-inch diameter line in Pacific Avenue), communication lines, three gas lines (one in Caven Point Avenue and two in Pacific Avenue), and three combined sewer lines (a 15-inch diameter vitrified clay pipe in Caven Point Avenue, and a 24-inch diameter concrete block pipe and a 36-inch diameter vitrified clay pipe in Pacific Avenue) (**Figure 2-1**).

Portions of the GA Group Sites that abut Caven Point Avenue and Pacific Avenue Roadways, as well as other areas south of Caven Point Avenue, have previously been investigated and/or remediated. Remedial excavation has been completed at the adjacent Site 135, the Al Smith Moving property, the majority of Site 133 East, and the majority of HSS. Additional remedial excavation is planned adjacent to Caven Point Avenue, in the southern portion of Site 133 East, in the southern portion of HSS, at Site 133 West, and at Ten West Apparel. Findings from investigation and remediation of these abutting sites may be utilized and/or referenced in this RIR/RAWP, where relevant to the conditions found or anticipated in Caven Point Avenue and Pacific Avenue Roadways.

Note that in 2011, PPG identified and delineated soil with concentrations of hexavalent chromium (Cr^{+6}) exceeding the NJDEP Chromium Soil Cleanup Criteria (CrSCC) in an area located to the southwest and adjacent to Caven Point Avenue. Subsequently, in 2014, PPG implemented a voluntary remedial action to excavate and dispose of the impacted materials off-site. The 2014 voluntary remedial action was performed to address the Cr^{+6} exceedance of the CrSCC at ICO-07. Details of this remedial action are documented in the *Remedial Action Report (Soil) (Revision 3) Caven Point*, submitted on July 16, 2015 by AECOM on behalf of PPG (AECOM, 2015a). NJDEP issued a letter dated August 4, 2015 approving this Remedial Action Report (RAR) (NJDEP, 2015). AECOM issued a Response Action Outcome for the remediation in this area in a letter dated December 18, 2015 (AECOM, 2015b).

Refer to the SSRIR and GA Group RAWP for additional details regarding site description including site history and environmental setting.

2.2 Constituents of Concern

This RIR/RAWP addresses only the soil impacts for which PPG is responsible under the ACO (NJDEP, 1990) and the JCO (Superior Court of New Jersey Law Division – Hudson County, 2009). PPG is responsible for CCPW and CCPW-related impacts. At Caven Point Avenue and Pacific Avenue Roadways, these constituents include:

- CCPW;
- Cr⁺⁶; and
- CCPW metals (antimony, total chromium, nickel, thallium, and vanadium).

Under the ACO/JCO, PPG is also responsible for COCs detected at concentrations exceeding NJDEP regulatory standards, criteria, and/or screening levels that were found to be emanating from Site 114. However, based on the following lines of evidence and as explained in the ACO/JCO Site Parameters List (AECOM, 2017a), no COCs are emanating from Site 114 onto Caven Point Avenue and Pacific Avenue Roadways:

- Site 132, Site 143, and the former Fishbein property are situated between Caven Point Avenue and Site 114. Since emanating-from parameters were not identified on Site 132, Site 143, or the former Fishbein property, it is not possible that constituents in soil have emanated from Site 114 onto the Caven Point Avenue property from these properties.
- Site 133 West is located between Caven Point Avenue and Site 114. Since emanating-from parameters were not identified on Site 133 West, which is situated between Caven Point Avenue and Site 114 (and abuts Caven Point Avenue), it is not possible that constituents in soil have emanated from Site 114 onto the Caven Point Avenue property from Site 133 West.
- The HSS property is located between Caven Point Avenue and Site 114 and abuts Caven Point Avenue. Emanating-from parameters were delineated to concentrations less than the NJDEP regulatory standards, criteria, and/or screening levels in the northeast portion of HSS. Therefore, it is not possible that constituents in soil have emanated from Site 114 onto the Caven Point Avenue property from HSS.
- Site 133 East is located between Caven Point Avenue and Site 114 and abuts Caven Point Avenue. Emanating-from impacts, specifically, naphthalene impacts, from Site 114 were delineated in Site 133 East but were not present in the grids abutting Caven Point Avenue. Therefore, it is not possible that constituents in soil have emanated from Site 114 onto the Caven Point Avenue property from Site 133 East.
- The Al Smith Moving (ASM) property is located between Site 114 and Caven Point Avenue and Pacific Avenue (and abuts Caven Point Avenue and Pacific Avenue). ASM was not impacted by COCs emanating from Site 114. Therefore, it is not possible that constituents in soil have emanated from Site 114 onto Caven Point Avenue and Pacific Avenue Roadways from the ASM property.
- Site 135 (North and South) is located between Site 114 and Pacific Avenue and abuts Pacific Avenue. Site 135 was not impacted by COCs emanating from Site 114. Therefore, it is not possible that constituents in soil have emanated from Site 114 onto the Pacific Avenue property from Site 135.

