

Block 4 Groundwater Management Strategy and Well Abandonment Plan

RACER Buick City Site, Flint, Michigan

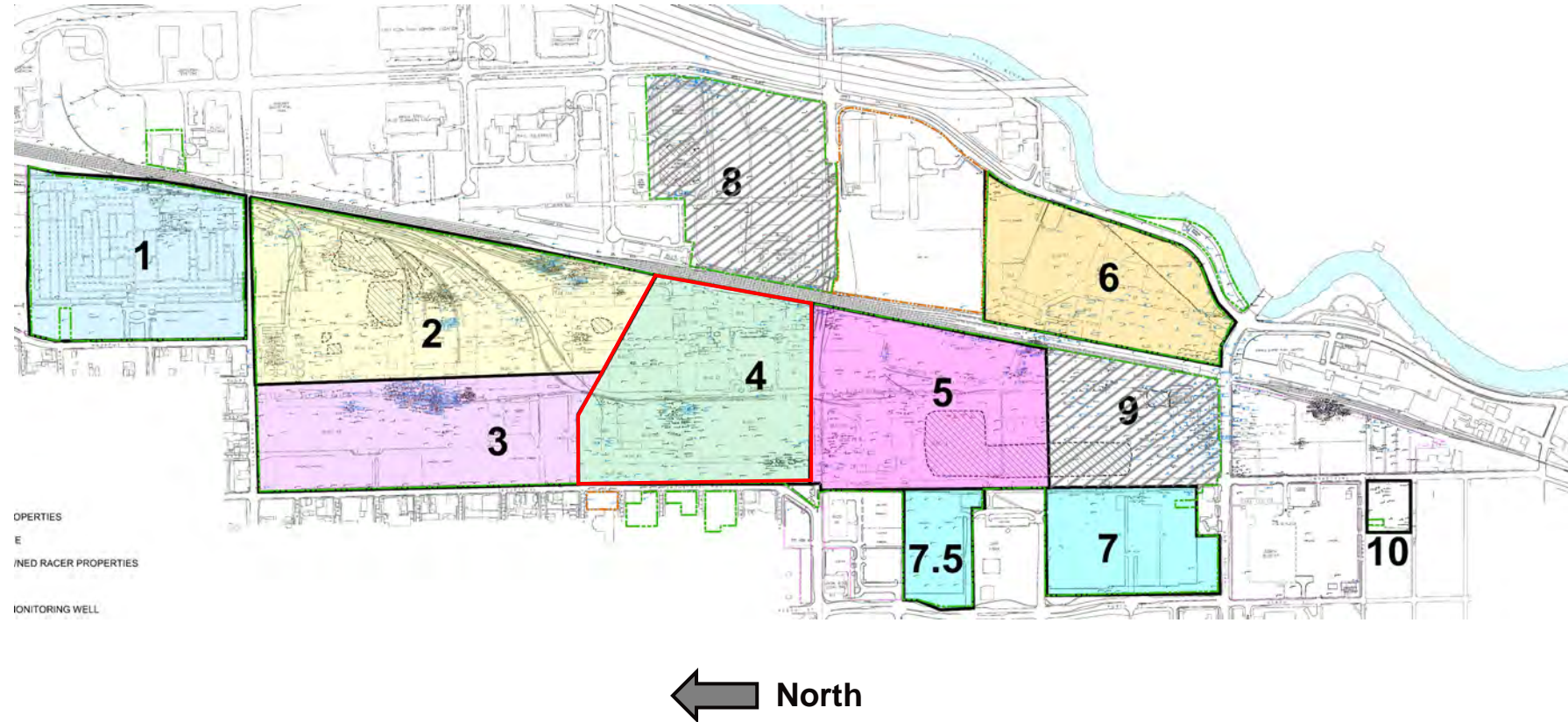
January 19, 2023

Rev March 16, 2023

Overview

This presentation includes the following for Block 4 at the Buick City Site

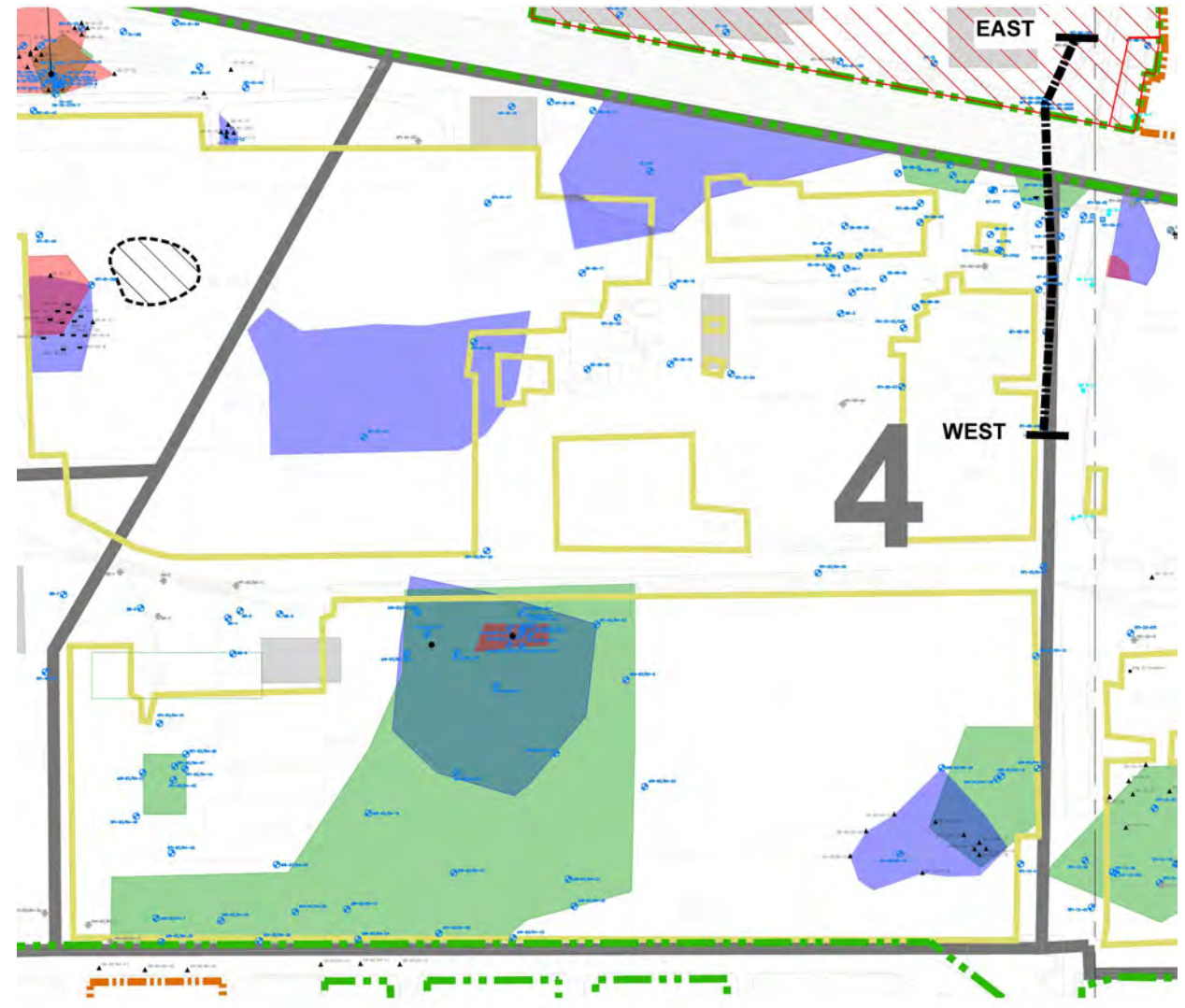
- Conceptual Site Model
- Proposed restricted areas and summary of impacts
- Proposed monitoring network for:
 - Short-term PFAS investigation
 - Short-term construction monitoring
 - Long-term monitoring
- Proposed wells to be abandoned



