P.W. GROSSER CONSULTING

351596

April 13, 2015

Ellis Koch
RXRGIP
1750 New Highway
Farmingdale, NY 11747

RE: SPLP Investigation / Red Flag Area Characterization Work Plan Amendment
Garvies' Point Redevelopment Project

Dear Mr. Koch:

P.W. Grosser Consulting, Inc. (PWGC) has prepared this amendment to the April 3, 2015 SPLP Investigation / Red Flag Area Characterization Work Plan to detail the modified approach for SPLP sample size selection. This modified approach is based upon the findings of total arsenic and lead from this investigation.

Soil concentrations for arsenic at the former Li Tungsten site were largely detected in the lower end of the observed range (0.84 to 10,400 mg/kg). The recent sampling event that was conducted between April 2, 2015 and April 7, 2015 entailed collecting 136 soil samples from the former Li Tungsten site and having them analyzed for total arsenic and lead concentrations. Soil concentrations for total arsenic of less than 100 mg/kg were detected in 112 of the 136 samples (over 82% of the samples). Due to the significant number of total arsenic soil concentrations below 100 mg/kg the data profile was strongly skewed to low values and thus a normal distribution type of analysis was no longer valid.

The approach to determining a site remediation standard for total arsenic is still to employ a linear regression analysis in accordance with the protocol in the New Jersey guidance document (Development of Site-Specific Impact to Ground Water Soil Remediation Standards Using Synthetic Precipitation leaching Procedure, Version 3.0 – November 2013) with the same linear correlation criteria applying (i.e., 50% or more of the soil concentration values will be above the midpoint of the range of soil concentration values and the R^2 value using a least squares best fit method will need to be 0.70 or better). In order to modify the approach for New York State criteria, the x-axis value corresponding to the SPLP value of 25 µg/L (NYSDEC GQS for Class GA Groundwater for arsenic and lead), based upon the best fit line, will be identified as the Soil Management Level. This approach will be applied to the total lead soil concentrations and also to the Captains Cove site for both total arsenic and lead for the same reasons as stated above. Soil samples will be selected to give a representative range of values that are likely to have SPLP values bracketing 25 µg/l and also meet the linear correlation criteria of at least 50% of the soil concentration values being equal to or exceeding the range midpoint values.

Complete analytical results are summarized in **Figures 1** through **4**. Based upon the results, PWGC proposes the following for supplemental SPLP testing.

FORMER LI TUNGSTEN SITE

Arsenic Soil Sample Concentrations

Range: 105 – 845 mg/kg, midpoint value = 475 mg/kg

Total number of samples to run SPLP on: 6

Sample ID	Depth	Total Arsenic (ppm)
LPC-GD-WW3	8-10'	105
LT-C-088	6-8'	220
LT-C-096	8-10'	396
PLC2	0-2'	511
LPC-GA-EW5	8-10'	550
LPC-GA-EW5	6-8'	845

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Lead Soil Sample Concentrations
Range: 365 – 1,210 mg/kg, midpoint value = 787.5 mg/kg
Total number of samples to run SPLP on: 8

Sample ID	Depth	Total Lead (ppm)
LPC-GD-WW2	8-10'	365
PA3	6-8'	513
PLC1	4-6'	619
PLC2	0-2'	637
LT-C-095	0-2'	919
PLC1	2-4'	1,150
LT-C-094	4-6'	1,180
LT-C-095	2-4'	1,210

FORMER CAPTAINS COVE SITE

Arsenic Soil Sample Concentrations
Range: 106 – 1,050 mg/kg, midpoint value = 578 mg/kg
Total number of samples to run SPLP on: 2

Sample ID	Depth	Total Arsenic (ppm)
CC-C-042	2-4'	106
CC-C-022	0-2'	187
CC-C-019	0-2'	993
CC-C-017	0-2'	1,050

Note: Two existing samples (CC-C-019 and CC-C-022) from the initial Captain's Cove SPLP investigation will be used to supplement these results.

