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Remedial Investigation Report Groundwater Area of Concern (AOC 2) Final

Hudson County Chromate Site 156
Metropolis Towers
270-280 Luis Munoz Marin Boulevard
Jersey City, New Jersey
NJDEP Program Interest Number: G000008770
Case Tracking Number: 104063

Document No. 156-017

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List of Acronyms

ACO	Administrative Consent Order
AOC	Area of Concern
amsl	above mean sea level
ARS	Alternative Remediation Standards
bgs	below ground surface
CCPW	Chromate Chemical Production Waste
CID	Case Inventory Document
CEC	Civil & Environmental Consultants, Inc.
COPR	Chromite Ore Processing Residue
Cr	total chromium
Cr^{+3}	trivalent chromium
Cr^{+6}	hexavalent chromium
CrSCC	Chromium Soil Cleanup Criteria
CY	cubic yards
DIGWSSL	Default Impact to Groundwater Soil Screening Levels
FSPM	Field Sampling Procedures Manual
FSP/QAPP	Field Sampling Plan – Quality Assurance Project Plan
ft	feet
GWQS	Ground Water Quality Standard
HCC	Hudson County Chromate
HUD	Housing and Urban Development
ICP-ES	Inductively Coupled Plasma Emission Spectrometry
ICP-MS	Inductively Coupled Plasma Mass Spectroscopy
IGWSRS	Impact to Groundwater Soil Remediation Standards
IRM	Interim Remedial Measure
JCO	Judicial Consent Order
MDL	method detection limit
mg/kg	milligrams per kilogram
MS	matrix spike
NAVD 88	North American Vertical Datum of 1988
Ni	nickel
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
No.	number
PATH	Port Authority Trans-Hudson
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RA	remedial action
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan
RDCSRS	Residential Direct Contact Soil Remediation Standards
RI	remedial investigation
RIR	Remedial Investigation Report
RL	reporting limit

Sb	antimony
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SRP	Site Remediation Program
SRP-PI	Site Remediation Program – Program Interest
SRRA	Site Remediation Reform Act
Tl	thallium
TRSR	Technical Requirements for Site Remediation
µg/L	micrograms per liter
U.S.	United States
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
V	vanadium

List of Definitions

The following definitions apply solely to this document.

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	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 (Cr), as measured in soil or groundwater, is the sum of Cr^{+3} and Cr^{+6}.
COPR	Chromite Ore Processing Residue is a specific type of CCPW generally characterized as a reddish brown, coarse to fine gravel with varying amounts of sand and silt particles. The gravel portion of the matrix is typically defined as nodules from the chromium manufacturing process that range in size from 3/4- to 1/8-inch in diameter. However, nodules have been infrequently detected at diameters of over an inch. Different sized nodules may be found cemented together to form larger clusters. The matrix of these clusters may consist of cement-like silt. These nodules can be easily disintegrated with a hammer. Occasionally, when detected in the saturated zone, COPR nodules may appear as a fine-grained material that has been weathered. The permeability of this material is variable. The inner matrix of COPR nodules typically contains higher concentrations of Cr^{+6} than the surface of the nodules but lower concentrations than Green-Gray Mud. The typical approximate range of Cr^{+6} concentrations in COPR is between 300 and 5,000 milligrams per kilogram (mg/kg).
Groundwater	The supply of fresh water found beneath the Earth's surface, which can be extracted by wells or through natural springs.
IRM	Interim Remedial Measure. Remedial action taken at a contaminated site to reduce the potential for human health or environmental exposure to contaminants at a site before a remedial investigation is complete.
Meadow Mat	A naturally occurring organic estuarine deposit located at approximately 13 to 20 feet below the ground surface, pre-excavation.

List of Definitions (Continued)

RAR	Remedial Action Report. A report documenting how a responsible party remediated a contaminated site or area of concern.
Remediation	Actions to reduce, isolate, or remove contamination with the goal of protecting human health and the environment.
RIR	Remedial Investigation Report. A report documenting the findings and recommendations from a remedial investigation of a contaminated site or area of concern.
Site Administrator	Under the terms of an agreement among PPG, the New Jersey Department of Environmental Protection and the City of Jersey, this court-appointed individual is responsible for: • Developing a master schedule; • Resolving issues that might arise; • Obtaining technical expertise required for the review of PPG's submittals; and • Maintaining regular communications with community representatives.
Soil	All solid earthen material (other than CCPW). Exceptions to this definition are specifically noted in the text.

1.0 Introduction

This Remedial Investigation Report (RIR) was prepared by AECOM on behalf of PPG to present the results of the Remedial Investigation (RI) for the Groundwater Area of Concern (AOC) 2 at Hudson County Chromate (HCC) Site 156, Metropolis Towers (the Site), located at 270-280 Luis Munoz Marin Boulevard, Jersey City, Hudson County, New Jersey (**Figure 1**). The groundwater RI activities for AOC 2 were completed between April 2016 and December 2017 to document the groundwater quality in areas where soil remediation activities had been completed. Remedial action (RA) activities for the soil at the Site (AOC 1) that were implemented from March 2013 through May 2014 and from September 2017 through November 2017, pursuant to the previously approved *Remedial Action Work Plan* (RAWP) (Civil & Environmental Consultants, Inc. [CEC], 2012), are documented in the March 2018 *Remedial Action Report – Soil Area of Concern (AOC 1), Revision 1* (AECOM, 2018a).

The Site is bounded to the north by Christopher Columbus Drive, to the south by Montgomery Street, to the east by Warren Street, and to the west by Luis Munoz Marin Boulevard. The Site occupies tax parcels Block 13101 Lots 1 and 2. The New Jersey Department of Environmental Protection (NJDEP) Site Remediation Program, Program Interest (SRP-PI) Number for Site 156 is G000008770.

In 1990, PPG and the NJDEP entered into an Administrative Consent Order (ACO) to investigate and remediate locations where Chromate Chemical Production Waste (CCPW) or CCPW-impacted materials related to former PPG operations may be present. On June 26, 2009, NJDEP, PPG, and the City of Jersey City entered into a Judicial Consent Order (JCO) (Superior Court of New Jersey Law Division – Hudson County, 2009) with the purpose of remediating the soils and sources of contamination at these HCC Sites as expeditiously as possible. The goal of the JCO is to complete the investigation and remediation of the PPG Sites in accordance with a judicially enforceable master schedule. Priority for the remedial activities will be given to residential locations where CCPW and CCPW-related contamination is present. The provisions of the original ACO remain in effect with the JCO taking precedence where conflicts exist between the two documents.

This RIR addresses investigation of only hexavalent chromium (Cr^{+6}) and CCPW-related constituents. PPG is not legally responsible for the investigation or remediation of other constituents that may be present at the Site. The Site 156 property owners were notified when impacts other than Cr^{+6} and CCPW-related constituents were encountered during investigation activities at the property.

1.1 Remedial Investigation Report Requirements

This RIR was prepared in accordance with the following requirements and guidance:

- New Jersey Administrative Code Chapter 26C, *Administrative Requirements for the Remediation of Contaminated Sites*, New Jersey Administrative Code (N.J.A.C.) 7:26C, last amended on May 4, 2015 (NJDEP, 2009);
- NJDEP *Technical Requirements for Site Remediation* (TRSR), N.J.A.C. 7:26E- 5.7 (May 7, 2012) (NJDEP, 2012a);
- NJDEP *Ground Water Quality Standards* (GWQS), N.J.A.C. 7:9C (last amended on July 22, 2010, readopted March 4, 2014, updated January 2018) (NJDEP, 2010);

- NJDEP *Well Construction and Maintenance; Sealing of Abandoned Wells*, N.J.A.C. 7:9D (January 31, 2014, updated January 2018) (NJDEP, 2014a);
- Appendix G of the July 19, 1990 NJDEP *Administrative Consent Order (ACO)* (NJDEP, 1990);
- June 26, 2009 *Partial Consent Judgment (JCO) Concerning the PPG Sites* (Superior Court of New Jersey Law Division – Hudson County, 2009);
- NJDEP *Site Remediation Program Ground Water Technical Guidance: Site Investigation Remedial Investigation Remedial Action Performance Monitoring* (April 3, 2012) (NJDEP, 2012b);
- NJDEP *Field Sampling Procedures Manual* (August 2005, last updated April 11, 2011) (NJDEP, 2005);
- *Field Sampling Plan / Quality Assurance Project Plan* (FSP/QAPP) (AECOM, 2010);
- *Program Health and Safety Plan, Rev. 1, PPG Industries, Inc., Hudson County Chromium Sites, Jersey City, New Jersey*. February 2014, (AECOM, 2014).

1.2 Remediation Standards

The groundwater sampling results that are the subject of this RIR are compared to the applicable NJDEP GWQS listed below. Currently, there is no GWQS for Cr^{+6}.

Ground Water Quality Standards for CCPW Metals

Contaminant	GWQS (µg/L)
Antimony (Sb)	6
Total Chromium (Cr)	70
Nickel (Ni)	100
Thallium (Tl)	2
Vanadium (V)	60

Notes:
CCPW – Chromate Chemical Production Waste
GWQS – Ground Water Quality Standard
µg/L – micrograms per liter

1.3 Site Remediation Program Documentation

The required NJDEP Site Remediation Program (SRP)/Site Remediation Reform Act (SRRA) forms are provided in **Appendix A**, including the Cover/Certification Form, Case Inventory Document (CID), and an updated Receptor Evaluation Form. The NJDEP RIR forms are only available online and cannot be prepared for this submittal because the RI activities at this Site are under NJDEP direct oversight.

NJDEP correspondence for the Site is provided in **Appendix B**. Previous Site reports are provided in **Appendix C**. The *Field Sampling Plan/Quality Assurance Project Plan* (FSP/QAPP) (AECOM, 2010) and

Program Health and Safety Plan, Rev. 1, PPG Industries, Inc., Hudson County Chromium Sites, Jersey City, New Jersey (AECOM, 2014) are provided in **Appendix D**.

The CID summarizes the presence of three AOCs in connection with the Site:

- AOC 1 – CCPW Impacts to Soil (Beyond AOC 3 Footprint)
- AOC 2 - CCPW Impacts to Groundwater (Site-wide)
- AOC 3 – CCPW Impacts to Building No. 2 Boiler Room – Concrete and Soils

This RIR addresses AOC 2 - CCPW Impacts to Groundwater (Site-wide) only. The remaining AOCs will be addressed by PPG in separate submittals to the NJDEP.

2.0 Background Information

This section provides a review of Site background information including a description of the physical setting, geology, hydrogeology, the receptor evaluation update, an overview of the Site AOCs, and a description of previous soil removal actions.

2.1 General Site History

Site 156 encompasses the Metropolis Towers property (also referred to as Gregory Park Apartments), which occupies approximately 8.6 acres (see **Figure 1**). The property consists of two 20-story, multi-unit residential buildings (Buildings 1 and 2). Most of the area surrounding the buildings is paved and is used as parking for property residents. A small percentage of the property consists of green space. The buildings were constructed between 1961 and 1967 with aid from Federal grants issued by the United States (U.S.) Department of Housing and Urban Development (HUD). The buildings are constructed of reinforced concrete and are supported by driven piles.

Historically, a two-story building known as the Central Building was located between Buildings 1 and 2. An in-ground swimming pool was located on the second floor of the Central Building. The building was demolished in 2006, but pilings and grade beams from the building were still present at the Site prior to the remedial action in AOC 1 (soil excavation).

A review of historical Sanborn maps indicates that between the late 1800's and 1950, Site 156 was occupied by several industries including National Iron Works, a filling station, a painting contractor, a chemical warehouse, auto truck parking, a motor freight station, a machine shop, and a furniture manufacturer. Aerial photographs from 1951 depict various commercial, light industrial, and row-style housing buildings at Site 156.

In 1990, the NJDEP notified PPG that Mr. Claude Perretti issued a statement noting that approximately 9,000 cubic yards (CY) of CCPW was used as backfill at the Site in 1961. The exact location of where the material was placed was not known. Several soil removal activities have taken place at the Site since 1961. In 1976 or 1977, a total of 5,200 to 6,800 cubic yards of soil was excavated from the north and south parking lots of Building 1. There is no indication that this excavation was conducted for RA purposes. An unknown volume of soil was excavated from the northeast corner of Building 1 in response to a leak from an aboveground heating oil tank in 1986-1987 and again in 1987 as part of the Port Authority Trans-Hudson (PATH) ventilation duct remodeling activity (CEC, 2012).

2.2 Surrounding Land Use

The surrounding land use is a mix of residential and commercial properties. The City Hall of Jersey City is located to the west of the apartment complex and across Luis Munoz Marin Boulevard. Several office towers, as well as several public schools and churches are located nearby. The PATH Grove Street Station is located across Christopher Columbus Drive (formerly Railroad Avenue) and a PATH subway tunnel runs beneath Christopher Columbus Drive along the northern edge of the Site. A ventilator shaft for the PATH tunnel lies adjacent to the Site at the corner of Christopher Columbus Drive and Warren Street.

2.3 Local and Regional Geology

2.3.1 Topography

The project area has little topographic relief, with ground surface elevations generally ranging from approximately 4 to 8 feet (ft) above mean sea level (amsl) using the North American Vertical Datum of 1988 (NAVD 88). Storm water runoff is channeled into the municipal storm sewer system. **Figure 1** shows the regional topography near the Site on a United States Geological Survey (USGS) Topographic Map.

2.3.2 Regional Geology

The Site lies within the physiographic province of the Piedmont Plain, which is characterized by low ridges trending in the northeasterly direction. The area is underlain by formations of Recent, Pleistocene, and Triassic ages. The bedrock at the Site belongs to the Newark Basin, which is the most northerly of the three basins known as the Newark Supergroup. The Newark Supergroup is comprised of rock from the Upper Triassic and Jurassic ages and lies along an arcuate belt stretching from southern New York to central Virginia.

The Newark Supergroup is divided into three formations on the basis of lithology: (1) the lower unit - the Stockton Formation, (2) the middle unit – the Lockatong Formation, and (3) the upper unit - the Passaic Formation. Site 156 is underlain primary by the Stockton Formation; however, a gradational contact and/or interfingering with the Lockatong Formation may exist at the Site. The Stockton Formation consists of gray to reddish brown sandstone, interbedded with conglomerate, siltstone, and shale that dips gently toward the west. This formation may be found at depths greater than 40 ft and has a thickness of approximately 850 ft beneath the Site.

The sediments overlying the Newark Supergroup in this area are usually Pleistocene glacial drift deposits. The Pleistocene glacial drift deposits exist as stratified and unstratified sediments ranging from silty clay to sands and gravels. Preglacial Lakes Hackensack and Hudson, which existed to the north of the Site, may have contributed outwash deposits to this area as drainage of these lakes occurred.

Recent alluvial deposits consist of unconsolidated mud and silt, with peat and other organic material, and occasional sand and gravel lenses. Streams have deposited alluvial sediments either directly on the Stockton Formation or on top of the Pleistocene-age glacial sediments. These deposits have resulted in the creation of the meadowlands tidal marshes. A peat layer called meadow mat is frequently associated with the tidal marsh deposits of silty clay. These marsh areas have been dewatered and backfilled in many areas of Jersey City, resulting in a surface layer of fill material overlying the meadow mat unit (first natural deposit).

2.3.3 Project Area Geology

The Project Area is located on fill material that was placed on top of the salt marsh and estuarine native soils for the expansion of Jersey City. A thick sequence of unconsolidated natural material underlies the fill. The major geologic units at the Site from top to bottom include:

- A non-native fill layer (the shallow zone);
- Native soils consisting of sand, silty sand, and clays generally separated from the fill by organic sediments or meadow mat (the intermediate zone);
- Till, directly above the bedrock, consisting of glacial drift deposits that exist as stratified and unstratified sediments ranging from silty clay to sands and gravels; and,

- Bedrock of the Stockton Formation and possibly Lockatong Formation.

2.3.4 Project Area Overburden

Shallow soils (consisting of fill material) in the vicinity of the Site generally extend from the ground surface to between 11 and 18 ft below ground surface (bgs). At Site 156, the deepest soil borings, which were previously advanced at the Site for investigation purposes, extended to 80.3 ft bgs. Bedrock beneath the Site was encountered between 47 and 55.5 ft bgs, with one notable exception where bedrock was encountered at 37.5 ft bgs in a historical boring, LB-23, located near the boundary of the property along Columbus Drive (Langan, 2004). Meadow mat was encountered during pre-design investigations between 11.8 and 15.3 ft bgs.