Block 4 Conceptual Site Model

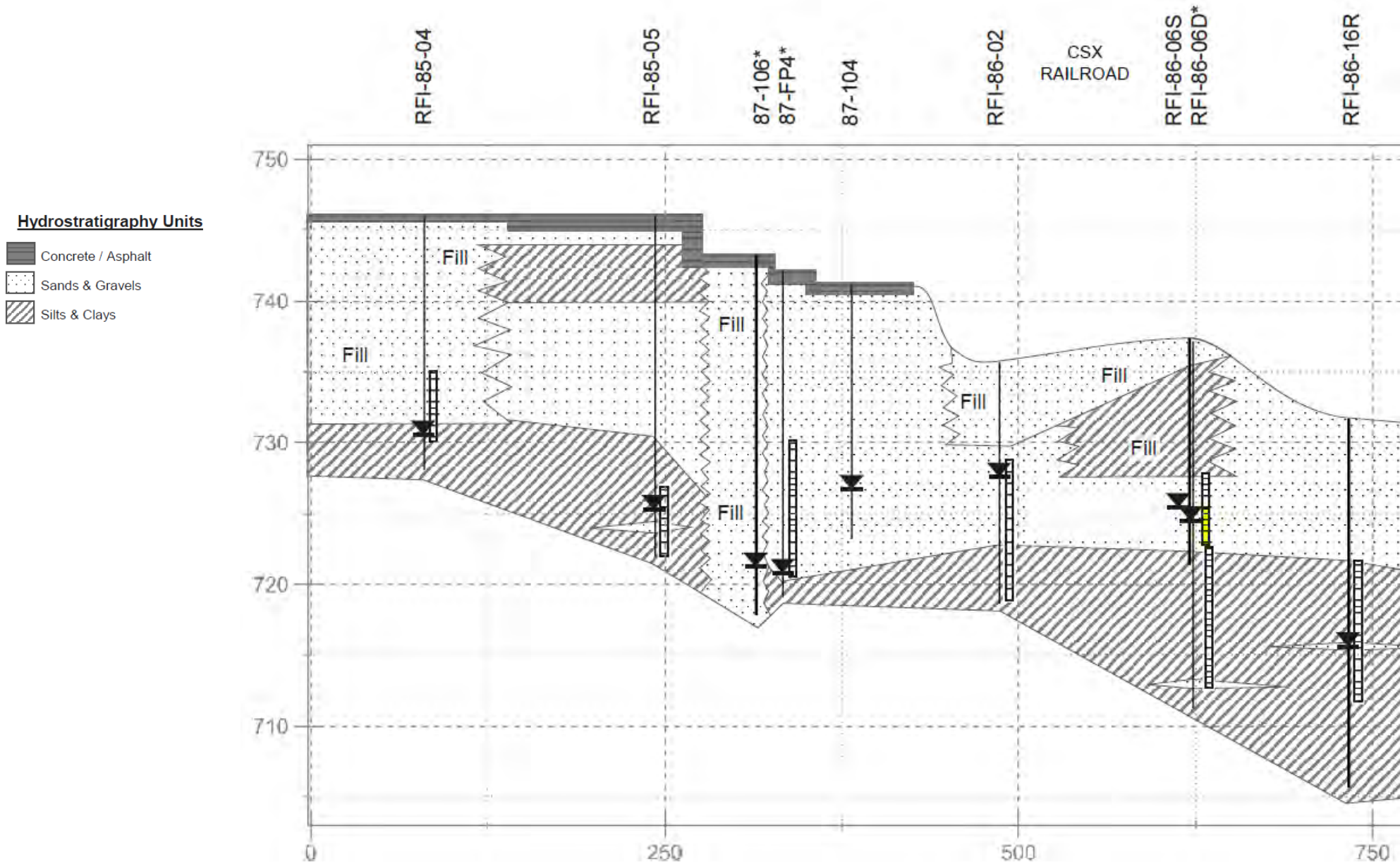
Block 4 is characterized by approximately 9-10 feet of topographic relief sloping from west to east. Most of the Block is covered by slabs, with the exception of the Factory 81 basement area, a small (approximately 80ft by 120 ft) vegetated area in the eastern half of the block, and a strip of vegetated areas along the east boundary of the block (and property boundary with CSX).

A cross section was prepared along the southern edge of Block 4 and is presented on the following slide. The subsurface geology is based on borings completed to a depth of up to 30' and elevations down to approximately 710 feet above mean sea level (AMSL). The subsurface geology consists of shallow fill material from approximately 5 to up to 25 feet thick, which is predominantly sandy in nature. A good portion of this fill layer within Block 4 is made up of foundry sand. The sandy fill is underlain by a natural sand layer between 5 and 10 feet thick. The sand and sandy fill are underlain by a silty clay layer of varying thickness. In some locations the fill extends down to the silty clay layer. The silty clay layer is underlain by a stiff clay till layer, which is continuous across the Buick City site. The clay till is encountered at elevations between approximately 730 and 715 AMSL.

