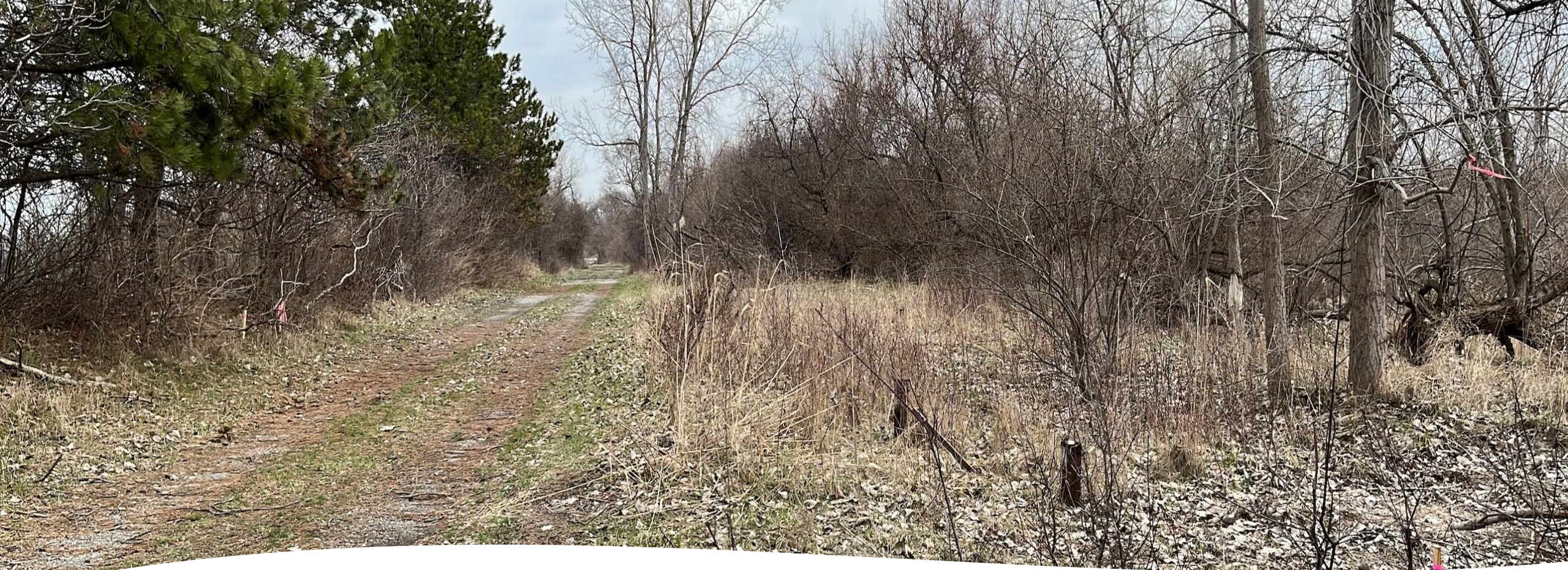




Point Hennepin Update

October 7, 2025



Agenda

- Q2 2025 Sampling Results
- Bench Scale Testing Update
- Modeling Update
- Summary and Path Forward

Q2 2025 SAMPLING RESULTS

Basis for Sampling Locations

Higher Priority
Response to surface water visible in groundwater data
Consistent outward gradient
Consistent GW levels higher than SW
Higher K zones; Higher estimated potential GW flux

Lower Priority
Limited or no response to SW in GW
Inward gradient or seasonal/low outward gradient
SW seasonally higher than GW levels
Lower K zones; Lower potential GW flux



