

SECOND QUARTER 2018 PROGRESS REPORT

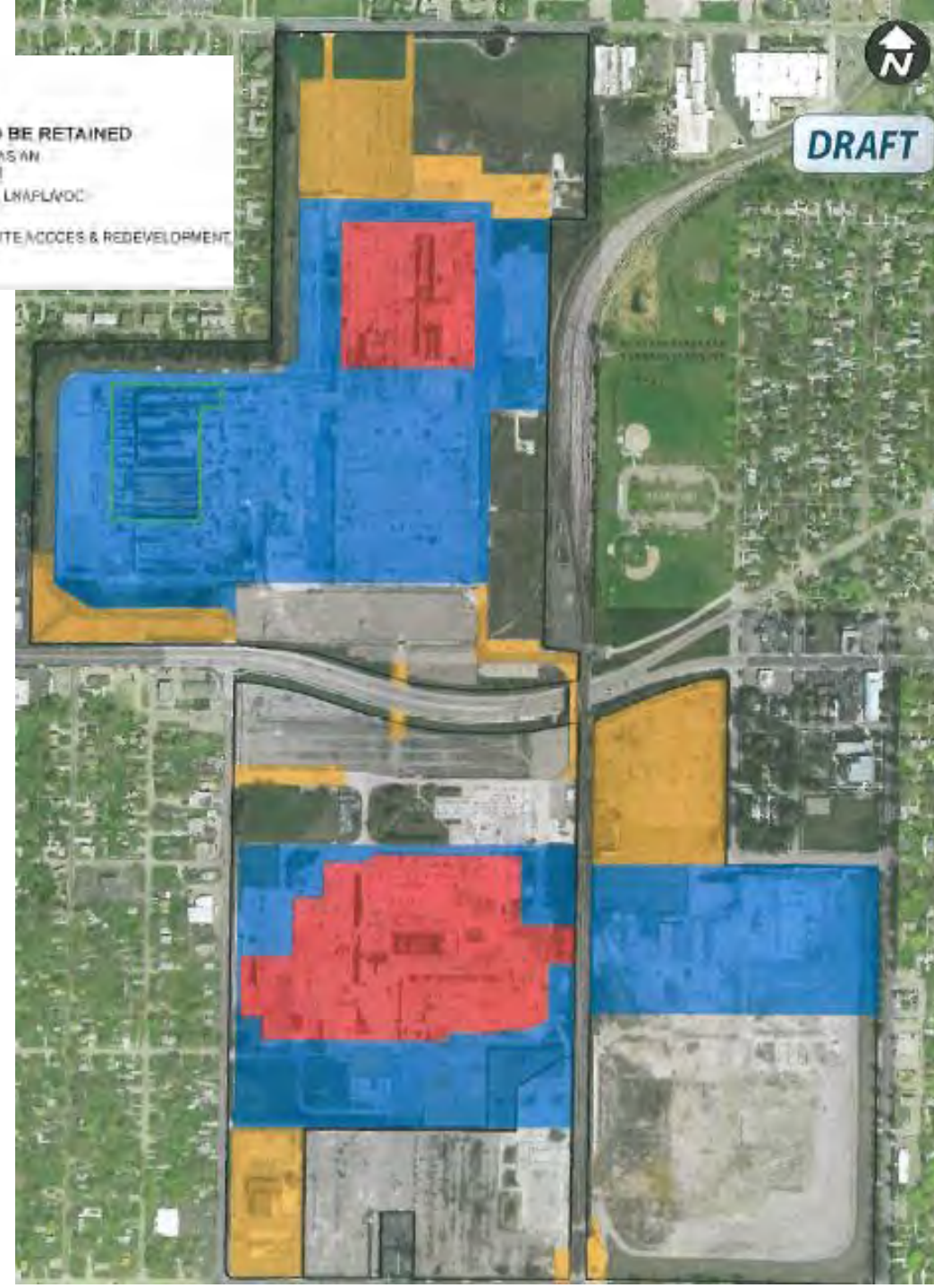
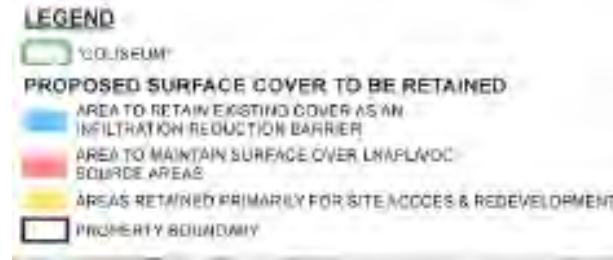
(Overall Site Status Review)

RACER Trust Plants 2, 3 & 6

July 16, 2018

Site Background

- RACER Trust
 - Created as a result of GM bankruptcy – transition From GM to MLC in 2009 and from MLC to RACER Trust in 2011.
 - Annual budget submitted to MDEQ for review and approval
 - Budgets for 3 Plants (2, 3, and 6) combined to one budget in 2018
 - Cushion funding needed to complete corrective actions
- Site History
 - The earliest operations began on Plant 2 between 1900 and 1910. Operations at Plants 3 and 6 commenced in the 1920s and 1930s
 - Plant 6 ceased operations in 2005. Plants 2 and 3 ceased operations in 2006.
 - Initial demo of buildings completed from 2006-2008
 - Phase 2 demo was completed from 2011-2012
 - The majority of the slabs were retained as surface cover. A surface cover retention plan was approved as an interim corrective measure in 2014



Site Background

Investigation Timeline

- 2011 - RFI Phase I investigation completed
- 2012 - Storm Sewer Investigation and Utility Corridor Assessment completed
- 2012 - RFI Phase II investigation Completed - 1,4-dioxane identified in Plant 3 deep overburden groundwater
- 2013 - Supplemental RFI completed – focused on characterizing lower 1,4-dioxane plume
- 2013 - Quarterly groundwater monitoring begins under the IGMP
- 2014 - Initial Plume Stability and Geochemical Assessment Completed. Subsequent updates completed annually.
- 2014 - Lower 1,4-Dioxane Source Evaluation completed at Plant 3
- 2015 - Plant 2 Lower 1,4-Dioxane Toe Investigation
- 2016 - Plant 2 Lower 1,4-Dioxane Supplemental Toe Investigation, Lower 1,4-Dioxane Northeast Lobe Investigation
- 2017 - Plant 2 LNAPL Area 1,4-Dioxane Investigation Completed
- 2017 - Plant 3 PFAS Delineation Phase I, II, and III completed along with a Storm Sewer Investigation
- 2018 – Plant 3 Offsite PFAS Investigation Fieldwork Completed (includes onsite delineation)





Conceptual Site Model

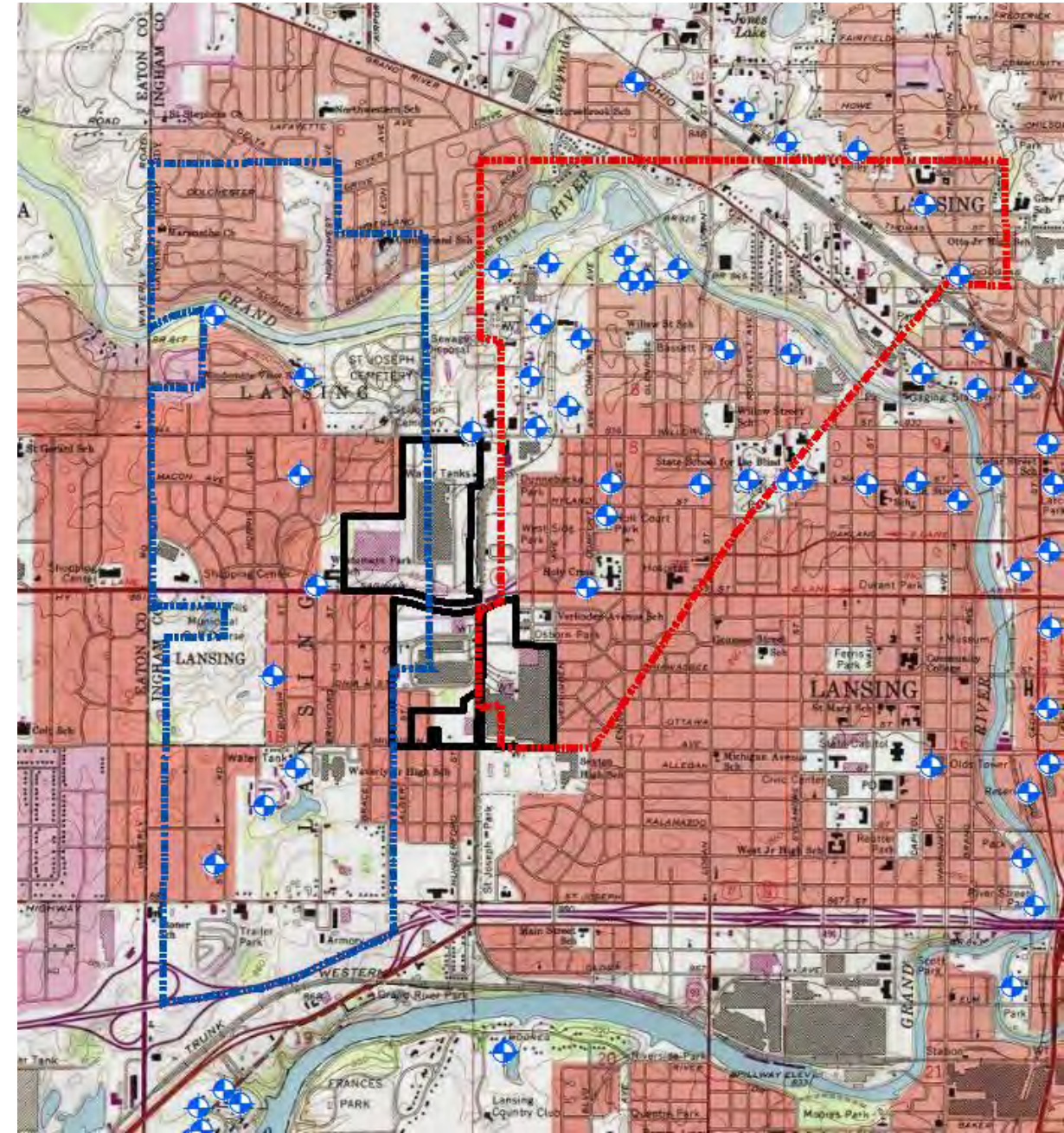
Site Location

West Lansing

- Site straddles two wellhead protection areas
- Municipal bedrock wells located throughout area
 - Typically cased to 100-130 ft bgs, open borehole to ~400 feet bgs
 - Pumping rates ~300-400 gpm

