

# MEMO

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Date:

July 16, 2021

Arcadis Project No.:

30075935

Subject:

Lagoon Investigation Summary Memo  
RACER Buick City Site

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## INTRODUCTION

On behalf of RACER, Arcadis U.S., Inc. (Arcadis) has prepared this memo to summarize investigation activities at the lagoon area of the Buick City Site (the Site) (**Figure 1**).

The availability of fill soils from the I-69 road reconstruction project prompted Revitalizing Auto Communities Environmental Response (RACER) Trust to request a review of a former lagoon at the Site along James P Cole Street north of Leith Street with the goal of filling in the abandoned lagoon. In March 2021 surface water and sediment samples were collected as an initial step in better understanding the Site conditions to plan for the closure/filling of the lagoon. These samples revealed the presence of per- and polyfluoroalkyl substances (PFAS) in surface water, soils, and sediment.

Defining an appropriate remedial response for the lagoon area requires more detailed site characterization. To that end the following investigation activities were completed in April through June 2021 to better understand impacts in the lagoon area.

- At the Eastern Lagoon (Lagoon) transects were completed to measure the thickness of sediment and additional sediment and surface water samples were collected for laboratory analysis.

- At the former Western Lagoon (WL) and the area south of the lagoons, borings were completed, and soil and groundwater samples were collected for PFAS analysis.

## BACKGROUND

The 2001 report *Description of Current Conditions for Areas North of Leith Street* states that:

The inactive wastewater aeration lagoons consist of two clay-lined lagoons with a total capacity of 12 million gallons (6 million gallons each) and are located between James P Cole Boulevard and the former St. John Street on the eastern perimeter of the Site north of Leith Street. Created in 1976, the lagoons provided tertiary treatment of industrial wastewater from the Site's wastewater treatment facility. The primary function of the lagoons was to reduce the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) of the process water in preparation for discharge to the Flint River. The lagoons were taken off-line in 1988 and the discharge was redirected to the City of Flint sanitary sewer system under the NPDES permit.

Although the effluent from a nonproduction electroplating operation contributed less than 1% of the lagoon's total influent, the sludge from the lagoons was originally classified as an F006 hazardous waste under the "mixture Rule" defined in 40CFR 261.3(b)(2). In 1986, GM submitted a delisting petition and provided data and justification to have the sludge considered nonhazardous. The State of Michigan issued a Redesignation Approval in 1994 to allow the nonhazardous lagoon sludge to be removed and disposed of in a Michigan Type II landfill.

The sludge was excavated from the lagoons and transported by rail to the ECDC Environmental, L.C., landfill located in East Carbon, Utah. After sludge removal was complete, soil in the area was tested in accordance with the Redesignation Authorization and Michigan Part 201 of Act 451. These activities are summarized in a report entitled *Environmental Oversight and Documentation for Wastewater Lagoon Cleanout* (The Traverse Group, 1996). The results of the testing verified that the lagoons met the associated cleanup criteria; therefore, no AOIs are currently identified related to these lagoons.

Further, as described in Section 4.15, several rounds of groundwater data have been historically collected in association with the former aeration lagoons. These data indicate no impacts to this area.

In 2009 the Lagoon was reworked for potential re-use as part of an on-Site treatment system; however, it was never put into active use. Subsequently the pond appears to have filled with rainwater and water from

a nearby water line break. A topographic survey of the pond after it was re-worked in 2009 and photos of the work are attached for reference (**Attachment 1**).

## SAMPLING ACTIVITIES

### March 2021

Samples of surface water and sediment were collected from two locations (Lagoon-01 and Lagoon-02) in the Lagoon in anticipation of filling it in with soil (**Figure 2**). Samples were submitted for laboratory analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), total suspended solids (TSS), total dissolved solids (TDS), and PFAS. No VOCs, SVOCs, or PCBs were detected. Sediment samples detected metals (arsenic, cobalt, chromium, manganese, and selenium) at concentrations exceeding GSIP criteria; however, the results are close to the state default background levels. Sample results also detected trichloroethylene (PCE), tetrachloroethylene (PCE), and PFOS in the surface water and sediment at concentrations exceeding the GSI/GSIP criteria. Sample results are presented in **Tables 1 and 2**.

### April 2021

Four monitoring wells (SB-LAG-01 through SB-LAG-04) were installed between the eastern and western lagoons to aid in evaluating whether the water in the lagoon was in connection with groundwater, or whether the clay liner, if one is present, remained intact. Groundwater samples were collected from each well and submitted to the laboratory for PFAS analysis. PFOS was detected in the wells at concentrations ranging from 48 to 1,800 ng/L (**Figure 2**)

At the WL area five borings (SB-LAG-05 through SB-LAG-09) were completed. A total of twenty-two soil and five groundwater samples were analyzed to evaluate the former lagoon for the presence of PFAS. PFOS was detected in 21 (of 22) soil samples with concentrations ranging from 127 to 48,000 ng/kg. Concentrations at the remaining four borings ranged from 170 to 4,700 ng/kg (**Figure 3**). PFOS concentration in groundwater at the WL area range from 1,200 to 2,900 ng/L (**Figure 2**). The highest concentrations of PFOS in soil and groundwater were detected at SB-LAG-08 located in the northwest corner of the former WL area.

### May 2021

During the 2009 rework of the eastern lagoon, sediment/organics were removed from the bottom of the lagoon and stockpiled along the north end of the WL area. In order to characterize the soils in the stockpile, sample was collected using the incremental sampling method (ISM). Soil samples were collected from throughout the depth of the pile at the 31 locations shown on **Figure 4**. In accordance with ISM methodology these samples were combined into a single sample for PFAS analysis. The analytical results detected PFOS at a concentration of 4,400 ng/kg.

## **June 2021**

An investigation of the Lagoon was performed to determine the volume of sediment in the pond. As shown on **Figure 5** sediment thicknesses were measured along six north-south transects. Sediment thicknesses ranged from 0.1 feet to 0.7 feet across the bottom of the lagoon. Assuming an average thickness of 0.19 feet (weighted average based on actual number of measurements) approximately 450 - 550 yards sediment are present in the east lagoon.

