Screening Study of Surface Soil in Selected Baltimore City Parks

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1.0 Scope of Work

The Maryland Department of the Environment (MDE), Land Restoration Program (LRP) prepared this study at the request of the City of Baltimore (City). The study's purpose was to sample surface soils for metals and determine whether any public spaces or recreational areas open immediately adjacent to known LRP sites were potentially impacted by past operational activities or releases of controlled hazardous substances. Figure 1 identifies the LRP sites and adjacent parks evaluated for this study. The LRP sites are also identified in Data from MDE's X-Ray Appendix A. Fluorescence (XRF) lab, as well as confirmation of 60 percent of those samples by the Department of Health and Mental Hygiene Laboratory (DHMH) for selected analytes, has been tabulated and plotted onto Google Earth maps. LRP did not perform data validation for the collected data. Furthermore, the data has not been assessed as part of a formal toxicological evaluation of the potential long-term human health risks at each site as sampling for all environmental media was not conducted.

1.1 Executive Summary

Of the 11 parks sampled, only four contaminants, arsenic, chromium, lead and vanadium, were identified in soil samples at concentrations in excess of the Region III risk-based concentrations (RBCs) for industrial or residential soil. Middle Branch Park at Waterview Avenue and Frank Bocek Park had exceedances of EPA's residential soil standards for vanadium (at 87.7 mg/kg) and chromium (at 268 mg//kg), respectively. analytical data identified arsenic The concentrations are in exceedance of their residential RBC (0.43 mg/kg) in almost all instances.

The LRP recommends that additional sampling be conducted at the Middle Branch

Park at Cherry Hill to determine whether any additional action should be taken. The analytical data from the samples collected at the Middle Branch Park at Dickman Street identified the presence of arsenic at concentrations ranging from 24 mg/kg to 195 mg/kg. However, this property is no longer a park and is being addressed through MDE's Voluntary Cleanup Program (VCP) by the Center for Aquatic Life Conservation.

It is important to emphasize that this report represents a site screening assessment of surface soils for select metals and that the data in this report has not undergone thirdparty validation. As the analytical data is only intended for screening purposes, no formal comprehensive risk assessment has been prepared. MDE did not evaluate other pathways, such as subsurface soils or groundwater at the selected sites.

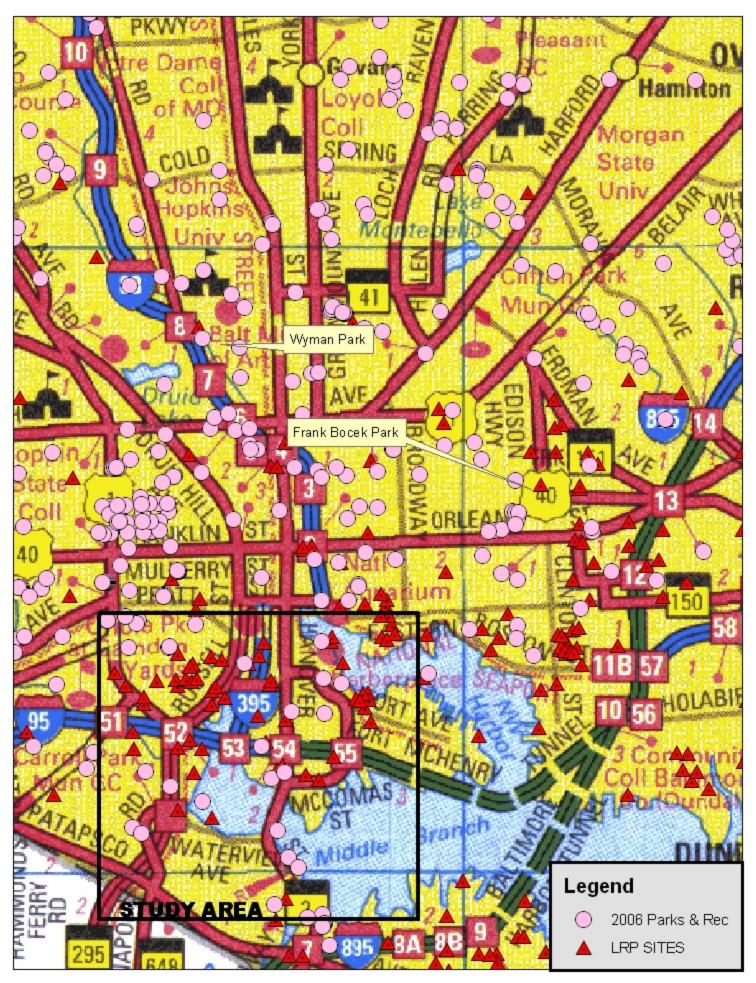
2.0 Background and Sampling Rationale

The study was initiated in response to concerns that certain parks in the area of the former Allied Chemical plant or other public open space and recreational areas may be impacted by historic releases of contamination from adjoining LRP sites.

Therefore, all parks within approximately a 1.5-mile radius of Allied Chemical were selected, as shown on Figure 1, and listed below:

- Middle Branch Park (at Waterview Avenue)
- Middle Branch Park (at Cherry Hill)
- Wegworth Park
- Leone Riverside Park
- Cherry Hill Splash Park
- Garrett Park
- Carroll Park

Figure 1 - Study Area and Outlying Parks



- Federal Hill Park
- Latrobe Park
- Ferry Bar Park

These parks are located in Baltimore City, and encompass an area south of Pratt Street, east of the intersection of I-95 and Washington Boulevard, north of Frankfurst Avenue, and west of the Fort McHenry Tunnel. The area is a mixture of industrial, residential, and commercial properties, with major thruways for roads and railroad tracks.

2.1 Description of Neighboring Use Assessment Study Area

As part of a neighboring use assessment initiative, two additional parks, Frank Bocek Park and Wyman Park, were selected based on their proximity to LRP sites, which include Brownfields, Voluntary Cleanup, State Superfund sites, and CERCLIS sites, or EPA's list of potential hazardous waste sites located immediately adjacent to public open spaces in Baltimore City. LRP combined a geographic information system (GIS) data identifying layer public parks and recreational open space provided bv Baltimore City with its own data layer identifying LRP sites in Baltimore. LRP also queried the State Department of Assessment and Taxation (SDAT) database to locate public open space that was not otherwise identified in the other data layers. Using the combined GIS data, LRP identified 32 LRP sites located immediately adjacent to public open space and conducted a file review to determine what hazardous substances were discovered on the specific LRP site¹. If the contaminants of concern have the potential for airborne mobility, LRP designated the adjacent public open space as an area for additional assessment due to potential airborne deposition.

Of the 32 LRP sites identified in the process described above, three LRP sites (Monument Street Landfill, Armco, and the Kirk-Steiff Silver) were found to have had a potential for air deposition of contaminants during their periods of operation on adjacent public open space. Frank Bocek and Wyman Parks were the closest parks to these sites

Surface soil sampling was conducted at the parks since that medium was considered the most likely to be impacted. Once the parks were selected, state personnel collected 10 samples from each park. In most cases, a duplicate sample was also collected and submitted to accompany the samples back to MDE's XRF lab. Sample locations were generally chosen in random open areas as well as in areas where a high frequency of contact with park users was expected, but away from possible sources of arsenic (i.e., treated-wood park benches). Soil sampling was conducted from May 3, 2007 to July 24, 2007.

3.0 Laboratory Analysis

The MDE's XRF lab analyzes for priority pollutant metals plus vanadium, titanium, manganese, and barium. The XRF is an instrument that is generally used for screening purposes and the XRF data has not been validated. Analytical parameters requested for confirmation from DHMH included arsenic, vanadium, chromium, and lead. In the case of Wyman and Frank Bocek Parks, silver analysis was also requested due to their proximity to a former silver jewelry manufacturer. At DHMH, the soil samples were digested and prepared using EPA Method 3050B (SW-846). The digestates were analyzed on an inductively coupled plasma-atomic emissions spectrometer (ICP-AES) according to EPA Method 200.7. All standards. reagents, QC samples and prepared calibration curves were and performed specified as in both aforementioned EPA methods.

¹ See Appendix A for a list of the LRP sites.

3.1 Collection of Screening Samples for XRF Analysis

State personnel collected surface soil samples by removing or digging below the sod where present, in order to access the soil below it. The latitude and longitude coordinates were recorded at each location. Soil was collected into whirlpacks and brought to MDE's XRF lab. The MDE analyst took a small portion of the sample out of the whirlpack bag for preparation for XRF analysis.

3.2 Collection of Samples for DHMH Laboratory Analysis

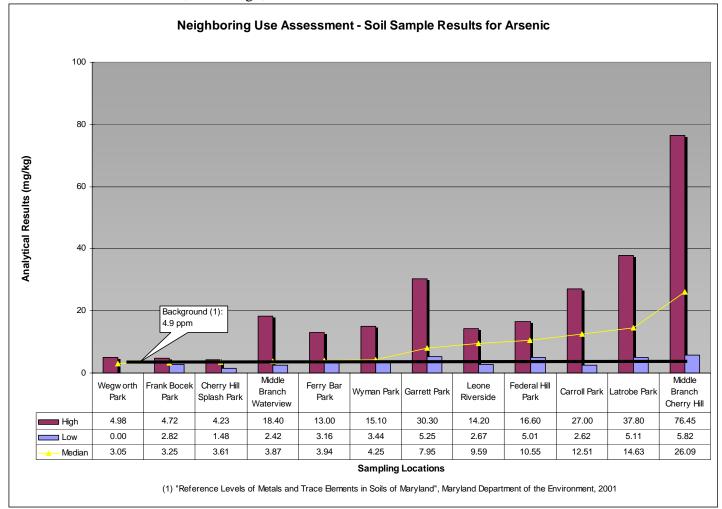
Once the XRF analysis was complete, samples were selected for laboratory confirmation at DHMH laboratory. Samples chosen for DHMH confirmation were selected based on their XRF concentrations of arsenic: two low, two high, and two intermediate concentration samples, and delivered to the DHMH lab for analysis.

3.3 Discussion of Results

Comparison of the XRF results with the DHMH results showed good relative correlation. Since the XRF is a screening tool and the DHMH analysis was performed with a more precise instrument, only the DHMH results are discussed herein.

The soil concentrations were compared to EPA Region III RBCs, using both industrial and residential screening concentrations. Neither set of screening concentration is directly applicable to a residential facility, but it can be assumed that these screening concentrations represent a range of reasonably protective comparisons.

A single soil sample each at Middle Branch



Park at Waterview Avenue and Frank Bocek Park exceeded EPA's residential soil standards for vanadium (at 87.7 mg/kg) and chromium (at 268 mg/kg), respectively. The analytical data identified arsenic concentrations are in exceedance of their residential RBC (0.43 mg/kg) in almost all instances.

