Memo

SUBJECT
Montcalm Seep Interim Measure Re-evaluation
RACER Pontiac North Campus Site

TO
Jennifer Stanhope
United States Environmental Protection Agency (USEPA)

DATE
July 28, 2026

OUR REF
Task 00007

DEPARTMENT
Environment

PROJECT NUMBER
30321425

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Project File
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The purpose of this memo is to document the history, as well as the recent evaluations and updates to the Montcalm Seep System (System) located at the RACER Pontiac North Campus (PNC) Site (Site). Pursuant to the Environmental Response Trust Consent Decree and Settlement Agreement entered by the U.S. Bankruptcy Court for the Southern District of New York on March 29, 2011, in the case of *In re Motors Liquidation Company, etc., et al*., Debtors, Case No. 09-50026 (REG), among the Debtors, the United States of America, certain states including the State of Michigan, the Saint Regis Mohawk Tribe and EPLET, LLC, (not individually but solely in its representative capacity as Administrative Trustee of RACER Trust), Revitalizing Automotive Communities Environmental Response (RACER) Trust was created and received ownership of and responsibility for certain environmental conditions at the Site. The Site, located in Pontiac Michigan, was a former General Motors Corporation (GMC) automotive plant and the general area of interest was leased and redeveloped into a United States Postal Service (USPS) facility in 2004. In late 2021 the USPS purchased the property on which its facility is located.

The specific area of interest is just north of Montcalm Street where groundwater seeps have historically been observed discharging from the base of the steep slope as shown in **Figures 1 and 2**. This portion of the Site underwent significant filling during the initial plant construction from 1920 to 1930 that resulted in the filled/regraded ground surface being 15 to 20 feet higher in elevation than Montcalm Ave. Prior to filling commencement, an intermittent stream was present in this area. GMC installed (date unknown) a toe drain at the base of the slope that intercepted groundwater and conveyed it via storm sewer to a stormwater detention facility operated by GM south of Montcalm Ave.

The new General Motors LLC that was created in 2009 after GMC's filing for bankruptcy leased and operated the stormwater detention facility from RACER until 2012. In 2012, the stormwater detention facility was decommissioned including discontinuing conveyance of groundwater from the toe drain to the detention facility and disconnecting the toe drain sump from the storm sewer. Seeps were observed following the disconnection of the toe drain from the storm sewer. Various activities were completed between 2014 and 2017 to evaluate and address the seep, including installation of a drainage swale, raising/sloping the sidewalk along Montcalm Ave., and various hydraulic evaluations. Ultimately, an active collection and pumping system that incorporated the existing toe drain was implemented to manage the seep. Note that RACER's bankruptcy-allocated funding for the PNC Site does not include any allotment for implementation and/or action to address the seep.

Original Design and Construction

The System was designed to mitigate groundwater seeps by collecting groundwater via the existing toe drain and conveying collected groundwater into a new below-grade collection sump. Submersible pumps in the below-grade collection sump were designed to transfer water from the collection sump to upgradient injection wells for injection into the subsurface. Two injection wells were installed approximately 1,400 feet upgradient laterally from the seep area and are screened approximately 15 to 35 feet below ground surface (bgs). Michigan Department of Environmental Quality (MDEQ – now the Michigan Department of Environment, Great Lakes, and Energy - EGLE) approved the Montcalm Seep Interim Measure Work Plan (Arcadis 2018, 2018 Montcalm Seep Work Plan) and the U.S. Environmental Protection Agency (USEPA) provided its approval to implement the 2018 Montcalm Seep Work Plan via email on June 25, 2018. The System was constructed and began operation in June 2019 (Arcadis, 2020).

The System operated as designed until 2021 when, due to the onset of fouling even after redevelopment efforts, the injection wells could no longer reliably accept the volume of water recovered by the toe drain needed to prevent the seep from flowing to Montcalm Street. Therefore, in order to keep control of the seep, a separate pump was installed near the surface of the collection sump which pumped water to the ground surface up to and extending approximately 150 feet past the top of the slope to supplement the injection wells which could not accept the full volume of water recovered by the toe drain. The injection well fouling continued to worsen such that by 2024, even after redeveloping the injection wells, over 90% of the water recovered by the collection sump was being discharged to the ground surface, with less than 10% going to the injection wells.

Options Evaluation

Following the detection of PFAS in the collection sump in 2023, a feasibility study was completed to re-evaluate options to effectively manage the seep and mitigate potential risks associated with PFAS in the groundwater recovered by the toe drain that exceeds the Part 201 Residential Drinking Water Criteria and Groundwater Surface Water Interaction (GSI) Criteria. Seep water also exceeds Part 201 Residential Drinking Water Criteria for iron and manganese, Health Based Residential Criteria for iron, and GSI Criteria for total dissolved solids (TDS). Options evaluated in the feasibility study included the following:

- Recovery of groundwater via the toe drain with surface discharge of groundwater
- Recovery of groundwater via the toe drain with discharge of groundwater to an infiltration pond
- Sheet pile cut off wall located upgradient of the toe drain
- Recovery of groundwater via the toe drain with treatment of groundwater (various options) and discharge to POTW, via NPDES permit, or subsurface injection

Groundwater modeling was used to assess and optimize the options. The feasibility study and supporting information is included in **Attachment 1**.

The recommended option for the seep was recovery of groundwater via the toe drain and surface discharge of groundwater. This option was selected based on the following:

- The proposed option is protective of relevant pathways:
    - Groundwater ordinance is in place that prevents installation of wells and drinking water exposure (see Figure 3)
    - Active pumping / recovery of groundwater prevents seepage/overland flow and direct discharge into storm drains

- No vapor intrusion risk associated with PFAS, iron, and TDS.

- High additional costs of pre-treating / treating water and reinjecting onsite are not justified, because they do not meaningfully improve the performance outcome relative to goals, and do not fit within Site funding
- Recovery of groundwater via the toe drain and direct ground surface discharge of groundwater is the most cost-effective option to mitigate the Montcalm Street seeps and qualifies for permitting exemption under Michigan's Part 31 R323.2210.

One of the outcomes of the feasibility study evaluation and associated modeling was that the surface discharge location that was implemented in 2021 was not ideal relative to capture infiltrated water by the toe drain. Modeling indicated that the optimal surface discharge location to maximize capture is centered on the toe drain and as close to the toe drain as possible.

Surface Discharge Hose Relocation

Based on the modeling and following consultation with USEPA, in May 2025 the surface discharge hose was moved to be more centered on and closer to the toe drain as shown in **Figure 2** and **Attachment 2**. The hose relocation also took into consideration Site constraints such as USPS operations, active storm sewers and catch basins, topography and locations where light non-aqueous phase liquid has historically been observed at the Site. Over the subsequent 2 months, the final hose placement was optimized to maximize infiltration and limit surface ponding.

Path Forward

Based on discussions with and concurrence by USEPA, surface discharge of groundwater recovered by the toe drain is RACER's recommended option for management of the Montcalm seep. We understand that per USEPA's confirmation with EGLE, this approach qualifies for a permitting exemption under Michigan's Part 31 R323.2210(u), which allows wastewater associated with environmental response activities to be re-injected into the plume of groundwater with similar contamination. The operation, maintenance and monitoring (OMM) of the System will include:

- Monthly visual inspections and adjustments to confirm:
  - Adequate operation of the System and that no seeps are occurring,
  - Discharged water is infiltrating and ponding is minimized, and
  - No runoff is occurring.
- Annual gauging of water levels of MW-01-17, MW-03-17, TW-10-01, MWW1-02, MWW10-03, MWW10-SEN01, MWW10-SEN02, MWW1-SEN03, MW-43-14R, MWW1-04, TW-MD-02, TW-MD-05, and TW-MD-06. Gauging will be completed to evaluate groundwater elevations and flow direction in the vicinity of the seep and seep discharge. This gauging is included in the Pontiac North Campus Groundwater Monitoring Plan (PNC GMP; Arcadis, 2026).
- Annual analytical sampling of PFAS, metals (iron and manganese), and TDS from MW-43-14R and the collection sump. Monitoring well MW-43-14R is located upgradient of the discharge location and therefore will be used to confirm that the water discharged from the collection sump is within the existing plume of groundwater with similar contamination. This sampling is also included in the PNC GMP (Arcadis, 2026).
- Annual analytical sampling of PFAS, metals (iron and manganese), and TDS from MWW1-04, MW-01-17, MWW1-02. These wells will be sampled to demonstrate that the proposed discharge of the seep water is not exacerbating the existing contamination. This sampling is also included in the PNC GMP (Arcadis, 2026).

Monitoring locations are shown on **Figure 3**. Additional monitoring for PFAS, metals, and TDS in the vicinity of the seep will continue in accordance with the PNC GMP (Arcadis, 2026). Most recent PFAS, metals (iron and manganese) and TDS data from wells in the vicinity of the seep area is included in **Table 1**. **Table 2,** which updates Table 4 of the 2018 Montcalm Seep Work Plan, summarizes the seep monitoring plan, is incorporated into the PNC GMP (Arcadis 2026). If the discharge location were to change for any reason in the future, USEPA would be notified and the monitoring plan will be reviewed and updated to ensure the required data is collected to meet the permit exemption requirements.

Evaluation of the data collected during OMM will be completed as part of the annual reporting associated with the PNC GMP (Arcadis, 2026). Data evaluation will include assessment of groundwater flow direction and concentration trends. If data suggests a modification to OMM activities is needed (e.g. concentration trends suggest more frequent or less frequent monitoring is needed, groundwater flow direction requires the addition or elimination of monitoring wells to the monitoring program, etc.), it will be recommended in the annual report for USEPA review and approval.

Enc.

Figure 1: Site Layout Map

Figure 2: Discharge Layout Enlargement

Figure 3: System Monitoring Plan

Table 1: Montcalm Seep PFAS Sampling Results

Table 2: Montcalm Seep Monitoring Plan

Attachment 1: Montcalm Seep Remedy Options Evaluation (July 2024), Montcalm Seep Follow Up (August 2024) and Montcalm Seep Update (May 2, 2025)

Attachment 2: Hose Relocation Photo Log

Ref.

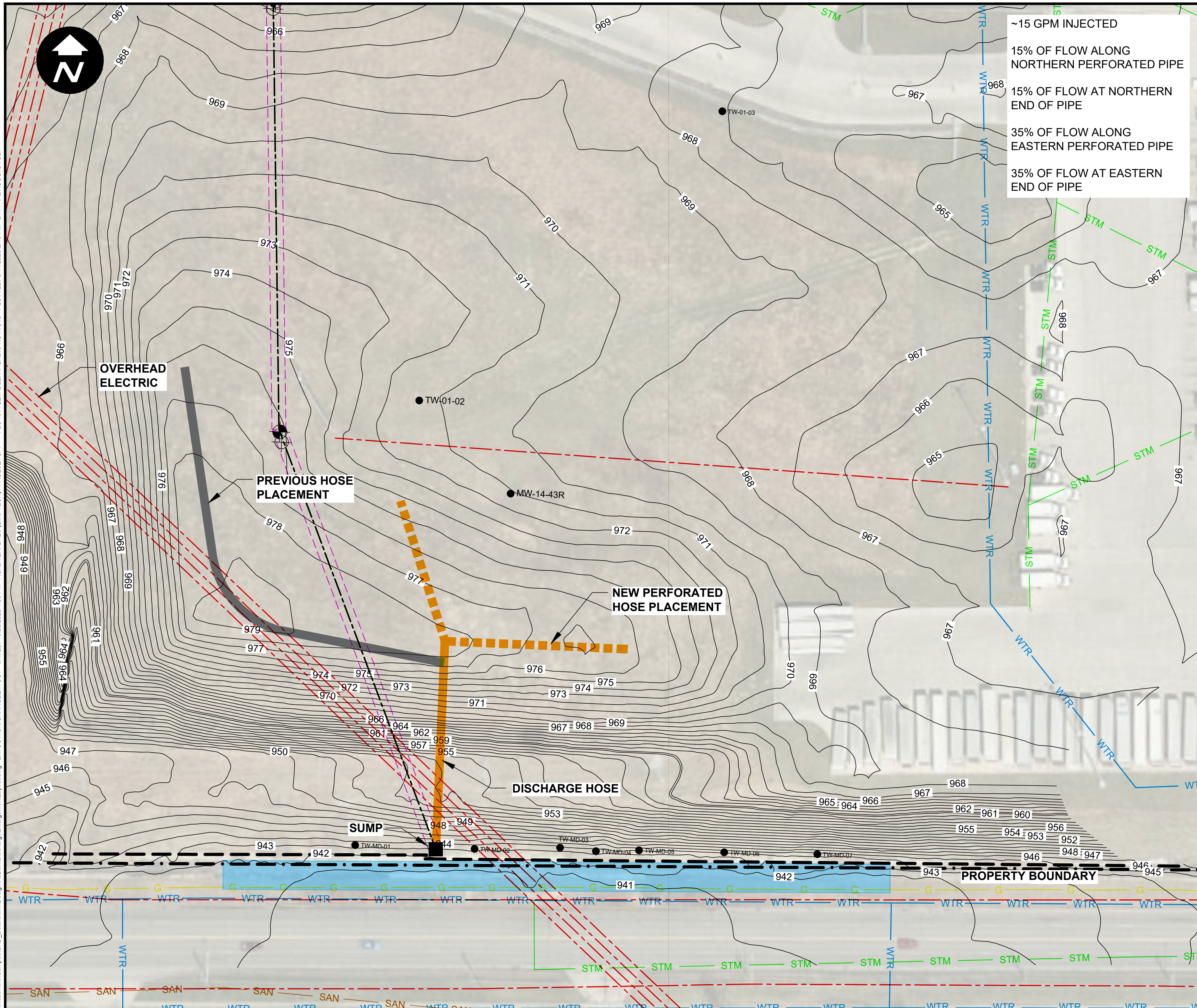
Arcadis. 2018. Montcalm Seep Interim Measure Work Plan. Pontiac North Campus Site, Pontiac, MI. April 2018.

Arcadis. 2020. Montcalm Seep Control System Interim Measure Completion Report. Pontiac North Campus Site, Pontiac, MI. July 2020.

Arcadis. 2026. Groundwater Monitoring Plan (2026 Modification). Pontiac North Campus Site, Pontiac, MI. May 2026.

Figures

PATH: D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\SoilDataSummary_2001-2023\SoilDataSummary_2001-2023\SoilDataSummary_2001-2023.aprx LAYOUT NAME: SiteLayoutMap_MontcalmSeep_AOI PLOTTED: 10/16/2025 GIS: TYarbrough



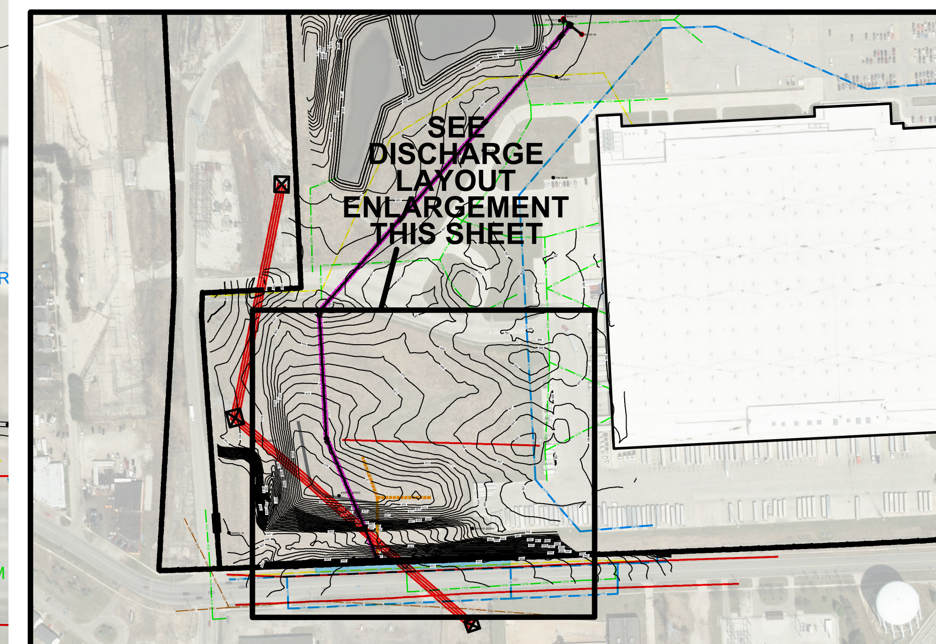
DISCHARGE LAYOUT ENLARGEMENT

LEGEND

- MONTCALM NETWORK MONITORING WELL LOCATION
- CLEAN-OUT ACCESS BOX
- CLEAN-OUT VALVE KEY ACCESS
- INJECTION WELL
- DISCHARGE HOSE
- PERFORATED HOSE
- PREVIOUS HOSE PLACEMENT
- CONVEYANCE LINE
- EXISTING PERFORATED TOE DRAIN
- PROPERTY BOUNDARY
- G — GAS MAIN
- SAN — SANITARY SEWER
- STM — STORM SEWER
- WTR — WATER MAIN
- OVERHEAD/UNDERGROUND ELECTRICAL
- AREA OF HORIZONTALLY BORED PIPE INSTALLATION
- SEEP AREA

NOTES

1. MONITORING WELLS SHOWN ARE EXISTING. NOT ALL MONITORING WELLS ARE SHOWN DUE TO DENSITY. ALL LOCATIONS IN PROXIMITY OF THE CONVEYANCE PIPE AND WHICH ARE INCLUDED IN THE MONITORING WELL NETWORK HAVE BEEN DISPLAYED.
2. GROUND SURFACE CONTOURS ARE APPROXIMATE.



DISCHARGE LAYOUT INSET LOCATION

0 80 160
APPROXIMATE SCALE IN FEET

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
2	04/30/2020	As-Built Drawing Set Revisions	TRY	MW
1	7/5/2018	General revisions to all sheets. Removed Sheet M-5	TRY	MW

Project Mgr. BS
Designed by DMS
Drawn by TRY
Checked by MRW

ARCADIS
ARCADIS OF MICHIGAN, LLC.

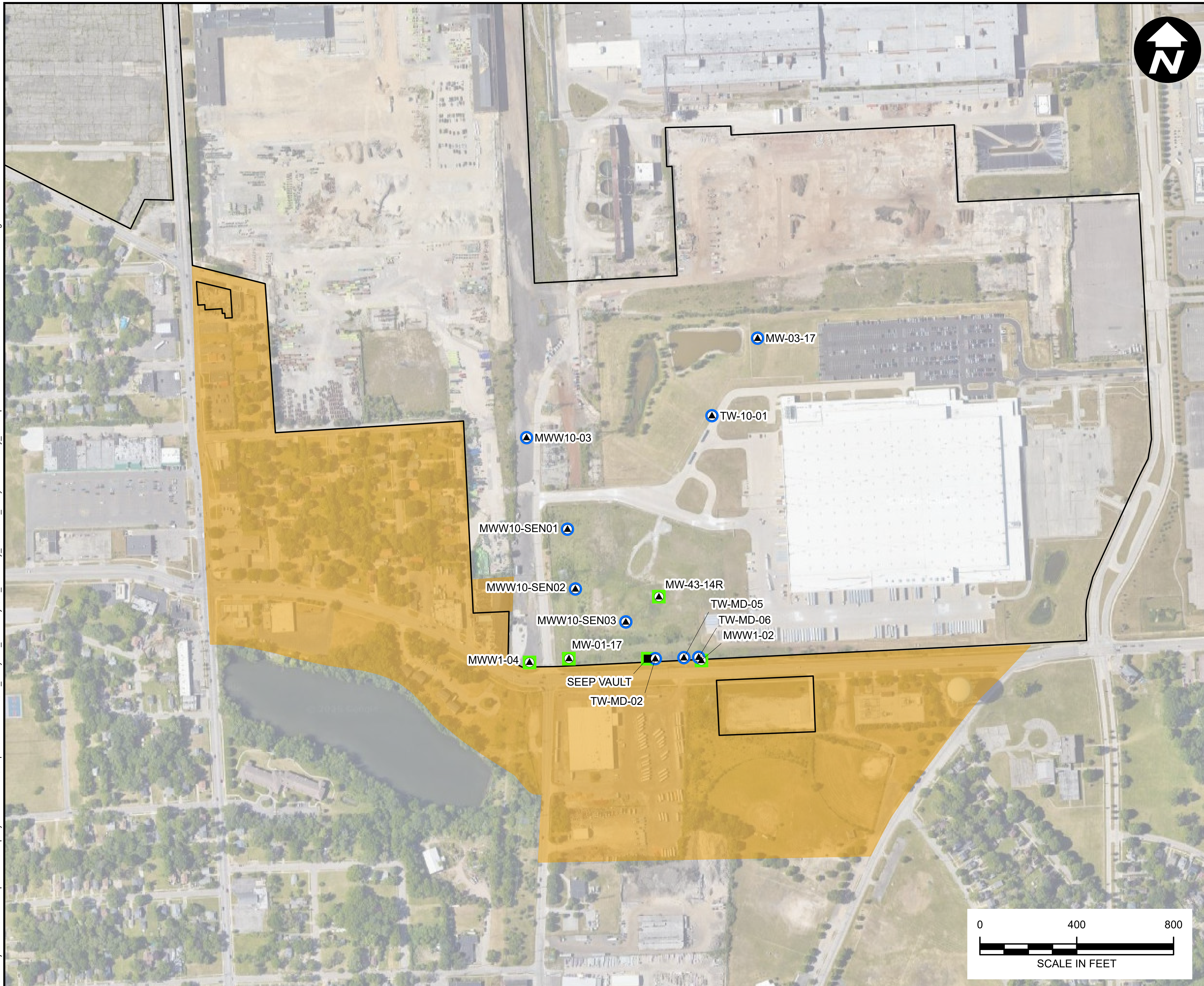
RACER TRUST
PONTIAC NORTH CAMPUS

DISCHARGE LAYOUT ENLARGEMENT

GENERAL

ARCADIS Project No. 30042811.00007
Date MAY 2020
ARCADIS
ARCADIS OF MICHIGAN, LLC.
300 S. WASHINGTON SQUARE, STE 315
LANSING, MICHIGAN 48933

2



LEGEND

- EXISTING MONITORING WELL LOCATION
- SEEP VAULT LOCATION
- ANNUAL GAUGING LOCATION
- ANNUAL GAUGING AND SAMPLING LOCATION
- OFF-SITE GROUNDWATER ORDINANCE EXTENT
- CURRENT OR FORMER RACER PROPERTY

NOTE: CONSTITUENTS TO BE SAMPLED ARE PFAS, METALS, TDS

RACER TRUST
PONTIAC NORTH CAMPUS
PONTIAC, MICHIGAN

SYSTEM MONITORING PLAN

ARCADIS

FIGURE
3

CITY: NOVI DIV: ENV DB: TRY PIC:J. Barrett PM: T. Linder TM: L. Nickerson TR: PROJECT NUMBER: 30267726 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\PontiacNorthCampus\Documents\GW_Analytical_Summary\GW_Summary_2025\GW_AnalyticalSummary_2025.aprx PLOTTED: 6/11/2026 1:35 PM BY: TYarbrough

