

BACKGROUND



Lansing Industrial Land, Lansing and Lansing Township, Michigan , August 2018

RACER TRUST KEY EVENTS

- **June 1, 2009** - General Motors Corporation (GMC) filed for protection under Chapter 11 of the U.S. bankruptcy code.
- **July 10, 2009** - GMC was renamed Motors Liquidation Company (MLC) and sells certain operating assets, but not these properties, to a newly formed company now named “General Motors LLC”.
- **March 31, 2011** - Ownership and responsibility for environmental remediation obligations for these properties transferred to RACER.



RCRA CORRECTIVE ACTION PROCESS

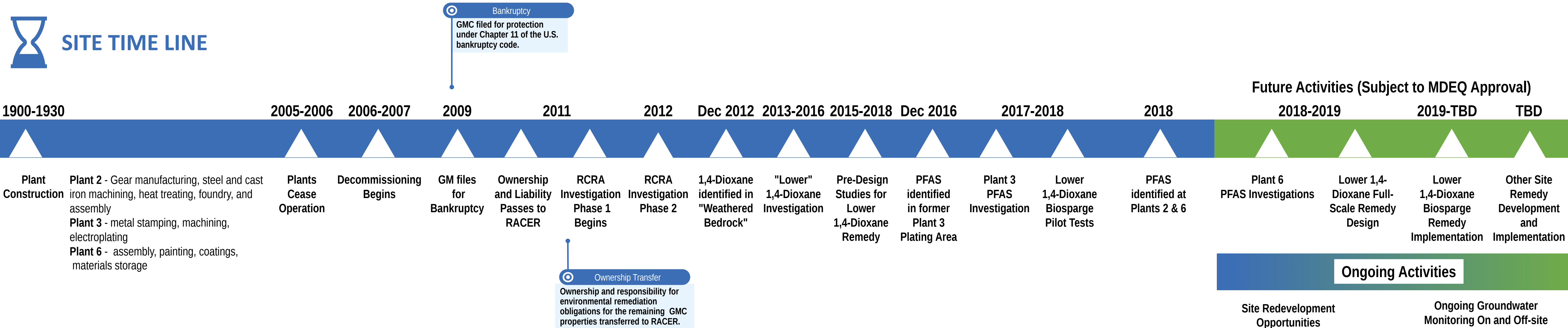
The Resource Conservation and Recovery Act (RCRA) is the US law that created the framework for management of hazardous and non-hazardous waste, and for clean-up of releases of hazardous substances at RCRA facilities. It gave the USEPA authority to develop the RCRA Corrective Action program consisting of the following steps:

1. **Initial Site Assessment** - gather information on site conditions, releases and exposure pathways
2. **Site Characterization** - identify the presence, movement, fate, and risks associated with environmental contamination at a site
3. **Interim Actions** - actions used to control any risks to human health and the environment in advance of the final remedy selection
4. **Evaluation of Remedial Alternatives** – develop and analyze a number of clean-up alternatives relative to facility-specific conditions
5. **Remedy Implementation** - remedy design, operation, maintenance and monitoring
6. **Long-Term Care** – monitoring after establishing institutional (e.g., deed restrictions) and engineering controls (e.g., covers)

Current Activities



SITE TIME LINE



CONCEPTUAL SITE MODEL

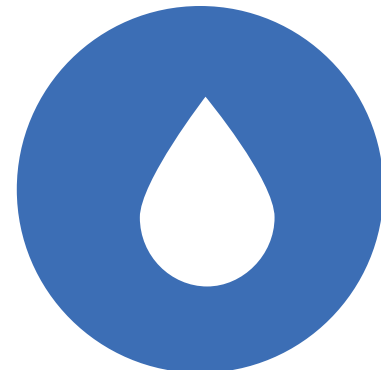
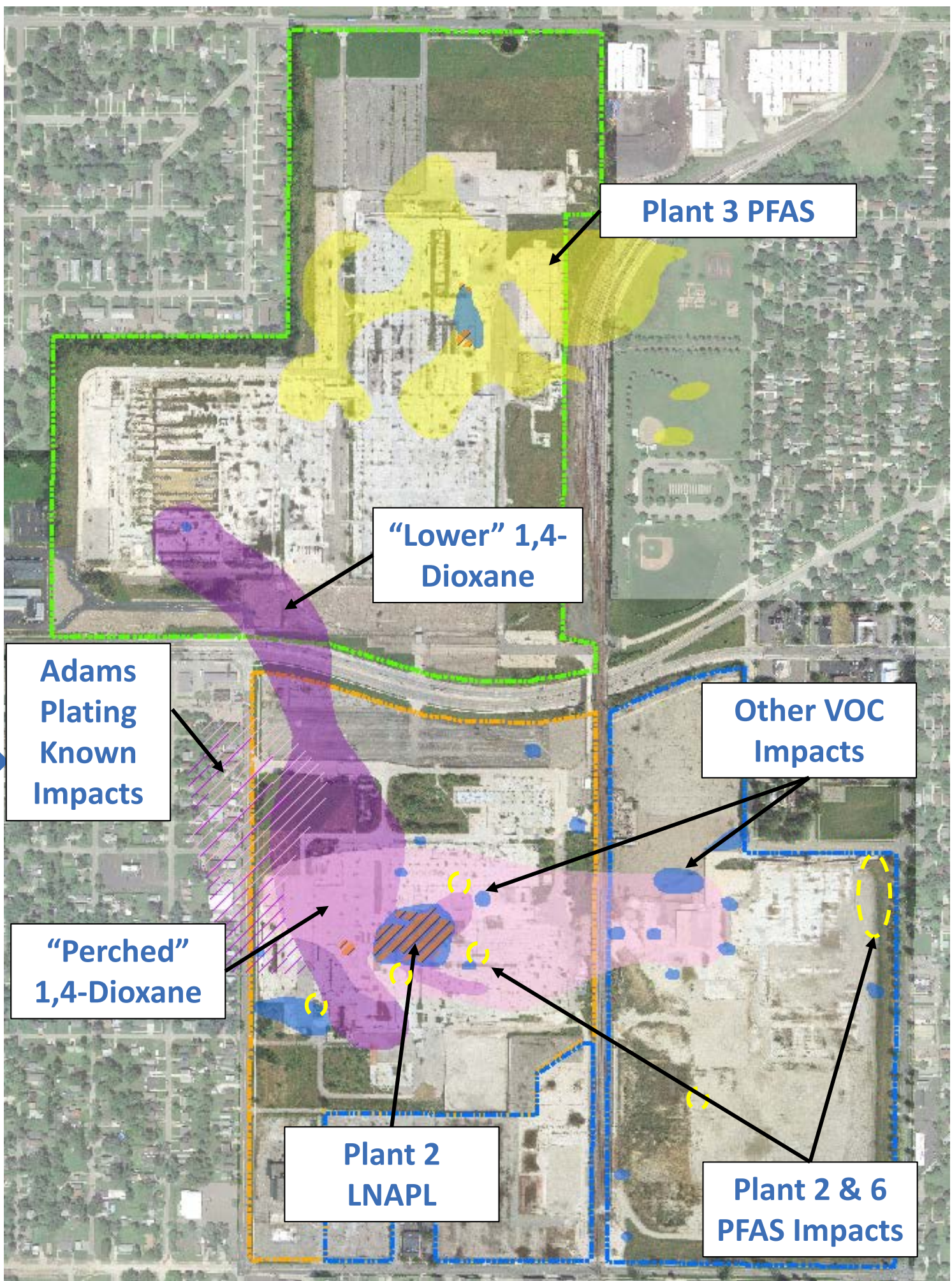
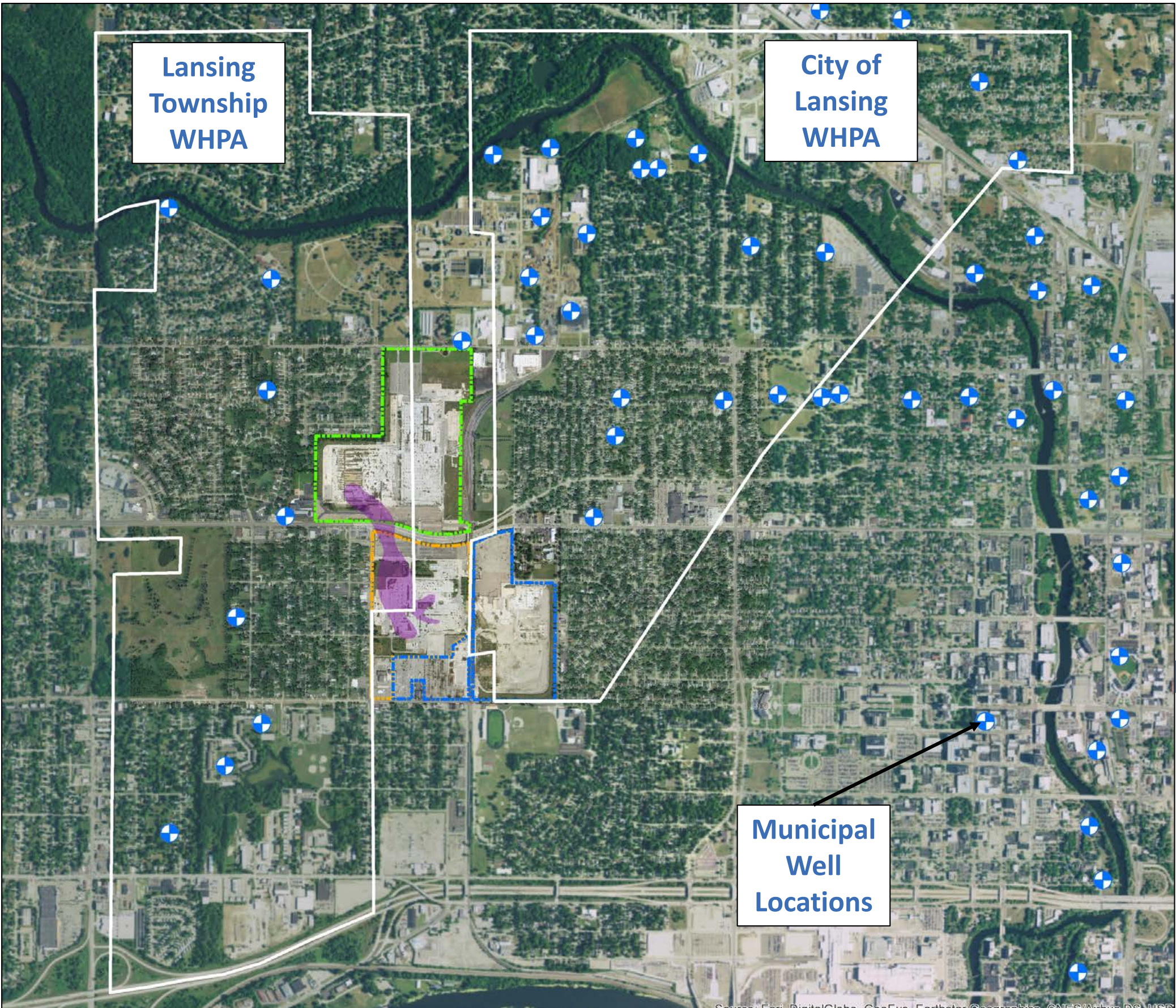
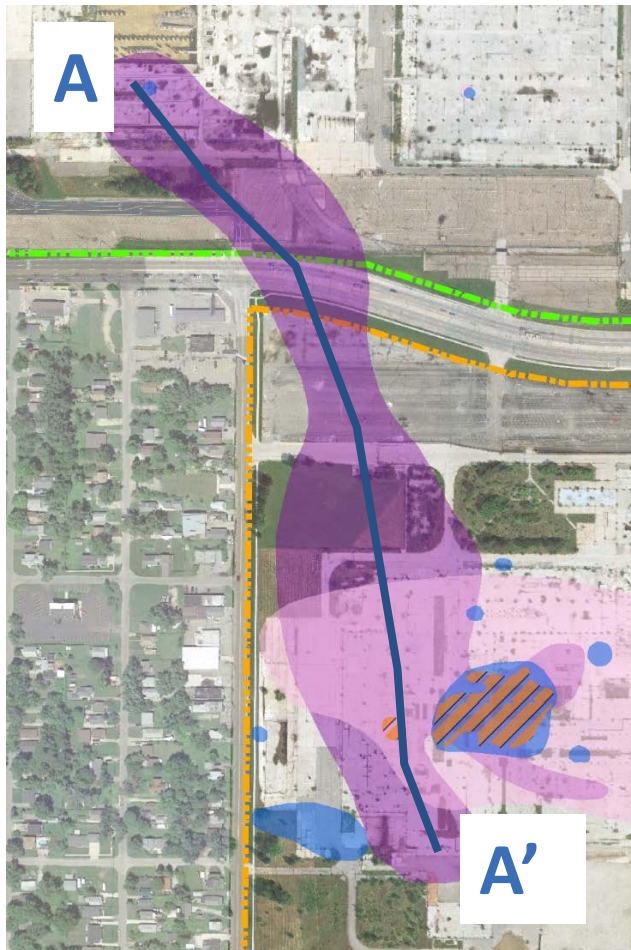


