

RACER Lansing Update Meeting

Plants 2, 3 & 6

Lansing, Michigan

June 30, 2015

Agenda

- Annual Sampling Report
- ISCO Pilot Testing Update
- Plant 2 LNAPL Delineation
- Area 16 Status Update
- Plant 2 PCB Excavations
- Plant 6 Excavations
- Schedule



Annual Groundwater Sampling Report

- Groundwater Elevation
- LNAPL Monitoring
- Analytical Results
- Storm Sewer Sampling
- Plume Stability
- Bio-Trap Sampling

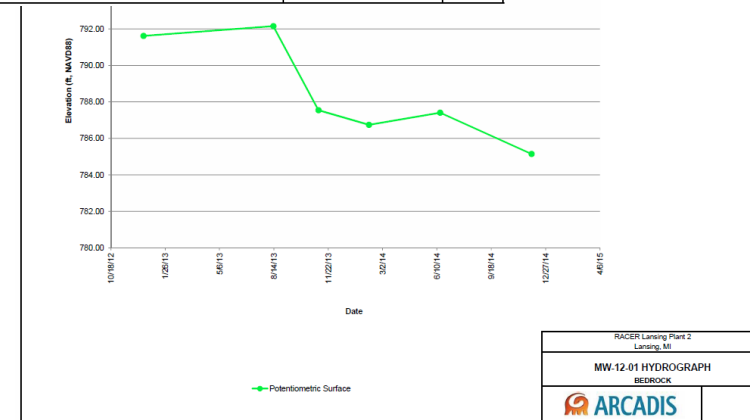
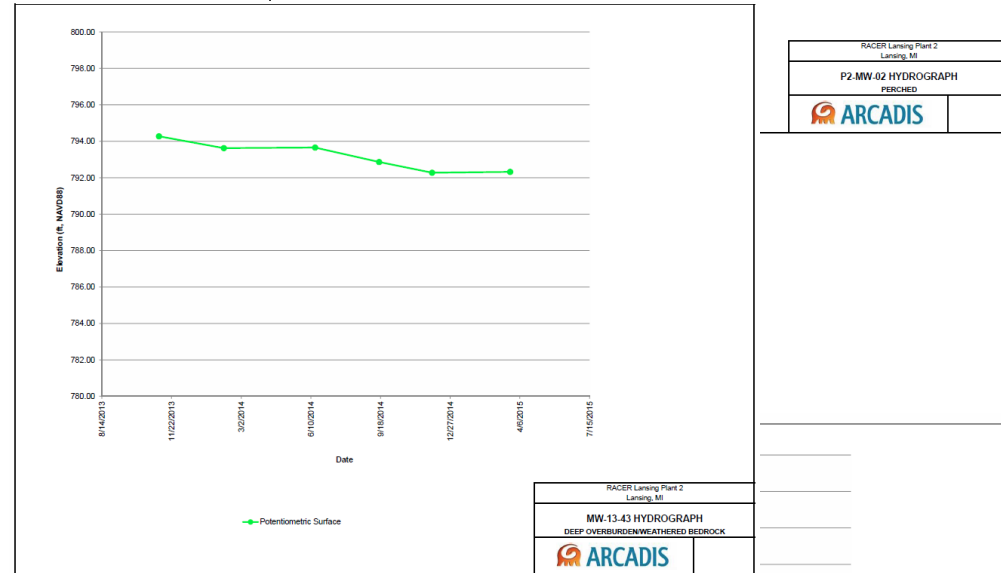
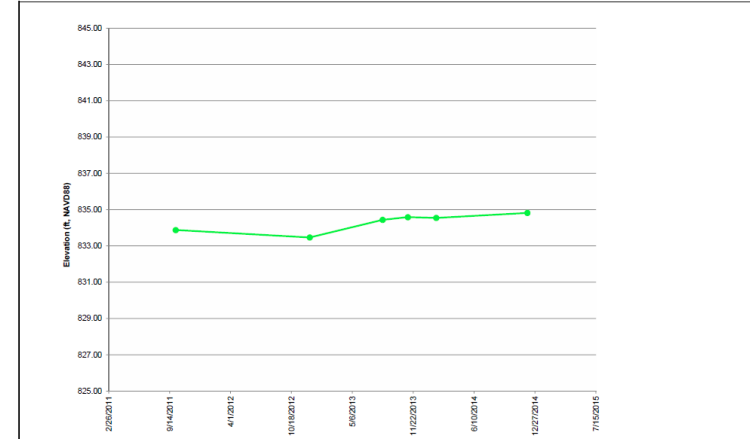
Groundwater Elevation

Contour maps consistent with RFI

- Complex hydrogeology
- Low-K / High gradients

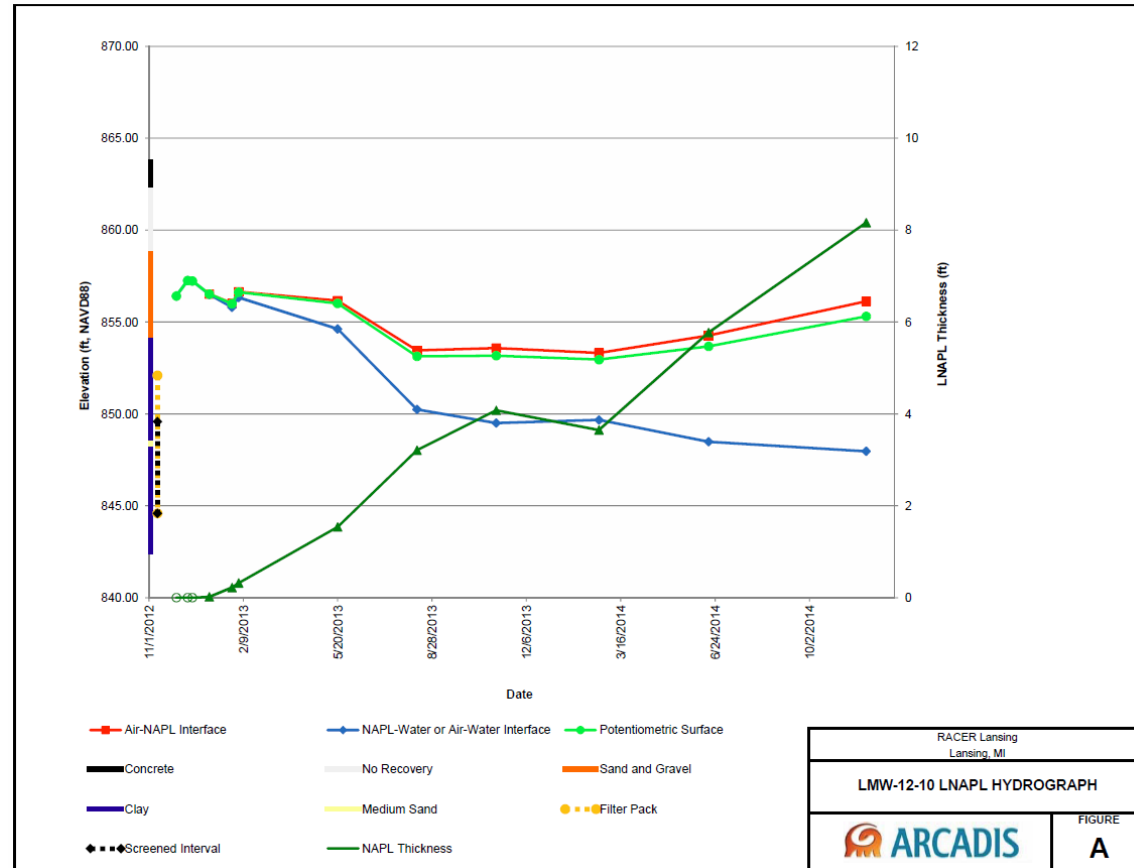
Trend graphs

- Stable/slightly increasing water levels in perched zone
- variable at depth likely associated with municipal pumping



LNAPL Monitoring

- LNAPL increases in thickness until it comes into equilibrium with static conditions
- No indication of migration
- Increasing thickness at LMW-12-10 at Plant 3.
 - Confined condition/slow discharge to well

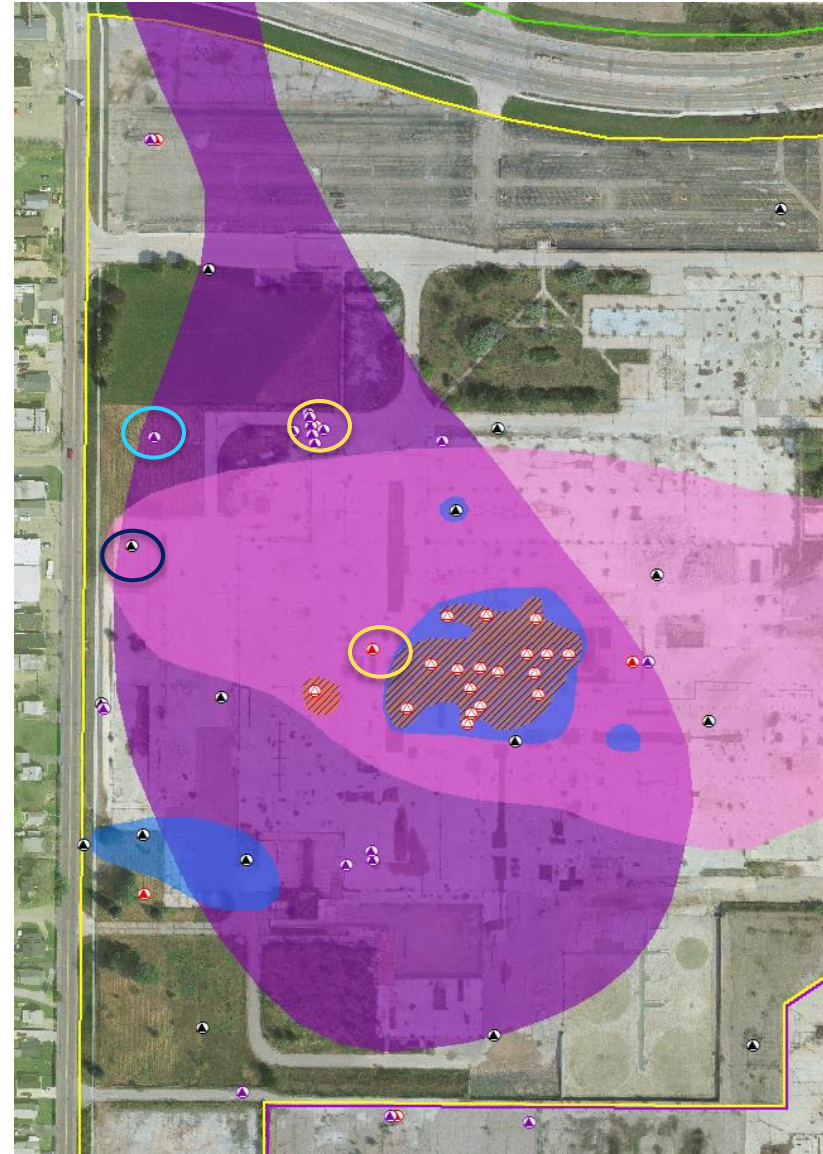


Groundwater Analytical Results

Other than metals – no exceedances of current DW Criteria at property boundaries

Storylines:

- MW-12-05 & MW-13-44 – bedrock 1,4-dioxane detections (Dec, 2014)
 - MW-13-44 – 6 µg/L
 - MW-12-05 – 7 µg/L
 - 2nd quarter 2015 - ND
- MW-14-58 – 1,4-dioxane above proposed criteria near Plant 2 property boundary
 - Comingled with APC plume?
 - Defined to west by APC wells
- MW-13-42 – weathered bedrock with increasing concentrations near western Plant 2 property boundary
 - Spreading? APC?
- Area 16 - Nickel in Groundwater

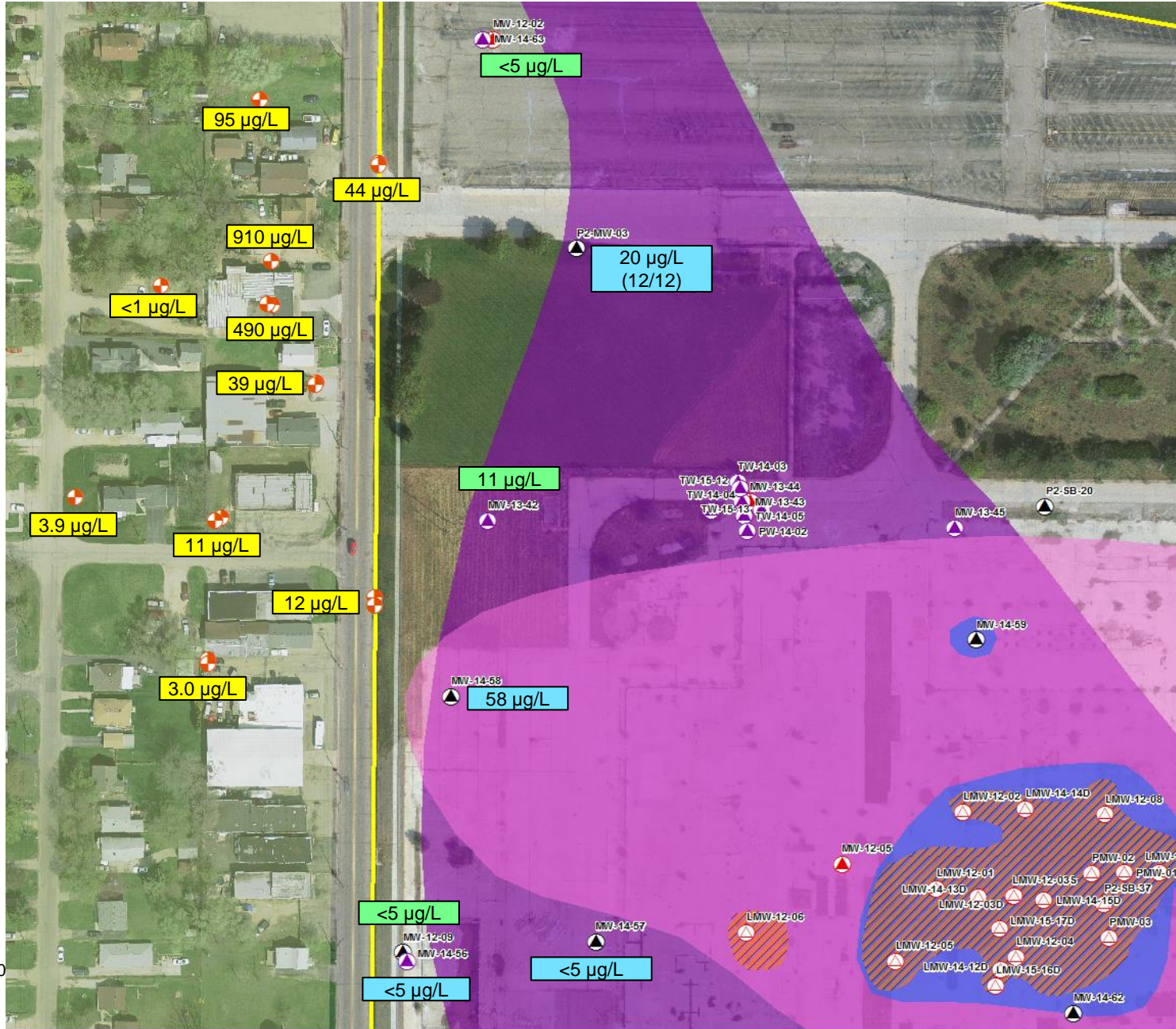


APC Wells – 1,4-Dioxane

APC Results –
Oct. 2014

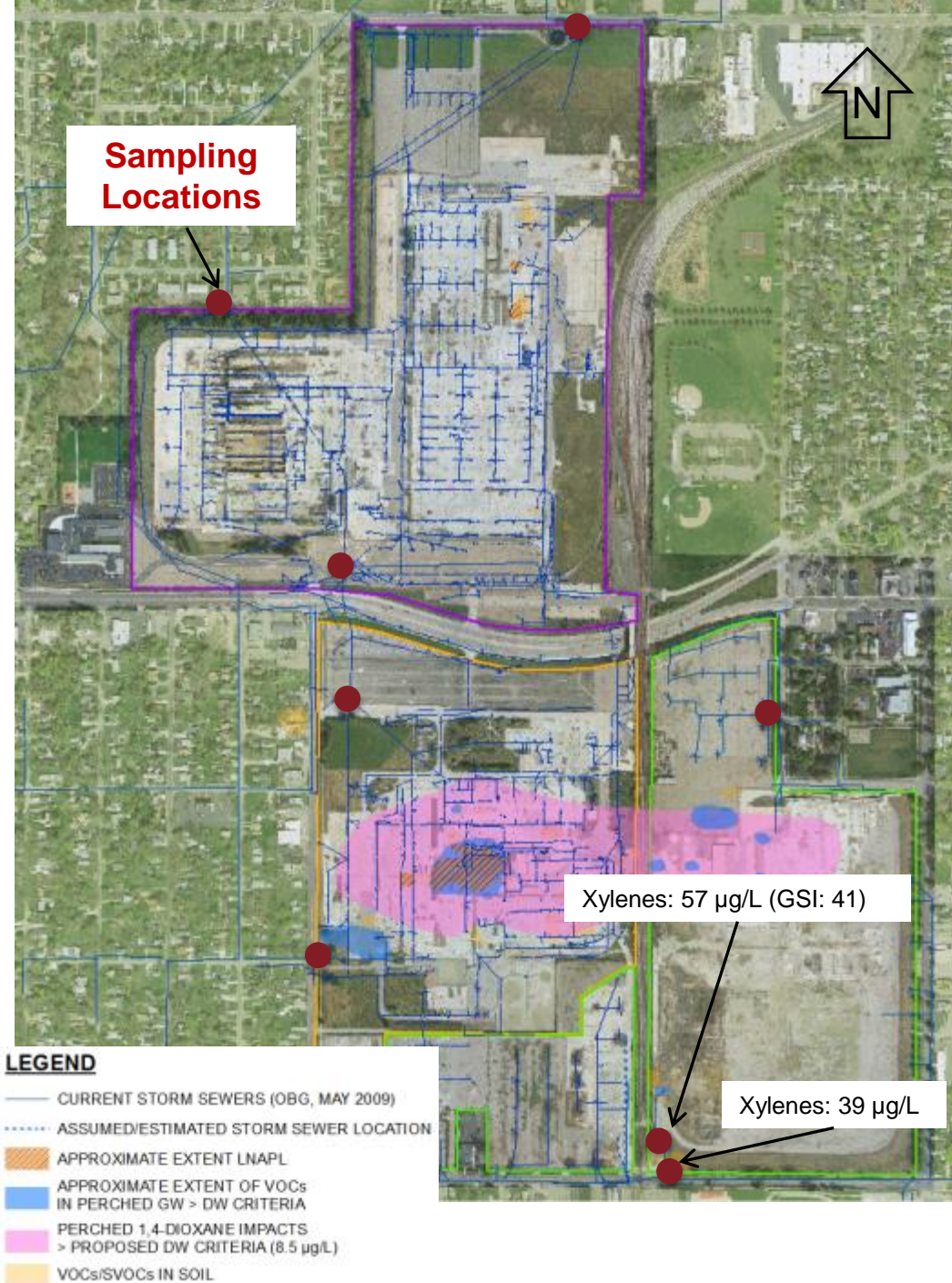
RACER
Results –
Dec. 2014

APC	
<1 µg/L	Perched
RACER	
58 µg/L	Perched
<5 µg/L	Lower



Storm Sewer Sampling (12/14)

- Results consistent with RFI
- Xylenes exceed GSI at 57 $\mu\text{g/L}$ at manhole, but not down-gradient at ESC-2



