

Appendix F

Compliance Averaging Memorandum for Antimony in Soil

Memorandum

To	Ian Curtis, NJDEP	Page 1
CC	Ronald Riccio, Site Administrator James Ray, Site Administrator PM Nancy Colson, Site Administrator Assistant Prabal Amin, Weston Solutions, Inc. Laura Amend-Babcock, Weston Solutions, Inc. Peter Baker, Jersey City Counsel Itza Wilson, Jersey City David Spader, ERFS Dorothy Laguzza, K&L Gates Joe Lagrotteria, K&L Gates Jody Overmyer, PPG Rich Feinberg, PPG Aimee Ruitter, AECOM Sandy Paulsen, AECOM Cameron Dixon, EH&S Support	
Subject	800 Garfield Avenue (the Former Ten West Apparel Property) Compliance Averaging for Antimony in Soil (Revision 1)	
From	Claire Hunt	
Date	August 1, 2022	

1.0 Introduction

This memorandum provides documentation of attainment of compliance for antimony (Sb) in soil with the New Jersey Department of Environmental Protection (NJDEP) Residential Direct Contact Soil Remediation Standard (RDCSRS) and with the Garfield Avenue Group (GAG) Site-Specific Impact to Groundwater Soil Remediation Standard (IGWSRS-GAG) for a soil sample set from 800 Garfield Avenue (the Former Ten West Apparel Property) in accordance with the NJDEP's Technical Guidance for the *Attainment of Remediation Standards and Site-Specific Criteria* (July 2021, Version 2.0).

Boring logs, laboratory reports, and data validation reports for samples discussed in this memorandum are included as part of the *Draft Remedial Action Report (RAR), Phase 3B South and a Portion of Site 133 East and Halladay Street South [Phase 3B South], Tables and Figures Submittal*, dated April 19, 2022 or the *Final Remedial Action Report (RAR), Phase 3B South and a Portion of Site 133 East and Halladay Street South [Phase 3B South], Tables and Figures Submittal*, dated August 1, 2022.

2.0 Compliance Averaging Evaluation of Sb Compared to RDCSRS

2.1 Antimony Concentrations Greater than RDCSRS

The following soil samples (**Table 1**) with Sb concentrations greater than the RDCSRS for Sb of 31 milligrams per kilogram (mg/kg) remain in place within the 800 Garfield Avenue property.

Table 1: Soil Samples Remaining with Sb Concentrations Greater than the RDCSRS

Location ID	Sample ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Sb (mg/kg)
10W-H34A	10W-H34A-6.5-7.0	6.5 - 7.0	9.0 - 8.5	163 J
P3BS-PDI-5+40-60L	P3BS-PDI-5+40-60L-8.0-8.5	8.0 - 8.5	6.9 - 6.4	50
TWA-3/ICO-15	ICO-B015-15.0	15.0 - 15.5	0.1 - (-0.4)	35.6 J

Notes:

bgs - below ground surface

ft - foot or feet

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

NAVD88 - North American Vertical Datum of 1988

Figure 1 depicts boring/sample locations, as well as analytical results for soil samples where Sb remains in place within the 800 Garfield Avenue property at concentrations greater than the RDCSRS.

2.2 Delineation - RDCSRS

Soil samples with Sb concentrations greater than the RDCSRS that remain in place within the 800 Garfield Avenue property are delineated as presented in **Table 2** through **Table 4**:

Table 2: Delineation of Sample 10W-H34A-6.5-7.0

Location ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Sb Result (mg/kg)	Direction
10W-F33A	6.5 - 7.0	9.2 - 8.7	05/23/2014	0.69 J	Northwest
10W-H34A	10.5 - 11.0	5.0 - 4.5	05/30/2014	3.5	Vertical
10W-H35A	6.5 - 7.0	9.0 - 8.5	05/27/2014	1.2 J	Southwest
FBP-I31A	5.0 - 5.5	8.6 - 8.1	05/05/2014	1.6 J	Northeast
TWA-4	6.0 - 6.5	9.1 - 8.6	04/06/2012	2.2 J	Southeast

Notes:

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

Table 3: Delineation of Sample P3BS-PDI-5+40-60L-8.0-8.5

Location ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Sb Result (mg/kg)	Direction
FBP-C31A	9.0 - 9.5	5.9 - 5.4	04/28/2014	0.68 J	North
P3BS-PDI-5+40-60L	10.0 - 10.5	4.9 - 4.4	09/08/2020	3.2	Vertical
10W-D33A	8.5 - 9.0	7.1 - 6.6	05/23/2014	0.77 J	West

Location ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Sb Result (mg/kg)	Direction
10W-F33A	10.5 - 11.0	5.2 - 4.7	05/23/2014	0.38 J	South
10W-G32A	8.5 - 9.0	6.4 - 5.9	05/09/2014	0.40 U	East

Notes:

U - The analyte was not detected above the sample reporting limit shown.

