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Date:
April 14, 2014

ARCADIS Project No.:
B0064410.2014.00801

Subject:
Additional NPDES Plus Monitoring Program Sampling Work Plan
RACER Buick City Site, Flint, Michigan

Introduction

This Additional NPDES Plus Monitoring Program (NPMP) Sampling Work Plan (work plan) was prepared by ARCADIS on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER) for the Buick City Site (Site) located in Flint, Michigan (**Figure 1**). The objectives of the work described in this work plan are to determine whether there are exceedances of Michigan Department of Environmental Quality (MDEQ) Part 201 Groundwater Surface Water Interface (GSI) Criteria for Site constituents of concern (COCs) at the compliance point for each outfall; to collect additional data to assess contributions of COCs from upgradient sources; to identify potential source areas for COCs along the storm sewers; and to determine whether metals impacts are associated with sediment located in the storm sewers. Sampling activities will include the following:

- Collect samples at the river discharge points of three outfalls to monitor compliance.
- Collect upgradient samples from select manholes to assess upgradient contributions to the storm sewers;
- Collect midpoint samples from select manholes to assess contributions from select sections of the storm sewers; and

- Analyze select samples for total and dissolved metals to assess impacts associated with sediment.

All work will be completed in accordance with the Site *Field Sampling Plan/Quality Assurance Project Plan* (FSP/QAPP) (BBL, 2001), Addenda No. 1 and 2 to Appendix C of the March 30, 2001 *RCRA Facility Investigation Work Plan – Field Sampling Plan/Quality Assurance Project Plan*, and *Health and Safety Plan* (ARCADIS, 2010).

GSI Compliance Point Sampling

The GSI compliance point for the storm sewers is at the discharge point to the Flint River. Samples will be collected at the discharge to the Flint River at the following outfalls:

- Outfall 001 – Historically, samples collected at the NPMP location (downstream property boundary) have exhibited exceedances of COCs (copper, lead, silver, thallium and zinc), particularly mercury. However, the sample collected from the upgradient property boundary generally exhibited higher concentrations of the same COCs. The sample collected at the river from this sewer is intended to determine if there are exceedances of GSI criteria for these COCs at the discharge point and whether any further sampling on the RACER property is necessary.
- Outfall 003 – Historically, concentrations in samples collected at the NPMP sample location have exceeded the GSI criterion for arsenic, copper, cyanide, mercury and silver. The sample collected at the river from this sewer is intended to determine if there are exceedances of GSI criteria for these COCs at the discharge point and whether any further sampling on the RACER property is necessary.
- Outfall 005 – The Outfall 005 sampling location was removed from the NPMP program following the completion of bulkheading activities in the Spring of 2012. During bulkheading activities the on-site surface drainage to the Outfall 005 storm sewer was eliminated with the exception of drainage from Leith Street. Subsequent groundwater data evaluation in the vicinity of the active portion of the Outfall 005 storm sewer identified a possible pathway for Site groundwater impacts to infiltrate the sewer. Therefore, additional sampling from Outfall 05 is recommended. Historically, concentrations in samples collected at the NPMP sample location have exceeded the GSI criterion for arsenic, copper, lead, and mercury. The sample collected at the river from this sewer is intended to determine if there are exceedances of GSI criteria for these COCs at the discharge point and whether any further sampling is necessary.

To evaluate GSI compliance at Outfalls 001, 003, and 005 a sample will be collected at the discharge points to the Flint River and submitted for laboratory analysis. Note that each of these outfalls has contributions from other parties between the Buick City Site and the river. The samples will be submitted for laboratory analysis of polychlorinated biphenyls (PCBs) by USEPA Method SW846 8082 (Outfall 003) and select RCRA metals by USEPA Method SW846 6020. The upgradient and downgradient samples will be collected simultaneously by two sampling teams to provide more representative samples. The list of analytes is provided in **Table 1**.

Upgradient Sampling

In order to assess upgradient contributions to the storm sewers, samples will be collected at the upgradient property boundaries within the Outfall 001, 003, and 013 sewers. These sewers all have contributions from properties upgradient of the RACER property. The samples will be analyzed for select COCs that have been detected at concentrations exceeding GSI criteria in the standard monthly NPMP sampling. The list of analytes is provided in **Table 1** and the upgradient sampling locations are shown on **Figure 2**. The upgradient and downgradient samples will be collected simultaneously to provide more representative samples.