LEGEND

-  RACER LANSING SITE BOUNDARY
-  LANSING/LANSING TWP MUNICIPAL WELLS
- WELLHEAD PROTECTION AREAS**
-  LANSING TOWNSHIP
-  CITY OF LANSING



Overview of Site Impacts

Perched PFAS Impacts

Plant 3 LNAPL



Lower 1,4-Dioxane Impacts

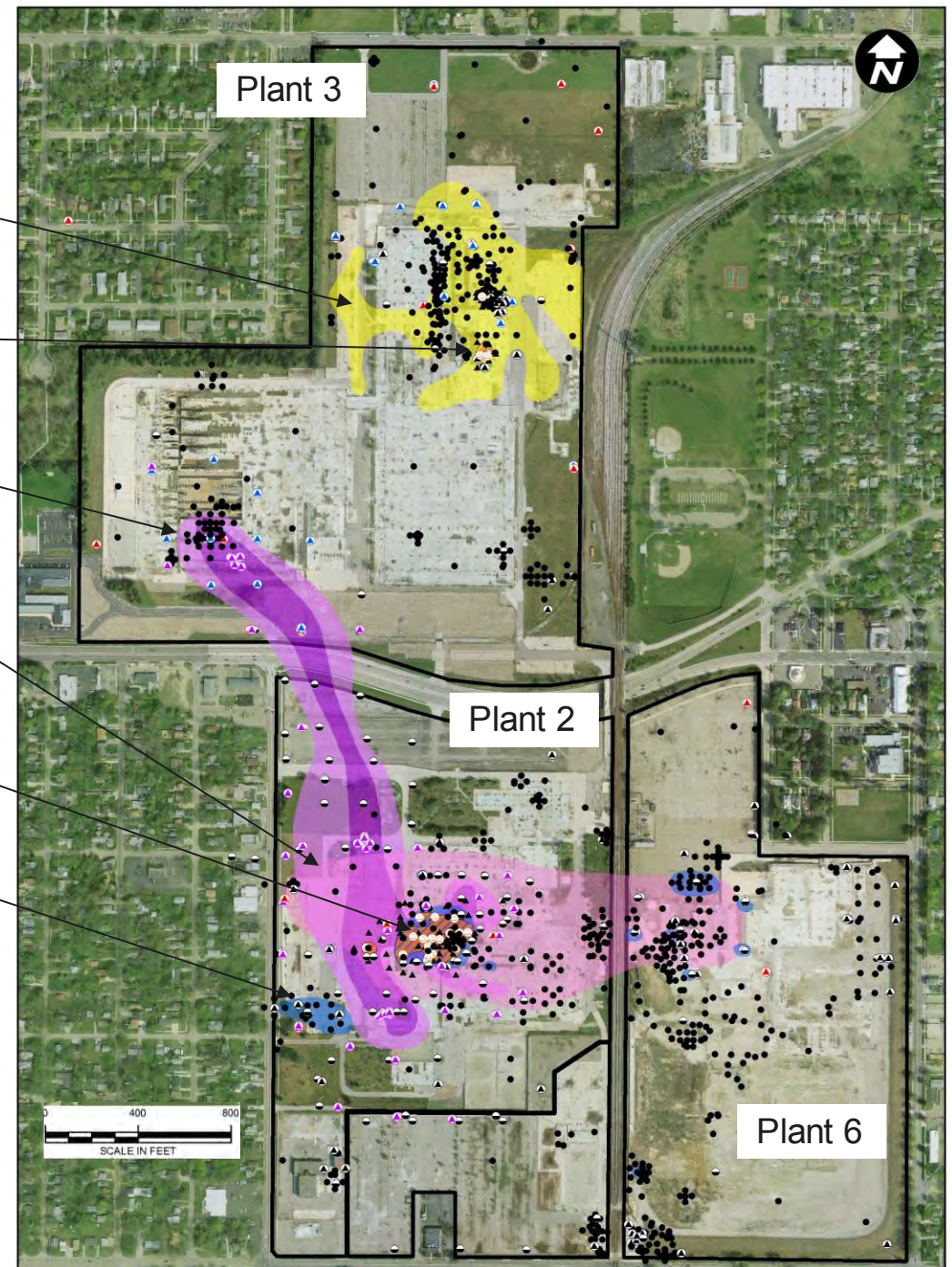
Perched 1,4-Dioxane Impacts

Plant 2 LNAPL

VOC Impacts

LEGEND













- | | | | |
|---|-----------------------------------|---|---|
|  | NAPL MONITORING WELL |  | APPROXIMATE EXTENT LNAPL |
|  | PERCHED MONITORING WELL |  | PERCHED PFOS+PFOA > 70 ng/L |
|  | DEEP OVBURDEN MONITORING WELL |  | VOCs IN PERCHED GROUNDWATER ABOVE DRINKING WATER CRITERIA |
|  | WEATHERED BEDROCK MONITORING WELL |  | PERCHED 1,4-DIOXANE PLUME ABOVE 7.2 µg/L |
|  | BEDROCK MONITORING WELL |  | LOWER 1,4-DIOXANE PLUME ABOVE 7.2 µg/L |
|  | HPT/VAP BORING LOCATION |  | LOWER 1,4-DIOXANE PLUME ABOVE 72 µg/L |
|  | LIF BORING LOCATION | | |
|  | SOIL BORING LOCATION | | |