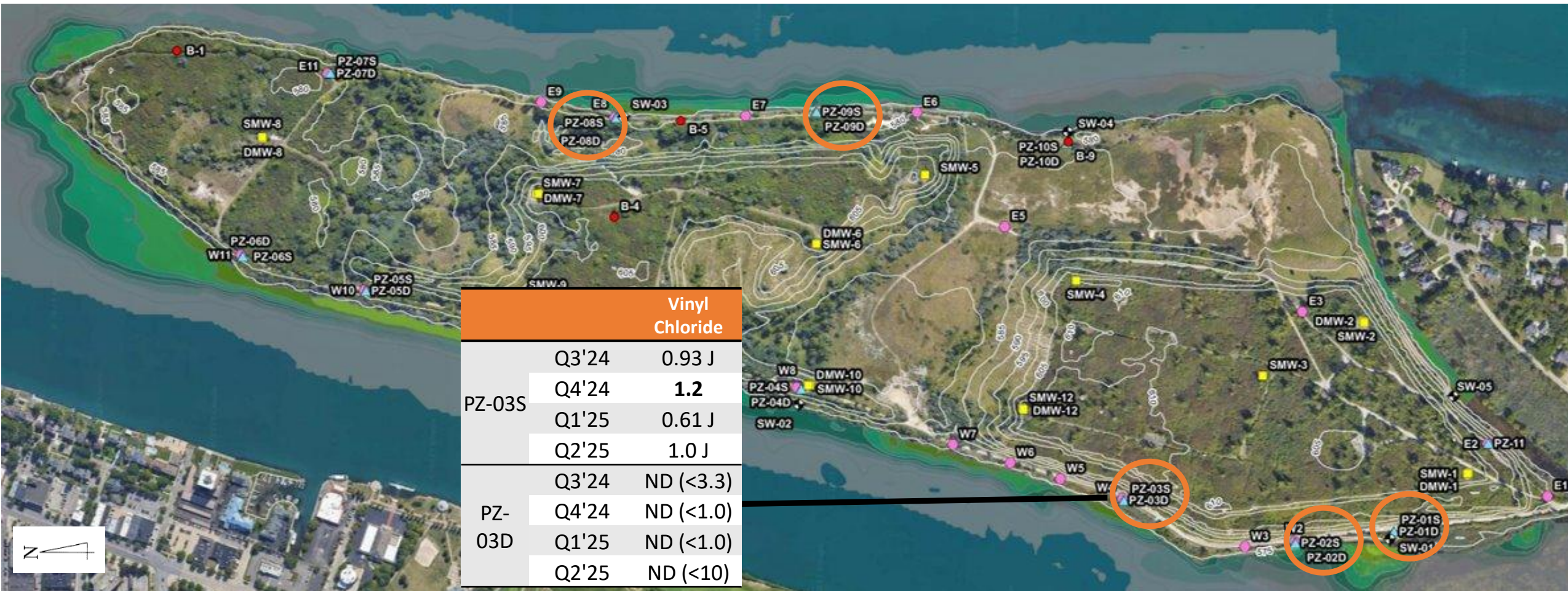
VOCs



No FAV or GSI exceedances of VOCs in Q2 2025
 No FAV exceedances during the previous year

BOLD = GSI criteria exceedance
Underline = FAV exceedance
 All concentration units are $\mu\text{g/L}$
 ND = non-detect
 Not Bold = detect < criteria

Criteria	GSI	FAV
Vinyl chloride	1.0	<u>17000</u>



Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.



pH and Un-ionized Ammonia

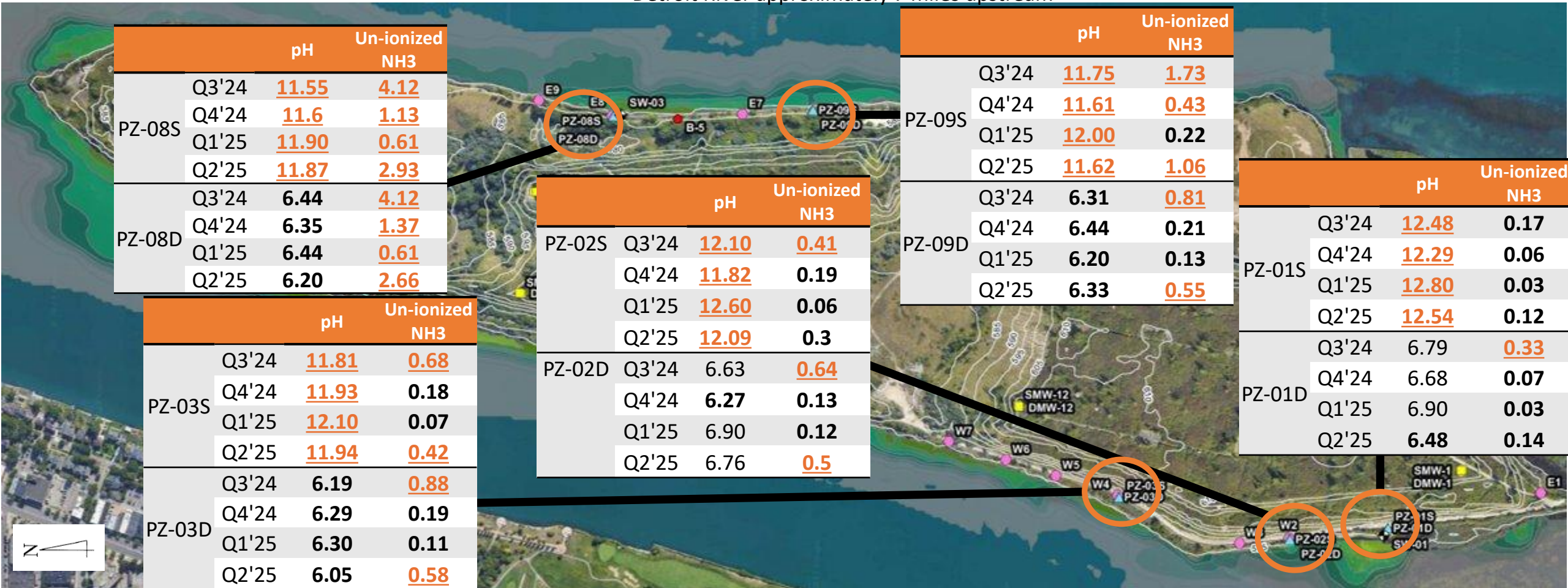
Criteria	GSI	FAV
pH	>6.5 & <9	<u>>9</u>
Un-ionized ammonia*	0.029	<u>0.32</u>