For soil at Caven Point Avenue and Pacific Avenue Roadways, PPG is only responsible for CCPW and CCPW-related impacts and not for any other constituents exceeding NJDEP Soil Remediation Standards (SRS) that may be present at the Site (e.g., constituents of historic fill). Remediation of

impacts within Caven Point Avenue and Pacific Avenue Roadways that are not subject to the ACO and JCO are to be managed by the City's Licensed Site Remediation Professional (LSRP) under the NJDEP LSRP program.

3.0 Soil Remedial Investigation

This section provides the results of the RI, including a description of the RI objectives and requirements, a summary of the data validation methods, the results of the data usability assessment, and a description of the nature and extent of COCs in the Site. As this RIR is an Addendum to the SSRIR, the SSRIR should be consulted for additional details regarding the previous remedial investigation conducted at this Site, including field investigation methodology.

3.1 Remedial Investigation Objectives and Requirements

The purpose of the additional sampling at the Site, included in this addendum to the SSRIR, was to delineate Cr⁺⁶ and antimony (Sb) exceedances observed in the Caven Point Avenue and Pacific Avenue Roadways Right-of-Ways (ROWs) during RI and pre-design investigation activities, or during excavation, as concluded in the SSRIR.

Specifically, SSRIR Figure 5-7 (Soil Comparison to NJDEP CrSCC – Southern Garfield Avenue Sites) depicts the maximum extent of visible CCPW and/or Cr⁺⁶ concentrations greater than the CrSCC, including areas where delineation was anticipated subject to further sampling. As a result of the findings of the SSRIR, additional delineation was proposed (AECOM, 2018a) and implemented at the Site for Sb and Cr⁺⁶.

The additional delineation program was conducted in accordance with the *Caven-Pacific Delineation Investigation Work Plan*, dated May 29, 2018 (AECOM, 2018a), as accepted by NJDEP/Weston on June 15, 2018 (Weston, 2018). Additionally, a test pit was conducted in Pacific Avenue to investigate “green staining” previously noted in the boring log for location 135-B13. This additional delineation program and test pit were conducted in accordance with the *Field Sampling Plan – Quality Assurance Project Plan* (FSP-QAPP) (AECOM, 2010).

Information included in this RIR/RAWP primarily represents data collected within Caven Point Avenue and Pacific Avenue Roadways. However, **Figure 3-1** also depicts locations from abutting properties, as needed, to demonstrate that delineation is complete for this Site.

This RIR Addendum was prepared in accordance with the following requirements:

- Appendix A of the *Administrative Order of Consent in the Matter of Hudson County Chromate Chemical Production Waste Sites and PPG Industries, Inc.*, July 19, 1990 (NJDEP, 1990);
- *Technical Requirements for Site Remediation*, New Jersey Administrative Code (N.J.A.C.) 7:26E et seq. (NJDEP, 1993);
- NJDEP Commissioner Jackson’s February 8, 2007 *Memorandum Regarding Chromium Moratorium* (NJDEP, 2007);
- N.J.A.C. 7:26D – *Soil Remediation Standards*, adopted effective June 2, 2008, last amended September 18, 2017 (NJDEP, 2008a);
- NJDEP *Chromium Soil Cleanup Criteria*, September 2008, revised April 2010 (NJDEP, 2008b);
- *Judicial Consent Order for the PPG Sites*, June 26, 2009 (Superior Court of New Jersey, Law Division – Hudson County, 2009); and

- Letter from Mr. Thomas Cozzi to W. Michael McCabe, Subject: *Re: Updated Method to Determine Compliance with the Department's Chromium Policy, Garfield Avenue – Sites 114, 132, 133, 135, 137, and 143, Jersey City, NJ.* August 13, 2013 (Method to Determine Compliance) (NJDEP, 2013a).

Currently, there are no SRS for total Cr or Cr⁶. For the purpose of this assessment, Cr⁶ concentrations were compared to the CrSCC of 20 milligrams per kilogram (mg/kg) for Cr⁶. Total Cr was compared to the CrSCC of 120,000 mg/kg for trivalent chromium (Cr³), pursuant to the CrSCC, last revised April 20, 2010 (NJDEP, 2008b).

Soil analytical results were compared to the NJDEP SRS for other COCs. Samples collected adjacent to the GA Group Sites were also compared to the CrSCC and the NJDEP SRS with the exception of vanadium (V), which has a NJDEP-approved site-specific alternative remediation standard (ARS). The NJDEP approved the ARS for V to replace the Residential Direct Contact SRS (RDCSRS) on December 28, 2016 (NJDEP, 2016) for the GA Group Sites and adjacent properties. Therefore, soil analytical results in and adjacent to the Site for V were compared to the site-specific ARS of 390 mg/kg.

