



# **RACER TRUST LANSING PLANTS 2, 3, & 6**

**2022 Fourth Quarter Progress Report | January 15, 2023**

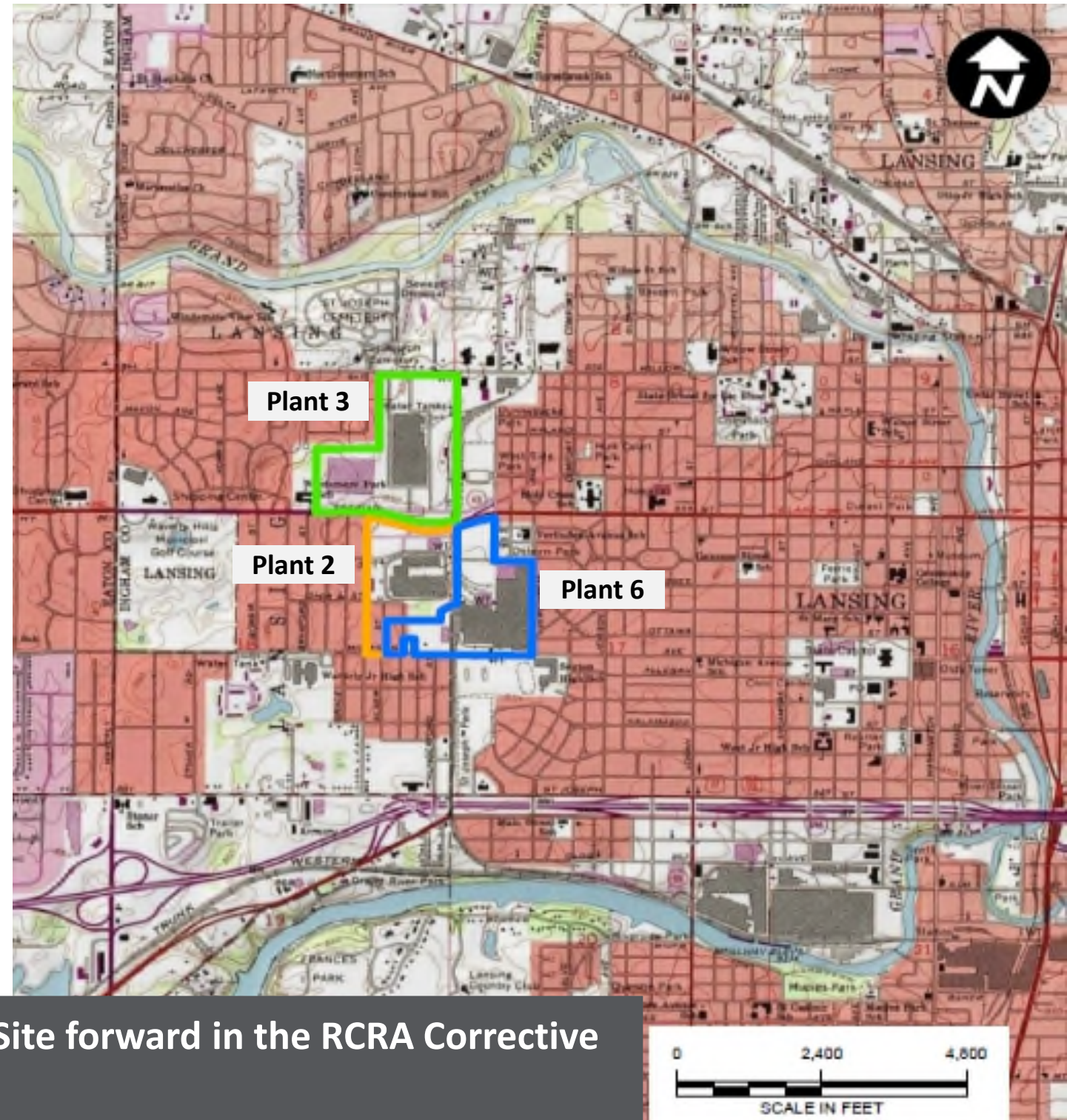
More detailed reports are available on RACER's Webpage for this Site:  
<https://www.racertrust.org/properties/lansing-plant-2-industrial-land>



# 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) in groundwater is ongoing to the east 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.