BOLD = GSI criteria exceedance

Underline = FAV exceedance

Un-ionized Ammonia concentration units mg/L

* Calculated using pH and temperature from USGS water quality monitoring station 04165710 on Detroit River approximately 7 miles upstream



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Chloride

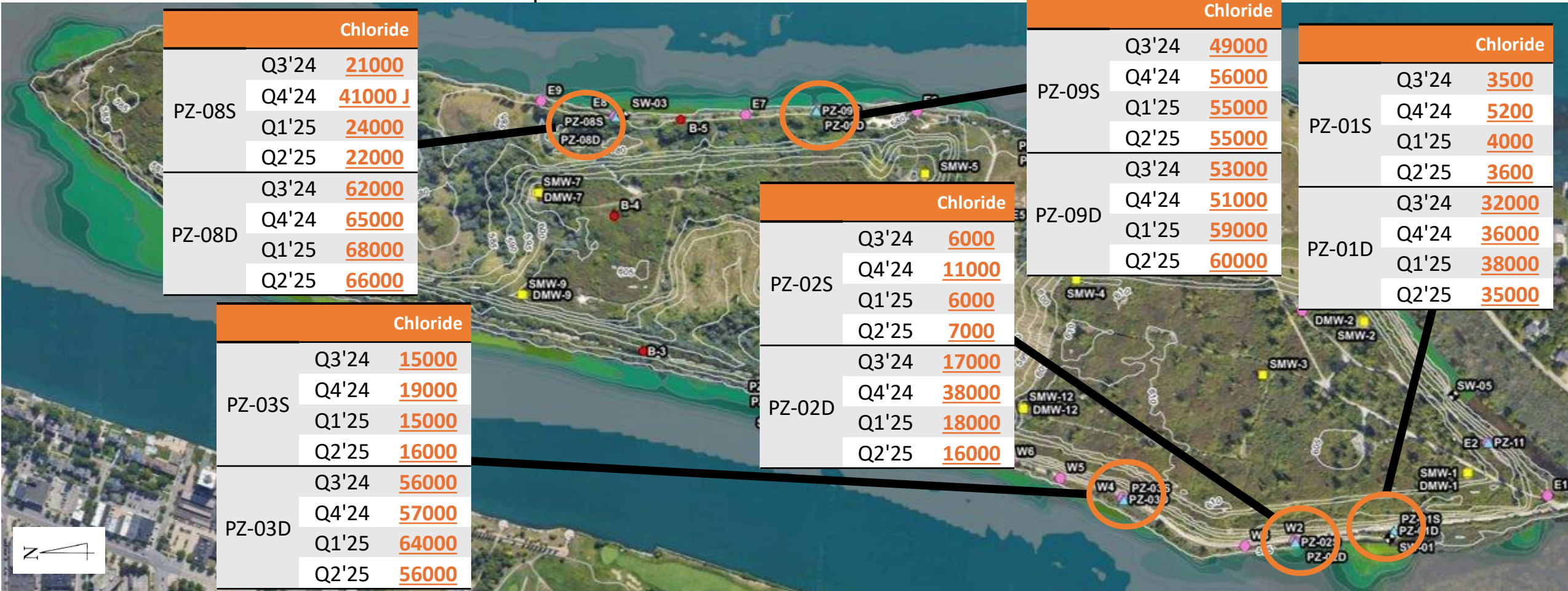
BOLD = GSI criteria exceedance

Underline = FAV exceedance

All concentration units are mg/L

J = estimated concentration less than the quantitation limit

Criteria	GSI	FAV
Chloride	50	<u>640</u>



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Total Metals

*Analytes displayed have a FAV regulated by Total Metals analytical portion (As, Ba, Mn, Se, Ag, V)

Vanadium exceedances in Q2 likely due to elevated turbidity in the samples, no exceedance in the dissolved (ie filtered) samples

Criteria	GSI	FAV*
Arsenic (As)	10	<u>680</u>
Barium (Ba)	440	<u>2500</u>
Manganese (Mn)	1300	<u>8500</u>
Selenium (Se)	5	<u>120</u>
Vanadium (V)	27	<u>160</u>

