Weston Solutions, Inc.
Federal East
101 Billerica Avenue
N. Billerica, Massachusetts 01862
978-552-2100 – Fax 978-689-2794

U.S. ENVIRONMENTAL PROTECTION AGENCY CONTRACT 68HE0120D0001
SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
TASK ORDER NO. 68HE0120F0027

M E M O R A N D U M

TO: Mansell Field Site File

cc: Athanasios Hatzopoulos, On-Scene Coordinator (OSC), U.S. Environmental Protection Agency (EPA) Region I, Emergency Planning and Response Branch (EPRB)

FROM: Bonnie Mace, Site Leader, Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team V (START)

Bonnie Mace Firriello Digitally signed by Bonnie Mace Firriello Date: 2022.09.13 08:56:36 -04'00'

DATE: 13 September 2022

RE: Preliminary Assessment / Site Investigation Activities at the Mansell Field Site, Salem, Massachusetts. AD Number (No.) TOFP-01-22-06-0001; Task No. 0143; Document Control No. (DCN) R-50430.

INTRODUCTION

On 5 July 2022, U.S. Environmental Protection Agency (EPA) Region I On-Scene Coordinator (OSC) Athanasios Hatzopoulos and Weston Solutions, Inc. (WESTON®), Superfund Technical Assessment and Response Team V (START) personnel Bonnie Mace, John Kelly, Paul Callahan, Tyler Evans, and Katie Santarpio mobilized to the Mansell Field Site (the Site) located in Salem, Essex County, Massachusetts (MA). The purpose of the trip was to conduct subsurface soil sampling activities to determine if further actions, including removal activities, are warranted at the site.

SITE DESCRIPTION

The Mansell Field site (the Site) is located at 50 Proctor Street, Salem, Essex County, Massachusetts (see Attachment A, Figure 1). The geographical position as measured from the center of the site is latitude 42º 30′ 57.9″ north and longitude 70º 54′ 38.4″ west. Mansell Field is the lower elevation portion of the Gallows Hill Park (see Attachment A, Figure 2). Gallows Hill Park consists of approximately 24 acres of land, including baseball and softball areas, a skate park, a basketball court, a playground, and a portion which is undeveloped tree covered area with walking trails. The Site contains a basketball court and a grass covered area that was used for soccer practice and other activities, and the Gallows Hill Park playground area abuts the Site to the west. The Site is bordered to the north by Langdon Street and residential properties; to the east by Proctor Street and residential properties; to the south by Mansell Parkway, Looney Avenue and Witch Hill Road; and to the west by additional park property.

The Site has a history of industrial use beginning in the early 20th century. There was reportedly an industrial facility (suspected to be a tannery) on the eastern portion of the Site, where animal hides were turned into leather consumer goods. The tanning process used during the active time period involved many hazardous chemicals, including arsenic, chromium sulfate, aluminum sulfate, and glutaraldehyde. The tannery was vacant by 1906, based on historical fire insurance mapping, and the former tannery buildings were demolished by the 1930s or earlier. During the 1940s and 1950s, there was a ponded area where elevated levels of arsenic were detected in shallow soils. Historical records also indicated there were other tannery operations in the local area, across Proctor Street, possibly through the 1960s.

In December 2018, Tighe & Bond, on behalf of the City of Salem, conducted Site Assessment activities as part of city plans for a park renovation project. This included soil borings, hand borings, exploratory test pits, monitoring well installations, and soil and groundwater sampling. Analytical sample results indicated elevated concentrations of metals, including arsenic at concentrations of up to 12,300 milligrams per kilogram (mg/kg). The Massachusetts Department of Environmental Protection (MassDEP) reportable concentration (RC) for soil (RC S-1) is 20 mg/kg. Elevated concentrations of arsenic were found in soils in the soccer field at the eastern end of the property, but not in any of the other fields. In addition, a select number of soil samples were submitted for Toxicity Characteristic Leaching Procedure (TCLP) metals (arsenic) analysis. Analytical sample results indicated that one of the 10 samples submitted for TCLP analysis exceeded the EPA Maximum Concentration of Contaminants for the Toxicity Characteristic of 5.0 micrograms per Liter (µg/L) (5.5 µg/L).

SITE ACTIVITIES

On 5 July 2022, START members Mace, Kelly, Callahan, Evans, and Santarpio mobilized to the site to conduct a sampling activity on the property to determine the extent of contamination. Site Leader (SL) Mace conducted a health and safety meeting, and all personnel signed the site-specific health and safety plan (HASP), which was prepared as a separate document entitled, *Weston Solutions, Inc. Region I START Site Health and Safety Plan for the Mansell Field Site Preliminary Assessment/Site Investigation, Salem, Massachusetts.* START personnel established a support zone and calibrated the air monitoring instruments, which included a MultiRae Pro unit [lower explosive limit (LEL), oxygen (O_2), carbon monoxide (CO), hydrogen sulfide (H_2S), and volatile organic compound (VOC) detectors]. Ambient conditions were recorded in the site-specific HASP as follows: LEL = 0 percent (%); O_2 = 20.9%; CO = ppm; H_2S = 0 ppm; VOC = 0 ppm. Air monitoring was conducted for the duration of the extent-of-contamination sampling. Any levels above background were documented in the site-specific HASP. START personnel unloaded equipment and conducted site decontamination activities on sampling equipment (augers).

START personnel advanced 16 soil borings (SBs) (SB-01 through SB-16) at locations in the soccer field area (see Attachment A, Figure 2). The soil samples from each boring were collected from 0-1 feet (A interval), 1-2 feet (B interval), and 2-3 feet (C interval). START personnel followed the sampling protocols outlined in the Sampling and Analysis Plan (SAP).

START completed sampling activities, utilized the Trimble™ Global Positioning System (GPS) unit to document boring locations, filled the boring locations with sand, and photodocumented site conditions and sample locations (see Attachment B, Photodocumentation Log). START personnel conducted sample management and labeling activities. START containerized metals soil samples in 4-ounce amber glass jars. All samples were documented in the SCRIBE database, and an EPA chain-of-custody was completed by START SL Mace. START personnel departed the site and delivered the samples to EPA Laboratory Services and Applied Science Division (LSASD).

A total of 51 soil samples (including three field duplicates) were collected from 16 soil boring locations. All of the soil samples were submitted to EPA LSASD for metals analysis.

On 3 August 2022, START personnel retrieved selected samples (20 samples, including one field duplicate sample) from EPA LSASD, as requested by OSC Hatzopoulos, and delivered them to a Contract Laboratory Program (CLP) laboratory for TCLP metals analysis.

ANALYTICAL DATA SUMMARIES

On 28 July 2022, START received the analytical results from EPA LSASD. Results are summarized in Attachment C, Table 1. Full LSASD analytical results are included in Attachment D, Analytical Data.

Analytical results of the soil samples indicated that 18 metals were detected above laboratory reporting limits (RLs), including the following [maximum concentration in parentheses]: aluminum (16,000 mg/kg); arsenic (19,000 mg/kg); barium (1,300 mg/kg); beryllium (1.4 mg/kg); calcium (360,000 mg/kg); cadmium (2.6 mg/kg); cobalt (18 mg/kg); chromium (4,200 mg/kg); copper (570 mg/kg); iron (130,000 mg/kg); magnesium (29,000 mg/kg); manganese (690 mg/kg); nickel (29 mg/kg); lead (1,100 mg/kg); antimony (28 mg/kg); vanadium (130 mg/kg); thallium (4.0 mg/kg); and zinc (1,000 mg/kg). In addition, three metals (arsenic, lead, and thallium) exceeded the EPA Removal Management Level (RML) for Residential Soil and/or Industrial Soil.

On 22 August 2022, START received the analytical results from the CLP laboratory. Results are summarized in Attachment C, Table 2. Full CLP analytical results are included in Attachment D, Analytical Data.

Analytical results of the TCLP soil samples indicated that seven metals were detected above laboratory RLs, including the following [maximum concentration in parentheses]: arsenic (59,000 µg/L); barium (1,100 µg/L); cadmium (310 µg/L); chromium (500 µg/L); lead (1,300 µg/L); selenium (8.9 µg/L); and silver (2.7 µg/L). The EPA Maximum Concentration of Contaminants for the Toxicity Characteristic is 5,000 µg/L [5.0 milligrams per Liter (mg/L)] for arsenic, chromium, and lead; 100,000 µg/L for barium (100.0 mg/L); and 1,000 µg/L for cadmium (1.0 mg/L). Two metals (arsenic and lead) exceeded the EPA Maximum Concentration of Contaminants for the Toxicity Characteristic.

Attachments

Attachment A

Figures

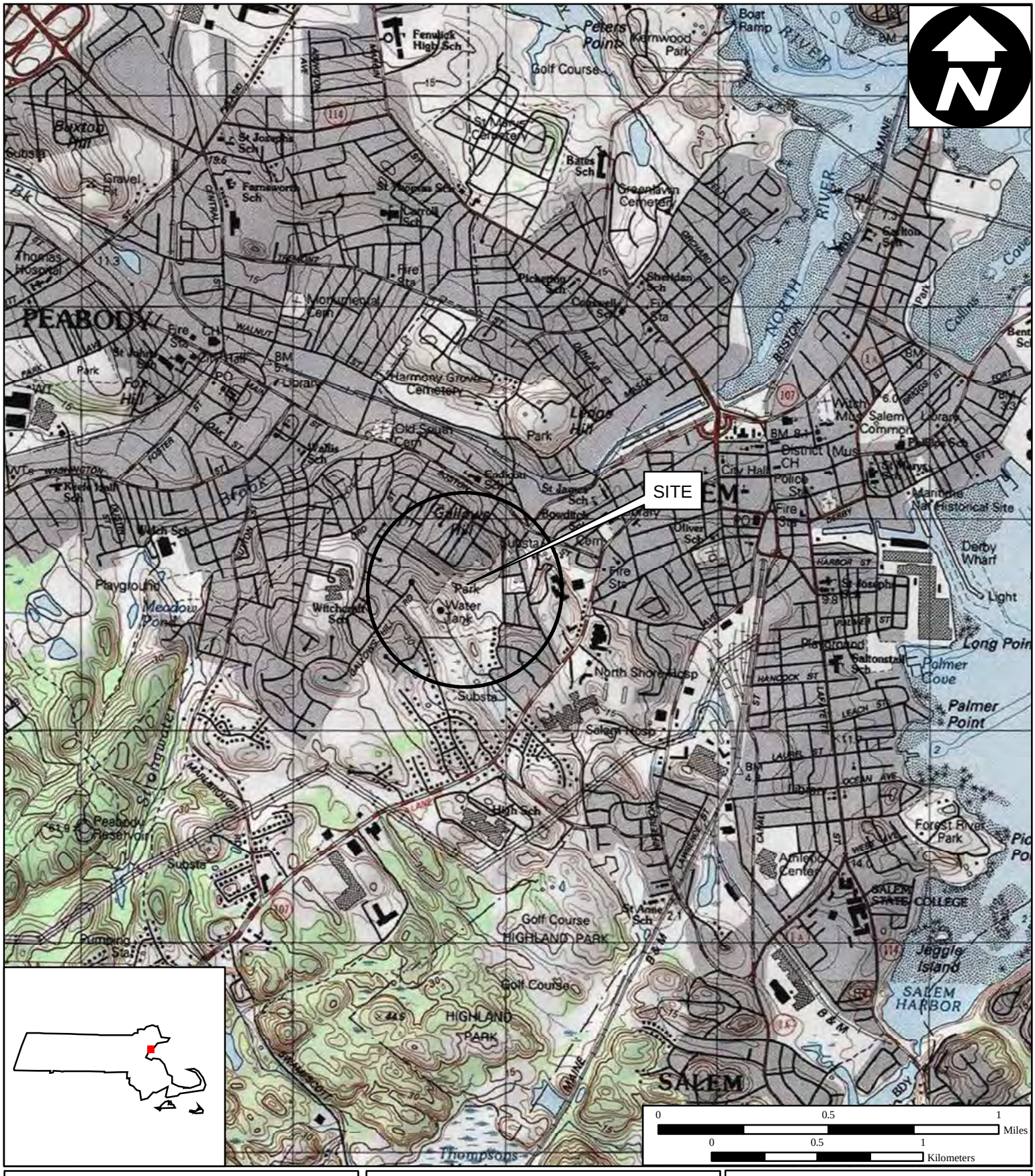

Figure 1

Site Location Map

Mansell Field Site
50 Proctor Street
Salem, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) V
Contract No. 68HE0120D0001

AD Number:	TOFP-01-22-06-0001
Created by:	T. Evans
Created on:	30 June 2022
Modified by:	T. Evans
Modified on:	30 June 2022

Data Sources:
Topos: MicroPath/USGS/USA Topo Maps
Quadrangle Name: Salem, MA
All other data: START

WESTON SOLUTIONS

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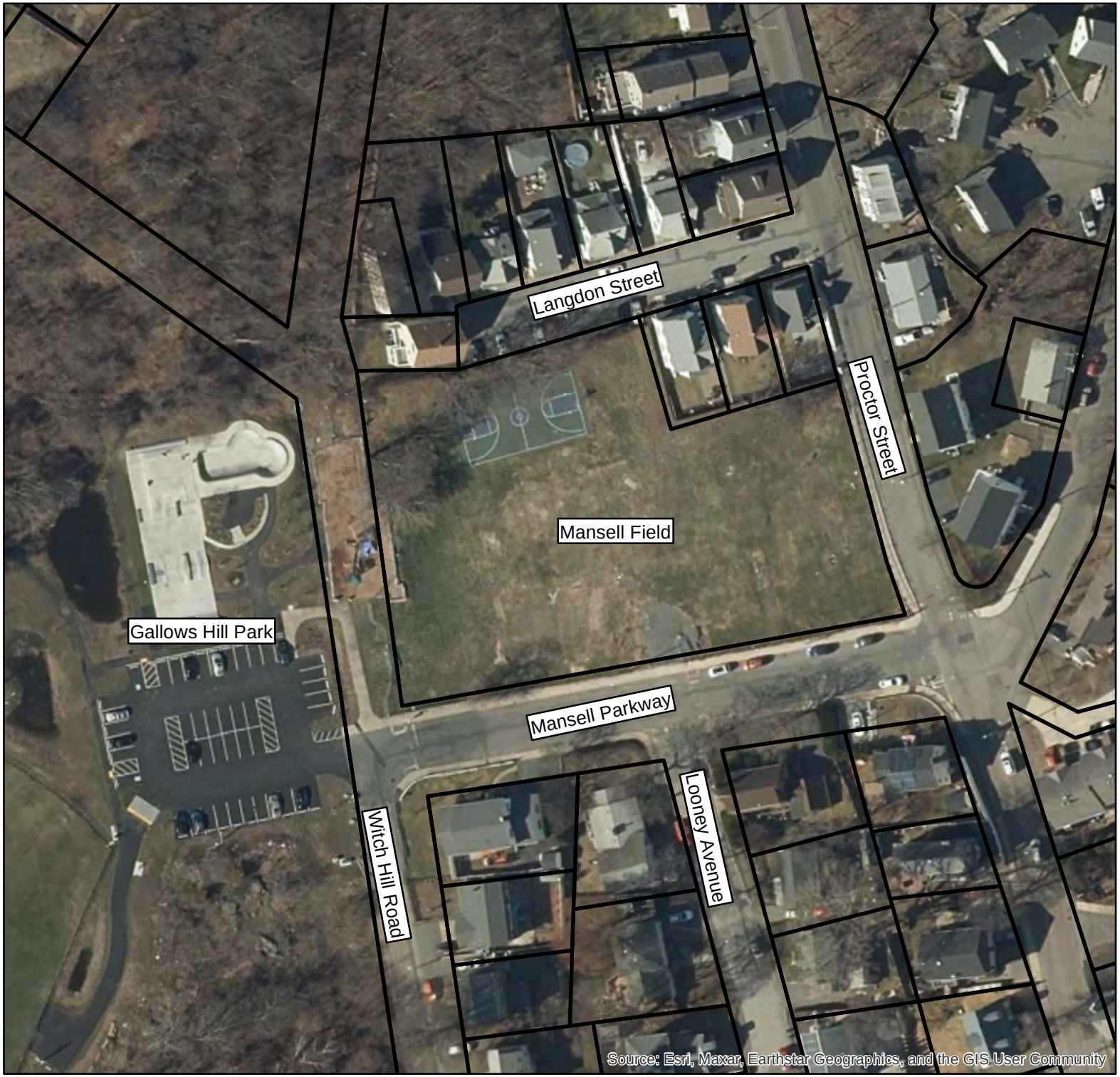

Figure 2

Site Diagram

Mansell Field Site
50 Proctor Street
Salem, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) V
Contract No. 68HE0120D0001

AD Number:	TOFP-01-22-06-0001
Created by:	T. Evans
Created on:	30 June 2022
Modified by:	B. Mace
Modified on:	26 July 2022

