

Harding Street Station Corrective Measures Assessment



Public meeting
September 16, 2025

aes Indiana

Agenda and Introductions

Stewart Ramsay

Managing Executive, Vanry and Associates

Agenda

Topic	Presenter
AESI Overview	Brandi Davis-Handy, AESI President, AES Indiana
AESI Harding Street	Greg Ellis, AESI Director of Generation
Environmental Regulations	Pilar Cuadra, AESI Environmental Manager
Harding Street CMA Report	Steve Putrich, Haley & Aldrich Professional Engineer
Summary and Next Steps	Pilar Cuadra, AESI Environmental Manager
Open for Comments	

Welcome and Overview

Brandi Davis-Handy

President, AES Indiana

Accelerating the future of energy, together.

Reliable

Resilient

Cost-Effective

Stable

Sustainable



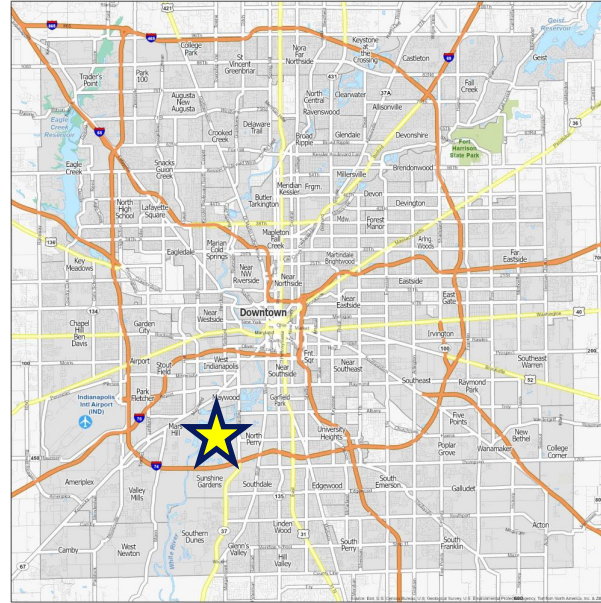
AES Indiana Harding Street Station

Greg Ellis

Director of Generation, AES Indiana

Harding Street Station

- Located in Indianapolis, IN on ~400 acres
- Stopped coal use and coal combustion residuals (CCR) production in February 2016
- HSS began operation in 1931
- Units 5, 6 and 7 repowered on natural gas in 2015 and 2016



Environmental regulations

Pilar Cuadra

Environmental Manager, AES Indiana

What are coal combustion residuals (CCR)?

- Coal Combustion Residuals (CCR) are byproducts generated from the combustion of coal from coal-fired power plants
- CCR contains trace metal elements, generally called CCR constituents

2015 CCR Federal Rule

Rule overview – General requirements

Establish groundwater monitoring systems to determine if there are impacts to the groundwater above groundwater protection standards.

If impacts are above groundwater protection standards, initiate evaluation of corrective measures.

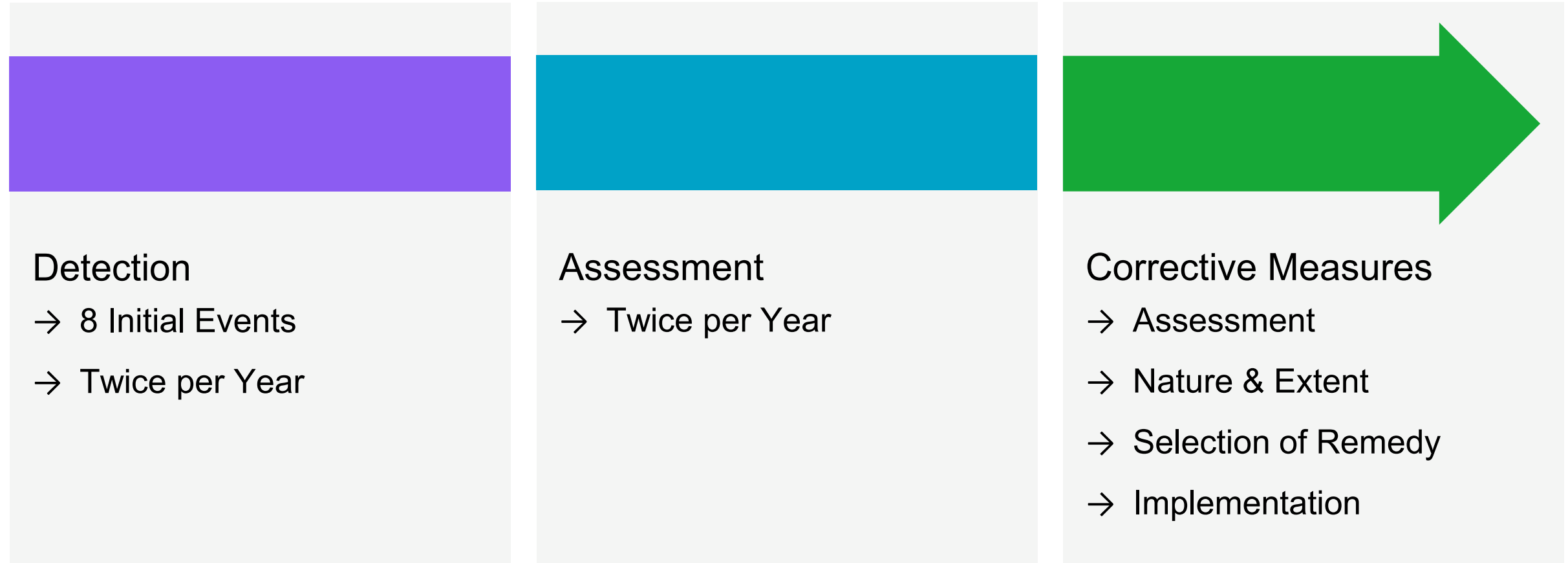
Initiate and complete closure of CCR units within a specific timeframe.

Depending on operating status of units.

Publish compliance data and information to a public website.

2015 CCR Federal Rule

Rule overview – Implementation



Harding Street CMA report

Steve Putrich

Engineer, Haley and Aldrich

Technical Agenda

1

CCR Groundwater Program, Monitoring Results and Groundwater Risk Evaluation Outcomes

2

Corrective Measures Assessment (CMA):
Background & Process

3

CMA Analysis and Results

4

Conclusion & Next Steps

CCR Groundwater Program, Monitoring Results and Groundwater Risk Evaluation Outcomes



HSS Site Features

- The HSS Ash Pond System includes Ponds 1, 2A, 2B, and 3 as well as Former Ponds 2 and 4. Together, these ponds cover approx. 72 acres.
- Ponds 1, 2A, 2B, and 3 are CCR surface impoundments subject to the CCR Rule. Former Ponds 2 and 4 will be CCR management units (CCRMUs) subject to the Legacy CCR Rule and are included in the Ash Pond System being monitored.

LEGEND

- · · · · APPROX. LIMITS OF PROPERTY LINE
- APPROX. LIMITS OF PONDS 1, 2A, 2B, AND 3
- APPROX. LIMITS OF FORMER PONDS 2 AND 4
- APPROX. LIMITS OF ASH POND SYSTEM