Soil analytical results in the unsaturated zone were also compared to the default Impact to Groundwater (IGW) soil screening levels (SSLs) in accordance with the NJDEP *Guidance Document for the Development of Impact to Ground Water Soil Remediation Standards Using the Soil-Water Partition Equation*, last updated in November 2013 (NJDEP, 2013b) with the exception of nickel (Ni) and Sb. Site-specific IGW SRS for Ni and Sb were developed during the course of Supplemental Soil RI work in accordance with the NJDEP November 2013 Guidance Document for the *Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using the Synthetic Precipitation Leaching Procedure* (NJDEP, 2013c). Details of the procedure and results are included in Section 4.5 of the SSRIR. Based on the completion of the Synthetic Precipitation Leaching Procedure (SPLP) analysis, soil analytical results adjacent to the GA Group sites for Sb were compared to a site-specific IGW SRS of 62.7 mg/kg and results for Ni were compared to a site-specific SRS value of 170 mg/kg.

3.2 Data Validation and Data Usability

The data validation and data usability assessment were conducted on data collected within the Caven Point Avenue and Pacific Avenue Roadways, as presented in **Tables 3-1, 3-2, and 3-3**.

3.2.1 Data Validation

Data validation was performed by AECOM to evaluate whether the analytical data collected to demonstrate compliance with the RI objectives were scientifically defensible, properly documented, of known quality, and met RI objectives. Data validation included the review of analytical procedures, quality control (QC) results, calibration procedures, data reduction, and completeness of the laboratory data packages as specified in the Soil Remedial Investigation Work Plan (RIWP) (AECOM, 2011) and FSP-QAPP (AECOM, 2010). Deficiencies noted were communicated to the laboratory and resolutions were documented in the data validation reports. If appropriate, data were qualified for use as described later in this section.

The laboratory analytical data packages (**Appendix C**) were reviewed in accordance with the FSP-QAPP (AECOM, 2010), the NJDEP validation Standard Operating Procedures (SOPs) for Cr⁶ and inorganic data, and United States Environmental Protection Agency (USEPA) Region 2 metals

validation guidelines. The following NJDEP validation guidelines served as the basis for the actions taken during validation:

- NJDEP Office of Data Quality *SOP 5.A.10, Rev 3 (September 2009), SOP for Analytical Data Validation of Hexavalent Chromium – for USEPA SW-846 Method 3060A, USEPA SW-846 Method 7196A and USEPA SW-846 Method 7199* (NJDEP, 2009); and
- NJDEP Office of Data Quality *SOP 5.A.16, Rev 1 (May 2002), Quality Assurance Data Validation of Analytical Deliverables for Inorganics (based on USEPA SW-846 Methods)* (NJDEP, 2002).

Where USEPA Region 2 inorganic validation guidelines were also used in assessing metals, the most current guidance in effect at the time of validation was used; the specific revision used is listed in each data validation memorandum provided in **Appendix C**. The link to USEPA Region 2 validation guidance on the USEPA website is shown below:

- <https://www.epa.gov/quality/region-2-quality-assurance-guidance-and-standard-operating-procedures>

The level of validation ranged from a comprehensive validation according to the NJDEP guidelines to a limited validation based on QC summary information or completeness reviews, depending on the analyte and matrix. The validation procedures for the Cr⁺⁶ data included full validation, which involved a comprehensive review of both summary forms and raw data, whereas the metals data received limited validation. Limited validation for metals data was based on information provided by the laboratory on its QC summary forms and did not include raw data review. At a minimum, limited validation included validation of the following data elements:

- Agreement of analyses conducted with chain-of-custody requests;
- Holding times and sample preservation;
- Method blanks/field equipment blanks/trip blanks;
- Surrogate spike recoveries;
- Laboratory control samples (LCS) or equivalent results;
- Matrix spike (MS)/matrix spike duplicate (MSD) results;
- Laboratory duplicate results;
- Field duplicate results; and
- Quantitation limits and sample results (limited to evaluating dilutions and re-analyses).

Full validation was conducted on the Cr⁺⁶ data. Full validation included each of the data elements listed for limited validation along with review of calibration data and raw data, and spot checks for verification of calculations.

Validation reports were prepared for each data package that was validated. The validation reports are provided in **Appendix C**. The reports summarize the samples reviewed, parameters reviewed, nonconformance with the established criteria, and validation actions (including application of data qualifiers) presented in accordance with the NJDEP “hit list” format. Validation data qualifiers were based on the USEPA Region 2 validation guidelines for organic data and the NJDEP validation SOPs for the Cr⁺⁶ and inorganic data. The following qualifiers are used in data validation:

- J Indicates the result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample. J+ or J- is used when the direction of bias can be determined.
- U Indicates the analyte was not detected in the sample above the sample reporting limit.
- UJ Indicates the analyte was not detected above the reporting limit and the reporting limit was approximate.
- UB The analyte concentration is less than or equal to three (3) times the concentration in the associated method/preparation blank. The presence of the analyte in the sample is negated due to laboratory blank contamination.
- JB The analyte concentration is greater than three (3) times, but less than or equal to ten (10) times the concentration in the associated method/preparation blank. The presence of that analyte in the sample is considered “real” but the concentration is quantitatively qualified due to method blank contamination.
- R The sample result was rejected due to serious deficiencies; the presence or absence of the analyte could not be confirmed.
- RA The sample result was rejected due to NJ-specific data validation QC requirements; however, the result is usable for project objectives. Refer to the Data Quality and Usability section of the data validation report for further information.