3.4 Findings and Recommendations

The LRP screening study did identify certain locations in the Middle Branch Cherry Hill Park where the presence of arsenic in the surface soils appeared to be above and beyond the normal levels found in areas where pesticides and herbicides have been applied as products. LRP recommends that the City of Baltimore perform additional surface soil investigation of these areas to determine whether further action is necessary. Appendix A

Land Restoration Program Sites Evaluated for Neighboring Use Assessment Initiative

Sites to Be Sampled

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Kirk-Steiff Silver Building 800 Wyman Park Dr. Soil Metals, PAHs, TPH Yes Wyman Park, Yes Operational history included baghouse to collect air emissions from manufacturing operation
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Monument Street LF Monument St. & Edison Hwy No File on Shelf Yes Frank C. Bocek, Yes Landfill is directly across Edison Hwy from the FCB Park.

Other Sites Under Consideration For Sampling

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Fort Holabird Crime Records Center (Federal Facility) GW VOCs from UST? Yes Fort Holabird Park Need to consult with Fed. Fac.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled?	Hawkins Point Landfill (RCRA Facility) Soil, GW Chrome Tailings Yes Fort Armistead Park
Comments:	Need to consult with HWP.

Neighboring Uses Assessment Initiative List of Adjacent Open Space Properties

Other Sites Considered For Sampling

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	WATERVIEW PROPERTY 3100 Waterview Ave. Yes MIDDLE BRANCH PARK, No Already sampled
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Montgomery Park Business Center 1800 Washington Blvd. Soil, GW TPH and Metals Yes Carroll Park, 1500 Washington Blvd No Site has been capped.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	REEDBIRD LANDFILL Potee St. and Reedbird Ave. Yes CHERRYHILL PARK, 201 Reedbird Ave No Already sampled

Site Name: Address: Media of Concern:	BALTIMORE CITYSOLID WASTE FACILITY 701 REEDBIRD AVE
Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Yes CHERRYHILL PARK, 201 Reedbird Ave No Already sampled
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space:	American Visionary Art Museum 820 Key Highway Soil As, Hg, Pb, SVOCs Yes Federal Hill Park, 300 N Warren Ave.
Adjacent Open Space to be Sampled? Comments:	No Unpaved park areas higher elevation than AVAM.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space?	RITZ CARLTON 801 KEYHIGHWAY No
Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	FEDERAL HILL PARK, No
Site Name: Address: Media of Concern: Contaminant of Concern:	ALLIED CHEMICAL - AG PLT 2000 Race Street
Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	No SWANN PARK, No Already sampled
Site Name: Address: Media of Concern:	DPW/MIDDLE BRANCH PARK 101 W. Cromwell St.
Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Yes MIDDLE BRANCH PARK, No Already sampled

Site Name:	Bloede Manfactuing
Address:	700 Block of Caton Ave.
Media of Concern:	Soil, SW
Contaminant of Concern:	Metals, PAHs, Pesticides
Adjacent Public Open Space?	Yes
Name of Adjacent Open Space:	,
Adjacent Open Space to be Sampled?	No
Comments:	Site not adjoined by parks or residences.
Site Name:	Cold Spring Lane LF
Address:	2221 W. Coldspring Ln.
Media of Concern:	Soil, Sediment
Contaminant of Concern:	Metals, PAHs
Adjacent Public Open Space?	Yes
Name of Adjacent Open Space:	Cylburn Park,
Adjacent Open Space to be Sampled?	No
Comments:	Landfill surrounds Cylburn Park.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	CLIPPER INDUSTRIAL PARK 3500 Clipper Road No DRUID HILL PARK, No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	BOWLEYS LANE LANDFILL 6101 BOWLEY LANE No HERRING RUN PARK, No Area already under investigation
Site Name:	Lower Herring Run Park
Address:	End of Aldricks Way
Media of Concern:	Soil, Sediment
Contaminant of Concern:	S: As, Pb, B(a)P, Sed: fluorathene
Adjacent Public Open Space?	Yes
Name of Adjacent Open Space:	Herring Run Park & Armistead Gardens,
Adjacent Open Space to be Sampled?	No
Comments:	Adjoins Herring Run Park & Armistead Gardens neighborhood.

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Hutton Landfill E&W 4825-4835 Windsor Mill Road Soil, SW, Sediment As, Be, Fe, Mn Yes Leakin Park, No Site located in the park, adjacent to outdoor education center.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	American Shot & Lead Co. 701 E. Fayette St. Soil Lead Yes , No Small park. Placed on FIS. Entire site excavated in 1968-69.
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Proctor & Gamble Soap Manufacturing 1422 Nicholson Street No 900 HULL STREET, No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	3800 E. Biddle St. Soil, GW Soil: As, Pb, B(a)P; GW: Pb, Hg Yes School? Not shown on ADC Map., 1401 E. Biddle St.? No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	3800 E. Biddle St. Soil, GW Soil: As, Pb, B(a)P; GW: Pb, Hg Yes Park? Not shown on ADC Map., 1050 N. Caroline St.? No

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	FORT MCHENRYSHIPYRD No CONSTELLATION PLAZA, No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	KANE & LOMBARD DRUM SITE 6200 E. Pratt St. No JOSEPH LEE PARK, No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	KANE & LOMBARD DRUM SITE 100 Kane St. No PATTERSON HS, No
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	MARTIN MARIETTA 1401 Fillmore St. Produced paste inks, etc. Oils, glycols, kerosene Yes COLDSTREAM PARK ES & MS, No Site evaluated and issued NFA by MDE and EPA
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Maryland White Lead Works 1215 E. Fort St. No File on Shelf Yes 1215 E. Fort Ave., No Site evaluated and issued NFA by MDE and EPA

Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Ainsworth Paint 3200 E. Biddle Street No File on Shelf Drums of chemicals, ASTs and USTs No No Drummed chemicals, ASTs and USTs removed from site.
Site Name:	PARKER METALS/AMERICAN CHEMMATE
Address:	1044 Ledenhall St.
Media of Concern:	Subsurface soil, gw
Contaminant of Concern:	PCE, BTEX, metals,
Adjacent Public Open Space?	Yes
Name of Adjacent Open Space:	SCHOOL/150 W. WEST ST.,
Adjacent Open Space to be Sampled?	No
Comments:	No onsite risk, issued NFRD
Site Name: Address: Media of Concern: Contaminant of Concern: Adjacent Public Open Space? Name of Adjacent Open Space: Adjacent Open Space to be Sampled? Comments:	Seton Business Park Metro Drive Soil, Sediment Metals, PAHs, PCBs No No No parks shown in vicinity of site on ADC map.
Site Name:	Ackerman & Baines
Address:	4215 Erdman Ave.
Media of Concern:	Soil
Contaminant of Concern:	As, Hg, Pb; As
Adjacent Public Open Space?	Yes
Name of Adjacent Open Space:	Archbishop Curley HS,
Adjacent Open Space to be Sampled?	No
Comments:	Property capped

Appendix B

Data Tables and Google Earth Maps Showing Arsenic Concentrations

Carroll Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

Sample ID	EPA RBC		CAP-1		CAP-2		CAP-3		CAP-4		CAP-5		CAP-6		CAP-7		CAP-8		CAP-9*		CAP- 10	
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	днмн	XRF	рнмн	XRF	днмн	XRF	рнмн	XRF	рнмн	XRF	днмн	XRF	рнмн	XRF	рнмн	XRF	днмн	XRF	DHMH
Arsenic	1.9	0.43	23.3	17.1	0.9	2.62	36.4	NA	26.3	NA	41.6	27	18.7	NA	13	7.92	14.9	7.16	4.1 7.4	NA	36	22.1
Vanadium	1000	78	80	26	бб.1	34.9	135.3	NA	б 7.7	NA	157.7	43	122.3	NA	71.5	32	133.7	38.4	142.6 145.9	NA	230.4	71
Thallium			9.5	NA	3.9	NA	8.6	NA	ND	NA	3.5	NA	ND	NA	ND	NA	3.7	NA	ND 7.3	NA	ND	NA
Titanium			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA
Chromium	3100	230	115.5	25.7	136.2	47.9	129.8	NA	186.6	NA	138.3	40.2	101.5	NA	148.7	36.5	66.5	35.9	37.4 37.6	NA	238.6	63.7
Manganese			239.1	NA	750.6	NA	288.3	NA	280.5	NA	370.8	NA	343.4	NA	446	NA	958	NA	383.5 411.7	NA	1368	NA
Nickel			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	85.8	NA
Copper			41.6	NA	86.4	NA	50.3	NA	62.2	NA	76	NA	52.7	NA	92.7	NA	53.7	NA	14.4 17.1	NA	110.1	NA
Zinc			154.4	NA	2628.4	NA	139.5	NA	128.9	NA	177.5	NA	180.8	NA	203.4	NA	134.5	NA	56.9 49.6	NA	363.9	NA
Selenium			ND	NA	ND	NA	0.4	NA	ND	NA	ND	NA	ND	NA	1.9	NA	2.9	NA	1.1 ND	NA	ND	NA
Silver	5100	390	1	NA	6.4	NA	1.9	NA	ND	NA	0.3	NA	2.9	NA	0.7	NA	ND	NA	ND 1.3	NA	ND	NA
Cadmium			1.3	NA	7.8	NA	ND	NA	3	NA	ND	NA	4	NA	0.5	NA	ND	NA	0.3 ND	NA	1.1	NA
Antimony			6.4	NA	ND	NA	2.2	NA	1.6	NA	1.1	NA	0.9	NA	3.6	NA	12.2	NA	ND 3.9	NA	2	NA
Barium			210.9	NA	1180.9	NA	267.3	NA	246.7	NA	263.3	NA	373.2	NA	364.3	NA	360.8	NA	847.6 1047.8	NA	265.5	NA
Lead			219.5	123	354.2	243	187.4	NA	193.5	NA	225.1	214	210.4	NA	241.6	159	81.8	47.2	21.5 21.1	NA	302.5	224
Mercury			5.9	NA	ND	NA	ND	NA	12.4	NA	3.8	NA	11.1	NA	ND	NA	ND	NA	ND ND	NA	ND	NA
																			1912			<u> </u>

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Cherry Hill Splash Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample CHS-5, results are as follows: XRF / XRF DUP / DHMH.