Five sediment samples were collected and submitted for PFAS analysis. PFOS was detected at concentrations ranging from 8,300 to 32,000 ng/kg.

South and west of the lagoons six borings (SB-LAG-10 through SB-LAG-15) were completed for soil and groundwater sampling on June 4(**Figure 2**). However, groundwater was only encountered at one location (SB-LAG-10) west of the WL area. The groundwater sample collected from this location detected PFOS at a concentration of 28 ng/L. No water was detected in the five borings completed south (downgradient) of the lagoons.

Two soil samples were collected from each of the six boring locations and submitted for PFAS analysis. At the boring completed to the west of the lagoon (SB-LAG-10) PFOS was detected at concentrations of 7,100 ng/kg (0 to 2 ft bgs) and 1,400 ng/kg (3 to 5 ft bgs). PFOS results from the borings completed in the field south of the lagoons detected PFOS in the surface soil samples at concentrations ranging from 610 ng/kg to 1,400 ng/kg. Four of the five samples collected at depth did not detect PFOA and one sample detected PFOS at a concentration of 850 ng/kg..

## **NEXT STEPS**

An investigation is planned downgradient of the lagoons using hydraulic profiling tool (HPT)/ Vertical Aquifer Profiling (VAP) to evaluate the possible migration of PFAS in the groundwater. This work is tentatively planned to be completed in July 2021.

Evaluation of alternative means of closing this area will depend on further test results. The goal remains to identify a solution and utilize the soils from the I-69 project in 2022 for cap/cover.

**Table 1 - Eastern Lagoon Sediment Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

Location ID: Date Collected:	Units	Lagoon 01 03/18/21	Lagoon 02 03/18/21
<b>Volatile Organics</b>			
1,1,1-Trichloroethane	ug/kg	100 U	200 U
1,1,2,2-Tetrachloroethane	ug/kg	100 U	200 U
1,1,2-Trichloroethane	ug/kg	100 U	200 U
1,1-Dichloroethane	ug/kg	100 U	200 U
1,1-Dichloroethene	ug/kg	100 U	200 U
1,2,4-Trichlorobenzene	ug/kg	300 U	400 U
1,2-Dibromo-3-chloropropane (DBCP)	ug/kg	100 U	200 U
1,2-Dibromoethane (Ethylene dibromide)	ug/kg	100 U	200 U
1,2-Dichlorobenzene	ug/kg	100 U	200 U
1,2-Dichloroethane	ug/kg	100 U	200 U
1,2-Dichloropropane	ug/kg	100 U	200 U
1,3-Dichlorobenzene	ug/kg	100 U	200 U
1,4-Dichlorobenzene	ug/kg	100 U	200 U
2-Butanone (Methyl ethyl ketone) (MEK)	ug/kg	2,100 U	2,700 U
2-Hexanone	ug/kg	7,000 U	9,000 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ug/kg	7,000 U	9,000 U
Acetone	ug/kg	2,100 U	2,700 U
Benzene	ug/kg	100 U	200 U
Bromodichloromethane	ug/kg	100 U	200 U
Bromoform	ug/kg	100 U	200 U
Bromomethane (Methyl bromide)	ug/kg	700 U	900 U
Carbon disulfide	ug/kg	700 U	900 U
Carbon tetrachloride	ug/kg	100 U	200 U
Chlorobenzene	ug/kg	100 U	200 U
Chloroethane	ug/kg	700 U	900 U
Chloroform (Trichloromethane)	ug/kg	100 U	200 U
Chloromethane (Methyl chloride)	ug/kg	700 U	900 U
cis-1,2-Dichloroethene	ug/kg	100 U	200 U
cis-1,3-Dichloropropene	ug/kg	100 U	200 U
Cyclohexane	ug/kg	100 U	200 U
Dibromochloromethane	ug/kg	100 U	200 U
Dichlorodifluoromethane (CFC-12)	ug/kg	100 U	200 U
Ethylbenzene	ug/kg	100 U	200 U
Isopropyl benzene	ug/kg	100 U	200 U
m&p-Xylene	ug/kg	300 U	400 U
Methyl acetate	ug/kg	7,000 U	9,000 U
Methyl cyclohexane	ug/kg	100 U	200 U
Methyl tert butyl ether (MTBE)	ug/kg	700 U	900 U
Methylene chloride	ug/kg	700 U	900 U

**Table 1 - Eastern Lagoon Sediment Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

Location ID: Date Collected:	Units	Lagoon 01 03/18/21	Lagoon 02 03/18/21
Naphthalene	ug/kg	100 U	200 U
N-Propylbenzene	ug/kg	100 U	200 U
o-Xylene	ug/kg	100 U	200 U
Styrene	ug/kg	100 U	200 U
Tetrachloroethene	ug/kg	100 U	200 U
Toluene	ug/kg	100 U	200 U
trans-1,2-Dichloroethene	ug/kg	100 U	200 U
trans-1,3-Dichloropropene	ug/kg	100 U	200 U
Trichloroethene	ug/kg	100 U	200 U
Trichlorofluoromethane (CFC-11)	ug/kg	300 U	400 U
Trifluorotrichloroethane (Freon 113)	ug/kg	300 U	400 U
Vinyl chloride	ug/kg	300 U	400 U
<b>SVOC</b>			
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)	ug/kg	330 U	330 U
2,4,5-Trichlorophenol	ug/kg	330 U	330 U
2,4,6-Trichlorophenol	ug/kg	330 U	330 U
2,4-Dichlorophenol	ug/kg	330 U	330 U
2,4-Dimethylphenol	ug/kg	330 U	330 U
2,4-Dinitrophenol	ug/kg	670 U	670 U
2,4-Dinitrotoluene	ug/kg	330 U	330 U
2,6-Dinitrotoluene	ug/kg	330 U	330 U
2-Chloronaphthalene	ug/kg	330 U	330 U
2-Chlorophenol	ug/kg	330 U	330 U
2-Methylnaphthalene	ug/kg	330 U	330 U
2-Methylphenol	ug/kg	330 U	330 U
2-Nitroaniline	ug/kg	670 U	670 U
2-Nitrophenol	ug/kg	330 U	330 U
3&4-Methylphenol	ug/kg	330 U	330 U
3,3'-Dichlorobenzidine	ug/kg	670 U	670 U
3-Nitroaniline	ug/kg	670 U	670 U
4,6-Dinitro-2-methylphenol	ug/kg	670 U	670 U
4-Bromophenyl phenyl ether	ug/kg	330 U	330 U
4-Chloro-3-methylphenol	ug/kg	330 U	330 U
4-Chloroaniline	ug/kg	670 U	670 U
4-Chlorophenyl phenyl ether	ug/kg	330 U	330 U
4-Nitroaniline	ug/kg	670 U	670 U
4-Nitrophenol	ug/kg	670 U	670 U
Acenaphthene	ug/kg	330 U	330 U
Acenaphthylene	ug/kg	330 U	330 U
Acetophenone	ug/kg	330 U	330 U