3.2.2 Data Usability Assessment

Soil samples collected to demonstrate compliance with the RI objectives were sent to Test America Laboratories (formerly Severn-Trent Laboratories) in Edison, NJ (NJ certification 12028) or SGS-Accutest Laboratories in Dayton, NJ (NJ Certification 12129). The analyses were performed in accordance with USEPA- and NJDEP-approved analytical protocols in place at the time the analyses were performed. Quality assurance analytical measures were implemented in accordance with the NJDEP’s *Technical Requirement for Site Remediation* (NJDEP, 1993) and complied with the requirements for a NJDEP-certified laboratory specified in *Regulations Governing the Certification of Laboratories and Environmental Measurements* (NJDEP, 1981). Specific quality control issues identified during validation are documented in the individual data validation reports provided in **Appendix C**. Results of the data validation indicated that, in general, the analytical data were of adequate quality to meet the project objectives. However, there were some quality assurance (QA)/QC issues identified during data validation that resulted in rejection of data or qualification of data as estimated.

Data usability was evaluated using the data quality indicators of precision, accuracy, representativeness, comparability, completeness, and sensitivity. Data that were not rejected during validation are regarded as usable.

Certain Cr⁺⁶ results that were rejected due to failure of the matrix spikes to meet the NJDEP-specified control limits of 50-150% were qualified “RA” to indicate that the result may have value for information purposes. This qualifier is typically used for Cr⁺⁶ where the spiked sample matrix appears to be reducing and would not be expected to support the presence of Cr⁺⁶. The presence of other indicators of a reducing environment such as total organic carbon (TOC), sulfide, or ferrous iron is a factor in the decision to utilize the “RA” qualifier.

3.2.2.1 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions and includes both field and analytical components. The information used to evaluate precision included results for field duplicates, matrix duplicates, and laboratory duplicates. For the RI data set (the data used to demonstrate compliance with the RI objectives), relative percent difference (RPD) non-conformances were observed for field and/or laboratory duplicates associated with Cr⁺⁶ and CCPW metals.

Field precision was assessed through the collection and analysis of field duplicates and expressed as the RPD of the sample and field duplicate pair results. For the Caven Point Avenue and Pacific Avenue Roadways data set, field duplicate precision resulted in qualification of 10.5% of the Cr⁺⁶ data, and 9.6% of the CCPW metals data.

Laboratory precision was assessed through the RPD results for MS/MSDs, LCS/laboratory control sample duplicate (LCSD) pairs, and duplicate sample analyses. MS/MSDs and duplicate sample analyses do not reflect laboratory precision as purely as LCS/LCSDs since sample homogeneity, which can be a significant issue for soil samples, can impact the precision of sample and matrix spike duplicates. However, no differentiation of the applied reason code is made between LCS/LCSDs and MS/MSDs or sample duplicates. Laboratory precision resulted in qualification of 13.4% of the Cr⁺⁶ data; none of the CCPW metals results were qualified on the basis of laboratory precision in the Caven Point Avenue and Pacific Avenue Roadways data set.

3.2.2.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value. The results of LCS data, method blanks, and MS/MSDs were used as the primary indicators of accuracy; information such as sample container type, preservation, and holding time was also considered as impacting to analytical accuracy. Some of this information was assessed by the laboratory at the time of receipt (container type and preservation); other parameters were evaluated during the validation process.

Of the Caven Point Avenue and Pacific Avenue Roadways data set, 27% was qualified “RA” to indicate the results were rejected since both initial and reanalysis spike recoveries fell outside the control limits of 50-150%, but the sample matrix appeared to be reducing and, therefore, unable to support the presence of Cr⁺⁶. The Cr⁺⁶ results that were qualified “RA” may provide further information for project decisions but should be used with an understanding of the QC issues identified.

Qualification of data as estimated (J/UJ) for accuracy was related to issues such as field or laboratory blank contamination, LCS results, MS results, and percent solids. A summary of the validation findings is presented by QC parameter type below.

The presence of negative blanks, or target analytes in laboratory blanks and/or blanks related to field activities (i.e., field blanks) was cited as a reason for qualification in 3.2% of the CCPW metals data, which resulted in qualification of five CCPW metals results (<1%) associated with the Caven Point Avenue and Pacific Avenue Roadways data set. For those blanks in which constituents were detected, action levels were established in accordance with the NJDEP or USEPA Region 2 validation guidance documents. Associated sample results were qualified accordingly.

In the Caven Point Avenue and Pacific Avenue Roadways data set, 71.7% of the Cr⁺⁶ data and 10.3% of the CCPW metals results were qualified on the basis of MS or MSD recoveries. Hexavalent

chromium results were flagged as estimated based on the results of soluble and/or insoluble spike recoveries outside the range of 75-125%, but within the limits of 50-150%. Data points impacted by MS and/or MSD recoveries within this range were flagged as J or UJ; individual data validation memoranda address the potential for high or low bias to sample results based on matrix interferences.