Overview of the CCR Groundwater Monitoring Program

Groundwater Monitoring

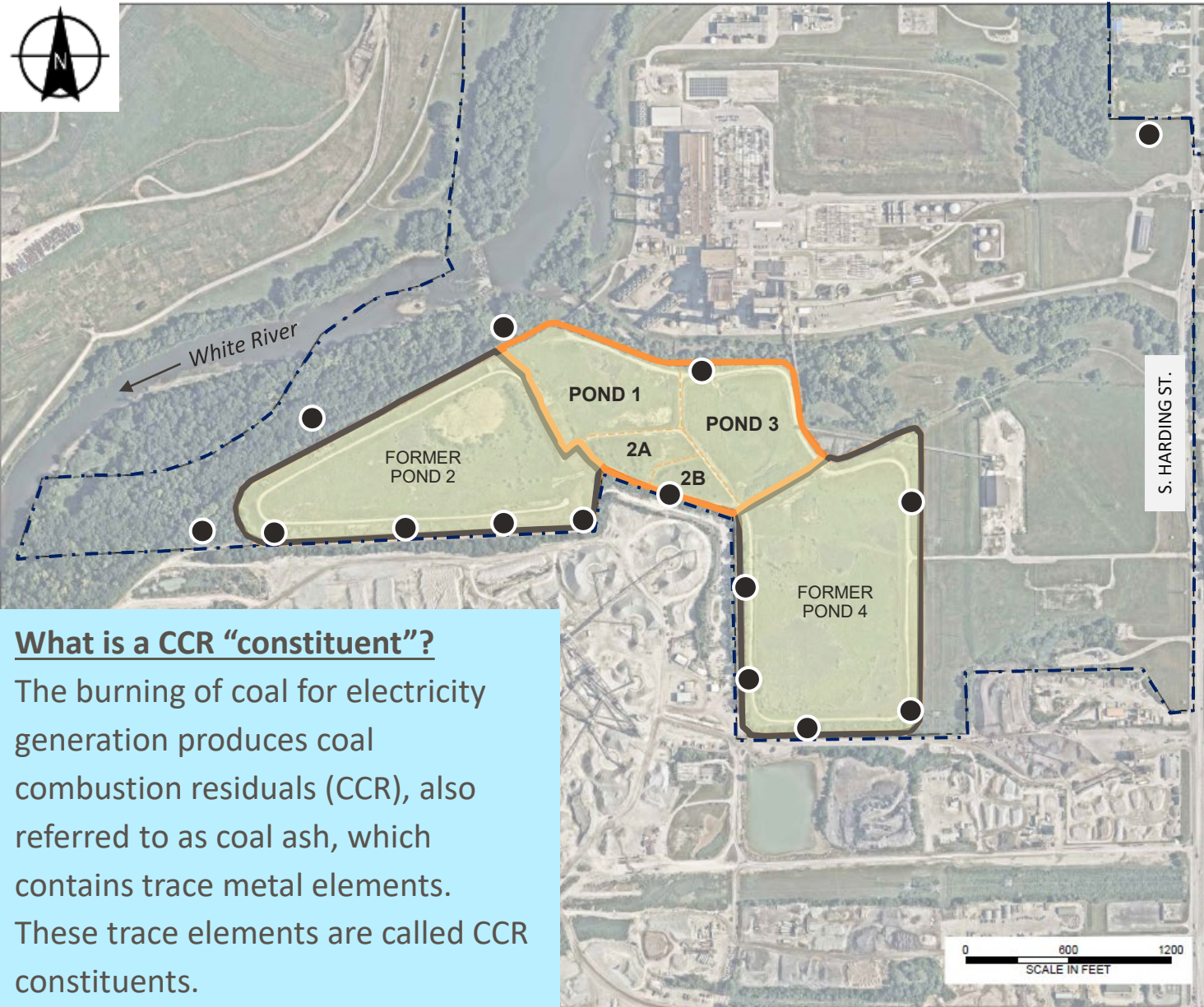
**Background
Monitoring**

**Detection
Monitoring**

**Assessment
Monitoring**



CCR Compliance Groundwater Monitoring Wells



What is a CCR “constituent”?

The burning of coal for electricity generation produces coal combustion residuals (CCR), also referred to as coal ash, which contains trace metal elements. These trace elements are called CCR constituents.

- AESI has been monitoring groundwater at HSS in compliance with the CCR Rule since 2016.
- CCR monitoring wells include a total of 15 well locations installed immediately upgradient and at the downgradient edge of the CCR units.
- Groundwater monitoring results for the Harding Street Station Ash Pond System identified three (3) CCR constituents [**arsenic, lithium, and molybdenum**] at levels above the Groundwater Protection Standards (which are the drinking water standards) set by the USEPA in the CCR Rule.

LEGEND

- CCR COMPLIANCE MONITORING WELL

CCR Rule Groundwater Monitoring Program & CMA Development (40 CFR 257)

Groundwater Monitoring

Background Monitoring

Detection Monitoring

Assessment Monitoring

Exceedance of GWPS
Triggers Nature & Extent (N&E)
Investigations and Corrective
Measures Assessment

**Nature & Extent (N&E)
Investigations**

GWPS = Groundwater Protection Standard



Nature & Extent (N&E) Groundwater Monitoring Wells

- Nature & Extent (N&E) monitoring wells include a total of 23 well locations installed south and west of the Ash Pond System.
- The N&E wells are used to determine the nature (i.e., to measure the CCR constituents present and the groundwater chemistry below the site) and the lateral and vertical extent of CCR-related groundwater impacts.

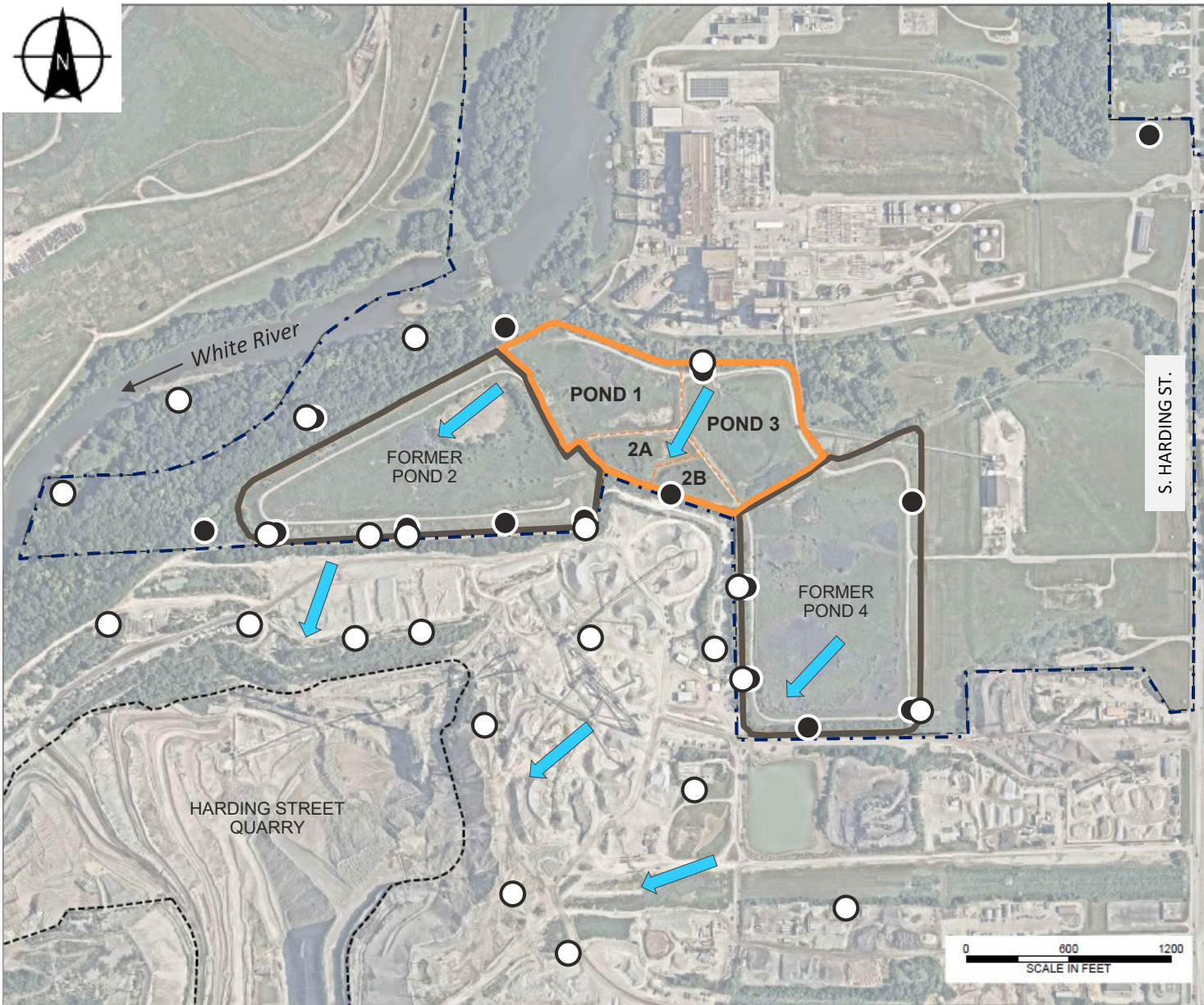
LEGEND

- NATURE & EXTENT MONITORING WELL
- CCR COMPLIANCE MONITORING WELL



Generalized Groundwater Flow

- Groundwater levels are generally higher in the spring and lower in the fall.
- While regional groundwater flow is typically toward the White River, ongoing dewatering operations at the quarry direct groundwater flow southwest, toward the quarry.