**Table 1 - Eastern Lagoon Sediment Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

Location ID: Date Collected:	Units	Lagoon 01 03/18/21	Lagoon 02 03/18/21
Anthracene	ug/kg	330 U	330 U
Atrazine	ug/kg	330 U	330 U
Benzaldehyde	ug/kg	330 U	330 U
Benzo(a)anthracene	ug/kg	330 U	330 U
Benzo(a)pyrene	ug/kg	330 U	330 U
Benzo(b)fluoranthene	ug/kg	330 U	330 U
Benzo(g,h,i)perylene	ug/kg	330 U	330 U
Benzo(k)fluoranthene	ug/kg	330 U	330 U
Biphenyl (1,1-Biphenyl)	ug/kg	330 U	330 U
bis(2-Chloroethoxy)methane	ug/kg	330 U	330 U
bis(2-Chloroethyl)ether	ug/kg	330 U	330 U
bis(2-Ethylhexyl)phthalate (DEHP)	ug/kg	330 U	330 U
Butyl benzylphthalate (BBP)	ug/kg	330 U	330 U
Caprolactam	ug/kg	330 U	330 U
Carbazole	ug/kg	330 U	330 U
Chrysene	ug/kg	330 U	330 U
Dibenz(a,h)anthracene	ug/kg	330 U	330 U
Dibenzofuran	ug/kg	330 U	330 U
Diethyl phthalate	ug/kg	330 U	330 U
Dimethyl phthalate	ug/kg	330 U	330 U
Di-n-butylphthalate (DBP)	ug/kg	330 U	330 U
Di-n-octyl phthalate (DnOP)	ug/kg	330 U	330 U
Fluoranthene	ug/kg	330 U	330 U
Fluorene	ug/kg	330 U	330 U
Hexachlorobenzene	ug/kg	330 U	330 U
Hexachlorobutadiene	ug/kg	330 U	330 U
Hexachlorocyclopentadiene	ug/kg	330 U	330 U
Hexachloroethane	ug/kg	330 U	330 U
Indeno(1,2,3-cd)pyrene	ug/kg	330 U	330 U
Isophorone	ug/kg	330 U	330 U
Naphthalene	ug/kg	330 U	330 U
Nitrobenzene	ug/kg	200 U	200 U
N-Nitrosodi-n-propylamine	ug/kg	330 U	330 U
N-Nitrosodiphenylamine	ug/kg	330 U	330 U
Pentachlorophenol	ug/kg	670 U	670 U
Phenanthrene	ug/kg	330 U	330 U
Phenol	ug/kg	330 U	330 U
Pyrene	ug/kg	330 U	330 U
<b>PCB</b>			
Aroclor-1016 (PCB-1016)	ug/kg	330 U	330 U

**Table 1 - Eastern Lagoon Sediment Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

Location ID: Date Collected:	Units	Lagoon 01 03/18/21	Lagoon 02 03/18/21
Aroclor-1221 (PCB-1221)	ug/kg	330 U	330 U
Aroclor-1232 (PCB-1232)	ug/kg	330 U	330 U
Aroclor-1242 (PCB-1242)	ug/kg	330 U	330 U
Aroclor-1248 (PCB-1248)	ug/kg	330 U	330 U
Aroclor-1254 (PCB-1254)	ug/kg	330 U	330 U
Aroclor-1260 (PCB-1260)	ug/kg	330 U	330 U
<b>Inorganic</b>			
Antimony	mg/kg	0.5 U	0.5 U
Arsenic	mg/kg	7.95	8.18
Barium	mg/kg	64.5	82.5
Beryllium	mg/kg	0.44	0.65
Cadmium	mg/kg	0.2	0.26
Chromium	mg/kg	15.5	22.9
Cobalt	mg/kg	7.83	10.3
Copper	mg/kg	17	23.5
Cyanide (total)	mg/kg	1 U	1.3 U
Lead	mg/kg	14	20.7
Manganese	mg/kg	372	517
Mercury	mg/kg	0.05 U	0.055
Nickel	mg/kg	19	27.2
Selenium	mg/kg	0.65	0.75
Silver	mg/kg	0.2 U	0.2 U
Thallium	mg/kg	0.2 U	0.2 U
Vanadium	mg/kg	21.6	32.8
Zinc	mg/kg	63.8	93.1
<b>Miscellaneous</b>			
Total solids	%	43	52
<b>PFAS</b>			
11CI-PF3OUdS (F-53B Minor)	ng/kg	39 U	56 U
4:2 FTS	ng/kg	39 U	56 U
6:2FTS	ng/kg	39 U	56 U
8:2FTS	ng/kg	39 U	56 U
9CI-PF3ONS (F-53B Major)	ng/kg	39 U	56 U
ADONA	ng/kg	39 U	56 U
HFPO-DA (GenX)	ng/kg	39 U	56 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSA)	ng/kg	51	56 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOA)	ng/kg	39 U	56 U
Perfluorobutanesulfonic acid (PFBS)	ng/kg	39 U	56 U
Perfluorobutanoic acid (PFBA)	ng/kg	78 U	110 U
Perfluorodecanesulfonic acid (PFDS)	ng/kg	39 U	56 U