2.4 Local and Regional Hydrogeology

Regionally, groundwater occurs in four hydrostratigraphic zones:

- The shallow fill zone (shallow water-bearing unit);
- The intermediate sand and silty sand zone (intermediate water-bearing zone);
- The deep sand, till, and gravel lenses (deep water-bearing zone); and
- Bedrock of the Stockton and Lockatong Formations.

2.4.1 Regional Groundwater in Fill Deposits

Groundwater in the fill is typically encountered between 5 to 10 ft bgs. In general, shallow groundwater flow patterns represent a subdued version of land surface topography. Variations from this can be attributed to factors such as heterogeneities in the fill, subsurface structures, and spatially variable recharge due to the presence of impervious surfaces.

2.4.2 Regional Groundwater in Native Unconsolidated Deposits

While there are some more permeable zones of sand and gravel in the intermediate zone, the aquifer below the meadow mat can be characterized as low to moderately permeable because of the high silt content. Observations of clay also support the presence of lower permeability below the meadow mat.

Groundwater flow in the deep zone glacial deposits and alluvium is controlled by primary permeability or flow through the interconnected pore spaces in the soil matrix. Groundwater moves most readily through the glacial deposits. Conceptually, in this stratum, groundwater flows horizontally but is influenced strongly by local recharge and discharge zones (i.e., drainage divides and surface water bodies, respectively).

2.4.3 Regional Groundwater in Stockton and Lockatong Formations (Bedrock)

Regionally, the unconsolidated native deposits and bedrock are considered part of an aquifer system serving most of the industrialized sections of northern New Jersey. Hydrogeologic properties of the Stockton and Lockatong Formations are not well documented, but are expected to be similar to the Passaic Formation. Hydraulic conductivity within the rock matrix is virtually nonexistent. Hydraulic conductivity is due to the presence of secondary features such as fractures and joints. The thickness of water-bearing zones is limited to fractures or fracture sets ranging from a few inches up to several feet thick. Groundwater occurrence and flow is controlled by major bedding plane partings and/or intensely fractured seams. Near-vertical fractures are also present but are considered minor flow paths. Groundwater flow within the bedrock is generally anisotropic, with preferential flow to the northeast or southwest along the strike of the beds. Well

yields range from several gallons to several hundred gallons per minute, with yields generally decreasing with depth. Groundwater within the bedrock occurs under both unconfined and confined conditions.

2.4.4 Project Area Hydrogeology

The shallow water-bearing zone includes groundwater present in fill material, from the water table to the top of the meadow mat (typically between 11.8 and 19.5 ft bgs). Five groundwater monitoring wells were installed at the Site during the 1993 RI, completed by ICF Kaiser. Additional wells were installed during subsequent RIs, There are currently nine active monitoring wells located on the Site. Data from these wells indicate that the water table is between approximately 3.5 and 7 ft bgs across the Site. Groundwater flow at the Site has historically been observed to be the southwest. During the 2017 monitoring events, a groundwater elevation high was present in the center of the Site resulting in northwesterly and northeasterly groundwater flow components on the northwestern and northeastern portions of the Site.

2.5 Surface Water and Wetlands

2.5.1 Wetlands

There are no wetlands on or adjacent to Site 156.

2.5.2 Surface Water

There are no surface water bodies on or adjacent to Site 156. Major water bodies in the vicinity of the Site include the Hudson River, located approximately 2,000 ft to the east of the Site, and the Morris Canal Basin of the Upper New York Bay, located approximately 2,000 ft to the south of the Site. There are no open water bodies on the Site. Most of Site 156 is improved with impervious pavement. Therefore, surface drainage at the Site is directed into the City of Jersey City's combined sewer overflow system. During precipitation periods, some runoff water may seep into the ground via infiltration through the limited vegetated areas and through cracks in the pavement at the Site.

2.6 Receptor Evaluation Update

The purpose of a receptor evaluation 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, receptor evaluations 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.

PPG submitted an Initial Receptor Evaluation Form for Site 156 in August 2011. An updated Receptor Evaluation Form was included in the January 2016 *Remedial Investigation Report/Remedial Action Work Plan, Building Number (No.) 2 – Boiler Room Subslab Soil and Interior Concrete Surfaces (AOC 3), Revision 2* (AECOM, 2016a). An updated Receptor Evaluation Form is provided with this RIR (**Appendix A**).

2.6.1 Land Use

The updated receptor evaluation identifies the current land uses at the Site and at properties within 200 feet of the property boundary. Residences are located on the Site. Within 200 feet of the Site property boundary, residences and one child care center are located off Site. Current Site uses are residential and commercial. Future development plans for the Site include construction of a Whole Foods store and other residential and commercial structures, but no specific plans have been provided to PPG. Contaminated soil is not accessible to the general public because of the presence of asphalt, concrete, and buildings, which cover

the ground surface over the majority of the Site. Soil and concrete impacts in the Building No. 2 basement were remediated by interim remedial measures and by implementation of a RA in the fall of 2017. Implementation of the RA for the Building No. 2 basement will be documented in a Remedial Action Report (RAR).

2.6.2 Groundwater

Total Cr was detected in groundwater at concentrations exceeding the GWQS at one well, in 2016. The soil remediation for AOC 1 at the Site that was conducted in September 2017 removed soil in the area surrounding the impacted well. Well abandonment, installation of a new shallow well and an intermediate well, and groundwater sampling was conducted in the fall of 2017. Documentation of the recent groundwater sampling is presented in **Section 4** of this RIR.

A 1-mile well search was conducted on June 10, 2018. A permit for one public non-community well was identified in the well search. The location is shown in Attachment B-1 of **Appendix A**. The public non-community well is located approximately 1,300 feet north of the Site. The current status of the public non-community well is not known. One industrial well was identified within one half mile of the Site. The well is located approximately 1,100 feet southeast of the Site. Both wells are expected to be bedrock wells based on their 200-foot depth. The City of Jersey City is serviced by public water supply.

2.6.3 Vapor Intrusion

There are no Vapor Intrusion Ground Water Screening Levels for Cr^{+6} or the CCPW metals that would trigger a vapor intrusion evaluation. A receptor evaluation for vapor intrusion is not required for Cr^{+6} and CCPW metals.

2.6.4 Ecological

As part of the receptor evaluation, an ecological receptor evaluation for Site 156 was conducted in accordance with the NJDEP requirements in N.J.A.C. 7:26E-1.16 for areas contaminated with, or by, CCPW. The evaluation was qualitative in nature and was used to determine whether further ecological investigation is required. Further evaluation of ecological receptors is required only if the following conditions exist:

- Contaminants of ecological concern exist on site;
- An environmentally sensitive area exists on or immediately adjacent to the site; and,
- Potential contaminant migration pathways to an environmentally sensitive area exist, or an impact to an environmentally sensitive area is indicated based on visual observation.

Contaminants of ecological concern associated with chromate waste at Site 156 can include Cr^{+6}, other metals, and elevated pH. Environmentally sensitive areas do not exist on or immediately adjacent to this Site, except for groundwater. Contaminant migration pathways to an environmentally sensitive area do not exist based on visual observations of the Site, except for migration of CCPW contaminants to groundwater. As documented in this RIR, Cr^{+6} and CCPW metals contamination has been remediated in soil and groundwater. Because all three conditions have not been met, no further ecological investigations are required for Site 156.

3.0 Summary of Remedial Investigations Prior to 2016

This section provides a summary of the findings and recommendations from the groundwater investigations conducted prior to 2016. The following reports were prepared for AOC 2, beginning with the report on initial environmental activities that started in 1990:

- *Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site* (ICF Kaiser, 1993);
- *Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site* (IT Corporation, 2001);
- *Remedial Action Work Plan, Metropolis Towers Site – Site 156 (Formerly Gregory Park Apartments) 270-280 Luis Munoz Marin Boulevard, Jersey City, New Jersey* (Civil & Environmental Consultants, Inc. [CEC], 2006);

A brief summary of each report is provided below. The documents are provided in **Appendix C**.

3.1 Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site (ICF Kaiser, 1993)

The 1993 RI was conducted by ICF Kaiser on behalf of PPG. Hydrogeological and groundwater quality data were collected to determine whether the groundwater was impacted by COPR. The groundwater investigation included the installation of five monitoring wells, permeability testing, and two rounds of groundwater sampling.

Two rounds of groundwater samples were collected (January 10, 1993 and July 19, 1993) from five monitoring wells (MW-1, MW-2, MW-3, MW-4, and MW-5) shown on **Figure 3**. At the main COPR source area where COPR deposits are thickest (MW-2), Cr and Cr^{+6} were detected in the unfiltered samples at concentrations of up to 1,630 µg/L and 476 µg/L, respectively. Downgradient of this source area to the south, at monitoring wells MW-3 and MW-4, Cr concentrations were less than 6 µg/L and Cr^{+6} was not detected at concentrations exceeding the detection limit of 25 µg/L in the samples. Downgradient of the main COPR area to the north, at MW-1, Cr concentrations ranged from 24.6 µg/L to 89.8 µg/L, and Cr^{+6} was not detected at concentrations exceeding the detection limit of 25 µg/L. Based on this data and the Site hydrogeology, the area where groundwater Cr^{+6} concentrations exceed 100 µg/L was limited to the central area of the Site. Antimony was not detected during either sampling round at concentrations greater than the method detection limit; however, the detection limits were higher than the GWQS. Nickel was not detected during either sampling round at concentrations greater than the current GWQS of 100 µg/L and the detection limits were less than the GWQS. Thallium was not detected in the unfiltered samples during either round in 1993; however, the detection limits were 3.0 µg/L, 3.4 µg/L, and, in one instance, 15 µg/L (MW-4), which are greater than the current GWQS of 2 µg/L. Vanadium was detected at concentrations exceeding the current GWQS of 6 µg/L in both sampling rounds (the maximum concentration detected was 469 µg/L in MW-2 on July 20, 1993).

3.2 Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site (IT Corporation, 2001)

The 2001 RIR was prepared by IT Corporation on behalf of PPG. This RIR ultimately incorporated the soil and groundwater data presented in the 1993 RIR (ICF Kaiser, 1993). The 2001 RIR (IT Corporation, 2001) supersedes the ICF Kaiser 1993 RIR. No additional groundwater investigation results were included in the 2001 RIR.

3.3 Remedial Action Work Plan, Metropolis Towers Site – Site 156 (Formerly Gregory Park Apartments) 270-280 Luis Munoz Marin Boulevard, Jersey City, New Jersey (CEC, 2006)

The 2006 RAWP was prepared by CEC on behalf of PPG to address remediation of COPR and chromium-impacted soil at Site 156. Re-sampling of the five RI monitoring wells was conducted as part of this RAWP investigation. The depth to groundwater was measured in each monitoring well using a groundwater interface probe and groundwater was sampled from the five RI monitoring wells using low-flow purge protocols. A single RI well (PPG1-MW2) was found to have Cr results that exceeded the GWQS of 70 µg/l.

4.0 Technical Overview

This section provides a technical overview of the 2016 and 2017 RI activities for groundwater (AOC 2) and includes a description of the procedures and methods employed to characterize the groundwater conditions following soil remediation.

A summary of monitoring well details is provided in **Table 1**. Well gauging results are provided in **Table 2**. A tabulation of sample results for Cr^{+6} and for CCPW metals in groundwater is provided in **Table 3**, which includes data for the two rounds of groundwater samples collected from monitoring wells 156-MW8A and 156-MW8B in 2016 and 2017. Monitoring well locations are presented in **Figure 3**. The sampling records including the boring logs, well decommissioning documents, monitoring well form As, monitoring well form Bs, well records, well permits, and groundwater sampling logs are provided in **Appendix E**. Investigation-derived waste documentation is provided in **Appendix F**. Laboratory data packages and data validation reports are provided in **Appendix G** and **Appendix H**, respectively. The electronic data deliverables are provided in **Appendix I**. The 2016 groundwater investigation was previously documented in the *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation - Groundwater Sampling Preliminary Data Summary* (AECOM, 2016b) (included in **Appendix C**). The 2016 and 2017 groundwater investigation was previously documented in the *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation 2017 Groundwater Sampling Results* (AECOM, 2018b) (included in **Appendix C**).

The groundwater investigation work plan was documented in the following memoranda, which are included in **Appendix C**:

- *PPG Site 156 (Metro Towers) Scope of Work and Technical Rationale for Supplemental Remedial Investigation - Soil and Groundwater Sampling* (AECOM, 2015)
- *PPG Site 156 (Metro Towers) Revised Scope of Work and Technical Rationale for Supplemental Remedial Investigation - Soil and Groundwater Sampling* (AECOM, 2016c)
- *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation Results, Survey Controls Review and Additional Remedial Investigation Activities Work Plan* (AECOM, 2016d)

4.1 Monitoring Well Installation and Well Abandonment in 2016 and 2017

This section provides an overview of the well installation and abandonment activities completed in 2016 and 2017. Four new groundwater monitoring wells were installed in the three former RA layout areas in April 2016. The wells are identified on **Figure 3** as MW-6, MW-7, MW-8, and MW-9. Well installation was completed by Advanced Drilling Inc. Existing well MW-1 was located beneath pavement. The well location was identified by the land surveyor; however, the well itself could not be found. The well was replaced by MW-1R. MW-5 was located by the land surveyor (Maser Consulting P.A.) under the pavement. The pavement over the well was removed during test pit excavation by EISCO. Because several feet of sediment were present in the well, the well was replaced by MW-5R.

The well installations were completed between April 14, 2016 and April 21, 2016. The wells are 2-inch diameter with flush mount casing and a screen length of 5 ft. The well screen was installed in

unconsolidated material above the confining layer (meadow mat). The wells were installed using a hollow stem auger rig pursuant to the Field Sampling Procedures Manual (FSPM). The wells were developed by Advanced Drilling Inc. on April 22, 2016. Additionally, Advanced Drilling Inc. reviewed information regarding the abandonment of MW-2, which was located in Layout Area 3 and was removed during the soil RA activities between 2013 and 2014. Advanced Drilling Inc. determined that no over-drilling was required to abandon wells MW-1, MW-2, and MW-5.

Monitoring well MW-10 was installed inside the Building 2 Boiler Room on April 8, 2016 by Enviroprobe using a direct-push rig. The 1.5-inch diameter, 5-foot long screen for MW-10 was installed from the top of the soil surface below the slab using a prepack screen section. The well was developed by Enviroprobe on April 11, 2016.

In October 2016, SGS installed shallow well MW-8R. Because supplemental soil remediation was required in the vicinity of MW-8R, the well was not sampled. MW-8R was removed during the soil remediation in September 2017 and the well was subsequently abandoned by SGS. Well MW-10 was decommissioned with NJDEP approval in September 2016 after two rounds of sampling.

On November 2-3, 2017, two wells were installed by SGS using a hollow stem auger rig pursuant to the FSPM. Shallow well 156- MW8A was installed to replace MW-8R. Intermediate well 156- MW8B was installed adjacent to MW-8R as required by NJDEP/Weston Solutions Inc. to investigate the groundwater below the meadow mat. Both wells were installed with flush-mount casing and a concrete pad in four inches of asphalt. The deeper well (156-MW8B) is double-cased with an 8-inch steel outer casing (ending at depth 13.5 ft bgs) and a 2-inch 40-schedule polyvinyl chloride (PVC) riser pipe inner casing (extending down to the well's total depth of 25 ft bgs). The shallow well (156-MW8A) consists solely of a 2-inch 40 schedule PVC riser pipe casing (extending down to the well's total depth of 13 feet bgs). Both wells are screened in the final 5 feet of their total respective depths. The well screen for 156-MW8B was installed in unconsolidated material below the confining layer (meadow mat). Both wells were developed by SGS using the pump and surge method. The wells were surveyed by the land surveyor (Maser Consulting P.A.).

A listing of the site wells and construction details is provided in **Table 1**. Boring logs, well decommissioning records, Monitoring Well Certification Forms A - As-Built Certification, Monitoring Well Certification Forms B - Location Certification, well records, well permits, and groundwater sampling logs are included in **Appendix E**.

4.2 Investigation-Derived Waste

Cuttings and purge water from the well installation and first round of groundwater sampling were drummed and disposed of off Site by WTS on May 12, 2016. One drum containing purge water from the second round of groundwater sampling in June and July 2016 was disposed by WTS on July 15, 2016.