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

Table 4: Delineation of Sample ICO-B015-15.0

Location ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Sb Result (mg/kg)	Direction
10W-L39A	12.5 - 13.0	2.0 - 2.5	05/19/2014	3.9	North
10W-L41A	15.0 - 15.5	0.1 - (-0.4)	05/20/2014	2.6	South
133-B22	12.0 - 12.5	0.3 - (-0.2)	12/14/2006	2 J	East
TWA-3/ICO-15	17.0 - 17.5	(-1.9) - (-2.4)	04/06/2012	1.8 J	Vertical
TWA-6	15.0 - 15.5	0.2 - (-0.3)	04/05/2012	0.22 J	West

Notes:

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

2.3 Functional Areas - RDCSRS

The Sb RDCSRS is based on the ingestion-dermal pathway (Attachment 1). The functional area for the ingestion-dermal pathway is limited to 0.25 acres for residential use. The extents of the residential functional areas are shown on Figure 1. Remaining samples within the functional areas extents were collected from deeper than 2 feet below ground surface and are considered to be a part of the functional areas for the calculations.

2.4 Compliance Averaging - RDCSRS

Compliance with the Sb RDCSRS is demonstrated through spatial averaging. Theissen polygons were created within Functional Areas 1 and 2 as shown in **Figure 1**. The sample selection process is as follows:

1. The samples for Sb that fall within a functional area (horizontally and vertically), including samples that are associated with a functional area but are located beyond the physical limits of a functional area, are identified.
2. The maximum concentration is selected at each sample location for use in the weighted average (refer to **Table 5** and **Table 6** below). The maximum of either the concentration for detections or the Method Detection Limit (MDL)/Reporting Limit (RL) for non-detects is selected.

Table 5: Samples Used to Determine Weighted Average Sb Concentration for Samples 10W-H34A-6.5-7.0, and P3BS-PDI-5+40-60L-8.0-8.5 (Functional Area 1)

Location ID	Sample Depth (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Maximum Sb Result (mg/kg)	Area (sf)	Area x Maximum Sb Result (sf*mg/kg)
10W-D32A	7.0 - 7.5	8.1 - 7.6	05/28/2014	7.6	262	1,991
10W-D33A	8.5 - 9.0	7.2 - 6.6	05/23/2014	0.77 J	172	132
10W-F33A	6.5 - 7.0	9.2 - 8.4	05/23/2014	0.69 J	1,303	899
10W-F33A-SW-W	2.2 - 2.7	13.4 - 12.9	07/30/2021	3.5 J	1,324	4,634
10W-G32A	18.0 - 18.5	(-3.1) - (-3.6)	05/09/2014	< 0.90 UJ	1,550	1,395
10W-H34A	6.5 - 7.0	9.0 - 8.5	05/30/2014	163 J	701	114,263
10W-P3BS-5+04-3R	4.1 - 4.6	10.4 - 9.9	5/19/2022	< 13 U	1,096	14,248
10W-P3BS-5+15-40R	4.1 - 4.6	9.4 - 8.9	5/19/2022	3.9	1,197	4,668
FBP-I31A	3.0 - 3.5	10.6 - 10.1	05/05/2014	7.2 J	175	1,260
P3BS-PDI-5+40-60L	8.0 - 8.5	6.9 - 6.4	09/08/2020	50	1,526	76,300
TWA-4	6.0 - 6.5	9.1 - 8.6	04/06/2012	2.2 J	236	519
TWA-8	3.0 - 3.5	12.5 - 12.0	04/06/2012	0.82 J	572	469
Total					10,114	220,778

Notes:

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

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.
sf - square feet

Weighted Average Sb Concentration for Functional Area 1 = 220,778 sf x mg/kg / 10,114 sf = 22 mg/kg.