**Table 1 - Eastern Lagoon Sediment Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

Location ID: Date Collected:	Units	Lagoon 01 03/18/21	Lagoon 02 03/18/21
Perfluorodecanoic acid (PFDA)	ng/kg	83	56 U
Perfluorododecanoic acid (PFDoA)	ng/kg	39 UI	56 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/kg	90	74
Perfluoroheptanoic acid (PFHpA)	ng/kg	43	56 U
Perfluorohexanesulfonic acid (PFHxS)	ng/kg	1,100	1,000
Perfluorohexanoic acid (PFHxA)	ng/kg	120	85
Perfluorononanesulfonic acid (PFNS)	ng/kg	39 U	56 U
Perfluorononanoic acid (PFNA)	ng/kg	81	56 U
Perfluorooctane Sulfonamide (FOSA)	ng/kg	39 U	56 U
Perfluorooctane sulfonic acid	ng/kg	13,000	6,800
Perfluorooctanoic acid	ng/kg	150	93
Perfluoropentanesulfonic acid (PFPeS)	ng/kg	39 U	56 U
Perfluoropentanoic acid (PFPeA)	ng/kg	56	56 U
Perfluorotetradecanoic acid (PFTeA)	ng/kg	39 UI	56 U
Perfluorotridecanoic Acid (PFTriA)	ng/kg	39 UI	56 U
Perfluoroundecanoic acid (PFUnA)	ng/kg	39 U	56 U
PFHxS-BR	ng/kg	110	96
PFHxS-LN	ng/kg	950	950
PFOS-BR	ng/kg	3,800	2,200
PFOS-LN	ng/kg	8,900	4,600

**Notes:**

I - Value is estimated maximum possible concentration

U - Not Detected

ug/kg - micrograms per kilogram

ng/kg - nanograms per kilogram

**Table 2 - Eastern Lagoon Water Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

	Location ID: Sample Depth: Date Collected:	Units	Lagoon 01 9 Feet 03/18/21	Lagoon 01 Surface 03/18/21	Lagoon 02 9 Feet 03/18/21	Lagoon 02 Surface 03/18/21
<b>Volatile Organics</b>						
1,1,1-Trichloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,1,2,2-Tetrachloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,1,2-Trichloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,1-Dichloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,1-Dichloroethene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,2,4-Trichlorobenzene	ng/L	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
1,2-Dibromo-3-chloropropane (DBCP)	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,2-Dibromoethane (Ethylene dibromide)	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,2-Dichlorobenzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,2-Dichloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,2-Dichloropropane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,3-Dichlorobenzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
1,4-Dichlorobenzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
2-Butanone (Methyl ethyl ketone) (MEK)	ng/L	20,000 U	20,000 U	20,000 U	20,000 U	20,000 U
2-Hexanone	ng/L	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	ng/L	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
Acetone	ng/L	20,000 U	20,000 U	20,000 U	20,000 U	20,000 U
Benzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Bromodichloromethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Bromoform	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Bromomethane (Methyl bromide)	ng/L	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
Carbon disulfide	ng/L	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U
Carbon tetrachloride	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Chlorobenzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Chloroethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Chloroform (Trichloromethane)	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Chloromethane (Methyl chloride)	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
cis-1,2-Dichloroethene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
cis-1,3-Dichloropropene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Cyclohexane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Dibromochloromethane	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Dichlorodifluoromethane (CFC-12)	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Ethylbenzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
Isopropyl benzene	ng/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
m&p-Xylene	ng/L	2,000 U	2,000 U	2,000 U	2,000 U	2,000 U
Methyl acetate	ng/L	10,000 U	10,000 U	10,000 U	10,000 U	10,000 U
Methyl cyclohexane	ng/L	20,000 U	20,000 U	20,000 U	20,000 U	20,000 U
Methyl tert butyl ether (MTBE)	ng/L	5,000 U	5,000 U	5,000 U	5,000 U	5,000 U

**Table 2 - Eastern Lagoon Water Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

	Location ID: Sample Depth: Date Collected:	Units	Lagoon 01 9 Feet 03/18/21	Lagoon 01 Surface 03/18/21	Lagoon 02 9 Feet 03/18/21	Lagoon 02 Surface 03/18/21
Methylene chloride		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Naphthalene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
N-Propylbenzene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
o-Xylene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Styrene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Tetrachloroethene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Toluene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
trans-1,2-Dichloroethene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
trans-1,3-Dichloropropene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Trichloroethene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Trichlorofluoromethane (CFC-11)		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Trifluorotrichloroethane (Freon 113)		ng/L	30,000 U	30,000 U	30,000 U	30,000 U
Vinyl chloride		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
<b>SVOC</b>						
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2,4,5-Trichlorophenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2,4,6-Trichlorophenol		ng/L	4,000 U	4,000 U	4,000 U	4,000 U
2,4-Dichlorophenol		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
2,4-Dimethylphenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2,4-Dinitrophenol		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
2,4-Dinitrotoluene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2,6-Dinitrotoluene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2-Chloronaphthalene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2-Chlorophenol		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
2-Methylnaphthalene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
2-Methylphenol		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
2-Nitroaniline		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
2-Nitrophenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
3&4-Methylphenol		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
3,3'-Dichlorobenzidine		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
3-Nitroaniline		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
4,6-Dinitro-2-methylphenol		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
4-Bromophenyl phenyl ether		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
4-Chloro-3-methylphenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
4-Chloroaniline		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
4-Chlorophenyl phenyl ether		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
4-Nitroaniline		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
4-Nitrophenol		ng/L	25,000 U	25,000 U	25,000 U	25,000 U
Acenaphthene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U