LEGEND

Property Boundary

N

0 100 200

Feet

Data Sources:

Imagery: ESRI, i-cubed, USDA FSA, USGS AEX, GeoEye, Getmapping, Aerogrid, IGP
Topos: USA TopoMaps
All other data: START

WESTON SOLUTIONS

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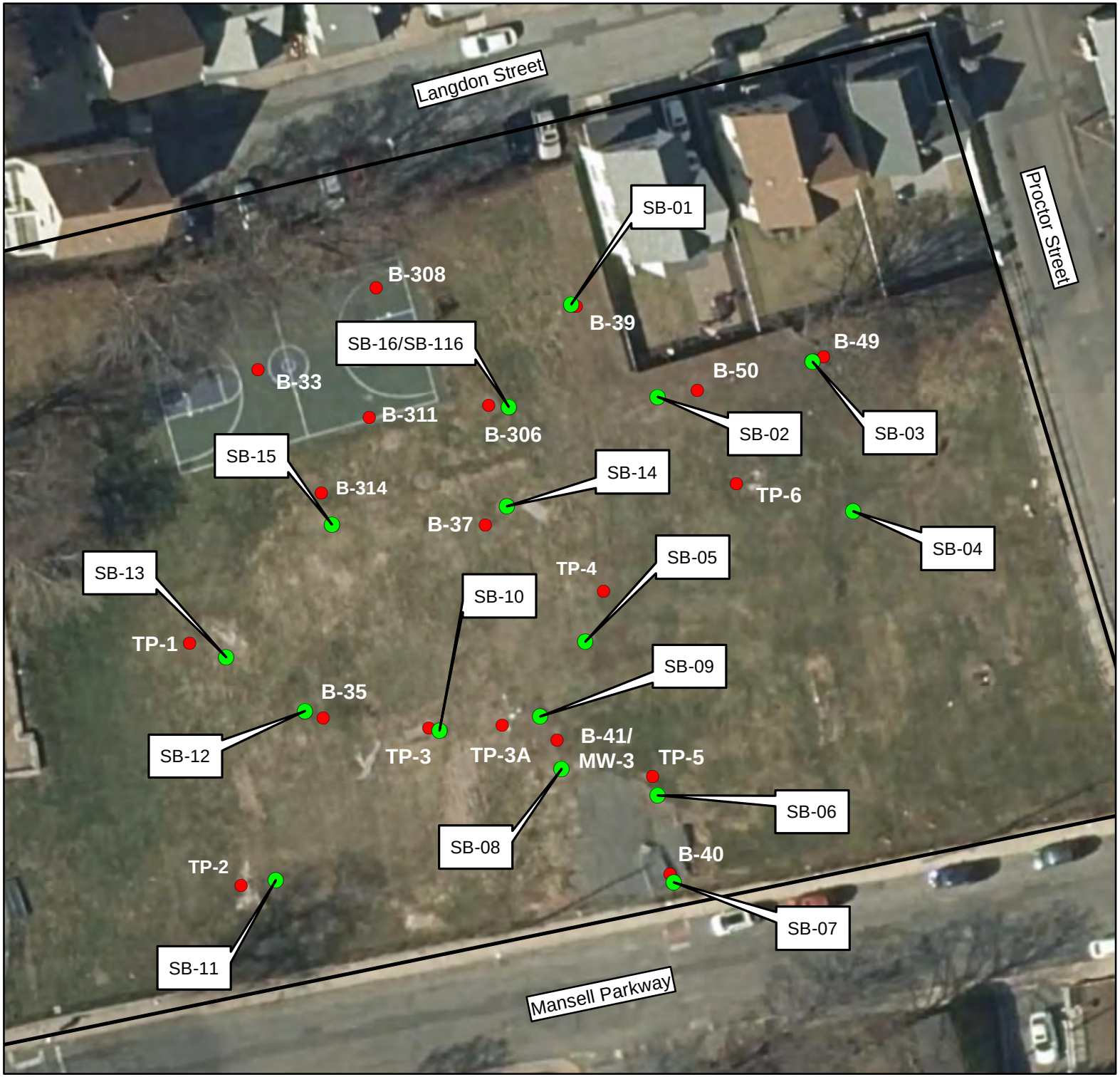

Figure 3

Sample Location Map

Mansell Field Site
50 Proctor Street
Salem, Massachusetts

EPA Region I
Superfund Technical Assessment and Response Team (START) V
Contract No. 68HE0120D0001

AD Number:	TOFP-01-22-06-0001
Created by:	T. Evans
Created on:	30 June 2022
Modified by:	B. Mace
Modified on:	24 August 2022

LEGEND

- Site Boundary
- 2022 EPA/START Soil Boring Locations
- 2018 Tighe & Bond Sample Locations

N

0 25 50 75

Feet

Data Sources:

Imagery: ESRI, i-cubed, USDA FSA, USGS AEX, GeoEye, Getmapping, Aerogrid, IGP
Topos: USA TopoMaps
All other data: START

WESTON SOLUTIONS

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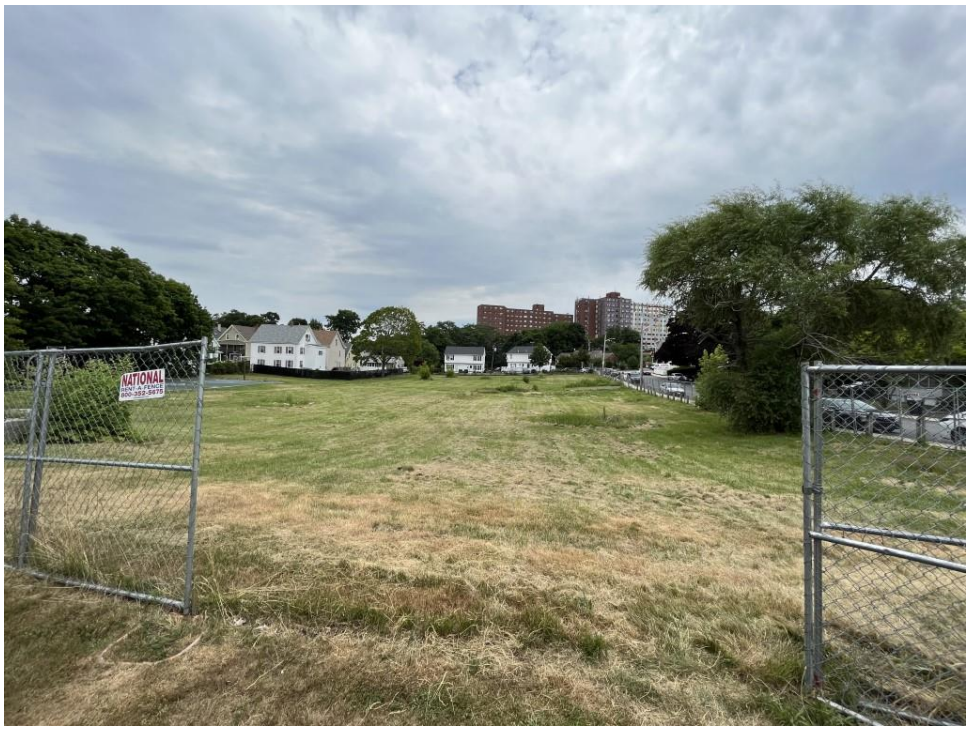
Attachment B

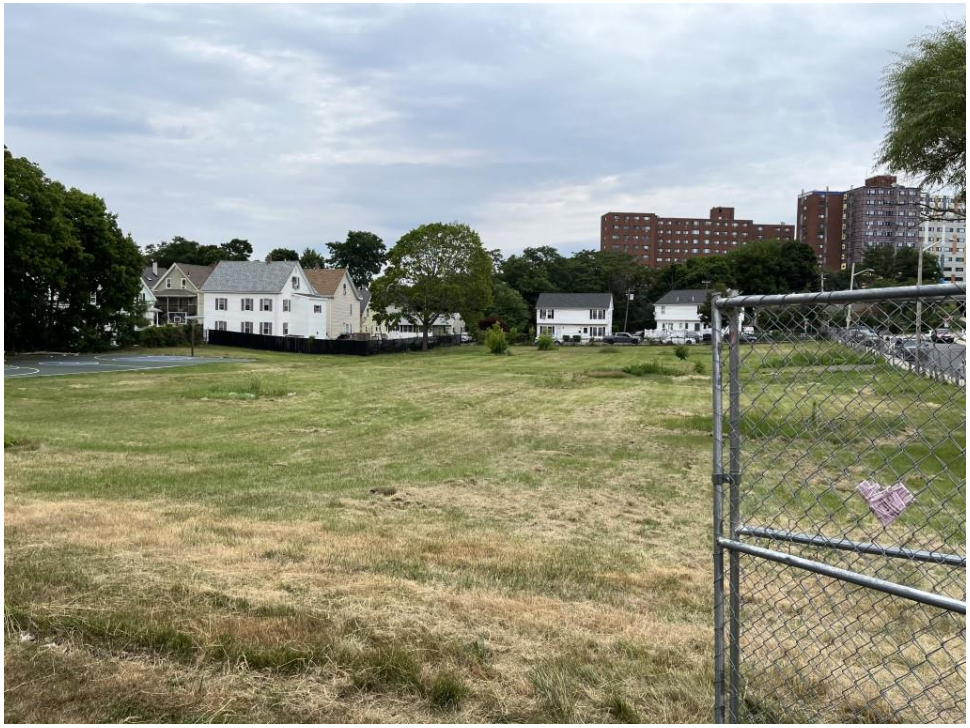
Photodocumentation Log

PHOTODOCUMENTATION LOG
Mansell Field ● Salem, Massachusetts



SCENE: View of Mansell Field. Photograph taken facing east.

DATE: 5 July 2022 **TIME:** 1204 hours
PHOTOGRAPHER: B. Mace **CAMERA:** Apple iPhone 13



SCENE: View of Mansell Field. Photograph taken facing northeast.

DATE: 5 July 2022 **TIME:** 1204 hours
PHOTOGRAPHER: B. Mace **CAMERA:** Apple iPhone 13

Attachment C

Tables

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

			SAMPLE LOCATION:	SB-01A	SB-01B	SB-01C	SB-02A	SB-02B	SB-03A	SB-03B
			SAMPLE NUMBER:	05MA0143-0001	05MA0143-0002	05MA0143-0003	05MA0143-0004	05MA0143-0005	05MA0143-0007	05MA0143-0008
			SAMPLE DEPTH:	1-foot	2-feet	3-feet	1-foot	2-feet	1-foot	2-feet
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**								
METALS	**mg/kg**			**mg/kg**						
Aluminum	230,000	3,400,000		12,000	11,000	11,000	13,000	14,000	10,000	14,000
Arsenic	68	300		6.8	ND	ND	**470**	**710**	34	**480**
Barium	46,000	650,000		49	53	44	280	210	72	510
Beryllium	470	6,900		ND	ND	ND	ND	ND	ND	ND
Calcium	NL	NL		16,000	14,000	15,000	14,000	29,000	3,900	17,000
Cadmium	210	2,900		ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000		18	17	17	8.8	9.7	8.4	11
Chromium	NL	NL		32	25	30	450	220	31	490
Copper	9,400	140,000		46	39	45	100	100	110	70
Iron	160,000	2,500,000		34,000	35,000	33,000	20,000	20,000	19,000	26,000
Magnesium	NL	NL		7,600	7,900	7,500	3,900	3,600	3,100	3,700
Manganese	5,500	77,000		290	250	200	390	470	190	690
Nickel	4,600	67,000		23	20	20	18	15	13	18
Lead	400	800		13	9.8	ND	200	170	120	**410**
Antimony	94	1,400		ND	ND	ND	ND	ND	ND	ND
Thallium	2.3	35		ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000		130	110	130	50	42	45	45
Zinc	70,000	1,100,000		66	71	59	340	240	290	440

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

		SAMPLE LOCATION:	SB-03C	SB-04A	SB-04B	SB-04C	SB-05A	SB-05B	SB-05C
		SAMPLE NUMBER:	05MA0143-0009	05MA0143-0010	05MA0143-0011	05MA0143-0012	05MA0143-0013	05MA0143-0014	05MA0143-0015
		SAMPLE DEPTH:	3-feet	1-foot	2-feet	3-feet	1-foot	2-feet	3-feet
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**							
METALS	**mg/kg**		**mg/kg**						
Aluminum	230,000	3,400,000	13,000	13,000	15,000	14,000	5,200	8,000	12,000
Arsenic	68	300	**1,000**	**180**	37	12	**7,200**	**1,900**	**2,600**
Barium	46,000	650,000	1,300	130	87	78	40	230	210
Beryllium	470	6,900	ND	0.89	ND	ND	ND	1.0	ND
Calcium	NL	NL	32,000	2,400	2,500	2,400	300,000	30,000	25,000
Cadmium	210	2,900	2.6	ND	ND	ND	ND	1.6	ND
Cobalt	70	1,000	8.8	8.1	6.9	8.2	ND	7.6	9.1
Chromium	NL	NL	1,600	380	160	62	36	450	770
Copper	9,400	140,000	140	140	87	33	ND	570	250
Iron	160,000	2,500,000	29,000	19,000	19,000	20,000	3,000	18,000	22,000
Magnesium	NL	NL	3,900	2,900	3,700	3,300	10,000	1,700	3,100
Manganese	5,500	77,000	530	260	170	500	92	190	310
Nickel	4,600	67,000	21	19	18	15	ND	18	16
Lead	400	800	**520**	200	93	76	30	300	160
Antimony	94	1,400	ND	ND	ND	ND	ND	ND	ND
Thallium	2.3	35	ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000	40	40	40	36	ND	25	39
Zinc	70,000	1,100,000	1,000	150	150	88	45	260	220

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

			SAMPLE LOCATION:	SB-06A	SB-06B	SB-06C	SB-07A	SB-07B	SB-07C	SB-08A
			SAMPLE NUMBER:	05MA0143-0016	05MA0143-0017	05MA0143-0018	05MA0143-0019	05MA0143-0020	05MA0143-0021	05MA0143-0022
			SAMPLE DEPTH:	1-foot	2-feet	3-feet	1-foot	2-feet	3-feet	1-foot
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**								
METALS	**mg/kg**			**mg/kg**						
Aluminum	230,000	3,400,000		11,000	15,000	12,000	15,000	9,600	13,000	8,700
Arsenic	68	300		**1,900**	**160**	26	**1,000**	**2,000**	**780**	**6,300**
Barium	46,000	650,000		280	99	93	160	170	410	120
Beryllium	470	6,900		0.82	ND	ND	ND	ND	1.4	ND
Calcium	NL	NL		34,000	7,500	4,800	5,000	23,000	27,000	150,000
Cadmium	210	2,900		ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000		8.6	9.9	9.1	9.4	8.4	7.4	ND
Chromium	NL	NL		470	51	30	1,000	850	720	4,200
Copper	9,400	140,000		230	63	29	140	210	490	100
Iron	160,000	2,500,000		24,000	21,000	19,000	25,000	30,000	19,000	12,000
Magnesium	NL	NL		3,800	4,400	4,200	3,800	3,500	2,200	9,700
Manganese	5,500	77,000		280	190	230	300	290	250	210
Nickel	4,600	67,000		23	10	16	19	21	20	ND
Lead	400	800		200	130	110	**420**	390	**1,100**	120
Antimony	94	1,400		ND	ND	ND	ND	ND	ND	ND
Thallium	2.3	35		ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000		33	48	36	48	35	29	29
Zinc	70,000	1,100,000		220	110	62	690	290	280	140

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

		SAMPLE LOCATION:	SB-08B	SB-08C	SB-09A	SB-09B	SB-09C	SB-10A	SB-10B
		SAMPLE NUMBER:	05MA0143-0023	05MA0143-0024	05MA0143-0025	05MA0143-0026	05MA0143-0027	05MA0143-0028	05MA0143-0029
		SAMPLE DEPTH:	2-feet	3-feet	1-foot	2-feet	3-feet	1-foot	2-feet
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**							
METALS	**mg/kg**		**mg/kg**						
Aluminum	230,000	3,400,000	6,600	9,700	8,700	4,400	12,000	15,000	8,200
Arsenic	68	300	**6,600**	**5,400**	**8,600**	**19,000**	**5,000**	**1,500**	**6,500**
Barium	46,000	650,000	120	110	140	34	90	130	100
Beryllium	470	6,900	ND	ND	ND	ND	ND	0.87	ND
Calcium	NL	NL	190,000	130,000	170,000	360,000	110,000	32,000	210,000
Cadmium	210	2,900	ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000	ND	ND	ND	ND	12	8.0	ND
Chromium	NL	NL	4,000	3,400	2,100	830	340	760	2,000
Copper	9,400	140,000	110	82	42	ND	51	74	28
Iron	160,000	2,500,000	9,600	14,000	9,900	1,900	22,000	20,000	10,000
Magnesium	NL	NL	10,000	10,000	14,000	29,000	8,700	6,300	12,000
Manganese	5,500	77,000	170	270	180	79	330	460	200
Nickel	4,600	67,000	ND	11	ND	ND	13	27	ND
Lead	400	800	98	120	98	23	140	190	120
Antimony	94	1,400	ND	ND	ND	ND	ND	ND	ND
Thallium	2.3	35	ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000	21	30	21	ND	39	49	27
Zinc	70,000	1,100,000	140	120	120	45	180	210	140