Tables

Table 1
Montcalm Seep PFAS Sampling Results
Montcalm Seep Interim Measure Re-evaluation
Pontiac North Campus Site, Pontiac, Michigan

ARCADIS

CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	MW-01-17 9/18/2023	MW-01-17 9/18/2023	MW-01-17 11/7/2024	MW-01-17 9/18/2025	MW-01-17 3/25/2026	MW-03-17 5/2/2023
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 3.9 U	< 4.56 U	< 4.68 U	< 7.8 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 3.9 U	< 4.52 U	< 9.37 U	< 7.8 U
6:2 FTS	27619-97-2	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 3.9 U	< 4.49 U	< 19.2 U	8.8 J
8:2 FTS	39108-34-4	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 4.0 U	< 4.64 U	< 11.3 U	< 7.8 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 3.8 U	< 4.51 U	< 4.49 U	< 7.8 U
ADONA	919005-14-4	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 3.9 U	< 4.56 U	< 5.63 U	< 7.8 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	NA	NA	NA	< 4.84 U	< 10.8 U	NA
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	NA	NA	NA	7.14	< 13.0 U	NA
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	NA	NA	NA	< 4.84 U	< 30.2 U	NA
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 7.3 U	< 7.4 U	< 4.1 U	< 4.84 U	< 11.7 U	< 7.8 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 4.1 U	< 4.84 U	< 15.5 U	< 7.8 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 7.3 U	< 7.4 U	< 4.1 U	< 4.84 U	< 6.45 U	< 7.8 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	7.0	4.9	< 3.7 U	4.41	3.97 J	5.2
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	18 J	< 3.7 UJ	< 4.1 UJ	< 4.84 U	< 26.0 U	18 J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.0 U	< 4.66 U	< 13.7 U	< 3.9 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 12.4 U	< 3.9 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 6.92 U	< 3.9 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 3.9 U	1.77 J	< 5.67 U	4.7
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	5.7	6.0	5.1	4.04 J	< 17.3 U	9.1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	13	13	13.1	13.2	14.2	**58**
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	9.2	9.6	6.2	6.28	< 12.0 U	14
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.0 U	< 4.65 U	< 4.97 U	< 3.9 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	0.67 J	0.72 J	< 4.1 U	< 4.84 U	< 8.71 U	2.4 J
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 7.12 U	< 3.9 U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	*13*	*14*	*13.1*	***18.6***	***19.3 J***	***140***
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	**14**	**13**	**14.0**	**18.0**	**18.6 J**	**27**
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	3.4 J	< 3.7 U	< 3.9 U	2.43 J	< 5.57 U	4.0
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	7.78	< 12.8 U	16
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 26.4 U	< 3.9 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 19.3 U	< 3.9 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 3.7 U	< 3.7 U	< 4.1 U	< 4.84 U	< 9.75 U	< 3.9 U
PFBSA	30334-69-1	ng/L	--	--	--	NA	NA	NA	< 4.84 U	< 19.9 U	NA
PFECHS	67584-42-3	ng/L	--	--	--	NA	NA	NA	434	441	NA
PFHxSA	41997-13-1	ng/L	--	--	--	NA	NA	NA	< 4.84 U	< 8.79 U	NA
Iron	7439-89-6	mg/L	**0.3**	2.00	--	NA	NA	**3.57 J**	**3.86**	**0.49**	NA
Manganese	7439-96-5	mg/L	**0.05**	0.86	*1.3*	NA	NA	**0.314**	**0.342**	**0.255**	NA
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	NA	NA	*1460*	*1470*	*1510*	NA

Notes:
DW: Drinking Water
GSI: Groundwater Surface Water
ng/L: nanograms per liter
mg/L: miligrams per liter
< / U : less than lab reporting limit
J : Less than reporting limit but greater than method detection limit
NA: not analyzed
-- : no criteria
Above Residential Drinking Water Criteria
Above Residential Health-Based Criteria
Above GSI Criteria

Table 1
Montcalm Seep PFAS Sampling Results
Montcalm Seep Interim Measure Re-evaluation
Pontiac North Campus Site, Pontiac, Michigan

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CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	MW-03-17 5/2/2023	MW-03-17 9/21/2023	MW-03-17 11/6/2024	MW-03-17 9/16/2025	MW-03-17 3/26/2026	MW-43-14R 3/30/2026
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 7.2 U	< 7.3 U	< 9.8 U	< 4.71 U	< 0.478 U	< 0.479 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 7.2 U	< 7.3 UJ	< 9.8 U	< 4.67 U	< 0.959 U	< 0.961 U
6:2 FTS	27619-97-2	ng/L	--	--	--	9.6 J	8.0 J	< 10 U	15.2	13.6	< 1.97 U
8:2 FTS	39108-34-4	ng/L	--	--	--	< 7.2 U	< 7.3 UJ	< 10.1 U	< 4.79 U	< 1.16 U	< 1.16 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 7.2 U	< 7.3 U	< 9.7 U	< 4.66 U	< 0.459 U	< 0.460 U
ADONA	919005-14-4	ng/L	--	--	--	< 7.2 U	< 7.3 U	< 9.9 U	< 4.71 U	< 0.576 U	< 0.577 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	NA	NA	NA	< 5.00 U	< 1.11 U	< 1.11 U
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	NA	NA	NA	1.41 J	1.57 J	9.47
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	NA	NA	NA	< 5.00 U	< 3.09 U	< 3.10 U
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 7.2 U	< 7.3 U	< 10.5 U	< 5.00 U	< 1.20 U	< 1.20 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 7.2 U	< 7.3 U	< 10.5 U	< 5.00 U	< 1.58 U	< 1.59 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 7.2 U	< 7.3 U	< 10.5 U	< 5.00 U	< 0.660 U	< 0.661 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	4.0	3.3 J	15.4	4.61	4.63 J	3.82 J
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	17 J	15	< 10.5 U	15.9	15.4	28.9
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.1 U	< 4.82 U	< 1.40 U	< 1.41 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.5 U	< 5.00 U	< 1.27 U	< 1.27 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.5 U	< 5.00 U	< 0.708 U	< 0.709 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	5.1	4.5	< 10 U	5.29	4.41 J	3.31 J
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	8.8	8.6	< 10.5 U	9.48	7.51	4.25 J
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	**57**	32	36.4	39.2	35.1	17.8
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	15	14	< 10.5 U	14.8	12.7	7.58
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.1 U	< 4.80 U	< 0.508 U	< 0.509 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	2.2 J	2.5 J	< 10.5 U	3.64 J	3.21 J	1.55 J
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 3.6 U	1.4 J	< 10.5 U	< 5.00 U	< 0.728 U	< 0.730 U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	***140***	***140***	***200***	***211***	***180***	***272***
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	**27**	**20**	**18.5**	**23.2**	**25.8**	**20.5**
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	3.8	2.7 J	< 9.8 U	3.34 J	2.57 J	2.85 J
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	16	15	< 10.5 U	14.4	12.7	5.26
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.5 U	< 5.00 U	< 2.70 U	< 2.71 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.5 U	< 5.00 U	< 1.98 U	< 1.98 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 3.6 U	< 3.6 U	< 10.5 U	< 5.00 U	< 0.998 U	< 1.00 U
PFBSA	30334-69-1	ng/L	--	--	--	NA	NA	NA	5.57	4.30 J	< 2.04 U
PFECHS	67584-42-3	ng/L	--	--	--	NA	NA	NA	55.6	43.0	740
PFHxSA	41997-13-1	ng/L	--	--	--	NA	NA	NA	1.52 J	< 0.900	< 0.901 U
Iron	7439-89-6	mg/L	**0.3**	2.00	--	**9.01**	NA	NA	NA	NA	**5.68**
Manganese	7439-96-5	mg/L	**0.05**	0.86	*1.3*	**0.423**	NA	NA	NA	NA	**0.641**
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	*550*	NA	NA	NA	NA	*1610*

Notes:
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Table 1
Montcalm Seep PFAS Sampling Results
Montcalm Seep Interim Measure Re-evaluation
Pontiac North Campus Site, Pontiac, Michigan

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CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	MWF12-02R 4/25/2023	MWF12-02R 9/12/2023	MWF12-02R 11/7/2024	MWF12-02R 9/16/2025	MWF12-02R 3/27/2026	MWW10-03 9/15/2023
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.0 U	< 4.63 U	< 0.457 U	< 7.5 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.0 U	< 4.59 U	< 0.915 U	< 7.5 U
6:2 FTS	27619-97-2	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.1 U	< 4.56 U	< 1.88 U	< 7.5 U
8:2 FTS	39108-34-4	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.1 U	< 4.71 U	< 1.11 U	< 7.5 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.0 U	< 4.58 U	< 0.438 U	< 7.5 U
ADONA	919005-14-4	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.0 U	< 4.63 U	< 0.550 U	< 7.5 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	NA	NA	NA	< 4.92 U	< 1.06 U	NA
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	NA	NA	NA	< 4.92 U	< 1.36 U	NA
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	NA	NA	NA	< 4.92 U	< 2.95 U	NA
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 7.6 U	< 6.9 U	< 2.2 U	< 4.92 U	< 1.14 U	< 7.5 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.2 U	< 4.92 U	< 1.51 U	< 7.5 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 7.6 U	< 6.9 U	< 2.2 U	< 4.92 U	< 0.630U	< 7.5 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	3.7 J	3.9	9.1	3.13 J	2.2 J	12
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	22	20	27.7 J	21.8	11.3	21
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.1 U	< 4.74 U	< 1.34 U	< 3.8 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 1.21 U	< 3.8 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 0.676 U	< 3.8 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.1 U	0.743 J	< 0.554 U	1.6 J
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	4.4	3.5	5.2	4.51 J	3.89 J	30
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	5.9	4.6	3.6	5.27	2.81 J	44
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	12	8.9	11.8	11.0	8.31	29
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.1 U	< 4.72 U	< 0.485 U	< 3.8 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 0.851 U	< 3.8 U
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 0.695 U	< 3.8 U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	4.0	9.0	4.5	6.17	3.80	< 3.8 U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	**11**	**9.6**	7.4	**10.0**	**10.2**	**50**
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	1.6 J	< 3.4 U	< 2.0 U	0.752 J	0.726 J	15
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	14	11	12.8	12.8	9.19	27
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 2.58 U	< 3.8 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 1.89 U	< 3.8 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 3.8 U	< 3.4 U	< 2.2 U	< 4.92 U	< 0.953 U	< 3.8 U
PFBSA	30334-69-1	ng/L	--	--	--	NA	NA	NA	< 4.92 U	< 1.94 U	NA
PFECHS	67584-42-3	ng/L	--	--	--	NA	NA	NA	76.5	15.0	NA
PFHxSA	41997-13-1	ng/L	--	--	--	NA	NA	NA	< 4.92 U	< 0.859 U	NA
Iron	7439-89-6	mg/L	**0.3**	2.00	--	NA	NA	0.29	0.04	< 0.02	NA
Manganese	7439-96-5	mg/L	**0.05**	0.86	*1.3*	NA	**0.439**	**0.733**	**0.614**	**0.396**	**0.48 J**
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	NA	NA	*732*	*818*	*672*	NA

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Pontiac North Campus Site, Pontiac, Michigan

CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	MWW10-03 11/8/2024	MWW10-03 9/16/2025	MWW10-03 9/16/2025	MWW1-02 9/19/2023	MWW1-02 11/7/2024	MWW1-02 9/19/2025
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 1.8 U	< 4.56 U	< 0.472 U	< 80 U	< 19.7 U	< 4.71 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 1.8 U	< 4.52 U	< 0.946 U	< 80 U	< 19.5 U	< 4.67 U
6:2 FTS	27619-97-2	ng/L	--	--	--	< 1.8 U	< 4.49 U	< 1.94 U	< 80 U	< 19.9 U	< 4.64 U
8:2 FTS	39108-34-4	ng/L	--	--	--	< 1.9 U	< 4.64 U	< 1.14 U	< 80 U	< 20.2 U	< 4.79 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 1.8 U	< 4.51 U	< 0.453 U	< 80 U	< 19.4 U	< 4.66 U
ADONA	919005-14-4	ng/L	--	--	--	< 1.8 U	< 4.56 U	< 0.568 U	< 80 U	< 19.8 U	< 4.71 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	NA	< 4.84 U	< 1.09 U	NA	NA	< 5.00 U
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	NA	< 4.84 U	< 1.41 U	NA	NA	5.62
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	NA	< 4.84 U	< 3.05 U	NA	NA	< 5.00 U
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 1.9 U	< 4.84 U	< 1.18 U	< 80 U	< 20.9 U	< 5.00 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 1.56 U	< 80 U	< 20.9 U	< 5.00 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 0.651 U	< 80 U	< 20.9 U	< 5.00 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	< 1.7 U	2.15 J	1.37 J	< 40 U	< 18.5 U	4.37 J
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	7.0 J	8.75	< 2.63 U	43	< 20.9 U	< 5.00 U
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 1.9 U	< 4.67 U	< 1.38 U	< 40 U	< 20.2 U	< 4.82 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 1.25 U	< 40 U	< 20.9 U	< 5.00 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 0.698 U	< 40 U	< 20.9 U	< 5.00 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	< 1.8 U	< 4.61 U	< 0.572 U	< 40 U	< 19.9 U	1.87 J
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	2.3	1.77 J	< 1.75 U	< 40 U	< 20.9 U	3.81 J
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	2.1	2.05 J	< 0.913 U	15 J	< 19.0 U	10.1
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	2.2	2.06 J	< 1.21 U	< 40 U	< 20.9 U	4.31 J
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 1.8 U	< 4.65 U	< 0.501 U	< 40 U	< 20.1 U	< 4.80 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	< 1.9 U	1.65 J	< 0.879 U	< 40 U	< 20.9 U	< 5.00 U
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 0.719 U	< 40 U	< 20.9 U	< 5.00 U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	***23.4***	***18.5***	3.59	***66***	***53.2***	***75.0***
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	**10.7**	7.33	1.69 J	**15 J**	< 20.9 U	**10.4**
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	< 1.8 U	0.775 J	< 0.562 U	< 40 U	< 19.7 U	1.85 J
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	< 1.9 U	2.93 J	< 1.29 U	< 40 U	< 20.9 U	5.73
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 2.67 U	< 40 U	< 20.9 U	< 5.00 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 1.95 U	< 40 U	< 20.9 U	< 5.00 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 1.9 U	< 4.84 U	< 0.985 U	< 40 U	< 20.9 U	< 5.00 U
PFBSA	30334-69-1	ng/L	--	--	--	NA	< 4.84 U	< 2.01 U	NA	NA	< 5.00 U
PFECHS	67584-42-3	ng/L	--	--	--	NA	4.92	2.15 J	NA	NA	463
PFHxSA	41997-13-1	ng/L	--	--	--	NA	< 4.84 U	< 0.887 U	NA	NA	< 5.00 U
Iron	7439-89-6	mg/L	**0.3**	2.00	--	NA	NA	NA	NA	**29.0 J**	**25.4**
Manganese	7439-96-5	mg/L	**0.05**	0.86	*1.3*	NA	NA	NA	NA	**0.844**	**0.916**
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	NA	NA	NA	NA	*1250*	*1460*

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Pontiac North Campus Site, Pontiac, Michigan

CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	MWW1-02 3/25/2026	MWW1-04 5/2/2023	MWW1-04 9/15/2023	MWW1-04 11/8/2024	MWW1-04 9/18/2025	MWW1-04 3/25/2026
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 0.467 U	< 7.1 U	< 7.8 U	< 3.7 U	< 23.5 U	< 0.467 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 0.936 U	< 7.1 U	< 7.8 U	< 3.7 U	< 23.3 U	< 0.936 U
6:2 FTS	27619-97-2	ng/L	--	--	--	< 1.92 U	< 7.1 U	< 7.8 U	< 3.8 U	< 23.2 U	< 1.92 U
8:2 FTS	39108-34-4	ng/L	--	--	--	< 1.13 U	< 7.1 U	< 7.8 U	< 3.8 U	< 23.9 U	< 1.13 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 0.448 U	< 7.1 U	< 7.8 U	< 3.7 U	< 23.3 U	< 0.448 U
ADONA	919005-14-4	ng/L	--	--	--	< 0.562 U	< 7.1 U	< 7.8 U	< 3.7 U	< 23.5 U	< 0.562 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	< 1.08 U	NA	NA	NA	< 25.0 U	< 1.08 U
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	< 1.39 U	NA	NA	NA	< 25.0 U	1.40 J
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	< 3.02 U	NA	NA	NA	< 25.0 U	< 3.02 U
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 1.17 U	< 7.1 U	< 7.8 U	< 4.0 U	< 25.0 U	< 1.17 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 1.54 U	8.9	15	11.4	15.5 J	< 1.54 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 0.644 U	< 7.1 U	1.0 J	< 4.0 U	< 25.0 U	< 0.644 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	4.35 J	< 3.5 U	< 3.9 U	< 3.5 U	2.43 J	2.39 J
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	19.8	R	< 40 U	< 4.0 UJ	< 25.0 U	< 2.60 U
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 1.37 U	< 3.5 U	0.88 J	< 3.8 U	< 24.1 U	< 1.37 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 1.24 U	< 3.5 U	0.87 J	< 4.0 U	< 25.0 U	< 1.24 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 0.691 U	< 3.5 U	< 3.9 U	< 4.0 U	< 25.0 U	< 0.691 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	0.808 J	< 3.5 U	< 3.9 U	< 3.8 U	3.52 J	0.899 J
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	< 1.73 U	< 3.5 U	3.1 J	< 4.0 U	< 25.0 U	< 1.73 U
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	3.68 J	4.1	4.5	6.7	10.3 J	4.94 J
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	2.86 J	< 3.5 U	< 3.9 U	< 4.0 U	6.25 J	< 1.20 U
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 0.496 U	< 3.5 U	< 3.9 U	< 3.8 U	< 24.0 U	< 0.496 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	< 0.870 U	< 3.5 U	1.3 J	< 4.0 U	< 25.0 U	< 0.870 U
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 0.711 U	1.2 J	1.7 J	< 4.0 U	4.27 J	1.36 J
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	***44.5***	***98***	***130***	***98.6***	***124***	***42.0***
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	3.93	2.8 J	6.8	6.5	7.58 J	0.868 J
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	0.942 J	< 3.5 U	< 3.9 U	< 3.7 U	< 23.4 U	0.814 J
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	3.78 J	< 3.5 U	5.2	< 4.0 U	< 25.0 U	< 1.28 U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 2.64 U	< 3.5 U	< 3.9 U	< 4.0 U	< 25.0 U	< 2.64 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 1.93 U	< 3.5 U	< 3.9 U	< 4.0 U	< 25.0 U	< 1.93 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 0.974 U	< 3.5 U	< 3.9 U	< 4.0 U	< 25.0 U	< 0.974 U
PFBSA	30334-69-1	ng/L	--	--	--	< 1.98 U	NA	NA	NA	< 25.0 U	< 1.98 U
PFECHS	67584-42-3	ng/L	--	--	--	133	NA	NA	NA	7.36 J	3.77 J
PFHxSA	41997-13-1	ng/L	--	--	--	< 0.878 U	NA	NA	NA	< 25.0 U	< 0.878 U
Iron	7439-89-6	mg/L	**0.3**	<u>2.00</u>	--	**<u>7.10</u>**	NA	**0.56**	<0.02 U	<0.02 U	<0.02 U
Manganese	7439-96-5	mg/L	**0.05**	<u>0.86</u>	*1.3*	**0.299**	NA	NA	<0.005 U	<0.005 U	< 0.005 U
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	*508*	NA	340	*500*	402	348

Notes:
DW: Drinking Water
GSI: Groundwater Surface Water
ng/L: nanograms per liter
mg/L: miligrams per liter
< / U : less than lab reporting limit
J : Less than reporting limit but greater than method detection limit
NA: not analyzed
-- : no criteria
Above Residential Drinking Water Criteria
<u>Above Residential Health-Based Criteria</u>
Above GSI Criteria

Table 1
Montcalm Seep PFAS Sampling Results
Montcalm Seep Interim Measure Re-evaluation
Pontiac North Campus Site, Pontiac, Michigan

CHEMICAL NAME	CAS #	UNIT	Part 201 Residential and Nonresidential DW Criteria	Part 201 Residential Health-Based DW Criteria	Part 201 GSI Criteria	SEEPVAULT 4/26/2023	SEEPVAULT 9/21/2023	SEEPVAULT 11/7/2024	SEEPVAULT 9/19/2025	SEEPVAULT 3/25/2026
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	ng/L	--	--	--	< 80 U	< 7.5 U	< 19.4 U	< 4.94 U	< 4.67 U
4:2 FTS	757124-72-4	ng/L	--	--	--	< 80 U	< 7.5 UJ	< 19.3 U	< 4.89 U	< 9.37 U
6:2 FTS	27619-97-2	ng/L	--	--	--	< 80 U	< 7.5 UJ	< 19.6 U	< 4.86 U	< 19.2 U
8:2 FTS	39108-34-4	ng/L	--	--	--	< 80 U	< 7.5 UJ	< 19.9 U	< 5.02 U	< 11.30 U
9Cl-PF3ONS (F-53B Major)	756426-58-1	ng/L	--	--	--	< 80 U	< 7.5 U	< 19.2 U	< 4.88 U	< 4.48 U
ADONA	919005-14-4	ng/L	--	--	--	< 80 U	< 7.5 U	< 19.5 U	< 4.94 U	< 5.62 U
FHpPA (7:3 FTCA)	812-70-4	ng/L	--	--	--	NA	NA	NA	< 5.24 U	< 10.8 U
FPePA (5:3 FTCA)	914637-49-3	ng/L	--	--	--	NA	NA	NA	4.55 J	< 13.9 U
FPrPA (3:3 FTCA)	356-02-5	ng/L	--	--	--	NA	NA	NA	< 5.24 U	< 30.2 U
HFPO-DA (GenX)	13252-13-6	ng/L	**370**	--	--	< 80 U	< 7.5 U	< 20.6 U	< 5.24 U	< 11.7 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6	ng/L	--	--	--	< 80 U	< 7.5 U	< 20.6 U	< 5.24 U	< 15.5 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9	ng/L	--	--	--	< 80 U	< 7.5 U	< 20.6 U	< 5.24 U	< 6.45 U
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/L	**420**	--	*670,000*	< 40 U	< 3.8 U	< 18.2 U	3.96 J	4.96 J
Perfluorobutanoic acid (PFBA)	375-22-4	ng/L	--	--	--	14 J	< 3.8 UJ	< 20.6 U	< 5.24 U	< 26.0 U
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/L	--	--	--	< 40 U	< 3.8 U	< 19.9 U	< 5.05 U	< 13.7 U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 12.4 U
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 6.92 U
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	ng/L	--	--	--	< 40 U	2.1 J	< 19.6 U	2.39 J	< 5.66 U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/L	--	--	--	< 40 U	4.4	< 20.6 U	3.76 J	< 17.3 U
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/L	**51**	--	*210*	12 J	11	< 18.7 U	10.0	15.1 J
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/L	**400,000**	--	--	< 40 U	7.4	< 20.6 U	5.80 J	< 12.0 U
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ng/L	--	--	--	< 40 U	< 3.8 U	< 19.8 U	< 5.03 U	< 4.96 U
Perfluorononanoic acid (PFNA)	375-95-1	ng/L	**6**	--	*30*	< 40 U	0.71 J	< 20.6 U	< 5.24 U	< 8.71 U
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 7.12 U
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	ng/L	**16**	--	*12*	***100***	***120***	***105***	***119***	***115***
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	**8**	--	*170*	**11 J**	**12**	< 20.6 U	**12.1**	**13.3 J**
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ng/L	--	--	--	< 40 U	< 3.8 U	< 19.4 U	2.11 J	< 5.56 U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	4.98 J	< 12.8 U
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 26.4 U
Perfluorotridecanoic Acid (PFTriA)	72629-94-8	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 19.3 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/L	--	--	--	< 40 U	< 3.8 U	< 20.6 U	< 5.24 U	< 9.75 U
PFBSA	30334-69-1	ng/L	--	--	--	NA	NA	NA	< 5.24 U	< 19.9 U
PFECHS	67584-42-3	ng/L	--	--	--	NA	NA	NA	442	513
PFHxSA	41997-13-1	ng/L	--	--	--	NA	NA	NA	< 5.24 U	< 8.79 U
Iron	7439-89-6	mg/L	**0.3**	2.00	--	NA	NA	**13.0 J**	**15.8 J**	**14.2**
Manganese	7439-96-5	mg/L	**0.05**	0.86	*1.3*	NA	NA	**0.463**	**0.526**	**0.548**
Total Dissolved Solids (TDS)	--	mg/L	--	--	*500*	NA	NA	*1680*	*1790*	*1870*