Plume Stability

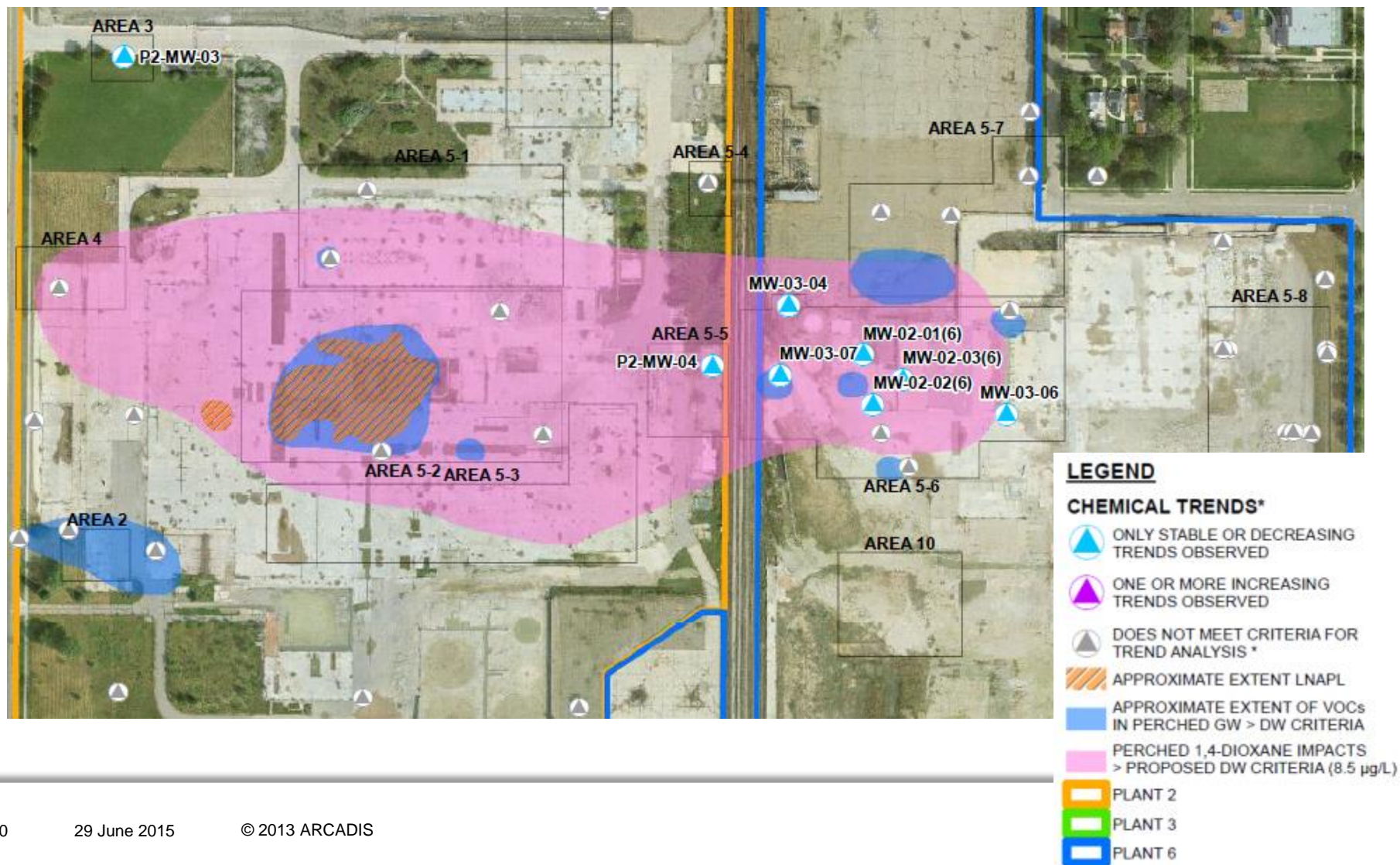
Results for perched zone consistent with the findings of the 2014 assessment:

- Stable or decreasing VOCs with elevated metals a result of shifts in Site geochemistry
- Perched 1,4-dioxane considered stable, receding from the eastern Plant 6 property boundary

Lower 1,4-dioxane - exhibits increasing trend in source area and central portions of the plume

- Recent sampling in source suggest stable

Plume Stability – Perched 1,4-Dioxane












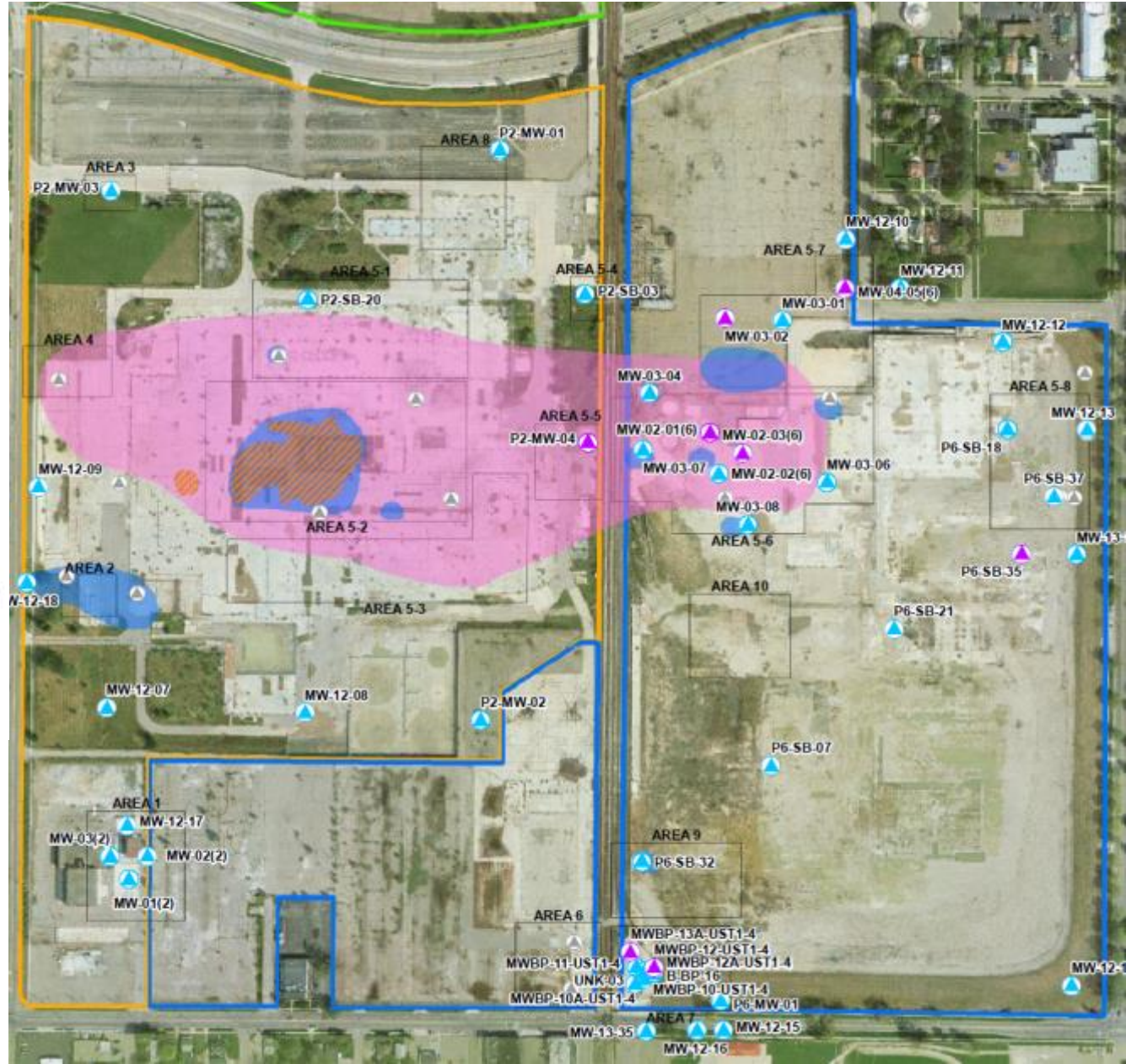
Plume Stability – Metals

Plants 2 & 6

LEGEND

CHEMICAL TRENDS*

-  ONLY STABLE OR DECREASING TRENDS OBSERVED
-  ONE OR MORE INCREASING TRENDS OBSERVED
-  DOES NOT MEET CRITERIA FOR TREND ANALYSIS *
-  APPROXIMATE EXTENT LNAPL
-  APPROXIMATE EXTENT OF VOCs IN PERCHED GW > DW CRITERIA
-  PERCHED 1,4-DIOXANE IMPACTS > PROPOSED DW CRITERIA (8.5 µg/L)
-  PLANT 2
-  PLANT 3
-  PLANT 6












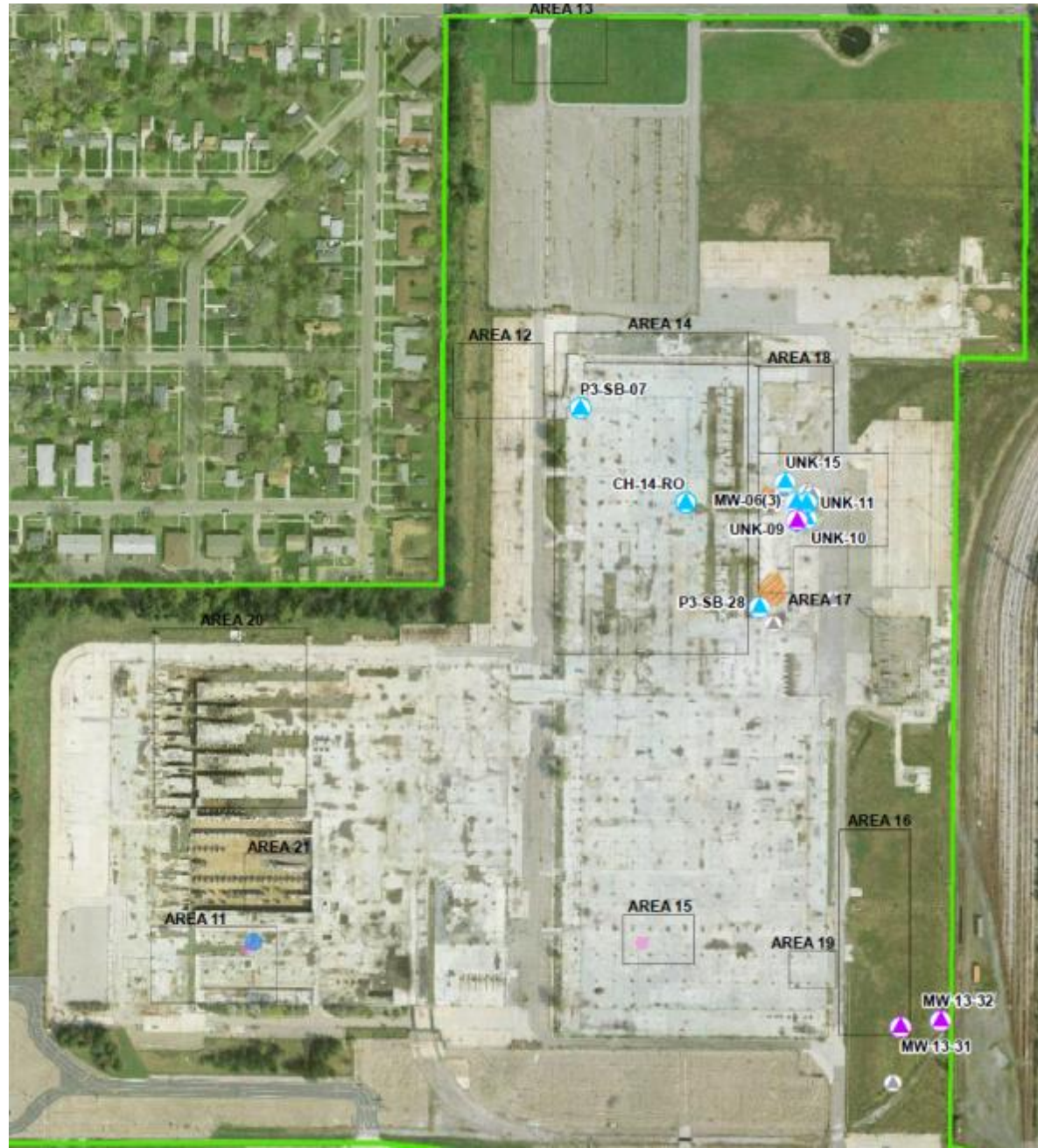
Plume Stability – Metals

Plant 3

LEGEND

CHEMICAL TRENDS*








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-  PLANT 2
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-  PLANT 6

