100008003

TECHNICAL MEMORANDUM, EAF SLAG SAMPLING EVENT

COLORADO SMELTER SUPERFUND SITE
PUEBLO, PUEBLO COUNTY, COLORADO

February 2020
Revision 0

Prepared for:

U.S. EPA Region 8
Denver, Colorado

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Table of Contents

Figures

Tables

Appendices

List of Acronyms

ASARCO	American Smelting and Refining Company
ASTM	American Society for Testing and Material
bgs	Below ground surface
COPC	Contaminant of potential concern
CTL	CTL Thompson Engineers
EAF	Electric arc furnace
EPA	U.S. Environmental Protection Agency
FS	Feasibility study
IC-ICP-MS	Ion chromatography with inductively-coupled plasma mass spectrometry
IC-VIS	Ion chromatography with visible spectroscopy
OU	Operable unit
PWT	Pacific Western Technologies, Ltd.
QAPP	Quality Assurance Project Plan
RI	Remedial investigation
RSD	Relative standard deviation
RSL	Regional screening level
SPLP	Synthetic Precipitation Leaching Procedure
Tt	Tetra Tech, Inc.

Units of Measurement

mg/kg	milligrams per kilogram
mm	millimeters
µg/L	micrograms per liter
µm	microns

1.0 Executive Summary

The purpose of this memorandum is to summarize metal concentrations in, and geotechnical properties of, electric arc furnace (EAF) slag product at residential properties in Operable Unit 1 (OU1) of the Colorado Smelter Superfund Site (Site). Pacific Western Technologies (PWT) and Tetra Tech (Tt) are currently working with the U.S. Environmental Protection Agency (EPA) to conduct a Remedial Investigation/Feasibility Study (RI/FS) for OU1 of the Site.

This memo presents a summary of results from sampling of EAF slag used as driveway or xeriscape material at residential properties within OU1. The results include chemical analysis results for metals that are potential contaminants of potential concern (COPCs) for the slag material, as well as geotechnical results.

A few of the COPCs analyzed for in the sampling event exceeded EPA Regional Screening Levels (RSLs) in one or more samples. These COPCs are arsenic, hexavalent chromium, iron, manganese, thallium, vanadium, and zinc. Geotechnical results were variable for different samples, which is expected since the EAF slag was placed at each property on different dates.

2.0 Area Background

Beginning operation in 1881, the Colorado Fuel and Iron Company Steel Mill produced rails for the Denver and Rio Grande Railroad who's owners also built the mill. The mill originally used blast furnaces and the Bessemer process to manufacture pig iron, rails, iron and steel bars and plates and cut nails and spikes. The main blast furnaces were removed in 1982, adopting instead the Electric Arc Furnace process which converts over a million tons of scrap per year into steel billets. These billets are processed into various products in the rail mill, rod and bar mill and seamless tube mill. The Steel Mill is currently owned by EVRAZ North America. The Harsco Company markets the waste products from the EAF furnace slag for use as construction aggregates used in roadmaking, railroad ballast and bank stabilization. Harsco also sells the smaller diameter aggregate to private homeowners to use as decorative landscape rock.

While performing soil sampling in the preliminary study area of the Colorado Smelter Superfund Site, EAF furnace slag was encountered in many of the yards as rock gardens, driveways and landscape coverings. The EPA requested PWT to identify residential properties containing the EAF slag and to collect samples of the material for analytical and geotechnical testing from a representative number of properties. Figure 1 identifies the location of the properties sampled. The slag sampling was performed in September and October 2019 and was conducted in addition to the standard soil sampling performed on these properties in support of the OU1 remedial investigation.

3.0 Identification of Properties

Up to 21 locations were planned for sampling within the boundary of OU1. During project planning, these

consisted of:

- 7 properties where RI sampling had been performed and no cleanup is required.
- 7 properties where RI sampling had been performed and cleanup is required.
- 7 properties where RI sampling had not yet been performed.

Now that soil sampling has been completed at all 21 properties where EAF slag was collected, the latter 7 properties all have soil data and the cleanup status is known. The properties sampled consist of:

- 10 properties where RI sampling had not yet been performed and no cleanup is required.
- 10 properties where RI sampling had not yet been performed and cleanup is required.
- 1 property where the property was found to be paved very close to the surface, therefore no RI surficial soil samples were collected, and cleanup status is unknown.

Samples of EAF slag were collected from each of the 21 properties at depths from 0 to 1 inch. The locations of the properties sampled are summarized in Figure 1. Appendix A shows the locations of the slag samples collected at each property. Duplicate samples were collected from three properties. Each owner was questioned about the approximate age of the EAF slag, and this information is summarized in Table 1.

Table 1. Summary of Properties Sampled

Property	Soil Cleanup Required?	Duplicate Collected?	Sampling Date	Estimated Age of EAF Slag*
PC0119	No	No	10/18/2019	2 to 3 years old
PC0168	Yes	No	10/17/2019	Most recently 1 year ago
PC0391	No	No	9/11/2019	5 years old
PC0398	No	No	9/24/2019	6 years old
PC0583	No	No	9/20/2019	Unknown
PC0621	No	No	10/4/2019	1 to 2 years old
PC0646	No	No	9/11/2019	More than 5 years old
PC1108	No	No	10/9/2019	More than 2 years old
PC1184	Yes	No	10/2/2019	8 years old
PC1347	Yes	No	10/10/2019	Approximately 10 years old
PC1435	Yes	Yes	9/26/2019	5 years old
PC1546	Unknown	No	10/23/2019	5 years
PC1586	Yes	No	10/21/2019	More than 5 years
PC1587	Yes	Yes – chemical only	10/21/2019	7 years old
PC1741	Yes	No	10/2/2019	More than 15 years old
PC1913	No	Yes – chemical only	10/2/2019	4 months old
PC1938	Yes	No	10/1/2019	3 years old
PC1967	No	No	10/22/2019	5 years old
PC2031	Yes	No	10/10/2019	Unknown
PC2100	No	No	9/23/2019	Appears recently applied
PC2251	Yes	No	9/25/2019	15 years old

Notes:

* Age of slag is estimated based on the recollection of the property owner.

4.0 Sampling and Analysis Approach

Samples were collected from each property identified in Table 1. Samples for chemical analysis were 5-point composite samples from driveways and yards, yielding a mass of 500 to 1,000 grams. Samples for geotechnical testing were 30 point composite samples, yielding a target volume of approximately 5 gallons.

Samples for chemical analysis were sieved using 10-mesh and 60-mesh sieves. The material retained on the 10-mesh and the 60-mesh sieves were combined and identified as the > 250 micron (μm) fraction (sample A), while material passing through both sieves was identified as the < 250 μm fraction (sample B). Both samples were sent for analysis through the EPA Contract Laboratory Program using the following methods:

- Digestion and analysis for metals by inductively-coupled plasma atomic emission spectrometry (ICP-AES) using EPA SW-846 methods 3050B and 6010, and mercury by EPA SW-846 method 7471.
- Analysis for leachable metals by synthetic precipitation leaching procedure (SPLP) using EPA SW-846 method 1312.
- Analysis for pH (acidity/basicity) by EPA SW-846 method 9045.

In addition to the CLP analysis, samples were sent for analysis for hexavalent chromium by two laboratories:

- TestAmerica used ion chromatography with visible spectroscopy (IC-VIS) by EPA SW-846 method 7199.
- Brooks Applied Laboratory used IC and inductively-coupled plasma mass spectrometry (IC-ICP-MS) by Brooks Applied Laboratory method SSA201. The samples from the > 250 μm fraction that were analyzed by method SSA201 required size reduction using a ceramic jaw crusher to homogenize the samples prior to analysis by the method.

Samples for geotechnical testing were submitted to CTL Thompson Materials Engineers (CTL). Testing included:

- Sieve analysis (gradation) using American Society for Testing and Materials (ASTM) method C136.
- Material finer than No. 200 sieve using ASTM method C117.
- Abrasion using the Los Angeles Abrasion method (ASTM method C131).
- In addition, CTL provided estimates of the gravel, sand, and silt/clay content of each sample.

5.0 Chemical Analysis Results

The following sections summarize the chemical analysis results for each group of analytes. The results for properties with duplicate samples were averaged to provide a concentration prior to any further use of the data.

5.1 *Metals in EAF Slag*

Table 2 summarizes statistics for total metals in EAF slag for all properties in the study. Appendix B, Table B.1 contains full results for all samples collected by property. Table 2 includes the number of detections and samples (detection frequency), and the minimum, maximum, and median result for each metal and sieve fraction. The calculated mean, standard deviation, and relative standard deviation (RSD) for each metal is also presented in Table 2.

5.2 *Synthetic Precipitation Leaching Procedure Results*

Table 3 summarizes statistics for total metals in EAF slag for all properties in the study. Appendix B, Table B.2 contains full results for all samples collected by property. Table 3 includes the number of detections and samples (detection frequency), and the minimum, maximum, and median result for each metal and sieve fraction. The calculated mean, standard deviation, and relative standard deviation (RSD) for each metal and sieve fraction is also presented in Table 3.

5.3 *Hexavalent Chromium Results*

Table 4 summarizes statistics for hexavalent chromium in EAF slag for all properties in the study. Appendix A, Table B.3 contains full results for all samples collected by property. Table 4 includes the number of detections and samples (detection frequency), and the minimum, maximum, and median result for hexavalent chromium for each method and sieve fraction. The calculated mean, standard deviation, and relative standard deviation (RSD) for each metal and sieve fraction is also presented in Table 3.

5.4 *Soil pH Results*

Table 5 summarizes statistics for soil pH in EAF slag for all properties in the study. Appendix B, Table B.4 contains full pH results for all samples collected by property. Table 5 presents the minimum, maximum, median, and mean result for pH. The mean pH results calculated in Table 5 were performed by first converting the pH to the hydronium ion concentration ([H+]=-log(pH)) for each sample, averaging the [H+] values for all properties, and then converting the average back to pH.

Table 2. Statistical Summary of Metals Results in EAF Slag

Fraction	Analyte	EPA Residential Soil Regional Screening Level	Detection Frequency	Min	Max	Median	Mean	Standard Deviation	Relative Standard Deviation
<250 microns	Aluminum	77,000	21 / 21	11,800	17,000	13,700	14,000	1,570	11%
	Antimony	39	7 / 18	0.63	3.3	0.83	1.22	0.936	77%
	Arsenic	0.68	21 / 21	5.1	37.6	13.4	13.6	7.56	56%
	Barium	15,000	21 / 21	229	471	293	313	66.1	21%
	Beryllium	160	12 / 21	0.37	1	0.56	0.62	0.176	28%
	Cadmium	71	21 / 21	0.1	8.9	3.3	3.52	2.39	68%
	Calcium	None	21 / 21	32,300	248,000	123,000	130,000	53,200	41%
	Chromium	120,000	21 / 21	86.9	3,690	1,320	1550	1080	70%
	Cobalt	23	21 / 21	5.1	9.2	6.7	6.85	1.25	18%
	Copper	3,100	21 / 21	60.8	288	140	150	50.9	34%
	Iron	55,000	21 / 21	24,100	136,000	87,300	85,400	30,900	36%
	Lead	400	21 / 21	38.8	276	120	123	70.2	57%
	Magnesium	None	21 / 21	5,800	52,800	26,300	26,400	12,900	49%
	Manganese	1,800	21 / 21	783	22,900	8,600	10,500	6,110	58%
	Mercury	23	19 / 21	0.018	0.33	0.052	0.0769	0.0803	104%
	Nickel	1,500	21 / 21	14.6	58.2	30.2	33.8	11.4	34%
	Potassium	None	20 / 21	804	3,340	1,770	1,860	684	37%
	Selenium	390	19 / 21	1.3	9.2	4.6	4.95	2.38	48%
	Silver	390	21 / 21	1.6	9.15	4.2	4.53	1.99	44%
	Sodium	None	18 / 21	177	1,250	315	436	279	64%
	Thallium	0.78	5 / 19	1.1	4.1	3	2.62	1.36	52%
	Vanadium	390	21 / 21	57.5	296	128	156	71.7	46%
	Zinc	2,300	21 / 21	266	8,190	1,380	1,930	1,770	91%

Notes: All results are in units of milligrams per kilogram (mg/kg).

Table 2. Statistical Summary of Metals Results in EAF Slag (Continued)

Fraction	Analyte	EPA Residential Soil Regional Screening Level	Detection Frequency	Min	Max	Median	Mean	Standard Deviation	Relative Standard Deviation
>250 microns	Aluminum	77,000	21 / 21	11,800	23,900	21,400	19,800	3,340	17%
	Antimony	39	13 / 20	1	14.8	5.7	6.31	4.75	75%
	Arsenic	0.68	21 / 21	4.8	37.2	28.3	22.5	12.2	54%
	Barium	15,000	21 / 21	285	645	517	516	99.9	19%
	Beryllium	160	10 / 21	0.31	0.89	0.435	0.483	0.188	39%
	Cadmium	71	17 / 21	0.65	8.75	3.5	4.32	2.76	64%
	Calcium	None	21 / 21	91,100	240,000	208,000	193,000	42,800	22%
	Chromium	120,000	21 / 21	1,310	6,410	4,730	4,450	1470	33%
	Cobalt	23	21 / 21	3.7	13	5.9	6.4	2.09	33%
	Copper	3,100	21 / 21	69.5	470	179	199	93.4	47%
	Iron	55,000	21 / 21	70,300	298,000	187,000	176,000	53,000	30%
	Lead	400	21 / 21	12	273	28.3	50	59.6	119%
	Magnesium	None	21 / 21	15,900	53,200	47,100	43,000	11,700	27%
	Manganese	1,800	21 / 21	10,400	37,100	30,000	28,500	7,440	26%
	Mercury	23	4 / 19	0.022	0.15	0.0625	0.0743	0.0621	84%
	Nickel	1,500	21 / 21	9.9	128	33.2	41.7	30.1	72%
	Potassium	None	8 / 21	183	1,640	693	875	624	71%
	Selenium	390	20 / 21	3.4	16.5	9.8	10.1	3.26	33%
	Silver	390	21 / 21	2.3	16.7	9.7	9.01	4.01	45%
	Sodium	None	17 / 21	119	588	231	260	110	42%
	Thallium	0.78	5 / 20	4	10.7	9.3	8.66	2.71	31%
	Vanadium	390	21 / 21	141	544	410	383	101	26%
	Zinc	2,300	21 / 21	92.1	4,260	931	1,240	1,030	82%

Notes: All results are in units of milligrams per kilogram (mg/kg).

Table 3. Statistical Summary of Synthetic Precipitation Leaching Procedure Metals Results

Fraction	Analyte	Detection Frequency	Min	Max	Median	Mean	Standard Deviation	Relative Standard Deviation
<250 microns	Aluminum	19 / 21	95.7	1640	445	548	424	77%
	Antimony	1 / 21	2.1	2.1	2.1	2.1	N/A	N/A
	Arsenic	7 / 21	1.7	53.1	4.3	11.3	18.6	164%
	Barium	11 / 21	59.7	399	145	175	103	59%
	Beryllium	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Cadmium	7 / 21	0.13	0.33	0.185	0.191	0.0667	35%
	Calcium	21 / 21	18,700	62,500	31,600	34,000	12,400	37%
	Chromium	17 / 21	4.3	44.6	10.7	15.2	10.7	71%
	Cobalt	6 / 21	0.22	1.2	0.325	0.455	0.371	82%
	Copper	8 / 21	3.7	23.3	15.4	14.2	6.64	47%
	Iron	21 / 21	118	1630	489	533	387	73%
	Lead	17 / 21	1.9	33.2	9.2	11.2	8.79	78%
	Magnesium	17 / 21	3,560	12,700	7,720	8,110	2,980	37%
	Manganese	21 / 21	21.9	131	59.4	60.4	31.5	52%
	Mercury	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Nickel	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Potassium	9 / 21	631	13,800	6,300	6,210	4,270	69%
	Selenium	6 / 21	3.7	6.9	5.15	5.36	1.24	23%
	Silver	3 / 21	0.42	0.68	0.6	0.567	0.133	24%
	Sodium	21 / 21	17,800	78,200	27,000	32,200	13,900	43%
	Thallium	3 / 21	1.6	2.3	2	1.97	0.351	18%
	Vanadium	18 / 21	14.6	269	51.8	92.8	78.5	85%
	Zinc	12 / 21	46	187	77	96.9	46.3	48%

Notes: All results are in units of micrograms per liter (µg/L).