Notes:
DW: Drinking Water
GSI: Groundwater Surface Water
ng/L: nanograms per liter
mg/L: miligrams per liter
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Above Residential Drinking Water Criteria
Above Residential Health-Based Criteria
Above GSI Criteria

Table 2
Montcalm Seep Monitoring Plan
RACER Trust
Pontiac North Campus
Pontiac, MI

Monitoring Well/Sampling Location	Purpose	Parameters	Frequency
MW-01-17, MW-03-17, TW-10-01, MWW1-02, MWW10-03, MWW10-SEN01, MWW10-SEN02, MWW1-SEN03, MW-43-14R, MWW1-04, MW-01-17, TW-MD-02, TW-MD-05, and TW-MD-06	Groundwater elevation and flow direction monitoring	Gauging	Annual
MW-43-14R and Seep Vault	Demonstrate that seepwater is discharged into plume of similar concentration.	PFAS, Metals, TDS	
MWW1-04, MW-01-17, and MWW1-02	Demonstrate that the proposed discharge of the seep water is not exacerbating the existing contamination.	PFAS, Metals, TDS	

PFAS = Per- and Polyfluoroalkyl Substances by USEPA Method 537M with isotope dilution (DoD QSM 5.1)
Metals = Iron and Manganese by Method 200.8
TDS = Total Dissolved Solids by SM2540C

Attachment 1

Montcalm Seep Remedy Options Evaluation (July 2024)

Montcalm Seep Follow Up (August 2024)

Montcalm Seep Update (May 2, 2025)

Montcalm Seep Remedy Options Evaluation

July 2024

Objective

Manage the Montcalm seep system to mitigate seeps along Montcalm Avenue

PFAS was detected in Montcalm sump water in 2023 at 100 to 120 ng/L, complicating the management of the seep, requiring re-assessment of options

Remedial Options Considered

As-is

- Combination of re-injection and surface discharge onsite

Hydraulic Control/Drainage

- Cut off wall (sheet pile wall)
- *Discharge to a pond for infiltration back into groundwater*
- ~~Impermeable cap~~
- ~~Soil infiltration tubes~~

Treatment

- Pretreatment only, new infiltration gallery onsite
- Pretreatment + granular activated carbon (GAC) treatment for PFAS, new infiltration gallery onsite
- ~~Iron pretreatment with GAC and resin treatment for PFAS, new infiltration gallery reinjection onsite~~
- Pretreatment + GAC treatment for PFAS, discharge to POTW
- Pretreatment + GAC treatment for PFAS, discharge to NPDES
- ~~PFAS destruction technology~~
- ~~Trap and treat (in-situ GAC) for PFAS treatment~~

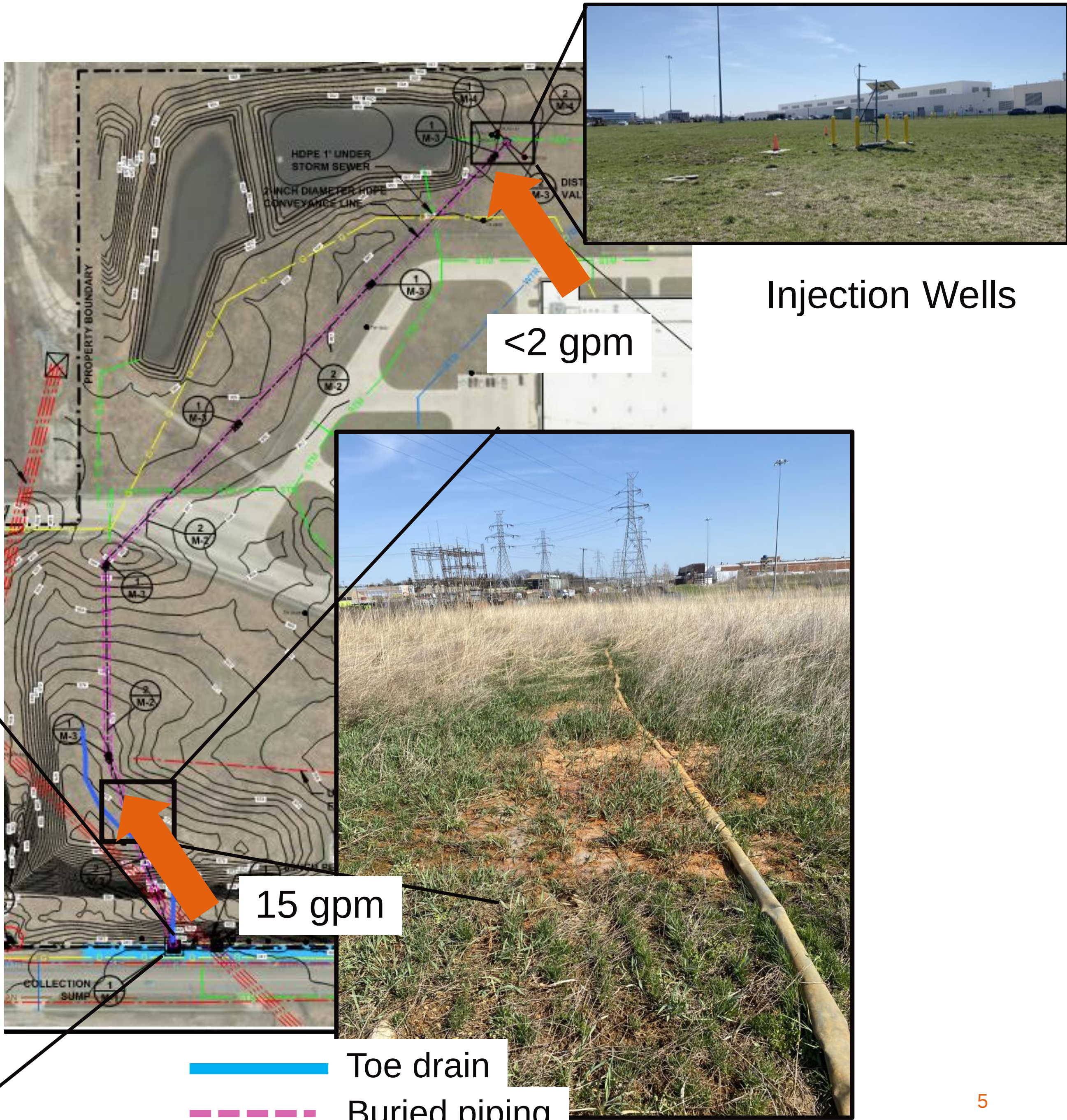
Sump Water Quality Considerations for Injection and Treatment Options

- Collected additional iron, TSS, TOC, and TDS data in 2023 to use in the evaluation of options
- TSS and iron must be removed prior to injection or treatment to prevent fouling injection wells, subsurface pore space, infiltration galleries, and/or the treatment system.

Parameter	Concentration	Considerations
PFOS	120 ng/L	Treatable with GAC
Total Iron	**11.8 mg/L**	**> 1 mg/L requires pretreatment. Primarily suspended iron, contributing to the high TSS.**
Soluble Ferrous Iron	**2.26 mg/L**	**>1 mg/L requires pretreatment. Requires aeration for removal**
TSS	**21.9 mg/L**	**>10 mg/L will increase O&M requirements. Solid waste generation increases linearly with TSS.**
TOC	**15.1 mg/L**	**Relatively high, will compete with PFAS for GAC sorption**
TDS	1,600 mg/L	Very high, would make use of resin difficult as the dissolved anions (e.g. chloride) will interfere with treatment
pH	7.34	

Option 1: No Change

- Continue operation as-is: Pump water from the toe drain collection sump up the hill to a combination of re-injection and surface discharge/infiltration.
- Injection wells foul quickly and generally do not accept measurable flows of water
- Majority of water (>90%) is discharged to ground surface
- **~ $1.4M spent to date on design, construction, and O&M of existing seep system**
- **Additional Capital Cost: $0**
- **Annual OMM Cost: $105K**



Montcalm Sump

Option 2: Pond Discharge

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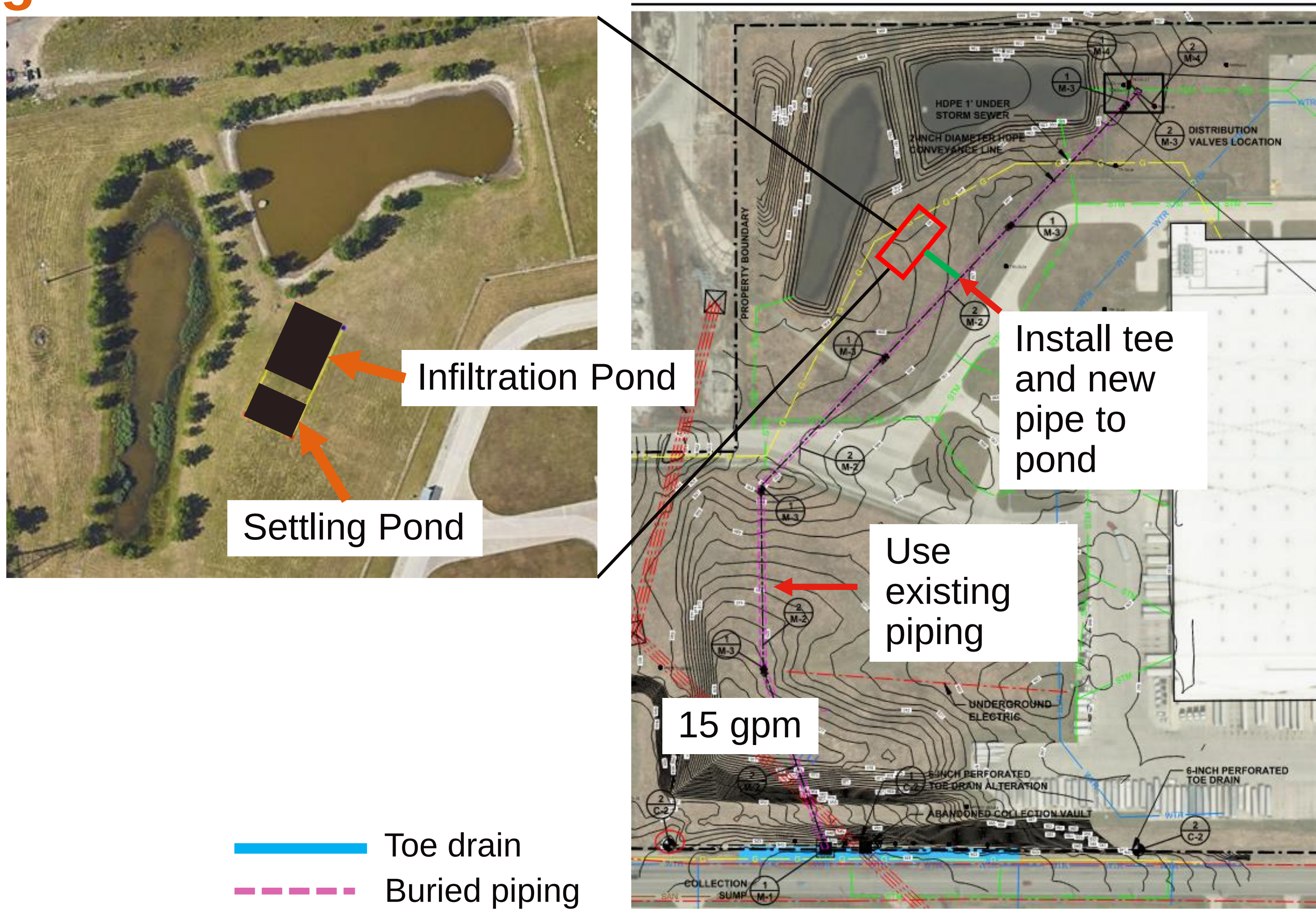
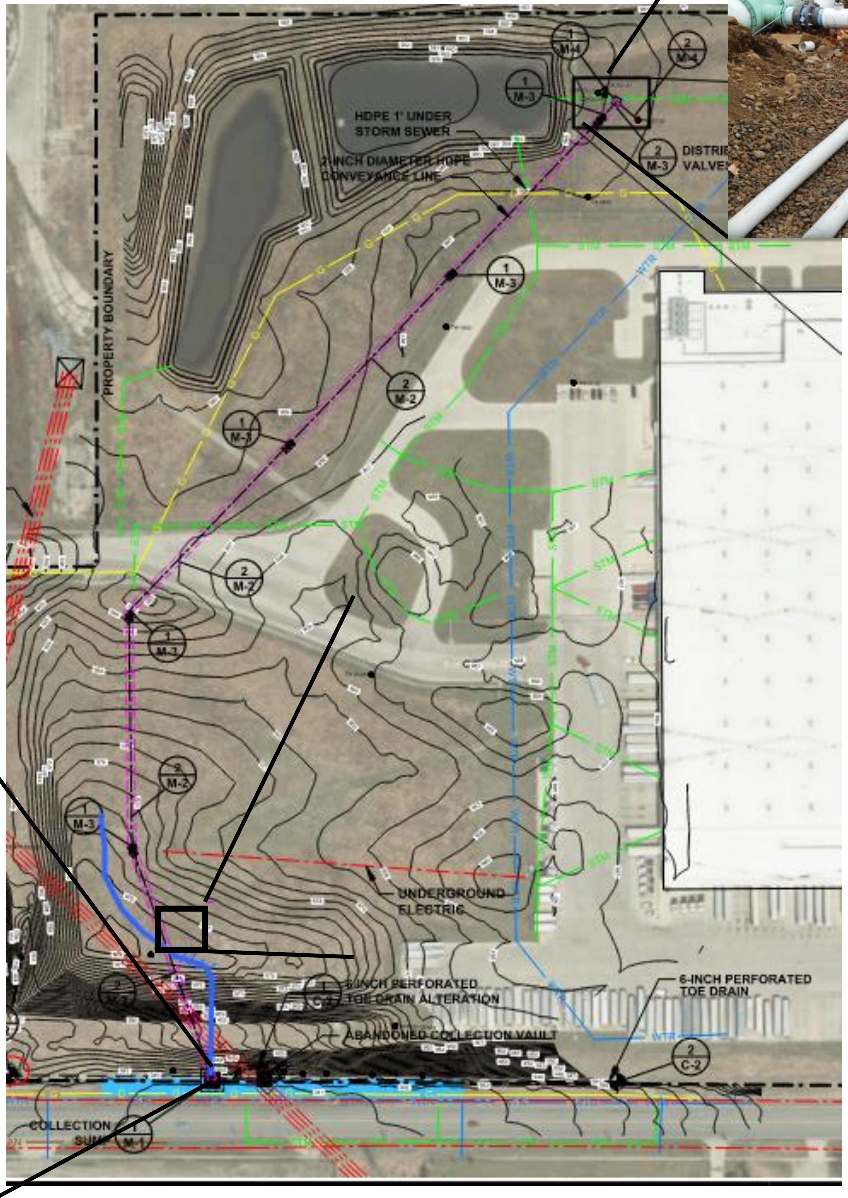
- Pump water from the toe drain collection sump up the hill to a settling and infiltration pond
- Promotes infiltration to the subsurface, mitigates risk of stormwater runoff, and reduces iron staining on the surface
- Infiltration tests indicate pond would need to be excavated down to sand at a depth of 15 feet bgs
- **Capital Cost: $900K (incl. $300K waste disposal)**
- **Annual OMM Cost: $130K (dredging and land apply sediments onsite near ponds)**



Option 3: Water Treatment – TSS/Iron Only

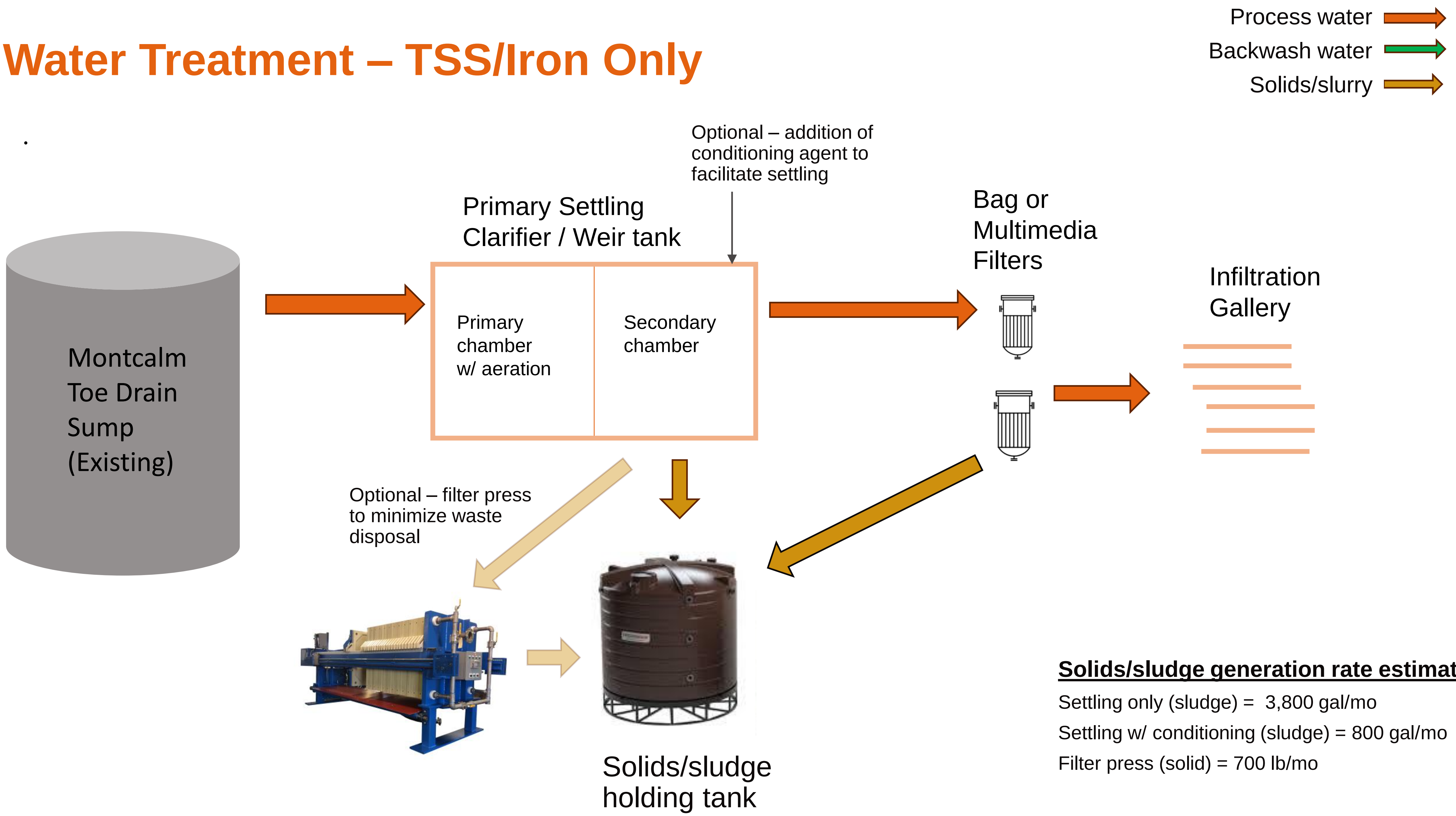
- Pump water from the sump to a pretreatment system designed to reduce TSS/Iron so that the water could be reinjected into a subgrade infiltration gallery
- Significant and expensive pre-treatment, high levels of solid waste generation expected.
- Infiltration testing indicates difficulty infiltrating water due to near-surface site geology in the injection area

- **Full-scale Capital Cost: $530K to $1.6M**
- **Annual OMM Cost: $210K - 360K (cost driver is slurry/solids disposal)**



Infiltration Gallery

Water Treatment – TSS/Iron Only



<u>Solids/sludge generation rate estimates</u>:

Settling only (sludge) = 3,800 gal/mo

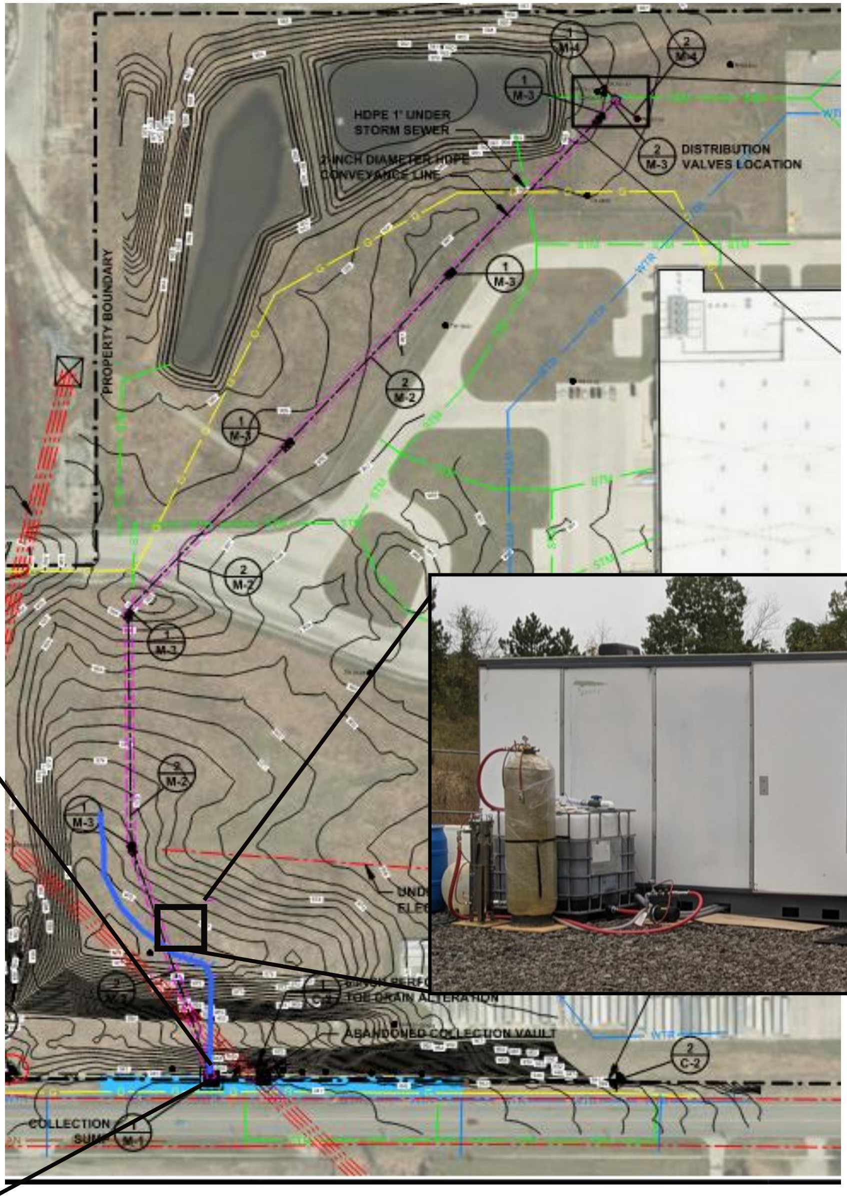
Settling w/ conditioning (sludge) = 800 gal/mo

Filter press (solid) = 700 lb/mo

Option 4: Water Treatment – TSS/Iron + PFAS

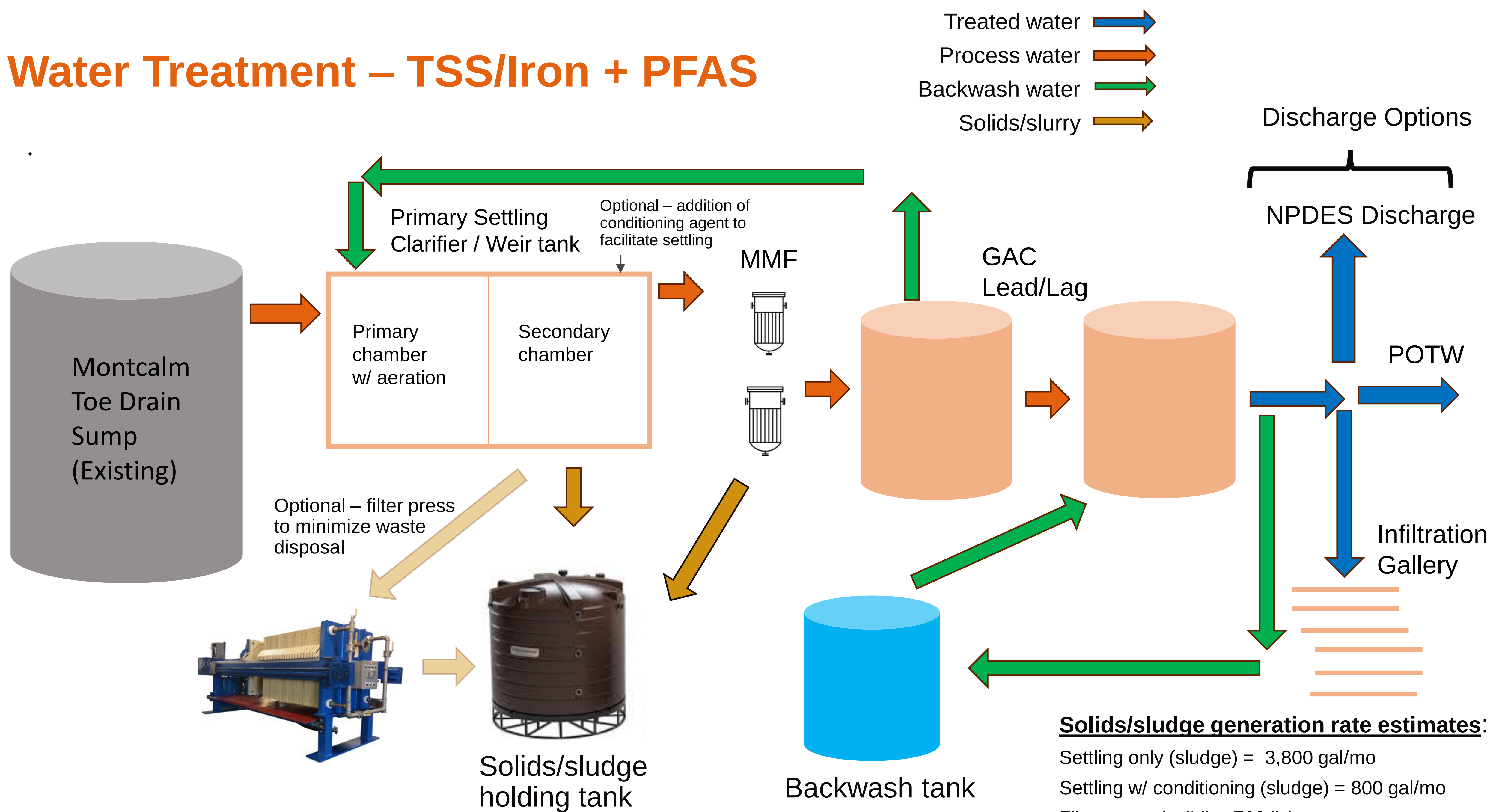
- Pump water from the sump to a pretreatment system designed to reduce TSS/Iron and then to GAC for PFAS treatment
- Pre-treatment required for optimal PFAS treatment
- Requires significant and expensive pre-treatment, high levels of solid waste generation expected.
- Treated effluent could be discharged to new infiltration gallery onsite, sanitary sewer (POTW), or storm sewer (NPDES discharge)

- **Pilot: $500K**
- **Full-scale Capital Cost: $675K to $1.8M**
- **Annual OMM Cost: $270K to $463K (major cost driver is solids disposal)**



Example System

Water Treatment – TSS/Iron + PFAS



Solids/sludge generation rate estimates:

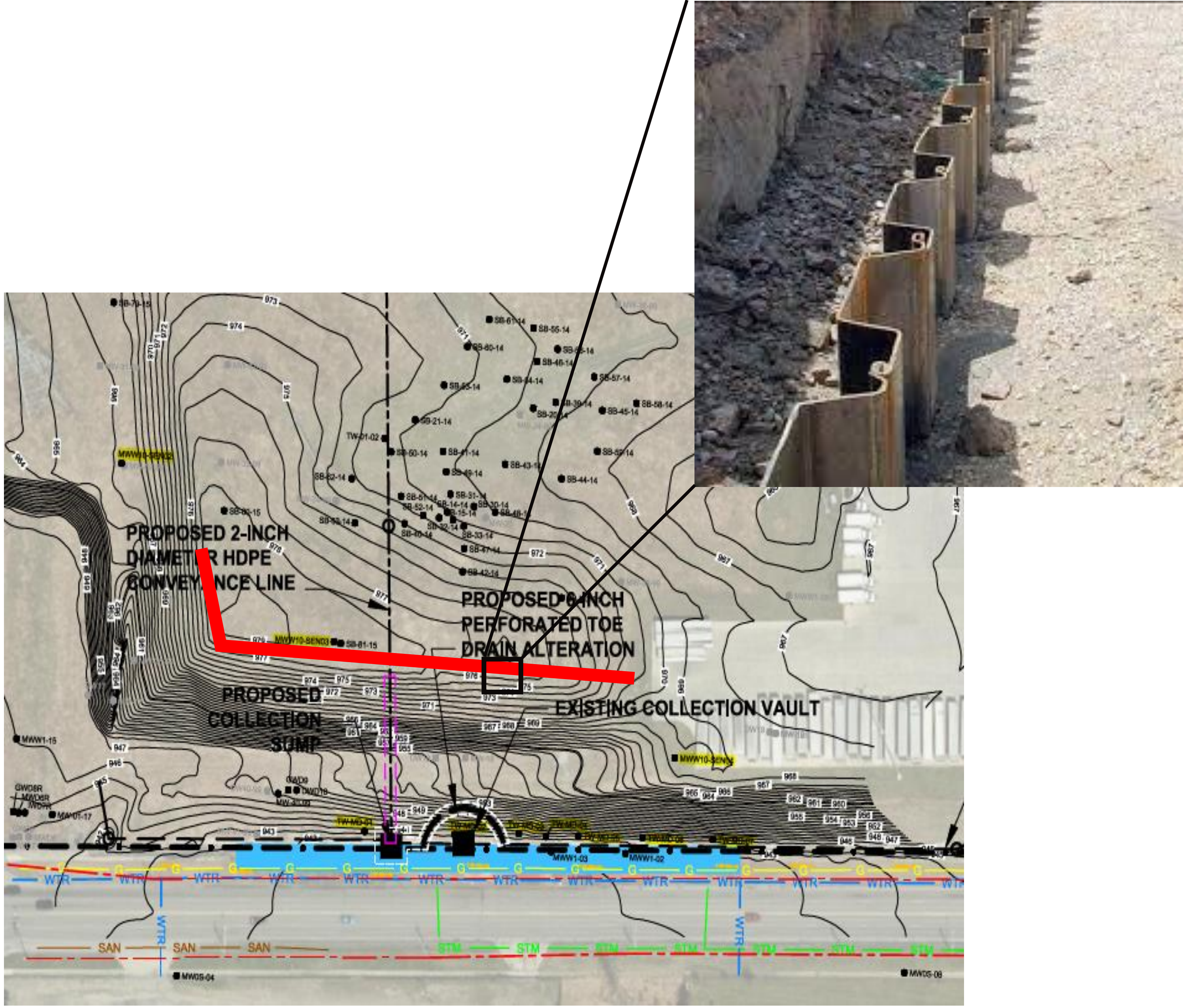
Settling only (sludge) = 3,800 gal/mo

Settling w/ conditioning (sludge) = 800 gal/mo

Filter press (solid) = 700 lb/mo

Option 5: Sheet Pile Wall

- Install steel sheet pile wall as hydraulic barrier to divert groundwater and mitigate seep
- Goal is to eliminate need for existing toe drain and sump system
- Conceptual design is 500 foot long, 40-foot deep steel sheet pile wall embedded into underlying competent clay
- Groundwater modeling indicates potential elimination of seeps
- **$3.6M capital cost**
- **$201K annual O&M cost first 2 years, then $20K long-term**



Evaluated Sheet Pile Wall

Updated Cost Estimates
Montcalm Options Summary

Cost Summary and Recommendation

Costs ± 30-50%	1 – No Change	2 – Pond	3 –Pretreatment Only (no PFAS treatment, Infiltration gallery)	4 – Pre-treatment + GAC (Infiltration Gallery, POTW, or NDPES Discharge)	5 – Sheet Pile Wall
Pilot Cost	$0	$20K	$10K	$500K	$0
Capital Cost	$0	$900K	$530K - $1.6M Settling only - Filter press	$675K - $1.8M Settling only - Filter press	$4.1M
Annual OM Cost	$105K	$130K	$360K - $210K Settling only - Filter press	$463K – $270K Settling only - Filter press POTW Infiltration	$201K first 2 years $20K thereafter
Lifecycle Cost (30 years)	$3.2M	$4.8M	$11.3M - $7.8M Settling only - Filter press	$15.1M - $10.4M Settling only - Filter press POTW Infiltration	$4.7M
Cost Uncertainties	None – currently successful in managing the seep	• Ability of soil to accept water from infiltration pond • Assumes disposal of soils to install pond • Onsite land application of dredged material, if disposal is required, significant increase in O&M costs	• Ability of infiltration gallery to accept water (affects sizing/ maintenance) • Potential need for additional pre-treatment • Solids generation rate ($10K - $215K/yr)	• Carbon change out frequency (assumes quarterly) • Potential need for additional pre-treatment (beyond aeration and MMF) or addition of resin (assumes none) • Solids generation rate	• Overall effectiveness in prevention of seeps – No pilot testing can be done to confirm objective will be met prior to capital investment, hydraulic studies could be done to further refine GW model • How long seep system will need to operate before mitigating the seep (assumes 2 yrs)

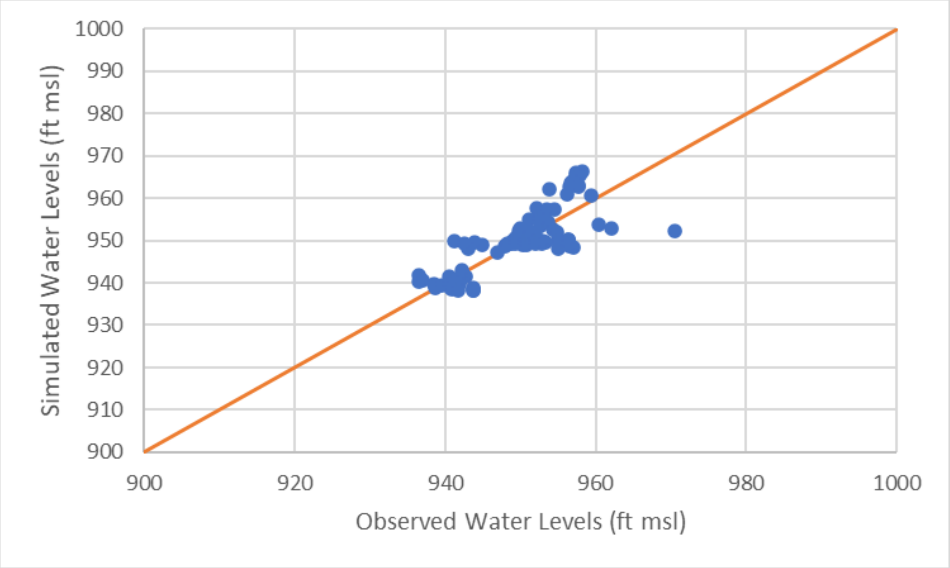
Remedy Screening Conclusions

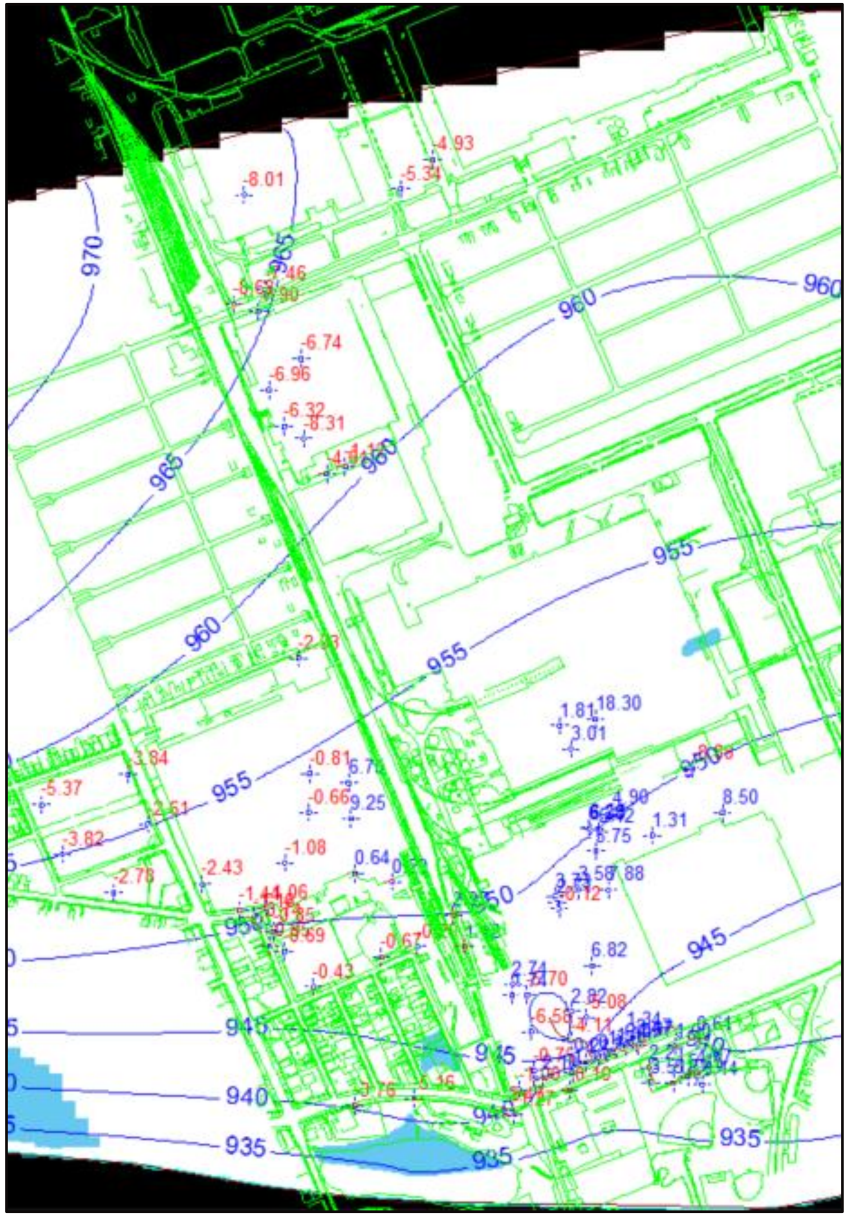
- High additional costs of pre-treating / treating water and reinjecting onsite are not justified, because they do not meaningfully improve the performance outcome relative to goals, and do not fit within site budget
- Direct ground surface discharge (As-is option) is the most cost-effective option to mitigate the Montcalm Street seeps
- Can the current as-is option be optimized to enhance capture, mitigate potential interaction with LNAPL, and/or further minimize potential for overland surface runoff?

Remedy Optimization

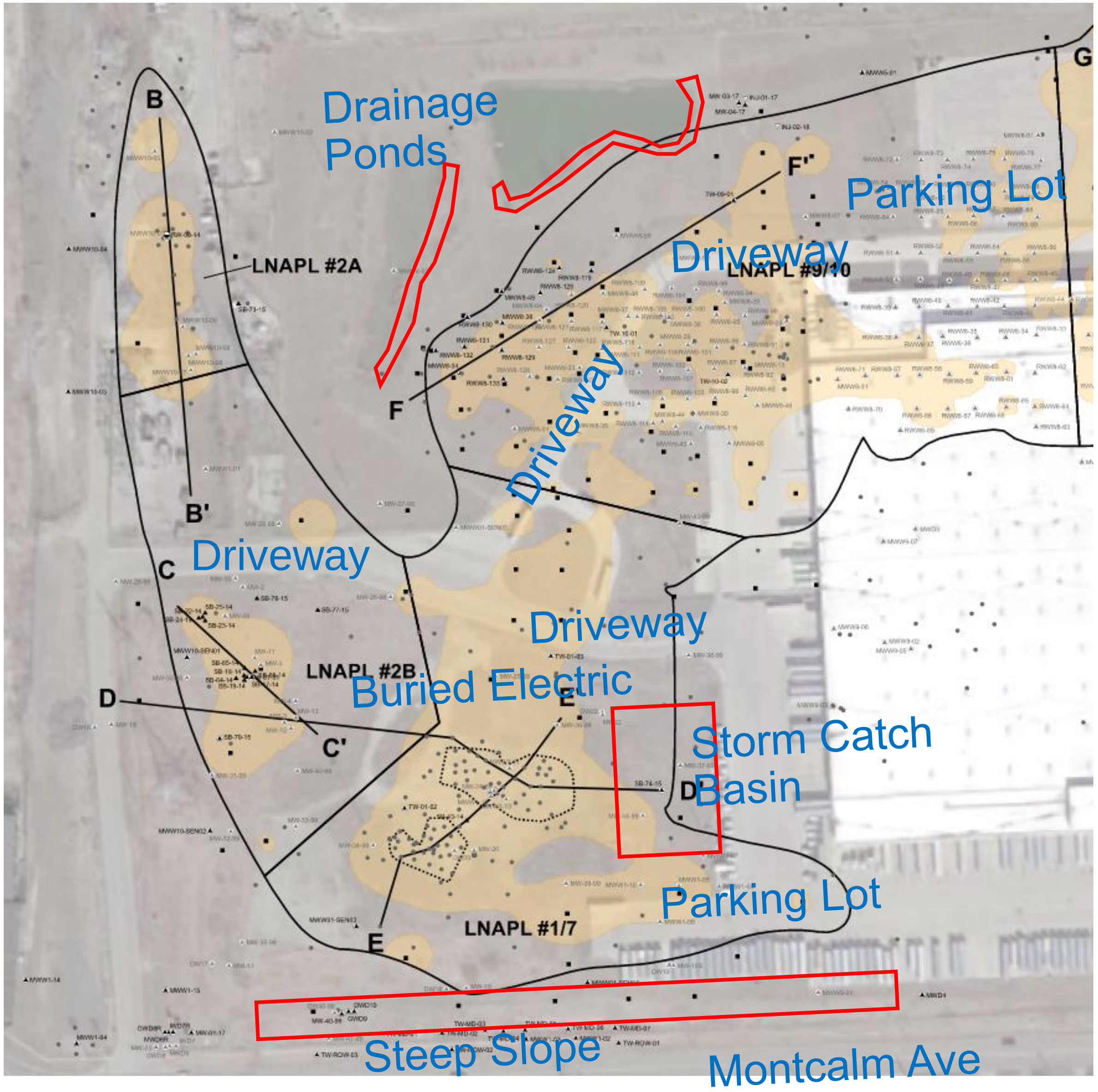
Groundwater Model Updates

- Groundwater model was originally developed to support the design and regulatory approval of the existing seep system
- Site groundwater model was updated to facilitate evaluation of remedy optimization alternatives:
    1. Imported the latest surface topography as a top of the model to evaluate potential flooding / seeps
    2. Updated drain and associated upgradient recharge parameters based on current operation
    3. Imported recent water level data
    4. Recalibrated groundwater flow model





Discharge Location Considerations



Objectives:

- Prevent seeps
- Maximize capture of water
- Minimize discharge to LNAPL areas
- Allocate sufficient space for surface discharge feature
- Avoid Site utilities and disruption to site operations

LNAPL Key

PCB-IMPACTED SOIL EXCAVATION AND PCB SOIL CAP

EXTENT OF LIF RESPONSES >25% BASED ON 2007 AND 2013-2014 MOBILITY STUDIES REPRESENTING CONSERVATIVE EXTENT OF RESIDUAL LNAPL

APPROXIMATE EXTENT OF RESIDUAL LNAPL BASED ON LIF RESPONSES >25% AND HISTORIC LNAPL OBSERVATIONS IN WELLS INTERPOLATED WITH THREE-DIMENSIONAL MODEL

