Mr. Kevin Lund, PG, P.E.
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Materials Management Division
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Date: October 29, 2021
Our Ref: 30075935
Subject: Updated Corrective Action Framework Document

Dear Mr. Lund,

On behalf of the RACER Trust, Arcadis of Michigan, LLC is providing the attached updated Corrective Action Framework (CAF) document, which was originally submitted in November 2020, plus an anticipated 18-month schedule for activities at the RACER Buick City Site (Site). This document and schedule have been prepared in response to your October 12, 2021 letter to Grant Trigger of the RACER Trust, in accordance with Section 8.2.1 of the Corrective Action Consent Order for the Site.

Specifically, you requested updates on six items related to Areas of Interest (AOIs) on the Site. The updated information on these items is primarily provided in Section 3.3 of the CAF, plus Tables 2A and 2B, which summarizes activities at each of the AOIs on Site. All the areas for which you requested updates are included in existing AOIs, with the exception of the former aeration lagoons, which is considered a new AOI.

With respect to the 18-month schedule, note that any items that we estimated would not be completed within 18 months are not included. The schedule should be considered a living document and will be periodically updated as work progresses.

Feel free to contact me with any questions.

Sincerely,
Arcadis of Michigan, LLC

Christopher S. Peters, PG
Vice President

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Kevin Lund, PG, P.E.
EGLE
October 29, 2021

CC. Grant Trigger – RACER Trust

Enclosures:

CAF document
18-month schedule

ARCADIS Design & Consultancy for natural and built assets

RACER Trust

CORRECTIVE ACTION FRAMEWORK

Buick City

Flint, Michigan

November 2020

Revised: October 2021

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

The Corrective Action Framework (CAF) is a tool intended to summarize the goals and expectations of the Michigan Department of Environment, Great Lakes and Energy (EGLE) and Revitalizing Auto Communities Environmental Response Trust (RACER) that will facilitate performance of Resource Conservation and Recovery Act (RCRA) Corrective Action at the RACER Buick City Facility in Flint, Michigan (the Facility). The CAF is not a legally binding document and is not a substitute for a permit or order. The CAF is also not expected to address every technical or administrative aspect or detail of the RFI. Rather, the CAF describes the discussions that took place during the CAF meeting or any subsequent meetings. Note that the CAF is a "living document" and is subject to change in light of new information or data.

2 CAF MEETING PARTICIPANTS

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3 FACILITY CHARACTERIZATION

3.1 Overview of Facility/Surrounding Properties

The Facility is located at 902 East Hamilton Avenue, Flint, Genesee County, Michigan. The Facility formerly consisted of approximately 413 acres of land that was improved with approximately 15 buildings and factories covering about 4.45 million square feet. A Facility location map is presented in **Figure 1**. The buildings and factories have been demolished, and some foundations and basement structures remain, although they are all filled in. The Facility is divided into two portions, the Northend and the Southend. The original area north of Leith Street (Northend) comprised approximately 246 acres (**Figure 2**). Production at the Northend ceased in December 2010. Facility activities included engine manufacturing, machining of ferrous and nonferrous metals, maintenance painting, and torque converter manufacturing operations. The original area south of Leith Street (Southend) comprised approximately 167 acres (**Figure 3**). Production at the Southend ceased in 1999. Manufacturing processes that occurred on the Southend included machining of ferrous and nonferrous metals, plating, painting, plastic injection molding, V-6 engine and vehicle engineering and testing, and vehicle assembly.

RACER Trust has sold five parcels from the original Facility footprint (**Figure 1**). Approximately 354 acres of the Facility remain.

Portions of the Facility were originally developed in the late 1800's. the Buick Motor Company was relocated here in 1903 from Detroit. In addition to the manufacturing of automobiles, in response to World War I, the Buick Motor Company began producing the Liberty Aircraft engine in 1918. Similarly, in response to World War II, the production of automobiles was stopped in 1942, and the Buick complex was converted for the production of military equipment.

3.2 Environmental Characteristics

The Facility elevation is approximately 742-feet above mean sea level. Topography at the Facility is fairly flat. Regional topography slopes to the east-southeast towards the Flint River. The ground surface elevation drops approximately 35 feet between Industrial Avenue at the western property boundary and James P. Cole Boulevard at the eastern property boundary, in close proximity to the Flint River. The river is approximately 100 feet east of the Southend of the Facility and approximately 3,000 feet east of the Northend of the Facility (**Figure 1**).

The geology of central Genesee County is dominated by two primary stratigraphic units consisting of unconsolidated glacial deposits of Pleistocene age, underlain by sandstone and limestone bedrock. The surficial glacial deposits are composed of a sequence of moraines, outwash, and glacial channels, lakebed sediments, and till plains. These deposits are underlain by glacial drift or till consisting primarily of clay with lesser amounts of sand and silt. These overburden materials are underlain by bedrock of the Saginaw Formation, consisting of Pennsylvania age sandstones and limestones.

As described in the May 1, 2008 RCRA Corrective Measures Proposal, the subsurface deposits at the Facility have been grouped into the following units: fill material, silty sand, silty clay, and bedrock. Each of these units is described below.

- Fill Material - is present beneath most areas of the Facility due to various construction activities, such as former buildings, loading docks, manufacturing facilities, and material storage areas. Fill material typically consists of sandy deposits. In some areas, the sandy fill material contains other debris, including coal chips, slag fragments, foundry sand, and metal shavings. Fill thicknesses vary across the Facility and are thickest (up to approximately 20 feet) in the vicinity of former Building 44 in the Southend of the Facility near Hamilton Avenue (**Figure 3**). In the Northend, fill thicknesses are up to approximately 15 feet at former Factory 10 in the Northend of the Facility near Stewart Avenue (**Figure 2**).
- Silty Sand and Silt/Clay - In the Northend of the Facility, a silty sand unit of variable thickness is present beneath the fill material. Interbedded with the silty sand unit are discontinuous layers of silt and clay. Where present, this unit ranges in thickness from 5 to 25 feet. This silty sand unit generally thins toward the south and is absent in some portions of the Southend of the Facility. Where it is present in the Southend, at least two and in some cases three distinct silty sand layers can be encountered, separated by finer grained (silt and/or clay) layers. The two most prevalent silty sand layers are encountered at the water table (approximately 5 to 10 feet below ground surface (bgs)) and approximately 18 to 25 feet bgs and are of varying thicknesses. The fill and native deposits extend to depths up to approximately 30 feet below ground surface.
- Silty Clay - A dense silty clay glacial till deposit underlies the above layers at the Facility. The silty clay till grades to clayey silt in some areas and contains discontinuous sand seams and lenses. The thickness of the glacial till in the Flint area has been estimated from 50 to 100 feet (Humphreys, 1960), although soil borings completed on the Facility indicate areas where the silty clay is less than 50 feet (see below).
- Bedrock – The bedrock consists of sandstone, sandy shale, shale, coal, and limestone (Saginaw Formation) and is reported to be present beneath the Facility at depths of approximately 60 to 80 feet below ground surface (bgs). Sandstone bedrock was encountered at about 60 feet bgs near the west side of the Aeration Lagoons in the Northend during an investigation completed in the 1980s.

Surface water drainage patterns at the Facility are generally east and southeast, toward the Flint River, which is the nearest surface water body. Paved surfaces, parking lots, and former structure footprints cover more than 80% of the Facility. Surface water outfalls at the Facility are summarized on **Table 1** and shown on **Figure 4**. The Facility operates under the requirements of its National Pollutant Discharge Elimination System (NPDES) Permit No. MI0001597, which regulates surface water discharges. The NPDES permit covers 17 outfalls. At the present time, stormwater runoff across the Facility is captured and conveyed to the Flint River by 13 storm sewers (Outfalls 002, 003, 004, 004A, 005, 005A, 006, 007, 007A, 008, 010, 011, and 013) (**Figure 4**). Of these, three of the outfalls that are still active – 003, 011, and 012 have limitations and monitoring requirements as defined by the NPDES permit. In addition, discharges from Outfalls 002, 003, 004, 004A, 005, 005A, 006, 007, 007A, 010, 011, and 013 include non-Facility drainage flow from other portions of the City of Flint, both upstream and downstream of the Facility's storm sewer system. Outfalls 003, 004, and 005 are also visually monitored as required in the Facility's PCB Pollutant Minimization Plan (PMP). Two of the outfalls included in the permit (001 and 012)

no longer drain an area owned by RACER, as they were sold to third parties in 2014 and 2017, respectively. A third outfall (009) is an internal outfall that originally drained to Outfall 011. This outfall was bulkheaded in 2014. A fourth outfall (100), which served as an emergency outfall for the Facility's wastewater treatment plant, was disconnected and bulkheaded following the demolition of the Facility.

The hydrogeology of the Facility is characterized by a shallow saturated zone with a depth to water ranging from approximately 5 to 16 feet bgs. Facility monitoring wells have been installed within shallow overburden deposits consisting of fill, silty sand, silt, and clay. The sandy fill materials and silty sand soil units can be partially or fully saturated depending on the horizontal distribution and depth of soils and seasonal fluctuations in the water table.

Groundwater across the Facility generally flows eastward toward the Flint River. In the northern portion of the Facility, there is a groundwater ridge, or divide, present in the vicinity of Stewart Avenue. Groundwater to the south of this divide appears to have an east to southeast flow component. Groundwater north of this divide flows generally to the east-northeast. Groundwater generally flows to the east and southeast in the central and southern portions of the Facility. A groundwater contour map for the Facility is provided on **Figure 5.**

Groundwater flow at the Facility is also strongly influenced by storm sewers that allow groundwater infiltration where the storm sewers are located below the groundwater table, and as such serve as groundwater sinks. This is evident on **Figure 5**, which shows deflection of groundwater contours in a hydraulically upgradient direction at storm sewers 001, 003, 005, 010, 011, and 012. In addition, the sanitary sewer within Hamilton Avenue adjacent to the Outfall 011 storm sewer is also located below the groundwater table and appears to leak, thus is influencing groundwater flow locally.

Groundwater impacts (as defined by concentrations greater than Michigan Part 201 groundwater residential drinking water and groundwater surface water interface [GSI] criteria) migrating off the Facility are present in several areas, as indicated on **Figure 5**. Groundwater impacts have been categorized into PFAS and Metals/VOCs. As indicated on **Figure 5**, at one location along Stewart Avenue, groundwater impacts are migrating onto the Facility from an off-property source.

In addition to groundwater migration off the property, light non-aqueous phase liquid (LNAPL) is present south of the former Building 83/84 area adjacent to industrial Avenue, as indicated on **Figure 2**.

No drinking water wells are present on the Facility property. Arcadis completed residential well surveys in 2014 and 2016 in order to identify possible private water supply wells hydraulically downgradient of the Facility. The well survey identified five wells to the northeast of the Facility, the closest of which was 2000 feet. The wells were finished between 160 to 220 feet below ground surface in sandstone, shale, and limestone. As indicated previously, groundwater at the Facility is encountered between 5 and 16 feet below ground surface and discharges to storm sewers or the Flint River. There is no evidence that impacted groundwater from the Facility is affecting these wells.