Cuttings and purge water from the installation of wells 156-MW8A and 156-MW8B were drummed and disposed of off Site by WTS on November 9, 2017. Purge water from both rounds of groundwater sampling in November and December 2017 was stored in 5-gallon totes and later transported to the Site 114 Garfield Avenue Waste Water Treatment Plant.

Waste disposal documentation is provided in **Appendix F**.

4.3 Groundwater Sampling Program

Two rounds of groundwater sampling were conducted by the low-flow sampling method during May 10, 11 and 17, 2016 and during June 16 through 17, 2016 (MW-1R, MW-3, MW-5R, MW-6, MW-7, MW-8, MW-9, and MW-10), following the requirements of the FSPM. Depth to groundwater measurements were collected during each round. MW-4 was gauged and sampled during the May 2016 sampling event but the well could not be accessed in June 2016 due to unsafe conditions related to construction work by the Metro Towers contractor. A groundwater sample was collected from MW-4 on July 14, 2016 and analyzed for Cr^{+6} and CCPW metals with a 2-day turnaround time.

Two rounds of groundwater sampling at wells 156-MW8A and 156-MW8B were conducted on November 21, 2017 and December 21, 2017 using the low-flow sampling method in accordance with the requirements of the FSPM. Depth to groundwater measurements were collected during each round.

4.4 Groundwater Sampling Methodology and Parameters

The groundwater samples were collected in accordance with the 2005 FSPM. A synoptic round of groundwater elevation measurements was collected from existing monitoring wells during each sampling event. The groundwater samples were unfiltered. The groundwater sampling logs are provided in **Appendix E**.

The groundwater samples were collected using the low-flow sampling method. The samples were transferred from sampling equipment to the laboratory supplied bottles, and were appropriately preserved, placed on ice, and transported to Accutest Laboratories of Dayton, New Jersey, a New Jersey-certified laboratory. The groundwater samples collected during the 2016 and 2017 sampling events were analyzed for Cr^{+6} and CCPW metals (including Cr). The laboratory analytical data packages for groundwater samples are provided in **Appendix G**.

Field measurements (pH, temperature, dissolved oxygen, conductivity, turbidity, and oxidation-reduction potential) were collected during well purging. The field measurements are provided on the groundwater sampling logs (**Appendix E**).

Environmental duplicate samples and field blanks were collected for quality assurance (QA)/quality control (QC) purposes.

4.5 Factors Influencing Data

No significant events or seasonal variations are known to have impacted the groundwater sampling results presented in this report.

4.6 Reliability of Data: Data Validation and Usability

The purpose of this section is to present an assessment of the reliability of the analytical data produced by the laboratory. Data validation and usability was evaluated prior to data use. The samples collected at the Site were analyzed according to United States Environmental Protection Agency (USEPA) SW-846 analytical methodologies. The employment of these published methods ensures comparability with other similarly analyzed environmental samples. Reduction, validation, and reporting specifications for these analyses are detailed below.

The data validation for groundwater samples collected during the 2016 and 2017 sampling events was conducted by AECOM. The results for Cr^{+6} and CCPW metals in groundwater samples that were collected as part of these sampling events were reviewed in accordance with the FSP/QAPP and the following NJDEP validation Standard Operating Procedures (SOPs):

- *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, and USEPA SW-846 Method 7196A;*
- *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); and*
- *ICP-AES Data Validation, SOP No. HW-3a Revision 0 (July 2015).*

The data validation reports for the groundwater samples are provided **Appendix H**.

The analytical data were found to be of adequate quality and of sufficient precision, accuracy, representativeness, comparability, completeness, and sensitivity for the intended purpose. Data associated with parameters that did not meet QC specifications or compliance requirements were qualified in accordance with USEPA Region II/NJDEP specifications/guidelines, as appropriate. No gross QC failures were noted and no CCPW Metals data were rejected. Several Cr^{+6} samples were rejected due to MS recovery or results that slightly exceeded total Cr results in the same sample. These results were qualified as "RA" meaning rejected but usable for information purposes.

The investigator has confidence that the laboratory data are usable for their intended purpose to demonstrate compliance with applicable standards and criteria. As the data quality objectives have been met, these analytical data may be relied on with confidence and used to support defensible conclusions regarding the Site. Although some analytical data may have been qualified, the data generated during the course of the work detailed here were generally found to be usable. QC and data usability issues identified during validation are discussed below:

- Sample Delivery Group (SDG) JC19972 contains no rejected data. Some CCPW metals sample results considered to be negated due to blank contamination are usable as non-detected results at the reporting limit (RL). Sample results reported between the method detection limit (MDL) and RL are usable as estimated values.
- SDG JC20060 contains no rejected data. No QC nonconformances were noted during validation for Cr^{+6}. CCPW sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.
- SDG JC22453 contains no rejected data. No QC nonconformances were noted during validation for Cr^{+6} and CCPW metals. CCPW sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.
- SDGs JC20458 and JC22339 contain rejected Cr^{+6} results on the basis of MS recovery and/or Cr^{+6} results that exceeded total Cr results in the same sample. Based on the reducing potential of the sample matrix shown by the Eh/pH phase diagram, there is evidence to suggest that the matrix for these samples was reducing and not capable of supporting Cr^{+6}. Although these Cr^{+6} results were rejected, these results are still useful for informational purposes as estimated values and were qualified "RA".
- SDG JC24082 contains no rejected data. CCPW sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.
- SDG JC55900 indicates that the Cr^{+6} results were accepted without qualification. The Ni results in samples 156-MW8A-20171121 and 156-MW8A-20171121X were qualified as estimated due to equipment blank contamination. CCPW sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.

- SDG JC57819 indicates that no data were rejected. CCPW sample results reported between the MDL and RL are usable as estimated values with an unknown directional bias.
- For SDGs JC55900 and JC57819, there were elevated detection limits for Sb and Tl due to dilution required for a high-interfering element. These elevated detection limits are further discussed in **Section 5.**

Hexavalent chromium was detected at concentrations ranging from 4 µg/L (MW-6 in May 2016) to 50 µg/L (MW-9 in June 2016). The June 2016 Cr^{+6} results for wells MW-1R, MW-4, MW-5R, MW-6, and MW-9 were rejected but qualified as "RA", and are considered usable for information purposes as estimated concentrations.

Some samples had higher concentrations of Cr^{+6} compared to total Cr. This can be explained by the fact that different analytical methods were used to test these two analytes. While Cr was analyzed using an Inductively Coupled Plasma Atomic Emission Spectroscopic (ICP-AES) method, Cr^{+6} was analyzed using a colorimetric procedure. The colorimetric procedure can be prone to interferences from other sample constituents, which impact color development; the total Cr determination by ICP-AES is generally considered a more reliable measurement. There is no NJDEP GWQS for Cr^{+6}. Therefore, these results are used for informational purposes only.

The analysis for total Cr is considered accurate and was used for comparison with the NJDEP GWQS.

5.0 Post-Soil Remediation RI of Groundwater

Findings from the groundwater investigation are provided below based on the sampling of Site wells in May, June, and July 2016 (excluding well MW-8, located in the Supplemental Layout Area 3 that was later remediated by excavation) and November and December 2017 (for 156-MW8A and 156-MW8B only).

5.1 Groundwater Elevations

The Site wells were gauged during each sampling round. The gauging results are presented in **Table 2**. Groundwater contours based on the well gauging events conducted on May 10, 2016, June 16, 2016, November 21, 2017 and December 21, 2017 are presented in **Figure 4, Figure 5**, **Figure 6**, and **Figure 7**, respectively. Historically, groundwater flow at the Site has been observed to be to the southwest. Groundwater flow was observed to be to the southwest on the southwestern portion of the Site; however, a groundwater elevation high was present in the center of the Site, resulting in northwesterly and northeasterly groundwater flow components on the northwestern and northeastern portions of the Site, respectively. Groundwater flow at the Site may be influenced by off Site pumping or dewatering activities.

5.2 2016 Groundwater Sampling

Two rounds of groundwater sampling were conducted on May 10, 11 and 17, 2016 and June 16 and 17, 2016. MW-4 was not gauged or sampled in June 2016 due to unsafe conditions related to construction work performed by the Metro Towers contractor. A second groundwater sample was collected from MW-4 on July 14, 2016.

Hexavalent chromium and CCPW metals sample results, as well as field stabilization parameters, are presented in the attached **Table 3**. No concentrations exceeded the applicable standards for CCPW metals, with the exception of the Cr results from monitoring well MW-8 (472 µg/L in May 2016 and 730 µg/L in June 2016), which exceeded the GWQS of 70 µg/L.

Two samples collected from well MW-3 (3.8 U µg/L in May 2016) and MW-6 (3.8 U µg/L in May 2016) exhibited non-detected results for Tl where the detection limit exceeded the GWQS of 2 µg/L. The laboratory noted that these results were impacted “due to dilution for a high interfering element.” This may be the result of elevated levels of sodium and chloride from salt water intrusion in this region. At MW-3, the MDL was less than twice the GWQS and MW-3 is located downgradient from MW-8 where Tl was not detected at concentrations greater than the GWQS at an appropriate MDL. Coupled with the non-detect result with an MDL less than the GWQS collected in June 2016, there is no indication that Tl is present in groundwater at MW-3. The Tl concentration at MW-6, in the field duplicate sample 156-MW6D-20160510, was non-detect with a MDL less than the GWQS. As such, there were two rounds of sampling at MW-6, (samples 156-MW6D-20160510 and 156-MW6-20160616) where the Tl detection limit was appropriate to demonstrate compliance with the GWQS.

5.3 2017 Groundwater Sampling

Two wells (shallow well 156-MW8A and intermediate well 156-MW8B) within the former MW-8 vicinity were installed after soil remediation of Supplemental Layout Area 3 was completed in 2017. Two consecutive samples were collected from these newly installed wells on November 21, 2017 and December 21, 2017.

Total Cr was detected at concentrations ranging from 0.9 J µg/L to 4.5 J µg/L, which are less than the 70 µg/L GWQS. Cr^{+6} was not detected at concentrations greater than a detection limit of 8.1 µg/L in the samples collected from 156-MW8A and 156-MW8B. These results indicate that the chromium-related contamination in groundwater was effectively remediated by the AOC 1 soil removal activities.

CCPW metals results were less than their respective GWQS with the following exceptions:

- In a groundwater sample collected from well 156-MW8A in November 2017, Sb was not detected but the detection limit (22 µg/L) exceeded the GWQS of 6 µg/L. This elevated detection limit is attributed to sample dilution required for a high-interfering element. Antimony was not detected in the field duplicate sample collected from well 156-MW8A in November 2017 and the MDL (4.3 µg/L) did not exceed the GWQS for Sb. In addition, Sb was not detected in two rounds of groundwater sampling at shallow well MW-8 in 2016, where the MDL did not exceed the GWQS. Based on these lines of evidence, there is no indication that Sb is present in shallow groundwater at a concentration greater than the GWQS.
- In the groundwater samples collected from the shallow well 156-MW8A in November and December 2017, Tl was not detected but the detection limit slightly exceeded the GWQS of 2 µg/L. The results were 8.2 U µg/L for both the sample and field duplicate sample in November 2017 and December 2017.
- In a groundwater sample collected from intermediate well 156-MW8B during the November 2016 sampling event, Tl was not detected but the detection limit slightly exceeded the GWQS of 2 µg/L (8.2 U µg/L) in November 2017. The elevated detection limit was due to dilution required for a high-interfering element.
- In a groundwater sample collected from intermediate well 156-MW8B, the concentration of Tl exceeded the GWQS of 2 µg/L (9.7 J µg/L in December 2017). The laboratory report (JC57819) describing this sample's analytical results states that, while testing for Tl, there was an elevated detection limit due to dilution required for matrix interference. Prior to the 2017 soil remediation, there were no samples with results that exceeded the GWQS for Tl in the shallow aquifer. There were no exceedances of the current GWQS for Tl during the 1993 sampling rounds. Even in samples collected from the well having the highest Cr concentrations (MW-2), the 1993 sample results were non-detect at 3.0 UJ and 3.4 UJ for Tl. There were no detected exceedances in the shallow aquifer for Tl and there are no Tl exceedances for soils remaining in place above the meadow mat. The meadow mat acts as an aquitard between the shallow and intermediate aquifers, which would have prevented migration of contamination into the intermediate aquifer. Elevated Tl concentrations were not present when the CCPW source material was in place; the detection limits for these samples were less than the GWQS exceedance detected in intermediate well 156-MW8B, and well 156-MW8B is screened beneath the meadow mat confining layer. Therefore, the Tl exceedance in intermediate well 156-MW8B is not considered a CCPW-related impact.

- Tl was not detected but the MDL exceeded the GWQS in samples from 156-MW8A in November and December 2017 (8.2 µg/L). However, Tl was not detected with a detection limit less than the GWQS in the two rounds of 2016 sampling at shallow monitoring well MW-8, which was installed and screened at approximately the same location as 156-MW8A. As noted previously, elevated levels of sodium resulting from salt water intrusion can interfere with low level determination of thallium.

6.0 Recommendations and Conclusions

Prior to the soil remedial action, groundwater was impacted by CCPW-related metals (Cr and V) at concentrations in excess of the NJDEP GWQS. The remedial action included source removal and the recovery, treatment, and discharge of a total of 1,849,600 gallons of impacted groundwater to support the RA (discussed in Sections 5.0 and 6.0 of the *PPG Site 156 Remedial Action Report – Soil Area of Concern (AOC 1) Revision 1* [AECOM, 2018a]), as well as the attenuation of residual groundwater contamination. The results of the groundwater remedial investigation completed following the remedial action indicate that it was successful in reducing CCPW-related contaminants in groundwater to concentrations less than the applicable GWQS with the exception of one Tl concentration exceeding the GWQS that is not attributed to CCPW metals in the intermediate well 156-MW8B.

No further investigation or action is warranted with respect to AOC 2 - CCPW Impacts to Groundwater (Site-wide) relative to CCPW-impacts. Therefore, PPG requests a *No Further Action* determination with regard to groundwater (AOC 2) at Site 156.

7.0 References

AECOM, 2010. *Field Sampling Plan / Quality Assurance Project Plan, PPG Non-Residential and Residential Chromium Sites, Hudson County, New Jersey*, AECOM. June 2010.

AECOM, 2014. *Program Health and Safety Plan, Rev. 1, PPG Industries, Inc., Hudson County Chromium Sites, Jersey City, New Jersey*. AECOM. February 2014.

AECOM, 2015. *PPG Site 156 (Metro Towers) Scope of Work and Technical Rationale for Supplemental Remedial Investigation - Soil and Groundwater Sampling*. AECOM. November 16, 2015.

AECOM, 2016a. *Remedial Investigation Report/Remedial Action Work Plan, Building Number (No.) 2 – Boiler Room Subslab Soil and Interior Concrete Surfaces (AOC 3), Revision 2*. AECOM. January 2016.

AECOM, 2016b. *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation - Groundwater Sampling Preliminary Data Summary*, Prepared for PPG by AECOM. August 11, 2016.

AECOM, 2016c. *PPG Site 156 (Metro Towers) Revised Scope of Work and Technical Rationale for Supplemental Remedial Investigation - Soil and Groundwater Sampling*. AECOM. February 26, 2016.

AECOM, 2016d. *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation Results, Survey Controls Review and Additional Remedial Investigation Activities Work Plan*, Prepared for PPG by AECOM. September 23, 2016.

AECOM, 2018a. *PPG Site 156 Remedial Action Report – Soil Area of Concern (AOC 1), Revision 1*. AECOM. March 2018.

AECOM, 2018b. *PPG Site 156 (Metro Towers) Supplemental Remedial Investigation 2017 Groundwater Sampling Results*. AECOM. March 2018.

Civil & Environmental Consultants, Inc. (CEC), 2006. *Remedial Action Work Plan, Metropolis Towers Site – Site 156 (Formerly Gregory Park Apartments) 270-280 Luis Munoz Marin Boulevard, Jersey City, New Jersey*. July 2006.

Civil & Environmental Consultants, Inc. (CEC), 2012. *Remedial Action Work Plan, Metropolis Towers Site – Site 156 (Formerly Gregory Park Apartments) 270-280 Luis Munoz Marin Boulevard, Jersey City, New Jersey*. November 16, 2012.