**Table 2 - Eastern Lagoon Water Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

	Location ID: Sample Depth: Date Collected:	Units	Lagoon 01 9 Feet 03/18/21	Lagoon 01 Surface 03/18/21	Lagoon 02 9 Feet 03/18/21	Lagoon 02 Surface 03/18/21
Acenaphthylene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Acetophenone		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Anthracene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Atrazine		ng/L	3,000 U	3,000 U	3,000 U	3,000 U
Benzaldehyde		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Benzo(a)anthracene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Benzo(a)pyrene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Benzo(b)fluoranthene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Benzo(g,h,i)perylene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Benzo(k)fluoranthene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Biphenyl (1,1-Biphenyl)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
bis(2-Chloroethoxy)methane		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
bis(2-Chloroethyl)ether		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
bis(2-Ethylhexyl)phthalate (DEHP)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Butyl benzylphthalate (BBP)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Caprolactam		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
Carbazole		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Chrysene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Dibenz(a,h)anthracene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Dibenzofuran		ng/L	4,000 U	4,000 U	4,000 U	4,000 U
Diethyl phthalate		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Dimethyl phthalate		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Di-n-butylphthalate (DBP)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Di-n-octyl phthalate (DnOP)		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Fluoranthene		ng/L	1,000 U	1,000 U	1,000 U	1,000 U
Fluorene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Hexachlorobenzene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Hexachlorobutadiene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Hexachlorocyclopentadiene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Hexachloroethane		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Indeno(1,2,3-cd)pyrene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Isophorone		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Naphthalene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Nitrobenzene		ng/L	3,000 U	3,000 U	3,000 U	3,000 U
N-Nitrosodi-n-propylamine		ng/L	10,000 U	10,000 U	10,000 U	10,000 U
N-Nitrosodiphenylamine		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Pentachlorophenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
Phenanthrene		ng/L	2,000 U	2,000 U	2,000 U	2,000 U
Phenol		ng/L	5,000 U	5,000 U	5,000 U	5,000 U

**Table 2 - Eastern Lagoon Water Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

	Location ID: Sample Depth: Date Collected:	Units	Lagoon 01 9 Feet 03/18/21	Lagoon 01 Surface 03/18/21	Lagoon 02 9 Feet 03/18/21	Lagoon 02 Surface 03/18/21
Pyrene		ng/L	5,000 U	5,000 U	5,000 U	5,000 U
<b>PCB</b>						
Aroclor-1016 (PCB-1016)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1221 (PCB-1221)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1232 (PCB-1232)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1242 (PCB-1242)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1248 (PCB-1248)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1254 (PCB-1254)		ng/L	100 U	100 U	100 U	100 U
Aroclor-1260 (PCB-1260)		ng/L	100 U	100 U	100 U	100 U
Total PCBs		ng/L	100 U	100 U	100 U	100 U
<b>Inorganic</b>						
Arsenic		mg/L	0.002 U	0.002 U	0.002 U	0.002
Barium		mg/L	0.058	0.056	0.056	0.054
Manganese		mg/L	0.063	0.06	0.067	0.068
Mercury		mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel		mg/L	0.005 U	0.005 U	0.005 U	0.005 U
Selenium		mg/L	0.005 U	0.005 U	0.005 U	0.005 U
Silver		mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium		mg/L	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium		mg/L	0.005 U	0.005 U	0.005 U	0.005 U
Zinc		mg/L	0.005 U	0.005 U	0.005 U	0.005 U
<b>Miscellaneous</b>						
Total dissolved solids (TDS)		mg/L	364	368	360	370
Total suspended solids (TSS)		mg/L	3 U	3 U	3 U	3 U
<b>PFAS</b>						
11Cl-PF3OUdS (F-53B Minor)		ng/L	1.9 U	1.9 U	2 U	1.9 U
4:2 FTS		ng/L	1.9 U	1.9 U	2 U	1.9 U
6:2 FTS		ng/L	1.9 U	1.9 U	2 U	1.9 U
8:2 FTS		ng/L	1.9 U	1.9 U	2 U	1.9 U
9Cl-PF3ONS (F-53B Major)		ng/L	1.9 U	1.9 U	2 U	1.9 U
ADONA		ng/L	1.9 U	1.9 U	2 U	1.9 U
HFPO-DA (GenX)		ng/L	1.9 U	1.9 U	2 U	1.9 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)		ng/L	3.9 U	3.8 U	4 U	3.9 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)		ng/L	1.9 U	1.9 U	2 U	1.9 U
Perfluorobutanesulfonic acid (PFBS)		ng/L	11	11	12	11
Perfluorobutanoic acid (PFBA)		ng/L	28	21	25	17
Perfluorodecanesulfonic acid (PFDS)		ng/L	1.9 U	1.9 U	2 U	1.9 U
Perfluorodecanoic acid (PFDA)		ng/L	3.7	2.7	4.4	3.6
Perfluorododecanoic acid (PFDoA)		ng/L	1.9 U	1.9 U	2 U	1.9 U

**Table 2 - Eastern Lagoon Water Sample Results**  
**RACER Trust, Buick City Site, Flint, Michigan**

	Location ID: Sample Depth: Date Collected:	Units	Lagoon 01 9 Feet 03/18/21	Lagoon 01 Surface 03/18/21	Lagoon 02 9 Feet 03/18/21	Lagoon 02 Surface 03/18/21
Perfluoroheptanesulfonic Acid (PFHpS)		ng/L	17	17	20	18
Perfluoroheptanoic acid (PFHpA)		ng/L	29	26	33	29
Perfluorohexanesulfonic acid (PFHxS)		ng/L	440	490	500	520
Perfluorohexanoic acid (PFHxA)		ng/L	84	84	87	87
Perfluorononanesulfonic acid (PFNS)		ng/L	1.9 U	1.9 U	2 U	1.9 U
Perfluorononanoic acid (PFNA)		ng/L	18	13	19	16
Perfluorooctane Sulfonamide (FOSA)		ng/L	1.9 U	1.9 U	2 U	1.9 U
Perfluorooctane sulfonic acid		ng/L	940	770	1,100	840
Perfluorooctanoic acid		ng/L	71	77	83	77
Perfluoropentanesulfonic acid (PFPeS)		ng/L	19	17	16	16
Perfluoropentanoic acid (PFPeA)		ng/L	46	46	50	48
Perfluorotetradecanoic acid (PFTeA)		ng/L	3.9 U	3.8 U	4 U	3.9 U
Perfluorotridecanoic Acid (PFTriA)		ng/L	1.9 U	1.9 U	2 U	1.9 U
Perfluoroundecanoic acid (PFUnA)		ng/L	1.9 U	1.9 U	2 U	1.9 U
PFHxS-BR		ng/L	50	55	57	58
PFHxS-LN		ng/L	390	430	440	460
PFOS-BR		ng/L	490	430	550	440
PFOS-LN		ng/L	460	340	500	400