Midpoint Sampling

In order to assess contributions of COCs from select sections of the Outfall 003 and 013 storm sewers, midpoint samples will be collected. The samples will be analyzed for select constituents that have been detected at concentrations exceeding GSI criteria in the standard monthly NPMP sampling. The list of analytes is provided in **Table 1** and the midpoint sampling locations are shown on **Figure 2**. The midpoint samples will be collected immediately after the upgradient and downgradient samples are collected for that outfall.

Total and Dissolved Metals Analysis

Select samples will be submitted for analysis of total and dissolved metals to assess impacts associated with sediment. The standard (downgradient), upgradient and midpoint samples will be analyzed for both total and dissolved concentrations of select metals that have historically been detected at concentrations exceeding GSI criteria in the standard monthly NPMP sampling. The list of analytes is provided in **Table 1** and the monitoring points are shown on **Figure 2**.

Next Steps

As a cost-saving measure, the sampling activities will be completed in conjunction with the planned April NPMP sampling event following approval of this work plan. The increased April sampling event is estimated to cost a total of \$17,500 and can be completed within the approved 2014 budget. A path forward will be developed after a review of the sampling data has been completed.

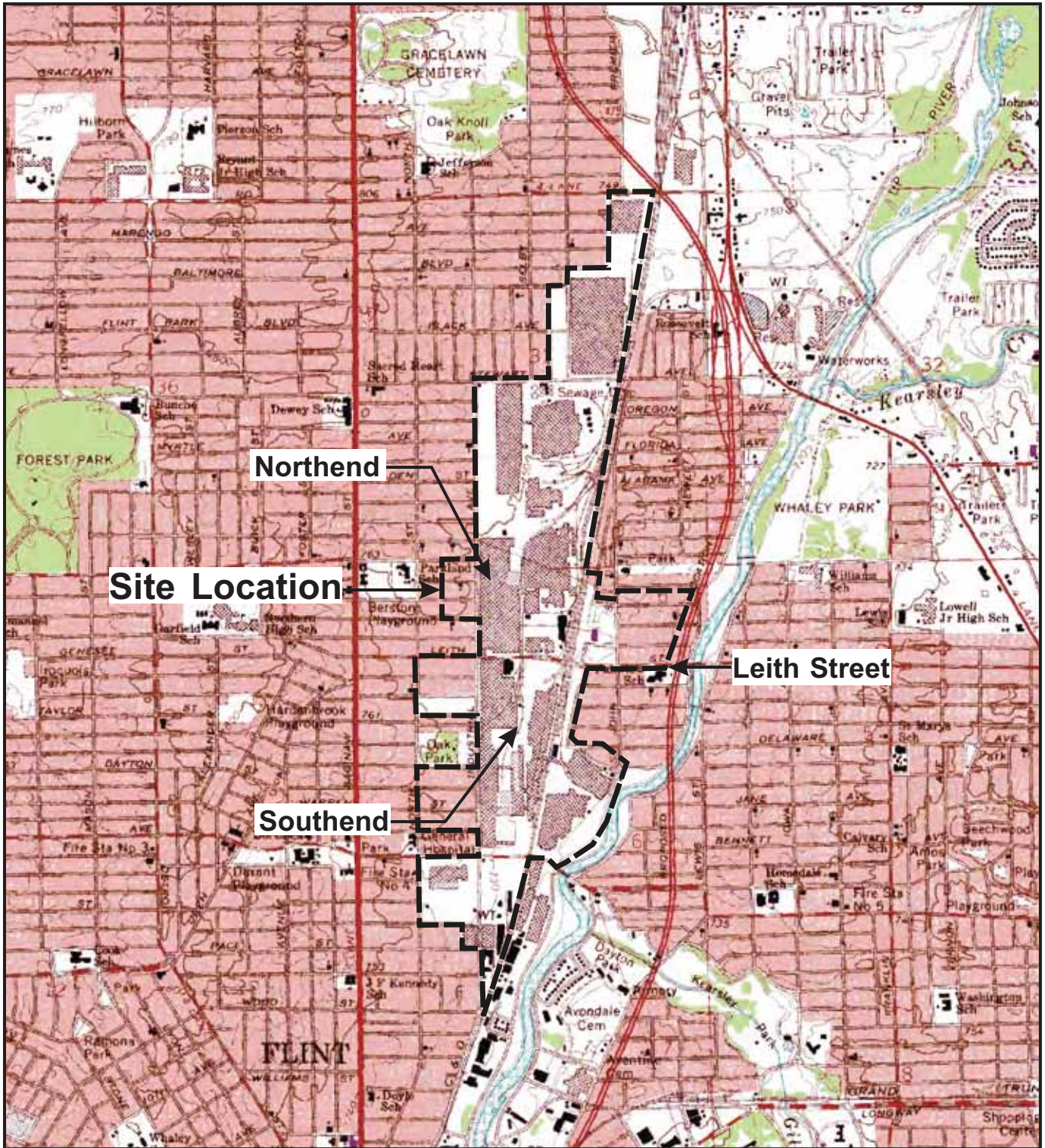
Table 1. Analyte List
 Additional NPMP Sampling Work Plan
 RACER Buick City Site, Flint, Michigan