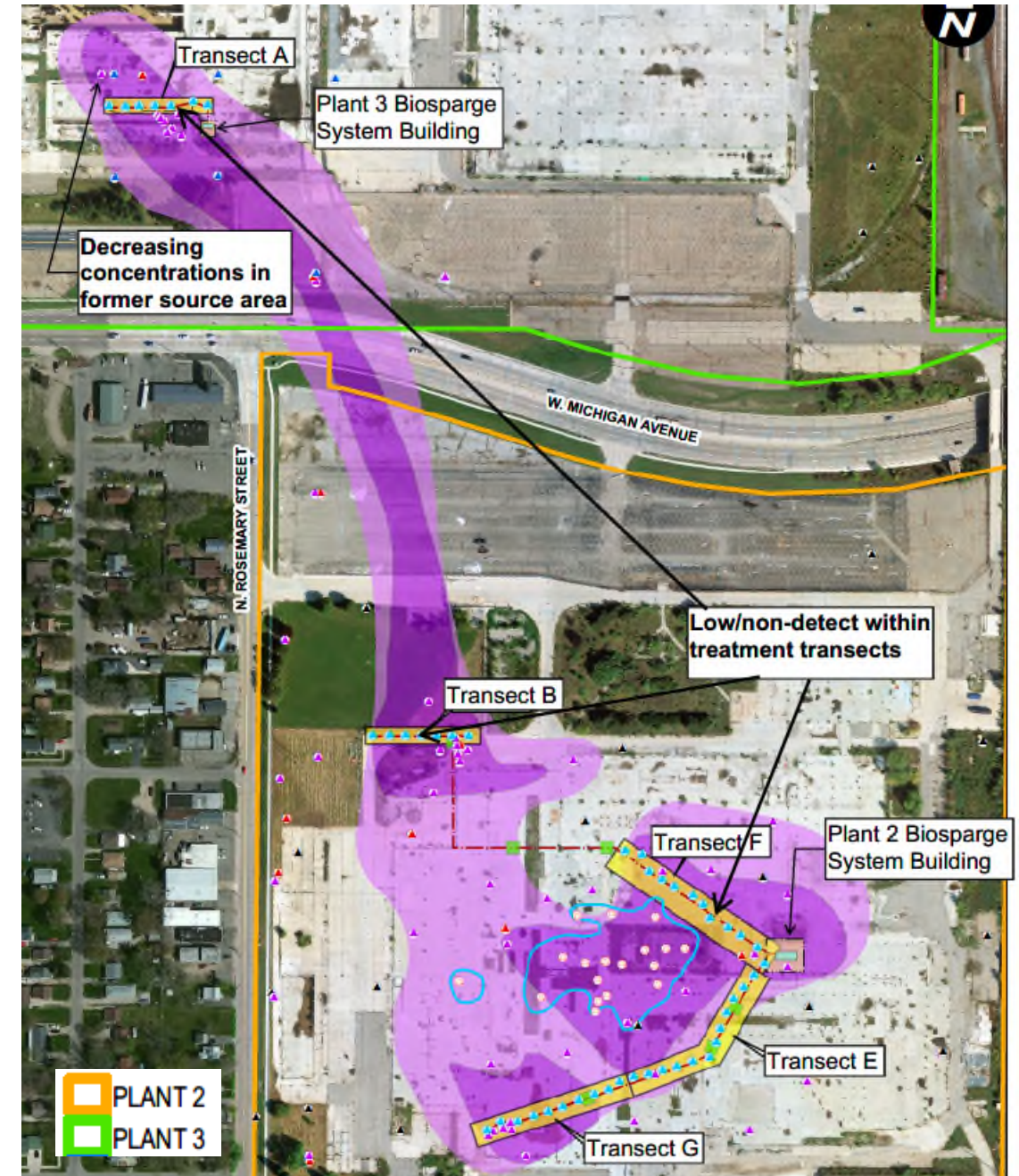
**Activities completed during this period move the Site forward in the RCRA Corrective Action process**





# Remediation of 1,4-Dioxane in Weathered Bedrock

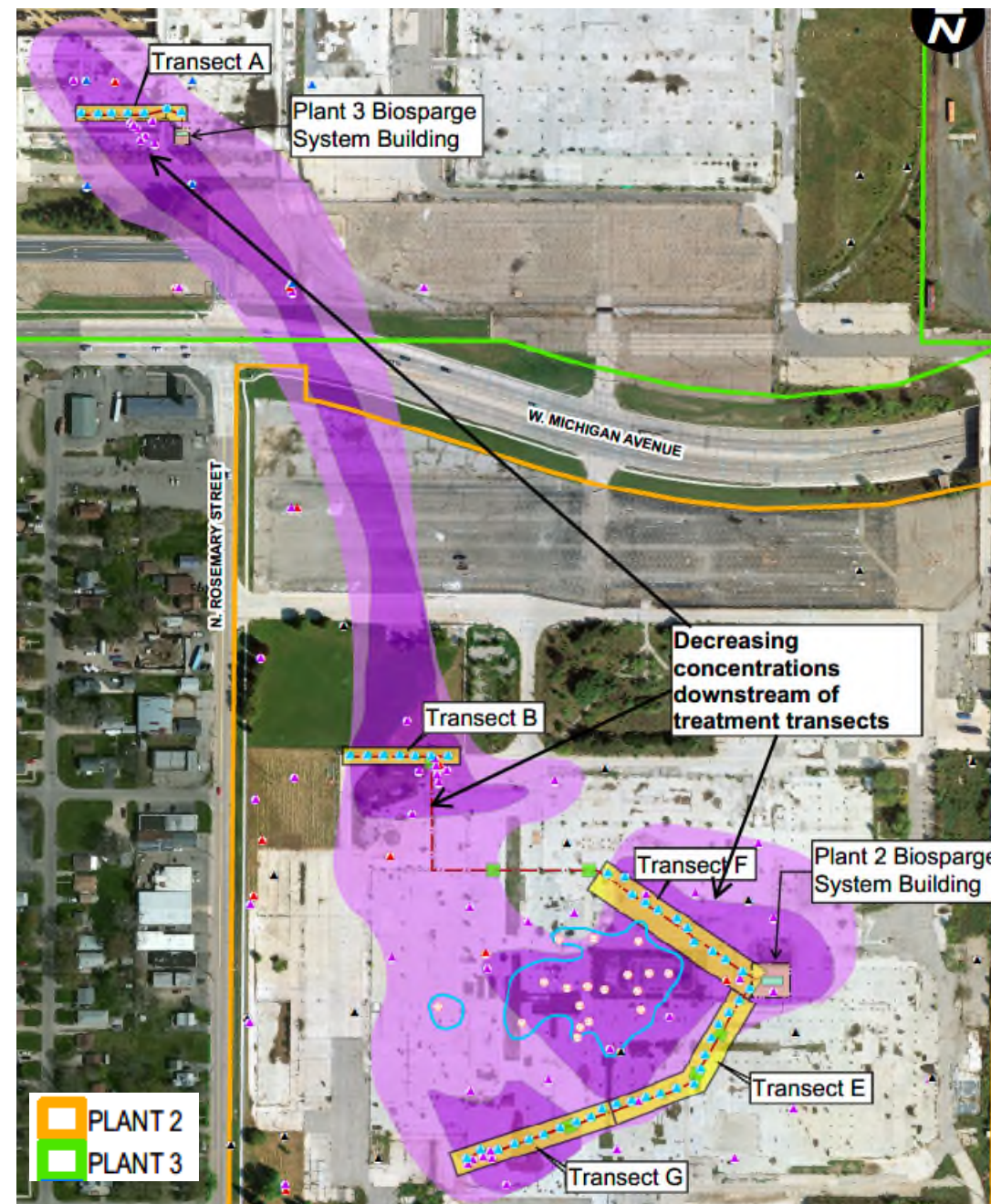
- Biosparge systems at Plant 2 and Plant 3 are fully operational
  - Minimal downtime related to equipment upgrades/replacement or regular system maintenance
- Results from the Third (select wells) and Fourth (full round) Quarter 2022 performance monitoring show that concentrations of 1,4-Dioxane at 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
  - 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 of performance monitoring 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 Second Quarter 2023 to continue with the semi-annual sampling schedule for 2023
- 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 March/April 2023