Table 3. Statistical Summary of Synthetic Precipitation Leaching Procedure Metals Results (Continued)

Fraction	Analyte	Detection Frequency	Min	Max	Median	Mean	Standard Deviation	Relative Standard Deviation
>250 microns	Aluminum	16 / 21	75.9	1750	317	427	398	93%
	Antimony	1 / 21	1.3	1.3	1.3	1.3	N/A	N/A
	Arsenic	1 / 21	37.9	37.9	37.9	37.9	N/A	N/A
	Barium	11 / 21	31.1	400	81.6	122	119	97%
	Beryllium	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Cadmium	4 / 21	0.13	0.3	0.175	0.195	0.0742	38%
	Calcium	21 / 21	11,700	53,800	25,900	26,800	9,630	36%
	Chromium	18 / 21	7.2	41.5	17.6	19.4	9.57	49%
	Cobalt	2 / 21	0.26	0.65	0.455	0.455	N/A	N/A
	Copper	11 / 21	1	28.4	8.7	11.5	8.82	77%
	Iron	16 / 21	101	1,900	347	526	496	94%
	Lead	11 / 21	3.2	45.1	6.9	12.7	14	111%
	Magnesium	10 / 21	501	4,290	2,530	2,410	1,140	47%
	Manganese	15 / 21	17.1	220	64.2	79.5	57.6	72%
	Mercury	1 / 21	0.17	0.17	0.17	0.17	N/A	N/A
	Nickel	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Potassium	5 / 21	188	4,820	987	1,480	1,900	128%
	Selenium	5 / 21	1.7	4	2.6	2.86	0.876	31%
	Silver	0 / 21	N/A	N/A	N/A	N/A	N/A	N/A
	Sodium	21 / 21	15,100	49,600	20,100	23,900	8,590	36%
	Thallium	4 / 21	1.7	2.2	1.85	1.9	0.216	11%
	Vanadium	17 / 21	29.6	119	66.7	71.3	28.5	40%
	Zinc	7 / 21	48.5	143	82.7	96.1	38.1	40%

Notes: All results are in units of micrograms per liter (µg/L).

Table 4. Statistical Summary of Hexavalent Chromium Results in EAF Slag

EPA Residential Soil Regional Screening Level	Method	Fraction	Detection Frequency	Minimum	Maximum	Median	Mean	Standard Deviation	Relative Standard Deviation
0.3	7199 (IC-VIS)	> 250 µm	18 / 21	0.161	5.68	1.51	1.87	1.59	85%
		< 250 µm	17 / 21	0.202	5.45	0.616	1.23	1.46	119%
	SSA201 (IC-ICP-MS)	> 250 µm	20 / 21	0.057	77.6	20	20.4	18	89%
		< 250 µm	21 / 21	0.029	57.3	2.67	10.5	14.4	137%

Notes: All results are in units of milligrams per kilogram (mg/kg).

Table 5. Statistical Summary of pH Results in EAF Slag

Fraction	Minimum	Maximum	Median	Mean
> 250 µm	7.76	9.96	8.72	8.51
< 250 µm	7.23	9.93	8.41	8.16

Notes: All results are in pH units

Mean pH was calculated by calculating the hydronium ion concentration ([H+]) from each result, taking the mean of the concentrations, and converting back to pH units.

6.0 Geotechnical Testing Results

A statistical summary of sample results for the geotechnical testing conducted by CTL are presented in Table 6. The raw results from reports for each property are presented in Appendix B, Table 5. The sieve fractions with the highest variability were those on the lower end of the size scale, likely because of the varying age of the slag at different properties.

Table 6. Statistical Summary of Geotechnical Results

Parameter	Units	Extreme Values		Central Measures	
		Minimum	Maximum	Median	Mean
2 inch (50 mm)	Percent Passing*	100	100	100	100
1.5 inch (37.5 mm)	Percent Passing*	100	100	100	100
1 inch (25 mm)	Percent Passing*	99	100	100	99.9
0.75 inch (19 mm)	Percent Passing*	92	100	100	99
0.5 inch (12.5 mm)	Percent Passing*	43	96	89	84.4
0.375 inch (9.5 mm)	Percent Passing*	13	88	74	68
No. 4 (4.75 mm)	Percent Passing*	2	57	37	35.5
No. 8 (2.36 mm)	Percent Passing*	1	30	16	16.6
No. 200 (0.075 mm)	Percent Passing*	0.1	4.1	1.1	1.29
Los Angeles Abrasion	Percent	11	20	14	14.3
Gravel	Percent Composition	43	98	63	64.4
Sand	Percent Composition	2	56	36	34.3
Silt and Clay	Percent Composition	0	4	1	1.31

Notes:

* Percent passing through the specified sieve size.

mm Millimeters

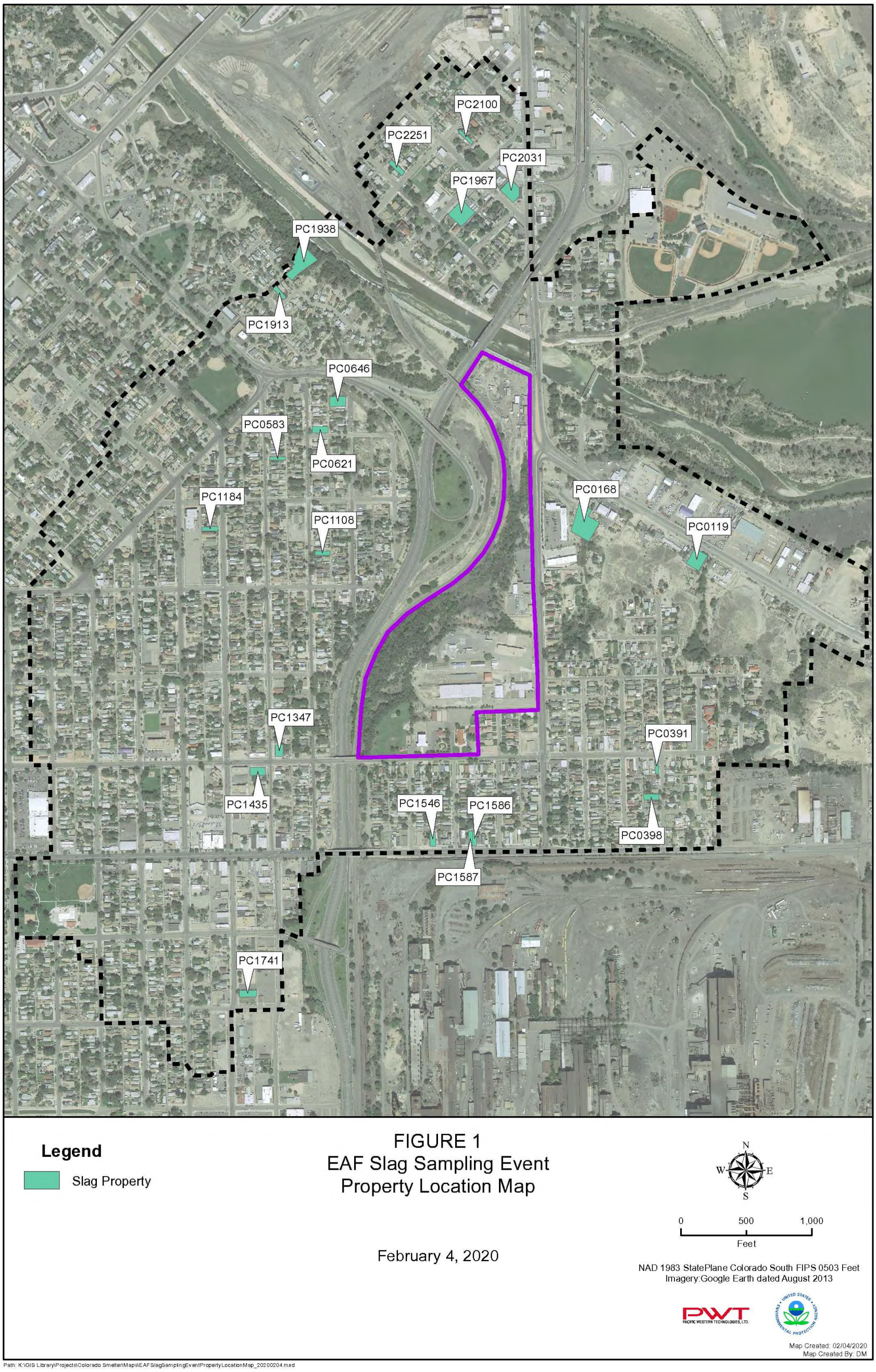
7.0 Conclusions

Sampling was conducted at 21 properties with EAF slag located in the Colorado Smelter OU1 site. The EAF slag had been used as driveway or landscape material at these properties. The EAF slag samples were analyzed for metals that are potential COPCs for the material, and also for geotechnical parameters.

Several of the COPCs analyzed for in the sampling event exceeded EPA Regional Screening Levels (RSLs) for residential soil in one or more samples. These COPCs are arsenic, hexavalent chromium, iron, manganese, thallium, vanadium, and zinc. Geotechnical results were variable for different samples, which is expected since the EAF slag was placed at each property at different dates.

FIGURES

Figure 1. EAF Slag Sampling Event Property Location Map



APPENDIX A

SAMPLE LOCATION FIGURES FOR EAF SLAG PROPERTIES

Notes:

- Approximate area of EAF slag sampling depicted.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

Not to Scale

Property Code: 0119
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: ArcGIS Online Map

File location:

Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

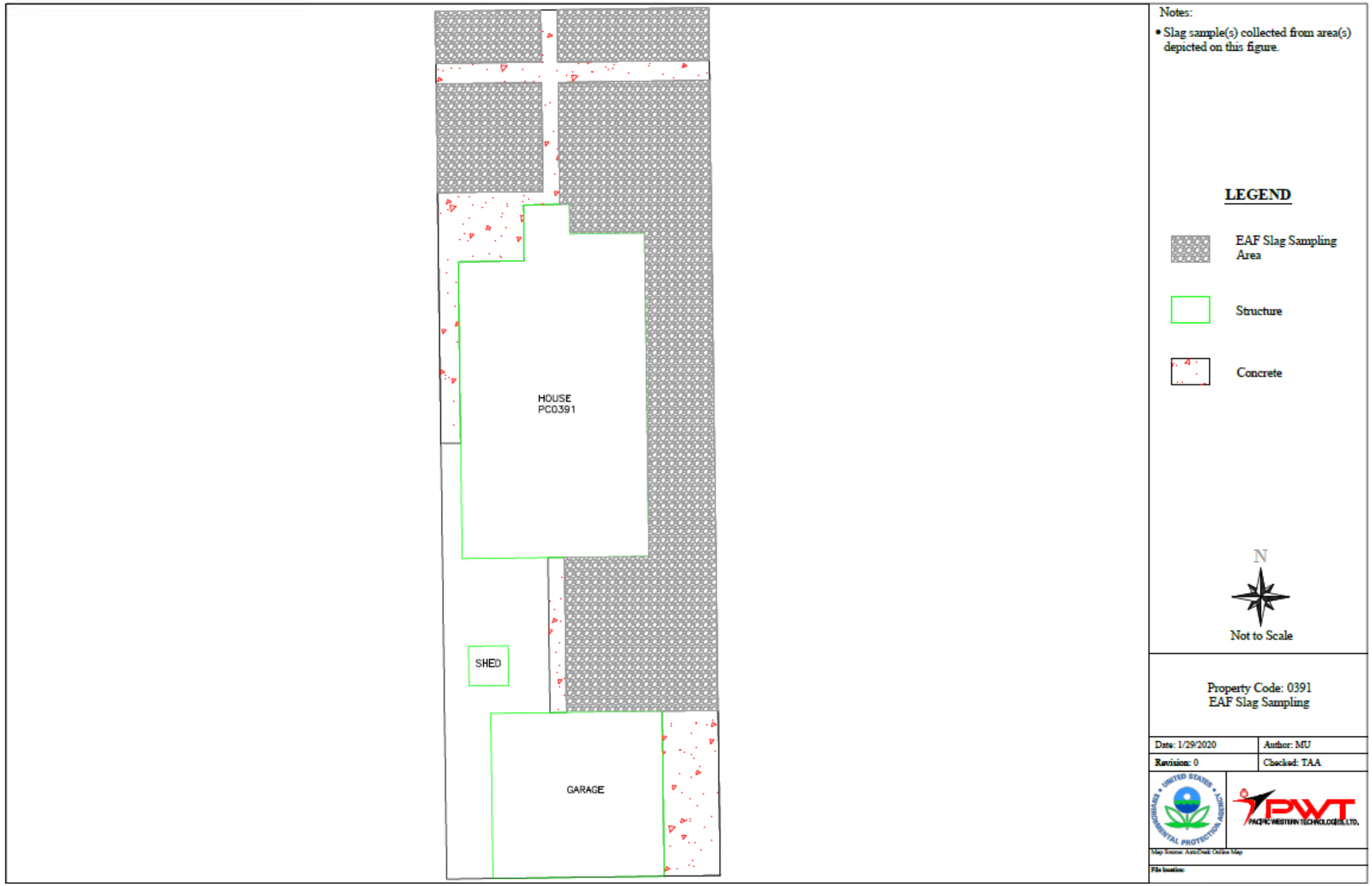
Not to Scale

Property Code: 0168
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: ArcGIS Online Map

File location:


HOUSE
PC0391
SHED
GARAGE
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 0391
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
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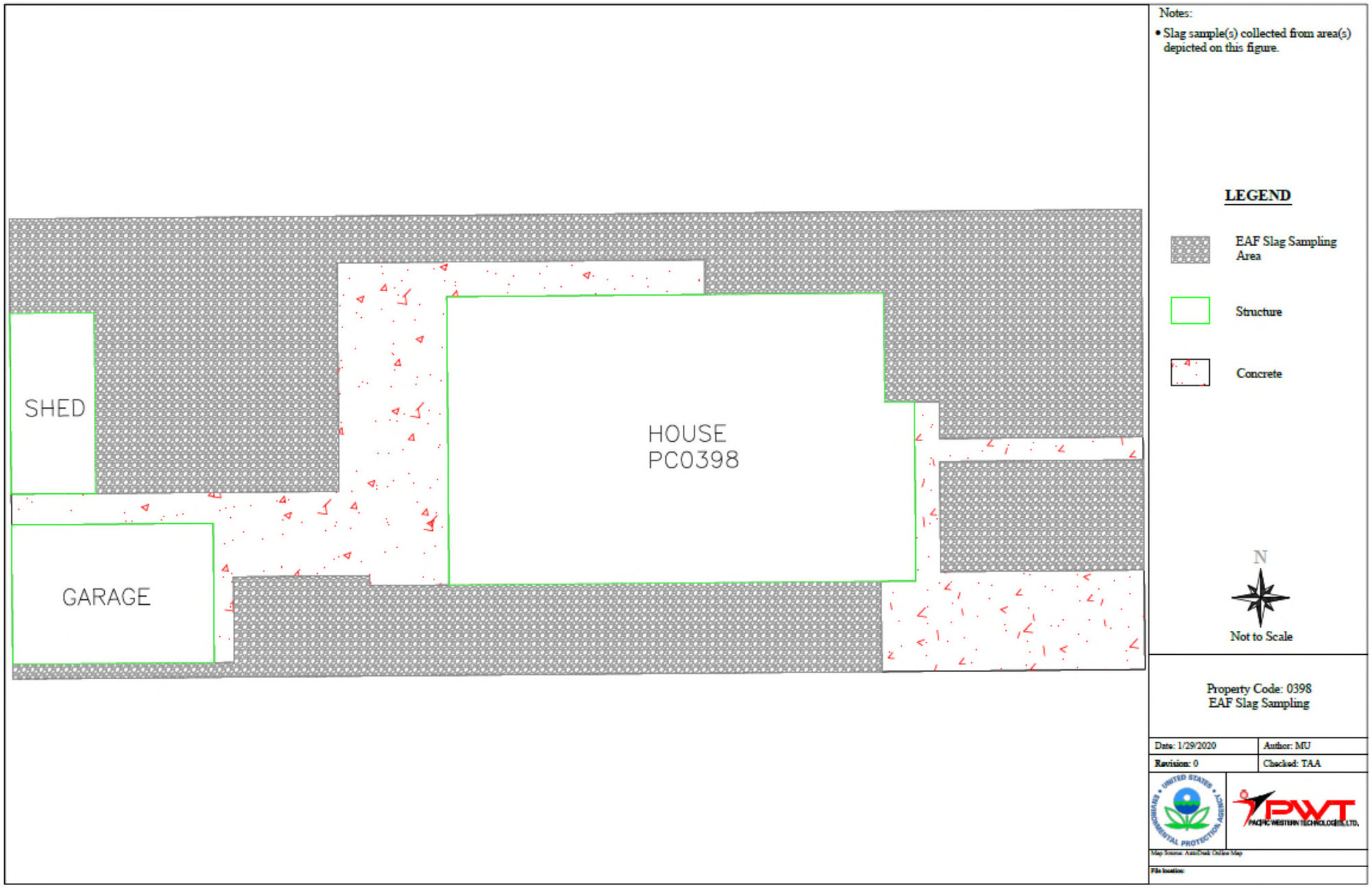
SHED
HOUSE
PC0398
GARAGE
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 0398
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
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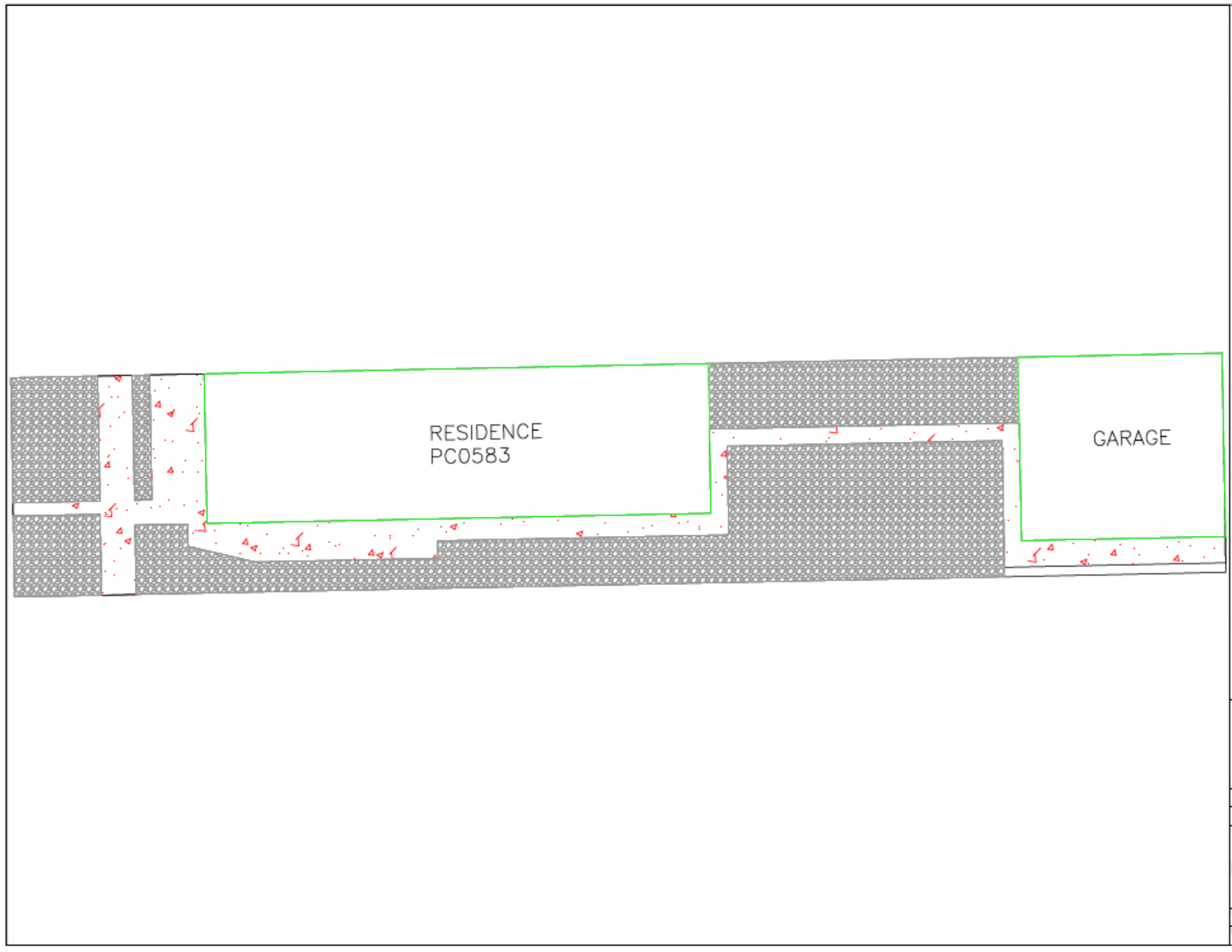


Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

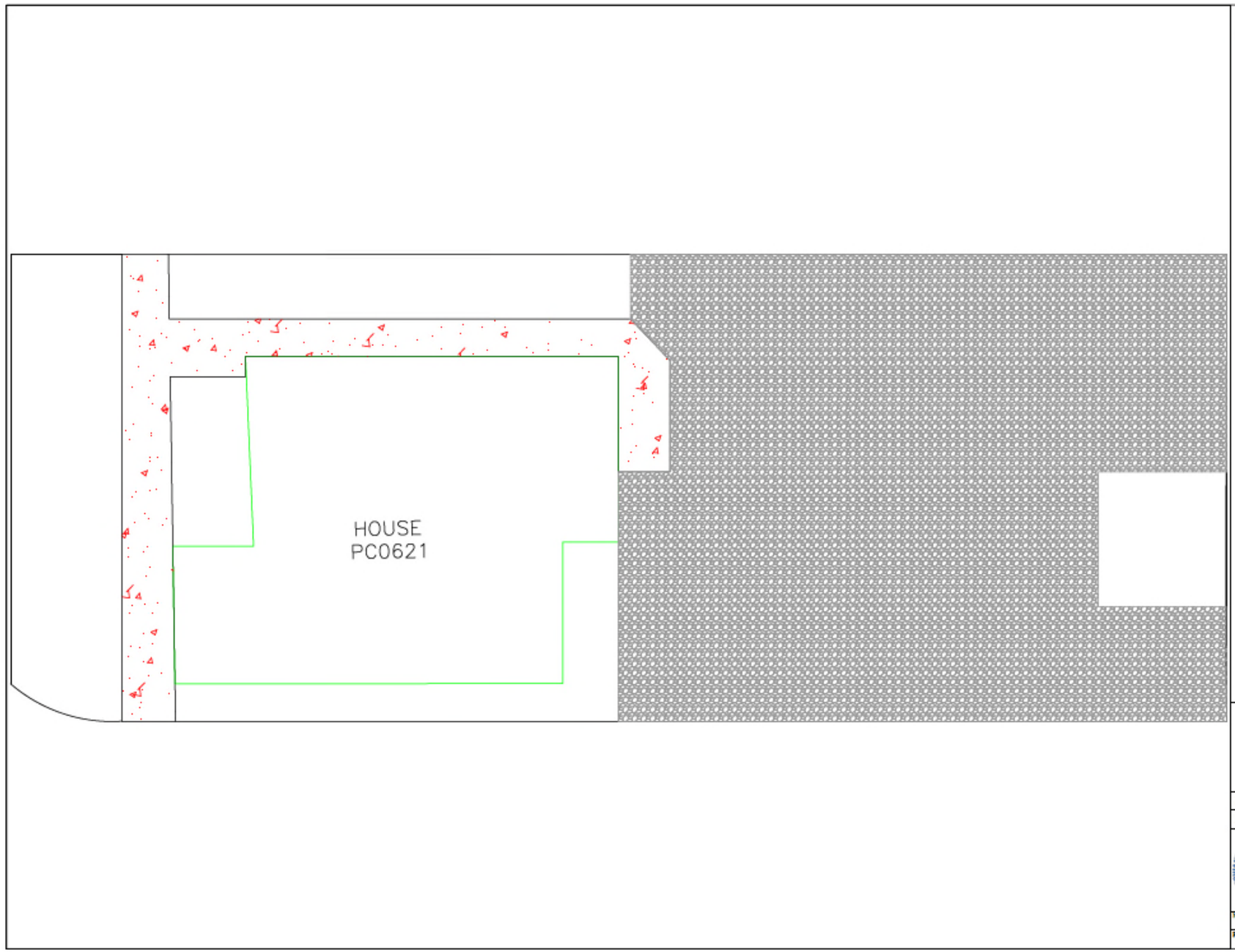
Not to Scale

Property Code: 0583
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: AutoDesk Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

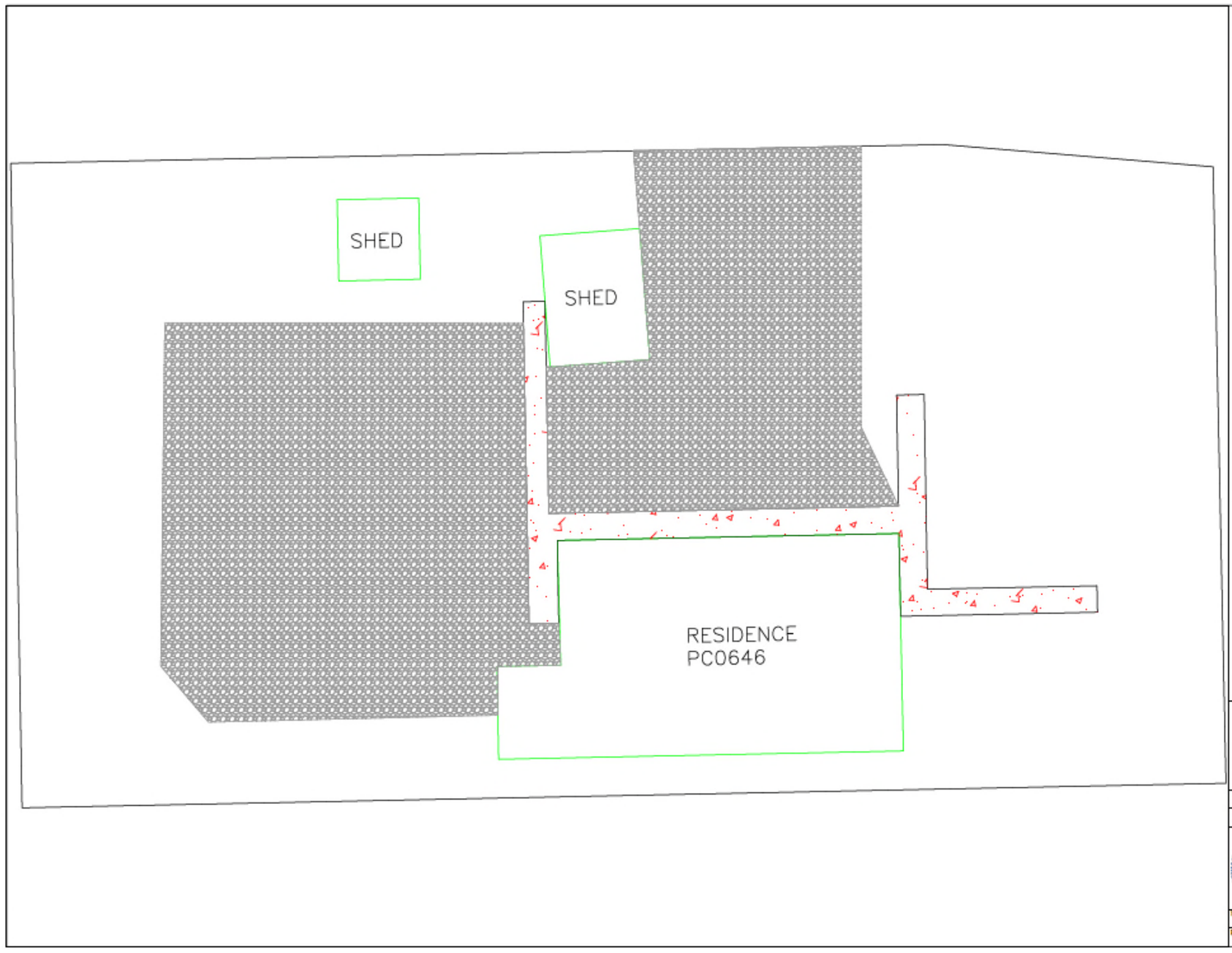
Not to Scale

Property Code: 0621
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: ArcGIS Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

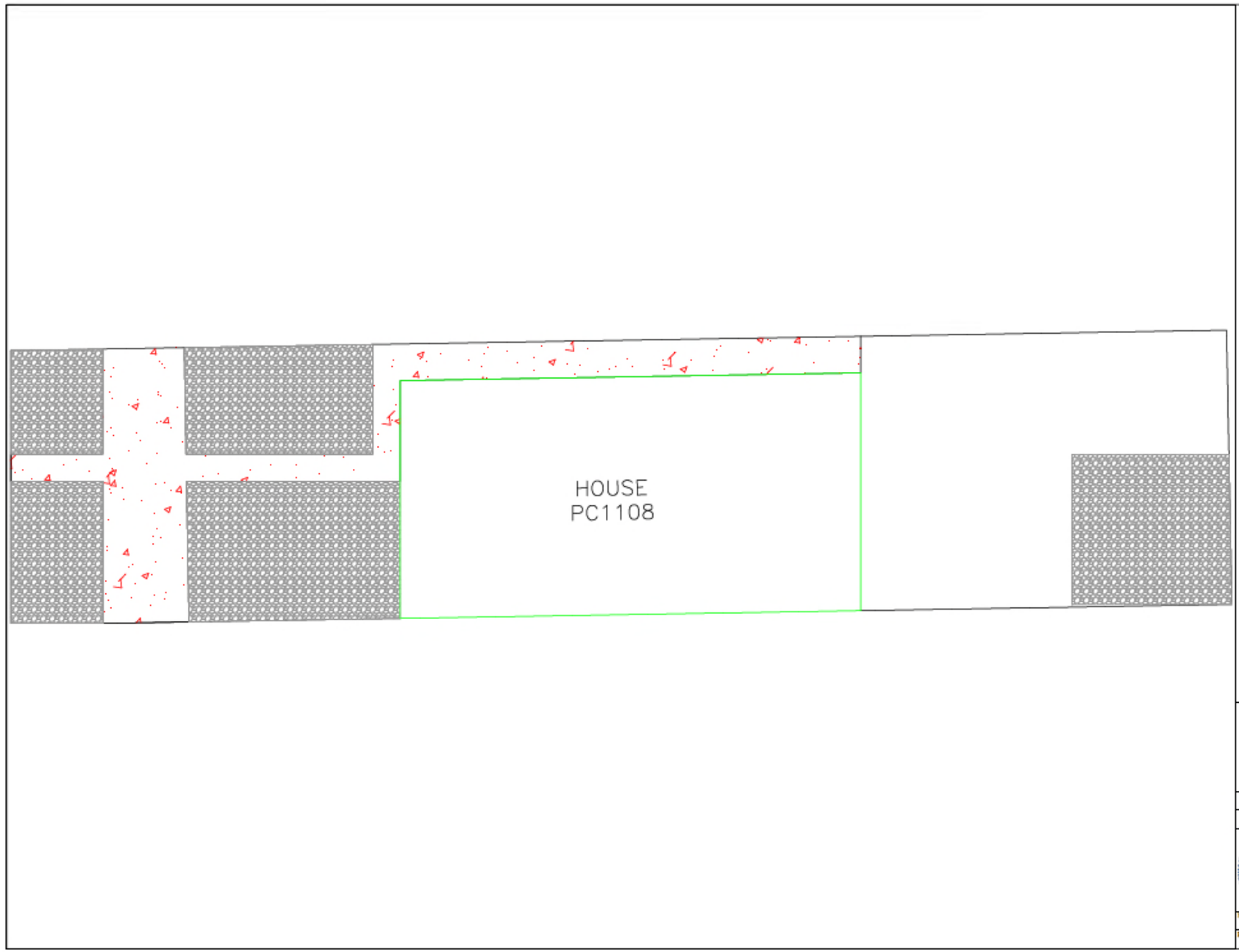
Not to Scale

Property Code: 0646
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: AutoDesk Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