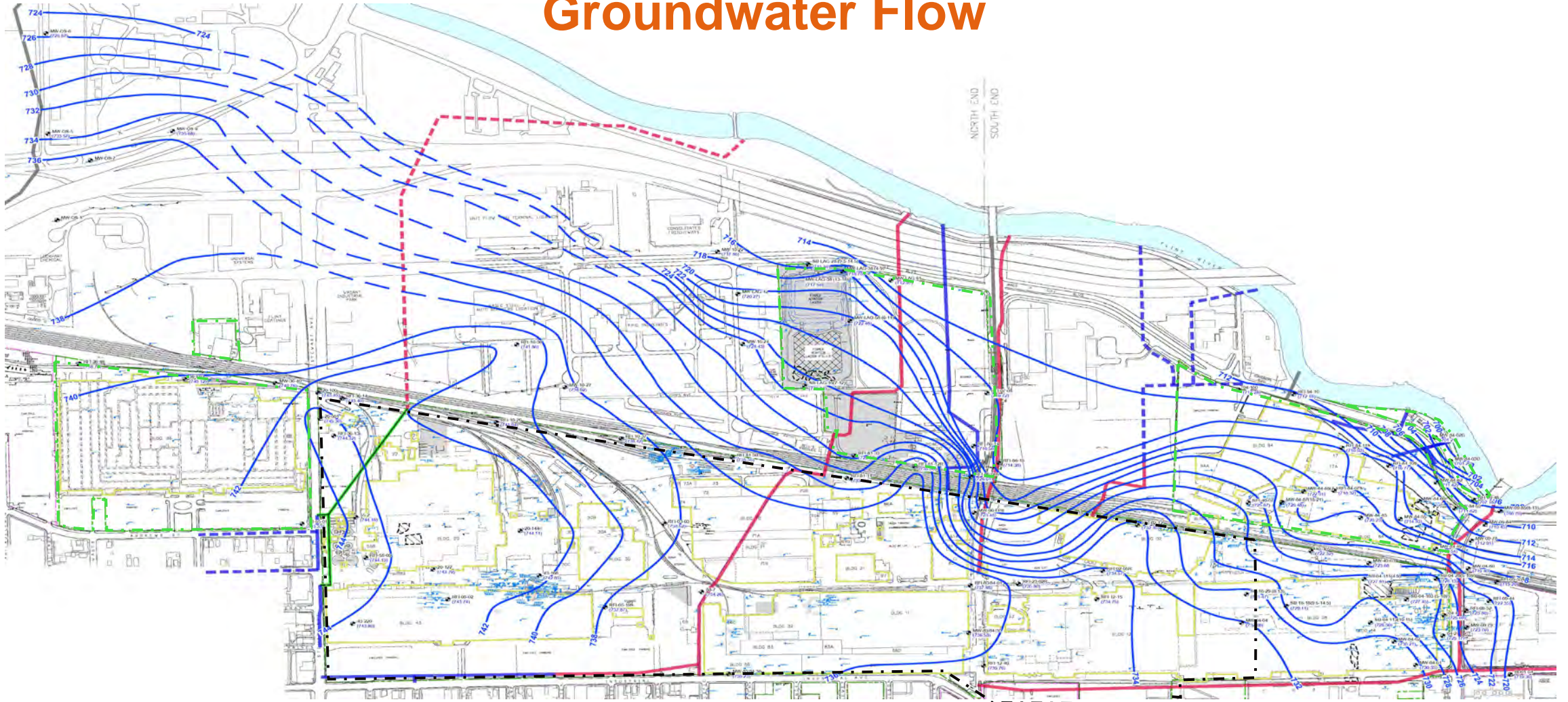


Block 4 Conceptual Site Model

EAST



Groundwater Flow



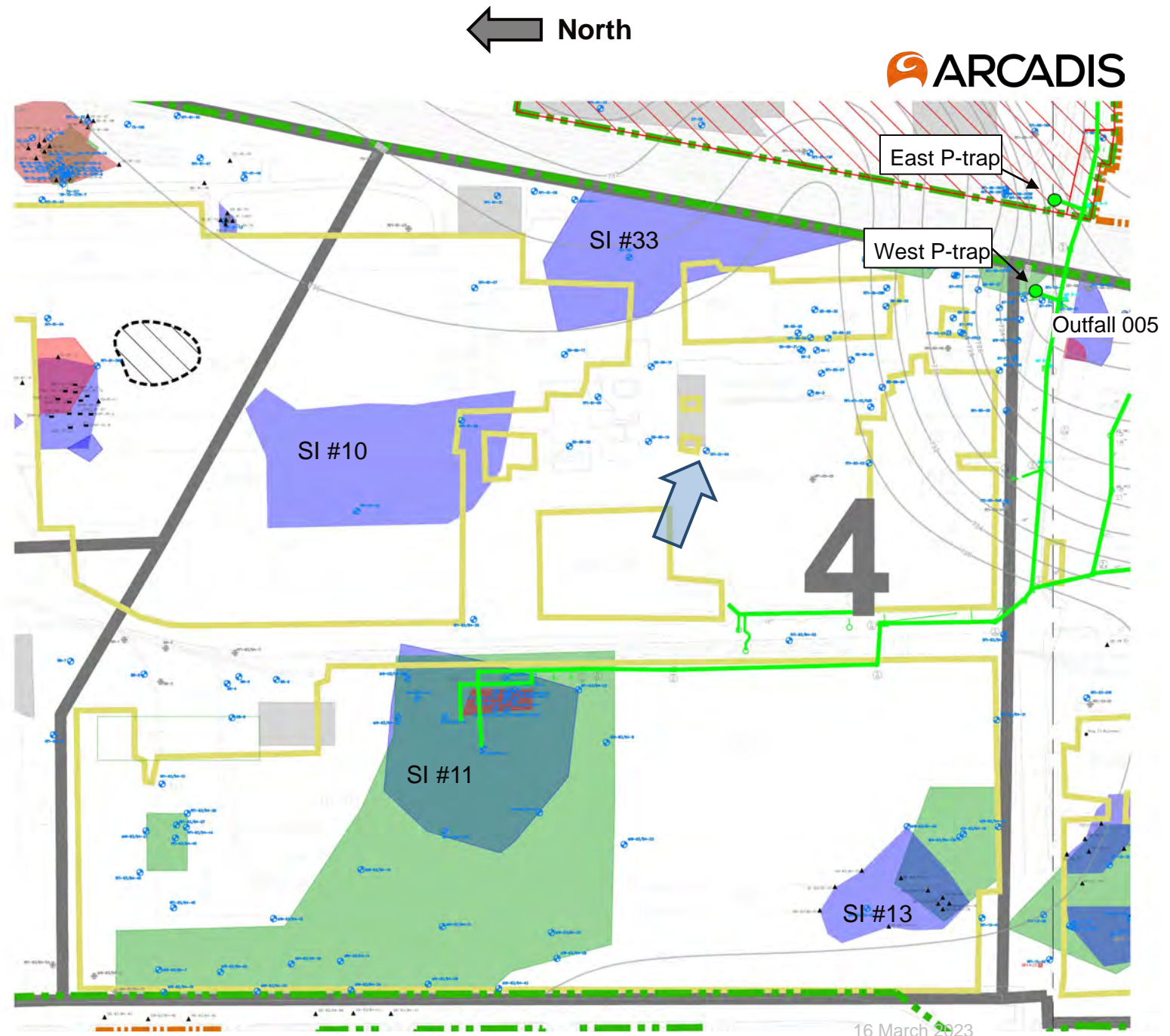
Groundwater on Block 4 is encountered at depths of between 2 and 15 feet below ground surface (bgs), groundwater depths increasing from northwest to southeast across the block. Groundwater flows primarily within the sandy fill and sand layers and is strongly influenced by the presence of the Outfall 005 storm sewer, which flows west to east beneath Leith Street and acts as a hydraulic sink for groundwater within the block. Groundwater flows generally northwest to southeast and the vast majority of flow discharges to the Outfall 005 sewer through a French drain system placed behind a retaining wall along the north side of Leith Street. Manholes located at the ends of the French drain are known as the West and East P-traps. The clay till layer is a barrier to vertical groundwater flow, based on soil boring logs, plus field and laboratory hydraulic conductivity data.

Block 4 Impacts - Proposed Restricted Areas

Areas at Block 4 will be restricted to be protective of human health and the environment for the following impacts:

- LNAPL (green areas)
- PCBs in soil (red area)
- Lead in soil (blue areas) - SI # 10, 13, and 33
- Lead, manganese, and benzo(a)pyrene in soil (blue area) - SI # 11
- Blue areas have been updated to include data through 12/23.

The routes of exposure at Block 4 consist of groundwater migration to the Flint River and groundwater discharge to the Outfall 005 storm sewer through the French drain, which is monitored via the West and East P-traps.



Block 4 Soil and Groundwater Impacts

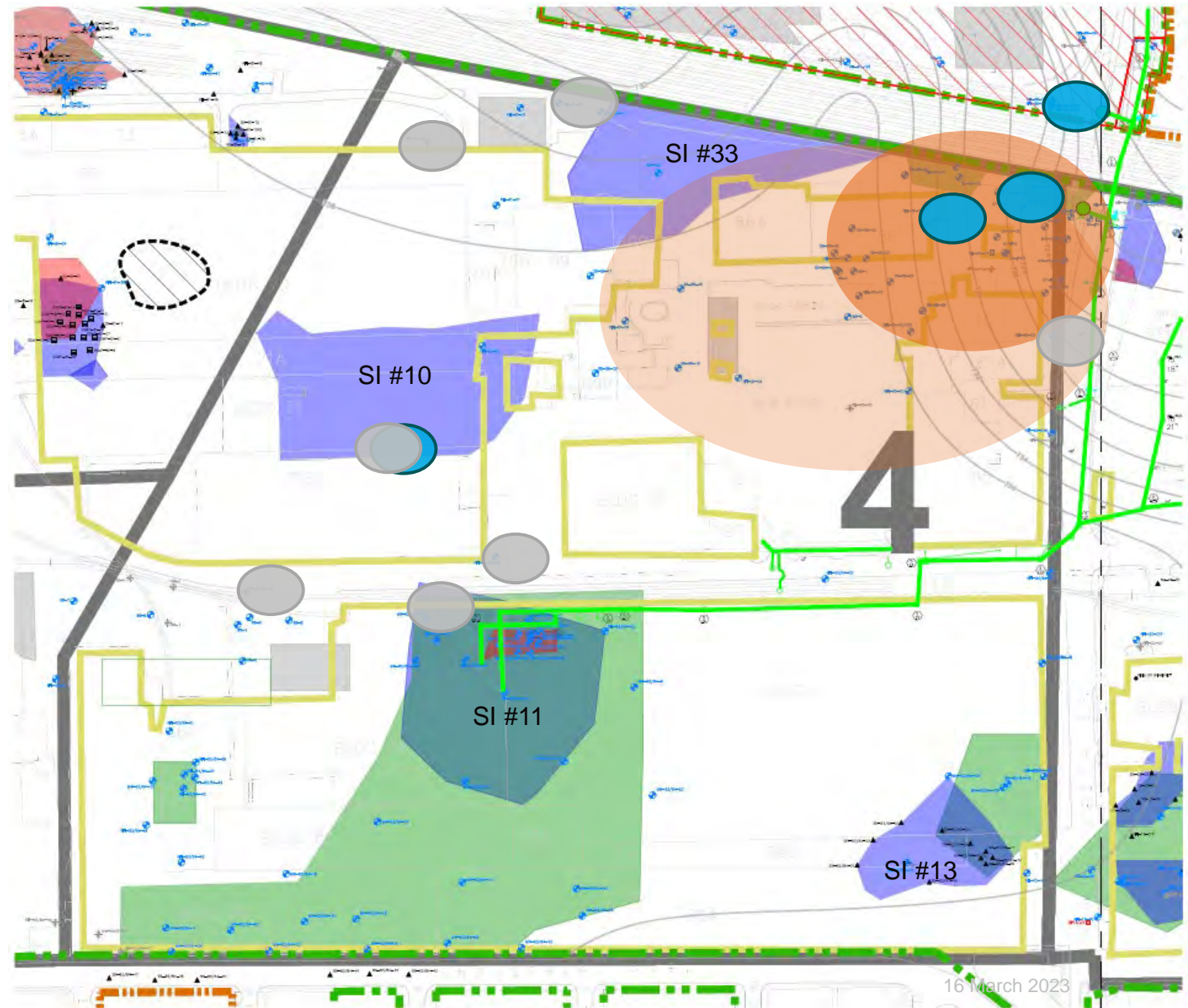
In addition to the proposed restricted areas the following impacts are also present at Block 4:

PFAS (large orange area) – Detected in soil and groundwater. Investigation is ongoing.

VOCs (small orange area) – VOCs are present in groundwater at concentrations exceeding criteria in the southeastern portion of Block 4.

Mercury (gray ovals) – Mercury has been detected in groundwater above criteria at seven monitoring wells.

Arsenic (blue ovals) – Arsenic has been detected in groundwater above criteria at four monitoring wells.



Block 4

Short-term and Long-term Monitoring Networks

In order to meet the investigative, redevelopment and monitoring goals for Block 4, short-term and long-term monitoring strategies will be used. These strategies are summarized briefly below and detailed in the following slides.

Short-term Investigation Monitoring Wells

- These wells will be used for short-term investigative purposes
- Wells will be abandoned when investigation activities are complete.

Short-term Construction Monitoring Wells

- These wells will be used to monitor groundwater during slab removal and construction activities.
- Wells will be abandoned when slab construction is completed.