Table 6: Samples Used to Determine Weighted Average Sb Concentration for Sample ICO-B015-15.0 (Functional Area 2)

Location ID	Sample Depth (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Maximum Sb Result (mg/kg)	Area (sf)	Area x Maximum Sb Result (sf*mg/kg)
10W-J39A	7.0 - 7.5	8.2 - 7.7	05/16/2014	3.0	1,501	4,503
10W-J41A	8.5 - 9.0	6.7 - 6.2	05/19/2014	0.43 J	1,735	746
10W-L39A	18.5 - 19.0	(-3.5) - (-4.0)	05/19/2014	17.0	1,841	31,297
10W-L41A	7.0 - 7.5	8.1 - 7.6	05/20/2014	5.0	1,684	8,420
10W-P3B-L38A-SW-R	8.2 - 8.7	7.0 - 6.5	10/27/2021	5.1 J-	23	117
133-B22	17.0 - 17.5	(-4.7) - (-5.2)	12/18/2006	<2.9 UJ	247	716
EF-24	17.5 - 18.0	(-2.8) - (-3.3)	04/18/2011	< 2.7 UJ	1,170	3,159
P3BS-PDI-2+20-50R	14.0 - 14.5	1.6 - 1.1	11/09/2020	3.9 J	39	152
TWA-3/ICO-15	15.0 - 15.5	0.1 - (-0.4)	04/06/2012	35.6 J	1,663	59,203
TWA-6	20.0 - 20.5	(-4.8) - (-5.3)	04/05/2012	< 0.60 UJ	681	409
Total					10,584	108,722

Notes:

J - The result was an estimated value; the associated numerical value was an approximate concentration of the analyte in the sample.
J- - The analyte was positively identified; the associated numerical value is an estimated quantity with a potential low bias.
UJ - The analyte was not detected above the sample reporting limit shown and the reporting limit was approximate.

Weighted Average Sb Concentration for Functional Area 2 = 108,722 sf x mg/kg / 10,584 sf = 10 mg/kg.

3.0 Compliance Averaging Evaluation of Sb Compared to IGWSRS-GAG

3.1 Antimony Concentrations Greater than IGWSRS-GAG

The following soil sample (**Table 7**) with an Sb concentration greater than the 62.7 mg/kg IGWSRS-GAG for Sb remains in place within the 800 Garfield Avenue property.

Table 7: Soil Sample Remaining with Sb Concentration Greater than the IGWSRS-GAG

Location ID	Sample ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Sb (mg/kg)
10W-H34A	10W-H34A-6.5-7.0	6.5 - 7.0	9.0 - 8.5	163 J

Notes:

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

Figure 2 depicts boring/sample locations, as well as analytical results for the soil sample where Sb remains in place within the 800 Garfield Avenue property at a concentration greater than the IGWSRS-GAG.

3.2 Delineation- IGWSRS-GAG

Soil sample 10W-H34A-6.5-7.0, with an Sb concentration greater than the IGWSRS-GAG, which remains in place within the 800 Garfield Avenue property, is delineated as presented in **Table 8**:

Table 8: Delineation of Sample 10W-H34A-6.5-7.0

Location ID	Depth Interval (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Sb Result (mg/kg)	Direction
10W-F33A	6.5 - 7.0	9.2 - 8.7	05/23/2014	0.69 J	Northwest
10W-H34A	10.5 - 11.0	5.0 - 4.5	05/30/2014	3.5	Vertical
10W-H35A	6.5 - 7.0	9.0 - 8.5	05/27/2014	1.2 J	Southwest
FBP-I31A	5.0 - 5.5	8.6 - 8.1	05/05/2014	1.6 J	Northeast
TWA-4	6.0 - 6.5	9.1 - 8.6	04/06/2012	2.2 J	Southeast

Notes:

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

3.3 Functional Area - IGWSRS-GAG

The length of the functional area (Functional Area 3) for the impact to groundwater pathway is limited to 100 feet in the direction of groundwater flow. Perpendicular to groundwater flow, the functional area is limited to the delineated extent of contamination. Historically, groundwater flow at the Site has been observed to be to the southeast. However, the groundwater flow direction has been altered by the presence of sheet piles installed during remediation at the Garfield Avenue

Group Sites and is assumed to radiate away from where the sheet piles intersect. Due to the uncertainty associated with the current groundwater flow directions and future site conditions (i.e., current and future property owners may or may not remove the sheet piles in the future), the highest of the spatially weighted concentrations for several groundwater flow scenarios was selected to demonstrate compliance. The assumed groundwater flow direction that resulted in the greatest spatially weighted concentration was to the southwest. The extent of the functional area within the site boundary, assuming groundwater flow to the southwest, is shown in **Figure 2**.