Sample ID		RBC	CHS-1		CHS-2		CHS-3		CHS-4		CHS-5*		CHS-6		CHS-7		CHS-8		CHS-9		CH	IS-10
	Industrial	Residential	VDE	DUDAU	VDE	DUDAU	VDE	DUDIU	VDE	DUMU	VDE	DUDAU	NDE	DUDAU	NDE	DUDIN	NDE	DIII	NDE	DUNUU	NDE	DUNU
Analytes	(mg/kg)	(mg/kg)	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF 8.7	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH
Arsenic	1.9	0.43	4.7	NA	7	3.66	4.4	3.55	10.3	3.83	12.6	1.49	ND	1.48	12.8	4.23	10.4	NA	ND	NA	10.9	NA
Vanadium	1000	78	72.6	NA	94.7	26.6	103.6	29.3	113.5	35.2	121.5 74.0	47.2	42.6	17.4	77.6	40.6	63.3	NA	104.2	NA	240.2	NA
Thallium			ND	NA	ND	NA	2.6	NA	4.9	NA	4.0 ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Titanium			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Chromium	3100	230	58.6	NA	59.2	20.5	61.3	20.3	143	38.3	69.7 74.8	34.5	35.2	8.7	80.4	21.1	бб	NA	165	NA	113.4	NA
Manganese			164.6	NA	152.4	NA	227.1	NA	279.3	NA	260.9 289.1	NA	100.6	NA	147.3	NA	1020.4	NA	428.9	NA	737.4	NA
Nickel			66	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	15.7	NA	24.8	NA	32.3	NA	ND	NA
Copper			17.9	NA	33.4	NA	16.2	NA	55.7	NA	38.2 40.7	NA	19.4	NA	39.3	NA	55.7	NA	58.7	NA	63.9	NA
Zinc			230.6	NA	123.8	NA	68.2	NA	193.3	NA	68.7 70.9	NA	37	NA	90.1	NA	70.5	NA	117.4	NA	801.4	NA
Selenium			ND	NA	0.5	NA	0.3	NA	ND	NA	0.2 0.4	NA	2.3	NA	ND	NA	ND	NA	ND	NA	ND	NA
Silver	5100	390	ND	NA	0.8	NA	ND	NA	3.3	NA	ND 2.5	NA	ND	NA	0.8	NA	1.6	NA	3.3	NA	ND	NA
Cadmium			0.9	NA	0.7	NA	1.4	NA	1.1	NA	0.8 ND	NA	1.4	NA	0.5	NA	ND	NA	1.3	NA	ND	NA
Antimony			3.7	NA	3.3	NA	1.9	NA	12.3	NA	ND 13.6	NA	4.7	NA	2	NA	8.2	NA	ND	NA	б.2	NA
Barium			274.4	NA	239.6	NA	191.5	NA	154.9	NA	647.4 704.3	NA	93.5	NA	303.1	NA	124.3	NA	253.1	NA	289.8	NA
Lead			37.4	NA	27	17.8	32.6	18.6	139.1	94.8	36.5 23.3	29.3	13.1	<12.5	86	66.3	44.7	NA	127.7	NA	118.3	NA
Mercury			ND	NA	ND	NA	4.2	NA	ND	NA	ND ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA

Cherry Hill Splash Park Data Table in mg/kg (XRF and DHMH)

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Federal Hill Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample FHP-5, results are as follows: XRF / XRF DUP / DHMH.

Federal Hill Park Data Table in mg/kg (XRF and DHMH)

Sample ID	EPA	RBC	FF	IP-1	F	HP-2	F	HP-3	FH	P-4	FH	P-5*	FI	I Р-б	FI	IP-7	FF	IP-8	FI	HP-9	FH	P-10
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	рнмн	XRF	днмн	XRF	рнмн	XRF	днмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн
Arsenic	1.9	0.43	36.9	16.6	13.3	NA	11.4	5.01	8.2	9.69	16.9 18.3	5.86	15.4	13.8	11.8	NA	13.2	NA	21	11.4	ND	NA
Vanadium	1000	78	82.3	43.1	82.5	NA	165.6	34.1	93.3	36.2	111.0 83.3	32.4	186.2	50.8	111.1	NA	132	NA	109.6	38.9	21.1	NA
Thallium			ND	NA	ND	NA	ND	NA	ND	NA	ND 2.6	NA	ND	NA	ND	NA	ND	NA	ND	NA	2	NA
Titanium			ND	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Chromium	3100	230	237	63.6	127.1	NA	110.8	37.4	242.2	52.6	190.4 147.3	38.4	243.8	69.2	165.8	NA	142	NA	184.5	49	4.8	NA
Manganese			533.4	NA	663.6	NA	715	NA	366.8	NA	278.8 286.2	NA	433.4	NA	804	NA	362.8	NA	515.9	NA	9.9	NA
Nickel			ND	NA	ND	NA	ND	NA	ND	NA	ND 18.4	NA	ND	NA	ND	NA	ND	NA	ND	NA	2.5	NA
Copper			89.6	NA	36	NA	45.3	NA	91.5	NA	49.9 70.0	NA	85.6	NA	72.5	NA	45.9	NA	71.6	NA	2.2	NA
Zinc			250.3	NA	148.6	NA	136.5	NA	302.1	NA	122.0 114.5	NA	183.9	NA	169.5	NA	113.2	NA	223.5	NA	14.2	NA
Selenium			0.2	NA	2	NA	0.1	NA	2.8	NA	0.6 ND	NA	2.6	NA	ND	NA	ND	NA	ND	NA	ND	NA
Silver	5100	390	ND	NA	1.9	NA	4.4	NA	0.3	NA	3.2 ND	NA	ND	NA	3.1	NA	ND	NA	3.5	NA	2.4	NA
Cadmium			1.4	NA	1.5	NA	ND	NA	1.7	NA	ND ND	NA	0.1	NA	0.6	NA	1	NA	2.7	NA	0.2	NA
Antimony			7.2	NA	3.3	NA	1.2	NA	10	NA	2.0 ND	NA	8.5	NA	б.8	NA	ND	NA	ND	NA	12.4	NA
Barium			449.1	NA	347	NA	399.2	NA	334.8	NA	311.5 278.3	NA	475.5	NA	411.4	NA	346.2	NA	335.5	NA	130.8	NA
Lead			342.2	285	189.2	NA	90.8	59.8	252.6	202	162.2 136.6	129	214.3	184	146.9	NA	113.3	NA	253	230	10.5	NA
Mercury			ND	NA	ND	NA	ND	NA	7.4	NA	6.7 ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	2.2	NA

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND - not detected. NA - not analyzed.

Ferry Bar Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

Ferry Bar Park Data Table in mg/kg (XRF and DHMH)

Sample ID	EPA	ARBC	FF	3P-1	FE	3P-2	FE	3P-3	FB	P-4	FI	3P-5	F	ВР-б	FI	3P-7	FBI	P-8*	FI	BP-9	FB	P-10
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	днмн	XRF	DHMH	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн
	(ing/kg)	0.43								3.55			1			4.33	ND			NA		
Arsenic	1.9	0.43	19.5	3.16	14.2	NA	56.9	13	ND	3.00	24	NA	24.4	6.6	34.9	4.33	15.2	NA	10.8	NA	3.8	3.35
Vanadium	1000	78	94.9	35.5	70.7	NA	169.4	68.6	161.4	41.7	128	NA	198.6	37.9	225	54.2	82.6 103.6	NA	194.7	NA	105	44.4
Thallium			4.3	NA	ND	NA	ND	NA	ND	NA	15.9	NA	ND	NA	ND	NA	2.6 ND	NA	ND	NA	1.9	NA
Titanium			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	ND	NA
Chromium	3100	230	128	29	259	NA	2328.5	44	180.7	36.2	7154	NA	7234.5	63.7	5613.4	45.5	66.2 90.9	NA	362.7	NA	109.9	34.6
Manganese			907.9	NA	877.8	NA	4607.1	NA	778.6	NA	1592.3	NA	1850.3	NA	1670.8	NA	199.4 211.1	NA	1072.6	NA	877.7	NA
Nickel			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	ND	NA
Copper			66.3	NA	180.8	NA	242.5	NA	46.4	NA	1260.8	NA	1771.8	NA	783.9	NA	21.3 24.0	NA	93.2	NA	46	NA
Zinc			163	NA	446.7	NA	1660.6	NA	124.3	NA	1086.8	NA	1526.7	NA	687.2	NA	47.6 63.2	NA	314.2	NA	124.7	NA
Selenium			ND	NA	0.7	NA	б.4	NA	1.2	NA	ND	NA	ND	NA	ND	NA	0.2 ND	NA	0.6	NA	ND	NA
Silver	5100	390	ND	NA	ND	NA	3.5	NA	ND	NA	3.2	NA	ND	NA	ND	NA	2.5 ND	NA	2.9	NA	0.8	NA
Cadmium			ND	NA	1.8	NA	ND	NA	ND	NA	7.5	NA	4.4	NA	2.9	NA	ND ND	NA	1.2	NA	ND	NA
Antimony			ND	NA	2.9	NA	19.1	NA	10.3	NA	16	NA	13.2	NA	3.3	NA	ND ND	NA	ND	NA	ND	NA
Barium			733.8	NA	530.4	NA	440.3	NA	1400.4	NA	298.2	NA	295.3	NA	315.5	NA	351.2 385.5	NA	811.4	NA	1463.3	NA
Lead			34.4	24.6	218.8	NA	465.9	256.1	51.1	23.8	288.6	NA	329.8	241.4	162.3	151.6	47.5 42.0	NA	122.4	NA	53.5	26.2
Mercury			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	8.7 ND	NA	ND	NA	ND	NA

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Frank Bocek Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

| EPA | RBC | FI | የጉ-1 | FI | RP-2 | FI

 | RP-3 | FR | P-4 | FI | RP-5 | FF | የ-6 | FI | थ - -7
 | FI
 | 2P-8 | FI
 | P-9 | FR | P-10 |
|-----------------------|--|--|---|---|---
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---|---
--|---|---|---|---|---|---