Site Constraints

areas to avoid

Current Surface Discharge

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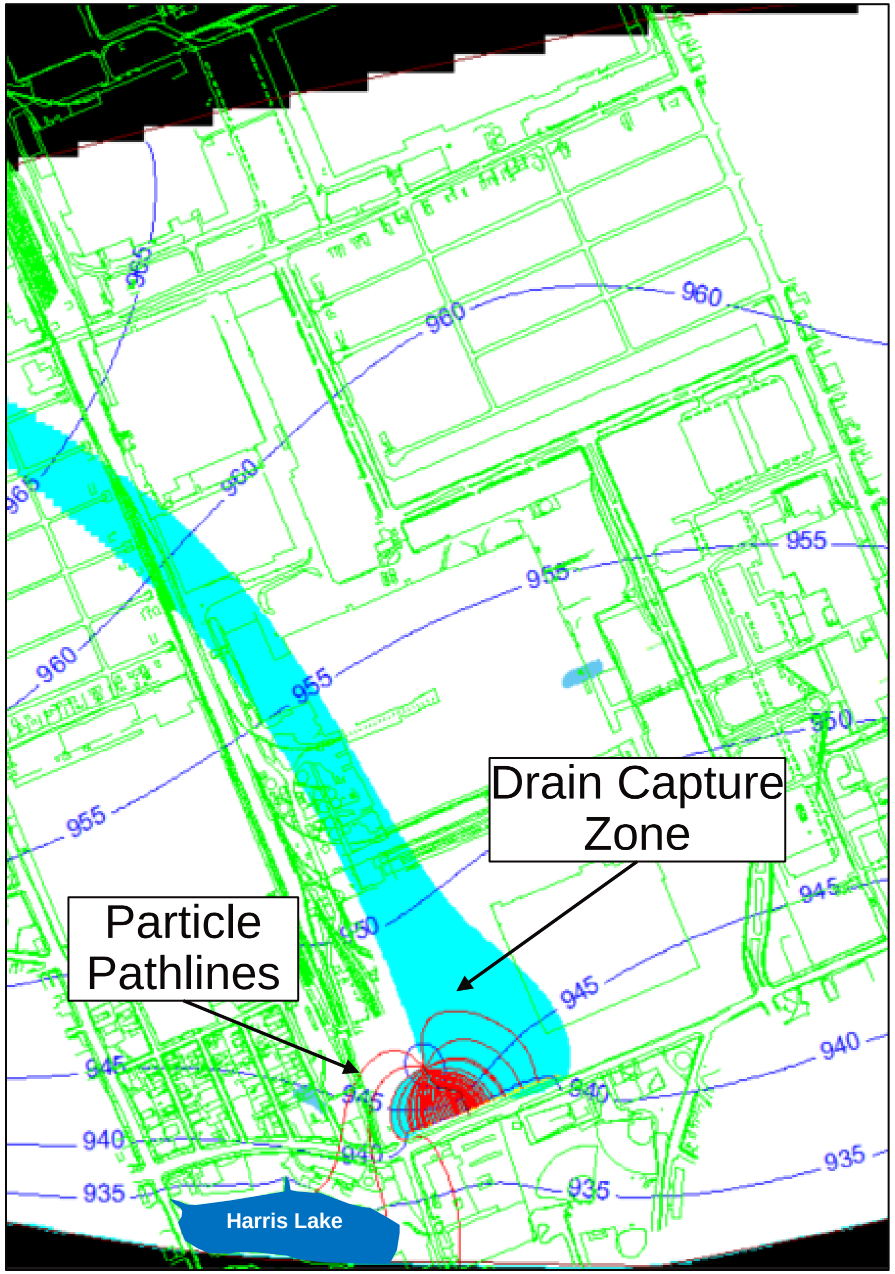
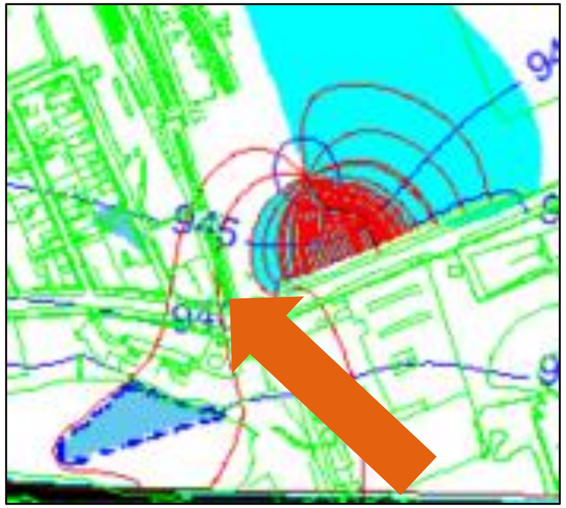


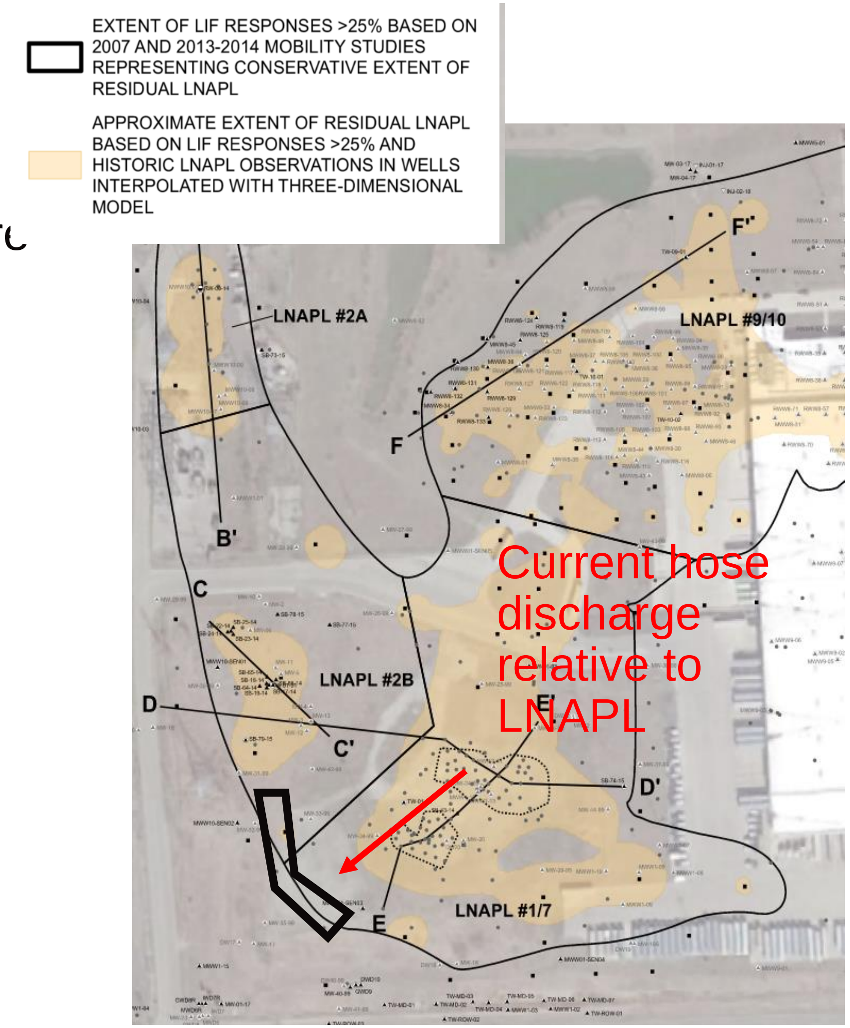
Current Conditions

- 15 gpm surface discharge

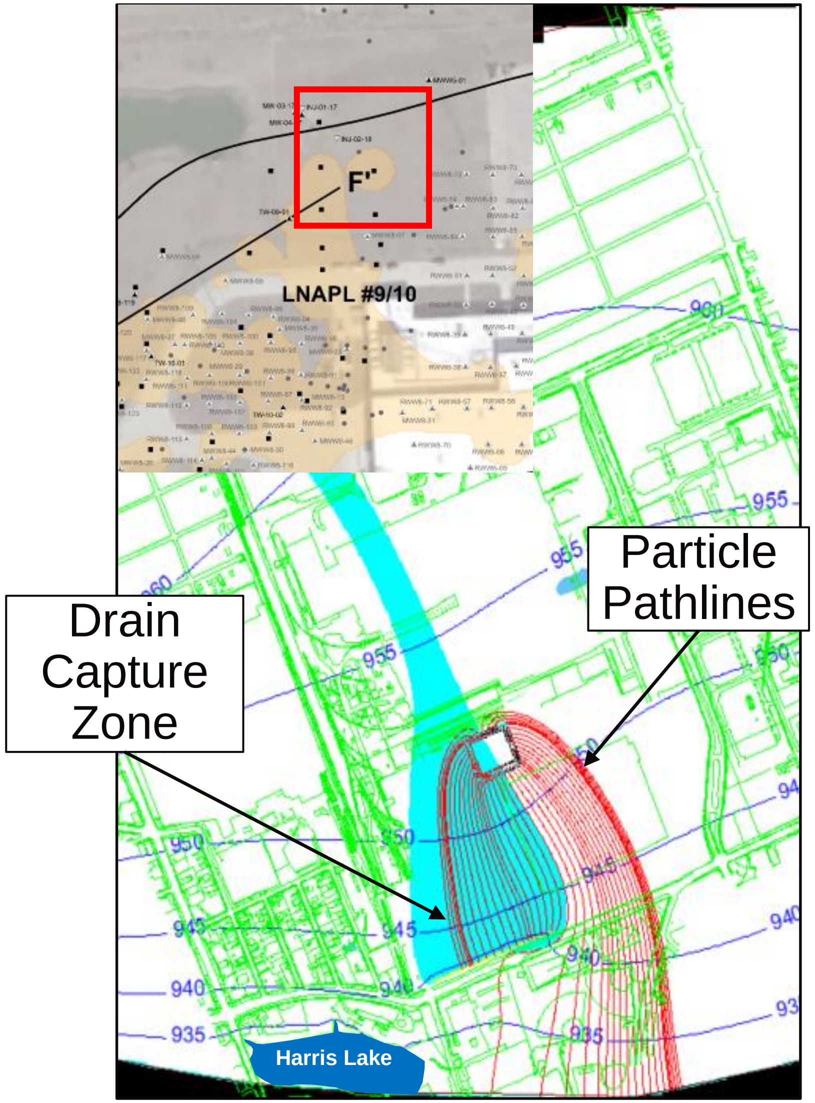
Observations:

- Proximity of infiltration location limits extent of hydraulic capture
- A small portion of the injected water on the west side is potentially not captured by the drain
- Current discharge is outside of LNAPL area

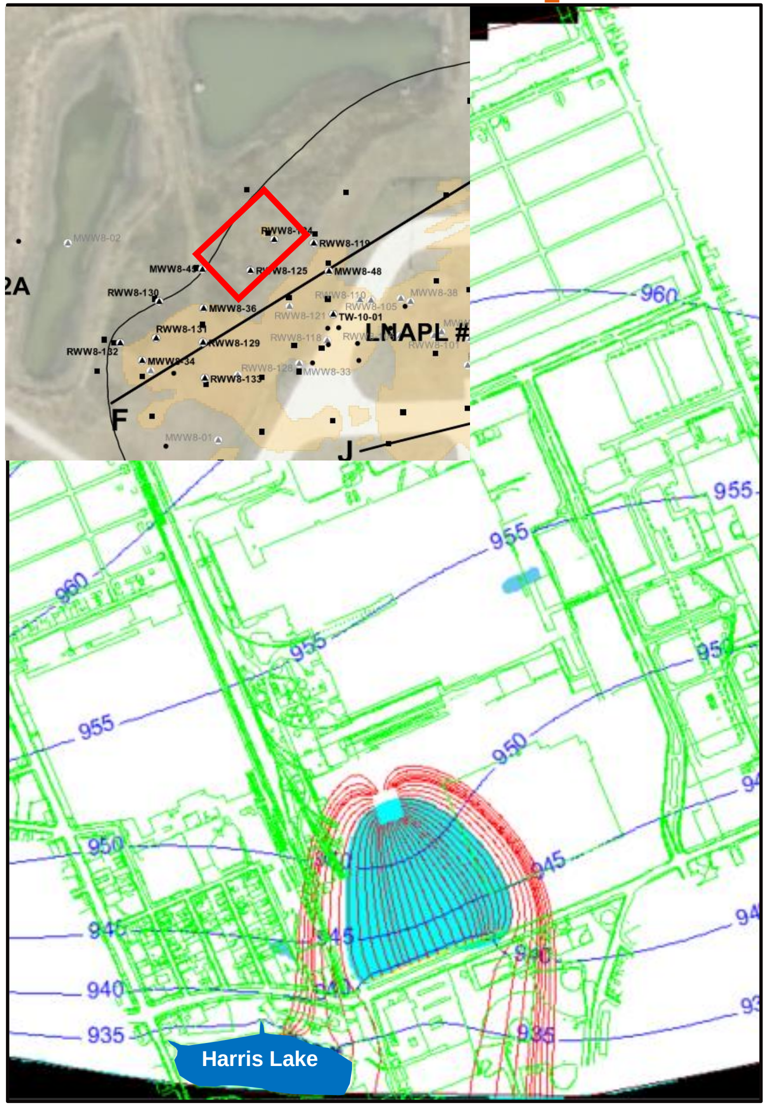




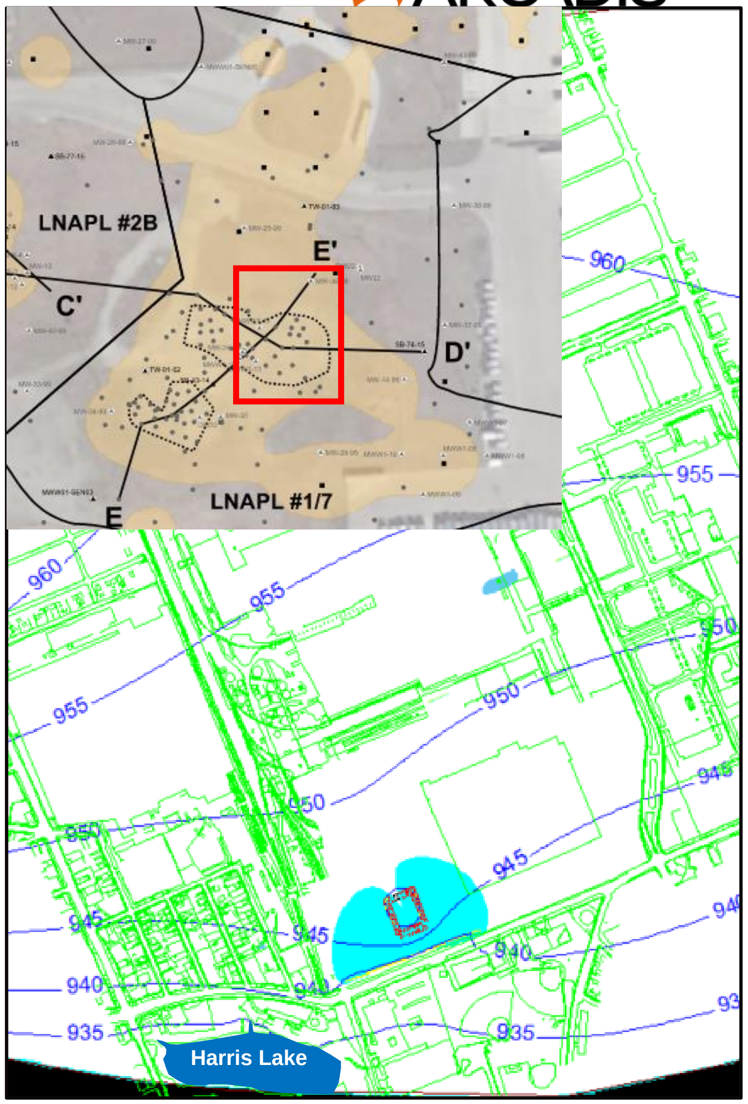
Alternate Infiltration Area Options



Current Injection Well Location



South of Stormwater Ponds



Centered on Drain

Groundwater Modeling Conclusions

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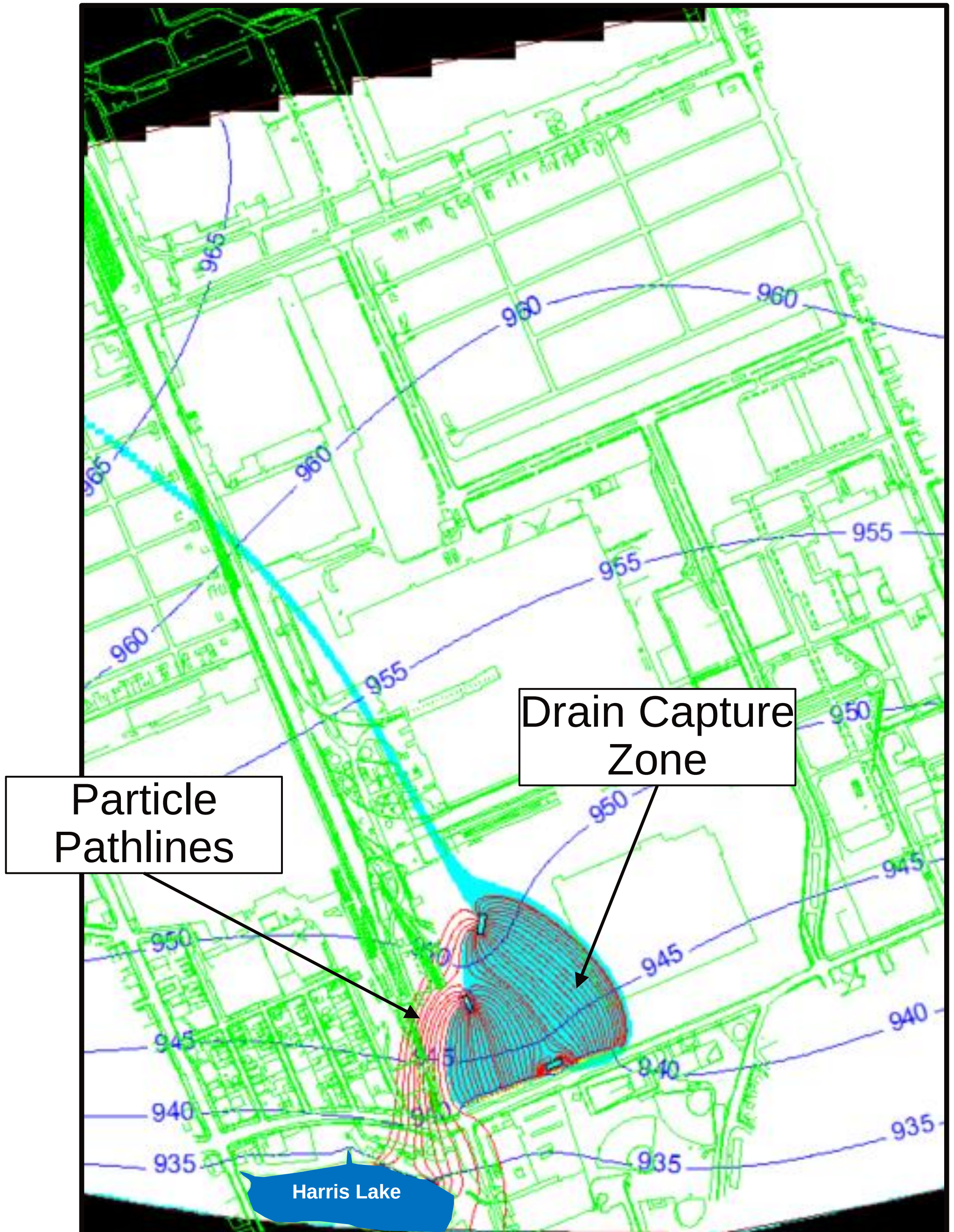
- Infiltration areas are ideally located in-line with the central portion of the drain in order to maximize capture of water at the toe drain

- Infiltration areas are ideally located closer to the drain in order to maximize capture of water at the toe drain. Moving the infiltration area further north away from the drain allows ambient recharge in the area reducing capture of the infiltrated water

- Potential infiltration area are limited due to the observed LNAPL distribution, presence of sewer lines, and Site operations/infrastructure

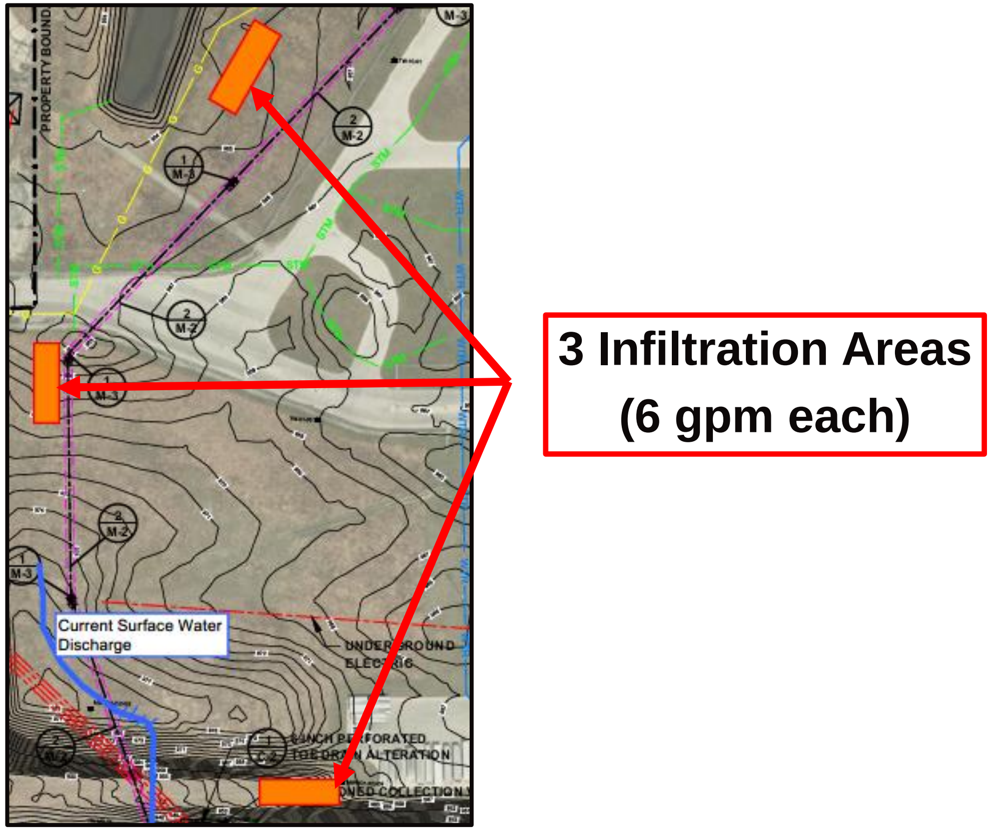
- Splitting the discharge amongst multiple locations decreases mounding and therefore minimizes the potential impact on LNAPL

