

# RACER Lansing Project Update Meeting

Plants 2, 3 & 6  
Lansing, Michigan

March 31, 2015



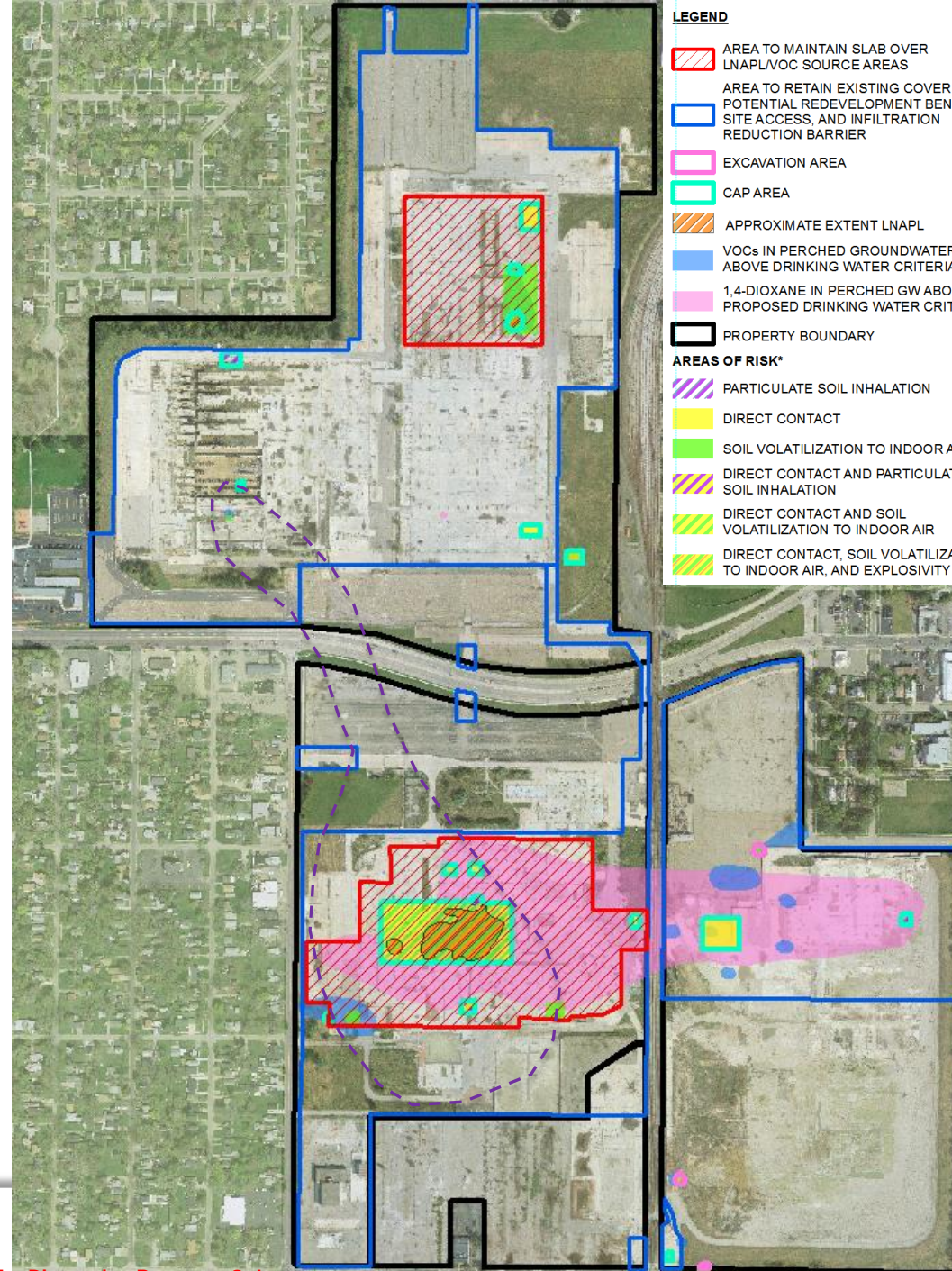
# Agenda

- Redevelopment Update
- RFI Review
  - Soil Impacts
  - Perched Groundwater
  - Plant 2 LNAPL
  - Stormwater
  - Lower 1,4-D Plume
- CMS Components
  - Shallow Subsurface Components
  - Plant 2 LNAPL
  - Lower 1,4-Dioxane Path Forward
- Upcoming Corrective Measures Activities

# Redevelopment Update

# Proposed Remedy Components

- Shallow Subsurface - corrective measures mitigate exposure and show continued stability
  - Groundwater / Land Use Restrictions
  - Monitored Plume Stability
    - Groundwater Monitoring
    - Minimize Infiltration (surface cover retention)
  - Caps
  - Targeted Excavation
  - Interim LNAPL Removal
- Lower 1,4-dioxane - mitigate potential offsite migration above current residential drinking water criteria
  - Several options currently being evaluated