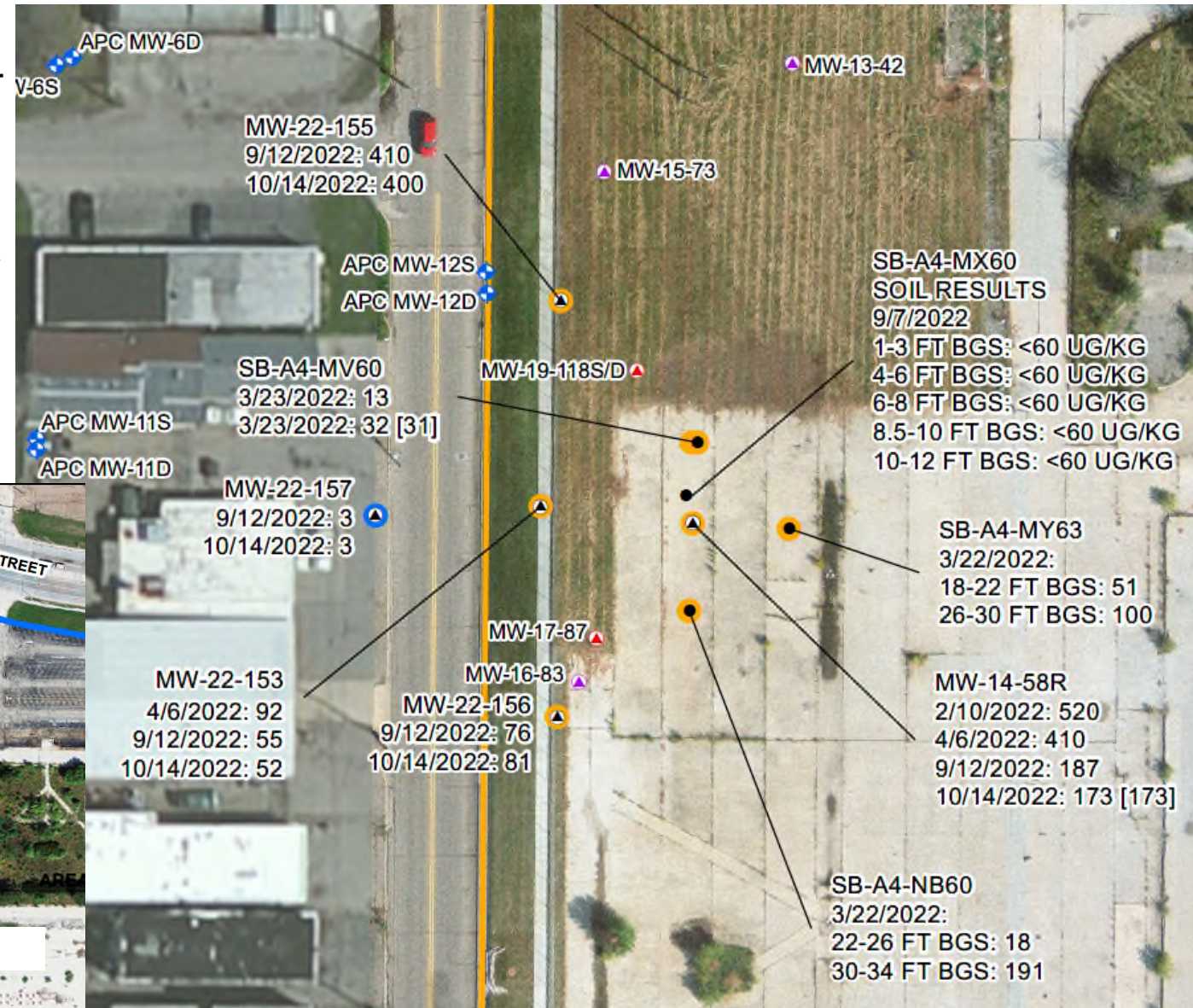
# Investigation of 1,4-Dioxane in Perched Zone Plant 2

On-going investigation to evaluate 1,4-dioxane at well MW-14-58R. Additional work completed:

- One soil boring to 15 feet below grade adjacent to MW-14-58R (SB-A4-MX60):
  - Collected 5 Soil samples
  - All Non-Detect for VOCs, including 1,4-dioxane
- Installation of three additional perched monitoring wells for a total of five wells within the 25-30 ft below grade sand seam
- Review of the boring logs suggests the 25-30 ft below grade sand seam is part of an outwash channel

## Legend

- ▲ PERCHED ZONE MONITORING WELL
- ▲ DEEP OVBURDEN MONITORING WELL
- ▲ WEATHERED BEDROCK MONITORING WELL
- ▲ BEDROCK MONITORING WELL
- ▲ ADAMS PLATING MONITORING WELL
- VERTICAL AQUIFER PROFILE BORING
- WELL SAMPLED AND NON-DETECT OR OR DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND EXCEEDS DW CRITERIA (7.2 µg/L)

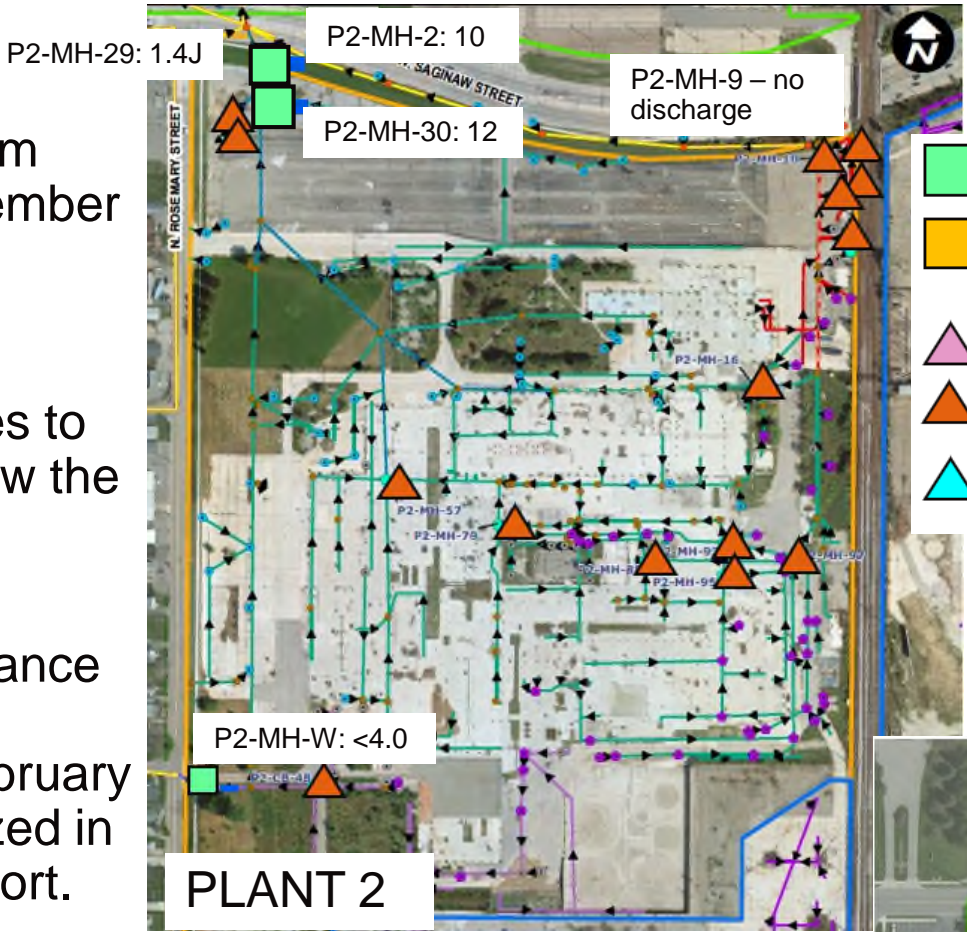




# Remediation of PFAS Impacts

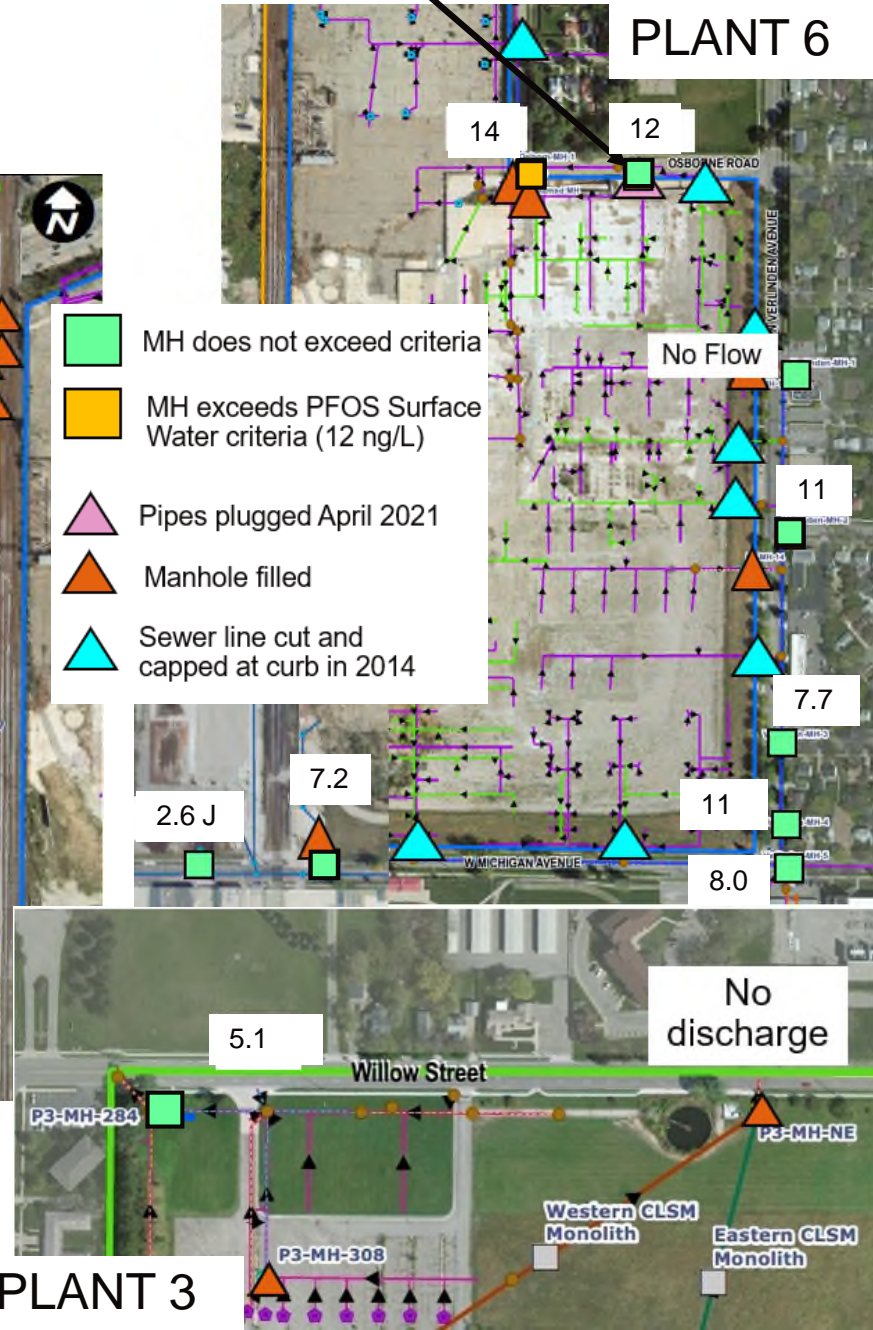
## Sewer Modifications and Performance Sampling

- Fourth Quarter site wide performance monitoring of storm sewers was conducted in November 2022. Results for