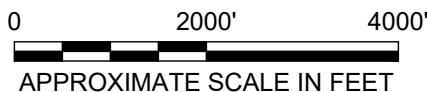
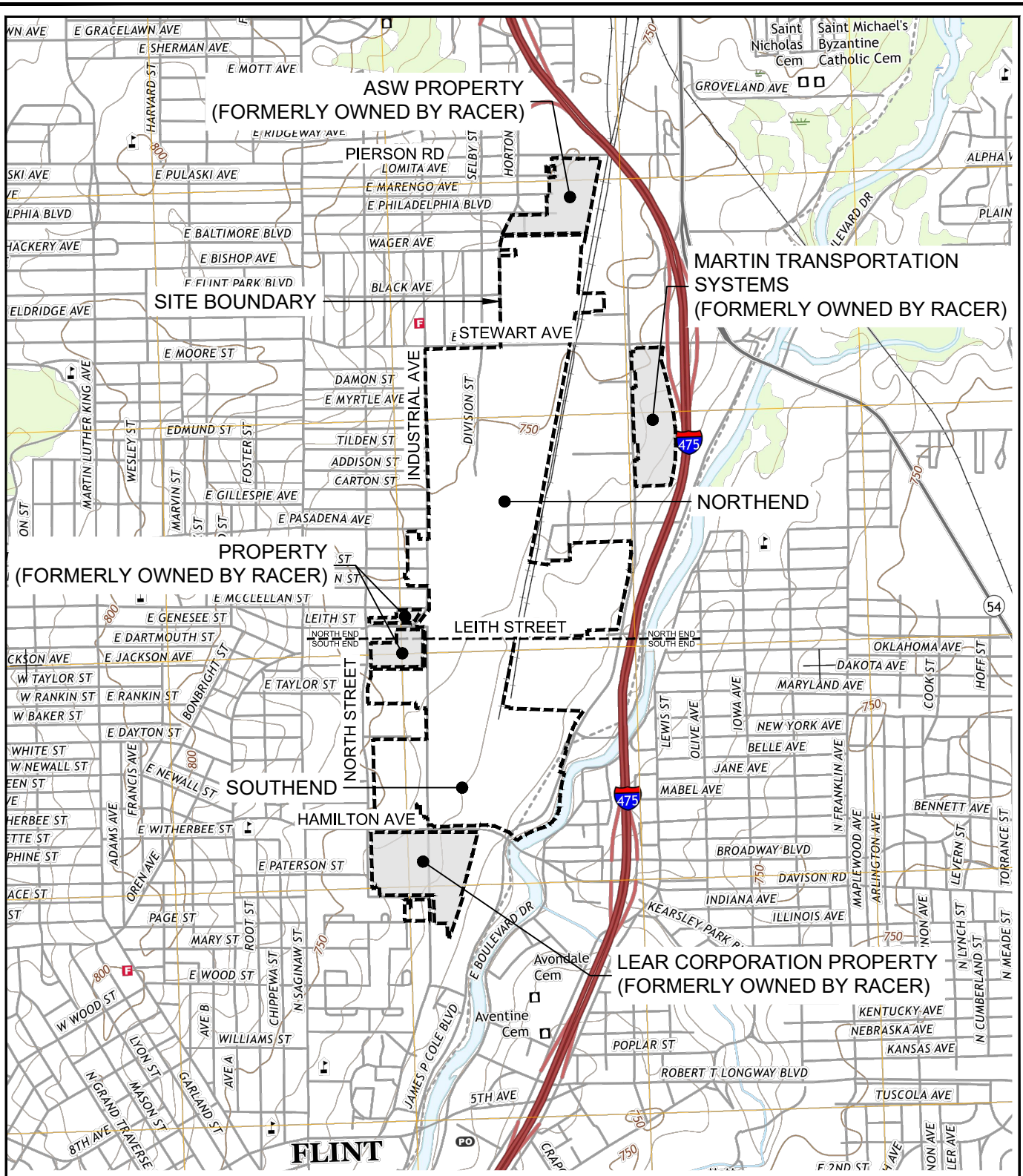
**Notes:**

U - Not Detected

mg/L - milligrams per liter

ng/L - nanograms per liter

CITY: SYRACUSE, NY DIV: GROUP-ENV DBA: SANCHEZ, LD: GMS PIC: S. PETERS PM: C. KIKER TRM: KIKER LVR: (OPTIONAL) OFF: REF  
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RACER TRUST  
 BUICK CITY  
 FLINT, MICHIGAN