Long Term Monitoring Network

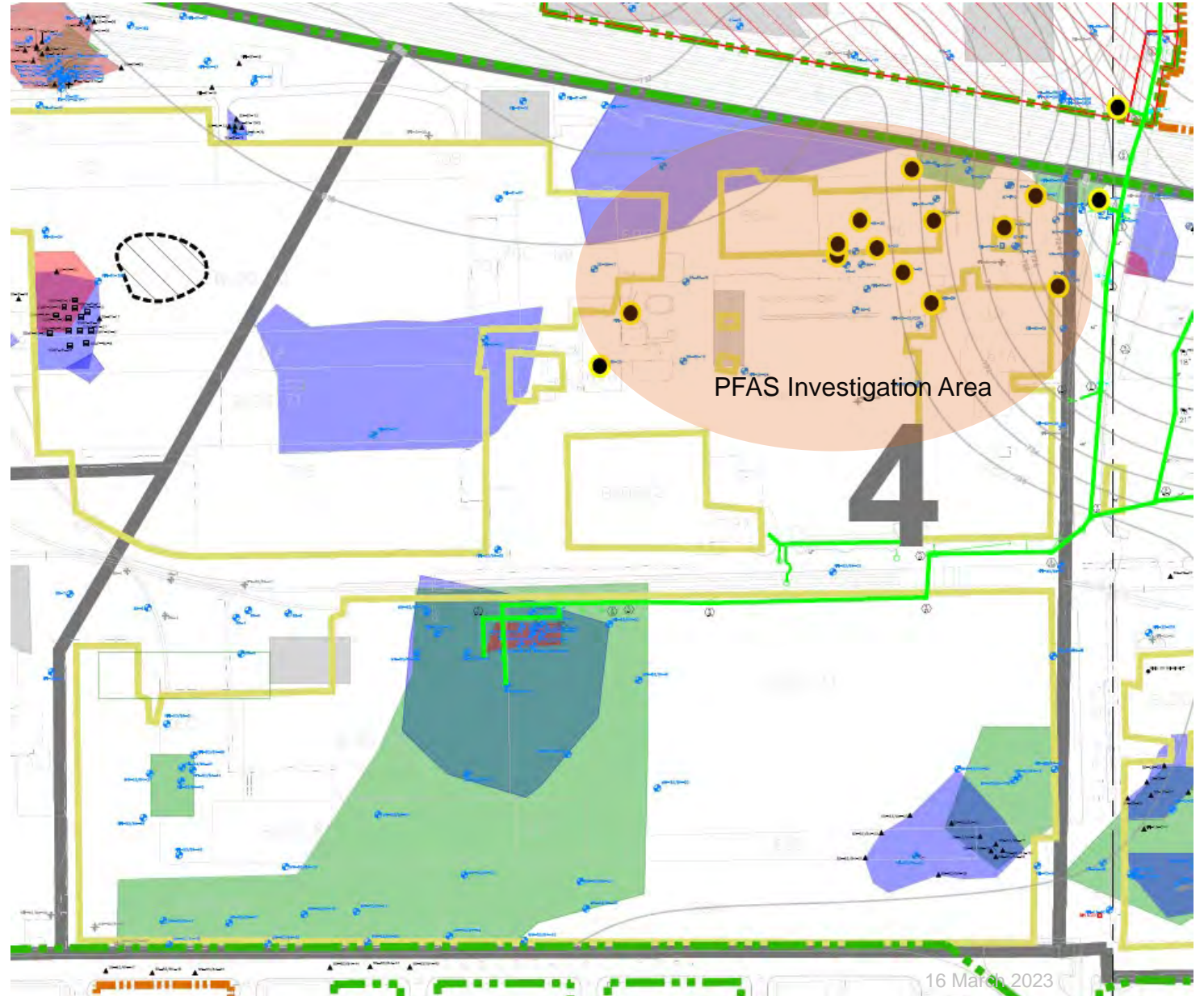
- These wells will remain for long-term monitoring of site conditions.

Block 4 Short-term Investigation Wells for PFAS

The wells shown in black and yellow are currently being used as part of PFAS investigation activities in this portion of the Site.

The majority of these short-term investigation wells will be abandoned when investigation activities are complete. Some wells may remain in place for long term monitoring, depending on the results of the investigation.



Long-term PFAS monitoring is discussed on **Slide 12**.







Block 4 Short-term Construction Monitoring Wells



During concrete slab removal activities and construction of new slabs, groundwater monitoring will be conducted using Site monitoring wells and the P-traps.

The short-term construction monitoring well network will consist of 15 wells.

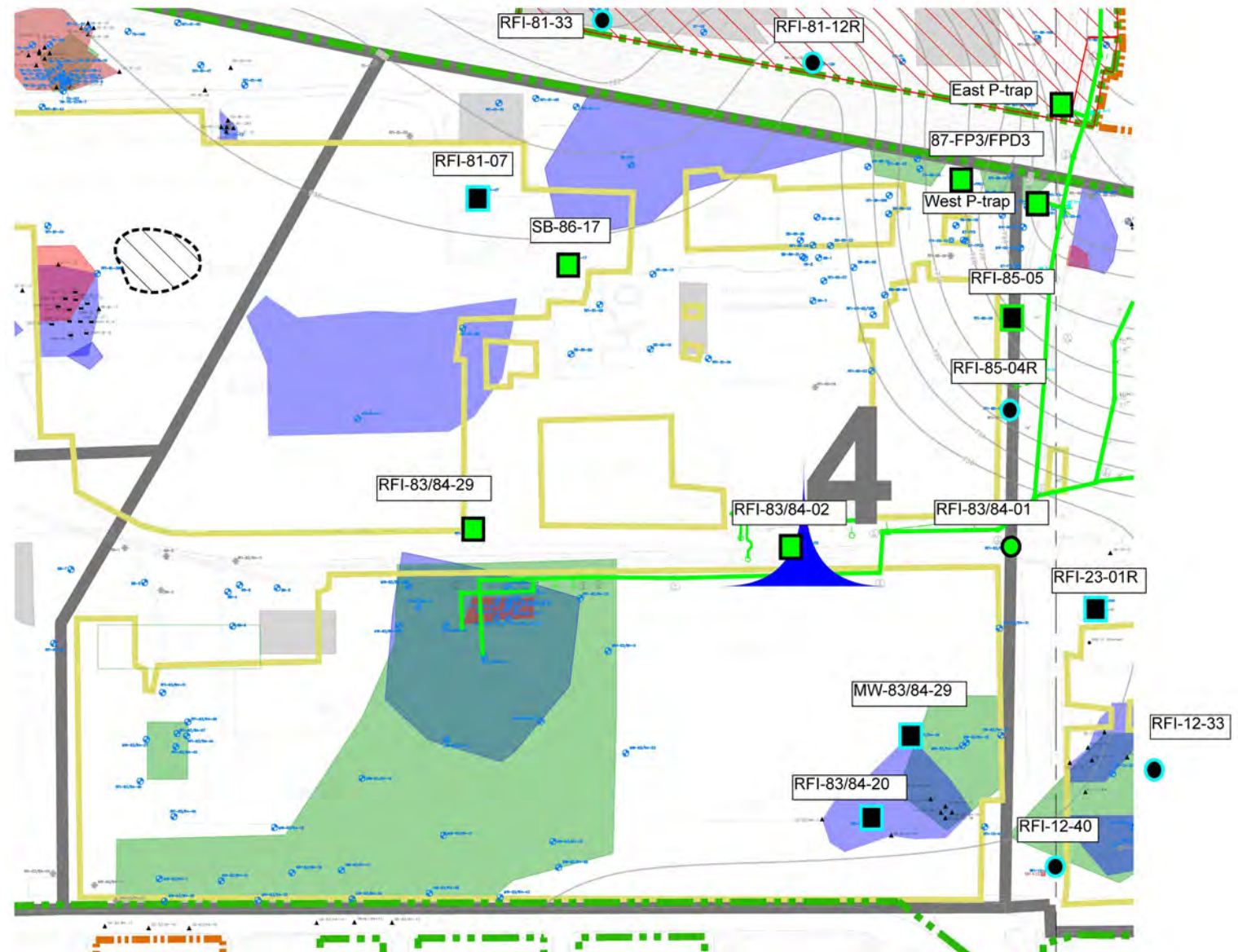
  Nine (9) wells will be monitored as sentinel wells (squares).

  The remaining six (6) wells are downgradient monitoring points (MP), if needed (circles)

  The wells only being used for short-term construction monitoring are shown in black/blue.

  The wells that will remain as part of the long-term monitoring network are shown in green/black

The short-term wells will be abandoned after slab construction is complete.