Moisture content greater than 50% resulted in selected data points being qualified as estimated (J or UJ). Approximately 3.9% of the Caven Point Avenue and Pacific Avenue Roadways data set was qualified on the basis of low percent solids.

3.2.2.3 Representativeness

The representativeness of any field program is a function of the planning and procedures used to collect the samples and the locations and density of samples collected. Sampling and preservation methods were based on established methods and SOPs outlined in the soil RIWP (AECOM, 2011) and FSP-QAPP (AECOM, 2010), which are known to minimize error associated with the disturbance of environmental samples from their natural setting.

Factors to be considered in evaluating representativeness are the use of standard analytical procedures, sample preservation, and the use of the appropriate sample container. The analytical methods, preservation procedures, and containers used in this program were as specified in the FSP-QAPP (AECOM, 2010).

The moisture content of samples is also a factor in the representativeness of the data. In accordance with USEPA Region 2 validation guidance, samples containing more than 50% moisture were qualified as estimated. As noted previously, this requirement resulted in the qualification of 3.9% of the Caven Point Avenue and Pacific Avenue Roadways data set.

3.2.2.4 Comparability

Comparability of the data in the RI data set was maximized by using standard methods for sampling, analysis, and data validation.

3.2.2.5 Completeness

Completeness is the measure of the amount of valid data obtained from a measurement system; valid data are defined as those data judged to be usable (i.e., not rejected as a result of the validation process). For the Caven Point Avenue and Pacific Avenue Roadways data set, 1,145 individual data points were generated; none of the data was qualified as rejected (R) and unusable. However, 9% of the data (103 Cr⁺⁶ results) were qualified “RA” to indicate that, although QC exceedances were identified, the results may still have value for understanding site conditions. Since none of the data was qualified as R, 100% of the reported Caven Point Avenue and Pacific Avenue Roadways data set values generated for Cr⁺⁶ and CCPW metals is considered usable for project decisions with an understanding of the data quality issues identified during validation.

The Cr⁺⁶ values qualified as “RA” do not meet the required 50-150% soluble and insoluble matrix spike recovery limits due to sample matrices that do not appear to be capable of supporting Cr⁺⁶. Results qualified as “RA” can be used for information purposes with a full understanding of the limitations as described in the data validation report.

3.2.2.6 Sensitivity

Analytical dilutions were necessary for certain samples due to the sample matrix or elevated concentrations of target or non-target analytes. The detection limits reported by the laboratory were adjusted to reflect dilution factors. Limitations in analytical methodologies and/or low percent solids content for some soil samples can result in detection limits that exceed either the RDCSRS or Default Impact to Ground Water Soil Screening Levels (DIGWSSL).

3.2.3 Data Quality/Data Usability Conclusions

The findings of this Data Quality Assessment and Data Usability Evaluation indicate that the data used to demonstrate compliance with the RI objectives are sufficiently representative of actual conditions and may be used to support decisions with the exceptions identified below:

- Cr⁺⁶ results qualified “RA” due to matrix spike recoveries outside the range of 50-150% but having evidence of a reducing matrix may provide useful information for site decisions but should be used with an understanding of the data limitations.

Data qualifiers and reason codes were applied by the data validator to identify data limitations found in the validation process. Specific details regarding analytes and samples can be found in the individual data validation reports in **Appendix C**.

3.3 Nature and Extent of COCs in Site Soil

This section provides the results of delineation of COCs at the Site. The analytical results were compared to appropriate regulatory criteria and standards as described in **Section 3.1**, and the data included in this evaluation are as described in **Section 3.2**. Laboratory data packages and data validation reports are provided in **Appendix C**. **Tables 3-1** through **3-3** provide analytical summary tables of the data. Field Records are provided in **Appendix B**.

Figure 3-1 depicts the outcome of the RI at the Site, indicating where COC concentrations in soil exceed the CrSCC and SRS, as well as the extent of visually observed CCPW.

3.3.1 Visual Observations of CCPW

No CCPW material was visually observed within Caven Point Avenue and Pacific Avenue Roadways, including in the delineation borings or during test-pitting for the Site, as reported in the October 4, 2018 email entitled, “CAV-009: Caven Point Avenue & Pacific Avenue Delineation Data Package”, from Aimee Ruitter (AECOM) to the Stakeholders (AECOM, 2018e). Specifically, a test pit was conducted in Pacific Avenue to investigate “green staining” previously noted in the boring log for location 135-B13. The test pit was conducted with Weston Solutions, Inc. oversight and the “green staining” previously recorded at this location was confirmed to be mottled silts/sands. The approximate extent of CCPW visually observed during excavation in areas that abut the Site is depicted on **Figure 3-1**. The presence of CCPW does not extend into Caven Point Avenue and Pacific Avenue Roadways. Delineation of visually-observed CCPW is complete.