Lead Soil Sample Concentrations
Range: 161 – 649 mg/kg, midpoint value = 405 mg/kg
Total number of samples to run SPLP on: 6

Sample ID	Depth	Total Lead (ppm)
CC-C-040	8-10'	161
CC-C-023	2-4'	258
CC-C-042	2-4'	368
CC-C-017	8-10'	428
CC-C-017	0-2'	537
D2	8-10'	1,550

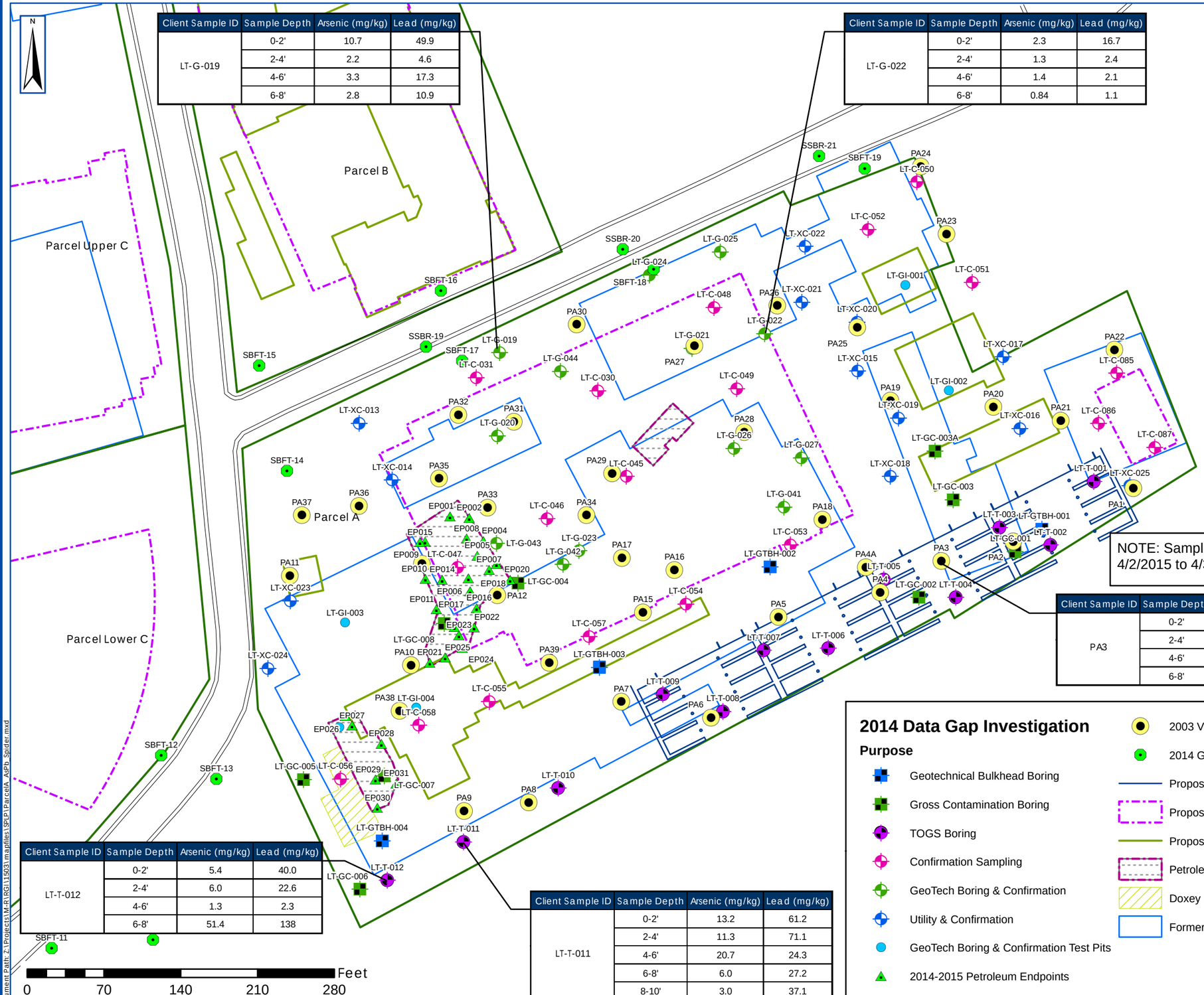
Feel free to contact us with any questions you may have.