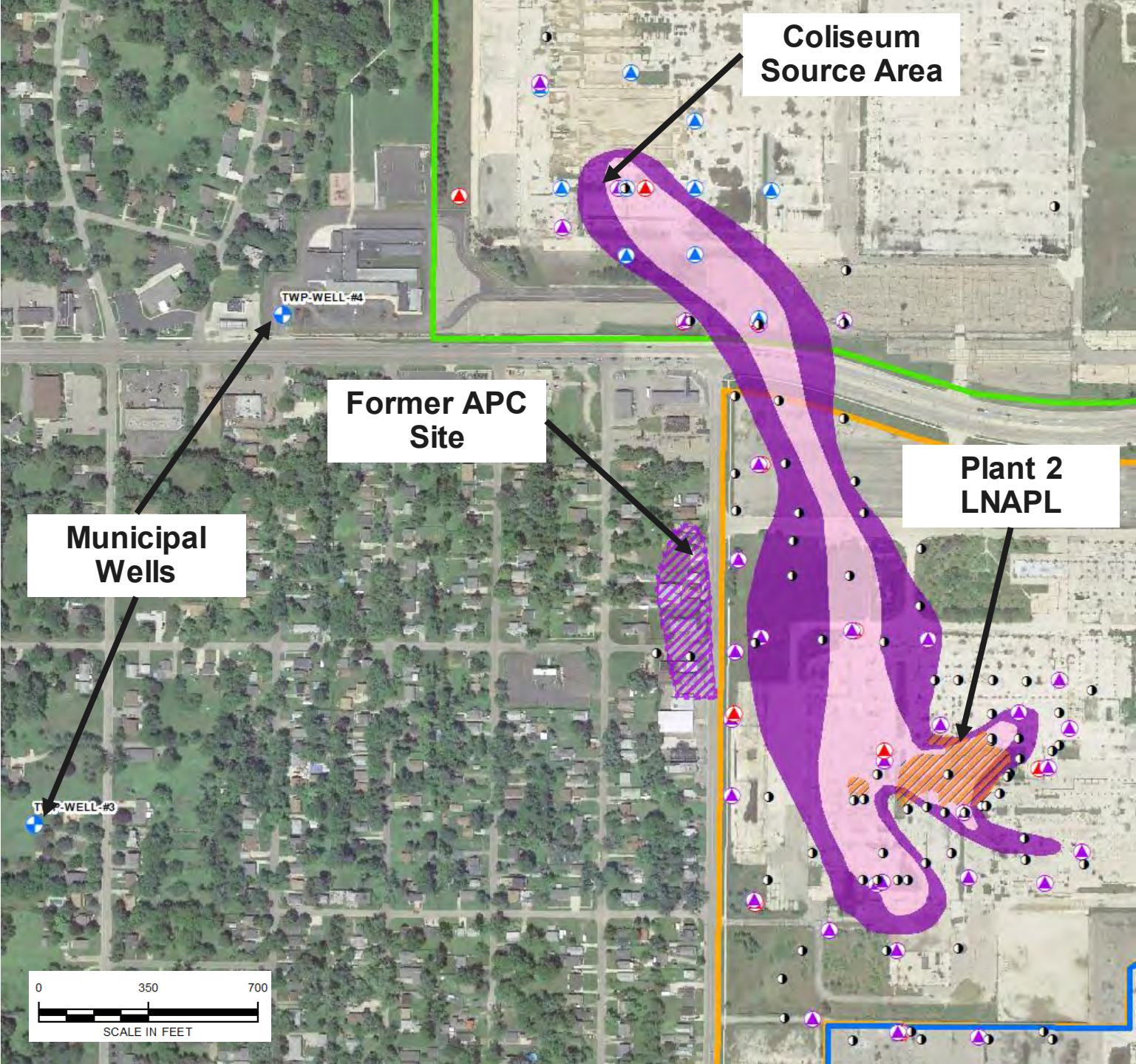


Lower 1,4-Dioxane

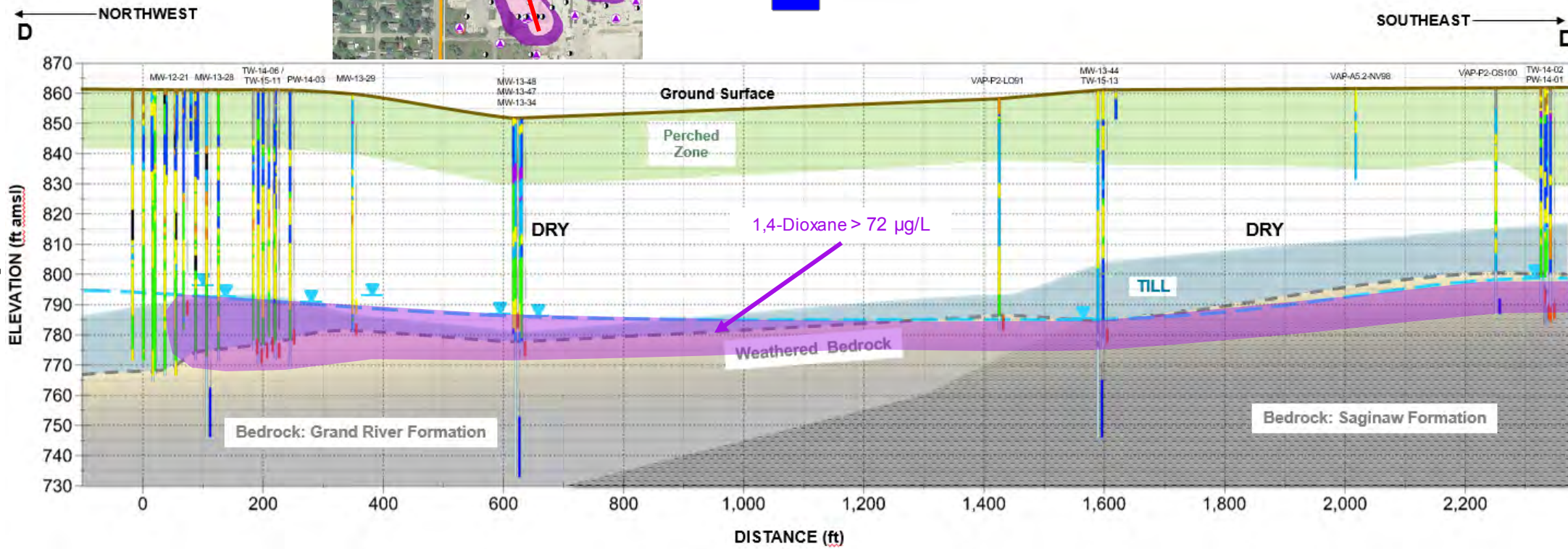
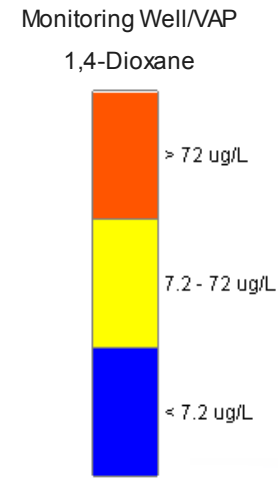
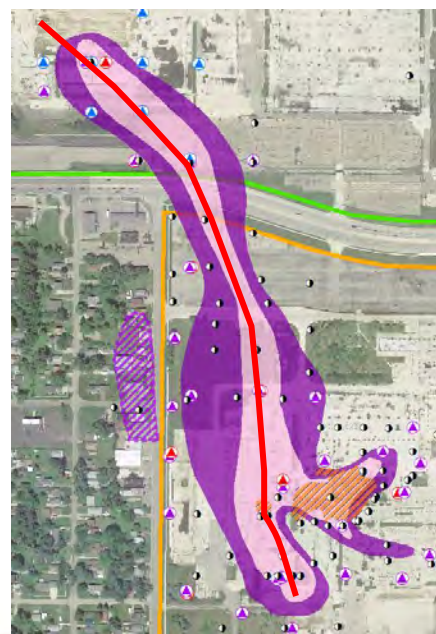
Lower 1,4-Dioxane Plume

LEGEND

-  BEDROCK MW
-  WEATHERED BR MW
-  DEEP OB MW
-  DEEP VAP BORING
-  MUNICIPAL BEDROCK WELL
-  PLANT 2 LNAPL
-  ESTIMATED APC > 7.2 ug/L
-  RACER > 72 ug/L
-  RACER > 7.2 ug/L
-  PLANT 2
-  PLANT 3
-  PLANT 6



Cross-Section



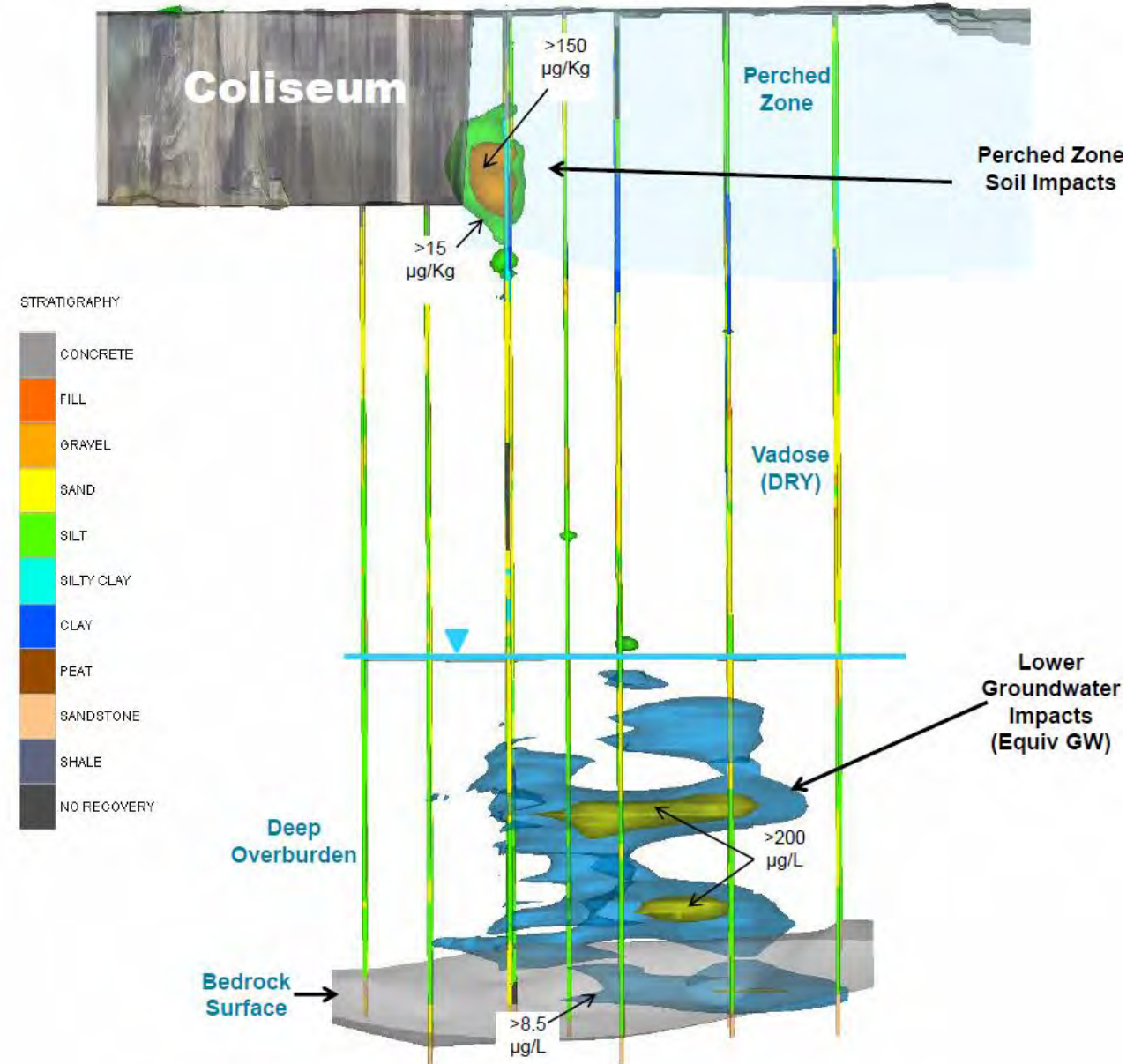
Coliseum Source Area

Perched zone

- Depleted source in low-K zones
 - Unlikely to leach based on SPLP

Deep Overburden

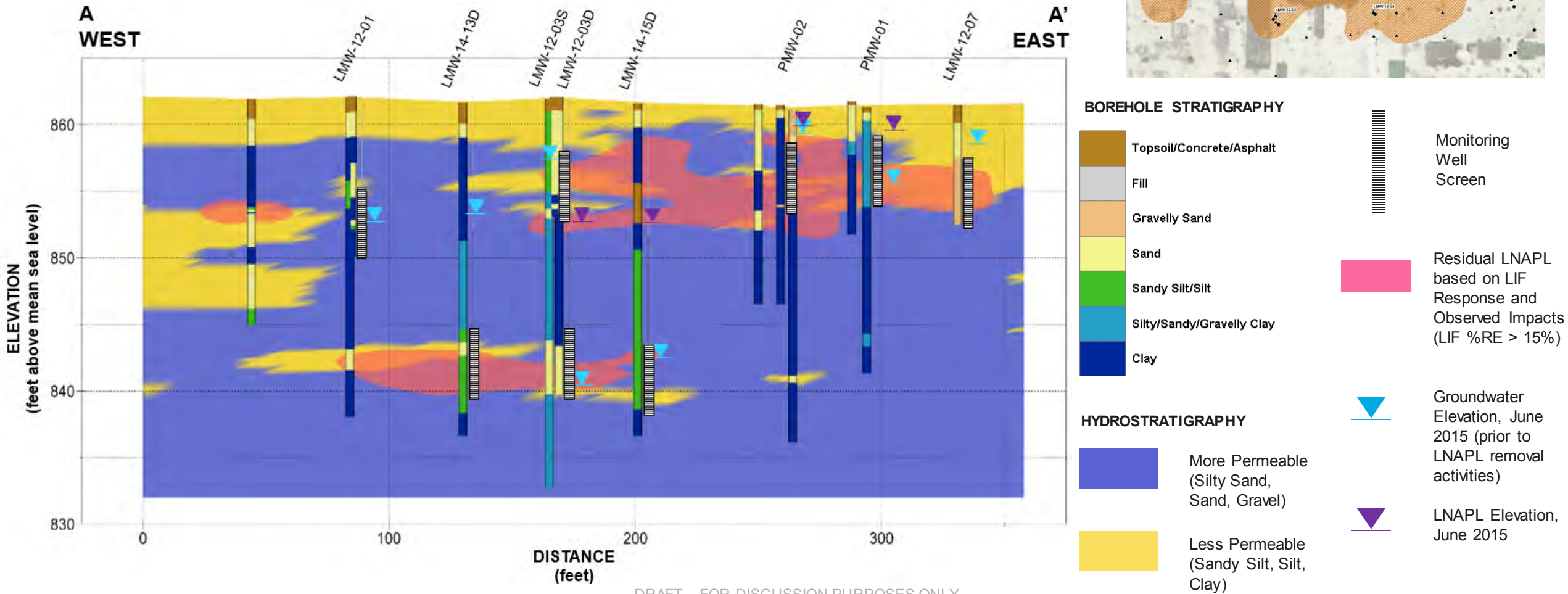
- Deep overburden consists of dense low-k silt and silty sand (10^{-4} to 10^{-5} cm/s)
- Concentrations consistent with downgradient plume
- Trend analysis suggests ongoing discharge from deep overburden to weathered bedrock decreasing
 - below target concentration ($72 \mu\text{g/L}$) within remediation timeframe



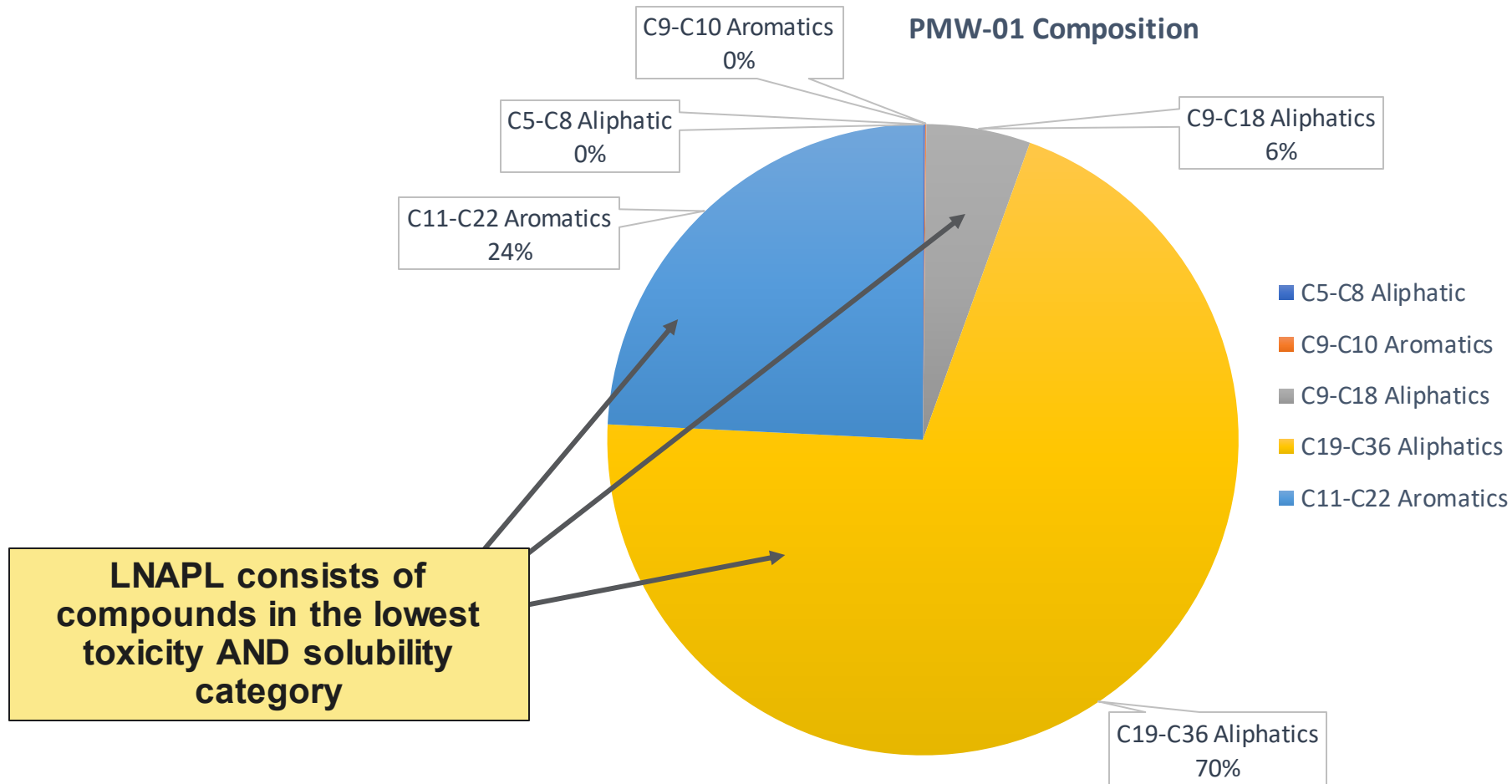
Plant 2 LNAPL

Plant 2 LNAPL Cross-Section

- Residual LNAPL impacts based on LIF response (>15 %RE), visual observations in soil borings, and/or positive shake test results.



Plant 2 LNAPL Composition



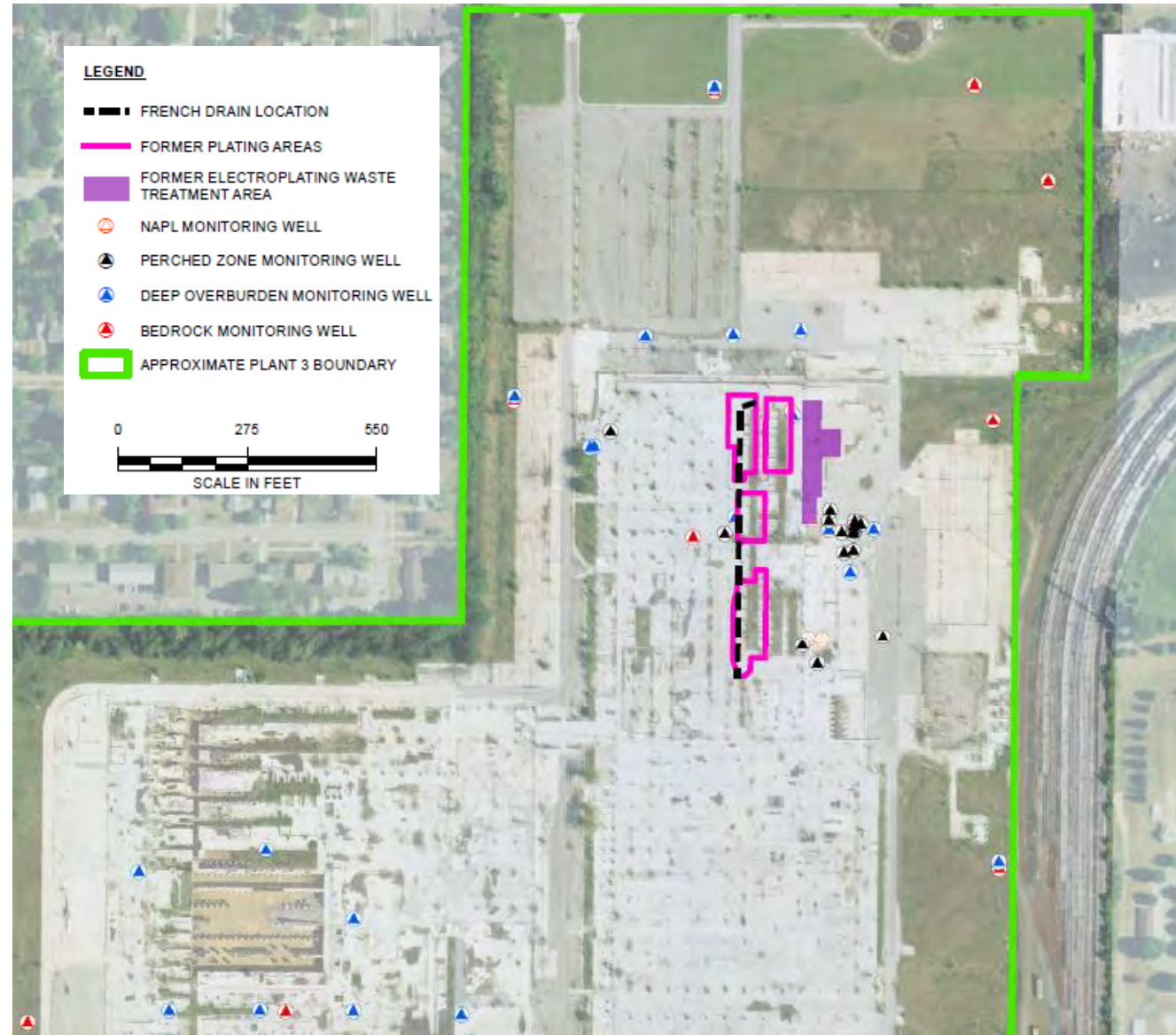
**TPH fractions indicate low overall risk related to toxicity and solubility.
LNAPL potentially addressed with NSZD and institutional controls.**

PFAS

Plant 3 Plating Area

Former Plating Line:

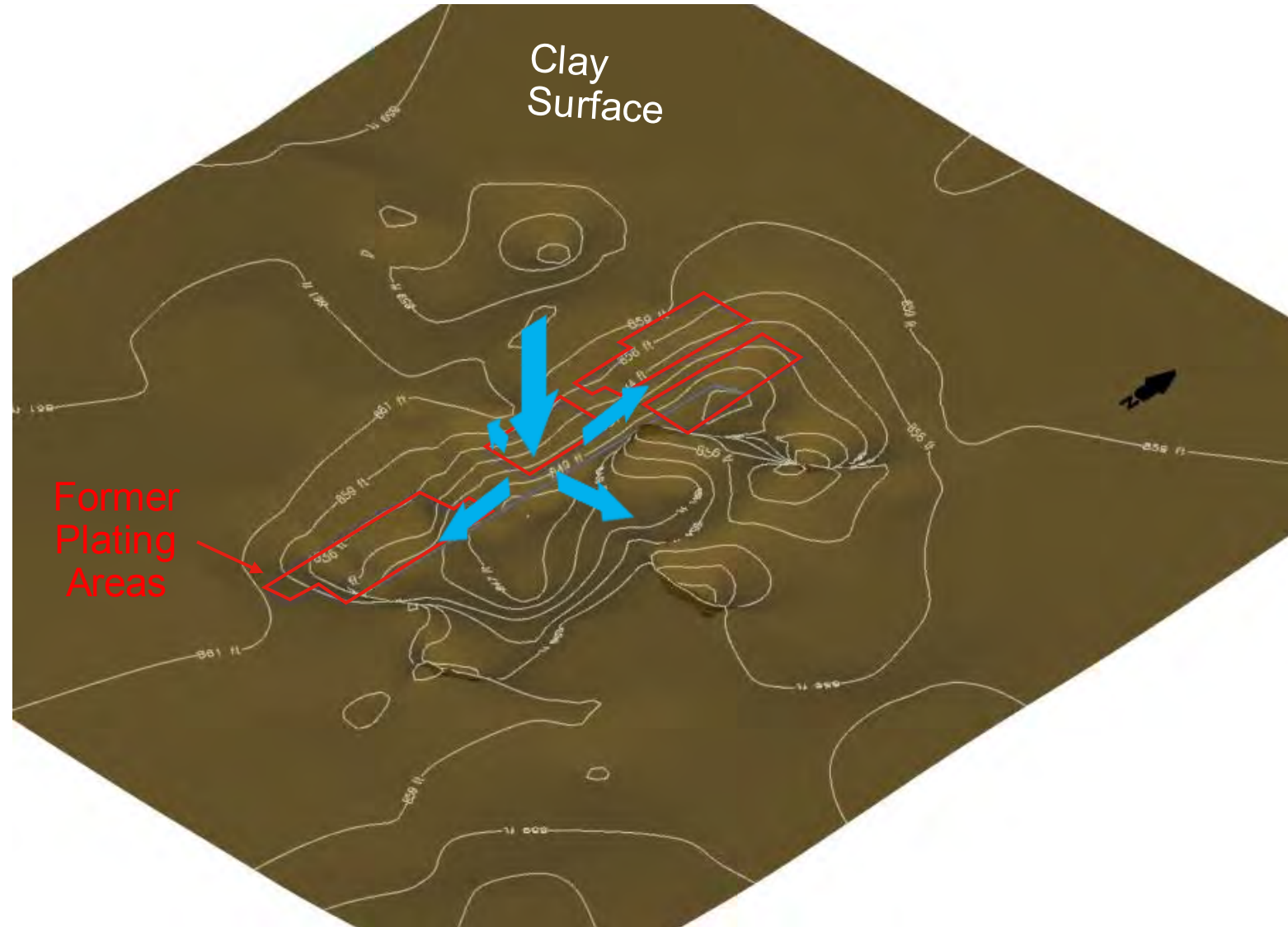
- PFAS used as part of plating mist suppressant system
- Plating line excavated in 1980s and replaced with fill
- Soils excavated and disposed
- French drain installed and impacted water collected periodically
- Area repurposed for press pits



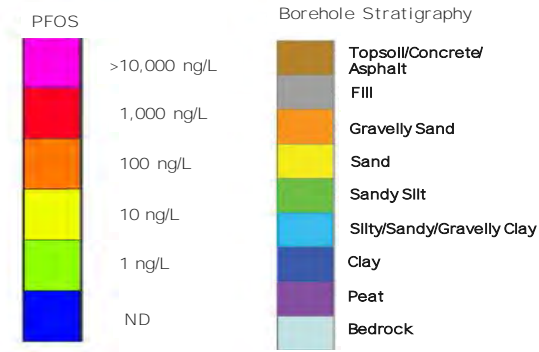
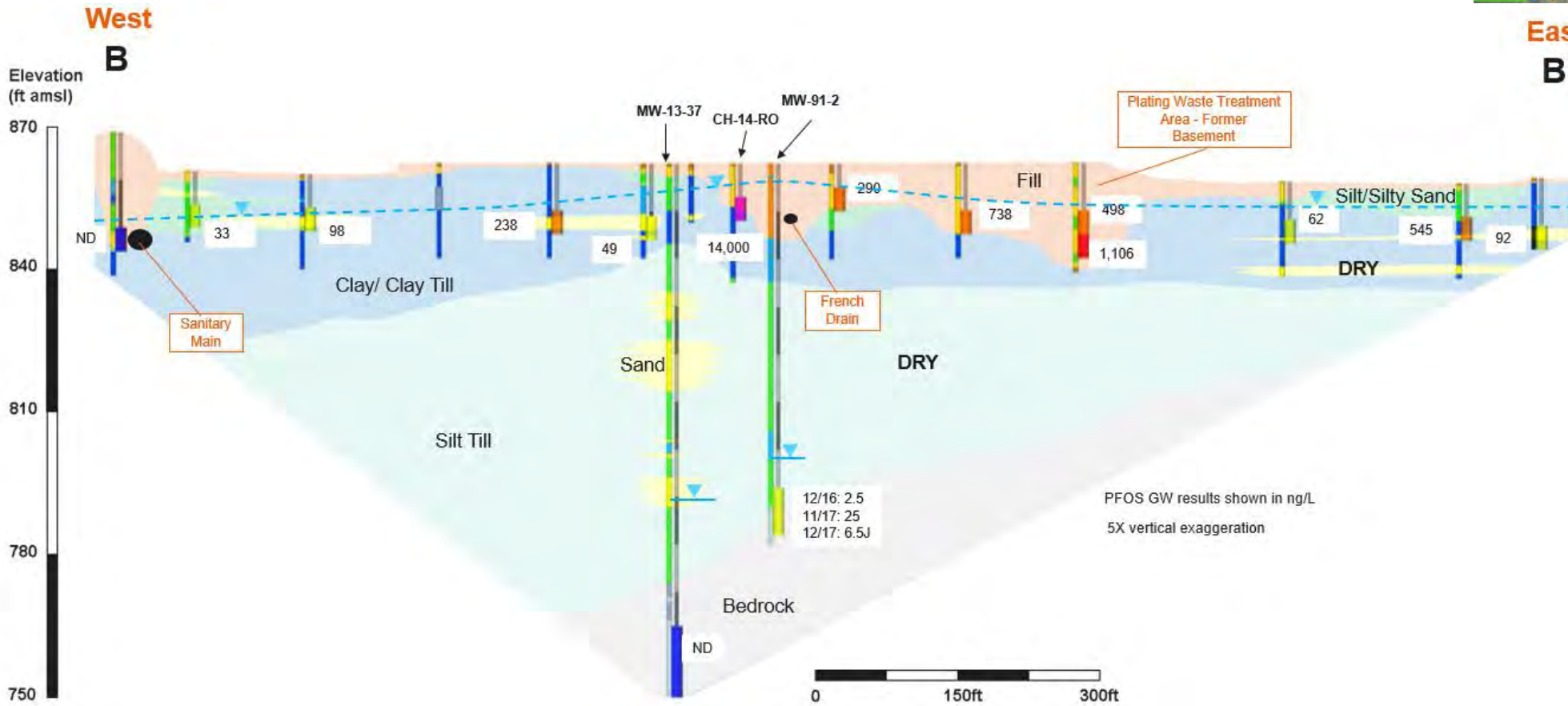
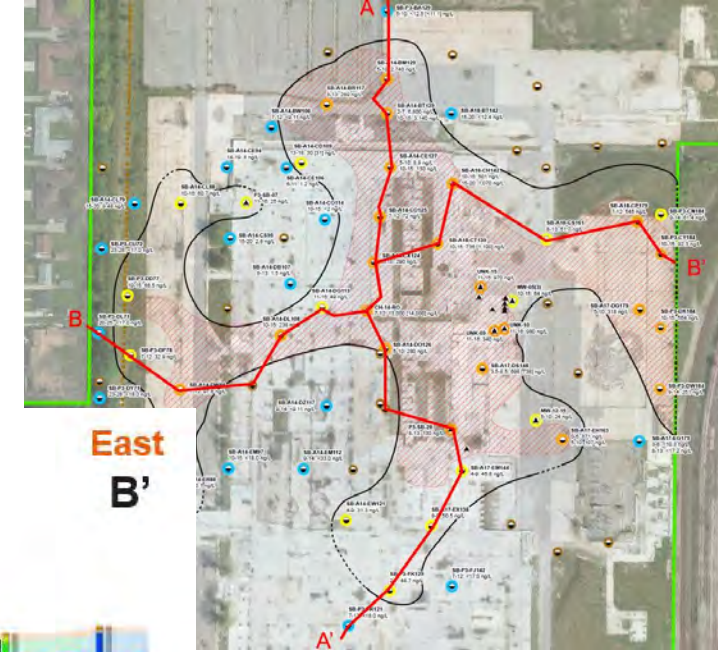
Site Geology

Clay surface underlying the shallow fill

- Fill placed following demolition of plating line
- Area repurposed as press pits
- Outside fill, transport is controlled by thin sand seams in clay till matrix
- Advection driven by recharge with radial flow in sand seams













