

MEMO

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Date:

April 6, 2022

Arcadis Project No.:

30121887

Subject:

Parcel 4 Redevelopment Summary of Impacts
RACER Buick City Site Flint, Michigan

EXECUTIVE SUMMARY

This memo provides a summary of soil impacts within Parcel 4 area of the RACER Buick City Site, located in Flint, Michigan, and the conditions under which redevelopment of the parcel may occur. As a general matter, under a designated AOC all soils in this parcel can be relocated within the parcel during construction activities if a cover (building slab, pavement, landscaping, etc.) is placed over the soils at the relocated location and appropriate dust control practices, soil erosion/sedimentation controls and avoidance of direct contact with soils, as applicable, are implemented as required under the Materials Management Plan (MMP).

In addition to the soil restrictions, the following provisions for redevelopment are applicable:

- There is a sitewide prohibition on groundwater use
- Any location proposed for placement of a building will require a vapor investigation or include an engineered barrier to mitigate vapor intrusion
- Any LNAPL that is removed as part of redevelopment needs to be characterized for off-Site disposal

Introduction

This memo provides a summary of soil impacts within the Parcel 4 area of the RACER Buick City Site, located in Flint, Michigan (**Figure 1**), and the conditions under which redevelopment of the parcel may occur. Samples collected at Parcel 4 detected analytes at concentrations in soils that exceeded the Michigan Part 201 Nonresidential Direct Contact criteria (NDC), Nonresidential Particulate Soil Inhalation criteria (NPSIC), Groundwater Surface Water Interface Protection criteria (GSIP) and Drinking Water Protection (DWP), and analytes at concentrations in groundwater that exceeded the Part 201 Nonresidential Drinking Water (NDW) and Groundwater/Surface Water Interface (GSI) criteria. The extent of Parcel 4 and the restricted areas are shown on **Figure 2**.

Light non-aqueous phase liquid (LNAPL), polychlorinated biphenyl (PCB), and soil impact (SI) areas located in Parcel 4 are shown on **Figure 2** and summarized on **Table 1**. Construction for redevelopment will be guided by the Materials Management Plan (MMP) for the Site, which is currently under development. A Proposed Environmental Redevelopment Management Strategy (ERMS) for Parcel 4 assuming an AOC is designated for the parcel is provided as **Attachment 1**. The restricted areas have been further broken down as described in the ERMS into “Zones” for the purposes of redevelopment of the parcel. The LNAPL, PCB, and SI areas will be managed via deed restrictions.

- Construction may proceed:
 - In areas with LNAPL-impacted soils (LNAPL #8, #9, #10, and #11), which must be managed per the MMP and kept within a capped location or disposed of off-site.
 - In the PCB-impacted soil area (PCB #10) if the soils are kept within the area and managed per the MMP.
 - In the soil direct contact impact areas (SI #10, #11, and #13) if no human direct contact with impacted soils is prevented during construction.
 - In NPSIC impacted soils (SI #10, #11, and #13) if proper monitoring and dust control measures are implemented per the MMP.
- Any site work needs to be completed in such a manner as not to exacerbate existing conditions and in accordance with the MMP.
- DW/DWP and GSI/GSIP impacts will be addressed through a sitewide restrictive covenant and stormwater and soil management practices.

Refer to **Table 1** for a summary of the exceedances, depths, and nature of impacts for the parcel.

Summary of Historical Use Investigation Data and Historic Data

As part of Resource Conservation and Recovery Act (RCRA) activities, groundwater and soil samples were collected to investigate historical site activities. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and polychlorinated biphenyls (PCBs). Additional investigations were completed to evaluate the presence of emerging contaminants such as 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS).

LNAPL Area Summary

The areal extents of measurable LNAPL at the Site were previously defined in the 2006 RFI Phase II Report and updated incorporating the most recent data, including the following:

MEMO

- LNAPL gauging data where LNAPL had been measured at a thickness of greater than 0.1 feet, more than once in the past three years.
- For monitoring wells that have been abandoned – the wells were included within the LNAPL area if LNAPL was measured at a thickness greater than 0.1 feet more than once, during the last three years it was monitored before abandonment.
- Positive responses on laser induced fluorescence (LIF) logs.

The extent of LNAPL is established halfway between a monitoring well where LNAPL is measurable and a monitoring well where LNAPL is not measurable (less than 0.1 feet), or in the case of LIF borings, halfway between where there is or is not a positive LIF response.

Four LNAPL areas are present in Parcel 4. The details of each area are and summarized in **Table 1**.

- LNAPL #8 is impacted by fuel oil. The depth to LNAPL impacted soils is estimated at 3 feet below ground surface (bgs). The extent of LNAPL #8 is shown on **Figure 3**.
 - If LNAPL is removed in liquid form, it will need to be sampled and characterized for off-site disposal.
 - Any LNAPL impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
- LNAPL #9 is impacted by cutting oil. The depth to LNAPL impacted soils is estimated at 10 to 11 ft bgs. The extent of LNAPL #9 is shown on **Figure 4**.
 - If LNAPL is removed in liquid form, it will need to be sampled and characterized for off-site disposal.
 - Any LNAPL impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
- LNAPL #10 is impacted by cutting oil. The depth to LNAPL-impacted soils is estimated to range from 3 to 10 ft bgs. This area is co-located with PCB #10, SI #11 (lead and manganese), and SI #12 (benzo(a)pyrene). The extent of LNAPL #10 is shown on **Figure 4**.
 - If LNAPL is removed in liquid form, it will need to be sampled and characterized for off-site disposal.
 - Any LNAPL-impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
 - Dust control/monitoring is required during excavation activities (SI #11).
 - No direct contact with impacted soils should occur during construction (SI #11, SI #12).
 - PCB-impacted soils (minor at 3.6 ppm) may be relocated within the TSCA restricted area if properly covered after relocation per the MMP.
- LNAPL #11 is impacted by cutting oil. The depth to LNAPL-impacted soils is estimated at 6 ft bgs. This area is co-located with SI #13 (lead). The extent of LNAPL #11 is shown on **Figure 5**.
 - If LNAPL is removed in liquid form, it will need to be sampled and characterized for off-site disposal.

- Any LNAPL impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
- Dust control/monitoring required during excavation activities (SI #13 – lead issues).
- No direct contact with impacted soils during construction (SI #13 – lead issues).

Excavations below the depth of the LNAPL and any soils exhibiting evidence of significant impacts (odors, staining, or sheens) must be managed per the MMP and kept within a capped location or disposed of off-site.

PCB Area Summary

One PCB area (#10) is located in Parcel 4. The details are summarized in **Table 1**. The extent of PCB #10 is shown **Figure 6**.

- Soil samples collected at PCB #10 detected PCBs in soil at 3.6 ppm at one location from 3 to 5 ft bgs. This area is co-located by LNAPL #10 and SI #11 (lead and manganese).
 - This area will be closed with a high occupancy restriction.
 - Any impacted soil will need to be managed per the MMP and kept within the area and covered with an approved cap or disposed of off-site.
 - No direct contact with impacted soils during construction (SI #11).
 - Dust control/monitoring required during excavation activities (SI #11).

Soil Impact Area Summary

Four soil impact areas are located within Parcel 4. The details of each area are summarized in **Table 1**.