## SITE LOCATION MAP



FIGURE

1



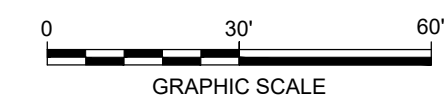
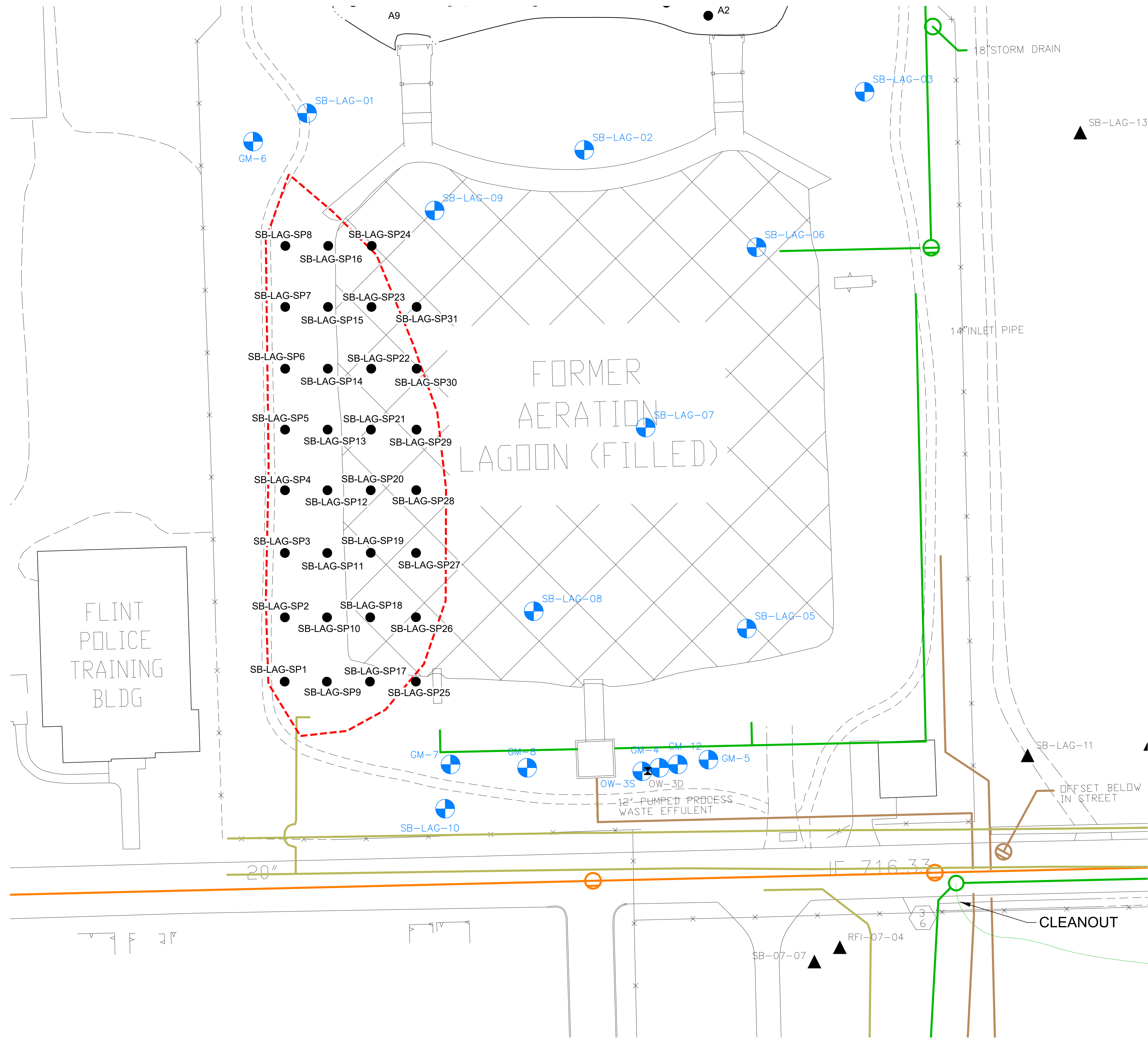








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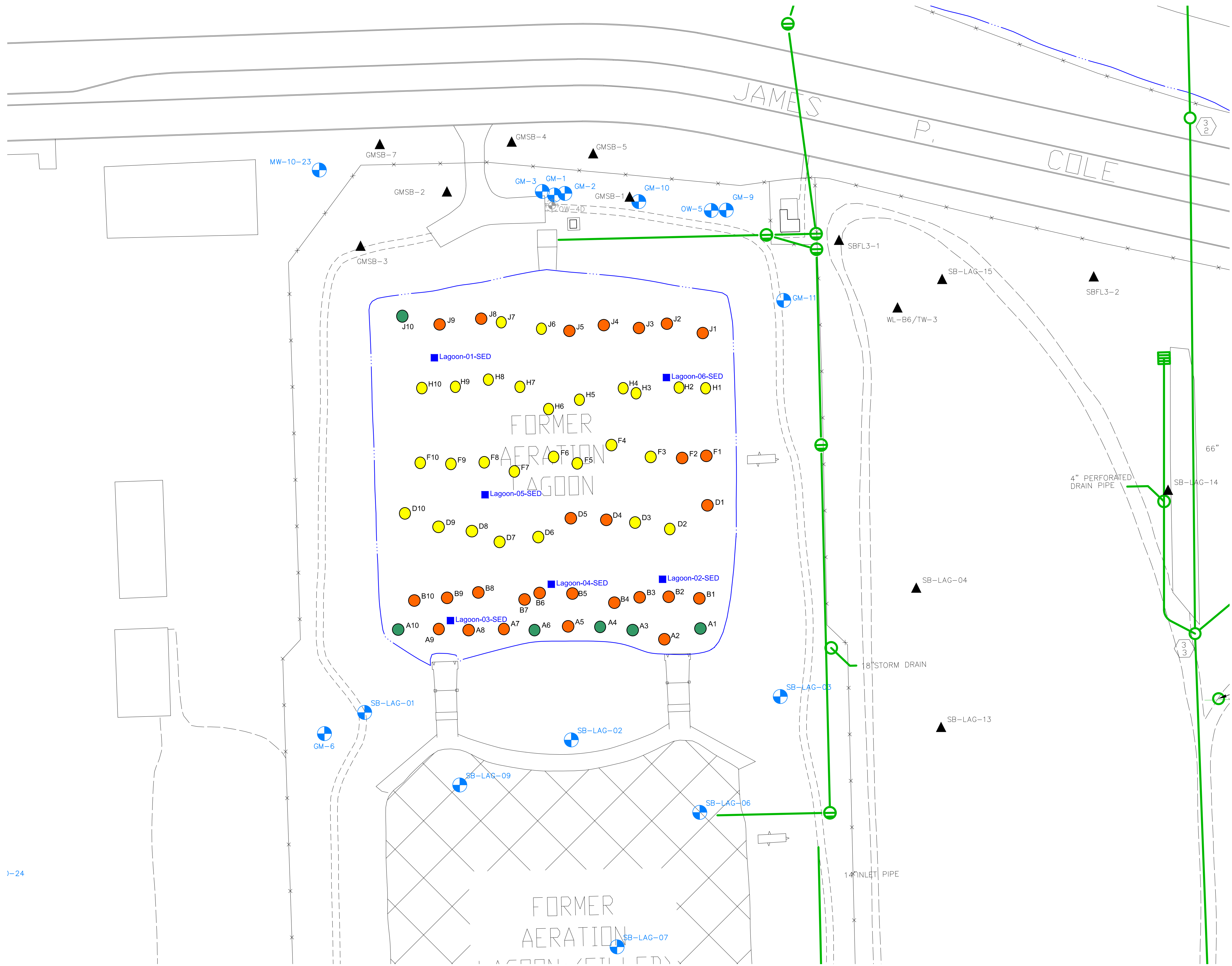