Vertically, the remaining samples located from the groundwater surface (elevation [El.] = 7.5 ft NAVD88) to two feet above the groundwater surface (elevation 7.5 to 9.5 ft NAVD88) are considered to be part of the functional area for the calculations.

3.4 Compliance Averaging - IGWSRS-GAG

Compliance with the Sb IGWSRS-GAG is demonstrated through spatial averaging. Theissen polygons were created within Functional Area 3 as shown in **Figure 2**. The process and results discussed in this section are based on a functional area orientation assuming a groundwater flow direction to the southwest. The sample selection process is as follows:

1. The samples for Sb that fall within a functional area (horizontally and vertically), including samples that are associated with a functional area but are located beyond the physical limits of a functional area, are identified.
2. The maximum concentration is selected at each sample location for use in the weighted averages (refer to **Table 9** below). The maximum of either the concentration for detections or the MDL/RL for non-detects is selected.

Table 9: Samples Used to Determine Weighted Average Sb Concentration for Sample 10W-H34A-6.5-7.0 (Functional Area 3) - Groundwater Flow Direction to the Southwest

Location ID	Sample Depth (ft bgs)	Sample Elevation (ft NAVD88)	Date Collected	Maximum Sb Result (mg/kg)	Area (sf)	Area x Maximum Sb Result (sf*mg/kg)
10W-F33A	6.5 - 7.0	9.2 - 8.7	05/23/2014	0.69 J	1,236	853
10W-H34A	6.5 - 7.0	9.0 - 8.5	5/30/2014	163 J	2,343	381,909
10W-H35A	6.5 - 7.0	9.0 - 8.5	05/27/2014	1.2 J	926	1,111
10W-P3BS-5+15-40R	4.1 - 4.6	9.4 - 8.9	5/19/2022	3.9	1,921	7,492
FBP-I31A	5.0 - 5.5	8.6 - 8.1	05/05/2014	1.6 J	32	51
P3BS-PDI-5+40-60L	6.0 - 6.5	8.9 - 8.4	09/08/2020	3.0	856	2,568
TWA-4	6.0 - 6.5	9.1 - 8.6	04/06/2012	2.2 J	1,217	2,677
TWA-8	7.0 - 7.5	8.5 - 8.0	04/06/2012	<0.18 UJ	2,170	391
Total					10,701	397,052

Notes:

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

UJ - The analyte was not detected above the sample reporting limit shown and the reporting limit was approximate.

Weighted Average Sb Concentration for Functional Area 4 = $397,052 \text{ sf} \times \text{mg/kg} / 10,701 \text{ sf} = 37 \text{ mg/kg}$.

4.0 Conclusions

The spatially weighted average Sb concentration within Functional Area 1 at the 800 Garfield Avenue property for samples 10W-H34A-6.5-7.0 and P3BS-PDI-5+40-60L-8.0-8.5 is 22 mg/kg, which is compliant with the 31 mg/kg RDCSRS.

The spatially weighted average Sb concentration within Functional Area 2 at the 800 Garfield Avenue property for ICO-B015-15.0 is 10 mg/kg, which is compliant with the 31 mg/kg RDCSRS.

The spatially weighted average Sb concentration within Functional Area 3 assuming groundwater flow direction to the southwest at the 800 Garfield Avenue property for 10W-H34A-6.5-7.0 is 37 mg/kg, which is compliant with the 62.7 mg/kg IGWSRS-GAG.

Attachments:

Figures:

Figure 1 – Compliance Averaging Evaluation, Antimony in Soil - RDCSRS, 800 Garfield Avenue (Former Ten West Apparel Property)

Figure 2 – Compliance Averaging Evaluation, Antimony in Soil - IGWSRS-GAG, 800 Garfield Avenue (Former Ten West Apparel Property)

Attachment 1 – NJDEP Environmental Criteria for Sb

Figures

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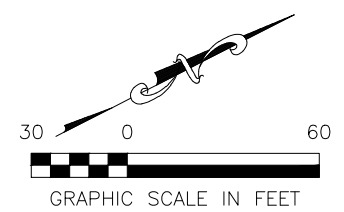
LEGEND

- PROPERTY LINE
- FENCE
- EDGE OF CONCRETE
- PHASE 3B SOUTH BOUNDARY
- EXISTING SHEET PILE
- ASPHALT
- DEPRESSED CURB
- CURB
- EXISTING BUILDING
- PRE-REMEDATION GROUND SURFACE ELEVATION CONTOURS 1' INTERVAL 5' INDEX
- STONE

- SOIL SAMPLE LOCATION - REMAINING IN SOIL - 800 GARFIELD AVENUE
- SOIL SAMPLE LOCATION - REMAINING IN SOIL - BEYOND 800 GARFIELD AVENUE, BUT IN PHASE 3B SOUTH
- LOCATION OF SOIL SAMPLE WITH Sb CONCENTRATION GREATER THAN THE RDCSRS WITHIN FUNCTIONAL AREA
- THEISSEN POLYGON
- FUNCTIONAL AREA

NOTES:
 1. Sb RESULTS ARE SHOWN IN MG/KG.

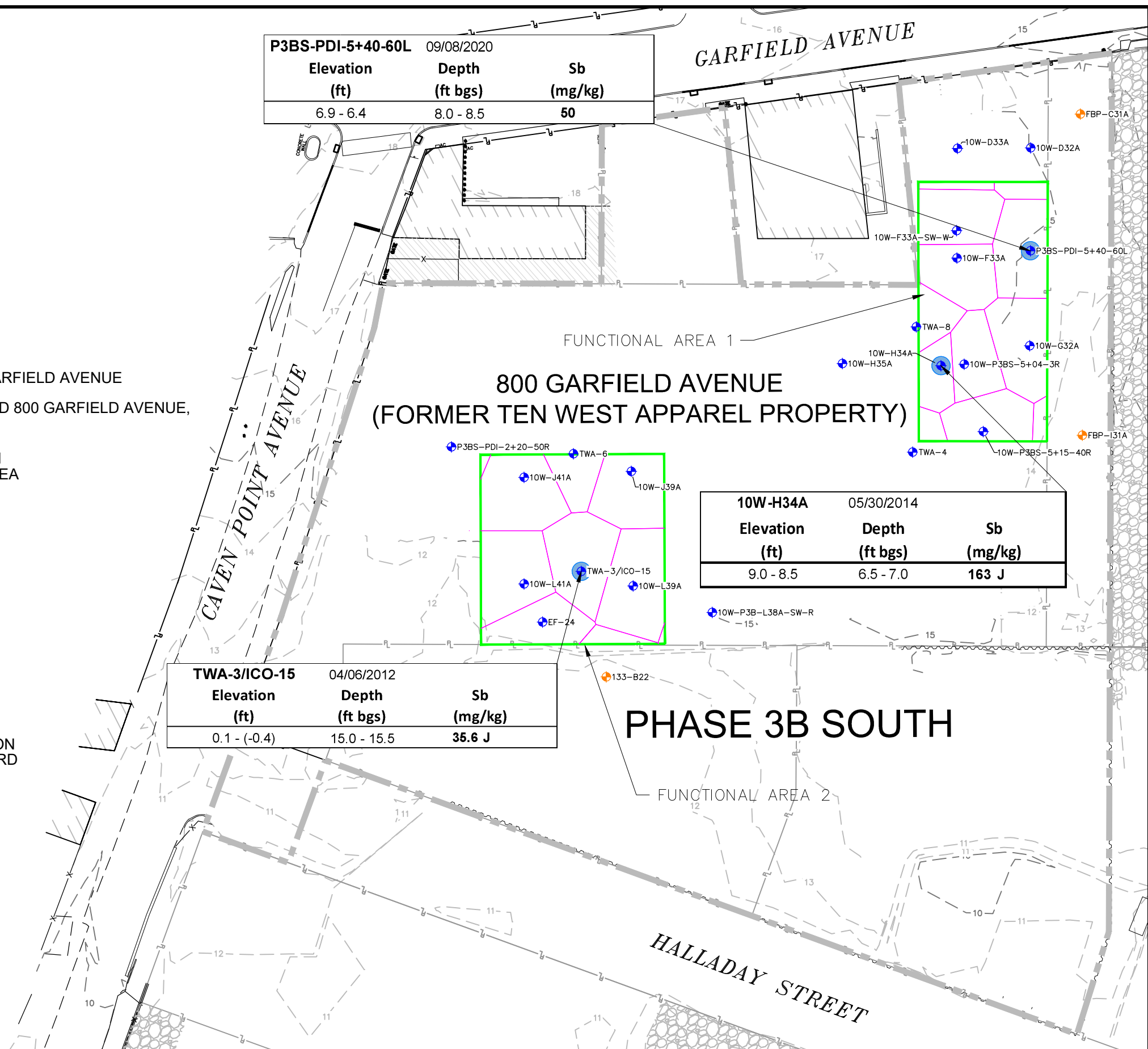
bgs BELOW GROUND SURFACE
 ft FEET
 mg/kg MILLIGRAMS PER KILOGRAM
 RDCSRS NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARD
 Sb ANTIMONY