Block 4 Short-term Construction Monitoring Wells – Constituents of Concern (COC)



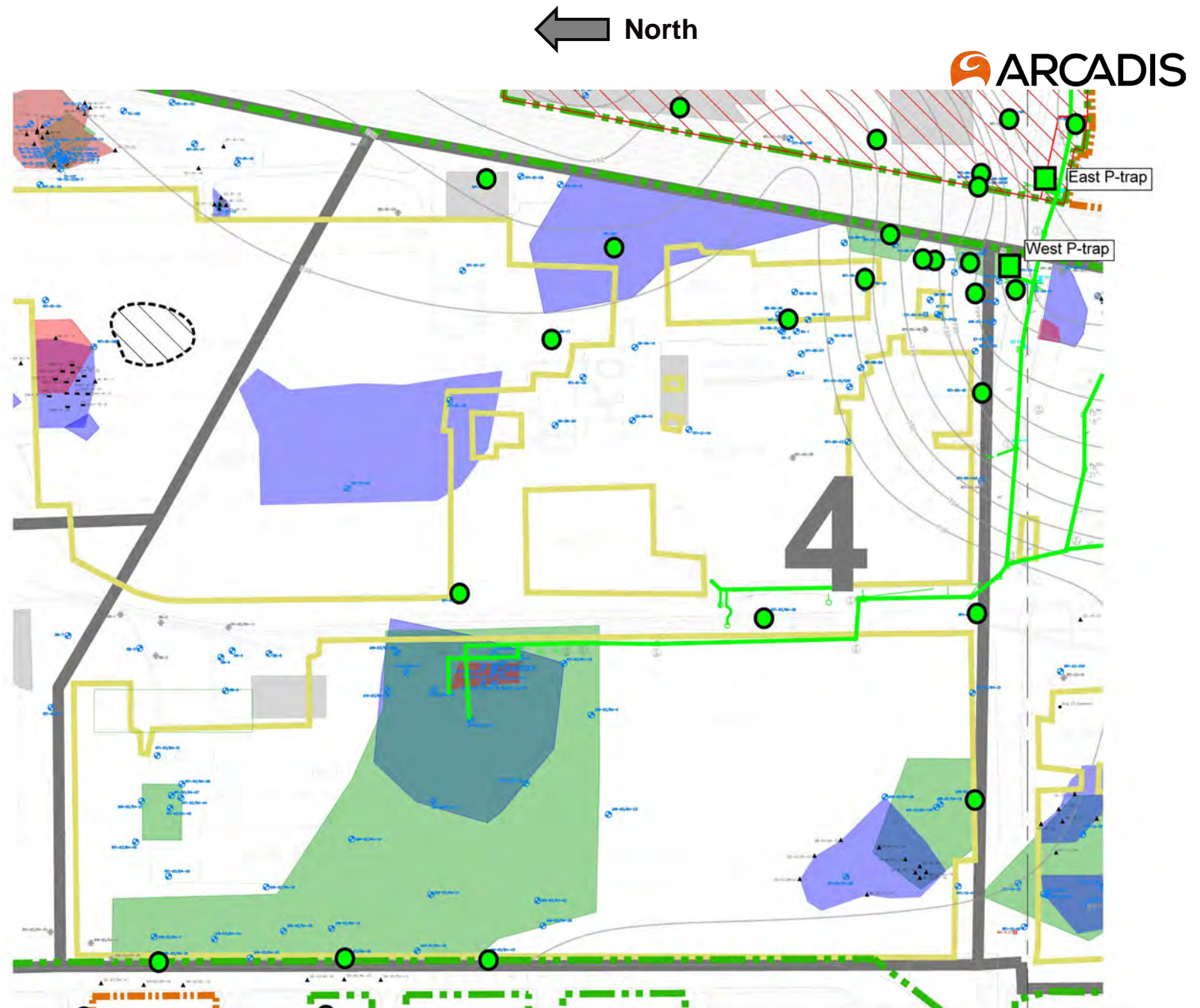
Monitoring Well ID	Type of Monitoring	Rationale	COC	RC Area
Block 4				
MW-83/84-29	Short Term - Slab Removal Monitoring	Sentinel Well	Lead	SI #13
RFI-81-07	Short Term - Slab Removal Monitoring	Sentinel well	Lead and Mercury	SI #10
RFI-83/84-20	Short Term - Slab Removal Monitoring	Sentinel Well	Lead	SI #13
RFI-85-04R	Short Term - Slab Removal Monitoring	Downgradient MP, if needed	Lead	SI #11
RFI-85-05	Short-Term and Long-Term Monitoring	Downgradient MP, if needed -Lead Sentinel - PFAS and mercury	PFAS, lead, mercury	NA
RFI-83/84-01	Short-Term and Long-Term Monitoring	Downgradient MP, if needed	Lead	SI #13
RFI-83/84-02	Short-Term and Long-Term Monitoring	Sentinel Well	Lead	SI #11
RFI-83/84-29	Short-Term and Long-Term Monitoring	Sentinel Well	LNAPL, Lead, Mercury, Manganese	SI #11 LNAPL Area #10
SB-86-17	Short-Term and Long-Term Monitoring	Sentinel Well	Lead	SI #10
87-FP3	Short-Term and Long-Term Monitoring	Sentinel Well	VOCs, arsenic, PFAS	NA
Block 5 and Block 8				
RFI-81-12R	Short Term MW	Downgradient MP, if Needed	Lead	SI #33
RFI-81-33	Short Term MW	Downgradient MP, if Needed	Lead and mercury	SI #10, SI #33
RFI-12-40	Short Term MW	Downgradient MP, if Needed	Lead	SI #13
RFI-23-01R	Short Term MW	Sentinel Well	Lead	SI #13
RFI-12-33	Short Term MW	Downgradient MP, if Needed	Lead	SI #13

Block 4 Proposed Long-term Monitoring Well Network

The proposed long-term monitoring well network for Block 4 consists of 28 wells. Eighteen wells are on Block 4 and 10 wells are located in the adjacent blocks. In addition, the West and East P-traps will be monitored.

These wells will be used to monitor LNAPL, PFAS, VOCs, arsenic, lead, manganese and/or mercury.

The following slides detail which wells will be used to monitor each of the impacts.



Block 4 Long-term PFAS Monitoring Wells

PFAS has been detected in soil and groundwater in the southeast corner of Block 4 and investigation activities are currently ongoing.

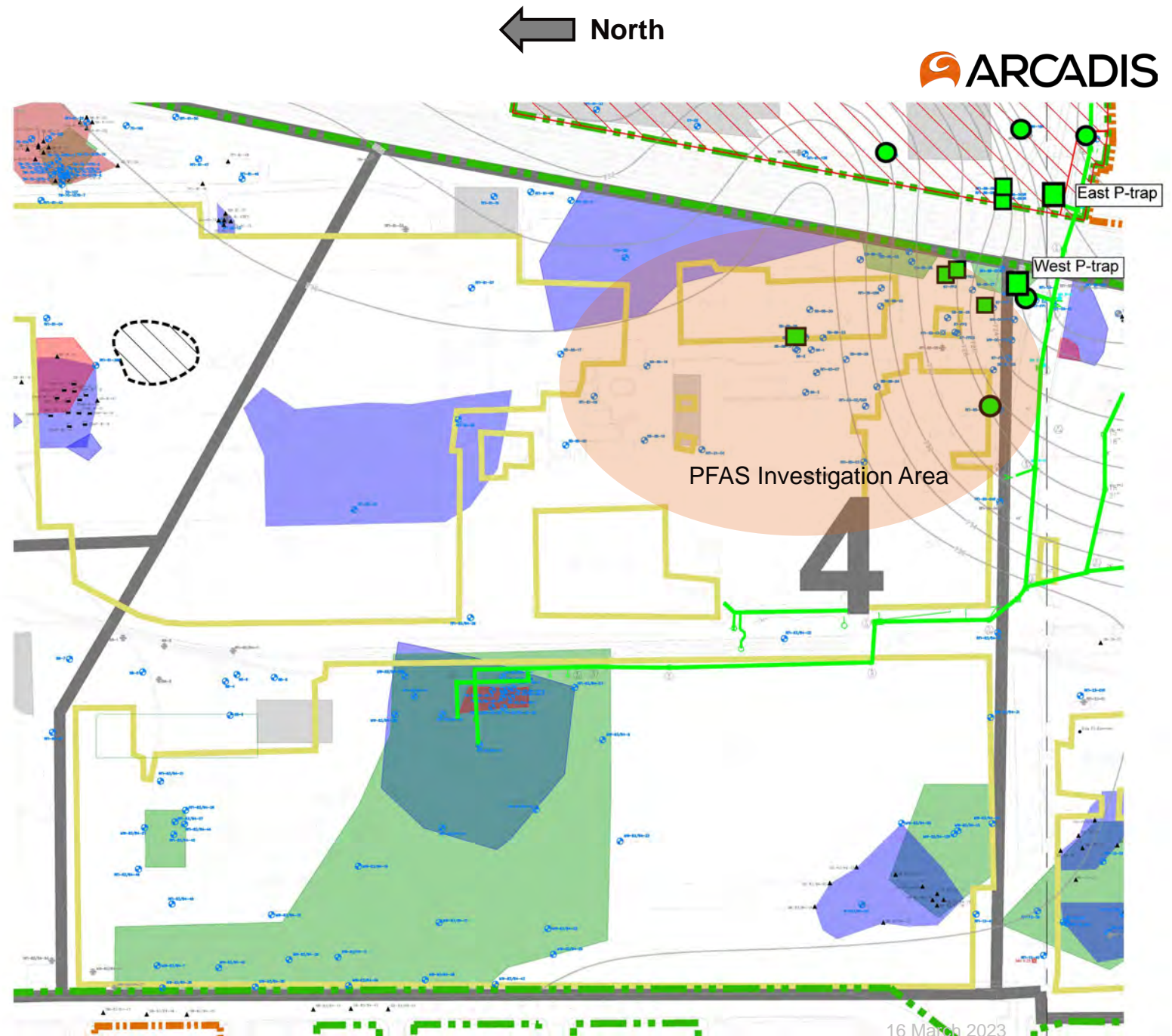
Groundwater flow in the southeast corner of Block 4 is primarily to the southeast and to the Outfall 005 storm sewer. Therefore, long term monitoring is focused in this area.