Sincerely Yours,
P.W. Grosser Consulting

Derek Ersbak
Project Manager

Paul K Boyce, PE
Senior Vice President

FIGURES



Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-G-019	0-2'	10.7	49.9
	2-4'	2.2	4.6
	4-6'	3.3	17.3
	6-8'	2.8	10.9

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-G-022	0-2'	2.3	16.7
	2-4'	1.3	2.4
	4-6'	1.4	2.1
	6-8'	0.84	1.1

NOTE: Samples were collected from 4/2/2015 to 4/3/2015.

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
PA3	0-2'	8.8	45.6
	2-4'	11.9	54.7
	4-6'	20.6	34.1
	6-8'	25.8	513

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-T-012	0-2'	5.4	40.0
	2-4'	6.0	22.6
	4-6'	1.3	2.3
	6-8'	51.4	138

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-T-011	0-2'	13.2	61.2
	2-4'	11.3	71.1
	4-6'	20.7	24.3
	6-8'	6.0	27.2
	8-10'	3.0	37.1

2014 Data Gap Investigation

Purpose

- Geotechnical Bulkhead Boring
- Gross Contamination Boring
- TOGS Boring
- Confirmation Sampling
- GeoTech Boring & Confirmation
- Utility & Confirmation
- GeoTech Boring & Confirmation Test Pits
- 2014-2015 Petroleum Endpoints
- 2003 Verification Samples Parcel A
- 2014 Gannett Fleming Borings
- Proposed Marinas
- Proposed Building
- Proposed Underground Structures
- Petroleum Excavation
- Doxey Excavation
- Former Building Footprint

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Project:	RGI1503	Designed by:	DE
Date:	4/8/2015	Drawn by:	JCG
Scale:	AS SHOWN	Approved by:	DE

ARSENIC & LEAD RESULTS

PARCEL A

FIGURE NO: 1

SHEET:

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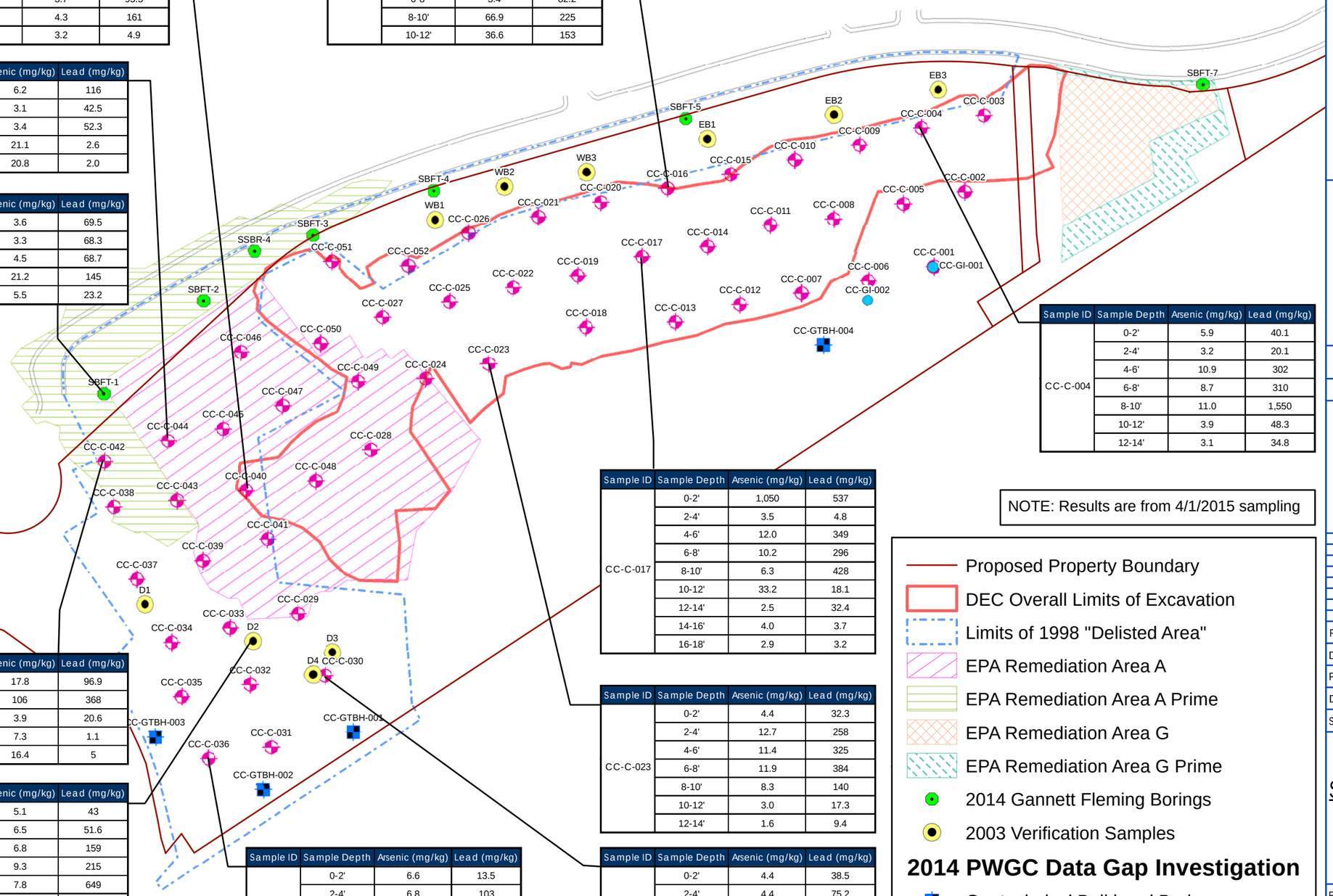
Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-040	0-2'	11.1	346
	2-4'	4.1	158
	4-6'	7.7	225
	6-8'	3.7	95.5
	8-10'	4.3	161
	10-12'	3.2	4.9

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-016	0-2'	10.2	45.3
	2-4'	4.4	26.1
	4-6'	6.1	130
	6-8'	3.4	82.2
	8-10'	66.9	225
	10-12'	36.6	153

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-044	0-2'	6.2	116
	2-4'	3.1	42.5
	4-6'	3.4	52.3
	6-8'	21.1	2.6
	8-10'	20.8	2.0

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
SBFT-1	0-2'	3.6	69.5
	2-4'	3.3	68.3
	4-6'	4.5	68.7
	6-8'	21.2	145
	8-10'	5.5	23.2



Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-004	0-2'	5.9	40.1
	2-4'	3.2	20.1
	4-6'	10.9	302
	6-8'	8.7	310
	8-10'	11.0	1,550
	10-12'	3.9	48.3
	12-14'	3.1	34.8

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-017	0-2'	1,050	537
	2-4'	3.5	4.8
	4-6'	12.0	349
	6-8'	10.2	296
	8-10'	6.3	428
	10-12'	33.2	18.1
	12-14'	2.5	32.4
	14-16'	4.0	3.7
	16-18'	2.9	3.2