ICF Kaiser Engineers, Inc., 1993. *Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site. Non-Residential Sites Chromium Remediation Project Hudson County, New Jersey Draft Remedial Investigation Report Group 1 Site 156 Gregory Park Apartments Site*. September 29, 1993.

IT Corporation, 2001. *Remedial Investigation Report Group 1 – Site 156 Gregory Park Apartments Site*. June 6, 2001.

Langan Engineering and Environmental Services, Inc. (Langan), 2004. *Chromium Remedial Action Workplan Metropolis Towers Site 270-280 Luis Munoz Marin Blvd., Jersey City, NJ*. June 28, 2004.

NJDEP, 1990. Appendix G of the July 19, 1990 NJDEP *Administrative Consent Order*. July 19, 1990.

NJDEP, 2005. *Field Sampling Procedures Manual*, August 2005, last updated April 2011.

NJDEP, 2009. New Jersey Administrative Code Chapter 26C, *Administrative Requirements for the Remediation of Contaminated Sites*, N.J.A.C. 7:26C, last amended on May 4, 2015.

NJDEP, 2010. New Jersey Administrative Code Chapter 9C, *Groundwater Quality Standards*, N.J.A.C. 7:9C, last amended on July 22, 2010, readopted without change March 4, 2014, and updated January 2018.

NJDEP, 2011b. Letter from NJDEP to M. Michael McCabe, Site Administrator, Jersey City PPG Chromium Sites, Subject: *Adequacy of Response to Comments on July 2006 Remedial Action Work Plan and the July 2010 Remedial Action Work Plan Addendum; Metropolis Towers, Site 146, Jersey City, New Jersey*. December 16, 2011.

NJDEP, 2012a. New Jersey Administrative Code Chapter 26E, *Technical Requirements for Site Remediation*, N.J.A.C. 7:26E, last amended on May 7, 2012.

NJDEP, 2012b. *Site Remediation Program Ground Water Technical Guidance: Site Investigation Remedial Investigation Remedial Action Performance Monitoring* (April 3, 2012)

NJDEP, 2012c. *Technical Guidance for the Attainment of Remediation Standards and Site Specific Criteria*, Version 1.0. September 24, 2012.

NJDEP, 2014a. *Well Construction and Maintenance; Sealing of Abandoned Wells*, N.J.A.C. 7:9D (January 31, 2014, updated January 2018).

Superior Court of New Jersey Law Division – Hudson County, 2009. *Partial Consent Judgment Concerning the PPG Sites*. New Jersey Department of Environmental Protection and the Administrator of the New Jersey Spill Compensation Fund, Plaintiffs, v. Honeywell International, Inc., Occidental Chemical Corporation and PPG Industries, Inc., Defendants, v. City of Jersey City, Jersey City Municipal Utilities Authority, Jersey City Incinerator Authority, and New Jersey Turnpike Authority, Third Party Defendants. Filed June 26, 2006.

Tables

Table 1
Well Construction Details
Site 156
PPG, Jersey City, New Jersey

Well ID	Aquifer	Year Installed	Year Abandoned	Well Depth (ft bgs)	Screen Length (ft)	Construction
MW-1	Shallow	1992	2016	15.0	10.0	Single Cased
MW-1R	Shallow	2016	N/A	15.5	5.0	Single Cased
MW-2	Shallow	1992	2016	17.4	10.0	Single Cased
MW-3	Shallow	1992	N/A	13.0	10.0	Single Cased
MW-4	Shallow	1992	N/A	15.0	10.0	Single Cased
MW-5	Shallow	1992	2016	13.5	10.0	Single Cased
MW-5R	Shallow	2016	N/A	15.0	5.0	Single Cased
MW-6	Shallow	2016	N/A	14.0	5.0	Single Cased
MW-7	Shallow	2016	N/A	16.0	5.0	Single Cased
MW-8	Shallow	2016	2017	16.5	5.0	Single Cased
MW-8R	Shallow	2016	2017	16.0	5.0	Single Cased
MW-9	Shallow	2016	N/A	15.0	5.0	Single Cased
MW-10	Shallow	2016	2016	7.0	5.0	Single Cased
156-MW8A	Shallow	2017	N/A	13.0	5.0	Single Cased
156-MW8B	Shallow	2017	N/A	20.0	5.0	Double Cased

Notes:

bgs - below ground surface

ft - feet

N/A - not applicable, the well is existing

Table 2
Depth to Water Readings
Site 156
PPG, Jersey City, New Jersey

				May 10, 2016		June 16, 2016		July 14, 2016		November 21, 2017		December 21, 2017	
Well ID	Easting (ft NAD83)	Northing (ft NAD83)	Top of Casing (TOC) Elevation (ft NAVD88)	Depth to Water (ft TOC)	Groundwater Elevation (ft NAVD88)	Depth to Water (ft TOC)	Groundwater Elevation (ft NAVD88)	Depth to Water (ft TOC)	Groundwater Elevation (ft NAVD88)	Depth to Water (ft TOC)	Groundwater Elevation (ft NAVD88)	Depth to Water (ft TOC)	Groundwater Elevation (ft NAVD88)
156-MW8A	619299	686710	5.53	N/A	N/A	N/A	N/A	N/A	N/A	4.59	0.94	4.52	1.01
156-MW8B	619298	686705	5.12	N/A	N/A	N/A	N/A	N/A	N/A	2.02	3.10	1.12	4.00
MW-1R	619432	686976	5.74	5.86	-0.12	6.01	-0.27	6.15	-0.41	5.86	-0.12	6.11	-0.37
MW-3	619218	686585	5.43	5.49	-0.06	5.58	-0.15	5.66	-0.23	5.57	-0.14	5.44	-0.01
MW-4	619508	686587	7.57	inaccessible		inaccessible		inaccessible		5.53	2.04	5.36	2.21
MW-5R	619294	686914	6.18	3.36	2.82	3.49	2.69	4.10	2.08	4.51	1.67	4.31	1.87
MW-6	619111	686739	4.54	4.89	-0.35	4.96	-0.42	5.12	-0.58	5.10	-0.56	5.07	-0.53
MW-7	619390	686805	7.29	5.81	1.48	5.78	1.51	6.09	1.20	6.24	1.05	6.16	1.13
MW-8	619300	686707	5.59	4.36	1.23	4.33	1.26	4.45	1.14	N/A	N/A	N/A	N/A
MW-9	619192	686977	6.18	5.63	0.55	5.30	0.88	5.22	0.96	5.74	0.44	5.57	0.61
MW-10	619564	686780	5.47	2.82	2.65	2.95	2.52	2.69	2.78	5.74	0.44	5.57	0.61

Abbreviations:
ft - feet
ft TOC - feet below top of casing
N/A - not available
NAD83 - New Jersey State Plane in North American Datum of 1983
NAVD88 - North American Vertical Datum 1988
TOC - top of casing

Notes:
- The easting and northing coordinates are New Jersey State Plane in North American Datum of 1983 (NAD83) datum, US survey feet units, to the nearest foot.
- The inner casing elevation is feet to the nearest 0.01 foot, North American Vertical Datum of 1988 (NAVD88).
- The MW-4 top-of-inner-casing elevations are from page 36 of the Remedial Action Work Plan Metropolis Towers - Site 156, prepared by Civil & Environmental Consultants, Inc., dated November 16, 2012.

Table 3
Hexavalent Chromium and CCPW Metals in Groundwater Collected in 2016 and 2017
Site 156
PPG, Jersey City, New Jersey

				Analyte Units CAS RN GWQS	ANTIMONY (µg/l) 7440-36-0 6		CHROMIUM (µg/l) 7440-47-3 70		(HEXAVALENT) (µg/l) 18540-29-9 N/A		NICKEL (µg/l) 7440-02-0 100		THALLIUM (µg/l) 7440-28-0 2		VANADIUM (µg/l) 7440-62-2 60		Specific Notes	TEMPER- ATURE (°C) N/A	PH N/A	SPECIFIC CONDUC- TIVITY (mS/cm) N/A	DISSOLVED OXYGEN (mg/L) N/A	OXYGEN REDUCTION POTENTIAL (mV) N/A	TURBIDITY (NTU) N/A
Location ID	Sample ID	Lab Sample ID	Sample Date	Type																			
MW-1R	156-MW1R-20160510	JC19972-5	5/10/2016	N	NA		NA		7.2	J	NA		NA		NA			15.9	6.74	3.69	0.55	-54.8	8.78
MW-1R	156-MW1R-20160510	JC19972-5A	5/10/2016	N	< 3.3	U	4.2	J			< 0.76	U	< 1.9	U	7.8	J		15.9	6.74	3.69	0.55	-54.8	8.78
MW-1R	156-MW1R-20160616	JC22339-4	6/16/2016	N	NA		NA		14	RA	NA		NA		NA			17.5	6.00	2.98	1.96	-32.0	4.58
MW-1R	156-MW1R-20160616	JC22339-4A	6/16/2016	N	< 3.3	U	4.7	J			< 0.76	U	< 1.9	U	7.2	J		17.5	6.00	2.98	1.96	-32.0	4.58
MW-1R	156-MW51R-20160616	JC22339-5	6/16/2016	FD	NA		NA		14	RA	NA		NA		NA			17.5	6.00	2.98	1.96	-32.0	4.58
MW-1R	156-MW51R-20160616	JC22339-5A	6/16/2016	FD	< 3.3	U	4.1	J			1.2	J	< 1.9	U	6.7	J		17.5	6.00	2.98	1.96	-32.0	4.58
MW-3	156-MW3-20160511	JC20060-1	5/11/2016	N	NA		NA		20		NA		NA		NA			13.4	6.60	5.62	1.14	-65.5	8.62
MW-3	156-MW3-20160511	JC20060-1A	5/11/2016	N	< 3.3	U	< 0.81	U			0.80	J	**< 3.8**	**U**	2.6	J	S1	13.4	6.60	5.62	1.14	-65.5	8.62
MW-3	156-MW3-20160617	JC22453-2	6/17/2016	N	NA		NA		6.9	J	NA		NA		NA			17.3	6.20	6.81	20.8	109	6.10
MW-3	156-MW3-20160617	JC22453-2A	6/17/2016	N	< 3.3	U	2.7	J			1.3	J	1.9	J	3.4	J		17.3	6.20	6.81	20.8	109	6.10
MW-4	MW-04_051716	JC20458-1	5/17/2016	N	< 3.3	U	1.9	J	17	RA	< 0.76	U	< 1.9	U	2.4	J		13.8	6.60	1.78	4.69	-76.0	7.10
MW-4	156-MW4-20160714	JC24082-1	7/14/2016	N	< 3.3	U	1.8	J	44		1.4	J	< 1.9	U	2.0	J		19.5	6.63	18.4	0.29	-99.7	29.9
MW-5R	156-MW5R-20160510	JC19972-2	5/10/2016	N	NA		NA		< 3.9	U	NA		NA		NA			19.0	7.56	0.85	0.44	-54.5	1.85
MW-5R	156-MW5R-20160510	JC19972-2A	5/10/2016	N	< 3.3	U	1.5	J			< 0.76	U	< 1.9	U	< 0.66	U		19.0	7.56	0.85	0.44	-54.5	1.85
MW-5R	156-MW5R-20160616	JC22339-3	6/16/2016	N	NA		NA		< 3.9	RA	NA		NA		NA			20.8	7.33	0.79	15.2	127	10.6
MW-5R	156-MW5R-20160616	JC22339-3A	6/16/2016	N	< 3.3	U	4.8	J			2.0	J	< 1.9	U	2.1	J		20.8	7.33	0.79	15.2	127	10.6
MW-6	156-MW6-20160510	JC19972-3	5/10/2016	N	NA		NA		4.0	J	NA		NA		NA			15.9	7.50	5.76	1.67	-104	2.73
MW-6	156-MW6-20160510	JC19972-3A	5/10/2016	N	< 3.3	U	1.7	J			18.0		**< 3.8**	**U**	17.7	J	S1	15.9	7.50	5.76	1.67	-104	2.73
MW-6	156-MW6-20160616	JC22339-1	6/16/2016	N	NA		NA		5.4	RA	NA		NA		NA			18.3	6.13	4.20	1.29	-85.6	4.87
MW-6	156-MW6-20160616	JC22339-1A	6/16/2016	N	< 3.3	U	4.0	J			32.5		< 1.9	U	18.3	J		18.3	6.13	4.20	1.29	-85.6	4.87
MW-6	156-MW6D-20160510	JC19972-4	5/10/2016	FD	NA		NA		< 3.9	U	NA		NA		NA			15.9	7.50	5.76	1.67	-104	2.73
MW-6	156-MW6D-20160510	JC19972-4A	5/10/2016	FD	< 3.3	U	1.7	J			16.6	J	< 1.9	U	16.3	J		15.9	7.50	5.76	1.67	-104	2.73
MW-7	156-MW7-20160510	JC19972-1	5/10/2016	N	NA		NA		< 3.9	U	NA		NA		NA			16.3	7.80	0.93	0.37	31.3	1.47
MW-7	156-MW7-20160510	JC19972-1A	5/10/2016	N	< 3.3	U	3.1	J			< 0.76	U	< 1.9	U	7.5	J		16.3	7.80	0.93	0.37	31.3	1.47
MW-7	156-MW7-20160617	JC22453-4	6/17/2016	N	NA		NA		< 3.9	U	NA		NA		NA			18.5	7.41	0.97	1.66	384	4.71
MW-7	156-MW7-20160617	JC22453-4A	6/17/2016	N	< 3.3	U	2.0	J			2.9	J	< 1.9	U	2.1	J		18.5	7.41	0.97	1.66	384	4.71
MW-8	156-MW8-20160511	JC20060-2	5/11/2016	N	NA		NA		< 3.9	U	NA		NA		NA			16.1	7.24	1.66	1.51	-68.1	0.40
MW-8	156-MW8-20160511	JC20060-2A	5/11/2016	N	< 3.3	U	**472**				4.1	J	< 1.9	U	6.8	J	S2	16.1	7.24	1.66	1.51	-68.1	0.40
MW-8	156-MW8-20160617	JC22453-1	6/17/2016	N	NA		NA		5.8	J	NA		NA		NA			18.4	6.79	2.53	3.75	-30.2	4.84
MW-8	156-MW8-20160617	JC22453-1A	6/17/2016	N	< 3.3	U	**730**				3.7	J	< 1.9	U	13.2	J	S2	18.4	6.79	2.53	3.75	-30.2	4.84
MW-9	156-MW9-20160511	JC20060-3	5/11/2016	N	NA		NA		31		NA		NA		NA			15.7	6.65	1.20	0.43	-56.0	-0.42
MW-9	156-MW9-20160511	JC20060-3A	5/11/2016	N	< 3.3	U	1.3	J			< 0.76	U	< 1.9	U	1.5	J		15.7	6.65	1.20	0.43	-56.0	-0.42
MW-9	156-MW9-20160616	JC22339-2	6/16/2016	N	NA		NA		50	RA	NA		NA		NA			16.7	6.23	1.19	40.4	65.5	4.49
MW-9	156-MW9-20160616	JC22339-2A	6/16/2016	N	< 3.3	U	1.9	J			< 0.76	U	< 1.9	U	1.7	J		16.7	6.23	1.19	40.4	65.5	4.49
MW-10	156-MW10-20160511	JC20060-5	5/11/2016	N	NA		NA		< 3.9	U	NA		NA		NA			26.0	7.40	0.28	1.76	17.6	1.50
MW-10	156-MW10-20160511	JC20060-5A	5/11/2016	N	5.1	J	42.2				17.4		< 1.9	U	10.9	J		26.0	7.40	0.28	1.76	17.6	1.50
MW-10	156-MW10-20160617	JC22453-3	6/17/2016	N	NA		NA		< 3.9	U	NA		NA		NA			26.0	7.48	1.83	5.36	115	4.05
MW-10	156-MW10-20160617	JC22453-3A	6/17/2016	N	< 3.3	U	5.3	J			62.7		< 1.9	U	5.2	J		26.0	7.48	1.83	5.36	115	4.05
156-MW8A	156-MW8A-20171121	JC55900-1	11/21/2017	N	NA		NA		< 8.1	U	NA		NA		NA		S2	18.7	7.35	2.85	0.83	201	3.41
156-MW8A	156-MW8A-20171121	JC55900-1A	11/21/2017	N	**< 22**	**U**	0.90	J			10.6	J	**< 8.2**	**U**	1.7	J	S1, S2	18.7	7.35	2.85	0.83	201	3.41
156-MW8A	156-MW8A-20171121X	JC55900-2	11/21/2017	FD	NA		NA		< 8.1	U	NA		NA		NA		S2	18.7	7.35	2.85	0.83	201	3.41
156-MW8A	156-MW8A-20171121X	JC55900-2A	11/21/2017	FD	< 4.3	U	1.4	J			10.9	J	**< 8.2**	**U**	2.5	J	S1, S2	18.7	7.35	2.85	0.83	201	3.41
156-MW8A	156-MW8A-20171221	JC57819-1	12/21/2017	N	NA		NA		< 8.1	U	NA		NA		NA		S2	15.0	7.31	2.90	0.33	46.5	6.30
156-MW8A	156-MW8A-20171221	JC57819-1A	12/21/2017	N	< 4.3	U	2.2	J			< 1.3	UJ	**< 8.2**	**U**	2.6	J	S1, S2	15.0	7.31	2.90	0.33	46.5	6.30