LEGEND

○ NATURE & EXTENT MONITORING WELL

● CCR COMPLIANCE MONITORING WELL

← APPROXIMATE GROUNDWATER FLOW DIRECTION

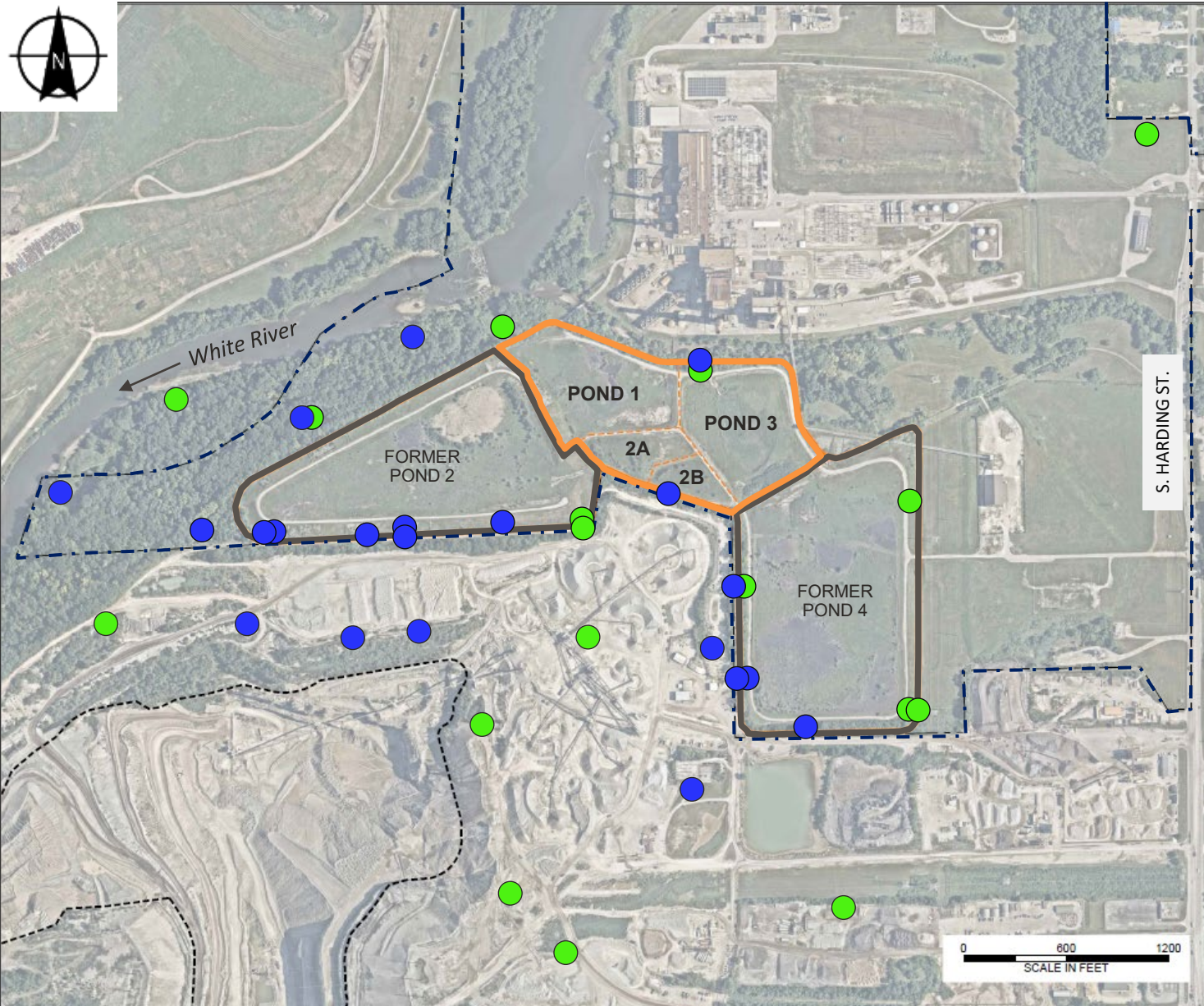


Findings from N&E Investigation

- The horizontal extent of groundwater impacts covers approx. 235 acres which encompasses the Ash Pond System and extends offsite on the property to the south.
- Ongoing dewatering operations at the quarry induce steep hydraulic gradients and direct groundwater flow toward the quarry.
- The vertical extent of affected groundwater limited by low permeability shale bedrock, on average 100 ft. below ground surface.
- The trends of CCR-related groundwater concentrations within the impacted area are generally stable or decreasing over time.

LEGEND

- NATURE & EXTENT MONITORING WELL
- CCR COMPLIANCE MONITORING WELL



CCR Constituent: Arsenic

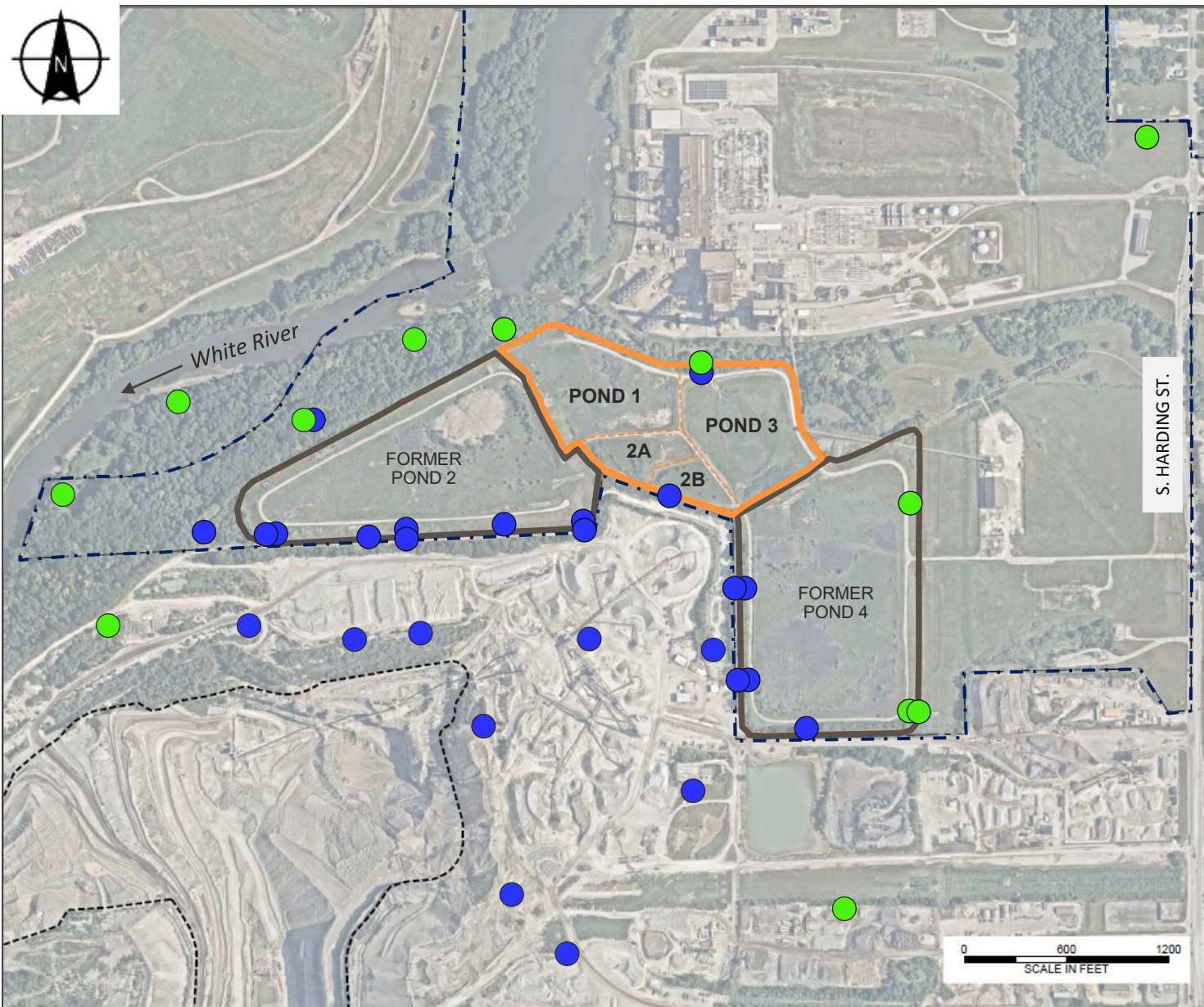
Arsenic N&E Summary

- Arsenic is one of three (3) constituents above the Groundwater Protection Standard (GWPS).
- Arsenic is the least mobile of the three (3) constituents identified in this group.
- For that reason, arsenic concentrations are greatest near the Ash Pond downgradient boundary and decrease significantly downgradient.

LEGEND

- Concentration < GWPS
- Concentration > GWPS

GWPS = Groundwater Protection Standard
N&E = Nature and Extent



CCR Constituent: Lithium

Lithium N&E Summary

- Lithium is relatively mobile in the environment and has been detected at concentrations above the Groundwater Protection Standard (GWPS) in each of the three flow zones, primarily south of the Ash Pond System.