NOTE: Results are from 4/1/2015 sampling

- Proposed Property Boundary
- DEC Overall Limits of Excavation
- Limits of 1998 "Delisted Area"
- EPA Remediation Area A
- EPA Remediation Area A Prime
- EPA Remediation Area G
- EPA Remediation Area G Prime
- 2014 Gannett Fleming Borings
- 2003 Verification Samples

2014 PWGC Data Gap Investigation

- Geotechnical Bulkhead Boring
- Confirmation Sampling
- GeoTech Boring & Confirmation Test Pits

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-042	0-2'	17.8	96.9
	2-4'	106	368
	4-6'	3.9	20.6
	6-8'	7.3	1.1
	8-10'	16.4	5

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
D2	0-2'	5.1	43
	2-4'	6.5	51.6
	4-6'	6.8	159
	6-8'	9.3	215
	8-10'	7.8	649
	10-12'	7.7	302
	12-14'	3.5	15.6

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-036	0-2'	6.6	13.5
	2-4'	6.8	103
	4-6'	5.3	220
	6-8'	1.8	87.6
	8-10'	1.5	3.9
	10-12'	4.0	226
	12-14'	3.0	28.7

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-023	0-2'	4.4	32.3
	2-4'	12.7	258
	4-6'	11.4	325
	6-8'	11.9	384
	8-10'	8.3	140
	10-12'	3.0	17.3
	12-14'	1.6	9.4

Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
CC-C-030	0-2'	4.4	38.5
	2-4'	4.4	75.2
	4-6'	6.7	229
	6-8'	4	79.2
	8-10'	9.2	1,210
	10-12'	4.2	239
	12-14'	4.7	12.4

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Scale:	AS SHOWN	Approved by:	DE

ARSENIC AND LEAD SOIL ANALYTICAL DATA

GLEN ISLE

FIGURE NO: 2

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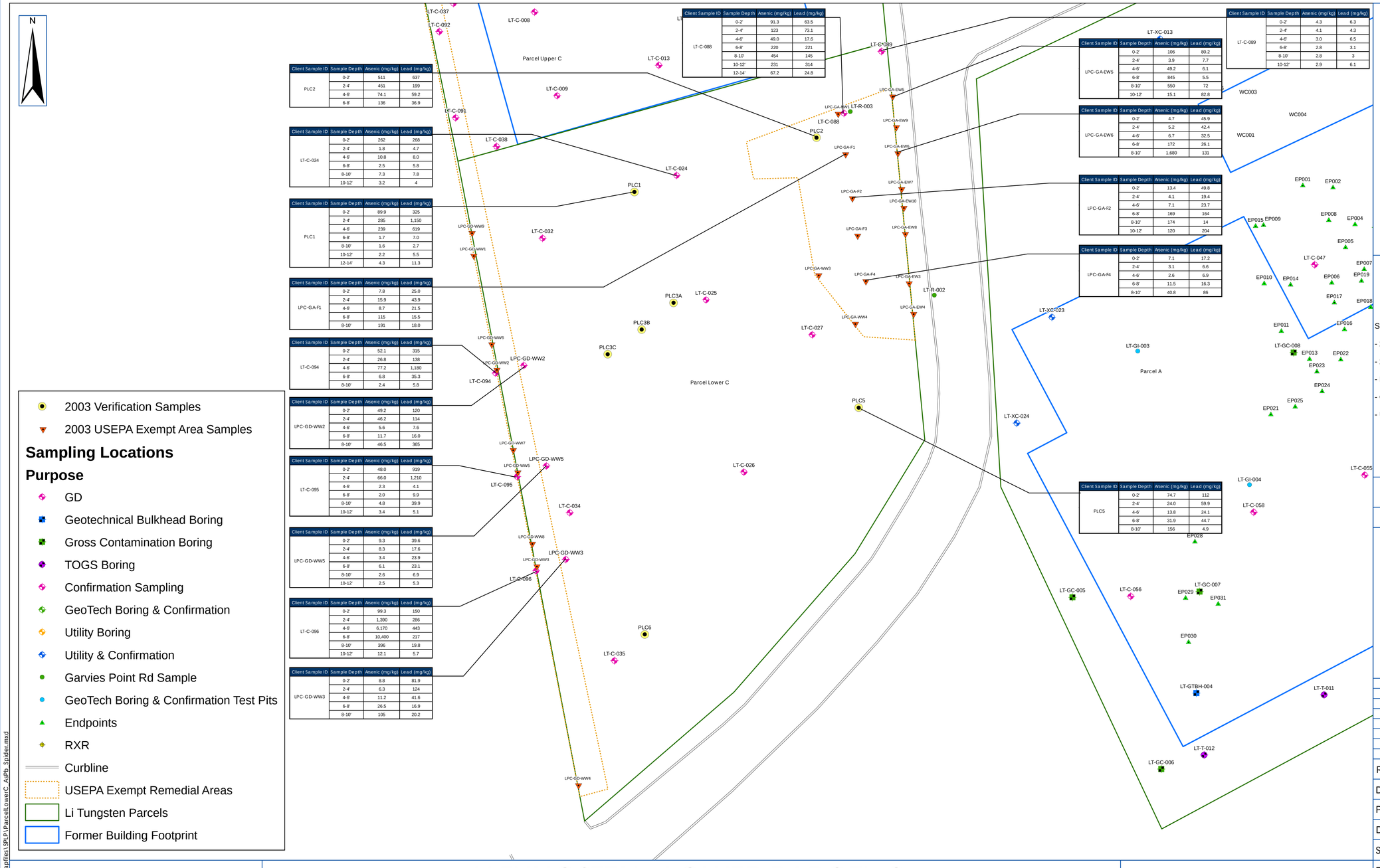