BOLD = GSI criteria exceedance

Underline = FAV exceedance

ND = Non-detect

Not Bold = detect < or = to criteria

J = estimated concentration less than the quantitation limit

All concentration units are µg/L



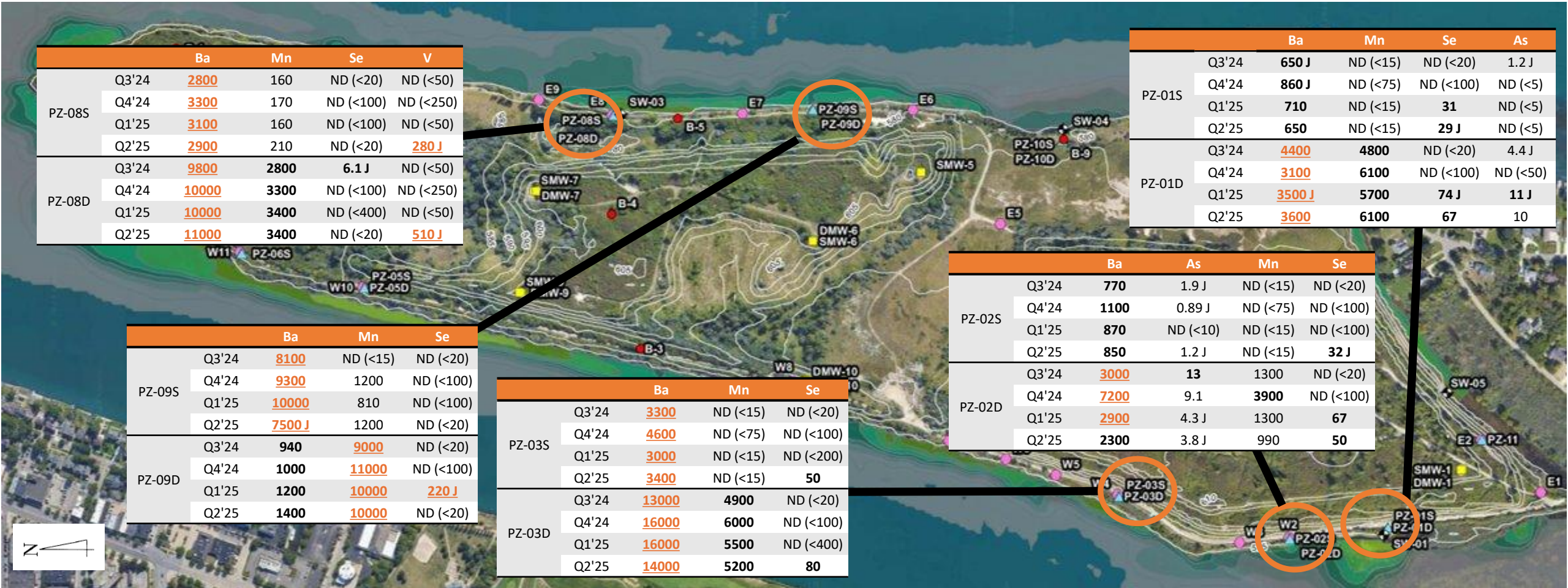
		Ba	Mn	Se	V
PZ-08S	Q3'24	<u>2800</u>	160	ND (<20)	ND (<50)
	Q4'24	<u>3300</u>	170	ND (<100)	ND (<250)
	Q1'25	<u>3100</u>	160	ND (<100)	ND (<50)
	Q2'25	<u>2900</u>	210	ND (<20)	<u>280 J</u>
PZ-08D	Q3'24	<u>9800</u>	2800	6.1 J	ND (<50)
	Q4'24	<u>10000</u>	3300	ND (<100)	ND (<250)
	Q1'25	<u>10000</u>	3400	ND (<400)	ND (<50)
	Q2'25	<u>11000</u>	3400	ND (<20)	<u>510 J</u>

		Ba	Mn	Se	As
PZ-01S	Q3'24	650 J	ND (<15)	ND (<20)	1.2 J
	Q4'24	860 J	ND (<75)	ND (<100)	ND (<5)
	Q1'25	710	ND (<15)	31	ND (<5)
	Q2'25	650	ND (<15)	29 J	ND (<5)
PZ-01D	Q3'24	4400	4800	ND (<20)	4.4 J
	Q4'24	3100	6100	ND (<100)	ND (<50)
	Q1'25	3500 J	5700	74 J	11 J
	Q2'25	3600	6100	67	10

		Ba	Mn	Se
PZ-09S	Q3'24	<u>8100</u>	ND (<15)	ND (<20)
	Q4'24	<u>9300</u>	1200	ND (<100)
	Q1'25	<u>10000</u>	810	ND (<100)
	Q2'25	<u>7500 J</u>	1200	ND (<20)
PZ-09D	Q3'24	940	<u>9000</u>	ND (<20)
	Q4'24	1000	<u>11000</u>	ND (<100)
	Q1'25	1200	<u>10000</u>	<u>220 J</u>
	Q2'25	1400	<u>10000</u>	ND (<20)

		Ba	Mn	Se
PZ-03S	Q3'24	<u>3300</u>	ND (<15)	ND (<20)
	Q4'24	<u>4600</u>	ND (<75)	ND (<100)
	Q1'25	<u>3000</u>	ND (<15)	ND (<200)
	Q2'25	<u>3400</u>	ND (<15)	50
PZ-03D	Q3'24	<u>13000</u>	4900	ND (<20)
	Q4'24	<u>16000</u>	6000	ND (<100)
	Q1'25	<u>16000</u>	5500	ND (<400)
	Q2'25	<u>14000</u>	5200	80

		Ba	As	Mn	Se
PZ-02S	Q3'24	770	1.9 J	ND (<15)	ND (<20)
	Q4'24	1100	0.89 J	ND (<75)	ND (<100)
	Q1'25	870	ND (<10)	ND (<15)	ND (<100)
	Q2'25	850	1.2 J	ND (<15)	32 J
PZ-02D	Q3'24	<u>3000</u>	13	1300	ND (<20)
	Q4'24	<u>7200</u>	9.1	3900	ND (<100)
	Q1'25	<u>2900</u>	4.3 J	1300	67
	Q2'25	2300	3.8 J	990	50



Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.