LEGEND

- Concentration < GWPS
- Concentration > GWPS

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N&E = Nature and Extent



CCR Constituent: Molybdenum

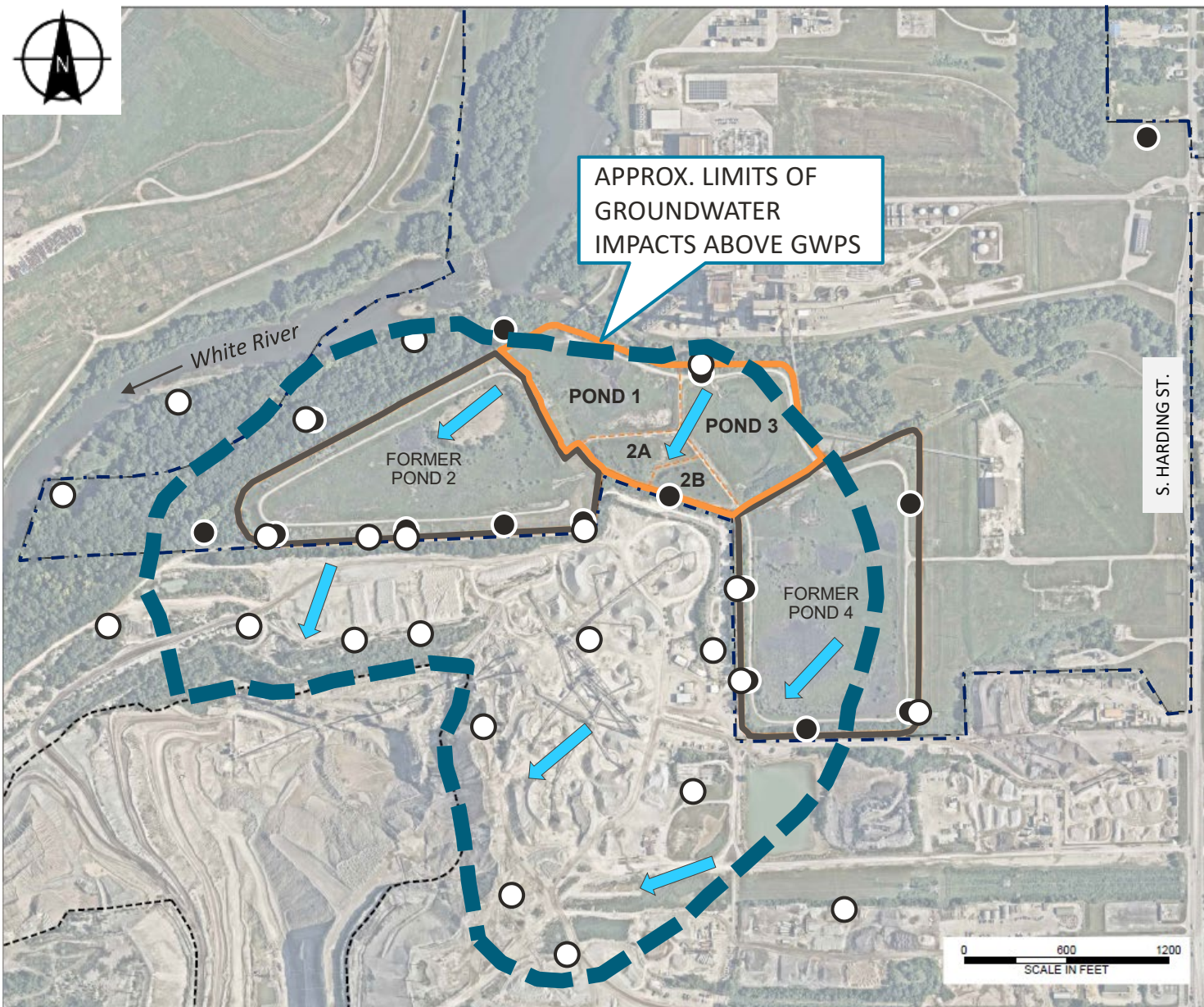
Molybdenum N&E Summary

- Like Lithium, Molybdenum is relatively mobile in the environment and has been detected at concentrations above the Groundwater Protection Standard (GWPS) in each of the three flow zones, primarily south of the Ash Pond System.

LEGEND

- Concentration < GWPS
- Concentration > GWPS

GWPS = Groundwater Protection Standard
N&E = Nature and Extent



HSS = Harding Street Station
N&E = Nature and Extent

Implications of N&E Findings

- Although groundwater results indicate levels above drinking water standards for arsenic, lithium, and molybdenum, **there is no use of groundwater for drinking water on or downgradient of the HSS site.**
- Furthermore, site-specific risk evaluations conducted in accordance with EPA standards conclude **there are no adverse impacts to people or the environment from the presence of these CCR constituents in groundwater at the site.**

LEGEND

- NATURE & EXTENT MONITORING WELL
- CCR COMPLIANCE MONITORING WELL

Risk Evaluation Summary

- **What work was performed?**

- Reviewed the analytical data at the Site and Site vicinity using EPA tools;
- Identified the pathways by which people and the environment could potentially come in contact with groundwater;
- Evaluated if the pathways could cause an adverse impact to people or the environment.

- **What was determined?**

- There is no direct contact between people or environmental receptors and groundwater impacted by the Ash Pond System.
- Detected concentrations of CCR constituents in groundwater:
 - Are below screening levels;
 - Do not pose an adverse impact to the White River;
 - Do not pose a risk to human health or ecological receptors.

- **What does this mean?**

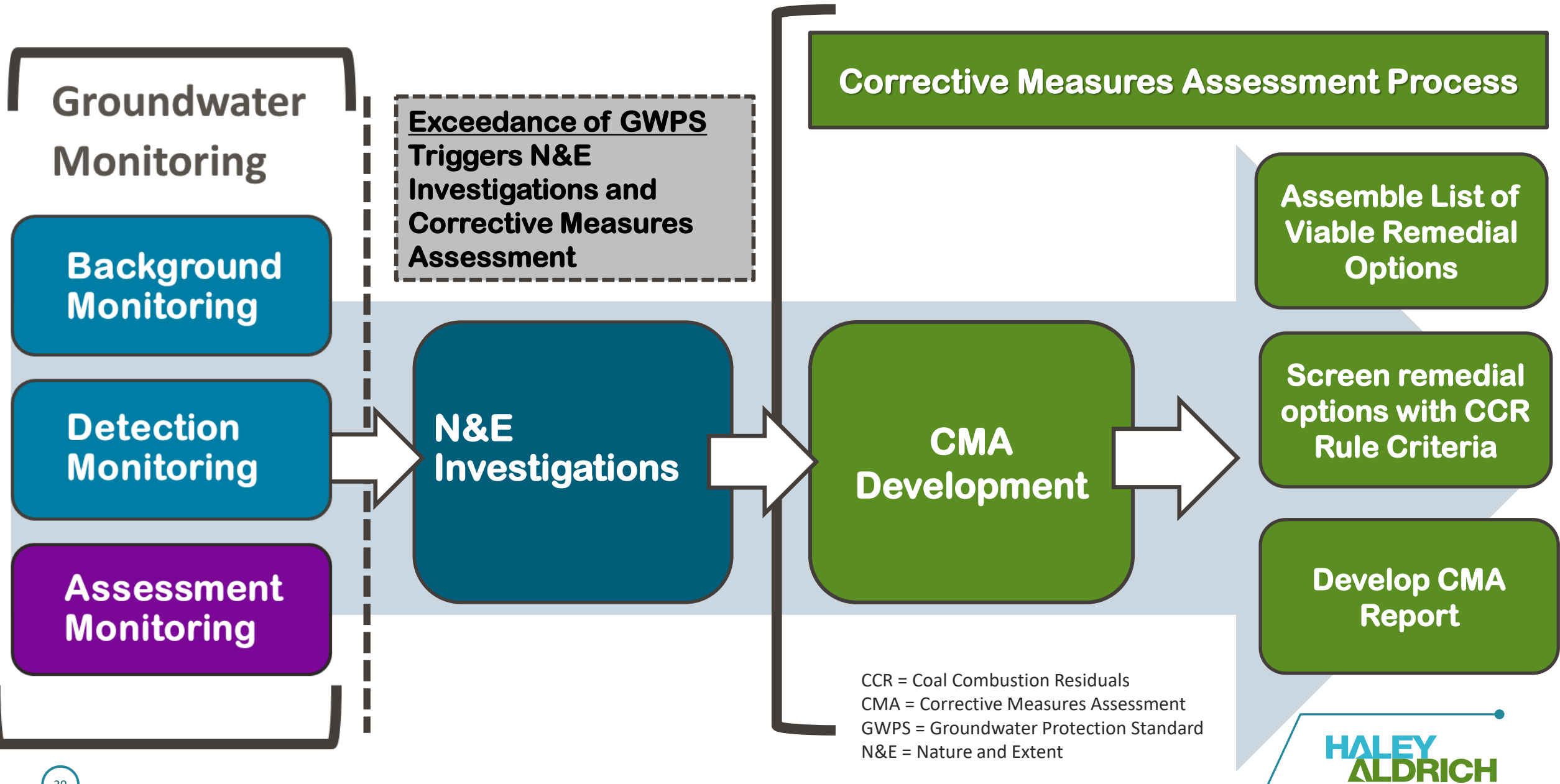
- There are no adverse impacts on human health or the environment from groundwater affected by the Ash Pond System.

Corrective Measures Assessment (CMA): Background & Process

What is a Corrective Measures Assessment (CMA)?

- When levels of constituents in groundwater are found to be above the groundwater protection standards, the CCR Rule calls for corrective measures to be evaluated.
- The Corrective Measures Assessment evaluates potential corrective measures that can be pursued to remediate groundwater for the constituents that are above the groundwater protection standards.

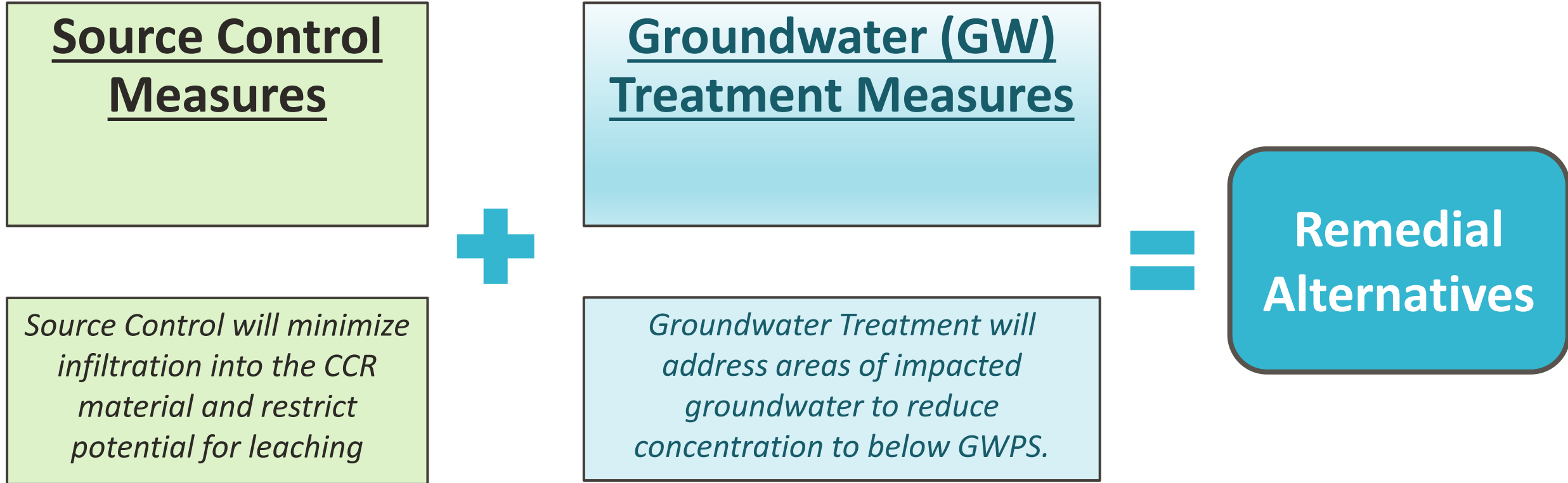
CCR Rule Groundwater Monitoring Program & CMA Development (40 CFR 257)



Background - Why was the CMA updated?