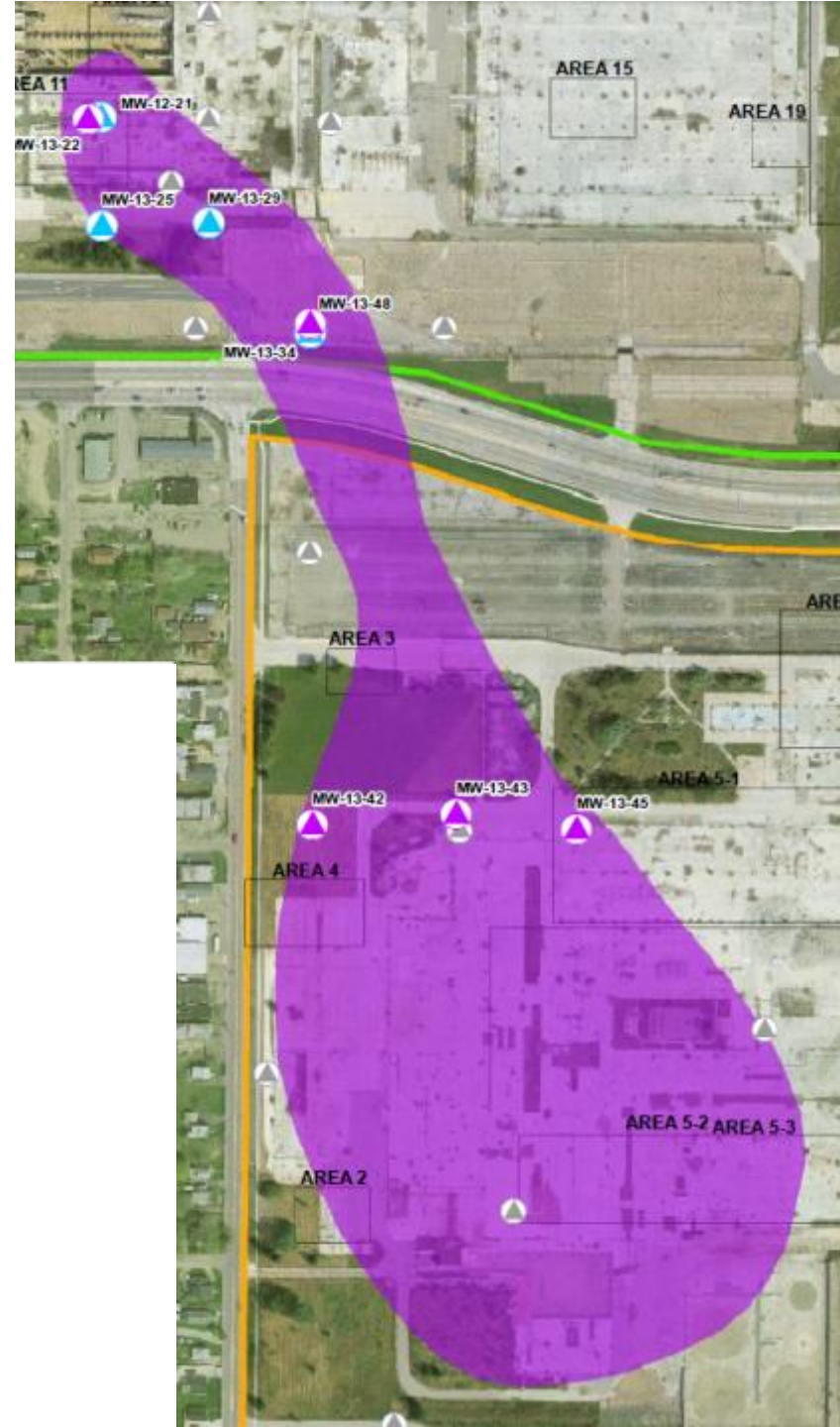


Plume Stability – Lower 1,4-Dioxane

LEGEND

CHEMICAL TRENDS*

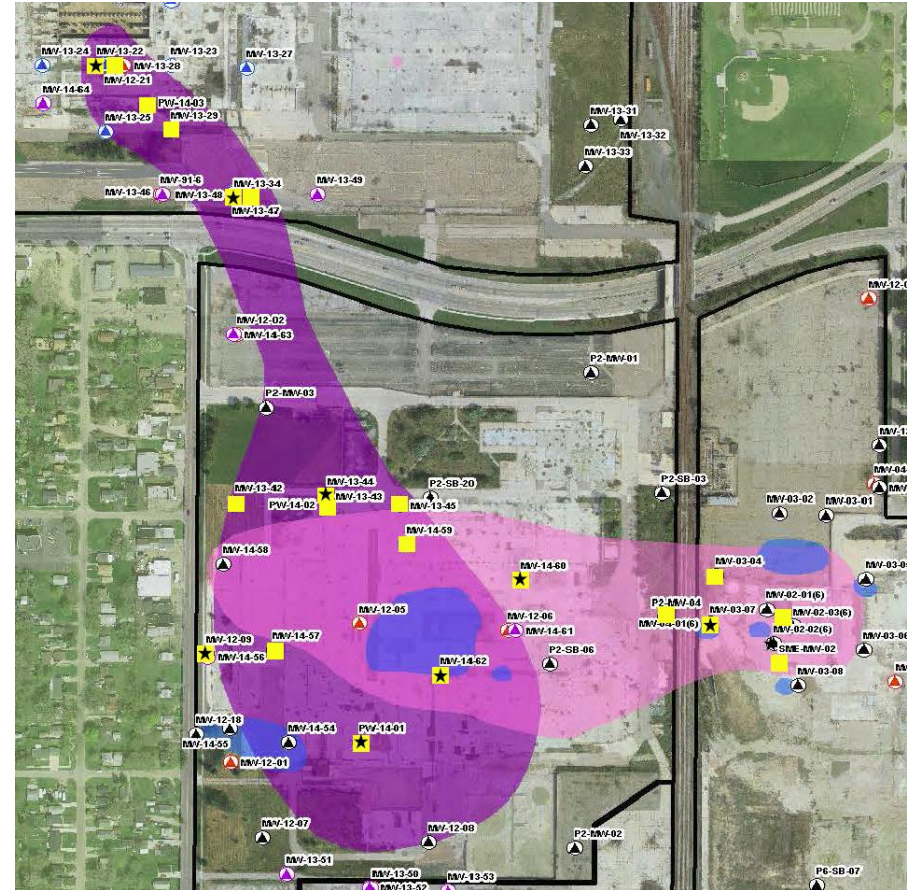
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-  ONE OR MORE INCREASING TRENDS OBSERVED
-  DOES NOT MEET CRITERIA FOR TREND ANALYSIS *
-  LOWER 1,4-DIOXANE IMPACTS > PROPOSED DW CRITERIA (8.5 µg/L)
-  PLANT 2
-  PLANT 3
-  PLANT 6



Bio-Trap Sampling

Line of evidence for 1,4-dioxane natural attenuation via microbial cometabolism at the Site:

- Components - substrate, genetic coding, genetic expression - are present in both plumes
- Particularly relevant where methane and DO are both present (e.g., edges of impacted groundwater zones)



NOTES:

■ MONITORING WELL SAMPLED FOR DISSOLVED LIGHT HYDROCARBON GASSES

★ BIO-TRAP® DEPLOYMENT LOCATION

NOT ALL WELLS SHOWN ON THIS FIGURE WERE SAMPLED DURING THIS MONITORING EVENT.

DW: DRINKING WATER
VOCs: VOLATILE ORGANIC COMPOUNDS

Annual Report Summary

- No immediate action recommended at this time
- LNAPL trends do not suggest LNAPL migration
 - Commence LNAPL removal 2nd quarter 2015
- Storm Sewer sampling results consistent with RFI
 - Xylenes at Plant 6 outfall below GSI criteria at ESC-2
- Perched impacts stable
 - Bio-traps suggest mechanism for biodegradation
- Continue to monitor lower 1,4-dioxane plume
 - Currently evaluating appropriate remedy and additional characterization options
- Several changes proposed to IGMP based on results

ISCO Pilot Testing Update

- Test well installation
- Bench scale testing

Well Installation

Test injection wells installed via dual rotary

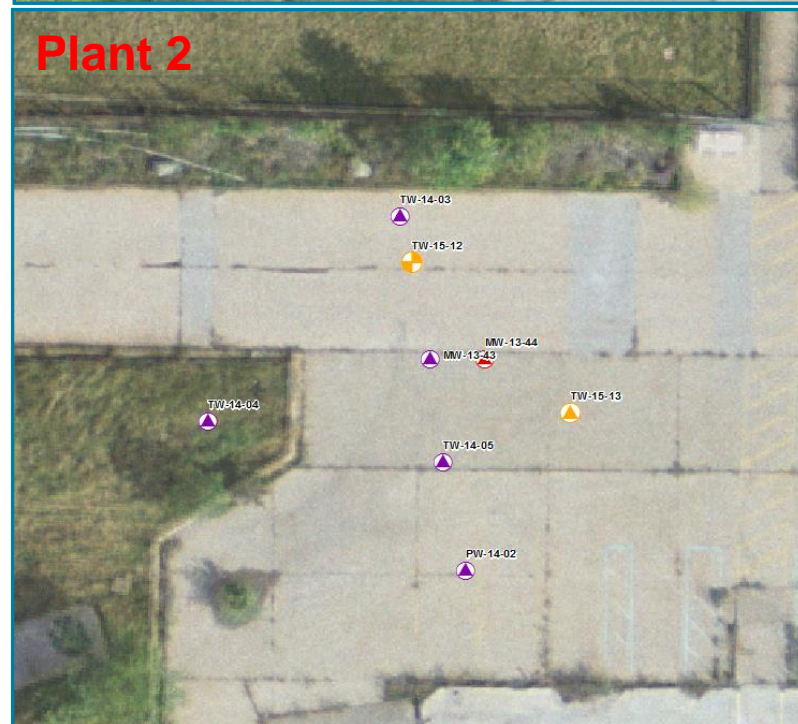
- Evaluate improvement to well efficiency