3.3 Areas of Interest (AOIs)

The Current Conditions Report (CCR) completed in 2000 identified over 300 AOIs at the facility. These AOIs were further investigated during the RCRA Facility Investigation (RFI) phase of the Corrective Action process, and a number of these AOIs were eliminated from further consideration or combined into groupings of individuals AOIs. Due to changes in cleanup criteria, the inclusion of emerging contaminants (e.g. PFAS), and reevaluation of the Facility, which added the storm sewers and the sanitary sewer along Hamilton Avenue in the Southend, plus selected former Waste Management Units (WMUs), ultimately 62 AOIs were retained, requiring corrective actions. A summary of these AOIs is presented in **Table 2A** (Northend) and **2B** (Southend). AOIs are shown on **Figures 2, 3, 4, and 6. Figures 2 and 3** includes the AOIs and Hazardous Waste Management Units (WMUs), which been incorporated into the list of AOIs. **Figure 4** includes the stormwater outfalls that have been included as AOIs, and **Figure 6** includes additional areas on the Facility that have also been considered AOIs.

Since the submittal of the CAF in November 2020, additional investigations have been completed or are currently underway at several areas on Site. A brief summary of these investigations is presented below. Some of these areas are within existing AOIs and some represent new AOIs. **Tables 2A and 2B** have been updated to reflect this information.

Investigation Area: Former GM Foam Generation Building – AOI 36-05 in Northend (**Table 2A**)

PFAS has been detected in soil and groundwater at the location of the Former GM Foam Generation Building (FGB). The FGB and associated tank farm appear to be the source of the impacts. Groundwater impacts are delineated below cleanup standards downgradient of the source area. Based on the data collected to date, PFAS impacts are limited and do not appear to be migrating beyond the property boundary above applicable Part 201 cleanup criteria. Additional soil and groundwater characterization is planned to determine potential remedies for this area.

Investigation Area: Former GM Aeration Lagoons – new AOI in Northend (**Table 2A**)

Historically GM constructed two aeration lagoons (Western and Eastern Lagoons). The lagoons were cleaned and closed in 1994. The Western Lagoon was filled by GM in the 1990's; however, the Eastern Lagoon remains. With the goal of filling in the Eastern Lagoon, RACER sampled water and sediment in the lagoon. However, PFAS was detected in the soil, sediment, surface water and groundwater at the former GM Aeration Lagoon area. Additional delineation is planned in 2021 to further delineate soil and groundwater impacts in the vicinity of the eastern lagoon. Following completion of delineation activities, a plan to fill in the lagoon will be prepared for review by EGLE.

Investigation Area: Leith Street Underpass – Outfall 005 (**Table 2A**)

PFAS impacts have been detected in groundwater and in the Outfall 005 storm sewer at the Leith Street underpass. Additional investigation and groundwater modelling activities are being completed to determine potential remedies for this area, which may include bulkheading storm sewer lines draining contaminated groundwater, filling in the underpass beneath the railroad with clean soils from nearby highway construction projects, and reconstructing the storm sewer along this section of Leith Street.

Investigation Area: Buildings 12 and 16 – AOIs 12-A and 16-A (**Table 2B**)

PFAS has been detected in soil and groundwater at the Building 12 and 16 areas of the Site. The impacts are thought to be related to former plant operations (painting, enameling). Groundwater in these areas flows to the east and southeast. Additional investigation is planned to be completed in 2021 and 2022 to determine potential remedies for this area.

Investigation Area: Factory 84 – AOI 84-D (**Table 2B**)

PFAS has been detected in soil and groundwater at the Factory 84 area of the Site. The impacts are thought to be related to a former tank farm associated with Factory 84. Additional investigation and modelling activities are planned for 2021 and 2022 to delineate soil and groundwater impacts in the vicinity.

Investigation Area: Buildings 04 and 44 – AOI – 44A (**Table 2B**)

Significant concentrations of PFAS have been detected in soil and groundwater at the Building 04 and 44 areas of the Site next to Hamilton Avenue in the Southend of the Site. The impacts are thought to be related to numerous former plant operations including painting/coatings. The impacts in soil and groundwater have largely been delineated. Groundwater flows to the east and southeast ultimately discharging to the Flint River. Some impacted groundwater is entering the sanitary sewer on Hamilton Avenue and storm sewers in this area, mainly through storm and sanitary laterals. Additional investigation, characterization, and modelling activities are ongoing to determine potential remedies for this area. Due to the significant volume of contaminated soils and groundwater a detailed review of alternative technologies and remedial options is underway.

Investigation Area: Hamilton Avenue Sewers – Outfall 010, 011, and Sanitary Sewer (**Table 2B**)

PFAS has been detected in the storm and sanitary sewers present in Hamilton Avenue. In order to eliminate impacted groundwater from infiltrating the sewers, several measures have been completed including: installing temporary plugs, installing permanent bulkheads and filling manholes on-Site with concrete. Additional sampling and monitoring is ongoing to determine the potential need for additional remedies for this area, including installing permanent bulkheads/plugs in the sanitary sewer and the Outfall 011 storm sewer.

Some of the AOIs will require active remediation. Many of the AOIs will require deed restrictions placed on them prohibiting activities that would otherwise disturb Facility conditions and potentially result in unacceptable exposures. This is discussed further in Section 4.3.

3.4 Previous Releases

There have been documented releases of non-aqueous phase liquid (NAPL) to the Flint River via the Facility storm sewer system. These releases have been addressed immediately and remediated to the satisfaction of USEPA/EGLE. LNAPL releases to the river have been mitigated through the following activities:

- Bulkheads have been placed in select storm sewer laterals and mains to prevent LNAPL migration to the river.

- Three oil-water separators were constructed within the Outfall 003 and 004 storm sewers over the past 25 to 30 years to prevent LNAPL from reaching the river.
- Oil absorbent and containment booms have been installed at Outfalls 002,003, 004, and 005 to prevent oil releases to the river.
- The Outfall 003 storm sewer is being rerouted around the areas on the Facility containing LNAPL to eliminate the potential for LNAPL (and PFAS) to migrate to the river within this drainage area.

Other documented releases include the following:

- Eighteen (18) documented releases to soil and groundwater in EGLE's data base from underground storage tanks (USTs) located on the Facility. Six of those releases were closed and the remaining 12 have been incorporated into the Corrective Action process.
- Documented releases to soil and groundwater from the five WMUs located on the Facility (**Figures 2 and 3**).

Other than the releases described above, it is assumed that the majority of elevated contaminant concentrations in soil and groundwater across the Facility are due to non-documented releases (e.g., accidental releases from former operations) that may or may not be associated with the identified AOIs. The releases at the Facility have resulted in groundwater plumes (exceeding Michigan Part 201 drinking water and/or groundwater surface water interface criteria) and areas of elevated PCBs, volatile organic compounds (VOCs) and benzo(a)pyrene in soils. There are also areas of elevated arsenic, lead, and manganese in soil that may have been releases but could also be caused by contaminated fill placement.

Some of the groundwater plumes extend beyond the Facility property boundary. In these instances, Notices of off-Site Migration have been filed with the predecessors to EGLE under Part 201.

3.5 RCRA Regulatory History

A brief overview of regulatory actions taken by the United States Environmental Protection Agency (USEPA) and EGLE and its predecessor state agencies at the Facility is below.

- February 1985 – General Motors Corporation (GMC) submitted a RCRA Part B Permit Application to USEPA which listed 10 hazardous waste management units at the Facility.
- November 1987 - GMC retracted its RCRA Part B applications and converted the Facility to less than 90-day generator status.
- March 2000 - GMC entered into a 3008(h) Administrative Order on Consent with the USEPA for the Facility.
- January 2010 – The Statement of Basis for the Southend was issued by U.S. EPA (Southend Statement of Basis).
- May 2010 - The Final Decision for the Southend of the Facility was issued by USEPA (Southend Final Decision).
- September 2011 – RACER entered into subsequent 3008(h) Administrative Order on Consent with the USEPA for the Facility.

- August 2020 – RACER entered into a Corrective Action Consent Order (CACO) with EGLE for the Facility, pursuant to Sections 1115a and 11151 of Part 111, Hazardous Waste Management of Michigan NREPA, 1994 PA 451, as amended.

The Facility, when operated by GMC, received 24 notices of hazardous waste violations on record from 1983 to 2006. These violations were issued due to "used oil generators, ground water monitoring, and generator transport, general oversight and record keeping requirements." Compliance was achieved for 23 hazardous waste violations during the same time frame. No documentation of the resolution of the 2006 violation was available.

The following documents associated with RCRA Corrective Action have been submitted to the USEPA/EGLE (see Section 9 for the full reference):

- Current Conditions Report (BBL, 2000)
- RCRA Facility Investigation Work Plan (BBL, 2001)
- RCRA Facility Investigation Reports (BBL, 2002 & BBL, 2006)
- Environmental Indicator Determination for CA 750 (2005)
- Corrective Measures Proposals (2006, 2008)
- Corrective Measures Proposal Addenda (2009 (#1), 2010 (#2), 2011 (#2-1))
- Corrective Measures Implementation Work Plan (August 13, 2010)
- Draft Remedy Recommendations Reports (Arcadis, 2014 & Arcadis, 2016)
- Corrective Action Framework Report (Arcadis, 2020)

In addition to the above documents, multiple documents have been submitted to comply with the conditions imposed by the USEPA in response to these documents (for example, Corrective Measures Implementation [CMI] Quarterly and Annual Reports).

3.6 Other Permitted Activities

Storm water discharges from the Facility are regulated under National Pollutant Discharge Elimination System (NPDES) permit No. MI0001597. The Facility storm sewer network includes over 20 miles of on-Facility storm sewers, which provide drainage across the Facility and discharge into the nearby Flint River through 13 outfalls (Outfalls 002, 003, 004, 004A, 005, 005A, 006, 007, 007A, 008, 010, 011, and 013). In addition, the discharges in some of these outfalls include contributions from off-Facility areas (both upgradient and downgradient) owned by the City of Flint or third parties.

3.7 Access or Physical Constraints

Facility access may be obtained through coordination with RACER. Manufacturing operations at the Facility ceased in 2010, thus there are currently no access limitations due to operations.

3.8 Other Potential Areas of Investigation based on Facility History

Additional investigation to define the extent of PFAS chemicals as well as the extent of elevated lead in

soil is ongoing.

3.9 Other

The Facility is listed as a RCRA CORRACTS Facility, indicating that corrective actions have been conducted at the Facility. Numerous corrective actions have been implemented at the Facility. See Section 6 below for additional information.

4 CONCEPTUAL SITE MODEL

A graphical CSM is presented as **Figure 7** and a summary of exposure pathways is presented in **Table 3**. The CSM illustrates the following:

- Facility geology and general hydrogeology:
  - The surface geology consists of a variable thickness (0 to 20 feet) of fill material consisting of silty clay as well as some residual manufacturing materials (e.g., brick, concrete, slag, foundry sand, scrap iron, etc.).
  - A mix of sand, silt and clay in varying proportions underlies the surficial fill materials, down to a depth of up to approximately 30 feet bgs. The Northend soils are predominantly sand and silty sand, whereas the Southend soils are a mix of sand/silty sand and clay and silt. Two and in some case three silty sand layers are present separated by silt and/or clay layers.
  - A dense silty clay underlies the above layers
  - Groundwater is encountered approximately 5 to 16 feet bgs.
  - Overall groundwater flow is to the east toward the Flint River (see Section 3.2. above). Locally, groundwater flow is influenced by the presence of storm and sanitary sewers (see below and section 3.2 above).
- Storm and sanitary sewer lines are present within the vertical interval where the saturated fill or soil units are present. Impacted Facility groundwater is infiltrating these sewers both on and beyond the Facility property boundary and subsequently discharging to the Flint River. LNAPL was documented in the past to be infiltrating the storm sewers as indicated on **Figure 7**, but these sewers were bulkheaded to eliminate that migration pathway.
- Impacted groundwater is migrating beyond the property boundary and discharging directly to the Flint River at one location in the Southend, as represented on **Figure 7**.

