# Appendix E

## Compliance Averaging Evaluation

# MEMO

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Date:

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Subject:

Attainment of Remediation Standards – Antimony, Nickel, and Thallium

Non-Garfield Avenue Group Chromium Site 107

## INTRODUCTION

This memorandum provides documentation of attainment of soil sample compliance for antimony, nickel and thallium with the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standard (RDCSRS) and default Impact to Groundwater Soil Screening Level (IGWSSL) for Majority Site AOC-1A soil samples from Non-Garfield Avenue Group (NGA) Chromium Site 107 in Jersey City, Hudson County, New Jersey in accordance with the NJDEP *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria* (September 24, 2012, Version 1.0).

# ANTIMONY

## Evaluation of Remaining Soil Samples – Antimony

The RDCSRS for antimony is 31 milligrams per kilogram (mg/kg). The IGWSSL is 6 mg/kg. Post-excavation soil sampling analytical results were evaluated for exceedances of antimony as follows:

- No remaining soil samples exceeded the RDCSRS for antimony.
- One soil sample in the unsaturated zone exceeded the IGWSSL, sample BS-E11, where antimony was detected at 19.5 mg/kg. Compliance averaging was performed on this sample. The unsaturated zone includes samples with end elevation greater than or equal to 9.5 feet North American Vertical Datum of 1988 [NAVD88] as observed during Site 107 remedial excavation.
- Antimony was detected in exceedance of the IGWSSL in one additional soil sample (BS-F24 at 7.2 mg/kg). However, this soil sample is in the saturated zone, where delineation/remediation to the IGWSSL is inapplicable per the NJDEP requirements. Therefore, no additional evaluation was required for soil sample BS-F24.
- Antimony was reported with a reporting limit of 13 mg/kg (which is above the IGWSSL of 6 mg/kg) in soil sample BS-E23. However, this soil sample was reanalyzed, and antimony was below 1.4 mg/kg (below the IGWSSL). In addition, this soil sample was in the saturated zone. Therefore, no additional evaluation was required for soil sample BS-E23.
- Antimony had reporting limits of 8.6 and 8.0 mg/kg (which are above the IGWSSL of 6 mg/kg) in Remedial Investigation/Supplemental Investigation (RI/SI) soil samples DD003 (8.0-8.5) and DD004 (8.0-8.5), respectively. These two soil samples were in the unsaturated zone. If antimony were present, it would be expected to be co-located with hexavalent chromium (CrVI) or other Chromite Chemical Production Waste (CCPW) metals. Hexavalent chromium was not detected at concentrations greater than the chromium Soil Cleanup Criteria (CrSCC) in these samples, CCPW metals were not detected at concentrations greater than applicable RDCSRS or IGWSSL, and visual CCPW was not observed at these locations. In addition, antimony was not detected at concentrations greater than the IGWSSL at nearby samples collected at similar elevations: BS-I5A, BS-J5, or BS-K5. Additionally, laboratory report JB52631 states that the antimony detection limits for both samples were elevated due to dilution required for high interfering element. Although these lines of evidence indicate that antimony does not exceed the IGWSSL at DD003 and DD004, these two soil samples have been included in the compliance averaging evaluation for antimony in the unsaturated zone.

## Compliance Averaging – Antimony

The NJDEP guidance document entitled *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria* dated September 24, 2012 (Guidance), was used to determine the applicable compliance averaging option. The 75 percent/10 times procedure was used to demonstrate compliance with the IGWSSL within the AOC-1A soil excavation, shown on Figure E-1 (as the limit of Site 107 excavation). According to the Guidance, the 75 percent/10 times procedure can be used for the impact to ground water exposure pathway after a remedial action has been conducted.

### Area of Concern

The AOC-1A excavation is depicted on Figure E-1. It includes all soil samples analyzed for antimony within the unsaturated zone (sample end elevation greater than or equal to 9.5 feet NAVD88), and encompasses soil samples BS-E11, DD003, and DD004.

### Number of Soil Samples within AOC-1A

The excavated volume of soil within the unsaturated zone at AOC-1A was 49,077 cubic yards.

The number of post-excavation/remaining unsaturated soil samples analyzed for antimony within AOC-1A is 198 soil samples. The Guidance requires eight post-remedial samples for up to 125 cubic yards of excavated soil, 12 soil samples for up to 3,000 cubic yards of excavated soil, and 12 additional soil samples for up to 3,000 cubic yards of excavated soil thereafter. For the 49,077 cubic yards of soil, 196 soil samples are required.

A review of the 2013 Remedial Investigation Report (RIR) prepared by Dresdner Robin, indicates that exceedances of antimony above the IGWSSL were detected at varying soil sampling depths from the surface down to 12.5 feet below grade (Figure 10 of the 2013 RIR included in Attachment 1). Therefore, using all soil samples analyzed for antimony within the unsaturated zone is representative of the zone of impact prior to excavation.

### Soil Sampling Results Evaluation

Table E-1 presents a summary of the antimony soil sampling analytical results within the Majority Site AOC-1A unsaturated zone and evaluates the results against the 75 percent/10 times procedure. As depicted in Table E-1, antimony is not detected above 60 mg/kg (10 times the IGWSSL of 6 mg/kg) in any of the remaining soil samples within the unsaturated zone at AOC-1A. Antimony was detected below the IGWSSL of 6 mg/kg in 195 out of the 198 soil samples; thus, 98% of the samples are below the IGWSSL.

Based on the above, both requirements for the 75 percent/10 times are met for antimony within AOC-1A. This indicates that no additional remedial action is required for antimony in the unsaturated zone when the impact to groundwater pathway is considered.

## NICKEL

### Evaluation of Remaining Soil Samples – Nickel

The RDCSRS for nickel is 1,600 mg/kg. The Site-Specific IGWSRS (SS IGWSRS) for nickel is 855 mg/kg. Post excavation soil sampling analytical results were evaluated for exceedances of nickel as follows:

- Two soil samples exceeded the RDCSRS – soil sample BS-E23, where nickel was detected at 3,700 mg/kg, and soil sample BS-F24, where nickel was detected at 7,520 mg/kg. Compliance averaging was performed on these samples.
- No soil samples in the unsaturated zone exceeded the SS IGWSRS for nickel.

  Nickel was detected in exceedance of the SS IGWSSL in three saturated zone soil samples where delineation/remediation to the SS IGWSRS is inapplicable per the NJDEP requirements:

  - Soil sample BS-E23 discussed above, where nickel was detected at 3,700 mg/kg.
  - Soil sample BS-F24 discussed above, where nickel was detected at 7,520 mg/kg.

- Soil sample BS-G29, where nickel was detected at 1,550 mg/kg.

## Compliance Averaging – Nickel

The NJDEP Guidance was used to determine the applicable compliance averaging option. Compliance averaging using the spatially weighted average was used to demonstrate compliance with the RDCSRS at post-excavation soil sampling locations BS-E23 and BS-F24. According to the Guidance, spatially weighted average can be used for the soil ingestion-dermal exposure pathway.

### Functional Area

The functional area is depicted on Figure E-2. It encompasses soil samples BS-E23 and BS-F24. Nickel in all soil samples within the functional area (excluding BS-E23 and BS-F24) was below the RDCSRS of 1,600 mg/kg.

The size of the functional area is 10,859.42 square feet or 0.25 acres, which satisfies the Guidance requirements for the ingestion-dermal residential exposure pathway (nickel's RDCSRS is based on the ingestion-dermal pathway).