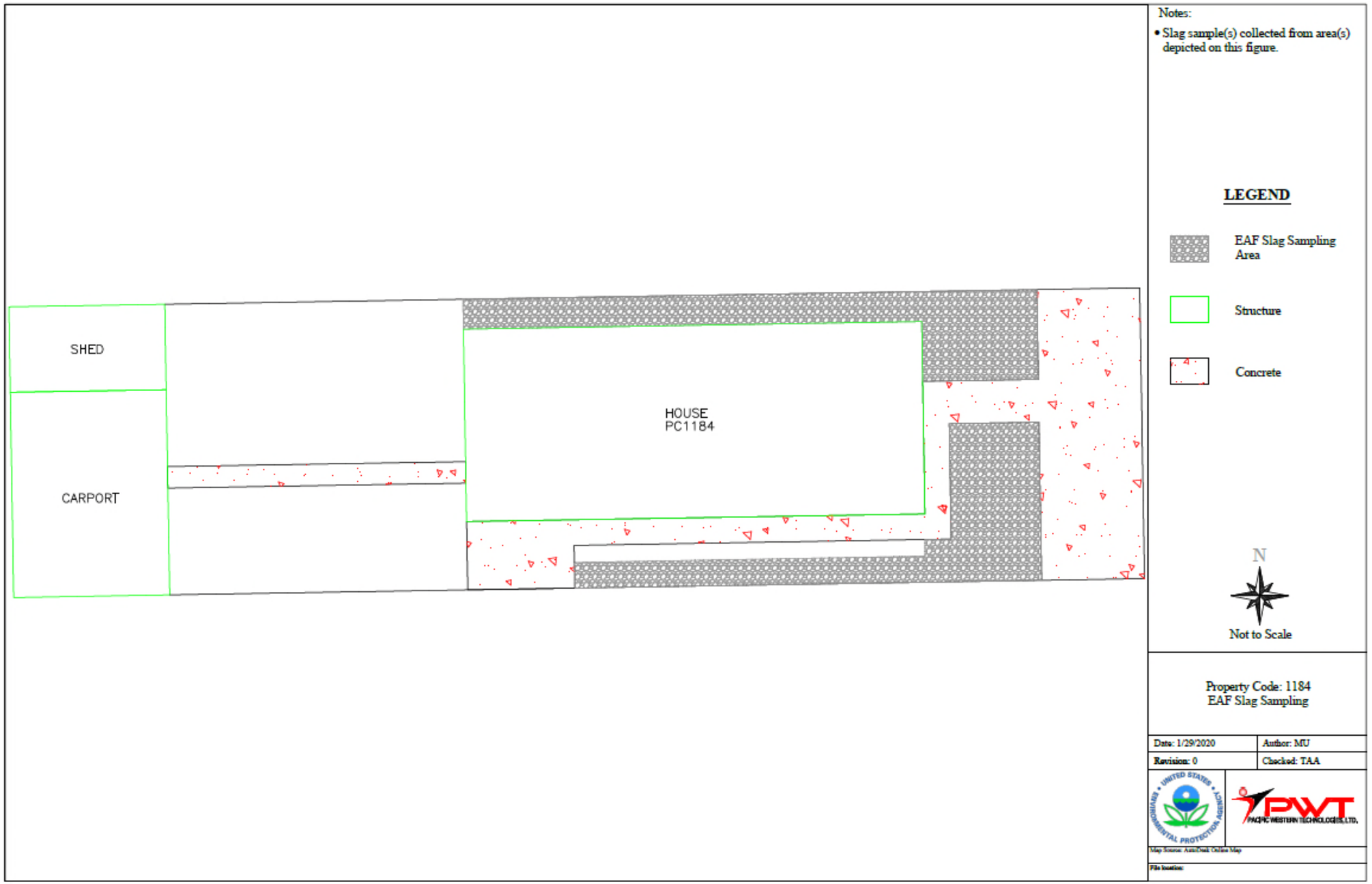
Not to Scale

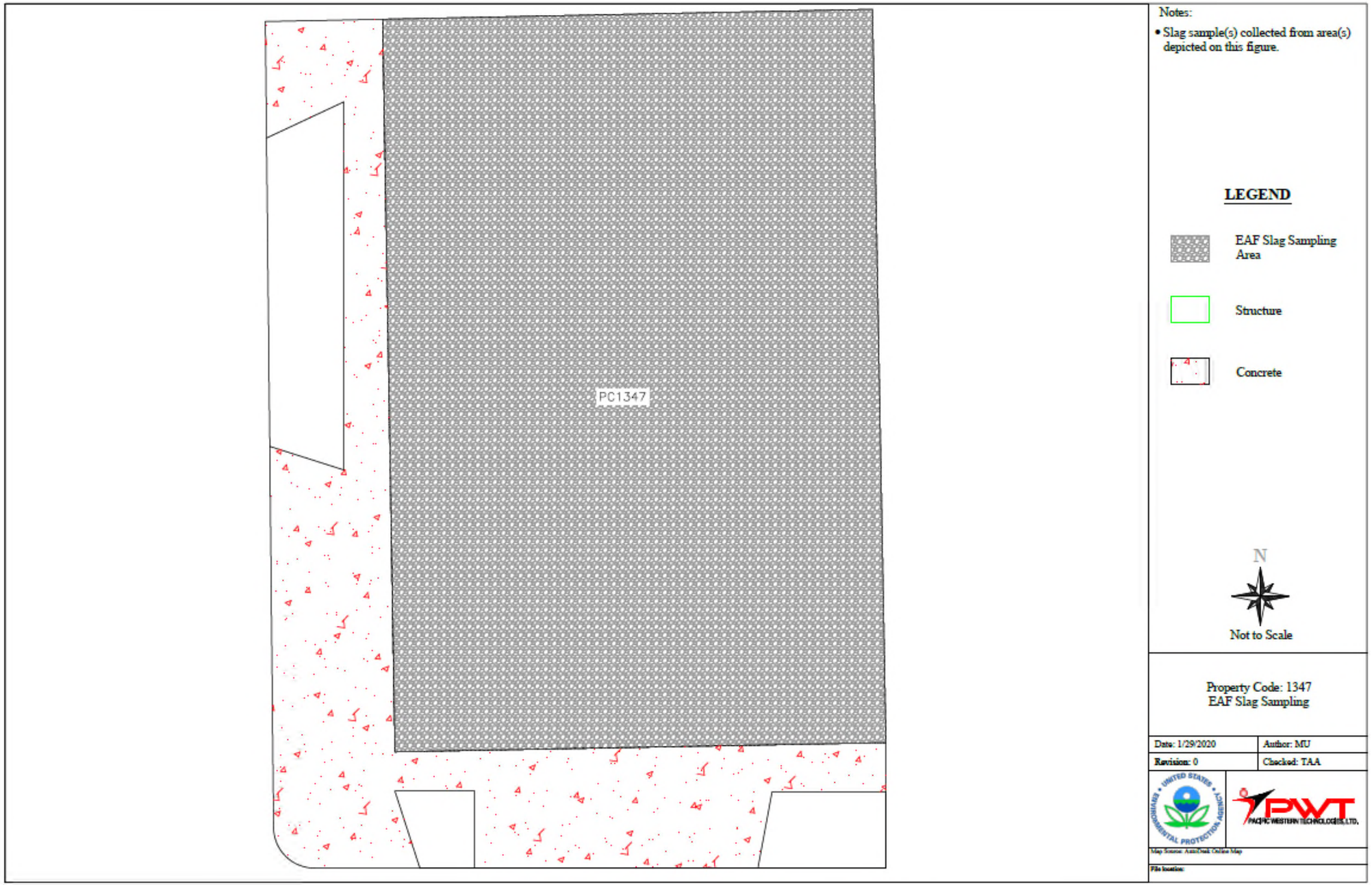
Property Code: 1108
EAF Slag Sampling

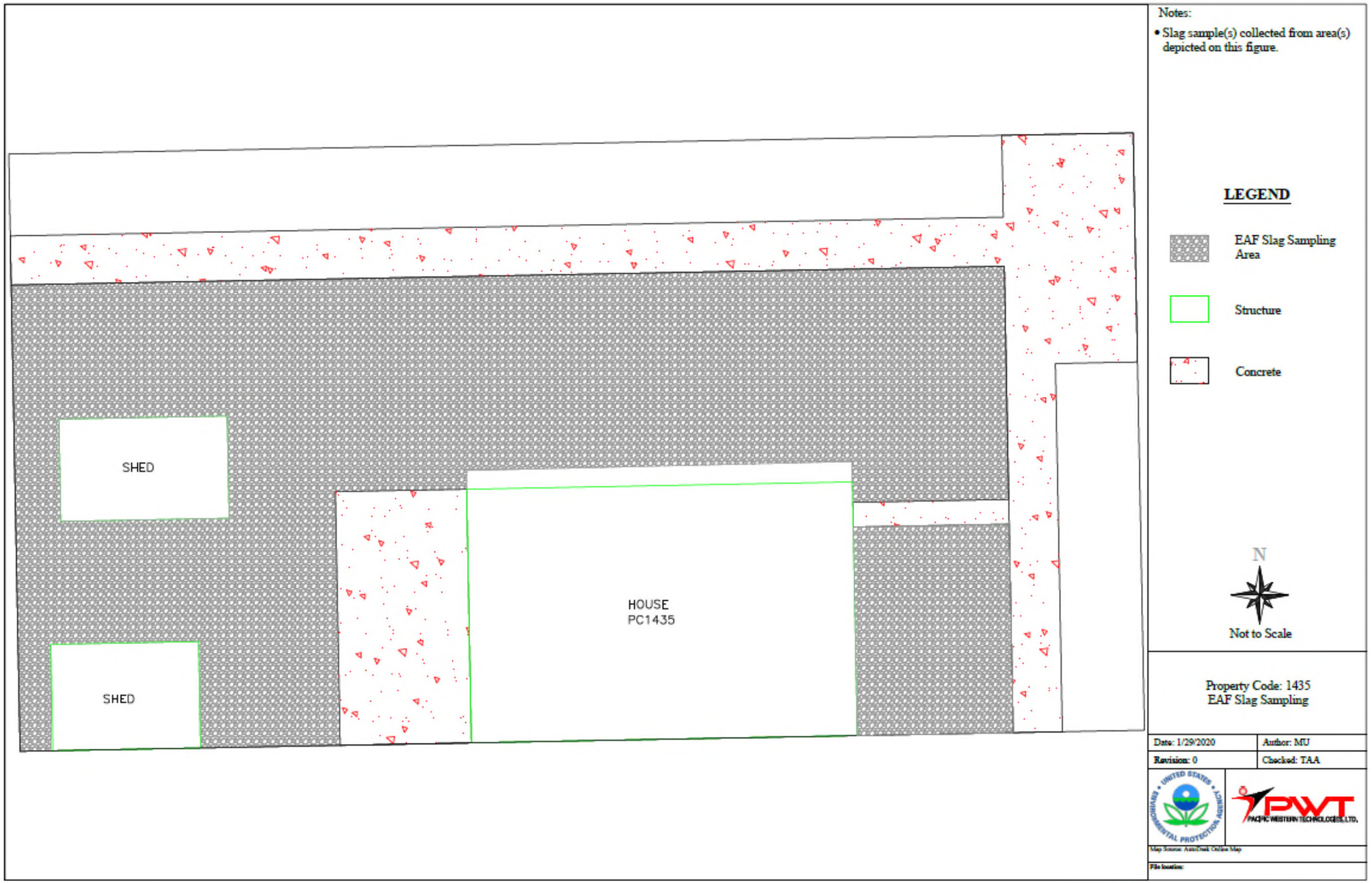
Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

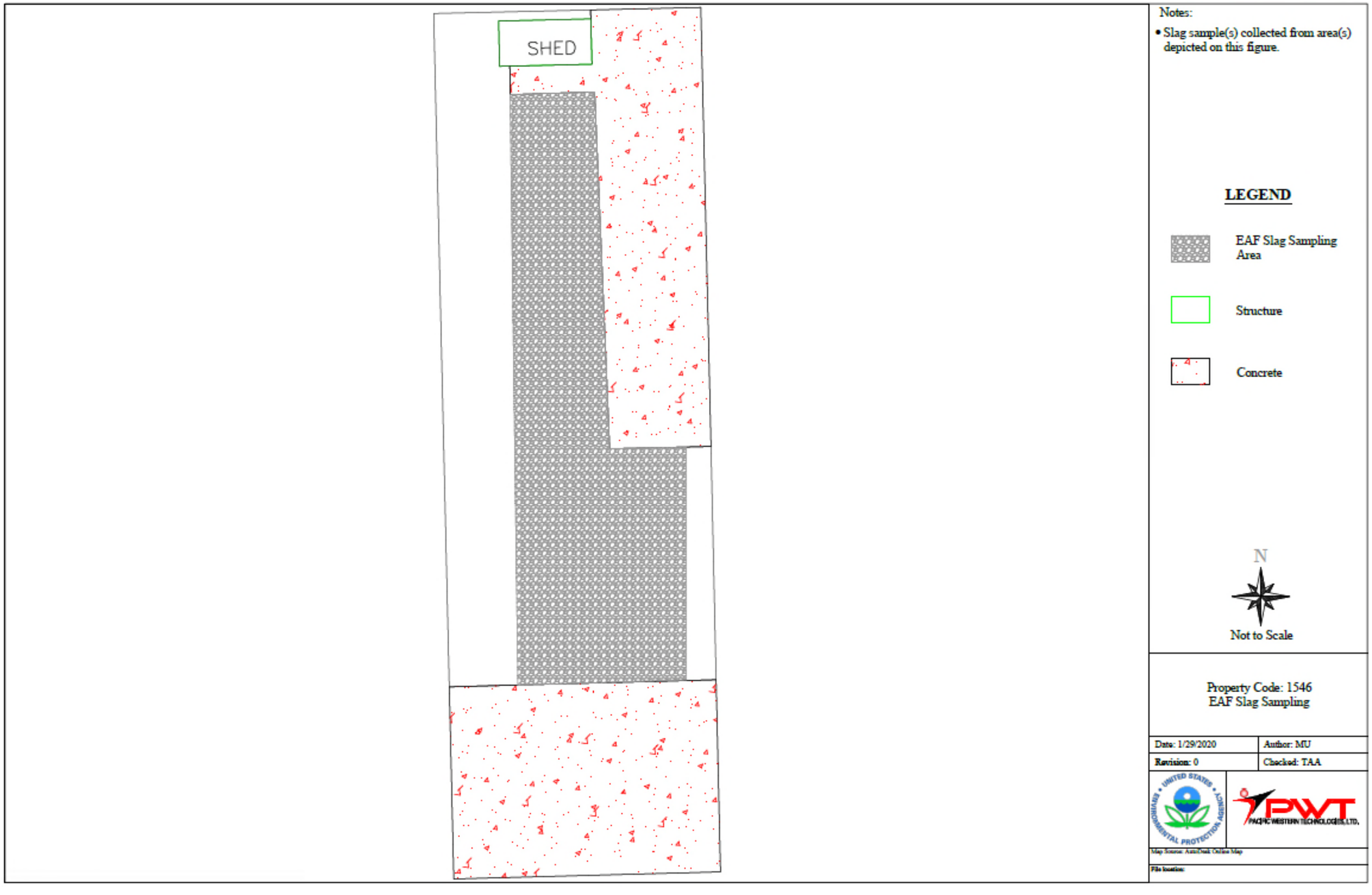
Map Source: ArcGIS Online Map

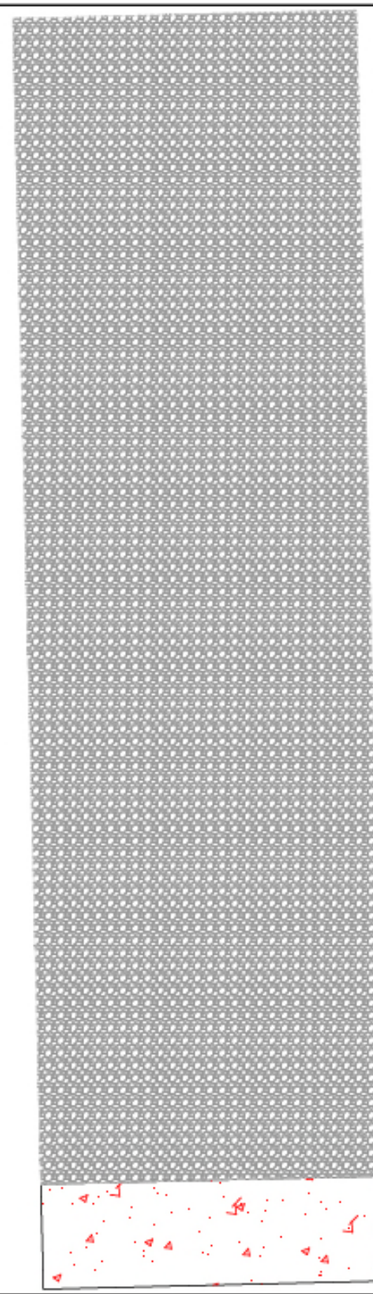
File location:


SHED
CARPORT
HOUSE
PC1184
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1184
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:


PC1347
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1347
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:


SHED
SHED
HOUSE
PC1435
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1435
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: AutoDesk Online Map
File location:


SHED
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1546
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