Additional monitoring wells installed with sonic

Plant 3

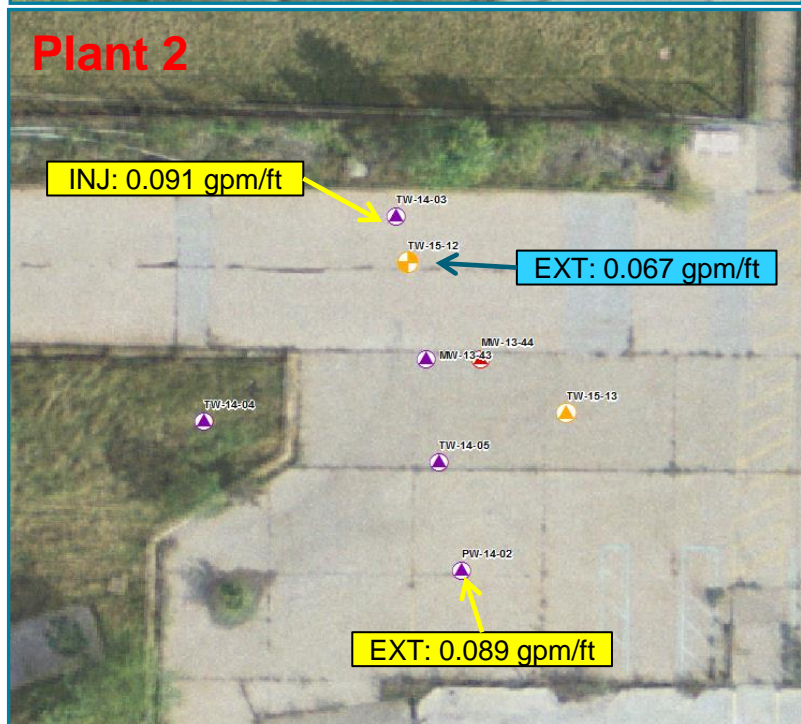


Plant 2



Specific Capacity

- Slight increase in capacity at Plant 3
- No difference / slight decrease at Plant 2



Bench Scale Testing

- Total Oxidant Demand (TOD) tests completed for the 3 activation options
 - ambient, iron, and alkaline
- Results show that Plant 2 has a higher TOD than Plant 3
- TOD is lowest for the ambient activation and highest for alkaline activation as expected
- TOD for iron activation not significantly different than ambient activation

Plant 3



Plant 2



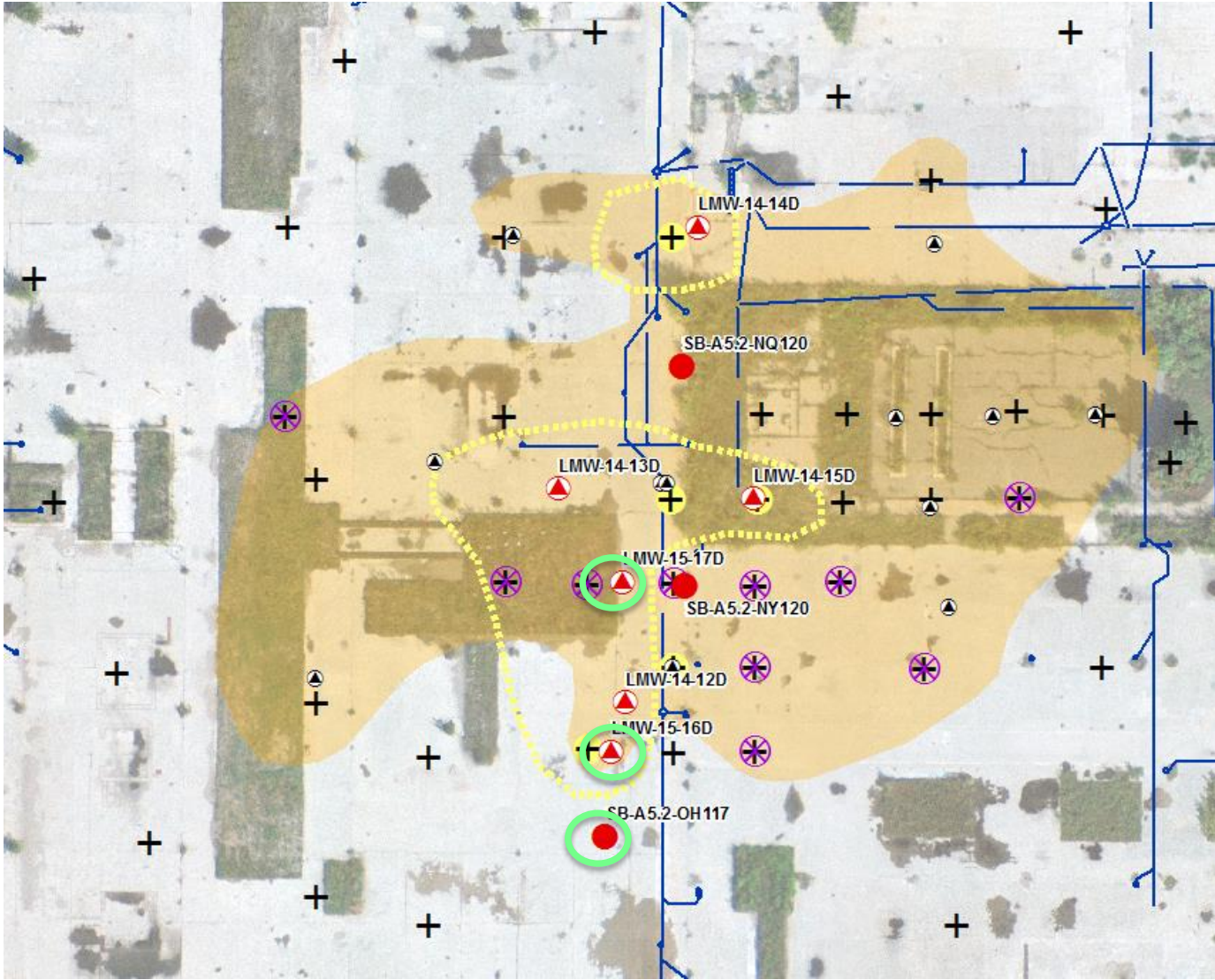
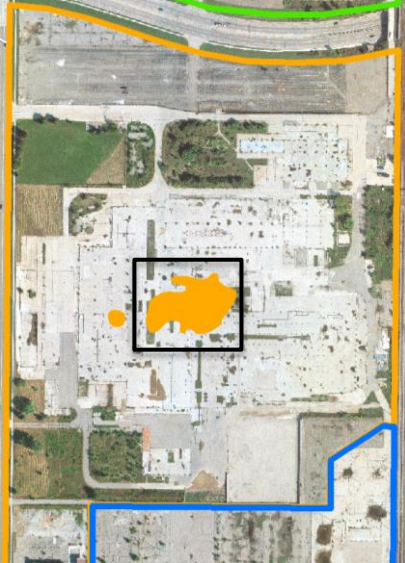
Bench Scale Testing Path Forward

- Treatability study to be completed at both locations (Plant 2 & 3)
- Iron activation eliminated as an option
- Pilot injection would be “inject and drift”
 - Requires high oxidant dose
 - Lower tests (15 g/L) eliminated from the second phase of the treatability test
- Three week 1,4-Dioxane treatment test; samples collected at 7, 14 and 21 days
- Overall timeframe for test is 4 weeks
- Tracer injection is schedule for the first week of September 2015

Additional LNAPL Investigation

- Well installation
- LNAPL Monitoring
- LNAPL Removal

Plant 2 Deeper LNAPL

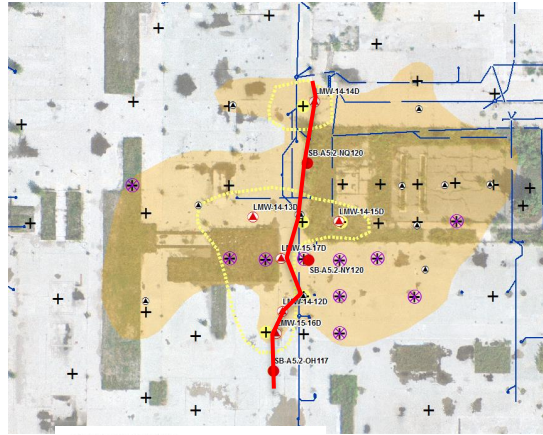


- LEGEND**
- NEW SOIL BORING
 - ▲ NEW SOIL BORING/DEEPER LNAPL MONITORING WELL
 - ▲ PREVIOUS LNAPL WELL
- LIF DATA**
- ⊕ LIF BORING 2012
 - ⊗ LIF BORING REFUSAL <15'
 - LIF DEEPER RESPONSE LOWER
 - APPROXIMATE EXTENT DEEPER LNAPL
 - STORM SEWER
 - APPROXIMATE EXTENT SHALLOW LNAPL