--|--
--|--|---|---|
| Industrial
(mg/kg) | Residential
(mg/kg) | XRF | рнмн | XRF | рнмн | XRF

 | рнмн | XRF | DHMH | XRF | рнмн | XRF | DHMH | XRF | онмн
 | XRF
 | днмн | XRF
 | рнмн | XRF | рнмн |
| 1.9 | 0.43 | ND | 3.28 | 10.2 | 4.72 | ND

 | NA | ND | NA | б.1 | 3.21 | 3.9 | 3.28 | 5 | 2.82
 | 6.2
 | NA | ND
 | NA | 4.7 | 2.99 |
| 1000 | 78 | 45.2 | 30.9 | 85.5 | 36.7 | 96.3

 | NA | 126.4 | NA | 95.1 | 30.7 | 68 | 29 | 134.9 | 44.8
 | 152.4
 | NA | 133.5
 | NA | 142.8 | 44.9 |
| | | ND | NA | 8.8 | NA | ND

 | NA | ND | NA | ND | NA | 1.8 | NA | ND | NA
 | ND
 | NA | 3.1
 | NA | 3.6 | NA |
| | | ND | NA | ND | NA | ND

 | NA | ND | NA | ND | NA | ND | NA | ND | NA
 | ND
 | NA | ND
 | NA | ND | NA |
| 3100 | 230 | 182.8 | 84.5 | 158.2 | 56.4 | 169.8

 | NA | 245.6 | NA | 281.2 | 70.3 | 159.9 | 45.2 | 154.7 | 47.6
 | 205.8
 | NA | 356.3
 | NA | 333.8 | 268 |
| | | 405.5 | NA | 409 | NA | 842.1

 | NA | 401.4 | NA | 401.4 | NA | 236.6 | NA | 678.3 | NA
 | 351.5
 | NA | 334.9
 | NA | 398.6 | NA |
| | | ND | NA | 21.3 | NA | ND

 | NA | 79.6 | NA | 57.6 | NA | 46.2 | NA | ND | NA
 | ND
 | NA | 92.3
 | NA | 99.7 | NA |
| | | 45.9 | NA | 37.9 | NA | 52.1

 | NA | 43.4 | NA | 49.6 | NA | 35.5 | NA | 34.2 | NA
 | 87
 | NA | 61.2
 | NA | 44.5 | NA |
| | | 168.5 | NA | 173.4 | NA | 113.1

 | NA | 102.1 | NA | 149.3 | NA | 168 | NA | 104.6 | NA
 | 125.6
 | NA | 145
 | NA | 199.7 | NA |
| | | 0.8 | NA | ND | NA | ND

 | NA | ND | NA | 0.3 | NA | 3 | NA | 3.5 | NA
 | ND
 | NA | ND
 | NA | ND | NA |
| 5100 | 390 | 7.2 | <1.25 | 0.8 | <1.25 | 1.4

 | NA | ND | NA | ND | <1.25 | 0.9 | <1.25 | ND | <1.25
 | 0.5
 | NA | ND
 | NA | 1.6 | <1.25 |
| | | 1.4 | NA | 2.5 | NA | 0.043

 | NA | ND | NA | 1.7 | NA | 1.3 | NA | 1.2 | NA
 | 0.3
 | NA | ND
 | NA | 0.5 | NA |
| | | 1.2 | NA | 10 | NA | 4.2

 | NA | 2.7 | NA | 2.6 | NA | ND | NA | 4 | NA
 | 1.6
 | NA | 5.8
 | NA | 4.5 | NA |
| | | 356 | NA | 324.8 | NA | 517

 | NA | 285.8 | NA | 259.1 | NA | 267.7 | NA | 471.5 | NA
 | 329.9
 | NA | 283.5
 | NA | 261.9 | NA |
| | | 135.9 | 106.5 | 169.7 | 138 | 45.7

 | NA | 80.4 | NA | 97.1 | 70.3 | 142.6 | 114.6 | 39.2 | 25.9
 | 141.8
 | NA | 152.1
 | NA | 139 | 99.5 |
| | | ND | NA | ND | NA | ND

 | NA | ND | NA | 0.9 | NA | ND | NA | ND | NA
 | 5
 | NA | 1.4
 | NA | 0.047 | NA |
| | Industrial
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5100 | (mg/kg) (mg/kg) 1.9 0.43 1000 78 3100 230 3100 230 5100 390 5100 390 | Industrial
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(mg/kg) Residential
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Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

 $ND-not \ detected. \ NA-not \ analyzed.$

Garrett Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample GRP-9, results are as follows: XRF / XRF DUP / DHMH.

Garrett Park Data Table in mg/kg (XRF and DHMH)

Sample ID	EPA	RBC	GI	RP-1	GI	RP-2	GI	RP-3	GR	P-4	GI	RP-5	G	RP-6	GI	RP-7	GI	RP-8	GR	P-9*	GR	P-10
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	рнмн	XRF	днмн	XRF	рнмн	XRF	рнмн	XRF	DHMH	XRF	рнмн	XRF	рнмн	XRF	онмн	XRF	DHMH
Arsenic	1.9	0.43	43.7	30.3	15.7	9.46	10.7	NA	10.7	NA	37.4	27.7	5.1	NA	23.8	5.25	16.4	NA	7.6 5.0	6.44	17.4	6.38
Vanadium	1000	78	134.1	31.1	147.5	30	148.6	NA	117.1	NA	118.1	32.1	98.5	NA	65.5	33	106.3	NA	73.3 108.2	30 <i>.5</i>	124.7	48.2
Thallium			ND	NA	2.7	NA	ND	NA	ND	NA												
Titanium			ND	NA	ND	NA	ND	NA														
Chromium	3100	230	136.9	44.5	117.3	45	232.8	NA	177	NA	110.7	27.6	151.7	NA	129.8	33.8	216.7	NA	146.9 182.0	48.2	214.9	44.6
Manganese			343.2	NA	340	NA	587.6	NA	463.7	NA	324.1	NA	870	NA	534.6	NA	526.1	NA	305.8 311.0	NA	606.7	NA
Nickel			ND	NA	ND	NA	ND	NA	ND	NA	23.5	NA	ND	NA	ND	NA	55.7	NA	ND	NA	ND	NA
Copper			76.2	NA	67.4	NA	66.8	NA	61.1	NA	37.6	NA	57.1	NA	65.1	NA	92.1	NA	105.1 132.6	NA	65.2	NA
Zinc			223.7	NA	332.4	NA	210.1	NA	148.2	NA	120.2	NA	145.7	NA	115.9	NA	237.9	NA	305.2 332.5	NA	207.3	NA
Selenium			1.1	NA	2	NA	ND	NA	1.3	NA	2.9	NA	1	NA	0.6	NA	2.9	NA	1.0 0.8	NA	ND	NA
Silver	5100	390	0.3	NA	1.2	NA	0.7	NA	5.2	NA	1.8	NA	0.8	NA	1.9	NA	0.9	NA	5.6 8.2	NA	1.7	NA
Cadmium			1.1	NA	3.5	NA	0.4	NA	3.2	NA	0.2	NA	0.3	NA	0.4	NA	1.3	NA	ND 3.3	NA	1.1	NA
Antimony			15.7	NA	9	NA	11.2	NA	ND	NA	ND	NA	ND	NA	0.2	NA	0.9	NA	11.6 5.2	NA	4.6	NA
Barium			313.3	NA	297.3	NA	375.4	NA	334.6	NA	422.3	NA	497.6	NA	309.2	NA	362.8	NA	389.5 453.5	NA	473.7	NA
Lead			206.5	164	208.6	132	166.9	NA	114.5	NA	98.4	74.7	98.6	NA	52.5	52.7	174.2	NA	208.2 231.6	150	179.6	135
Mercury			ND	NA	ND	NA	ND	NA	3	NA	ND	NA	12.4	NA	ND	NA	ND	NA	4.4 ND	NA	ND	NA

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND - not detected. NA - not analyzed.

Latrobe Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample LAT-4, results are as follows: XRF / XRF DUP / DHMH.

Latrobe Park Data Table in mg/kg (XRF and DHMH)

Sample ID	EPA	RBC	LA	AT-1	LA	AT-2	LA	AT-3	LA	[-4*	LA	T-5	LA	Т-б	LA	AT-7	LA	AT-8	LA	AT-9	LA	T-10
A sue laste a	Industrial	Residential	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн
Analytes	(mg/kg)	(mg/kg)							31.3													
Arsenic	1.9	0.43	12.5	5.11	18.5	NA	55.1	37.8	27.4	19.4	32.7	NA	28.2	NA	24.9	9.75	20.3	NA	37.6	22	20.7	9.86
Vanadium	1000	78	77.7	29	147	NA	191.8	42.7	125.5 136.1	33	110.9	NA	90.8	NA	62.6	12.5	80.7	NA	71.9	38.1	147.8	31
Thallium			ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	ND	NA	3.3	NA	ND	NA	ND	NA	3.1	NA
Titanium			ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA										
Chromium	3100	230	158.2	27.8	336.1	NA	186.7	47.3	276.8 223.4	35.7	181.8	NA	144.2	NA	166.8	26.2	158.9	NA	174.7	36.8	134.8	30.3
Manganese			293.5	NA	408.9	NA	470.5	NA	302.6 367.1	NA	329.7	NA	420.2	NA	144.6	NA	252.2	NA	275.9	NA	404.2	NA
Nickel			ND	NA	ND	NA	ND	NA	ND 25.9	NA	ND	NA	ND	NA	23.4	NA	ND	NA	ND	NA	ND	NA
Copper			52.7	NA	154	NA	89.1	NA	51.5 46.5	NA	153.8	NA	117.5	NA	31	NA	73.8	NA	92.2	NA	107.9	NA
Zinc			122.2	NA	280.8	NA	161.3	NA	186.3 200.4	NA	239.6	NA	310	NA	130.4	NA	169.7	NA	179.2	NA	2637.4	NA
Selenium			1.2	NA	3	NA	1.3	NA	1.9 ND	NA	0.6	NA	0.7	NA	ND	NA	ND	NA	1.6	NA	ND	NA
Silver	5100	390	ND	NA	ND	NA	2.6	NA	ND ND	NA	4.3	NA	0.6	NA	ND	NA	1.9	NA	0.6	NA	ND	NA
Cadmium			ND	NA	0.4	NA	2.9	NA	4.5 1.8	NA	1.9	NA	0.1	NA	0.2	NA	ND	NA	0.4	NA	2.3	NA
Antimony			14.7	NA	3.7	NA	ND	NA	1.0 5.8	NA	0.8	NA	10.1	NA	3.5	NA	ND	NA	9.9	NA	9.6	NA
Barium			292.8	NA	374.9	NA	403.9	NA	253.2 353.5	NA	283.9	NA	387.2	NA	124.3	NA	247.2	NA	293.9	NA	219	NA
Lead			72.9	42.4	213.7	NA	182.4	129.9	134.1 146.6	91.3	123.3	NA	202.6	NA	82.4	70.9	92.6	NA	101.1	76.3	111.2	92.6
Mercury			ND	NA	ND	NA	11.1	NA	ND ND	NA	ND	NA										

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND - not detected. NA - not analyzed.

Leone Riverside Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample LEO-4, results are as follows: XRF / XRF DUP / DHMH.