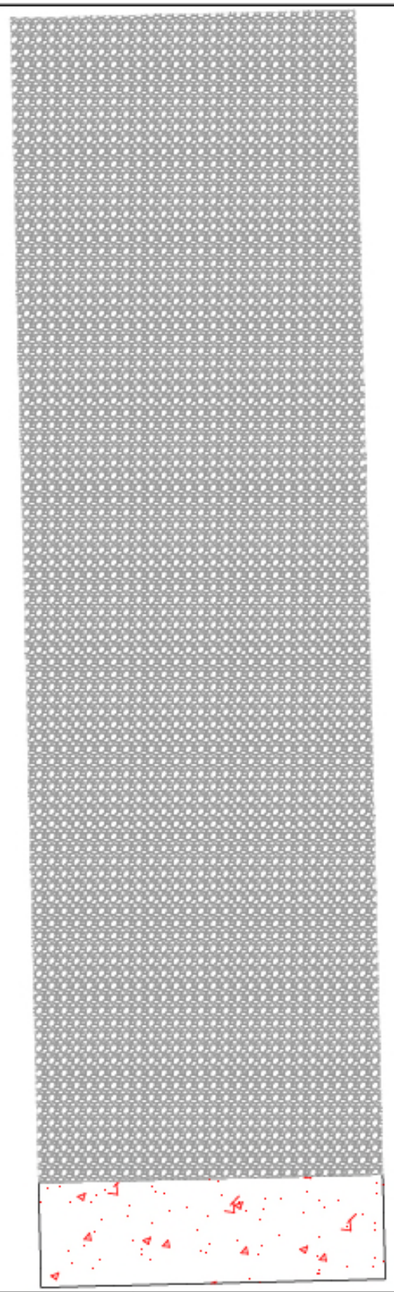
Not to Scale

Property Code: 1586
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: AutoDesk Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

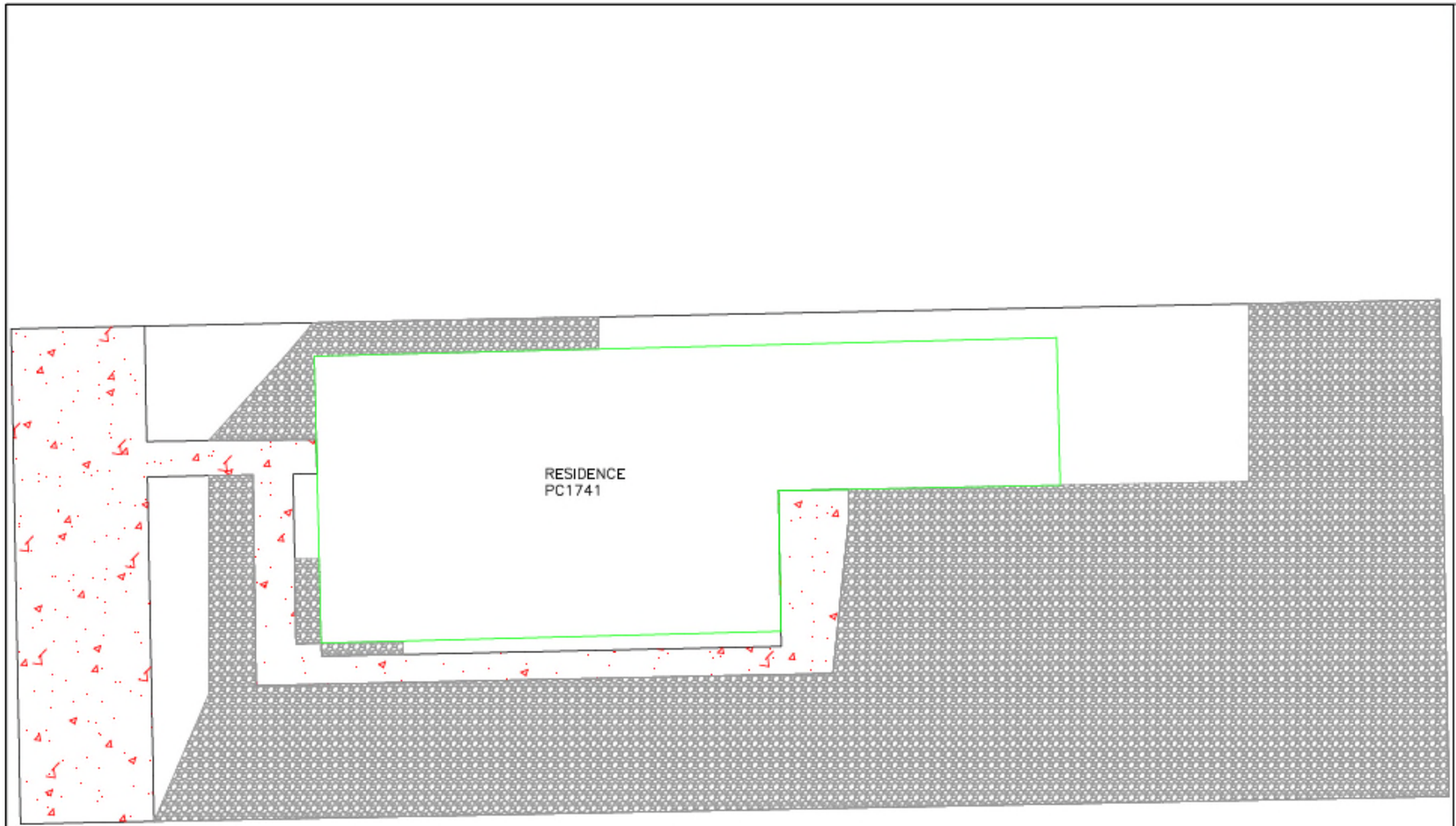
Not to Scale

Property Code: 1587
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: AutoDesk Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

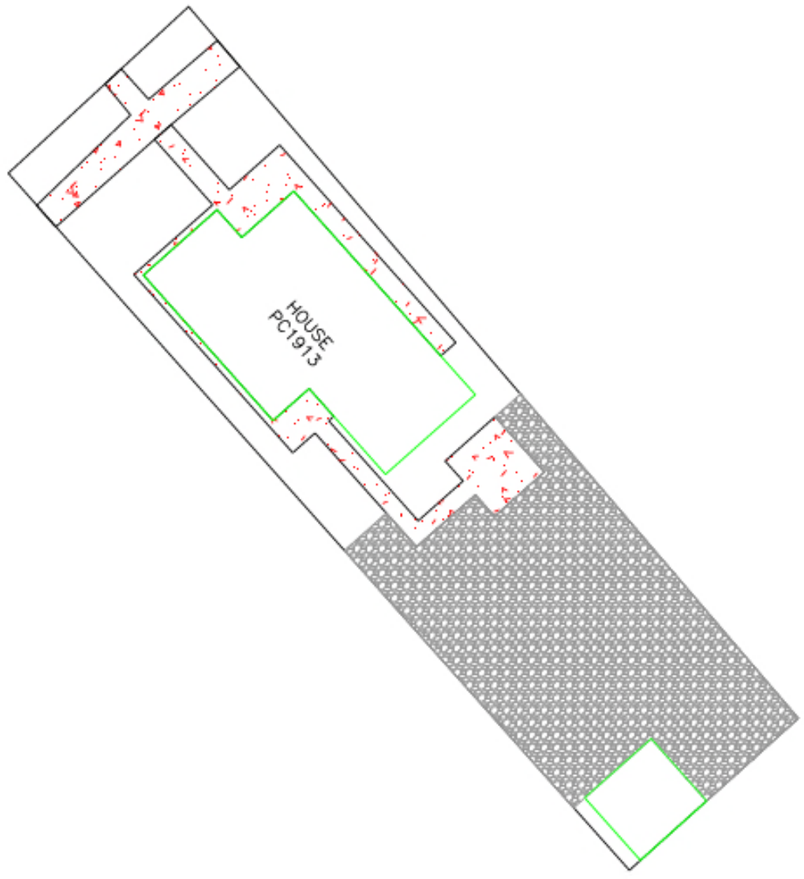
Not to Scale

Property Code: 1741
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

Map Source: ArcGIS Online Map

File location:



Notes:

- Slag sample(s) collected from area(s) depicted on this figure.