East-West Cross-Section

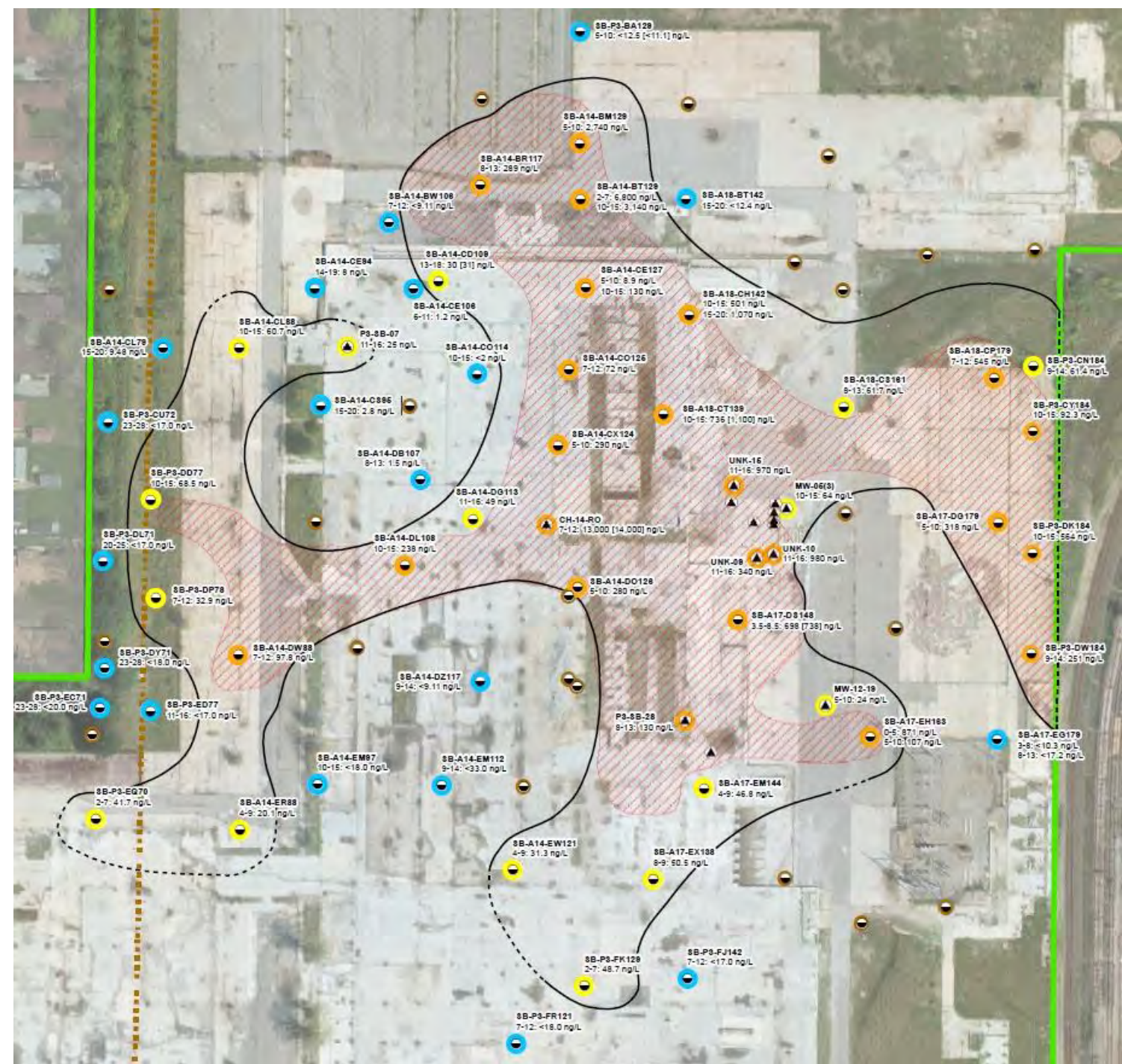


Delineation

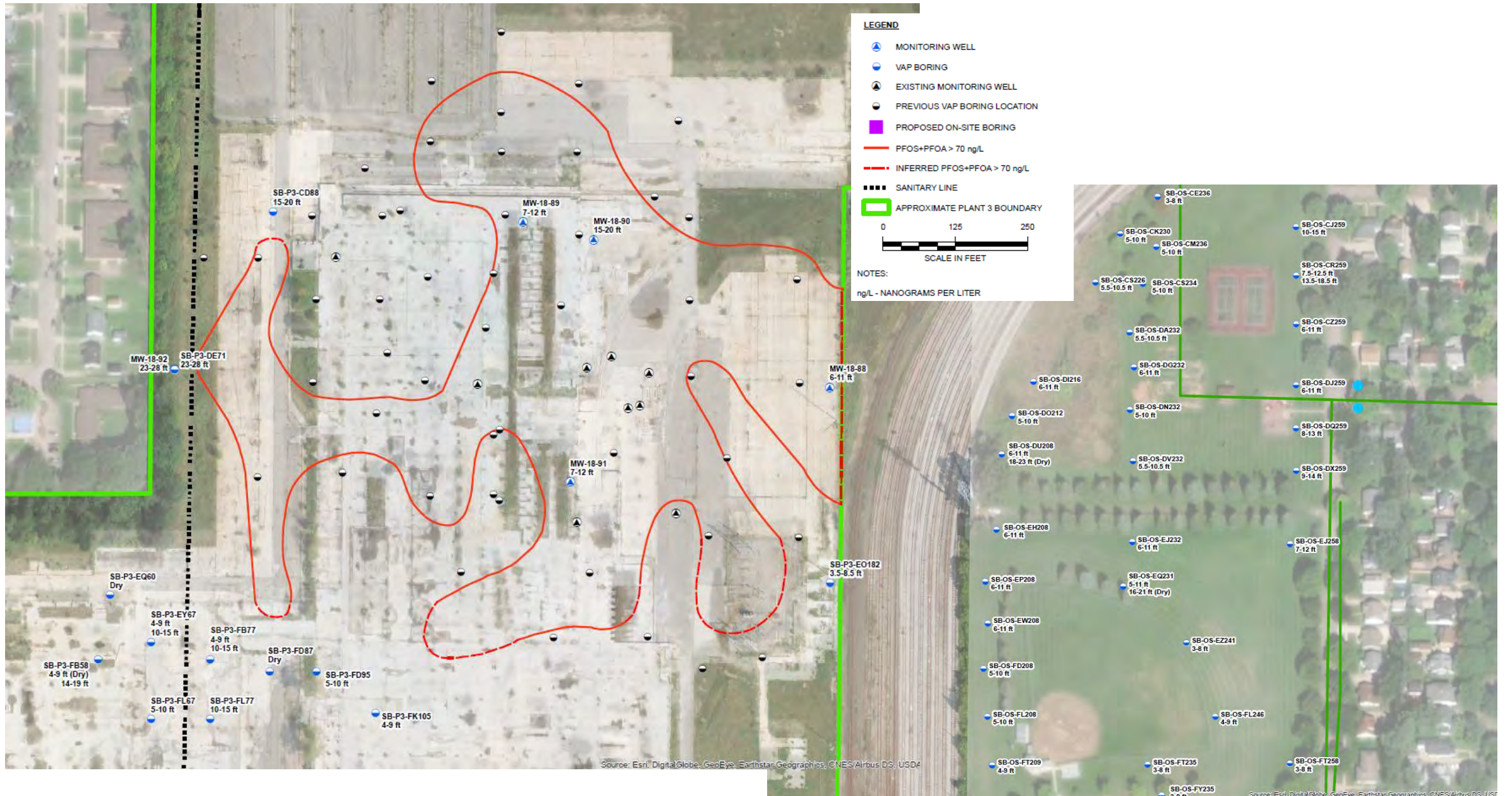
Initial Delineation indicating PFAS impacts off-site to the east.

LEGEND

-  APPROXIMATE PLUME PFOS > 70 ng/L [dashed where inferred]
-  APPROXIMATE PLUME PFOS > 12 ng/L [dashed where inferred]
-  PFOS < 12 ng/L
-  PFOS > 12 ng/L
-  PFOS > 70 ng/L
-  DRY LOCATION
-  SANITARY LINE
-  VAP BORING LOCATION
-  PERCHED ZONE MONITORING WELL
-  APPROXIMATE PLANT 3 BOUNDARY