Industrial			EO-1		EO-2	L	0-3	LEC)-4*	LE	0-5	LE	0-6	LE	0-7	LE	EO-8	LE	0-9	LE	0-10
(Residential	XRF	БИМИ	NDE	БШАЦІ	NDE	БШАШ	NDE	рнмн	VDE	DUMU	VDE	DUMU	NDE	рнмн	NDE	рнмн	VDE	БИМИ	NDE	DUMU
(mg/kg)	(mg/kg)	XKF	DHMH	XRF	DHMH	XRF	DHMH	XRF 14.4	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH
1.9	0.43	14.3	NA	18.2	NA	5.3	2.67	5.5	6.37	13.5	NA	13	5.32	21.3	12.8	12.7	NA	37.5	14	26	14.2
1000	78	91.8	NA	111.3	NA	97.8	28.9	89.4 96.7	29.6	62	NA	68.1	26	66.5	33.6	103	NA	213.2	42.5	118	34.6
		ND	NA	8.9	NA	ND	NA	ND 2.7	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
		ND	NA	ND	NA	ND	NA	ND ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
3100	230	198.5	NA	255.8	NA	127.4	23.4	94.8 77.2	24.1	92	NA	103.8	19.7	197.2	35.2	180.2	NA	282.7	52.2	284.7	70.4
		385.9	NA	515.4	NA	302.2	NA	472.6 432.0	NA	295.7	NA	373.8	NA	296.3	NA	329.4	NA	180.8	NA	264.2	NA
		ND	NA	25.8	NA	ND	NA	ND ND	NA	11.2	NA	ND	NA	59.9	NA	ND	NA	ND	NA	ND	NA
		73.2	NA	101.8	NA	26	NA	46.5 59.9	NA	36.3	NA	24.8	NA	98.3	NA	63.5	NA	72.8	NA	137.6	NA
		161.1	NA	299.5	NA	51.5	NA	104.0 94.8	NA	135.9	NA	66.6	NA	145.5	NA	139.2	NA	112.4	NA	182.7	NA
		0.3	NA	ND	NA	ND	NA	2.3 3.8	NA	0.8	NA	1.4	NA	ND	NA	0.4	NA	3.3	NA	4.1	NA
5100	390	2.6	NA	ND	NA	0.2	NA	ND 4.8	NA	2.9	NA	ND	NA	ND	NA	4.9	NA	1.5	NA	5.1	NA
		ND	NA	1.1	NA	ND	NA	0.4 2.4	NA	0.3	NA	ND	NA	ND	NA	1.9	NA	2	NA	ND	NA
		ND	NA	12.5	NA	ND	NA	2.3 5.2	NA	1.9	NA	ND	NA	11.2	NA	10.7	NA	8.4	NA	18.9	NA
		362.5	NA	254.1	NA	483.1	NA	207.4 299.5	NA	278.8	NA	287.7	NA	255.2	NA	325.7	NA	262.2	NA	299.4	NA
		180.2	NA	305.4	NA	24.4	14.3	59.6 68.7	44.7	59.7	NA	49.9	38.1	131.2	96.3	165.3	NA	144.9	115.8	277.4	194.5
		ND	NA	ND	NA	2.4	NA	ND ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
	3100	1000 78 1000 78 3100 230 3100 230 5100 390 5100 390	International International 1000 78 91.8 1000 78 91.8 ND ND 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 230 198.5 3100 301 73.2 161.1 0.3 0.3 5100 390 2.6 ND ND ND 101 ND ND 102 362.5 180.2	NN NN 1000 78 91.8 NA ND ND NA 3100 230 198.5 NA 3100 73.2 NA 161.1 NA 0.3 NA 5100 390 2.6 NA ND NA ND NA 5100 390 2.6 NA ND NA ND NA 100 362.5 NA ND	International International International International 1000 78 91.8 NA 111.3 ND NA 8.9 ND NA 8.9 ND NA ND 3100 230 198.5 NA 255.8 3100 230 198.5 NA 515.4 ND NA 255.8 101.8 255.8 101 ND NA 255.8 101 ND NA 255.8 101 ND NA 255.8 101 ND NA 258 101 ND NA 259.5 0.3 NA ND ND 5100 390 2.6 NA ND 5100 390 2.6 NA 11 ND NA 12.5 362.5 NA 254.1 180.2 NA 305.4	NN NN NN NN NN 1000 78 91.8 NA 111.3 NA ND NA 8.9 NA ND NA ND NA 8.9 NA 3100 230 198.5 NA 255.8 NA 1010 73.2 NA 515.4 NA 161.1 NA 299.5 NA 5100 390 2.6 NA ND NA 5100 390 2.6 NA ND NA 5100 390 2.6 NA ND NA 11 ND NA 1.1 NA 120 ND NA 12.5 NA 14 362.5	NN NN NN NN NN NN NN SN SN<	1000 78 91.8 NA 111.3 NA 97.8 28.9 1000 78 91.8 NA 111.3 NA 97.8 28.9 1000 78 91.8 NA 111.3 NA 97.8 28.9 1000 ND NA 8.9 NA ND NA 1000 ND NA ND NA S.9 NA ND NA 1000 230 198.5 NA 255.8 NA 127.4 234 3100 230 198.5 NA 515.4 NA 302.2 NA 3100 230 198.5 NA 515.4 NA 302.2 NA MD NA 25.8 NA ND NA 16.1 NA 25.8 NA ND NA 161.1 NA 299.5 NA 51.5 NA 14.1 5100 390 2.6 NA <	International Interna International Internationali	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 1000 78 91.8 NA 111.3 NA 97.8 289 96.7 29.6 ND ND NA 8.9 NA ND NA ND NA 23.7 100 NA ND NA ND NA 10.0 NA ND NA 28.9 96.7 29.6 3100 230 198.5 NA ND NA ND NA ND NA ND NA 3100 230 198.5 NA 255.8 NA 127.4 23.4 94.8 24.1 7.12 385.9 NA 515.4 NA 302.2 NA 472.6 432.0 NA 101 ND NA 25.8 NA ND NA 94.8 94.8 94.8 94.8 94.8 94.8 94.8 94.8 94.8	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 1000 78 91.8 NA 111.3 NA 97.8 28.9 89.4 96.7 29.6 62 ND ND NA 8.9 NA ND NA ND NA ND ND ND NA ND NA ND NA ND NA ND 3100 230 198.5 NA 255.8 NA 127.4 23.4 94.8 24.1 92 3100 230 198.5 NA 255.8 NA 102.1 NA 472.6 NA 295.7 MD NA 25.8 NA ND NA 405.5 NA 112.1 MD NA 25.8 NA ND NA 46.5 59.9 NA 36.3 MD NA 291.5 NA 51.5 NA <t< td=""><td>1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 1000 78 91.8 NA 111.3 NA 97.8 28.9 89.4 96.7 29.6 62 NA 1000 78 91.8 NA 111.3 NA 97.8 28.9 89.4 96.7 29.6 62 NA 1000 78 91.8 NA 8.9 NA ND NA 11.2 NA 11.2</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 247 5.5 637 13.5 NA 13 1000 78 91.8 NA 111.3 NA 97.8 289 98.4 99.6 62 NA 68.1 1000 78 91.8 NA 111.3 NA 97.8 289 96.7 29.6 62 NA 68.1 1000 78 91.8 NA 89.9 NA ND 1000 230 198.5 NA 255.8 NA 127.4 234 94.8 77.2 NA 103.8 3100 230 198.5 NA 515.4 NA 302.2 NA 472.6 443.20 NA 295.7 NA 373.8 1101 NA 25.8 NA ND NA 14.3</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.32 1000 78 91.8 NA 111.3 NA 97.8 289 99.7 29.6 62 NA 68.1 26 ND NA 8.9 NA ND NA 113.5 NA 103.8 197 3100 230 198.5 NA 515.4 NA 302.2 NA 472.6 NA 295.7 NA 373.8 NA 1010<</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.52 21.3 1000 78 91.8 NA 111.3 NA 97.8 289 99.4 29.6 62 NA 68.1 26 66.5 ND ND NA 8.9 NA ND NA 103.8 19.7 197.2 3100 230 198.5 NA 515.4 NA 302.2 NA</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 247 5.5 6.37 13.5 NA 13 532 21.3 128 1000 78 91.8 NA 111.3 NA 97.8 289 89.7 296 62 NA 68.1 26 66.5 33.6 1000 78 91.8 NA 111.3 NA 97.8 289 89.7 NA ND NA</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.32 21.3 12.8 11.7 1000 78 91.8 NA 111.3 NA 97.8 28.9 39.6.7 29.6 62 NA 68.1 26 66.5 33.4 103 1000 78 91.8 NA 111.3 NA 97.8 28.9 39.6.7 29.6 62 NA 68.1 26 66.5 33.4 103 1000 78 ND NA 103.8 197 197.2 352 180.2 180.2 3100 2300 NA 515.4</td><td>1.9 0.43 14.3 NA 15.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.52 2.13 12.8 1.7. NA 1000 78 91.8 NA 111.3 NA 97.8 289 96.7 296 62 NA 68.1 26 66.5 33.4 10.3 NA 1000 78 91.8 NA ND NA<</td><td>1.9 0.43 14.3 NA 18.2 NA 5.3 2.47 5.5 6.47 13.5 NA 13 5.22 21.3 12.8 12.7 NA 37.5 1000 78 91.8 NA 111.3 NA 97.8 289 $\frac{90.7}{90.6.7}$ 296 62 NA 68.1 26 66.5 33.6 103 NA 213.2 1000 78 91.8 NA 89 NA ND NA 103.8 197 197.2 352 180.2 NA 180.8 3100 230<</td><td>1.9 0.43 143 NA 183 NA 53 207 55 637 135 NA 13 532 21.3 128 12.7 NA 37.5 144 1000 78 91.8 NA 111.3 NA 97.8 289 90.4 206 62 NA 68.1 26 65.5 33.6 103 NA 13.2 425.5 1000 ND NA 8.9 NA ND NA ND<td>19 0.43 143 NA 182 NA 53 2A7 55 637 135 NA 135 522 213 128 12.7 NA 37.5 14 200 1000 78 91.8 NA 1113 NA 97.8 289 96.7 29.6 62 NA 68.1 26 66.5 336 103 NA 213.2 42.5 118 1000 ND NA ND</td></td></t<>	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 1000 78 91.8 NA 111.3 NA 97.8 28.9 89.4 96.7 29.6 62 NA 1000 78 91.8 NA 111.3 NA 97.8 28.9 89.4 96.7 29.6 62 NA 1000 78 91.8 NA 8.9 NA ND NA 11.2 NA 11.2	1.9 0.43 14.3 NA 18.2 NA 5.3 247 5.5 637 13.5 NA 13 1000 78 91.8 NA 111.3 NA 97.8 289 98.4 99.6 62 NA 68.1 1000 78 91.8 NA 111.3 NA 97.8 289 96.7 29.6 62 NA 68.1 1000 78 91.8 NA 89.9 NA ND 1000 230 198.5 NA 255.8 NA 127.4 234 94.8 77.2 NA 103.8 3100 230 198.5 NA 515.4 NA 302.2 NA 472.6 443.20 NA 295.7 NA 373.8 1101 NA 25.8 NA ND NA 14.3	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.32 1000 78 91.8 NA 111.3 NA 97.8 289 99.7 29.6 62 NA 68.1 26 ND NA 8.9 NA ND NA 113.5 NA 103.8 197 3100 230 198.5 NA 515.4 NA 302.2 NA 472.6 NA 295.7 NA 373.8 NA 1010<	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.52 21.3 1000 78 91.8 NA 111.3 NA 97.8 289 99.4 29.6 62 NA 68.1 26 66.5 ND ND NA 8.9 NA ND NA 103.8 19.7 197.2 3100 230 198.5 NA 515.4 NA 302.2 NA	1.9 0.43 14.3 NA 18.2 NA 5.3 247 5.5 6.37 13.5 NA 13 532 21.3 128 1000 78 91.8 NA 111.3 NA 97.8 289 89.7 296 62 NA 68.1 26 66.5 33.6 1000 78 91.8 NA 111.3 NA 97.8 289 89.7 NA ND NA	1.9 0.43 14.3 NA 18.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.32 21.3 12.8 11.7 1000 78 91.8 NA 111.3 NA 97.8 28.9 39.6.7 29.6 62 NA 68.1 26 66.5 33.4 103 1000 78 91.8 NA 111.3 NA 97.8 28.9 39.6.7 29.6 62 NA 68.1 26 66.5 33.4 103 1000 78 ND NA 103.8 197 197.2 352 180.2 180.2 3100 2300 NA 515.4	1.9 0.43 14.3 NA 15.2 NA 5.3 2.67 5.5 6.37 13.5 NA 13 5.52 2.13 12.8 1.7. NA 1000 78 91.8 NA 111.3 NA 97.8 289 96.7 296 62 NA 68.1 26 66.5 33.4 10.3 NA 1000 78 91.8 NA ND NA<	1.9 0.43 14.3 NA 18.2 NA 5.3 2.47 5.5 6.47 13.5 NA 13 5.22 21.3 12.8 12.7 NA 37.5 1000 78 91.8 NA 111.3 NA 97.8 289 $\frac{90.7}{90.6.7}$ 296 62 NA 68.1 26 66.5 33.6 103 NA 213.2 1000 78 91.8 NA 89 NA ND NA 103.8 197 197.2 352 180.2 NA 180.8 3100 230<	1.9 0.43 143 NA 183 NA 53 207 55 637 135 NA 13 532 21.3 128 12.7 NA 37.5 144 1000 78 91.8 NA 111.3 NA 97.8 289 90.4 206 62 NA 68.1 26 65.5 33.6 103 NA 13.2 425.5 1000 ND NA 8.9 NA ND NA ND <td>19 0.43 143 NA 182 NA 53 2A7 55 637 135 NA 135 522 213 128 12.7 NA 37.5 14 200 1000 78 91.8 NA 1113 NA 97.8 289 96.7 29.6 62 NA 68.1 26 66.5 336 103 NA 213.2 42.5 118 1000 ND NA ND</td>	19 0.43 143 NA 182 NA 53 2A7 55 637 135 NA 135 522 213 128 12.7 NA 37.5 14 200 1000 78 91.8 NA 1113 NA 97.8 289 96.7 29.6 62 NA 68.1 26 66.5 336 103 NA 213.2 42.5 118 1000 ND NA ND