Perfluorooctanesulfonic acid (PFOS), the specific PFAS of concern, are depicted on figures to the right. Results are at or below the relevant criteria for all but one sample location.
- First Quarter site wide performance monitoring of storm sewers is planned to be completed in February 2023. Results will be summarized in the First Quarter Progress Report.



Catch basin structure replaced in Nov 2021

**ARCADIS**

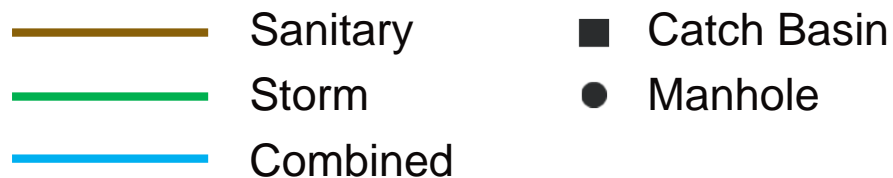




# Remediation of PFAS Impacts

## Sewer Inspections and Sampling

- Inspected downstream of Osborn-MH-1
    - Confirmed separate sanitary and storm sewer until Stanley and Genesee
    - Noted filled pipe running east from Stanley-MH-2 (located at Drexel and Stanley intersection)
    - Only pipes coming in/out of Stanley-MH-1, 2, and 3 are the main line confirmed to connect the structures and pipes running straight to catch basins
  - Stanley-MH-2 PFOS: 17 ng/L
  - Stanley-MH-3 PFOS: 14 ng/L
- Consistent with Osborn-MH-1 14 ng/L