The long-term monitoring well network for PFAS consists of 11 wells as well as the P-traps.

■ Six (6) wells will be monitored as sentinel wells (square).

● The remaining five (5) wells are downgradient monitoring points, if needed (circles).

This network may be modified based on the results of the PFAS investigation



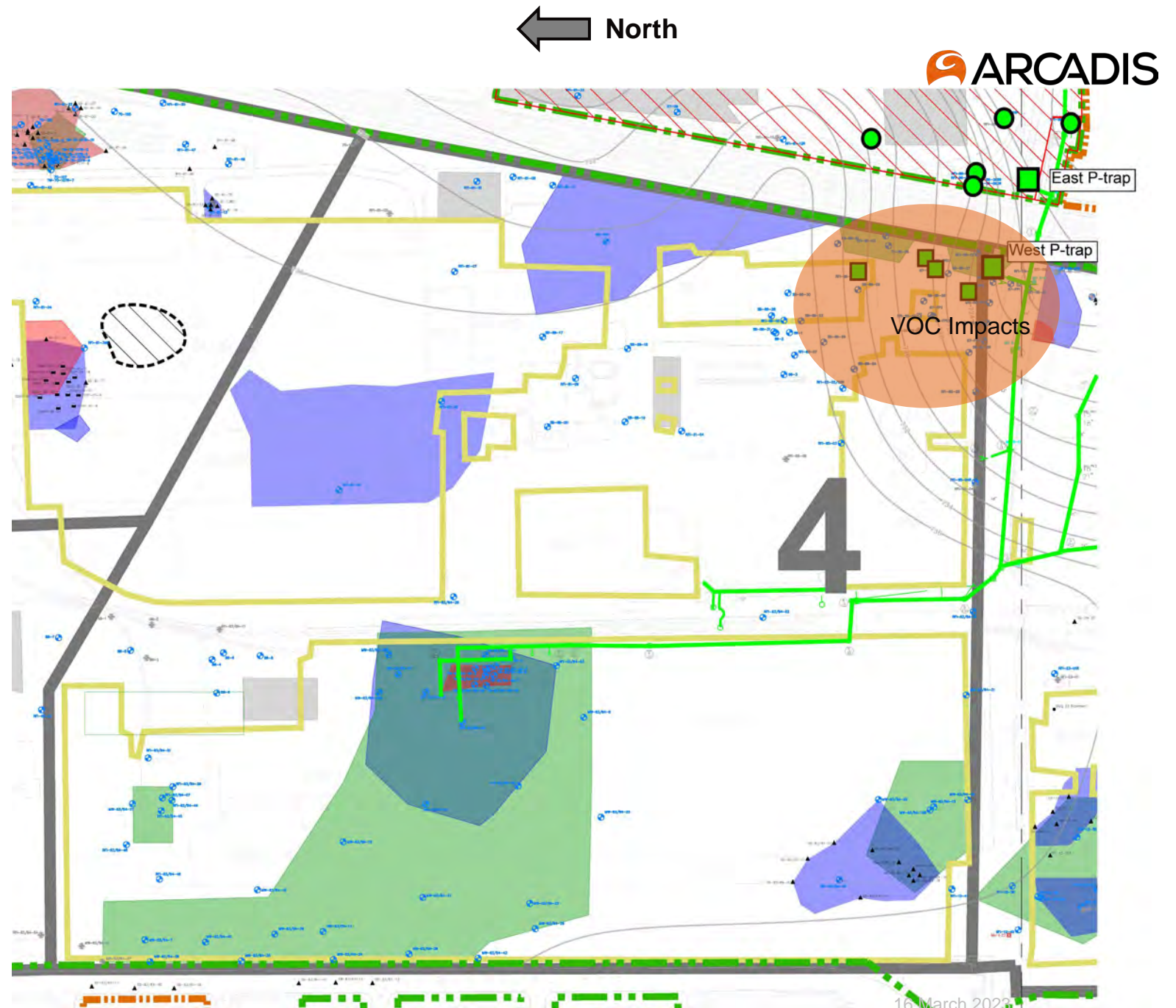
Block 4 Long-term VOC Monitoring Wells

VOCs have been detected in groundwater in the southeast corner of Block 4.

Groundwater flow in the southeast corner of Block 4 is primarily to the southeast and to the Outfall 005 storm sewer. Therefore, long term monitoring is focused in this area.

The long-term monitoring well network for VOCs consists of nine (9) wells as well as the P-traps.

- Four (4) wells will be monitored as sentinel wells (squares).
- The remaining five (5) wells are downgradient monitoring points, if needed (circles).



Block 4

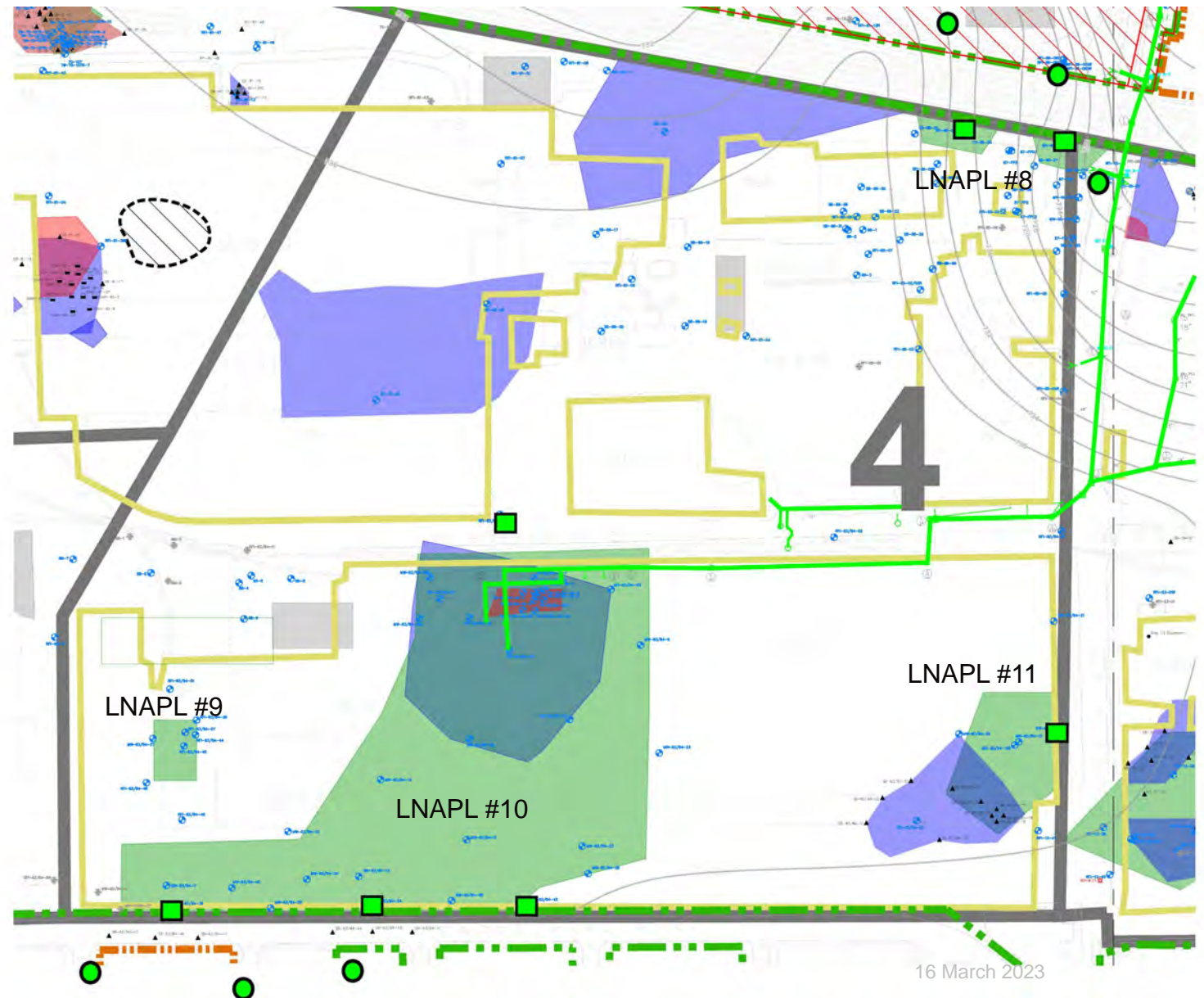
Long-term LNAPL Monitoring Wells

Four LNAPL areas have been identified in Block 4 (green areas).

Groundwater flow in Block 4 is primarily to the east and southeast and to the Outfall 005 storm sewer.

The long-term monitoring well network for LNAPL consists of 13 wells as well as the P-traps.

- Seven (7) sentinel wells will be monitored for evidence of possible LNAPL migration (squares).
- The remaining six(6) wells are upgradient/downgradient monitoring points, if needed (circles).