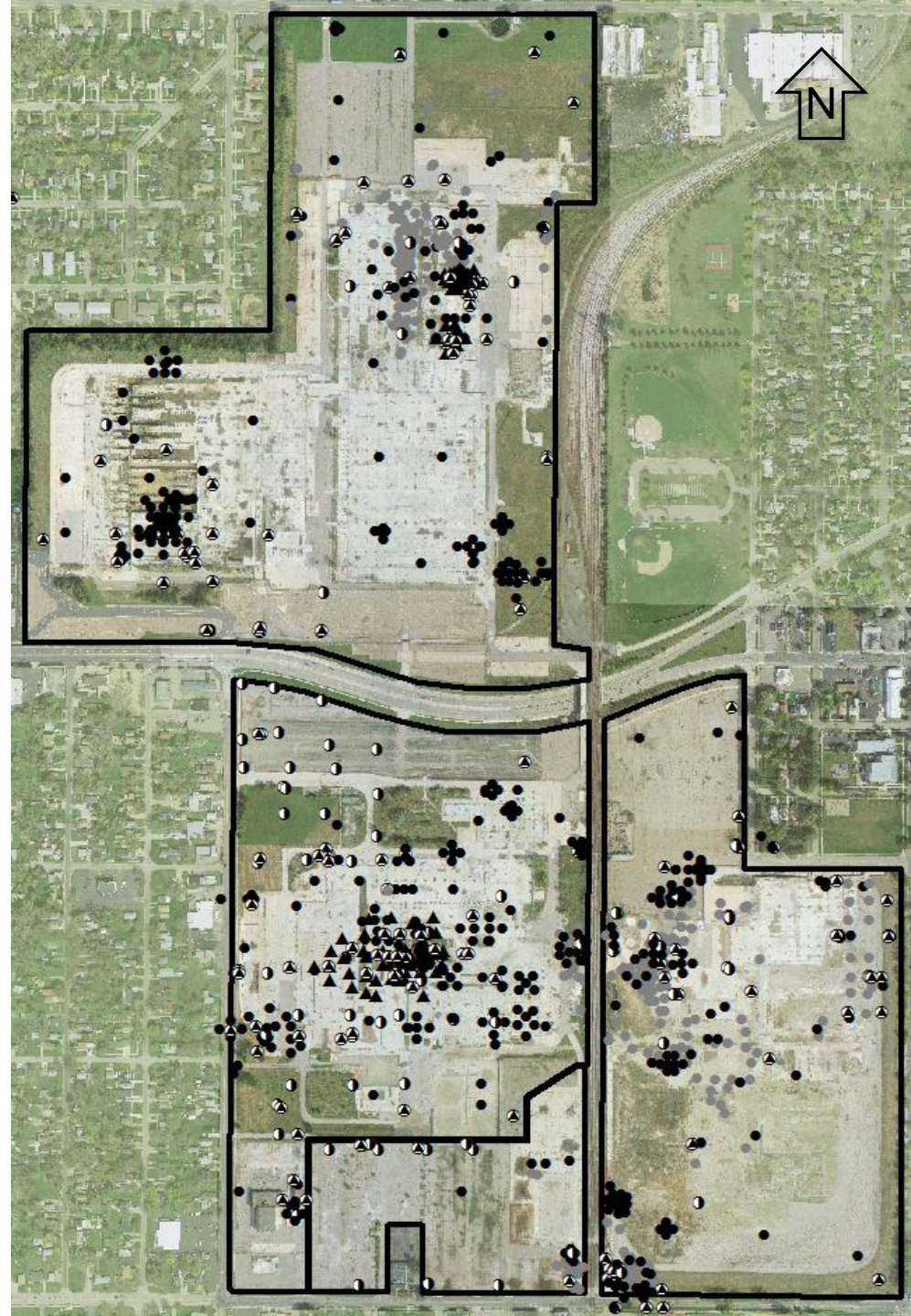
# RFI Review

# RFI Scope

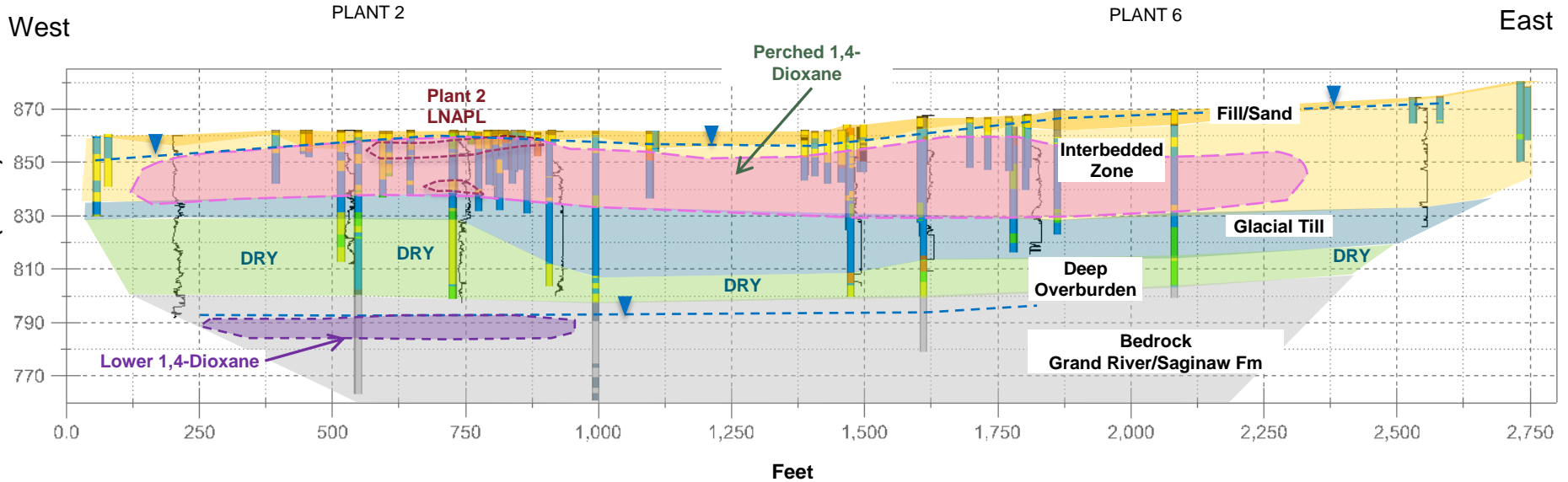
- 660 Soil Borings
  - + 450 historical borings
  - Adaptive scope
  - LIF, HPT, VAP, & WCSS
- Focused installation of 121 monitoring/test wells
  - 177 wells total

## LEGEND

- ⊙ MONITORING WELL
- DEEP VAP BORING
- ▲ LIF BORING
- SOIL BORING (RFI)
- SOIL BORING (HISTORICAL)
- ▭ PROPERTY BOUNDARY

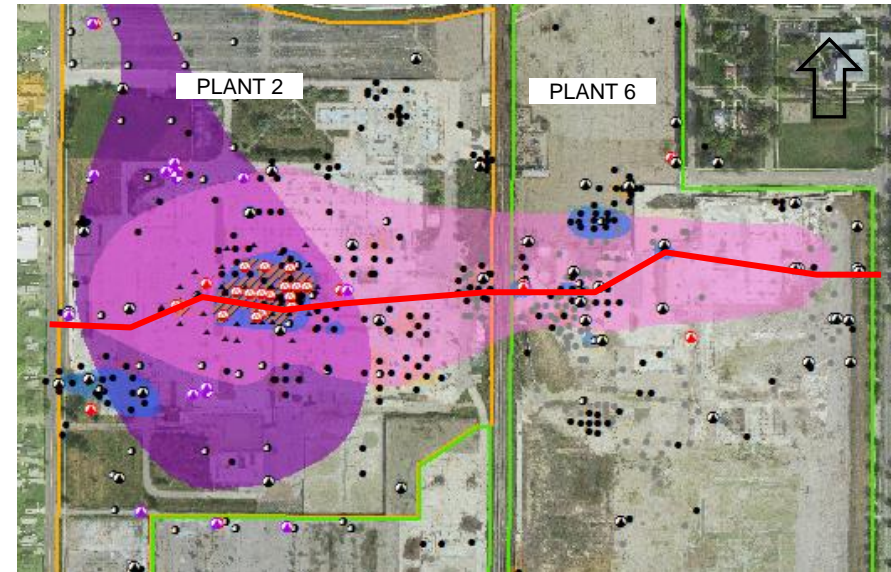


# Generalized Cross-Section – Plants 2 & 6



## STRATIGRAPHY

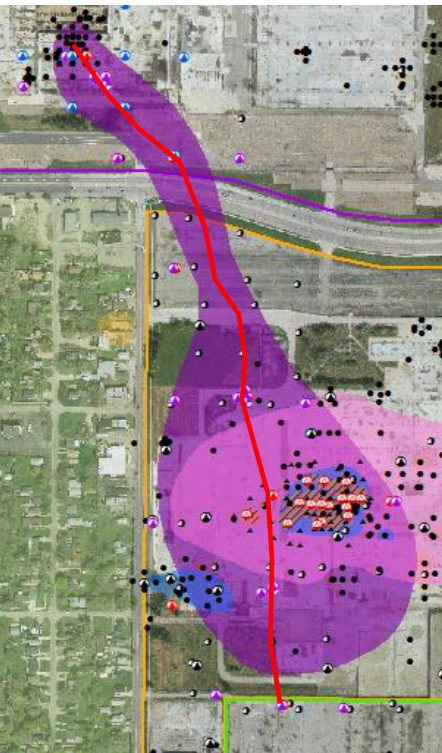
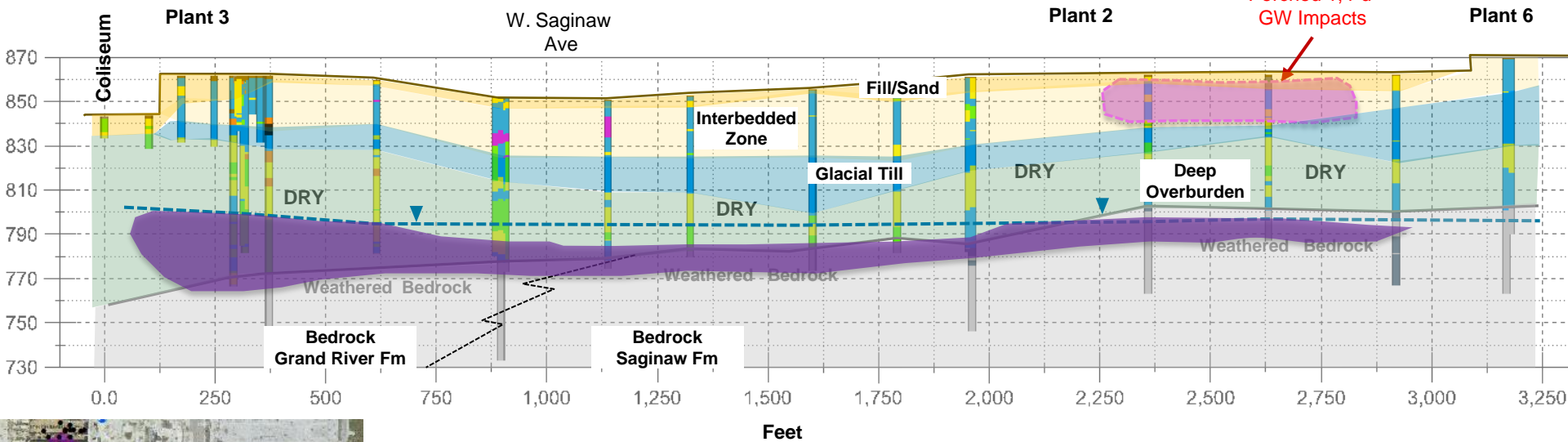
	CONCRETE/ASPHALT/TOPSOIL
	FILL
	GRAVELLY SAND
	SAND
	SANDY SILT/SILT
	SILTY/SANDY/GRAVELLY CLAY
	CLAY
	PEAT
	BEDROCK-SANDSTONE
	BEDROCK-SHALE
	NO RECOVERY