3.3.2 Hexavalent Chromium

Hexavalent chromium analytical results relative to the CrSCC are reported in **Table 3-1** and illustrated on **Figure 3-1**. The delineation results for Cr⁺⁶ were less than the applicable criterion. The delineation soil sampling most recently conducted to the southwest, south, and southeast of the ASM property in Caven Point Avenue and Pacific Avenue establishes the extent of Cr⁺⁶. Specifically, Cr⁺⁶ in soil at

concentrations greater than applicable criteria does not extend beyond the southwest, south, or southeast site boundaries of Caven Point Avenue and Pacific Avenue Roadways, as depicted in **Exhibit B-1A** of **Appendix D**. Delineation of Cr⁺⁶ in soil is complete.

3.3.3 CCPW Metals

The delineation of CCPW metals relative to the Site was presented in the SSRIR and concluded that only Sb required additional delineation. The delineation results for Sb presented herein were less than the applicable criteria. CCPW metals analytical results relative to the SRS are reported in **Table 3-2** and **Table 3-3** and illustrated on **Figure 3-1**. CCPW metals in soil at concentrations greater than applicable criteria do not extend beyond the southwest, south, or southeast site boundaries of Caven Point Avenue and Pacific Avenue Roadways, as depicted in **Exhibit B-1A** of **Appendix D**. Delineation of CCPW metals in soil is complete.

4.0 Receptor Evaluation Update

The purpose of a receptor evaluation (RE) is to document the existence of human or ecological receptors, and the actions taken to protect those receptors, at contaminated sites. Pursuant to N.J.A.C. 7:25E-1.12, REs must include general site information, an evaluation of surrounding land use, a description of contamination, a discussion of groundwater use in the area, an evaluation of vapor intrusion potential, and an ecological evaluation.

The *Receptor Evaluation Report, Rev. 3, Non-Residential Chromate Chemical Production Waste Sites 114, 132, 133, 135, 137, 143 and 186 Jersey City, New Jersey*, dated March 20, 2012, was submitted to the NJDEP on March 23, 2012 (AECOM, 2012). The Final GA Group RE/Ground Water RE/Baseline Ecological Evaluation Reports were submitted to the NJDEP on July 22, 2013. The updated RE form and required attachments are provided with this RIR/RAWP.

5.0 Soil Remedial Alternatives

5.1 Soil Remediation Standards/Criteria

PPG's responsibility to remediate soil impacts at the GA Group Sites (other than Site 114) includes CCPW impacts and non-CCPW impacts emanating from Site 114. CCPW impacts include the presence of CCPW and the presence of Cr⁺⁶ and CCPW metals in soil at concentrations exceeding applicable criteria.

According to former NJDEP Commissioner Jackson's February 8, 2007 *Chromium Moratorium Memorandum* (Chromium Policy) (NJDEP, 2007), the remediation standards for Cr⁺⁶ and Cr⁺³ are the CrSCC, which are 20 mg/kg for Cr⁺⁶ and 120,000 mg/kg for Cr⁺³, respectively. The soil remediation standards applicable to the remediation of CCPW-metals are the RDCSRS, the Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS), or the site-specific ARS established for V for the Garfield Avenue Group (i.e., the RDCSRS-GAG); and the DIGWSSL, or the site-specific Impact to Ground Water Soil Remediation Standards for the Garfield Avenue Group (IGWSRS-GAG), where applicable. The ARS for V was approved by the NJDEP on December 28, 2016 (NJDEP, 2016). The IGWSRS-GAG for Sb and Ni were developed and proposed in the SSRIR (AECOM, 2018b), which was approved by NJDEP on October 22, 2018 (NJDEP, 2018a).

The DIGWSSL and IGWSRS-GAGs are applicable only to unsaturated zone soil. The groundwater elevations (above which is the unsaturated zone) for Caven Point Avenue and Pacific Avenue were estimated as the 50th percentile groundwater elevation from six monitoring wells, three located on or adjacent to Caven Point Avenue and three located on Pacific Avenue; monitoring wells included in this evaluation were gauged between February 2007 and May 2018. The monitoring well locations and data are included in **Appendix A**. The estimated groundwater elevation for the Caven Point Avenue area is elevation (El.) 6.9 feet (ft) in the North American Vertical Datum of 1988 (NAVD88) and the estimated groundwater elevation for the Pacific Avenue area is 5.3 ft NAVD88.

As discussed in **Section 2.2**, for soil at Caven Point Avenue and Pacific Avenue Roadways, PPG is only responsible for CCPW and CCPW-related impacts and not for any other constituents exceeding NJDEP SRS that may be present at the Site (e.g., constituents of historic fill). This RAWP addresses only the soil impacts for which PPG is responsible. Remediation of impacts within Caven Point Avenue and Pacific Avenue Roadways that are not subject to the ACO and JCO are to be managed by the City's LSRP under the NJDEP LSRP program.

The NJDEP SRS or criteria relevant to the remediation at Caven Point Avenue and Pacific Avenue Roadways are presented in **Table 5-1**.

5.2 Evaluation of Impacts

5.2.1 Visual Observations of CCPW

No CCPW material was visually observed within Caven Point Avenue and Pacific Avenue Roadways.