Table 3
Hexavalent Chromium and CCPW Metals in Groundwater Collected in 2016 and 2017
Site 156
PPG, Jersey City, New Jersey

				Analyte	ANTIMONY (µg/l)		CHROMIUM (µg/l)		(HEXAVALENT) (µg/l)		NICKEL (µg/l)		THALLIUM (µg/l)		VANADIUM (µg/l)			TEMPER-ATURE	PH	SPECIFIC CONDUC-TIVITY	DISSOLVED OXYGEN	OXYGEN REDUCTION POTENTIAL	TURBIDITY
				CAS RN GWQS	7440-36-0 6		7440-47-3 70		18540-29-9 N/A		7440-02-0 100		7440-28-0 2		7440-62-2 60		Specific Notes	(^{o}C) N/A	N/A	(mS/cm) N/A	(mg/L) N/A	(mV) N/A	(NTU) N/A
Location ID	Sample ID	Lab Sample ID	Sample Date	Type																			
156-MW8A	156-MW8A-20171221X	JC57819-2	12/21/2017	FD	NA		NA		< 8.1	U	NA		NA		NA		S2	15.0	7.31	2.90	0.33	46.5	6.30
156-MW8A	156-MW8A-20171221X	JC57819-2A	12/21/2017	FD	< 4.3	U	2.4	J			< 1.3	UJ	**< 8.2**	**U**	2.3	J	S1, S2	15.0	7.31	2.90	0.33	46.5	6.30
156-MW8B	156-MW8B-20171121	JC55900-3	11/21/2017	N	NA		NA		< 8.1	U	NA		NA		NA			19.0	8.39	13.3	0.06	-199	5.97
156-MW8B	156-MW8B-20171121	JC55900-3A	11/21/2017	N	< 4.3	U	1.9	J			< 6.7	U	**< 8.2**	**U**	22.8	J	S1	19.0	8.39	13.3	0.06	-199	5.97
156-MW8B	156-MW8B-20171221	JC57819-3	12/21/2017	N	NA		NA		< 8.1	U	NA		NA		NA			16.0	8.10	10.1	0.11	-149	5.01
156-MW8B	156-MW8B-20171221	JC57819-3A	12/21/2017	N	< 4.3	U	4.5	J			< 6.7	U	**9.7**	**J**	41.8	J	S3	16.0	8.10	10.1	0.11	-149	5.01

Table 3
Hexavalent Chromium and CCPW Metals in Groundwater Collected in 2016 and 2017
Site 156
PPG, Jersey City, New Jersey

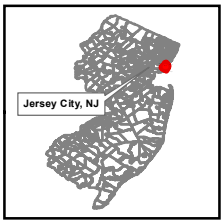
Abbreviations:
µg/l - micrograms per liter
^{o}C - degrees Celsius
CAS RN - Chemical Abstracts Service Registry Number
CCPW - Chromate Chemical Production Waste
Cr - total chromium
Cr^{+6} - hexavalent chromium
EB - equipment blank sample type
FD - field duplicate sample type
GWQS - Ground Water Quality Standard
IRIS - Integrated Risk Information System
mg/L - milligrams per liter
mS/cm - millisiemens per centimeter
mV - millivolts
N - normal sample type
N/A - not applicable
NA - not analyzed
N.J.A.C. - New Jersey Administrative Code
NTU - nephelometric unit
USEPA - United States Environmental Protection Agency

Data Qualifiers:
J - The result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
RA - The result was rejected due to deficiencies but is considered usable for decision-making purposes.
U - The analyte was not detected above the sample reporting limit shown.
UJ - The analyte was not detected above the sample reporting limit shown and the reporting limit was approximate.

General Notes:
1. GWQS exceedances are bolded.
2. The GWQS for vanadium pentoxide is shown. A GWQS has not been established for total vanadium. The USEPA IRIS database, which is incorporated into N.J.A.C. 7:9D by reference, has not assigned a Carcinogenic Slope Factor or Reference Dose for vanadium and a GWQS cannot be calculated.
3. Temperature, pH, specific conductivity, dissolved oxygen, oxygen reduction potential, and turbidity are field-measured parameters.

Specific Notes:
S1. The elevated detection limits for antimony and thallium are not considered CCPW related but are due to dilution required for matrix interference.
S2. Well MW-8 was removed during remediation of Supplemental Layout Area 3 in 2017. The sample results from well 156-MW8A are representative of groundwater in the vicinity of MW-8 post-remediation.
S3. The thallium exceedance in well 156-MW8B is not CCPW related because: 1) the intermediate well is screened below the meadow mat, which acts as a confining layer; 2) the Cr concentrations are compliant with the GWQS in all shallow wells and this intermediate well, there were no detections exceeding the current GWQS in the source area well (MW-2) which was sampled in 1993; 3) the Cr^{+6} concentrations are not detected in both samples collected from the intermediate well; and 4) there are no remaining soil samples with thallium exceedances.

Figures



0 1,000 2,000 4,000 Feet

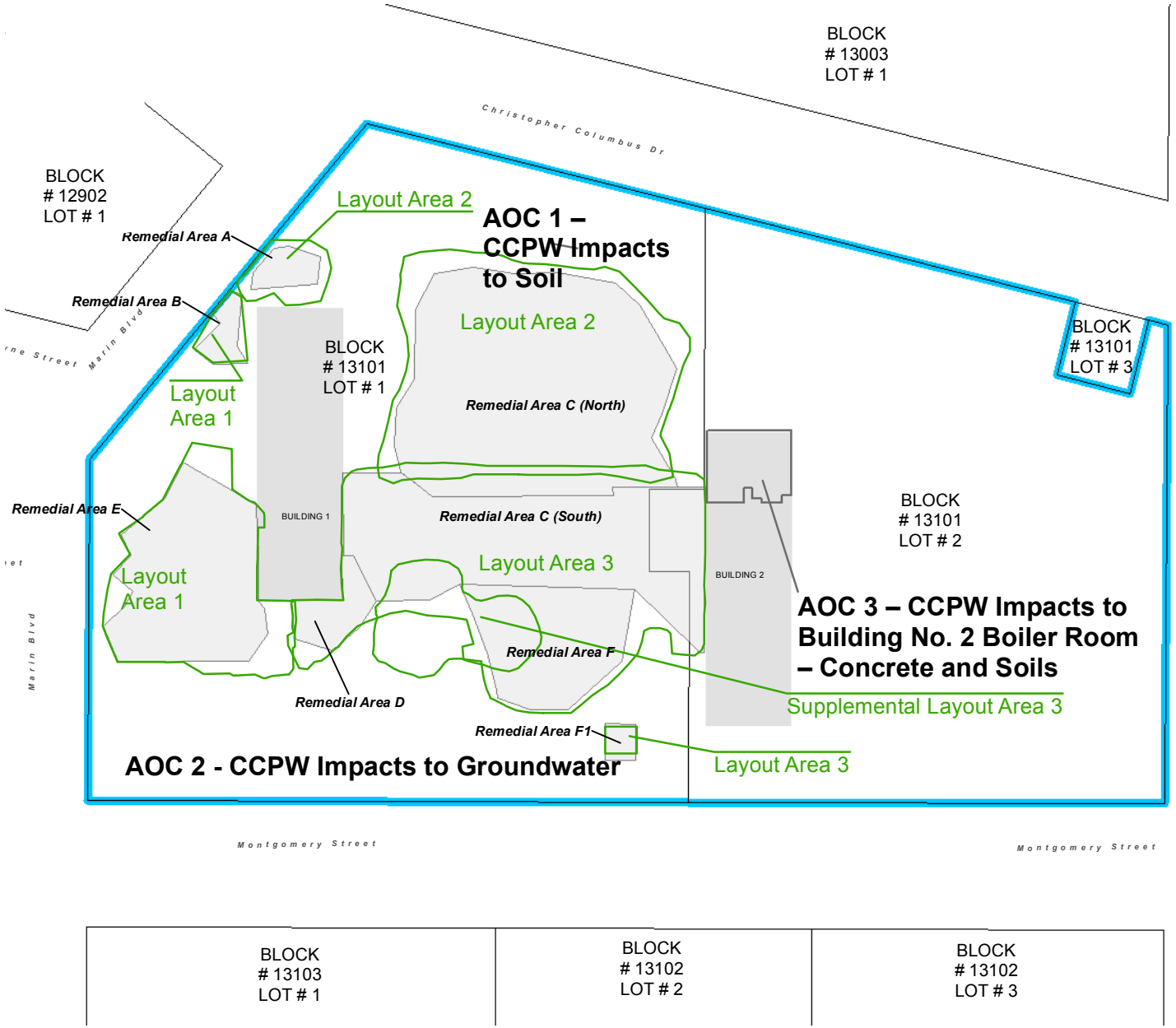
Notes:
1. Coordinate System: Web Mercator Auxiliary Sphere (WKID 102100)

AECOM

N W E S

PPG SITE 156 JERSEY CITY, NEW JERSEY	FIGURE 1 USGS SITE LOCATION MAP
DATE: 3/21/2018	

\\uspsw2vfp001\DATA_USPSW2VFP001\Environment\Piscataway\Project\PPG-NJCProgram\6-ProjectInput\6.4-GIS\MXD\GAGroup\RIWP-GW\GAG_RIWP-GW_RegionalGeology.mxd



Abbreviations:
AOC - Area of Concern
CCPW - Chromate Chemical Production Waste

Notes:
1. AOC 1 is defined by the Layout Areas.
2. AOC 2 is site-wide.

Legend

- LAYOUT AREA
- REMEDIAL AREA
- AOC 3 EXTENT
- BUILDING
- PROPERTY BOUNDARY
- SITE BOUNDARY

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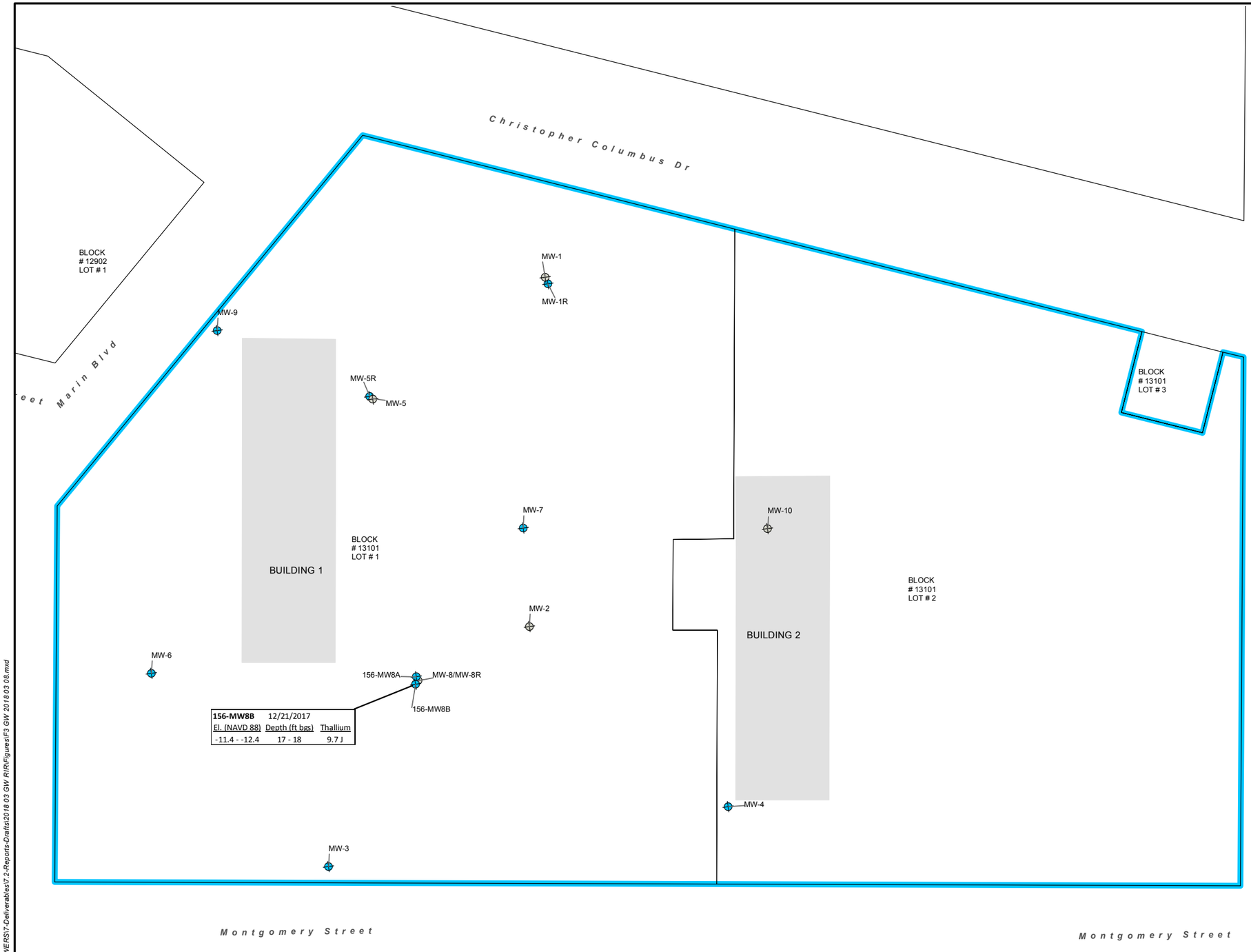
Feet

PPG SITE 156 METROPOLIS TOWERS JERSEY CITY, NEW JERSEY		**AREAS OF CONCERN AND REMEDIAL LAYOUT AREAS**
DATE: 04/05/2018		**FIGURE 2**

Last saved by: huntc 2018-04-05
Filename: F:\Projects\PPG\SITE 156 - METRO TOWERS\7-Deliverables\7.2-Reports-Drafts\2018 03 GW RIR\Figures\F2 AOCs 2018 02 15.mxd



ABBREVIATIONS:
bgs - below ground surface
CCPW - Chromate Chemical Production Waste
El. - elevation
ft - feet
GWQS - Ground Water Quality Standard
IRIS - Integrated Risk Information System
µg/l - micrograms per liter
N/A - not applicable
NAVD 88 - North American Vertical Datum of 1988
N.J.A.C. - New Jersey Administrative Code
USEPA - United States Environmental Protection Agency

QUALIFIERS:
J - The result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.