RACER TRUST  
BUICK CITY  
FLINT, MICHIGAN

## LAGOON SOIL PILE ISM SAMPLE LOCATIONS

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1-24



- LEGEND:
- SOIL BORING
  - ABANDONED MONITORING WELL
  - MONITORING WELL (ACTIVE)
  - TRANSECT LOCATIONS
  - SEDIMENT SAMPLES
  - STORM SEWER
- SEDIMENT THICKNESS
- 0.1-0.2 ft
  - 0.3-0.4 ft
  - 0.5-0.7 ft

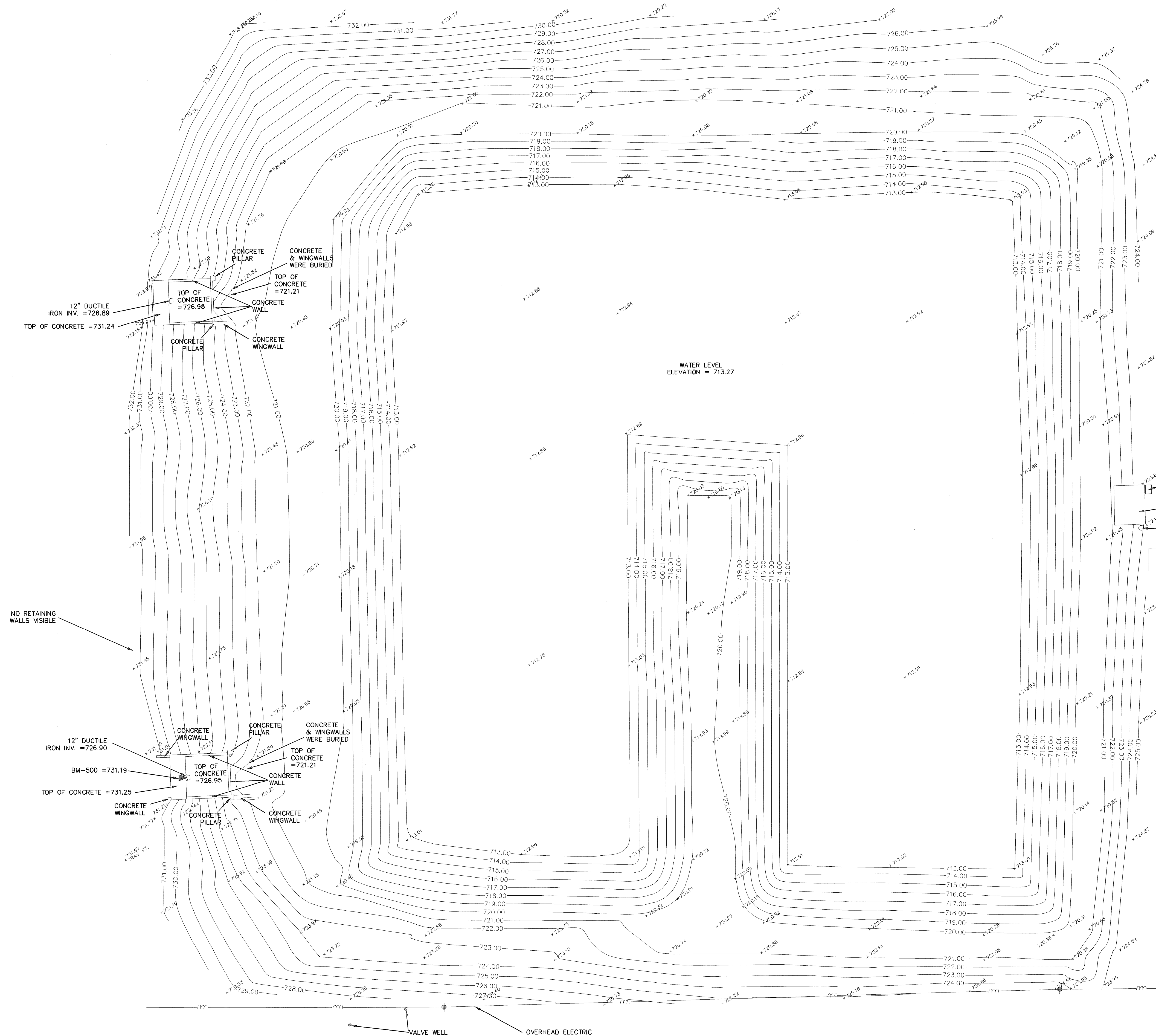
0 40' 80'  
GRAPHIC SCALE

RACER TRUST  
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FLINT, MICHIGAN

LAGOON SEDIMENT  
THICKNESS TRANSECTS

# Attachment 1





NOTES:  
ELEVATIONS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.  
COORDINATES ARE STATE PLANE COORDINATES BASED ON NORTH  
AMERICAN DATUM 1983, MICHIGAN, SOUTH ZONE-2113.

BENCH MARK:  
BM-500 "X" ON HEADWALL AT WEST SIDE OF VALVE SHUT OFF ON  
SOUTHWEST VAULT OF POND ELEVATION = 731.19

**SURVEYOR'S CERTIFICATE:**  
AS A PROFESSIONAL SURVEYOR IN THE STATE OF MICHIGAN,  
I HEREBY STATE that the survey work hereon delineated has been  
performed under my supervision.

*Carolyn R. Hunter*  
Carolyn R. Hunter, P.S. No. 46670

**Outfalls 003 and 004 Construction  
Photo Log 11.02.09**



Former pond aerator post – currently serving as survey control point for new pond







Western Wall

Pond berm

Pumping accumulated storm water from within excavation





Borrowing material from Western  
Wall to use as fill material for berm  
construction

Northern Wall