Dissolved Metals

*Analytes displayed have a FAV regulated by Dissolved Metals analytical portion (Cd, Cr, Cu, Pb, Hg, Ni, Zn) or are bioaccumulative

Criteria	GSI	FAV*
Cadmium (Cd)	2.2	<u>8.5</u>
Lead (Pb)	14	<u>240</u>
Mercury (Hg)	0.0013	<u>2.8</u>
Nickel (Ni)	52	<u>940</u>

BOLD = GSI criteria exceedance

Underline = FAV exceedance

ND = Non-detect

NM = Not measured

Not Bold = detect < or = to criteria

J = estimated concentration less than the quantitation limit

All concentration units are µg/L



Hg	
PZ-08S	Q3'24 NA
	Q4'24 1.1
	Q1'25 1.1
	Q2'25 1.1
PZ-08D	Q3'24 NA
	Q4'24 ND (<0.20)
	Q1'25 ND (<0.20)
	Q2'25 ND (<0.20)

	Cd	Pb	Ni
PZ-09S	Q3'24 ND (<5)	9.9 J	62
	Q4'24 ND (<25)	ND (<50)	47 J
	Q1'25 ND (<25)	ND (<50)	34 J
	Q2'25 ND (<5)	ND (<10)	22 J
PZ-09D	Q3'24 ND (<5)	14	35 J
	Q4'24 ND (<25)	ND (<50)	12 J
	Q1'25 9.0 J	110 J	76 J
	Q2'25 ND (<5)	ND (<10)	4.1 J

	Pb	Ni
PZ-02S	Q3'24 12	12 J
	Q4'24 ND (<50)	12 J
	Q1'25 8.5 J	13 J
	Q2'25 14	15 J
PZ-02D	Q3'24 15	35 J
	Q4'24 ND (<50)	14 J
	Q1'25 6.1 J	110
	Q2'25 14	41

	Pb	Ni
PZ-01S	Q3'24 14 J	9.3 J
	Q4'24 ND (<50)	ND (<200)
	Q1'25 8.4 J	10 J
	Q2'25 12	11 J
PZ-01D	Q3'24 8.8 J	35 J
	Q4'24 ND (<50)	11 J
	Q1'25 91 J	63 J
	Q2'25 6.1 J	36 J

Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.

Q2 2025 Analytical Data Summary

GSI Compliance Approach - Utilize a mixing zone for COCs that exceed GSI but are not bioaccumulative and do not exceed the FAV for aquatic life.

Summary of locations with COCs above FAV/bioaccumulative and would therefore need compliance approach beyond mixing zone:

PZ	pH	Un-Ionized Ammonia (USGS)	Cl	Ba	Mn	Hg	Se	Cd	V
PZ-01S	4/4	-	4/4	-	-	-	-	-	-
PZ-01D	-	1/4	4/4	4/4	-	-	-	-	-
PZ-02S	4/4	1/4	4/4	-	-	-	-	-	-
PZ-02D	-	2/4	4/4	3/4	-	-	-	-	-
PZ-03S	4/4	2/4	4/4	4/4	-	-	-	-	-
PZ-03D	-	2/4	4/4	4/4	-	-	-	-	-
PZ-08S	4/4	4/4	4/4	4/4	-	3/3*	-	-	1/4**
PZ-08D	-	4/4	4/4	4/4	-	-	-	-	1/4**
PZ-09S	4/4	3/4	4/4	4/4	-	-	-	-	-
PZ-09D	-	2/4	4/4	-	4/4	-	1/4	1/4	-

Number of events exceeding criteria/Total number of sampling event

“-” : no exceedances for all events

* - note that Mercury is above the GSI criteria and not FAV criteria, however, is considered bio accumulative and included on this summary table

** - exceedance likely due to turbidity issues with sample

Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.

GW Sampling Summary

- Elevated pH limited to shallow interval across all quarters of sampling.
- Exceedances of un-ionized ammonia are consistent at PZ08S/D and appear seasonal for the remaining wells.
- Hg detected at one location (PZ-08S) across all sampling events, exceeding GSI.
- Consistent FAV exceedances of Ba (7/10 wells) and Cl (10/10 wells)
- Sporadic (often j-flagged) FAV exceedances of Se, Cd, Mn and V.
 - Q2 vanadium exceedance likely represents concentrations associated with particulate rather than dissolved concentrations based on sample turbidity and total vs dissolved concentrations
- Q3 event completed week of September 22. Three additional quarterly events to follow.
 - Analyte list limited key COCs based on first year of data: pH, un-ionized ammonia, chloride, and select metals (barium, cadmium, manganese, selenium, vanadium).

Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.