Upgradient and Midpoint Locations	
Outfall 001	Total Suspended Solids
2 sample locations	Total (5): Ag, Cu, Pb, Tl, Zn
	Dissolved (5): Ag, Cu, Pb, Tl, Zn
	Total: LL Hg
	Dissolved: LL Hg
Outfall 003	Total Suspended Solids
7 sample locations	Total (3): Ag, As, Cu
	Dissolved (3): Ag, As, Cu
	Total: LL Hg
	Dissolved: LL Hg
	Total: Cyanide
	Dissolved: Cyanide
Outfall 005	No Sample
Outfall 006	No Sample
Outfall 009	No Sample
Outfall 010	No Sample
Outfall 011	No Sample
Outfall 013	Total Suspended Solids
3 samples + 1 duplicate + 2 MS/MSD	Total (6): Ag, As, Cr (total), Cu, Pb, Se
	Dissolved (6): Ag, As, Cr (total), Cu, Pb, Se
	Total: LL Hg
	Dissolved: LL Hg
	Total: Cyanide
	Dissolved: Cyanide
Field Blank	Total Suspended Solids
1 sample	Total (8): Ag, As, Cr (total), Cu, Pb, Se, Tl, Zn
	Dissolved (8): Ag, As, Cr (total), Cu, Pb, Se, Tl, Zn
	Total: LL Hg
	Dissolved: LL Hg
	Total: Cyanide
	Dissolved: Cyanide
Equip Blank	Total Suspended Solids
1 sample	Total (8): Ag, As, Cr (total), Cu, Pb, Se, Tl, Zn
	Dissolved (8): Ag, As, Cr (total), Cu, Pb, Se, Tl, Zn
	Total: LL Hg
	Dissolved: LL Hg
	Total: Cyanide
	Dissolved: Cyanide

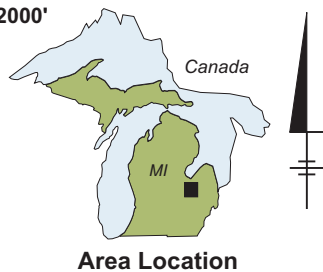
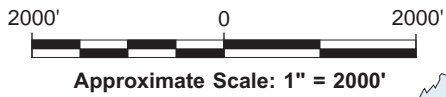
Standard Monitoring Locations		
Outfall 001	Total Suspended Solids	
1 sample location	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Dissolved (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
		PCB
Outfall 003	Total Suspended Solids	
1 sample + 1 duplicate + 2 MS/MSD	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Dissolved (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
		PCB
		PCB
Outfall 005	Total Suspended Solids	
1 sample location	Total (3): As, Cu, Pb	
	Dissolved (3): As, Cu, Pb	
	Total: LL Hg	
	Dissolved: LL Hg	
Outfall 006	Total Suspended Solids	
1 sample location	Total (5): As, Cr (total), Cu, Pb, Se	
	Dissolved (5): As, Cr (total), Cu, Pb, Se	
	Total: LL Hg	
	Dissolved: LL Hg	
Outfall 009	Total Suspended Solids	
1 sample location	Total (10): As, Ba, Cd, Cr (total), Cu, Pb, Mn, Tl, V, Zn	
	Dissolved (10): As, Ba, Cd, Cr (total), Cu, Pb, Mn, Tl, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
Outfall 010	Total Suspended Solids	
1 sample location	Total (10): As, Ba, Cd, Cr (total), Cu, Pb, Mn, Ni, V, Zn	
	Dissolved (10): As, Ba, Cd, Cr (total), Cu, Pb, Mn, Ni, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
Outfall 011	Total Suspended Solids	
1 sample location	Total (3): Cu, Pb, V	
	Dissolved (3): Cu, Pb, V	
	Total: LL Hg	
	Dissolved: LL Hg	
Outfall 013	Total Suspended Solids	
1 sample location	Total (9): Ag, As, Cr (total), Cu, Mn, Pb, Se, V, Zn	
	Dissolved (9): Ag, As, Cr (total), Cu, Mn, Pb, Se, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
Field Blank	Total Suspended Solids	
1 sample	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Dissolved (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
		PCB
Equip Blank	Total Suspended Solids	
1 sample	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Dissolved (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn	
	Total: LL Hg	
	Dissolved: LL Hg	
	Total: Cyanide	
	Dissolved: Cyanide	
		PCB