# Generalized Cross-Section – Plants 2 & 3

NW

SE



- Lower 1,4-dioxane remedy selection will govern surface/capping strategy for coliseum

MODEL





## STRATIGRAPHIC UNIT

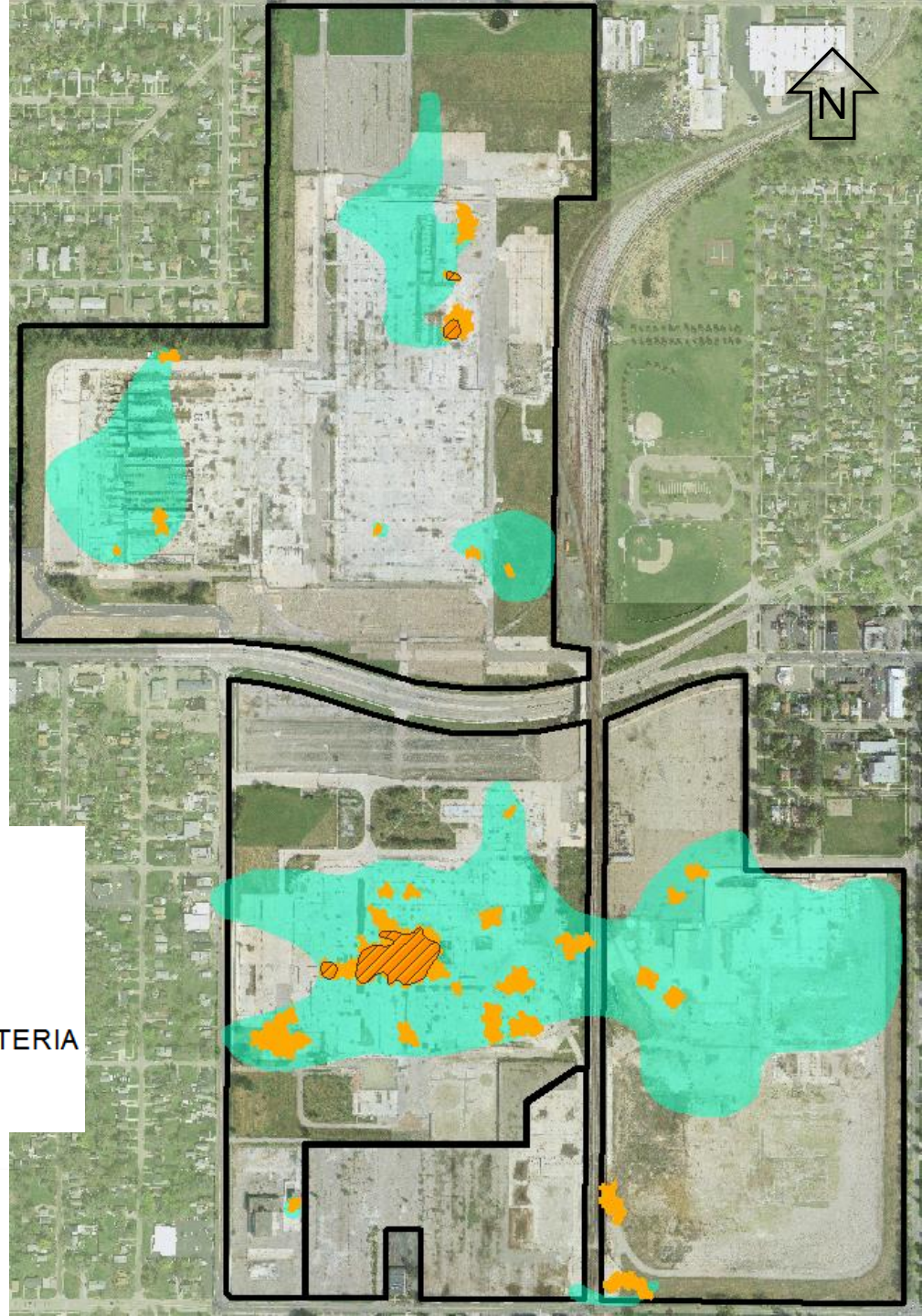
CONCRETE/ASPHALT/TOPSOIL
FILL
GRAVELLY_SAND
SAND
SANDY_SILT/SILT
SILTY/SANDY/GRAVELLY_CLAY
CLAY
PEAT
BEDROCK-SANDSTONE
BEDROCK-SHALE
NO_RECOVERY

# Soil Impacts

- Shallow soil impacts primarily consist of metals/SVOCs above MDEQ Criteria

## LEGEND

-  APPROXIMATE EXTENT LNAPL
-  APPRX EXTENT VOC/SVOC IN SOIL > CRITERIA
-  APPROXIMATE EXTENT OF METALS IN SOIL > CRITERIA
-  PROPERTY BOUNDARY