Plant 2 LNAPL Cross-Section

NORTH

SOUTH

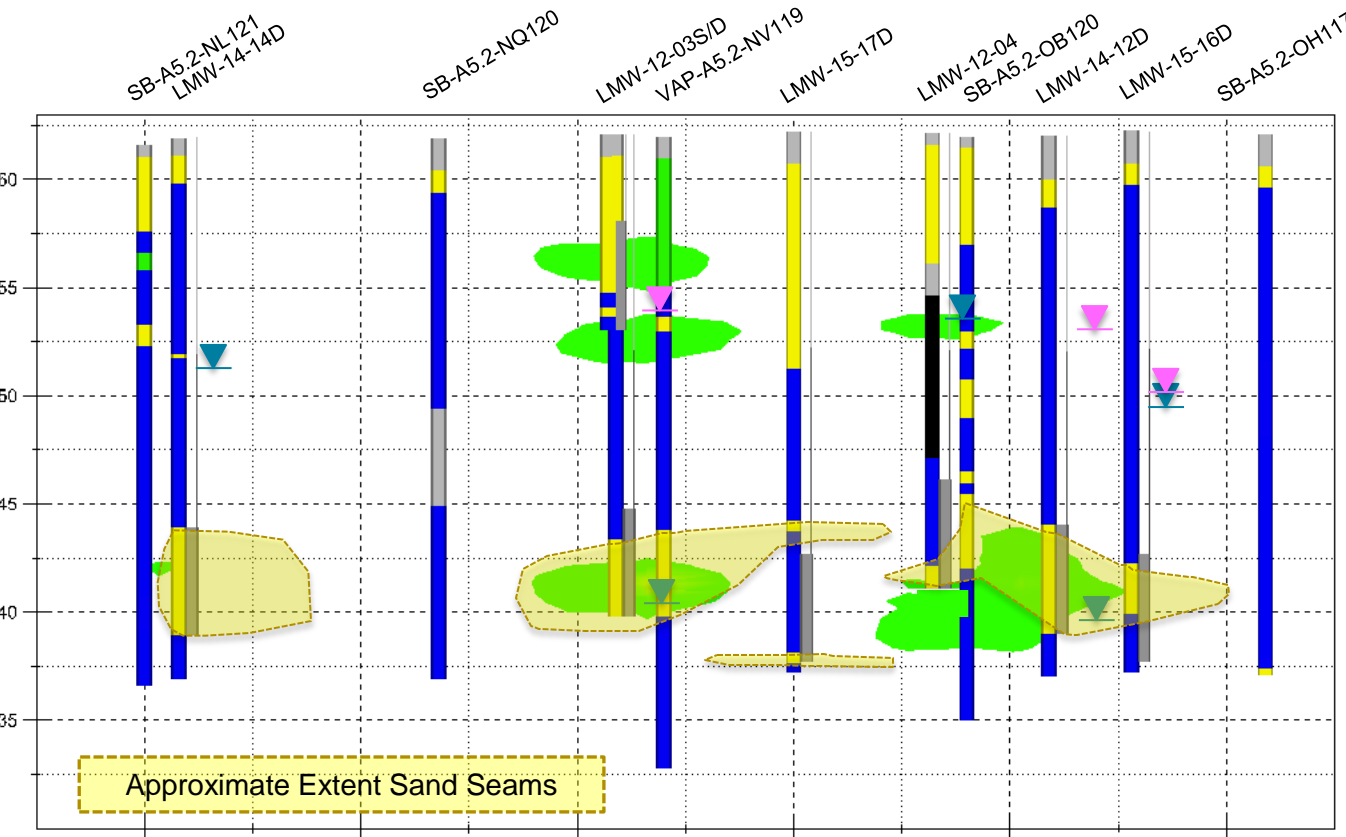


STRATIGRAPHY

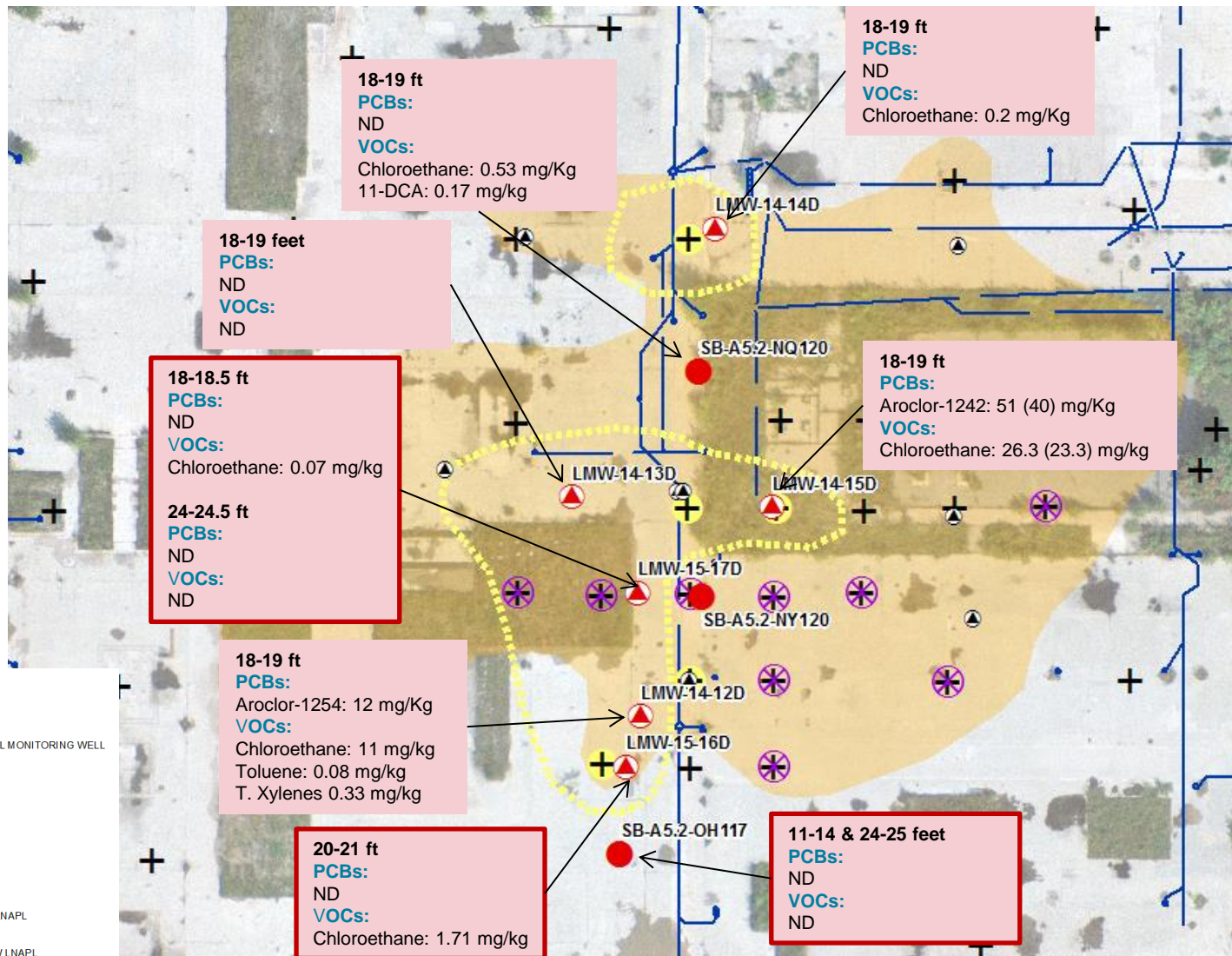
- CONCRETE/ASPHALT/TOPSOIL
- FILL
- GRAVEL/GRAVELLY SAND
- SAND
- SANDY SILT/SILT
- SANDY/SILTY CLAY
- CLAY
- PEAT
- SANDSTONE
- SHALE
- NO RECOVERY

- Approximate LNAPL elevation
- Approximate groundwater elevation

LNAPL based on LIF Response



Plant 2 LNAPL Soil Analytical - Deeper



Plant 2 LNAPL Summary

- Lower LNAPL defined to the south
- Permeable lower sand sporadic, discontinuous
- First recovery event completed during 2nd quarter sampling event
 - ~7 gallons LNAPL recovered