Outfall Locations	
Outfall 001	Total Suspended Solids
1 sample location	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn
	Total: LL Hg
	Cyanide
Outfall 003	Total Suspended Solids
1 sample location	Total (16): Ag, As, Ba, Be, Cd, Co, Cr (total), Cu, Mn, Ni, Pb, Sb, Se, Tl, V, Zn
	Total: LL Hg
	Cyanide
	PCB
Outfall 005	Total Suspended Solids
1 sample location	Total (3): As, Cu, Pb
	Total: LL Hg
Outfall 006	No Sample
Outfall 009	No Sample
Outfall 010	No Sample
Outfall 011	No Sample
Outfall 013	No Sample
Field Blank	PCB
Equip Blank	PCB

Notes:
 LL = Low level mercury analysis



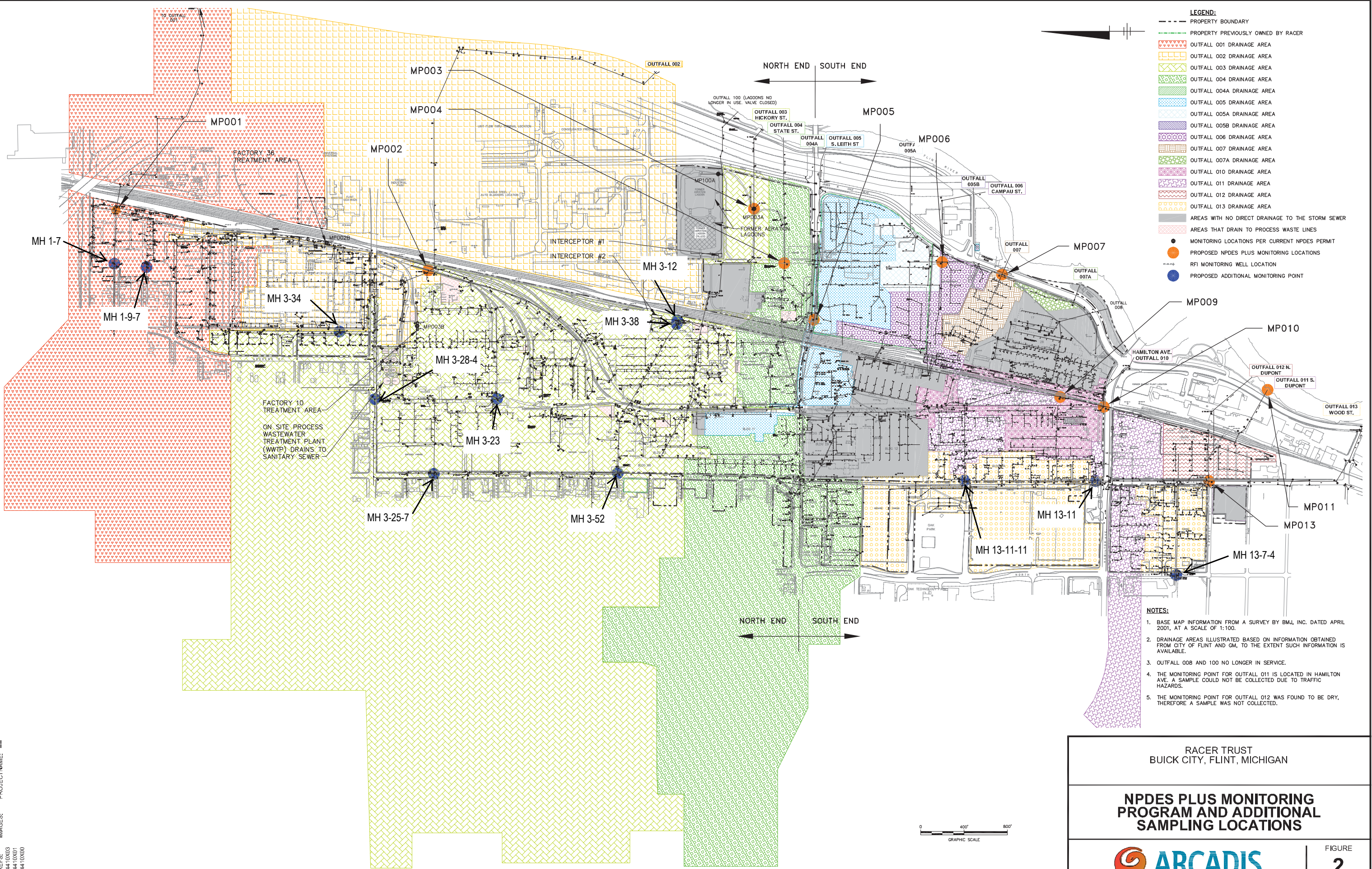
REFERENCE: Base Map Source: USGS 7.5 Min. Topo. Quad., Flint North, Mich. (1969, Photorevised 1975).