GENERAL NOTES:
G1. The CCPW metals data associated with the sample locations shown on this figure are provided in Table 3. Data presented in call out boxes on this figure are outliers (i.e., data points that require further explanation).
G2. Results are reported in µg/l.
G3. Source of block/lot information is Jersey City Parcel Data from New Jersey Geographic Information Network (NJ GIN), last updated 10/6/2015 (available at: http://data.jerseycitynj.gov/dataset/jersey-city-parcel-polygon).
G4. The GWQS for vanadium pentoxide is shown. A GWQS has not been established for total vanadium. The USEPA IRIS database, which is incorporated into N.J.A.C. 7:9D by reference, has not assigned a Carcinogenic Slope Factor or Reference Dose for vanadium and a GWQS cannot be

Legend

- MONITORING WELL, EXISTING
- MONITORING WELL, ABANDONED
- BUILDING
- PROPERTY BOUNDARY
- SITE BOUNDARY

Analyte	GWQS (µg/L)
ANTIMONY	6
CHROMIUM	70
HEXAVALENT CHROMIUM	N/A
NICKEL	100
THALLIUM	2
VANADIUM	60

AECOM

N W E S

0 50 100 200 300 Feet

PPG
SITE 156
METROPOLIS TOWERS
JERSEY CITY, NEW JERSEY

DATE: 6/11/2018 | DRWN: CH

SITE 156
SAMPLE MAP FOR CCPW METALS COMPARED TO GWQS

FIGURE: 3

Path: F:\Projects\PPG\SITE 156 - METRO TOWERS\7-Deliverables\7.2-Reports-Drafts\2018 03 GW RI\RI Figures\F3 GW 2018 03 08.mxd

BLOCK
13003
LOT # 1

Christopher Columbus Dr

BLOCK
12902
LOT # 1

BLOCK
11613
LOT # 1

BLOCK
13101
LOT # 3

MW-1R (-0.12)

MW-9 (0.55)

MW-5R (2.82)

MW-7 (1.48)

MW-10 (2.65)

MW-6 (-0.35)

156-MW8A (1.23)

MW-3 (0.45)

0.0

0.5

1.0

1.5

2.0

2.5

Building 1

Building 2

BLOCK
13101
LOT # 1

BLOCK
13101
LOT # 2

Montgomery Street

Warren Street

MONITORING WELL, EXISTING (WITH GROUNDWATER ELEVATION)

GROUNDWATER CONTOUR, FT NAVD88

PROPERTY BOUNDARY

BUILDINGS

SITE BOUNDARY

Note:
G1. Groundwater elevations are in feet North American Vertical Datum 1988 (ft NAVD88).
G2. Source of block/lot information is Jersey City Parcel Data from New Jersey Geographic Information Network (NJ GIN), last updated 10/6/2015 (available at: http://data.jerseycitynj.gov/dataset/jersey-city-parcel-polygon).

AECOM

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PPG
SITE 156
METROPOLIS TOWERS
JERSEY CITY, NEW JERSEY

DATE: 6/8/2018 | DRWN: CH

SHALLOW GROUNDWATER ZONE CONTOURS
MAY 10, 2016

FIGURE: 4

BLOCK
13003
LOT # 1

Christopher Columbus Dr

BLOCK
12902
LOT # 1

BLOCK
11613
LOT # 1

MW-1R (-0.27)

0.0

0.5

1.0

MW-9 (0.88)

BLOCK
13101
LOT # 3

1.5

MW-5R (2.69)

2

2.5

2.0

Building 1

BLOCK
13101
LOT # 1

MW-7 (1.51)

MW-10 (2.52)

BLOCK
13101
LOT # 2

Building 2

MW-6 (-0.42)

MW-8 (1.26)

0.0

1.5

MW-3 (0.36)

0.5

1.0

Montgomery Street

Warren Street

Montgomery Street

MONITORING WELL, EXISTING (WITH GROUNDWATER ELEVATION)

GROUNDWATER CONTOUR, FT NAVD88

PROPERTY BOUNDARY

BUILDINGS

SITE BOUNDARY

Note:
G1. Groundwater elevations are in feet North American Vertical Datum 1988 (ft NAVD88).
G2. Source of block/lot information is Jersey City Parcel Data from New Jersey Geographic Information Network (NJ GIN), last updated 10/6/2015 (available at: http://data.jerseycitynj.gov/dataset/jersey-city-parcel-polygon).

AECOM

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0 50 100 200 300 Feet

PPG
SITE 156
METROPOLIS TOWERS
JERSEY CITY, NEW JERSEY

DATE: 6/8/2018 | DRWN: CH

SHALLOW GROUNDWATER ZONE CONTOURS
JUNE 16, 2016

FIGURE: 5

BLOCK
13003
LOT # 1

BLOCK
11613
LOT # 1

BLOCK
12902
LOT # 1

Christopher Columbus Dr

MW-1R (-0.12)

MW-9 (0.44)

MW-5R (1.67)

BLOCK
13101
LOT # 3

Marin Blvd

Building 1

BLOCK
13101
LOT # 1

MW-7 (1.05)

0.0

0.5

1.0

1.5

BLOCK
13101
LOT # 2

Building 2

Warren Street

MW-6 (-0.56)

156-MW8A (0.94)

MW-4 (2.04)

MW-3 (-0.14)

-0.5

0.0

0.5

1.0

1.5

2.0

Montgomery Street

Montgomery Street

MONITORING WELL, EXISTING (WITH GROUNDWATER ELEVATION)

GROUNDWATER CONTOUR, FT NAVD88

GROUNDWATER CONTOUR, ESTIMATED

PROPERTY BOUNDARY

BUILDINGS

SITE BOUNDARY

Note:
G1. Groundwater elevations are in feet North American Vertical Datum 1988 (ft NAVD88).
G2. Source of block/lot information is Jersey City Parcel Data from New Jersey Geographic Information Network (NJ GIN), last updated 10/6/2015 (available at: http://data.jerseycitynj.gov/dataset/jersey-city-parcel-polygon).

N
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0 50 100 200 300 Feet

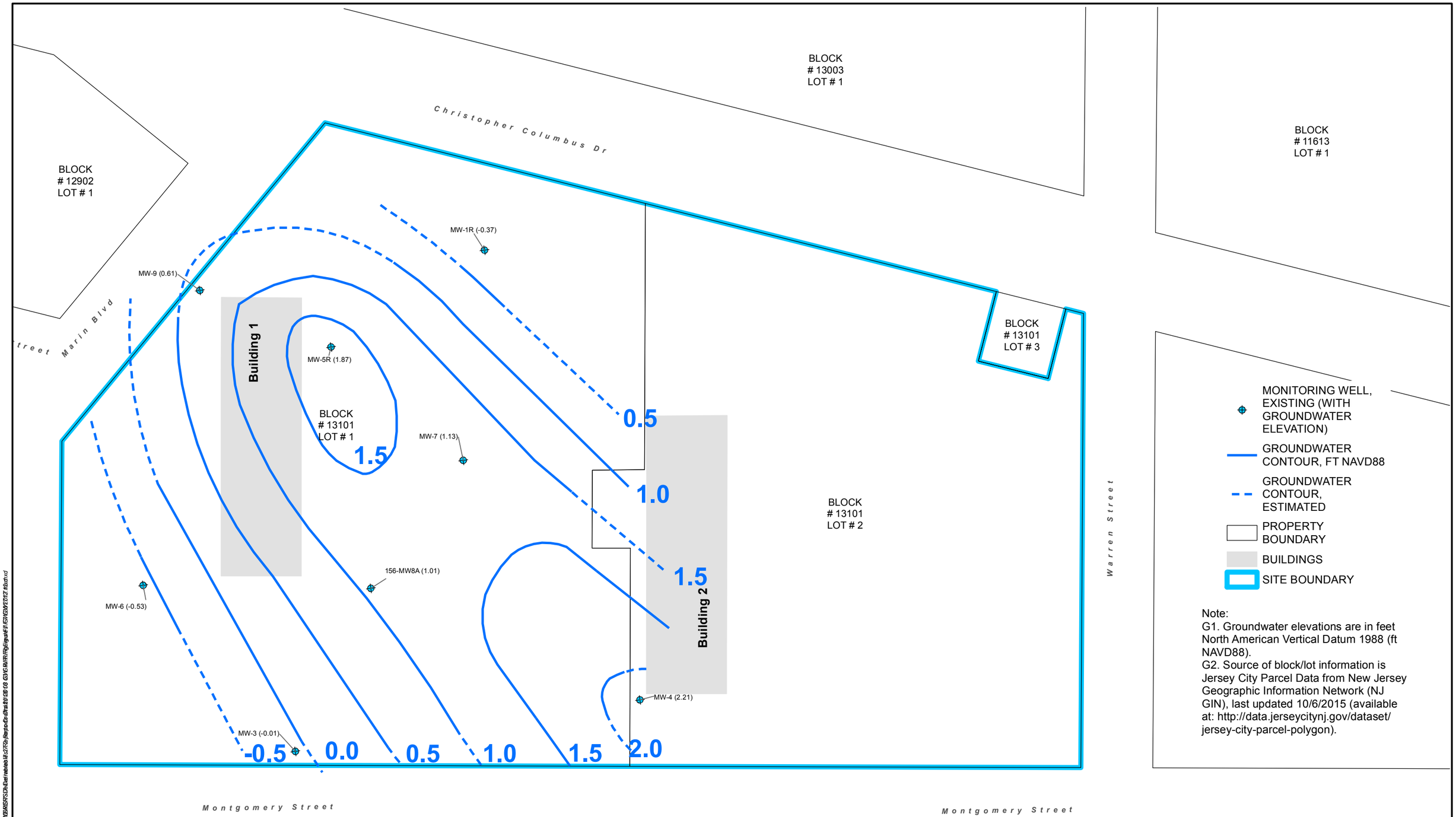
AECOM

PPG
SITE 156
METROPOLIS TOWERS
JERSEY CITY, NEW JERSEY

DATE: 6/8/2018 | DRWN: CH

SHALLOW GROUNDWATER ZONE CONTOURS NOVEMBER 21, 2017

FIGURE: 6



Note:
G1. Groundwater elevations are in feet North American Vertical Datum 1988 (ft NAVD88).
G2. Source of block/lot information is Jersey City Parcel Data from New Jersey Geographic Information Network (NJ GIN), last updated 10/6/2015 (available at: http://data.jerseycitynj.gov/dataset/jersey-city-parcel-polygon).

AECOM

N
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0 50 100 200 300 Feet

PPG
SITE 156
METROPOLIS TOWERS
JERSEY CITY, NEW JERSEY

DATE: 6/8/2018 | DRWN: CH

SHALLOW GROUNDWATER ZONE CONTOURS
DECEMBER 21, 2017

FIGURE: 7

Appendices

(Provided on CD)

Appendices

Appendix A

Site Remediation Program Forms

New Jersey Department of Environmental Protection
Site Remediation 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 Site 156

AKAs: HCC Site 156; Metropolis Towers; Gregory Park Apartments; 270 Henderson St.; 280 Gregory Park Plaza

Street Address: 270-280 Luis Munoz Marin Blvd (aka 270-280 Henderson Street)

Municipality: Jersey City (*Township, Borough or City*)

County: Hudson Zip Code: 07302

Program Interest (PI) Number(s): G000008770

Case Tracking Number(s) for this submission: 104063

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: 619397 Northing: 686772

List current Municipal Block and Lot Numbers of the Site:

Block # 13101	Lot #(s) 1	Block #	Lot #(s)
Block # 13101	Lot #(s) 2	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.state.nj.us (attach NJDEP confirmation email); or
   - ☐ CD (attach to this submission)
   - ☐ Not Applicable – No EDD
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	☒	☐	☐				
Site Investigation Report	☒	☐	☐				
Remedial Investigation Report	☐	☒	☐	09/29/1993			
Remedial Action Work Plan	☐	☐	☒	11/16/2012		01/22/2013	
Remedial Action Report	☐	☐	☒	03/29/2018			
Response Action Outcome	☒	☐	☐				
Other Submissions							
Alternative Soil Remediation Standard and/or Screening level Application Form	☐	☐	☒	03/29/2018			
Case Inventory Document		☒					
Classification Exception Area / Well Restriction Area (CEA/WRA)	☒	☐	☐				
Discharge to Ground Water Permit by Rule Authorization Request	☒	☐	☐				

IEC Engineered System Response Action Report	☒	☐	☐				
Immediate Environmental Concern Report	☒	☐	☐				
LNAPL Interim Remedial Measure Report	☒	☐	☐				
Public Notification	☐	☐	☒				
Receptor Evaluation	☐	☒	☐				
Technical Impracticability Determination	☒	☐	☐				
Vapor Concern Mitigation Report	☒	☐	☐				
Permit Application – list:	☐						
Soil Erosion and Sediment Control		☐	☒	07/18/2017			
Treatment Works Approval		☐	☒	08/19/2013			
		☐	☐				
		☐	☐				
Radionuclide Remedial Action Report	☒	☐	☐				
Radionuclide Remedial Action Workplan	☒	☐	☐				
Radionuclide Remedial Investigation Report	☒	☐	☐				
Radionuclide Remedial Investigation Workplan	☒	☐	☐				

SECTION C. SITE USE

Current Site Use: (*check all that apply*)

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

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

- ☐ Industrial
- ☒ Residential
- ☒ Commercial
- ☐ School or child care
- ☐ Park or recreational use
- ☐ Vacant
- ☐ Government
- ☐ Future site use unknown
- ☐ Other: _____

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. PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: PPG Industries, Inc.

Representative First Name: Mark Representative Last Name: Terril

Title: Corporate Director, Environmental Affairs

Phone Number: (412) 434-2708 Ext: Fax:

Mailing Address: 440 College Park Drive

City/Town: Monroeville State: PA Zip Code: 15146

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: Mark Terril Date: June 8, 2018

Name/Title: 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.

SECTION G. LICENSED SITE REMEDIATION PROFESSIONAL INFORMATION AND STATEMENT

LSRP ID Number: _____

First Name: _____ Last Name: _____

Phone Number: _____ Ext: _____ Fax: _____

Mailing Address: _____

City/Town: _____ 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).

I certify that I am a Licensed Site Remediation Professional authorized pursuant to N.J.S.A. 58:10C to conduct business in New Jersey. As the Licensed Site Remediation Professional of record for this remediation, I:

[SELECT ONE OR BOTH OF THE FOLLOWING AS APPLICABLE]:

☐ *directly oversaw and supervised all of the referenced remediation, and\or*

☐ *personally reviewed and accepted all of the referenced remediation presented herein.*

I believe that the information contained herein, and including all attached documents, is true, accurate and complete.

It is my independent professional judgment and opinion that the remediation conducted at this site, as reflected in this submission to the Department, conforms to, and is consistent with, the remediation requirements in N.J.S.A. 58:10C-14.

My conduct and decisions in this matter were made upon the exercise of reasonable care and diligence, and by applying the knowledge and skill ordinarily exercised by licensed site remediation professionals practicing in good standing, in accordance with N.J.S.A. 58:10C-16, in the State of New Jersey at the time I performed these professional services.

I am aware pursuant to N.J.S.A. 58:10C-17 that for purposely, knowingly or recklessly submitting false statement, representation or certification in any document or information submitted to the board or Department, etc., that there are significant civil, administrative and criminal penalties, including license revocation or suspension, fines and being punished by imprisonment for conviction of a crime of the third degree.

LSRP Signature: _____ Date: _____

LSRP Name/Title: _____

Company Name: _____

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 Program

RECEPTOR EVALUATION (RE) FORM

Date Stamp
(For Department use only)

SECTION A. SITE

Site Name: Hudson County Chromate 156

Program Interest (PI) Number(s): G000008770

Case Tracking Number(s) for this submission: 104063

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

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

	On-site	Off-site
None of the following	☐	☐
Residences or residential property	☒	☒
Public or Private Schools grades K-12	☐	☐
Child care centers	☐	☒
Public parks, playgrounds or other recreation areas	☐	☐
Other sensitive population use(s) Explain _____	☐	☐

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. See Attachment A-1

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

☐ Industrial ☒ Residential ☒ Commercial ☐ Agricultural
☐ School or child care ☐ Government ☐ Park or recreational use
☐ Vacant ☐ Other: _____

3. Planned future site uses and off-site use within 200 ft of site boundary (check all that apply):

☐ Industrial ☒ Residential ☒ Commercial ☐ Agricultural
☒ School or child care ☒ Government ☐ Park or recreational use
☒ Vacant ☒ Other: No specific development plans for the site

Provide a map depicting the location of the proposed changes in land use.

SECTION C. DESCRIPTION OF CONTAMINATION

1. Identify if any of the following exist at the site (check all that apply):
   - ☐ 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 high concentration source materials not identified above (e.g., buried drums, containers, unsecured friable asbestos)

     Explain: _____

   * LNAPL – measured thickness of .01 feet or more

   **DNAPL – See US EPA DNAPL Overview

2. Soil Migration Pathway

   Has soil contamination been delineated to the applicable Direct Contact Soil Remediation Standard? ☒ 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.

SECTION D. GROUND WATER USE

1. Has the requirement for ground water sampling been triggered? ☒ Yes ☐ No ☐ Unknown
   If "No," proceed to Section F. If "Unknown," explain:

   _____

2. Is Ground water contaminated above the Ground Water Remediation Standards [N.J.A.C.7:9C]? ☒ Yes ☐ No ☐ Unknown

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes," provide the date that the laboratory data was available and confirmed contamination above the Ground Water Remediation Standards. Date: 09/29/1993

   If "Unknown," explain: _____

   If "No," or awaiting laboratory data proceed to Section F.