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Middle Branch Park, Cherry Hill, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

LI 21	RBC	M	3C-1	MI	3C-2	M	BC-3	ME	3C-4	M	3C-5	M	BC-6	M	BC-7	M	BC-8	M	BC-9	ME	3C-10
Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	рнмн	XRF	DHMH	XRF	DHMH	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	рнмн	XRF	DHMH
1.9	0.43	15.6	NA	39.3	44.09	14.7	NA	110.9	76.45	43.7	NA	14.4	5.82	23.5	18.4	20.2	14.84	55.7	NA	57.5	33.77
1000	78	81.7	NA	147.8	36.69	94.1	NA	168.8	44.47	138	NA	125.8	25.11	131.3	41.68	73.5	30.1	140.1	NA	127.6	45.27
		2.1	NA	ND	NA	3.5	NA	ND	NA	4.1	NA	5.5	NA	ND	NA	2.2	NA	б	NA	ND	NA
		ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
3100	230	75	NA	123.1	62.44	111	NA	176.2	98.6	107.8	NA	204.2	95.32	148.7	52.59	104.4	35.67	132.2	NA	159.6	67.76
		176.7	NA	315.4	NA	352.2	NA	420.9	NA	442.3	NA	384.5	NA	383	NA	375.1	NA	279.4	NA	310	NA
		27.2	NA	85.5	NA	ND	NA	69	NA	77.7	NA	209.2	NA	36.7	NA	321.2	NA	49.4	NA	ND	NA
		44.5	NA	136.1	NA	45	NA	308.8	NA	128.1	NA	139.5	NA	113.7	NA	96.2	NA	150.1	NA	128.4	NA
		127.9	NA	220.9	NA	148.7	NA	478.1	NA	623	NA	243.7	NA	259.6	NA	574.8	NA	240	NA	249.7	NA
		ND	NA	0.8	NA	1.3	NA	2.2	NA	ND	NA	ND	NA	1.2	NA	0.5	NA	3.1	NA	1	NA
5100	390	2.2	NA	ND	NA	4.8	NA	1.3	NA	2.7	NA	4.8	NA	1.6	NA	ND	NA	1.6	NA	2.9	NA
		ND	NA	0.4	NA	2.7	NA	ND	NA	2.5	NA	2	NA	0.4	NA	0.1	NA	0.2	NA	0.8	NA
		3.1	NA	0.3	NA	ND	NA	5.7	NA	15	NA	4.4	NA	10.7	NA	7.3	NA	7.2	NA	4.9	NA
		141	NA	358.8	NA	457.5	NA	262.9	NA	350.3	NA	266.5	NA	238.9	NA	168	NA	327.6	NA	317.7	NA
		55.6	NA	134	106.81	102.8	NA	224.3	169.93	258.8	NA	67.6	41.85	136.1	77.17	98.7	66.59	153.2	NA	130.1	90.96
		4.6	NA	ND	NA	9.9	NA	ND	NA	ND	NA	ND	NA	ND	NA	7.6	NA	ND	NA	ND	NA
	(mg/kg) 1.9 1000 3100 5100	(mg/kg) (mg/kg) 1.9 0.43 1000 78 3100 230 3100 230 5100 390 5100 390	(mg/kg) XRF 1.9 0.43 15.6 1000 78 81.7 1000 78 81.7 2.1 ND 2.1 3100 230 75 3100 230 75 3100 230 75 3100 230 75 5100 390 2.2 5100 390 2.2 5100 390 3.1 411 55.6	(mg/kg) (mg/kg) XRF DHMH 1.9 0.43 15.6 NA 1000 78 81.7 NA 1000 78 81.7 NA 1000 78 81.7 NA 1000 78 81.7 NA 1000 78 9.1 NA 1000 230 75 NA 3100 230 75 NA 3100 230 75 NA 3100 230 75 NA 5100 27.2 NA 5100 390 2.2 NA 5100 390 2.2 NA 5100 31.1 NA	(mg/kg) (mg/kg) XRF DHMH XRF 1.9 0.43 15.6 NA 39.3 1000 78 81.7 NA 147.8 1000 78 81.7 NA ND 1100 78 9.0 NA 147.8 3100 230 75 NA 123.1 3100 230 75 NA 315.4 1100 230 75 NA 315.4 1100 230 27.2 NA 35.1 1100 390 2.2 NA 0.4 1100 390 2.1 NA 0.4 1100 390 2.1 NA 0.4 111 NA 35.8 1.4 1.4	(mg/kg) XRF DHMH XRF DHMH 1.9 0.43 15.6 NA 39.3 44.09 1000 78 81.7 NA 14.7.8 36.69 1000 78 81.7 NA 147.8 36.69 1000 78 81.7 NA 147.8 36.69 1000 78 2.1 NA ND NA 1000 78 9.12 NA ND NA 1100 78 9.12 NA ND NA 3100 230 75 NA 131.4 NA 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<td>ImagkesIXRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMZRFDEMDEMDEMDEMDEMDEMDEMDEMDEM<td>Image Image Image10007806.111.126.121.111.121.11<</br></br></br></br></br></br></td><td>imagesimage</td><td>Image1000100010</td></td>	ImagkayIXRDHMXRFDHMXRFDHMXRFDHMHXRFDHMZRFDHMZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMZRFDHMZRFDHM<	ImagkesIXRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMZRFDEMDEMDEMDEMDEMDEMDEMDEMDEM <td>Image Image Image10007806.111.126.121.111.121.11<</br></br></br></br></br></br></td> <td>imagesimage</td> <td>Image1000100010</td>	Image Image ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage ImageImage 	imagesimage	Image1000100010

Middle Branch Park (Cherry Hill) Data Table in mg/kg (XRF and DHMH)

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Middle Branch Park, Dickman Street, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

Sample ID	EPA	RBC	MDE Cleanup Standards	ME	3D-1	мі	3D-2	мі	BD-3	мі	3D-4	ME	3D-5	МІ	ЗD-б	MI	3D-7	мв	D-8	м	3D-9	мв	D-10
Analytes	Industrial (mg/kg)	Residential (mg/kg)	Non- residential (mg/kg)	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	DHMH
Arsenic	1.9	0.43	3.8	110.2	60.8	107.9	NA	109.8	NA	231.7	195.0	95.0	53.8	100.7	NA	105.3	98.7	81.3	60.0	86.7	NA	38.3	24.0
Vanadium	1000	78	1400	130.2	38.9	177.7	NA	87.2	NA	161.8	53.A	119.6	36.8	182.3	NA	56.3	54.D	121.8	72.4	153.1	NA	76.8	35.3
Thallium				ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Titanium				ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Chromium	3100	230	610	189.3	86.9	217.1	NA	221.9	NA	258.1	158.0	173.7	69.5	257.0	NA	213.9	93.8	197.8	90.8	176.1	NA	176.9	72.0
Manganese				366.0	NA	335.3	NA	460.9	NA	438.4	NA	414.6	NA	263.7	NA	339.2	NA	1150.2	NA	329.9	NA	388.6	NA
Nickel				ND	NA	ND	NA	74.0	NA	ND	NA	41.5	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Copper				299.9	NA	317.7	NA	340.9	NA	511.3	NA	242.2	NA	276.2	NA	253.6	NA	244.9	NA	250.7	NA	178.5	NA
Zinc				548.6	NA	527.7	NA	1040.0	NA	961.5	NA	550.1	NA	514.6	NA	359.6	NA	621.3	NA	384.4	NA	410.1	NA
Selenium				4.5	NA	3.4	NA	2.2	NA	3.8	NA	1.4	NA	3.0	NA	1.1	NA	0.1	NA	4.5	NA	1.7	NA
Silver	5100	390	1000	1.1	NA	1.0	NA	0.7	NA	ND	NA	2.3	NA	4.6	NA	1.7	NA	1.6	NA	1.7	NA	0.3	NA
Cadmium				3.7	NA	0.5	NA	ND	NA	2.8	NA	ND	NA	ND	NA	0.3	NA	ND	NA	0.9	NA	ND	NA
Antimony				9.1	NA	10.5	NA	ND	NA	12.2	NA	9.6	NA	11.4	NA	6.6	NA	ND	NA	5.8	NA	14.1	NA
Barium				263.1	NA	430.2	NA	189.4	NA	289.8	NA	296.2	NA	465.2	NA	349.6	NA	319.5	NA	388.9	NA	212.7	NA
Lead			400	267.2	165.0	263.3	NA	421.6	NA	526.2	475.0	319.7	208.0	474.8	NA	255.7	270.0	415.5	349.0	210.8	NA	282.9	130.0
Mercury				ND	NA	ND	NA	ND	NA	ND	NA	ND		ND	NA	ND	NA	ND	NA	ND	NA	7.6	NA