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

		SAMPLE LOCATION:	SB-10C	SB-11A	SB-11B	SB-12A	SB-12B	SB-12C	SB-13A
		SAMPLE NUMBER:	05MA0143-0030	05MA0143-0031	05MA0143-0032	05MA0143-0034	05MA0143-0035	05MA0143-0036	05MA0143-0037
		SAMPLE DEPTH:	3-feet	1-foot	2-feet	1-foot	2-feet	3-feet	1-foot
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**							
METALS	**mg/kg**		**mg/kg**						
Aluminum	230,000	3,400,000	8,700	15,000	16,000	12,000	13,000	15,000	12,000
Arsenic	68	300	**5,000**	**1,300**	**670**	**1,200**	**1,600**	**760**	**1,900**
Barium	46,000	650,000	120	91	74	89	110	95	220
Beryllium	470	6,900	ND	ND	ND	ND	ND	ND	ND
Calcium	NL	NL	170,000	22,000	13,000	28,000	44,000	17,000	27,000
Cadmium	210	2,900	ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000	ND	6.9	6.5	8.8	7.4	7.0	10
Chromium	NL	NL	1,500	550	290	520	790	340	1,500
Copper	9,400	140,000	32	73	36	45	58	34	140
Iron	160,000	2,500,000	10,000	18,000	18,000	21,000	22,000	21,000	45,000
Magnesium	NL	NL	10,000	440	4,000	5,500	5,800	4,000	4,700
Manganese	5,500	77,000	250	270	340	280	330	350	350
Nickel	4,600	67,000	17	16	15	18	18	16	29
Lead	400	800	160	120	99	84	190	120	280
Antimony	94	1,400	ND	ND	ND	ND	ND	ND	ND
Thallium	2.3	35	ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000	29	35	38	39	36	39	49
Zinc	70,000	1,100,000	150	120	100	100	140	120	290

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

		SAMPLE LOCATION:	SB-13B	SB-13C	SB-14A	SB-14B	SB-14C	SB-15A	SB-15B
		SAMPLE NUMBER:	05MA0143-0038	05MA0143-0039	05MA0143-0040	05MA0143-0041	05MA0143-0042	05MA0143-0043	05MA0143-0044
		SAMPLE DEPTH:	2-feet	3-feet	1-foot	2-feet	3-feet	1-foot	2-feet
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**							
METALS	**mg/kg**		**mg/kg**						
Aluminum	230,000	3,400,000	10,000	13,000	13,000	6,000	8,700	12,000	6,900
Arsenic	68	300	**2,900**	**630**	**710**	**1,900**	**2,100**	**540**	**780**
Barium	46,000	650,000	150	100	90	88	610	92	63
Beryllium	470	6,900	ND	ND	ND	ND	ND	ND	ND
Calcium	NL	NL	98,000	18,000	17,000	72,000	41,000	100,000	240,000
Cadmium	210	2,900	ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000	6.6	8.4	5.9	ND	5.3	7.1	ND
Chromium	NL	NL	2,600	310	130	600	330	440	570
Copper	9,400	140,000	89	41	41	58	150	26	ND
Iron	160,000	2,500,000	19,000	24,000	17,000	10,000	26,000	19,000	7,000
Magnesium	NL	NL	6,500	5,200	3,500	2,700	2,300	8,500	13,000
Manganese	5,500	77,000	290	360	300	280	410	290	180
Nickel	4,600	67,000	15	17	13	11	12	14	ND
Lead	400	800	160	68	150	140	250	76	79
Antimony	94	1,400	ND	ND	ND	ND	28	ND	ND
Thallium	2.3	35	ND	**4.0**	ND	ND	ND	ND	ND
Vanadium	1,200	17,000	39	45	36	19	31	41	ND
Zinc	70,000	1,100,000	180	110	160	120	240	100	99

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 1

SUMMARY OF SOIL SAMPLE RESULTS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

		SAMPLE LOCATION:	SB-15C	SB-16A	SB-16B	SB-16C	SB-116A	SB-116B	SB-116C
		SAMPLE NUMBER:	05MA0143-0045	05MA0143-0046	05MA0143-0047	05MA0143-0048	05MA0143-0049	05MA0143-0050	05MA0143-0051
		SAMPLE DEPTH:	3-feet	1-foot	2-feet	3-feet	1-foot	2-feet	3-feet
COMPOUND	**EPA RML-Res**	**EPA RML-Ind**							
METALS	**mg/kg**		**mg/kg**						
Aluminum	230,000	3,400,000	5,600	9,900	9,000	5,600	8,900	9,400	7,400
Arsenic	68	300	**400**	**2,900**	**1,800**	**460**	**3,200**	**2,000**	**650**
Barium	46,000	650,000	110	120	150	100	110	160	110
Beryllium	470	6,900	ND	ND	ND	ND	ND	ND	ND
Calcium	NL	NL	260,000	85,000	32,000	19,000	100,000	4,200	20,000
Cadmium	210	2,900	ND	ND	ND	ND	ND	ND	ND
Cobalt	70	1,000	ND	ND	5.1	ND	ND	4.8	ND
Chromium	NL	NL	1,900	380	350	100	310	380	130
Copper	9,400	140,000	ND	94	150	73	71	160	81
Iron	160,000	2,500,000	6,000	130,000	14,000	7,200	12,000	14,000	11,000
Magnesium	NL	NL	11,000	4,000	2,200	1,100	3,900	2,400	1,600
Manganese	5,500	77,000	140	200	170	80	180	170	150
Nickel	4,600	67,000	ND	11	13	6.5	9.7	13	9.3
Lead	400	800	72	170	190	90	140	190	110
Antimony	94	1,400	ND	ND	5.0	ND	ND	5.4	ND
Thallium	2.3	35	ND	ND	ND	ND	ND	ND	ND
Vanadium	1,200	17,000	ND	27	28	15	25	30	22
Zinc	70,000	1,100,000	130	130	130	92	110	130	110

ANALYTICAL METHODS

Samples analyzed by U.S. EPA LSASD as follows:

Metals: EPA Region I LSBSOP-OPTIMAS1,
Metals in Soil by ICP-OES.

NOTES:

1) mg/kg = milligrams per kilogram
2) ND = Not Detected.
3) NL = Not Listed.
4) EPA RML-Res = US EPA Removal Management Level for Residential Soil
5) EPA RML-Ind = US EPA Removal Management Level for Industrial Soil
6) Values bolded and shaded in yellow indicate compounds exceeding the EPA Residential RML.
7) Values bolded and shaded in red indicate compounds exceeding the EPA Industrial RML.
8) A compound is listed in the table above only if it was detected in at least one of the samples analyzed. Compounds that were analyzed for, but not detected, have been omitted.

TABLE 2

SUMMARY OF
METALS IN SOIL TCLP LEACHATE ANALYSIS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

CLP SAMPLE NUMBER	MA43H3	MA43H4	MA43H5	MA43H6	MA43H7	MA43H8	MA43H9
SAMPLE LOCATION	SB-05A	SB-05C	SB-06A	SB-07B	SB-08A	SB-08B	SB-08C
SAMPLE IDENTIFIER	05MA0143-0013	05MA0143-0015	05MA0143-0016	05MA0143-0020	05MA0143-0022	05MA0143-0023	05MA0143-0024
LABORATORY NUMBER	200-64438-1	200-64438-2	200-64438-3	200-64438-4	200-64438-5	200-64438-6	200-64438-7
COMPOUND							
METALS				µg/L			
Arsenic	59,000	12,000	9,500	1,700	6,900	8,500	10,000
Barium	410	750	1,100	610	420	420	350
Cadmium	310	65	50	38	38	45	51
Chromium	94	150	21	28	200	150	130
Lead	87	39	130	5.6	1,300	420	27
Selenium	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	2.7	1.2	ND

ANALYTICAL METHODS

P - INDUCTIVELY COUPLED PLASMA
Samples analyzed by Eurofins.
Case: 50197 SDG: MA43H3
All results are reported on a Wet Weight Basis.
TCLP = Toxicity Characteristic Leachate Procedure
CLP = Contract Laboratory Program

NOTES:

1) Results are reported in micrograms per Liter (µg/L).
2) ND = Not Detected.
3) Results shown are unvalidated CLP laboratory data. The results may change based on data validation.

TABLE 2

SUMMARY OF
METALS IN SOIL TCLP LEACHATE ANALYSIS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

CLP SAMPLE NUMBER	MA43J0	MA43J1	MA43J2	MA43J3	MA43J4	MA43J5	MA43J6
SAMPLE LOCATION	SB-09A	SB-09B	SB-09C	SB-10A	SB-10B	SB-10C	SB-12A
SAMPLE IDENTIFIER	05MA0143-0025	05MA0143-0026	05MA0143-0027	05MA0143-0028	05MA0143-0029	05MA0143-0030	05MA0143-001334
LABORATORY NUMBER	200-64438-8	200-64438-9	200-64438-10	200-64438-11	200-64438-12	200-64438-13	200-64438-14
COMPOUND							
METALS				µg/L			
Arsenic	19,000	240	40,000	4,400	8,100	7,800	5,800
Barium	500	340	180	710	460	510	540
Cadmium	95	4.9	210	23	42	40	31
Chromium	500	110	140	54	170	170	75
Lead	360	120	53	31	130	140	31
Selenium	ND	ND	ND	8.9	ND	ND	ND
Silver	ND	2.1	ND	ND	1.2	ND	ND

ANALYTICAL METHODS

P - INDUCTIVELY COUPLED PLASMA
Samples analyzed by Eurofins.
Case: 50197 SDG: MA43H3
All results are reported on a Wet Weight Basis.
TCLP = Toxicity Characteristic Leachate Procedure
CLP = Contract Laboratory Program

NOTES:

1) Results are reported in micrograms per Liter (µg/L).
2) ND = Not Detected.
3) Results shown are unvalidated CLP laboratory data. The results may change based on data validation.

TABLE 2

SUMMARY OF
METALS IN SOIL TCLP LEACHATE ANALYSIS
MANSELL FIELD SITE
SALEM, MASSACHUSETTS

CLP SAMPLE NUMBER	MA43J7	MA43J8	MA43J9	MA43K0	MA43K1	MA43K2
SAMPLE LOCATION	SB-13A	SB-13B	SB-14B	SB-14C	SB-16A	SB-116A
SAMPLE IDENTIFIER	05MA0143-0037	05MA0143-0038	05MA0143-0041	05MA0143-0042	05MA0143-0046	05MA0143-0049
LABORATORY NUMBER	200-64438-15	200-64438-16	200-64438-17	200-64438-18	200-64438-19	200-64438-20
COMPOUND						
METALS	µg/L					
Arsenic	4,700	5,100	5,900	5,700	18,000	7,700
Barium	910	570	440	600	760	600
Cadmium	25	26	30	30	92	40
Chromium	84	82	110	84	190	80
Lead	28	43	140	27	90	31
Selenium	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND

ANALYTICAL METHODS

P - INDUCTIVELY COUPLED PLASMA
Samples analyzed by Eurofins.
Case: 50197 SDG: MA43H3
All results are reported on a Wet Weight Basis.
TCLP = Toxicity Characteristic Leachate Procedure
CLP = Contract Laboratory Program

NOTES:

1) Results are reported in micrograms per Liter (µg/L).
2) ND = Not Detected.
3) Results shown are unvalidated CLP laboratory data. The results may change based on data validation.

Attachment D

Analytical Data and Chain-of-Custody Record

United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

July 27, 2022

Tom Hatzopoulos
US EPA New England R1

Project Number: 22070004
Project: Mansell Field - Salem, MA
Analysis: Metals in Soil by ICP-OES
EPA Chemist: Michael Dowling

Date Samples Received by the Laboratory: 07/05/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, LSBSOP-OPTIMAS1.

Samples were prepared following the EPA Region I SOP, EIASOP-INGMETALSPREP8

Preparation and analysis SOP's are based on "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Revision 2, Final Update III, Methods 3050B and 6010B," respectively. Samples were analyzed for Total Recoverable Metals using a Perkin Elmer Dual View Inductively Coupled Plasma - Optical Emission Spectrometer.

Samples were prepared and analyzed by ESAT contractors working at the USEPA New England Laboratory.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

DANIEL BOUDREAU

Digitally signed by DANIEL BOUDREAU
Date: 2022.07.27 11:57:06 -04'00'

22070004$METMS_PE

Qualifiers:

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
J1 = Estimated value due to MS recovery outside accceptance criteria
J2 = Estimated value due to LFB result outside acceptance criteria
J3 = Estimated value due to RPD result outside acceptance criteria
J4 = Estimated value due to LCS result outside acceptance criteria
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.
P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.
C = The identification has been confirmed by GC/MS.
A = Suspected Aldol condensation product.
N = Tentatively identified compound.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0001	Lab Sample ID:	AC00182
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.0	
7429-90-5	Aluminum	**12000**	22	
7440-38-2	Arsenic	**6.8**	4.0	
7440-39-3	Barium	**49**	4.0	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**16000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	**18**	4.0	
7440-47-3	Chromium	**32**	4.0	
7440-50-8	Copper	**46**	4.0	
7439-89-6	Iron	**34000**	8.0	
7439-95-4	Magnesium	**7600**	20	
7439-96-5	Manganese	**290**	4.0	
7440-02-0	Nickel	**23**	4.0	
7439-92-1	Lead	**13**	4.0	
7440-36-0	Antimony	ND	4.0	J1
7782-49-2	Selenium	ND	8.0	
7440-28-0	Thallium	ND	8.0	
7440-62-2	Vanadium	**130**	4.0	
7440-66-6	Zinc	**66**	4.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0002	Lab Sample ID:	AC00183
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.0	
7429-90-5	Aluminum	**11000**	33	
7440-38-2	Arsenic	ND	6.0	
7440-39-3	Barium	**53**	6.0	
7440-41-7	Beryllium	ND	2.4	
7440-70-2	Calcium	**14000**	30	
7440-43-9	Cadmium	ND	3.0	
7440-48-4	Cobalt	**17**	6.0	
7440-47-3	Chromium	**25**	6.0	
7440-50-8	Copper	**39**	6.0	
7439-89-6	Iron	**35000**	12	
7439-95-4	Magnesium	**7900**	30	
7439-96-5	Manganese	**250**	6.0	
7440-02-0	Nickel	**20**	6.0	
7439-92-1	Lead	**9.8**	6.0	
7440-36-0	Antimony	ND	6.0	
7782-49-2	Selenium	ND	12	
7440-28-0	Thallium	ND	12	
7440-62-2	Vanadium	**110**	6.0	
7440-66-6	Zinc	**71**	6.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0003	Lab Sample ID:	AC00184
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.9	
7429-90-5	Aluminum	**11000**	21	
7440-38-2	Arsenic	ND	3.8	
7440-39-3	Barium	**44**	3.8	
7440-41-7	Beryllium	ND	1.5	
7440-70-2	Calcium	**15000**	19	
7440-43-9	Cadmium	ND	1.9	
7440-48-4	Cobalt	**17**	3.8	
7440-47-3	Chromium	**30**	3.8	
7440-50-8	Copper	**45**	3.8	
7439-89-6	Iron	**33000**	7.5	
7439-95-4	Magnesium	**7500**	19	
7439-96-5	Manganese	**200**	3.8	
7440-02-0	Nickel	**20**	3.8	
7439-92-1	Lead	ND	3.8	
7440-36-0	Antimony	ND	3.8	
7782-49-2	Selenium	ND	7.5	
7440-28-0	Thallium	ND	7.5	
7440-62-2	Vanadium	**130**	3.8	
7440-66-6	Zinc	**59**	3.8	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0004	Lab Sample ID:	AC00185
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**13000**	12	
7440-38-2	Arsenic	**470**	2.1	
7440-39-3	Barium	**280**	2.1	
7440-41-7	Beryllium	ND	0.85	
7440-70-2	Calcium	**14000**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**8.8**	2.1	
7440-47-3	Chromium	**450**	2.1	
7440-50-8	Copper	**100**	2.1	
7439-89-6	Iron	**20000**	4.2	
7439-95-4	Magnesium	**3900**	11	
7439-96-5	Manganese	**390**	2.1	
7440-02-0	Nickel	**18**	2.1	
7439-92-1	Lead	**200**	2.1	
7440-36-0	Antimony	ND	2.1	
7782-49-2	Selenium	ND	4.2	
7440-28-0	Thallium	ND	4.2	
7440-62-2	Vanadium	**50**	2.1	
7440-66-6	Zinc	**340**	2.1	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0005	Lab Sample ID:	AC00186
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**14000**	12	
7440-38-2	Arsenic	**710**	2.2	
7440-39-3	Barium	**210**	2.2	
7440-41-7	Beryllium	ND	0.87	
7440-70-2	Calcium	**29000**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**9.7**	2.2	
7440-47-3	Chromium	**220**	2.2	
7440-50-8	Copper	**100**	2.2	
7439-89-6	Iron	**20000**	4.4	
7439-95-4	Magnesium	**3600**	11	
7439-96-5	Manganese	**470**	2.2	
7440-02-0	Nickel	**15**	2.2	
7439-92-1	Lead	**170**	2.2	
7440-36-0	Antimony	ND	2.2	
7782-49-2	Selenium	ND	4.4	
7440-28-0	Thallium	ND	4.4	
7440-62-2	Vanadium	**42**	2.2	
7440-66-6	Zinc	**240**	2.2	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0007	Lab Sample ID:	AC00187
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**10000**	11	
7440-38-2	Arsenic	**34**	2.0	
7440-39-3	Barium	**72**	2.0	
7440-41-7	Beryllium	ND	0.80	
7440-70-2	Calcium	**3900**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**8.4**	2.0	
7440-47-3	Chromium	**31**	2.0	
7440-50-8	Copper	**110**	2.0	
7439-89-6	Iron	**19000**	4.0	
7439-95-4	Magnesium	**3100**	10	
7439-96-5	Manganese	**190**	2.0	
7440-02-0	Nickel	**13**	2.0	
7439-92-1	Lead	**120**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.0	
7440-28-0	Thallium	ND	4.0	
7440-62-2	Vanadium	**45**	2.0	
7440-66-6	Zinc	**290**	2.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0008	Lab Sample ID:	AC00188
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**14000**	12	
7440-38-2	Arsenic	**480**	2.1	
7440-39-3	Barium	**510**	2.1	
7440-41-7	Beryllium	ND	0.85	
7440-70-2	Calcium	**17000**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**11**	2.1	
7440-47-3	Chromium	**490**	2.1	
7440-50-8	Copper	**70**	2.1	
7439-89-6	Iron	**26000**	4.2	
7439-95-4	Magnesium	**3700**	11	
7439-96-5	Manganese	**690**	2.1	
7440-02-0	Nickel	**18**	2.1	
7439-92-1	Lead	**410**	2.1	
7440-36-0	Antimony	ND	2.1	
7782-49-2	Selenium	ND	4.2	
7440-28-0	Thallium	ND	4.2	
7440-62-2	Vanadium	**45**	2.1	
7440-66-6	Zinc	**440**	2.1	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0009	Lab Sample ID:	AC00189
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.2	
7429-90-5	Aluminum	**13000**	24	
7440-38-2	Arsenic	**1000**	4.4	
7440-39-3	Barium	**1300**	4.4	
7440-41-7	Beryllium	ND	1.7	
7440-70-2	Calcium	**32000**	22	
7440-43-9	Cadmium	**2.6**	2.2	
7440-48-4	Cobalt	**8.8**	4.4	
7440-47-3	Chromium	**1600**	4.4	
7440-50-8	Copper	**140**	4.4	
7439-89-6	Iron	**29000**	8.7	
7439-95-4	Magnesium	**3900**	22	
7439-96-5	Manganese	**530**	4.4	
7440-02-0	Nickel	**21**	4.4	
7439-92-1	Lead	**520**	4.4	
7440-36-0	Antimony	ND	4.4	
7782-49-2	Selenium	ND	8.7	
7440-28-0	Thallium	ND	8.7	
7440-62-2	Vanadium	**40**	4.4	
7440-66-6	Zinc	**1000**	4.4	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0010	Lab Sample ID:	AC00190
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**13000**	11	
7440-38-2	Arsenic	**180**	2.0	
7440-39-3	Barium	**130**	2.0	
7440-41-7	Beryllium	**0.89**	0.82	
7440-70-2	Calcium	**2400**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**8.1**	2.0	
7440-47-3	Chromium	**380**	2.0	
7440-50-8	Copper	**140**	2.0	
7439-89-6	Iron	**19000**	4.1	
7439-95-4	Magnesium	**2900**	10	
7439-96-5	Manganese	**260**	2.0	
7440-02-0	Nickel	**19**	2.0	
7439-92-1	Lead	**200**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	4.1	
7440-62-2	Vanadium	**40**	2.0	
7440-66-6	Zinc	**150**	2.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0011	Lab Sample ID:	AC00191
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**15000**	11	
7440-38-2	Arsenic	**37**	2.0	
7440-39-3	Barium	**87**	2.0	
7440-41-7	Beryllium	ND	0.82	
7440-70-2	Calcium	**2500**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**6.9**	2.0	
7440-47-3	Chromium	**160**	2.0	
7440-50-8	Copper	**87**	2.0	
7439-89-6	Iron	**19000**	4.1	
7439-95-4	Magnesium	**3700**	10	
7439-96-5	Manganese	**170**	2.0	
7440-02-0	Nickel	**18**	2.0	
7439-92-1	Lead	**93**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	4.1	
7440-62-2	Vanadium	**40**	2.0	
7440-66-6	Zinc	**150**	2.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0012	Lab Sample ID:	AC00192
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**14000**	12	
7440-38-2	Arsenic	**12**	2.1	
7440-39-3	Barium	**78**	2.1	
7440-41-7	Beryllium	ND	0.85	
7440-70-2	Calcium	**2400**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**8.2**	2.1	
7440-47-3	Chromium	**62**	2.1	
7440-50-8	Copper	**33**	2.1	
7439-89-6	Iron	**20000**	4.2	
7439-95-4	Magnesium	**3300**	11	
7439-96-5	Manganese	**500**	2.1	
7440-02-0	Nickel	**15**	2.1	
7439-92-1	Lead	**76**	2.1	
7440-36-0	Antimony	ND	2.1	
7782-49-2	Selenium	ND	4.2	
7440-28-0	Thallium	ND	4.2	
7440-62-2	Vanadium	**36**	2.1	
7440-66-6	Zinc	**88**	2.1	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0013	Lab Sample ID:	AC00193
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	6
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	7.7	
7429-90-5	Aluminum	**5200**	84	
7440-38-2	Arsenic	**7200**	15	
7440-39-3	Barium	**40**	15	
7440-41-7	Beryllium	ND	6.1	
7440-70-2	Calcium	**300000**	77	
7440-43-9	Cadmium	ND	7.7	
7440-48-4	Cobalt	ND	15	
7440-47-3	Chromium	**36**	15	
7440-50-8	Copper	ND	15	
7439-89-6	Iron	**3000**	31	
7439-95-4	Magnesium	**10000**	77	
7439-96-5	Manganese	**92**	15	
7440-02-0	Nickel	ND	15	
7439-92-1	Lead	**30**	15	
7440-36-0	Antimony	ND	15	
7782-49-2	Selenium	ND	31	
7440-28-0	Thallium	ND	31	
7440-62-2	Vanadium	ND	15	
7440-66-6	Zinc	**45**	15	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0014	Lab Sample ID:	AC00194
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**8000**	11	
7440-38-2	Arsenic	**1900**	2.1	
7440-39-3	Barium	**230**	2.1	
7440-41-7	Beryllium	**1.5**	0.83	
7440-70-2	Calcium	**30000**	10	
7440-43-9	Cadmium	**1.6**	1.0	
7440-48-4	Cobalt	**7.6**	2.1	
7440-47-3	Chromium	**450**	2.1	
7440-50-8	Copper	**570**	2.1	
7439-89-6	Iron	**18000**	4.2	
7439-95-4	Magnesium	**1700**	10	
7439-96-5	Manganese	**190**	2.1	
7440-02-0	Nickel	**18**	2.1	
7439-92-1	Lead	**300**	2.1	
7440-36-0	Antimony	ND	2.1	
7782-49-2	Selenium	ND	4.2	
7440-28-0	Thallium	ND	4.2	
7440-62-2	Vanadium	**25**	2.1	
7440-66-6	Zinc	**260**	2.1	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0015	Lab Sample ID:	AC00195
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.4	
7429-90-5	Aluminum	**12000**	15	
7440-38-2	Arsenic	**2600**	2.7	
7440-39-3	Barium	**210**	2.7	
7440-41-7	Beryllium	ND	1.1	
7440-70-2	Calcium	**25000**	14	
7440-43-9	Cadmium	ND	1.4	
7440-48-4	Cobalt	**9.1**	2.7	
7440-47-3	Chromium	**770**	2.7	
7440-50-8	Copper	**250**	2.7	
7439-89-6	Iron	**22000**	5.4	
7439-95-4	Magnesium	**3100**	14	
7439-96-5	Manganese	**310**	2.7	
7440-02-0	Nickel	**16**	2.7	
7439-92-1	Lead	**160**	2.7	
7440-36-0	Antimony	ND	2.7	
7782-49-2	Selenium	ND	5.4	
7440-28-0	Thallium	ND	5.4	
7440-62-2	Vanadium	**39**	2.7	
7440-66-6	Zinc	**220**	2.7	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0016	Lab Sample ID:	AC00196
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**11000**	11	
7440-38-2	Arsenic	**1900**	2.0	
7440-39-3	Barium	**280**	2.0	
7440-41-7	Beryllium	**0.82**	0.80	
7440-70-2	Calcium	**34000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**8.6**	2.0	
7440-47-3	Chromium	**470**	2.0	
7440-50-8	Copper	**230**	2.0	
7439-89-6	Iron	**24000**	4.0	
7439-95-4	Magnesium	**3800**	10	
7439-96-5	Manganese	**280**	2.0	
7440-02-0	Nickel	**23**	2.0	
7439-92-1	Lead	**200**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.0	
7440-28-0	Thallium	ND	4.0	
7440-62-2	Vanadium	**33**	2.0	
7440-66-6	Zinc	**220**	2.0	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0017	Lab Sample ID:	AC00197
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**15000**	12	
7440-38-2	Arsenic	**160**	2.2	
7440-39-3	Barium	**99**	2.2	
7440-41-7	Beryllium	ND	0.89	
7440-70-2	Calcium	**7500**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**9.9**	2.2	
7440-47-3	Chromium	**51**	2.2	
7440-50-8	Copper	**63**	2.2	
7439-89-6	Iron	**21000**	4.4	
7439-95-4	Magnesium	**4400**	11	
7439-96-5	Manganese	**190**	2.2	
7440-02-0	Nickel	**19**	2.2	
7439-92-1	Lead	**130**	2.2	
7440-36-0	Antimony	ND	2.2	
7782-49-2	Selenium	ND	4.4	
7440-28-0	Thallium	ND	4.4	
7440-62-2	Vanadium	**48**	2.2	
7440-66-6	Zinc	**110**	2.2	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0018	Lab Sample ID:	AC00198
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**12000**	12	
7440-38-2	Arsenic	**26**	2.2	
7440-39-3	Barium	**93**	2.2	
7440-41-7	Beryllium	ND	0.87	
7440-70-2	Calcium	**4800**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**9.1**	2.2	
7440-47-3	Chromium	**30**	2.2	
7440-50-8	Copper	**29**	2.2	
7439-89-6	Iron	**19000**	4.4	
7439-95-4	Magnesium	**4200**	11	
7439-96-5	Manganese	**230**	2.2	
7440-02-0	Nickel	**16**	2.2	
7439-92-1	Lead	**110**	2.2	
7440-36-0	Antimony	ND	2.2	
7782-49-2	Selenium	ND	4.4	
7440-28-0	Thallium	ND	4.4	
7440-62-2	Vanadium	**36**	2.2	
7440-66-6	Zinc	**62**	2.2	

Comments: Results reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Laboratory Reagent Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Soil
Date of Preparation:	7/12/2022	Amount Prepared:	N/A
Date of Analysis:	7/19/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
7440-22-4	Silver	ND	10	
7429-90-5	Aluminum	ND	110	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8.0	
7440-70-2	Calcium	ND	100	
7440-43-9	Cadmium	ND	10	
7440-48-4	Cobalt	ND	20	
7440-47-3	Chromium	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	ND	40	
7439-95-4	Magnesium	ND	100	
7439-96-5	Manganese	ND	20	
7440-02-0	Nickel	ND	20	
7439-92-1	Lead	ND	20	
7440-36-0	Antimony	ND	20	
7782-49-2	Selenium	ND	40	
7440-28-0	Thallium	ND	40	
7440-62-2	Vanadium	ND	20	
7440-66-6	Zinc	ND	20	

Mansell Field - Salem, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AC00182

PARAMETER	SPIKE ADDED mg/Kg	SAMPLE CONCENTRATION mg/Kg	MS CONCENTRATION mg/Kg	MS % REC	QC LIMITS (% REC)
Antimony	100	ND	19.0	19	75 - 125
Arsenic	100	6.8	108	101	75 - 125
Barium	100	49.0	149	100	75 - 125
Beryllium	40.0	ND	41.0	102	75 - 125
Cadmium	50.0	ND	50.0	99	75 - 125
Chromium	100	32.0	127	95	75 - 125
Cobalt	100	18.0	117	99	75 - 125
Copper	100	46.0	152	106	75 - 125
Lead	100	13.0	111	98	75 - 125
Manganese	100	290	377	87	75 - 125
Nickel	100	23.0	120	97	75 - 125
Selenium	100	ND	99.0	99	75 - 125
Silver	20.0	ND	20.0	99	75 - 125
Thallium	100	ND	98.0	98	75 - 125
Vanadium	100	130	217	87	75 - 125
Zinc	100	66.0	168	102	75 - 125

Mansell Field - Salem, MA

Laboratory Duplicate Results

Sample ID: AC00183

PARAMETER	SAMPLE RESULT mg/Kg	SAMPLE DUPLICATE RESULT mg/Kg	PRECISION RPD %	QC LIMITS
Aluminum	11000	12000	8.7	30
Antimony	ND	ND	NC	30
Arsenic	ND	ND	NC	30
Barium	53.0	58.0	9.0	30
Beryllium	ND	ND	NC	30
Cadmium	ND	ND	NC	30
Calcium	14000	14000	0	30
Chromium	25.0	26.0	3.9	30
Cobalt	17.0	18.0	5.7	30
Copper	39.0	38.0	2.6	30
Iron	35000	37000	5.6	30
Lead	9.8	ND	NC	30
Magnesium	7900	8200	3.7	30
Manganese	250	260	3.9	30
Nickel	20.0	19.0	5.1	30
Selenium	ND	ND	NC	30
Silver	ND	ND	NC	30
Thallium	ND	ND	NC	30
Vanadium	110	120	8.7	30
Zinc	71.0	72.0	1.4	30

Mansell Field - Salem, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ug/L	LFB RESULT ug/L	LFB RECOVERY %	QC LIMITS %
Aluminum	1000	1030	103	85 - 115
Antimony	1000	1050	105	85 - 115
Arsenic	1000	1050	105	85 - 115
Barium	1000	1050	105	85 - 115
Beryllium	400	413	103	85 - 115
Cadmium	500	507	101	85 - 115
Calcium	10000	10900	109	85 - 115
Chromium	1000	1040	104	85 - 115
Cobalt	1000	1040	104	85 - 115
Copper	1000	1080	108	85 - 115
Iron	1000	1070	107	85 - 115
Lead	1000	1020	102	85 - 115
Magnesium	10000	10600	106	85 - 115
Manganese	1000	1060	106	85 - 115
Nickel	1000	1040	104	85 - 115
Selenium	1000	1030	103	85 - 115
Silver	200	196	98	85 - 115
Thallium	1000	1020	102	85 - 115
Vanadium	1000	1040	104	85 - 115
Zinc	1000	1030	103	85 - 115

Comments:

Mansell Field - Salem, MA

Solid Laboratory Control Sample (LCS) Results

PARAMETER	LCS RESULTS mg/Kg	CONTROL LIMITS mg/Kg
Aluminum	8880	4050 - 12200
Antimony	88.1	26.9 - 336
Arsenic	165	119 - 221
Barium	177	138 - 229
Beryllium	112	87.0 - 145
Cadmium	85.0	67.1 - 112
Calcium	4430	3490 - 6120
Chromium	99.4	70.6 - 131
Cobalt	81.7	63.6 - 106
Copper	148	112 - 186
Iron	15300	4920 - 23200
Lead	132	101 - 179
Magnesium	2400	1460 - 3240
Manganese	627	505 - 791
Nickel	66.2	47.8 - 88.8
Selenium	178	124 - 240
Silver	47.3	35.1 - 65.2
Thallium	83.1	57.9 - 118
Vanadium	152	111 - 196
Zinc	219	159 - 296

Comments:

Samples in Batch: AC00182, AC00183, AC00184, AC00185, AC00186, AC00187, AC00188, AC00189, AC00190, AC00191, AC00192, AC00193, AC00194, AC00195, AC00196, AC00197, AC00198

 PN 2207004

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0001	SB-01	A	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	Y
	05MA0143-0002	SB-01	B	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0003	SB-01	C	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0004	SB-02	A	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0005	SB-02	B	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0007	SB-03	A	Metals	Soil	7/5/2022	09:25	1	4 oz jar	4 C	N
	05MA0143-0008	SB-03	B	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N
	05MA0143-0009	SB-03	C	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0010	SB-04	A	Metals	Soil	7/5/2022	10:35	1	4 oz jar	4 C	N
	05MA0143-0011	SB-04	B	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0012	SB-04	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0013	SB-05	A	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0014	SB-05	B	Metals	Soil	7/5/2022	10:45	1	4 oz jar	4 C	N
	05MA0143-0015	SB-05	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0016	SB-06	A	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0017	SB-06	B	Metals	Soil	7/5/2022	10:18	1	4 oz jar	4 C	N
	05MA0143-0018	SB-06	C	Metals	Soil	7/5/2022	10:22	1	4 oz jar	4 C	N
	05MA0143-0019	SB-07	A	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0020	SB-07	B	Metals	Soil	7/5/2022	10:36	1	4 oz jar	4 C	N

PN 2207004 → PN 2207005

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1449	[illegible] ESAT	7-5-22 14:49	

PN 22070005

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

PN 22070005 → PN 22070006

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0021	SB-07	C	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0022	SB-08	A	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0023	SB-08	B	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0024	SB-08	C	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0025	SB-09	A	Metals	Soil	7/5/2022	10:32	1	4 oz jar	4 C	N
	05MA0143-0026	SB-09	B	Metals	Soil	7/5/2022	10:38	1	4 oz jar	4 C	N
	05MA0143-0027	SB-09	C	Metals	Soil	7/5/2022	10:42	1	4 oz jar	4 C	N
	05MA0143-0028	SB-10	A	Metals	Soil	7/5/2022	10:13	1	4 oz jar	4 C	N
	05MA0143-0029	SB-10	B	Metals	Soil	7/5/2022	10:16	1	4 oz jar	4 C	N
	05MA0143-0030	SB-10	C	Metals	Soil	7/5/2022	10:26	1	4 oz jar	4 C	N
	05MA0143-0031	SB-11	A	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0032	SB-11	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0034	SB-12	A	Metals	Soil	7/5/2022	09:28	1	4 oz jar	4 C	N
	05MA0143-0035	SB-12	B	Metals	Soil	7/5/2022	09:38	1	4 oz jar	4 C	N
	05MA0143-0036	SB-12	C	Metals	Soil	7/5/2022	09:42	1	4 oz jar	4 C	N
	05MA0143-0037	SB-13	A	Metals	Soil	7/5/2022	09:29	1	4 oz jar	4 C	N
	05MA0143-0038	SB-13	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0039	SB-13	C	Metals	Soil	7/5/2022	09:44	1	4 oz jar	4 C	N
	05MA0143-0040	SB-14	A	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 14:49	ESAT	7-5-22 14:49	

PN 22070006

Page 3 of 3 PN 22070006

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0041	SB-14	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0042	SB-14	C	Metals	Soil	7/5/2022	09:40	1	4 oz jar	4 C	N
	05MA0143-0043	SB-15	A	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0044	SB-15	B	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0045	SB-15	C	Metals	Soil	7/5/2022	10:20	1	4 oz jar	4 C	N
	05MA0143-0046	SB-16	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0047	SB-16	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0048	SB-16	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0049	SB-116	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0050	SB-116	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0051	SB-116	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0052	RB-01		Metals	Blank	7/5/2022	11:30	1	500 ml poly	HNO3 pH<2	N
	05MA0143-0053	IS6418		Metals	Lab Sand	7/5/2022	11:00	1	2 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1459	[signature] Ecat 7	7-5-22 14:49	

United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

July 28, 2022

Tom Hatzopoulos
US EPA New England R1

Project Number: 22070005
Project: Mansell Field - Salem, MA
Analysis: Metals in Soil by ICP-OES
EPA Chemist: Michael Dowling

Date Samples Received by the Laboratory: 07/05/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, LSBSOP-OPTIMAS1.

Samples were prepared following the EPA Region I SOP, EIASOP-INGMETALSPREP8

Preparation and analysis SOP's are based on "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Revision 2, Final Update III, Methods 3050B and 6010B," respectively. Samples were analyzed for Total Recoverable Metals using a Perkin Elmer Dual View Inductively Coupled Plasma - Optical Emission Spectrometer.

Samples were prepared and analyzed by ESAT contractors working at the USEPA New England Laboratory.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

DANIEL BOUDREAU

Digitally signed by DANIEL BOUDREAU
Date: 2022.07.28 13:33:32 -04'00'

Qualifiers:

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
J1 = Estimated value due to MS recovery outside accceptance criteria
J2 = Estimated value due to LFB result outside acceptance criteria
J3 = Estimated value due to RPD result outside acceptance criteria
J4 = Estimated value due to LCS result outside acceptance criteria
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.
P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.
C = The identification has been confirmed by GC/MS.
A = Suspected Aldol condensation product.
N = Tentatively identified compound.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0019	Lab Sample ID:	AC00199
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	**4.0**	2.0	
7429-90-5	Aluminum	**15000**	110	
7440-38-2	Arsenic	**1000**	4.1	
7440-39-3	Barium	**160**	4.1	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**5000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	**9.4**	4.1	
7440-47-3	Chromium	**1000**	4.1	
7440-50-8	Copper	**140**	4.1	
7439-89-6	Iron	**25000**	8.2	
7439-95-4	Magnesium	**3800**	20	
7439-96-5	Manganese	**300**	4.1	
7440-02-0	Nickel	**19**	4.1	
7439-92-1	Lead	**420**	4.1	
7440-36-0	Antimony	ND	4.1	J1
7782-49-2	Selenium	ND	8.2	
7440-28-0	Thallium	ND	4.1	
7440-62-2	Vanadium	**48**	4.1	
7440-66-6	Zinc	**690**	4.1	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0020	Lab Sample ID:	AC00200
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.0	
7429-90-5	Aluminum	**9600**	110	
7440-38-2	Arsenic	**2000**	4.0	
7440-39-3	Barium	**170**	4.0	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**23000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	**8.4**	4.0	
7440-47-3	Chromium	**850**	4.0	
7440-50-8	Copper	**210**	4.0	
7439-89-6	Iron	**30000**	8.0	
7439-95-4	Magnesium	**3500**	20	
7439-96-5	Manganese	**290**	4.0	
7440-02-0	Nickel	**21**	4.0	
7439-92-1	Lead	**390**	4.0	
7440-36-0	Antimony	ND	4.0	
7782-49-2	Selenium	ND	8.0	
7440-28-0	Thallium	ND	4.0	
7440-62-2	Vanadium	**35**	4.0	
7440-66-6	Zinc	**290**	4.0	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0021	Lab Sample ID:	AC00201
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.1	
7429-90-5	Aluminum	**13000**	60	
7440-38-2	Arsenic	**780**	2.2	
7440-39-3	Barium	**410**	2.2	
7440-41-7	Beryllium	**1.4**	0.87	
7440-70-2	Calcium	**27000**	11	
7440-43-9	Cadmium	ND	1.1	
7440-48-4	Cobalt	**7.4**	2.2	
7440-47-3	Chromium	**720**	2.2	
7440-50-8	Copper	**490**	2.2	
7439-89-6	Iron	**19000**	4.4	
7439-95-4	Magnesium	**2200**	11	
7439-96-5	Manganese	**250**	2.2	
7440-02-0	Nickel	**20**	2.2	
7439-92-1	Lead	**1100**	2.2	
7440-36-0	Antimony	ND	2.2	
7782-49-2	Selenium	ND	4.4	
7440-28-0	Thallium	ND	2.2	
7440-62-2	Vanadium	**29**	2.2	
7440-66-6	Zinc	**280**	2.2	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0022	Lab Sample ID:	AC00202
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	5
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	5.2	
7429-90-5	Aluminum	**8700**	290	
7440-38-2	Arsenic	**6300**	10	
7440-39-3	Barium	**120**	10	
7440-41-7	Beryllium	ND	4.2	
7440-70-2	Calcium	**150000**	52	
7440-43-9	Cadmium	ND	5.2	
7440-48-4	Cobalt	ND	10	
7440-47-3	Chromium	**4200**	10	
7440-50-8	Copper	**100**	10	
7439-89-6	Iron	**12000**	21	
7439-95-4	Magnesium	**9700**	52	
7439-96-5	Manganese	**210**	10	
7440-02-0	Nickel	ND	10	
7439-92-1	Lead	**120**	10	
7440-36-0	Antimony	ND	10	
7782-49-2	Selenium	ND	21	
7440-28-0	Thallium	ND	10	
7440-62-2	Vanadium	**29**	10	
7440-66-6	Zinc	**140**	10	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0023	Lab Sample ID:	AC00203
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	5
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	5.3	
7429-90-5	Aluminum	**6600**	290	
7440-38-2	Arsenic	**6600**	11	
7440-39-3	Barium	**120**	11	
7440-41-7	Beryllium	ND	4.2	
7440-70-2	Calcium	**190000**	53	
7440-43-9	Cadmium	ND	5.3	
7440-48-4	Cobalt	ND	11	
7440-47-3	Chromium	**4000**	11	
7440-50-8	Copper	**110**	11	
7439-89-6	Iron	**9600**	21	
7439-95-4	Magnesium	**10000**	53	
7439-96-5	Manganese	**170**	11	
7440-02-0	Nickel	ND	11	
7439-92-1	Lead	**98**	11	
7440-36-0	Antimony	ND	11	
7782-49-2	Selenium	ND	21	
7440-28-0	Thallium	ND	11	
7440-62-2	Vanadium	**21**	11	
7440-66-6	Zinc	**140**	11	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0024	Lab Sample ID:	AC00204
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	4
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	4.4	
7429-90-5	Aluminum	**9700**	240	
7440-38-2	Arsenic	**5400**	8.7	
7440-39-3	Barium	**110**	8.7	
7440-41-7	Beryllium	ND	3.5	
7440-70-2	Calcium	**130000**	44	
7440-43-9	Cadmium	ND	4.4	
7440-48-4	Cobalt	ND	8.7	
7440-47-3	Chromium	**3400**	8.7	
7440-50-8	Copper	**82**	8.7	
7439-89-6	Iron	**14000**	17	
7439-95-4	Magnesium	**10000**	44	
7439-96-5	Manganese	**270**	8.7	
7440-02-0	Nickel	**11**	8.7	
7439-92-1	Lead	**120**	8.7	
7440-36-0	Antimony	ND	8.7	
7782-49-2	Selenium	ND	17	
7440-28-0	Thallium	ND	8.7	
7440-62-2	Vanadium	**30**	8.7	
7440-66-6	Zinc	**120**	8.7	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0025	Lab Sample ID:	AC00205
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	5
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	5.1	
7429-90-5	Aluminum	**8700**	280	
7440-38-2	Arsenic	**8600**	10	
7440-39-3	Barium	**140**	10	
7440-41-7	Beryllium	ND	4.1	
7440-70-2	Calcium	**170000**	51	
7440-43-9	Cadmium	ND	5.1	
7440-48-4	Cobalt	ND	10	
7440-47-3	Chromium	**2100**	10	
7440-50-8	Copper	**42**	10	
7439-89-6	Iron	**9900**	20	
7439-95-4	Magnesium	**14000**	51	
7439-96-5	Manganese	**180**	10	
7440-02-0	Nickel	ND	10	
7439-92-1	Lead	**98**	10	
7440-36-0	Antimony	ND	10	
7782-49-2	Selenium	ND	20	
7440-28-0	Thallium	ND	10	
7440-62-2	Vanadium	**21**	10	
7440-66-6	Zinc	**120**	10	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0026	Lab Sample ID:	AC00206
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	7
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	9.4	
7429-90-5	Aluminum	**4400**	520	
7440-38-2	Arsenic	**19000**	19	
7440-39-3	Barium	**34**	19	
7440-41-7	Beryllium	ND	7.6	
7440-70-2	Calcium	**360000**	94	
7440-43-9	Cadmium	ND	9.4	
7440-48-4	Cobalt	ND	19	
7440-47-3	Chromium	**830**	19	
7440-50-8	Copper	ND	19	
7439-89-6	Iron	**1900**	38	
7439-95-4	Magnesium	**29000**	94	
7439-96-5	Manganese	**79**	19	
7440-02-0	Nickel	ND	19	
7439-92-1	Lead	**23**	19	
7440-36-0	Antimony	ND	19	
7782-49-2	Selenium	ND	38	
7440-28-0	Thallium	ND	19	
7440-62-2	Vanadium	ND	19	
7440-66-6	Zinc	**45**	19	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0027	Lab Sample ID:	AC00207
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.2	
7429-90-5	Aluminum	**12000**	170	
7440-38-2	Arsenic	**5000**	6.4	
7440-39-3	Barium	**90**	6.4	
7440-41-7	Beryllium	ND	2.5	
7440-70-2	Calcium	**110000**	32	
7440-43-9	Cadmium	ND	3.2	
7440-48-4	Cobalt	**12**	6.4	
7440-47-3	Chromium	**340**	6.4	
7440-50-8	Copper	**51**	6.4	
7439-89-6	Iron	**22000**	13	
7439-95-4	Magnesium	**8700**	32	
7439-96-5	Manganese	**330**	6.4	
7440-02-0	Nickel	**13**	6.4	
7439-92-1	Lead	**140**	6.4	
7440-36-0	Antimony	ND	6.4	
7782-49-2	Selenium	ND	13	
7440-28-0	Thallium	ND	6.4	
7440-62-2	Vanadium	**39**	6.4	
7440-66-6	Zinc	**180**	6.4	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0028	Lab Sample ID:	AC00208
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**15000**	56	
7440-38-2	Arsenic	**1500**	2.0	
7440-39-3	Barium	**130**	2.0	
7440-41-7	Beryllium	**0.87**	0.82	
7440-70-2	Calcium	**32000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**8.0**	2.0	
7440-47-3	Chromium	**760**	2.0	
7440-50-8	Copper	**74**	2.0	
7439-89-6	Iron	**20000**	4.1	
7439-95-4	Magnesium	**6300**	10	
7439-96-5	Manganese	**460**	2.0	
7440-02-0	Nickel	**27**	2.0	
7439-92-1	Lead	**190**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	2.0	
7440-62-2	Vanadium	**49**	2.0	
7440-66-6	Zinc	**210**	2.0	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0029	Lab Sample ID:	AC00209
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	5
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	6.1	
7429-90-5	Aluminum	**8200**	340	
7440-38-2	Arsenic	**6500**	12	
7440-39-3	Barium	**100**	12	
7440-41-7	Beryllium	ND	4.9	
7440-70-2	Calcium	**210000**	61	
7440-43-9	Cadmium	ND	6.1	
7440-48-4	Cobalt	ND	12	
7440-47-3	Chromium	**2000**	12	
7440-50-8	Copper	**28**	12	
7439-89-6	Iron	**10000**	24	
7439-95-4	Magnesium	**12000**	61	
7439-96-5	Manganese	**200**	12	
7440-02-0	Nickel	ND	12	
7439-92-1	Lead	**120**	12	
7440-36-0	Antimony	ND	12	
7782-49-2	Selenium	ND	24	
7440-28-0	Thallium	ND	12	
7440-62-2	Vanadium	**27**	12	
7440-66-6	Zinc	**140**	12	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0030	Lab Sample ID:	AC00210
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	4
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	4.6	
7429-90-5	Aluminum	**8700**	250	
7440-38-2	Arsenic	**5000**	9.1	
7440-39-3	Barium	**120**	9.1	
7440-41-7	Beryllium	ND	3.6	
7440-70-2	Calcium	**170000**	46	
7440-43-9	Cadmium	ND	4.6	
7440-48-4	Cobalt	ND	9.1	
7440-47-3	Chromium	**1500**	9.1	
7440-50-8	Copper	**32**	9.1	
7439-89-6	Iron	**10000**	18	
7439-95-4	Magnesium	**10000**	46	
7439-96-5	Manganese	**250**	9.1	
7440-02-0	Nickel	**17**	9.1	
7439-92-1	Lead	**160**	9.1	
7440-36-0	Antimony	ND	9.1	
7782-49-2	Selenium	ND	18	
7440-28-0	Thallium	ND	9.1	
7440-62-2	Vanadium	**29**	9.1	
7440-66-6	Zinc	**150**	9.1	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0031	Lab Sample ID:	AC00211
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**15000**	56	
7440-38-2	Arsenic	**1300**	2.0	
7440-39-3	Barium	**91**	2.0	
7440-41-7	Beryllium	ND	0.82	
7440-70-2	Calcium	**22000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**6.9**	2.0	
7440-47-3	Chromium	**550**	2.0	
7440-50-8	Copper	**73**	2.0	
7439-89-6	Iron	**18000**	4.1	
7439-95-4	Magnesium	**4400**	10	
7439-96-5	Manganese	**270**	2.0	
7440-02-0	Nickel	**16**	2.0	
7439-92-1	Lead	**120**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	2.0	
7440-62-2	Vanadium	**35**	2.0	
7440-66-6	Zinc	**120**	2.0	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0032	Lab Sample ID:	AC00212
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**16000**	56	
7440-38-2	Arsenic	**670**	2.0	
7440-39-3	Barium	**74**	2.0	
7440-41-7	Beryllium	ND	0.82	
7440-70-2	Calcium	**13000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**6.5**	2.0	
7440-47-3	Chromium	**290**	2.0	
7440-50-8	Copper	**36**	2.0	
7439-89-6	Iron	**18000**	4.1	
7439-95-4	Magnesium	**4000**	10	
7439-96-5	Manganese	**340**	2.0	
7440-02-0	Nickel	**15**	2.0	
7439-92-1	Lead	**99**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	2.0	
7440-62-2	Vanadium	**38**	2.0	
7440-66-6	Zinc	**100**	2.0	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0034	Lab Sample ID:	AC00213
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.0	
7429-90-5	Aluminum	**12000**	110	
7440-38-2	Arsenic	**1200**	4.1	
7440-39-3	Barium	**89**	4.1	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**28000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	**8.8**	4.1	
7440-47-3	Chromium	**520**	4.1	
7440-50-8	Copper	**45**	4.1	
7439-89-6	Iron	**21000**	8.2	
7439-95-4	Magnesium	**5500**	20	
7439-96-5	Manganese	**280**	4.1	
7440-02-0	Nickel	**18**	4.1	
7439-92-1	Lead	**84**	4.1	
7440-36-0	Antimony	ND	4.1	
7782-49-2	Selenium	ND	8.2	
7440-28-0	Thallium	ND	4.1	
7440-62-2	Vanadium	**39**	4.1	
7440-66-6	Zinc	**100**	4.1	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0035	Lab Sample ID:	AC00214
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.0	
7429-90-5	Aluminum	**13000**	110	
7440-38-2	Arsenic	**1600**	4.1	
7440-39-3	Barium	**110**	4.1	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**44000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	**7.4**	4.1	
7440-47-3	Chromium	**790**	4.1	
7440-50-8	Copper	**58**	4.1	
7439-89-6	Iron	**22000**	8.2	
7439-95-4	Magnesium	**5800**	20	
7439-96-5	Manganese	**330**	4.1	
7440-02-0	Nickel	**18**	4.1	
7439-92-1	Lead	**190**	4.1	
7440-36-0	Antimony	ND	4.1	
7782-49-2	Selenium	ND	8.2	
7440-28-0	Thallium	ND	4.1	
7440-62-2	Vanadium	**36**	4.1	
7440-66-6	Zinc	**140**	4.1	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0036	Lab Sample ID:	AC00215
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**15000**	56	
7440-38-2	Arsenic	**760**	2.0	
7440-39-3	Barium	**95**	2.0	
7440-41-7	Beryllium	ND	0.82	
7440-70-2	Calcium	**17000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**7.0**	2.0	
7440-47-3	Chromium	**340**	2.0	
7440-50-8	Copper	**34**	2.0	
7439-89-6	Iron	**21000**	4.1	
7439-95-4	Magnesium	**4000**	10	
7439-96-5	Manganese	**350**	2.0	
7440-02-0	Nickel	**16**	2.0	
7439-92-1	Lead	**120**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.1	
7440-28-0	Thallium	ND	2.0	
7440-62-2	Vanadium	**39**	2.0	
7440-66-6	Zinc	**120**	2.0	

Comments: Results reported mg/Kg, dry weight units.

Mansell Field - Salem, MA

Laboratory Reagent Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Soil
Date of Preparation:	7/18/2022	Amount Prepared:	N/A
Date of Analysis:	7/21/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
7440-22-4	Silver	ND	10	
7429-90-5	Aluminum	ND	550	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8.0	
7440-70-2	Calcium	ND	100	
7440-43-9	Cadmium	ND	10	
7440-48-4	Cobalt	ND	20	
7440-47-3	Chromium	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	ND	40	
7439-95-4	Magnesium	ND	100	
7439-96-5	Manganese	ND	20	
7440-02-0	Nickel	ND	20	
7439-92-1	Lead	ND	20	
7440-36-0	Antimony	ND	20	
7782-49-2	Selenium	ND	40	
7440-28-0	Thallium	ND	20	
7440-62-2	Vanadium	ND	20	
7440-66-6	Zinc	ND	20	

Mansell Field - Salem, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AC00199

PARAMETER	SPIKE ADDED mg/Kg	SAMPLE CONCENTRATION mg/Kg	MS CONCENTRATION mg/Kg	MS % REC	QC LIMITS (% REC)
Antimony	102	ND	25.0	25	75 - 125
Arsenic	102	1000	1110	R	75 - 125
Barium	102	160	253	91	75 - 125
Beryllium	41.0	ND	42.0	102	75 - 125
Cadmium	51.0	ND	52.0	103	75 - 125
Chromium	102	1000	1120	R	75 - 125
Cobalt	102	9.4	112	101	75 - 125
Copper	102	140	238	96	75 - 125
Lead	102	420	517	R	75 - 125
Manganese	102	300	422	120	75 - 125
Nickel	102	19.0	122	101	75 - 125
Selenium	102	ND	106	104	75 - 125
Silver	20.0	4.0	24.0	101	75 - 125
Thallium	102	ND	103	101	75 - 125
Vanadium	102	48.0	157	107	75 - 125
Zinc	102	690	790	R	75 - 125

Mansell Field - Salem, MA

Laboratory Duplicate Results

Sample ID: AC00200

PARAMETER	SAMPLE RESULT mg/Kg	SAMPLE DUPLICATE RESULT mg/Kg	PRECISION RPD %	QC LIMITS
Aluminum	9600	10000	4.1	30
Antimony	ND	ND	NC	30
Arsenic	2000	1900	5.1	30
Barium	170	160	6.1	30
Beryllium	ND	ND	NC	30
Cadmium	ND	ND	NC	30
Calcium	23000	22000	4.4	30
Chromium	850	780	8.6	30
Cobalt	8.4	8.3	1.2	30
Copper	210	170	21	30
Iron	30000	32000	6.5	30
Lead	390	380	2.6	30
Magnesium	3500	3800	8.2	30
Manganese	290	300	3.4	30
Nickel	21.0	21.0	0	30
Selenium	ND	ND	NC	30
Silver	ND	ND	NC	30
Thallium	ND	ND	NC	30
Vanadium	35.0	37.0	5.6	30
Zinc	290	280	3.5	30

Mansell Field - Salem, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ug/L	LFB RESULT ug/L	LFB RECOVERY %	QC LIMITS %
Aluminum	1000	954	95	85 - 115
Antimony	1000	1080	108	85 - 115
Arsenic	1000	1070	107	85 - 115
Barium	1000	1010	101	85 - 115
Beryllium	400	404	101	85 - 115
Cadmium	500	515	103	85 - 115
Calcium	10000	10600	106	85 - 115
Chromium	1000	1020	102	85 - 115
Cobalt	1000	1020	102	85 - 115
Copper	1000	1030	103	85 - 115
Iron	1000	1020	102	85 - 115
Lead	1000	1040	104	85 - 115
Magnesium	10000	10600	106	85 - 115
Manganese	1000	1020	102	85 - 115
Nickel	1000	1020	102	85 - 115
Selenium	1000	1070	107	85 - 115
Silver	200	195	98	85 - 115
Thallium	1000	1060	106	85 - 115
Vanadium	1000	1020	102	85 - 115
Zinc	1000	1050	105	85 - 115

Comments:

Mansell Field - Salem, MA

Solid Laboratory Control Sample (LCS) Results

PARAMETER	LCS RESULTS mg/Kg	CONTROL LIMITS mg/Kg
Aluminum	8350	4150 - 12400
Antimony	80.9	27.4 - 339
Arsenic	60.2	44.1 - 81.9
Barium	229	193 - 322
Beryllium	124	102 - 169
Cadmium	61.6	49.9 - 83.8
Calcium	4230	3310 - 5840
Chromium	64.2	48.5 - 90.1
Cobalt	111	91.3 - 152
Copper	162	131 - 218
Iron	13600	4800 - 23000
Lead	77.9	59.6 - 112
Magnesium	2320	1410 - 3160
Manganese	713	630 - 975
Nickel	66.9	50.7 - 94.1
Selenium	130	89.4 - 178
Silver	23.0	17.7 - 34.8
Thallium	86.6	62.0 - 124
Vanadium	100	72.3 - 140
Zinc	164	122 - 226

Comments:

Samples in Batch: AC00199, AC00200, AC00201, AC00202, AC00203, AC00204, AC00205, AC00206, AC00207, AC00208, AC00209, AC00210, AC00211, AC00212, AC00213, AC00214, AC00215

 PN 2207004

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0001	SB-01	A	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	Y
	05MA0143-0002	SB-01	B	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0003	SB-01	C	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0004	SB-02	A	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0005	SB-02	B	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0007	SB-03	A	Metals	Soil	7/5/2022	09:25	1	4 oz jar	4 C	N
	05MA0143-0008	SB-03	B	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N
	05MA0143-0009	SB-03	C	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0010	SB-04	A	Metals	Soil	7/5/2022	10:35	1	4 oz jar	4 C	N
	05MA0143-0011	SB-04	B	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0012	SB-04	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0013	SB-05	A	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0014	SB-05	B	Metals	Soil	7/5/2022	10:45	1	4 oz jar	4 C	N
	05MA0143-0015	SB-05	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0016	SB-06	A	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0017	SB-06	B	Metals	Soil	7/5/2022	10:18	1	4 oz jar	4 C	N
	05MA0143-0018	SB-06	C	Metals	Soil	7/5/2022	10:22	1	4 oz jar	4 C	N
	05MA0143-0019	SB-07	A	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0020	SB-07	B	Metals	Soil	7/5/2022	10:36	1	4 oz jar	4 C	N

PN 2207004 → PN 2207005

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1449	[illegible] ESAT	7-5-22 14:49	

PN 22070005

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

PN 22070005 → PN 22070006

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0021	SB-07	C	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0022	SB-08	A	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0023	SB-08	B	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0024	SB-08	C	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0025	SB-09	A	Metals	Soil	7/5/2022	10:32	1	4 oz jar	4 C	N
	05MA0143-0026	SB-09	B	Metals	Soil	7/5/2022	10:38	1	4 oz jar	4 C	N
	05MA0143-0027	SB-09	C	Metals	Soil	7/5/2022	10:42	1	4 oz jar	4 C	N
	05MA0143-0028	SB-10	A	Metals	Soil	7/5/2022	10:13	1	4 oz jar	4 C	N
	05MA0143-0029	SB-10	B	Metals	Soil	7/5/2022	10:16	1	4 oz jar	4 C	N
	05MA0143-0030	SB-10	C	Metals	Soil	7/5/2022	10:26	1	4 oz jar	4 C	N
	05MA0143-0031	SB-11	A	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0032	SB-11	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0034	SB-12	A	Metals	Soil	7/5/2022	09:28	1	4 oz jar	4 C	N
	05MA0143-0035	SB-12	B	Metals	Soil	7/5/2022	09:38	1	4 oz jar	4 C	N
	05MA0143-0036	SB-12	C	Metals	Soil	7/5/2022	09:42	1	4 oz jar	4 C	N
	05MA0143-0037	SB-13	A	Metals	Soil	7/5/2022	09:29	1	4 oz jar	4 C	N
	05MA0143-0038	SB-13	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0039	SB-13	C	Metals	Soil	7/5/2022	09:44	1	4 oz jar	4 C	N
	05MA0143-0040	SB-14	A	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 14:49	ESAT	7-5-22 14:49	

PN 22070006

Page 3 of 3 PN 22070006

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0041	SB-14	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0042	SB-14	C	Metals	Soil	7/5/2022	09:40	1	4 oz jar	4 C	N
	05MA0143-0043	SB-15	A	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0044	SB-15	B	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0045	SB-15	C	Metals	Soil	7/5/2022	10:20	1	4 oz jar	4 C	N
	05MA0143-0046	SB-16	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0047	SB-16	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0048	SB-16	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0049	SB-116	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0050	SB-116	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0051	SB-116	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0052	RB-01		Metals	Blank	7/5/2022	11:30	1	500 ml poly	HNO3 pH<2	N
	05MA0143-0053	IS6418		Metals	Lab Sand	7/5/2022	11:00	1	2 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1459	[signature] Ecat 7	7-5-22 14:49	

United States Environmental Protection Agency
Laboratory Services and Applied Science Division
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

July 28, 2022

Tom Hatzopoulos
US EPA New England R1

Project Number: 22070006
Project: Mansell Field - Salem, MA
Analysis: Metals in Soil by ICP-OES
EPA Chemist: Michael Dowling

Date Samples Received by the Laboratory: 07/05/2022

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, LSBSOP-OPTIMAS1.

Samples were prepared following the EPA Region I SOP, EIASOP-INGMETALSPREP8

Preparation and analysis SOP's are based on "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Revision 2, Final Update III, Methods 3050B and 6010B," respectively. Samples were analyzed for Total Recoverable Metals using a Perkin Elmer Dual View Inductively Coupled Plasma - Optical Emission Spectrometer.

Samples were prepared and analyzed by ESAT contractors working at the USEPA New England Laboratory.

Data were reviewed in accordance with the internal verification procedures described in the EPA New England Quality Manual for NERL.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

If you have any questions please call me at 617-918-8340 .

Sincerely,

DANIEL BOUDREAU

Digitally signed by DANIEL BOUDREAU
Date: 2022.07.28 12:17:53 -04'00'

22070006$METMS_PE

Qualifiers:

RL = Reporting limit
ND = Not Detected above Reporting limit
NA = Not Applicable due to high sample dilutions or sample interferences
NC = Not calculated since analyte concentration is ND.
J = Estimated value
J1 = Estimated value due to MS recovery outside accceptance criteria
J2 = Estimated value due to LFB result outside acceptance criteria
J3 = Estimated value due to RPD result outside acceptance criteria
J4 = Estimated value due to LCS result outside acceptance criteria
E = Estimated value exceeds the calibration range
L = Estimated value is below the calibration range
B = Analyte is associated with the lab blank or trip blank contamination. Values are qualified when the observed concentration of the contamination in the sample extract is less than 10 times the concentration in the blank.
R = No recovery was calculated since the analyte concentration is greater than four times the spike level.
P = The confirmation value exceeded 35% difference and is less than 100%. The lower value is reported.
C = The identification has been confirmed by GC/MS.
A = Suspected Aldol condensation product.
N = Tentatively identified compound.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0037	Lab Sample ID:	AC00216
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.1	
7429-90-5	Aluminum	**12000**	34	
7440-38-2	Arsenic	**1900**	6.1	
7440-39-3	Barium	**220**	6.1	
7440-41-7	Beryllium	ND	2.4	
7440-70-2	Calcium	**27000**	31	
7440-43-9	Cadmium	ND	3.1	
7440-48-4	Cobalt	**10**	6.1	
7440-47-3	Chromium	**1500**	6.1	
7440-50-8	Copper	**140**	6.1	
7439-89-6	Iron	**45000**	12	
7439-95-4	Magnesium	**4700**	31	
7439-96-5	Manganese	**350**	6.1	J1
7440-02-0	Nickel	**29**	6.1	
7439-92-1	Lead	**280**	6.1	
7440-36-0	Antimony	ND	6.1	J1
7782-49-2	Selenium	ND	12	
7440-28-0	Thallium	ND	12	
7440-62-2	Vanadium	**49**	6.1	
7440-66-6	Zinc	**290**	6.1	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0038	Lab Sample ID:	AC00217
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.1	
7429-90-5	Aluminum	**10000**	34	
7440-38-2	Arsenic	**2900**	6.2	
7440-39-3	Barium	**150**	6.2	
7440-41-7	Beryllium	ND	2.5	
7440-70-2	Calcium	**98000**	31	
7440-43-9	Cadmium	ND	3.1	
7440-48-4	Cobalt	**6.6**	6.2	
7440-47-3	Chromium	**2600**	6.2	
7440-50-8	Copper	**89**	6.2	
7439-89-6	Iron	**19000**	12	
7439-95-4	Magnesium	**6500**	31	
7439-96-5	Manganese	**290**	6.2	
7440-02-0	Nickel	**15**	6.2	
7439-92-1	Lead	**160**	6.2	
7440-36-0	Antimony	ND	21	
7782-49-2	Selenium	ND	12	
7440-28-0	Thallium	ND	12	
7440-62-2	Vanadium	**39**	6.2	
7440-66-6	Zinc	**180**	6.2	

Comments: Results are reported mg/kg, dry weight units. Result for antimony reported from a 10x dilution due to negative interference.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0039	Lab Sample ID:	AC00218
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**13000**	11	
7440-38-2	Arsenic	**630**	2.0	
7440-39-3	Barium	**100**	2.0	
7440-41-7	Beryllium	ND	0.80	
7440-70-2	Calcium	**18000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**8.4**	2.0	
7440-47-3	Chromium	**310**	2.0	
7440-50-8	Copper	**41**	2.0	
7439-89-6	Iron	**24000**	4.0	
7439-95-4	Magnesium	**5200**	10	
7439-96-5	Manganese	**360**	2.0	
7440-02-0	Nickel	**17**	2.0	
7439-92-1	Lead	**68**	2.0	
7440-36-0	Antimony	ND	2.0	
7782-49-2	Selenium	ND	4.0	
7440-28-0	Thallium	**4.0**	4.0	
7440-62-2	Vanadium	**45**	2.0	
7440-66-6	Zinc	**110**	2.0	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0040	Lab Sample ID:	AC00219
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.0	
7429-90-5	Aluminum	**13000**	11	
7440-38-2	Arsenic	**710**	2.1	
7440-39-3	Barium	**90**	2.1	
7440-41-7	Beryllium	ND	0.83	
7440-70-2	Calcium	**17000**	10	
7440-43-9	Cadmium	ND	1.0	
7440-48-4	Cobalt	**5.9**	2.1	
7440-47-3	Chromium	**130**	2.1	
7440-50-8	Copper	**41**	2.1	
7439-89-6	Iron	**17000**	4.2	
7439-95-4	Magnesium	**3500**	10	
7439-96-5	Manganese	**300**	2.1	
7440-02-0	Nickel	**13**	2.1	
7439-92-1	Lead	**150**	2.1	
7440-36-0	Antimony	ND	2.1	
7782-49-2	Selenium	ND	4.2	
7440-28-0	Thallium	ND	4.2	
7440-62-2	Vanadium	**36**	2.1	
7440-66-6	Zinc	**160**	2.1	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0041	Lab Sample ID:	AC00220
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	2
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.4	
7429-90-5	Aluminum	**6000**	26	
7440-38-2	Arsenic	**1900**	4.8	
7440-39-3	Barium	**88**	4.8	
7440-41-7	Beryllium	ND	1.9	
7440-70-2	Calcium	**72000**	24	
7440-43-9	Cadmium	ND	2.4	
7440-48-4	Cobalt	ND	4.8	
7440-47-3	Chromium	**600**	4.8	
7440-50-8	Copper	**58**	4.8	
7439-89-6	Iron	**10000**	9.5	
7439-95-4	Magnesium	**2700**	24	
7439-96-5	Manganese	**280**	4.8	
7440-02-0	Nickel	**11**	4.8	
7439-92-1	Lead	**140**	4.8	
7440-36-0	Antimony	ND	4.8	
7782-49-2	Selenium	ND	9.5	
7440-28-0	Thallium	ND	9.5	
7440-62-2	Vanadium	**19**	4.8	
7440-66-6	Zinc	**120**	4.8	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0042	Lab Sample ID:	AC00221
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.9	
7429-90-5	Aluminum	**8700**	21	
7440-38-2	Arsenic	**2100**	3.8	
7440-39-3	Barium	**610**	3.8	
7440-41-7	Beryllium	ND	1.5	
7440-70-2	Calcium	**41000**	19	
7440-43-9	Cadmium	ND	1.9	
7440-48-4	Cobalt	**5.3**	3.8	
7440-47-3	Chromium	**330**	3.8	
7440-50-8	Copper	**150**	3.8	
7439-89-6	Iron	**26000**	7.7	
7439-95-4	Magnesium	**2300**	19	
7439-96-5	Manganese	**410**	3.8	
7440-02-0	Nickel	**12**	3.8	
7439-92-1	Lead	**250**	3.8	
7440-36-0	Antimony	**28**	3.8	
7782-49-2	Selenium	ND	7.7	
7440-28-0	Thallium	ND	7.7	
7440-62-2	Vanadium	**31**	3.8	
7440-66-6	Zinc	**240**	3.8	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0043	Lab Sample ID:	AC00222
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.2	
7429-90-5	Aluminum	**12000**	35	
7440-38-2	Arsenic	**540**	6.4	
7440-39-3	Barium	**92**	6.4	
7440-41-7	Beryllium	ND	2.5	
7440-70-2	Calcium	**100000**	32	
7440-43-9	Cadmium	ND	3.2	
7440-48-4	Cobalt	**7.1**	6.4	
7440-47-3	Chromium	**440**	6.4	
7440-50-8	Copper	**26**	6.4	
7439-89-6	Iron	**19000**	13	
7439-95-4	Magnesium	**8500**	32	
7439-96-5	Manganese	**290**	6.4	
7440-02-0	Nickel	**14**	6.4	
7439-92-1	Lead	**76**	6.4	
7440-36-0	Antimony	ND	6.4	
7782-49-2	Selenium	ND	13	
7440-28-0	Thallium	ND	13	
7440-62-2	Vanadium	**41**	6.4	
7440-66-6	Zinc	**100**	6.4	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0044	Lab Sample ID:	AC00223
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	7
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	7.8	
7429-90-5	Aluminum	**6900**	85	
7440-38-2	Arsenic	**780**	16	
7440-39-3	Barium	**63**	16	
7440-41-7	Beryllium	ND	6.2	
7440-70-2	Calcium	**240000**	78	
7440-43-9	Cadmium	ND	7.8	
7440-48-4	Cobalt	ND	16	
7440-47-3	Chromium	**570**	16	
7440-50-8	Copper	ND	16	
7439-89-6	Iron	**7000**	31	
7439-95-4	Magnesium	**13000**	78	
7439-96-5	Manganese	**180**	16	
7440-02-0	Nickel	ND	16	
7439-92-1	Lead	**79**	16	
7440-36-0	Antimony	ND	16	
7782-49-2	Selenium	ND	31	
7440-28-0	Thallium	ND	31	
7440-62-2	Vanadium	ND	16	
7440-66-6	Zinc	**99**	16	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0045	Lab Sample ID:	AC00224
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	7
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	7.8	
7429-90-5	Aluminum	**5600**	85	
7440-38-2	Arsenic	**400**	16	
7440-39-3	Barium	**110**	16	
7440-41-7	Beryllium	ND	6.2	
7440-70-2	Calcium	**260000**	78	
7440-43-9	Cadmium	ND	7.8	
7440-48-4	Cobalt	ND	16	
7440-47-3	Chromium	**1900**	16	
7440-50-8	Copper	ND	16	
7439-89-6	Iron	**6000**	31	
7439-95-4	Magnesium	**11000**	78	
7439-96-5	Manganese	**140**	16	
7440-02-0	Nickel	ND	16	
7439-92-1	Lead	**72**	16	
7440-36-0	Antimony	ND	16	
7782-49-2	Selenium	ND	31	
7440-28-0	Thallium	ND	31	
7440-62-2	Vanadium	ND	16	
7440-66-6	Zinc	**130**	16	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0046	Lab Sample ID:	AC00225
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.3	
7429-90-5	Aluminum	**9900**	36	
7440-38-2	Arsenic	**2900**	6.5	
7440-39-3	Barium	**120**	6.5	
7440-41-7	Beryllium	ND	2.6	
7440-70-2	Calcium	**85000**	33	
7440-43-9	Cadmium	ND	3.3	
7440-48-4	Cobalt	ND	6.5	
7440-47-3	Chromium	**380**	6.5	
7440-50-8	Copper	**94**	6.5	
7439-89-6	Iron	**13000**	13	
7439-95-4	Magnesium	**4000**	33	
7439-96-5	Manganese	**200**	6.5	
7440-02-0	Nickel	**11**	6.5	
7439-92-1	Lead	**170**	6.5	
7440-36-0	Antimony	ND	6.5	
7782-49-2	Selenium	ND	13	
7440-28-0	Thallium	ND	13	
7440-62-2	Vanadium	**27**	6.5	
7440-66-6	Zinc	**130**	6.5	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0047	Lab Sample ID:	AC00226
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.3	
7429-90-5	Aluminum	**9000**	14	
7440-38-2	Arsenic	**1800**	2.6	
7440-39-3	Barium	**150**	2.6	
7440-41-7	Beryllium	ND	1.0	
7440-70-2	Calcium	**32000**	13	
7440-43-9	Cadmium	ND	1.3	
7440-48-4	Cobalt	**5.1**	2.6	
7440-47-3	Chromium	**350**	2.6	
7440-50-8	Copper	**150**	2.6	
7439-89-6	Iron	**14000**	5.1	
7439-95-4	Magnesium	**2200**	13	
7439-96-5	Manganese	**170**	2.6	
7440-02-0	Nickel	**13**	2.6	
7439-92-1	Lead	**190**	2.6	
7440-36-0	Antimony	**5.0**	2.6	
7782-49-2	Selenium	ND	5.1	
7440-28-0	Thallium	ND	5.1	
7440-62-2	Vanadium	**28**	2.6	
7440-66-6	Zinc	**130**	2.6	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0048	Lab Sample ID:	AC00227
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.0	
7429-90-5	Aluminum	**5600**	22	
7440-38-2	Arsenic	**460**	4.0	
7440-39-3	Barium	**100**	4.0	
7440-41-7	Beryllium	ND	1.6	
7440-70-2	Calcium	**19000**	20	
7440-43-9	Cadmium	ND	2.0	
7440-48-4	Cobalt	ND	4.0	
7440-47-3	Chromium	**100**	4.0	
7440-50-8	Copper	**73**	4.0	
7439-89-6	Iron	**7200**	8.0	
7439-95-4	Magnesium	**1100**	20	
7439-96-5	Manganese	**80**	4.0	
7440-02-0	Nickel	**6.5**	4.0	
7439-92-1	Lead	**90**	4.0	
7440-36-0	Antimony	ND	4.0	
7782-49-2	Selenium	ND	8.0	
7440-28-0	Thallium	ND	8.0	
7440-62-2	Vanadium	**15**	4.0	
7440-66-6	Zinc	**92**	4.0	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0049	Lab Sample ID:	AC00228
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	3
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	3.2	
7429-90-5	Aluminum	**8900**	35	
7440-38-2	Arsenic	**3200**	6.4	
7440-39-3	Barium	**110**	6.4	
7440-41-7	Beryllium	ND	2.5	
7440-70-2	Calcium	**100000**	32	
7440-43-9	Cadmium	ND	3.2	
7440-48-4	Cobalt	ND	6.4	
7440-47-3	Chromium	**310**	6.4	
7440-50-8	Copper	**71**	6.4	
7439-89-6	Iron	**12000**	13	
7439-95-4	Magnesium	**3900**	32	
7439-96-5	Manganese	**180**	6.4	
7440-02-0	Nickel	**9.7**	6.4	
7439-92-1	Lead	**140**	6.4	
7440-36-0	Antimony	ND	6.4	
7782-49-2	Selenium	ND	13	
7440-28-0	Thallium	ND	13	
7440-62-2	Vanadium	**25**	6.4	
7440-66-6	Zinc	**110**	6.4	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0050	Lab Sample ID:	AC00229
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	1.3	
7429-90-5	Aluminum	**9400**	14	
7440-38-2	Arsenic	**2000**	2.6	
7440-39-3	Barium	**160**	2.6	
7440-41-7	Beryllium	ND	1.0	
7440-70-2	Calcium	**42000**	13	
7440-43-9	Cadmium	ND	1.3	
7440-48-4	Cobalt	**4.8**	2.6	
7440-47-3	Chromium	**380**	2.6	
7440-50-8	Copper	**160**	2.6	
7439-89-6	Iron	**14000**	5.1	
7439-95-4	Magnesium	**2400**	13	
7439-96-5	Manganese	**170**	2.6	
7440-02-0	Nickel	**13**	2.6	
7439-92-1	Lead	**190**	2.6	
7440-36-0	Antimony	**5.4**	2.6	
7782-49-2	Selenium	ND	5.1	
7440-28-0	Thallium	ND	5.1	
7440-62-2	Vanadium	**30**	2.6	
7440-66-6	Zinc	**130**	2.6	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0051	Lab Sample ID:	AC00230
Date of Collection:	7/05/2022	Matrix:	Soil
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	ND	2.1	
7429-90-5	Aluminum	**7400**	23	
7440-38-2	Arsenic	**650**	4.2	
7440-39-3	Barium	**110**	4.2	
7440-41-7	Beryllium	ND	1.7	
7440-70-2	Calcium	**20000**	21	
7440-43-9	Cadmium	ND	2.1	
7440-48-4	Cobalt	ND	4.2	
7440-47-3	Chromium	**130**	4.2	
7440-50-8	Copper	**81**	4.2	
7439-89-6	Iron	**11000**	8.3	
7439-95-4	Magnesium	**1600**	21	
7439-96-5	Manganese	**150**	4.2	
7440-02-0	Nickel	**9.3**	4.2	
7439-92-1	Lead	**110**	4.2	
7440-36-0	Antimony	ND	4.2	
7782-49-2	Selenium	ND	8.3	
7440-28-0	Thallium	ND	8.3	
7440-62-2	Vanadium	**22**	4.2	
7440-66-6	Zinc	**110**	4.2	

Comments: Results are reported mg/kg, dry weight units.

Mansell Field - Salem, MA

Metals in Soil by ICP-OES

Client Sample ID:	05MA0143-0053	Lab Sample ID:	AC00232
Date of Collection:	7/05/2022	Matrix:	Lab Sand
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-22-4	Silver	**21**	1.0	
7429-90-5	Aluminum	**4000**	11	
7440-38-2	Arsenic	**19**	2.0	
7440-39-3	Barium	**7.4**	2.0	
7440-41-7	Beryllium	**19**	0.80	
7440-70-2	Calcium	**1100**	10	
7440-43-9	Cadmium	**14**	1.0	
7440-48-4	Cobalt	ND	2.0	
7440-47-3	Chromium	**5.4**	2.0	
7440-50-8	Copper	**59**	2.0	
7439-89-6	Iron	**4600**	4.0	
7439-95-4	Magnesium	**440**	10	
7439-96-5	Manganese	**35**	2.0	
7440-02-0	Nickel	**28**	2.0	
7439-92-1	Lead	**4.5**	2.0	
7440-36-0	Antimony	**7.6**	2.0	
7782-49-2	Selenium	**5.1**	4.0	
7440-28-0	Thallium	**24**	4.0	
7440-62-2	Vanadium	**110**	2.0	
7440-66-6	Zinc	**50**	2.0	

Comments: Results are reported mg/kg, as received.