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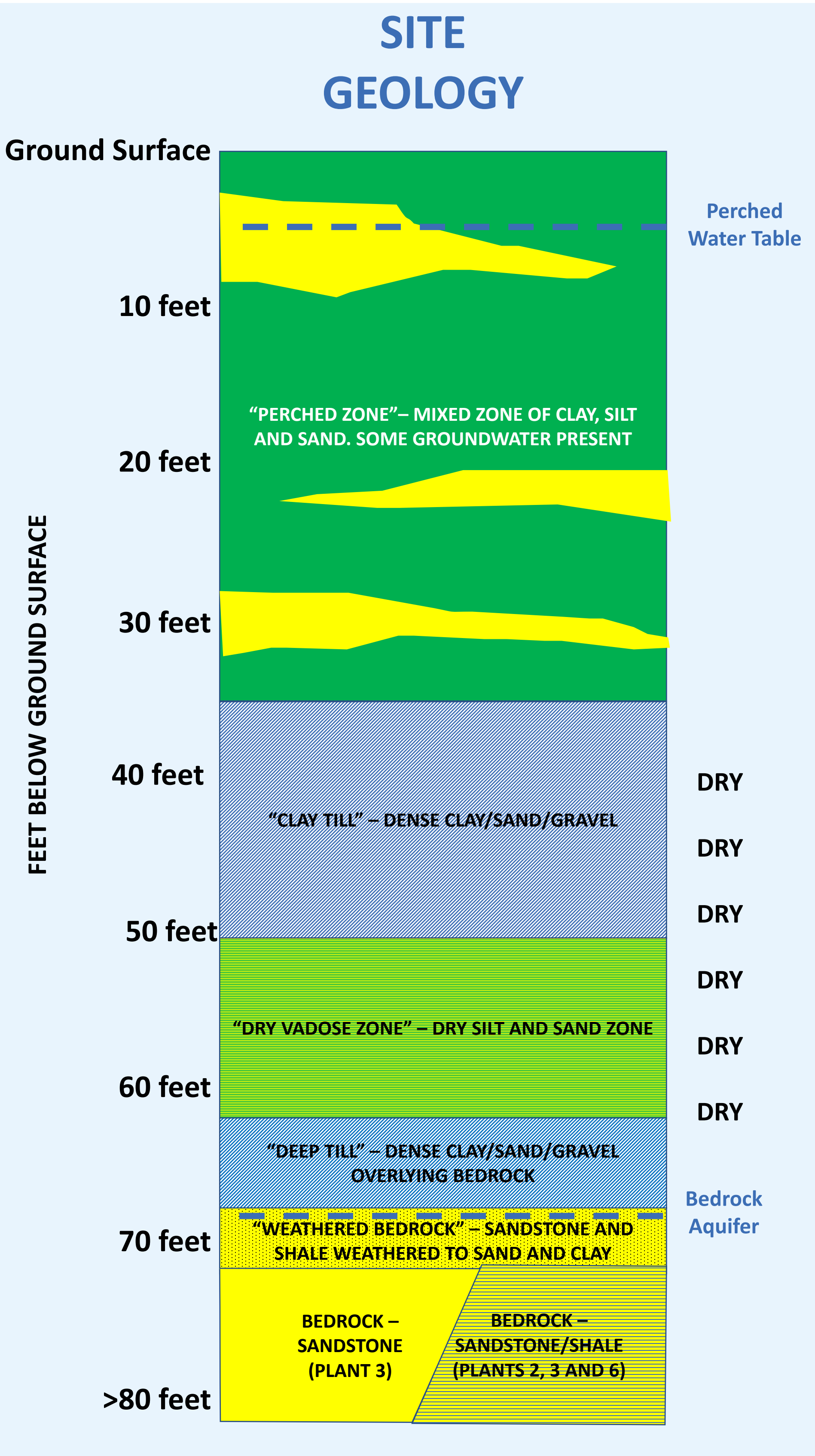
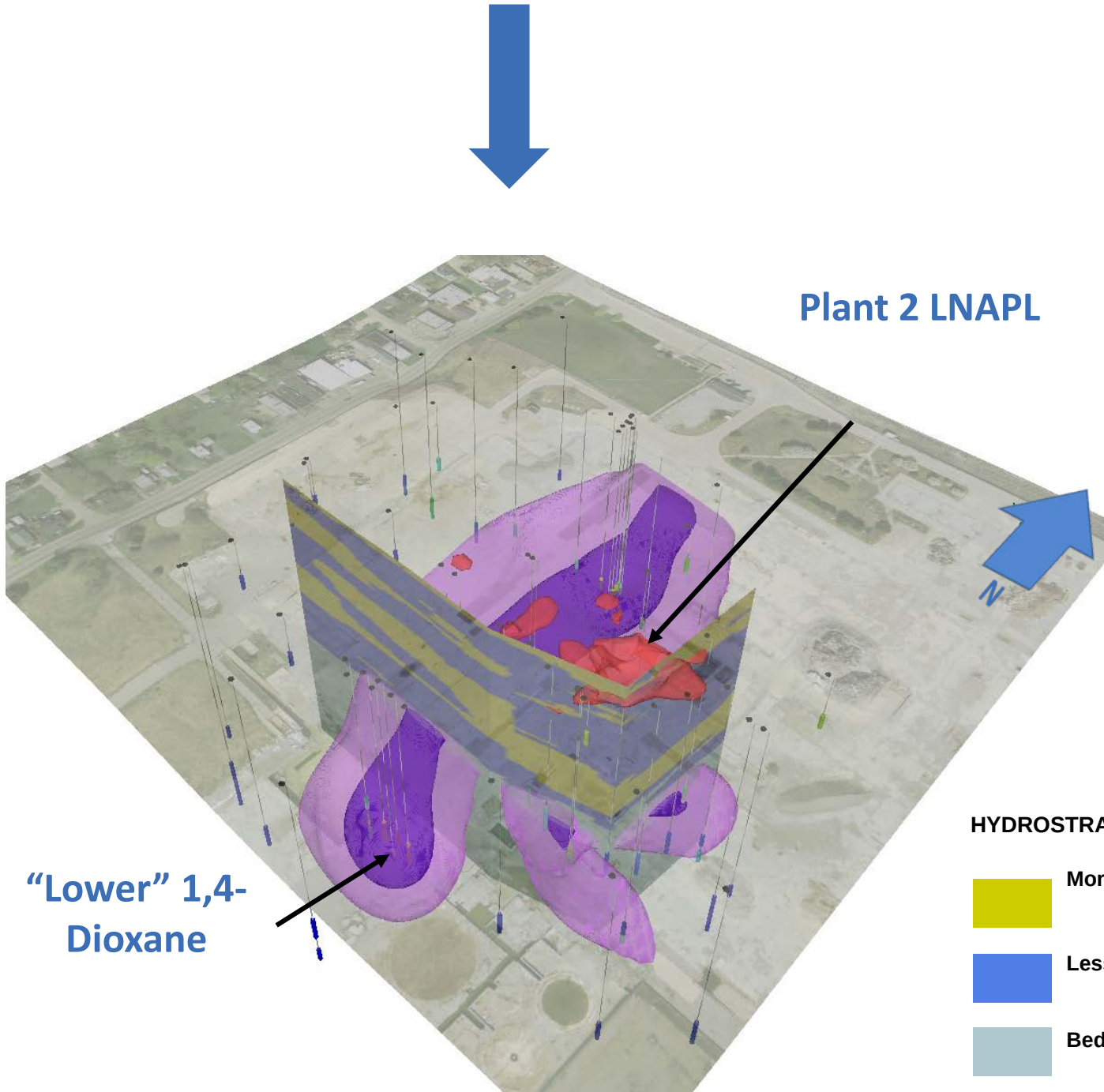
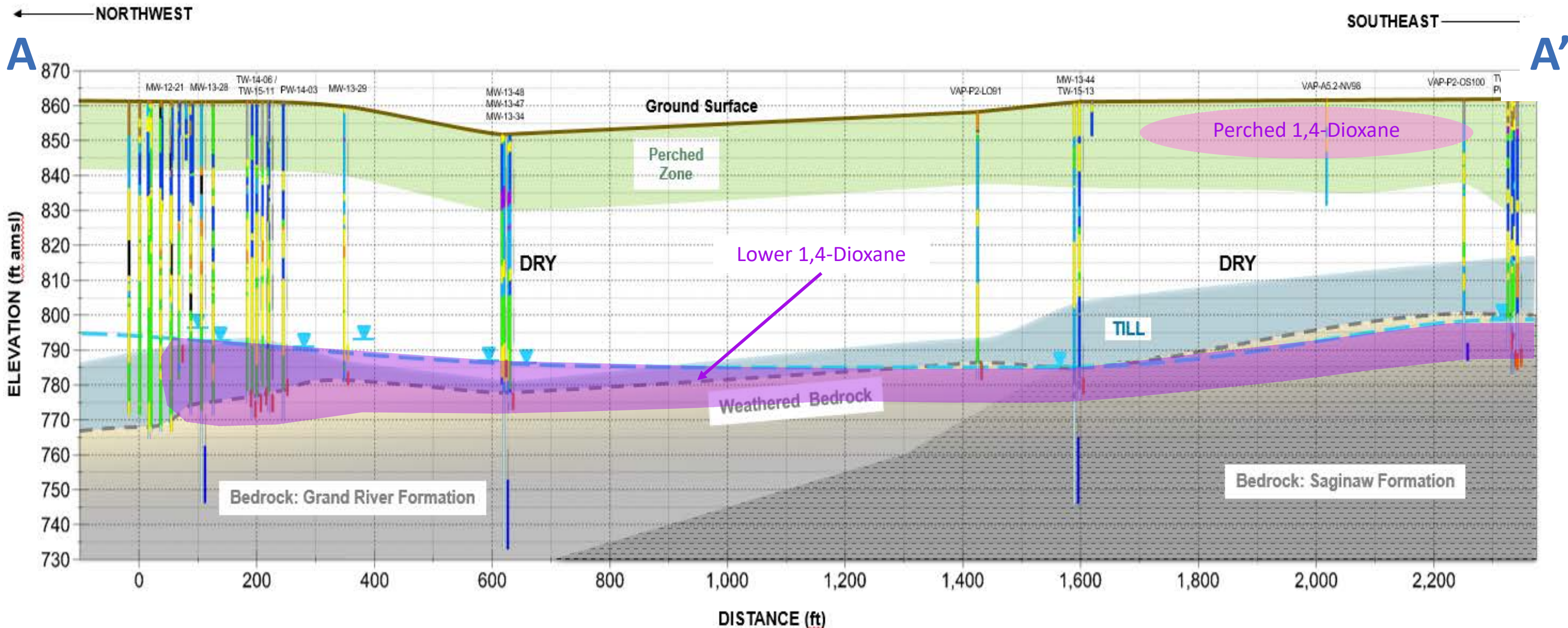
WELL HEAD PROTECTION AREAS