Vertically, the Guidance requires the designation of a surface zone (upper two feet), and a subsurface zone (greater than two feet). There are no remaining nickel impacts within the surface zone. The two soil samples where nickel exceeded the RDCSRS (BS-E23 and BS-F-24) were collected from a depth of 15.8 to 16.3 feet below ground surface (bgs), and 14.7 to 15.2 feet bgs, respectively. Therefore, only the subsurface zone has been considered herein.

### Number of Soil Samples within Functional Area

The functional area includes 17 soil samples, and 17 Thiessen Polygons. Table E-2 presents the spatially weighted average calculation for nickel within the functional area. The spatially weighted average of nickel within the functional area is 829.8 mg/kg, which is below the RDCSRS for nickel. This indicates that no additional remedial action is required for nickel.

In addition, the two soil samples exceeding RDCSRS (BS-E23 and BS-F24) are approximately 100 feet southwest of the area defined as the "Nickel Only Area" (Figure 3b of the RAR), and apparently from the same non-PPG fill source. As described in the *Nickel Exceedances in Fill Unrelated to CCPW* memo (Arcadis 2019), approved by NJDEP on March 21, 2019, material within the Nickel Only Area at depths greater than 11.0 to 12.0 NAVD88 is separate from the CCPW-impacted fill that PPG is responsible for remediating. Samples collected within the Nickel-Only Area exhibited an arithmetic mean nickel concentration of 705.2 mg/kg, and a maximum nickel concentration of 12,600 mg/kg, with corresponding non-detect hexavalent chromium (CrVI). Samples BS-E23 (elevation 4.7 to 4.2 NAVD88) and BS-F24 (elevation 4.9 to 4.4 NAVD88) were collected at elevations corresponding to the Nickel-Only Area material, nickel detections are within the concentration range observed in the Nickel-Only Area samples, exhibited a lack of visual CCPW, and corresponding CrVI was non-detect at both locations.

## THALLIUM

### Evaluation of Remaining Soil Samples – Thallium

The IGWSSL for thallium is 3 mg/kg. Post-excavation soil sampling analytical results were evaluated for exceedances of thallium as follows:

- Exceedances above the IGWSSL within the unsaturated zone (sample end elevation greater than or equal to 9.5 feet NAVD88): no soil sample concentrations above laboratory reporting limits in the unsaturated zone exceeded the IGWSSL.
- Thallium was reported with a reporting limit ranging from 4.0 mg/kg to 6.1 mg/kg (which are above the IGWSSL of 3 mg/kg) in five soil samples collected in the unsaturated zone: BS-E13D, ID002, DD003, DD004, and SW-D3 (6.0-6.5)A. If thallium were present in these samples, it would be expected to be co-located with CrVI or other CCPW metals. Hexavalent chromium was not detected at concentrations greater than the CrSCC, CCPW metals were not detected at concentrations greater than applicable RDCSRS or IGWSSL in these samples, and visual CCPW was not observed at these locations. In addition, thallium was not detected at concentrations greater than the IGWSSL at any sample onsite in both the saturated and unsaturated zones. Additionally, laboratory reports state that the thallium detection limits for all five samples were elevated due to dilution required for high interfering element. Based on these lines of evidence, there is no indication that thallium remains in place at concentrations greater than the IGWSSL.
- Thallium was reported with a reporting limit ranging from 3.1 mg/kg to 6.2 mg/kg (which are above the IGWSSL of 3 mg/kg) in four soil samples BS-D23, BS-I18, BS-I19, and BS-K11. However, these soil samples were reanalyzed, and thallium was below the IGWSSL. In addition, these soil sample were in the saturated zone. Therefore, no additional evaluation was required for these four soil samples.

## CONCLUSION

Compliance averaging was conducted on post-excavation soil samples exceeding applicable antimony and nickel screening levels in accordance with NJDEP's *Technical Guidance for the Attainment of Remediation Standards and Site-Specific Criteria* dated September 24, 2012. Compliance was demonstrated for all samples remaining on-site which exceed appliable RDCSRS and/or IGWSSL.

**Enclosures:**

Table E-1: Compliance Averaging Evaluation – Antimony

Table E-2: Compliance Averaging Evaluation – Nickel

Figure E-1: Soil AOC-1A – Antimony Exceedances in Remaining Vadose Zone Soil Samples

Figure E-2: Functional Area and Thiessen Polygons – Nickel Exceedances in Post-Excavation Soil Samples

Attachment 1: Figure 10 of the 2013 RIR

**Table E-1**
**Compliance Averaging Evaluation - Antimony**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

ARCADIS Design & Consultancy for natural and built assets

| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Antimony (mg/kg) |
|---|---|---|---|---|---|
| 107_M034 | 11.4 | 10.9 | 7.5 | 8.0 | < 2.2 U |
| BS-A6T | 12.9 | 12.4 | 7.7 | 8.2 | < 2.3 U |
| BS-A7T | 14.6 | 14.1 | 6.1 | 6.6 | < 2.4 U |
| BS-B10 | 14.9 | 14.4 | 6.1 | 6.6 | < 2.5 U |
| LD003 | 12.5 | 12.0 | 6.5 | 7.0 | < 1.9 U |
| LD003 | 11.5 | 11.0 | 7.5 | 8.0 | < 1.1 U |
| LD003 | 10.5 | 10.0 | 8.5 | 9.0 | < 1.1 U |
| BS-B12 | 14.0 | 13.5 | 6.9 | 7.4 | < 2.5 U |
| BS-B12D | 12.0 | 11.5 | 8.7 | 9.2 | < 2.3 U |
| LD004 | 11.0 | 10.5 | 8.0 | 8.5 | < 1.9 U |
| LD004 | 10.0 | 9.5 | 9.0 | 9.5 | < 2.0 U |
| LD005 | 10.5 | 10.0 | 8.5 | 9.0 | < 1.0 U |
| BS-B14 | 11.3 | 10.8 | 9.4 | 9.9 | < 2.2 U |
| BS-B15 | 11.2 | 10.7 | 9.6 | 10.1 | < 2.4 U |
| BS-B16 | 11.1 | 10.6 | 9.6 | 10.1 | < 2.5 U |
| BS-B5A | 12.5 | 12.0 | 8.2 | 8.7 | < 2.3 U |
| BS-B6 | 15.3 | 14.8 | 5.4 | 5.9 | < 2.4 U |
| BS-B6E | 12.8 | 12.3 | 7.9 | 8.4 | < 2.4 U |
| BS-B7 | 15.7 | 15.2 | 5.0 | 5.5 | < 2.3 U |
| BS-B8 | 15.3 | 14.8 | 5.4 | 5.9 | < 2.5 U |
| BS-B9 | 14.7 | 14.2 | 6.1 | 6.6 | < 2.6 U |
| BS-C10A | 14.1 | 13.6 | 6.7 | 7.2 | < 2.4 U |
| KD004 | 12.0 | 11.5 | 7.0 | 7.5 | < 1.8 U |
| KD004 | 11.0 | 10.5 | 8.0 | 8.5 | < 4.7 U |
| KD004 | 10.0 | 9.5 | 9.0 | 9.5 | < 4.2 U |
| BS-C11 | 13.5 | 13.0 | 7.2 | 7.7 | < 2.7 UJ- |
| BS-C12 | 12.4 | 11.9 | 8.3 | 8.8 | < 2.4 UJ- |
| BS-C12 | 12.4 | 11.9 | 8.3 | 8.8 | < 2.3 UJ- |
| BS-C13 | 10.5 | 10.0 | 10.1 | 10.6 | < 2.7 U |
| BS-C15 | 10.1 | 9.6 | 10.6 | 11.1 | 4.2 |
| KD001 | 12.5 | 12.0 | 6.5 | 7.0 | < 0.99 U |
| KD001 | 11.5 | 11.0 | 7.5 | 8.0 | < 4.9 U |
| KD001 | 10.5 | 10.0 | 8.5 | 9.0 | < 3.8 U |
| BS-C6 | 14.4 | 13.9 | 6.2 | 6.7 | < 2.4 U |
| KD002 | 12.5 | 12.0 | 6.5 | 7.0 | < 1.8 U |
| KD002 | 11.5 | 11.0 | 7.5 | 8.0 | < 1.9 U |
| BS-C7E | 14.3 | 13.8 | 6.4 | 6.9 | < 2.5 U |
| BS-C8E | 13.7 | 13.2 | 7.0 | 7.5 | < 2.4 U |
| BS-C9E | 13.1 | 12.6 | 7.8 | 8.3 | < 2.7 U |
| BS-D10 | 13.6 | 13.1 | 7.1 | 7.6 | < 4.0 U |
| JD002 | 12.0 | 11.5 | 7.0 | 7.5 | < 0.95 U |
| BS-D11 | 14.1 | 13.6 | 6.6 | 7.1 | 3.7 J- |
| BS-D25 | 11.6 | 11.1 | 9.3 | 9.8 | < 2.3 UJ- |
| BS-D5 | 14.6 | 14.1 | 6.2 | 6.7 | < 2.1 U |