3 Recharge Basin Scenario



3 Infiltration Area Scenario

- 18 gpm split evenly over 3 upgradient infiltration areas

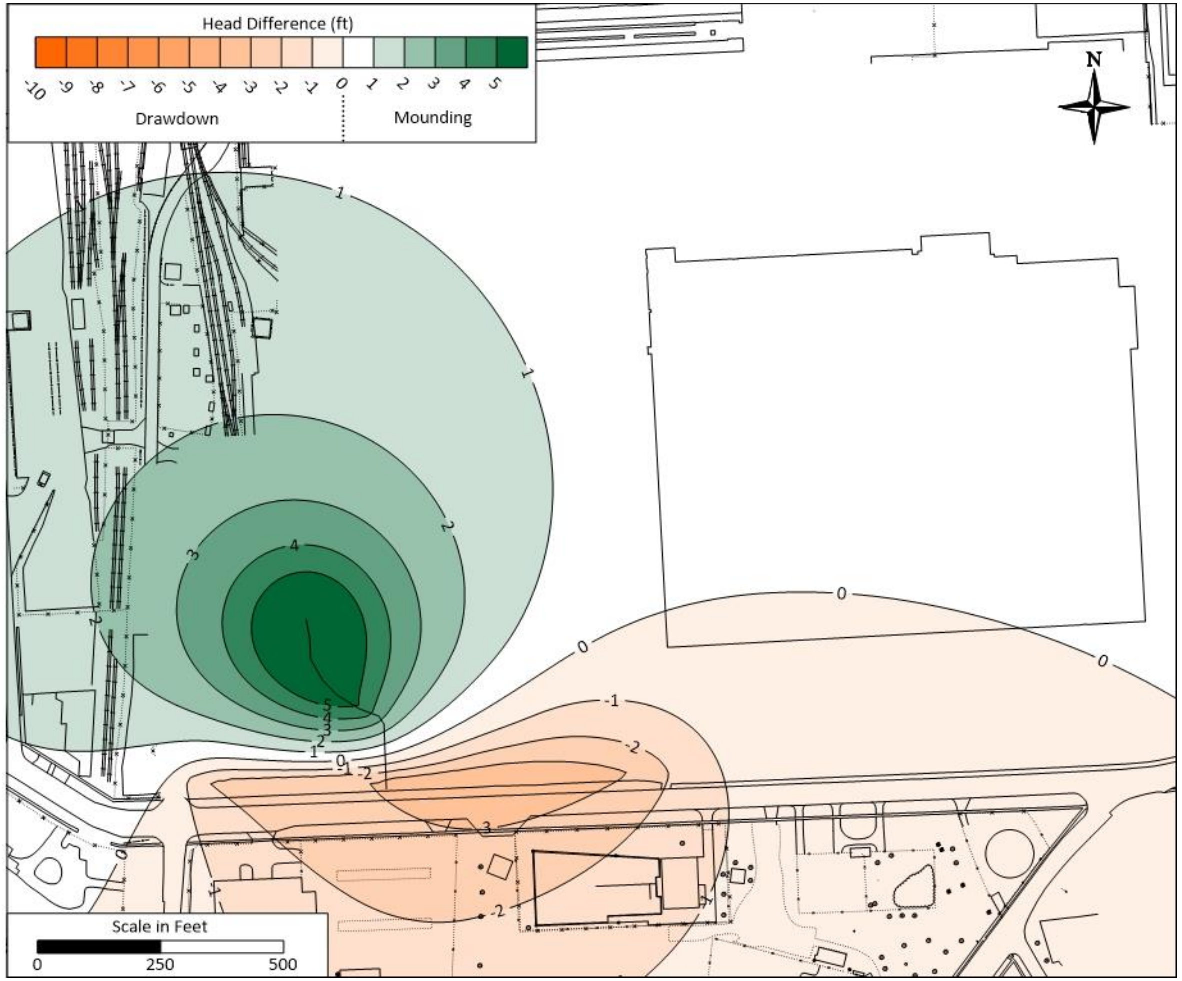


Observations:

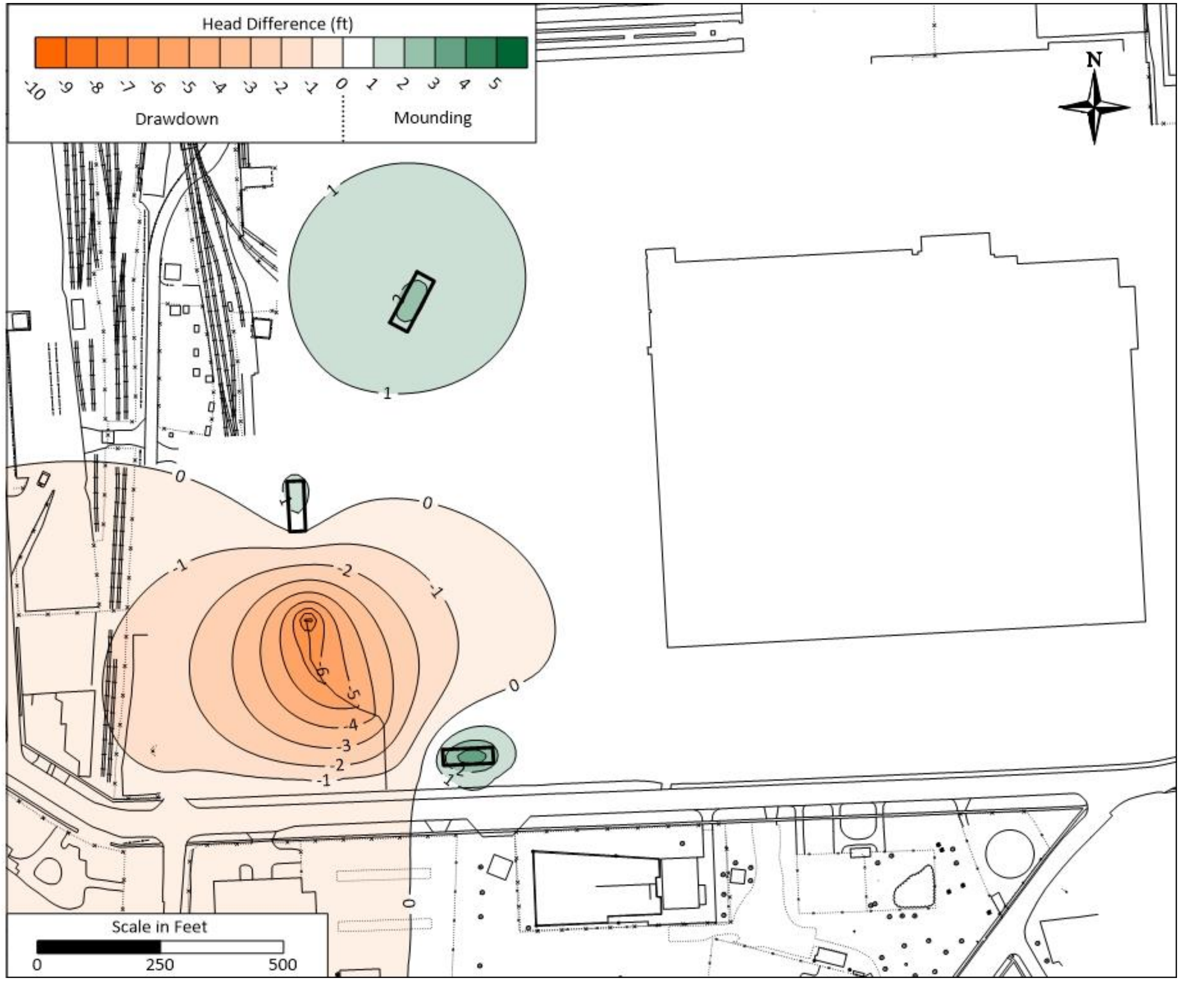
- Hydraulic capture zone extends to northernmost basin
- Portions of northernmost and westernmost infiltrations areas are not hydraulically controlled by the drain
- No surficial flooding occurs

Simulated Mounding

ARCADIS



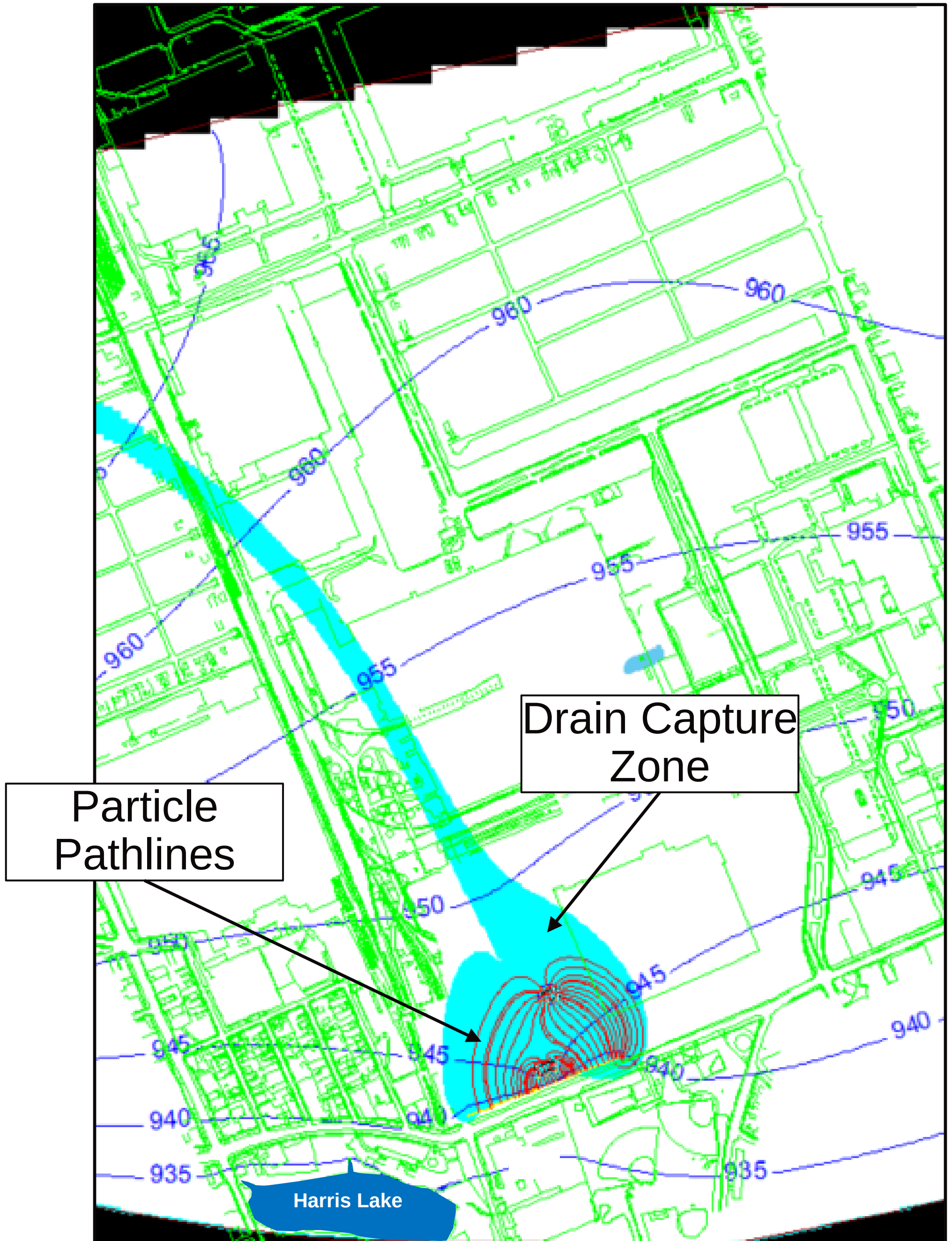
Current Conditions minus Ambient Conditions



3 Infiltrations Areas Scenario minus Current Conditions

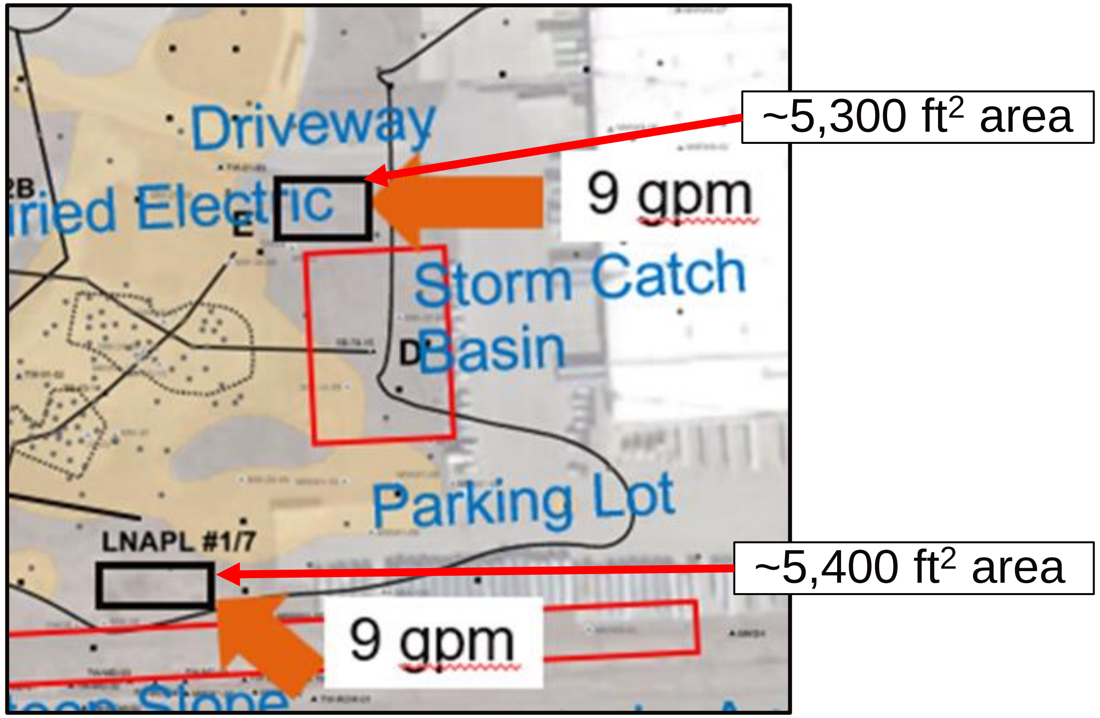
Splitting groundwater discharge amongst multiple locations minimizes magnitude of mounding

2 Infiltration Area Scenario



2 Recharge Basin Scenario

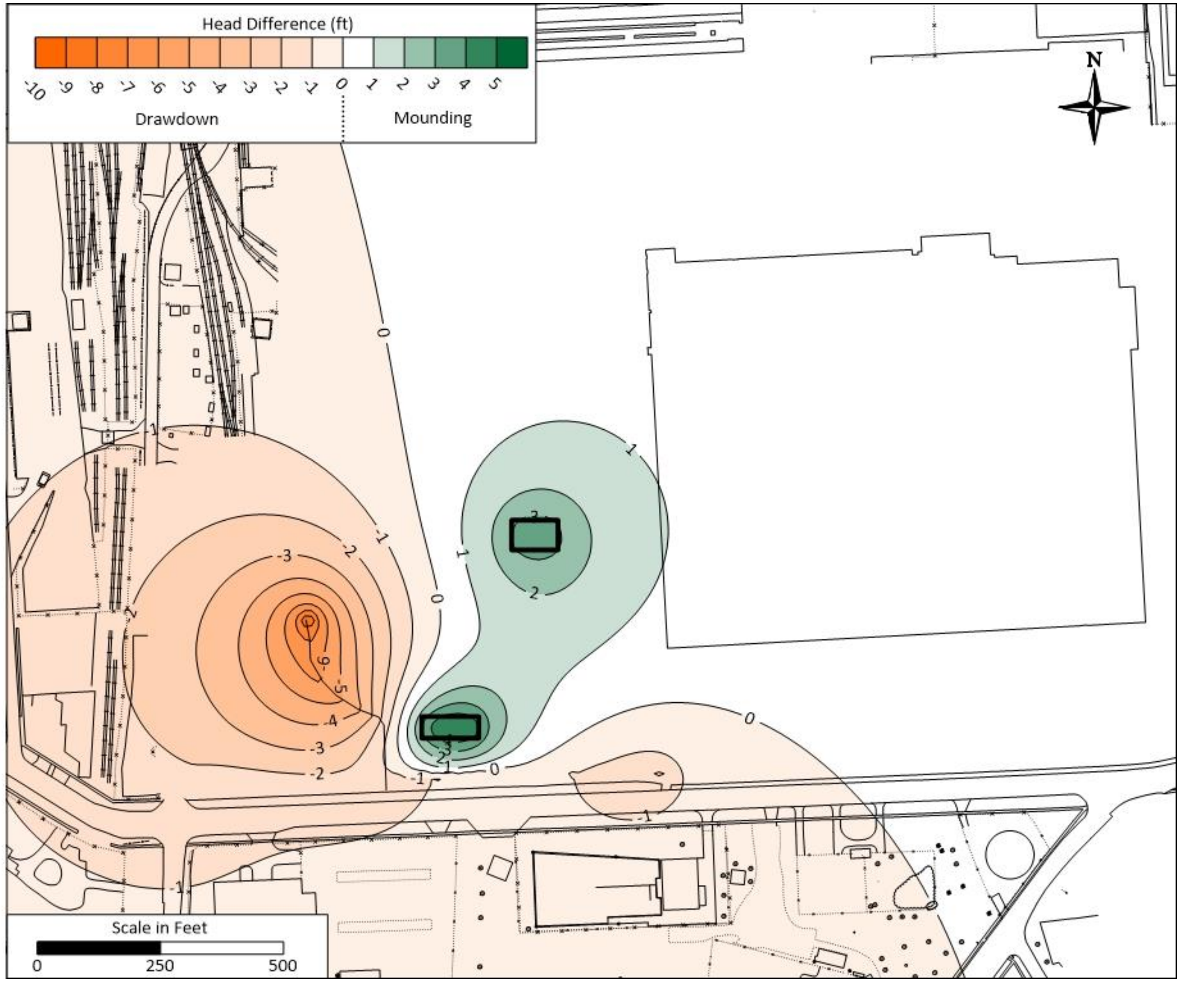
- 18 gpm split evenly over 2 infiltration areas



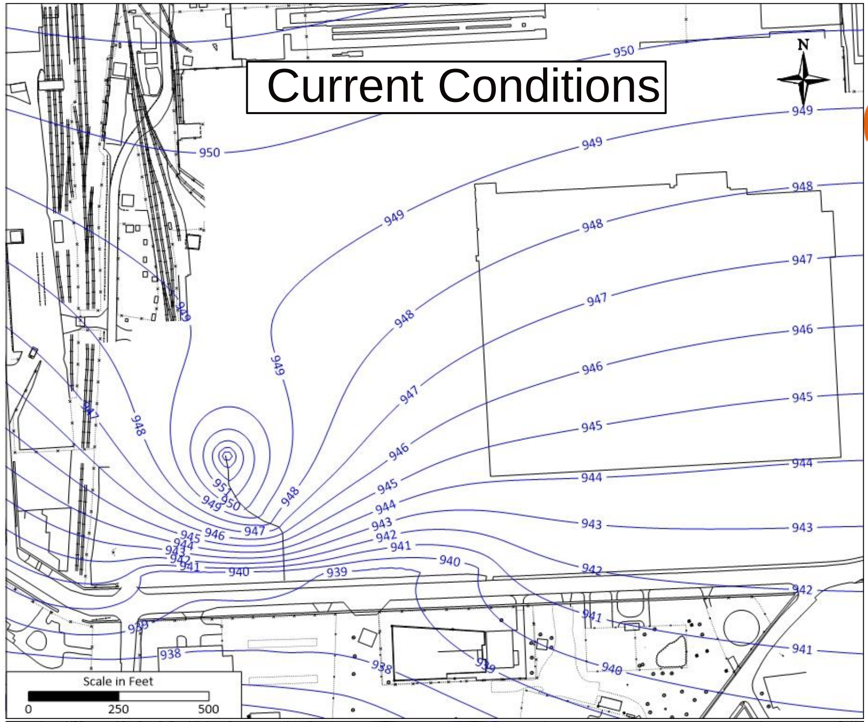
Observations:

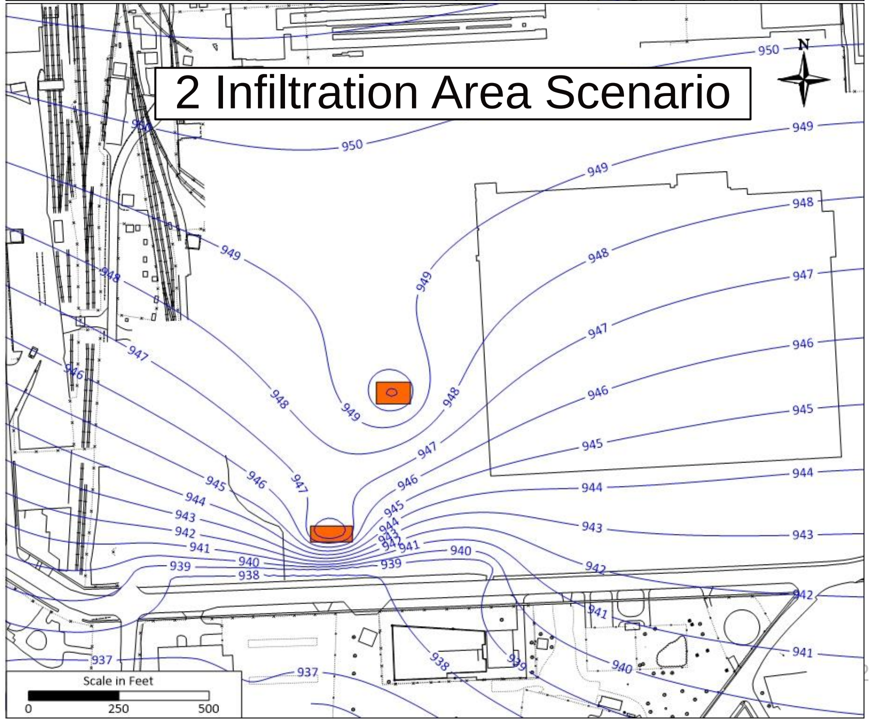
- Hydraulic capture zone extends to northernmost basin
- Both infiltration areas are fully hydraulically controlled by the drain
- No surficial flooding occurs