4.1 Sources and Extent of Known Contamination

See Sections 3.3 and 3.4.

4.2 Contamination Transport/Migration Pathways

The tentative contaminant transport/migration pathways are shown on **Figure 7**. The migration pathway of greatest concern is infiltration of contaminants into the storm sewers and subsequent discharge to the Flint River. The primary contaminants of concern (COCs) are per and poly-fluoroalkyl substances

(PFAS), specifically perfluorosulfonic acid (PFOS) which has been documented to be present in the storm water at the storm sewer outfalls across the Facility and adjacent to the Flint River in the groundwater at the Building 84 Area (**Figure 3**) at concentrations exceeding the Michigan Rule 57 surface water criterion.

PFOS, perfluorooctanoic acid (PFOA), and perfluorohexanesulfonic acid (PFHxS) are also present at concentrations exceeding their respective Michigan Part 201 drinking water criteria across the facility, particularly in the Southend near Hamilton Avenue and the Building 84 Area (**Figure 3**), but because the groundwater beneath the Facility is not used for drinking water, this exposure pathway is not relevant.

4.3 Tentative Exposure Pathways

The tentative contaminant exposure routes are depicted on **Figure 7**. **Figure 8** depicts areas on site where soil concentrations exceed the risk-based levels for various exposure pathways (e.g. soil direct contact, inhalation exposure, etc.). Restrictive covenants will be placed on these areas to prevent future exposure.

4.4 Discussion of Unknowns and Uncertainty

Data gaps have been identified based on a review of Facility characterization data collected to date.

RFI field investigation activities are ongoing to address these data gaps (e.g., extent of PFAS). In general, the RFI field investigations are intended to address uncertainties regarding the nature and extent of contamination at and around the Facility under current and future environmental conditions. The RFI field investigations have been and will continue to be performed in phases, and the data from each phase will be assessed quantitatively and qualitatively to determine if further sampling is warranted to support decisions regarding the need for interim measures (IMs) or corrective measures.

5 RFI WORK PLAN

An initial RFI Work Plan was developed in 2001 to guide the investigation activities completed at the Facility.

It should be noted that several phases of investigation have been completed since 2001. The scopes of work for those additional investigation phases were approved by USEPA/MDEQ/EGLE.

5.1 Scope and Objectives of the Investigation

The scope of the RFI was developed and has been amended to complete activities necessary to identify and define the nature and extent of releases of hazardous waste and/or hazardous constituents at or from the Facility. Potential exposure risks were evaluated to determine if identified release(s) pose or posed an unacceptable risk to human health and the environment.

5.2 Screening Levels

The Part 201 cleanup criteria current at the time during which the data were collected were used for data screening and have been periodically updated. Facility-specific soil background screening levels were developed as part of the RFI Phase II Report.

5.3 Adaptive Approach

The RFI scope was modified or amended based on the data evaluation in order to delineate contaminant concentrations.

5.4 Quality Assurance Project Plan (QAPP)

The current (2001) QAPP will be updated in accordance with the CACO requirements. The updated QAPP will include updated Data Quality Objectives (DQO) and Standard Operating Procedures.

5.5 Data Quality Objectives

The data quality objectives will be specified in the QAPP. The primary objectives for data collection activities include:

- Define the nature and extent of releases of hazardous wastes and/or hazardous constituents in environmental media (e.g., soil, sediment, groundwater, and/or surface water) at the Facility.
- Collect sufficient data and information to evaluate the risk to human health and the environment, if any, associated with any releases of hazardous waste and/or hazardous constituents; and
- Collect sufficient data for all contaminated media to support the required update to the existing Environmental Indicator Determination for CA 750. Note a CA 750 document was prepared in 2005. It will need to be updated for PFAS.

The Decision Statement for the investigation is as follows:

- Determine whether sufficient data and information has been collected to define the nature and extent of releases. The determination will be made by professional judgment based on the results of the quantitative and qualitative data evaluation procedures and consultation with EGLE.
- Determine whether additional interim remedial actions are necessary to control current unacceptable risks, if any, to human health or the environment; and
- Provide data for the development of a study of appropriate corrective measures (if warranted) to control current and future unacceptable risks to human health and the environment. Associated specific objectives for field and laboratory data collection will be described in the updated QAPP to be developed.

5.6 Modeling

To date, limited modeling has been used to evaluate groundwater conditions. Modeling may be done in the future to support investigation and/or evaluation of corrective measures.

5.7 Sampling Approach/Design

Media sampling was designed to define the nature and extent of contaminants present on and off the Facility property in order to provide data used to evaluate corrective measures.

5.8 Sampling Analysis

The laboratory analyses will be completed in accordance with the updated QAPP.

5.9 Use of Historical Data

It is expected that historical soil data will be used in limited circumstances, to the extent that an assessment indicates that is appropriate to do so.

Historical groundwater data will be used to the extent it provides useful data trends for remedial decisions (for example, for the purposes of a natural attenuation remedy).

5.10 Background

Soil metals data have been evaluated using the Michigan Part 201 default background levels, and the 2015 statewide soil survey. Facility-specific background soil concentrations were developed as part of the RFI Phase II Report although they have not been used.

Facility background groundwater concentrations have not been developed.

5.11 Health and Safety Plan

The Facility Health and Safety Plan is updated periodically based on changing Facility conditions and/or sampling data.

5.12 Community Involvement

A Public Involvement/Communications Plan was submitted to EGLE as specified in the CACO.

The City of Flint Library is the current repository for facility related RCRA Corrective Action documents.

5.13 Work Plan

The scope of work presented in the 2001 RFI Work Plan and subsequent work scopes were submitted to the USEPA and subsequently approved.

Future RFI work scopes will be submitted to EGLE for approval.

6 INTERIM MEASURES

6.1 Identified Interim Measures

The updated completed interim measures are summarized in **Tables 2A** and **2B**.

6.2 Future Potential Interim Measures

The proposed future potential interim measures are presented in **Tables 2A** and **2B**.

7 GOALS AND EXPECTATIONS

The Corrective Action Objectives are presented in **Table 3**.

8 OTHER POTENTIAL ISSUES

8.1 Format for Data/Information Exchange/Submissions

Communication (reports/memos/work plan) will be submitted electronically to Kevin Lund of EGLE by Grant Trigger of RACER.

Submittals will be accompanied by a certification statement in compliance with Sections 12.2 and 12.3 of the CACO.

Facility investigation data will be submitted to EGLE in the format requested (e.g., Excel, Access).

8.2 Schedule of Deliverables

Report deliverables will be submitted to EGLE in accordance with the schedule presented in the CACO, which includes the following:

- Quality Assurance Project Plan
- Corrective Measures Study Work Plan
- Corrective Measures Implementation Plan
- Public Involvement/Communications Plan
- Interim Progress Reports (during corrective measures implementation)
- Final Corrective Measures Construction Completion Report

8.3 Elements of RFI

The objective of the RFI is as follows:

- determine Facility-wide geology and hydrogeologic conditions, as necessary, to properly investigate AOIs;
- characterize the nature and extent of releases of hazardous waste and/or hazardous constituents in environmental media at the Facility;
- assess potential risk to human health and the environment associated with releases of hazardous waste and/or hazardous constituents;
- provide sufficient data to update the RCRA corrective action Environmental Indicators determinations (CA750);
- determine whether interim corrective measures are necessary to control current unacceptable risks, if any, to human health; and

- determine whether a corrective measures evaluation is necessary to mitigate all current and future unacceptable risks, if any, to human health and the environment.

8.4 Risk Assessment

A human health risk assessment (HHRA) was completed as part of the RFI Phase II report prepared in 2006. An addendum to the HHRA was prepared in 2010, as part of Addendum #2 to the Corrective Measures Proposal. The results of the HHRA were in part used to develop the selected remedies at the Facility. An ecological risk assessment (ERA) was also prepared as part of the RFI Phase II and the risks determined to be negligible. The discovery of PFAS in groundwater and the storm sewers has required that the risks be reevaluated. PFAS investigations are ongoing.

9 REFERENCES

Arcadis. May 1, 2008. Resource Conservation and Recovery Act (RCRA) Revised Corrective Measures Proposal. NAO Flint Operations Site. ID #MID 005 356 712.

Arcadis. October 1, 2009. Resource Conservation and Recovery Act (RCRA) Corrective Measures Proposal – Addendum No. 1. NAO Flint Operations Site. ID #MID 005 356 712.

Arcadis. October 21, 2010. Resource Conservation and Recovery Act (RCRA) Corrective Measures Proposal – Addendum No. 2 – Northend Corrective Measures and Site-wide Groundwater Monitoring. Former NAO Flint Operations Site. ID #MID 005 356 712.

Arcadis. June 2011. Resource Conservation and Recovery Act (RCRA) Corrective Measures Proposal – Addendum No. 2-1. Former NAO Flint Operations Site. ID #MID 005 356 712.

Arcadis. Corrective Measures Implementation Work Plan (August 13, 2010).

Arcadis. August 29, 2014. Draft Remedy Recommendations Report. Revitalizing Auto Communities Environmental Response Trust. Buick City Site, Flint, Michigan.

Arcadis. February 15, 2016. Final Draft - Remedy Recommendations Report. Revitalizing Auto Communities Environmental Response Trust. Buick City Site, Flint, Michigan.

BBL. May 30, 2000. Descriptions of Current Conditions for Areas South of Leith Street. General Motors Corp. NAO-Flint Operations. Flint, Michigan

BBL. November 26, 2000. Descriptions of Current Conditions for Areas North of Leith Street. General Motors Corp. NAO-Flint Operations. Flint, Michigan

BBL. March 30, 2001. RCRA Facility Investigation Work Plan. General Motors Corporation. NAO Flint Operations Site. Flint, Michigan.

BBL. June 28, 2002. Resource Conservation and Recovery Act Facility Investigation Phase I Report. General Motors Corporation. NAO Flint Operations Site. Flint, Michigan.

BBL. July 14, 2006. Resource Conservation and Recovery Act Facility Investigation Phase II Report. General Motors Corporation. NAO Flint Operations Site. ID #MID 005 356 712. Flint, Michigan.

ENVIRON International Corporation. September 23, 2005. RCRA Environmental Indicator CA750 Report Determination of Migration of Contaminated Groundwater Under Control. NAO Flint Operations Site. Flint, Michigan.

Humphreys, C.R. January 1960. Water Resource Analysis of Genesee County, Michigan.