The RACER Site is located partially in and partially between two wellhead protection areas

- City of Lansing
- Lansing Township



The City of Lansing obtains its water from drinking water wells that extract groundwater from bedrock at depths between ~130 and 400 feet below grade



PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

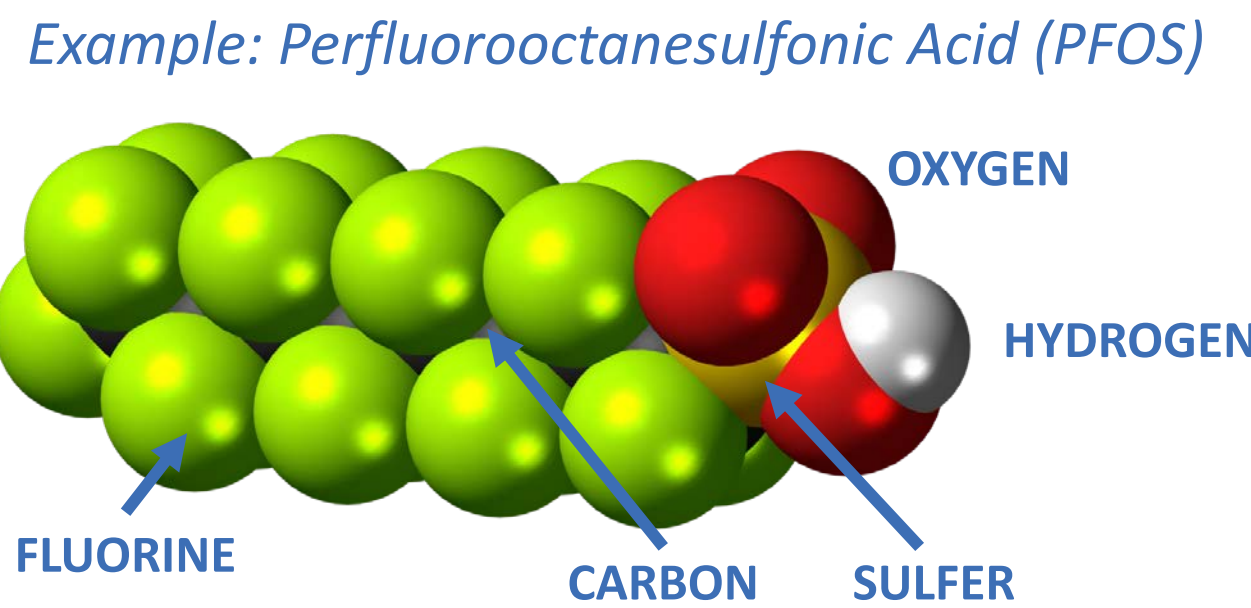
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WHAT ARE PFAS?

PFAS, such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), are part of a group of chemicals used globally during the past half century in manufacturing, firefighting and thousands of common household and other consumer products (USEPA 2018):

- Made up of “chains” of carbon atoms attached to fluorine and other atoms
- Stable and persistent in the environment
- Bioaccumulative
- Suspected carcinogen
- Difficult to Clean-up