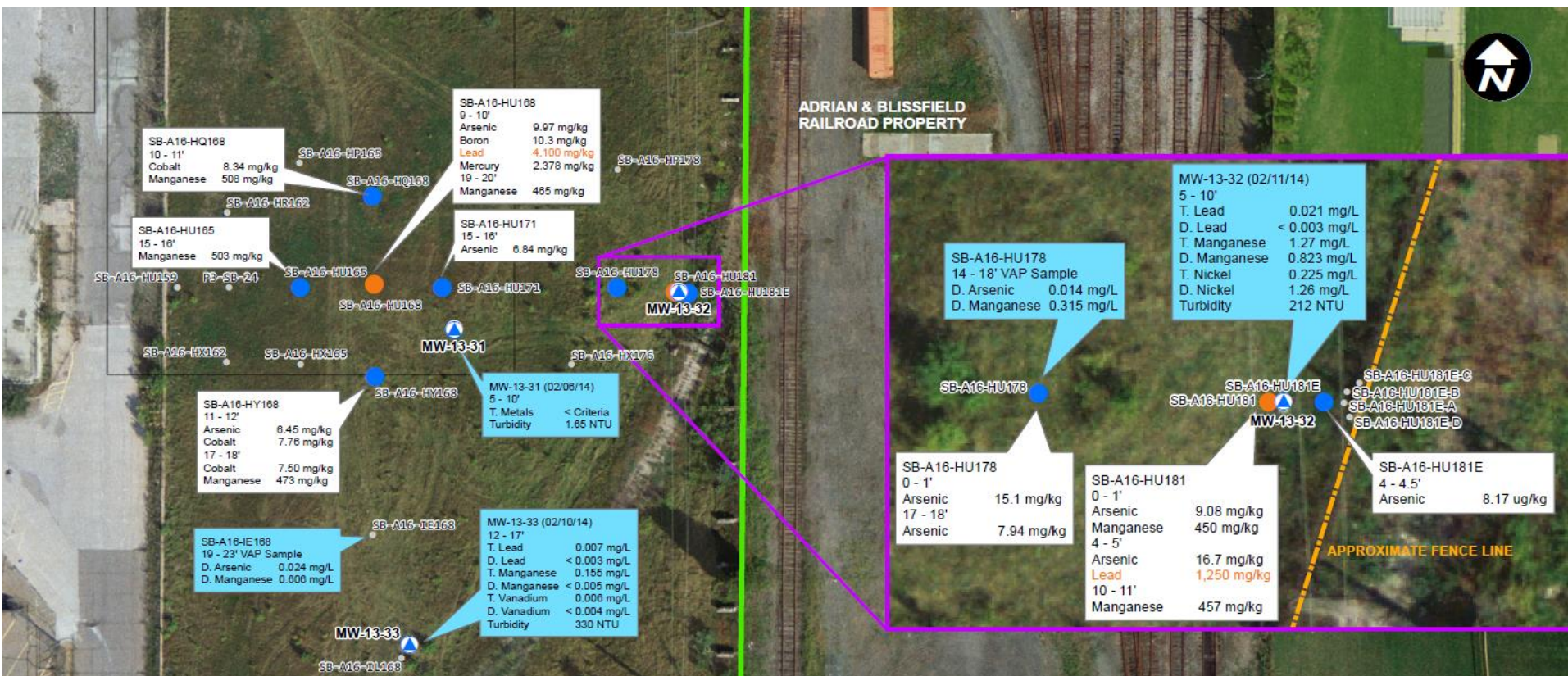
Area 16 Evaluation

- Soil Evaluation
- Groundwater Evaluation

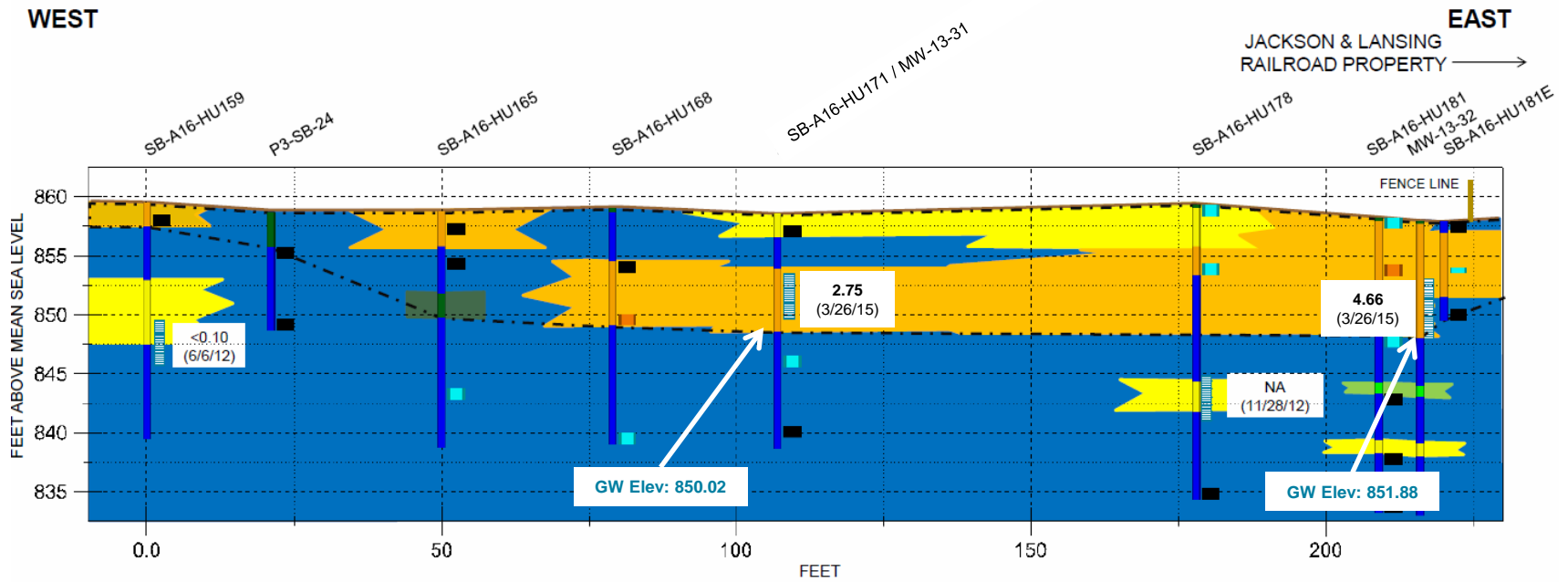
Area 16

Nickel in perched water > DW Criteria at property boundary

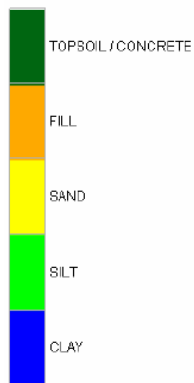
- No nickel exceedances in soil within Area 16
- TCLP data indicates nickel does not leach from fill at property boundary



Area 16 Cross-Section and GW Results



STRATIGRAPHY



SOIL METALS

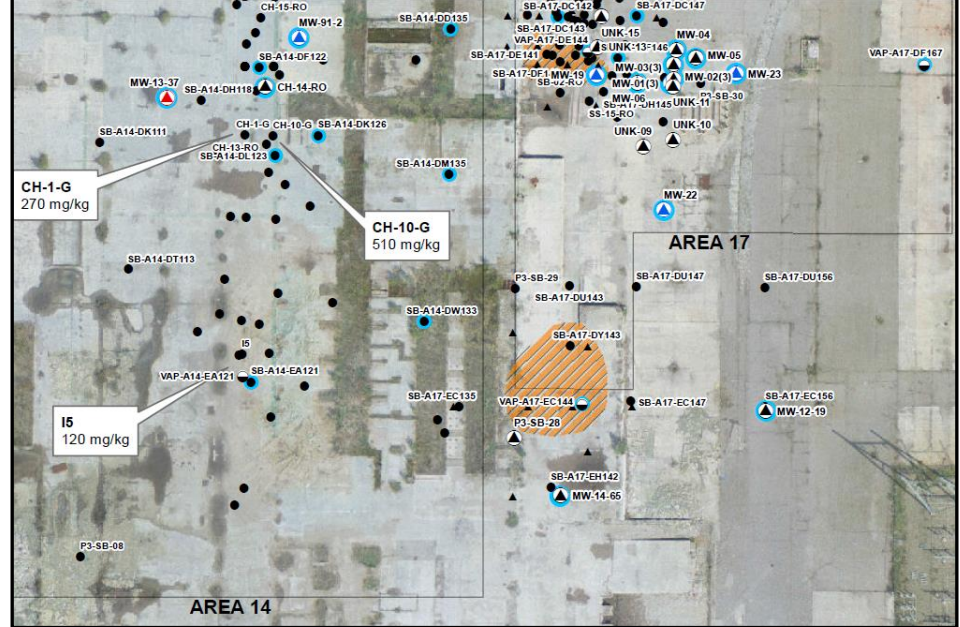
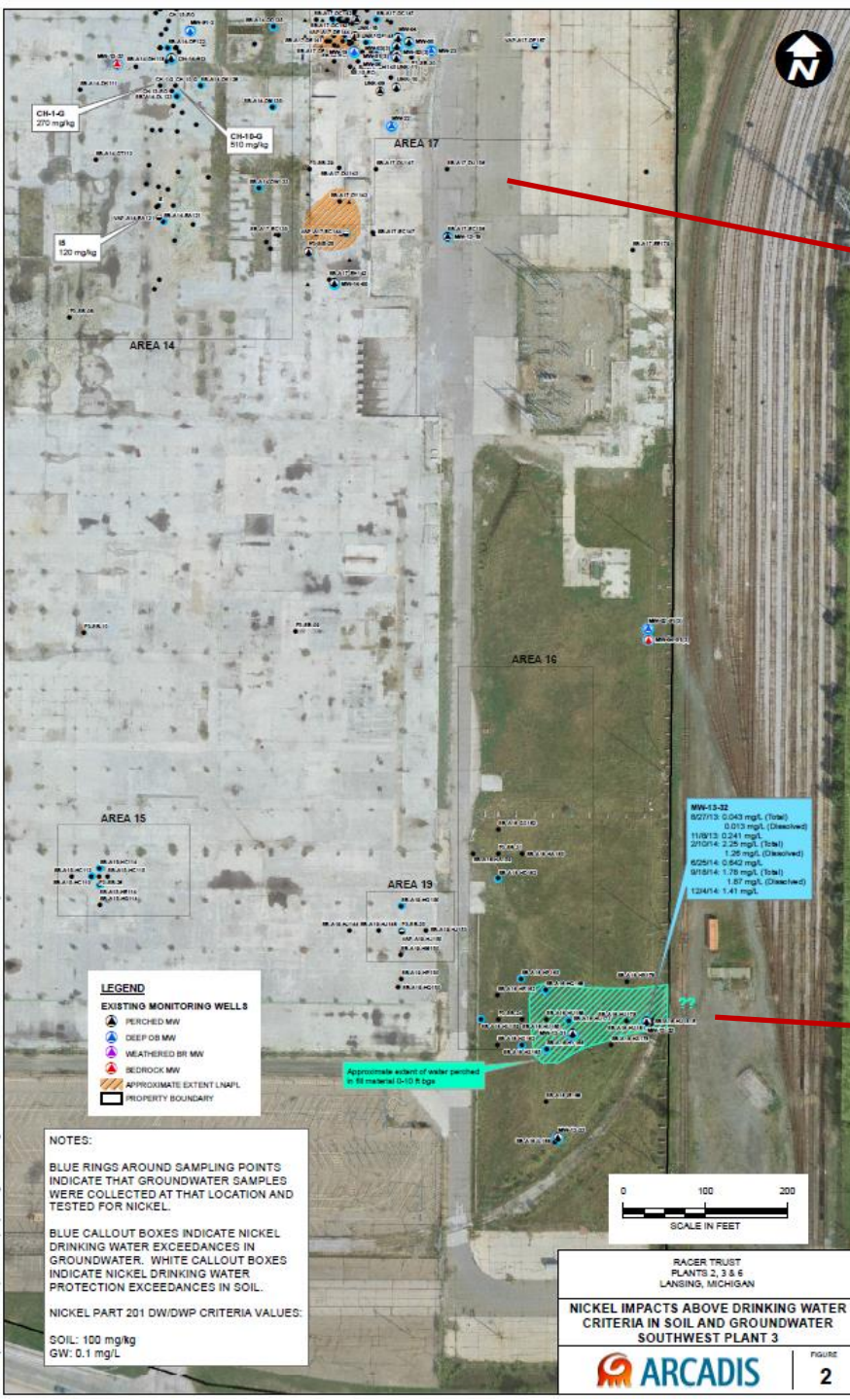


- SOIL SAMPLING INTERVAL (FOR ANALYTICAL RESULTS, PLEASE SEE TABLE 2)
- APPROXIMATE MONITORING WELL SCREEN INTERVAL
- ALL SOILS WITHIN THIS AREA ARE CONSIDERED FILL
- GROUND SURFACE

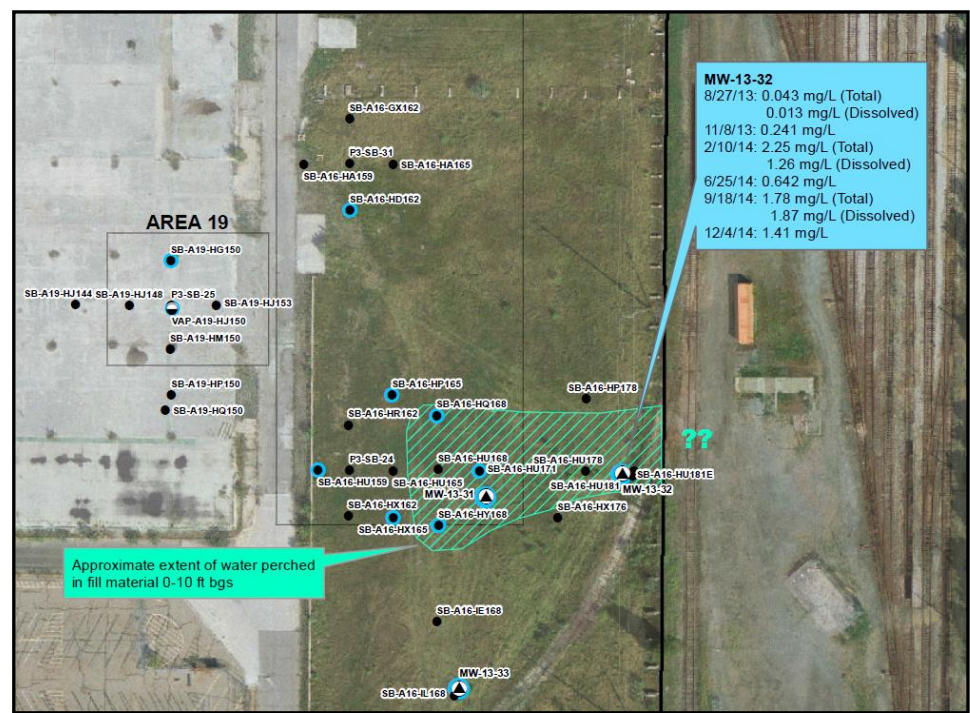
1.41 (12/4/14) NICKEL CONCENTRATION IN GROUNDWATER (mg/L) (AND DATE COLLECTED)
BOLD VALUES REPRESENT A DRINKING WATER CRITERIA EXCEEDANCE
 NA - NOT ANALYZED