- The CMA and associated report were updated to account for the supplemental information collected since 2019. That supplemental information is sourced from:
 - additional monitoring data and groundwater N&E investigations,
 - conceptual site model development and groundwater modeling updates,
 - supplemental geochemical and site-specific investigations, and
 - potential corrective measures evaluations.
- The updated CMA includes five (5) remedial alternatives that consider additional information gathered since the 2019 CMA report and a refined understanding of site conditions.
- Following review of information and feedback from this public meeting, AESI will then make the remedy selection for HSS Ash Pond System in accordance with the CCR Rule.

Groundwater Corrective Measures/Remedy Diagram

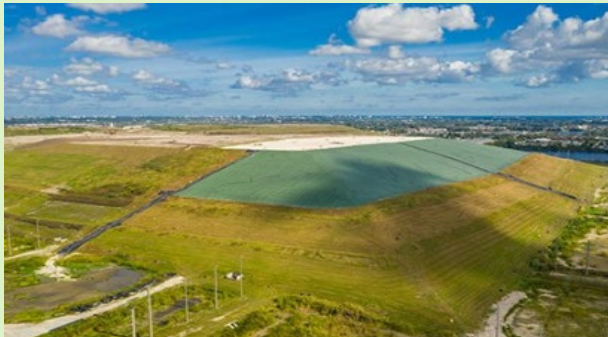


Source Control (Closure) Measures

Source Control will minimize infiltration into the CCR material and restrict potential for leaching

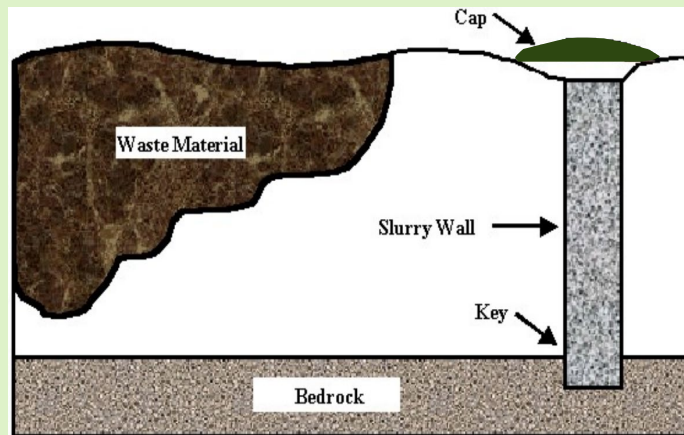
Hybrid Closure in Place

- Removal of CCR in potential contact with seasonal high groundwater.
- Backfill areas where CCR was removed with clean soil to at least 1 foot above seasonal high groundwater table
- Regrade CCR within the pond footprint
- Place a final cover over the CCR



Closure in Place with Slurry Wall

- Regrade CCR within the pond(s) footprint
- Install a low-permeability cement-bentonite slurry wall around the perimeter(s) of the pond(s)
- Place a final cover over the CCR

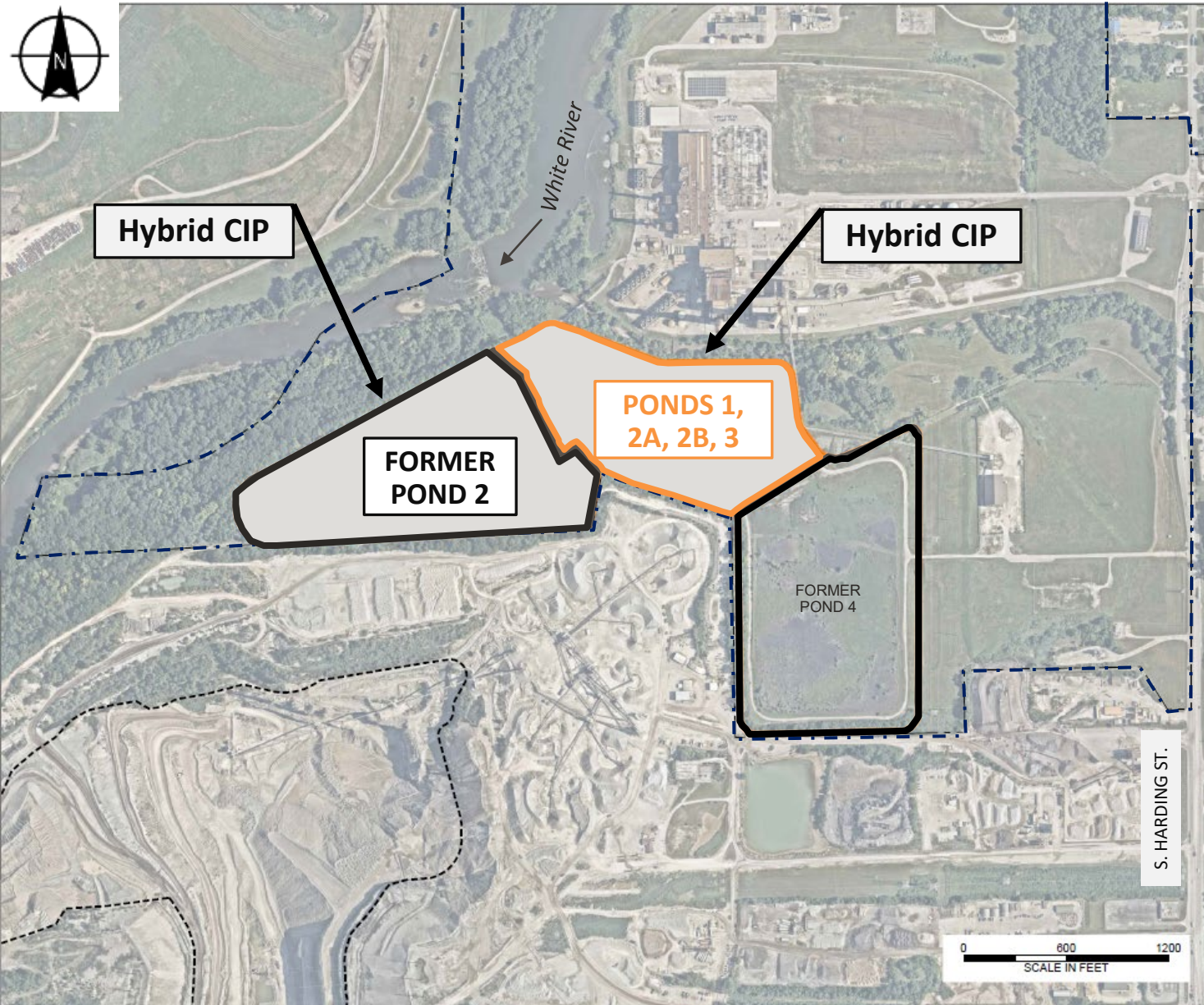


Source: IDEM Technical Guidance Document

Closure by Removal

- Excavate CCR and place into dump trucks
- Transport CCR material offsite for disposal or beneficial use
- Regrade area (focus on eliminating steep and or unsafe slopes) and promoting drainage of stormwater runoff