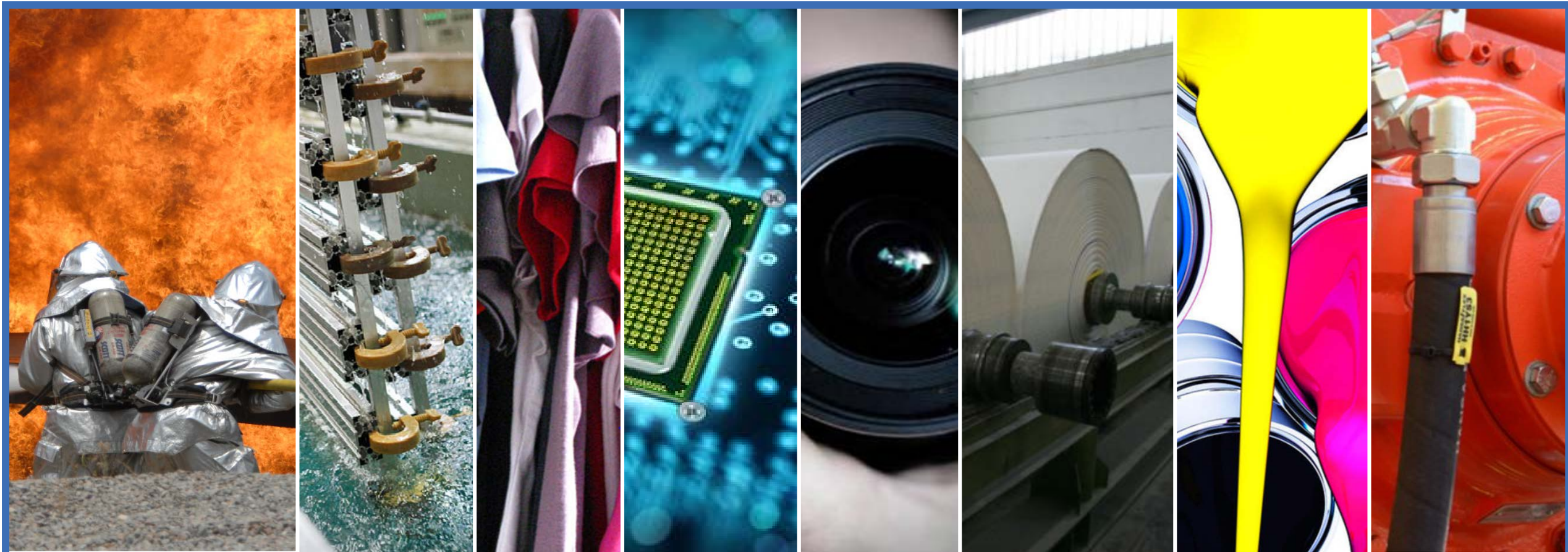
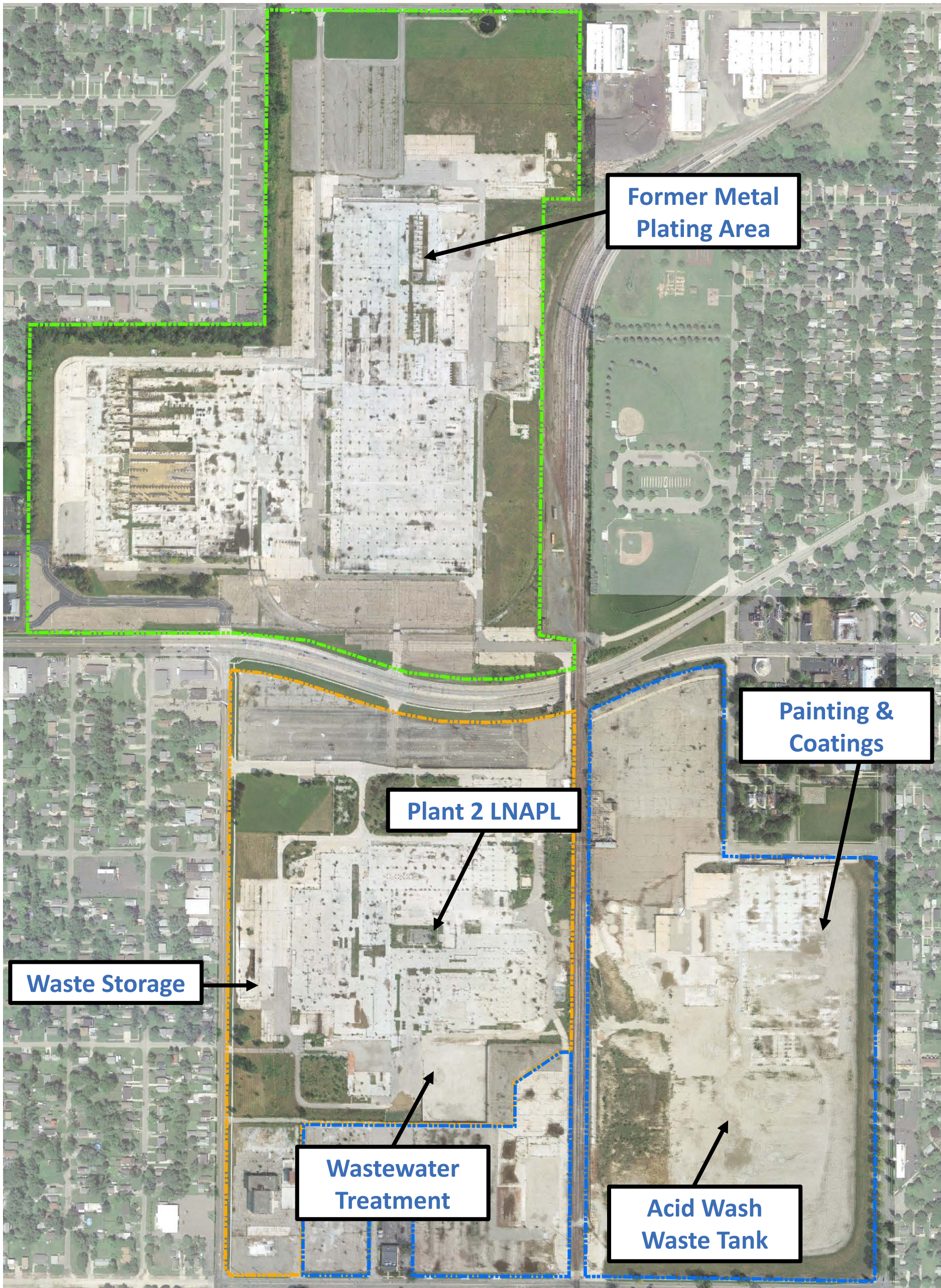
CLEAN-UP CRITERIA

MDEQ has established Clean-Up Criteria Standards for two PFAS compounds PFOA and PFOS:

- Surface Water
- Drinking Water
- Soil Criteria Protective of Surface Water

PFAS COMPOUND	SURFACE WATER QUALITY STANDARD	DRINKING WATER QUALITY STANDARD	SOIL STANDARD PROTECTIVE OF SURFACE WATER
PFOS	12 PARTS PER TRILLION	COMBINED 70 PARTS PER TRILLION	240 PARTS PER TRILLION
PFOA	12,000 PARTS PER TRILLION		10,000 PARTS PER BILLION

POTENTIAL SOURCES OF PFAS AT RACER LANSING



Firefighting Foams Metal Plating Textiles Electronics Photography Paper Coatings Paints Hydraulic Fluids

HISTORICAL PERSPECTIVE ON PFAS

1938: Roy Plunkett discovers polytetrafluoroethylene (PTFE).

1954: Production of first PTFE-coated, non-stick cookware.

1968: U.S. Navy develops first PFAS-containing firefighting foams known as AFFF in response to catastrophic ship fire.

1997: PFOS ubiquitously detected in blood bank samples from non-occupationally exposed people around the world.

2006: Eight major manufacturers commit to phase out PFOA by 2015 as part of U.S. EPA PFOA Stewardship Program.

2013: After 7 years of research, C8 Science Panel determines probable link between PFOA exposure with ulcerative colitis, high cholesterol, pregnancy-induced hypertension, thyroid disease, kidney and testicular cancer.

2009: The Stockholm Convention classes PFOS as a Persistent Organic Pollutant and add it to Annex B to restrict its use.

1949: Products containing PTFE first used for coatings of pipes and leak proofing of pipe connections.

1956: Products containing perfluorooctane sulfonic acid (PFOS) become a popular treatment for clothes, carpets, and furniture.

1978: Manufacturers become aware of C8 PFAS in blood of their manufacturing workers.

2002: The primary global manufacturer of PFOS phases out PFOS production and related chemistries.

2008: The European Food Safety Authority establishes “tolerable daily intake” for PFAS.

RECENT ACCELERATED ATTENTION ON PFAS

2015: Phase-out of PFOA completed by eight leading manufacturers as part of US EPA Stewardship Council.

May 2015: Hundreds of prominent scientists and professionals sign on to the Madrid Statement, urging a complete move away from PFAS chemistry.

January 2016: Manufacturing facility in Hoosick Falls, NY named first PFAS-related Superfund site for PFOA-contaminated drinking water.

2016: Stockholm Convention to add PFOA as a Persistent Organic Pollutant.

May 2017: PFAS first identified at Wolverine House Street Dump associated with tannery wastes near Rockford, MI.

January 2018: Michigan adopts PFAS drinking water criteria of 70 ppt.

2015: US EPA UCMR3 sampling of public drinking water finds PFAS in 97 public drinking water supplies.

October 2015: Payment agreed for a woman's kidney cancer in its first of 3500 personal lawsuits related to PFOA contamination of drinking water near a manufacturing facility.

February 2016: Channel Island, loses lawsuit against a manufacturer in pursuit of costs related to cleanup of PFOS-contaminated groundwater and soil.

May 2016: US EPA announces drinking water health advisory limit for PFOS and PFOA (separately or combined) at 70 ppt (ng/L), which combined with UCMR3 data meant 60 water supplies were out of compliance and 6 million Americans were affected.

August 2016: Potential source of PFAS impacts are published and mainstream media broadcast the news that 6 million Americans are affected.

November 2017: Michigan launches PFAS Action Response Team (MPART) as the first multi-agency action team of its kind in the nation.

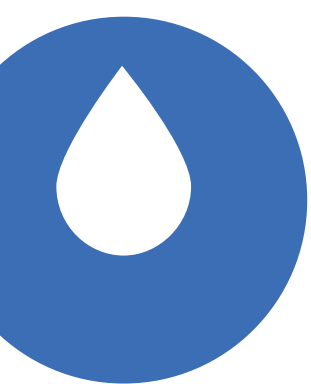
PFAS AT RACER

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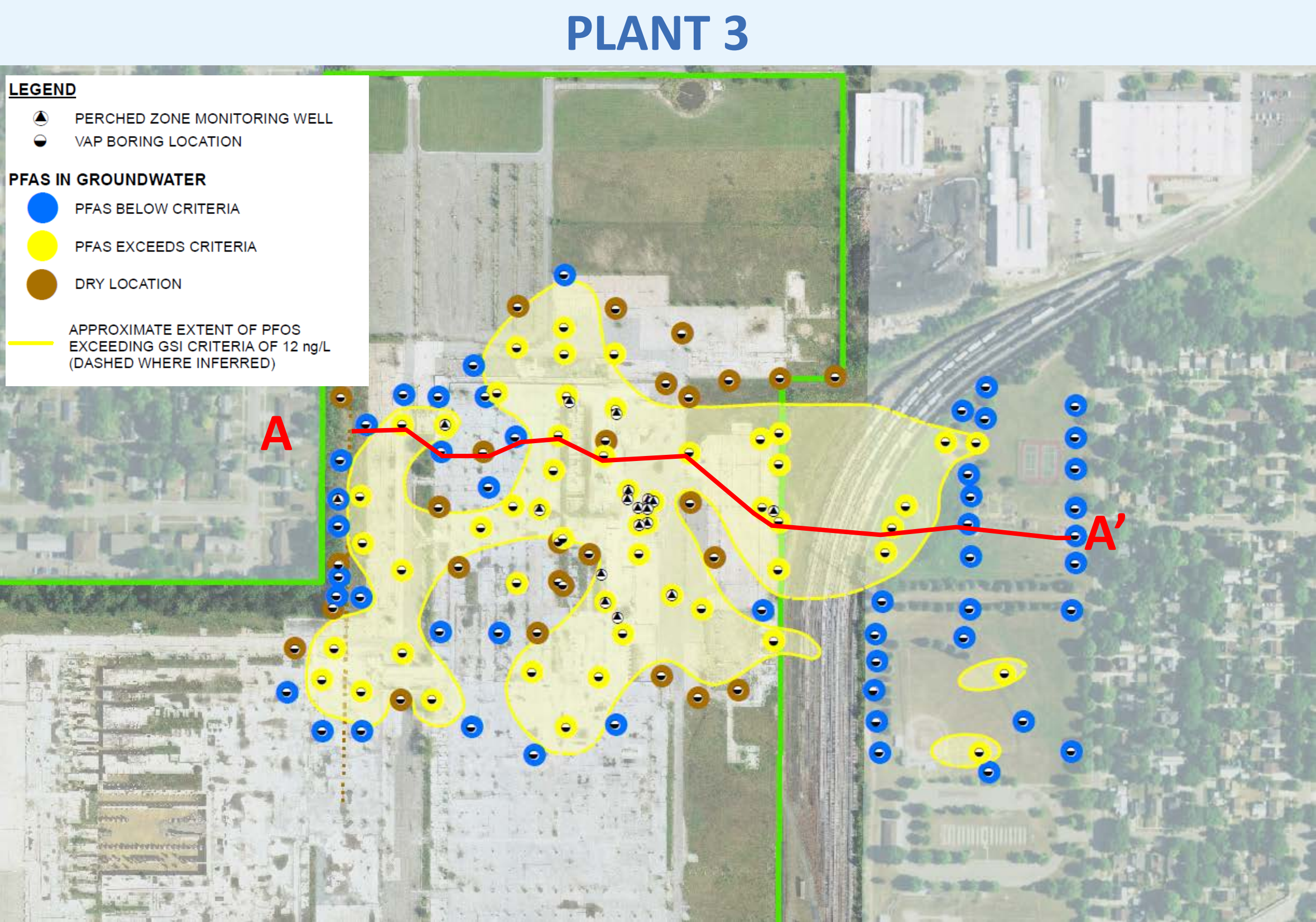


LOCATIONS OF PFAS IDENTIFIED AT THE RACER SITE

- Plant 3 – Associated with the former plating operations in the north central portion. Delineated on-site and off-site to the east.
- Plant 2 – Generally low-concentrations associated with the Plant 2 oils and other former waste storage areas
- Plant 6 – Associated with painting and coating and phosphoric acid bath operations.

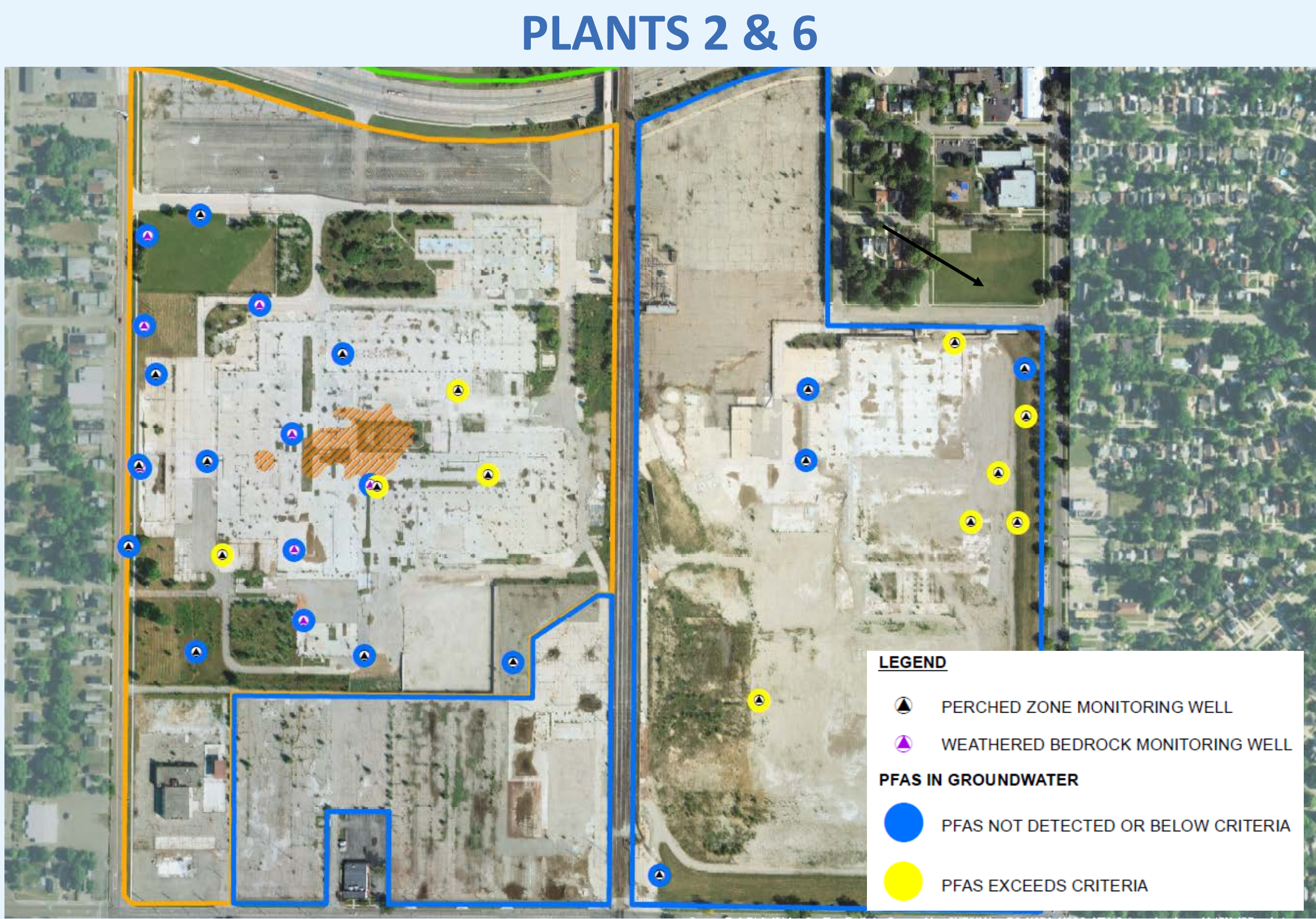


PFAS has not been found in the bedrock drinking water aquifer above MDEQ criteria at the RACER Site.



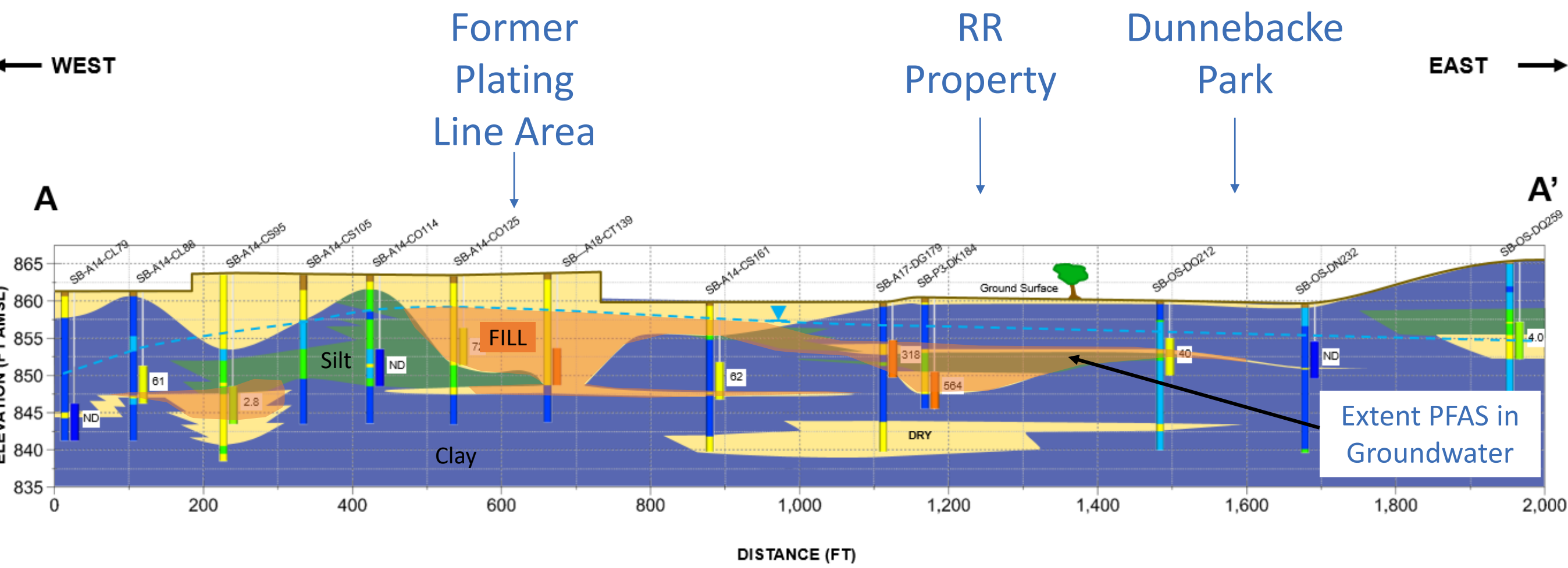
The highest concentrations of PFAS at Plant 3 are within shallow fill material placed as part of the plating line decommissioning

- Migrates away from fill in groundwater through small sand and silt seams
- No detections of PFAS noted within the bedrock aquifer
- Extends into park properties east of Site
- No drinking water exceedances noted off-site

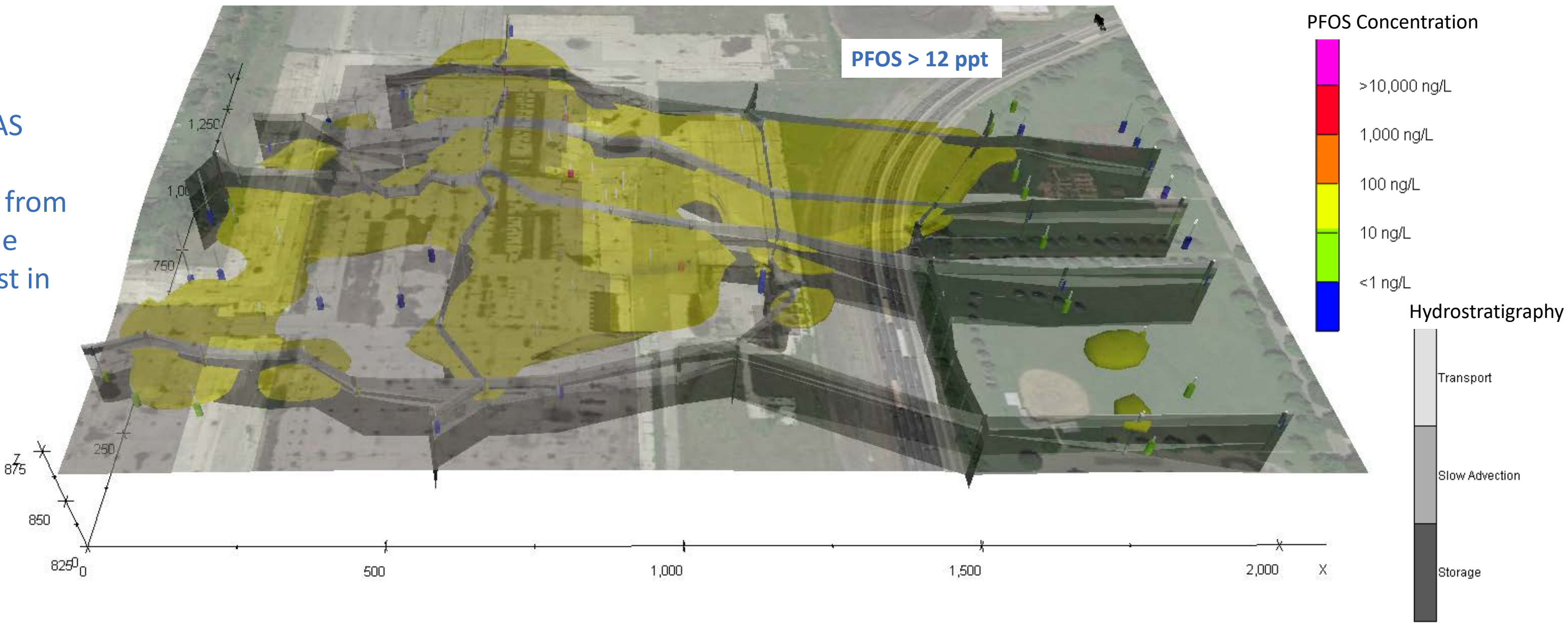


Monitoring wells at Plants 2 and 6 were sampled in June 2018

- Plant 2 – PFAS generally detected at low concentrations and extent is delineated by existing monitoring wells
- Plant 6 - has concentrations above criteria adjacent to the property boundary that will require additional characterization both on and off-site



Cross-section and 3D model illustrating PFAS Plume extents in the subsurface migrating from the former plating line area offsite to the east in shallow soils

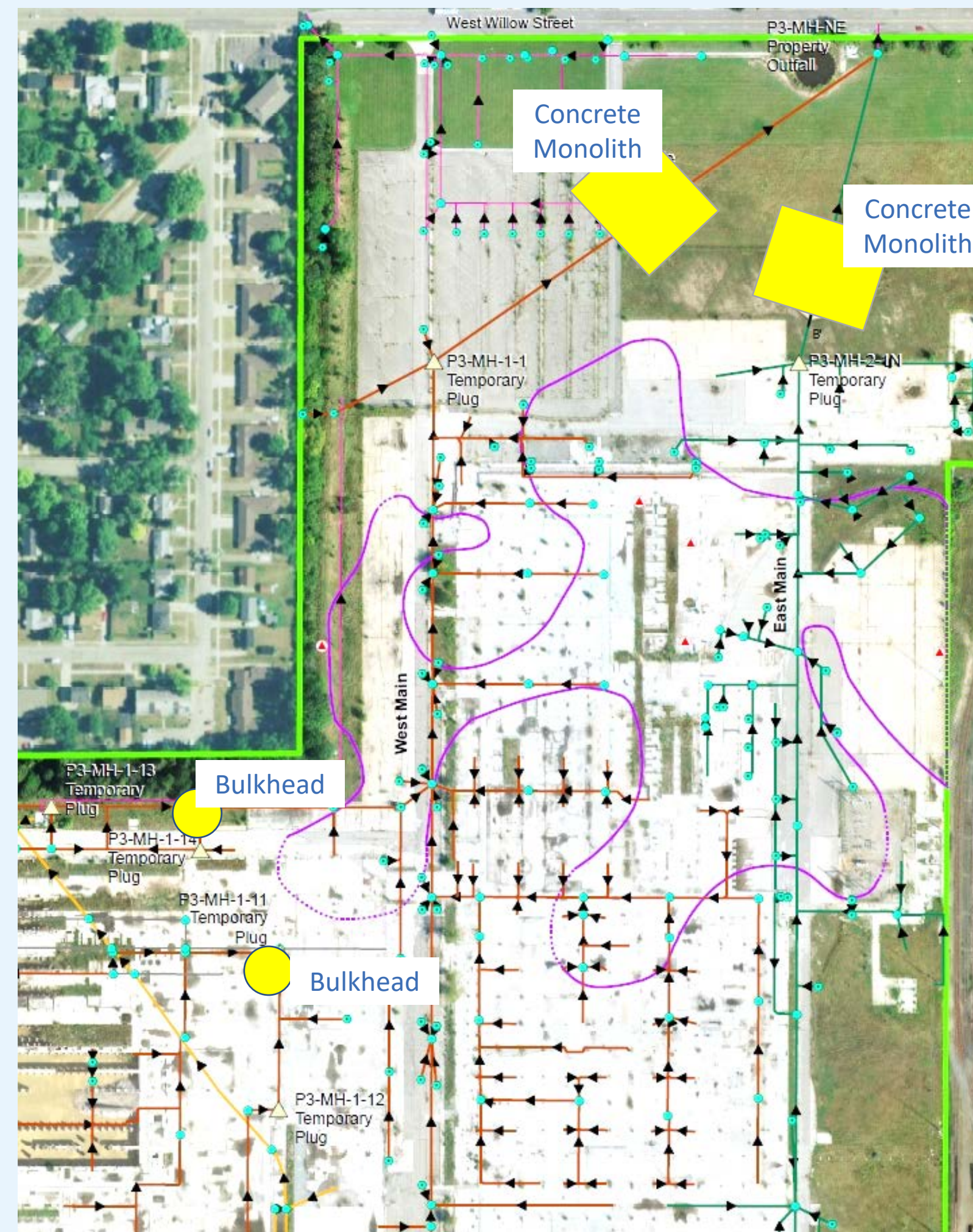
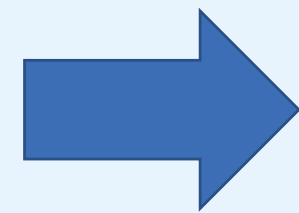


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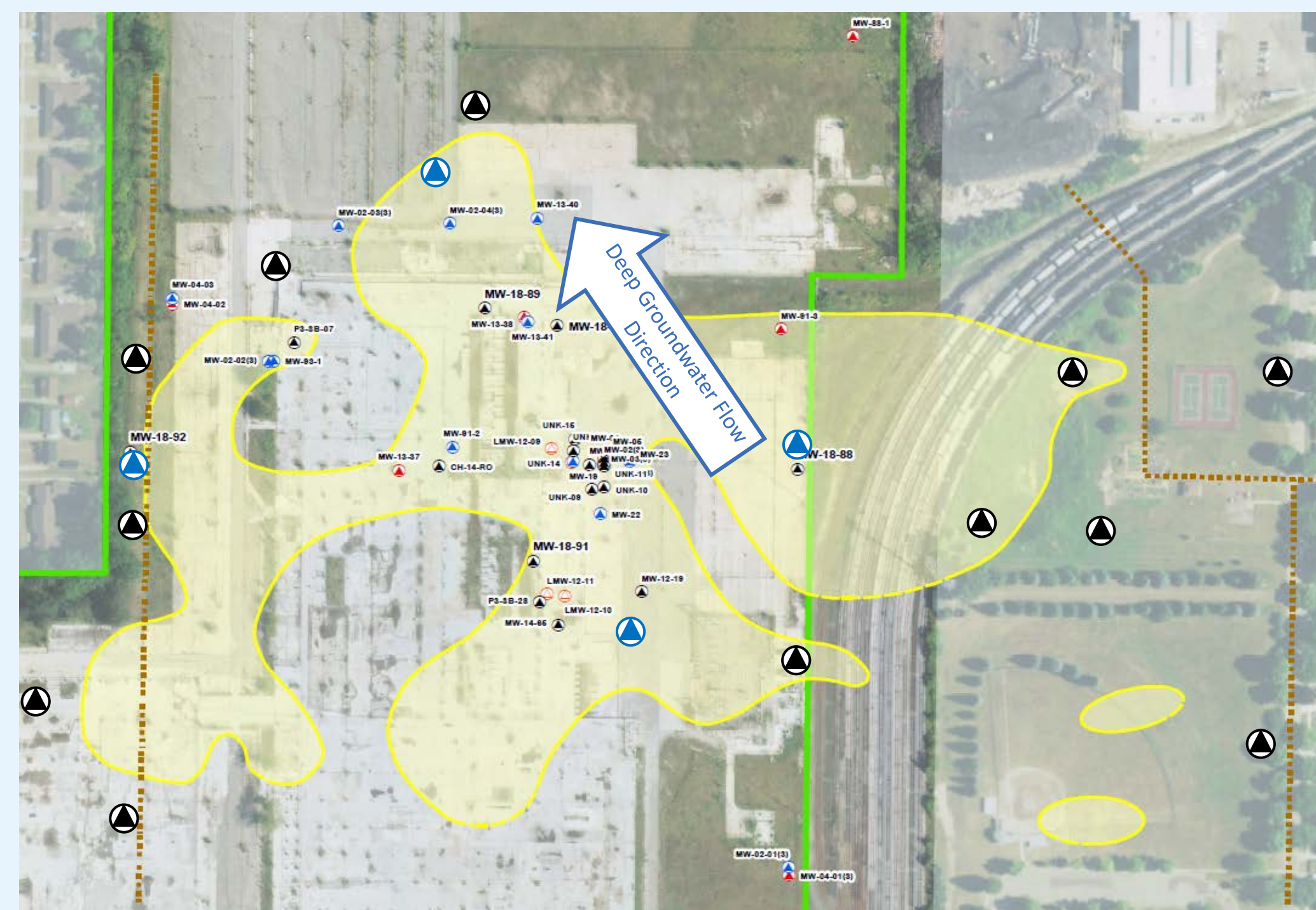
To eliminate the potential for PFAS to migrate off-site within leaking storm sewers, the storm sewer system will be blocked and runoff to the Grand River eliminated.

- Block the main lines that drain to the north by placing a large concrete monolith to block flow
- Eliminate potential for overflow to county drain with smaller bulkheads to the south



Additional monitoring wells will be installed around the perimeter and within the impacted area to monitor the plume and collect additional data needed to evaluate trends and to allow for remedy development

-  **Proposed Perched Monitoring well**
-  **Proposed Deep OB/WB Well**



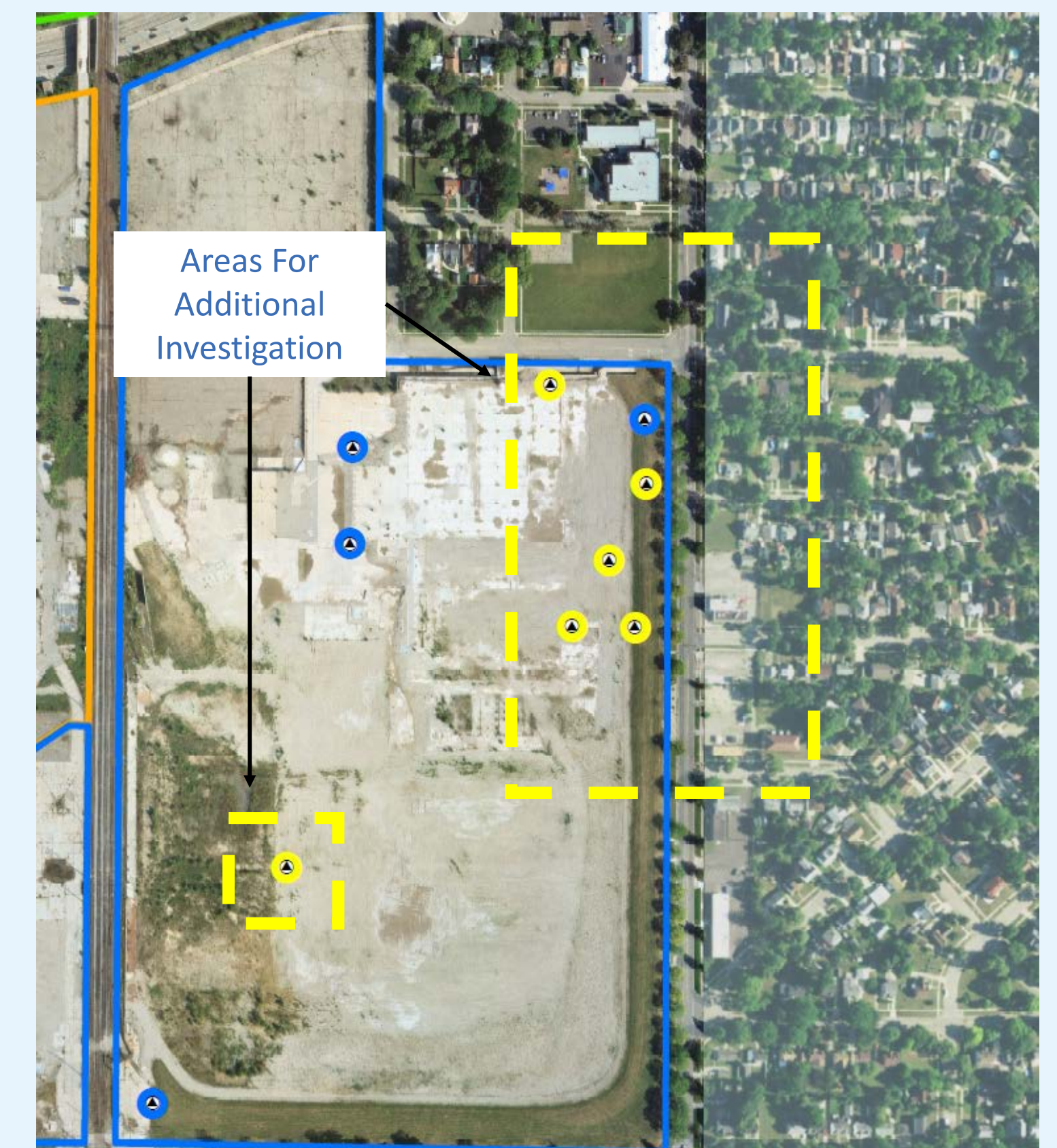
Plant 6 has concentrations above MDEQ criteria adjacent to the property boundary that will require additional characterization both on and off-site

- Borings will be completed next to the property boundary and offsite to define the extent of PFAS in groundwater
- Off-site work to be completed in public right-of-way
- Additional borings on-site to further characterize former acid waste tank area

Plant 2 has some exceedances of MDEQ PFAS criteria interior to the plant but is defined at the property boundary by existing wells. The PFAS impacts will not effect the remedy currently being reviewed with MDEQ for Plant 2.