- Soil samples collected at SI #10 detected lead at concentrations that exceed NDC and NPSIC (21 samples exceeding criteria) from depths of 2 to 12 ft bgs. Approximately 1 to 4 feet of concrete is located at the surface. The extent of SI #10 is shown **Figure 7**.
 - Any impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
 - Dust control/monitoring required during excavation activities.
 - No direct contact with impacted soils during construction.
 - A RCRA area of contamination (AOC) designation needs to be established to allow lead impacted soil to be relocated without unnecessary hazardous waste management restrictions.
- Soil samples collected at SI #11 detected lead at concentrations that exceed NDC (18 samples exceeding criterion) from 1 to 9 ft bgs and manganese detections in concentrations that exceed NPSIC (four samples exceeding criterion) from 0.9 to 8.7 ft bgs. SI #11 also exhibits benzo(a)pyrene concentrations that exceed NDC (one sample) from depths of 0.5 to 2 ft bgs. Approximately 0.5 feet of concrete is located at the surface. This area is co-located with PCB #10, LNAPL #10, and SI #12 (benzo(a)pyrene). The extent of SI #11 is shown **Figure 8**.
 - Any impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
 - Dust control/monitoring required during excavation activities.

- No direct contact with impacted soils during construction.
 - Cover must be maintained on exposed impacted soil.
 - LNAPL impacted soils may be encountered at 3 ft bgs and need to be managed per the MMP.
 - PCB impacted soils will need to be managed in accordance with TSCA.
 - A RCRA area of contamination (AOC) designation needs to be established to allow lead impacted soil to be relocated without unnecessary hazardous waste management restrictions.
- Soil samples collected at SI #13 detected lead at concentrations that exceed NDC and NPSIC (16 samples) from depths of 0.7 to 8 ft bgs. Up to 1 feet of concrete is located at the surface. The area is co-located with LNAPL #11. The extent of SI #13 is shown **Figure 9**.
 - Any impacted soil will need to be managed per the MMP and kept within a capped location or disposed of off-site.
 - Dust control/monitoring required during excavation activities.
 - No direct contact with impacted soils during construction.
 - Cover must be maintained on exposed impacted soil.
 - LNAPL impacted soils may be encountered at 6 ft bgs and will need to be managed per the MMP.
 - A RCRA area of contamination (AOC) designation needs to be established to allow lead-impacted soil to be managed without unnecessary hazardous waste restrictions.

Lead Groundwater Results

Figure 10 presents the groundwater lead results in Parcel 4. The samples were collected on August 27, 2020. The data demonstrate that despite the elevated lead concentration in the soil impact areas, groundwater concentrations remain low. Groundwater on Parcel 4 flows to the southeast. Despite elevated lead concentrations in the soil, only one groundwater sample out of 14 exceeded the drinking water criteria (RFI-83/84-29), and that sample was unfiltered. The filtered sample was non-detect for lead. All other groundwater samples were non-detect for lead. These data demonstrate that the establishment of an AOC is justified and that moving lead-impacted soil within the AOC will not impact groundwater concentrations.

Groundwater Impact Summary

Groundwater samples exceeded drinking water criteria in this parcel; however, there is no complete pathway for drinking water. GSI impacts are only relevant to the extent that there is a migration pathway to the storm sewer. The only current pathway is Outfall 005 which is currently under investigation. Construction activities must be conducted so that they do not exacerbate contamination or impact the GSI pathway.

Attachments:

Figures 1-10

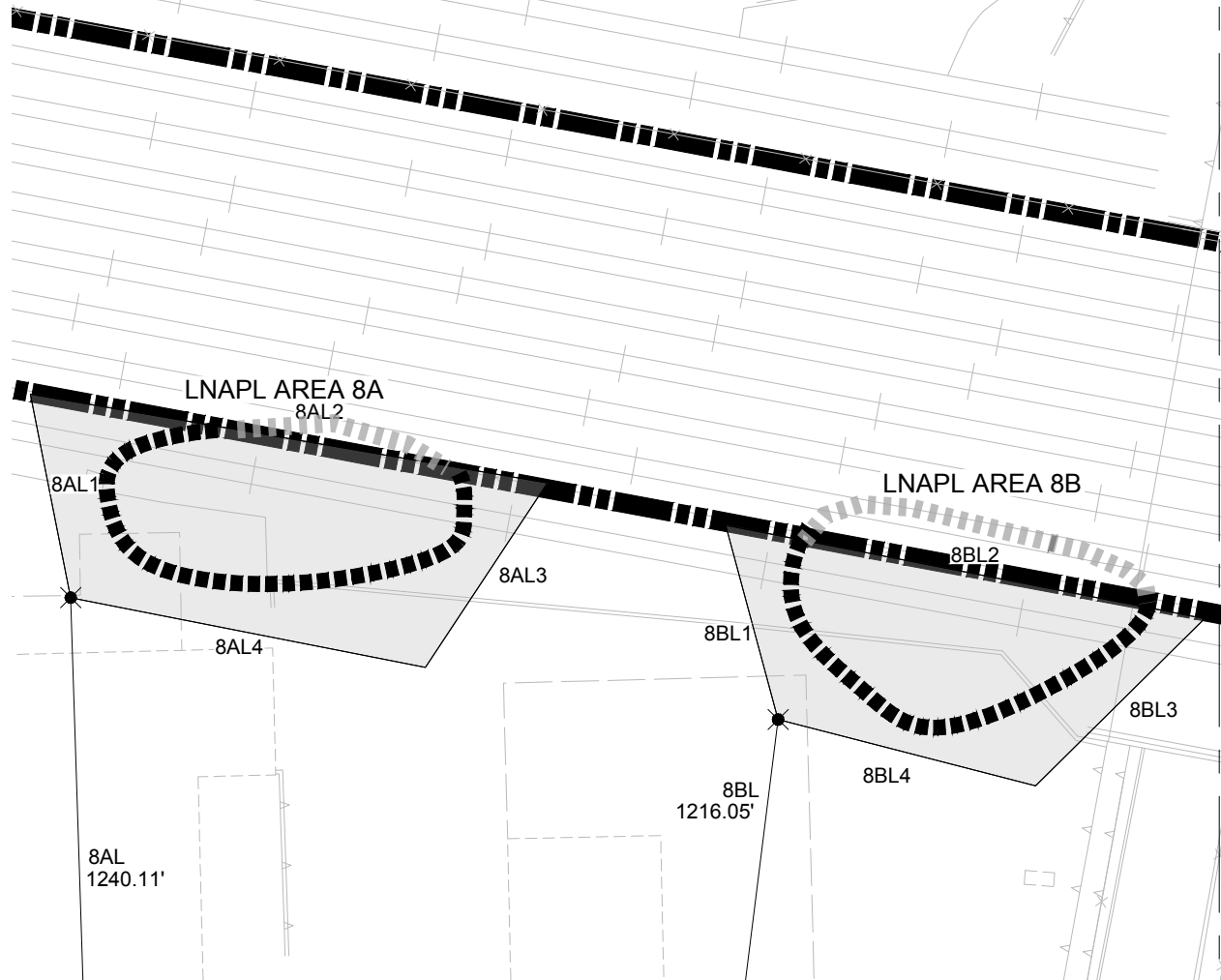
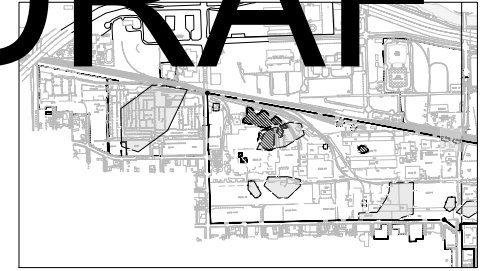
Table 1 – Parcel 4 Impact Summary

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Attachment 1 – Proposed Environmental Redevelopment Strategy – Parcel 4 Impacted Soils