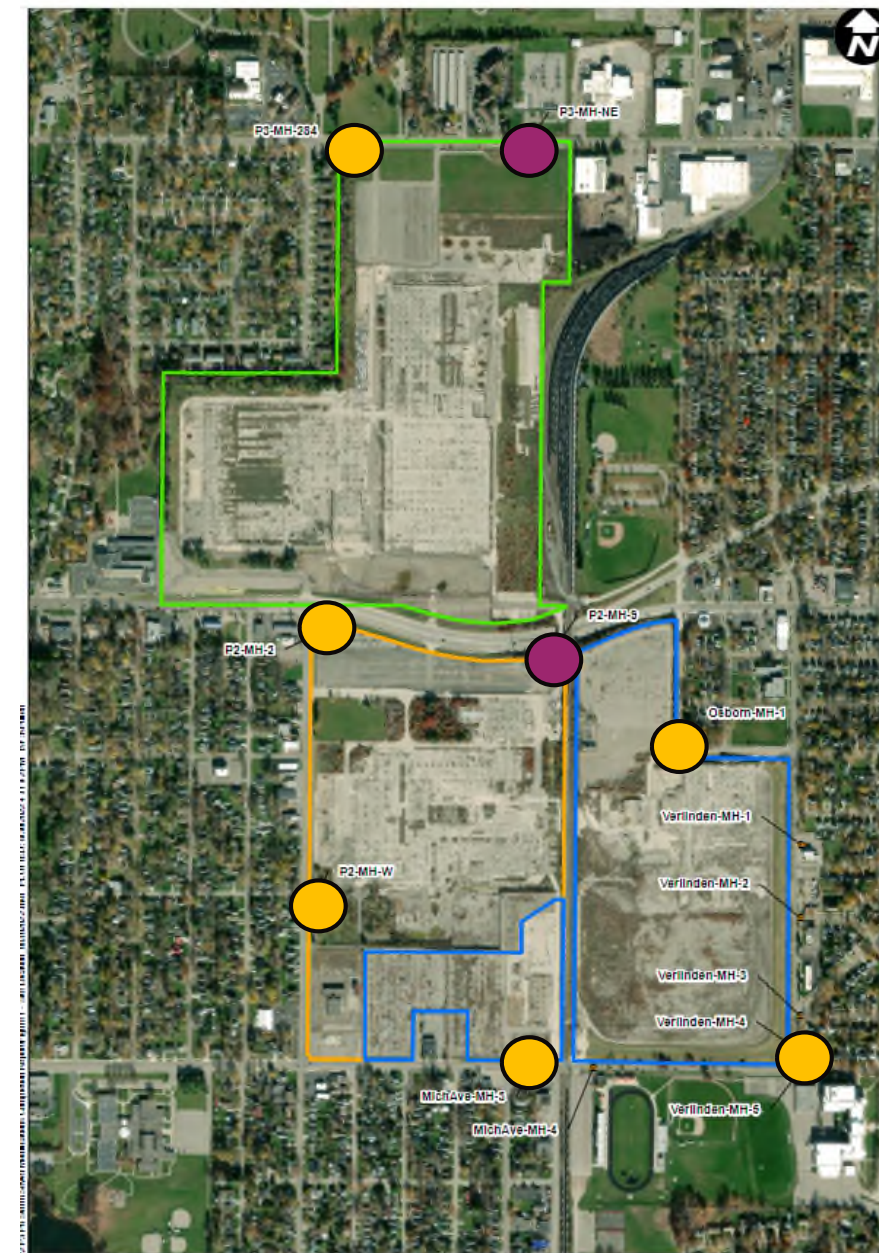




# Remediation of PFAS Impacts

- Quarterly monitoring of select sewer outfalls will be included in the Interim Groundwater Monitoring Program beginning in 2023
- Proposed inspection locations are typically dry based on modifications
- Sampling results will be reported in the semi-annual and annual Groundwater Monitoring Reports
- Based on results, any proposed modifications (if necessary) will be discussed with EGLE