**Table E-1**
**Compliance Averaging Evaluation - Antimony**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

ARCADIS Design & Consultancy for natural and built assets

| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Antimony (mg/kg) |
|---|---|---|---|---|---|
| BS-D7 | 15.5 | 15.0 | 5.2 | 5.7 | < 2.5 U |
| BS-D8 | 15.6 | 15.1 | 5.1 | 5.6 | < 2.6 UJ- |
| BS-D8 | 15.6 | 15.1 | 5.1 | 5.6 | < 2.4 UJ- |
| BS-D9 | 13.7 | 13.2 | 7.1 | 7.6 | < 2.5 U |
| BS-E10 | 13.8 | 13.3 | 7.0 | 7.5 | < 2.4 U |
| ID005 | 12.5 | 12.0 | 6.5 | 7.0 | < 2.1 U |
| ID005 | 11.5 | 11.0 | 7.5 | 8.0 | < 0.90 U |
| ID005 | 10.5 | 10.0 | 8.5 | 9.0 | < 0.90 U |
| BS-E11 | 14.5 | 14.0 | 6.2 | 6.7 | **19.5 J-** |
| BS-E11D | 10.0 | 9.5 | 10.6 | 11.1 | < 2.5 UJ- |
| 107_M028E2 | 13.3 | 12.8 | 5.6 | 6.1 | < 2.3 U |
| 107_M028W | 13.4 | 12.9 | 6.9 | 7.4 | < 2.5 UJ- |
| 108_M018_C | 13.5 | 13.0 | 7.2 | 7.7 | < 2.5 U |
| BS-A10T | 14.1 | 13.6 | 6.9 | 7.4 | < 2.6 U |
| BS-A11T | 14.5 | 14.0 | 6.6 | 7.1 | < 2.4 U |
| BS-A12T | 13.4 | 12.9 | 7.3 | 7.8 | < 2.4 U |
| BS-A8T | 14.9 | 14.4 | 5.9 | 6.4 | < 2.4 U |
| BS-A9V | 12.5 | 12.0 | 8.3 | 8.8 | < 2.4 U |
| BS-E25 | 11.7 | 11.2 | 8.7 | 9.2 | < 2.3 UJ- |
| BS-E25 | 11.7 | 11.2 | 8.7 | 9.2 | < 2.3 UJ- |
| BS-E26 | 11.6 | 11.1 | 8.6 | 9.1 | < 2.5 UJ- |
| BS-E31 | 10.2 | 9.7 | 9.1 | 9.6 | < 2.4 U |
| BS-E5 | 14.6 | 14.1 | 6.2 | 6.7 | < 2.1 U |
| ID001 | 13.0 | 12.5 | 6.0 | 6.5 | < 4.9 U |
| ID001 | 12.0 | 11.5 | 7.0 | 7.5 | < 4.8 U |
| ID001 | 11.0 | 10.5 | 8.0 | 8.5 | < 4.6 U |
| BS-E6 | 15.1 | 14.6 | 5.7 | 6.2 | < 2.2 U |
| ID002 | 13.5 | 13.0 | 5.5 | 6.0 | < 4.5 U |
| ID002 | 12.5 | 12.0 | 6.5 | 7.0 | < 4.9 U |
| ID002 | 11.5 | 11.0 | 7.5 | 8.0 | < 5.5 U |
| ID002 | 10.5 | 10.0 | 8.5 | 9.0 | < 4.8 U |
| BS-E8 | 15.6 | 15.1 | 5.1 | 5.6 | < 2.5 UJ- |
| BS-E8 | 15.6 | 15.1 | 5.1 | 5.6 | < 2.3 UJ- |
| BS-E9 | 14.9 | 14.4 | 5.9 | 6.4 | < 2.4 U |
| BS-G10A | 11.7 | 11.2 | 9.0 | 9.5 | < 2.3 UJ- |
| BS-F10A | 11.6 | 11.1 | 9.2 | 9.7 | < 2.5 U |
| BS-G12 | 10.6 | 10.1 | 10.1 | 10.6 | < 2.2 UJ- |
| ID006 | 11.0 | 10.5 | 8.0 | 8.5 | < 1.1 U |
| BS-F25 | 10.8 | 10.3 | 8.7 | 9.2 | < 2.5 UJ- |
| BS-F26 | 10.8 | 10.3 | 8.2 | 8.7 | < 2.3 UJ- |
| BS-F27 | 11.4 | 10.9 | 7.4 | 7.9 | < 2.4 UJ- |
| BS-F28 | 10.4 | 9.9 | 8.1 | 8.6 | < 2.4 U |
| BS-F30 | 10.3 | 9.8 | 8.3 | 8.8 | < 2.3 U |
| BS-F5 | 14.7 | 14.2 | 6.1 | 6.6 | < 2.3 U |

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**Compliance Averaging Evaluation - Antimony**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