3. Has ground water contamination been delineated to the applicable Remediation Standard? ☒ Yes ☐ No
4. Has a well search been completed? See Attachment B-1 ☒ Yes ☐ No

   Date of most recent or updated well search: 06/10/2018

   Identify if any of the following conditions exist based on the well search [N.J.A.C.7:26E-1.14(a)] (check all that apply):
   - ☐ Potable wells located within 500 feet from the downgradient edge of the currently known extent of contamination.
   - ☐ Potable well located 250 feet upgradient or 500 feet side gradient of the currently known extent of contamination.
   - ☐ Ground water contamination is located within a Tier 1 wellhead protection area (WHPA).

5. 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.state.nj.us. ☒ Yes ☐ No

   If "No," explain: _____

6. Are any private potable or irrigation wells located within ½ mile of the currently known extent of contamination? ☒ Yes ☐ No

   If "Yes," was a door to door survey completed? ☐ Yes ☐ No

   If survey was not completed explain: * See note below.

7. Has sampling been conducted of ☐ potable well(s) and /or ☐ non-potable use well(s)? ☐ Yes ☒ No

   If "No," provide justification then proceed to Section E.

   * See note below.

* A survey and sampling was not conducted because the groundwater remedial investigation results indicate that the remedial action was successful in reducing CCPW-related contaminants in groundwater to concentrations less than the applicable GWQS with the exception of one TI concentration exceeding the GWQS that is not attributed to CCPW metals in the intermediate well 156-MW8B. Also, both wells are 200 feet deep and are likely to be bedrock wells. Jersey City is serviced by public water supply.

8 Has contamination been identified in potable well(s) above Ground Water Remediation Standards that is not suspected to be from the site? (If "Yes," provide justification) ..... ☐ Yes ☐ No

_____

9 Has contamination been identified in potable well(s) that is above the Ground Water Remediation Standards or Federal Drinking Water Standards? ..... ☐ Yes ☐ No

Provide date laboratory data was received: _____

Or ☐ awaiting laboratory data with the expected due date: _____

If "Yes" for potable well contamination **not attributable to background**, follow the IEC Guidance Document at http://www.nj.gov/dep/srp/guidance/index.html#iec for required actions and answer the following:

Has an engineered system response action been completed on all receptors? ..... ☐ Yes ☐ No

Provide a brief narrative description:

Date completed: _____ NJDEP Case Manager: _____

10. Were Non-potable use well(s) sampled and results were above Class II Ground Water Remediation Standards? ..... ☐ Yes ☐ No

Provide date laboratory data was received: _____

Or ☐ awaiting laboratory data with the expected due date: _____

11. Has the ground water use evaluation been completed? ..... ☐ Yes ☐ No

SECTION E. VAPOR INTRUSION (VI)

1. Contaminants present in ground water exceed the Vapor Intrusion Ground Water Screening Levels that trigger a VI evaluation. (see NJDEP Vapor Intrusion Technical Guidance). ... ☐ Yes ☒ No ☐ Unknown

Or ☐ Awaiting laboratory data and the expected due date: _____

Provide the date that the laboratory data was available and confirmed contamination above the Vapor Intrusion Trigger Levels. Date: _____

2. Other existing conditions that trigger a VI evaluation. (see NJDEP Vapor Intrusion Technical Guidance)

☐ Wet basement or sump containing free product or ground water containing volatile organics
☐ Methane generating conditions causing oxygen deficient or explosion concern
☐ Other human or safety concern from the VI pathway (i.e. elemental mercury, unsaturated contamination, elevated soil gas or indoor vapor (explain):

If you answered "No," or awaiting laboratory data to Question 1., *and* did not check any boxes in Question 2, proceed to Section F, "Ecological Receptors", otherwise complete the rest of this section.

3. Has ground water contamination been delineated to the applicable Ground Water Vapor Screening Level? ..... ☐ Yes ☐ No

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

5. Identify and locate on a scaled map any buildings/sensitive populations that exist within the following distances from ground water contamination with concentrations above the Vapor Intrusion Ground Water Screening Levels or specific threats (check all that apply):

☐ 30 feet of petroleum free product or dissolved petroleum hydrocarbon contamination in ground water
☐ 100 feet of any non-petroleum free product or any non-petroleum dissolved volatile organic ground water contamination
☐ No buildings exist within the specified distances

6. The vapor intrusion pathway is a concern at or adjacent to the site (if "No," attach justification) ..... ☐ Yes ☐ No

7. Has soil gas sampling of the building(s) been conducted? ☐ Yes ☐ No ☐ N/A
   If "No," or "N/A," proceed to #12

8. Has indoor air sampling been conducted at the identified building(s)? ☐ Yes ☐ No
   If "No," proceed to #12

9 Has indoor air contamination been identified but not suspected to be from the site?
   (if "Yes," attach justification) ☐ Yes ☐ No

10. Indoor air results were above the NJDEP's Rapid Action Levels. ☐ Yes ☐ No

   Provide the date that the laboratory data was available. Date: _____

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes" to #10 above, follow the IEC Guidance Document at
   http://www.nj.gov/dep/srp/guidance/index.html#iec **for required actions.**

   The IEC engineering system response for control was implemented for all
   identified structures ☐ Yes ☐ No

   Date: _____ NJDEP Case Manager: _____

11. Indoor air sampling was conducted and results were above the NJDEP's Indoor Air Screening
   Levels but at or below the Rapid Action Levels ☐ Yes ☐ No

   Provide the date that the laboratory data was available. Date: _____

   Or ☐ Awaiting laboratory data with the expected due date: _____

   If "Yes" to #11 above, answer the following:

   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: _____

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) has been conducted? [N.J.A.C. 7:26E-1.16] ☒ Yes ☐ No

   Date conducted: 01/12/2016

2. Do the results of an EE trigger a remedial investigation of ecological receptors? [N.J.A.C. 7:26E-4.8] ☐ Yes ☒ No

3. Has a remedial investigation of ecological receptors been conducted? ☐ Yes ☒ No

   Date conducted: _____

4. Provide the following information for any surface water body on or within 200 feet of the site:

Surface Water Body Name	Stream Classification	Antidegradation Designation	Trout Production	Trout Maintenance
None identified			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐
			☐	☐

5. Does the site contain any features regulated by the Land Use Regulation Program (LURP)? (e.g. wetlands, flood hazard area, tidelands, etc.). ☒ Yes ☐ No

   If "Yes," identify the type(s) of features: Special flood hazard area subject to inundation by the 1% annual chance flood

6. Have any formal LURP jurisdiction letters or approvals been issued for the site? ☐ Yes ☒ No

   If "Yes," what is the LURP Program Interest (PI) number(s) for the site? _____

7. Have any applications for formal LURP jurisdiction letters or approvals been submitted the NJDEP? ☐ Yes ☒ No

   If "Yes," what is the LURP Program Interest (PI) number(s) for the site? _____

8. Is free product or residual product located within 100 feet from an ecological receptor? ☐ Yes ☒ No

9. Does available data indicate an impact on Ecological receptor(s), Surface water, or Sediment? ☐ Yes ☒ No

   If "Yes,"

   a) Check all that apply:

      ☐ Ecological receptor(s) ☐ Surface water ☐ Sediment

   b) Submit with this evaluation either a technical document that includes contaminant summary information, or a description of the type of contamination, a schedule, and a description of all actions to be taken to mitigate exposure.

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

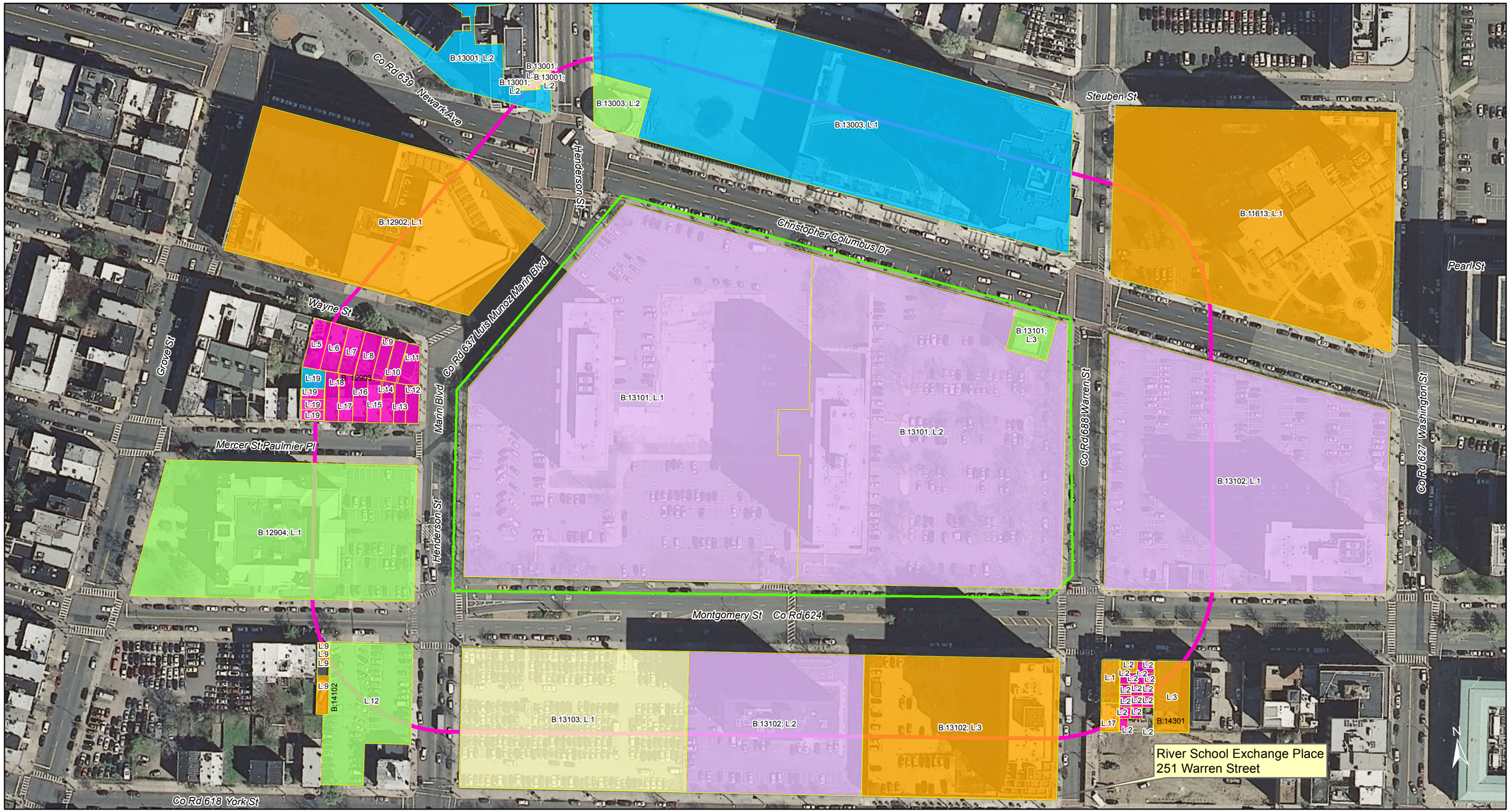
Attachment A-1

List and Map of Properties Within 200 feet of Site

Table A-1
List of Properties Within 200-feet of Site

Sensitive Properties within 200 Feet of Site								
MUN	**BLOCK**	**LOT**	**PROPERTY CLASS**	**PROPERTY LOCATION**	**OWNER**	**STREET**	**CITY, STATE**	**ZIP CODE**
906	13001	2	1 Vacant	102 COLUMBUS DR.	VARIOUS OWNERS	102 COLUMBUS DR.	JERSEY CITY, NJ	07302
906	13103	1	1 Vacant	155 MONTGOMERY ST.	EDISON MONTGOMERY, LLC	100 WASHINGTON ST.	NEWARK, NJ	07102
906	12903	10	2 Residential	5 WAYNE ST.	JADHAV, ANIRUDHA	5 WAYNE ST.	JERSEY CITY, N.J.	07302
906	12903	11	2 Residential	3 WAYNE ST.	MEHTA, PUNEET & SONPREET	3 WAYNE ST.	JERSEY CITY, N.J.	07302
906	12903	12	2 Residential	2 MERCER ST.	MCCORKLE, DEVON J.	2 MERCER STREET	JERSEY CITY, N.J.	07302
906	12903	13	2 Residential	4 MERCER ST.	CAPRIHOUSE LLC.	4111 QUEENS BLVD	SUNNYSIDE, N.Y.	11104
906	12903	14	2 Residential	4.5 MERCER STREET	WOODS, TONY & TRAIKOS, STEPHANIE	4.5 MERCER ST.	JERSEY CITY, NJ	07302
906	12903	15	2 Residential	6 MERCER ST.	COCKRELL, CURTIS & SANDRA	6 MERCER STREET	JERSEY CITY, N.J.	07302
906	12903	16	2 Residential	8 MERCER ST.	DESTIN, ANNA V.	8 MERCER ST.	JERSEY CITY, N.J.	07302
906	12903	17	2 Residential	10 MERCER ST.	RAMOS, ANTHONY & NANCY	10 MERCER ST.	JERSEY CITY, N.J.	07302
906	12903	18	2 Residential	12 MERCER ST.	LEE, JAY & WU, JENNY	640 OVERHILL ROAD	SOUTH ORANGE, NJ	07079
906	12903	19	2 Residential	14 MERCER ST.	ZHANG, NING & YU, LU	14 MERCER ST. #3	JERSEY CITY, N.J.	07302
906	12903	19	2 Residential	14 MERCER ST.	SAVOV, PAVLIN & MARGARITA	14 MERCER STREET #2	JERSEY CITY, N.J.	07302
906	12903	19	2 Residential	14 MERCER ST.	DARSNEY, BENJAMIN & NICOLE	14 MERCER STREET #1	JERSEY CITY, N.J.	07302
906	12903	5	2 Residential	15 WAYNE ST.	WANG, CASEY & XIE, CHENYUE	227 8TH ST #1	JERSEY CITY, NJ	07302
906	12903	6	2 Residential	13 WAYNE ST.	MAI, WENDY	13 WAYNE ST.	JERSEY CITY, N.J.	07302
906	12903	7	2 Residential	11 WAYNE ST.	GHOUSIA, LLC %DATA REALTY,LLC	250 NEWARK AVENUE	JERSEY CITY, N.J.	07302
906	12903	8	2 Residential	9 WAYNE ST.	FREMANTLE URF LLC %DIXON ADVISORY	1000 PLAZA TWO, 10 FL	JERSEY CITY, NJ	07311
906	12903	9	2 Residential	7 WAYNE ST.	7 WAYNE ST.,LLC	7 WAYNE ST.	JERSEY CITY, N.J.	07302
906	14301	2	2 Residential	99 MONTGOMERY ST.	VARIOUS OWNERS		JERSEY CITY, NJ	07302
906	13101	1	4C Apartment/cooperative	280 GREGORY PARK PLAZA	METROPOLIS TOWERS APT. CORP. MGT.	280 GREGORY PARK PLAZA	JERSEY CITY, NJ	07302
906	13101	2	4C Apartment/cooperative	270 GREGORY PARK PLAZA	METROPOLIS TOWERS APT. CORP. MGT.	280 GREGORY PARK PLAZA	JERSEY CITY, NJ	07302
906	13102	1	4C Apartment/cooperative	100 MONTGOMERY ST.	PH RESIDENTIAL OWNER LLC See Note 1	7 THOMAS DRIVE	CUMBERLAND FORESIDE, M.E.	04110
906	13102	2	4C Apartment/cooperative	95 MONTGOMERY ST.	See Note 2			
Other Properties within 200 Feet of Site								
906	11613	1	4A Commercial	1 EVERTRUST PLAZA	EVERGREEN AMERICA CORPORATION	ONE EVERTRUST PLAZA	JERSEY CITY, N.J.	07302
906	12902	1	4A Commercial	95 COLUMBUS DR.	WELLS REIT II-INT'L FNCL TW%M. CALI	P.O. BOX 56607	ATLANTA,GA	30343
906	13102	3	4A Commercial	75 MONTGOMERY ST.	See Note 3			
906	14102	9	4A Commercial	183 MONTGOMERY ST.	VANTAGE PROPERTIES 183,LLC	183 MONTGOMERY ST.	JERSEY CITY, N.J.	07302
906	14301	1	4A Commercial	103 MONTGOMERY ST.	CP3, INC. % ALAN LAU	270 MARIN BLVD., #10E	JERSEY CITY, NJ	07302
906	14301	17	4A Commercial	260-262 WARREN ST.	CP3, INC. % ALAN LAU	270 MARIN BLVD., #10E	JERSEY CITY, NJ	07302
906	14301	2	4A Commercial	99 MONTGOMERY ST.	MONTGOMERY PEDIATRIC & DENTAL, LLC	99 MONTGOMERY ST. COM. 1	JERSEY CITY, NJ	07302
906	14301	3	4A Commercial	95 MONTGOMERY ST.	95 MONTGOMERY,LLC%POINT CAP.DEV.LLC	PO BOX 4	JERSEY CITY, NJ	07303
906	12904	1	15C Exempt Public	280 GROVE STREET	CITY OF JERSEY CITY	280 GROVE ST.	JERSEY CITY, NJ	07302
906	13003	2	15C Exempt Public	90 COLUMBUS DR.	PORT AUTHORITY TRANS-HUDSON CORP.	225 PARK AVE., 15TH FLR	NEW YORK, NJ	10006
906	13101	3	15C Exempt Public	COLUMBUS DR.	PORT AUTHORITY TRANS-HUDSON CORP	225 PARK AVE., 15TH FLR	NEW YORK, NY	10006
906	14102	12	15C Exempt Public	179 MONTGOMERY ST.	CITY OF JERSEY CITY	280 GROVE ST.	JERSEY CITY, N.J.	07302
906	12903	19	15F Exempt Miscellaneous	14 MERCER ST.	14 MERCER ST.CONDOMINIUM ASSOCIATIO	14 MERCER ST.	JERSEY CITY, NJ	07302
906	13001	2	15F Exempt Miscellaneous	100-102 COLUMBUS DR.	GROVE POINTE COMMUNITY ASSOCIATION	P.O. BOX 6872	BRIDGEWATER, NJ	08807
906	13003	1	15F Exempt Miscellaneous	50 COLUMBUS DR.	100 COLUMBUS CONDO.OWNER'S ASSOC.,	50 WASHINGTON ST.	HOBOKEN, NJ	07030
906	14301	2	15F Exempt Miscellaneous	99 MONTGOMERY ST.	99 MONTGOMERY ST.CONDOMINIUM ASSOC.	99 MONTGOMERY ST.	JERSEY CITY, NJ	07302