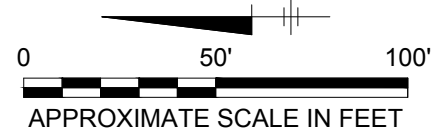
XREFS: IMAGES: PROJECTNAME: ---
 X-BDR-RC-LA
 X-AREAS LNAPL
 X-SITE BASE

DRAFT



- LEGEND:**
- PROPERTY BOUNDARY
 - APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
 - EXTENT OF PROPOSED RESTRICTION
 - POINT OF BEGINNING
 - 8AL1 RESTRICTED AREA SIDE ID

Depth to LNAPL is ~ 7.5 ft bgs based on data from 2 wells in LNAPL 8 Area



Parcel Line Table LNAPL #8A			Parcel Line Table LNAPL #8B		
Line #	Direction	Length	Line #	Direction	Length
8AL	N88°10'08"E	1,240.11'	8BL	S82°52'43"E	1,216.05'
8AL1	N79°08'05"E	52.99'	8BL1	N74°55'25"E	51.74'
8AL2	S10°34'24"W	137.41'	8BL2	S10°34'24"W	129.54'
8AL3	N56°56'32"W	54.38'	8BL3	N44°38'48"W	62.68'
8AL4	N11°07'07"E	97.24'	8BL4	N14°27'19"E	71.55'

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RESTRICTIVE COVENANT

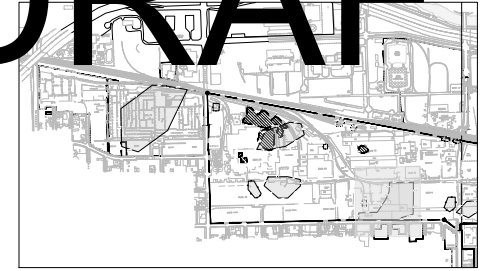
LNAPL AREA #8

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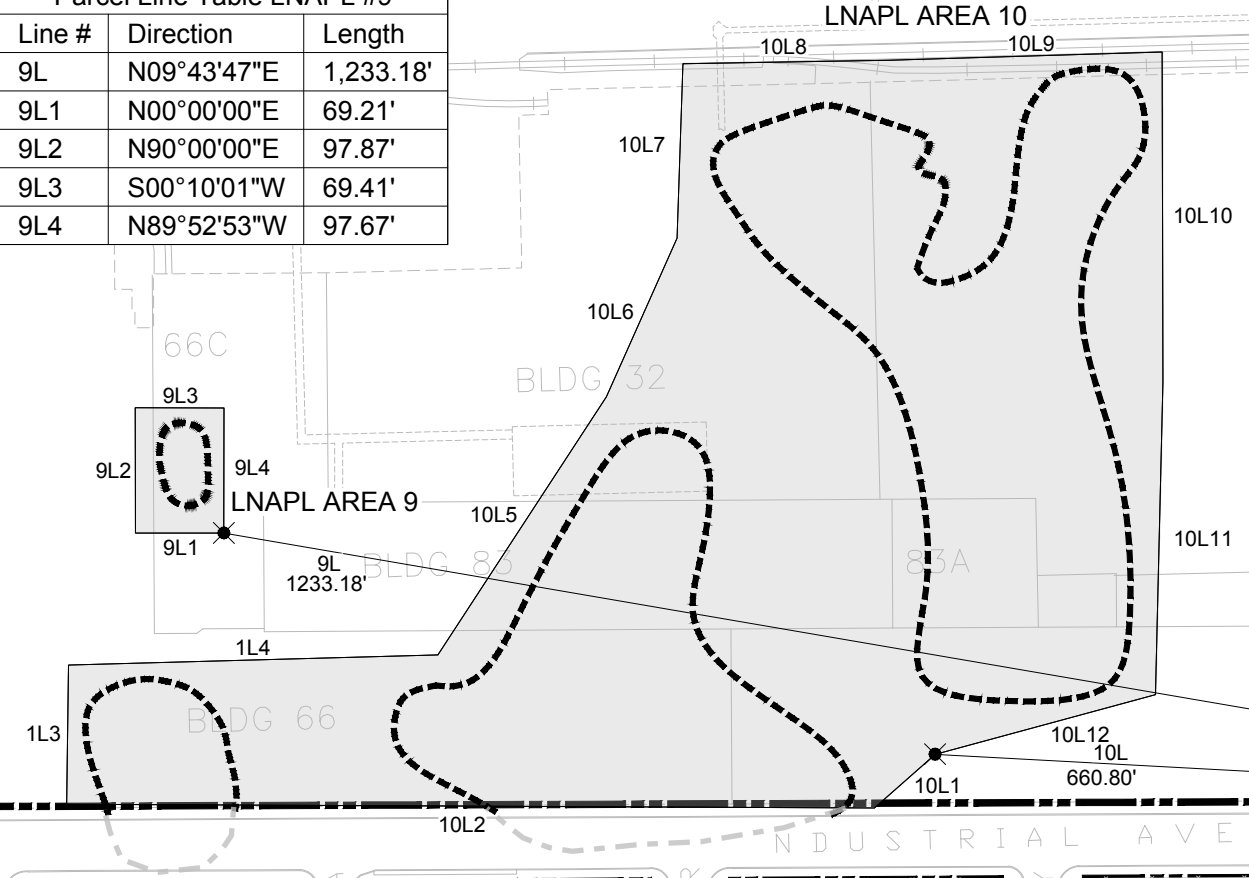
FIGURE
3

XREFS: IMAGES: PROJECTNAME: ----
 X-BDR-RC-LA
 X-AREAS LNAPL
 X-SITE BASE

DRAFT



Line #	Direction	Length
9L	N09°43'47"E	1,233.18'
9L1	N00°00'00"E	69.21'
9L2	N90°00'00"E	97.87'
9L3	S00°10'01"W	69.41'
9L4	N89°52'53"W	97.67'



- LEGEND:**
- PROPERTY BOUNDARY
 - APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
 - EXTENT OF PROPOSED RESTRICTION
 - POINT OF BEGINNING
 - RESTRICTED AREA SIDE ID

LNAPL Area 9 - Depth to LNAPL is ~ 10 ft bgs based on data from 2 wells

LNAPL Area 10 - Depth to LNAPL is ~7 to 10 ft bgs

Line #	Direction	Length	Line #	Direction	Length	Line #	Direction	Length
10L	N03°05'15"E	660.80'	10L5	S56°53'39"E	240.63'	10L9	S01°43'03"E	213.52'
10L1	N41°21'10"W	63.27'	10L6	S65°57'07"E	135.75'	10L10	S89°53'34"W	257.46'
10L2	N00°12'46"E	630.85'	10L7	S88°07'37"E	136.27'	10L11	N88°39'21"W	244.50'
10L3	S89°14'28"E	113.98'	10L8	S00°56'15"E	160.98'	10L12	N15°09'40"W	178.23'
10L4	S01°34'16"E	288.63'						