 PERCHED ZONE MONITORING WELL
 WEATHERED BEDROCK MONITORING WELL

 PFAS NOT DETECTED OR BELOW CRITERIA
 PFAS EXCEEDS CRITERIA



1,4-DIOXANE AT RACER

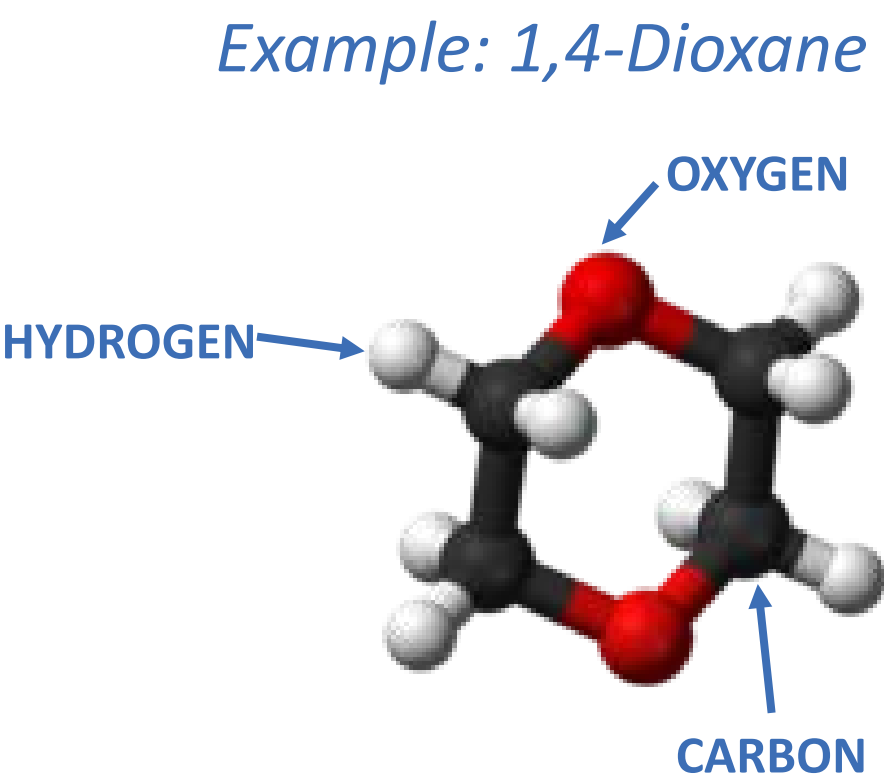


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WHAT IS 1,4-DIOXANE?

1,4-Dioxane is an industrial solvent and is typically used as a stabilizer in other solvents such as 1,1,1-trichloroethane but it is also commonly found in many household products and is:

- Highly soluble in water
- Very mobile, flows with groundwater
- Creates long plumes
- Suspected carcinogen



1,4-DIOXANE AT RACER LANSING

1,4-Dioxane at the RACER Site is primarily associated with two source areas.

- Press-pit basement where solvent was released and migrated through the perching clay via the basement excavated for press pits
- Plant 2 LNAPL area – The light non-aqueous phase liquid (i.e. cutting oil) released in this area also contained concentrations of some solvents that contained 1,4-dioxane

SOURCES OF 1,4-DIOXANE

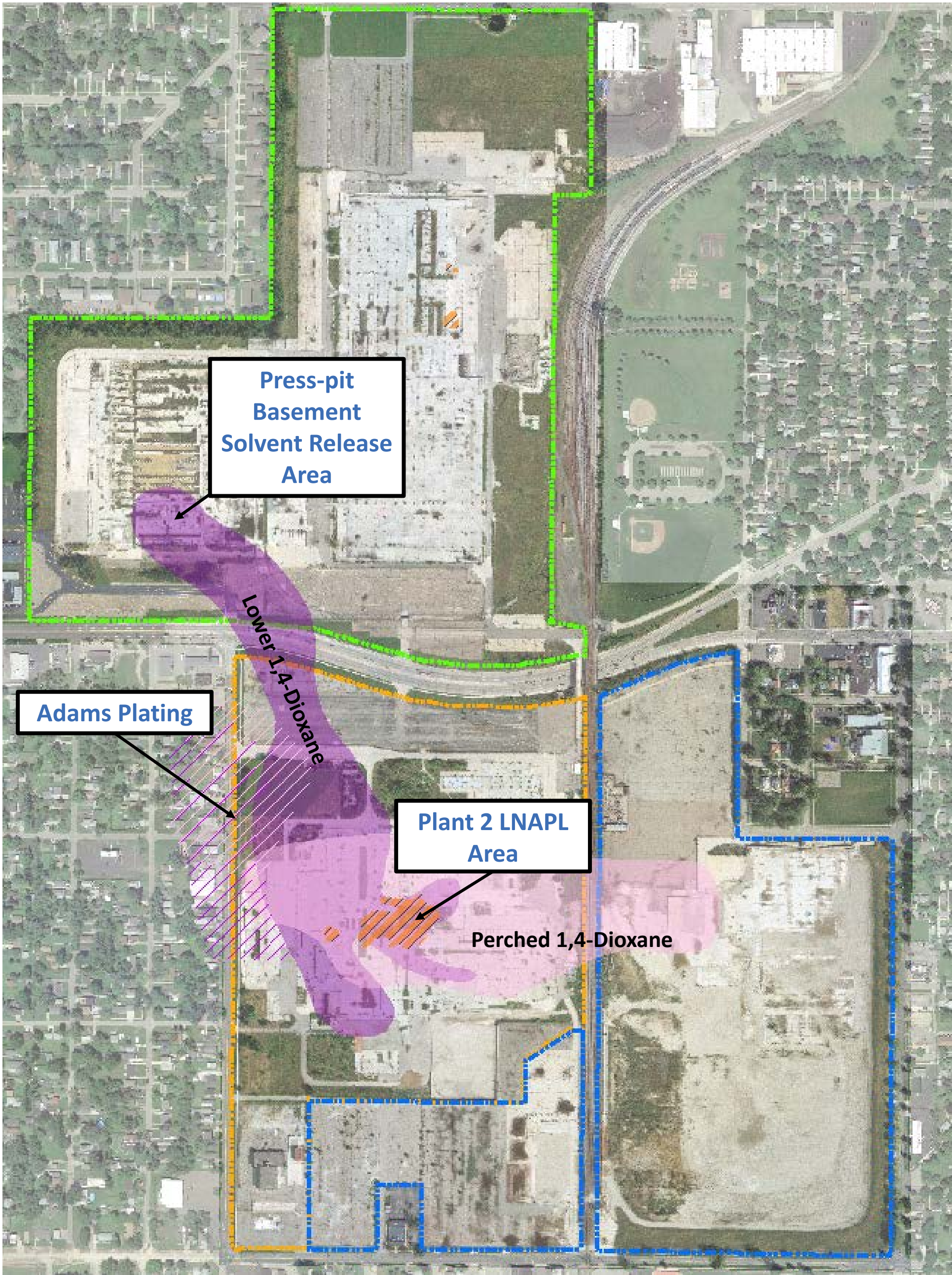
Consumer Products	Detergents	Paint / Dye / Grease
Manufacturing Byproduct		Direct Use
Chlorinated Solvents (1,1,1-TCA)		

CLEAN-UP CRITERIA

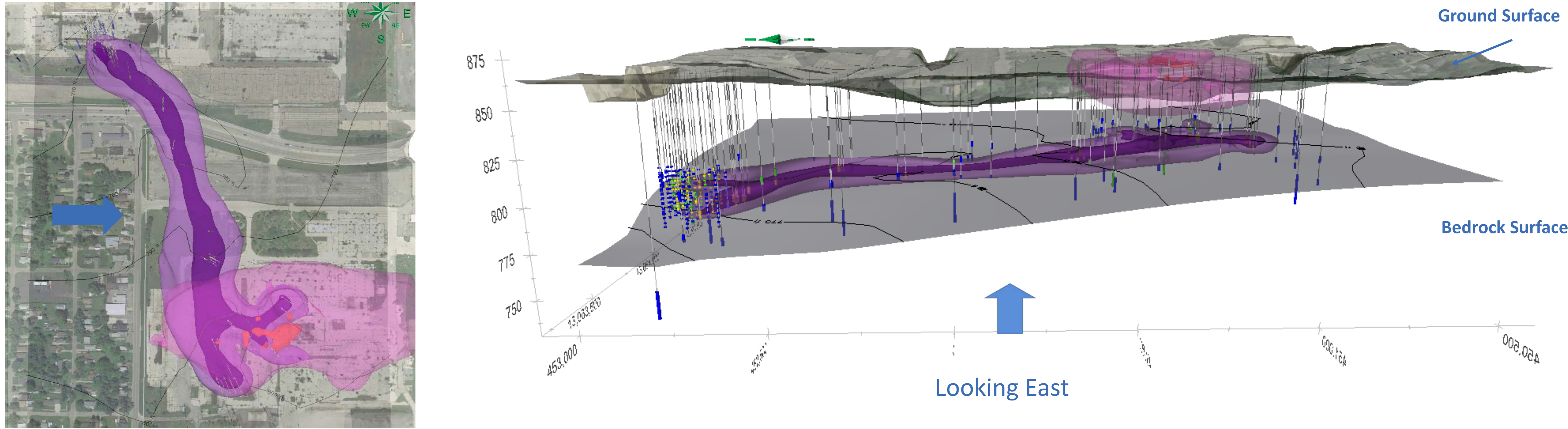
MDEQ has recently issued revised criteria for 1,4-Dioxane.

COMPOUND	GROUNDWATER-SURFACE WATER INTERFACE	DRINKING WATER QUALITY STANDARD
1,4-DIOXANE	280 PARTS PER BILLION	7.2 PARTS PER BILLION

DISTRIBUTION OF 1,4-DIOXANE IN GROUNDWATER



RACER 1,4-DIOXANE 3D MODEL



OTHER SOURCES OF 1,4-DIOXANE

- There are several industrial sites in the west Lansing Area with the potential to contribute 1,4-dioxane to the bedrock aquifer
- The USEPA Superfund Site - Adams Plating - is located west of Plant 2 and has known 1,4-dioxane and PFAS impacts