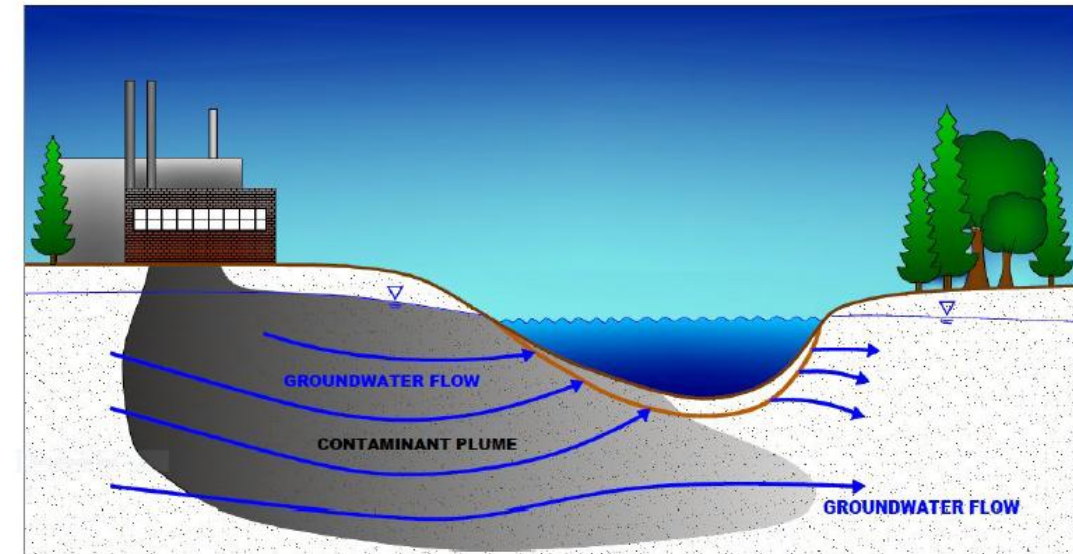
SUMMARY AND PATH FORWARD

GSI Compliance Approach

- Potential GSI compliance approaches may include (but are not limited to):
 - ★ **Mixing zones** for COCs that are not bioaccumulative and do not exceed the final acute value for aquatic life;
 - ★ **Alternative monitoring points** designed to measure COCs in groundwater that is venting at the GSI;
 - **Ecological assessments** to evaluate the likelihood of adverse ecological effects as a result of exposure of aquatic life and/or wildlife to COCs in venting GW;
 - ★ **Modeling assessments** to determine compliance with the GSI pathway using scientifically valid modeling approaches that are calibrated and verified with site-specific field data;
 - ★ **Natural attenuation** demonstration in accordance with published reference documents;
 - ★ **Technical Impracticability** is the inability to achieve certain requirements based on engineering feasibility / reliability, cost, and risk-based considerations;
 - ★ **Passive or active remediation** where treatment is required to reduce concentrations of COCs to below applicable GSI criteria prior to groundwater venting to surface water.
- Samples were collected at wells at the perimeter of the island, samples were not collected where groundwater may be discharging to the river. Exceedances of GSI criteria at the perimeter do not indicate a GSI compliance concern. It informs the development of the GSI compliance approach and next steps for data collection.

GROUNDWATER-SURFACE WATER INTERFACE PATHWAY COMPLIANCE OPTIONS

REMEDIATION AND REDEVELOPMENT DIVISION
RESOURCE MATERIALS



Adapted from US EPA, Proceedings of the Groundwater/Surface-Water Interactions Workshop, EPA/542/R-00/007, July 2000