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RESTRICTIVE COVENANT

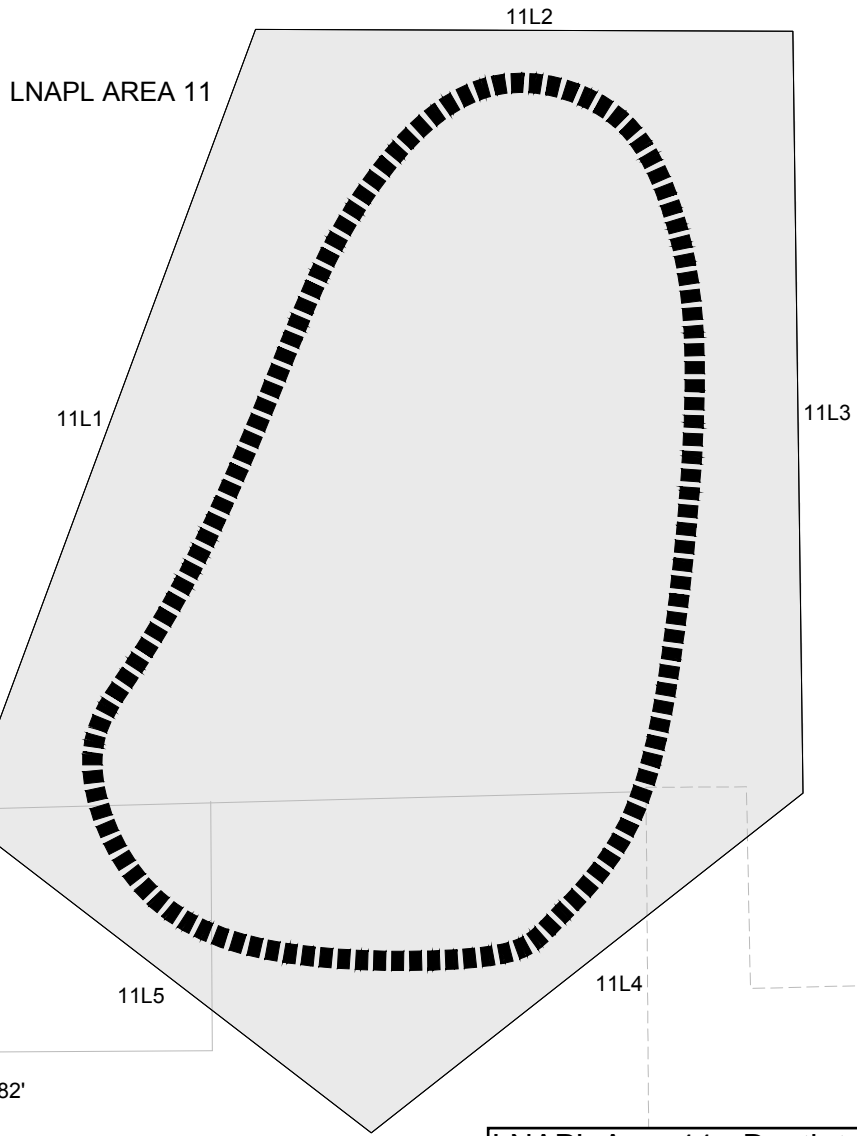
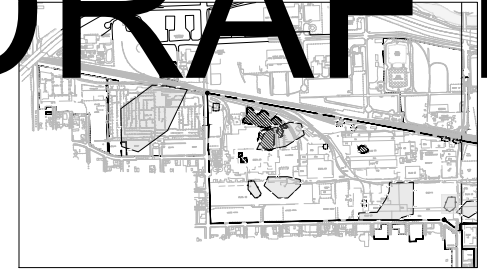
LNAPL AREA #9 AND AREA #10

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FIGURE
4

XREFS: IMAGES: PROJECTNAME: ----
 X-BDR-RC-LA
 X-AREAS LNAPL
 X-SITE BASE

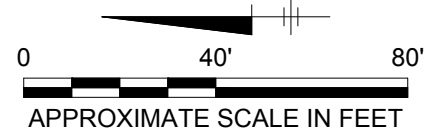
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LEGEND:

- APPROXIMATE CURRENT EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
- EXTENT OF PROPOSED RESTRICTION
- POINT OF BEGINNING
- 11L1 RESTRICTED AREA SIDE ID

Parcel Line Table LNAPL #11		
Line #	Direction	Length
11L	N89°22'13"E	186.82'
11L1	S69°40'03"E	175.30'
11L2	S00°10'37"W	111.94'
11L3	S89°15'08"W	158.76'
11L4	N38°13'15"W	114.40'
11L5	N37°35'59"E	107.34'



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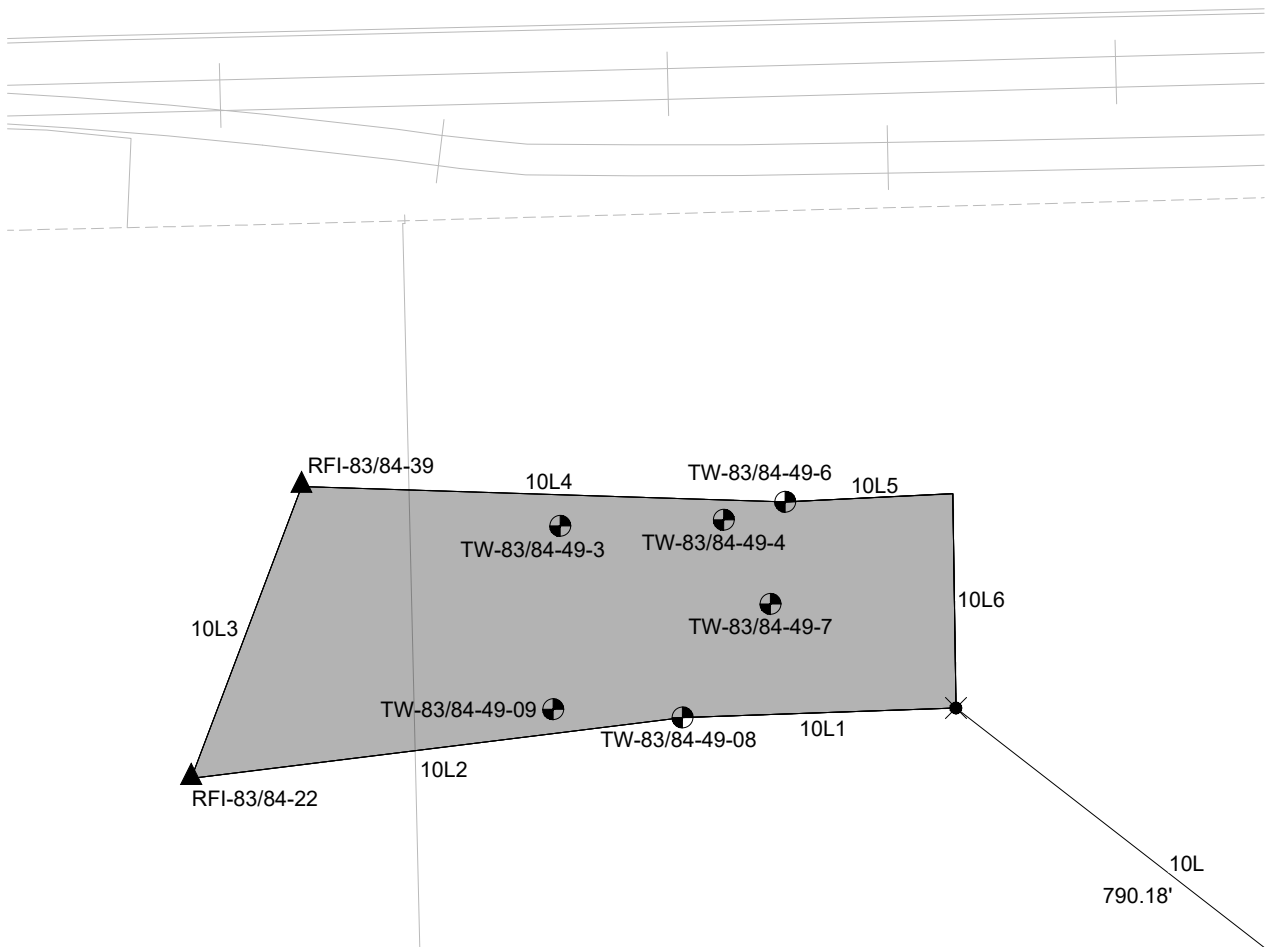
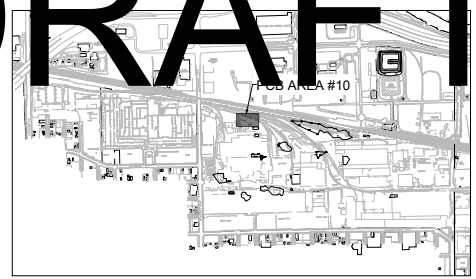
LNAPL AREA #11