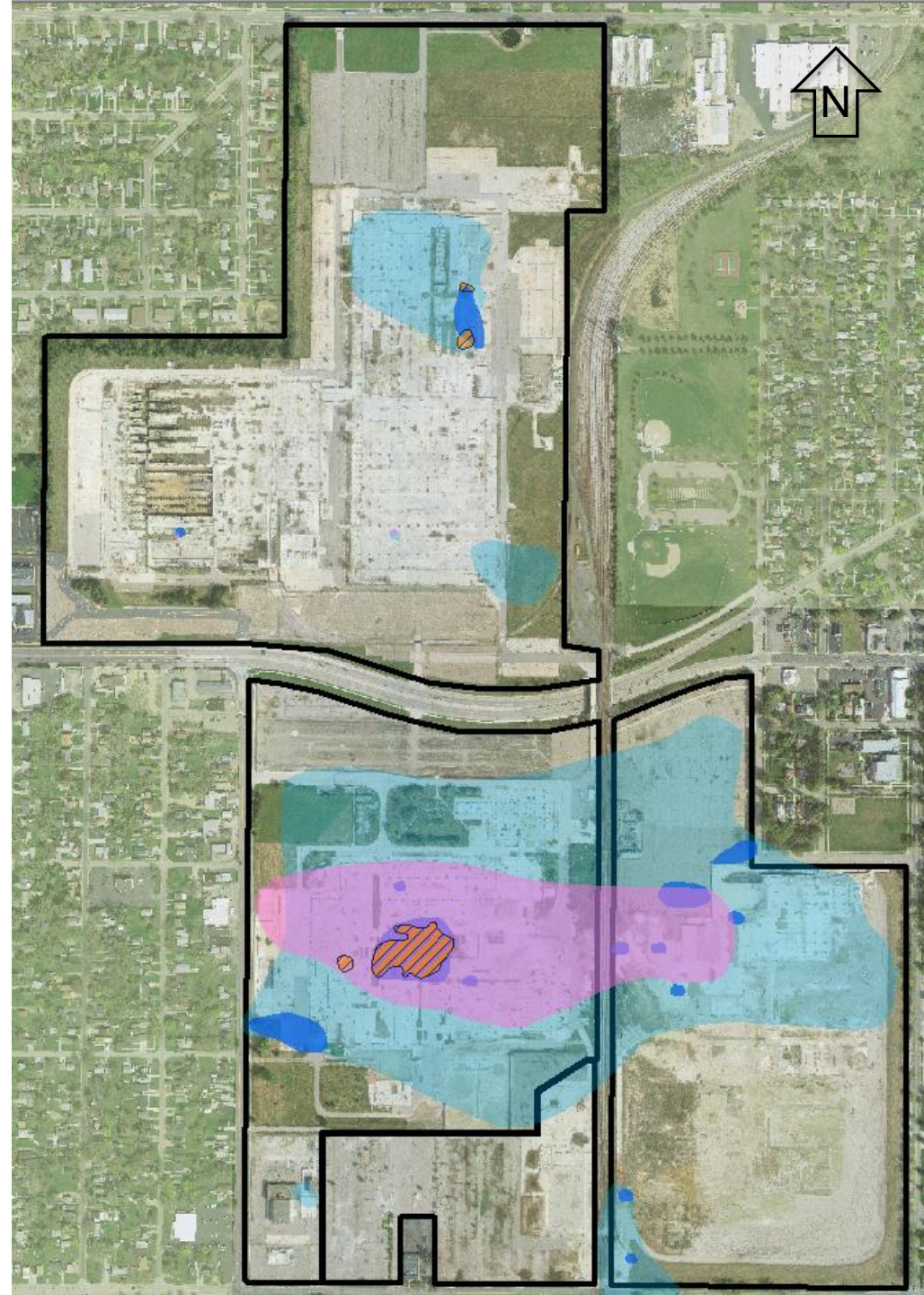


# Perched Groundwater Impacts

- Elevated metals associated with
  - Natural soil and geochemical conditions
  - Site specific geochemical conditions (i.e. related to LNAPL or local VOC plumes)
- Preliminary plume stability assessment indicates the impacts are stable and not migrating

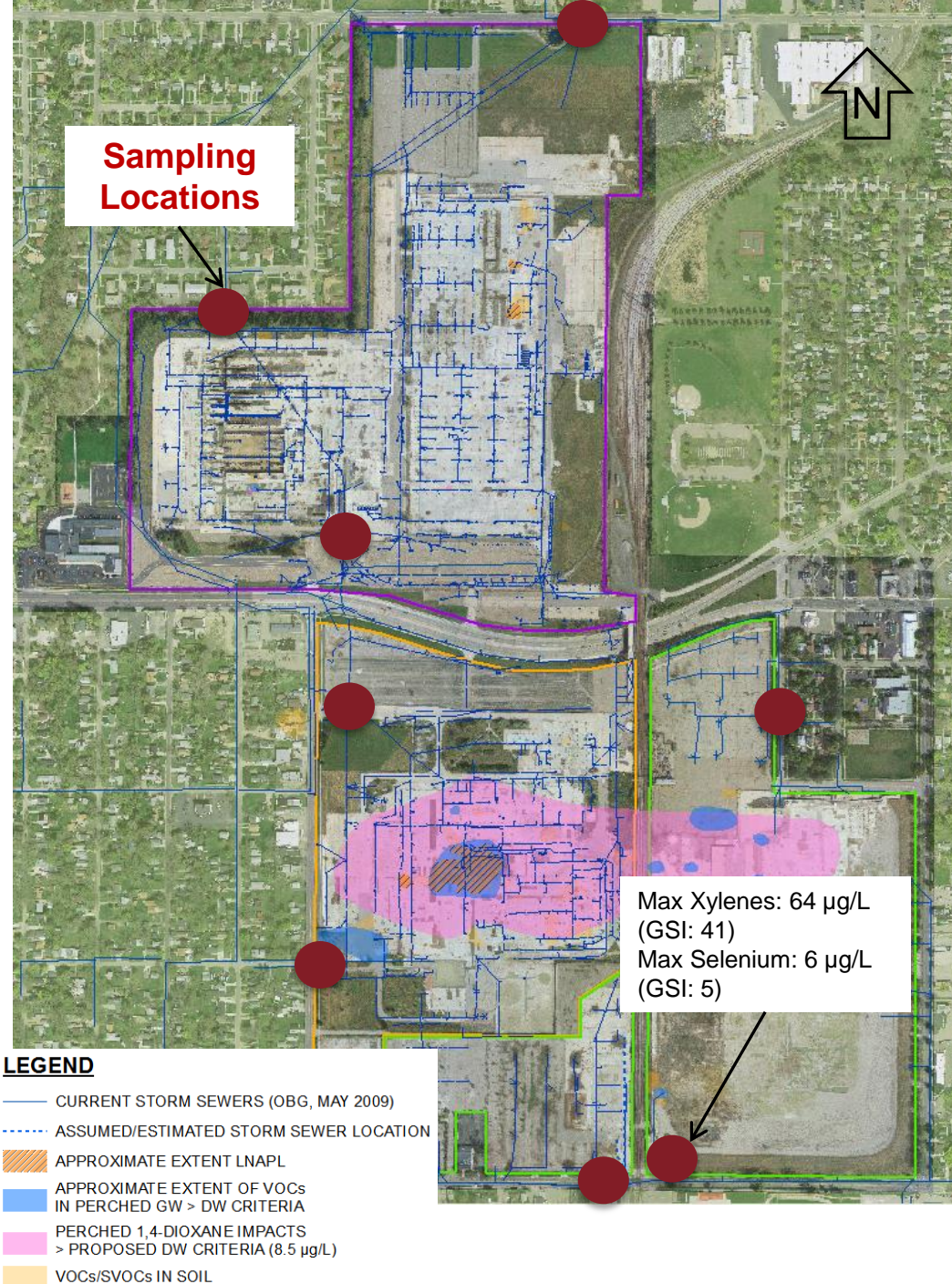
## LEGEND

-  APPROXIMATE EXTENT LNAPL
-  1,4-DIOXANE IN PERCHED GW > 8.5 ug/L
-  VOCs IN PERCHED GW > DW CRITERIA
-  METALS IN GROUNDWATER > DW CRITERIA
-  PROPERTY BOUNDARY



# Stormwater

- Quarterly Sampling – 11/12 through 9/13
  - Annually thereafter
- Results compared to GSI Criteria
  - Point of compliance at outfall to river
- Initial results indicated several metals exceeded GSI
  - Refined sampling / reduced turbidity eliminated metals at most locations
- Sporadic minor exceedances at Plant 6 for xylenes and selenium
  - ~6X dilution factor will reduce concentrations below criteria at point of compliance