5.2.2 Hexavalent Chromium

Hexavalent chromium analytical results relative to the CrSCC are reported in **Table 3-1** and illustrated on **Figure 3-1**. Hexavalent chromium in soil remains in place within Caven Point Avenue and Pacific

Avenue Roadways at concentrations greater than the CrSCC, as depicted in **Exhibit B-1A** and **Exhibit B-2A** of **Appendix D**.

5.2.3 CCPW Metals

CCPW metals analytical results relative to the SRS are reported in **Table 3-2** and illustrated on **Figure 3-1**. CCPW metals analytical results from the unsaturated soil zone compared to IGW soil screening levels and SRS are reported in **Table 3-3**. Except for Sb, CCPW metals are not present at concentrations greater than the applicable criteria in soil in Caven Point Avenue and Pacific Avenue Roadways. Sb in soil remains in place at concentrations greater than the RDCSRS, but less than the NRDCSRS, as depicted in **Exhibit B-1A** and **Exhibit B-2B** of **Appendix D**. Because the roadway is a non-residential area, the remedy for Sb in soil at concentrations greater than the RDCSRS (but less than the NRDCSRS) is institutional controls. Compliance averaging is an acceptable approach to achieve compliance with the RDCSRS for antimony in soil at the Site.

5.3 Soil Remedial Alternatives Evaluation

RAs were identified and evaluated for the remediation of Caven Point Avenue and Pacific Avenue Roadways based on: (1) protectiveness of human health and the environment; and (2) impact on community residents and businesses. The RAs evaluated are:

- RA 1: Remedial Excavation; and
- RA 2: Asphalt Capping.

Based on an evaluation of the alternatives, the recommended RA is:

- RA 2: Asphalt Capping.

This RA requires institutional controls (Notice in Lieu of Deed Notice [NILODN] and implementation of the measures in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol).

A brief description of the evaluated RAs, including the one selected, is provided below.

5.4 RA 1: Remedial Excavation

5.4.1 Description

RA 1 is remedial excavation and disposal of CCPW-impacted soil in accordance with the Chromium Policy and the *Updated Method to Determine Compliance with the Department's Chromium Policy, Garfield Avenue – Sites 114, 132, 133, 135, 137, and 143, Jersey City, NJ* (NJDEP, 2013a), and backfilling with dense-graded aggregate (DGA). RA 1 includes excavation to no deeper than 20 feet below ground surface (bgs) in Caven Point Avenue and Pacific Avenue Roadways, where Cr⁺⁶ is present at concentrations greater than the CrSCC.

5.4.2 Protectiveness

RA 1 is presented in the GA Group RAWP, which was approved by the NJDEP on November 9, 2018 (NJDEP, 2018b). Excavation and disposal of CCPW-impacted soil is a proven remedial approach that prevents direct contact with, ingestion of, and inhalation of Cr⁺⁶ and CCPW metals.

5.4.3 Community Impact

RA 1 would require full closure of the Caven Point Avenue and Pacific Avenue roadways within the Site. Caven Point Avenue and Pacific Avenue are frequently traveled urban roadways and Jersey City vehicular and pedestrian traffic would be negatively impacted by road closures that would be required for this significant remedial excavation. In addition, utilities within the street service portions of Jersey City cannot be easily taken out of service to remove the soil with Cr⁺⁶ concentrations greater than the CrSCC.

5.4.4 Conclusion

RA 1 is not recommended due to the significant community impact.

5.5 RA 2: Asphalt Capping

5.5.1 Description

RA 2 is the designation of the roadways' existing paved asphalt surface as an engineered cap.

Since RA 2 is a restricted-use remedy, a corresponding institutional control (i.e., a NILODN documenting the CCPW-related impacts remaining) will be implemented.

RA 2 will include implementation of the measures in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol, which will include:

- A procedure for excavation and removal of CCPW-impacted soil by PPG whenever normal operating repairs or replacement of utilities require removal of the CCPW-impacted soil; and
- A procedure for ensuring worker safety, notifying NJDEP, and disposing of excavated CCPW-impacted soil in the event of an emergency repair.

5.5.2 Protectiveness

Engineered capping combined with a corresponding institutional control is a well-accepted and effective remedial approach for preventing direct contact with, ingestion of, and inhalation of soil contamination. Since the Site is anticipated to remain as roadways for the foreseeable future, there is minimal risk of direct contact with, ingestion of, or inhalation of CCPW impacts.

The measures described in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol, will be protective of utility worker safety. RA 2 relies solely on the procedures required by the Sewer Protocol to protect utility workers and, therefore, is less protective than RA 1, particularly in the event of emergency repairs; however, utilization of the roadways' paved surface as an engineering control is presented in the Sewer Protocol as the presumptive remedy for CCPW-impacted soil beneath a public street or highway.

5.5.3 Community Impact

RA 2 has no negative impact on the community, since the roadways' existing paved surface remains in place.

5.5.4 Conclusion

RA 2 is recommended for the Site, since it is protective of human health and the environment and has no community impact.