LEGEND

EAF Slag Sampling Area

Structure

Concrete

N

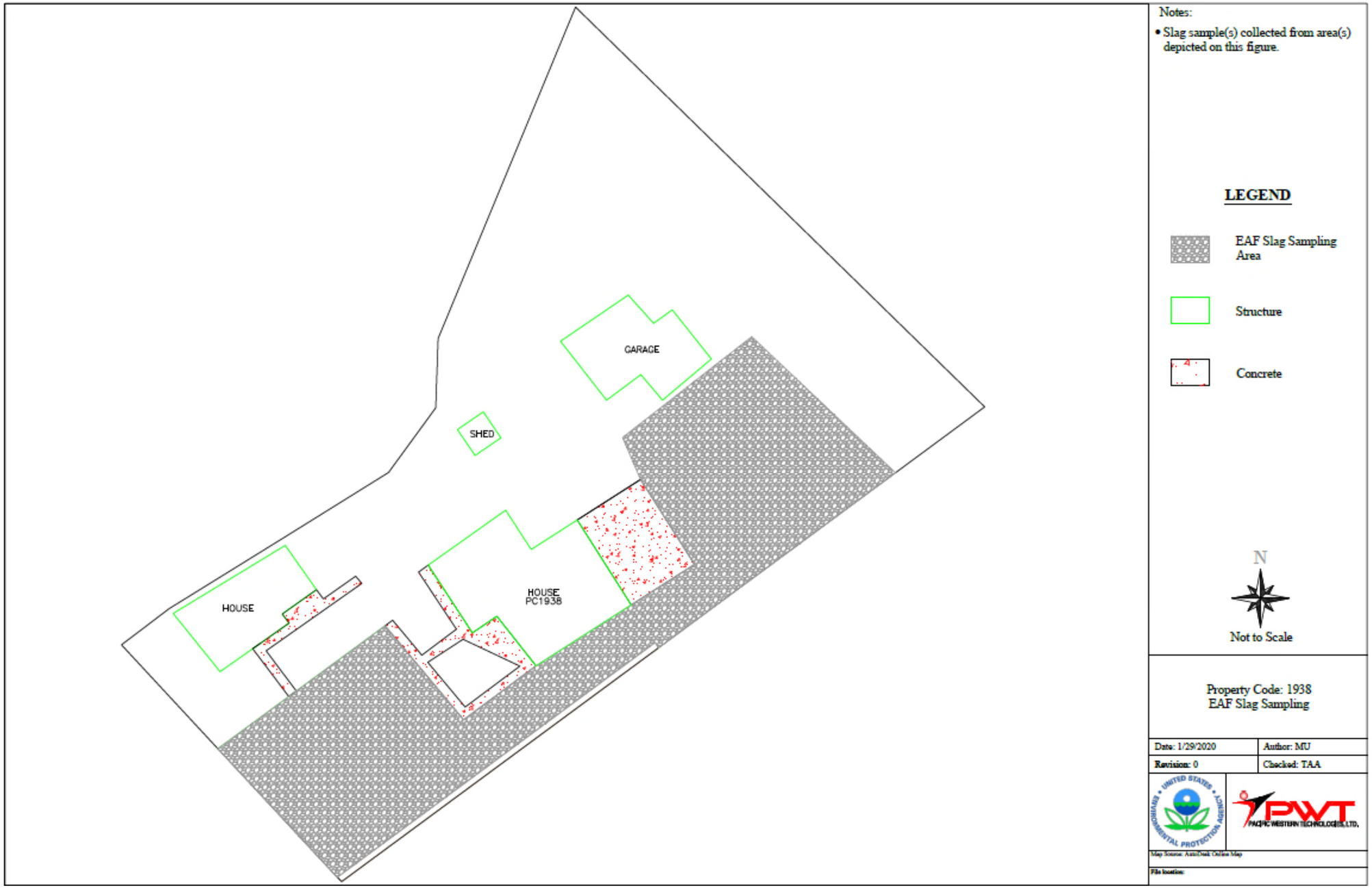
Not to Scale

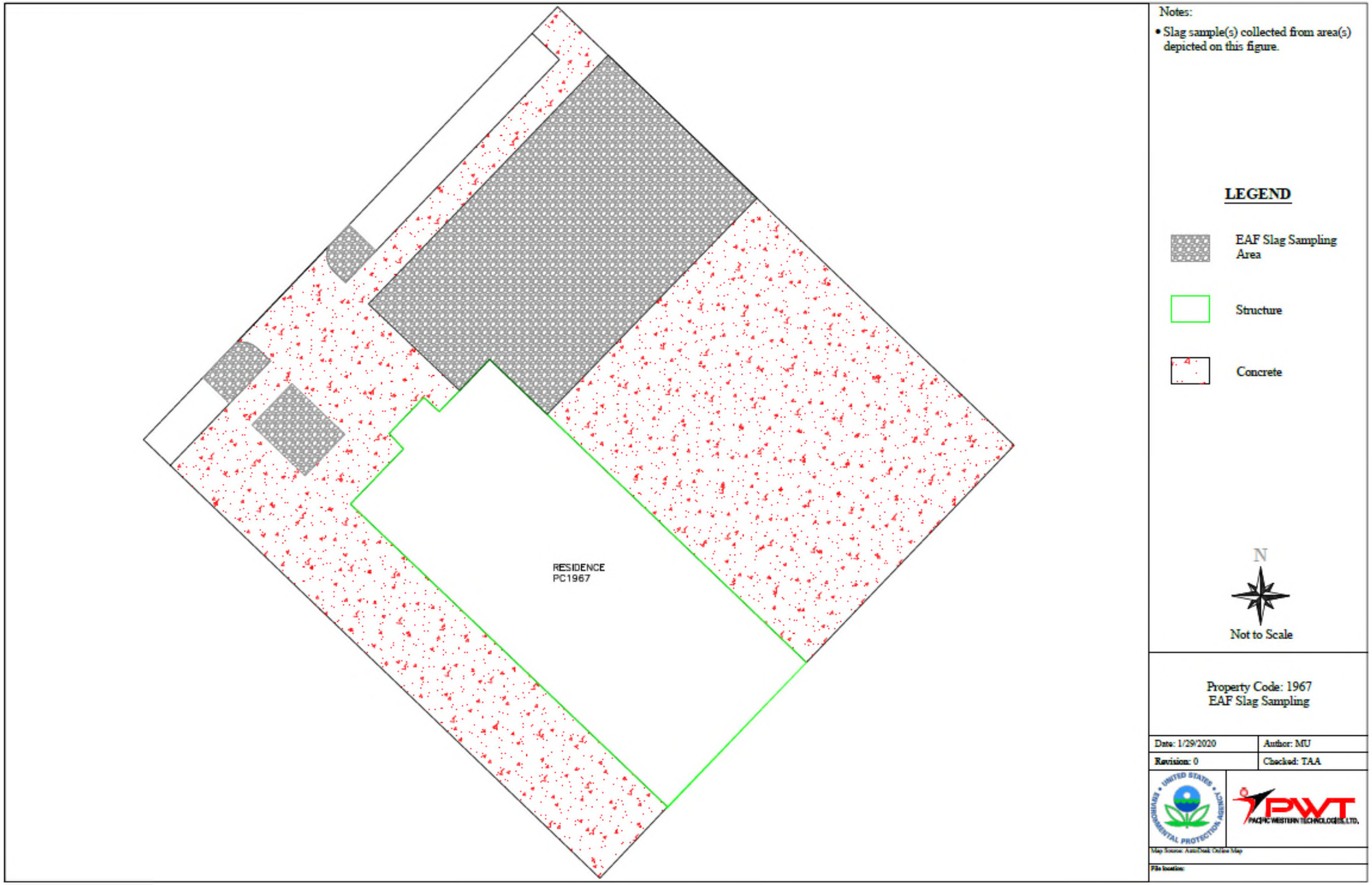
Property Code: 1913
EAF Slag Sampling

Date: 1/29/2020	Author: MU
Revision: 0	Checked: TAA

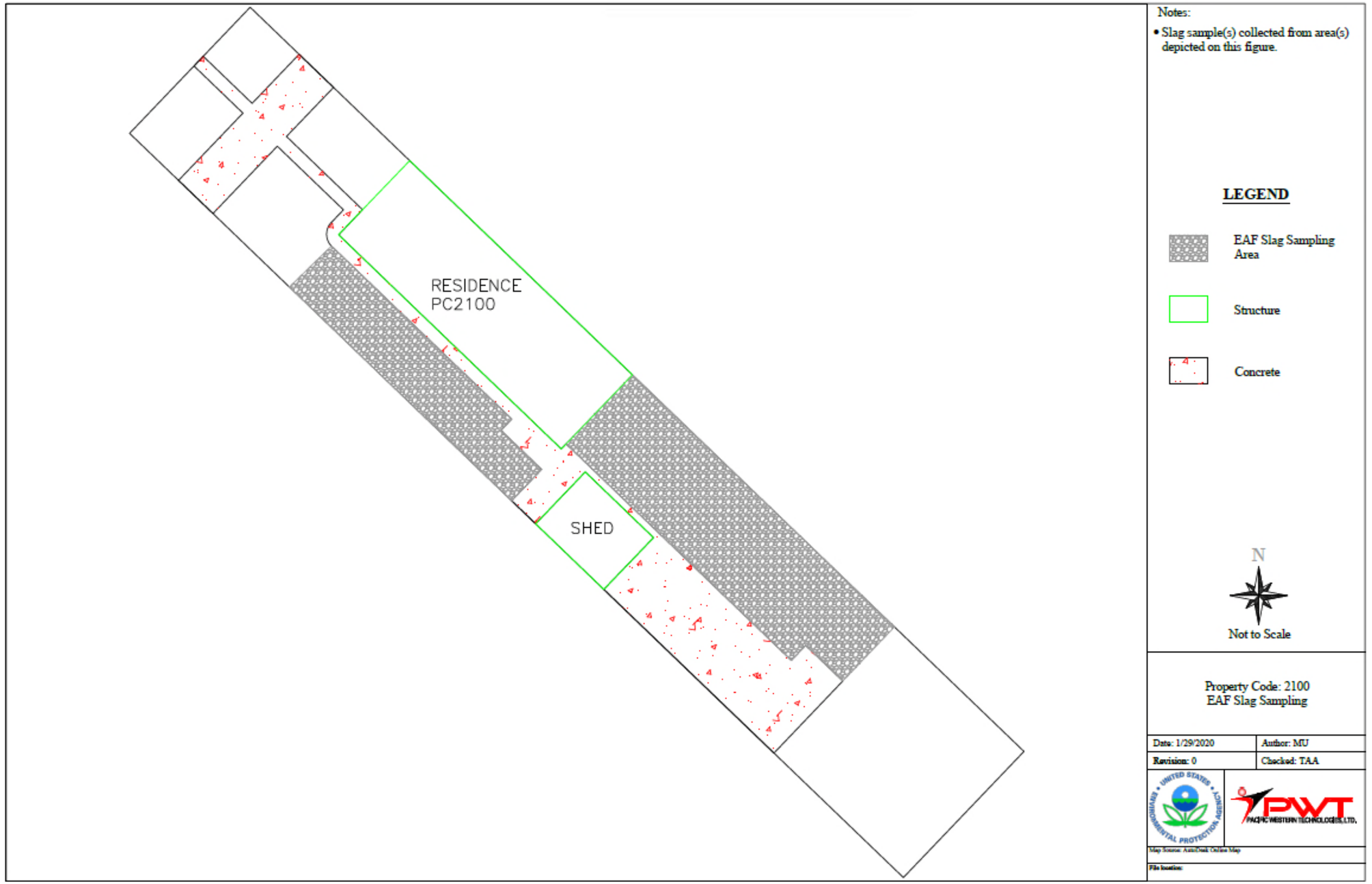
Map Source: ArcGIS Online Map

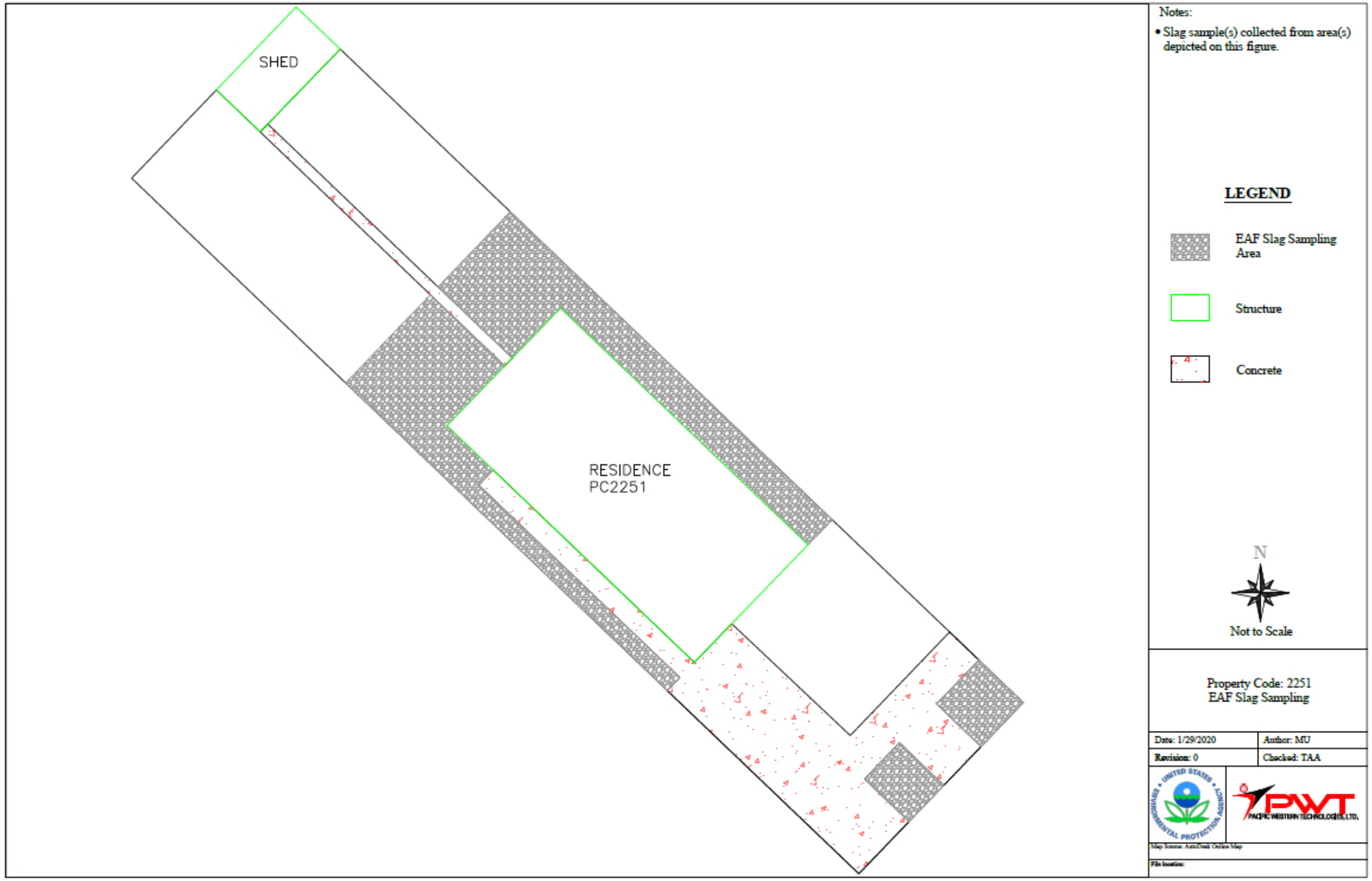
File location:


GARAGE
SHED
HOUSE
HOUSE
PC1938
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1938
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
PACIFIC WESTERN TECHNOLOGIES, LTD.
Map Source: AutoDesk Online Map
File location:


RESIDENCE
PC1967
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 1967
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:


SHED
RESIDENCE
PC2031
BUILDING
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 2031
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:


RESIDENCE
PC2100
SHED
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 2100
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:


SHED
RESIDENCE
PC2251
Notes:
• Slag sample(s) collected from area(s) depicted on this figure.
LEGEND
EAF Slag Sampling Area
Structure
Concrete
N
Not to Scale
Property Code: 2251
EAF Slag Sampling
Date: 1/29/2020
Author: MU
Revision: 0
Checked: TAA
Map Source: ArcGIS Online Map
File location:

APPENDIX B

FULL DATA TABLES FOR EAF SLAG PROPERTIES

Table B.1 Sample Results for EAF Slag Samples, Total Metals

EPA Regional Screening Levels for Residential Soil			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
			77000	39	0.68	15000	160	71	None	120000	23	3100	55000
Fraction	Property ID	Sample Number	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
>=250 microns	PC0119	S0119-EAF-0001-01A	18100 J	5.8 UJ	5.2 J	475 J	0.32 U	1.6 J	199000 J	4480 J	4.7 J	130 J	190000 J
	PC0168	S0168-EAF-0001-01A	22000 J	5.9 UJ	5.6 J	645 J	0.32 U	1.6 J	206000 J	5070 J	6.3 J	245 J	200000 J
	PC0391	S0391-EAF-0001-01A	21400 J	2.4 J-	37.2 J	597	0.31 J	6.6 J	225000	6410	5	172 J	209000
	PC0398	S0398-EAF-0001-01A	19300 J	3.8 J-	33 J	575	0.31 J	6.1 J	203000	4730	6.6	209 J	177000
	PC0583	S0583-EAF-0001-01A	20900 J	5.7 J-	29.5 J	611	0.44 J	6.7 J	234000	4820	4.6 J	153 J	176000
	PC0621	S0621-EAF-0001-01A	23900	14.8 J	28.3	632	0.25 U	0.48 U	213000	5700	6.1	180 J	172000
	PC0646	S0646-EAF-0001-01A	21800 J	9.8 J-	35.1 J	547	0.31 J	7 J	221000	6190	5.9	149 J	202000
	PC1108	S1108-EAF-0001-01A	19800	9 J	22.3	566	0.36 U	0.65	208000	4050	5.8	161 J	156000
	PC1184	S1184-EAF-0001-01A	22300 J	1.7 J-	30.4 J	447	0.44 UJ	6.7 J	208000	3330	7.7	206 J	190000
	PC1347	S1347-EAF-0001-01A	11800	3.2 UJ	9.8	285	0.69	0.5 U	91100	1650	3.7 J	69.5 J	71100
	PC1435	S1435-EAF-0001-01A	22100 J	R	30.9	544 J	0.48 UJ	4.6 J-	219000	4540	5.2 J-	183 J-	185000 J-
	PC1435	S1435-EAF-0001-02A	16800 J	7.2 J-	38.3 J	445	0.39 J	11.4 J+	180000	3740	13.9 J+	482 J+	265000 J+
	PC1546	S1546-EAF-0001-01A	21500 J	5.8 UJ	5.6 J	446 J	0.89	1 J	172000 J	2660 J	5.7 J	143 J	132000 J
	PC1586	S1586-EAF-0001-01A	22900 J	5.9 UJ	4.8 J	630 J	0.34 U	1.4 J	209000 J	6180 J	4.5 J	141 J	193000 J
	PC1587	S1587-EAF-0001-01A	21700 J+	5.9 UJ	6.9 J-	661 J+	0.32 U	2 J-	209000 J+	6230 J	8.6 J-	376 J-	209000 J-
	PC1587	S1587-EAF-0001-02A	13400 J-	5.9 UJ	15.7 J+	372 J-	0.13 U	4 J+	138000 J-	4380 J	17.4 J+	563 J+	387000 J+
	PC1741	S1741-EAF-0001-01A	22300	14 J	29.2	511	0.17 U	0.49 U	227000	5610	6.4	205 J	161000
	PC1913	S1913-EAF-0001-01A	18400 J	3.5 J-	37.4 J	507	0.27 UJ	10.3 J+	204000	5720	5	214 J	205000
	PC1913	S1913-EAF-0001-02A	20400 J	0.27 J-	34.6	508 J	0.47 UJ	7.2 J-	219000	5710	6.1	226 J	228000
	PC1938	S1938-EAF-0001-01A	22600 J	R	29.7	514 J	0.5 UJ	6 J	240000	4310	7.9	306 J	173000
	PC1967	S1967-EAF-0001-01A	21500 J	6 UJ	5.3 J	592 J	0.28 U	1.6 J	208000 J	5140 J	5.3 J	179 J	187000 J
	PC2031	S2031-EAF-0001-01A	21500	9 J	26.7	558	0.49	0.48 U	200000	4230	8.7	316 J	206000
	PC2100	S2100-EAF-0001-01A	13700 J	1 J-	20.1 J	377	0.43 J	3.5 J	103000	2360	4.9 J	103 J	84100
	PC2251	S2251-EAF-0001-01A	13100 J	1.7 J-	33.1 J	311	0.57 J	3.2 J	101000	1310	6.4	94.6 J	70300
<250 microns	PC0119	S0119-EAF-0001-01B	13700 J	6.1 UJ	6.9 J	287 J	0.44 U	2 J	153000 J	1450 J	5.1 J	94.8 J	87300 J
	PC0168	S0168-EAF-0001-01B	17000 J	5.9 UJ	5.2 J	447 J	0.38 U	1.6 J	205000 J	2880 J	6.3 J	198 J	126000 J
	PC0391	S0391-EAF-0001-01B	12900 J	R	18.9 J	292	0.53 J	4.6 J	97200	1320	9.2	140 J	82000
	PC0398	S0398-EAF-0001-01B	13100 J	1.1 J-	18.2 J	293	0.48 J	4.7 J	121000	982	9.1	198 J	90800
	PC0583	S0583-EAF-0001-01B	12400 J	0.83 J-	14.6 J	278	0.44 J	5.2 J	107000	1290	5.9	138 J	68700
	PC0621	S0621-EAF-0001-01B	15200	4.7 UJ	15.6	326	0.41 U	0.1 J	123000	2160	6.3	109 J	88500
	PC0646	S0646-EAF-0001-01B	16100 J	3.3 J-	22.7 J	364	0.37 J	5.1 J	183000	3190	7.2	151 J	136000
	PC1108	S1108-EAF-0001-01B	12700	2 UJ	11.8	258	0.55	8.9	83700	738	6.7	137 J	63600
	PC1184	S1184-EAF-0001-01B	12600 J	1.1 J-	15 J	229	0.55 J	4.1 J	73400	529	8.6	157 J	77600
	PC1347	S1347-EAF-0001-01B	11800	1.5 UJ	9	235	0.69	0.22 J	85000	624	5.8	88.4 J	49300
	PC1435	S1435-EAF-0001-01B	11300 J	0.66 J-	10.5 J	201 J-	0.67 J	3.3 J	68900	277 J-	7	98.8 J	37900
	PC1435	S1435-EAF-0001-02B	13100 J	0.8 J-	13.4 J	303 J+	0.76 J	4.3 J	70000	422 J+	7.2	122 J	47900
	PC1546	S1546-EAF-0001-01B	15400 J	5.8 UJ	6.5 J	359 J	1	1.8 J	122000 J	701 J	6.8 J	129 J	68400 J
	PC1586	S1586-EAF-0001-01B	16500 J	6 UJ	5.4 J	471 J	0.38 U	3.3 J	159000 J	3690 J	5.9 J	146 J	132000 J
	PC1587	S1587-EAF-0001-01B	14500 J	6 UJ	5.7 J	400 J	0.44 U	3.4 J	146000 J	3030 J	6 J	146 J	118000 J
	PC1587	S1587-EAF-0001-02B	15100 J	5.8 UJ	5.3 J	417 J	0.43 U	3.7 J	144000 J	3210 J	5.8 J	155 J	122000 J
	PC1741	S1741-EAF-0001-01B	15600	5.5 UJ	16.5	325	0.29 U	0.51	248000	2790	5.9	185 J	110000
	PC1913	S1913-EAF-0001-01B	14100 J	R	17.3	291 J	0.5 UJ	8.8 J	153000	2010	6.1	216 J	101000
	PC1913	S1913-EAF-0001-02B	13900 J	R	18.5	311 J	0.51 UJ	8.8 J	184000	2420	5.8	225 J	119000
	PC1938	S1938-EAF-0001-01B	13200 J	R	13.4	281 J	0.49 UJ	5.3 J	156000	924	6.7	193 J	85500
	PC1967	S1967-EAF-0001-01B	14900 J	6.1 UJ	5.1 J	334 J	0.34 U	2.4 J	182000 J	1930 J	5.1 J	130 J	89100 J
	PC2031	S2031-EAF-0001-01B	14100	2.9 UJ	14.5	307	0.57	1.7	151000	1370	8	288 J	100000
	PC2100	S2100-EAF-0001-01B	11900 J	0.63 J-	12.4 J	246	0.75 J	2.9 J	32300	86.9	7.7	60.8 J	24100
	PC2251	S2251-EAF-0001-01B	13200 J	0.82 J-	37.6 J	272	0.8 J	3.3 J	59700	270	8.6	121 J	40600

Table B.1 Sample Results for EAF Slag Samples, Total Metals (continued)