TABLES

TABLE 1
Storm Sewer Outfalls
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Outfalls Covered in NPDES Permit	Outfalls No Longer Active	Outfalls No Longer Owned by RACER	Outfalls Draining Site Areas
001		001	
002			002
003			003
004			004
004A			004A
005			005
005A			005A
006			006
007			007
007A			007A
008			008
009	009		009
010			010
011			011
012		012	
013			013
100	100		

TABLE 2A
Areas of Interest and Interim Measures - Northend
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Area of Interest	Matrix	Impact	Applicable Criteria [1,2]	Completed IMs/Remedies	Next Steps
AOI 38-1	Soil	SVOCs	NDC	NA	Restrictive Covenant
	Soil	Manganese	NPSIC	Targeted Excavation	NA
AOI 36-1/36-2	LNAPL	Mineral Seal, Hydraulic oi, and Gasoline LNAPL Area	NA	Factory 36 LNAPL Recovery System Outfall 002 Passive Recovery Trench	Restrictive Covenant
	Soil	Arsenic	NDC	NA	Restrictive Covenant
	Soil	Benzene, Toluene, Ethylbenzene	NVSICI, NSVIA	Sitewide VI Restrictive Covenant	NA
	Groundwater	1.1.1-TCA, 1,1-DCA, 1,1-DCE, 1,4-Dioxane, Arsenic, Manganese	NDW and GSI	Sitewide Groundwater Restrictive Covenant	Institutional Controls Possible MZD for 1,4-Dioxane
	Groundwater	Benzene, Ethylbenzene, Naphthalene	NDW	Sitewide Groundwater Restrictive Covenant	Confirm pathways are not complete
	Groundwater	PFAS	NDW and GSI	NA	Confirm pathways are not complete
AOI 36-5	LNAPL	Fuel Oil LNAPL	NA	Tank Farm Excavated Passive LNAPL Recovery Trenches for ~20 Years Outfall 002 Storm Sewer Bulkhead 002 Passive Recovery Trench Monitoring	Restrictive Covenant
	Groundwater	Trichloroethene	NDW	Sitewide Groundwater Restrictive Covenant	Institutional Controls
	Groundwater	PFAS	NDW and GSI	Sitewide Groundwater Restrictive Covenant	Institutional Controls and Monitoring
	Soil	PFAS	GSIP	NA	TBD
AOI 55-1	Soil	PCB	TSCA (>1 ppm)	NA	TSCA Restrictive Covenant
	Groundwater	PFAS	NDW and GSI[3]	NA	Outfall 003 Re-route and Restrictive Covenant
AOI 10-1	LNAPL	Hydraulic Oil LNAPL	NA	- 13 years of LNAPL removal - Storm sewer laterals bulkheaded to eliminate LNAPL migration pathway	Outfall 003 Re-route and Restrictive Covenant
	Soil	Lead	NDC	NA	Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
	Soil	PCBs	TSCA (<25 ppm)	NA	TSCA Restrictive Covenant
	Soil	PCBs	TSCA (<10 ppm)	NA	TSCA Restrictive Covenant
	Concrete	PCBs	TSCA (<10 ppm)	Restrictive Covenant	TSCA Restrictive Covenant
AOI 10-2	Groundwater	PFAS	NDW and GSI	NA	TBD
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
	Soil	TCE	NSVIA	Sitewide VI Restrictive Covenant	Restrictive Covenant
AOI 10-3	Soil	Manganese	NPSIC	NA	Restrictive Covenant
AOI 10-4	Groundwater	TCE	NDW	Sitewide Groundwater Restrictive Covenant	Institutional Controls
	Soil	PCBs	TSCA (>50 ppm)	Excavation	Excavation and Restrictive Covenant
	Soil	PCBs	NDC (>16 ppm)[4]	NA	Restrictive Covenant
AOI 05-1	LNAPL	Cutting Oil LNAPL	NA	15 years of LNAPL removal from three passive recovery trenches.	Outfall 003 Re-route and Restrictive Covenant
	Soil	PCB	TSCA (>50 ppm)	Targeted excavation of select soils > 50 ppm	TSCA Restrictive Covenant
	Soil	PCB	NDC (>16 ppm) (two areas)[4]	NA	Restrictive Covenant
	Soil	Lead	NDC	Placed 2-feet of soil over impacted area	Restrictive Covenant
	Soil	PCBs	TSCA (>1 ppm)	NA	TSCA Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
AOI 05-5	LNAPL	Cutting Oil LNAPL	NA	5 years of LNAPL removal from recovery wells	Outfall 003 Re-route and Restrictive Covenant
	Soil	PCBs	TSCA (<25 ppm)	NA	TSCA Restrictive Covenant
	Soil	PCBs	NDC (>16 ppm)[4]	NA	Restrictive Covenant
	Concrete	PCBs	TSCA (>1 ppm, <10 ppm)	Restrictive Covenant	TSCA Restrictive Covenant

TABLE 2A
Areas of Interest and Interim Measures - Northend
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Area of Interest	Matrix	Impact	Applicable Criteria [1,2]	Completed IMs/Remedies	Next Steps
AOI 05-6	Soil	Lead	NDC	NA	Restrictive Covenant
AOI 03-1	LNAPL	Quench Oil LNAPL	NA	A recovery sump addressed the suspected source/release area.	Restrictive Covenant
	Soil	PCBs	TSCA (>1 ppm)	NA	TSCA Restrictive Covenant
	Soil	Benzo(a)pyrene	NDC	NA	Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Excavate/Cap, or similar and Restrictive Covenant
AOI 81-1	Soil	Lead	NDC	NA	Restrictive Covenant
AOI 81-2	LNAPL	Cutting Oil LNAPL	NA	Passive Recovery Trench for ~17 years	Restrictive Covenant
	Soil	PCBs	TSCA (< 25 ppm)	Targeted excavation	TSCA Restrictive Covenant
	Soil	PCBs	TSCA (>1 ppm)	NA	TSCA Restrictive Covenant
	Soil	Arsenic	NDC	NA	Surface Cover and Restrictive Covenant or Targeted Excavation
	Soil	VOCs	NVSICI, NSVIA	Sitewide VI Restrictive Covenant	NA
AOI 81-3	Groundwater	VOCs and metals	NDW	Sitewide Groundwater Restrictive Covenant	Institutional Controls
AOI 83/84-1	LNAPL	Cutting Oil LNAPL	NA	Outfall 004 Reroute	Restrictive Covenant
AOI 83/84-2	LNAPL	Cutting Oil LNAPL	NA	Bulkhead Lateral to Outfall 003 Bulkhead to Outfall 005	Restrictive Covenant
	Soil	PCBs	TSCA (>1 ppm)	NA	TSCA Restrictive Covenant
	Soil	Lead	NDC	NA	Restrictive Covenant
	Soil	Benzo(a)pyrene	NDC	NA	Restrictive Covenant
AOI 83/84-3	Soil	Lead	NDC	NA	Restrictive Covenant
AOI 83/84-04	LNAPL	Cutting Oil LNAPL	NA	NA	Restrictive Covenant
AOI 83/84-5	LNAPL	Cutting Oil LNAPL	NA	Bulkhead lateral to Outfall 003 storm sewer	LNAPL Recovery and Restrictive Covenant
AOI 86-1	LNAPL	Fuel Oil LNAPL	None	Excavated Tank Farm (source area) Two recovery wells operated for 5 years LNAPL Bailing and Monitoring for 4 years Outfall 004 reroute and bulkheading	Restrictive Covenant
	Groundwater	VOCs, 1,4-Dioxane, and metals	NDW and GSI	Sitewide Groundwater Restrictive Covenant	NA
	Groundwater	PFAS	NDW and GSI	NA	TBD
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
	Soil	Arsenic	NDC	NA	Restrictive Covenant
	Soil	PCBs	TSCA (>1 ppm)	NA	Restrictive Covenant
Former Aeration Lagoons	Soil/Sediment	PFAS	GSIP	NA	TBD
	Groundwater	PFAS	NDW and GSI	NA	TBD
Outfall 001	Water	1,4-Dioxane, PFAS	GSI	NA	Possible Mixing Zone Determination -1,4-Dioxane TBD - PFAS
Outfall 002	Water/sediment	1,4-Dioxane, PFAS, LNAPL	GSI	Physically disconnected at property boundary	Outfall 003 Reroute - property boundary bulkhead removed and pipe connected to new sealed stormwater line Further assessment at discharge may be needed. Final Steps -TBD
Outfall 003	Water/sediment	PFAS, LNAPL	GSI	Outfall 003/004 oil water treatment system select laterals bulkheaded	Outfall 003 Reroute Further assessment at discharge may be needed. Final Steps -TBD
Outfall 004	Water/sediment	PFAS, LNAPL	NA	Outfall 003/004 oil water treatment system Outfall 004 Reroute and bulkheads	Further assessment at discharge may be needed. Final steps - TBD
Outfall 004A	Water	PFAS	GSI	NA	Further evaluation at Outfall Final Steps - TBD

TABLE 2A
Areas of Interest and Interim Measures - Northend
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Area of Interest	Matrix	Impact	Applicable Criteria [1,2]	Completed IMs/Remedies	Next Steps
Outfall 005	Water/sediment	PFAS, LNAPL	GSI	Bulkhead Main and lateral; fill in Leith Street Underpass and construct new storm sewer and manholes	Bulkheads Further assessment at discharge may be needed. Final Steps TBD
WMU #2	Soil	Benzene, ethylbenzene and toluene	GSIP, NDWP	NA	Restrictive Covenant
WMU #3	Soil	1,1,1-TCA, 1,1-DCE, TCE	GSIP, NDWP, NSVIA	Sitewide VI Restrictive Covenant	Restrictive Covenant
	Groundwater	1,1,1-TCE, 1,1-DCA, 1,1-DCE, 1,4-dioxane, PCE, TCE	NDW	Sitewide Groundwater Restrictive Covenant	NA
WMU #4	Soil	1,1,1-TCA, PCE, TCE, PFAS	GSIP, NDWP	NA	Additional Investigation, Restrictive Covenant
	Groundwater	Benzene, Ethylbenzene, TCE, PFOS	NDW, GSI		
WMU #5	Soil	2-Methylphenol, 3&4- Methylphenol, and PFAS	GSIP	NA	Additional Investigation, Restrictive Covenant
	Groundwater	PFAS	GSI and NDW	NA	Additional Investigation, Restrictive Covenant

Footnote

1 - For the purposes of determining which AOIs require further action, data were compared to NDC, NPSIC, NVSICI, NSVIA criteria for soils and NDW, GSI, NGVII for groundwater. However, the data from the WMUs are compared to all Part 201 nonresidential criteria to determine whether there was a historic release.

2 - GSI criteria are considered applicable in the Outfalls or if there is direct venting or potential for direct venting of groundwater to surface water (for example AOI 84-D).