Simulated Mounding



2 Infiltration Area Scenario minus Current Conditions





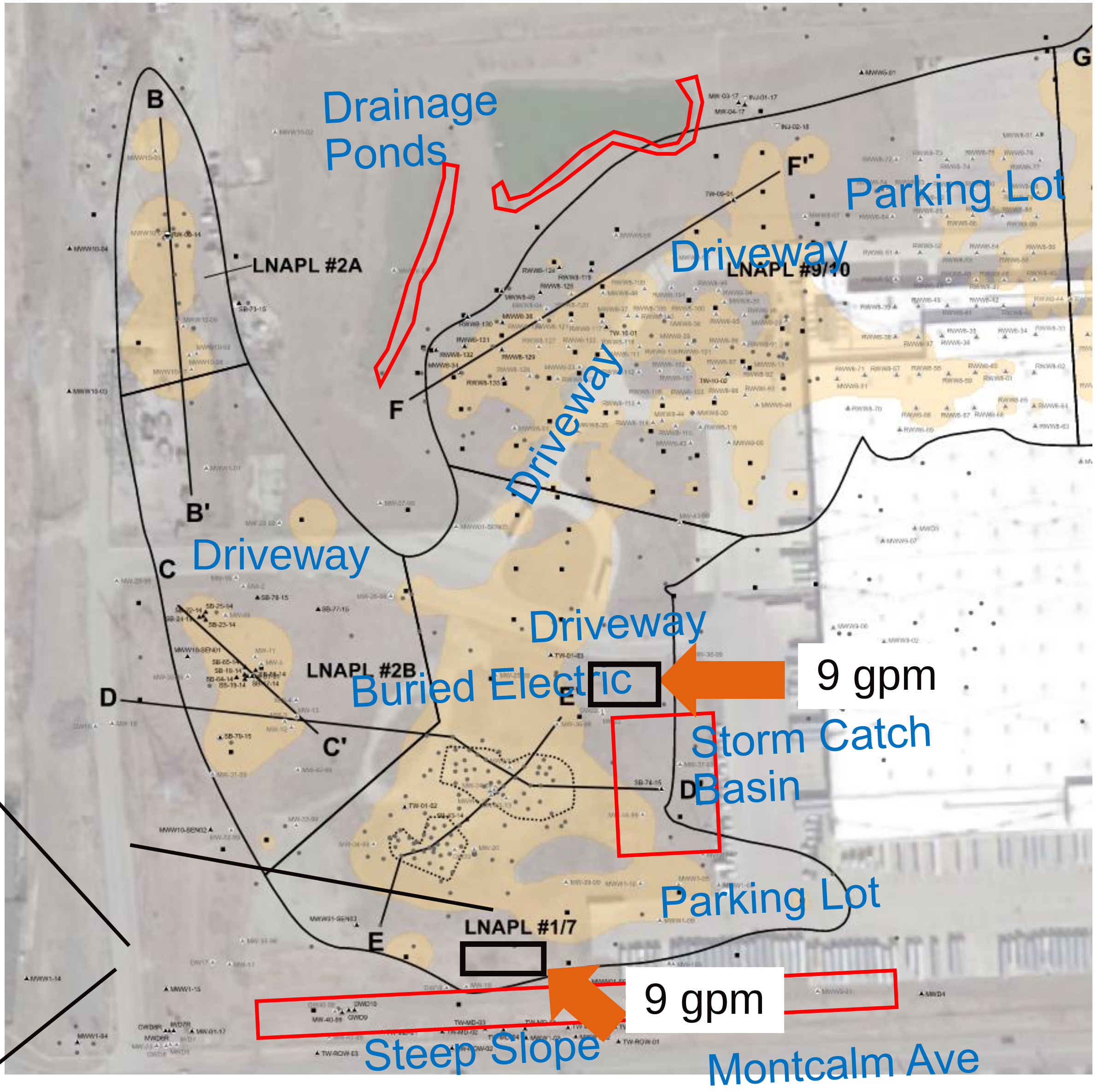
Updated Full Scale Option Summary Review

Improved Direct Discharge

- Continue direct ground surface discharge of sump water; discontinue injection wells
- Revise piping (hoses) to split flow between two locations placed to maintain hydraulic control and minimize impact to LNAPL body
- Monitor ground surface for evidence of runoff and/or erosion, and implement improvements if necessary

- **Capital Cost: $100K**
- **Annual OMM Cost Adder: $0**
- **Effective, cost-efficient method of managing seeps**

Montcalm Sump



Potential Direct Ground Surface Discharge Improvements

- Monitor revised surface discharge for evidence of erosion and/or runoff
- If necessary, implement ground surface improvements

Berm

Sand bags

Rip Rap

Geotextile Apron

Cost Summary and Recommendation

Costs ± 30-50%	1 – No Change	1A –No Change Optimized	2 – Pond	3 –Pretreatment Only (no PFAS treatment, Infiltration gallery)	4 – Pre-treatment + GAC (Infiltration Gallery, POTW, or NDPES Discharge)	5 – Sheet Pile Wall
Pilot Cost	$0	$0	$20K	$10K	$500K	$0
Capital Cost	$0	$100K	$900K	$530K - $1.6M Settling only - Filter press	$675K - $1.8M Settling only - Filter press	$4.1M
Annual OM Cost	$105K	$105K	$130K	$360K - $210K Settling only - Filter press	$463K – $270K Settling only - Filter press POTW Infiltration	$201K first 2 years $20K thereafter
Lifecycle Cost (30 years)	$3.2M	$3.3M	$4.8M	$11.3M - $7.8M Settling only - Filter press	$15.1M - $10.4M Settling only - Filter press POTW Infiltration	$4.7M
Cost Uncertainties	None – currently successful in managing the seep	• Ability of new locations to infiltrate surface discharge	• Ability of soil to accept water from infiltration pond • Assumes disposal of soils to install pond • Onsite land application of dredged material, if disposal is required, significant increase in O&M costs	• Ability of infiltration gallery to accept water (affects sizing/ maintenance) • Potential need for additional pre-treatment • Solids generation rate ($10K - $215K/yr)	• Carbon change out frequency (assumes quarterly) • Potential need for additional pre-treatment (beyond aeration and MMF) or addition of resin (assumes none) • Solids generation rate	• Overall effectiveness in prevention of seeps – No pilot testing can be done to confirm objective will be met prior to capital investment, hydraulic studies could be done to further refine GW model • How long seep system will need to operate before mitigating the seep (assumes 2 yrs)

Next Steps

- Finalize hose placement optimization
- Assess information to evaluate infiltration potential (i.e. boring logs in the vicinity)
- Relocate the sump water discharge hose to the proposed discharge locations
- Routine operation and maintenance inspections and water level gauging will continue
- Groundwater model could be re-run after 6 to 9 months of operation with new configuration water level and flow data
- Next sump chemistry sample collection is scheduled for Fall 2024

Montcalm Seep Follow Up

Review EPA Questions

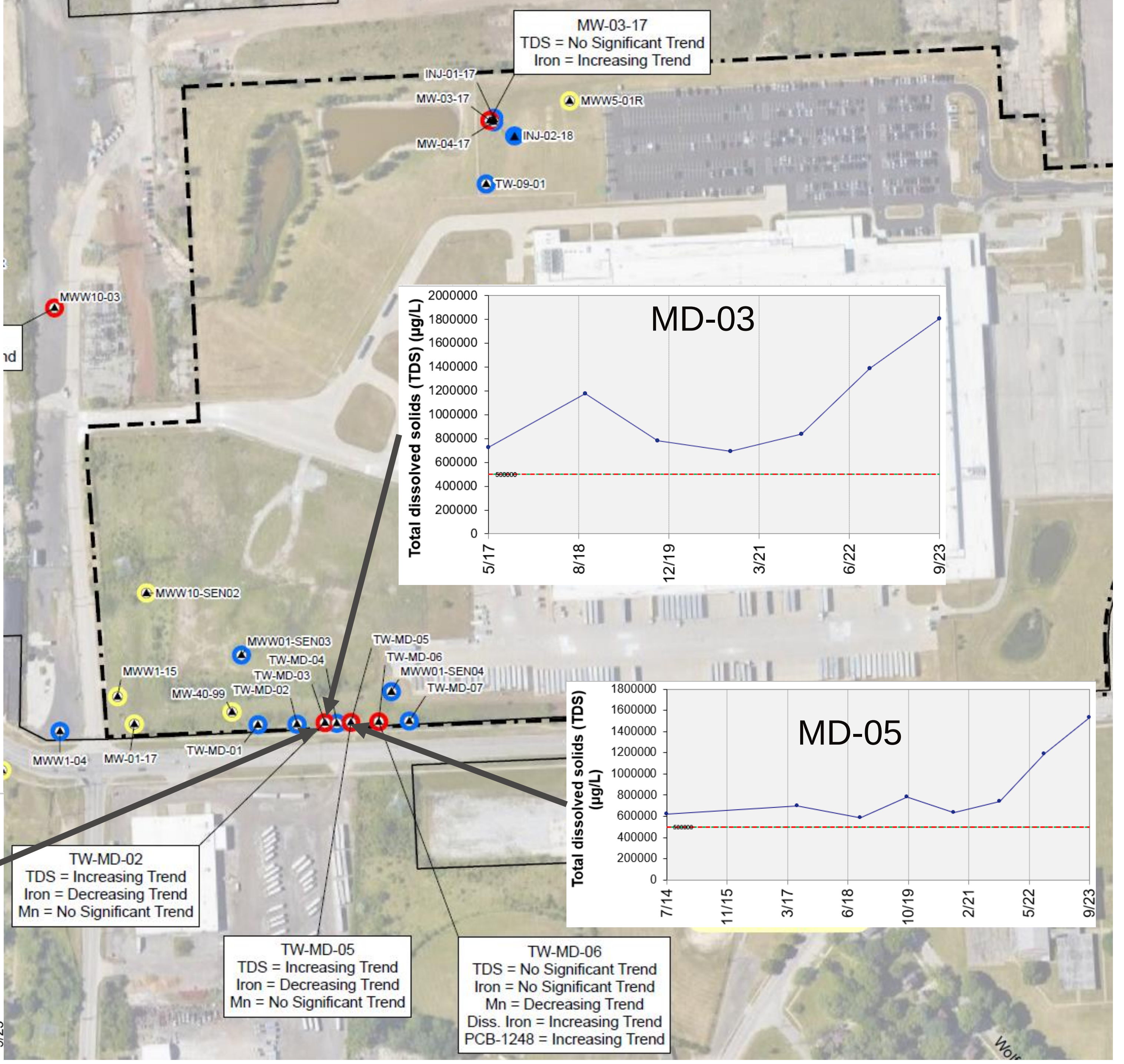
August 14, 2024

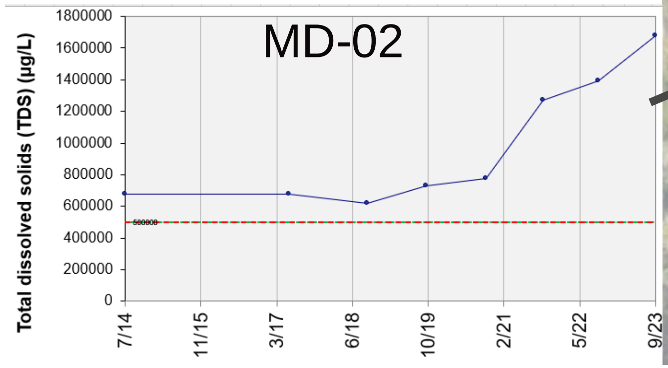
The cost estimates focus on a 30-year time period to implement O&M, but realistically a pumping remedy will need to continue indefinitely. How does the financial evaluation change if a 50 or 75 year O&M timeframe is considered?

- Total cost will increase for each additional year added to the timeframe
- NPV was not taken into consideration for this evaluation
- Note - current PNC budget is only projected until 2038 – 14 more yrs

Has the team evaluated whether the recirculation of water could be contributing to the increase in TDS concentrations?

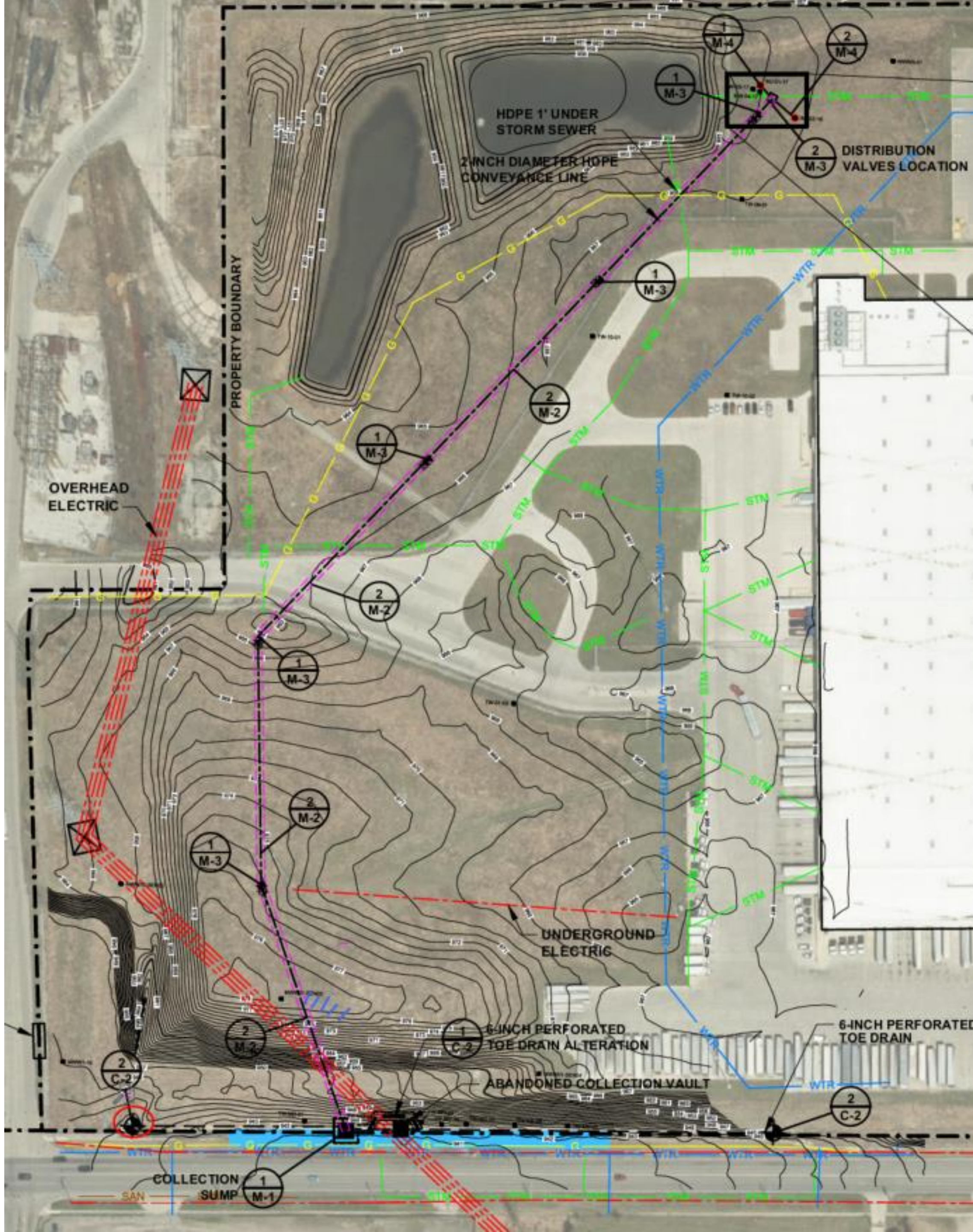
- Road salting on Montcalm adjacent to the toe drain and fill are likely contributors to TDS
- Seep system started up in 2019
- Increasing TDS trend in 2020/2021 could be correlated to recirculation





Are there any other hydraulic options that could be considered that would have less O&M such as a pond that intercepts the shallow groundwater and prevents migration above the elevation of the sidewalk/street? Or options other than sheet pile to divert and potentially treat in situ?

- Any surface water feature (pond, swale, etc.) would need to be located near the toe drain. GW would be too deep up on the hill. Surface water feature would collect/intercept groundwater – but the collected water would need to be removed in some way or equilibrium would be re-established and the seep would begin again
- For re-diversion, installation on top of the hill is required for the hydraulics to work. Based on depths – sheet pile is the easiest and most economical way to install a low K barrier.
- Soil/cement barriers (or similar) installed with excavators or augers would be difficult to install with the depth of GW and through fill material.
- Trap and treat / in-situ carbon was considered but screened out (discussed on next slide)



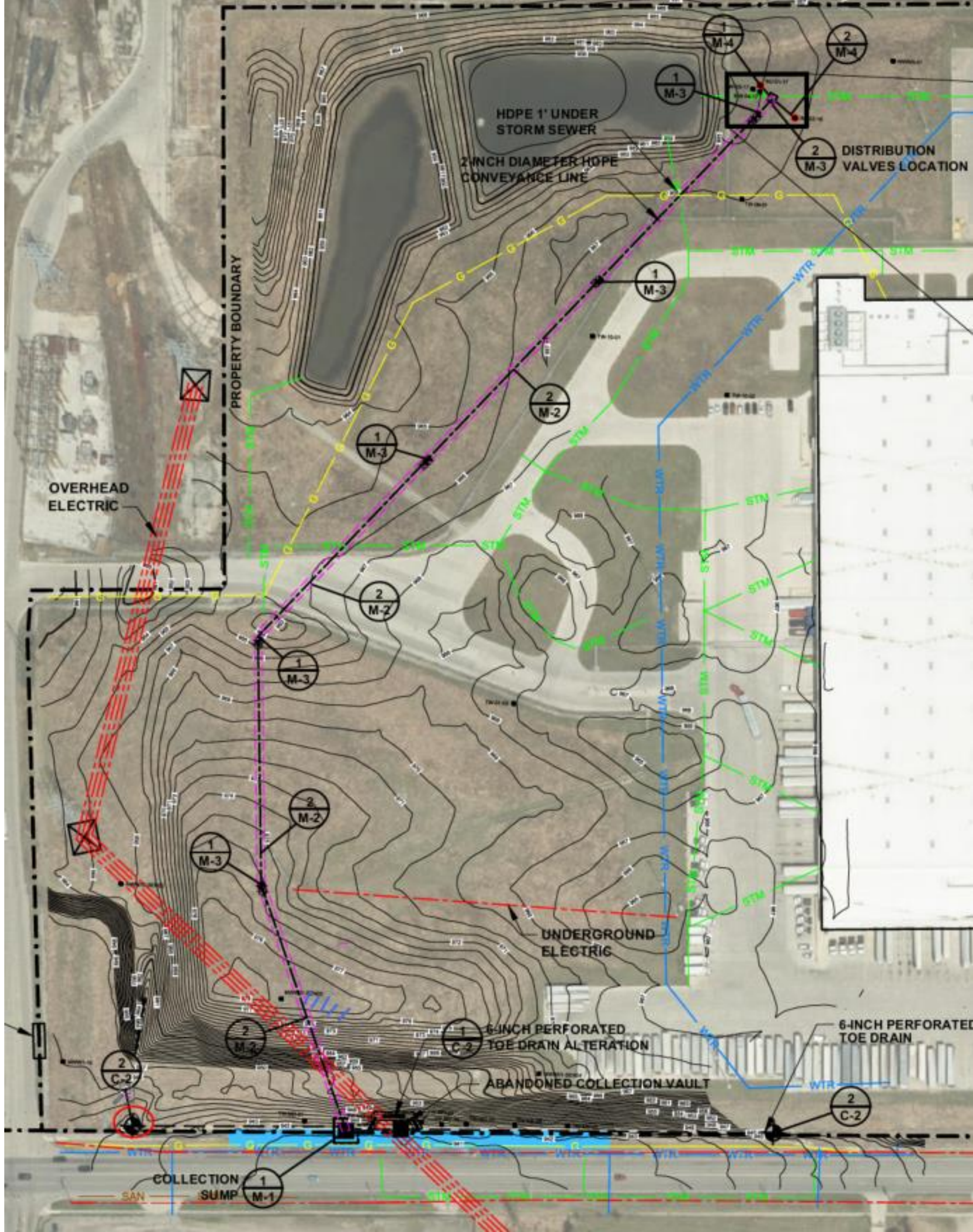
ARCADIS

It appears RACER considered use of PRBs earlier in the process and screened out this option. Can the team provide more detail about why this option was screened out? Could it possibly be used in combination with a hydraulic option?

- Trap and treat / In-situ carbon was screened out for the following reasons:
  - Does not manage the seep – all existing pumping infrastructure would need to be operated and maintained
  - Injection/distribution of carbon a permeable sand 25-30 feet in depth will be difficult and not likely provide a robust treatment barrier (surfacing, not radial distribution, gaps would be expected – as seen in the ZVI injection at Fiero).
  - Trenching in a barrier would be costly and difficult with the depth of fill materials to get through
  - Carbon barriers for PFAS treatment have a finite lifespan and will be required to be monitored and re-installed once breakthrough is observed
  - Fouling of media is a concern based on the Site GW conditions

The proposed option of discharge through a hose across the ground may have challenges with durability over the decades of treatment that will be required. As part of enhancement of this approach, what options could be implemented to improve the durability of the discharge?

- Depending on the final discharge location(s), the existing subgrade piping could be used to get the water up to the surface discharge location.
- Surface discharge hosing can be easily/quickly swapped out as needed.
- In the past 5 years – we've had no issues with the current piping/hoses.
- Grading, berming, etc. can be completed in the area of surface discharge to improve aesthetics and better define the surface infiltration area.



Has the team considered whether surface discharge will lead to concentration of the contaminants in the soil?

- In the sump water, the only detected COC above any criteria is PFAS
- Any sorption of PFAS to soil would be limited to organics in soil – no different than in-situ carbon
- Exposure to soils is managed with the DRCs

Based on climate models and history of water levels at the facility, can we expect groundwater elevations to increase over time? If so, how does this impact the current solution?

- There is the potential for more water to enter the system over time, generally the pumps are able to handle higher flow rates than currently pumping so it could be managed.
- Could evaluate water level trends in monitoring reports to keep tabs on trends over time.

Are there any opportunities to include green remediation and/or green infrastructure in the remedy (lower energy use, climate resilient)?

- Phytoremediation can be considered to uptake water during the growing season to remove it from the system altogether, to supplement the existing system.
  - Down by the toe drain, roots could uptake direct from the groundwater
  - Up on hill, could minimize the volume of water infiltrating
- While phytoremediation is a “green” remediation technology, it does still require O&M (i.e.$$)

Preliminary Draft – For Discussion Purposes Only

ARCADIS

USEPA Update Meeting

RACER Pontiac North Campus

May 2, 2025

Montcalm Seep Update

April 1 Follow Up Items

- Evaluate the lifetime infiltration capacity of the soils for surface application of water
    - ➢ Will be difficult to model/predict, but can be easily managed with O&M. Rototill / scarify surface, as needed, to maintain infiltration capacity over time
- For the sheet pile wall alternative – consider if moving the wall further upgradient would be beneficial
    - ➢ The sheet pile wall needs to be as close to the seep as possible. The further upgradient / further from the seep the wall is, the more likely the groundwater elevation will rise behind the wall and increase the likelihood of a seep
- Consider the potential for sheet flow during storm events and the potential for the surface discharge to become runoff
    - ➢ Can be managed with O&M and surface improvements, as needed (i.e berms)

April 1 Follow Up Items

- Consider evaluation of an option using treatment mats (i.e. GAC or other passive media) that could be placed on the ground where the water is discharged to the surface
  - Reactive mats (ie GAC, Fluorosorb) have been deployed in applications where groundwater is discharging to surface water.
  - Plugging of the media in the mats is a challenge – reduces permeability and treatment capacity.
  - Based on PNC groundwater chemistry, we would expect plugging issues



April 1 Follow Up Items

- Confirm the existing stormwater ponds are lined (or underlain ty low permeability materials) and that the groundwater model appropriately accounts for this
  - Documentation of pond construction has not been located, field inspection does not indicate plastic/poly liner. Could be clay lined.
  - Ponds constantly have water, meaning they are less permeable than surrounding area.
  - Model is currently set up assuming that recharge from the ponds is equal to the surrounding area
  - Model is over estimating the amount of recharge, making our modeled scenarios conservative
- Evaluate foam fractionation (or similar technology) for PFAS treatment since it may not need as robust pre-treatment requirements
  - Can run this evaluation, will be much more costly than recommended option, potentially slightly less costly than the other treatment options.