● Sample ● Inspect



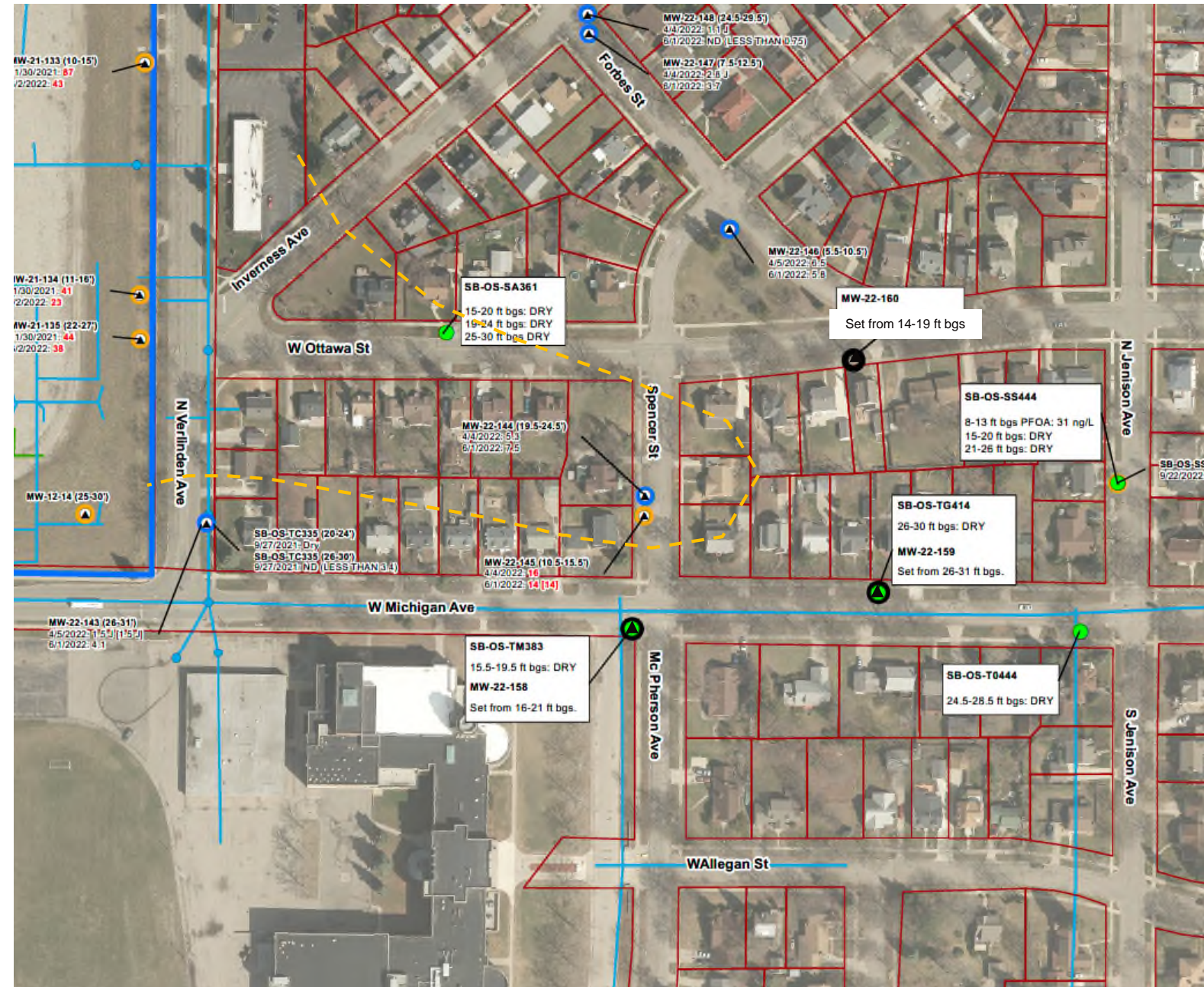


# Plant 6 Off-Site PFAS Investigation

- Completed 5 vertical aquifer profile borings to 30 feet. Not enough groundwater to sample except at location SS444.
- Several lines of evidence suggest SS444 result is related to a source other than Plant 6
- Installed 3 monitoring wells within shallow moist poorly sorted sand/silt/clay
- Samples collected from new monitoring wells on 12/12/22

## Legend

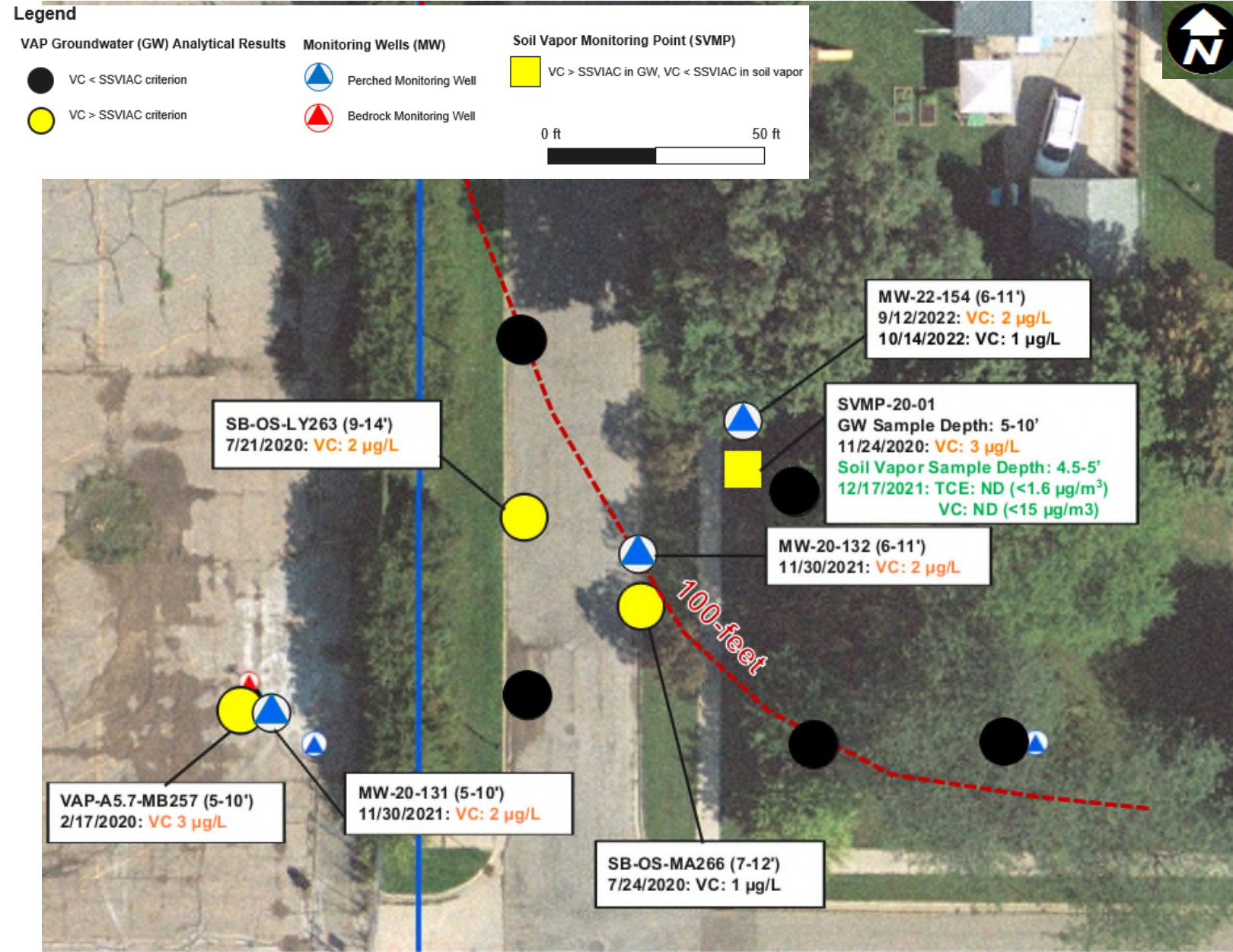
- MONITORING WELL
- SOIL BORING LOCATION
- NEW MONITORING WELL LOCATION
- WELLS SAMPLED AND PFOA DOES NOT EXCEED DW CRITERIA
- WELLS SAMPLED AND PFOA EXCEEDS DW CRITERIA
- PLANT 6 - APPROXIMATE
- PARCEL OUTLINE
- STORMWATER MAIN
- SANITARY MAIN





# Plant 6 VI Evaluation Update

- Installed new monitoring well in September at park boundary
- Does not exceed 2020 Draft VIAP (Res GWNIC) ( $2.1 \mu\text{g/L}$ )
- Will resample 1<sup>st</sup> quarter 2023 and develop path forward