3 - At AOI 55-1, VOC impacted groundwater is migrating on-Site from an off-Site source

4 - Location is within an area where a TSCA deed restriction may be executed. Remedy is specifically related to Michigan Part 201 NDC for PCBs

Notes:

1,1-DCA - 1,1-Dichloroehtane
1,1-DCE - 1,1-Dichloroethene
1,1,1-TCA - 1,1,1-Trichloroethane
GSI - Groundwater/surface water interface criteria
GSIP - Groundwater/surface water interface protection criteria
IM - Interim measures
LNAPL - Light non-aqueous phase liquid
NA - Not Applicable
NDC - Nonresidential direct contact
NDW- Nonresidential drinking water criteria
NDWP - Nonresidential drinking water protection criteria
NGVII - Nonresidential groundwater volatilization to indoor air criteria
NPSIC Nonresidential particulate inhalation criteria
NSVIA - Nonresidential soil volatilization to indoor air criteria
NVSICI - Nonresidential volatile soil inhalation -Infinite source criteria
PCBs - Polychlorinated biphenyls
PCE - Tetrachloroethylene
PFAS - Per- and polyfluoroalkyl substances
PPM - parts per million
SVOC - Semi-volatile organic compounds
TBD - To Be Determined
TCE - Trichloroethene
TSCA - Toxic Substance Control Act
VOC - Volatile organic compounds
WMU - Waste management Unit

TABLE 2B
Areas of Interest and Interim Measures - Southend
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Area of Interest	Matrix	Impact	Applicable Criteria [1,2]	Completed IMs/Remedies	Next Steps
AOI 02-B	LNAPL	Hydraulic Oil LNAPL	NA	NA	Restrictive Covenant
	Soil	Lead	NDC	NA	Restrictive Covenant
AOI 09-A	Groundwater	TCE, Vinyl Chloride	NDW and RDW	Sitewide Groundwater Restrictive Covenant	Institutional Controls
	Soil	Lead	NDC	Off Site impacted soils were excavated. Surface cover installed over on Site impacts	Restrictive Covenant
	Soil	Lead	NDC	Surface cover installed over impacts	Restrictive Covenant
AOI 09-B	LNAPL	Gasoline LNAPL	NA	MPE system for LNAPL recovery	Restrictive Covenant
	Groundwater	Manganese	NDW (aesthetic), RDW (aesthetic)	Sitewide Groundwater Restrictive Covenant	Institutional Controls
	Soil	PCB	TSCA > 1 ppm	PCB impacts Excavated	NA
	Soil	Lead	NDC	Surface cover installed over impacts	Restrictive Covenant
AOI 12-A,-B, & -C	LNAPL	Hydraulic Oil LNAPL	NA	LNAPL Recovery attempted for 2 years Outfall 004 Re-route	Restrictive Covenant
AOI 12-A	Soil	Lead	NDC	Surface cover installed over impacts	Restrictive Covenant
	Soil	PFAS	GSIP	NA	TBD
AOI 16-A	Groundwater	PFAS	NDW and GSI	NA	TBD
	Soil	PFAS	GSIP	NA	TBD
	Groundwater	PFAS	NDW and GSI	NA	TBD
AOI 29-A	Soil	Lead	NDC	Surface cover installed over impacts	Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
AOI 40-A, -B & 16-C	LNAPL	Fuel Oil LNAPL	NA	LNAPL Bailing and Recovery Outfall 009 and Outfall 010 Bulkheads	Restrictive Covenant
AOI 40-A	Soil	Benzo(a)pyrene	NDC	NA	Surface Cover or Targeted Excavation
	Soil	PCBs	TSCA > 1 ppm	NA	TSCA Restrictive Covenant or Targeted Excavation
AOI 40-D	Groundwater	Vinyl Chloride	NDW	Sitewide Groundwater Restrictive Covenant	Restrictive Covenant
	Soil	PCBs	TSCA > 1 ppm	NA	TSCA Restrictive Covenant
	Tunnel	PCBs	TSCA > 1 ppm	Bldg. 40 Tunnel Cleaning Annual Downgradient Sampling	TSCA Restrictive Covenant
AOI 44-A	Groundwater	PFAS	NDW and GSI	see Outfall 010, 011, and Sanitary Sewers	TBD
	Soil	Benzo(a)pyrene	NDC	NA	Restrictive Covenant
	Soil	Manganese	NPSIC	NA	Restrictive Covenant
	Soil	PFAS	GSIP	NA	TBD
AOI 84-A	Soil	VOC	NVSICI, NSVIA	Sitewide VI Restrictive Covenant	Restrictive Covenant
AOI 84-D	Groundwater	Vinyl Chloride	NDW	Sitewide Groundwater Restrictive Covenant	NA
	Groundwater	Arsenic	NDW and GSI		Mixing Zone Determination
	Groundwater	Cyanide	GSI		Mixing Zone Determination
	Groundwater	Benzene	RDW and GSI		NA
	Groundwater	PFAS	NDW and GSI		TBD
	Soil	Benzo(a)pyrene	NDC	NA	Restrictive Covenant
	Soil	PFAS	GSIP	NA	TBD
AOI 94-B	Groundwater	TCE	RDW and GSI	Sitewide Groundwater Restrictive Covenant	Institutional Controls
	Soil	PCBs	TSCA > 1 ppm	NA	TSCA Restrictive Covenant
AOI 94-D	Soil	Lead	NDC	NA	Restrictive Covenant
Outfall 005A	NA	NA	NA	NA	Confirm no additional action required
Outfall 006	Water	LNAPL, PFAS, metals	GSI	Bulkhead main west of railroad tracks and select laterals servicing the Site	TBD

TABLE 2B
Areas of Interest and Interim Measures - Southend
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Area of Interest	Matrix	Impact	Applicable Criteria [1,2]	Completed IMs/Remedies	Next Steps
Outfall 007	Water	Metals, PFAS	GSI	Bulkhead main at property boundary	TBD
Outfall 007A	NA	NA	NA	NA	NA
Outfall 008	Watre	PFAS	GSI	Bulkhead main near property boundary	TBD
Outfall 010	Water	PFAS, metals	GSI	Bulkhead main near property boundary and and select laterals, fill MH 10-5 and 10-4 with concrete, and bulkhead MH-10-2	TBD
Outfall 011	Water	PFAS	GSI	Bulkhead select laterals	Place permanent bulkheads/plus in laterals
Outfall 012	NA	NA	NA	NA	NA
Outfall 013	Water	PFAS, metals	GSI	Bulkhead select laterals	TBD
Harriet Street UST Farm	Soil	PCBs	TSCA > 1 ppm	NA	TSCA Restrictive Covenant
Former Employee Parking Lots	Soil	Lead	NDC	NA	Restrictive Covenant
WMU #7	Soil	NA	NA	NA	Restrictive Covenant
WMU #10	Soil	Ethylbenzene, Toluene	GSIP, NDWP	NA	Restrictive Covenant
Sanitary Sewer	water	PFAS	GSI	Place temporary plugs in two locations on Hamilton Avenue	Permanent bulkheads at two locations and flowable fill between bulkheads
Facility Groundwater Management	Groundwater	LNAPL, VOCs, 1,4-Dioxane, Metals, and PFAS	GSI, RDW	Storm Sewer Reroutes, Bulkheads, LNAPL Recovery, and Sitewide Groundwater Restrictive Covenant	Refine understanding of groundwater movement

Footnote

1 - For the purposes of determining which AOIs require further action, data were compared to NDC, NPSIC, NVSICI, NSVIA criteria for soils and NDW, GSI, NGVII for groundwater. However, the data from the WMUs are compared to all Part 201 nonresidential criteria to determine whether there was a historic release.

2 - GSI criteria are considered applicable in the Outfalls or if there is direct venting or potential for direct venting of groundwater to surface water (for example AOI 84-D).

Notes:

1,1-DCA - 1,1-Dichloroehtane
1,1-DCE - 1,1-Dichloroethene
1,1,1-TCA - 1,1,1-Trichloroethane
GSI - Groundwater/surface water interface criteria
GSIP - Groundwater/surface water interface protection criteria
IM - Interim measures
LNAPL - Light non-aqueous phase liquid
NA - Not Applicable
NDC - Nonresidential direct contact
NDW- Nonresidential drinking water criteria
NDWP - Nonresidential drinking water protection criteria
NGVII - Nonresidential groundwater volatilization to indoor air criteria
NPSIC Nonresidential particulate inhalation criteria
NSVIA - Nonresidential soil volatilization to indoor air criteria
NVSICI - Nonresidential volatile soil inhalation Infinite source criteria
PCBs - Polychlorinated biphenyls
PCE - Tetrachloroethylene
PFAS - Per- and polyfluoroalkyl substances
PPM - parts per million
SVOC - Semi-volatile organic compounds
TBD - To Be Determined
TCE - Trichloroethene
TSCA - Toxic Substance Control Act
VOC - Volatile organic compounds
WMU - Waste management Unit

TABLE 3
Corrective Action Objectives
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Environmental Media		Human Health (On-Site)	Human Health (Off-Site)	Ecological Receptors	Potential Cross-Media Transfer	Resource Restoration
Surface Water	Corrective Action Objective	Mitigate releases from site that result in surface water quality exceedances in Flint River	Mitigate recreator ingestion/contact with potentially impacted surface water (assuming this section of the Flint River is not being used as a drinking water source)	Mitigate off-site releases from site that result in surface water quality exceedances	NA	NA
	Priority/Time Frame[(1)]	2	2	2		
	Potential/Existing Corrective Measure	Bulkheading of storm sewers and storm sewer laterals. Lining of storm sewers. Rerouting storm sewers arounds areas of impact on-site. Also, see soil and groundwater corrective actions.	Work with public health agencies to establish fish consumption advisories and recreational user alerts.	Bulkheading of storm sewers and storm sewer laterals. Lining of storm sewers. Rerouting storm sewers arounds areas of impact on-site.		
Groundwater	Corrective Action Objective	- Mitigate ingestion of and contact with potentially impacted shallow groundwater beneath site - Mitigate off-site discharge of potentially impacted groundwater	Mitigate ingestion of and contact with potentially impacted shallow groundwater.	Mitigate discharge of groundwater with PFAS concentrations above GSI non-drinking water	Groundwater to Surface Water: Mitigate discharge of potentially impacted groundwater to surface water through storm sewers (indirect) or direct discharge of groundwater to the river. Groundwater Volatilization to Indoor Air: NA (no buildings)	NA
	Priority/Time Frame[(1)]	3	3	3	3	
	Potential/Existing Corrective Measure	- Establish restrictive covenant prohibiting potable groundwater use on site (Mitigate use of groundwater with contaminant concentrations greater than non-residential criteria). - Monitored natural attenuation - Storm sewers may be bulkheaded and/or lined as deemed necessary to Mitigate infiltration and subsequent off-site discharge of potentially impacted groundwater to the river. - Mixing Zone Determinations, where appropriate	- Establish institutional control prohibiting potable groundwater use off-site (Mitigate use of groundwater with contaminant concentrations greater than residential criteria). - Storm sewers may be bulkheaded and/or lined as deemed necessary to mitigate infiltration and subsequent off-site discharge of potentially impacted groundwater to the river. - Mixing Zone Determinations, where appropriate	Storm sewers may be bulkheaded and/or lined if necessary to mitigate infiltration and subsequent off-site discharge of potentially impacted groundwater to the river.	Groundwater to Surface Water: - Request mixing zone criteria to reevaluate groundwater data from groundwater/surface water interface compliance wells and storm sewers. - Line/bulkhead sewers to Mitigate infiltration of potentially impacted groundwater to storm sewer and subsequent discharge to the river.	
Soil (groundwater protection)	Corrective Action Objective	Mitigate leaching of contaminant from soil to groundwater with concentrations greater than non-residential drinking water protection criteria.	NA - off-site soil not impacted by site	NA	NA	NA
	Priority/Time Frame[(1)]	3	3			
	Potential/Existing Corrective Measure	- Provide/maintain soil/asphalt/concrete cover to areas on-site where potential for soil leaching to groundwater at concentrations greater than GSIP is present - Establish restrictive covenant prohibiting potable groundwater use on site - Stabilization of soil source areas to Mitigate leaching to groundwater - Targeted excavations to remove impacted soils.	NA - off-site soil not impacted by site			
Soil (direct contact)	Corrective Action Objective	Mitigate contact with soil with contaminant levels greater than non-residential direct contact criteria.	NA - off-site soil not impacted by site	NA	NA	NA
	Priority/Time Frame[(1)]	3	3			
	Potential/Existing Corrective Measure	- Establish restrictive covenant to maintain cap/cover over surface soil with contaminant levels greater than direct contact criteria (e.g., arsenic, lead, benzo(a)pyrene) . - Provide Due Care information to construction/maintenance workers who may encounter surface and/or subsurface soil with contaminant levels greater than direct contact criteria in order to implement engineering controls to mitigate impact. - Complete targeted excavations to remove some substances from the direct contact pathway.	NA - off-site soil not impacted by site			
Soil (particulate inhalation)	Corrective Action Objective	Mitigate inhalation of potentially impacted soil with contaminant concentrations greater than non-residential particulate inhalation criteria (manganese).	NA - off-site soil not impacted by site	NA	NA	NA
	Priority/Time Frame[(1)]	3	3			
	Potential/Existing Corrective Measure	- Establish restrictive covenant to maintain cap/cover over surface soil with contaminant levels greater than particulate inhalation criteria. - Provide Due Care information to construction/maintenance workers who may encounter surface and/or subsurface soil with levels greater than particulate inhalation criteria. - Complete targeted excavations to remove some substances from particulate inhalation pathway.	On-site corrective measures will address potential off-site impacts			
Sediment	Corrective Action Objective	mitigate exposure to potentially impacted sediment in storm sewer	mitigate exposure to potentially impacted sediment in storm sewer	NA	Limit leaching of contaminants from potentially impacted sediment to surface water	NA
	Priority/Time Frame[(1)]	3	3	4	4	
	Potential/Existing Corrective Measure	Monitoring of outfall discharges to document compliance with surface water criteria and determine if sediment is an issue. Targeted removal of impacted sediment from storm sewers if determined to be a contaminant source.	- Monitoring of outfall discharges to document compliance with surface water criteria and determine if sediment is an issue. - Targeted removal of impacted sediment from storm sewers if determined to be a contaminant source.	NA - no evidence of impacted sediment discharging from storm sewers	NA - no evidence of impacted sediment discharging from storm sewers	