EPA Regional Screening Levels for Residential Soil			Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
			400	None	1800	23	1500	None	390	390	None	0.78	390	2300
Fraction	Property ID	Sample Number	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
>=250 microns	PC0119	S0119-EAF-0001-01A	25.9 J	51900 J	28700 J	0.095 U	22 J	547	6.8 J	8.8 J	221 J	2.4 UJ	408 J	680 J
	PC0168	S0168-EAF-0001-01A	19.1 J	53200 J	31900 J	0.1 U	45.3 J	107 U	7.4 J	10.2 J	199 J	2.5 UJ	419 J	1120 J
	PC0391	S0391-EAF-0001-01A	25	47100	35300	R	22.6 J	153 U	9.8 J	12 J	140 J	63 U	439	1650
	PC0398	S0398-EAF-0001-01A	29.8	48500	30000	0.095 U	36.7 J	386 U	9.8 J	11.6 J	429 J	62.3 U	410	1570
	PC0583	S0583-EAF-0001-01A	30.7	51100	34000	0.095 U	17 J	257 U	13.1 J	11.6 J	214 J	62.1 U	427	1160
	PC0621	S0621-EAF-0001-01A	12.7	47000	32000	0.1 U	30 J	177 U	16.5	4.9 J	135 UJ	10.7	490	669
	PC0646	S0646-EAF-0001-01A	12	51900	37000	R	19.9 J	78.2 U	11.9 J	12.6 J	119 J	62 U	544	419
	PC1108	S1108-EAF-0001-01A	59.6	48400	26800	0.025 J	33.2 J	374 U	13.9	3.6 J	206 UJ	8.9	433	2850
	PC1184	S1184-EAF-0001-01A	46.1	46500	27200	0.098 U	52.6 J	236 U	7.5 J	11.4 J	177 J	59.2 U	366	658
	PC1347	S1347-EAF-0001-01A	13.6	15900	11500	0.1 U	13 J	1500	8.2	2.3 J	588	4	141	92.1
	PC1435	S1435-EAF-0001-01A	47.9 J-	47700	31000	0.095 U	42.4 J-	312 J	4.4 UJ	12.8 J	260 J	R	377 J	1520 J-
	PC1435	S1435-EAF-0001-02A	122 J+	35000	27200	0.022 J	136 J+	367 U	3.4 J	20.6 J	255 J	62.6 U	320	3960 J+
	PC1546	S1546-EAF-0001-01A	25 J	38200 J	28000 J	0.097 U	38 J	838	11.3 J	5.1	272 J	2.4 UJ	335 J	219 J
	PC1586	S1586-EAF-0001-01A	16.1 J	47100 J	37100 J	0.096 U	16.1 J	163 U	12.4 J	8.7 J	281 J	2.5 UJ	460 J	602 J
	PC1587	S1587-EAF-0001-01A	29.8 J	50200 J+	37700 J	0.094 U	48.5 J-	234 U	10.2 J	9.6 J	330 J	2.5 UJ	468 J+	1860 J+
	PC1587	S1587-EAF-0001-02A	23.3 J	30400 J-	27000 J	0.098 U	208 J+	120 U	3.4 UJ	12.3 J	241 J	2.5 UJ	298 J-	664 J-
	PC1741	S1741-EAF-0001-01A	19.2	48500	28700	0.1 U	45.3 J	100 U	14.7	5 J	254 UJ	9.3	466	1520
	PC1913	S1913-EAF-0001-01A	58.3 J+	52500	32000	0.098 U	32.2 J-	228 U	8.4 J	13.3 J	254 J	59.1 U	399	5780 J+
	PC1913	S1913-EAF-0001-02A	25 J-	48300	31000	0.1 U	53.4 J+	183 J	82.9 U	16.8 J	208 J	R	431 J	2730 J-
	PC1938	S1938-EAF-0001-01A	120 J	43300	32200	0.095 U	75 J	348 J	4.8 UJ	13 J	309 J	R	405 J	2090 J
	PC1967	S1967-EAF-0001-01A	28.3 J	52800 J	31800 J	0.099 U	32.3 J	155 U	8.9 J	4.8	218 J	2.5 UJ	416 J	931 J
	PC2031	S2031-EAF-0001-01A	29.2	44400	28500	0.1 U	86.1 J	312 U	12.7	9.7 J	259 UJ	10.4	352	763
	PC2100	S2100-EAF-0001-01A	273	17600	14800	0.15	9.9 J	1630	8.4 J	6.2 J	217 J	24.8 U	223	402
	PC2251	S2251-EAF-0001-01A	112	17000	10400	0.1	21 J	1640	5.7 J	5.1 J	268 J	24.9 U	155	486
<250 microns	PC0119	S0119-EAF-0001-01B	78.9 J	29700 J	11100 J	0.02 J	23.7 J	2120	5.8 J	3	293 J	2.5 UJ	198 J	545 J
	PC0168	S0168-EAF-0001-01B	38.8 J	52100 J	18300 J	0.097 U	41.4 J	940	6.2 J	4.7	280 J	2.5 UJ	253 J	1380 J
	PC0391	S0391-EAF-0001-01B	120	18300	8330	0.059 J-	34.5 J	1750	3.4 J	5.4 J	260 J	25.3 U	128	1590
	PC0398	S0398-EAF-0001-01B	176	22900	7270	0.16	50.9 J	2150	2.6 J	6.2 J	784 J	12.7 U	120	1120
	PC0583	S0583-EAF-0001-01B	131	19200	8260	0.067 J	22.9 J	1780	4.6 J	5.4 J	239 J	12.7 U	125	2440
	PC0621	S0621-EAF-0001-01B	44	26300	12500	0.032 J	25.5 J	1610	7.8	3.6 J	211 UJ	3.6	197	681
	PC0646	S0646-EAF-0001-01B	50.5	43100	19900	0.032 J-	30.2 J	804	6.6 J	9.1 J	177 J	48.3 U	296	632
	PC1108	S1108-EAF-0001-01B	178	17800	5980	0.073 J	31.6 J	2170	4.1	2.8 J	304 UJ	1.3 J	106	3370
	PC1184	S1184-EAF-0001-01B	167	14200 J	4850	0.088 J	47.5 J	1950	2.4 J	4.8 J	221 J	12.4 U	92.4	1090
	PC1347	S1347-EAF-0001-01B	57.7	12400	5490	0.022 J	21.1 J	3020	4.2	1.6 J	1250	1.1 J	99.1	266
	PC1435	S1435-EAF-0001-01B	185 J-	13800	2710	0.12 J-	27.9 J	2220	1.7 J	3.1 J	500 J	2.5 U	64.3	1020
	PC1435	S1435-EAF-0001-02B	366 J+	14100 J	3690	0.22 J+	30.3 J	2590	2.8 J	4.1 J	486 J	7.5 U	73.5	1450
	PC1546	S1546-EAF-0001-01B	131 J	23500 J	8570 J	0.052 J	46.4 J	2240	3.6 J	2.8	417 J	2.4 UJ	111 J	710 J
	PC1586	S1586-EAF-0001-01B	77.6 J	31100 J	22900 J	0.026 J	25.5 J	1310	8.7 J	4.3	616 J	2.5 UJ	276 J	2750 J
	PC1587	S1587-EAF-0001-01B	90.4 J	28400 J	19100 J	0.029 J	25.7 J	1260	7.7 J	4.2	844 J	2.5 UJ	231 J	3200 J
	PC1587	S1587-EAF-0001-02B	91.3 J	31200 J	20100 J	0.017 J	27.8 J	1200	7.4 J	4.1	826 J	2.4 UJ	241 J	3350 J
	PC1741	S1741-EAF-0001-01B	39.6	52800	16400	0.018 J	38 J	428 U	9.2	5.8 J	252 UJ	4.1	243	1940
	PC1913	S1913-EAF-0001-01B	138 J	33000 J	11800	0.033 J	36.2 J	1590 J	35.1 U	8.5 J	307 J	R	162 J	7700 J
	PC1913	S1913-EAF-0001-02B	123 J	39300 J	14100	0.028 J	40.2 J	1140 J	53 U	9.8 J	329 J	R	183 J	8670 J
	PC1938	S1938-EAF-0001-01B	136 J	27400 J	8600	0.052 J	48.5 J	1540 J	34.4 U	6 J	312 J	R	110 J	3650 J
	PC1967	S1967-EAF-0001-01B	70.1 J	37600 J	12600 J	0.098 U	29.9 J	1030	4.8 J	3.4	361 J	2.5 UJ	168 J	2100 J
	PC2031	S2031-EAF-0001-01B	105	29400	10100	0.026 J	58.2 J	1660	6.8	4.2 J	507	3	137	2430
	PC2100	S2100-EAF-0001-01B	268	5800	783	0.33	14.6 J	3340	1.3 J	2 J	203 J	2.5 U	57.5	439
	PC2251	S2251-EAF-0001-01B	213	10300	2880	0.18	25 J	2770	2.1 J	3.1 J	276 J	2.5 U	72.5	789

Notes: All results are reported in mg/kg.

J Result is estimated. J+ indicates a result with a high bias, J- indicates an estimated result with a low bias.

R Result is rejected. No numeric result is reported.

U Result is non-detect. The numeric value represents the quantitation limit.

UJ Result is non-detect, with an estimated quantitation limit.

Table B.2 Sample Results for EAF Slag Samples, Synthetic Precipitation and Leaching Procedure Metals

Fraction	Property ID	Sample Number	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron
>=250 microns	PC0119	S0119-EAF-0001-01A	41.5 U	60 U	10 U	84.4 UJ	0.12 UJ	5 U	23200 J	8.7 UJ	50 U	25 U	112
	PC0168	S0168-EAF-0001-01A	102 U	60 U	10 U	57.9 UJ	5 U	5 U	29700 J	13 J	50 U	28.4	40.5 UJ
	PC0391	S0391-EAF-0001-01A	274	60 U	10 U	81.6 J	5 U	5 U	22700	19.5	50 U	1.6 J-	233
	PC0398	S0398-EAF-0001-01A	152 J	60 U	10 U	81.6 J	5 U	5 U	27300	7.2 J	50 U	6.9 J-	226
	PC0583	S0583-EAF-0001-01A	472	60 U	10 U	117 J	5 U	0.13 J	39000	41.5	50 U	12.1 J-	850
	PC0621	S0621-EAF-0001-01A	353	60 U	10 U	158 U	5 U	5 U	31000	19.2	50 U	7.9 UJ	136
	PC0646	S0646-EAF-0001-01A	125 J	60 U	10 U	31.1 J	5 U	5 U	20200	15	50 U	1 J-	122
	PC1108	S1108-EAF-0001-01A	205	60 U	3.5 UJ	308	5 U	0.17 U	34500	33.4	50 U	15 UJ	378
	PC1184	S1184-EAF-0001-01A	322	60 U	10 U	60 J	5 U	5 U	24700	18.7	50 U	10.9 J-	477
	PC1347	S1347-EAF-0001-01A	582	60 U	2.1 UJ	400	5 U	0.18 U	32300	11.7	50 U	25.2	1100
	PC1435	S1435-EAF-0001-01A	103 J	1.3 J	10 U	100 U	5 U	5 U	21900 J-	13.5 J-	50 U	5.2 UJ	58.7 UJ
	PC1435	S1435-EAF-0001-02A	301	60 U	10 U	92.1 J	5 U	5 U	29800	16.9	0.26 J	7.4 J-	413
	PC1546	S1546-EAF-0001-01A	588	60 U	10 U	52.1 UJ	5 U	0.15 UJ	23300 J	10.8 J	50 U	8.6 U	578
	PC1586	S1586-EAF-0001-01A	199 U	60 U	10 U	47.7 UJ	5 U	5 U	14300 J	15.8 J	50 U	0.85 U	24.1 UJ
	PC1587	S1587-EAF-0001-01A	121 U	60 U	10 U	56.8 UJ	5 U	5 U	17400 J	15.6 J-	50 U	0.76 U	28.3 UJ
	PC1587	S1587-EAF-0001-02A	102 U	60 U	10 U	50.4 UJ	5 U	5 U	18400 J	21.4 J+	50 U	1 U	23.1 UJ
	PC1741	S1741-EAF-0001-01A	356	60 U	1.8 UJ	119 U	5 U	0.13 U	53800	20.6	50 U	8 UJ	47.1 U
	PC1913	S1913-EAF-0001-01A	272	60 U	10 U	71.5 J	5 U	5 U	25900	16.9	50 U	6.9 J-	261
	PC1913	S1913-EAF-0001-02A	330	60 U	10 U	102 U	5 U	0.16 J	32500 J+	16.3	50 U	11.3 UJ	370 J+
	PC1938	S1938-EAF-0001-01A	765	60 U	10 U	131 U	0.024 UJ	0.19 J	34600	40.1	50 U	10.6 UJ	1160
	PC1967	S1967-EAF-0001-01A	144 U	60 U	10 U	42.4 UJ	5 U	5 U	11700 J	9.8 UJ	50 U	25 U	101
	PC2031	S2031-EAF-0001-01A	75.9 J	60 U	1.6 UJ	123 U	5 U	5 U	13700	9.9 U	50 U	4.6 UJ	100 U
	PC2100	S2100-EAF-0001-01A	311	60 U	10 U	36.3 J	5 U	5 U	33300	21.2	50 U	8.7 J-	315
	PC2251	S2251-EAF-0001-01A	1750	2.4 U	37.9	64.3 J	5 U	0.3 J	21500	11.8	0.65 J	16.9 J-	1900
<250 microns	PC0119	S0119-EAF-0001-01B	145 U	60 U	10 U	105 UJ	5 U	5 U	36400 J	8.6 UJ	50 U	6 U	182
	PC0168	S0168-EAF-0001-01B	151 U	60 U	10 U	65.5 UJ	5 U	0.13 UJ	27700 J	18.1 J	50 U	3.7 U	141
	PC0391	S0391-EAF-0001-01B	863	60 U	5.4 J	145 J	5 U	0.19 J	24200	7 J	0.3 J	7.8 J-	856
	PC0398	S0398-EAF-0001-01B	663	60 U	4.3 J	162 J	5 U	0.13 J	54100	7.4 J	0.35 J	23.3 J	722
	PC0583	S0583-EAF-0001-01B	578	60 U	3 J	127 J	5 U	0.14 J	38600	10.2	0.41 J	16.2 J-	573
	PC0621	S0621-EAF-0001-01B	387	60 U	3 UJ	240	5 U	0.18 U	22200	9.4 U	50 U	12.4 UJ	340
	PC0646	S0646-EAF-0001-01B	172 J	60 U	10 U	79.7 J	5 U	5 U	26700	10.7	50 U	3.7 J-	148
	PC1108	S1108-EAF-0001-01B	464	1.6 U	3.9 UJ	154 U	5 U	0.26 U	27900	10.5	0.23 U	18.5 UJ	497
	PC1184	S1184-EAF-0001-01B	956	60 U	10 U	59.7 J	5 U	5 U	22800	8.2 J	0.47 U	14.5 J-	878
	PC1347	S1347-EAF-0001-01B	347	1.7 U	2.3 UJ	399	5 U	0.12 U	45500	7.8 U	50 U	24.8 UJ	556
	PC1435	S1435-EAF-0001-01B	482	60 U	2.8 J	107 J	5 U	5 U	39400 J-	4.8 J	0.22 J	10.1 J-	469
	PC1435	S1435-EAF-0001-02B	115 J	60 U	3.2 J	230	5 U	5 U	78800 J+	7.4 J	50 U	9.6 J-	85.6 J
	PC1546	S1546-EAF-0001-01B	445	60 U	10 U	73.6 UJ	5 U	0.21 UJ	22500 J	8.3 UJ	50 U	10.1 U	489
	PC1586	S1586-EAF-0001-01B	477	60 U	10 U	101 UJ	5 U	0.19 UJ	34600 J	44.6 J	50 U	7 U	719
	PC1587	S1587-EAF-0001-01B	234	60 U	10 U	107 UJ	5 U	5 U	42100 J	35.1 J	50 U	4.9 U	439
	PC1587	S1587-EAF-0001-02B	173 U	60 U	10 U	119 UJ	5 U	5 U	41300 J	37.6 J	50 U	4.6 U	366
	PC1741	S1741-EAF-0001-01B	95.7 J	60 U	10 U	115 U	5 U	0.21 U	62500	20.9	50 U	11.2 UJ	118
	PC1913	S1913-EAF-0001-01B	548 J+	60 U	10 U	105 U	5 U	0.22 J	31800	17.8 J+	50 U	12.5 UJ	535 J+
	PC1913	S1913-EAF-0001-02B	248 J-	60 U	10 U	125 U	5 U	0.15 J	35800	13 J-	50 U	14.3 UJ	292 J-
	PC1938	S1938-EAF-0001-01B	585	2.1 J	10 U	180 U	5 U	0.16 J	33700	14.6	50 U	14 UJ	598
	PC1967	S1967-EAF-0001-01B	223	60 U	1.7 J	37.7 UJ	5 U	0.11 UJ	18700 J	18 J	50 U	10.6 U	224
	PC2031	S2031-EAF-0001-01B	113 J	60 U	1.7 UJ	311	5 U	5 U	31600	16.8	50 U	8.2 UJ	166
	PC2100	S2100-EAF-0001-01B	1470	60 U	8.9 J	91.9 J	5 U	0.33 J	26400	4.3 J	1.2 J	19.8 J-	1260
	PC2251	S2251-EAF-0001-01B	1640	60 U	53.1	137 J	5 U	0.2 J	23500	9.6 J	0.25 J	18.7 J-	1630

Table B.2 Sample Results for EAF Slag Samples, Synthetic Precipitation and Leaching Procedure Metals (continued)