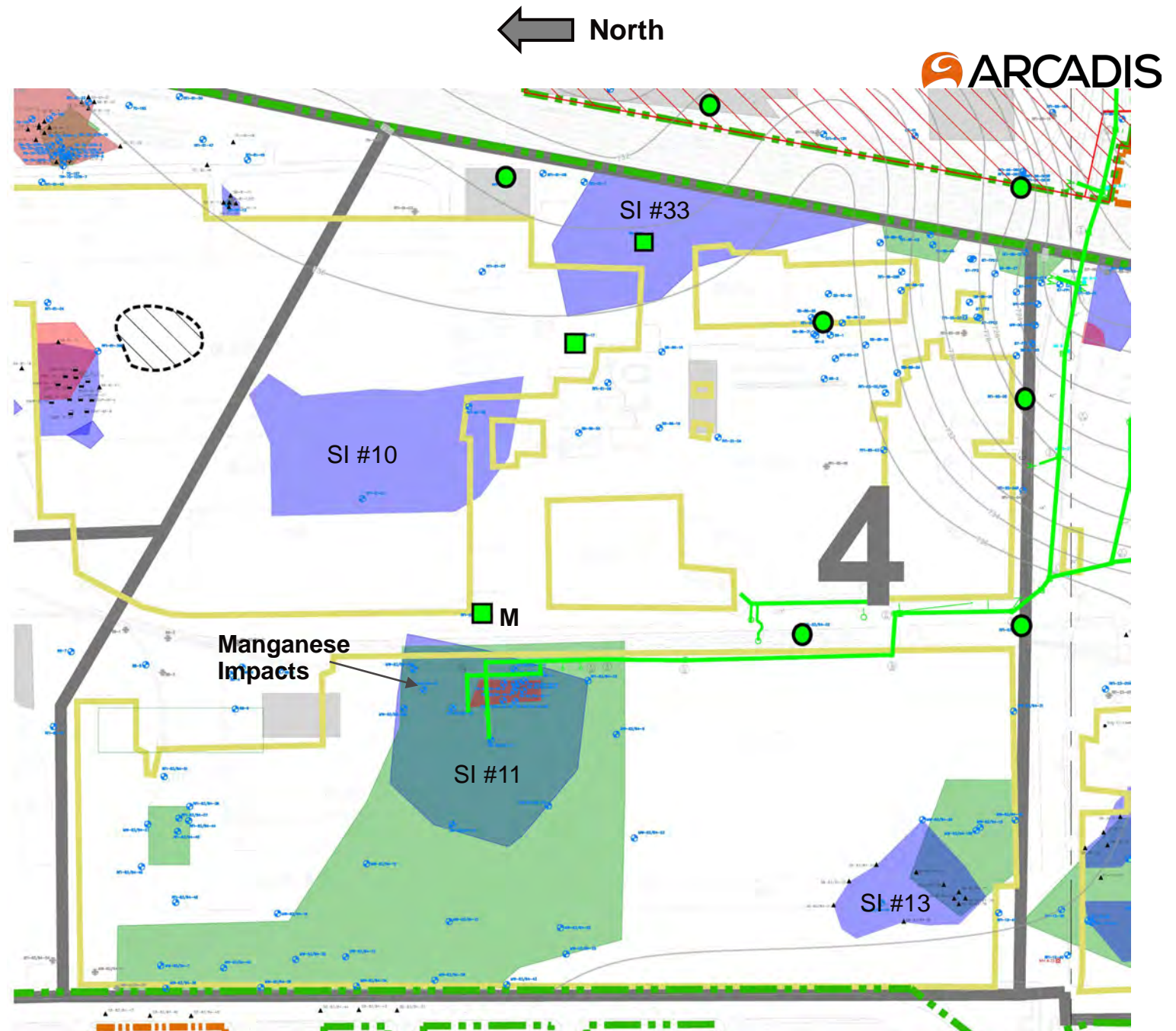
Block 4 Long-term Lead/Manganese Monitoring Wells

Four lead impacted soil areas are located at Block 4 – SI#10, SI#11, SI#13, and SI#33.

One manganese impacted soil area is located at Block 4. It is located in the northeast portion of SI #11.

The long-term monitoring well network for lead/manganese consists of 10 wells.

- Three (3) wells will be monitored for lead as sentinel wells (squares).
- The remaining seven (7) wells are downgradient monitoring points, to be monitored for lead if needed (circles).
- M One (1) of the sentinel wells will also be monitored for manganese.



Block 4 Long-term Arsenic Monitoring Wells

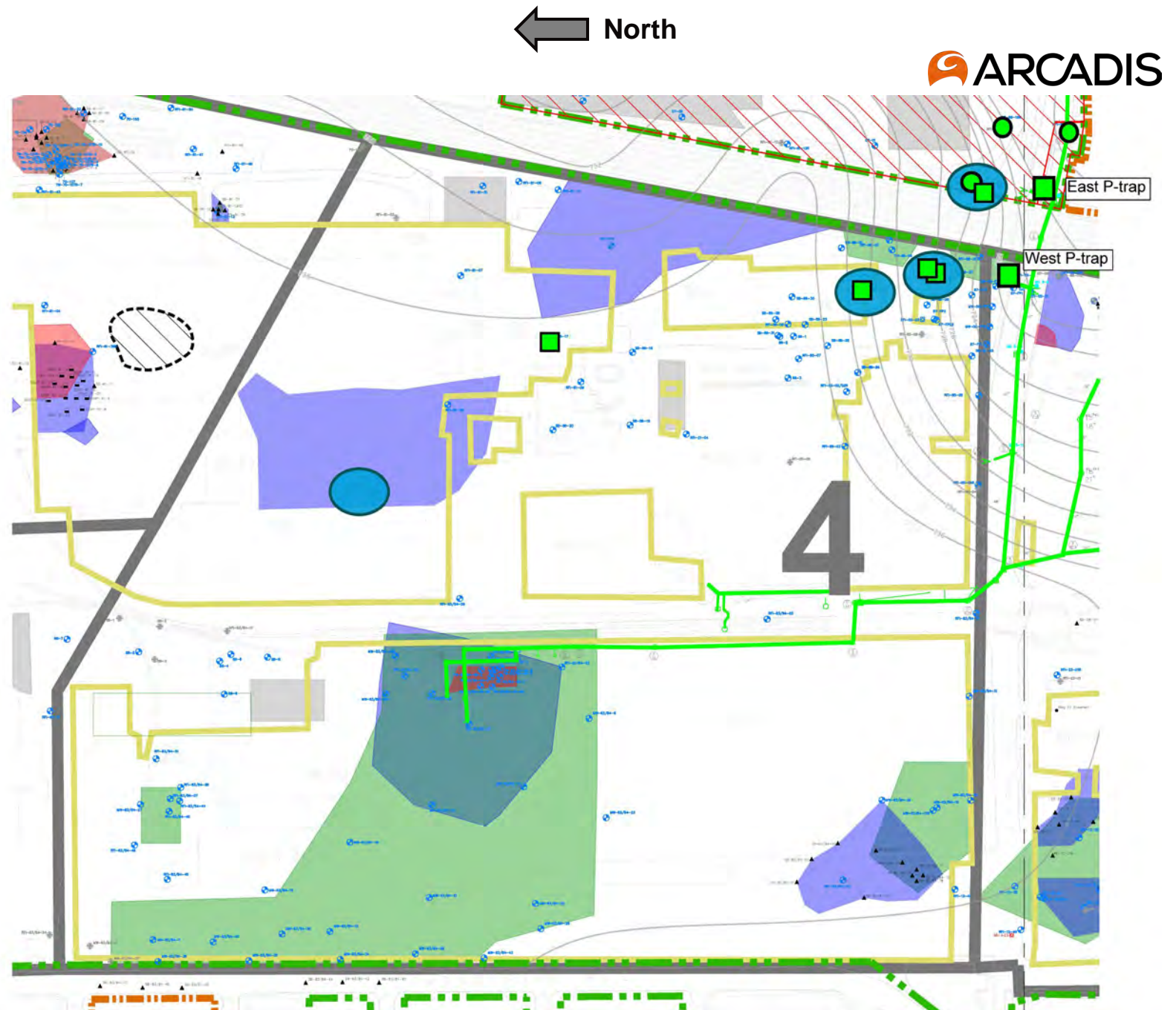
Arsenic has been detected at concentrations exceeding criteria at four monitoring wells in Block 4 (blue ovals)

Groundwater flow in Block 4 is primarily to the east and southeast and to the Outfall 005 storm sewer.

The long-term monitoring well network for arsenic consists of 8 wells as well as the P-traps

■ Five (5) wells will be monitored as sentinel wells (squares).

● The remaining three (3) wells are downgradient monitoring points, if needed (circles).