2018 PFAS Delineation Work

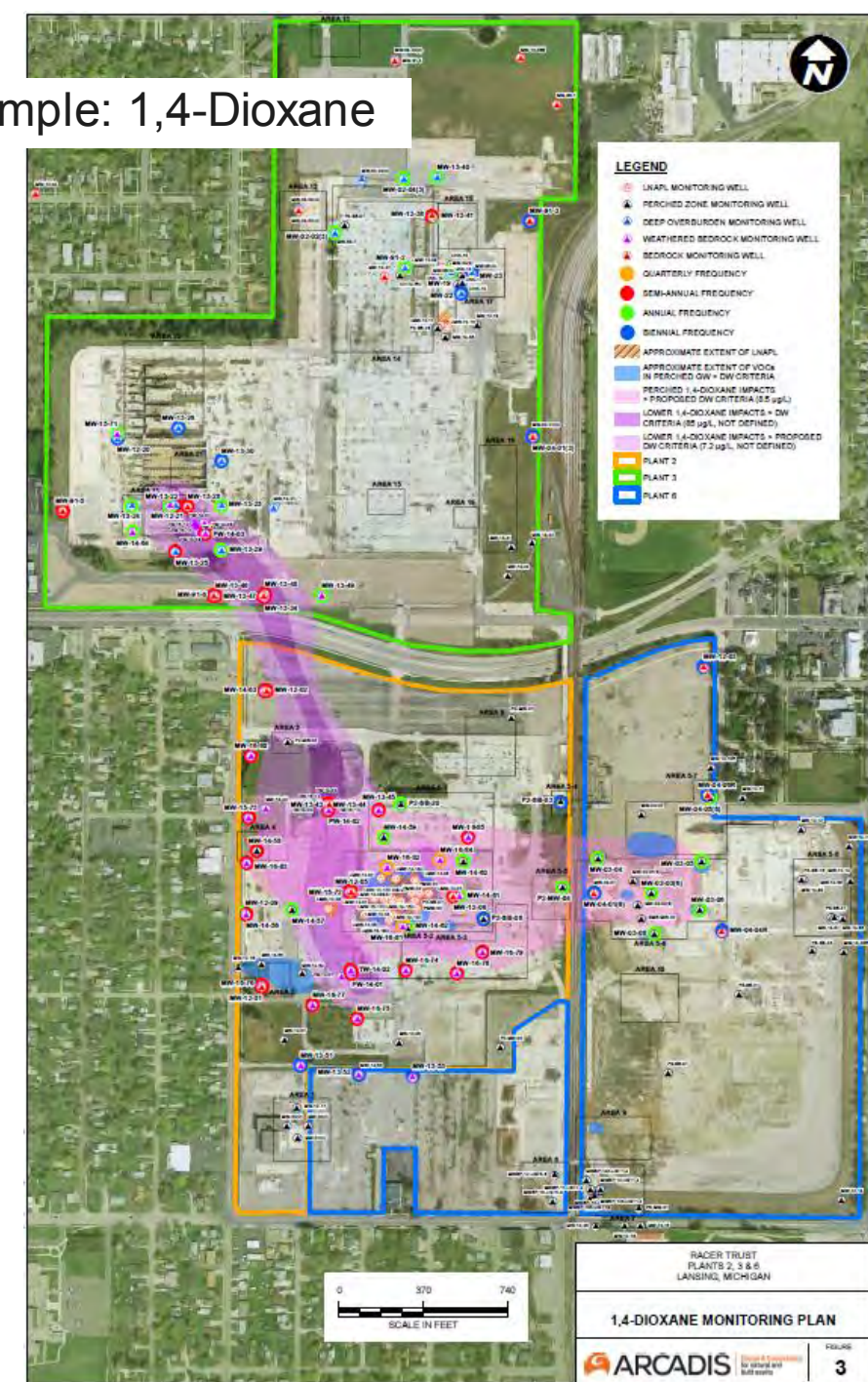


Ongoing Site Activities

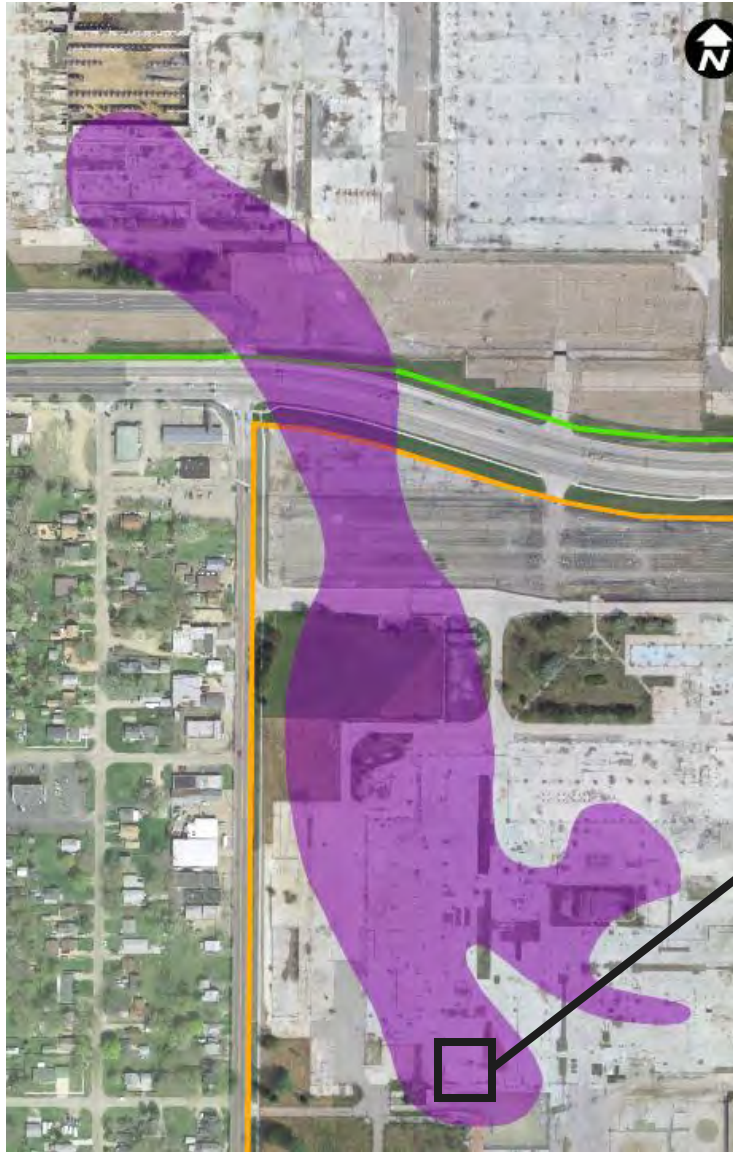
Interim Groundwater Sampling Plan

- Current plan approved in February 2017 and covers monitoring through Spring 2020
- Primarily semi-annual or annual sampling of monitoring wells
- Quarterly gauging and removal of LNAPL
- Storm sewer sampling
- Will require updates: e.g. include PFAS and new monitoring wells

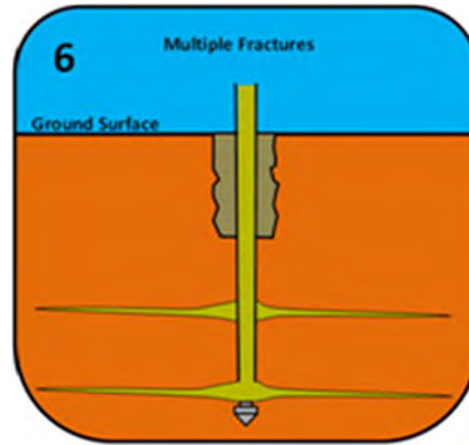
Example: 1,4-Dioxane



Biosparge Pre-Design Testing

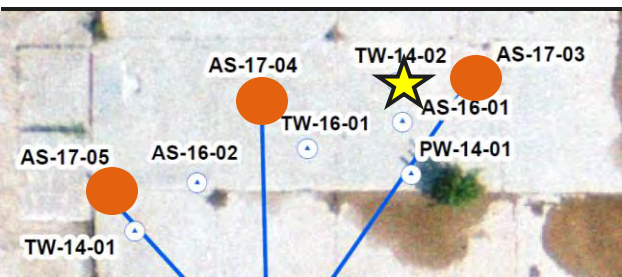


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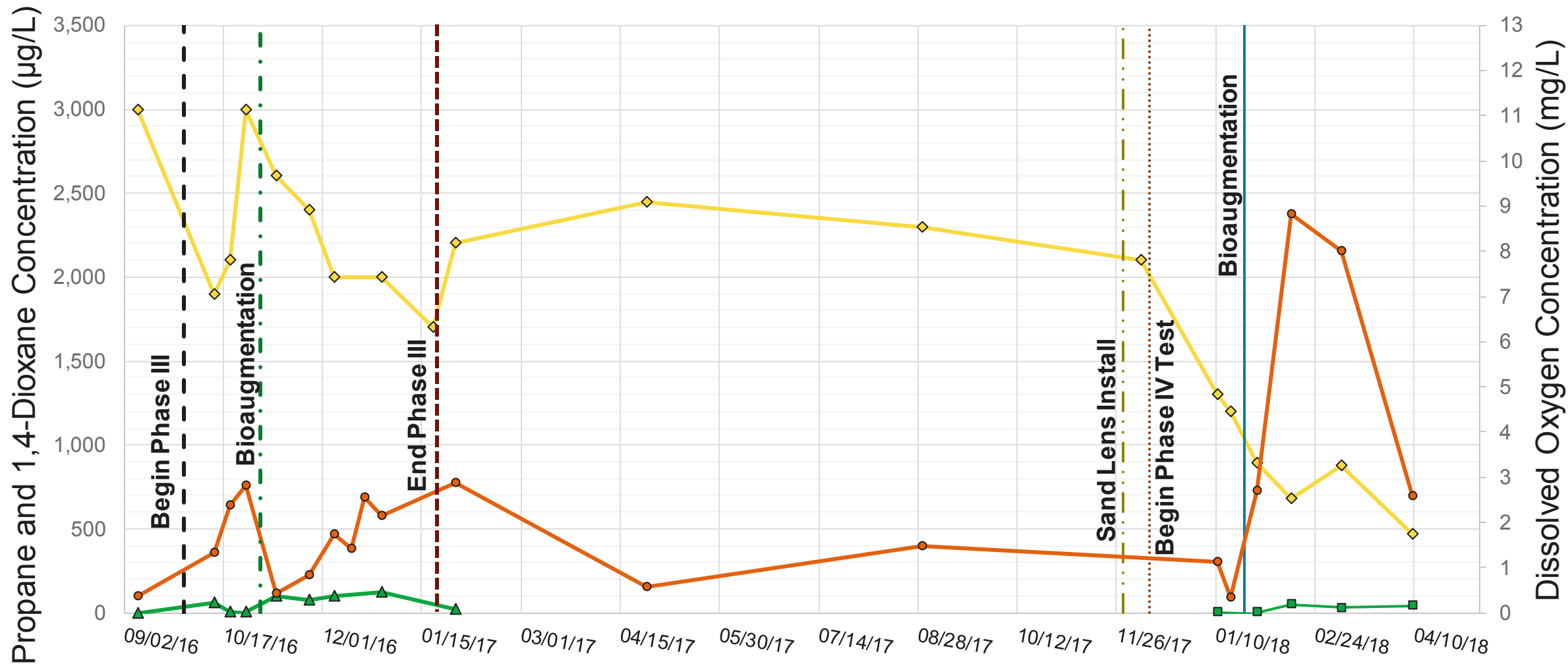
- Co-metabolic biodegradation of 1,4-dioxane utilizing biosparge of air and propane
- Installed sand lens enhancements to consistently distribute gases in weathered zone
- 4 month test sparging 3 sparge wells
- 6 hours of air flow per point per day, 1 hour intervals,
- 2 hours of propane flow per day, 1/2 hour intervals @ 15% LEL
- Bioaugmentation (ENV 425) and nutrient addition (DAP)
- Greater than 97% up time during testing