Ash Pond System

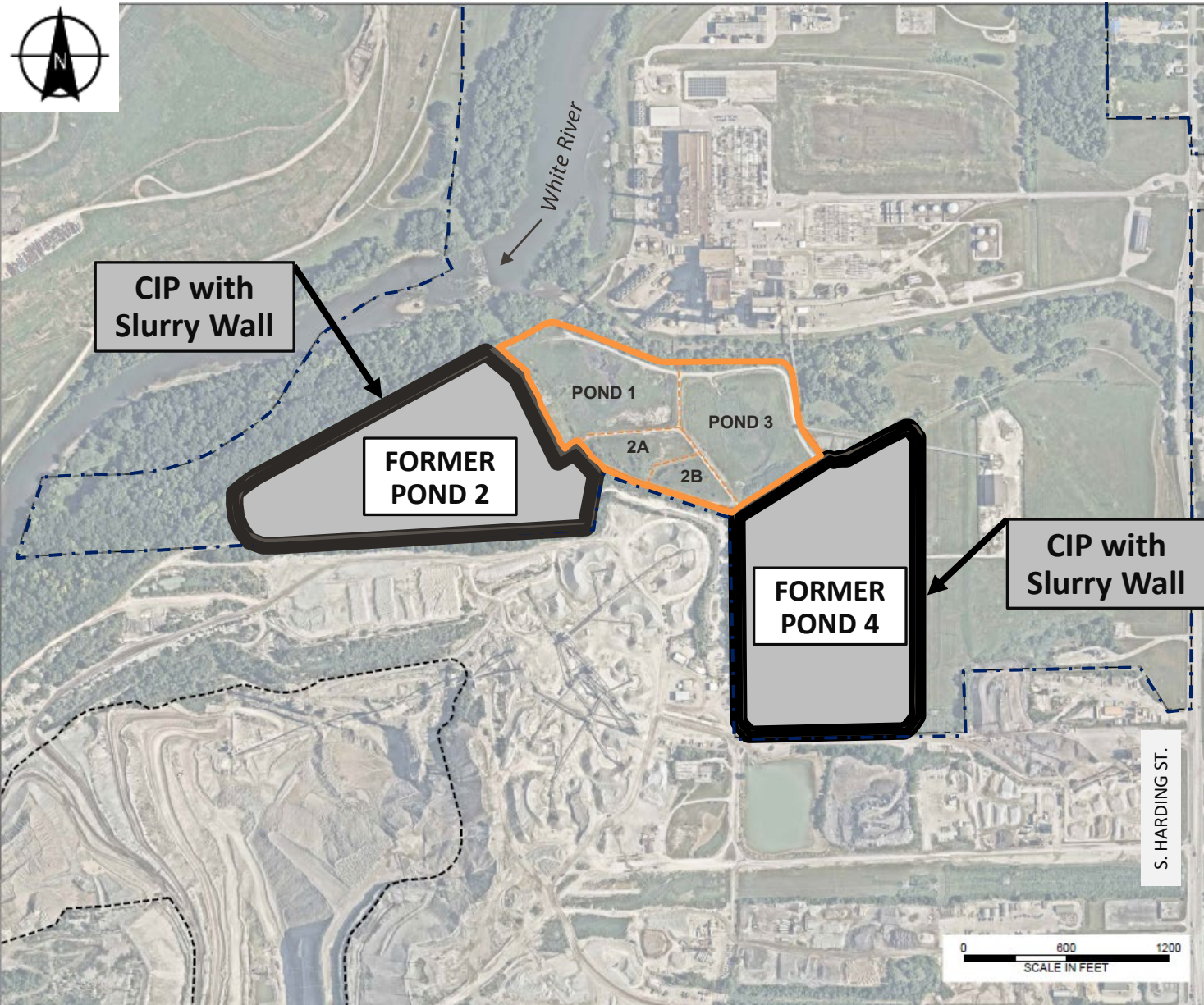
Source Control Measure

Hybrid Closure in Place

Source control measures to address ponded CCR material are considered individually based on each pond's unique characteristics.

Hybrid Closure in Place (Hybrid CIP):

- Considered for Former Pond 2
- Considered for Ponds 1, 2A, 2B and 3

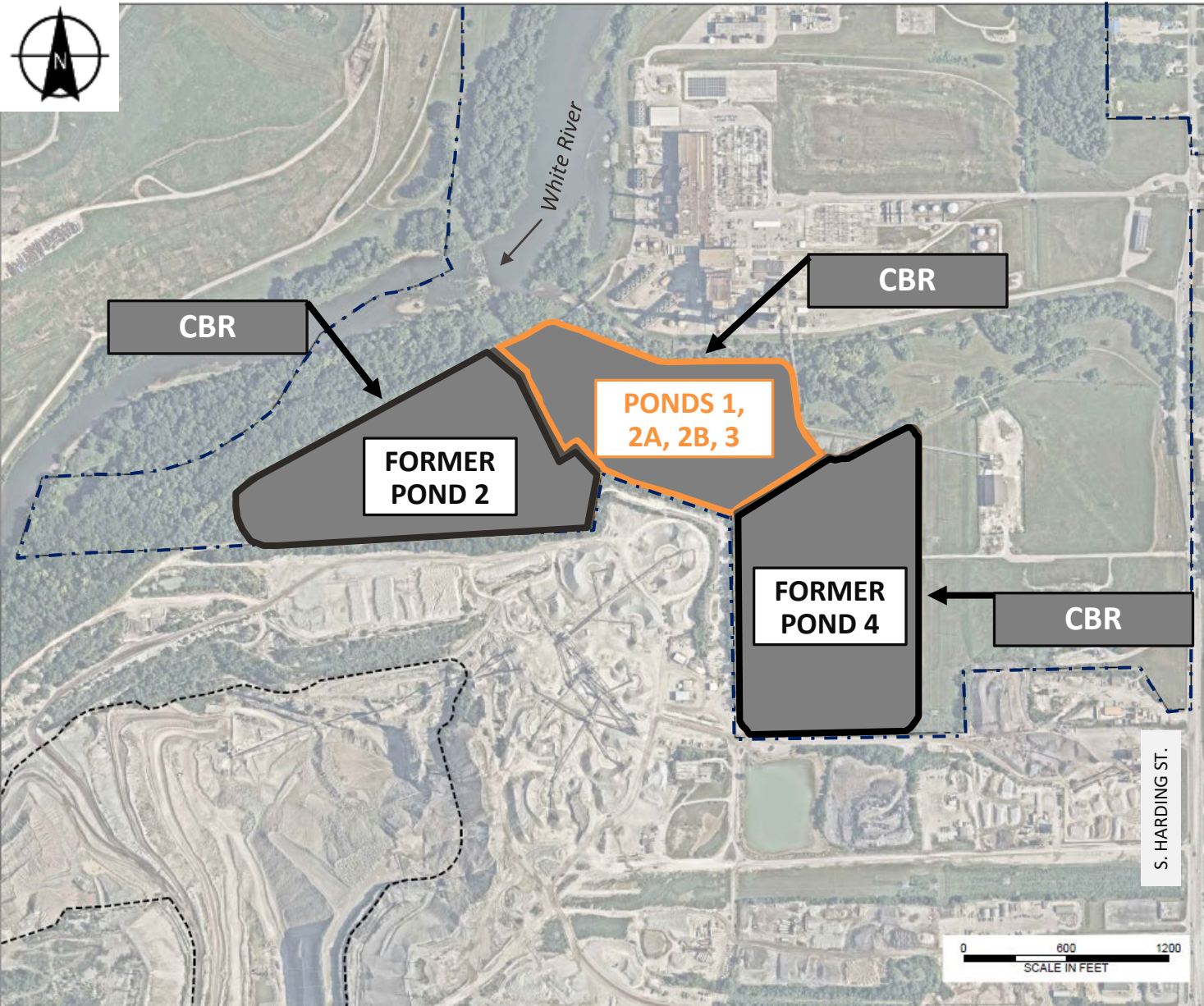


Ash Pond System Source Control Measure Closure in Place with Slurry Wall

Source control measures to address ponded CCR material are considered individually based on each pond's unique characteristics.

Closure in Place (CIP) with Slurry Wall:

- Considered for Former Pond 2
- Considered for Former Pond 4

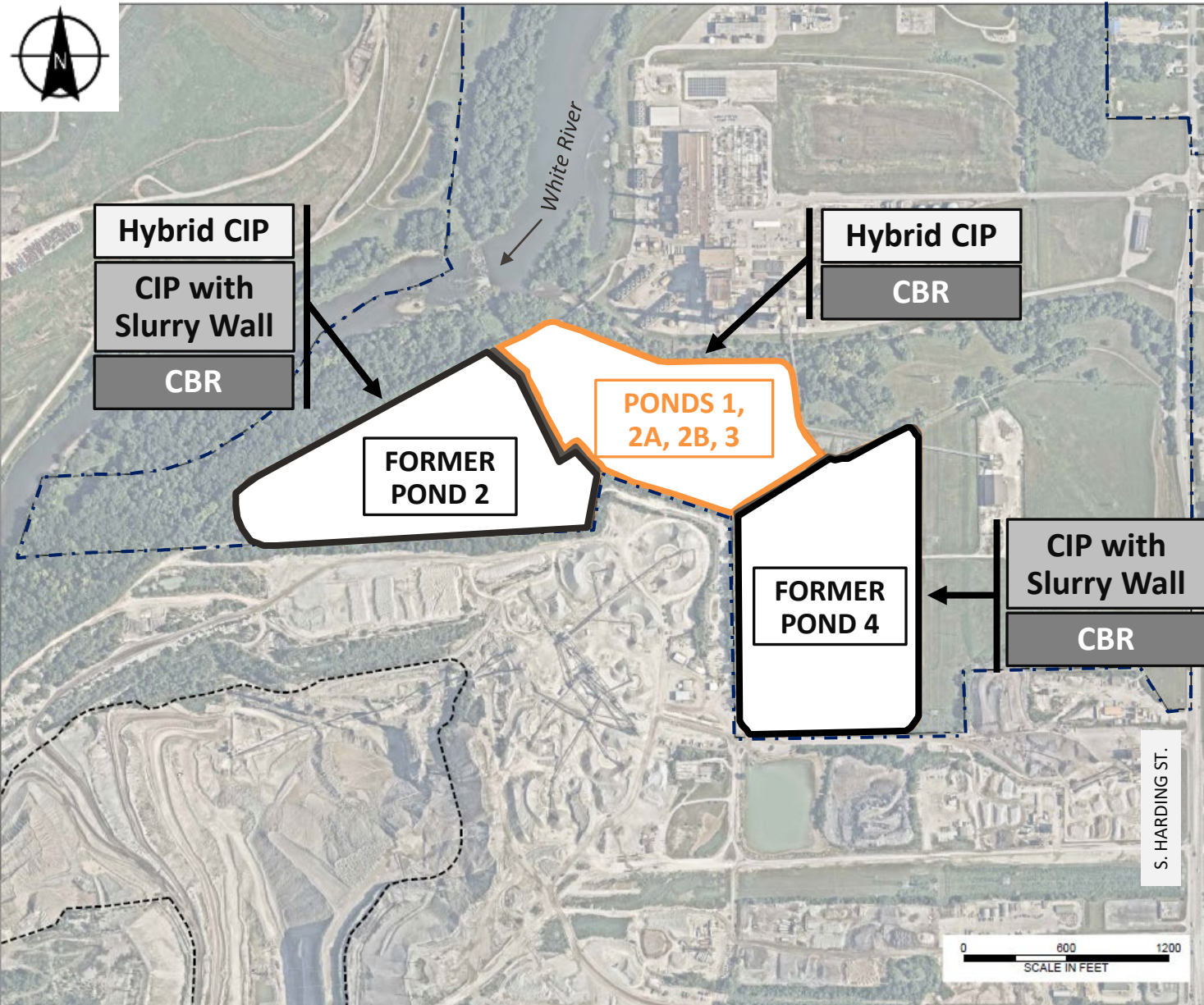


Ash Pond System Source Control Measure Closure by Removal

Source control measures to address ponded CCR material are considered individually based on each pond's unique characteristics.