TABLE 3
Corrective Action Objectives
RACER Buick City Facility - Flint, Michigan
Corrective Action Framework

Environmental Media		Human Health (On-Site)	Human Health (Off-Site)	Ecological Receptors	Potential Cross-Media Transfer	Resource Restoration
Air (indoor)	Corrective Action Objective	NA - no buildings on site. A vapor intrusion assessment will be required from future owner/operator if buildings are proposed.	NA - no evidence of off-site contaminant migration that could result in vapor intrusion	NA	NA	NA
	Priority/Time Frame(1)					
	Potential/Existing Corrective Measure					
Air (ambient outdoor)	Corrective Action Objective	Mitigate inhalation of organic vapors from potentially impacted soil/groundwater with contaminant concentrations greater than ambient air inhalation criteria.	NA	NA	NA	NA
	Priority/Time Frame(1)	3	3			
	Potential/Existing Corrective Measure	- Establish restrictive covenant to maintain cap/cover over surface soil with contaminant levels greater than ambient air inhalation criteria. - Provide Due Care information to construction/maintenance workers who may encounter surface and/or subsurface soil with levels greater than ambient air criteria - Complete targeted excavations to remove ambient air pathway	No evidence of off-site ambient air impacts			
LNAPL	Corrective Action Objective	Mitigate direct contact with LNAPL and exposure to vapors emanating from LNAPL on site	Mitigate direct contact with LNAPL and exposure to vapors emanating from LNAPL off site	NA (no potential contact)	Mitigate impact to groundwater (diffusion)	NA
	Priority/Time Frame(1)	3	3		1 or 2	
	Potential/Existing Corrective Measure	- Provide Due Care information to construction/maintenance workers who may encounter LNAPL in order to use engineering controls to mitigate impact - Recover LNAPL where applicable ITRC standards indicate removal is appropriate.	- Provide Due Care information to construction/maintenance workers who may encounter LNAPL in order to use engineering controls to mitigate impact. - Recover LNAPL where applicable ITRC standards indicate removal is appropriate.		Address groundwater impacts with deed restrictions prohibiting groundwater use	

Notes:
(1) Priority/Time Frame: 1 = Short-term; 2 = Intermediate; 3 = Part of Long-term final cleanup; 4 = Existing control in place;
Human health non-residential refers to on-Site.
Human health residential refers to off-Site
NA - Not applicable

FIGURES

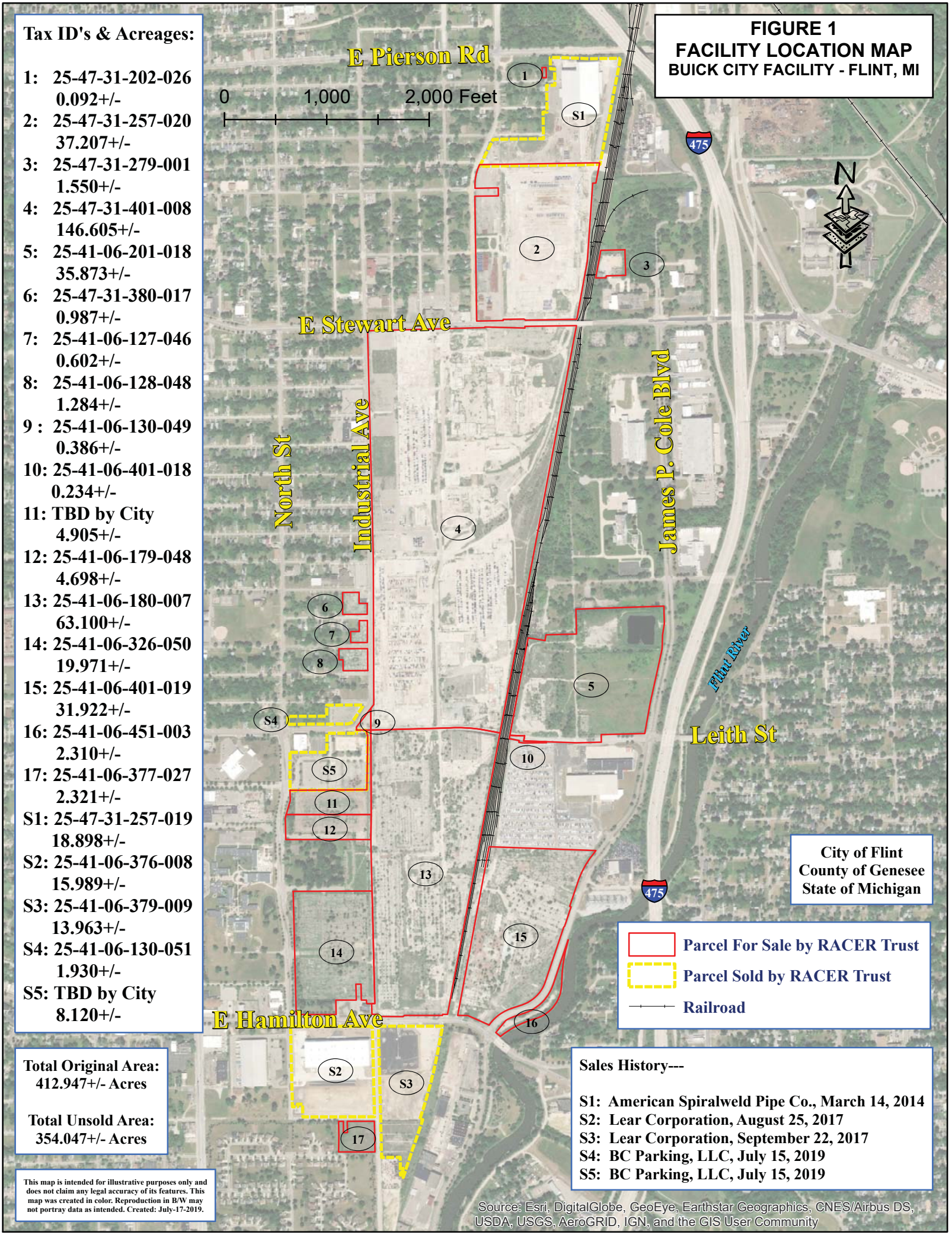
FIGURE 1
FACILITY LOCATION MAP
BUICK CITY FACILITY - FLINT, MI
Tax ID's & Acreages:
1: 25-47-31-202-026 0.092+/-
2: 25-47-31-257-020 37.207+/-
3: 25-47-31-279-001 1.550+/-
4: 25-47-31-401-008 146.605+/-
5: 25-41-06-201-018 35.873+/-
6: 25-47-31-380-017 0.987+/-
7: 25-41-06-127-046 0.602+/-
8: 25-41-06-128-048 1.284+/-
9 : 25-41-06-130-049 0.386+/-
10: 25-41-06-401-018 0.234+/-
11: TBD by City 4.905+/-
12: 25-41-06-179-048 4.698+/-
13: 25-41-06-180-007 63.100+/-
14: 25-41-06-326-050 19.971+/-
15: 25-41-06-401-019 31.922+/-
16: 25-41-06-451-003 2.310+/-
17: 25-41-06-377-027 2.321+/-
S1: 25-47-31-257-019 18.898+/-
S2: 25-41-06-376-008 15.989+/-
S3: 25-41-06-379-009 13.963+/-
S4: 25-41-06-130-051 1.930+/-
S5: TBD by City 8.120+/-
E Pierson Rd
0
1,000
2,000 Feet
E Stewart Ave
North St
Industrial Ave
James P. Cole Blvd
Flint River
Leith St
E Hamilton Ave
475
N
City of Flint
County of Genesee
State of Michigan
Parcel For Sale by RACER Trust
Parcel Sold by RACER Trust
Railroad
Total Original Area:
412.947+/- Acres
Total Unsold Area:
354.047+/- Acres
Sales History---
S1: American Spiralweld Pipe Co., March 14, 2014
S2: Lear Corporation, August 25, 2017
S3: Lear Corporation, September 22, 2017
S4: BC Parking, LLC, July 15, 2019
S5: BC Parking, LLC, July 15, 2019
This map is intended for illustrative purposes only and does not claim any legal accuracy of its features. This map was created in color. Reproduction in B/W may not portray data as intended. Created: July-17-2019.
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

JAMES P. COLE BLVD.

STEWART AVE.

LEITH ST.

WMU #2

WMUs #4 & #5

WMU #3

AOI 38-1
AOI 36-1
AOI 36-2
AOI 36-3
AOI 36-4
AOI 38-2
AOI 10-3
AOI 10-2
AOI 10-1
AOI 55-1
AOI 05-1
AOI 05-2
AOI 05-3
AOI 05-4
AOI 05-5
AOI 05-6
AOI 03-1
AOI 81-1
AOI 81-2
AOI 81-3
AOI 81-4
AOI 81-5
AOI 21-1
AOI 85-1
AOI 07-1
AOI 07-3
AOI 07-2
AOI 86-1
AOI 83/84-7
AOI 83/84-1
AOI 83/84-2
AOI 83/84-4
AOI 83/84-5
AOI 83/84-6
AOI 83/84-3
AOI 65-1
AOI 23-A
AOI 29-A
AOI 12-C
AOI 12-B

LEGEND:

- SOIL BORING
- MONITORING WELL (ACTIVE)
- AOI 65-1 — AREA OF INTEREST WITH ID
- LNAPL PLUME
- WMU #10 — WASTE MANAGEMENT UNIT