ARCADIS Design & Consultancy for natural and built assets

| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Antimony (mg/kg) |
|---|---|---|---|---|---|
| GI001 | 13.0 | 12.5 | 6.0 | 6.5 | < 3.7 U |
| GI001 | 12.0 | 11.5 | 7.0 | 7.5 | < 5.3 U |
| GI001 | 11.0 | 10.5 | 8.0 | 8.5 | < 4.3 U |
| BS-F6 | 15.5 | 15.0 | 5.3 | 5.8 | < 2.4 U |
| BS-H11 | 11.8 | 11.3 | 8.9 | 9.4 | < 2.3 UJ- |
| BS-F7 | 15.6 | 15.1 | 5.2 | 5.7 | < 2.2 U |
| BS-F8 | 15.8 | 15.3 | 5.0 | 5.5 | < 2.4 U |
| BS-F9 | 15.1 | 14.6 | 5.6 | 6.1 | < 2.3 U |
| BS-H12 | 10.4 | 9.9 | 10.2 | 10.7 | < 2.3 UJ- |
| BS-G10A | 11.7 | 11.2 | 9.0 | 9.5 | < 2.3 U |
| BS-G11A | 11.9 | 11.4 | 8.8 | 9.3 | < 2.4 U |
| BS-G12 | 10.6 | 10.1 | 10.1 | 10.6 | < 2.6 UJ- |
| BS-G12 | 10.6 | 10.1 | 10.1 | 10.6 | < 2.5 UJ- |
| BS-G5 | 15.0 | 14.5 | 5.7 | 6.2 | < 2.2 U |
| BS-G5T | 14.0 | 13.5 | 6.9 | 7.4 | < 2.4 U |
| FI001 | 10.0 | 9.5 | 8.0 | 8.5 | < 4.5 U |
| BS-G6A | 12.5 | 12.0 | 8.4 | 8.9 | < 2.2 U |
| BS-G7A | 14.5 | 14.0 | 6.4 | 6.9 | < 2.3 U |
| BS-G8 | 15.0 | 14.5 | 5.9 | 6.4 | < 2.4 U |
| BS-G9 | 14.5 | 14.0 | 6.3 | 6.8 | < 2.7 U |
| BS-G9 | 14.5 | 14.0 | 6.3 | 6.8 | < 2.6 U |
| BS-H10A | 12.0 | 11.5 | 8.7 | 9.2 | < 2.4 U |
| BS-H11 | 11.8 | 11.3 | 8.9 | 9.4 | < 2.3 U |
| BS-H11D | 10.0 | 9.5 | 10.6 | 11.1 | < 2.4 UJ- |
| BS-H12 | 10.4 | 9.9 | 10.2 | 10.7 | < 2.6 UJ- |
| BS-H5 | 13.9 | 13.4 | 3.3 | 3.8 | < 2.2 UJ- |
| BS-H5T | 12.0 | 11.5 | 4.9 | 5.4 | < 2.4 U |
| FI002 | 14.0 | 13.5 | 4.0 | 4.5 | < 4.1 U |
| FI002 | 12.0 | 11.5 | 6.0 | 6.5 | < 4.1 U |
| FI002 | 10.0 | 9.5 | 8.0 | 8.5 | < 3.8 U |
| BS-H6 | 15.4 | 14.9 | 2.0 | 2.5 | < 2.2 UJ- |
| BS-H6T | 11.8 | 11.3 | 7.8 | 8.3 | < 2.9 U |
| BS-H6TT | 11.9 | 11.4 | 9.0 | 9.5 | < 2.4 U |
| BS-H8 | 14.8 | 14.3 | 6.1 | 6.6 | < 2.5 U |
| BS-H9 | 14.2 | 13.7 | 6.7 | 7.2 | < 2.3 U |
| SW-A60 (6.0-6.5) | 12.8 | 12.3 | 5.1 | 5.6 | < 2.5 U |
| SW-A61 (6.0 - 6.5) | 13.7 | 13.2 | 6.9 | 7.4 | < 2.3 U |
| BS-E30 (8.0-8.5)A | 11.0 | 10.5 | 8.5 | 9.0 | < 2.3 UJ- |
| BS-I5A | 11.4 | 10.9 | 5.7 | 6.2 | < 2.3 U |
| BS-I5T | 11.8 | 11.3 | 5.6 | 6.1 | < 2.4 U |
| BS-I6A | 12.7 | 12.2 | 4.4 | 4.9 | < 2.2 UJ- |
| BS-I6T | 11.4 | 10.9 | 8.1 | 8.6 | < 3.0 U |
| BS-I7A | 13.2 | 12.7 | 6.5 | 7.0 | < 2.5 UJ- |
| BS-I8A | 12.7 | 12.2 | 5.9 | 6.4 | < 4.6 UJ- |

**Table E-1**
**Compliance Averaging Evaluation - Antimony**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

ARCADIS Design & Consultancy for natural and built assets

| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Antimony (mg/kg) |
|---|---|---|---|---|---|
| BS-I9S | 13.4 | 12.9 | 7.4 | 7.9 | < 2.6 U |
| BS-J5 | 13.2 | 12.7 | 4.7 | 5.2 | < 2.1 UJ- |
| DD003 | 12.0 | 11.5 | 6.0 | 6.5 | < 0.91 U |
| DD003 | 10.0 | 9.5 | 8.0 | 8.5 | ***< 8.6 U*** |
| DD004 | 12.0 | 11.5 | 6.0 | 6.5 | < 0.96 U |
| DD004 | 10.0 | 9.5 | 8.0 | 8.5 | ***< 8.0 U*** |
| BS-J6 | 12.5 | 12.0 | 5.4 | 5.9 | < 2.5 UJ- |
| BS-J6T | 10.0 | 9.5 | 7.9 | 8.4 | < 2.3 U |
| 107_D021 | 11.5 | 11.0 | 6.5 | 7.0 | < 2.4 U |
| BS-J7 | 13.2 | 12.7 | 4.8 | 5.3 | < 2.5 UJ- |
| BS-J7T | 10.2 | 9.7 | 8.0 | 8.5 | < 2.6 UJ- |
| BS-J8A | 12.7 | 12.2 | 5.4 | 5.9 | < 2.3 UJ- |
| BS-K5 | 11.4 | 10.9 | 6.5 | 7.0 | < 2.4 U |
| BS-K5T | 10.9 | 10.4 | 7.1 | 7.6 | < 2.6 U |
| BS-K6 | 12.8 | 12.3 | 5.1 | 5.6 | < 2.4 UJ- |
| BS-K6T | 11.7 | 11.2 | 6.2 | 6.7 | < 2.5 UJ- |
| BS-K7 | 13.0 | 12.5 | 4.9 | 5.4 | < 2.5 UJ- |
| BS-K7T | 11.8 | 11.3 | 6.0 | 6.5 | < 2.6 UJ- |
| BS-K8A | 11.3 | 10.8 | 6.7 | 7.2 | < 2.4 UJ- |
| SW-D1 (10.0-10.5) | 10.4 | 9.9 | 10.1 | 10.6 | < 2.5 UJ- |
| SW-D1 (8.0-8.5) | 12.4 | 11.9 | 8.2 | 8.7 | < 2.2 UJ- |
| SW-D11 (8.0-8.5) | 11.9 | 11.4 | 8.5 | 9.0 | < 3.0 UJ- |
| SW-D13 (8.0-8.5) | 10.9 | 10.4 | 8.6 | 9.1 | < 2.4 UJ- |
| SW-D2 (10.0-10.5)A | 10.4 | 9.9 | 9.8 | 10.3 | < 2.4 UJ- |
| SW-D1 (0.0-0.5) | 20.3 | 19.8 | 0.5 | 1.0 | < 2.1 UJ- |
| SW-D2 (8.0-8.5)A | 12.3 | 11.8 | 8.0 | 8.5 | < 2.4 UJ- |
| SW-D1 (2.0-2.5) | 18.4 | 17.9 | 2.3 | 2.8 | < 2.3 UJ- |
| SW-D3 (10.0-10.5)A | 10.1 | 9.6 | 9.7 | 10.2 | < 2.5 UJ- |
| SW-D1 (4.0-4.5) | 16.4 | 15.9 | 4.2 | 4.7 | < 2.3 UJ- |
| SW-D1 (6.0-6.5) | 14.5 | 14.0 | 6.2 | 6.7 | < 2.3 UJ- |
| SW-D11 (0.0-0.5) | 19.9 | 19.4 | 0.7 | 1.2 | < 2.2 UJ- |
| SW-D3 (8.0-8.5)A | 12.1 | 11.6 | 7.9 | 8.4 | < 2.4 UJ- |
| SW-D11 (2.0-2.5) | 17.9 | 17.4 | 2.6 | 3.1 | < 2.2 UJ- |
| SW-D4 (10.0-10.5)A | 10.0 | 9.5 | 9.8 | 10.3 | < 2.4 U |
| SW-D11 (4.0-4.5) | 15.9 | 15.4 | 4.6 | 5.1 | < 2.3 UJ- |
| SW-D11 (6.0-6.5) | 13.9 | 13.4 | 6.5 | 7.0 | < 2.2 UJ- |
| SW-D12 (2.2-2.7) | 17.9 | 17.4 | 2.8 | 3.3 | < 2.2 U |
| SW-D4 (8.0-8.5)A | 11.9 | 11.4 | 8.0 | 8.5 | < 2.4 U |
| SW-D12 (4.0-4.5) | 16.6 | 16.1 | 4.1 | 4.6 | < 2.2 U |
| SW-D12 (6.0-6.5) | 14.7 | 14.2 | 6.0 | 6.5 | < 2.2 U |
| SW-D5 (8.0-8.5) | 10.9 | 10.4 | 8.9 | 9.4 | < 2.4 UJ- |
| SW-D13 (0.0-0.5) | 18.9 | 18.4 | 0.8 | 1.3 | < 2.3 UJ- |
| SW-D8 (8.0-8.5) | 10.1 | 9.6 | 8.8 | 9.3 | < 2.3 U |
| SW-D9 (8.0-8.5) | 10.2 | 9.7 | 8.8 | 9.3 | < 2.3 UJ- |