FIGURE
5

XREFS: IMAGES: PROJECTNAME: ---
 X-SITE BASE
 X-BDR-RC-LA
 X-SAMPLE NETWORK

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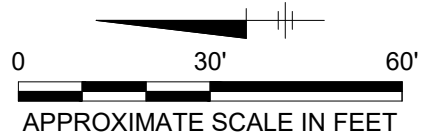


LEGEND:

- EXTENT OF PROPOSED PCB RESTRICTION
- +
 POINT OF BEGINNING
- 10L1 PCB AREA SIDE ID

Parcel Line Table PCB Area #10		
Line #	Direction	Length
10L	N37°48'38"E	790.18'
10L1	N01°59'55"W	42.74'
10L2	N07°04'30"W	77.37'
10L3	S69°18'08"E	48.78'
10L4	S01°49'36"W	75.62'
10L5	S02°46'46"E	26.20'
10L6	S89°08'39"W	33.47'

PCB IMPACTS DETECTED AT CONCENTRATIONS OF UP TO 3.6 PPM



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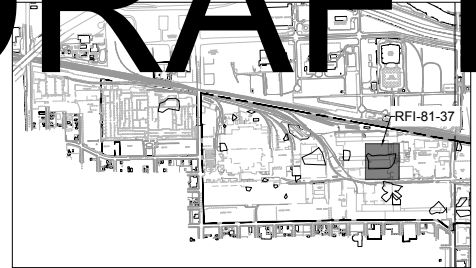
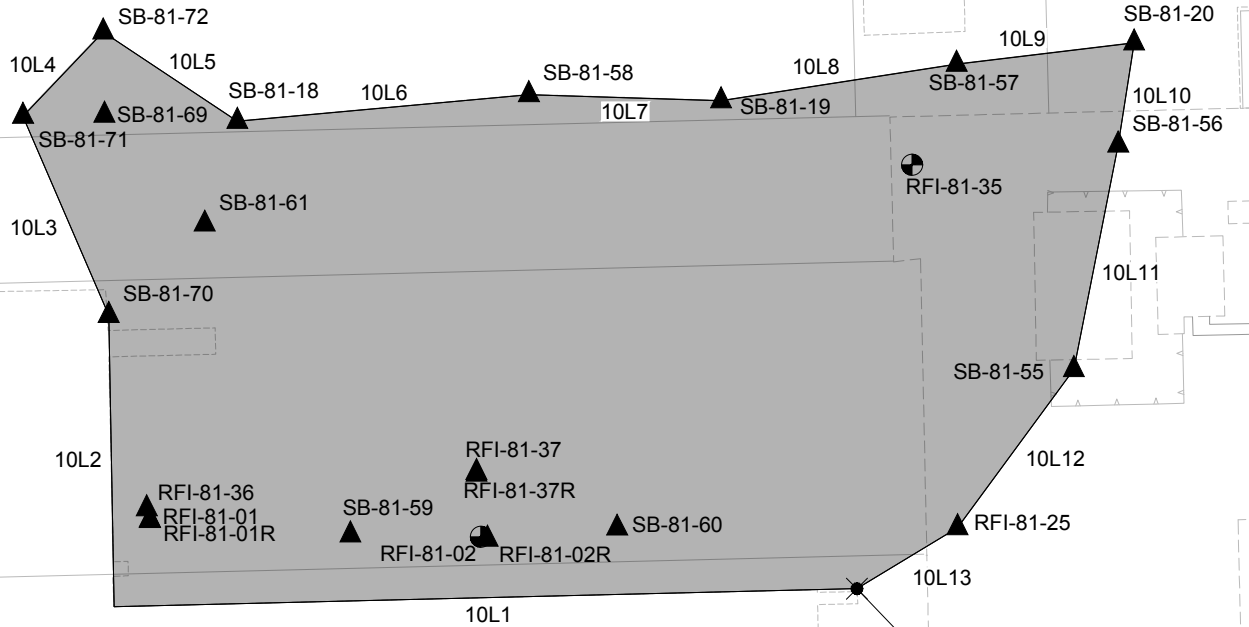
PCB AREA #10

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FIGURE
6

XREFS: IMAGES: PROJECTNAME: ----
 X-SITE BASE
 X-BDR-RC-LA
 X-SAMPLE NETWORK

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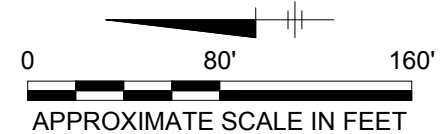


LEGEND:

- EXTENT OF PROPOSED SOIL IMPACT AREA RESTRICTION
- POINT OF BEGINNING
- 10L1 SOIL IMPACT AREA SIDE ID

Parcel Line Table SI AREA 10		
Line #	Direction	Length
10L	N46° 13' 57" E	1110.29'
10L1	N01° 22' 57" W	309.62'
10L2	N88° 57' 11" E	121.39'
10L3	N66° 42' 20" E	90.30'
10L4	S46° 25' 46" E	48.47'
10L5	S33° 39' 08" W	67.13'
10L6	S05° 12' 58" E	121.99'
10L7	S01° 48' 10" W	80.11'
10L8	S08° 48' 35" E	99.31'
10L9	S06° 51' 08" E	74.51'
10L10	N81° 06' 45" W	43.11'
10L11	N78° 50' 15" W	95.30'
10L12	N53° 39' 33" W	81.86'
10L13	N31° 13' 47" W	48.98'

LEAD DETECTED AT CONCENTRATIONS OF UP TO 74,500 PPM WHICH EXCEEDS DIRECT CONTACT CRITERIA (900 PPM) AND PARTICLE INHALATION CRITERIA (44,000 PPM). THE HIGHEST CONCENTRATIONS (>5,000 PPM) OF LEAD IMPACTS ARE PRIMARILY DEEPER THAN 6 FT BGS.



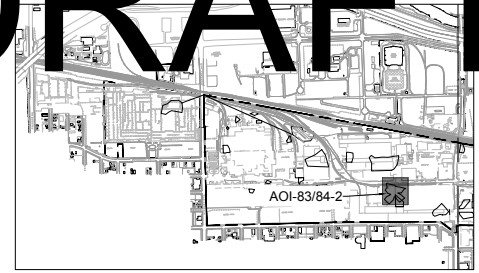
RACER TRUST BUICK CITY FLINT, MICHIGAN RESTRICTIVE COVENANT	
SOIL IMPACT AREA #10	
ARCADIS <small>Design & Consultancy for natural and built assets</small>	FIGURE 7

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 X-SITE BASE
 X-BDR-RC-LA
 X-SAMPLE NETWORK