Middle Branch Park (Dickman) Data Table in mg/kg (XRF and DHMH)

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

 $ND-not \ detected. \ NA-not \ analyzed.$

Middle Branch Park, Waterview Avenue, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

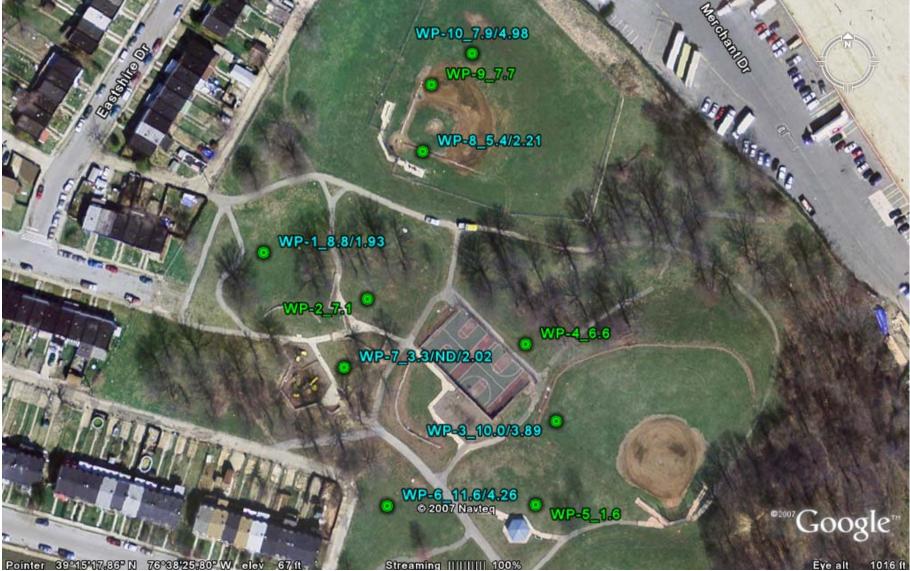
EPA		MI	3W-1	M	BW-2	M	BW-3	MB	W-4	M	3W-5	MI	3W-6	MI	3W-7	M	3W-8	M	BW-9	ME	BW-10
Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	рнмн	XRF	рнмн	XRF	DHMH	XRF	DHMH
1.9	0.43	17.9	5.97	10	2.57	7.8	2.42	39.7	18.4	12	NA	13.6	NA	10.2	7.63	22.3	3.87	10	NA	7.8	NA
1000	78	74	28.2	80.1	19.9	71.1	21.9	122.6	87.7	104.7	NA	165.7	NA	102.2	35.9	154.5	31.2	66.7	NA	85	NA
		ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
		ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
3100	230	166.8	16.5	57.4	12.9	88.8	13.6	81.1	17.6	77.2	NA	86.1	NA	118.4	32.8	120.6	27.9	121.7	NA	67.3	NA
		233.3	NA	112.4	NA	142.1	NA	164	NA	317.8	NA	583.1	NA	483.4	NA	418.3	NA	457.3	NA	209.9	NA
		36.4	NA	ND	NA	ND	NA	ND	NA	ND	NA	19.3	NA	29.9	NA	ND	NA	28.8	NA	12.7	NA
		32	NA	17.1	NA	27.5	NA	45	NA	12.2	NA	30.9	NA	53.6	NA	52.1	NA	59.9	NA	35.1	NA
		64.8	NA	48.9	NA	58.2	NA	107.5	NA	65.3	NA	130.9	NA	306.3	NA	174.2	NA	179.4	NA	111.8	NA
		1.1	NA	1.2	NA	ND	NA	3.4	NA	1.7	NA	0.7	NA	ND	NA	1.9	NA	1.3	NA	0.б	NA
5100	390	0.5	NA	1.7	NA	ND	NA	0.1	NA	ND	NA	ND	NA	ND	NA	0.1	NA	1.8	NA	ND	NA
		0.7	NA	0.1	NA	0.б	NA	0.4	NA	0.9	NA	3.5	NA	0.8	NA	0.2	NA	1.5	NA	1.2	NA
		9.6	NA	1.7	NA	2	NA	0.8	NA	4.6	NA	ND	NA	5.3	NA	4.9	NA	3.2	NA	5.3	NA
		143.5	NA	123.7	NA	139.4	NA	140.2	NA	134.6	NA	303.9	NA	332.2	NA	241.9	NA	253.2	NA	178.1	NA
		37.2	34.6	36	31.2	38.7	33.7	91.3	51.9	22.2	NA	39.9	NA	123	92.7	111.3	69.1	137.6	NA	61.5	NA
		ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	12.4	NA	14.4	NA	ND	NA	9.1	NA	ND	NA
	Industrial (mg/kg) 1.9 1000 3100 5100	(mg/kg) (mg/kg) 1.9 0.43 1000 78 3100 230 3100 230 5100 390 5100 390	Industrial (mg/kg) Residential (mg/kg) XRF 1.9 0.43 17.9 1000 78 74 1000 78 74 1000 78 74 1000 78 74 1000 78 74 1000 78 74 1000 78 74 1000 78 74 1000 78 74 3100 230 166.8 3100 230 36.4 3100 230 36.4 3100 300 32 3100 390 0.5 5100 390 0.5 5100 390 0.5 143.5 143.5 37.2	Industrial (mg/kg) Residential (mg/kg) XRF DHMH 1.9 0.43 17.9 5.97 1000 78 74 28.2 1000 78 74 28.2 1000 78 74 28.2 1000 78 74 28.2 1000 78 74 28.2 1000 78 74 28.2 1000 78 74 28.2 1000 78 ND NA 3100 230 166.8 16.5 3100 230 166.8 16.4 1001 36.4 NA 143.5 101 143.5 143.5 143.5 101 143.5 143.5 143.5	Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF 1.9 0.43 17.9 5.97 10 1000 78 74 28.2 80.1 1000 78 74 28.2 80.1 1000 78 74 28.2 80.1 1000 78 74 28.2 80.1 1000 78 74 28.2 80.1 100 78 74 28.2 80.1 100 78 74 28.2 80.1 100 78 74 28.2 80.1 101 ND ND ND 12.4 3100 230 166.8 16.5 57.4 3100 230 36.4 NA 112.4 112.4 36.4 NA 17.1 114 NA 1.2 1.1 1.1 1.1 111 390 0.5 NA 1.7 1.1	Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF DHMH 1.9 0.43 17.9 5.97 10 2.57 1000 78 74 28.2 80.1 19.9 1000 78 74 28.2 80.1 19.9 1000 78 74 28.2 80.1 19.9 1000 78 74 28.2 80.1 19.9 1000 78 74 28.2 80.1 19.9 1000 78 74 28.2 80.1 19.9 1000 78 ND NA ND NA 3100 230 ND IA NA 12.9 3100 230 166.8 16.5 57.4 12.9 4 1.23 NA 112.4 NA 5100 390 0.5 NA 1.2 NA 5100 390 0.5 NA 1.7 NA	Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF DHMH XRF 1.9 0.43 17.9 5.97 10 2.57 7.8 1000 78 74 28.2 80.1 19.9 71.1 1000 78 74 28.2 80.1 19.9 71.1 1000 78 74 28.2 80.1 19.9 71.1 1000 78 74 28.2 80.1 19.9 71.1 1000 78 74 28.2 80.1 ND ND ND 1000 78 ND NA ND NA ND 3100 230 166.8 16.5 57.4 12.9 88.8 3100 230 166.8 10.4 NA ND ND 3100 230 36.4 NA 12.4 NA ND 11 36.4 NA 17.1 NA 58.2	Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF DHMH XRF DHMH 1.9 0.43 17.9 5.97 10 2.57 7.8 2.42 1000 78 74 28.2 80.1 19.9 7.1 21.9 1000 78 74 28.2 80.1 19.9 7.1 21.9 1000 78 74 28.2 80.1 19.9 7.1 21.9 1000 78 74 28.2 80.1 ND NA ND NA 1000 78 74 28.2 80.1 ND NA ND NA 1010 78 ND NA ND NA ND NA NA 3100 230 166.8 16.5 57.4 12.9 88.8 13.6 3100 230 166.8 16.4 NA ND NA NA 11 36.4 NA <td>Industrial (mg/kg) Residential (mg/kg) XRF DHMH ZRF J307 1000 78 74 28.2 80.1 100 NA 101 NA 101 NA 101 104 104 104 104 104 104 104 101 101 101 101 101 101 101 101 101 101</td> <td>Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF DHMH XRF DHMH XRF DHMH 1.9 0.43 17.9 5.97 10 2.57 7.8 2.42 39.7 18.4 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 ND NA S1.1 17.6 NA ND NA ND NA S1.1<!--</td--><td>Industrial (mg/kg) Residential (mg/kg) XRF DHMH ZA2 39.7 18.4 12.1 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 104.7 1000 78 ND NA ND NA</td><td>Industrial (mg/kg)XRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAZRFDHADIADIADIADIADIA</td><td>Industrial (mg/kg)Residential (mg/kg)XRFDHMHZRFDHMHZRFDHAZRFDHADE310073016681659165757.412.0NA17.017.017.017.017.017.017.017.017.017.017.017.017.017.017.017.</td><td>Industrial (mg/kg)KRFDHMHKRFDHMKRFDHADADADADADADADADADADADADADADADADADADADA<</td><td>Industrial (mg/kg)KRFDHMHKRFDHMDH1000780780780780780780780780780780780780<t< td=""><td>Industrial (ng/kg)KRFDHMHKRFDHMDHMDHMDHMDHMDHMDHMDHMDHMDHM<</td><td>Industrial (ongke)KrepDHMDHMD</td><td>Industrial (magke) Ker Ker</td><td>Industriating Residenting Kare Jame Jame<</td><td>Industry (may) Kr <thkr< th=""> Kr Kr</thkr<></td><td>Indication (marged)KRP</td></t<></td></td>	Industrial (mg/kg) Residential (mg/kg) XRF DHMH ZRF J307 1000 78 74 28.2 80.1 100 NA 101 NA 101 NA 101 104 104 104 104 104 104 104 101 101 101 101 101 101 101 101 101 101	Industrial (mg/kg) Residential (mg/kg) XRF DHMH XRF DHMH XRF DHMH XRF DHMH 1.9 0.43 17.9 5.97 10 2.57 7.8 2.42 39.7 18.4 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 1000 78 74 28.2 80.1 ND NA S1.1 17.6 NA ND NA ND NA S1.1 </td <td>Industrial (mg/kg) Residential (mg/kg) XRF DHMH ZA2 39.7 18.4 12.1 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 104.7 1000 78 ND NA ND NA</td> <td>Industrial (mg/kg)XRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAZRFDHADIADIADIADIADIA</td> <td>Industrial (mg/kg)Residential (mg/kg)XRFDHMHZRFDHMHZRFDHAZRFDHADE310073016681659165757.412.0NA17.017.017.017.017.017.017.017.017.017.017.017.017.017.017.017.</td> <td>Industrial (mg/kg)KRFDHMHKRFDHMKRFDHADADADADADADADADADADADADADADADADADADADA<</td> <td>Industrial (mg/kg)KRFDHMHKRFDHMDH1000780780780780780780780780780780780780<t< td=""><td>Industrial (ng/kg)KRFDHMHKRFDHMDHMDHMDHMDHMDHMDHMDHMDHMDHM<</td><td>Industrial (ongke)KrepDHMDHMD</td><td>Industrial (magke) Ker Ker</td><td>Industriating Residenting Kare Jame Jame<</td><td>Industry (may) Kr <thkr< th=""> Kr Kr</thkr<></td><td>Indication (marged)KRP</td></t<></td>	Industrial (mg/kg) Residential (mg/kg) XRF DHMH ZA2 39.7 18.4 12.1 1000 78 74 28.2 80.1 19.9 71.1 21.9 122.6 87.7 104.7 1000 78 ND NA ND NA	Industrial (mg/kg)XRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHMHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAHZRFDHAZRFDHADIADIADIADIADIA	Industrial (mg/kg)Residential (mg/kg)XRFDHMHZRFDHMHZRFDHAZRFDHADE310073016681659165757.412.0NA17.017.017.017.017.017.017.017.017.017.017.017.017.017.017.017.	Industrial (mg/kg)KRFDHMHKRFDHMKRFDHADADADADADADADADADADADADADADADADADADADA<	Industrial (mg/kg)KRFDHMHKRFDHMDH1000780780780780780780780780780780780780 <t< td=""><td>Industrial (ng/kg)KRFDHMHKRFDHMDHMDHMDHMDHMDHMDHMDHMDHMDHM<</td><td>Industrial (ongke)KrepDHMDHMD</td><td>Industrial (magke) Ker Ker</td><td>Industriating Residenting Kare Jame Jame<</td><td>Industry (may) Kr <thkr< th=""> Kr Kr</thkr<></td><td>Indication (marged)KRP</td></t<>	Industrial (ng/kg)KRFDHMHKRFDHMDHMDHMDHMDHMDHMDHMDHMDHMDHM<	Industrial (ongke)KrepDHMDHMD	Industrial (magke) Ker Ker	Industriating Residenting Kare Jame Jame<	Industry (may) Kr Kr <thkr< th=""> Kr Kr</thkr<>	Indication (marged)KRP