**Table E-1**
**Compliance Averaging Evaluation - Antimony**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

ARCADIS Design & Consultancy for natural and built assets

| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Antimony (mg/kg) |
|---|---|---|---|---|---|
| 107_M028W | 13.4 | 12.9 | 6.9 | 7.4 | < 2.4 UJ- |
| SW-D13 (2.0-2.5) | 16.8 | 16.3 | 2.8 | 3.3 | < 2.4 UJ- |
| SW-D13 (4.0-4.5) | 14.9 | 14.4 | 4.7 | 5.2 | < 2.3 UJ- |
| SW-D13 (6.0-6.5) | 12.9 | 12.4 | 6.7 | 7.2 | < 2.4 UJ- |
| SW-D2 (0.0-0.5)A | 20.1 | 19.6 | 0.3 | 0.8 | < 2.2 UJ- |
| SW-D2 (2.0-2.5)A | 18.3 | 17.8 | 2.1 | 2.6 | < 2.4 UJ- |
| SW-D2 (4.0-4.5)A | 16.3 | 15.8 | 4.0 | 4.5 | < 2.3 UJ- |
| SW-D2 (6.0-6.5)A | 14.3 | 13.8 | 6.0 | 6.5 | < 2.4 UJ- |
| SW-D3 (0.0-0.5)A | 20.1 | 19.6 | 9.7 | 10.2 | < 2.1 UJ- |
| SW-D3 (2.0-2.5)A | 18.1 | 17.6 | 2.3 | 2.8 | < 2.4 UJ- |
| SW-D3 (4.0-4.5)A | 16.1 | 15.6 | 4.1 | 4.6 | < 2.2 UJ- |
| SW-D3 (6.0-6.5)A | 14.1 | 13.6 | 6.0 | 6.5 | < 2.3 UJ- |
| SW-D4 (0.0-0.5)A | 19.9 | 19.4 | 0.4 | 0.9 | < 2.4 U |
| SW-D4 (2.0-2.5)A | 17.8 | 17.3 | 2.3 | 2.8 | < 2.1 U |
| SW-D4 (4.0-4.5)A | 15.9 | 15.4 | 4.2 | 4.7 | < 2.3 U |
| SW-D4 (6.0-6.5)A | 13.8 | 13.3 | 6.2 | 6.7 | < 2.2 U |
| SW-D5 (4.0-4.5) | 14.6 | 14.1 | 5.1 | 5.6 | < 2.3 UJ- |
| SW-D5 (6.0-6.5) | 12.9 | 12.4 | 6.9 | 7.4 | < 2.4 UJ- |
| SW-D6 (6.0-6.5) | 11.1 | 10.6 | 8.2 | 8.7 | < 2.5 UJ- |
| SW-D13 (8.0-8.5) | 10.9 | 10.4 | 8.6 | 9.1 | < 2.4 UJ- |
| SW-D3 (10.0-10.5)A | 10.1 | 9.6 | 9.7 | 10.2 | < 2.6 UJ- |
| SW-D6 (6.0-6.5) | 11.1 | 10.6 | 8.2 | 8.7 | < 2.3 UJ- |
| | | | | | |

| | | |
|---|---|---|
| Total number of soil samples within the Area of Concern (the excavated area within the unsaturated zone) | 198 | |
| Volume of unsaturated soil that was excavated within the Area of Concern | 49,077 | cubic yards |
| Number of soil samples below the IGWSSL of **6 mg/kg** | 195 | |
| Percentage of samples below the IGWSSL | 98% | |
| Number of samples greater than 10 times the IGWSSL | 0 | |

**More than 75% of the samples are below the IGWSSL, and no samples are above 10 times the IGWSSL; therefore, compliance averaging using the 75%/10x methodology indicates no additional remedial action is required for antimony for the impact to groundwater pathway at BS-E11, DD003 and DD004.**

**Notes:**

bgs: below ground surface
mg/kg: milligrams per kilogram
IGWSSL: Impact to Groundwater Soil Screening Level
**19.5** Antimony's concentration is above the IGWSSL of 6 mg/kg
***< 8.6 U*** Antimony was analyzed for but not detected. The associated value is the analyte instrument detection limit, which is greater that antimony's IGWSSL of 6 mg/kg
U: The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit
J-: The result is an estimated quantity, but the result may be biased low