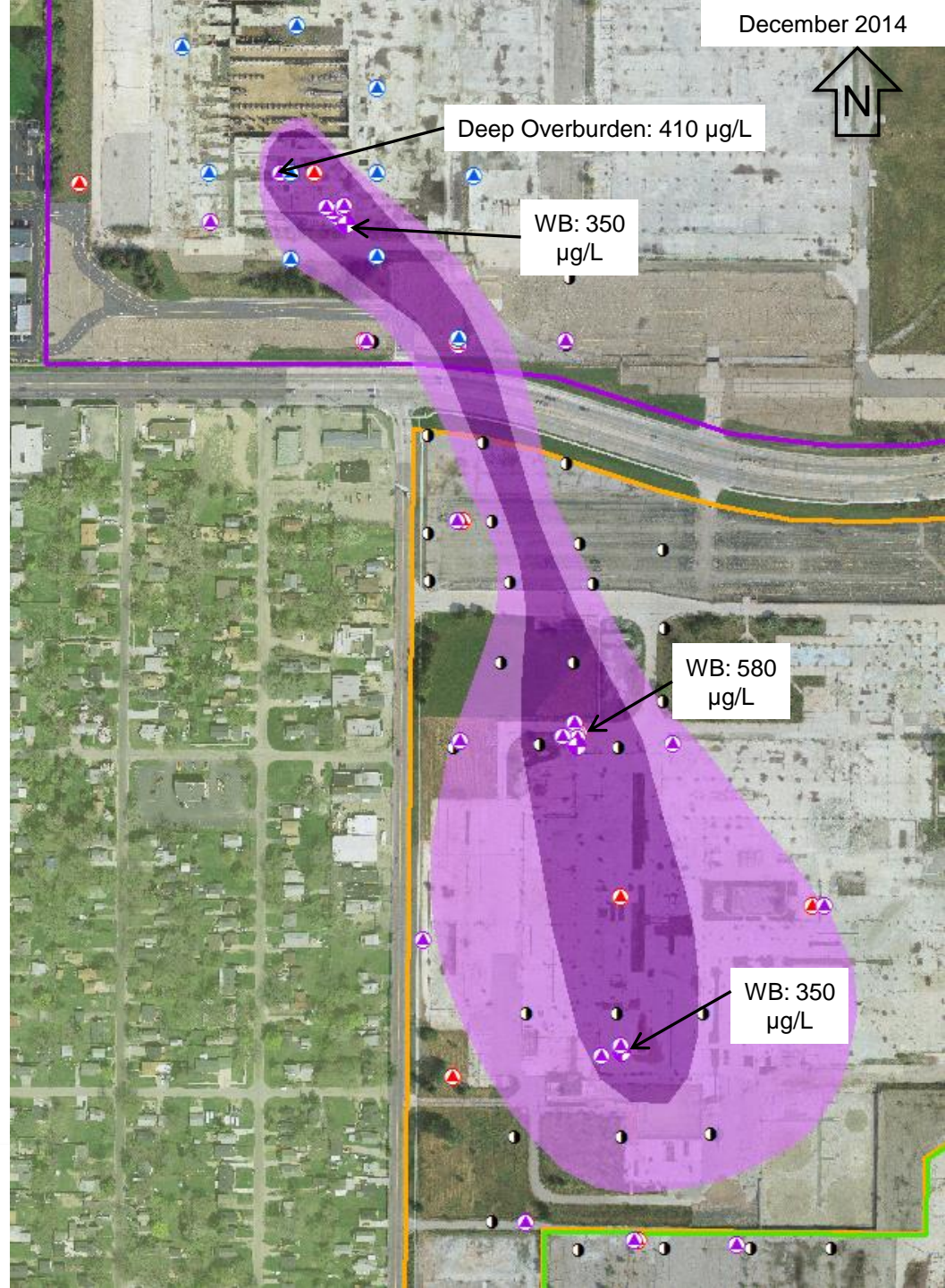


# Lower 1,4-Dioxane Plume

- Consistent concentrations along axis of plume
- Plume stability will be evaluated 2<sup>nd</sup> quarter 2015

## LEGEND

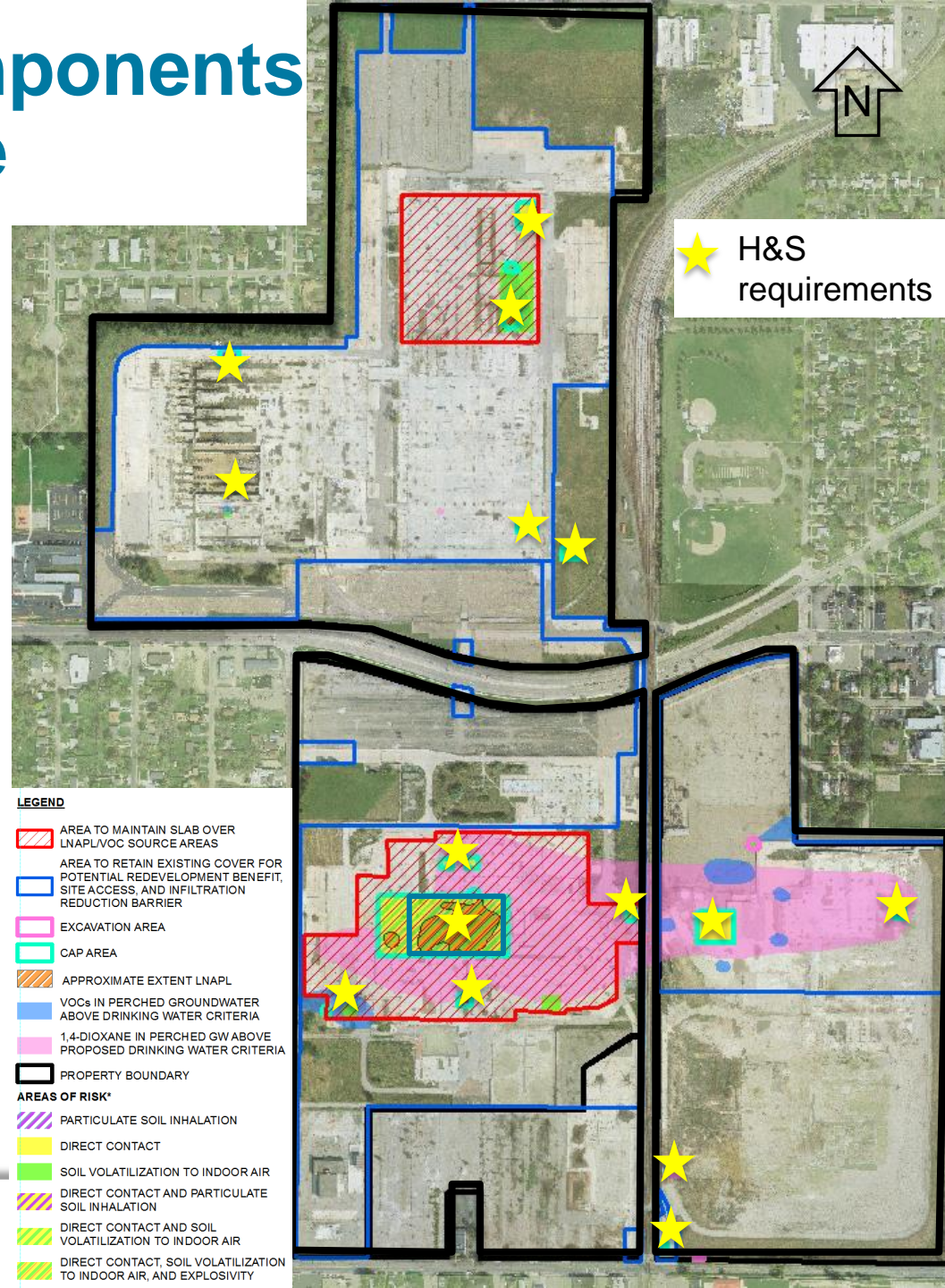
-  DEEP OVBURDEN MONITORING WELL
-  WEATHERED BEDROCK MONITORING WELL
-  TEST EXTRACTION WELL (WEATHERED BEDROCK)
-  BEDROCK MONITORING WELL
-  DEEP VAP BORING
-  1,4-DIOXANE > 85 ug/L
-  1,4-DIOXANE > 8.5 ug/L



# CMS Components

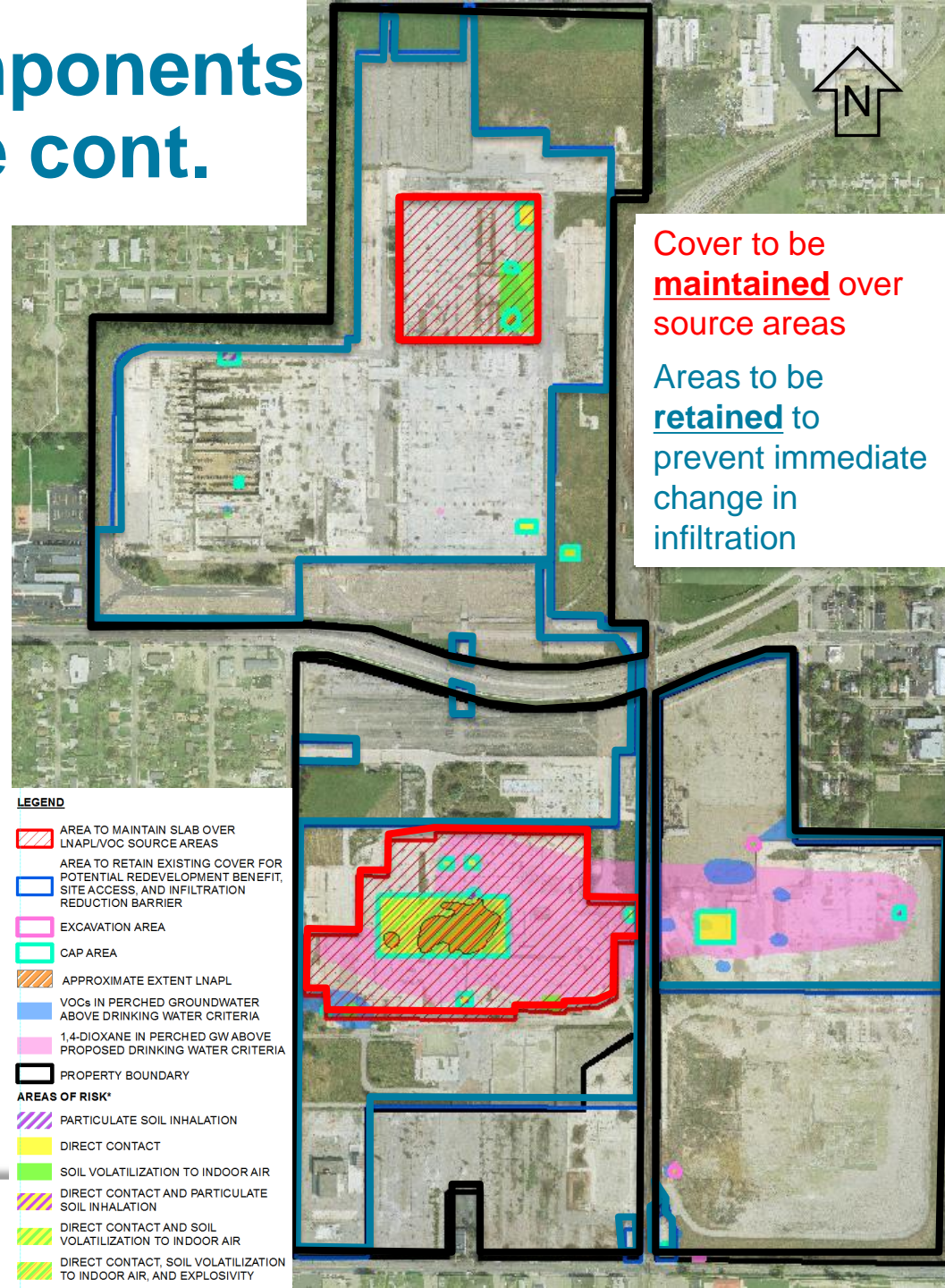
# CMS - Remedy Components Shallow Subsurface

- Site Wide GW Use Restriction
- Land Use Restrictions
  - Site-wide non-residential use
  - Site-wide soil vapor management
  - Site-wide contaminated soil management
  - Area specific sub-surface utility construction
- PCB Area Restriction
  - Interim LNAPL Removal
- Intrusive Health & Safety Requirements



# CMS - Remedy Components Shallow Subsurface cont.

- Monitored Plume Stability
  - Groundwater Monitoring
    - Verify stability of GW plumes and LNAPL
    - Further evaluate metals at property boundary
    - Monitor GW in storm sewers
- Minimize Infiltration

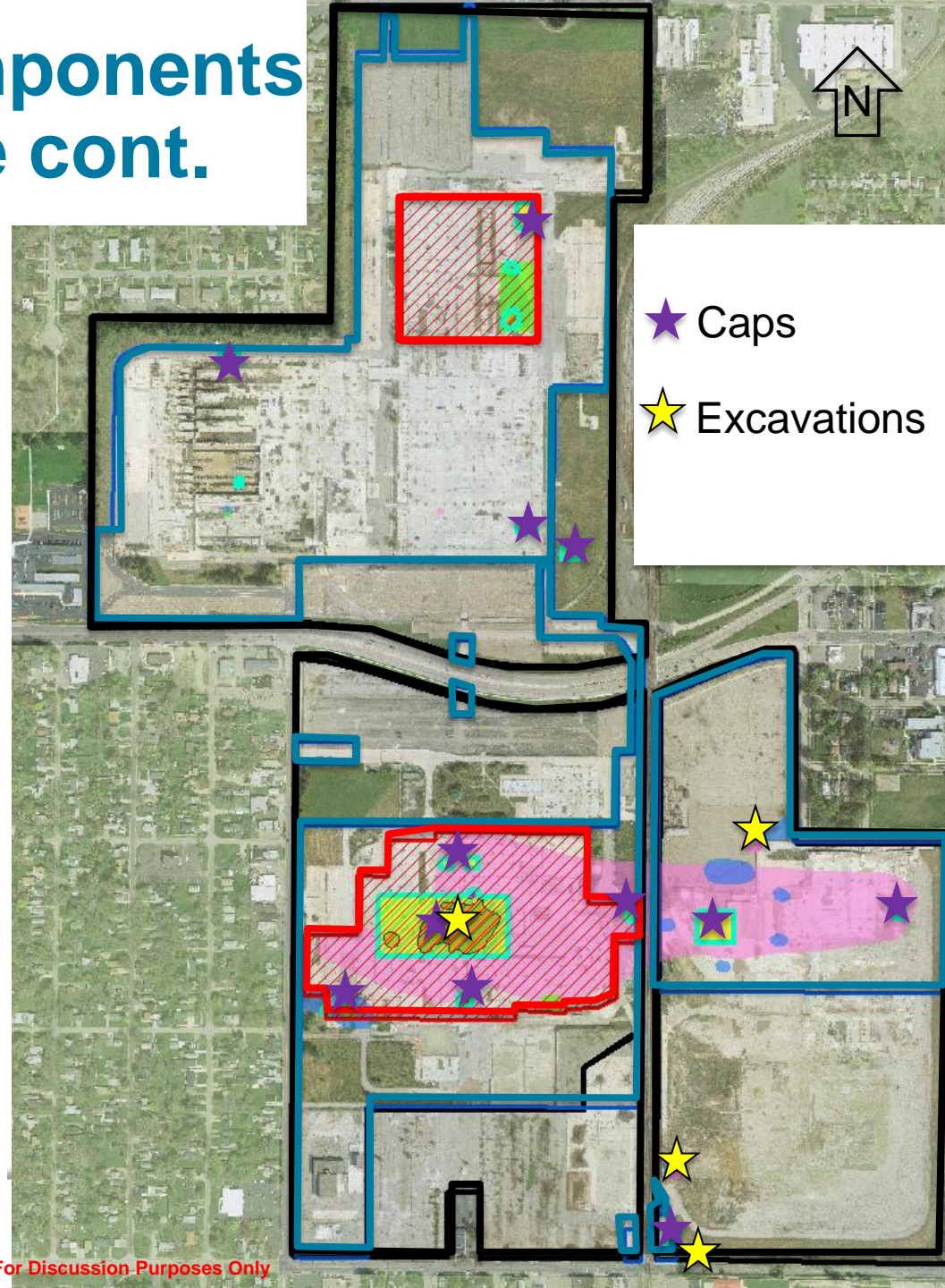


Cover to be **maintained** over source areas

Areas to be **retained** to prevent immediate change in infiltration

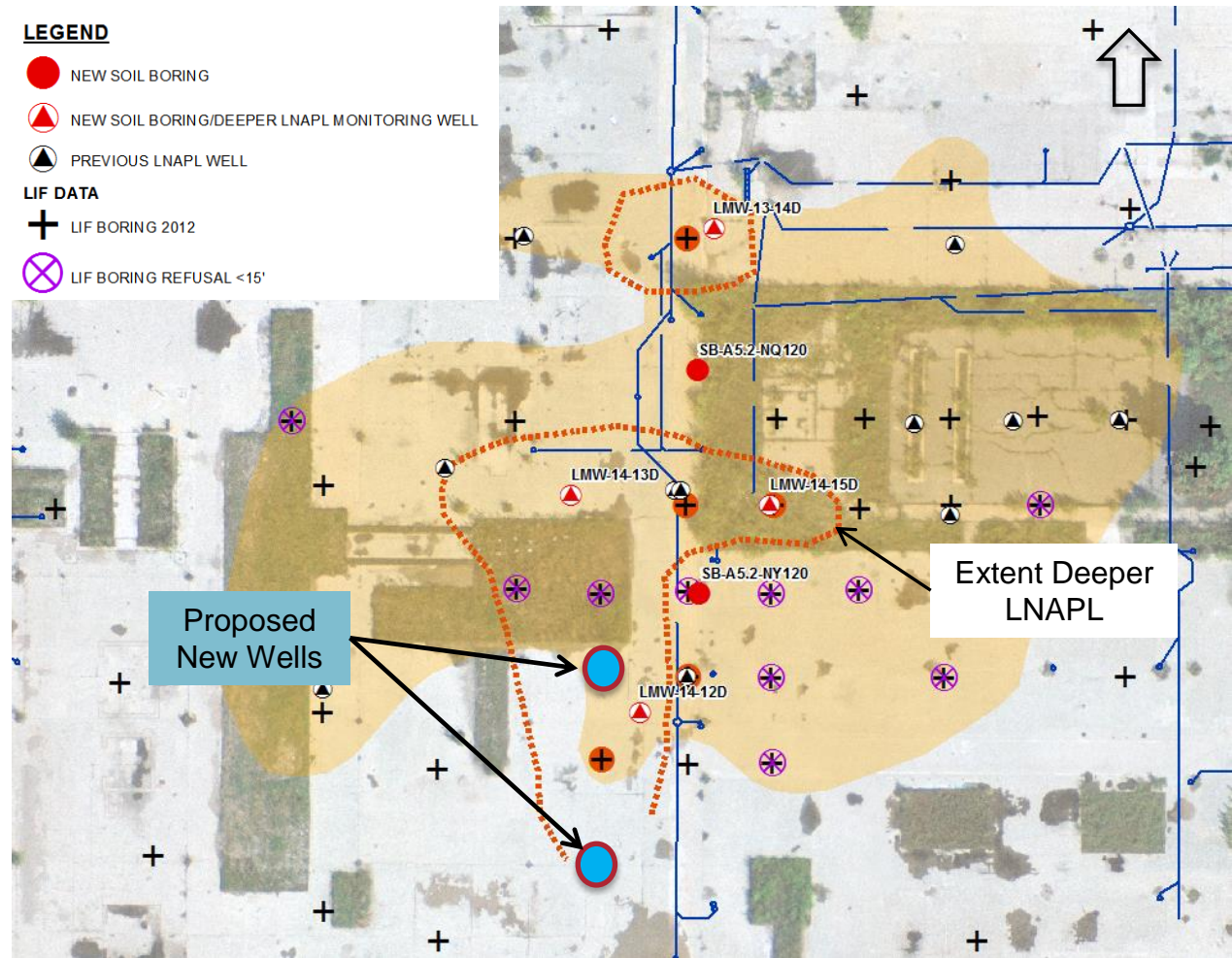
# CMS - Remedy Components Shallow Subsurface cont.

- Caps
  - Areas with soil DC and PSIC exceedances
  - Use existing slabs, concrete, gravel, soil, etc.
  - Repair and/or add additional clean soil as needed to prevent exposure
- Targeted Excavations
  - Areas with VI and explosivity exceedances near the property boundary
  - PCB area excavation



# Plant 2 LNAPL

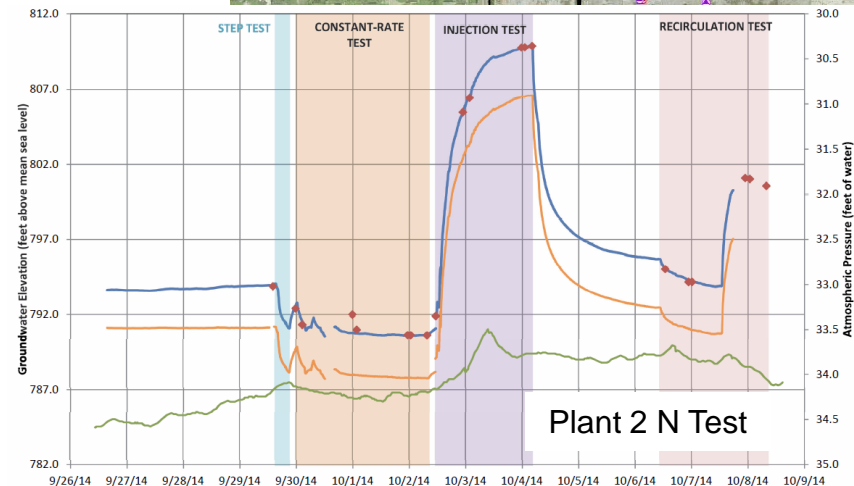
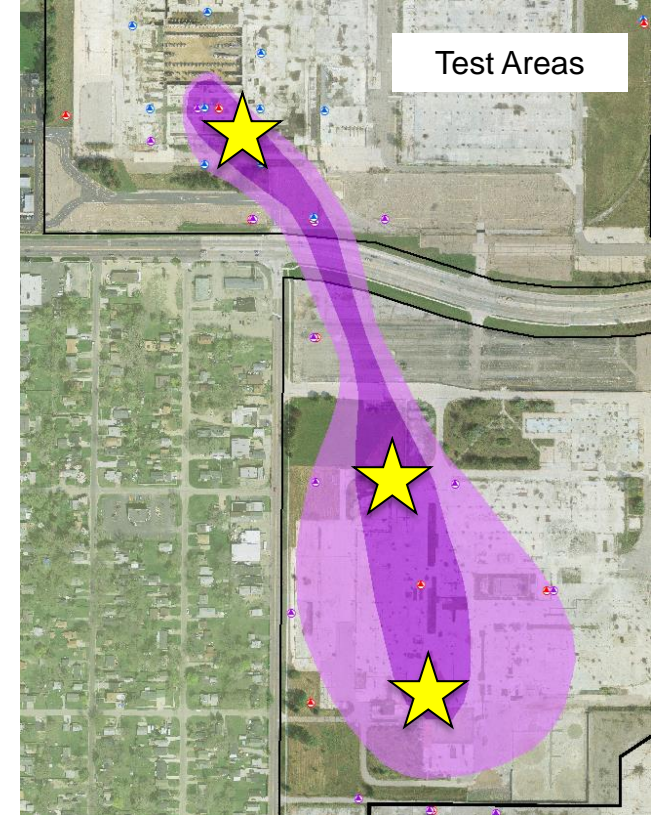
- Installation of two additional deeper wells
  - Additional recovery
  - Delineation to the south
- Interim LNAPL removal
  - Propose quarterly removal
  - Re-evaluate frequency 1st quarter 2016



# Lower 1,4- Dioxane Path Forward

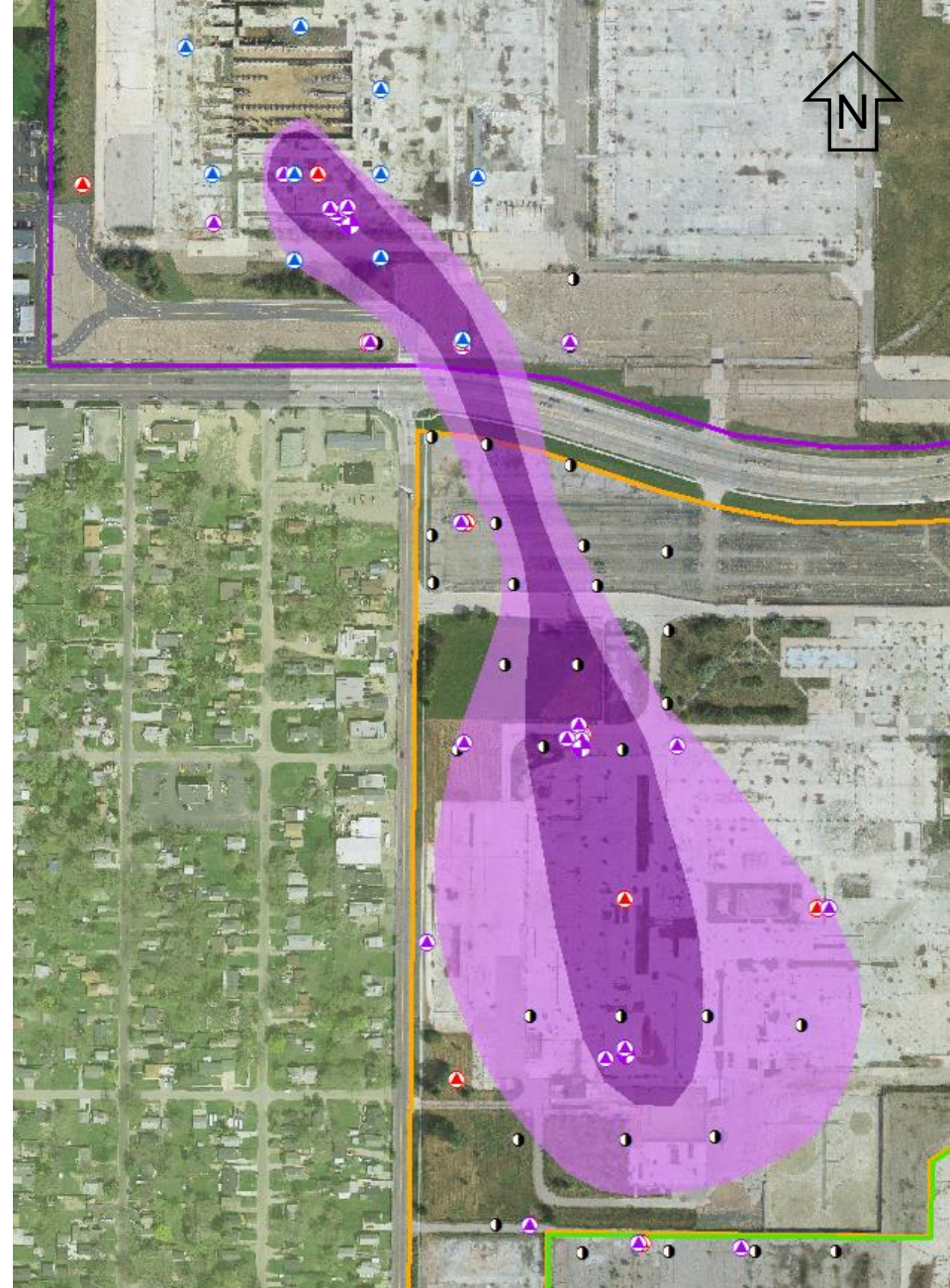
## Draft CMS proposed recirculation

- Completed Hydraulic Testing in 3 Areas
- Extraction rates limited by the saturated thickness of the weathered bedrock
  - Pumping rates <1 gpm
  - Well efficiency
  - Extraction rates improved by recirculation
- Easier to inject due to available head
  - Injection Rates > 5 gpm



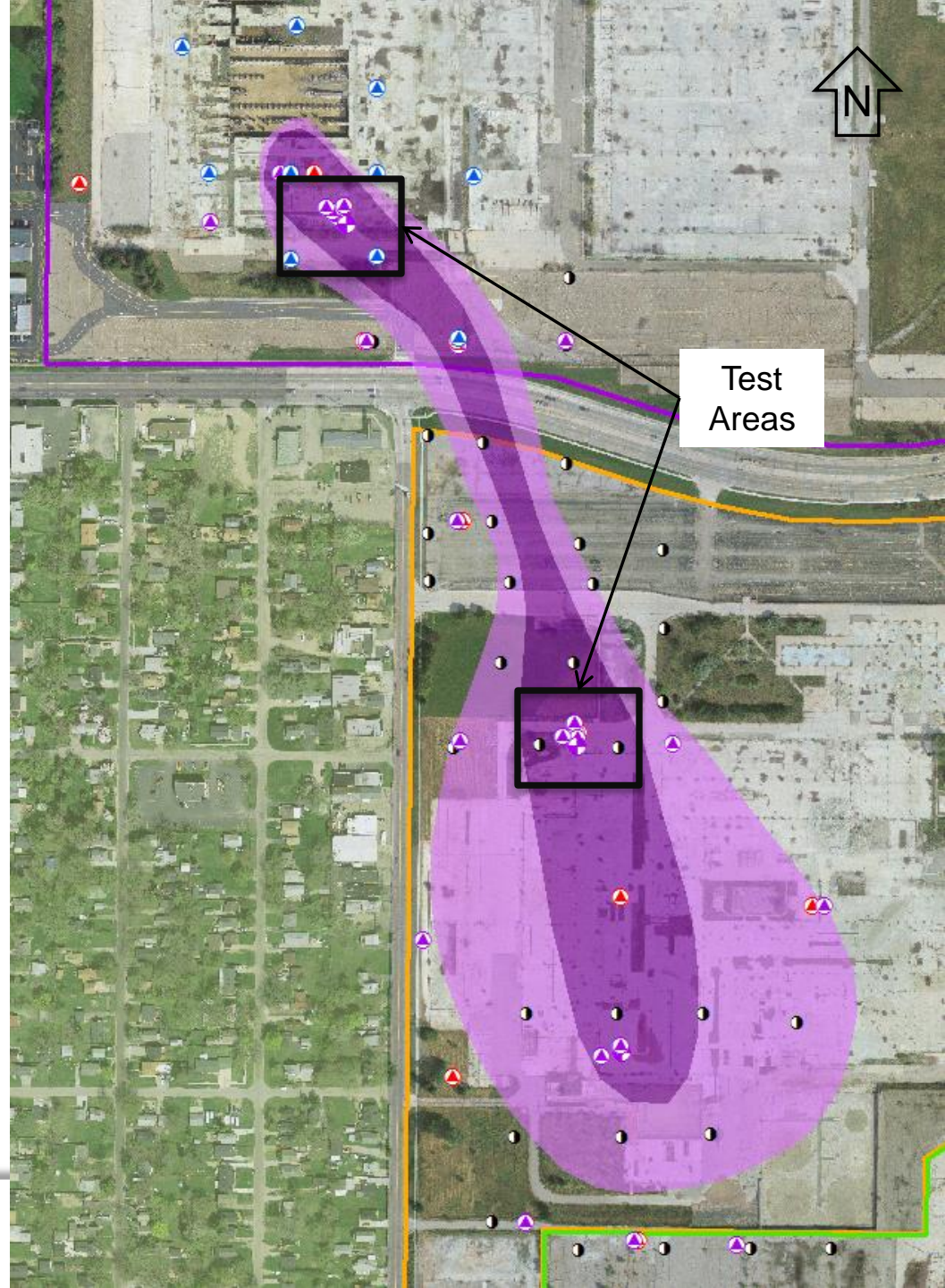
# Lower 1,4-D Additional Pre-Design

- Design of the remedy may include:
  - Additional injection / flushing
  - Bio-remediation
  - Oxidant injection
- Injection-heavy remedy requires additional characterization of weathered bedrock unit:
  - Tracer study
- Evaluate bio-remediation options
  - Bio-Trap microbial sampling
    - perched and lower zones



# Lower 1,4-Dioxane Tracer/ISCO Pilot Test

- Bench scale study for oxidant activation and effectiveness
- Evaluate alternate drilling method for remediation well installation
- Complete tracer/ISCO pilot test at two locations. Evaluate:
  - mobile porosity/injection volumes
  - Distribution of tracer/oxidant
  - Flow direction
  - Oxidant effectiveness
  - Oxidation by-products
  - Rebound



# Upcoming Corrective Measures Activities

- **April-May 2015** - Begin installation of lower 1,4-D tracer/ISCO test wells
  - Additional LNAPL wells (Plant 2)
- **June 2015** – Annual Groundwater Monitoring Report
- **May - September 2015** – Lower 1,4-d tracer study/ ISCO pilot testing
- **Summer 2015** – Plant 2 & 6 excavations
- **Fourth Quarter 2015** – Updated CMS
  - Lower 1,4-dioxane remedy

Imagine the result