Parcel Line Table SI AREA 11

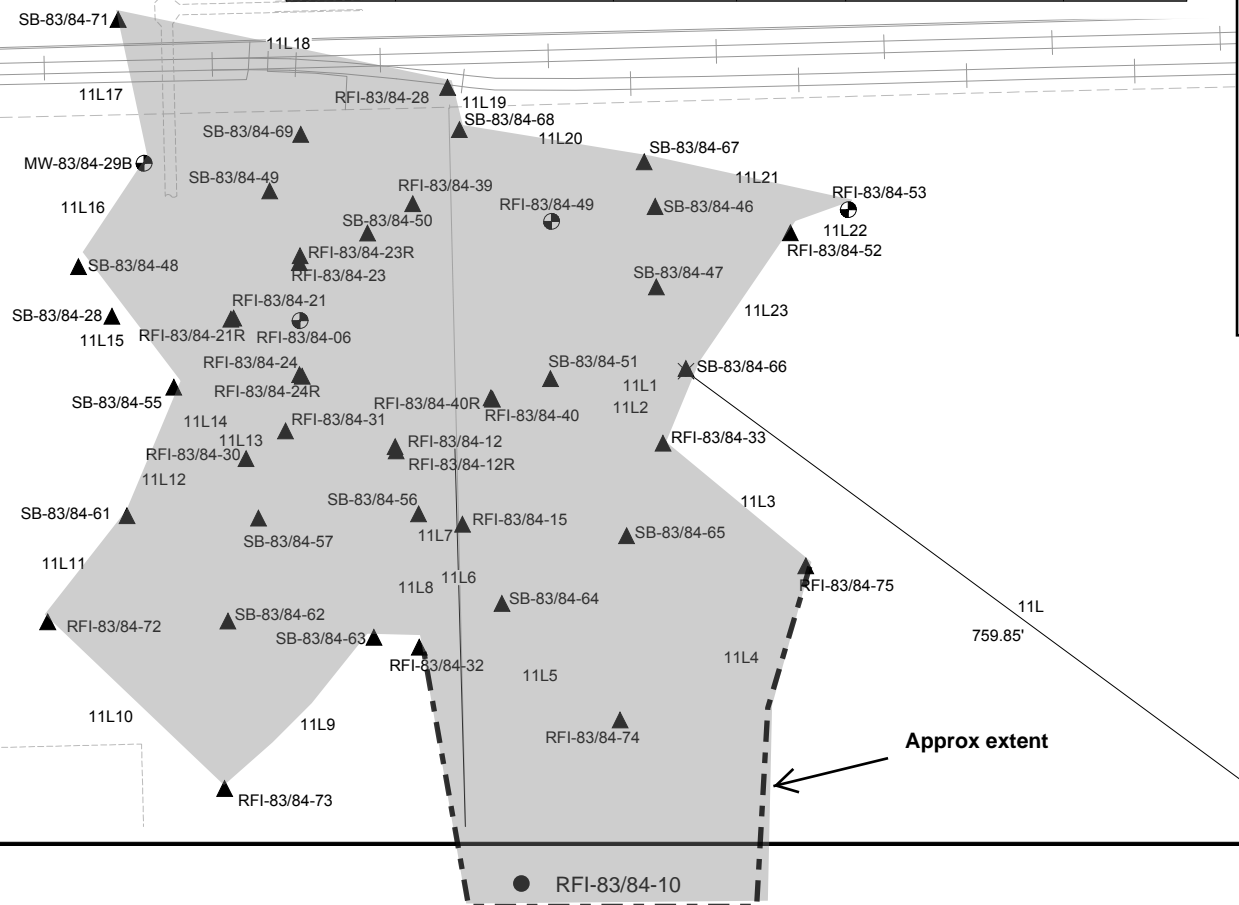
Line #	Direction	Length	Line #	Direction	Length
11L	N36° 21' 46" E	759.85'	11L12	S25° 39' 52" E	55.00'
11L1	N04° 11' 38" W	56.61'	11L13	S34° 54' 41" E	20.10'
11L2	S29° 53' 34" W	54.07'	11L14	N21° 24' 44" E	50.04'
11L3	S40° 39' 22" W	78.40'	11L15	N51° 36' 52" E	63.97'
11L4	N39° 42' 07" W	100.55'	11L16	S56° 49' 13" E	52.84'
11L5	N44° 34' 42" E	69.13'	11L17	N78° 06' 35" E	60.08'
11L6	N63° 30' 16" E	36.90'	11L18	S11° 38' 07" W	140.12'
11L7	N13° 30' 10" E	18.76'	11L19	S74° 16' 28" W	18.26'
11L8	N70° 06' 10" W	54.77'	11L20	S09° 52' 46" W	78.16'
11L9	N45° 21' 25" W	88.56'	11L21	S12° 30' 45" W	87.10'
11L10	N43° 19' 10" E	101.26'	11L22	N23° 55' 38" W	26.43'
11L11	S53° 13' 32" E	55.21'	11L23	N52° 29' 33" W	71.36'

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LEGEND:

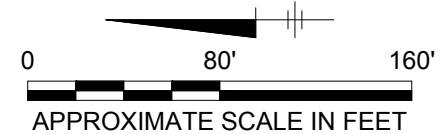
-  EXTENT OF PROPOSED SOIL IMPACT AREA RESTRICTION
-  POINT OF BEGINNING
- 11L1 SOIL IMPACT AREA SIDE ID




LEAD DETECTED AT CONCENTRATIONS OF UP TO 9,840 PPM (18 LOCATIONS) WHICH EXCEEDS DIRECT CONTACT CRITERIA (900 PPM)

MANGANESE DETECTED AT CONCENTRATIONS UP TO 3,500 PPM (4 LOCATIONS) WHICH EXCEEDS PARTICULATE SOIL INHALATION CRITERIA (1,500 PPM)

BENZO(A)PYRENE DETECTED AT A CONCENTRATION OF 8.3 PPM (1 LOCATION) WHICH EXCEEDS DIRECT CONTACT CRITERIA (8 PPM)

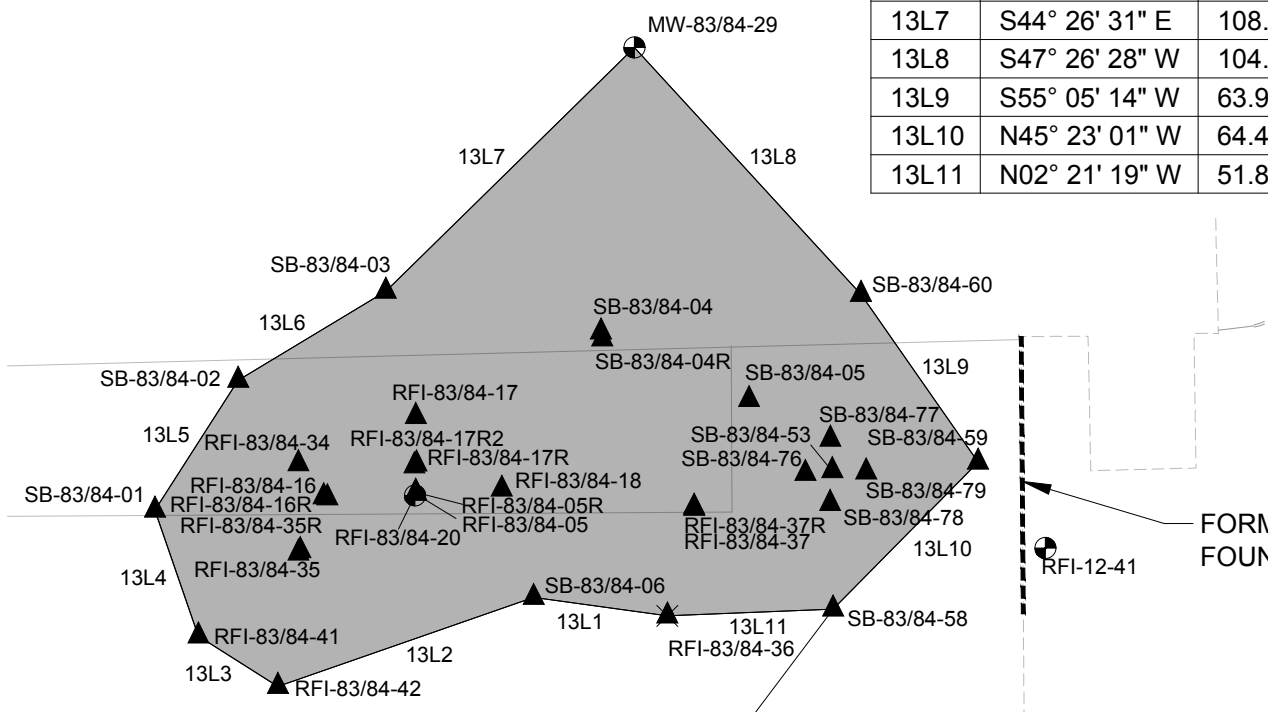
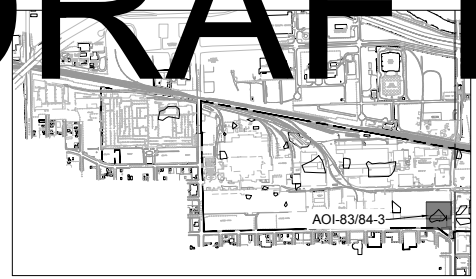