Closure by Removal (CBR):

- Considered for all ponds



Ash Pond System Source Control Measures

Source control measures to address ponded CCR material are considered individually based on each pond's unique characteristics.

Hybrid Closure in Place (Hybrid CIP):

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Closure in Place (CIP) with Slurry Wall:

- Considered for Former Pond 2
- Considered for Former Pond 4

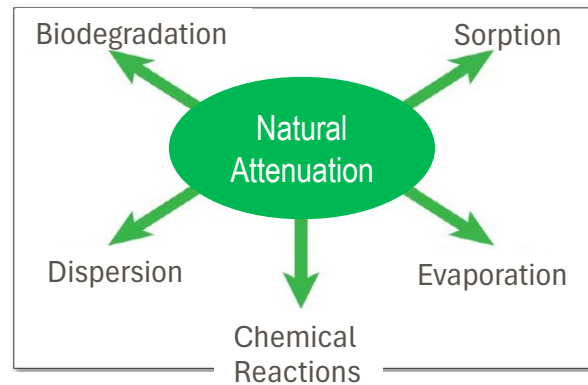
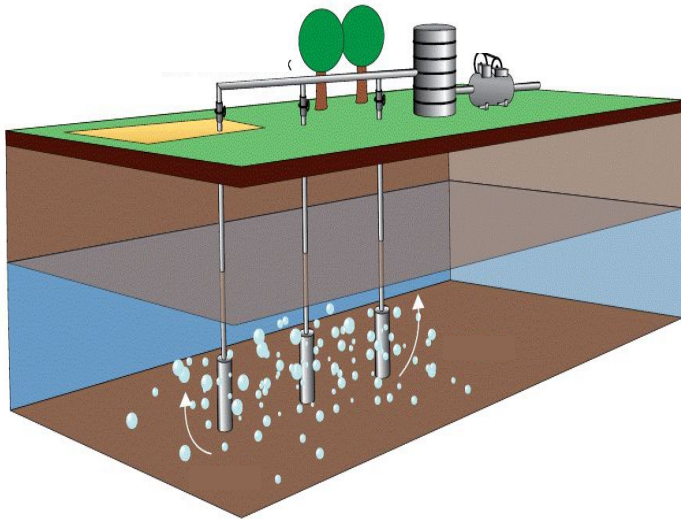
Closure by Removal (CBR):

- Considered for all ponds

Groundwater Treatment Measures

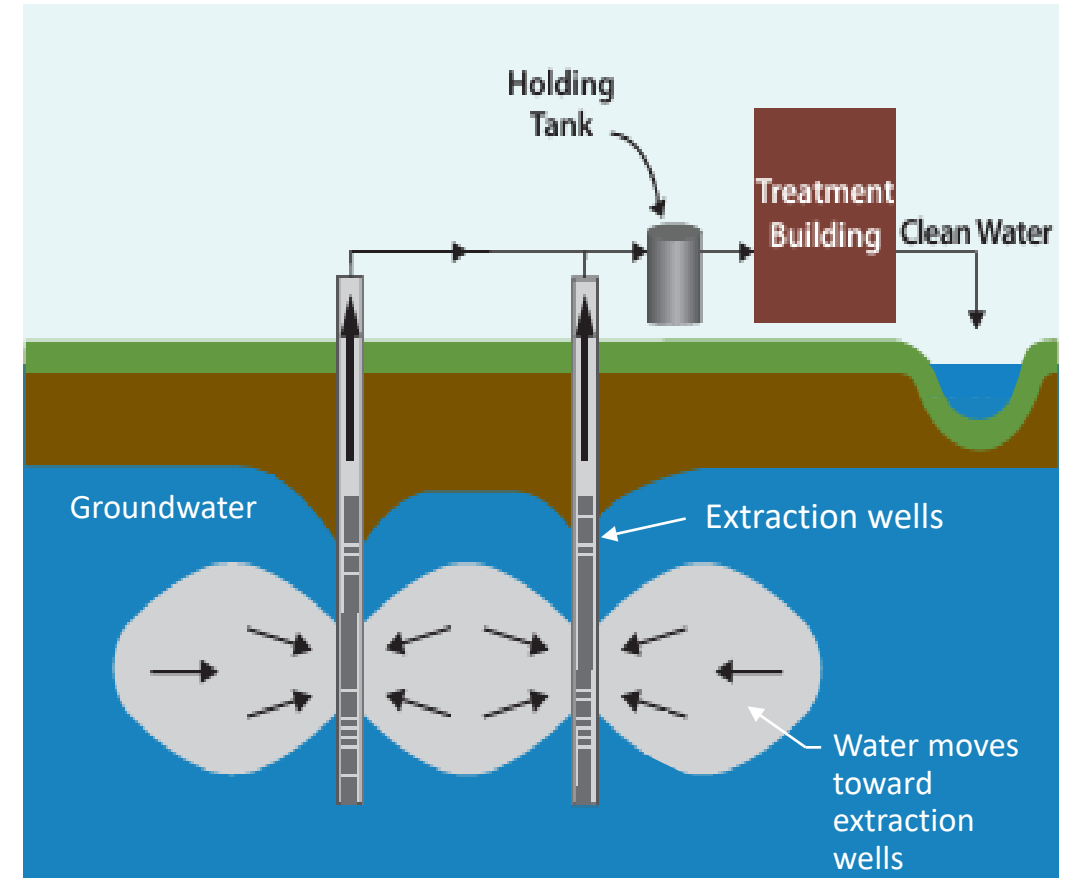
In-situ (treatment in the ground)

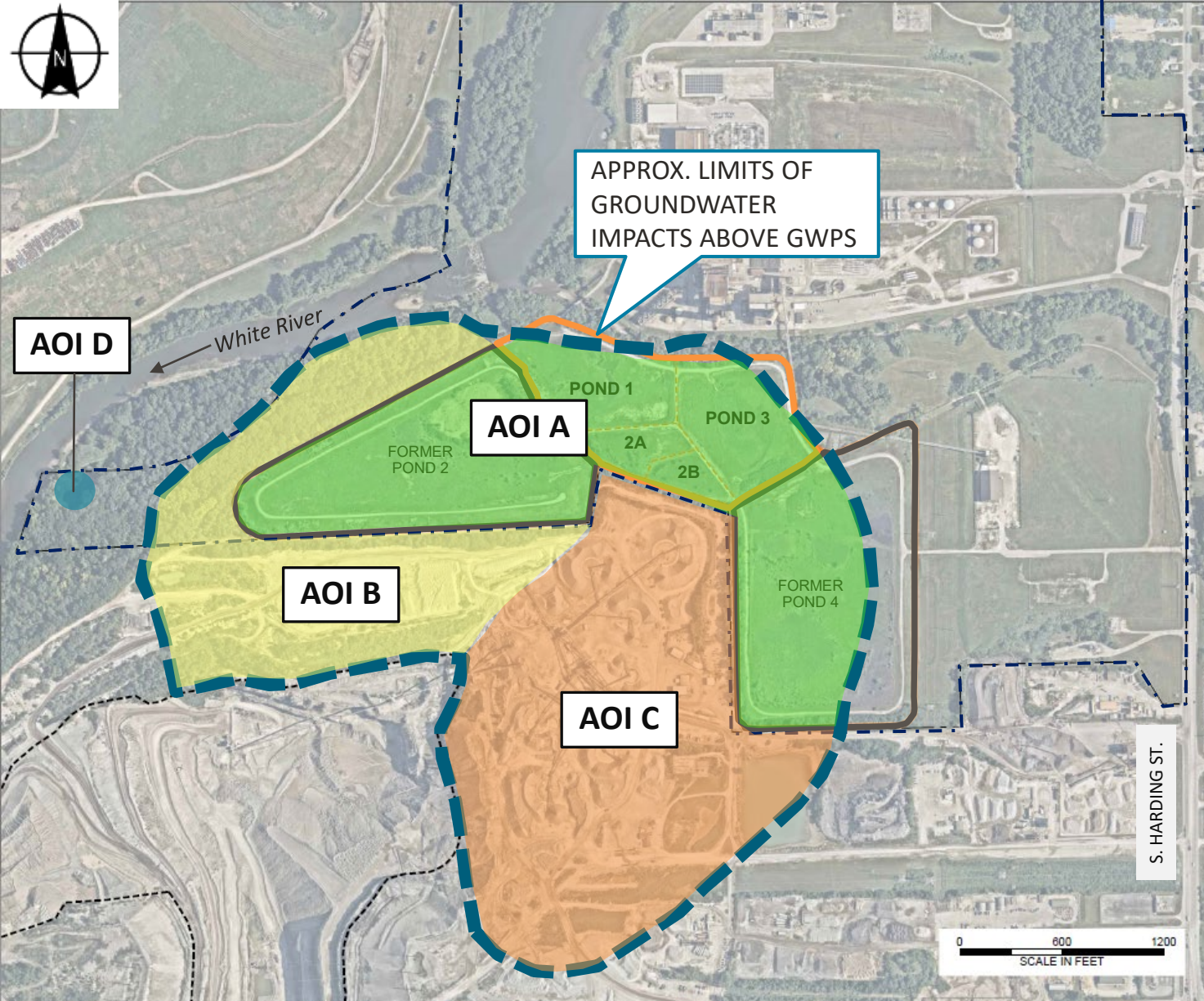
- Monitored Natural Attenuation
- Redox Manipulation (e.g., reagent injection, air sparging)
- Water Infiltration (e.g., injection wells)



Ex-situ (above ground) Hydraulic Controls

- Pump
- Pump & Treat (e.g., reverse osmosis)





Impacted Groundwater Areas of Interest (AOIs)

Areas of Interest (AOIs) are used to designate portions of the impacted groundwater based on the CCR constituents above the GWPS [Arsenic, Lithium, Molybdenum] and the location on the site.