- ◆ 1,4-Dioxane
- ▲ Propane
- Dissolved Oxygen

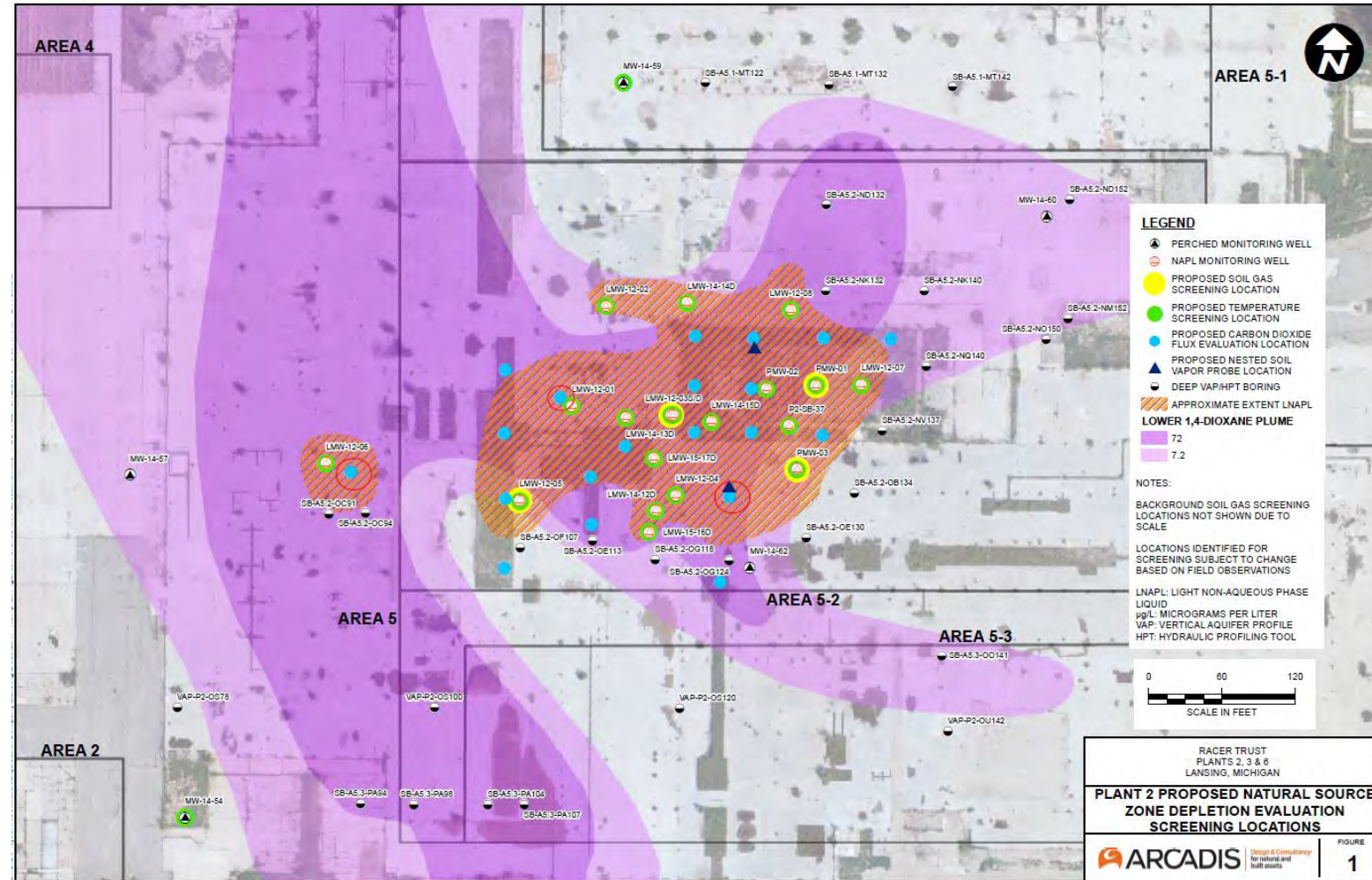
TW-14-02



Natural Source Zone Depletion

Three components:

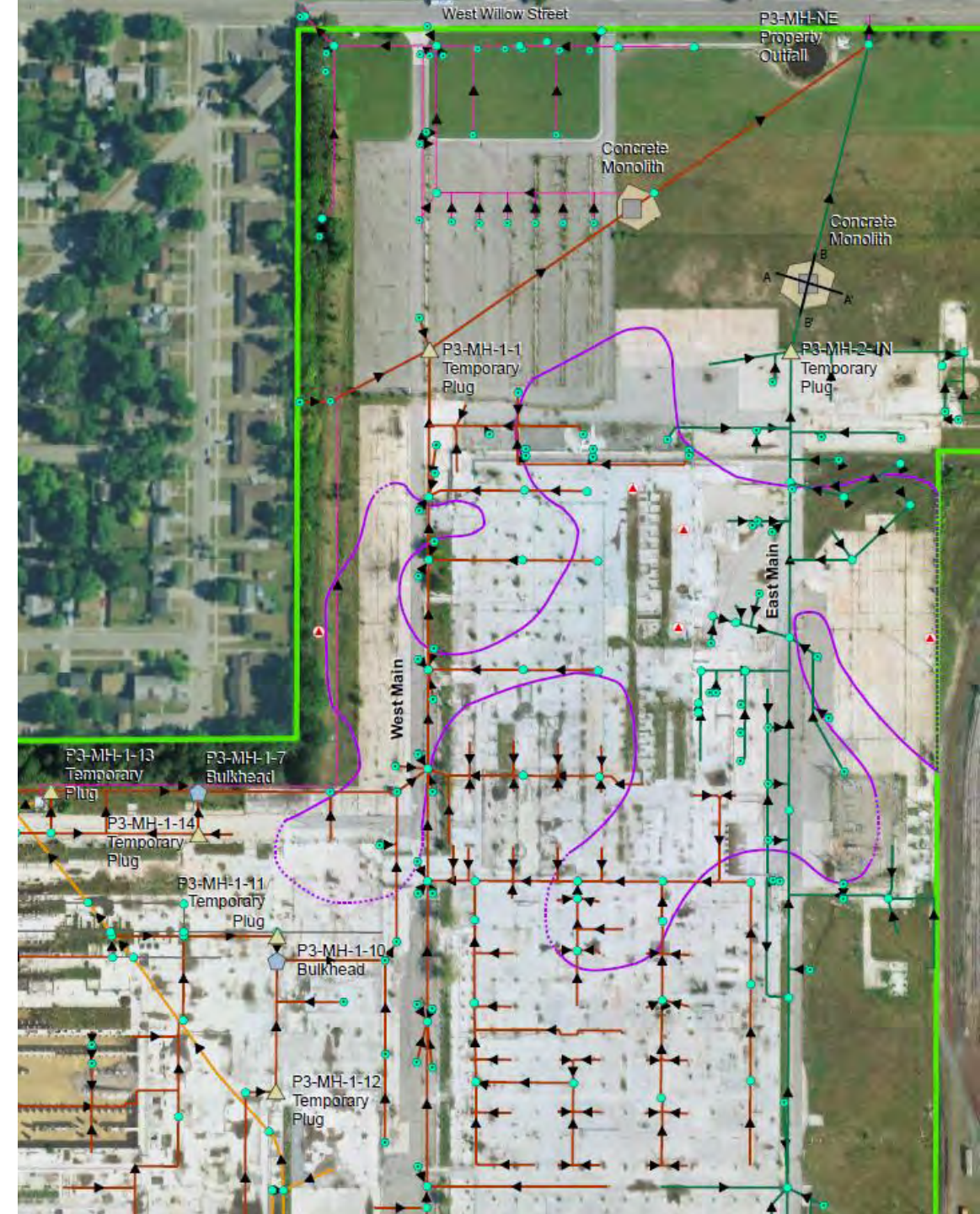
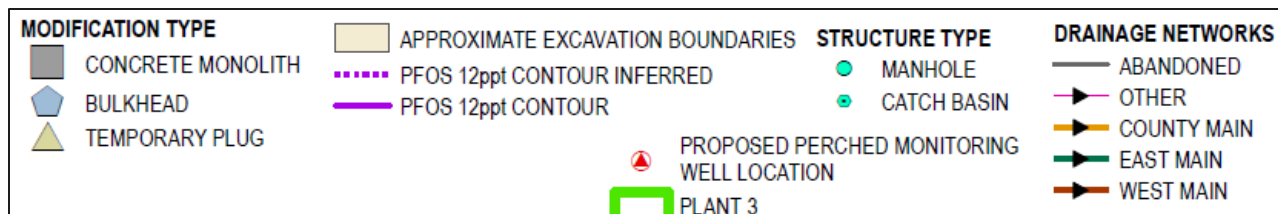
- Soil vapor screening from existing wells screened across the water table
 - evaluate the extent to which hydrocarbons and/or respiration and biogenic gases are present in the vadose zone
- Temperature profiling (one-time snapshot and long-term)
 - measure the heat released during the biologically-mediated NSZD processes
- CO2 flux evaluation to estimate time-averaged NSZD rates associated with volatilization and biodegradation of hydrocarbons in the vadose zone.



Plant 3 Bulkheading

Prevent PFAS from migrating off-site via storm sewer

- Install monoliths on main lines to north
- Bulkhead lines near county drain to prevent potential overflow to county drain
- Cap existing storm catch basins
- Bid package prep in progress
- Bid process expected to be completed this summer
- Work to be completed late summer-early fall



Vapor Intrusion Assessment

Currently evaluating vapor intrusion based on the latest guidance

- Building at Rosemary and W. Michigan
- Property Boundaries



Reviews in Progress

- Annual Report/Monitoring Changes/LNAPL Gauging
- Plant 6 Construction Completion Report