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
PLC2	0-2'	511	637
	2-4'	451	199
	4-6'	74.1	59.2
	6-8'	136	36.9

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-024	0-2'	262	268
	2-4'	1.8	4.7
	4-6'	10.8	8.0
	6-8'	2.5	5.8
	8-10'	7.3	7.8
	10-12'	3.2	4

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
PLC1	0-2'	89.9	325
	2-4'	285	1,150
	4-6'	239	619
	6-8'	1.7	7.0
	8-10'	1.6	2.7
	10-12'	2.2	5.5
	12-14'	4.3	11.3

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GA-F1	0-2'	7.8	25.0
	2-4'	15.9	43.9
	4-6'	8.7	21.5
	6-8'	115	15.5
	8-10'	191	18.0

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-094	0-2'	52.1	315
	2-4'	26.8	138
	4-6'	77.2	1,180
	6-8'	6.8	35.3
	8-10'	2.4	5.8

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GD-WW2	0-2'	49.2	120
	2-4'	46.2	114
	4-6'	5.6	7.6
	6-8'	11.7	16.0
	8-10'	46.5	365

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-095	0-2'	48.0	919
	2-4'	66.0	1,210
	4-6'	2.3	4.1
	6-8'	2.0	9.9
	8-10'	4.8	39.9
	10-12'	3.4	5.1

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GD-WW5	0-2'	9.3	39.6
	2-4'	8.3	17.6
	4-6'	3.4	23.9
	6-8'	6.1	23.1
	8-10'	2.6	6.9
	10-12'	2.5	5.3

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-096	0-2'	99.3	150
	2-4'	1,390	286
	4-6'	6,170	443
	6-8'	10,400	217
	8-10'	396	19.8
	10-12'	12.1	5.7

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GD-WW3	0-2'	8.8	81.9
	2-4'	6.3	124
	4-6'	11.2	41.6
	6-8'	26.5	16.9
	8-10'	105	20.2

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-088	0-2'	91.3	63.5
	2-4'	123	73.1
	4-6'	49.0	17.6
	6-8'	220	221
	8-10'	454	145
	10-12'	231	314
	12-14'	67.2	24.8