P3BS-PDI-5+40-60L	09/08/2020	
Elevation (ft)	Depth (ft bgs)	Sb (mg/kg)
6.9 - 6.4	8.0 - 8.5	50

10W-H34A	05/30/2014	
Elevation (ft)	Depth (ft bgs)	Sb (mg/kg)
9.0 - 8.5	6.5 - 7.0	163 J

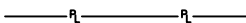
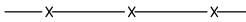









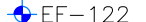
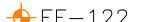



TWA-3/ICO-15	04/06/2012	
Elevation (ft)	Depth (ft bgs)	Sb (mg/kg)
0.1 - (-0.4)	15.0 - 15.5	35.6 J



PPG GARFIELD AVENUE GROUP SITES JERSEY CITY, NEW JERSEY	COMPLIANCE AVERAGING EVALUATION ANTIMONY IN SOIL - RDCSRS 800 GARFIELD AVENUE (FORMER TEN WEST APPAREL PROPERTY)
DATE: 08/01/2022 DRWN: DCB/SAP	FIGURE 1

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LEGEND

-  PROPERTY LINE
-  FENCE
-  EDGE OF CONCRETE
-  PHASE 3B SOUTH LIMIT
-  EXISTING SHEET PILE
-  ASPHALT
-  DEPRESSED CURB
-  CURB
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-  LOCATION OF SOIL SAMPLE WITH Sb CONCENTRATION GREATER THAN THE IGWSRS-GAG WITHIN FUNCTIONAL AREA
-  THEISSEN POLYGON
-  FUNCTIONAL AREA

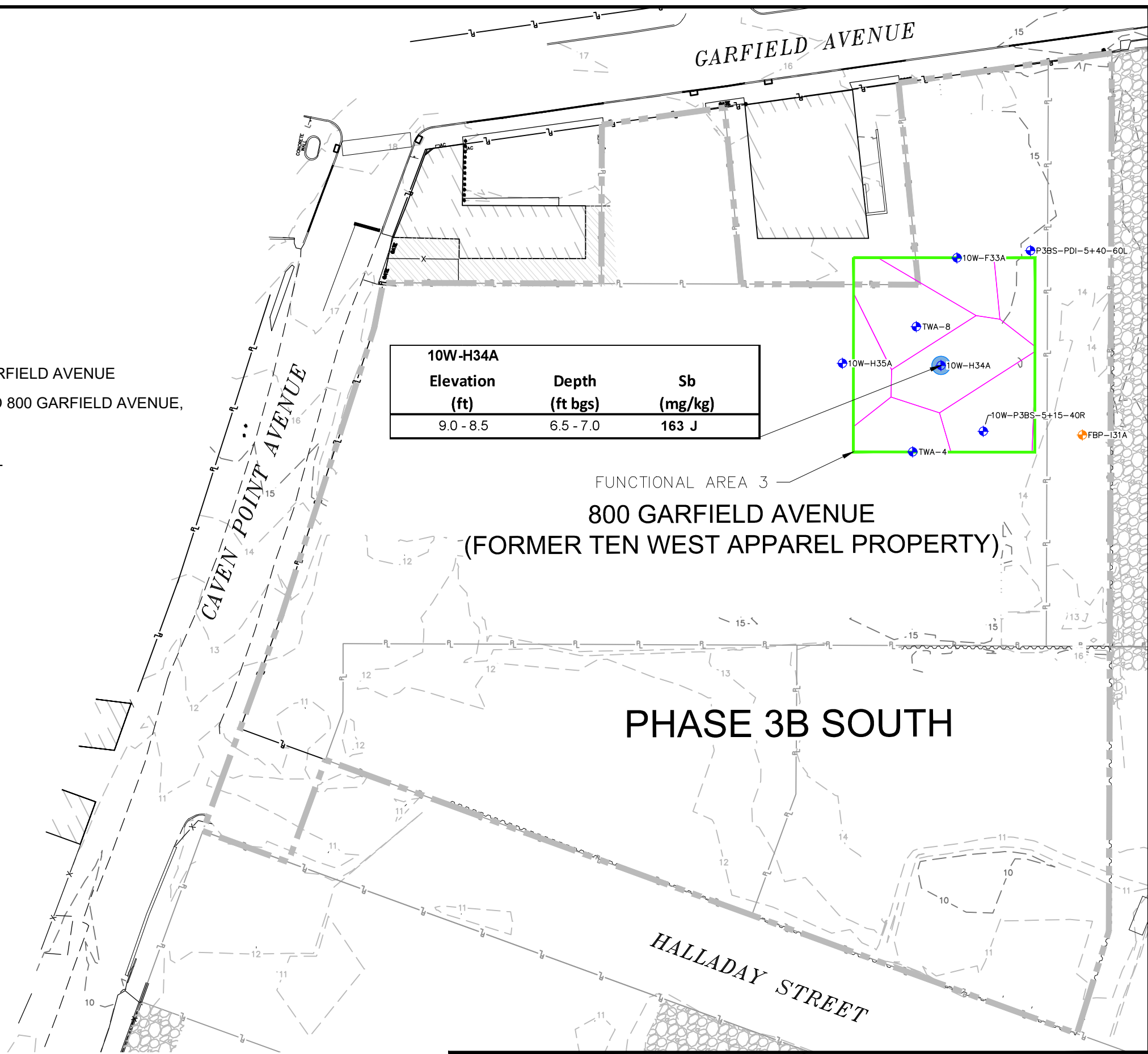
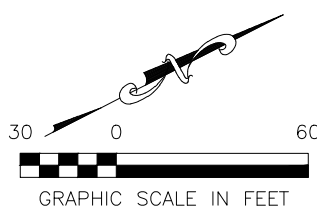
NOTES:
 1. Sb RESULTS ARE SHOWN IN MG/KG.