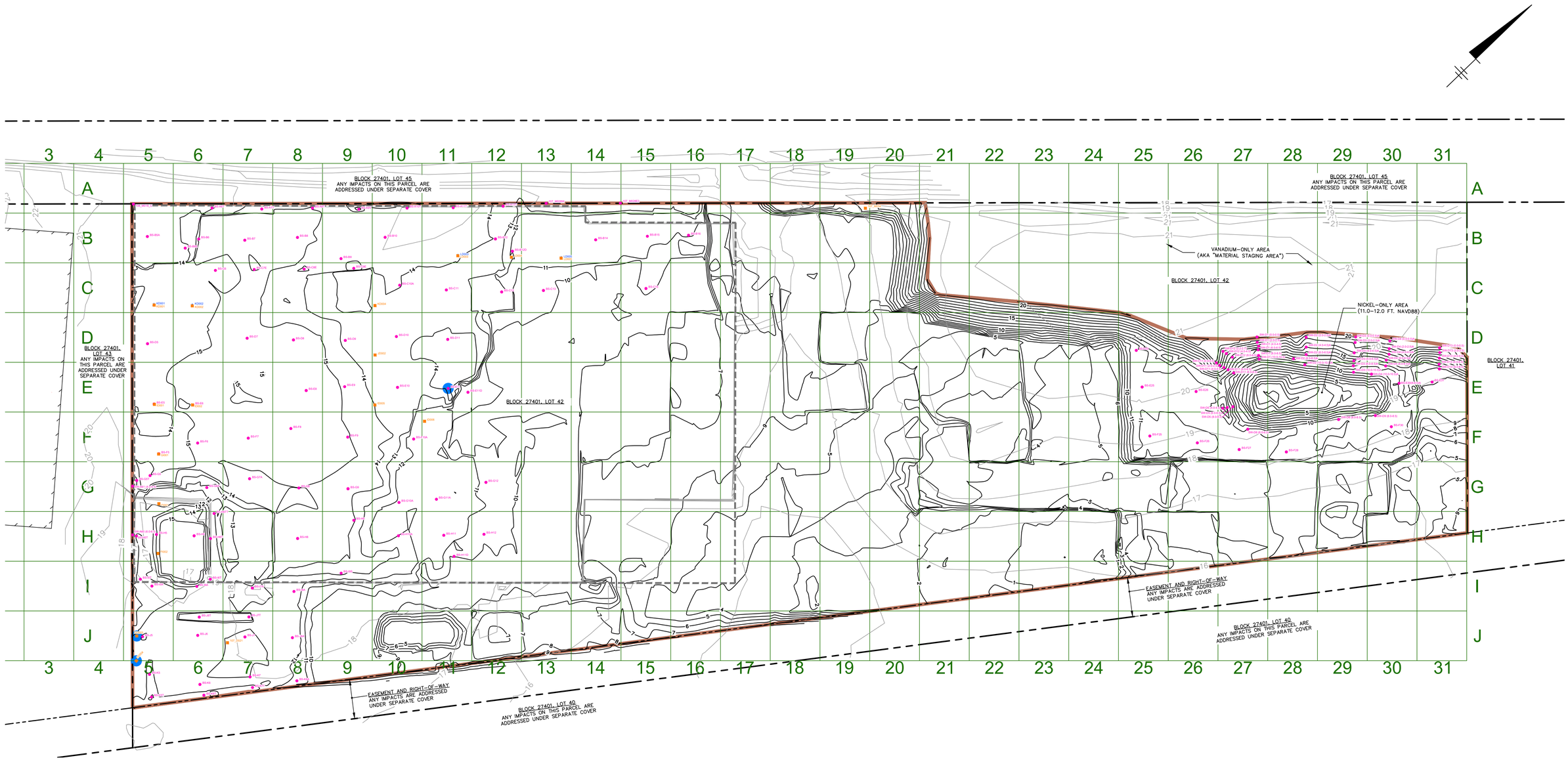
**Table E-2**
**Compliance Averaging Evaluation - Nickel**
**Site 107**
**18 Chapel Avenue**
**Jersey City, New Jersey**

| Points for Thiessen Polygon - Direct Contact Pathway (Subsurface Zone) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample ID | Sample Start Elevation (NAVD 88) | Sample End Elevation (NAVD 88) | Sample Start Depth (feet bgs) | Sample End Depth (feet bgs) | Nickel (mg/kg) | Area (sq. ft) | Area * Concentration |
| 107_I038 | 3.3 | 2.8 | 17.0 | 17.5 | 834 | 301.32 | 251,303 |
| BS-D22 | 4.3 | 3.8 | 16.5 | 17.0 | 11.5 | 473.33 | 5,443 |
| BS-D23 | 5.3 | 4.8 | 15.7 | 16.2 | 65.1 | 801.27 | 52,163 |
| BS-D24 | 5.4 | 4.9 | 15.5 | 16.0 | 33.2 | 588.14 | 19,526 |
| BS-D25 | 11.6 | 11.1 | 9.3 | 9.8 | 61.6 | 488.78 | 30,109 |
| BS-E22 | 3.5 | 3.0 | 16.8 | 17.3 | 7.5 | 731.71 | 5,488 |
| BS-E23 | 4.7 | 4.2 | 15.8 | 16.3 | **3,700** | 644.33 | 2,384,030 |
| BS-E24 | 5.1 | 4.6 | 15.4 | 15.9 | 217 | 527.96 | 114,567 |
| BS-E25 | 11.7 | 11.2 | 8.7 | 9.2 | 54.7 | 620.15 | 33,922 |
| BS-F22 | 2.5 | 2.0 | 17.5 | 18.0 | 23.4 | 878.99 | 20,568 |
| BS-F23 | 4.4 | 3.9 | 15.1 | 15.6 | 209 | 809.33 | 169,151 |
| BS-F24 | 4.9 | 4.4 | 14.7 | 15.2 | **7,520** | 768.45 | 5,778,778 |
| BS-F25 | 10.8 | 10.3 | 8.7 | 9.2 | 36.4 | 580.24 | 21,121 |
| BS-G22 | 5.9 | 5.4 | 12.9 | 13.4 | 85.3 | 640.17 | 54,606 |
| BS-G23 | 5.6 | 5.1 | 13.0 | 13.5 | 61.2 | 764.38 | 46,780 |
| BS-G24 | 5.3 | 4.8 | 13.1 | 13.6 | 16.2 | 705.11 | 11,423 |
| BS-G25 | 5.3 | 4.8 | 12.9 | 13.4 | 22.1 | 535.77 | 11,840 |
| **Total** | | | | | | **10,859.42** | **9,010,818** |
| **Area-Weighted Average (mg/kg) = (Sum of Area*Concentration)/(Total Area)** | | | | | | **829.8** | |
| **Conclusion** | | | | | | **No Remediation Required** | |

**The Area-Weighted Average represents the average nickel concentration, which is less than the RDCSRS of 1,600 mg/kg; therefore, compliance averaging using the spatially weighted average indicates that no additional remedial action is required for nickel at BS-E23 and BS-F24**

**Notes:**

bgs: below ground surface
mg/kg: milligrams per kilogram
sq. ft: square feet
RDCSRS: Residential Direct Contact Soil Remediation Standard
**7,520** Nickel concentration is above the RDCSRS of 1,600 mg/kg




LEGEND:

- POST-EXCAVATION SOIL SAMPLE LOCATION
- RI/SI SAMPLE USED AS POST-EX SAMPLE
- REMAINING RI/SI SAMPLE LOCATION
- SAMPLES WITH ANTIMONY EXCEEDANCE ABOVE THE IMPACT TO GROUNDWATER SOIL SCREENING LEVEL
- PRE-EXCAVATION GROUND SURFACE ELEVATION (1-FT INTERVAL NAVD-88)
- AS-BUILT EXCAVATION ELEVATION (1-FT INTERVAL IN NAVD-88)
- LIMITS OF SITE 107 EXCAVATION
- FORMER BUILDING
- EXCAVATION GRID
- PROPERTY BOUNDARY

NOTES:

1. ELEVATION VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), IN US SURVEY FEET.
2. EXCAVATION ELEVATION CONTOURS FROM POST EXCAVATION SURVEY BY MASER CONSULTING, FILENAME V-POST-EX.DWG, DATED 8/13/2020.
3. LOT/BLOCK INFORMATION FROM CITY OF JERSEY CITY TAX MAP, SHEET 274, DATED AUGUST 2006 AT A SCALE OF 1" = 200'.
4. PRE-REMEDIATION ELEVATION CONTOURS FROM ENTACT, DRAWING FILE "PPG Site 107_PRE TOPO Surf_3.20.19.dwg" DATED 11/14/2018.

