

**Revitalizing Auto Communities
Environmental Response (RACER) Trust**

**Resource Conservation and
Recovery Act Facility Investigation
(RFI) Summary Report**

Plants 2, 3, & 6, Industrial Land
Lansing, Michigan

August 11, 2014



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Lansing, Michigan

Prepared for:
Revitalizing Auto Communities
Environmental Response (RACER) Trust

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1. Introduction

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Summary Report (Report) has been prepared on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust. This document has been prepared at the request of the Michigan Department of Environmental Quality (MDEQ) to summarize all of the RFI activities completed to date at Plants 2, 3, and 6 located in Lansing, Michigan (Site) in a single report.

The objective of this report is to outline the components of the RFI and provide a narrative demonstrating the RFI is complete and has adequately characterized the nature and extent of impacts and risk associated with the Site.

1.1 RFI Reports

Given the large and adaptive scope of work, as well as the expedited nature of the investigation, RFI activities have been reported in several submittals in parallel with the development of the *Corrective Measures Study* (CMS, ARCADIS 2014a). A complete list of major report submittals and key correspondence with the MDEQ is included on Table 1. The key components of the RFI are summarized in the following:

- *Current Conditions Report* (ARCADIS 2008): Describes the current conditions and historical waste management practices at the former General Motors Corporation Plants 2, 3 and 6. Provides basis for Areas of Interest (AOIs) investigated as part of the RFI.
- *Updated Draft RFI Activities Matrix* (ARCADIS 2011a): Several iterations of the matrix were provided for comment to the MDEQ beginning in 2009. The final version of the activities matrix outlines the AOIs agreed upon as requiring characterization and provides the basis for the RFI Work Plan (Phase 1).
- *RFI Work Plan, RACER Lansing Plants 2, 3 & 6 (Phase 1)* (ARCADIS 2011b): Outlines the initial investigation to evaluate if constituents of concern (COCs) were released to the subsurface and are present in soil and groundwater within the identified AOIs.



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- *Quality Assurance Project Plan* (ARCADIS 2011c): Outlines the organization, objectives, and specific quality assurance / quality control (QA/QC) procedures associated with the Site.
- *RACER RFI Phase 1 Activities Summary Report* (ARCADIS 2012a): Provides a summary of the RFI Phase 1 results organized by Plant and AOI.
- *RFI Work Plan, Phase 2* (ARCADIS 2012b): Based on the results of the RFI Phase 1, outlines an adaptive investigation to delineate all soil and groundwater impacts identified at the Site.
- *Storm Sewer Investigation Work Plan* (ARCADIS 2012c): Outlines the work plan for assessment of the on-site storm sewer collection system as well as a sampling plan to assess the potential for Groundwater-Surface Water Interface (GSI) Criteria exceedances in groundwater discharge via storm sewer.
- *Utility Corridor Assessment* (ARCADIS, 2012d): Review the locations of utility corridors at the Site and evaluation of utility corridors that could potentially serve as pathways for off-site migration of constituents of concern (COCs) in groundwater. The assessment focused on areas with groundwater impacts that are located near to property boundaries.
- *RFI Phase 2 Activities Summary Report* (ARCADIS 2013a): Provides a summary of the RFI Phase 2 results and identifies several remaining data gaps, including the presence of 1,4-dioxane identified within the deep overburden beneath the “coliseum” in the southwestern portion of Plant 3.
- *Interim Groundwater Sampling Work Plan* (ARCADIS 2013b): Provides a work plan to perform quarterly groundwater sampling at the Site through 2013.
- *Plant 3 1,4-Dioxane Investigation* (ARCADIS 2013c): Provides a summary of the initial lower 1,4-dioxane investigation results followed by a plan for additional borings across the southern portion of Plant 3.



- *Addendum to Interim Groundwater Sampling Plan (ARCADIS 2013d)*: Outlined changes to the interim sampling plan to counter turbidity issues associated with several wells.
- *Conceptual 1,4-Dioxane Investigation Work Plan – Plants 2 & 3 (ARCADIS 2013e)*: Outlines the final and most significant phase of the lower 1,4-dioxane investigation extending from southern Plant 3 and extending to the southern portion of Plant 2.
- *RFI Supplemental Phase 2 Activities Summary Report (ARCADIS 2014b)*: Provides a summary of additional work completed to address the data gaps outlined at the conclusion of the *RFI Phase 2 Activities Summary Report*. Includes a complete summary of the lower 1,4-dioxane investigation results.
- *Preliminary Geochemical and Plume Stability Assessment (ARCADIS 2014c)*: Provides a preliminary assessment of the Site geochemical conditions and plume stability.
- *Revised Interim Groundwater Sampling Work Plan (ARCADIS 2014d)*: Provides a revised plan for continued interim groundwater monitoring through first quarter 2018 and outlines the justification for a reduced list of constituents of concern (COCs) for various areas of the Site.
- *Passive Flux Meter and Transducer Study Summary (ARCADIS 2014e)*: Provides a summary of the PFM and municipal well transducer studies completed to further characterize the hydraulic characteristics surrounding the lower 1,4-dioxane plume.
- *Area 16 Metals Summary (ARCADIS 2014f)*: Provides a summary of soil and groundwater sampling completed to characterize metals and fill material within Area 16 in the southeastern portion of Plant 3.
- *2014 Additional AOI Investigation (ARCADIS 2014g)*: Provides a summary of soil and groundwater sampling completed to characterize two additional AOIs identified by the MDEQ on Plants 2 & 3.

A summary of the soil and groundwater impacts identified at the Site is provided as Figure 1. A disc containing all of the submittals outlined above is included as Appendix A.



2. Results of the RFI Investigation Activities

The RFI activities to date have adequately characterized the nature and extent of impacts, as well as relevant exposure pathways associated with the Site. The *Preliminary Geochemistry and Plume Stability Assessment* (ARCADIS 2014c) provided additional analysis of Site groundwater conditions. Based on the work completed to date, the following will be addressed as part of the CMS:

- Impacts in the perched zone that will be addressed in the CMS include:
 - Soil exceedances of Direct Contact Criteria (DC Criteria) and Particulate Soil Inhalation Criteria (PSIC) in Areas 2, 5-1, 5-2, 5-3, 5-8, 5-5, 5-6, 7, 9, 16, 18, 19, 20 and 21.
 - Vapor intrusion exceedances in soil and groundwater across the Site, with more aggressive options considered in Areas 5-7, 7, and 9, where concentrations of volatile organic compounds (VOCs) in soil and groundwater represent a vapor intrusion risk near the property boundary.
 - Light non-aqueous phase liquid (LNAPL) present in the central portion of Plant 2 (Area 5-2). LNAPL consists of cutting oil that contains elevated concentrations of VOCs and polychlorinated biphenyls (PCBs) in some areas.
 - VOC impacts in perched water associated with LNAPL at Plant 2.
 - 1,4-Dioxane impacts in perched water associated with LNAPL at Plant 2.
 - LNAPL present within the shallow fill material in the north central portion of Plant 3 (Area 17) associated with a former underground storage tank farm. The LNAPL consists of gasoline with associated soil and groundwater impacts consisting primarily of benzene, toluene, ethylbenzene, and xylenes.
 - VOCs in perched water associated with the LNAPL at Plant 3 (Area 17).
 - VOC criteria exceedances in soil and perched water at locations throughout the Site.
 - Metals exceedances in perched water where metals are known to be Site-related, in areas near Site boundaries, and in areas where the preliminary

stability assessment showed increasing concentration trends (Areas 1, 5-5, 5-6, 5-7, 5-8, 6, 7, 9, 14, 17, and 19).

- Impacts in the deep overburden / weathered bedrock that will be addressed as part of the CMS include:
 - Lower 1,4-dioxane plume at Plants 2 and 3. The source area for the lower 1,4-dioxane plume is located near the “coliseum” on the southwestern portion of Plant 3 (Area 11). Other VOCs, including benzene and acetone, exceed criteria at sporadic locations generally coincident with the lower 1,4-dioxane plume. The *RFI Supplemental Phase 2 Activities Summary Report* indicated benzene may not be defined to the east near Saginaw Avenue at Monitoring Well MW-13-49. Follow-up sampling at this location has indicated benzene is below Part 201 Criteria and will continue to be monitored as part of the interim groundwater monitoring activities. Because the benzene and acetone impacts are co-located with 1,4-dioxane, the CMS strategy for mitigation of 1,4-dioxane will also address benzene and acetone.

Soil and groundwater impacts that require corrective measures are presented on Figure 2. Table 2 includes a summary of exceedances identified during the RFI and the rationale for why they are not addressed as part of the CMS.



3. Additional Activities 2014

The CMS (ARCADIS 2014a) outlined the proposed remedy elements for the various areas outlined above. Additional work will be completed at the Site prior to the preparation of the *Corrective Measures Implementation Work Plan* targeted for submittal in late 2014. Data collected during these “pre-design” studies will be used to refine the proposed corrective measures, in particular for the lower 1,4-dioxane remedy, and better define the assumptions used for the CMS cost estimates. Pre-design work planned for the remainder of 2014 includes:

- A source area evaluation for the lower 1,4-dioxane groundwater plume. The objectives of the source evaluation are to determine: 1) if 1,4-dioxane source mass is present and continuing to contribute to the deep 1,4-dioxane plume and 2) to determine the size and extent of the lower 1,4-dioxane source mass.
- Hydraulic testing for the weathered bedrock and deep overburden along the lower 1,4-dioxane plume. The objectives of the hydraulic testing are to estimate specific capacity and pumping rates required for plume capture, as well as determine aquifer injectability, both within the source area and the downgradient portion of the plume.

Other work to be completed at the Site in 2014 includes:

- Installation of additional monitoring wells at the Site for interim groundwater monitoring. The additional monitoring wells will be installed to better monitor source area plume stability and to provide a more robust sentinel monitoring well network as discussed with the MDEQ on May 27, 2014. It is anticipated the additional monitoring wells will be installed as part of the pre-design hydraulic testing well installation program. Additional monitoring wells are anticipated to be installed and ready for integration into the 3rd quarter 2014 sampling event.

The work completed and the documents included in this report fulfill the requirements of an RFI. The RFI activities outlined above, and more fully described in the documents included as Appendix A, have adequately characterized the nature and extent of impacts and risk associated with the Site. The additional work outlined above will further characterize delineated impacts in preparation for the implementation of corrective measures at the Site. The results of additional work and of implementation of corrective measures will be presented to the MDEQ and other stakeholders as appropriate.



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4. References

ARCADIS. 2008. Current Conditions Report for GM Lansing Plants 2, 3 & 6. August 1.

ARCADIS. 2011a. Correspondence to Mr. Pete Quackenbush, Re: Response to MDEQ Draft Comments Regarding MLC RFI Matrix Update for MLC. Lansing Plants 2, 3 and 6, dated March 18 2011. June 22.

ARCADIS. 2011b. Resource Conservation and Recovery Act Facility Investigation (RFI) Work Plan (Phase 1). RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. August 26.

ARCADIS. 2011c. Quality Assurance Project Plan. RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. August 26.

ARCADIS. 2012a. Resource Conservation and Recovery Act Facility Investigation (RFI) Phase 1 Activities Summary Report. RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. January 30.

ARCADIS. 2012b. Resource Conservation and Recovery Act Facility Investigation (RFI) Work Plan, Phase 2. RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. March 12.

ARCADIS. 2012c. Correspondence to Mr. Pete Quackenbush, Re: Storm Sewer Investigation Work Plan. RACER Trust, Plants 2, 3 & 6, Lansing, Michigan. October 18.

ARCADIS. 2012d. Memorandum, Re: RACER Trust Utility Corridor Assessment. RACER Trust Plant 3, Lansing, Michigan. December 2012.

ARCADIS. 2013a. Resource Conservation and Recovery Act Facility Investigation (RFI) Phase 2 Activities Summary Report. Michigan Plants 2, 3 & 6 Industrial Land. April.

ARCADIS. 2013b. Correspondence to Mr. Pete Quackenbush, Re: Interim Groundwater Sampling Work Plan. RACER Trust, Plants 2, 3 & 6, Lansing, Michigan. May 31.

ARCADIS. 2013c. Email correspondence to MDEQ. Re: RACER Lansing – Plant 3 1,4-Dioxane Investigation. May 2.



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ARCADIS. 2013d. Email correspondence to MDEQ. Re: RACER Lansing - addendum to interim groundwater sampling plan - August 2013. August 8.

ARCADIS. 2013e. Email correspondence to MDEQ. Re: RACER Lansing - Plant 2 & 3 1,4-Dioxane Investigation. September 25.

ARCADIS. 2014a. RCRA Corrective Action, Corrective Measures Study. Plants 2, 3 and 6 Industrial Land. June.

ARCADIS. 2014b. RFI Supplemental Phase 2 Activities Summary Report. RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. February 26.

ARCADIS, 2014c. Preliminary Groundwater Geochemical and Plume Stability Assessment. Plants 2, 3, and 6, Industrial Land, Lansing, Michigan. April 24 (as amended).

ARCADIS, 2014d. Revised Interim Groundwater Monitoring Work Plan. RACER Trust, Plants 2, 3, & 6, Lansing, Michigan. August 8.

ARCADIS. 2014e. Passive Flux Meter and Transducer Study Memorandum. RACER Trust, Lansing, Michigan Plants 2, 3, & 6 Industrial Land. June 3.

ARCADIS. 2014f. Memorandum, Re: Area 16 Soil and Groundwater Metals Summary RACER Trust Plant 3, Lansing, Michigan. June 13.

ARCADIS. 2014g. Memorandum, Re: 2014 Additional AOI Investigation, RACER Plants 2 & 3, Lansing, Michigan. July 24.

Tables

**Table 1
Summary of Project Correspondence and Submittals
RACER Trust Plants 2, 3 and 6 - Lansing, Michigan**

Date	Originator	Recipient(s)	Type of Correspondence	Subject	Subject Details	Purpose of Correspondence
August 1, 2008	ARCADIS	GMC	Hardcopy	Current Conditions Report for Lansing Plants 2, 3 & 6	CCR Report submitted to MDEQ on 08/01/2008. No response requested from MDEQ.	Submittal
September 1, 2008	ARCADIS	GMC and MDEQ	Hardcopy	Draft RFI Activities Matrix and Figures, Lansing Plants 2, 3 & 6	Draft matrix and figures listing AOIs to be investigated submitted to MDEQ for their review and comment.	Submittal
February 1, 2009	ARCADIS	GMC and MDEQ	Hardcopy	Updated Draft RFI Activities Matrix and Figures, Lansing Plants 2, 3 & 6	Updated draft matrix and figures listing AOIs to be investigated submitted to MDEQ for their review and comment.	Submittal
August 1, 2010	ARCADIS	MLC and MDEQ	Meeting	Meeting with MDEQ to discuss reduced list of AOIs for the Lansing Plants	Updated draft matrix and figures listing AOIs to be investigated submitted to MDEQ for their review and comment.	Meeting
March 1, 2011	ARCADIS	RACER and MDEQ	Hardcopy	Updated Draft RFI Activities Matrix and Figures, Lansing Plants 2, 3 & 6	Updated draft matrix and figures listing AOIs to be investigated submitted to MDEQ for their review and comment.	Submittal
June 1, 2011	ARCADIS	RACER and MDEQ	Hardcopy	Updated Draft RFI Activities Matrix and Figures, Lansing Plants 2, 3 & 6	Updated draft matrix and figures listing AOIs to be investigated submitted to MDEQ for their review and comment.	Submittal
July 8, 2011	MDEQ	RACER and ARCADIS	Letter	Updated Draft RFI Activities Matrix and Figures, Lansing Plants 2, 3 & 6 - Dated June 22, 2011.	MDEQ Approval letter dated July 8, 2011 of the Updated Draft RFI Activities Matrix and Figures dated June 22, 2011	Approval
August 1, 2011	ARCADIS	RACER and MDEQ	Hardcopy	RFI Work plan, RACER Lansing Plants 2, 3 & 6 Quality Assurance Project Plan, RACER Lansing Plants 2, 3 & 6 Field Sampling Plan, RACER Lansing Plants 2,3 & 6	Submitted the RFI Work plan, QAPP and FSP to MDEQ for review and approval.	Submittal
September 26, 2011	MDEQ	ARCADIS	Hardcopy	RFI Work plan, RACER Lansing Plants 2, 3 & 6 Quality Assurance Project Plan, RACER Lansing Plants 2, 3 & 6 Field Sampling Plan, RACER Lansing Plants 2,3 & 6	Approval with modifications of the RFI Work plan, QAPP and FSP from MDEQ in a letter dated 9/26/2011.	Submittal
October 1, 2011	ARCADIS	RACER	Hardcopy	Public Involvement Plan	Provided RACER with a draft copy of the PIP. Because the PIP will be an evolving document the no final copy submitted.	Submittal
December 6, 2011	ARCADIS	RACER	Email with file attached	2012 EA Annual Budget Request	Submitted original 2012 EA Budget Request to RACER. Original scope and cost estimates pulled directly from RCES.	Submittal
December 12, 2011	RACER	ARCADIS	Email with file attached	2012 EA Annual Budget Request	Original 2012 EA Budget Request approved and signed by RACER on 12/12/11	Submittal
January 1, 2012	ARCADIS	RACER and MDEQ	Hardcopy	RACER RFI Phase 1 Activities Summary Report Lansing Plants 2, 3 & 6	Submitted the RACER RFI Phase 1 Activities Summary Report for Lansing Plants 2, 3 & 6 to RACER and MDEQ on 01/30/12. Report summarizes the investigation activities completed in 2011.	Submittal
February 1, 2012	ARCADIS	ARCADIS	Email	MDEQ FOIA request for Ashland Chemical Property	ARCADIS completed a search of the files MDEQ has on the Ashland Chemical Site in Lansing. File search was completed on 02/14/12.	Request for Information
March 1, 2012	ARCADIS	RACER and MDEQ	Hardcopy	RACER RFI Work Plan, Phase 2	Submitted work plan to MDEQ and RACER on 03/12/12. Work Plan to be completed in 3 stages: Assessment Stage (4/16-6/8/12) Characterization Stage (9/5-9/25/2012) Delineation Stage (11/7-11/30/2012)	Submittal
March 1, 2012	ARCADIS	RACER and MDEQ	Hardcopy	Bedrock Sentinel Monitoring Well Installation Work Plan	Submitted the Bedrock Sentinel Monitoring Well Installation Work Plan to MDEQ for review	Submittal
March 29, 2012	ARCADIS	RACER and MDEQ	Email	RACER Drilling Water Question	Request to discharge drilling water onto the ground and MDEQ response agreeing to allow the drilling water to be dispensed onto the ground. Request and response via emails dated 03/29/12.	General Inquiry
April 24, 2012	MDEQ	ARCADIS	Email	RACER RFI Work Plan, Phase 2	MDEQ approval of the RFI Work Plan Phase 2 provided via email on 04/24/12	Approval
July 1, 2012	ARCADIS	RACER and MDEQ	Hardcopy	RFI Phase 2 Work Plan - Characterization Stage SOW	RFI Phase 2 Work Plan - Characterization Stage SOW submitted to MDEQ.	Submittal
August 13, 2012	ARCADIS	MDEQ	Email	RFI Phase 2 Work Plan - Characterization Stage SOW Comments	PC response to questions from MDEQ related to historical data used in model to develop SOW.	Response to Comments
August 21, 2012	MDEQ	ARCADIS and RACER	Letter	RFI Phase 2 Work Plan - Characterization Stage SOW	Approval letter from MDEQ for the RFI Phase 2 Work Plan - Characterization Stage SOW. Letter dated 08/21/12	Approval
August 1, 2012	ARCADIS	RACER	Email with file attached	2012 Annual EA Budget Amendment Request #1	Submitted 2012 BA #1 to RACER on 8/1/12. Requested funds to cover additional investigation of expanded number of AOIs.	Submittal
August 3, 2012	RACER	ARCADIS	Email	2012 Annual EA Budget Amendment Request #1	RACER and MDEQ approved (signed) BA #1 on 08/03/12	Approval
August 16, 2012	ARCADIS	RACER	Email with file attached	2012 Annual EA Budget Amendment Request #2	Submitted BA #2 to RACER on 8/16/12. Requested funds to cover increased number of borings/samples collected at each AOI. Original estimates based on 3 boring/AOI and 3 samples/boring. Also requested funds to evaluate GSI criteria and complete groundwater sampling from within the storm sewers.	Submittal
August 24, 2012	RACER	ARCADIS	Email	2012 Annual EA Budget Amendment Request #2	RACER and MDEQ approved (signed) BA #2 on 08/29/12	Approval
August 13, 2012	ARCADIS	MDEQ	Email	RACER Lansing Sample Parameters	ARCADIS request to reduce parameters analyzed during investigation. Specifically request to reduce SVOCs to PNAs, where applicable, and to reduce list of metals.	Submittal
August 29, 2012	ARCADIS	MDEQ	Email	Access to Adams Plating Site and to Collect Groundwater Samples from the APC wells.	ARCADIS requests access to the APC property and for permission to sample the APC wells. MDEQ to coordinate with the APC PM for access.	Request for Information
August 29, 2012	MDEQ	MDEQ	Email	Access to Adams Plating Site for Off-Site Groundwater Samples	update from MDEQ on coordination with APC PMs to get us access to APC property to sample wells.	Response to Comments

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RACER Trust Plants 2, 3 and 6 - Lansing, Michigan**

Date	Originator	Recipient(s)	Type of Correspondence	Subject	Subject Details	Purpose of Correspondence
September 14, 2012	ARCADIS	RACER and MDEQ	Email	Adams Plating Company Groundwater Sampling Plan.	Submitted Work Plan to MDEQ for sampling the groundwater monitoring wells at Adams Plating. MDEQ responded with questions about methods and pump type..	Submittal
September 26, 2012	ARCADIS	MDEQ	Email	RACER Updates	Email exchanges updating MDEQ with findings from the Characterization Phase of the investigation and proposing additional contingency VAP borings at select locations. MDEQ approval on contingency boring locations via email dated 09/13/12	Approval
October 15, 2012	ARCADIS	MDEQ	Email with file attached	RACER Lansing - Storm water Sampling Plan	Submitted Storm water Sampling Plan, near the property boundaries, to MDEQ on 10/18/12.	Submittal
October 15, 2012	MDEQ	ARCADIS	Email	RACER Lansing - Storm water Sampling Plan	MDEQ approval of the Storm water Sampling Plan. Approval via email dated 10/18/12	Approval
October 15, 2012	ARCADIS	MDEQ	Email	RACER Lansing Pump Test	Discussed completing pump tests on bedrock wells to see if influence on drinking water aquifer present. Also discussed transducer data collected in Oct. 2012.	General Correspondence
November 2, 2012	ARCADIS	RACER	Email with file attached	2012 Annual EA Budget Amendment Request #3	Submitted 2012 BA #3 to RACER on 11/2/12. Requested funds to cover additional borings/samples at the AOs, to conduct a utility corridor investigation near the property boundary, to complete soil gas sampling, to complete pump test and to complete an LNAPL mobility assessment at Plants 2 & 3.	Submittal
November 15, 2012	RACER	ARCADIS	Email with file attached	2012 Annual EA Budget Amendment Request #3	RACER and MDEQ approved (signed) BA #3 on 11/15/12	Approval
November 26, 2012	ARCADIS	MDEQ	Email with file attached	RACER Lansing Pumping Test Work Plan	Submitted Pump Test Work Plan to MDEQ for review and approval.	Submittal
November 27, 2012	ARCADIS	MDEQ	Email	RACER Lansing Pumping Test Work Plan	Follow up with MDEQ on review of Work Plan. MDEQ to discuss internally with their experts and get back to us. Follow-up phone conversation confirms test cancellation.	General Correspondence
December 3, 2012	ARCADIS	MDEQ	Email with file attached	RACER Trust Utility Corridor Assessment Work Plan	Submitted Utility Corridor Assessment Work Plan to the MDEQ, via memo format, on 12/03/12.	Submittal
December 21, 2012	MDEQ	ARCADIS	Email	Comments on RACER Lansing Storm Sewer Sampling Summary Report	MDEQ comments to the Storm water Sewer Sampling Report. MDEQ thinks Stormceptor should remain in place (interim measure). Metals exceedances, whether total or dissolved, still coming from site and need to be addressed.	Response to Submittal
December 1, 2012	ARCADIS	RACER	Email with file attached	RACER Lansing - 2013 EA Annual Budget Request	Submitted final 2013 Annual Budget Request to RACER on 12/18/12. Original budget request to cover PM and routine GWS only.	Submittal
January 1, 2013	RACER	ARCADIS	Email	RACER Lansing - 2013 EA Annual Budget Request	RACER and MDEQ approved (signed) the 2013 Annual Budget request on 12/20/12 and 01/2/13 respectively.	Approval
January 12, 2013	ARCADIS	MDEQ	Email	RACER Lansing - response to comment related to Soil Gas sampling and Utility Corridor Assessment	Email to MDEQ to inquire if MDEQ has reviewed ARCADIS response to MDEQs comments	General Correspondence
January 24, 2013	MDEQ	RACER and MDEQ	Email	RACER Lansing - response to comments related to soil gas sampling and the utility corridor assessment	Approval from MDEQ related to soil gas sampling and utility corridor assessment work plans.	Approval
February 28, 2013	ARCADIS	RACER and MDEQ	meeting	MDEQ Delineation Milestone Meeting.	Meeting at MDEQ to discuss the Phase 2 Investigation results and delineation of each AOI.	Meeting
February 28, 2013	ARCADIS	RACER	Email with file attached	2013 EA Budget Amendment Request #1	Submitted 2013 BA #1 to RACER. BA #1 to cover costs for utility corridor investigation, additional storm sewer sampling, to complete the NAPL mobility assessment and to begin the 1,4-dioxane investigation at Plant 3.	Submittal
March 1, 2013	RACER	ARCADIS	Email	2013 EA Budget Amendment Request #1	2013 BA #1 approved by MDEQ on 03/08/2013	Approval
April 3, 2013	ARCADIS	RACER and MDEQ	Hardcopy	RACER Lansing RFI Phase 2 Activities Summary Report	Submitted the RACER Lansing RFI Phase 2 Activities Summary Report to RACER and MDEQ on April	Submittal
April 11, 2013	ARCADIS	RACER and MDEQ	Email with file attached	Plant 3 1, 4-dioxane Results	ARCADIS update to MDEQ on 1,4-dioxane investigation. Results indicate east and vertical delineation incomplete, coliseum recharge affecting plume migration, will continue investigation consistent with approved contingency scope - install 3 overburden wells and 1 overburden well	Submittal
May 1, 2013	ARCADIS	RACER and MDEQ	Hardcopy	RACER Lansing - Revised Interim Groundwater Sampling Work Plan	Submitted Revised Interim Groundwater Sampling Work Plan to MDEQ for review and approval. Work plan addresses the issue of turbidity and how we propose to purge/redevelop high turbidity wells.	Submittal
May 2, 2013	ARCADIS	RACER and MDEQ	Email with file attached	RACER Lansing - Plant 3 1, 4-Dioxane Investigation	Update to the MDEQ summarizing the Plant 3 1,4-dioxane investigation. The southeast boring, completed as part of the contingency borings, turned up 1,4-dioxane above criteria, 130 ug/L in the deep interval (on top of rock) and 38 ug/L in the monitoring well set a few feet above. Attached is the proposed conceptual layout for additional borings to define the extent of the 1,4-dioxane plume.	Submittal
May 13, 2013	MDEQ	RACER and MDEQ	Email	RACER Lansing - Plant 3 1, 4-Dioxane Investigation	MDEQ reviewed info regarding the Plant 3 1, 4-dioxane investigation and concurs with the proposed conceptual layout for additional borings.	Approval
June 1, 2013	ARCADIS	RACER	Email with file attached	2013 EA BA #2 request	Submitted BA #2 budget request to RACER on 6/12/2013. 2013 BA #2 to cover extended 1,4-dioxane investigation and collection of groundwater geochemical parameters	Submittal
June 6, 2013	MDEQ	RACER and MDEQ	Email	RACER Lansing - Revised Interim Groundwater Sampling Work Plan	DEQ reviewed the Revised Interim GWS Work Plan and found it acceptable, need to provide DEQ with a hard copy for their records.	Approval
June 13, 2013	ARCADIS	RACER, MDEQ and BWL	Meeting	Meeting with BWL	Meeting with BWL to discuss the results of the investigation to date and to get input from BWL	Meeting
June 27, 2013	ARCADIS	RACER and MDEQ	Email with file attached	RACER Lansing Plants 2,3 and 6 Corrective Measures Study	Submitted Draft RCRA Corrective Action Corrective Measures Study Report (electronically) to MDEQ on 06/27/13	Submittal
July 10, 2013	ARCADIS	RACER, MDEQ, BWL and Lansing Township	Meeting	Corrective Action Meeting with various stakeholders (RACER, MDEQ, BWL and Lansing Township).	Meeting to the various stake holders to discuss the proposed corrective measures. Meeting took place 07/10/13	Meeting

Table 1
Summary of Project Correspondence and Submittals
RACER Trust Plants 2, 3 and 6 - Lansing, Michigan

Date	Originator	Recipient(s)	Type of Correspondence	Subject	Subject Details	Purpose of Correspondence
August 8, 2013	ARCADIS	MDEQ	Email with file attached	RACER Lansing - addendum to interim groundwater sampling plan - August 2013	Discussion of elevated turbidity present in the monitoring wells and how it will be addressed during the future sampling events.	General Correspondence
August 8, 2013	MDEQ	ARCADIS	Email	RACER Lansing - addendum to interim groundwater sampling plan - August 2013	MDEQ approved addendum to interim GWS which requested not to purge 3 hours on high turbidity wells. If turbidity is elevated AUS will collect total and dissolved metals samples.	Approval
August 15, 2013	BWL	RACER, ARCADIS, MDEQ and Lansing Township	Hardcopy	Comments to RFI, CMS and BWL	Letter from BWL, dated 8/19/13, related to comments/concerns to the RFI and proposed corrective measures reports and the stakeholders meeting from 07/10/13	Response to Submittal
August 19, 2013	ARCADIS	RACER, MDEQ, BWL and Lansing Township	Email	RACER Lansing - Municipal Well Sampling	Email to MDEQ summarizing the BWL and Lansing Township request that ARCADIS sample municipal wells BWL 10-10 and Twp. Well #4 and ARCADIS agreement to grant request.	General Correspondence
September 1, 2013	ARCADIS	RACER	Email with file attached	2013 EA BA #3 Request	Submitted BA #3 request to RACER on 09/18/2013. BA #3 to cover additional 1,4-dioxane investigation, meeting with stake holders and groundwater sampling	Submittal
September 1, 2013	ARCADIS	RACER	Email	2013 EA BA #3 Request	2013 BA #3 approved (signed) by RACER on 09/23/13	Approval
September 4, 2013	ARCADIS	RACER and MDEQ	Meeting	RACER Lansing RFI-CMS Update	Meeting with MDEQ to discuss RFI activities, surface cover/O&M, BWL comment letter, updated CMS costs and budget amendments	Meeting
September 12, 2013	ARCADIS	RACER, MDEQ and BWL	Meeting	RACER Lansing - BWL Bedrock Summary	Discussion with BWL related to CSM, deep 1,4-dioxane investigation, CVOCs, and regional vinyl chloride	Meeting
September 24, 2013	ARCADIS	RACER and BWL	Email	RACER Lansing - BWL Plant 3 Vinyl Chloride Bedrock Well Install	Email correspondence with BWLs consultant related to the installation of bedrock monitoring wells at the northern end of Plant 3. Proposed to install 3 bedrock wells to better understand the Vinyl Chloride impacts and to confirm the Vinyl Chloride is related to an off site source. BWL agreed to approach in the email chain and Phone conversation between 09/25/13 and 09/25/13.	General Correspondence
September 24, 2013	ARCADIS	RACER and MDEQ	Email with file attached	RACER Lansing Plants - Groundwater Restricted Area for City of Lansing	Provided MDEQ with existing language from the City ordinance restricting groundwater use and wells within the City proper.	Submittal
September 25, 2013	ARCADIS	RACER and MDEQ	Email with file attached	Plant 2 & 3 Conceptual 1, 4-dioxane investigation	Submitted the Plant 2 & 3 Conceptual 1, 4-dioxane investigation scope of work to MDEQ via an email dated 09/25/13 for their review and approval.	Submittal
October 1, 2013	MDEQ	RACER and MDEQ	Email	Plant 2 & 3 Conceptual 1, 4-dioxane investigation	DEQ reviewed the conceptual 1,4 dioxane investigation plans and find them to be acceptable with the following understanding based on phone conversation with Joe Rogers; all wells/borings being installed in areas of known groundwater contamination would be double cased as described in the weathered bedrock VAP sampling bullet of the 1,4-dioxane conceptual work plan.	Approval
November 13, 2013	ARCADIS	RACER and MDEQ	Email	BWL Well Sampling Work Plan	Submitted proposed sampling plan to MDEQ for their review and approval via an email dated 11/13/13	Submittal
November 13, 2013	MDEQ	ARCADIS	Email	BWL Well Sampling Work Plan	MDEQ approval of the proposed BWL Well Sampling Plan via an email dated 11/15/2013	Approval
November 13, 2013	ARCADIS	RACER and MDEQ	Email with file attached	Work Plan - Delineation of Excavation Areas at Plant 6	Submitted the Work Plan for delineation of excavation areas at Plant 6 to MDEQ for review and	Submittal
November 21, 2013	ARCADIS	RACER, HMA and MDEQ	Meeting	RACER Lansing CSM Review	Meeting to discuss CSM related to 1,4-Dioxane investigation/treatment	Meeting
November 22, 2013	MDEQ	RACER	Email	Work Plan - Delineation of Excavation Areas at Plant 6	MDEQ approval of the Delineation of Excavation Areas Work Plan. Approval via email dated	Approval
January 15, 2014	ARCADIS	MDEQ and RACER	Email with file attached	4th Quarter 2013 Quarterly Progress Report	Submitted 4Q13 Quarterly Progress Report to MDEQ	Submittal
January 29, 2014	ARCADIS	MDEQ	Email	RACER Lansing RFI Supplemental Slides	Submittal of RFI Phase 2 Supplemental Report, dated 1/28/2014.	Submittal
February 7, 2014	ARCADIS	MDEQ	Email	RACER Lansing PFM - Transducer Study Work Plan	Submittal of PFM-Transducer study Work Plan to MDEQ.	Submittal
February 13, 2014	MDEQ	ARCADIS	Email	RE: RACER Lansing PFM - Transducer Study Work Plan	Approval of the PFM/Transducer Study Work Plan as described in the 2/7/2014 email.	Approval
February 27, 2014	ARCADIS	MDEQ	Email	RACER - Summary of simulation on the elution of 2-propanol in groundwater from the PFMs	Submittal of PFM simulation summary related to potential elution of 2-propanol into the groundwater from a PFM	general correspondence
March 3, 2014	ARCADIS	MDEQ	Email	RE: RACER PFM study - pfm_sim_MODFLOW.zip	Correspondence over the PFM study regarding no groundwater discharge permit will be required for their use as proposed in ARCADIS's email or 2/7/2014. ARCADIS will begin the PFM installation tomorrow, 3/4/2014.	Correspondence
March 3, 2014	MDEQ	ARCADIS	Email	RE: RACER PMF study - pfm_sim_MODFLOW.zip	MDEQ approves the PFM Study after running several simulations and indicates that no groundwater discharge permit will be required for their use as proposed in the PFM study.	Approval
March 17, 2014	ARCADIS	MDEQ	Email	RE: FW: Potential Issue with 1,4-Dioxane Sampling	MDEQ internal memo/correspondence related to potential issues with 1,4-Dioxane sampling usingalconox/liquinox/dawn as a decon solution.	Correspondence
April 24, 2014	ARCADIS	MDEQ	Hard Copy	Preliminary Groundwater Geochemical and Plume Stability Assessment	Submittal of Preliminary Groundwater Geochemical and Plume Stability assessment to MDEQ.	Submittal
May 20, 2014	ARCADIS	Booze, Allen and Hamilton	Email	RACER Lansing Sites Follow-up	Response to questions from BAH related to Plant 6 Targeted Excavation Delineation Work Plan.	Correspondence
May 20, 2014	ARCADIS	RACER	Email	2014 Budget Amendment No. 1 for Plants 2 & 3 submitted to RACER	2014 Budget Amendment No. 1 for Plants 2 & 3 submitted to RACER	Submittal
May 20, 2014	ARCADIS	MDEQ	Email	RACER Lansing - Draft Storm water Management Plan	Submitted DRAFT RACER Trust Storm Water Evaluation Report to MDEQ. Report prepared by ENG dated 4-28-14.	Submittal
May 22, 2014	RACER	MDEQ	Email	RACER submits 2014 Budget Amendment No. 1 to MDEQ	RACER submits 2014 BA No. 1 to MDEQ	Submittal

Table 1
Summary of Project Correspondence and Submittals
RACER Trust Plants 2, 3 and 6 - Lansing, Michigan

Date	Originator	Recipient(s)	Type of Correspondence	Subject	Subject Details	Purpose of Correspondence
May 23, 2014	ARCADIS	MDEQ	Email	RACER Lansing - Revised Interim Groundwater Monitoring Plan	Submitted Revised Interim Groundwater Monitoring Plan, dated 5/23/14, to MDEQ	Submittal
June 2, 2014	MDEQ	RACER	Email	MDEQ approval of 2014 Budget Amendment No. 1	MDEQ approval of 2014 BA No. 1	Approval
June 3, 2014	ARCADIS	MDEQ	Hard Copy	RACER Lansing PFM - Transducer Summary Memo 06-14	Submittal of Passive Flux Meter and Transducer Study Summary for Racer Trust Plants 2, 3, and 6, Lansing Michigan to MDEQ.	Submittal
June 3, 2014	ARCADIS	MDEQ	Email	RACER Lansing - Pressure Transducer and Passive Flux Meter Study Summary Memo	Submitted PFM - Transducer Summary Memo to MDEQ for review.	Submittal
June 4, 2014	ARCADIS	MDEQ	Hard Copy	RCRA Corrective Measures Study	Submittal of Draft RCRA Corrective Measures Study to MDEQ	Submittal
June 4, 2014	MDEQ	ARCADIS	Email	Additional Site Drawings	Additional site drawings provided by MDEQ requesting response to two areas represented on figures. One at Plant 2 and one at Plant 3.	Agency Comments
June 11, 2014	MDEQ	RACER	Email	Comments on Groundwater Geotechnical and Plume Stability Assessment and Interim Monitoring Plan	Comments on Groundwater Geotechnical and Plume Stability Assessment and Interim Monitoring Plan	Agency Comments
June 17, 2014	ARCADIS	MDEQ	Email	Proposed Work Plan for Additional AOIs Investigation	Work Plan to investigate additional AOIs per MDEQ figures presented on June 4, 2014	Submittal
June 20, 2014	RACER	ARCADIS	Email	Budget Amendment No. 1	Approval of Budget Amendment No. 1	Approval
June 24, 2014	ARCADIS	MDEQ	Memo via email	Area 16 Metals Summary Memo	Summary of investigation activities completed at Area 16.	Submittal
June 24, 2014	ARCADIS	MDEQ	Email	1,4-Dioxane Source Investigation Work Plan	Submitted 1,4-Dioxane Source Investigation Work Plan to MDEQ for review.	Submittal
July 2, 2014	MDEQ	ARCADIS	Email	1,4-Dioxane Source Investigation Work Plan	Approval from MDEQ on 1,4-Dioxane Source Investigation Work Plan	Approval
July 24, 2014	ARCADIS	MDEQ	Memo	Additional AOIs Investigation	Submitted Additional AOIs Investigation Summary to MDEQ for review.	Submittal
July 28, 2014	MDEQ	ARCADIS	Email	Additional AOIs Investigation	Concurs with findings of July 24 AOI Investigation Summary memo.	Approval
August 6, 2014	ARCADIS	MDEQ	Email	CMS Pre-Design Lower 1,4-Dioxane Extraction and Injection Testing Work Plan	Submitted CMS Pre-Design Lower 1,4-Dioxane Extraction and Injection Testing Work Plan to MDEQ for review.	Submittal
August 8, 2014	ARCADIS	MDEQ	Email	Revised 2014 Interim Groundwater Monitoring Work Plan	Revised 2014 Interim Groundwater Monitoring Work Plan per MDEQ comments	Submittal
August 8, 2014	ARCADIS	MDEQ	Email	RCRA RFI Investigation Summary Report	Submitted RFI Summary Report. This report ties all previous investigation reports together.	Submittal
August 8, 2014	ARCADIS	MDEQ	Email	Expanded Discussion for the Geochem & Plume Stability Report	Questions to MDEQ related to content of revised report and how they would prefer revision to be submitted	Inquiry

Table 2
RFI Screening Matrix and CMS Applicable Exceedances
RCRA Corrective Action Corrective Measures Study
RACER Plants 2, 3, and 6
Lansing, Michigan

Plant and Investigation Area	Subarea	Associated AOI	RFI Identified Exceedances	CMS Applicable Exceedances	Exceedances that do not Require a Corrective Measure
Lower 1,4-Dioxane Plants 2 and 3	NA	Lower 1,4-Dioxane Plants 2 and 3	GW: 1,4-dioxane and VOCs > DW Metals > DW	GW: 1,4-dioxane > Proposed DW (8.5 µg/L) and DW	• Metals > DW: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
Plant 2 AREA 1	NA	AOI 2-16	SOIL: SVOCs > GSIP Metals > DWP and GSIP	SOIL: SVOCs > GSIP Metals > DWP and GSIP	• NA
			GW: VOCs & SVOCs > GSI Metals > DW and GSI	GW: VOCs > GSI Metals > DW and GSI	• SVOCs > GSI: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 2	NA	AOI 2-12 AOI 2-52 AOI ID 2-26	SOIL: VOCs > DWP, GSIP, and SVIIC Metals > DWP, GSIP, DC and PSIC	SOIL: VOCs > DWP, GSIP, and SVIIC Metals > DWP, GSIP, DC, and PSIC	• NA
			GW: VOCs > DW, GSI, and draft GW _{VI-nr} Metals > DW	GW: VOCs > DW, GSI, and draft GW _{VI-nr}	• Metals > DW: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 3	NA	AOI 2-11	SOIL: No constituents exceed Part 201 Criteria	SOIL: No applicable exceedances of Part 201 Criteria	• SOIL: No constituents exceed Part 201 Criteria.
			GW: 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	GW: No applicable exceedances of Part 201 Criteria	• 1,4-dioxane > Proposed DW (8.5 µg/L): Included in lower 1,4-Dioxane AOI (ARCADIS 2014a). • Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS, 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 4	NA	AOI 2-8	SOIL: Metals > DWP and GSIP	SOIL: Metals > DWP and GSIP	• NA
			GW: Metals > DW	GW: No applicable exceedances of Part 201 Criteria	• Metals > DW: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS(ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 5-1	5-1	AOI 2-11 AOI ID 2-31 ID 2-32 ID 2-33 ID 2-34 ID 2-35 ID 2-49	SOIL: SVOCs > DWP, GSIP, and DC Metals > DWP and GSIP	SOIL: SVOCs > DWP, GSIP, and DC Metals > DWP and GSIP	• NA
			GW: VOCs > DW 1,4-dioxane > Proposed DW (8.5 µg/L) and DW SVOCs > DW Metals > DW and GSI	GW: VOCs > DW 1,4-dioxane > Proposed DW (8.5 µg/L) and DW	• SVOCs > DW: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c). • Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 5-2	5-2	AOI 2-6 AOI 2-14 AOI ID 2-36	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > DWP, GSIP, VSIC, and DC PCBs > DC Metals > DWP, GSIP, DC, and PSIC	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > DWP, GSIP, and DC PCBs > DC Metals > DWP, GSIP, DC, and PSIC	• SVOCs > VSIC: The concentrations did not exceed the generic Infinite Source VSIC for a ½-acre source area and, therefore, will not be addressed as part of the CMS (ARCADIS 2013).
			GW: VOCs > DW and GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW SVOCs > DW, GSI, GC, and Sol PCBs > DW, GSI, GW _{VI-nr} , GC, and Sol Metals > DW and GSI	GW: VOCs > DW and GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW PCBs > DW, GC, and Sol	• SVOCs > DW, GSI, GC, and Sol: There has only been one historical SVOC exceedance in this area, the corrective measures driver in this area is LNAPL, 1,4-dioxane, and VOCs. Corrective measures implemented to address these drivers will address the SVOCs. Therefore, SVOCs are not separately evaluated in the CMS (ARCADIS 2014c). • Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: Present	LNAPL: Present	• NA

See notes on page 5.

Table 2
RFI Screening Matrix and CMS Applicable Exceedances
RCRA Corrective Action Corrective Measures Study
RACER Plants 2, 3, and 6
Lansing, Michigan

Plant and Investigation Area	Subarea	Associated AOI	RFI Identified Exceedances	CMS Applicable Exceedances	Exceedances that do not Require a Corrective Measure
Plant 2 AREA 5-3	5-3	AOI 2-1 AOI ID 2-59 Miscellaneous Data Gap Borings	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > DWP, GSIP, and DC Metals > DWP, GSIP, and PSIC	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > DWP, GSIP, and DC Metals > DWP, GSIP, and PSIC	• NA
			GW: VOCs > GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW Metals > DW and GSI	GW: VOCs > GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW	• Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 5-4	5-4	AOI ID 2-39	SOIL: No constituents exceed Part 201 Criteria	SOIL: No constituents exceed Part 201 Criteria	• SOIL: No constituents exceed Part 201 Criteria
			GW: Metals > DW and GSI	GW: No applicable exceedances of Part 201 Criteria	• Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 5-5	5-5	AOI 2-15	SOIL: VOCs > DWP SVOCs > GSIP and DC Metals > DWP, GSIP, and PSIC	SOIL: VOCs > DWP SVOCs > GSIP and DC Metals > DWP and GSIP	• Metals > PSIC: Manganese exceedance of the PSIC is deep (56 to 57 feet) and, therefore, is not a concern, as soil this deep is not likely to be brought to the surface (ARCADIS 2013).
			GW: 1,4-dioxane > Prop DW (8.5 µg/L) SVOCs > DW Metals > DW and GSI	GW: 1,4-dioxane > Prop DW (8.5 µg/L) Metals > DW and GSI	• SVOCs > DW: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 5-6	5-6	AOI 6-18 AOI 6-48	SOIL: VOCs > DWP and GSIP Metals > DWP, GSIP, and DC	SOIL: VOCs > DWP and GSIP Metals > DWP, GSIP, and DC	• NA
			GW: VOCs > DW and GSI 1,4-dioxane > Prop DW (8.5 µg/L) Metals > DW and GSI	GW: VOCs > DW and GSI 1,4-dioxane > Prop DW (8.5 µg/L) Metals > DW and GSI	• NA
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 5-7	5-7	AOI 6-43 AOI 6-88	SOIL: VOCs > DWP, GSIP, SVIIC, and VSIC Metals > DWP and GSIP	SOIL: VOCs > DWP, GSIP, and SVIIC Metals > DWP and GSIP	• VOCs > VSIC: The concentrations did not exceed the generic Infinite Source VSIC for a ½-acre source area and, therefore, are not likely to be a concern for the Site (ARCADIS 2013).
			GW: VOCs > DW, GSI, and GW _{VI-NR} SVOCs > GSI 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	GW: VOCs > DW, GSI, and GW _{VI-NR} 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	• SVOCs > GSI: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 5-8	5-8	AOI 6-49 AOI 6-81	SOIL: Metals > GSIP and PSIC	SOIL: Metals > GSIP and PSIC	• NA
			GW: 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	GW: 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	• NA
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 6	NA	AOI 6-16/6-33 AOI 6-59 AOI ID 6-36 ID 6-38 ID 6-39 ID 6-75	SOIL: No constituents exceed Part 201 Criteria	SOIL: No constituents exceed Part 201 Criteria	• SOIL: No constituents exceed Part 201 Criteria
			GW: 1,4-dioxane > Prop DW (8.5 µg/L) Metals > DW and GSI	GW: Metals > DW and GSI	• 1,4-dioxane > Prop DW (8.5 µg/L): One historical detection of 1,4-dioxane was detected above the proposed drinking water standard at MWBP-12-UST5-6 at a concentration of 9 µg/L in October 2011. MWBP-UST5-6 has been sampled quarterly since October 2011 and no exceedances have been detected since that date.
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present

See notes on page 5.

Table 2
RFI Screening Matrix and CMS Applicable Exceedances
RCRA Corrective Action Corrective Measures Study
RACER Plants 2, 3, and 6
Lansing, Michigan

Plant and Investigation Area	Subarea	Associated AOI	RFI Identified Exceedances	CMS Applicable Exceedances	Exceedances that do not Require a Corrective Measure
Plant 6 AREA 7	NA	AOI 6-17 AOI 6-47	SOIL: VOCs > DWP, GSIP, SVIIC, DC, GCP, and C _{sat} SVOCs > GSIP and DC Metals > GSIP	SOIL: VOCs > DWP, GSIP, DC, SVIIC, and C _{sat} SVOCs > GSIP and DC Metals > GSIP	• VOCs > GCP: GCP is no longer an MDEQ criteria (ARCADIS 2014a).
			GW: VOCs > DW and GSI SVOCs > DW Metals > DW and GSI	GW: VOCs > DW and GSI Metals > DW and GSI	• SVOCs > DW: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 2 AREA 8	NA	AOI 2-7 AOI ID 2-37 AOI ID 2-38	SOIL: SVOCs > DWP and GSIP Metals > DWP and GSIP	SOIL: SVOCs > DWP & GSIP Metals > DWP & GSIP	• NA
			GW: SVOCs > GSI Metals > DW and GSI	GW: No applicable exceedances of Part 201 Criteria	• SVOCs > GSI: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c). • Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 9	NA	AOI 6-60 Miscellaneous data gap	SOIL: VOCs > DWP, GSIP, DC, SVIIC, GCP, and C _{sat} SVOCs > DWP, GSIP, VSIC, and DC	SOIL: VOCs > DWP, GSIP, DC, SVIIC, and C _{sat} SVOCs > DWP, GSIP, and DC	• VOCs > GCP: GCP is no longer an MDEQ criteria (ARCADIS 2013). • SVOCs > VSIC: The concentrations did not exceed the generic Infinite Source VSIC for a ½-acre source area and, therefore, are not likely to be a concern for the Site (ARCADIS 2013).
			GW: VOCs > DW, GSI, FESL, and GW _{Vl-nr} SVOCs > GSI Metals > DW and GSI	GW: VOCs > DW, GSI, FESL, and GW _{Vl-nr} Metals > DW & GSI	• SVOCs > GSI: The SVOC exceedance in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 6 AREA 10	NA	AOI 6-19 AOI 6-63 AOI 6-82	SOIL: Metals > GSIP and PSIC	SOIL: Metals > GSIP	• Metals > PSIC: Manganese (historical sample) exceeded the PSIC for a 100-acre source, but not a 5-acre source. Therefore, likely not a concern for the Site (ARCADIS 2013).
			GW: No constituents exceed Part 201 Criteria	GW: No constituents exceed Part 201 Criteria	• GW: No constituents exceed Part 201 Criteria.
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 11	NA	AOI ID 3-54	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > GSIP Metals > DWP and GSIP	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > GSIP Metals > DWP and GSIP	• NA
			GW: VOCs > DW and GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW Metals > DW	GW: VOCs > DW and GSI 1,4-dioxane > Proposed DW (8.5 µg/L) and DW	• Metals > DW: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 12	NA	MW-04-02 (TD=132.7') MW-04-03 (TD=88.25')	SOIL: No applicable exceedances of Part 201 Criteria	SOIL: No applicable exceedances of Part 201 Criteria	• SOIL: No applicable exceedances of Part 201 Criteria
			GW: VOCs > DW	GW: No applicable exceedances of Part 201 Criteria	• VOCs > DW: Based on the general lack of a chlorinated volatile organic compound (CVOC) source at Plant 3 and the known regional vinyl chloride impacts to bedrock, the vinyl chloride identified at Plant 3 is attributed to off-site source(s) and will not be addressed as part of the CMS (ARCADIS, 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 13	NA	Background Sample	SOIL: No applicable exceedances of Part 201 Criteria	SOIL: No constituents exceed Part 201 Criteria	• SOIL: No applicable exceedances of Part 201 Criteria
			GW: No applicable exceedances of Part 201 Criteria	GW: No applicable exceedances of Part 201 Criteria	• GW: No applicable exceedances of Part 201 Criteria
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 14	NA	AOI 3-10 Misc. Data Gap Borings	SOIL: Metals > DWP, GSIP, DC, and PSIC	SOIL: Metals > DWP and GSIP	• Metals > DC and PSIC: Arsenic exceeds the DC in the northern portion of Area 14 at a depth of 43.5 to 45 feet bgs, due to the depth of the exceedance exposure is not likely. Nickel did not exceed the PSIC for a ½-acre. Total chromium (as hexavalent chromium) did; however, it was determined that total chromium should be compared to chromium 3 and, therefore, it does not exceed PSIC (ARCADIS 2013).
			GW: Metals > DW and GSI	GW: Metals > DW and GSI	• NA
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present

See notes on page 5.

Table 2
RFI Screening Matrix and CMS Applicable Exceedances
RCRA Corrective Action Corrective Measures Study
RACER Plants 2, 3, and 6
Lansing, Michigan

Plant and Investigation Area	Subarea	Associated AOI	RFI Identified Exceedances	CMS Applicable Exceedances	Exceedances that do not Require a Corrective Measure
Plant 3 AREA 15	NA	AOI ID 3-15	SOIL: VOCs > DWP and VSIC SVOCs > GSIP Metals > GSIP	SOIL: VOCs > DWP SVOCs > GSIP Metals > GSIP	• VOCs > VSIC: The concentrations did not exceed the generic Infinite Source VSIC for a ½-acre source area and, therefore, are not likely to be a concern for the Site (ARCADIS 2013).
			GW: 1,4-dioxane > Proposed DW (8.5 µg/L) SVOCs > DW Metals > DW and GSI	GW: 1,4-dioxane > Proposed DW (8.5 µg/L)	• SVOCs > DW: The SVOC exceedance(s) in this area were phthalates. Phthalates are a common laboratory contaminant and were detected in blanks. Therefore, evaluation of corrective measures for SVOCs in this area are not required (ARCADIS 2014c). • Metals > DW & GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 16	NA	AOI 3-11	SOIL: SVOCs > DWP, GSIP, and DC Metals > DWP, GSIP, DC, and PSIC	SOIL: SVOCs > DWP, GSIP, and DC Metals > DWP, GSIP, and DC	• Metals > PSIC: The concentration did not exceed the 5-acre source area and, therefore, are not likely to be a concern for the Site (ARCADIS 2013).
			GW: Metals > DW and GSI	GW: No constituents exceed Part 201 Criteria	• Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 17	NA	AOI 3-3 AOI 3-4 AOI 3-9	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > GSIP Metals > GSIP	SOIL: VOCs > DWP, GSIP, and SVIIC SVOCs > GSIP Metals > GSIP	• NA
			GW: VOCs > DW, GSI, and GW _{VInr} 1,4-dioxane > Proposed DW (8.5 µg/L) SVOCs > DW Metals > DW and GSI	GW: VOCs > DW, GSI, and GW _{VInr} Metals > DW and GSI	• SVOCs > DW, GSI, GC, and Sol: There has only been one historical SVOC exceedance in this area, the corrective measures driver in this area is LNAPL and VOCs. Corrective measures implemented to address these drivers will address the SVOCs. Therefore, SVOCs are not separately evaluated in the CMS (ARCADIS 2014c).
			LNAPL: Present	LNAPL: Present	• NA
Plant 3 AREA 18	NA	AOI 3-2 AOI 3-6	SOIL: SVOCs > DWP, GSIP, and DC Metals > DW and GSI	SOIL: SVOCs > DWP, GSIP, and DC Metals > DWP and GSIP	• NA
			GW: 1,4-dioxane > Proposed DW (8.5 µg/L) Metals > DW and GSI	GW: 1,4-dioxane > Proposed DW (8.5 µg/L)	• Metals > DW and GSI: Exceedances in groundwater are attributed to natural fluctuations in geochemical conditions; therefore, metals in this area will not be addressed as part of the CMS (ARCADIS 2014b).
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 19	NA	AOI ID 3-17	SOIL: SVOCs > GSIP Metals > DWP, GSIP, and DC	SOIL: SVOCs > GSIP Metals > DWP, GSIP, and DC	• NA
			GW: Metals > DW and GSI	GW: Metals > DW and GSI	• NA
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 20	NA	AOI 3-51	SOIL: SVOCs > GSIP Metals > DWP, GSIP, and PSIC	SOIL: SVOCs > GSIP Metals > DWP, GSIP, and PSIC	• NA
			GW: No constituents exceed Part 201 Criteria	GW: No constituents exceed Part 201 Criteria	• GW: No constituents exceed Part 201 Criteria
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present
Plant 3 AREA 21	NA	AOI 3-51	SOIL: Metals > DWP, GSIP, and DC	SOIL: Metals > DWP, GSIP, and DC	• NA
			GW: No constituents exceed Part 201 Criteria	GW: No constituents exceed Part 201 Criteria	• GW: No constituents exceed Part 201 Criteria
			LNAPL: NA, not present	LNAPL: NA, not present	• LNAPL: NA, not present

See notes on page 5.

Table 2
RFI Screening Matrix and CMS Applicable Exceedances
RCRA Corrective Action Corrective Measures Study
RACER Plants 2, 3, and 6
Lansing, Michigan

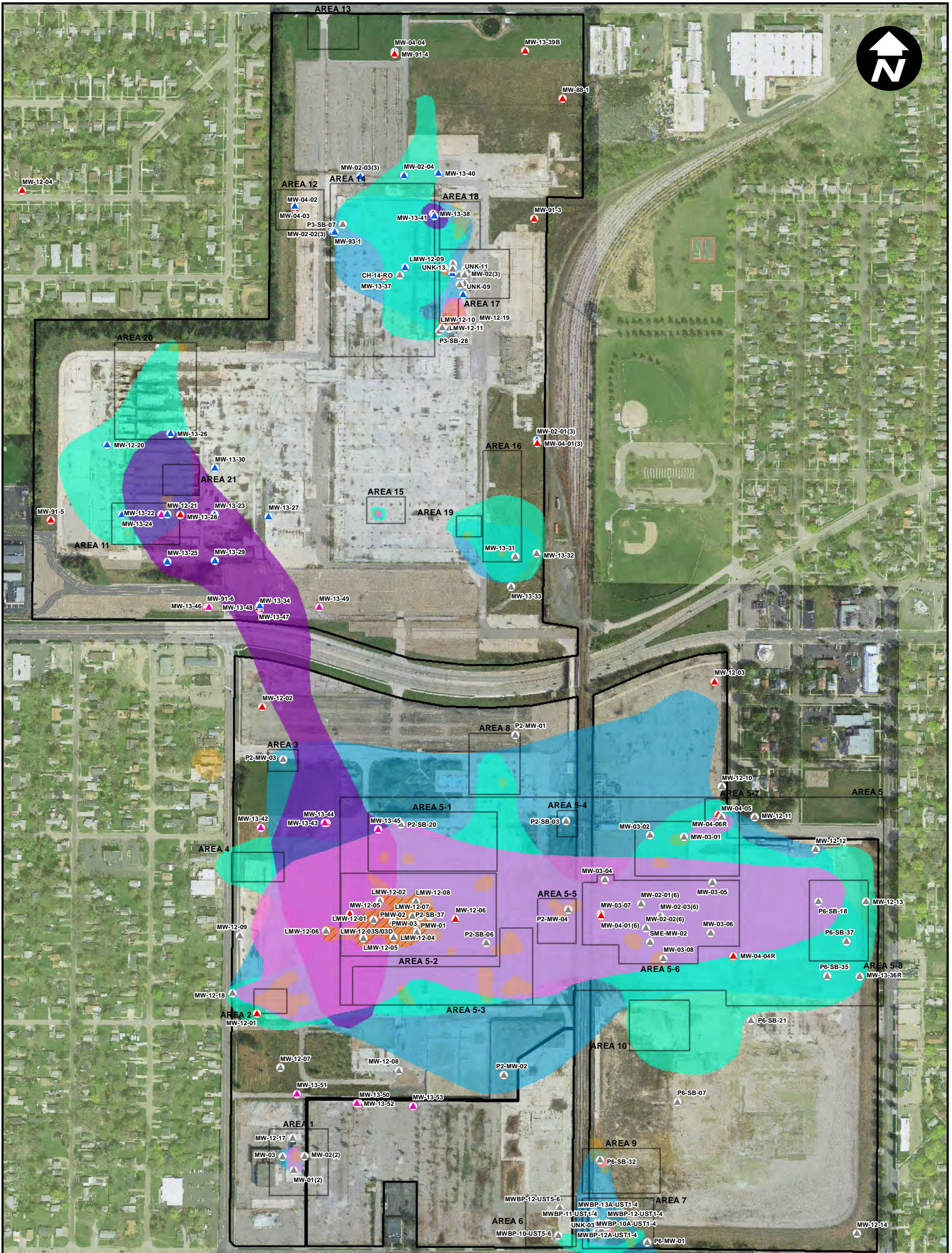
Acronyms and Abbreviations:

> = greater than
AOI = area of interest
bgs = below ground surface
CMS = Corrective Measures Study
C_{sat} = Soil Saturation Concentration Criteria
DC = Direct Contact Criteria
DW = Residential Drinking Water Criteria
DWP = Drinking Water Protection Criteria
FESL = Flammability and Explosivity Screening Level
GC = groundwater contact
GCP = groundwater contact protection
GSI = Groundwater/Surface Water Interface
GSIP = Groundwater/Surface Water Interface Protection Criteria
GW = groundwater
GW_{vtr} = draft Groundwater Concentrations for Vapor Intrusion
LNAPL = light non-aqueous phase liquid
MDEQ = Michigan Department of Environmental Quality
NA = not applicable
Part 201 Criteria = Part 201 Generic Cleanup Criteria
PCB = polychlorinated biphenyl
Prop = proposed
PSIC = Particulate Soil Inhalation Criteria
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation
Sol = solubility
SVIIC = Soil Volatilization to Indoor Air Inhalation Criteria
SVOC = semivolatile organic compound
µg/L = micrograms per liter
VOC = volatile organic compound
VSIC = volatile soil inhalation criteria

References:

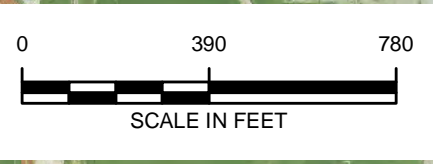
ARCADIS. 2013. Resource Conservation and Recovery Act Facility Investigation (RFI) Phase 2 Activities Summary Report. Michigan Plants 2, 3 & 6 Industrial Land. April.
ARCADIS. 2014a. RFI Supplemental Phase 2 Activities Summary Report. RACER Trust, Lansing, Michigan Plants 2, 3 & 6 Industrial Land. February 26.
ARCADIS. 2014b. Preliminary Groundwater Geochemical and Plume Stability Assessment. Plants 2, 3, and 6, Industrial Land, Lansing, Michigan. April 24.
ARCADIS. 2014c. Revised Interim Groundwater Monitoring Work Plan. RACER Trust, Plants 2, 3, & 6, Lansing, Michigan. May 23.

Figures



LEGEND

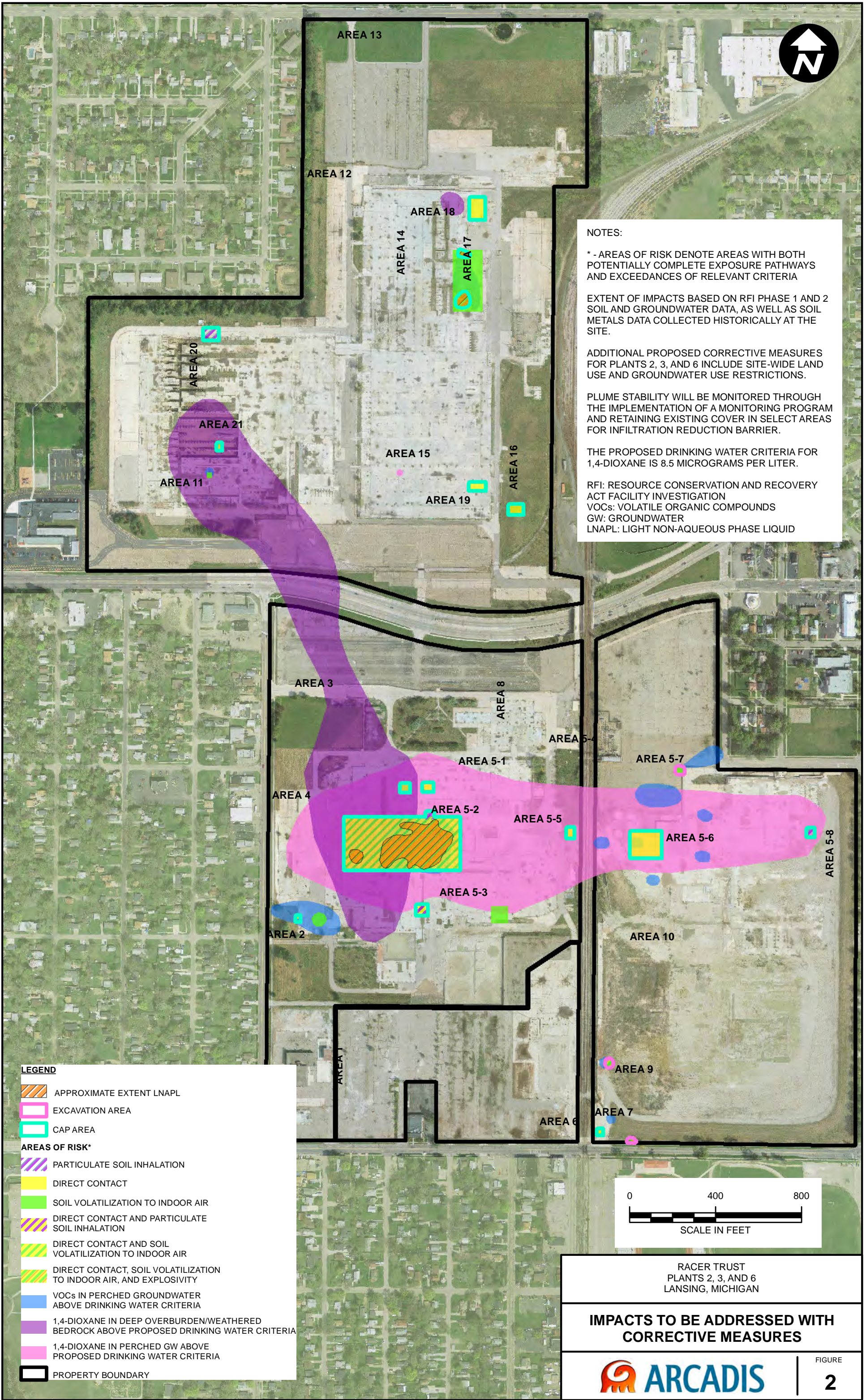
- PERCHED MONITORING WELL
- DEEP OVERBURDEN MONITORING WELL
- WEATHERED BEDROCK MONITORING WELL
- BEDROCK MONITORING WELL
- APPROXIMATE EXTENT LNAPL
- APPROXIMATE EXTENT >CRITERIA**
- VOCs/SVOCs IN SOIL
- UPPER PERCHED 1,4-DIOXANE / VOC IMPACTS
- LOWER 1,4-DIOXANE IMPACTS
- METALS IN SOIL
- METALS IN GROUNDWATER
- PROPERTY BOUNDARY



RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

**RFI SOIL AND GROUNDWATER
IMPACT SUMMARY**





NOTES:

* - AREAS OF RISK DENOTE AREAS WITH BOTH POTENTIALLY COMPLETE EXPOSURE PATHWAYS AND EXCEEDANCES OF RELEVANT CRITERIA

EXTENT OF IMPACTS BASED ON RFI PHASE 1 AND 2 SOIL AND GROUNDWATER DATA, AS WELL AS SOIL METALS DATA COLLECTED HISTORICALLY AT THE SITE.

ADDITIONAL PROPOSED CORRECTIVE MEASURES FOR PLANTS 2, 3, AND 6 INCLUDE SITE-WIDE LAND USE AND GROUNDWATER USE RESTRICTIONS.

PLUME STABILITY WILL BE MONITORED THROUGH THE IMPLEMENTATION OF A MONITORING PROGRAM AND RETAINING EXISTING COVER IN SELECT AREAS FOR INFILTRATION REDUCTION BARRIER.

THE PROPOSED DRINKING WATER CRITERIA FOR 1,4-DIOXANE IS 8.5 MICROGRAMS PER LITER.

RFI: RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION
 VOCs: VOLATILE ORGANIC COMPOUNDS
 GW: GROUNDWATER
 LNAPL: LIGHT NON-AQUEOUS PHASE LIQUID

LEGEND

- APPROXIMATE EXTENT LNAPL
- EXCAVATION AREA
- CAP AREA

AREAS OF RISK*

- PARTICULATE SOIL INHALATION
- DIRECT CONTACT
- SOIL VOLATILIZATION TO INDOOR AIR
- DIRECT CONTACT AND PARTICULATE SOIL INHALATION
- DIRECT CONTACT AND SOIL VOLATILIZATION TO INDOOR AIR
- DIRECT CONTACT, SOIL VOLATILIZATION TO INDOOR AIR, AND EXPLOSIVITY
- VOCs IN PERCHED GROUNDWATER ABOVE DRINKING WATER CRITERIA
- 1,4-DIOXANE IN DEEP OVERBURDEN/WEATHERED BEDROCK ABOVE PROPOSED DRINKING WATER CRITERIA
- 1,4-DIOXANE IN PERCHED GW ABOVE PROPOSED DRINKING WATER CRITERIA
- PROPERTY BOUNDARY

RACER TRUST
 PLANTS 2, 3, AND 6
 LANSING, MICHIGAN

IMPACTS TO BE ADDRESSED WITH CORRECTIVE MEASURES

ARCADIS

FIGURE
2



Appendix A

RFI Document Compendium (on disc)

- Laboratory Analytical Reports - RACER Lansing RFI
- 08.08.01 - Current Conditions Report.pdf
- 11.06.22 - RFI Matrix - Response to MDEQ Comments regarding.pdf
- 11.08.26 – QAPP.pdf
- 11.08.26 - RFI Phase 1 Work Plan.pdf
- 12.01.30 - RFI Phase I Activities Summary Report.pdf
- 12.03.12 - RFI Phase 2 Work Plan.pdf
- 12.10.18 - Stormsewer Investigation Work Plan.pdf
- 12.12.03 - Utility Corridor Assessment.pdf
- 13.04.15 - RFI Phase 2 Report.pdf
- 13.05.02 - Plant 3 1,4-Dioxane Investigation Work Plan.msg
- 13.05.31 - Interim RFI GW Sampling Work Plan.pdf
- 13.08.08 - RACER Lansing - addendum to interim groundwater sampling plan.msg
- 13.09.25 - Plant 2 & 3 1,4-dioxane investigation Work Plan.msg
- 14.02.26 - RFI Supplemental Phase 2 Report.pdf
- 14.04.24 - Preliminary GW Geochem and Plume Stability Assessment.pdf
- 14.06.03 - PFM-Transducer Summary Memo.pdf
- 14.06.04 - CMS - 2014 DRAFT.pdf
- 14.06.24 - Area 16 Metals Memo.pdf
- 14.07.23 - 2014 Additional AOI Memo.pdf
- 14.08.08 - Revised Interim GW Monitoring Work Plan.pdf