<p>RACER TRUST BUICK CITY, FLINT, MICHIGAN</p>	
<p>SITE LOCATION MAP</p>	
	<p>FIGURE 1</p>

CITY: SYRACUSE DW/GRUP: 141 DB: G. STOWELL L. FORAKER LD: GMS PM: L. MCBURNEY LVR: ONE-OF-TWO PLOT: 3272014 4:51 PM BY: STOWELL, GARY
 G:\ENVCAD\SYRACUSE\ACT\BIB64410\20140808\DWG\64410B01.dwg LAYOUT: 2 SAVED: 3/27/2014 4:48 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: C:\D2B-D2F-GMS PLOTSTYLETABLE: PLT\FULL.CTB PLOTTED: 3/27/2014 4:51 PM

PROJECT NAME: ---
 XREFS:
 64410X03
 64410X01
 64410X01



- LEGEND:**
- PROPERTY BOUNDARY
 - PROPERTY PREVIOUSLY OWNED BY RACER
 - OUTFALL 001 DRAINAGE AREA
 - OUTFALL 002 DRAINAGE AREA
 - OUTFALL 003 DRAINAGE AREA
 - OUTFALL 004 DRAINAGE AREA
 - OUTFALL 004A DRAINAGE AREA
 - OUTFALL 005 DRAINAGE AREA
 - OUTFALL 005A DRAINAGE AREA
 - OUTFALL 005B DRAINAGE AREA
 - OUTFALL 006 DRAINAGE AREA
 - OUTFALL 007 DRAINAGE AREA
 - OUTFALL 007A DRAINAGE AREA
 - OUTFALL 010 DRAINAGE AREA
 - OUTFALL 011 DRAINAGE AREA
 - OUTFALL 012 DRAINAGE AREA
 - OUTFALL 013 DRAINAGE AREA
 - AREAS WITH NO DIRECT DRAINAGE TO THE STORM SEWER
 - AREAS THAT DRAIN TO PROCESS WASTE LINES
 - MONITORING LOCATIONS PER CURRENT NPDES PERMIT
 - PROPOSED NPDES PLUS MONITORING LOCATIONS
 - RFI MONITORING WELL LOCATION
 - PROPOSED ADDITIONAL MONITORING POINT

- NOTES:**
1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100.
 2. DRAINAGE AREAS ILLUSTRATED BASED ON INFORMATION OBTAINED FROM CITY OF FLINT AND GM, TO THE EXTENT SUCH INFORMATION IS AVAILABLE.
 3. OUTFALL 008 AND 100 NO LONGER IN SERVICE.
 4. THE MONITORING POINT FOR OUTFALL 011 IS LOCATED IN HAMILTON AVE. A SAMPLE COULD NOT BE COLLECTED DUE TO TRAFFIC HAZARDS.
 5. THE MONITORING POINT FOR OUTFALL 012 WAS FOUND TO BE DRY, THEREFORE A SAMPLE WAS NOT COLLECTED.

RACER TRUST
 BUICK CITY, FLINT, MICHIGAN

NPDES PLUS MONITORING PROGRAM AND ADDITIONAL SAMPLING LOCATIONS