0 30' 60'
GRAPHIC SCALE

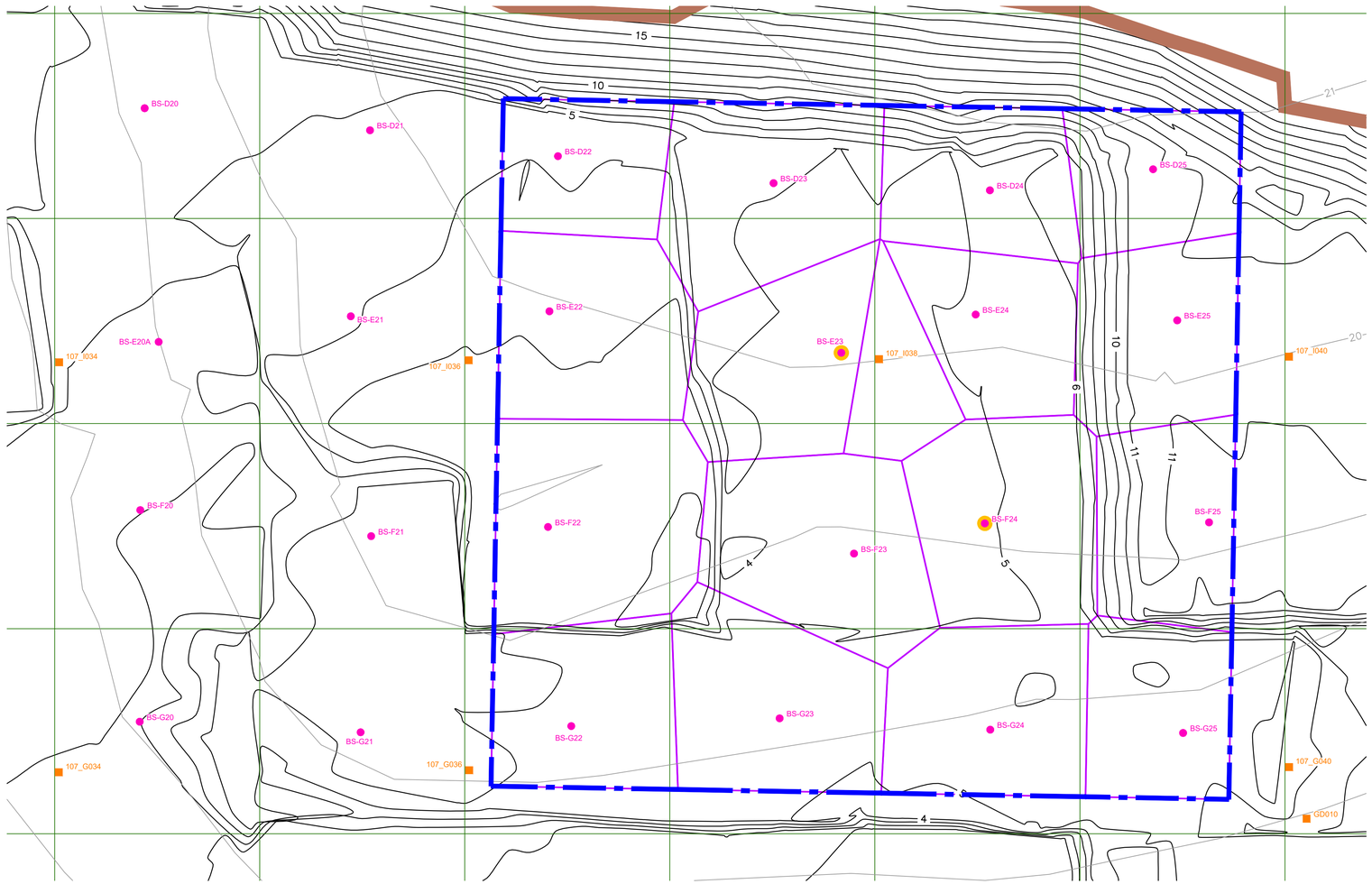
PPG
18 CHAPEL AVENUE, JERSEY CITY, NEW JERSEY

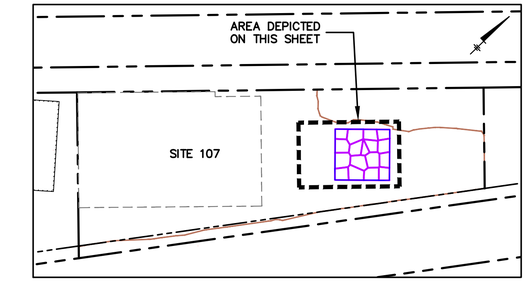
# SOIL AOC-1A- ANTIMONY EXCEEDANCES IN REMAINING VADOSE ZONE SOIL SAMPLES

ARCADIS

FIGURE
E-1

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:G.STEINBERGER LD: PIC: PM:M.CONGER TM:P.BRACKEN LYR:ON=*;OFF=*REF*
C:\Users\gsteinberger\ACCDocs\Arcadis\Z-ARCHIVED-ANA - PPG\Project Files\PPG - Site 107 Demo\Construction Mgmt\2021101-DWG\SB-SAMP-FIG-G01-EXCEED.dwg LAYOUT: E-1 SAVED: 3/12/2021 11:48 AM ACADVER: 24.1S (LMS TECH) PAGESETUP: PDF-D PLOTSTYLETABLE: PLTFULL.CTB
PLOTTED: 10/22/2021 9:12 AM BY: STEINBERGER, GEORGE
XREFS: IMAGES: PROJECTNAME: ----
GEN-X-TITLE




## KEY MAP

NOT TO SCALE

LEGEND:

- POST–EXCAVATION SOIL SAMPLE LOCATION
- RI/SI SAMPLE USED AS POST–EX SAMPLE
- REMAINING RI/SI SAMPLE LOCATION
- SAMPLES WITH NICKEL EXCEEDANCE ABOVE THE RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARD
- PRE–EXCAVATION GROUND SURFACE ELEVATION (1–FT INTERVAL NAVD–88)
- AS–BUILT EXCAVATION ELEVATION (1–FT INTERVAL IN NAVD–88)
- LIMITS OF SITE 107 EXCAVATION
- FUNCTIONAL AREA
- THIESSEN POLYGON NETWORK

0 10' 20'
GRAPHIC SCALE

PPG
18 CHAPEL AVENUE, JERSEY CITY, NEW JERSEY

# FUNCTIONAL AREA AND THIESSEN POLYGONS - NICKEL EXCEEDANCES IN POST-EXCAVATION SOIL SAMPLES

ARCADIS

FIGURE
E-2

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:G.STEINBERGER LD: PIC: PM:M.CONGER TM:P.BRACKEN LYR:ON=*;OFF=*REF*
C:\Users\gsteinberger\ACCDocs\Arcadis\AUS-PPG-SITE 107 DEMO-JERSEY CITY New Jersey\Project Files\2021\01-In Progress\01-DWG\N1-SAMP-FIG-E02-POLYGONS.dwg LAYOUT: E-2 SAVED: 8/9/2021 8:32 AM ACADVER: 24.1S (LMS TECH) PAGESETUP: PDF-D PLOTSTYLETABLE: PLTFULL.CTB
PLOTTED: 10/22/2021 9:27 AM BY: STEINBERGER, GEORGE
XREFS: IMAGES: PROJECTNAME: ---
GEN-X-TITLE

# Attachment 1

**Figure 10 of the 2013 RIR**

LINDEN AVE
DANFORTH AVE
CATOR AVE
WILLARD ST
PRINCETON AVE

M.S. CONRAIL C.C.R. CO., OF NJ, MAIN LINE MAIN STEM
(AS PER TAX MAP)