bgs
ft
IGWSRS-GAG

BELOW GROUND SURFACE
FEET
IMPACT TO GROUNDWATER SOIL REMEDIATION STANDARD - GARFIELD AVENUE GROUP (SITE-SPECIFIC ALTERNATIVE REMEDIATION STANDARD AS PROPOSED IN THE SUPPLEMENTAL SOIL REMEDIAL INVESTIGATION REPORT, FINAL DRAFT, DATED 09/17/2017)

mg/kg
Sb

MILLIGRAMS PER KILOGRAM
ANTIMONY



PPG GARFIELD AVENUE GROUP SITES JERSEY CITY, NEW JERSEY	COMPLIANCE AVERAGING EVALUATION ANTIMONY IN SOIL - IGWSRS-GAG 800 GARFIELD AVENUE (FORMER TEN WEST APPAREL PROPERTY)
DATE: 08/01/2022 DRWN: DCB/SAP	FIGURE 2

800 Garfield Avenue (the Former Ten West Apparel Property) Compliance Averaging for Antimony in Soil (Revision 1)
PPG, Jersey City, New Jersey

Attachment 1

NJDEP Environmental Criteria for Sb



New Jersey Department of Environmental Protection

Standards for Drinking Water, Ground Water, Soil and Surface Water

Antimony (Total)

CAS #: 7440-36-0

Drinking Water Standards (μ g/l or ppb)

Standard: 6

Type: Primary

FEDERAL MCL

Ground Water Quality Standards (μ g/l or ppb)

Standard: 6

Type: Specific

GW-Quality Criterion: 6

PQL: 3

Surface Water Quality Standards (μ g/l or ppb)

Fresh Water-

Human Health: 5.6(h)(T)

Aquatic-Acute:

Aquatic-Chronic:

Saline Water-

Human Health: 640(h)(T)

Aquatic-Acute:

Aquatic-Chronic:

Soil Standards (mg/kg)

Residential Direct Contact Health Based Criteria and Soil Remediation Standard

Soil Remediation Standard: 31

Effective: 6/2/2008 **Interim:**

Ingestion Dermal: 31

Inhalation: 360,000

Soil PQL: 6

Non-Residential Direct Contact Health Based Criteria and Soil Remediation Standard

Soil Remediation Standard: 450

Effective: 6/2/2008 **Interim:**

Ingestion Dermal: 450

Inhalation: 23,000

Soil PQL: 6