**EGLE GSI TAPs Team Input
will be critical during the
development of Phase 2**

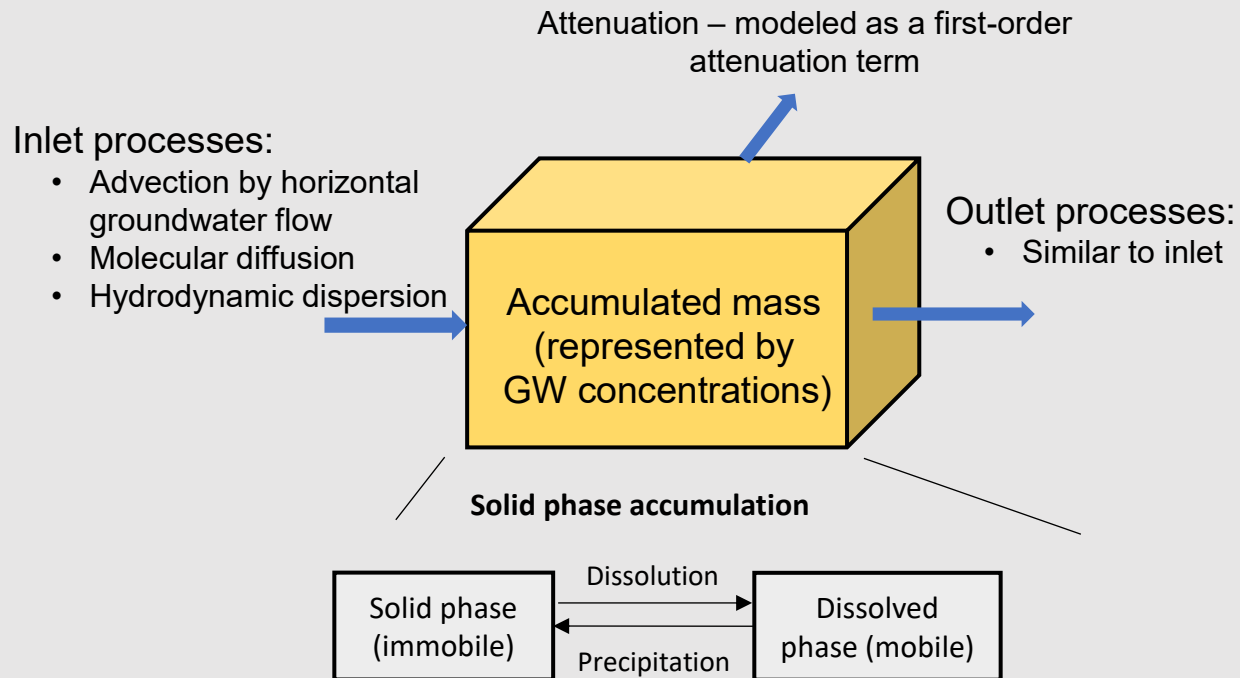
Biostimulation Bench Scale Test

- Work Plan submitted with the objective of evaluate the efficacy of in-Situ biostimulation of microbes capable to decreasing concentrations of ammonia (and select metals)
 - Increasing levels of sulfate and/or iron could promote further consumption of ammonia by the microbes
- Collect 4 gal. groundwater + 4 kg soil from each zone near PZ-08.
- Install S/D pilot injection wells for future field pilot testing
- For quick results, a carbon source (bacteria food) of acetate will be used as this is quickly bioavailable to microbial populations
- Reactors with different reagents and levels of 1) carbon only 2) carbon + sulfate 3) carbon + ferrous iron and 4) carbon + ferric iron
- Information and understandings developed will inform potential next steps
 - Field Pilot Test
 - Additional bench scale testing
 - Re-evaluate of GSI compliance strategy



1-Dimension Fate and Transport Model Using CapSIM

Mass Balance in a Control Volume






1-D Mass Conservation Approach

Inlet – Outlet – Attenuation = Accumulation
Accumulation = 0 at steady-state

- Utilizing CapSIM to model chemical flux from the Site to the river, specifically Cl and metals
- Site specific hydraulic parameters used to inform the model
- The following processes were considered with a first-order model
 - Diffusion
 - Hydrodynamic dispersion
 - Attenuation (e.g., dilution via mixing with upgradient, rainwater infiltration, and groundwater flux from low COC concentration areas)
 - Precipitation/dissolution of COCs (evaluated using literature parameters)
- Results from the biostimulation treatability study may also be used to refine model results when available

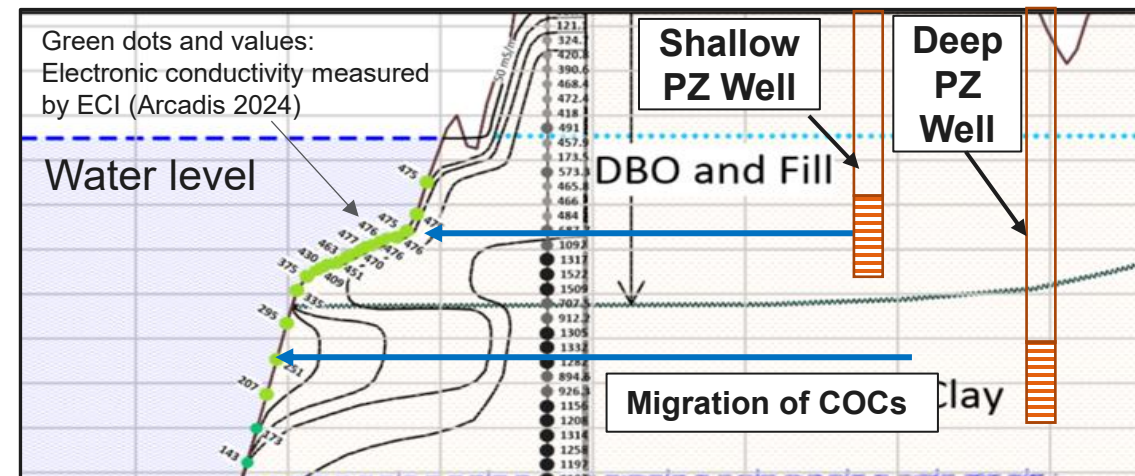
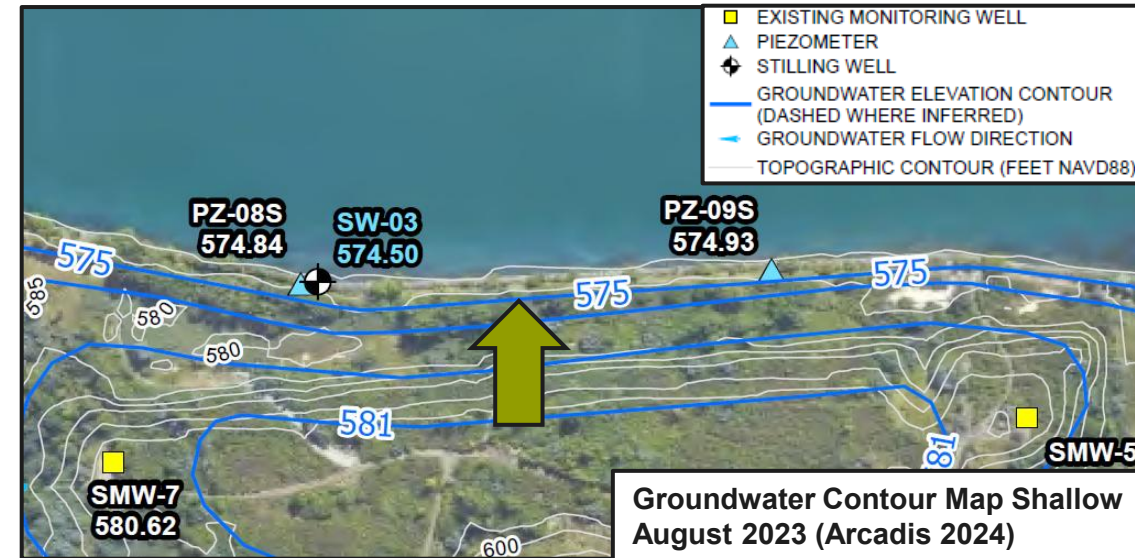
Key Model Inputs

Category	Input Parameter	Source	Justification/Rationale
Chemical	COC concentrations and properties	Site-specific concentrations	Chemicals exceeding GSI or FAVs
Soil/ Sediment Physical Properties	Porosity, bulk density	Field measurements	Necessary for modeling
Transport	Transport distance	Calculated based on the PZ location coordinate and water level calculated based on bathymetry	Necessary for modeling
	Groundwater/porewater Darcy Velocity	Calculated from hydraulic gradient and conductivity	Use site-specific groundwater flow to inform model
	Effective diffusion coefficient	COC-specific from literature (10^{-5} to 10^{-6} cm ² /yr) corrected by tortuosity	Chemical properties to inform model
	Attenuation rate	Evaluated by spatial/temporal site-specific field measurement from multiple locations	Incorporate attenuation processes in model
Sorption/ Reaction	Precipitation/dissolution rate, sorption coefficient	Literature values	Precipitation/dissolution are relatively constant
	Ionic strength	Calculated from field measurements of ion concentrations (e.g., Cl, Na, Ca, OH)	Use to refine calculation of metal precipitation and dissolution
Initial and Boundary conditions	Initial COC concentrations	Field groundwater/solid concentration measurements	Use site-specific information to inform model
	Shoreline boundary	Fixed flux	Evaluate based on site-specific information
	River boundary	Benthic mass transfer	Represent the mass exchange in the GSI

Color Key		Available based on site data
		Literature value or relatively constant
		Evaluated using site-specific data and/or literature information

Model Updates

- Simulations of chemical concentrations at GSI
 - Cl, Ba, Mn, Hg, Se, and Cd
 - Modeled 10 scenarios (shallow and deep PZ at 5 locations)
 - Base case: Based on average COC concentrations and Darcy velocity from groundwater sampling
 - Sensitivity analysis:
 - Seasonal variation of Darcy velocity and associated COC levels
 - Attenuation rates
- Preliminary results
 - Mn, Hg, Se, and Cd remained below FAV under all base case scenarios evaluated
 - Ba slightly exceeded FAV at 1 location; Cl exceeded in 7 locations
 - Seasonal changes in Darcy velocity does impact results:
 - Cl exceedances of FAV at as few as 4 locations
 - No Ba exceedances of FAV
 - Attenuation rate variation presented limited impacts on results
- Proposing a modeling meeting in late October/early November to review modeling approach and results with EGLE.



Source: Adapted from Hydraulic Investigation Summary Report (Arcadis 2024)

Path Forward

- BASF is continuing quarterly sampling for another year (beginning in September 2025) to further evaluate seasonal fluctuations and trends:
 - Monitor for pH, un-ionized ammonia, and select metals (Manganese, cadmium, barium, selenium, chloride, vanadium) at same 5 well pairs.
 - Annual monitoring report for first year of monitoring will be submitted to EGLE by November 1, 2025
- Biostimulation bench test work plan submitted to EGLE for review on 9/17/25
 - Upon approval, complete field work to collect the soil and groundwater necessary to complete the study
- Preliminary modeling complete, schedule meeting with EGLE for late October/early November to discuss approach and results
- In parallel with the ongoing Part 201 work, shoreline stabilization pilot test is planned for 2026 in the SW corner of the island

QUESTIONS?