1. In http://tax1.co.monmouth.nj.us, the property location is 8 HORIZON WAY ST. and the lot is 1.01.
2. In www.njtaxrecords.net, the block is 14301 and the lot is 3 for this property location.
3. In www.njtaxrecords.net, the block is 14301 and the lot is 7 for this property location.



0 50 100
Feet

- SiteBoundary
- 200 ft Buffer
- Parcels within 200ft of Site Boundary
- 1 Vacant
- 2 Residential
- 4A Commercial
- 4C Apartment/Cooperative
- 15C Exempt Public
- 15F Exempt Miscellaneous

Receptors Evaluation - Land Use

Hudson County Chromate 156
Metropolis Towers
Jersey City, New Jersey

SCALE:	DATE:	PROJECT NUMBER:	PATH AND FILE NAME:
1:1,565	8/8/2017	60290456	F:\Projects\PPG\SITE 156 - METRO TOWERS\7-Deliverables\7.2-Reports-Drafts\2017 08 RAR\Appendices\C Forms\3 RE Form\A Parcels Map.mxd

AECOM

AECOM Environment
30 KNIGHTSBRIDGE ROAD, SUITE 520
PISCATAWAY , NJ 08854
PHONE: (732) 564-3200
FAX: (732) 369-0122
WEB: HTTP://WWW.AECOM.COM

FIGURE NUMBER:

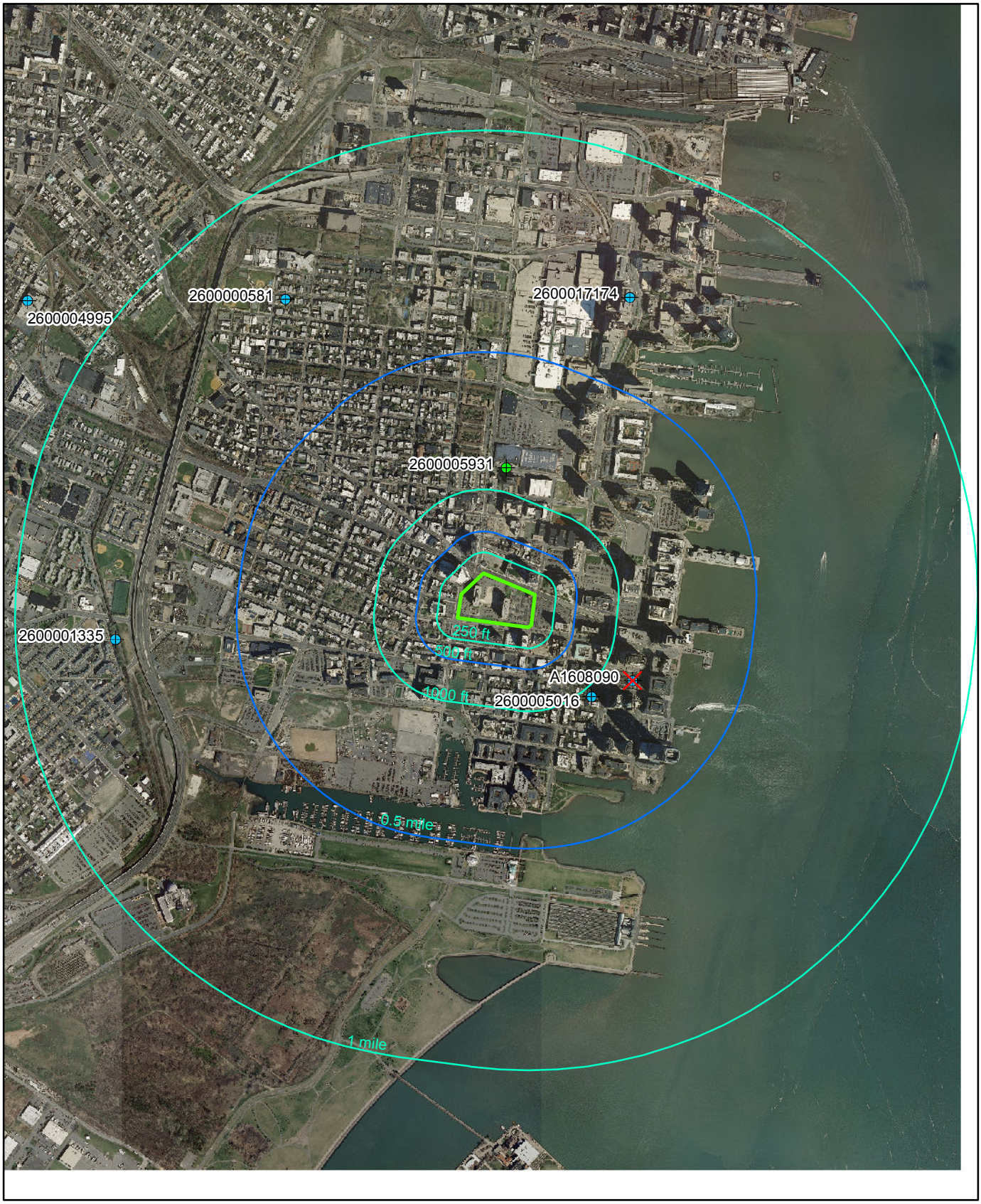
A-1

SHEET NUMBER:

1 of 1

Attachment B-1

Results of Well Search



Permit numbers are shown.

N
W E
S
1,600
Feet

Figure B-1
Well Locations

Hudson County Chromate 156
Metropolis Towers
Jersey City, New Jersey

8/8/17

Industrial
Public Non-Community
Decommissioning

SITE NAME	Hudson County Chromate 156
SITE STREET ADDRESS	270-280 Luis Munoz Marin Blvd
SITE COUNTY (select)	Hudson
SITE MUNICIPALITY (select)	Jersey City
PROGRAM INTEREST (PI) ID # :	G000008770
SOURCE COORDINATE X	619397
SOURCE COORDINATE Y	686772
GROUNDWATER FLOW DIRECTION USED (if any)	
WERE APPLICABLE WELL TYPES FOUND? (Yes/No)	Yes
IS THIS SUBMISSION AN UPDATE? (Yes/No)	Yes
AUTHOR (name of company)	AECOM
AUTHOR STREET ADDRESS (include town and zip code)	30 Knightsbridge Road, Suite 520 Piscataway, NJ 08854
LSRP LICENSE NUMBER OVERSEEING WORK	Not Available - Direct Oversight
LSRP NAME OVERSEEING WORK	Claire Hunt
PROFESSIONAL WHO PREPARED SUBMISSION	claire.hunt@aecom.com
EMAIL CONTACT	845-425-4980
PHONE CONTACT	

Download_Document	Permit_Number	Well_Use	Potentially_Potable	Document	Date (permitted/drilled	Physical_Address	County	Municipality	Block	Lot	Location_Method
	A1608090	Industrial	Yes	Decommissioning	9/16/2016	99 Hudson St	Hudson	Jersey City	14507	1	GPS
	2600001335	Industrial	Yes	Record	4/18/1956	GRAND STREET	Hudson	Jersey City			Prop Loc - Dig Image
	2600000581	Industrial	Yes	Permit	11/5/1952		Hudson	Jersey City			Prop Loc - Hard Copy
	2600000581	Industrial	Yes	Record	12/9/1952	9TH STREET	Hudson	Jersey City			Prop Loc - Dig Image
	2600005016	Industrial	Yes	Permit	3/5/1981		Hudson	Jersey City	36	1A	Prop Loc - Hard Copy
	2600004995	Industrial	Yes	Record	3/31/1981	BALDWIN AVENUE	Hudson	Jersey City	1880	12B	Prop Loc - Dig Image
	2600005931	Public Non-Community	Yes	Permit	12/7/1982		Hudson	Jersey City	2L15	1507	Prop Loc - Hard Copy
	2600017174	Industrial	Yes	Permit	8/25/1989		Hudson	Jersey City	20	2.1	Prop Loc - Hard Copy
	2600017174	Industrial	Yes	Record	1/18/1990	111 PAUONIA AVENUE	Hudson	Jersey City	20	2.1	Prop Loc - Dig Image

Search Date: 6/10/2018

Download_ Document	Permit_Number	Easting_X	Northing_Y	Distance _(feet)	Depth (feet)	Capacity (gal/min)	COORD_ METHOD	TOP_OPEN _INT	BOT_OPE N_INT	STATIC _LEVEL	STATUS	WELL_SAMPLED?
	A1608090	621091	685833	1936.84								
	2600001335	614920	686324	4499.63	335	0						
	2600000581	617488	690992		100	125						
	2600000581	616952	690382	4359.86	99	0						
	2600005016	620596	685645		200	65						
	2600004995	613873	690366	6590.55	1000	0						
	2600005931	619580	688372		200	8						
	2600017174	621568	691013		1000	150						
	2600017174	621058	690403	3993.26	1000	0						

Search Date: 6/10/2018

From:	Foster, Celeste
To:	Hunt, Claire
Subject:	FW: G000008770, RPC040001, G000008770, HB224509, (Directory: 20180405) - Passed
Date:	Friday, April 06, 2018 5:54:12 PM
Attachments:	DTST.TXT EDSA_Error_Log.html erdtst-7-1-8.txt erresult-7-1-8.txt ersample-7-1-8.txt HZRESULT.TXT HZSAMPLE.TXT SampleLoc-7-1-8.KML

From: DEP SRPEDD [mailto:SRPEDD@dep.nj.gov]
Sent: Friday, April 06, 2018 5:07 PM
To: Foster, Celeste
Subject: G000008770, RPC040001, G000008770, HB224509, (Directory: 20180405) - Passed

The EDD submission via email from (Celeste.Foster@aecom.com) on (4/5/2018 8:34:16 PM) with the subjectline "G000008770, 104063".

The following identifiers were in the DTST file:

- Directory: 20180405
- DESC: Metro Towers
- SRPID: G000008770
- Submit Date: 2018/04/05

This submission has been issued an SRP Catalog ID: HB224509

Submission status: Passed.

Please do **not** resubmit.

EDD data deliverable must be submitted only once.
- To fulfill Key Document requirements attach only a copy of this email as an appendix to the document.
- Do **not** resubmit any approved EDD deliverable as part of a portal submission.

Email ID: OEM_11532
Sub ID:SUB_55775

Case Name: Hudson County Chromium Site 156

PI #: G000008770

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
Site 156 - AOC 1	Other areas of concern - Other discharge area	CCPW Impacts to Soil (Beyond AOC 3 Footprint)	Yes	RAR	3/29/2018			Soil	Metals	Not Applicable	Not Applicable	AOC Specific ARS and Remediation Standards	Ingestion/Dermal
Site 156 - AOC 2	Other areas of concern - Other discharge area	CCPW Impacts to Groundwater	Yes	RI	4/12/2018			Ground Water	Metals	Not Applicable	Not Applicable	Remediation Standards	Ground Water
Site 156 - AOC 3	Other areas of concern - Any area suspected of containing contaminants	CCPW Impacts to Building No. 2 Boiler Room – Concrete and Soils	Yes	RAR	12/21/2017			Mixed Media	Metals	Not Applicable	Not Applicable	Remediation Standards	Ingestion/Dermal

Case Name: Hudson County Chromium Site 156

PI #: G000008770

Case Inventory Document Version 1.4 02/23/17

AOC ID	AOC Type	Additional Exposure Route	RA Type	Additional RA Type	Additional RA Type	Was an Order of Magnitude Evaluation Conducted?	Activity
Site 156 - AOC 1	Other areas of concern - Other discharge area	Inhalation	Excavation			Yes	Soil remedial action (RA) conducted in 2013-14 per the approved 11/2012 remedial action work plan (RAWP). Draft remedial action report (RAR) submitted to NJDEP 10/2014. Revised RAR figures and tables submitted 01/2015 and 04/2015. Residual hexavalent chromium (Cr+6) soil contamination identified during figure preparation. NJDEP approved work plans submitted 2/2016. In 04/2016, test pits excavated at borings PPG1-T02 and LA1-1; and soil samples collected to provide additional confirmation of 2013-14 RA and to remove soil contamination at borings LB3 and PS3-1, but additional Cr+6 exceedances found at CS LB3, CS PS3-1 and CS LB5. In 10/2016, soil samples from test pit excavated at CS LB3 and CS PS3-1, and borings excavated around CS LB5 found additional Cr+6 exceedances. NJDEP approved work plan submitted 3/1/2017 for Cr+6 delineation. Excavation of residual conducted in 09-10/2017. RAR submitted 3/29/2017.
Site 156 - AOC 2	Other areas of concern - Other discharge area					No	1993 - Total chromium (Cr) and Cr+6 were detected at concentrations of up to 1,630 µg/L and 476 µg/L, respectively. In 2006, well MW-2 50 µg/L for hexavalent chromium. In 09/2014, Cr was detected at 188 µg/Lin a grab groundwater sample from a test pit in the Bldg No. 2 Boiler Room. Well MW-2 was removed during 2013-14 RA and MW-5 was removed in 04/2016 test pit. Wells MW-5R, MW-6 through MW-10 were installed in 04/2016. Groundwater sampled from all site wells in 05/2016 and 06/2016. Groundwater exceeded GWQS for Cr at MW-8. There were no other exceedances. MW-8 removed by CS LB3 test pit and replaced with MW-8R in 10/2016. Shallow well 156-MW8A and intermediate well 156-MW8A were installed in 11/2017 and sampled 11/2017 and 12/2017. Cr compliant with GWQS. Thallium exceedance of GWQS in 156-MW8B is not chrome-related.
Site 156 - AOC 3	Other areas of concern - Any area suspected of containing contaminants	Inhalation	Containment	Other (specify in Activity column)		No	The area of Cr+6 contamination in the concrete floor and column, as well as underlying soils, has been delineated as documented in the remedial investigation report (RIR), and remediated pursuant to the RAWP which includes a Deed Notice with Engineering Controls. The RIR/RAWP was submitted to NJDEP in 11/2017. The RAR is on hold pending repairs to the engineering control.