Fraction	Property ID	Sample Number	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
>=250 microns	PC0119	S0119-EAF-0001-01A	10 U	4050 U	17.1	0.17 J-	1.9 U	4050 U	35 U	10 U	20900 J	25 U	47.2 UJ	6.4 U
	PC0168	S0168-EAF-0001-01A	10 U	1050 U	7.4 U	0.2 U	27.1 U	665 U	35 U	10 U	15100 J	25 U	115 J	6.7 U
	PC0391	S0391-EAF-0001-01A	10 U	968 J	41.3	0.2 U	40 U	385 U	2.8 U	10 U	17900	25 U	53.5	13.8 U
	PC0398	S0398-EAF-0001-01A	3.2 J	2960 J	34.6	0.2 U	40 U	2070 U	2.8 U	10 U	25400	25 U	35.8 J	16.1 U
	PC0583	S0583-EAF-0001-01A	7.8 J	3450 J	141	0.2 U	0.96 U	880 U	35 U	10 U	37200	2.2 J	54.7	143
	PC0621	S0621-EAF-0001-01A	10 U	508 U	26.1	0.2 U	1.8 UJ	407 J	2.6 J	10 U	28800 J	25 U	119	7.7 UJ
	PC0646	S0646-EAF-0001-01A	10 U	1500 J	35	0.025 U	40 U	193 U	35 U	10 U	18000	1.8 J	99.1	4.9 U
	PC1108	S1108-EAF-0001-01A	6.9 J	2100 U	69.1	0.2 U	2 UJ	987 J	2.6 J	10 U	31500 J	25 U	100	82.7
	PC1184	S1184-EAF-0001-01A	11.1	2540 J	64.2	0.034 U	0.73 U	265 U	35 U	10 U	19400	1.9 J	47.5 J	48.5 J
	PC1347	S1347-EAF-0001-01A	6.5 J	2710 U	166	0.2 U	2.6 UJ	4820 J	3.4 J	10 U	49600 J	25 U	77.7	31.5 UJ
	PC1435	S1435-EAF-0001-01A	10 U	1120 J	13.3 U	0.022 U	0.55 U	664 U	1.7 J	0.38 U	16400 J-	25 U	53.4	12.1 UJ
	PC1435	S1435-EAF-0001-02A	45.1	3760 J	58.4	0.031 U	2.7 U	1740 U	35 U	10 U	22000	25 U	30.8 J	61.5
	PC1546	S1546-EAF-0001-01A	5.7 J	2420 U	103	0.2 U	2 U	1130 U	35 U	10 U	18600 J	25 U	39.7 UJ	33.8 U
	PC1586	S1586-EAF-0001-01A	10 U	732 U	3.5 U	0.2 U	4 U	849 U	35 U	10 U	15500 J	25 U	65.8 J	3.6 U
	PC1587	S1587-EAF-0001-01A	10 U	1350 U	4.7 U	0.2 U	1.8 U	941 U	35 U	10 U	19700 J	25 U	57.2 J-	5.9 U
	PC1587	S1587-EAF-0001-02A	10 U	1110 U	4 U	0.2 U	0.92 U	1110 U	35 U	10 U	17700 J	25 U	76.1 J+	2.6 U
	PC1741	S1741-EAF-0001-01A	10 U	427 U	10.8 UJ	0.2 U	3.5 UJ	188 J	35 U	10 U	27800 J	25 U	106	25.4 UJ
	PC1913	S1913-EAF-0001-01A	3.4 J	3920 J	67.8	0.033 U	0.89 U	605 U	4 J	10 U	19500	1.7 J	73.9	108
	PC1913	S1913-EAF-0001-02A	3.3 J	4650 J	84.3 J+	0.023 U	4.7 U	750 U	35 U	0.46 U	24100 J+	25 U	76.7	166 J+
	PC1938	S1938-EAF-0001-01A	9.5 J	2950 J	220	0.2 U	1.9 U	765 U	35 U	0.73 U	18800 J	25 U	40 UJ	124
	PC1967	S1967-EAF-0001-01A	10 U	3670 U	13.7 U	0.2 U	2.7 U	892 U	35 U	10 U	15900 J	25 U	23.1 UJ	9.2 U
	PC2031	S2031-EAF-0001-01A	10 U	1990 U	1.6 UJ	0.2 U	2.8 UJ	1000 J	35 U	10 U	31100 J	25 U	29.6 J	6.3 UJ
	PC2100	S2100-EAF-0001-01A	4.9 J	501 J	41.2	0.045 U	1.7 U	1060 U	35 U	10 U	20100	25 U	81	10.3 U
	PC2251	S2251-EAF-0001-01A	35.6	2520 J	99.8	0.074 U	5.4 U	732 U	3 U	10 U	31200	25 U	43 J	75.7
<250 microns	PC0119	S0119-EAF-0001-01B	10 U	11800	32	0.2 U	3 U	6950	35 U	10 U	20700 J	25 U	53.2 J	12.3 U
	PC0168	S0168-EAF-0001-01B	10 U	5920	26.7	0.2 U	0.76 U	1590 U	35 U	0.6 J	17800 J	25 U	193 J	15.9 U
	PC0391	S0391-EAF-0001-01B	12	4320 J	61	0.03 U	2.1 U	1340 U	35 U	10 U	24000	1.6 J	44.8 J	72.1
	PC0398	S0398-EAF-0001-01B	12.6	12200	78.6	0.028 U	5 U	9430	3.7 U	10 U	49200	2 J	38.9 J	60.7
	PC0583	S0583-EAF-0001-01B	15.1	7720	68	0.024 U	3.1 U	3850 U	35 U	10 U	24200	25 U	24 J	87.9
	PC0621	S0621-EAF-0001-01B	4.5 J	3540 U	21.9	0.2 U	2.5 UJ	1270 J	35 U	0.42 J	43200 J	25 U	216	15.2 UJ
	PC0646	S0646-EAF-0001-01B	4.5 J	8750	27.2	0.2 U	4.1 U	703 U	35 U	10 U	21000	2.3 J	153	9.1 U
	PC1108	S1108-EAF-0001-01B	11.9	9760	57.5	0.2 U	2.2 UJ	4630 J	35 U	10 U	31500 J	25 U	29.1 J	109
	PC1184	S1184-EAF-0001-01B	20.9	5690	81.7	0.028 U	2.8 U	1450 U	35 U	10 U	22500	25 U	21.7 J	74.5
	PC1347	S1347-EAF-0001-01B	3.4 J	5860	82	0.2 U	5.6 UJ	13800	6.9 J	10 U	78200 J	25 U	71.4	19.4 UJ
	PC1435	S1435-EAF-0001-01B	11	10100 J-	45.9	0.027 U	2.3 U	6970 J-	4.6 U	10 U	31100 J-	25 U	13.9 J	46 J
	PC1435	S1435-EAF-0001-02B	7.4 J	15200 J+	13.3 J	0.2 U	3.6 U	12100 J+	5.5 J	10 U	40200 J+	25 U	15.3 J	16 U
	PC1546	S1546-EAF-0001-01B	9.2 J	4430 U	92.8	0.2 U	4 U	1740 U	35 U	10 U	20100 J	25 U	44.3 UJ	45.1 U
	PC1586	S1586-EAF-0001-01B	6 J	4140 U	131	0.2 U	3.9 U	2730 U	4.8 J	0.68 J	34600 J	25 U	269 J	173
	PC1587	S1587-EAF-0001-01B	10 U	6460	75.3	0.2 U	3.5 U	2920 U	5.6 J	10 U	45900 J	25 U	161 J	79.4
	PC1587	S1587-EAF-0001-02B	10 U	6060	65.7	0.2 U	2 U	3570 U	7.7 J	10 U	41100 J	25 U	194 J	58.8 U
	PC1741	S1741-EAF-0001-01B	3.4 J	448 U	25.5	0.2 U	2.7 UJ	631 J	3.7 J	10 U	26000 J	25 U	133	11.3 UJ
	PC1913	S1913-EAF-0001-01B	8.7 J	10600	60.4	0.024 U	1.6 U	3170 U	35 U	0.7 U	22300 J	25 U	116	117 J-
	PC1913	S1913-EAF-0001-02B	3.1 J	10900	58.4	0.031 U	3.7 U	2920 U	35 U	0.39 U	22300 J	25 U	106	167 J+
	PC1938	S1938-EAF-0001-01B	9.4 J	6230	122	0.2 U	2.5 U	3250 U	35 U	10 U	27000 J	25 U	44.6 UJ	187
	PC1967	S1967-EAF-0001-01B	10 U	11900	39.9	0.2 U	1.3 U	1890 U	35 U	10 U	22800 J	25 U	33.1 UJ	41.8 U
	PC2031	S2031-EAF-0001-01B	1.9 J	9050	29.3	0.2 U	1.6 UJ	3360 J	4.6 J	10 U	36600 J	25 U	37.6 J	24.7 UJ
	PC2100	S2100-EAF-0001-01B	33.2	5380	50.5	0.074 U	4.6 U	6300	4.8 U	10 U	37200	25 U	50.4	58.9 J
	PC2251	S2251-EAF-0001-01B	27.8	3560 J	80.7	0.033 U	2.6 U	1020 U	3.6 U	10 U	39000	25 U	31.4 J	72.2

Notes: All results are reported in µg/L.

J Result is estimated. J+ indicates a result with a high bias, J- indicates an estimated result with a low bias.

R Result is rejected. No numeric result is reported.

U Result is non-detect. The numeric value represents the quantitation limit.

UJ Result is non-detect, with an estimated quantitation limit.

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Table B.3 Sample Results for EAF Slag Samples, Hexavalent Chromium

EPA Regional Screening Levels for Residential Soil			Chromium(VI) 0.3	
Fraction	**Property ID**	**Sample Number**	**Method 7199**	**Method SSA201**
>=250 microns	PC0119	S0119-EAF-0001-01A	0.161 J	28.1 J
	PC0168	S0168-EAF-0001-01A	1.49	27.3 J
	PC0391	S0391-EAF-0001-01A	3.02 J-	17.1 J
	PC0398	S0398-EAF-0001-01A	0.15 U	0.959 J
	PC0583	S0583-EAF-0001-01A	1.11	18.4 J
	PC0621	S0621-EAF-0001-01A	1.65	26.4 J
	PC0646	S0646-EAF-0001-01A	1.52 J-	22.3 J
	PC1108	S1108-EAF-0001-01A	0.208 J	26.7 J
	PC1184	S1184-EAF-0001-01A	1.03 J	14.6 J
	PC1347	S1347-EAF-0001-01A	0.15 U	0.082 J
	PC1435	S1435-EAF-0001-01A	2.06 J	5.39 J+
	PC1435	S1435-EAF-0001-02A	1.51 J	2.24 J-
	PC1546	S1546-EAF-0001-01A	0.358	0.01 UJ
	PC1586	S1586-EAF-0001-01A	5.68	38.1 J
	PC1587	S1587-EAF-0001-01A	3.84	61.5 J-
	PC1587	S1587-EAF-0001-02A	4.03	93.6 J+
	PC1741	S1741-EAF-0001-01A	3.64	12.2 J
	PC1913	S1913-EAF-0001-01A	0.51 J	41.4 J+
	PC1913	S1913-EAF-0001-02A	0.271 J	1.7 J-
	PC1938	S1938-EAF-0001-01A	0.804 J	4.05 J
	PC1967	S1967-EAF-0001-01A	3.13	33.4 J
	PC2031	S2031-EAF-0001-01A	3.54	30.9 J
	PC2100	S2100-EAF-0001-01A	0.15 UJ	0.057 J
	PC2251	S2251-EAF-0001-01A	0.238 J	3.78 J
<250 microns	PC0119	S0119-EAF-0001-01B	0.208 J	6.78 J
	PC0168	S0168-EAF-0001-01B	0.82	18.4 J
	PC0391	S0391-EAF-0001-01B	0.323	6.24 J
	PC0398	S0398-EAF-0001-01B	0.153 U	0.049 J
	PC0583	S0583-EAF-0001-01B	0.511	0.214 J
	PC0621	S0621-EAF-0001-01B	0.676	17.6 J
	PC0646	S0646-EAF-0001-01B	1.32 J-	24.9 J
	PC1108	S1108-EAF-0001-01B	1.01 U	0.039 J
	PC1184	S1184-EAF-0001-01B	0.275 J	1.71 J
	PC1347	S1347-EAF-0001-01B	0.507 U	0.029 J
	PC1435	S1435-EAF-0001-01B	0.262 J	0.309 J+
	PC1435	S1435-EAF-0001-02B	0.15 UJ	0.136 J-
	PC1546	S1546-EAF-0001-01B	0.616	1.06 J
	PC1586	S1586-EAF-0001-01B	5.45	57.3 J
	PC1587	S1587-EAF-0001-01B	3.31	26 J-
	PC1587	S1587-EAF-0001-02B	3.51	33.8 J+
	PC1741	S1741-EAF-0001-01B	1.94	14.9 J
	PC1913	S1913-EAF-0001-01B	0.325 J	5.28 J+
	PC1913	S1913-EAF-0001-02B	0.263 J	0.062 J-
	PC1938	S1938-EAF-0001-01B	0.353 J	0.349 J
	PC1967	S1967-EAF-0001-01B	1.16	18.4 J
	PC2031	S2031-EAF-0001-01B	3.08	18.4 J
	PC2100	S2100-EAF-0001-01B	0.153 U	0.111 J
	PC2251	S2251-EAF-0001-01B	0.202 J	1.21 J

Notes: All results are reported in mg/kg.
J Result is estimated. J+ indicates a result with a high bias, J- indicates an estimated result with a low bias.
U Result is non-detect. The numeric value represents the quantitation limit.
UJ Result is non-detect, with an estimated quantitation limit.

Table B.4 Sample Results for EAF Slag Samples, pH

EPA Regional Screening Levels for Residential Soil			pH
			None
Fraction	**Property ID**	**Sample Number**	**pH**
>=250 microns	**PC0119**	S0119-EAF-0001-01A	8.56
	PC0168	S0168-EAF-0001-01A	9.75
	PC0391	S0391-EAF-0001-01A	8.13
	PC0398	S0398-EAF-0001-01A	8.51
	PC0583	S0583-EAF-0001-01A	8.65
	PC0621	S0621-EAF-0001-01A	9.22
	PC0646	S0646-EAF-0001-01A	9.09
	PC1108	S1108-EAF-0001-01A	9.02
	PC1184	S1184-EAF-0001-01A	8.11
	PC1347	S1347-EAF-0001-01A	8.81
	PC1435	S1435-EAF-0001-01A	8.25
	PC1435	S1435-EAF-0001-02A	7.76
	PC1546	S1546-EAF-0001-01A	8.66
	PC1586	S1586-EAF-0001-01A	8.79
	PC1587	S1587-EAF-0001-01A	8.82
	PC1587	S1587-EAF-0001-02A	8.94
	PC1741	S1741-EAF-0001-01A	9.96
	PC1913	S1913-EAF-0001-01A	8.78
	PC1913	S1913-EAF-0001-02A	8.64
	PC1938	S1938-EAF-0001-01A	8.61
	PC1967	S1967-EAF-0001-01A	9.02
	PC2031	S2031-EAF-0001-01A	9.23
	PC2100	S2100-EAF-0001-01A	8.41
	PC2251	S2251-EAF-0001-01A	8.27
<250 microns	**PC0119**	S0119-EAF-0001-01B	8.39
	PC0168	S0168-EAF-0001-01B	9.33
	PC0391	S0391-EAF-0001-01B	7.91
	PC0398	S0398-EAF-0001-01B	8.07
	PC0583	S0583-EAF-0001-01B	8.09
	PC0621	S0621-EAF-0001-01B	8.94
	PC0646	S0646-EAF-0001-01B	8.66
	PC1108	S1108-EAF-0001-01B	8.56
	PC1184	S1184-EAF-0001-01B	8.32
	PC1347	S1347-EAF-0001-01B	8.26
	PC1435	S1435-EAF-0001-01B	7.23
	PC1435	S1435-EAF-0001-02B	7.86
	PC1546	S1546-EAF-0001-01B	8.61
	PC1586	S1586-EAF-0001-01B	8.49
	PC1587	S1587-EAF-0001-01B	8.39
	PC1587	S1587-EAF-0001-02B	8.59
	PC1741	S1741-EAF-0001-01B	9.93
	PC1913	S1913-EAF-0001-01B	8.33
	PC1913	S1913-EAF-0001-02B	8.54
	PC1938	S1938-EAF-0001-01B	8.63
	PC1967	S1967-EAF-0001-01B	8.96
	PC2031	S2031-EAF-0001-01B	8.43
	PC2100	S2100-EAF-0001-01B	8.07
	PC2251	S2251-EAF-0001-01B	8.07

Notes: All results are reported in pH units.