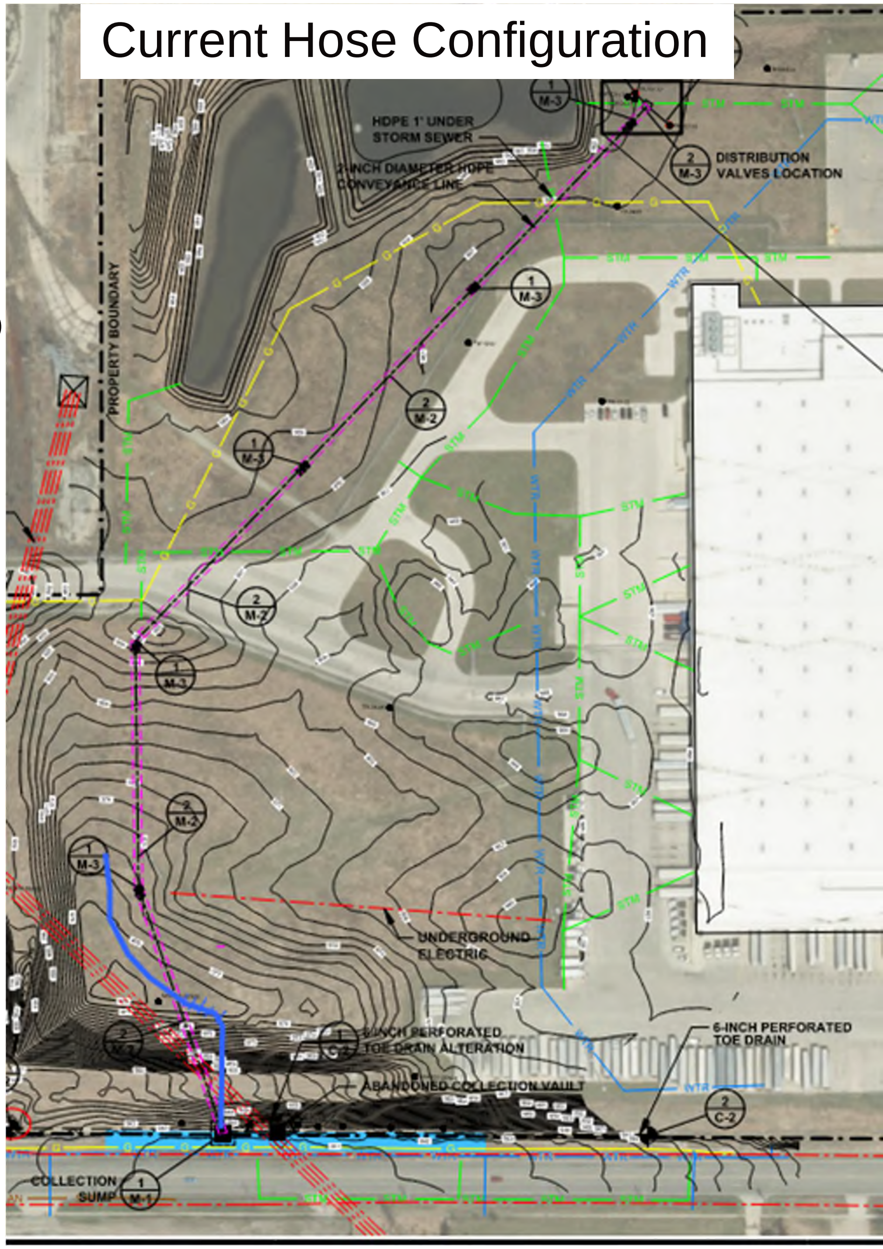
Path Forward

ARCADIS

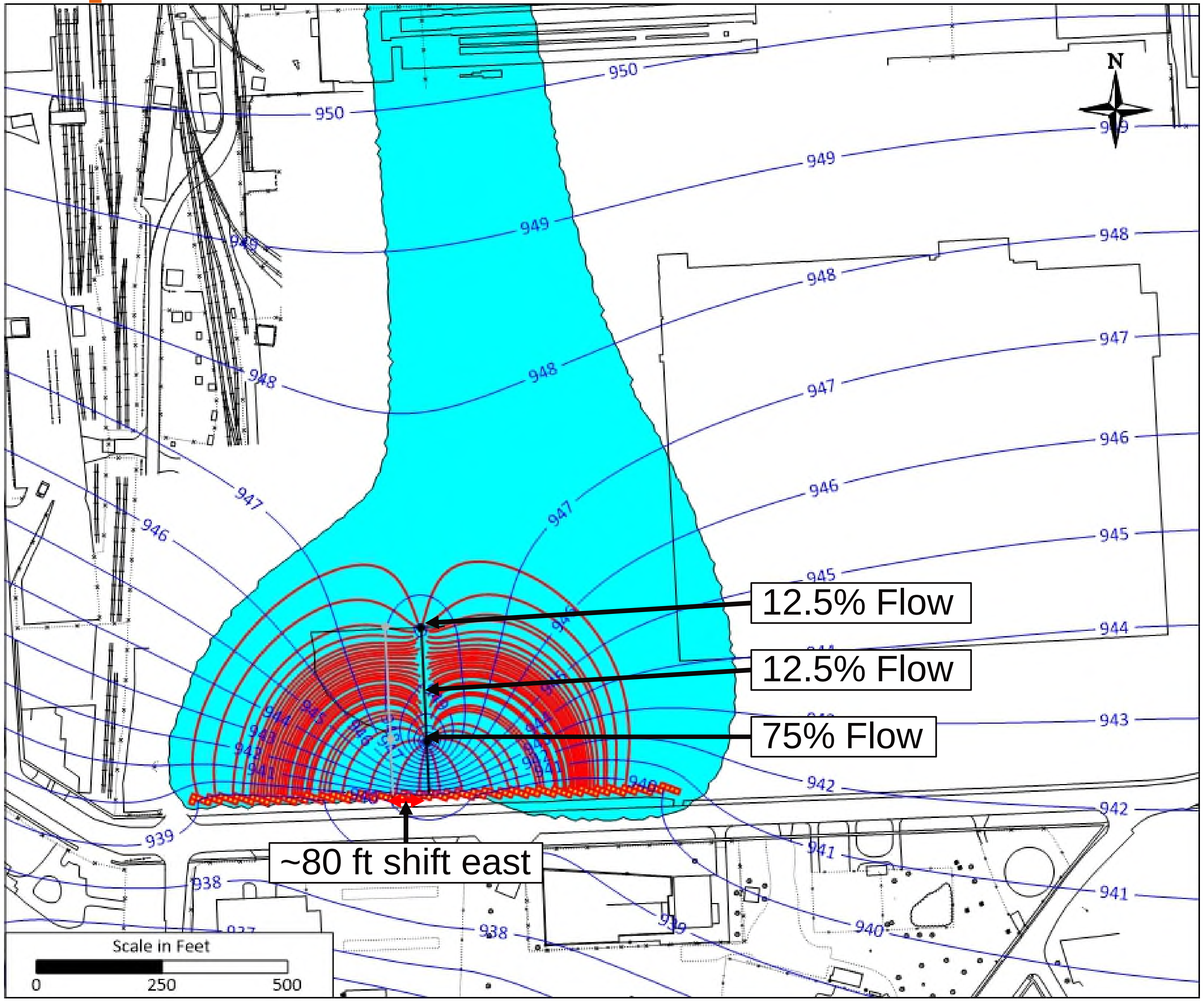
Objective: Mitigate seeps along Montcalm Avenue in a protective and sustainable manner

- Remedy screening conclusion:
  - Direct ground surface discharge (As-is option) is the most cost-effective option to mitigate the Montcalm Street seeps that is protective and sustainable.
  - Treating water has high additional costs which are not justified because they do not meaningfully improve the performance outcome relative to risk, and do not fit within site budget, or fit with funding prioritization
- Optimize current hose placement to maximize capture ASAP (in May) as an immediate measure and allow time and further EPA evaluation and/or further optimization of the surface discharge
  - Completed modeling scenarios to identify options for hose reconfiguration for complete capture of surface applied water
  - Identified multiple scenarios that could quickly/easily be implemented – actual orientation will depend on field conditions
  - Following changes to hose configuration, inspections will be conducted to ensure no runoff and that water in infiltrating:
    - 2-3 times within the week following the changes
    - Following precipitation events for the first month.

Current Hose Configuration



Option 1



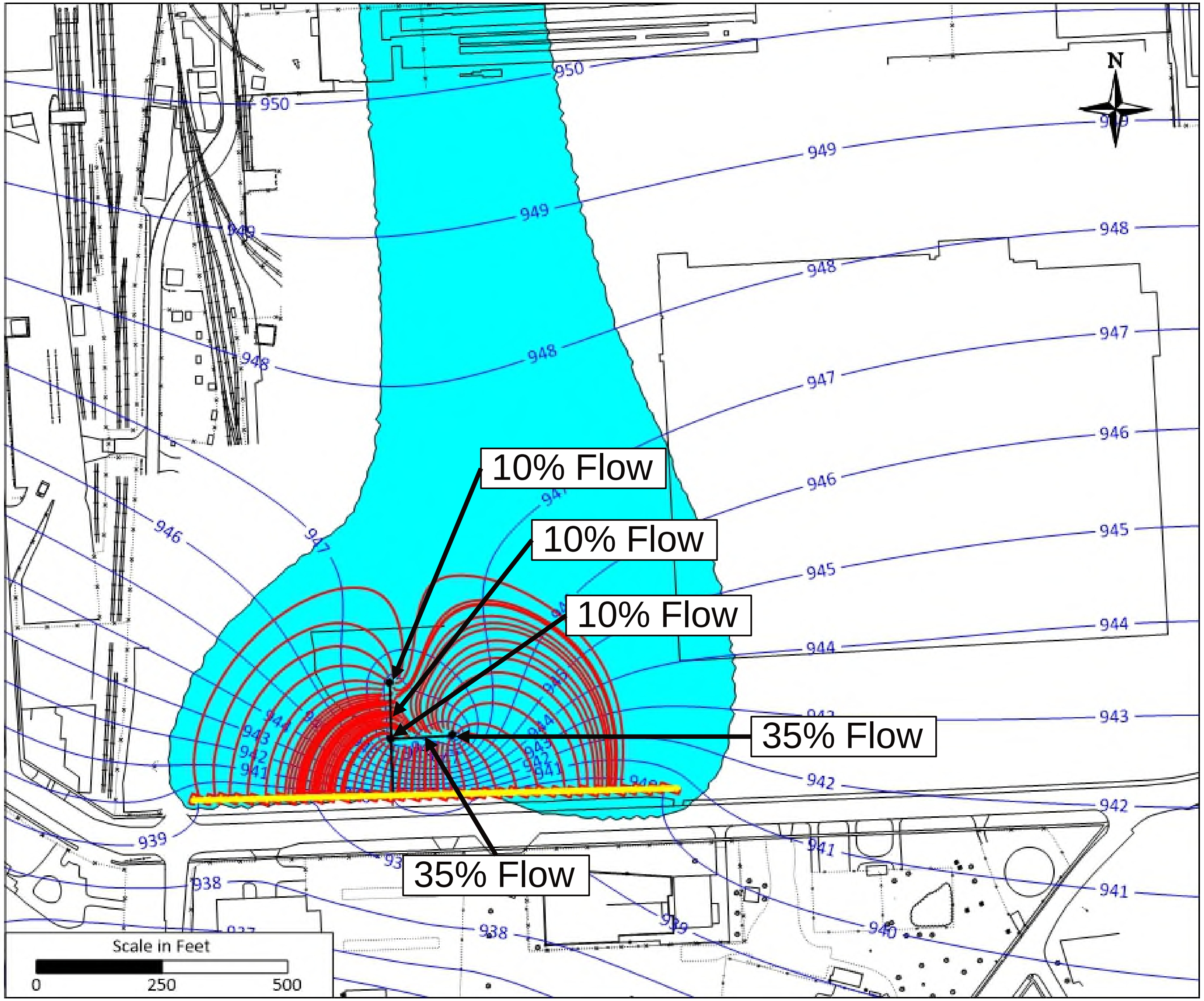
Option 1

- Injection line shifted ~80 ft to East
- 15 gpm Injected:
  - 75% of flow at “T” junction
  - 12.5% of flow along perforated pipe
  - 12.5% of flow at end of pipe

Observations:

- Pathlines indicate full hydraulic control of injected water

Option 2



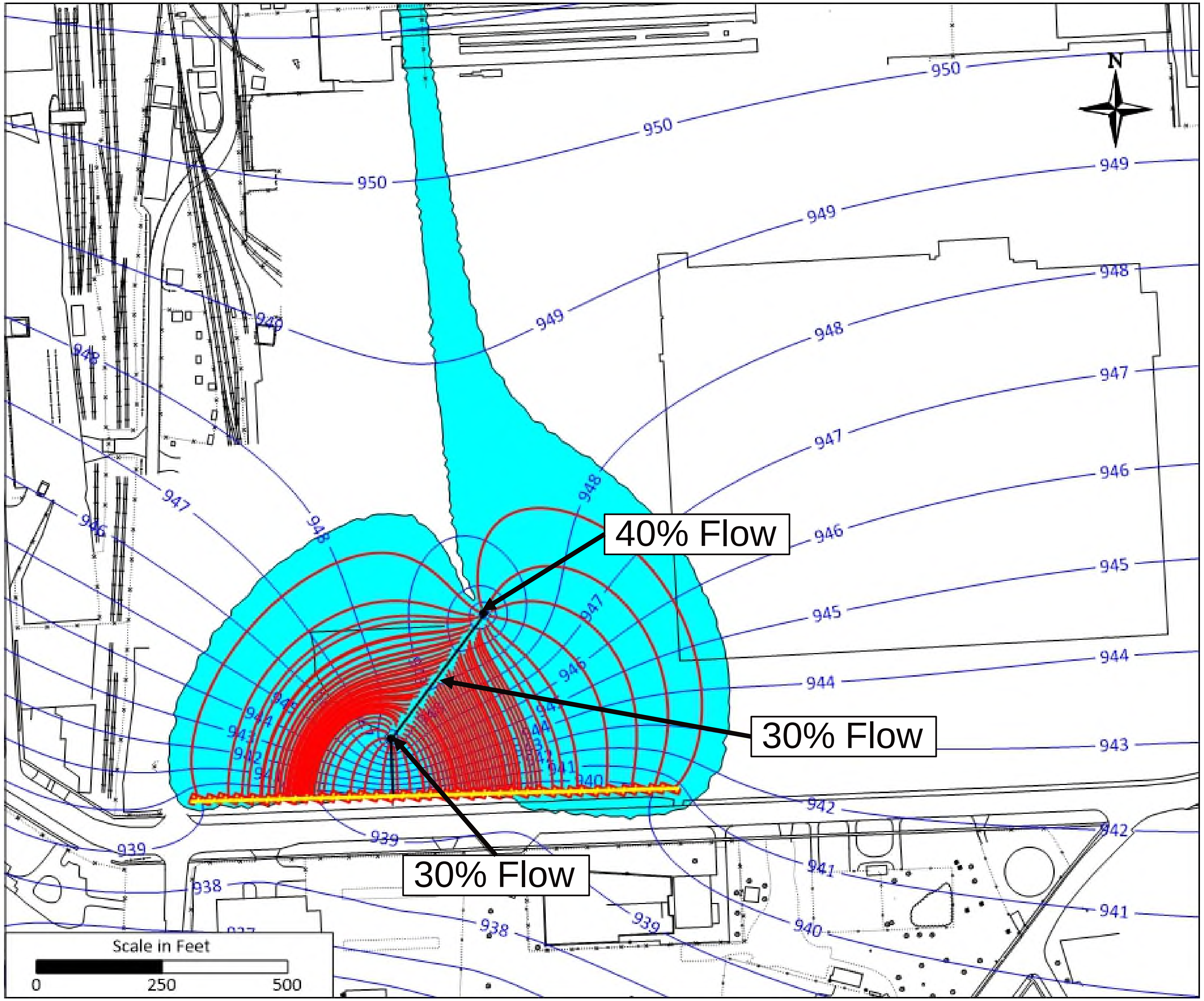
Option 2

- Injection line split ~120 ft to east and northern injection line reduced to ~100 ft
- 15 gpm Injected:
  - 10% of flow at "T" junction
  - 10% of flow along northern perforated pipe
  - 10% of flow at northern end of pipe
  - 35% of flow along eastern perforated pipe
  - 35% of flow at eastern end of pipe

Observations:

- Pathlines indicate full hydraulic control of injected water

Option 3



Option 3

- Injection line shifted to the northeast approximately 180 ft (perforated pipe ~300 ft long)
- 15 gpm Injected:
  - 30% of flow at “T” junction
  - 30% of flow along northeastern perforated pipe
  - 40% of flow at northeastern end of pipe

Observations:

- Pathlines indicate full hydraulic control of injected water

Path Forward

May 2025

- Completion of 2024 Annual Inspection Report
- Submittal of 2024 Annual Groundwater Report
- Complete USEPA Approved additional RCRA investigation SOW – currently scheduled for May 19th week
- Complete hose optimization for Montcalm Seep

June 2025

- Submittal of 2024 Annual Inspection Report
- Well Repairs for Monitoring Wells utilized in monitoring programs
- Submittal of Updated GMP

Suggestion should we move meetings to bi-monthly?

Attachment 2

Hose Relocation Photo Log

Photograph Log

RACER
Pontiac North Campus (PNC)
30267726

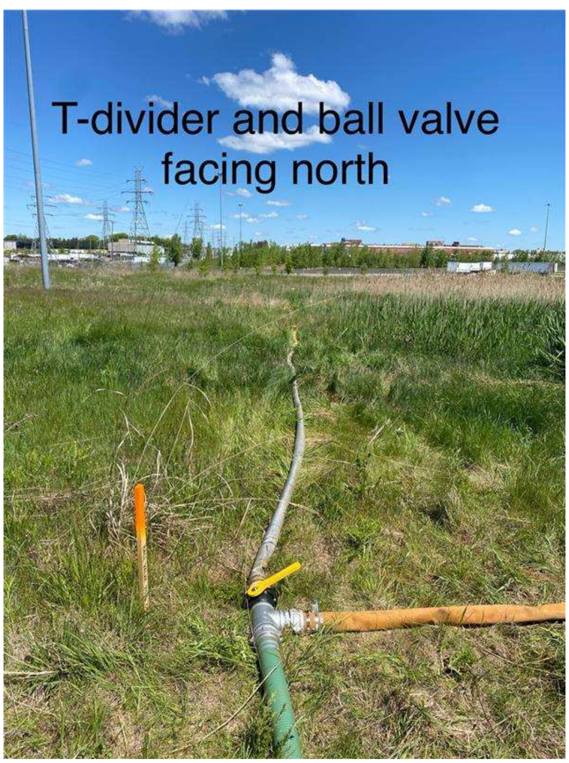
Photograph: 1

Description:
Hose placement bucket test location

Location:
Top of hill north of sump

Photograph taken by:
Kent Kasper

Date: 5/26/2025



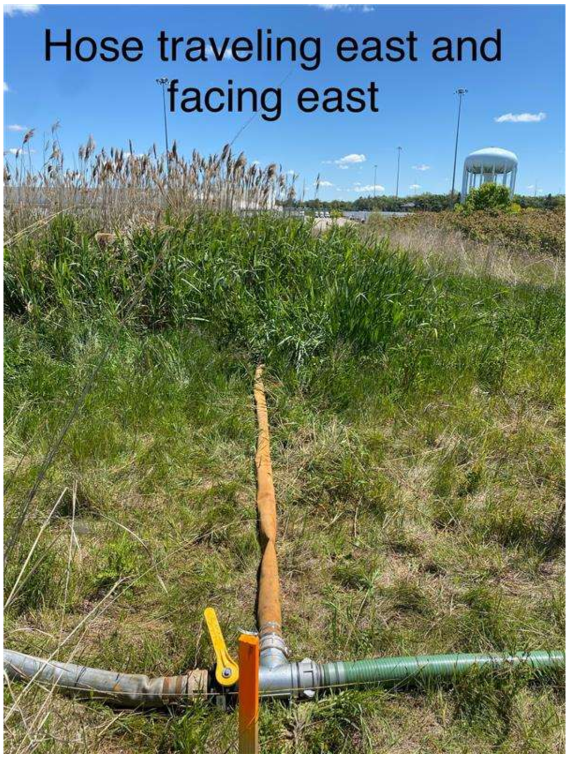
Photograph: 2

Description:
Hose placement T-divider facing north

Location:
Top of hill north of sump

Photograph taken by:
Kent Kasper

Date: 5/26/2025



Photograph: 3

Description:
Hose placement T-divider facing east

Location:
Top of hill north of sump

Photograph taken by:
Kent Kasper

Date: 5/26/2025

Photograph: 4

Description:
Hose placement T-divider facing south

Location:
Top of hill north of sump

Photograph taken by:
Kent Kasper

Date: 5/26/2025

Photograph Log

RACER
Pontiac North Campus (PNC)
30267726

Photograph: 5

Description:
North hose placement standing water

Location:
North of T-divider

Photograph taken by:
Kent Kasper

Date: 5/26/2025

Photograph: 6

Description:
End of north hose, discharge point

Location:
End of north discharge hose

Photograph taken by:
Kent Kasper

Date: 5/26/2025

Photograph Log

RACER
Pontiac North Campus (PNC)
30267726

Photograph: 7

Description:
Standing water at TW-01-02

Location:
TW-01-02

Photograph taken by:
Kent Kasper

Date: 5/28/2025

Photograph: 8

Description:
Standing water around TW-01-02

Location:
TW-01-02

Photograph taken by:
Kent Kasper

Date: 5/28/2025

Photograph: 9

Description:
North discharge, moved west

Location:
Top of hill north of sump

Photograph taken by:
Lottie Jay

Date: 6/6/2025

Photograph: 10

Description:
North discharge hose, moved west

Location:
Northern discharge hose north of T-divider

Photograph taken by:
Lottie Jay

Date: 6/6/2025

Photograph Log

RACER
Pontiac North Campus (PNC)
30267726

Photograph: 11

Description:
North discharge final discharge area

Location:
North hose final discharge location

Photograph taken by:
Lottie Jay

Date: 6/6/2025