Middle Branch Park (Waterview) Data Table in mg/kg (XRF and DHMH)

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Wegworth Park, Arsenic Concentrations in mg/kg



Pointer 39°15'17,85° N 76°38'25,80° W elev 67 ft Streaming IIIIIII 100% Eve alt Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH). Note for sample WP-7, results are as follows: XRF / XRF DUP / DHMH.

Wegworth Park Data Table in mg/kg (XRF and DHMH)

Sample ID	EPA	RBC	W	P-1	W	P-2	W	P-3	W	P-4	W	P-5	W	/Р-б	W	P-7*	W	P-8	W	P-9	W	P-10
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	днмн	XRF	dнмн	XRF	днмн	XRF	рнмн	XRF	онмн	XRF	DHMH	XRF	рнмн	XRF	рнмн	XRF	DHMH	XRF	рнмн
Arsenic	1.9	0.43	8.8	1.93	7.1	NA	10	3.89	б.б	NA	1.6	NA	11.6	4.26	3.3 ND	2.02	5.4	2.21	7.7	NA	7.9	4.98
Vanadium	1000	78	64.2	22.4	108.9	NA	99	29	72.6	NA	148.1	NA	108.9	35.6	94.1 85.9	14	87.3	23.8	71.7	NA	97.4	38
Thallium			8.5	NA	ND	NA	ND	NA	ND	NA	ND	NA	4.1	NA	1 ND	NA	ND	NA	1.1	NA	ND	NA
Titanium			ND	NA	ND ND	NA	ND	NA	ND	NA	ND	NA										
Chromium	3100	230	65	16.5	б4.4	NA	60.2	20.3	63.5	NA	64.9	NA	77	23.3	75.7 61.7	13.7	102	31.4	136.5	NA	161.2	27.8
Manganese			242.6	NA	375.4	NA	372.3	NA	217.4	NA	209.1	NA	313.3	NA	244 218.4	NA	306.3	NA	461.9	NA	260.7	NA
Nickel			ND	NA	34.9	NA	ND	NA	ND	NA	ND	NA	ND	NA	9.7 ND	NA	ND	NA	ND	NA	ND	NA
Copper			32.5	NA	19.6	NA	57.4	NA	34.8	NA	39.9	NA	49.7	NA	27.5 38.3	NA	54.1	NA	71.8	NA	62.1	NA
Zinc			87.5	NA	131.5	NA	108.6	NA	306.6	NA	106.9	NA	94.6	NA	81.1 87.3	NA	208.7	NA	124.1	NA	136.3	NA
Selenium			2.6	NA	ND	NA	1.5	NA	1.8	NA	0.6	NA	ND	NA	1.4	NA	ND	NA	0.3	NA	ND	NA
Silver	5100	390	ND	NA	ND	NA	ND	NA	4.7	NA	1.4	NA	1.5	NA	6 ND	NA	0.1	NA	2.3	NA	1.6	NA
Cadmium			0.6	NA	2.2	NA	1.5	NA	3.1	NA	1.7	NA	2.9	NA	ND 12	NA	0.2	NA	ND	NA	2.9	NA
Antimony			ND	NA	ND	NA	3.6	NA	2.5	NA	5.7	NA	5.5	NA	12 ND	NA	10.5	NA	1.2	NA	2.4	NA
Barium			262.7	NA	190.9	NA	250	NA	130.9	NA	221.8	NA	273.6	NA	152.8 128.7	NA	269.8	NA	415.2	NA	341.2	NA
Lead			47	27.3	32.2	NA	57.9	37.4	33.9	NA	50.5	NA	69.2	41.5	32.9 42.3	24.7	82.1	44.1	63.6	NA	84.8	61.1
Mercury			ND	NA	ND	NA	ND	NA	ND	NA	8.1	NA	ND	NA	6.8 ND	NA	ND	NA	3.8	NA	ND	NA
															ΠD							

* A duplicate sample was collected at this location and analyzed by XRF.

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Wyman Park, Arsenic Concentrations in mg/kg



Green text – XRF data. Blue text - both MDE XRF and DHMH analysis run (XRF/DHMH).

Sample ID	EPA RBC		WYP-1		WYP-2		WYP-3		WYP-4		WYP-5		WYP-6		WYP-7		WYP-8		WYP-9		WYP-10	
Analytes	Industrial (mg/kg)	Residential (mg/kg)	XRF	рнмн	XRF	рнмн	XRF	DHMH	XRF	днмн	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	DHMH	XRF	рнмн	XRF	днмн
Arsenic	1.9	0.43	30.5	15.1	ND	39	13.6	6.22	1.2	4.52	б.б	3.98	11.4	3.44	4.8	NA	2.5	NA	3.9	NA	41.2	NA
Vanadium	1000	78	139.4	42.5	113.1	38.9	170.9	45	134.8	48.2	165.5	49	115.3	46.6	107.5	NA	138.2	NA	141.9	NA	164.7	NA
Thallium			ND	NA	ND	NA	ND	NA	ND	NA	9.5	NA	3	NA	ND	NA	ND	NA	0.5	NA	ND	NA
Titanium			ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Chromium	3100	230	194	42.7	149.6	103	117.1	38.4	162.1	47 <i>A</i>	102.2	31.8	61.4	30.9	54.9	NA	71.6	NA	82.5	NA	138.9	NA
Manganese			820.2	NA	418.8	NA	728.8	NA	908.4	NA	861.3	NA	774.2	NA	528.9	NA	121	NA	579.1	NA	524.7	NA
Nickel			ND	NA	ND	NA	ND	NA	47.2	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA
Copper			93.1	NA	83.6	NA	153.4	NA	77.3	NA	25.8	NA	49.1	NA	25	NA	26.4	NA	12.6	NA	52.9	NA
Zinc			951.9	NA	329.6	NA	454.4	NA	296.1	NA	91.8	NA	758.3	NA	86.5	NA	52.8	NA	75.6	NA	289.8	NA
Selenium			2.5	NA	0.5	NA	3.3	NA	ND	NA	1.5	NA	ND	NA	1.3	NA	1.4	NA	ND	NA	0.6	NA
Silver	5100	390	17.9	4.06	3.5	<1.25	1.7	<1.25	0.043	<1.25	2.3	<1.25	3.2	<1.25	ND	NA	2.9	NA	ND	NA	3.1	NA
Cadmium			2.8	NA	б	NA	2.1	NA	ND	NA	2.5	NA	ND	NA	1.4	NA	ND	NA	ND	NA	ND	NA
Antimony			9.9	NA	ND	NA	8.6	NA	5	NA	3.5	NA	0.2	NA	14.2	NA	9.2	NA	ND	NA	4.7	NA
Barium			563.5	NA	551.3	NA	805.2	NA	649.6	NA	586.8	NA	625.6	NA	511.6	NA	195.6	NA	839.5	NA	479.9	NA
Lead			480.9	351	253.1	202	747.2	556	350.3	322	62.6	47.7	59.8	42.8	37.9	NA	33.2	NA	16.6	NA	246.5	NA
Mercury			ND	NA	ND	NA	ND	NA	ND	NA	5.9	NA	11.8	NA	ND	NA	ND	NA	4	NA	ND	NA
			n																			

Wyman Park Data Table in mg/kg (XRF and DHMH)

Soil samples analyzed by the fixed laboratory at DHMH are provided in the DHMH column while sampling data analyzed using the XRF is provided in the XRF column. Yellow highlighting indicates that either industrial or residential soil RBCs or MDE's non-residential soil cleanup standard has been exceeded.

ND – not detected. NA – not analyzed.

Appendix C

XRF Data

Appendix D

DHMH Data