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-089	0-2'	4.3	6.3
	2-4'	4.1	4.3
	4-6'	3.0	6.5
	6-8'	2.8	3.1
	8-10'	2.8	3
	10-12'	2.9	6.1

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GA-EW5	0-2'	106	80.2
	2-4'	3.9	7.7
	4-6'	49.2	6.1
	6-8'	845	5.5
	8-10'	550	72
	10-12'	15.1	82.8

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GA-EW6	0-2'	4.7	45.9
	2-4'	5.2	42.4
	4-6'	6.7	32.5
	6-8'	172	26.1
	8-10'	1,680	131

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GA-F2	0-2'	13.4	49.8
	2-4'	4.1	19.4
	4-6'	7.1	23.7
	6-8'	169	164
	8-10'	174	14
	10-12'	120	204

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LPC-GA-F4	0-2'	7.1	17.2
	2-4'	3.1	6.6
	4-6'	2.6	6.9
	6-8'	11.5	16.3
	8-10'	40.8	86

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
PLC5	0-2'	74.7	112
	2-4'	24.0	59.9
	4-6'	13.8	24.1
	6-8'	31.9	44.7
	8-10'	156	4.9

- 2003 Verification Samples
- 2003 USEPA Exempt Area Samples

Sampling Locations

Purpose

- GD
- Geotechnical Bulkhead Boring
- Gross Contamination Boring
- TOGS Boring
- Confirmation Sampling
- GeoTech Boring & Confirmation
- Utility Boring
- Utility & Confirmation
- Garvies Point Rd Sample
- GeoTech Boring & Confirmation Test Pits
- Endpoints
- RXR
- Curbline
- USEPA Exempt Remedial Areas
- Li Tungsten Parcels
- Former Building Footprint

LI TUNGSTEN - LOWER PARCEL C
ARSENIC & LEAD

GLEN ISLE

0 100 200 300 400 Feet

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Sampling Dates:

- 2014 Data Gap Samples collected from 1/13/2014 to 10/24/2014
- 2003 Verification Samples collected from 10/30/2003 to 11/11/2003
- Petroleum Endpoints collected from 10/1/2014 to 2/23/2015
- Gannett Fleming Samples collected from 10/6/2014 to 11/19/2014
- USEPA Exempt Area Samples collected from 10/27/2003 to 10/30/2003

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FIGURE NO:

3

SHEET:

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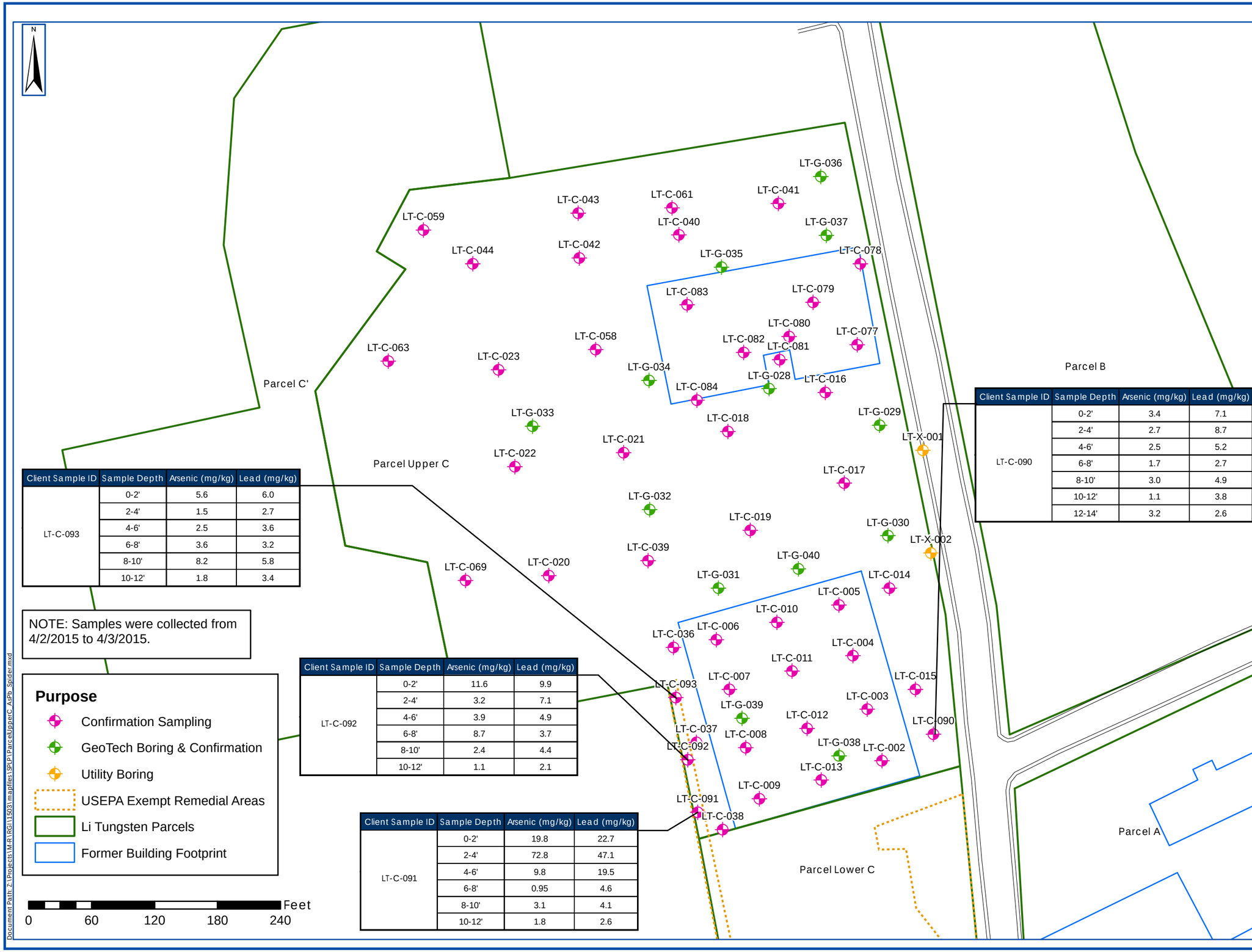

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-093	0-2'	5.6	6.0
	2-4'	1.5	2.7
	4-6'	2.5	3.6
	6-8'	3.6	3.2
	8-10'	8.2	5.8
	10-12'	1.8	3.4

NOTE: Samples were collected from 4/2/2015 to 4/3/2015.

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-092	0-2'	11.6	9.9
	2-4'	3.2	7.1
	4-6'	3.9	4.9
	6-8'	8.7	3.7
	8-10'	2.4	4.4
	10-12'	1.1	2.1

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-091	0-2'	19.8	22.7
	2-4'	72.8	47.1
	4-6'	9.8	19.5
	6-8'	0.95	4.6
	8-10'	3.1	4.1
	10-12'	1.8	2.6

Client Sample ID	Sample Depth	Arsenic (mg/kg)	Lead (mg/kg)
LT-C-090	0-2'	3.4	7.1
	2-4'	2.7	8.7
	4-6'	2.5	5.2
	6-8'	1.7	2.7
	8-10'	3.0	4.9
	10-12'	1.1	3.8
	12-14'	3.2	2.6

Purpose

- Confirmation Sampling
- GeoTech Boring & Confirmation
- Utility Boring
- USEPA Exempt Remedial Areas
- Li Tungsten Parcels
- Former Building Footprint

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ARSENIC & LEAD RESULTS

PARCEL UPPER C

FIGURE NO: 4

SHEET: