RACER TRUST
LANSING PLANTS 2, 3, & 6

2022 Second Quarter Progress Report | July 15, 2022

More detailed reports are available on RACER's Webpage for this Site:
https://www.racertrust.org/properties/lansing-plant-2-industrial-land

Site Introduction

- Remediation at the RACER Lansing Site is being performed through the Resource Conservation and Recovery Act (RCRA) Corrective Action program under the oversight of the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Current activities include focused site characterization, interim remedial actions, and evaluation of remedial alternatives.

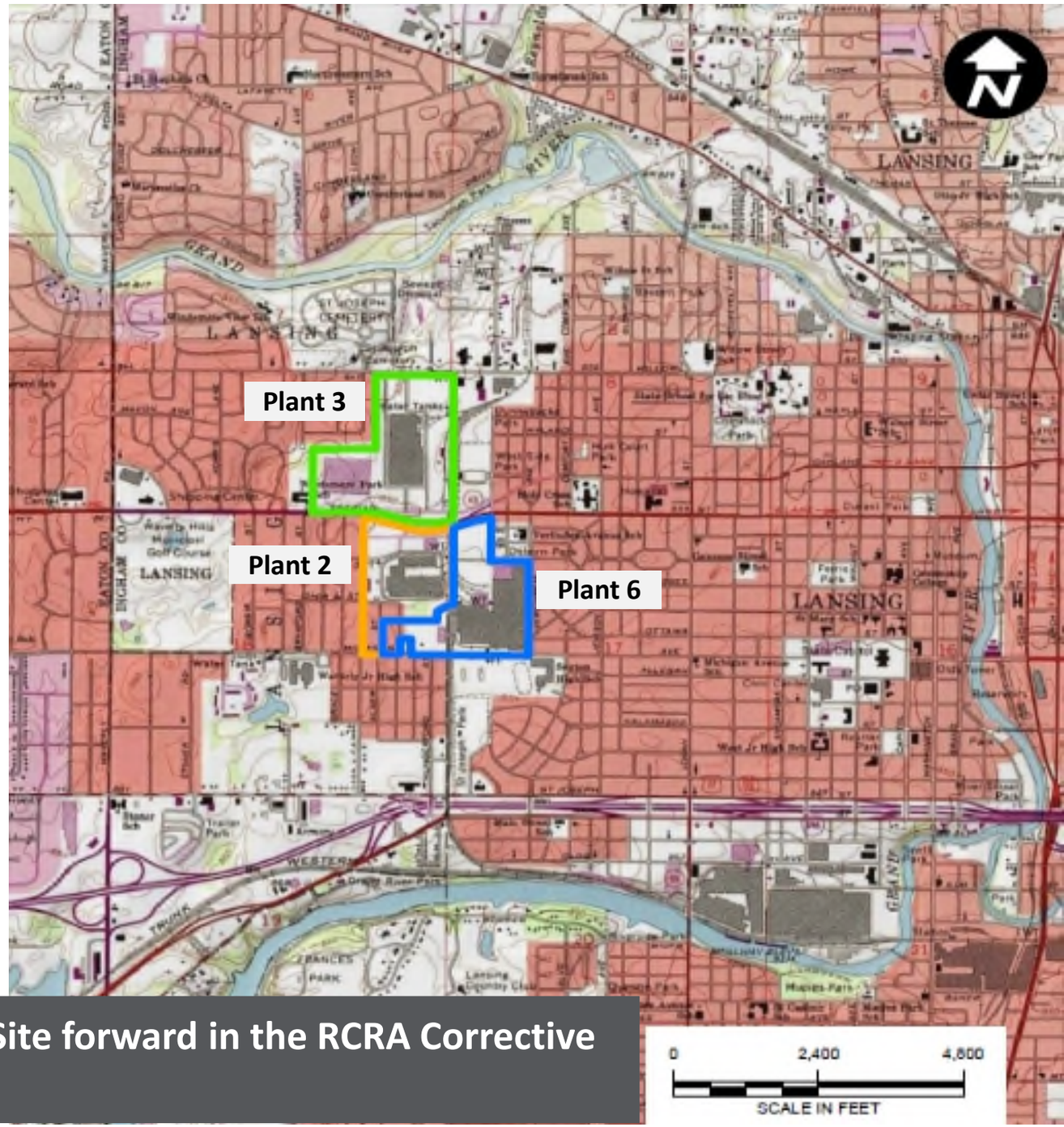
- There is currently no known exposure pathways for area residents associated with the site contaminants.

- Characterization of the 1,4-dioxane plume in weathered bedrock at a depth of approximately 60 to 75 feet below the ground surface is complete. Remediation of 1,4-dioxane in the weathered bedrock includes operation of the Plant 2 and Plant 3 biosparge systems (Plant 2 system started operations during the third quarter of 2020). It is anticipated that portions of the Plant 2 biosparge system may need to operate for 10 to 15 years. See the appendix at the end of this report for more information on biosparging.

- Characterization of per and polyfluoroalkyl substances (PFAS) is ongoing to the north, east, and south of Plant 6. Interim actions for PFAS include storm sewer modifications on Plants 2, 3, and 6 to eliminate groundwater containing PFAS from infiltrating into and then discharging off-site through the storm sewers.

- Monitoring of potential soil vapor intrusion (VI) to indoor air is ongoing and will continue in the northeast portion of Plant 6 and the adjacent off-site area.

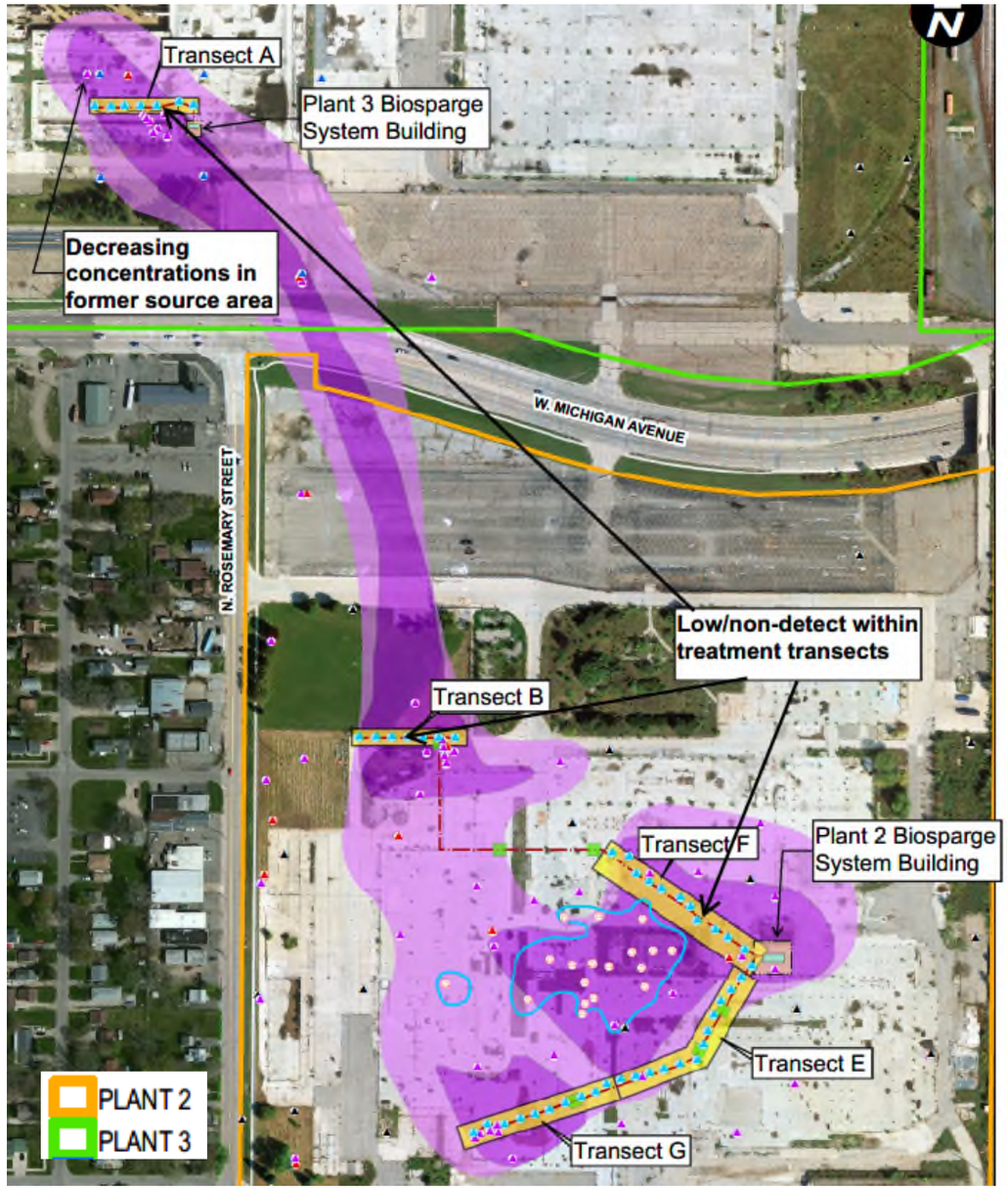
- Routine groundwater monitoring on Plants 2, 3, & 6 in the shallow (perched) zone, weathered bedrock, shallow bedrock, and deep bedrock is ongoing and is anticipated to continue for 25 to 30 years.



Activities completed during this period move the Site forward in the RCRA Corrective Action process

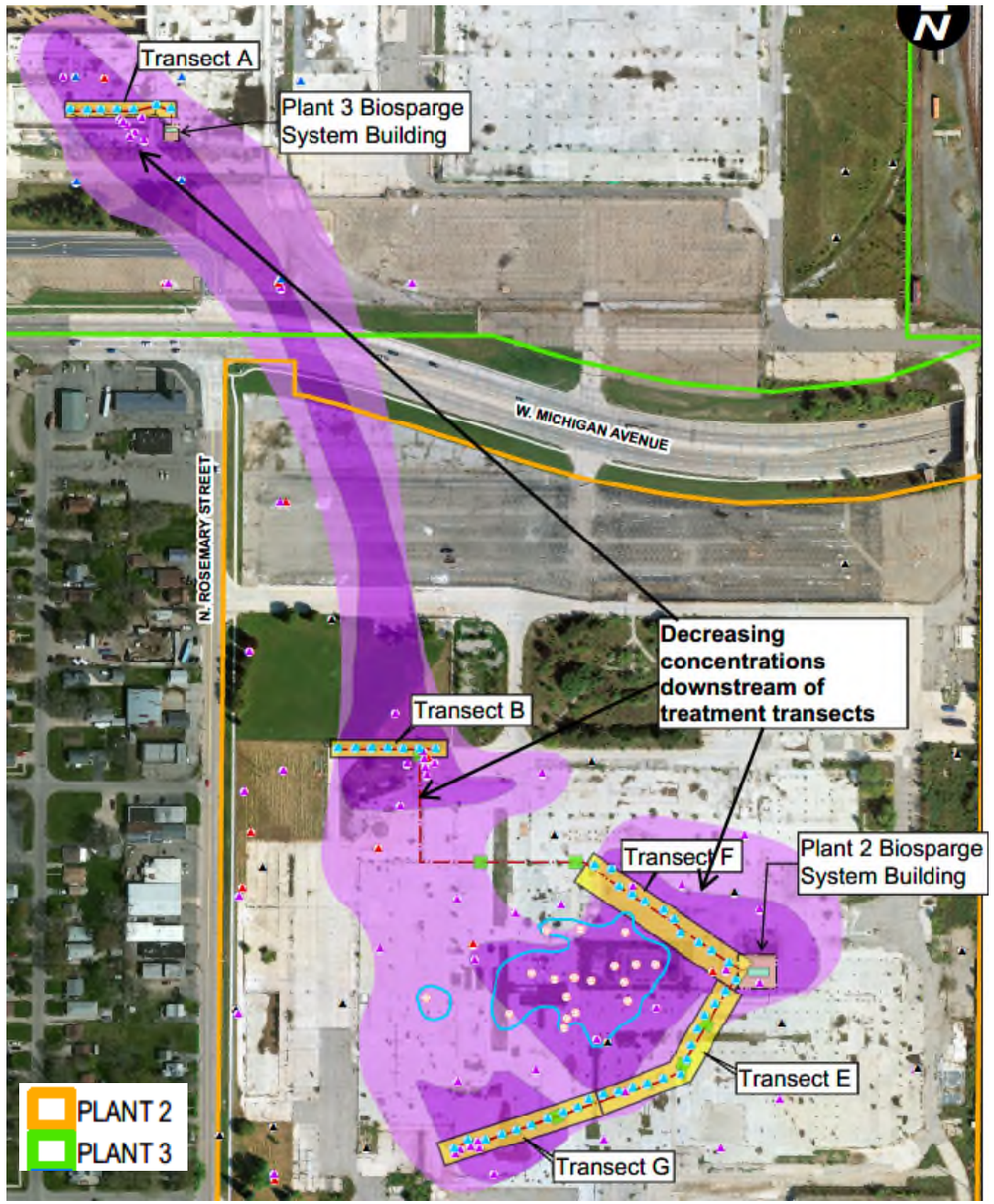
Remediation of 1,4-Dioxane in Weathered Bedrock

- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Plants 2 and 3 – greater than 94% uptime since August 2020
  - Minimal downtime related to equipment upgrades/replacement or regular system maintenance
  - Re-development of 2 wells completed in June 2022 for preventative system maintenance
- Results from the First (select wells) and Second (full round) Quarter 2022 performance monitoring show that concentrations of 1,4-Dioxane at Plant 2 and Plant 3 continue to decrease:
  - 1,4-dioxane concentrations upstream of biosparge treatment transect on Plant 3 continue to remain stable or are decreasing, indicating that the former source of contamination is depleted and attenuating
  - Due to changes in water levels/flow, small upticks were observed Fourth Quarter 2021 in Transect B at Plant 2. However, First and Second quarter results have returned to decreasing to stable trends.
  - 1,4-dioxane concentrations in groundwater downstream of the biosparge treatment transects have started to decrease as treated groundwater flows downstream



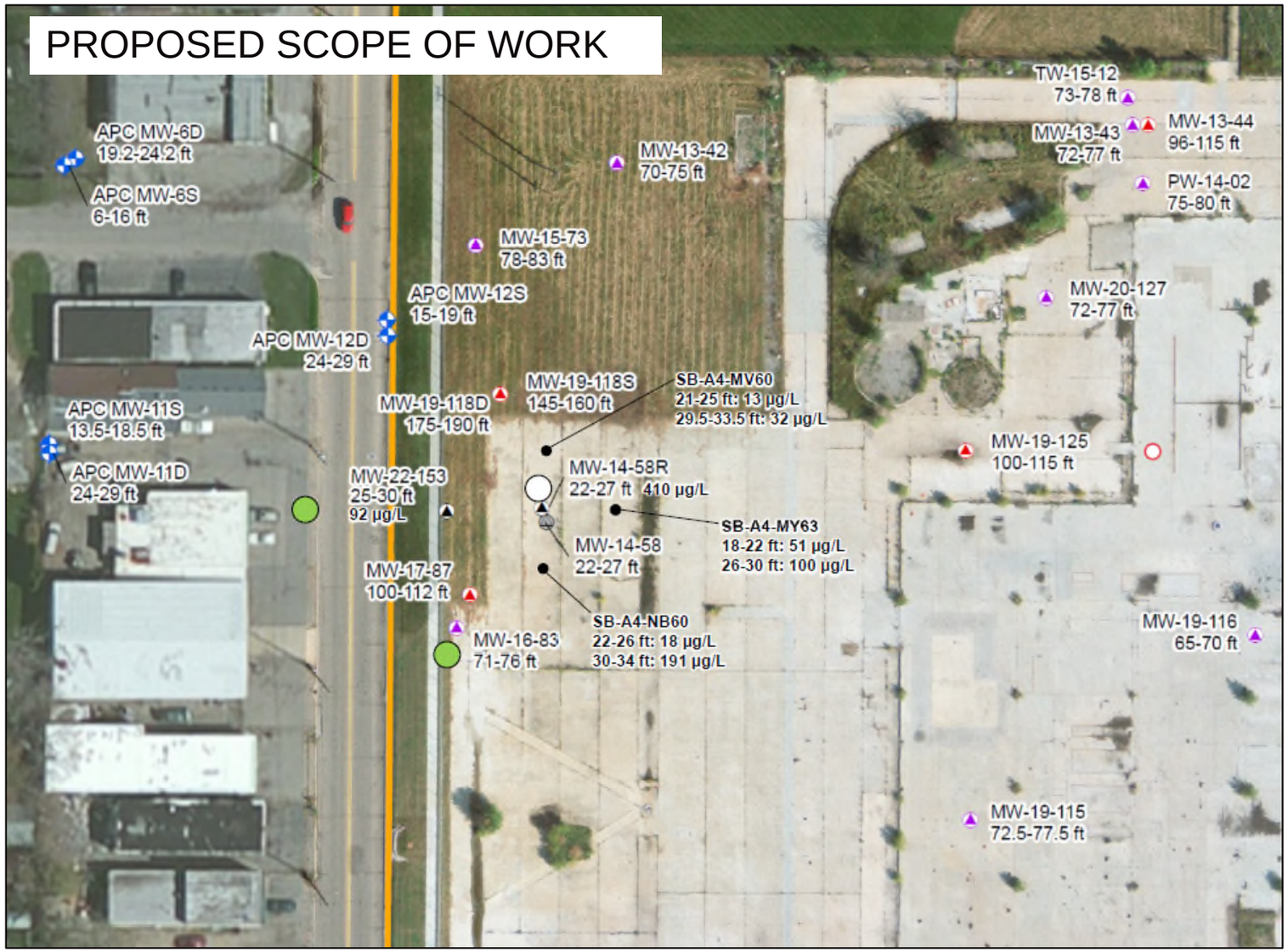
Remediation of 1,4-Dioxane in Weathered Bedrock

- Results show that the biosparge systems are achieving the short-term objective of reducing 1,4-dioxane concentrations and mass along the core of the weathered bedrock plume
- A full round of performance monitoring will be conducted in Fourth Quarter 2022 to continue with the semi-annual sampling schedule for 2022
- The results of performance monitoring conducted in 2021 were summarized in the Annual Lower 1,4-Dioxane Biosparge Progress Report submitted to EGLE on April 15th, 2022
- Results of performance monitoring conducted in 2022 will be summarized in the Annual Lower 1,4-Dioxane Biosparge Progress Report to be submitted in approximately April 2023
- Nutrient injection is scheduled for mid-late September 2022



Investigation of 1,4-Dioxane in Perched Zone Plant 2

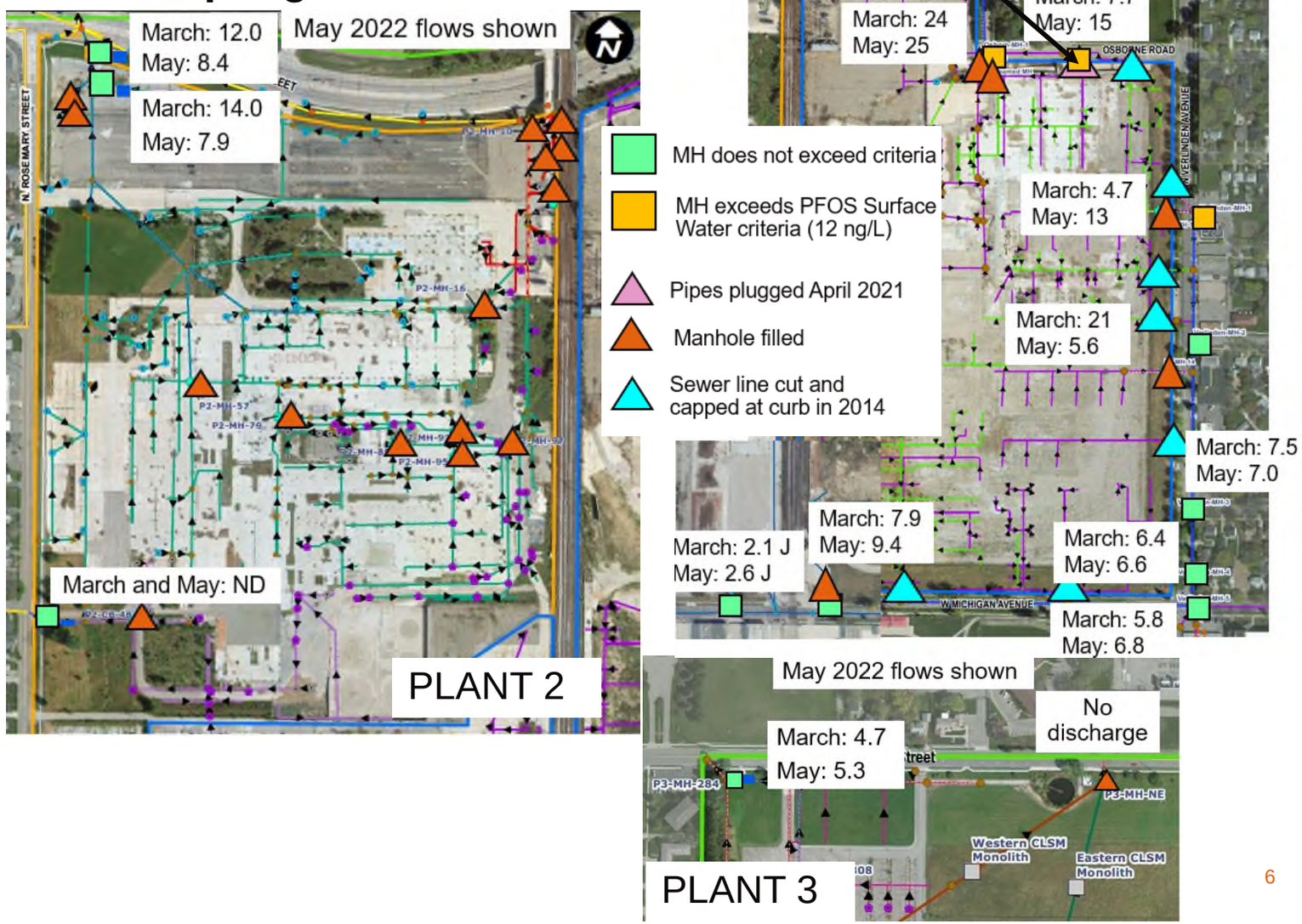
- Proposed completion of one direct push soil boring (white dot) adjacent to MW-14-58R:
  - Soil samples will be collected and analyzed for 1,4-dioxane and VOCs
- Proposed installation of two perched monitoring wells (green dots)
  - Western ROW of Rosemary St. to delineate impacts at MW-22-153
  - To south of MW-22-153 to provide delineation and support evaluation of groundwater flow direction.



Remediation of PFAS Impacts

Sewer Modifications and Performance Sampling

- First and Second Quarter site wide performance monitoring of storm sewers was conducted in March and May 2022. Results for Perfluorooctanesulfonic acid (PFOS), the specific PFAS of concern, are depicted on figures to the right.
- Third Quarter site wide performance monitoring of storm sewers is planned to be completed in August 2022. Results will be summarized in the Third Quarter Progress Report.



PFAS Investigation

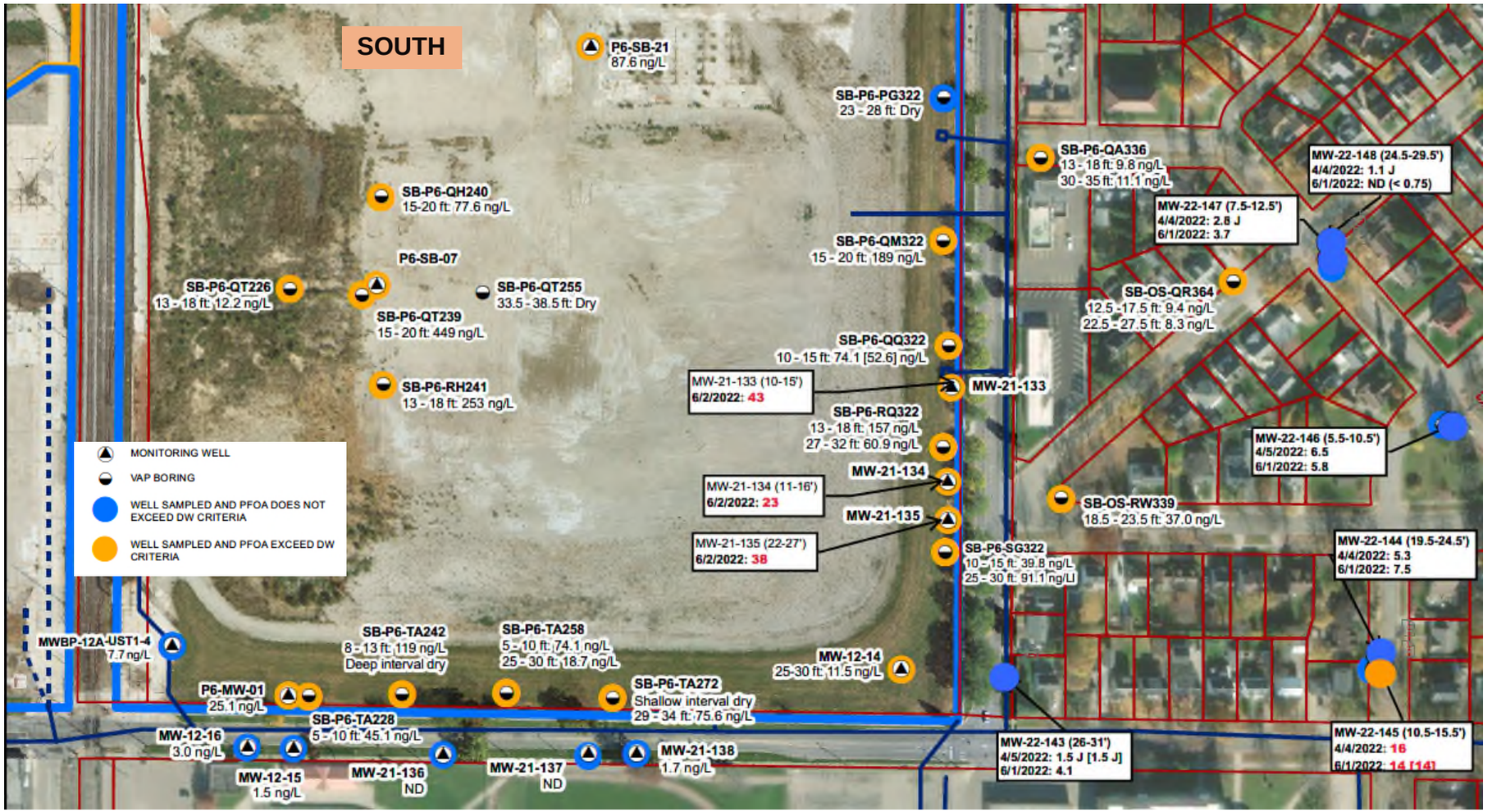
Plant 6 Off-site Investigation

- Plant 6 off-site and select on-site monitoring wells were sampled in April and June 2022
- Results are provided on the image to the right
- Northern off-site Well MW-22-151 below PFOA criteria (8 nanograms/liter [ng/L]) in June 2022

PFAS Investigation

Plant 6 Off-site Investigation

- Southeastern off-site well MW-22-145 above DW criteria for PFOA June 2022 (14 ng/L) – considering additional delineation
- There are no known complete exposure pathways to PFOA in the groundwater for residents and therefore PFOA present in shallow groundwater is not expected to pose a risk to residents



Work in Progress and Near-Term Milestones Anticipated During the Third Quarter of 2022

Activity	Schedule
Remediation of 1,4-Dioxane in the Weathered Bedrock	
Plants 2 and 3 Biosparge System Operation	Ongoing
Semi-Annual Biosparge Nutrient Injection	September 2022
Investigation of 1,4-Dioxane in Perched Zone	
Plant 2 1,4 Dioxane MW-14-58R Additional Investigation (following EGLE approval)	September 2022
Remediation and Investigation of PFAS	
Plant 6 Off-Site Well Installation, Sampling, and Proposed Scope of Work Report	July 2022
Plant 6 Off-Site Delineation to Southeast (following EGLE approval)	September 2022
Quarterly Storm Sewer Sampling	August 2022
Other investigations and Sampling	
Plant 6 Final VI Summary Report	May 2022
P2 and P3 Soil Corrective Measures Work Plan and Toxic Substance Control Act (TSCA) Plan Responses to EGLE Comments	July 2022
Updates to Interim Groundwater Monitoring Plan (IGMP)	September 2022
2022 Semi-Annual Groundwater Monitoring Report Submittal	September 2022
Third Quarter 2022 Groundwater Monitoring	August 2022

ARCADIS Design & Consultancy for natural and built assets

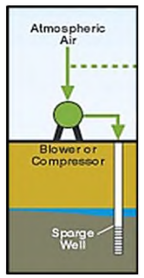
Appendix

BIOSPARGING TREATMENT OF 1,4-DIOXANE

Lansing Industrial Land, Lansing and Lansing Township, Michigan

WHAT IS BIOSPARGING?

- Air and small amounts of propane are injected into the ground through wells
- Promotes biodegradation of chemicals in groundwater, much faster than it would occur naturally
- 1,4-dioxane is treated in the ground, so minimal waste is generated
- Nearby wells are sampled to make sure treatment is occurring



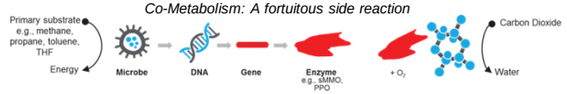
TREATMENT OBJECTIVES

- Reduce onsite concentrations of 1,4-dioxane in the top/weathered zone of the bedrock aquifer
- Prevent off-site migration of 1,4-dioxane

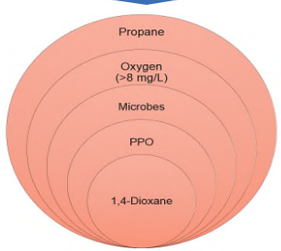
CO-METABOLIC BIODEGRADATION OF 1,4-DIOXANE:

Metabolism: the goal is to produce energy

Co-Metabolism: A fortuitous side reaction



Propane + Oxygen + Microbes = 1,4-Dioxane Treatment

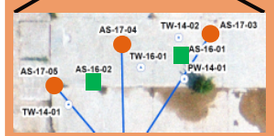


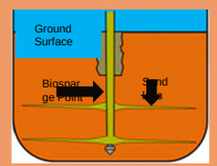
SYSTEM SETUP

Propane

Compressor

Biosparge Points



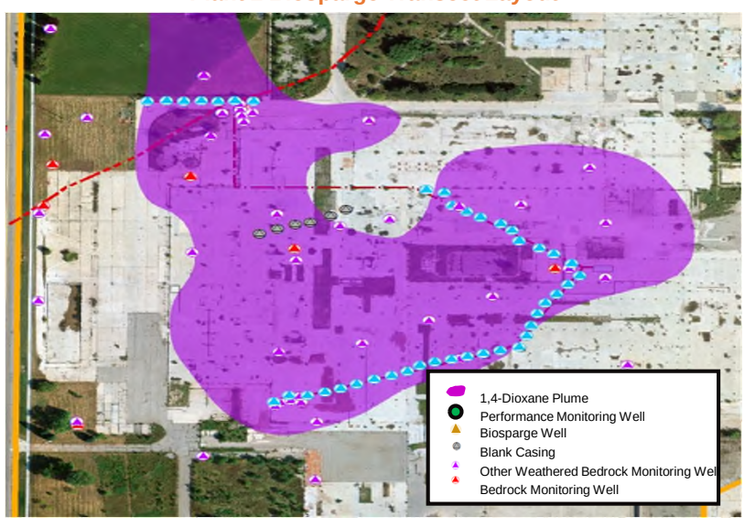


Sand Enhancements

Biosparge Transect With Hoses in Gravel Cover

2016 Pilot Test Biosparge Points
2018 Pre-Design Study Biosparge Points With Sand Enhancements
Weathered Bedrock Monitoring Well

Plant 2 Biosparge Transect Layout



CONCLUSIONS

- Biosparging is a low cost, effective, safe and sustainable method for treating 1,4-dioxane
- Installation of sand enhancements improves treatment
- Continual monitoring of the treatment system improves results
- Technology can be scaled up to treat the rest of the site

FULL-SCALE DESIGN

- 5 transects with 48 air sparge wells across Plants 2 and 4
- Nearly 5 miles of air hose and an air/propane injection network
- Groundwater flows from northwest to southeast and is cleaned by each transect
- Tubing installed above grade to save on costs and to accommodate future development
- Network of monitoring wells to track treatment progress

Plant 2 Biosparge Unit and Nutrient Injection Tanks