Mansell Field - Salem, MA

Laboratory Reagent Blank

Client Sample ID:	N/A	Lab Sample ID:	N/A
Date of Collection:	N/A	Matrix:	Lab Sand
Date of Preparation:	7/19/2022	Amount Prepared:	N/A
Date of Analysis:	7/22/2022	Percent Solids:	N/A
Dry Weight Prepared:	N/A	Extract Dilution:	1
Wet Weight Prepared:	N/A	pH:	N/A
Volume Extracted:	N/A	GPC Factor:	N/A
Final Volume:	50 mL		

CAS Number	Compound	Concentration ug/L	RL ug/L	Qualifier
7440-22-4	Silver	ND	10	
7429-90-5	Aluminum	ND	110	
7440-38-2	Arsenic	ND	20	
7440-39-3	Barium	ND	20	
7440-41-7	Beryllium	ND	8.0	
7440-70-2	Calcium	ND	100	
7440-43-9	Cadmium	ND	10	
7440-48-4	Cobalt	ND	20	
7440-47-3	Chromium	ND	20	
7440-50-8	Copper	ND	20	
7439-89-6	Iron	ND	40	
7439-95-4	Magnesium	ND	100	
7439-96-5	Manganese	ND	20	
7440-02-0	Nickel	ND	20	
7439-92-1	Lead	ND	20	
7440-36-0	Antimony	ND	20	
7782-49-2	Selenium	ND	40	
7440-28-0	Thallium	ND	40	
7440-62-2	Vanadium	ND	20	
7440-66-6	Zinc	ND	20	

Mansell Field - Salem, MA

MATRIX SPIKE (MS) RECOVERY

Sample ID: AC00216

PARAMETER	SPIKE ADDED mg/Kg	SAMPLE CONCENTRATION mg/Kg	MS CONCENTRATION mg/Kg	MS % REC	QC LIMITS (% REC)
Antimony	102	ND	20.0	20	75 - 125
Arsenic	102	1900	2210	R	75 - 125
Barium	102	220	325	103	75 - 125
Beryllium	41.0	ND	43.0	105	75 - 125
Cadmium	51.0	ND	51.0	100	75 - 125
Chromium	102	1500	2130	R	75 - 125
Cobalt	102	10.0	111	99	75 - 125
Copper	102	140	252	110	75 - 125
Lead	102	280	397	115	75 - 125
Manganese	102	350	414	63	75 - 125
Nickel	102	29.0	121	90	75 - 125
Selenium	102	ND	102	100	75 - 125
Silver	20.0	ND	20.0	99	75 - 125
Thallium	102	ND	102	100	75 - 125
Vanadium	102	49.0	156	105	75 - 125
Zinc	102	290	379	87	75 - 125

Mansell Field - Salem, MA

Laboratory Duplicate Results

Sample ID: AC00217

PARAMETER	SAMPLE RESULT mg/Kg	SAMPLE DUPLICATE RESULT mg/Kg	PRECISION RPD %	QC LIMITS
Aluminum	10000	9600	4.1	30
Antimony	ND	ND	NC	30
Arsenic	2900	2700	7.1	30
Barium	150	130	14	30
Beryllium	ND	ND	NC	30
Cadmium	ND	ND	NC	30
Calcium	98000	90000	8.5	30
Chromium	2600	2400	8.0	30
Cobalt	6.6	ND	NC	30
Copper	89.0	87.0	2.3	30
Iron	19000	17000	11	30
Lead	160	140	13	30
Magnesium	6500	6000	8.0	30
Manganese	290	260	11	30
Nickel	15.0	14.0	6.9	30
Selenium	ND	ND	NC	30
Silver	ND	ND	NC	30
Thallium	ND	ND	NC	30
Vanadium	39.0	35.0	11	30
Zinc	180	160	12	30

Mansell Field - Salem, MA

Laboratory Fortified Blank (LFB) Results

PARAMETER	LFB AMOUNT SPIKED ug/L	LFB RESULT ug/L	LFB RECOVERY %	QC LIMITS %
Aluminum	1000	1100	110	85 - 115
Antimony	1000	1060	106	85 - 115
Arsenic	1000	1040	104	85 - 115
Barium	1000	1050	105	85 - 115
Beryllium	400	429	107	85 - 115
Cadmium	500	511	102	85 - 115
Calcium	10000	10900	109	85 - 115
Chromium	1000	1090	109	85 - 115
Cobalt	1000	1070	107	85 - 115
Copper	1000	1110	111	85 - 115
Iron	1000	1100	110	85 - 115
Lead	1000	1060	106	85 - 115
Magnesium	10000	10800	108	85 - 115
Manganese	1000	1090	109	85 - 115
Nickel	1000	1060	106	85 - 115
Selenium	1000	1020	102	85 - 115
Silver	200	200	100	85 - 115
Thallium	1000	1050	105	85 - 115
Vanadium	1000	1110	111	85 - 115
Zinc	1000	1010	101	85 - 115

Comments:

Mansell Field - Salem, MA

Solid Laboratory Control Sample (LCS) Results

PARAMETER	LCS RESULTS mg/Kg	CONTROL LIMITS mg/Kg
Aluminum	9460	4050 - 12200
Antimony	73.5	26.9 - 336
Arsenic	67.0	119 - 221
Barium	262	138 - 229
Beryllium	131	87.0 - 145
Cadmium	4810	67.1 - 112
Calcium	64.7	3490 - 6120
Chromium	68.4	70.6 - 131
Cobalt	123	63.6 - 106
Copper	186	112 - 186
Iron	15700	4920 - 23200
Lead	91.2	101 - 179
Magnesium	2430	1460 - 3240
Manganese	809	505 - 791
Nickel	72.1	47.8 - 88.8
Selenium	137	124 - 240
Silver	26.9	35.1 - 65.2
Thallium	98.0	57.9 - 118
Vanadium	112	111 - 196
Zinc	175	159 - 296

Comments:

Samples in Batch: AC00216, AC00217, AC00218, AC00219, AC00220, AC00221, AC00222, AC00223, AC00224, AC00225, AC00226, AC00227, AC00228, AC00229, AC00230, AC00232

 PN 22070004

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0001	SB-01	A	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	Y
	05MA0143-0002	SB-01	B	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0003	SB-01	C	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0004	SB-02	A	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0005	SB-02	B	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0007	SB-03	A	Metals	Soil	7/5/2022	09:25	1	4 oz jar	4 C	N
	05MA0143-0008	SB-03	B	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N
	05MA0143-0009	SB-03	C	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0010	SB-04	A	Metals	Soil	7/5/2022	10:35	1	4 oz jar	4 C	N
	05MA0143-0011	SB-04	B	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0012	SB-04	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0013	SB-05	A	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0014	SB-05	B	Metals	Soil	7/5/2022	10:45	1	4 oz jar	4 C	N
	05MA0143-0015	SB-05	C	Metals	Soil	7/5/2022	10:50	1	4 oz jar	4 C	N
	05MA0143-0016	SB-06	A	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0017	SB-06	B	Metals	Soil	7/5/2022	10:18	1	4 oz jar	4 C	N
	05MA0143-0018	SB-06	C	Metals	Soil	7/5/2022	10:22	1	4 oz jar	4 C	N
	05MA0143-0019	SB-07	A	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0020	SB-07	B	Metals	Soil	7/5/2022	10:36	1	4 oz jar	4 C	N

PN 22070004 → PN 22070005

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1449	[signature] ESAT	7-5-22 14:49	

PN 22070005

PN 22070005

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

PN 22070005 → PN 22070006

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0021	SB-07	C	Metals	Soil	7/5/2022	10:40	1	4 oz jar	4 C	N
	05MA0143-0022	SB-08	A	Metals	Soil	7/5/2022	10:00	1	4 oz jar	4 C	N
	05MA0143-0023	SB-08	B	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0024	SB-08	C	Metals	Soil	7/5/2022	10:30	1	4 oz jar	4 C	N
	05MA0143-0025	SB-09	A	Metals	Soil	7/5/2022	10:32	1	4 oz jar	4 C	N
	05MA0143-0026	SB-09	B	Metals	Soil	7/5/2022	10:38	1	4 oz jar	4 C	N
	05MA0143-0027	SB-09	C	Metals	Soil	7/5/2022	10:42	1	4 oz jar	4 C	N
	05MA0143-0028	SB-10	A	Metals	Soil	7/5/2022	10:13	1	4 oz jar	4 C	N
	05MA0143-0029	SB-10	B	Metals	Soil	7/5/2022	10:16	1	4 oz jar	4 C	N
	05MA0143-0030	SB-10	C	Metals	Soil	7/5/2022	10:26	1	4 oz jar	4 C	N
	05MA0143-0031	SB-11	A	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0032	SB-11	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0034	SB-12	A	Metals	Soil	7/5/2022	09:28	1	4 oz jar	4 C	N
	05MA0143-0035	SB-12	B	Metals	Soil	7/5/2022	09:38	1	4 oz jar	4 C	N
	05MA0143-0036	SB-12	C	Metals	Soil	7/5/2022	09:42	1	4 oz jar	4 C	N
	05MA0143-0037	SB-13	A	Metals	Soil	7/5/2022	09:29	1	4 oz jar	4 C	N
	05MA0143-0038	SB-13	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0039	SB-13	C	Metals	Soil	7/5/2022	09:44	1	4 oz jar	4 C	N
	05MA0143-0040	SB-14	A	Metals	Soil	7/5/2022	09:30	1	4 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 14:49	ESAT	7-5-22 14:49	

PN 22070006

Page 3 of 3 PN 22070006

USEPA
Weston/START V
101 Billerica Ave
N Billerica, MA 01862

CHAIN OF CUSTODY RECORD
Site #: 05MA0143
Contact Name: Bonnie Mace
Contact Phone: 978-621-1213

No: 1-070522-112636-0001
Mansell Field Site
Lab: NERL
Lab Phone: 617-918-8640

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
	05MA0143-0041	SB-14	B	Metals	Soil	7/5/2022	09:35	1	4 oz jar	4 C	N
	05MA0143-0042	SB-14	C	Metals	Soil	7/5/2022	09:40	1	4 oz jar	4 C	N
	05MA0143-0043	SB-15	A	Metals	Soil	7/5/2022	10:10	1	4 oz jar	4 C	N
	05MA0143-0044	SB-15	B	Metals	Soil	7/5/2022	10:15	1	4 oz jar	4 C	N
	05MA0143-0045	SB-15	C	Metals	Soil	7/5/2022	10:20	1	4 oz jar	4 C	N
	05MA0143-0046	SB-16	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0047	SB-16	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0048	SB-16	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0049	SB-116	A	Metals	Soil	7/5/2022	09:45	1	4 oz jar	4 C	N
	05MA0143-0050	SB-116	B	Metals	Soil	7/5/2022	09:50	1	4 oz jar	4 C	N
	05MA0143-0051	SB-116	C	Metals	Soil	7/5/2022	09:55	1	4 oz jar	4 C	N
	05MA0143-0052	RB-01		Metals	Blank	7/5/2022	11:30	1	500 ml poly	HNO3 pH<2	N
	05MA0143-0053	IS6418		Metals	Lab Sand	7/5/2022	11:00	1	2 oz jar	4 C	N

Special Instructions: Please forward sample results to OSC Tom Hatzopoulos.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	Bonnie Mace	7/5/22 1459	[signature] Ecat 7	7-5-22 14:49	

SITE: MANSELL FIELD
CASE: 50197 SDG: MA43H3
LABORATORY: EUROFINS

DATA SUMMARY TABLE 1
METALS IN SOIL TCLP LEACHATE ANALYSIS
µg/L

				CLP SAMPLE NUMBER	MA43H3	MA43H4	MA43H5	MA43H6	MA43H7	MA43H8
				SAMPLE LOCATION	SB-05A	SB-05C	SB-06A	SB-07B	SB-08A	SB-08B
				SAMPLE IDENTIFIER	05MA0143-0013	05MA0143-0015	05MA0143-0016	05MA0143-0020	05MA0143-0022	05MA0143-0023
				LABORATORY NUMBER	200-64438-1	200-64438-2	200-64438-3	200-64438-4	200-64438-5	200-64438-6
ANALYTES	**METHOD**	**MDL**	**CRQL**							
Arsenic	**P**	**3.9**	**10**		**59000 D**	**12000 D**	**9500 D**	**1700**	**6900 D**	**8500 D**
Barium	**P**	**4.3**	**200**		**410**	**750**	**1100**	**610**	**420**	**420**
Cadmium	**P**	**0.41**	**5.0**		**310 D**	**65 D**	**50 D**	**38**	**38 D**	**45 D**
Chromium	**P**	**0.76**	**10**		**94**	**150**	**21**	**28**	**200**	**150**
Lead	**P**	**2.2**	**10**		**87**	**39**	**130**	**5.6 J**	**1300**	**420**
Selenium	**P**	**6.2**	**35**		35 U	35 U	35 U	35 U	35 U	35 U
Silver	**P**	**1.1**	**10**		10 U	10 U	10 U	10 U	2.7 J	1.2 J
				DILUTION FACTOR	50	10	10	1	5	5
				DATE SAMPLED	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022

S2BVEM DATA VALIDATION

QUALIFIER COMMENTS: U = Value is Non-Detected.
J = Results that are greater than the MDL but less than the CRQL are flagged (J) as estimated values with no superscripts.
D = Value is from a diluted run.

ANALYTICAL METHOD:
P - INDUCTIVELY COUPLED PLASMA

NOTES:
Results are reported in micrograms per Liter (µg/L).
MDL = Method Detection Limit
CRQL = Contract Required Quantitation Limit
CLP = Contract Laboratory Program
TCLP = Toxicity Characteristic Leaching Procedure

SITE: MANSELL FIELD
CASE: 50197 SDG: MA43H3
LABORATORY: EUROFINS

DATA SUMMARY TABLE 1
METALS IN SOIL TCLP LEACHATE ANALYSIS
µg/L

				CLP SAMPLE NUMBER	MA43H9	MA43J0	MA43J1	MA43J2	MA43J3	MA43J4
				SAMPLE LOCATION	SB-08C	SB-09A	SB-09B	SB-09C	SB-10A	SB-10B
				SAMPLE IDENTIFIER	05MA0143-0024	05MA0143-0025	05MA0143-0026	05MA0143-0027	05MA0143-0028	05MA0143-0029
				LABORATORY NUMBER	200-64438-7	200-64438-8	200-64438-9	200-64438-10	200-64438-11	200-64438-12
ANALYTES	**METHOD**	**MDL**	**CRQL**							
Arsenic	**P**	**3.9**	**10**		**10000 D**	**19000 D**	**240**	**40000 D**	**4400 D**	**8100 D**
Barium	**P**	**4.3**	**200**		**350**	**500**	**340**	**180 J**	**710**	**460**
Cadmium	**P**	**0.41**	**5.0**		**51 D**	**95 D**	**4.9 J**	**210 D**	**23 D**	**42 D**
Chromium	**P**	**0.76**	**10**		**130**	**500**	**110**	**140**	**54**	**170**
Lead	**P**	**2.2**	**10**		**27**	**360**	**120**	**53**	**31**	**130**
Selenium	**P**	**6.2**	**35**		35 U	35 U	35 U	35 U	8.9 J	35 U
Silver	**P**	**1.1**	**10**		10 U	10 U	2.1 J	10 U	10 U	1.2 J
				DILUTION FACTOR	10	15	1	30	3	5
				DATE SAMPLED	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022

S2BVEM DATA VALIDATION

QUALIFIER COMMENTS: U = Value is Non-Detected.
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P - INDUCTIVELY COUPLED PLASMA

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TCLP = Toxicity Characteristic Leaching Procedure

SITE: MANSELL FIELD
CASE: 50197 SDG: MA43H3
LABORATORY: EUROFINS

DATA SUMMARY TABLE 1
METALS IN SOIL TCLP LEACHATE ANALYSIS
µg/L

				CLP SAMPLE NUMBER	MA43J5	MA43J6	MA43J7	MA43J8	MA43J9	MA43K0
				SAMPLE LOCATION	SB-10C	SB-12A	SB-13A	SB-13B	SB-14B	SB-14C
				SAMPLE IDENTIFIER	05MA0143-0030	05MA0143-001334	05MA0143-0037	05MA0143-0038	05MA0143-0041	05MA0143-0042
				LABORATORY NUMBER	200-64438-13	200-64438-14	200-64438-15	200-64438-16	200-64438-17	200-64438-18
ANALYTES	**METHOD**	**MDL**	**CRQL**							
Arsenic	**P**	**3.9**	**10**		**7800 D**	**5800 D**	**4700 D**	**5100 D**	**5900 D**	**5700 D**
Barium	**P**	**4.3**	**200**		**510**	**540**	**910**	**570**	**440**	**600**
Cadmium	**P**	**0.41**	**5.0**		**40 D**	**31 D**	**25 D**	**26 D**	**30 D**	**30 D**
Chromium	**P**	**0.76**	**10**		**170**	**75**	**84**	**82**	**110**	**84**
Lead	**P**	**2.2**	**10**		**140**	**31**	**28**	**43**	**140**	**27**
Selenium	**P**	**6.2**	**35**		35 U	35 U	35 U	35 U	35 U	35 U
Silver	**P**	**1.1**	**10**		10 U	10 U	10 U	10 U	10 U	10 U
				DILUTION FACTOR	5	4	4	4	5	5
				DATE SAMPLED	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022	7/5/2022

S2BVEM DATA VALIDATION

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ANALYTICAL METHOD:
P - INDUCTIVELY COUPLED PLASMA

NOTES:
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CRQL = Contract Required Quantitation Limit
CLP = Contract Laboratory Program
TCLP = Toxicity Characteristic Leaching Procedure

SITE: MANSELL FIELD
CASE: 50197 SDG: MA43H3
LABORATORY: EUROFINS

DATA SUMMARY TABLE 1
METALS IN SOIL TCLP LEACHATE ANALYSIS
µg/L

			CLP SAMPLE NUMBER	**MA43K1**	**MA43K2**				
			SAMPLE LOCATION	**SB-16A**	**SB-116A**				
			SAMPLE IDENTIFIER	**05MA0143-0046**	**05MA0143-0049**				
			LABORATORY NUMBER	**200-64438-19**	**200-64438-20**				
ANALYTES	**METHOD**	**MDL**	**CRQL**						
Arsenic	**P**	**3.9**	**10**	**18000 D**	**7700 D**				
Barium	**P**	**4.3**	**200**	**760**	**600**				
Cadmium	**P**	**0.41**	**5.0**	**92 D**	**40 D**				
Chromium	**P**	**0.76**	**10**	**190**	**80**				
Lead	**P**	**2.2**	**10**	**90**	**31**				
Selenium	**P**	**6.2**	**35**	35 U	35 U				
Silver	**P**	**1.1**	**10**	10 U	10 U				
			DILUTION FACTOR	10	5				
			DATE SAMPLED	7/5/2022	7/5/2022				

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P - INDUCTIVELY COUPLED PLASMA

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