BLOCK 1505
LOT C
N/F CONSOLIDATED RAIL

BLOCK 1505
LOT D
N/F CONSOLIDATED RAIL

M.S. CONRAIL L.V.R.R. CO., NATIONAL DOCKS BR. MAIN STEM
(AS PER TAX MAP)

457.63'

885.68'

"SITE 107"
BLOCK 1505
LOT Z²
DEED BOOK 8366, PAGE 1
N/F GREENBERG PROP, LLC COMMERCIAL RLT

"SITE 108"
BLOCK 1505
LOT 1
DEED BOOK 7937, PAGE 286

TOTAL AREA LOTS 1 & Z²:
364,539 S.F. OR 8.369 ACRES

229.45'

EASEMENT & RIGHT OF WAY

811.75'

BLOCK 1505
LOT A
N/F CONSOLIDATED RAIL

BLOCK 1505
LOT B
N/F CONSOLIDATED RAIL

M.S. CONRAIL L.V.R.R. CO., MAIN LINE MAIN STEM
(AS PER TAX MAP)

INTERSTATE 78

107_M020 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 38.6
1.0- 1.5 321
2.5- 3.0 457
3.0- 3.5 123

107_M020 THALLIUM CONC.
DEPTH (ft) (mg/kg)
2.5- 3.0 3.4 U

107_M022 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 68.0
1.0- 1.5 41.8

107_M024 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.5- 1.0 76.7

107_M026 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.5- 1.0 389

107_M028 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
1.0- 3.5 23.2

107_M028 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 108
0.5- 1.0 510
1.0- 1.5 673

107_M030 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 111
0.5- 1.0 90.1

107_M032 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
1.5- 2.0 8.7

107_M032 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.5- 1.0 179
1.5- 2.0 355

107_M034 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 34.9
3.0- 3.5 75.3
3.5- 4.0 65.1

107_M038 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 129

107_K038 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 31.6
7.5- 8.0 33.5

107_M040 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 14.7

107_M040 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 44.6

107_K040 NICKEL CONC.
DEPTH (ft) (mg/kg)
11.5-12.0 56.8

107_M042 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 7.2

107_M042 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.5- 1.0 39.6
7.5- 8.0 45.9

107_K042 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 45.7
15.0-15.5 47.6

107_M046 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 48.6

107_K046 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 45.1

107_M045 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
8.0- 8.5 39.3

107_M045 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 39.8
8.0- 8.5 50.1

107_K046 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 32.5
3.5- 4.0 35.9
11.5-12.0 38.7

107_J044 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 33.6

107_J040 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 49.1
11.5-12.0 85.7

107_G044 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 57.1

107_G046 NICKEL CONC.
DEPTH (ft) (mg/kg)
4.5- 5.0 73.6
7.5- 8.0 49.1

107_J042 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 41.3
11.5-12.0 57.5

107_J038 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 7.7

107_J038 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 47.0
11.5-12.0 41.5

107_J040 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 47.0
11.5-12.0 41.5

107_J034 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 90.2

107_J036 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 49.2

107_J032 NICKEL CONC.
DEPTH (ft) (mg/kg)
10.0-10.5 103

107_G032 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 57.1
3.5- 4.0 38.3

107_J031 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 49.9

107_G036 NICKEL CONC.
DEPTH (ft) (mg/kg)
5.0- 5.5 42.2
6.0- 6.5 189
7.0- 7.5 43.4

107_G036 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 7.9

107_G034 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 47.9
7.5- 8.0 31.0

107_J038 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 52.0
3.5- 4.0 38.2
6.5- 7.0 47.5
7.0- 7.5 395
8.0- 8.5 35.8
10.0-10.5 54.0

107_J038 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
7.0- 7.5 69.4
12.0-12.5 17.7

107_J038 THALLIUM CONC.
DEPTH (ft) (mg/kg)
7.0- 7.5 3.0 U

107_G038 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 32.0
6.0- 6.5 392

107_G040 NICKEL CONC.
DEPTH (ft) (mg/kg)
5.0- 5.5 79.4
7.5- 8.0 49.6
11.5-12.0 51.7

107_G040 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
4.5- 5.0 20.9

107_G042 NICKEL CONC.
DEPTH (ft) (mg/kg)
7.5- 8.0 44.6
11.5-12.0 64.3
14.0-14.5 46.5

107_F040 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 50.8
5.5- 6.0 46.6
6.0- 6.5 453
6.5- 7.0 178
7.5- 8.0 101

107_F040 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 14.4
6.5- 7.0 6.6

107_F040 THALLIUM CONC.
DEPTH (ft) (mg/kg)
6.0- 6.5 3.0 U

107_D026A NICKEL CONC.
DEPTH (ft) (mg/kg)
4.5- 5.0 34.2
7.0- 7.5 50.6

107_E028A ANTIMONY CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 10.8

107_E028A NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 39.9
4.0- 6.5 144

107_E029 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 44.5

107_E029 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 33.7
7.5- 8.0 71.7

107_E034 NICKEL CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 43.3
7.5- 8.0 44.6

107_D021 NICKEL CONC.
DEPTH (ft) (mg/kg)
0.0- 0.5 31.7

107_D021 ANTIMONY CONC.
DEPTH (ft) (mg/kg)
3.5- 4.0 6.2

**LEGEND:**

- SOIL SAMPLE LOCATION WITHOUT EXCEEDANCE OF NJDEP DCSRS
- SOIL SAMPLE EXCEEDANCE OF NJDEP IGW SSL

**SAMPLING CHRONOLOGY**

- JANUARY / FEBRUARY 2011
- JUNE 2011
- AUGUST 2011
- SITE 107 BOUNDARY
- ADJOINING PROPERTY BOUNDARY

NOTE:
1. SOIL SAMPLE CONCENTRATIONS EXCEEDING NJDEP IGWSSL ARE DISPLAYED IN THIS EXTENT. ALL OTHER RESULTS NOT CONTAINING EXCEEDANCES OF NJDEP IGWSSL HAVE BEEN OMMITED.

| NJDEP IMPACT TO GROUNDWATER SOIL SCREENING LEVELS | IGWSSL (mg/kg) |
|---|---|
| Antimony | 6 |
| Nickel | 31 |
| Thallium | 3 |
| Vanadium | NC |

*NC=No Criteria

0 25 50 100 150 200
FEET

PROJECT:
PPG INDUSTRIES
SITE 107

LOCATION:
18 CHAPEL AVENUE
BLOCK 1505, LOT Z²
CITY OF JERSEY CITY
HUDSON COUNTY, NEW JERSEY

DRAWING TITLE:
CHROMATE CHEMICAL PRODUCTION WASTE:
SOIL SAMPLE EXCEEDANCES OF
NJDEP IMPACT TO GROUNDWATER SSL

DRESDNER ROBIN

DRAWN BY: N.K.
CHECKED BY: D.N.
DATE: 10/09/12
JOB NUMBER: 10236-1
FILE: FIG6_SHT_ISSL.dgn
FIGURE 10

References: State of New Jersey Office of Information Technology (NJOIT) 1997-2006, Office of Geographic Information Systems (OGIS), New Jersey Department of Transportation 2006.

Q:\Env\Projects\10236-1 Pittsburgh Plate and Glass - Site 107-108\Survey-GIS data\GIS\107-108-12\Fig10 107 CCPW IGW.mxd