6.0 Selected Remedial Action

This section presents the selected remedial action for the Caven Point Avenue and Pacific Avenue Roadways.

6.1 Remedial Action

The selected remedial action for Caven Point Avenue and Pacific Avenue Roadways includes engineering controls (existing asphalt cap) and institutional controls (NILODN and implementation of the measures described in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol).

The existing asphalt roadway surface will serve as an engineering control (existing asphalt cap) to restrict access to soil with CCPW-related impacts. A diagram of the engineering control is presented in **Exhibit B-1B** of **Appendix D**. PPG will monitor the existing asphalt cap to confirm the protectiveness of the remedy, in accordance with the requirements of the remedial action permit. PPG will not be responsible for repairing or maintaining the asphalt roadway surface, as maintaining the roadway is currently the responsibility of the City. PPG will inform the City when maintenance of the asphalt cap is required. CCPW-related impacts in Caven Point Avenue and Pacific Avenue Roadways will be documented in a NILODN. A draft NILODN is provided in **Appendix D**.

Although Caven Point Avenue and Pacific Avenue Roadways is not specifically listed as a sewer site per the September 7, 2011 *Consent Judgment* (2011 Consent Judgment) (Superior Court of New Jersey, Chancery Division – Hudson County, 2011), CCPW-related impacts in Caven Point Avenue and Pacific Avenue Roadways will be addressed through implementation of the measures described in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol as defined in the 2011 Consent Judgment. The Sewer Protocol, authored in 2011, is part of the Orphan Chromium Site Agreement between NJDEP, PPG, Honeywell, and Tierra Solutions. The Sewer Protocol addresses the remedial approach to be implemented when impacted soil is rendered inaccessible due to its proximity to infrastructure such as sewer lines. A copy of the final Utility Work Coordination Manual will be included as part of the final NILODN upon filing. Utility workers will follow the final Utility Work Coordination Manual when they have to repair or otherwise maintain pipelines and any associated equipment that has been constructed in areas where chromium-contaminated soil or CCPW is located. The manual will help protect utility workers who may encounter chromium-contaminated soil, CCPW, or fill during the course of their work. The manual will address sewer repair or replacement performed either as part of planned maintenance work or required as a result of an emergency situation.

6.2 Capillary Break Evaluation

Based on the presence of soil with Cr⁺⁶ concentrations greater than 20 mg/kg within portions of Caven Point Avenue and Pacific Avenue Roadways, and based on the criteria established as part of the *Capillary Break Design Final Report (Revision 2)* (AECOM, 2017b), a capillary break is required along a portion of Caven Point Avenue and Pacific Avenue Roadways.

Evaluation of groundwater conditions suggests that there may be low-level CCPW-related impacts to shallow groundwater in the area of the Site. The groundwater remedial investigation is ongoing and issuance of the final Groundwater Remedial Investigation Report for the GA Group Sites is anticipated

in December 2020. No chromium blooming or chromium staining has been observed within Caven Point Avenue and Pacific Avenue Roadways.

The requirement for a capillary break will be satisfied through the monitoring of the existing soil engineering control (existing asphalt cap). The roadways' asphalt surfaces and sidewalks will continue to be monitored for chromium blooming as part of the monitoring of the soil engineering control (existing asphalt cap). The area subject to monitoring for chromium blooming is depicted in **Figure 6-1**. If chromium blooming is confirmed as a result of monitoring events, additional remedial measures (to be determined in the future) will be implemented.

7.0 Schedule

The Caven Point Avenue and Pacific Avenue Roadways proposed remedial action is anticipated to be conducted in accordance with the March 5, 2020 Master Schedule for the NJ PPG Chrome Remediation Sites, Exhibit 2/3 (Riccio, 2020). This remedial action, which consists of designation of the existing asphalt roadways as an engineered cap and issuance of a NILODN, will be documented in a forthcoming Caven Point Avenue and Pacific Avenue Roadways RAR. The Master Schedule milestone “RAR Determination by NJDEP” for the Caven Point Avenue and Pacific Avenue Roadways RAR is June 2021. Following NJDEP approval of the RAR, the NILODN will be filed and a corresponding Remedial Action Permit (RAP) will be applied for. Upon issuance of the RAP by NJDEP, PPG will request that NJDEP issue a Consent Judgment Compliance Letter for Caven Point Avenue and Pacific Avenue Roadways.

8.0 Conclusions and Recommendations

8.1 Remedial Investigation

Based on the results presented herein, CCPW-related impacts (i.e., visible CCPW, Cr⁺⁶, and CCPW metals) have been delineated with respect to Caven Point Avenue and Pacific Avenue Roadways. The Cr⁺⁶ delineation limit is depicted in **Exhibit B-1A** of **Appendix D**. No further soil RI work is recommended.

8.2 Remedial Action

The selected remedial action for Caven Point Avenue and Pacific Avenue Roadways includes engineering controls (existing asphalt cap) and institutional controls (NILODN and implementation of the measures in the forthcoming Utility Work Coordination Manual, to be developed in accordance with the Sewer Protocol).

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