RACER TRUST BUICK CITY FLINT, MICHIGAN RESTRICTIVE COVENANT	
SOIL IMPACT AREA #11	
	Design & Consultancy for natural and built assets
FIGURE 8	

XREFS: IMAGES: PROJECTNAME: ----
 X-SITE BASE
 X-BDR-RC-LA
 X-SAMPLE NETWORK

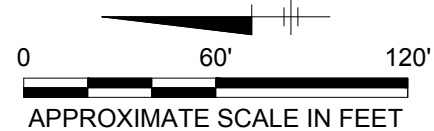
Parcel Line Table SI AREA 13		
Line #	Direction	Length
13L	S74° 23' 36" E	110.11'
13L1	N07° 51' 19" E	42.16'
13L2	N19° 10' 48" W	84.62'
13L3	N32° 21' 22" E	29.43'
13L4	N70° 57' 34" E	41.60'
13L5	S57° 21' 17" E	48.22'
13L6	S31° 06' 09" E	53.88'
13L7	S44° 26' 31" E	108.76'
13L8	S47° 26' 28" W	104.73'
13L9	S55° 05' 14" W	63.95'
13L10	N45° 23' 01" W	64.48'
13L11	N02° 21' 19" W	51.86'

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LEGEND:

- EXTENT OF PROPOSED SOIL IMPACT AREA RESTRICTION
- POINT OF BEGINNING
- SOIL IMPACT AREA SIDE ID
- FORMER FEATURE USED FOR DELINEATION



LEAD DETECTED AT CONCENTRATIONS OF UP TO 385,000 PPM WHICH EXCEEDS DIRECT CONTACT CRITERIA (900 PPM) AND PARTICLE INHALATION CRITERIA (44,000 PPM). LEAD IMPACTS ARE PRIMARILY LOCATED IN SHALLOW SOILS BENEATH THE CONCRETE.

RACER TRUST BUICK CITY FLINT, MICHIGAN RESTRICTIVE COVENANT	
SOIL IMPACT AREA #13	
ARCADIS <small>Design & Consultancy for natural and built assets</small>	FIGURE 9

- WO-83/84-04
- WO-83/84-05

Table 1 - Parcel 4 Impact Summary Table
RACER Buick City Site, Flint, Michigan

Area ID	COC (Criteria Exceeded)	Concentration (ppm)	Sample Depth (ft bgs)	# Samples Exceeding Criteria/LNAPL (>0.1 ft)	Elevation (ft AMSL)	Surface Cover	Approximate Depth to LNAPL Impacted Soils	Remedy (Bold to Be completed)	Active Work Needed?	Co-Located RC	Restrictions and Conditions	Notes
LNAPL #8	LNAPL - Fuel Oil	NA	NA	2	733.6	Gravel	3	Bulkheading, Sewer Re-Route, RC	No	NA	<p>Construction in this area may proceed if soils are managed per the MMP and are placed under a cap at the completion of construction or disposed of off-site.</p> <p>LNAPL impacted soils are expected to be encountered starting at a depth of 3 feet bgs. However, if evidence of impact (odors, staining, sheens, oils) are encountered shallower, those soils must also be managed in accordance with the MMP.</p>	If LNAPL is removed in liquid form it will need to be sampled and characterized for off-site disposal.
LNAPL #9	LNAPL - Cutting Oil	NA	NA	2	736.57 - 735.57	1 foot concrete	10 to 11	RC	No	NA	<p>Construction in this area may proceed if soils are managed per the MMP and are placed under a cap at the completion of construction or disposed of off-site.</p> <p>LNAPL impacted soils are expected to be encountered starting at a depth of 10 feet bgs. However, if evidence of impact (odors, staining, sheens, oils) are encountered shallower, those soils must also be managed in accordance with the MMP.</p>	If LNAPL is removed in liquid form it will need to be sampled and characterized for off-site disposal.
LNAPL #10	LNAPL - Cutting Oil	NA	NA	TBD	742.6 - 735.6	1 foot concrete	3 to 10	Consider Recovery and RC	Yes	<p>PCB #10 - PCB impacted soil from 3 to 5 feet bgs</p> <p>SI #11 - Direct Contact restriction for lead from 1 to 9 ft bgs and Particulate Soil Inhalation restriction for manganese from 0.9 to 8.7 feet bgs</p> <p>SI #12 - Direct Contact restriction for benzo(a)pyrene from 0.5 to 2 feet bgs</p>	<p>Construction in this area may proceed and soils up to 2 feet bgs may be relocated within the area. No excavation below 2 feet is permitted unless soils are managed per the MMP and placed under a cap at the completion of construction or disposed of off-site.</p> <p>LNAPL impacted soils are expected to be encountered starting at a depth of 3 feet bgs. However, if evidence of impact (odors, staining, sheens, oils) are encountered shallower, those soils must also be managed in accordance with the MMP.</p> <p>No contact with lead and benzo(a)pyrene impacted soils during construction.</p> <p>Dust control/monitoring required during excavation activities.</p>	<p>If LNAPL is removed in liquid form it will need to be sampled and characterized for off-site disposal.</p> <p>PCB impacted soils will need to be managed in accordance with TSCA.</p>
LNAPL #11	LNAPL - Cutting Oil	NA	NA	1	739.7	1 foot concrete	6	Bulkheading, Sewer Re-route, Consider Recovery, RC	Yes	<p>SI #13 - Direct Contact and Particulate Soil Inhalation restriction for lead from 0.7 to 8 feet bgs</p>	<p>Construction in this area may proceed if soils are managed per the MMP and are placed under a cap at the completion of construction or disposed of off-site.</p> <p>LNAPL impacted soils are expected to be encountered starting at a depth of 6 feet bgs. However, if evidence of impact (odors, staining, sheens, oils) are encountered shallower, those soils must also be managed in accordance with the MMP.</p> <p>No contact with lead impacted soils during construction.</p> <p>Dust control/monitoring required during excavation activities.</p>	If LNAPL is removed it will need to be sampled and characterized for off-site disposal.