Block 4 Long-term Mercury Monitoring Wells

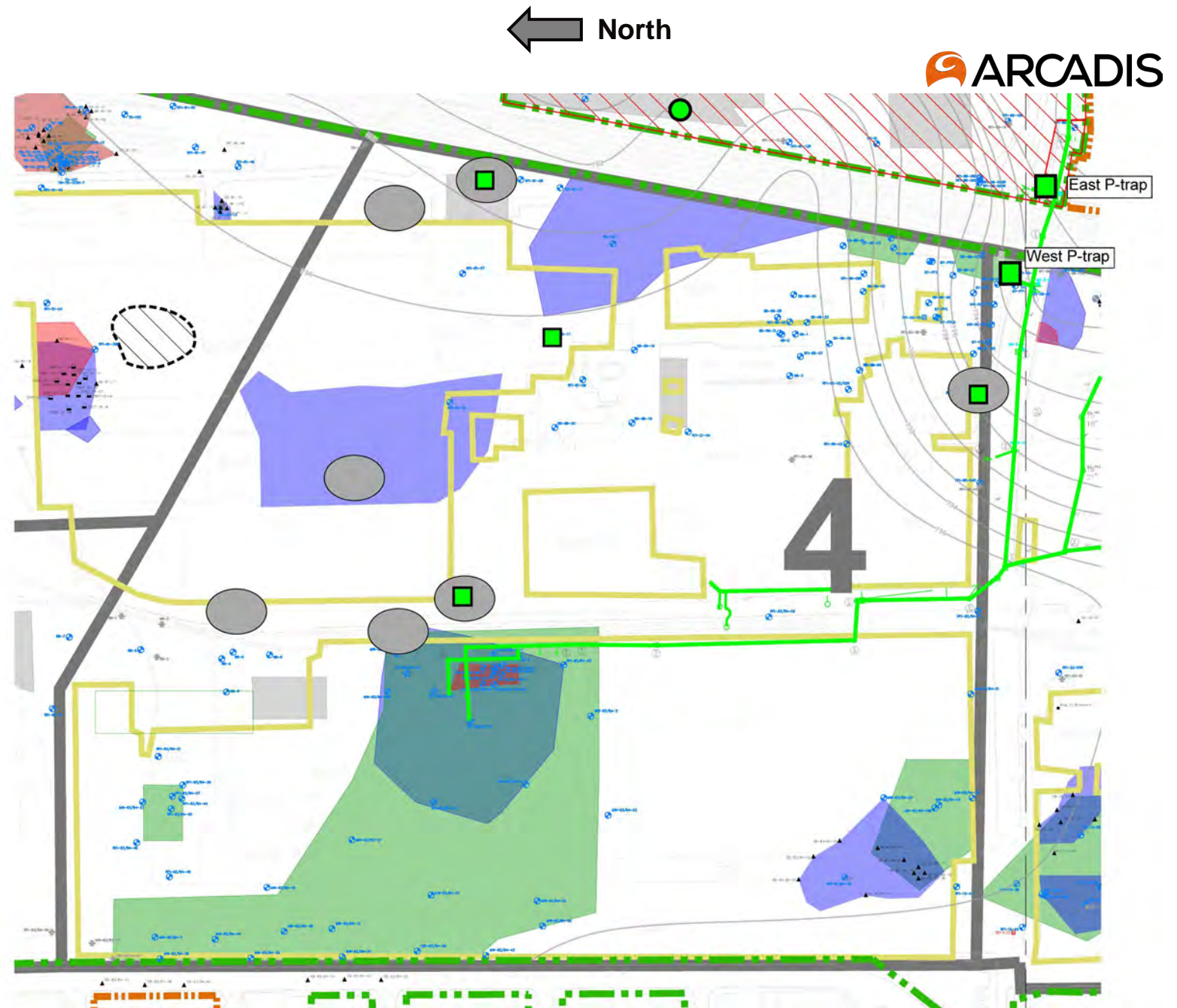
Mercury has been detected at concentrations exceeding criteria at seven monitoring wells in Block 4 (gray ovals).

Groundwater flow in Block 4 is primarily to the east and southeast and to the Outfall 005 storm sewer.

The long-term monitoring well network for mercury consists of 5 wells, as well as the P-traps.

■ Four (4) wells will be monitored as sentinel wells (squares).

○ The remaining one (1) well is a downgradient monitoring point, if needed (circle).



Block 4 Proposed Long Term Monitoring Well Network

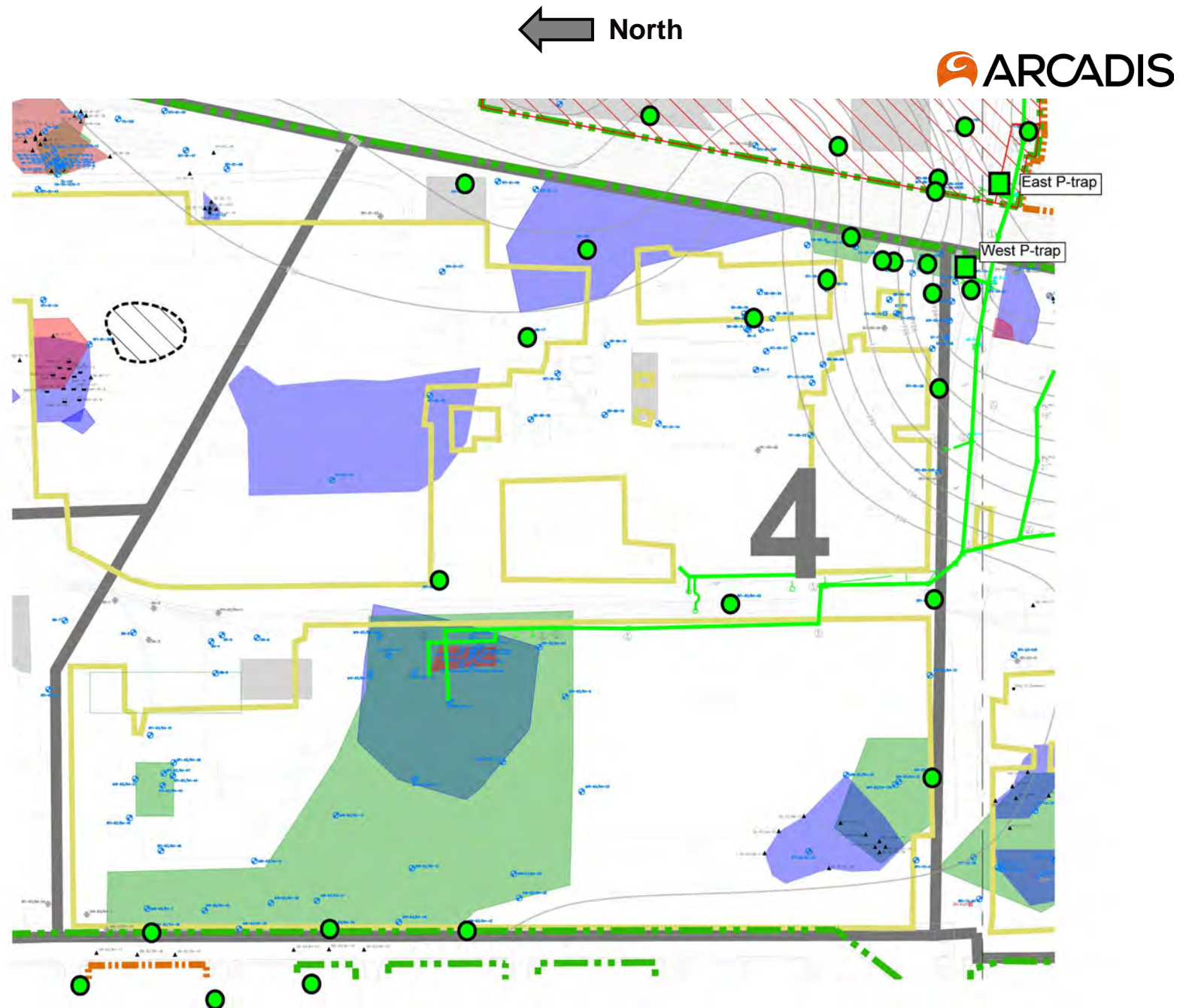
The proposed long-term monitoring well network for Block 4 consists of 28 wells, as well as the P-traps.

Of the 28 wells –

- Three (3) of these wells are located upgradient of Block 4.
- One (1) of these wells is located upgradient of Block 5.
- Six (6) of these wells are located on downgradient Block 8.
- Eighteen (18) wells are located on Block 4.

Long-term monitoring is proposed for LNAPL, VOCs, PFAS, arsenic, lead, manganese and mercury.

No monitoring is proposed for PCBs or benzo(a)pyrene and these constituents do not leach to groundwater.



Block 4 Proposed Abandonment Plan and Monitoring Network

Proposed for Immediate Abandonment

- Wells no longer needed for investigation, remediation, or monitoring
- To be abandoned prior to beginning construction activities.

Short Term Investigation Monitoring Wells

- Wells used for short-term investigative purposes.
- To be abandoned when investigation activities are complete.

Short-Term Construction Monitoring Wells

- Wells to remain during slab removal and construction activities.
- To be abandoned when slab construction is completed.

Long Term Monitoring Network

- Wells to remain for long-term monitoring of site conditions.