RACER TRUST PLANT 3 LANSING, MICHIGAN	
AREA 16 CROSS SECTION	
	FIGURE 3



Plant 3 Nickel in GW



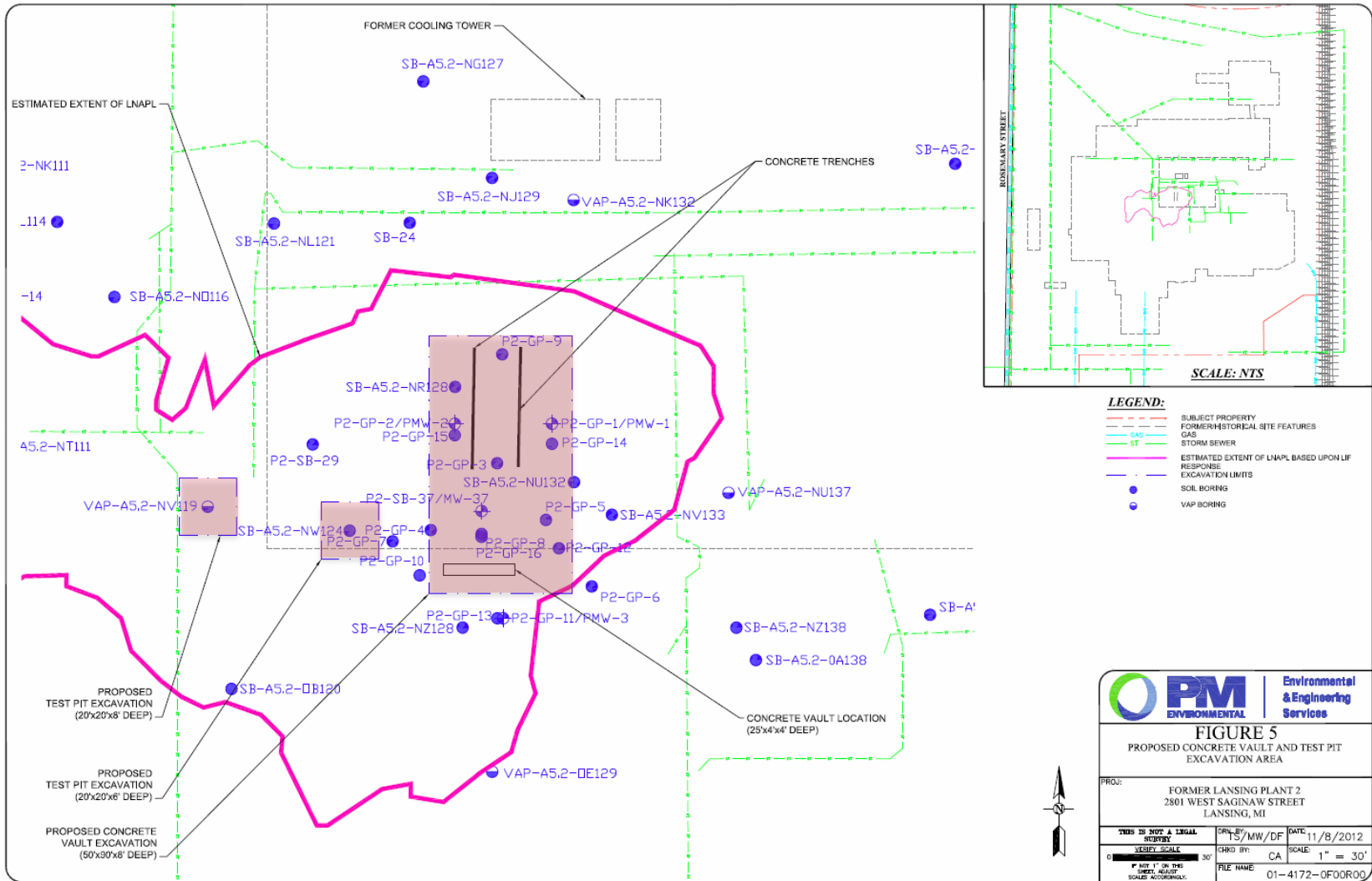
Area 16 Nickel Summary

- Fill material on railroad property (glass, metal, coal, slag) different than RACER property (construction debris)
- TCLP suggests nickel does not leach from fill located at the property boundary
- Nickel in GW in Area 16 not associated with a source at Plant 3
 - GW: 16 MWs, 22 VAP - No DW exceedances
 - Soil (Area 16): 62 samples - No DW exceedances
 - Soil (SE Plant 3): 220 Samples - 3 DW exceedances (former plating area)
- Area of perched water with nickel is limited in extent and extends onto the railroad property
 - Groundwater elevation suggest westerly component of flow onto Area 16
- Based on the data, source of nickel appears associated with off-site source

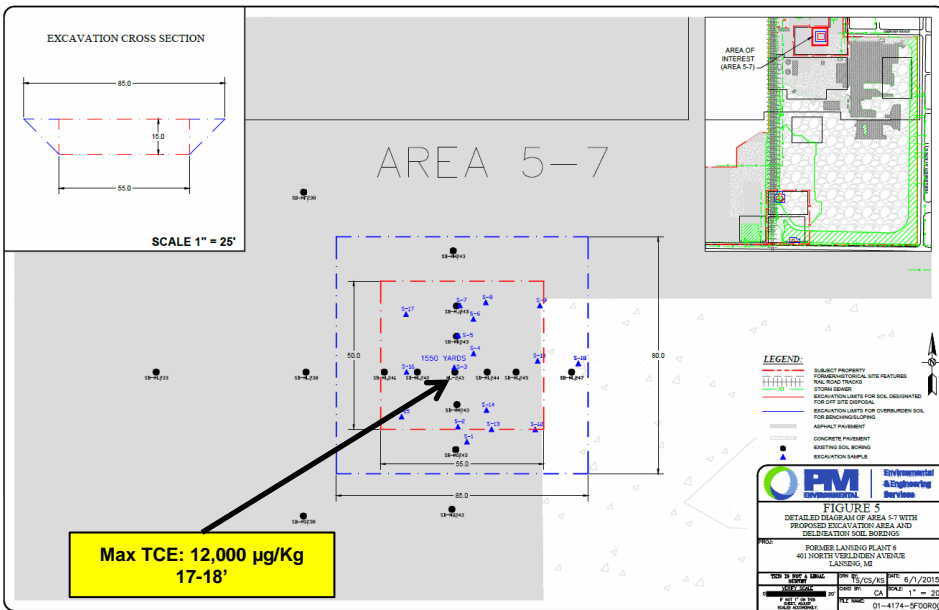
Excavations

- Plant 2 PCB Excavation / Coordinated Approval
- Plant 6 Excavations / MDEQ Approval

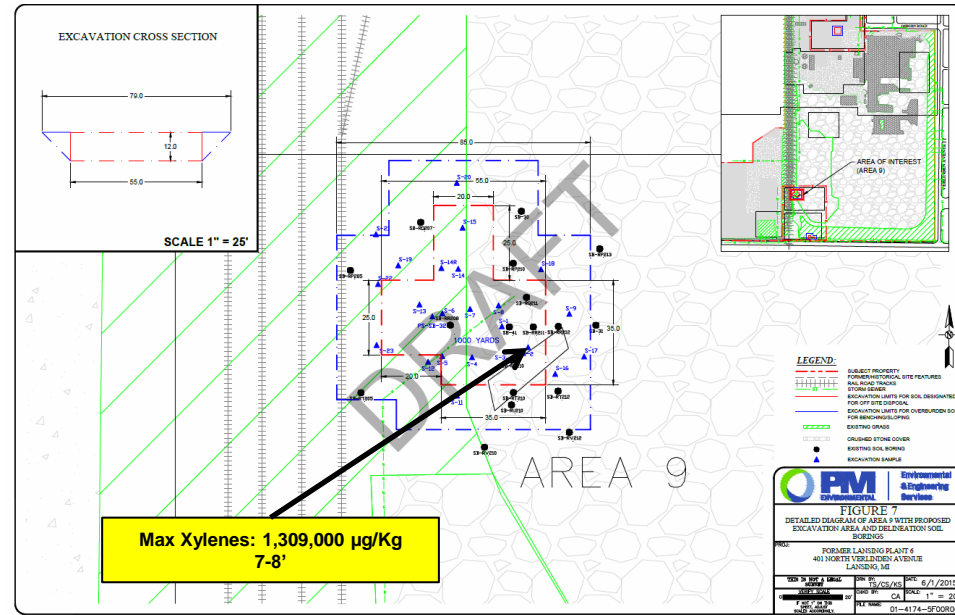
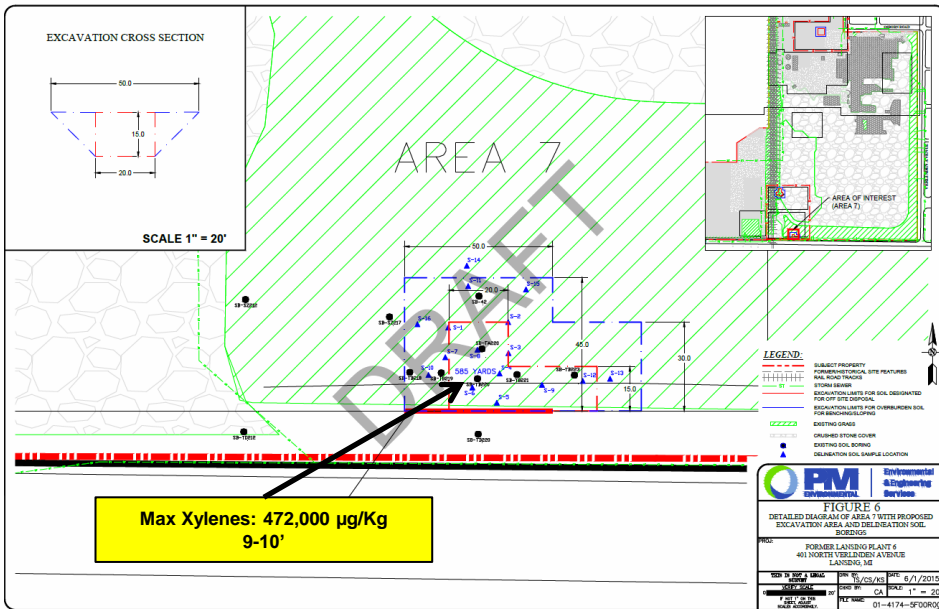
Plant 2 PCB Excavations



Plant 6 Excavations



- Area 5-7:
 - 1,130 yds overburden
 - 1,550 yds impacted
- Area 7:
 - 565 yds overburden
 - 585 yds impacted
- Area 9:
 - 1,200 yds overburden
 - 1,000 yds impacted



Schedule

- 2015 - Tracer / ISCO Pilot Study -
 - Late July - Complete Bench Scale Testing / Order Supplies
 - Early Sept - Begin Injection
 - Sept - Dec – Tracer Monitoring
 - First Quarter 2016 – Reporting
- 2015 - Plant 2 & 6 Excavations
 - Contingent on USEPA/MDEQ Approval
- 2016 – Final CMS – 2nd Quarter(?)

Imagine the result