# Work in Progress and Near-Term Milestones Anticipated During the First Quarter of 2023



Activity	Schedule
<b>Remediation of 1,4-Dioxane in the Weathered Bedrock</b>	
Plants 2 and 3 Biosparge System Operation	Ongoing
Annual Biosparge Performance Report Submittal	March 2023
Biosparge Nutrient Injections	March/April 2023
<b>Investigation of 1,4-Dioxane in Perched Zone</b>	
Plant 2 1,4 Dioxane MW-14-58R Evaluation Summary Memo	February 2023
<b>Remediation and Investigation of PFAS</b>	
Plant 6 Off-Site PFAS Monitoring Well Installation Report	February 2023
Quarterly Storm Sewer Sampling	February 2023
<b>Other investigations and Sampling</b>	
Plant 6 VI Evaluation Additional Groundwater Sampling	February 2023
P2 and P3 Soil Corrective Measures Work Plan and Toxic Substance Control Act (TSCA) Plan Updates	March 2023
Final Revisions to Interim Groundwater Monitoring Plan (IGMP) based on EGLE comment	January 2023
First Quarter 2023 Groundwater Monitoring	February 2023
2022 Annual Groundwater Monitoring Report	May 2023



# Appendix

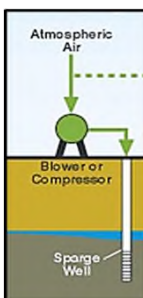


# BIOSPARGING TREATMENT OF 1,4-DIOXANE

## Lansing Industrial Land, Lansing and Lansing Township, Michigan

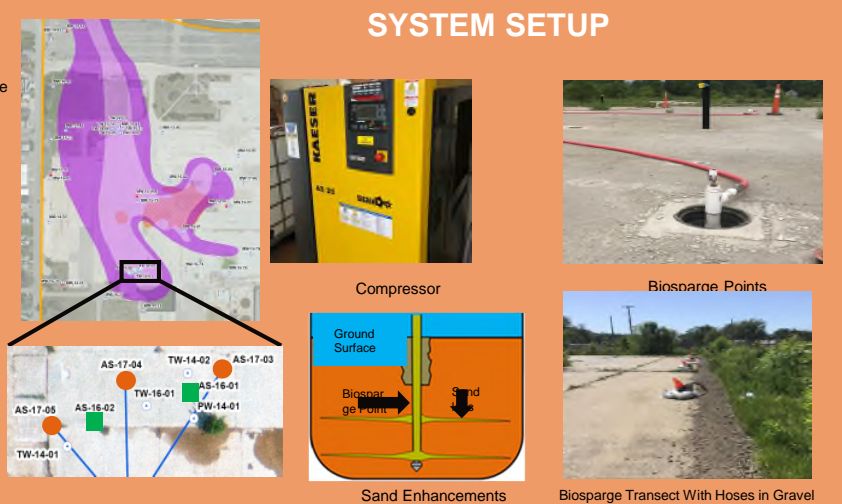
### WHAT IS BIOSPARGING?

- 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



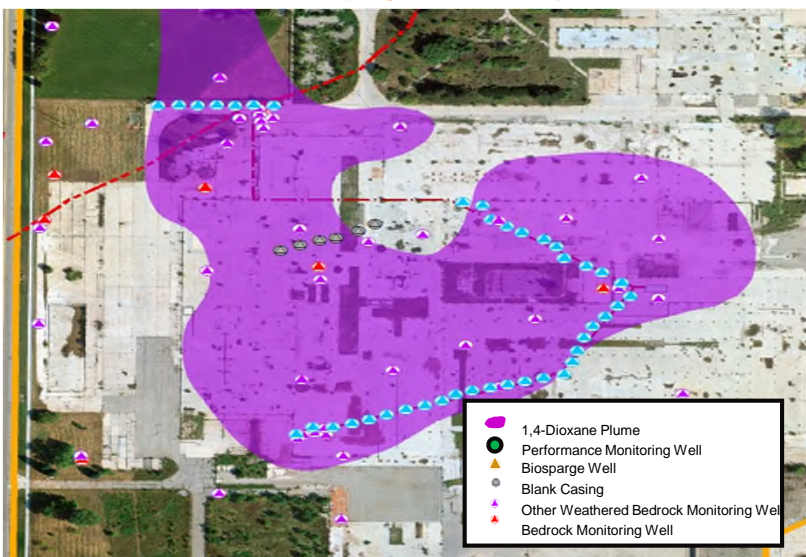
Propane

### SYSTEM SETUP



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

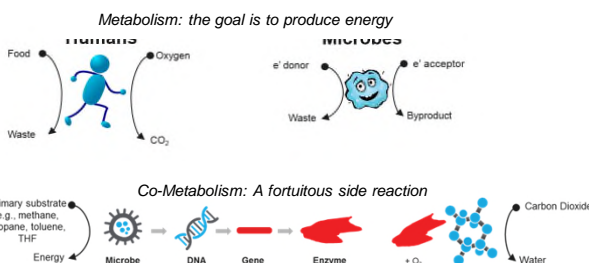
### Plant 2 Biosparge Transect Layout



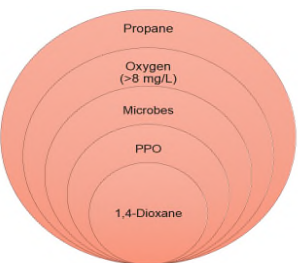
### TREATMENT OBJECTIVES

- 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:



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



### 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