0 300' 600'
GRAPHIC SCALE

RACER TRUST
BUICK CITY
FLINT, MICHIGAN

NORTHEND AOIs

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

DIV/GROUP: IMDV DB: G.STOWELL LD: ALS/GMS PIC: C.S.PETERS PM: C.KIKER TM: C.KIKER LYR: ON=*;OFF=*REF* ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 10/23/2020 12:30 PM BY: STOWELL, GARY
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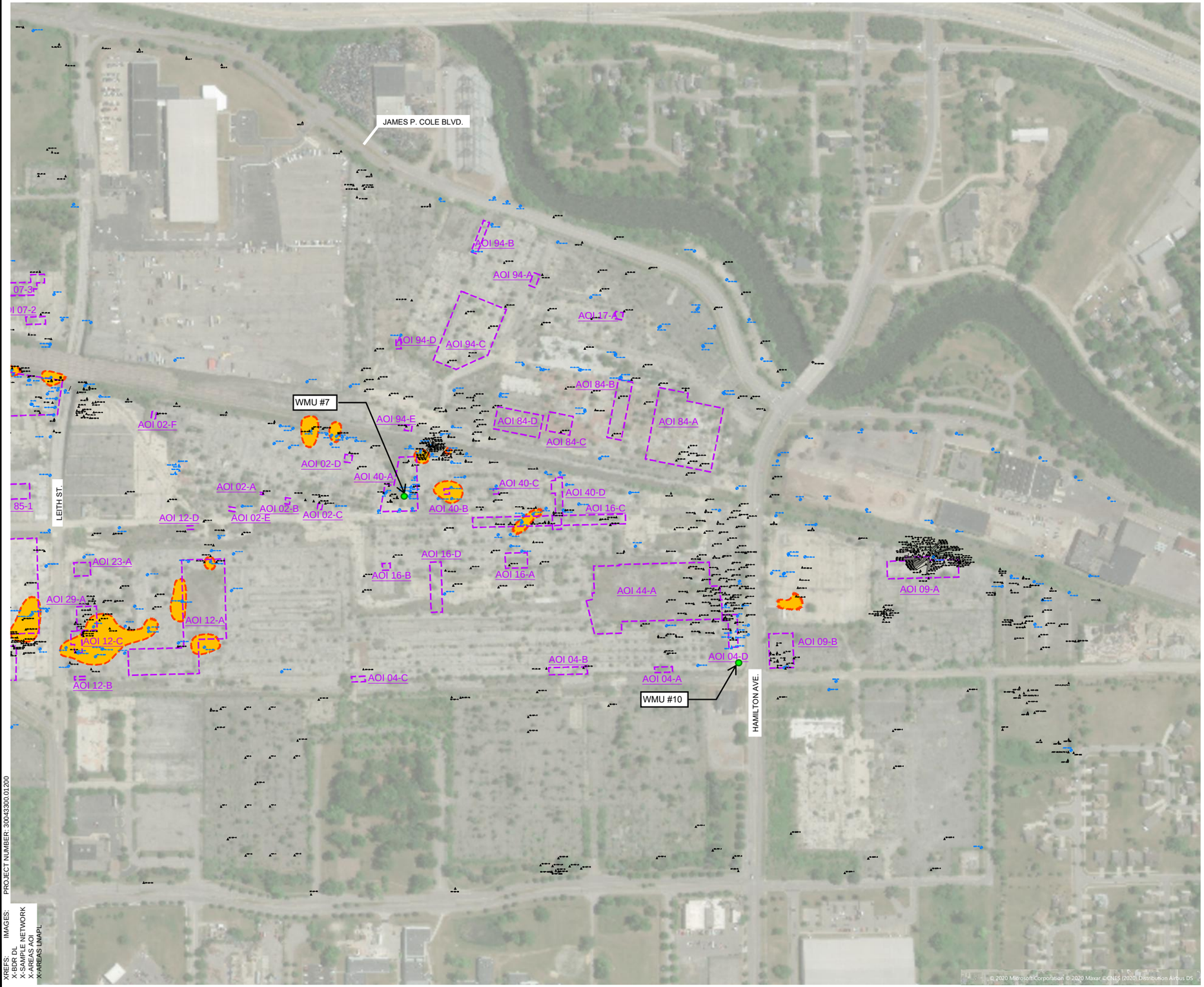
X-SAMPLE NETWORK
X-AREAS AOI
X-AREAS LNAPL



LEGEND:

- SOIL BORING
- MONITORING WELL (ACTIVE)
- AOI 65-1 — AREA OF INTEREST WITH ID
- LNAPL PLUME
- WMU #10 — WASTE MANAGEMENT UNIT

0 200' 400'
GRAPHIC SCALE

RACER TRUST
BUICK CITY
FLINT, MICHIGAN

SOUTHEND AOIs

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

DIV/GROUP: IMDV DB: G.STOWELL LD: ALS/GMS PIC: C.S.PETERS PM: C.KIKER TM: C.KIKER LYR: ON=*;OFF=*REF* ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 10/23/2020 12:30 PM BY: STOWELL GARY
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PROJECT NUMBER: 30043300.01200
IMAGES:
XREFS:
X-BDR DL
X-SAMPLE NETWORK
X-AREAS AOI
X-AREAS LNAPL

LEGEND:

RACER PROPERTY BOUNDARY

FORMER RACER PROPERTIES

001 OUTFALL DRAINAGE AREA AND NUMBER

008 SITE NO LONGER DRAINS TO OUTFALL

AREAS WITH NO DIRECT DRAINAGE TO THE STORM SEWER

0 400' 800'
GRAPHIC SCALE

PIERSON ROAD

STEWART AVENUE

JAMES P. COLE BLVD

KEITH STREET

HAMILTON AVENUE

INDUSTRIAL AVENUE

NORTH STREET

0

1-MILE

2 MILES

RACER TRUST
BUICK CITY
FLINT, MICHIGAN

OUTFALL AREAS

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FIGURE 4

DIV/GROUP: IMDV DB: G.STOWELL LD: ALSIGMS PIC: C.S.PETERS PM: C.KIKER TM: C.KIKER LYR: ON=*;OFF=*REF* ACADVER: 23.1S (LMS TECH)
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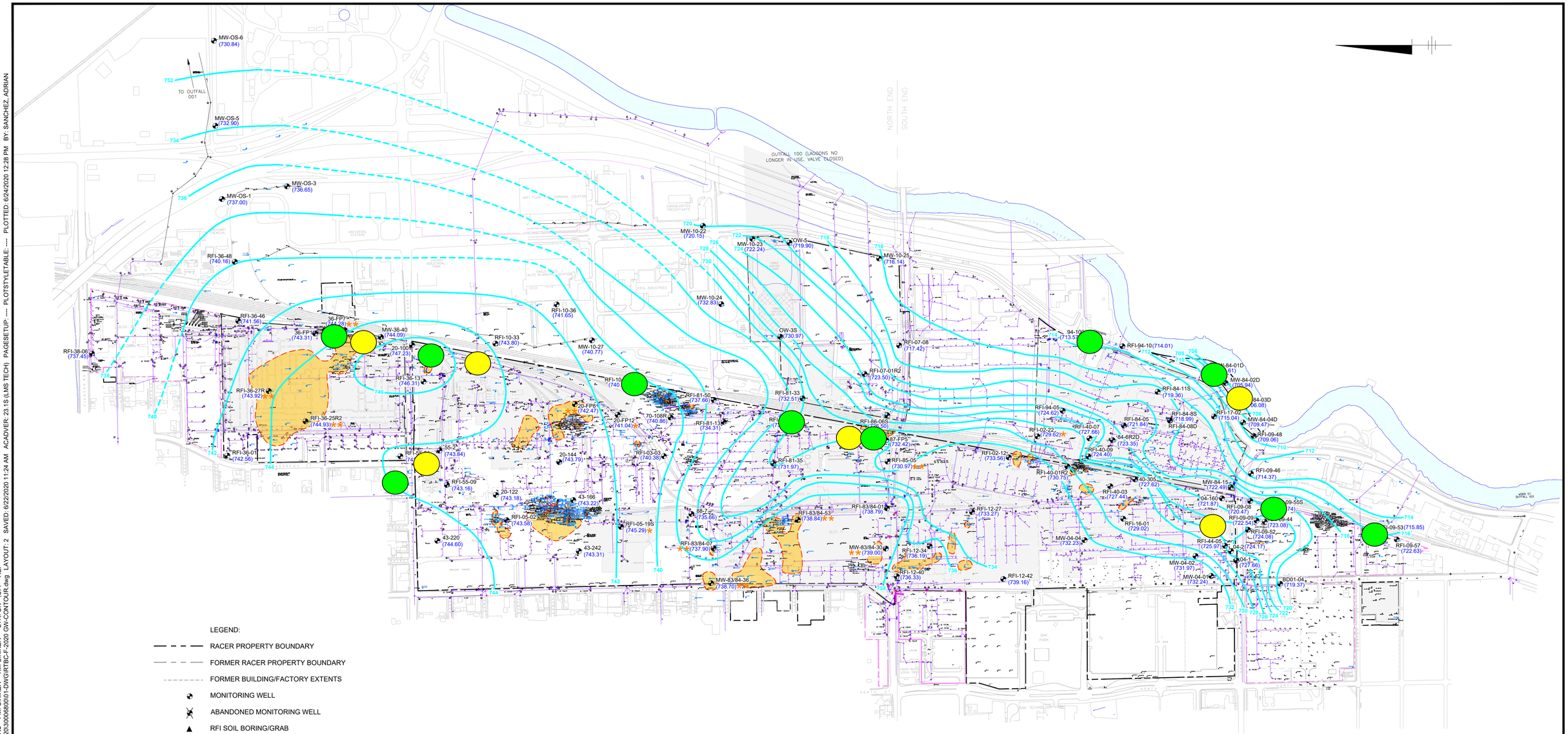

LEGEND:

- RACER PROPERTY BOUNDARY
- FORMER RACER PROPERTY BOUNDARY
- FORMER BUILDING/FACTORY EXTENTS
- MONITORING WELL
- ABANDONED MONITORING WELL
- RFI SOIL BORING/GRAB
- APPROXIMATE KNOWN EXTENT OF MEASURABLE LNAPL (>0.1 FEET)
- STORM SEWER LINE
- COMPLETED BULKHEAD
- (743.31) GROUNDWATER ELEVATION (IN FEET)
- * GROUNDWATER ELEVATION NOT USED FOR CONTOURING
- ** FREE PRODUCT OBSERVED
- 728 GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- APPROXIMATE AREAS WITH NO DIRECT DRAINAGE TO THE STORM SEWER
- AREA OF PFAS IMPACTED GROUNDWATER
- AREA OF VOC AND/OR METALS IMPACTED GROUNDWATER

NOTES:

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100. AERIAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 6/12/2013.
2. BASED ON SITE CONDITIONS AVAILABLE AS OF MAY 2015.