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RACER Buick City Site, Flint, Michigan

Area ID	COC (Criteria Exceeded)	Concentration (ppm)	Sample Depth (ft bgs)	# Samples Exceeding Criteria/LNAPL (>0.1 ft)	Elevation (ft AMSL)	Surface Cover	Approximate Depth to LNAPL Impacted Soils	Remedy (Bold to Be completed)	Active Work Needed?	Co-Located RC	Restrictions and Conditions	Notes
PCB #10	PCB	3.6	3 to 5	1	742.7 - 740.7	1 foot concrete	NA	Existing Cap and RC	No	LNAPL #10 - LNAPL impacted soils from 3 to 10 feet bgs SI #11 - Direct Contact restriction for lead from 1 to 9 feet bgs and Particulate Soil Inhalation restriction for manganese from 0.9 to 9 feet bgs	High Occupancy No excavation is permitted unless soils are managed per MMP and kept within the area and properly capped or disposed of off-site. LNAPL impacted soils may be encountered at 10 feet bgs. LNAPL impacted soils need to be managed per the MMP. No contact with lead impacted soils during construction. Dust control/monitoring required during excavation activities.	
SI #10	Lead (NDC, NPSIC)	1,000 to 74,500	2 to 12	21	741.0 - 731.0	1 to 4 feet of concrete	NA	Existing Cap and RC	No	NA	Allows excavation if soils are managed per the MMP and kept within a capped location or disposed of off-site. No contact with lead impacted soils during construction. Dust control/monitoring required during excavation activities.	Needs an AOC Based on existing Site data soil is considered hazardous unless TCLP samples are collected.
SI #11	Lead (NDC)	1,000 to 9,840	1 to 9	18	744.0 - 736.0	0.7 to 1 feet of concrete	NA	Existing Cap and RC	No	PCB #10 - PCB impacted soil from 3 to 5 feet bgs LNAPL #10 - LNAPL impacted soil from 3 to 10 feet bgs SI #12 - Direct Contact restriction for benzo(a)pyrene from 0.5 to 2 feet bgs	Allows excavation if soils are managed per the MMP and kept within the area and capped or disposed of off-site. No contact with lead or benzo(a)pyrene impacted soils during construction. LNAPL impacted soils may be encountered at 3 feet bgs. LNAPL impacted soils need to be managed per the MMP. Dust control/monitoring required during excavation activities.	Needs an AOC Based on existing Site data lead impacted soil is considered hazardous unless TCLP samples are collected. PCB impacted soils will need to be managed in accordance with TSCA. Cap over the reworked area must be constructed in accordance with 761.61(a)(7).
	Manganese (NPSIC)	1,800 to 3,500	0.9 to 8.7	4	744.1 - 736.3							
	Benzo(a)pyrene (NDC)	8.3	0.5 to 2	1	745.1 - 743.6	0.5 feet of concrete						
SI #13	Lead (NDC, NPSIC)	915 to 385,000	0.7 to 8	16	744.9 - 737.6	0.7 to 1 feet of concrete	NA	Existing Cap and RC	No	LNAPL #11 - LNAPL impacted soil 6 feet bgs	Allows excavation if soils are managed per the MMP and kept within a capped location or disposed of off-site. No contact with lead impacted soils during construction. LNAPL impacted soils may be encountered at 6 feet bgs. LNAPL impacted soils need to be managed per the MMP. Dust control/monitoring required during excavation activities.	Needs an AOC Based on existing Site data lead impacted soil is considered hazardous unless TCLP samples are collected. Cap over the reworked PCB area must be constructed in accordance with 761.61(a)(7).

Notes:
LNAPL # - Light Non-Aqueous Phase Liquid Area
PCB # - Polychlorinated Biphenyl Area
SI # - Surface Impact Area
COC - Contaminant of Concern
ppm - parts per million
ft bgs - feet below ground surface
ft AMSL - feet above mean sea level
RC - Restrictive Covenant

Table 1 - Parcel 4 Impact Summary Table
RACER Buick City Site, Flint, Michigan

Area ID	COC (Criteria Exceeded)	Concentration (ppm)	Sample Depth (ft bgs)	# Samples Exceeding Criteria/LNAPL (>0.1 ft)	Elevation (ft AMSL)	Surface Cover	Approximate Depth to LNAPL Impacted Soils	Remedy (Bold to Be completed)	Active Work Needed?	Co-Located RC	Restrictions and Conditions	Notes
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NA - not applicable
MMP - Materials Management Plan
AOC - Area of Contamination
TCLP - toxicity characteristic leaching procedure
TSCA - Toxic Substance Control Act
NDC - Nonresidential direct contact criteria
NPSIC - Nonresidential Particulate Soil Inhalation criteria

Attachment 1
Proposed Environmental Redevelopment Management Strategy - Parcel 4
Impacted Soils

(Assume AOC is designated for the entire parcel)

Figure 2 presents a breakdown of the impacted soils in Parcel 4 into zones for the purpose of a proposed environmental redevelopment management strategy. These zones are discussed below.

Zone A: Lead-impacted soils: Ranging up to 74,500 ppm – highest concentrations (>5,000ppm) are primarily below 6' BGS. AOC designation allows soils to be graded and relocated if covered with building slabs, pavement, or properly placed landscaping in accordance with the MMP without triggering RCRA hazardous waste requirements (per EPA 1996 AOC Guidance). Lead TCLP results exceed 5 mg/L (characteristically hazardous) – however, groundwater sampling in the vicinity of this zone and Zone B show ND for lead – with minor exceptions (See **Figure 10**).

Zone B: LNAPL-impacted soils: Found generally throughout this zone (about 7' to 10' BGS) – with overlain areas of soil contamination from PCBs, lead, manganese, and an isolated benzo-a-pyrene sample. Unless LNAPL in liquid form is removed (and disposed off-site) the LNAPL impacted soils may be graded or relocated within the AOC if covered with building slabs, pavement, or properly placed landscaping in accordance with the MMP.

Zone C: PCBs, lead, manganese, and benzo(a)pyrene-impacted soil: Underlain by Zone B (LNAPL-impacted soils) Benzo(a)pyrene is an isolated sample.

PCBs - PCB Area #10 represents a single sample at 3.6 ppm at a depth of 3' to 5' BGS. A TSCA DRC will be recorded to prevent excavation of soils below 2 feet in this area - this restriction could be removed if the development team prefers to excavate the PCB impacted soils (>1 ppm) and dispose of them off site. Otherwise, any relocation of PCBs would be confined to the TSCA restricted PCB Area.

Lead, Manganese, and Benzo-a-pyrene - Are found in Soil Impact Area #11 near surface - each subject to the same management controls – dust control to prevent wind borne migration, sediment control to prevent any surface runoff migration and a cover with building slabs, pavement, or properly placed landscaping in accordance with the MMP when work is completed to avoid any direct exposure. The lead impacted soils may be graded, excavated, and relocated without triggering RCRA hazardous waste requirements (per EPA 1996 AOC Guidance.) in accordance with the MMP.

Zone D: LNAPL-impacted soils: In LNAPL Area #11 LNAPL-impacted soils are found generally throughout this zone (about 5' BGS) – with an overlain area of soil contaminated with lead (portion of Soil Impact Area #13). Unless LNAPL in liquid form is removed (and disposed off-site) the LNAPL impacted soils may be graded or relocated within the AOC if covered with building slabs, pavement, or properly placed landscaping in accordance with the MMP. AOC designation allows lead impacted soils (Soil Impact Area #13 – a portion of which overlays LNAPL Area #11) to be graded and relocated if covered with building slabs, pavement, or properly placed landscaping in accordance with the MMP without triggering RCRA hazardous waste requirements (per EPA 1996 AOC Guidance.) Lead TCLP results exceed 5 mg/L.

(characteristically hazardous) – however, groundwater sampling in the vicinity of this zone and Zone B show ND for lead – with minor exceptions (see **Figure 10**).

Zone E LNAPL-impacted soils: These soils are present at depth (7' to 8' BGS) in two smaller areas may be graded or relocated within the AOC if covered with building slabs, pavement, or properly placed landscaping in accordance with the MMP.