RACER TRUST
BUICK CITY
FLINT, MICHIGAN

2020 GROUNDWATER CONTOUR MAP AND AREAS OF GROUNDWATER IMPACT

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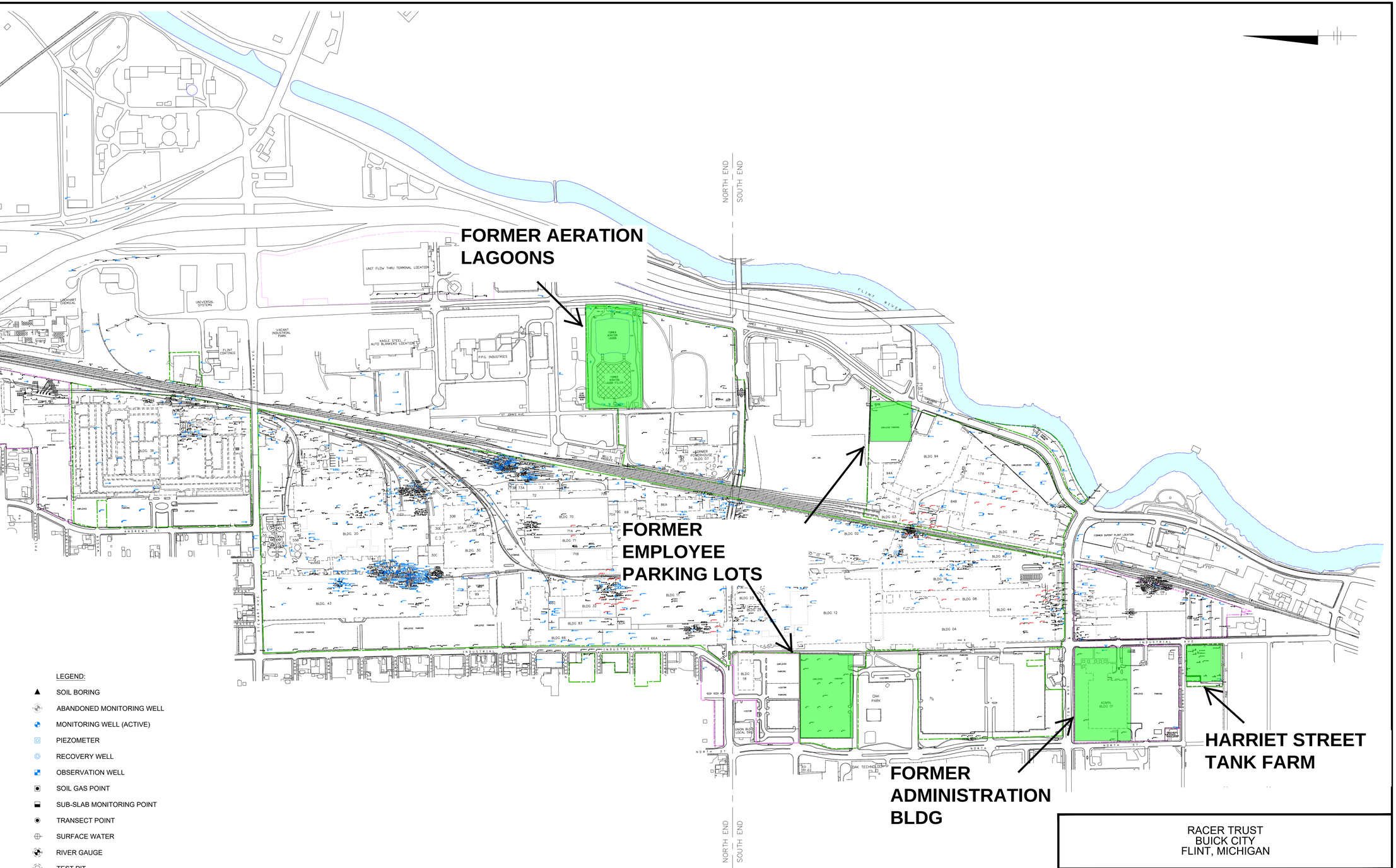
FIGURE 5



LEGEND:

- ▲ SOIL BORING
- ABANDONED MONITORING WELL
- MONITORING WELL (ACTIVE)
- PIEZOMETER
- RECOVERY WELL
- OBSERVATION WELL
- SOIL GAS POINT
- SUB-SLAB MONITORING POINT
- TRANSECT POINT
- SURFACE WATER
- RIVER GAUGE
- TEST PIT
- UNABLE TO LOCATE

0 400' 800'
APPROXIMATE SCALE IN FEET

RACER TRUST
BUICK CITY
FLINT, MICHIGAN

ADDITIONAL AREAS OF INTEREST

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FIGURE
6

FIGURE 7

SCHEMATIC OF CONCEPTUAL SITE MODEL

RACER BUICK CITY FACILITY - FLINT, MICHGIAN
CORRCTIVE ACTION FRAMEWORK
[not to scale]

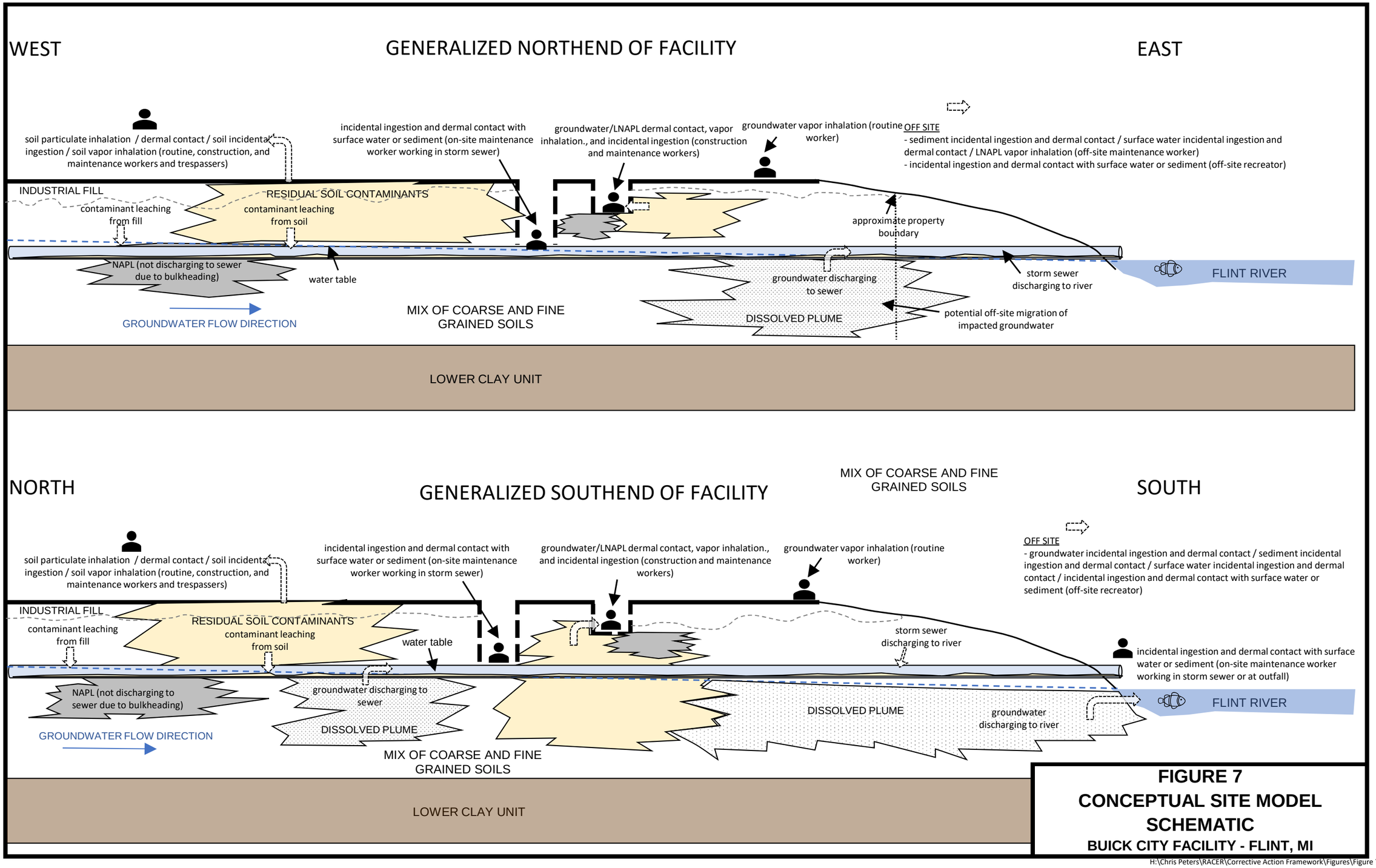
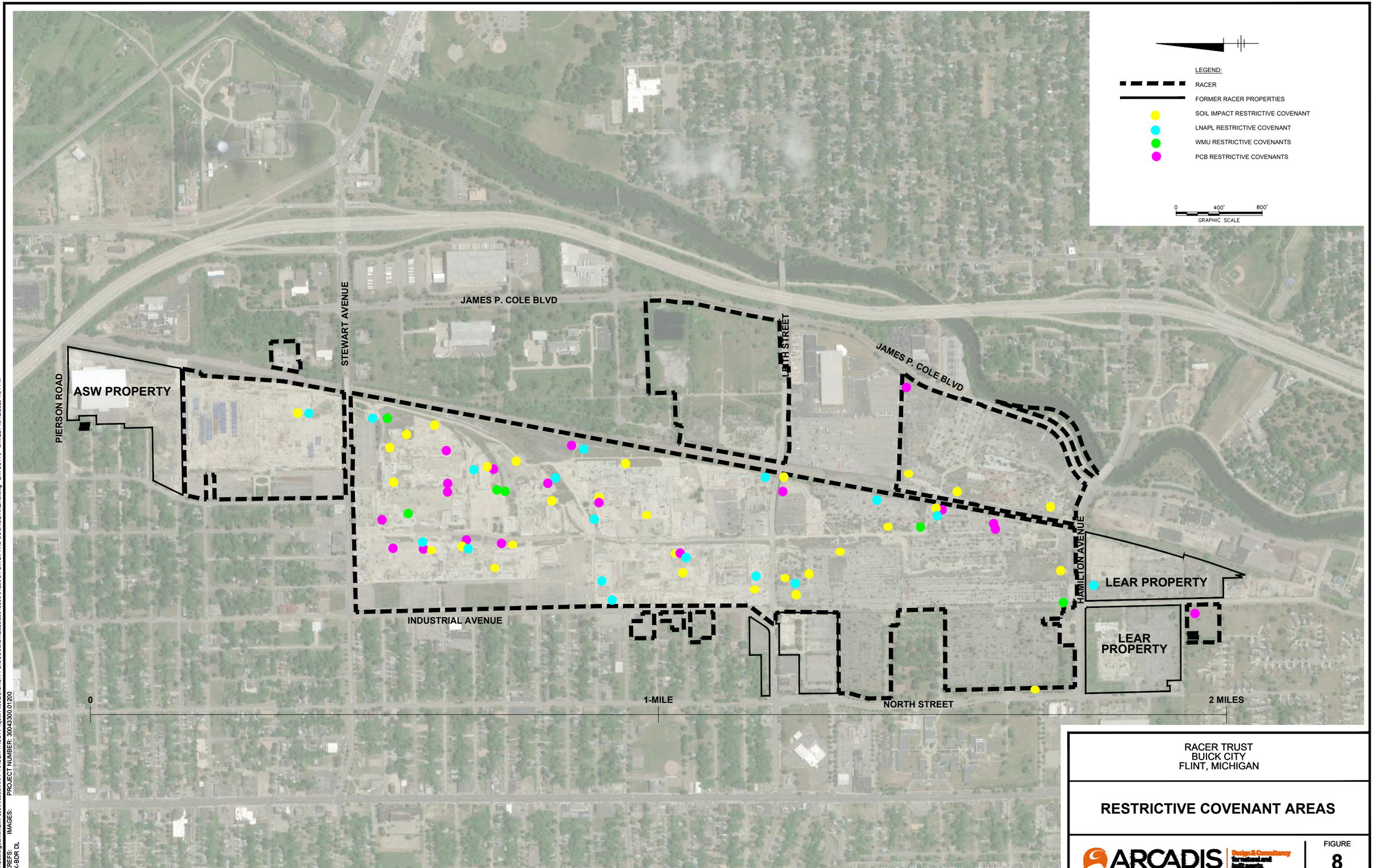


FIGURE 7
CONCEPTUAL SITE MODEL SCHEMATIC
BUICK CITY FACILITY - FLINT, MI

H:\Chris Peters\RACER\Corrective Action Framework\Figures\Figure 7 - CSM Schematic



RACER TRUST
BUICK CITY
FLINT, MICHIGAN

RESTRICTIVE COVENANT AREAS

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FIGURE
8

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