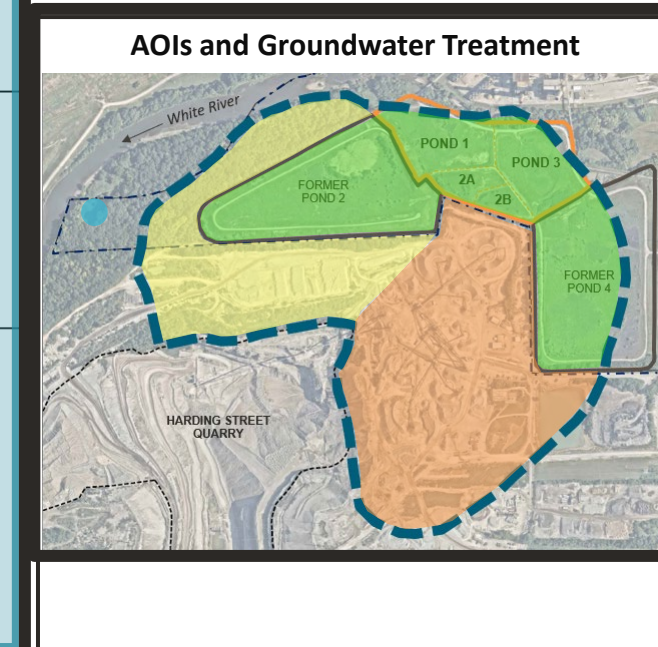
AOI A	WITHIN ASH POND SYSTEM <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI B	ADJACENT TO FORMER POND 2 <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI C	DOWNGRAIDENT OF PONDS 1, 2A, 2B, 3 AND FORMER POND 4 <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI D	ISOLATED AREA NEAR MW-18 WELL CLUSTER <ul style="list-style-type: none">• ARSENIC

AOI = Area of interest
GWPS = Groundwater Protection Standard

Summary of Remedial Alternatives

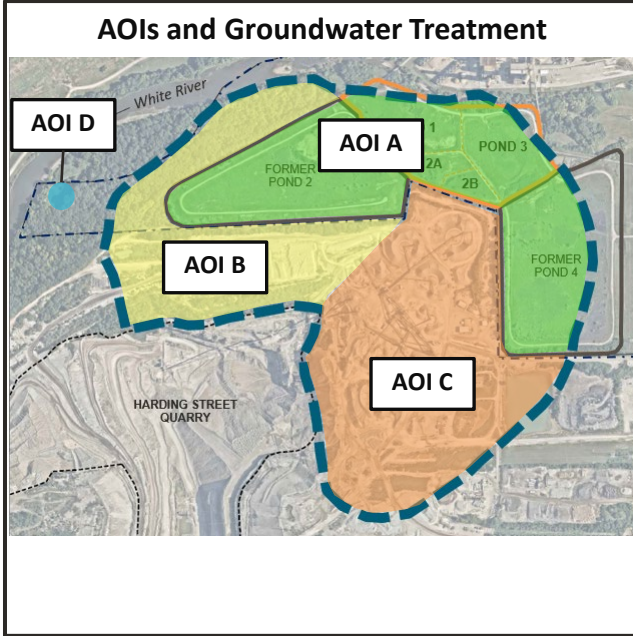
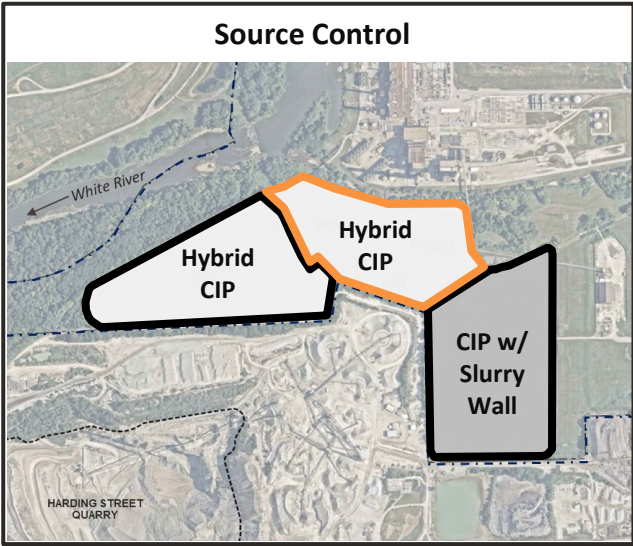
Alternative Number	Remedial Alternative	Source Control			Groundwater Treatment			
		Former Pond 2	Ponds 1, 2A, 2B, and 3	Former Pond 4	AOI A	AOI B	AOI C	AOI D
1A	Hybrid CIP with Capping, CIP with Slurry Wall, Groundwater Pumping, in-ground Treatment and MNA	Hybrid CIP	Hybrid CIP	CIP with Slurry Wall	Slurry Wall (Former Pond 4)	Groundwater Pumping and in-ground Treatment	Groundwater Pumping, in-ground Treatment and MNA	MNA
1B	Hybrid CIP with Capping, CIP with Slurry Wall, in-ground Treatment, Water Infiltration and MNA					In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	
2	Hybrid CIP with Capping, CIP with Slurry Wall, in-ground Treatment, Water Infiltration and MNA	CIP with Slurry Wall	Hybrid CIP	CIP with Slurry Wall	Slurry Wall (Former Pond 2 and Former Pond 4)	In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	MNA
3A	CBR, Groundwater Pumping, in-ground Treatment and MNA	CBR	CBR	CBR	N/A	Groundwater Pumping and in-ground Treatment	Groundwater Pumping, in-ground Treatment and MNA	MNA
3B	CBR, in-ground Treatment, Water Infiltration and MNA					In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	

AOI = Area of interest
 CIP = Closure in place
 CBR = Closure by removal
 MNA = Monitored natural attenuation



Summary of Remedial Alternatives

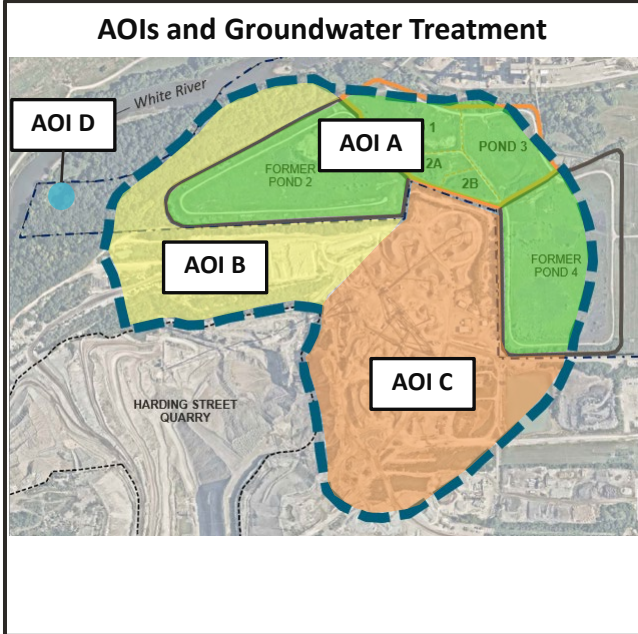
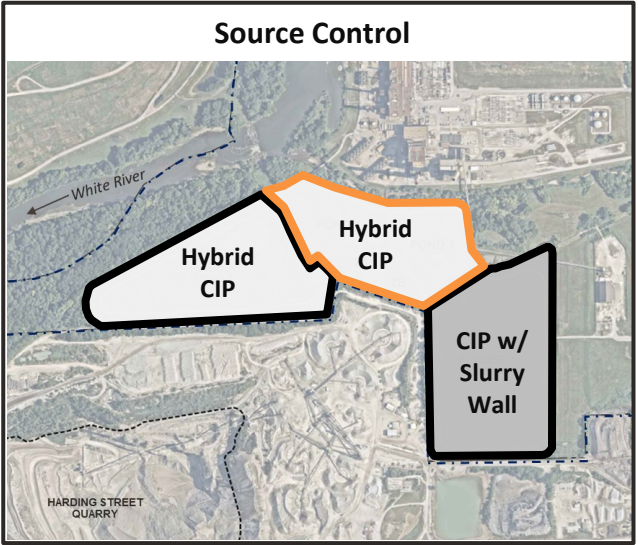
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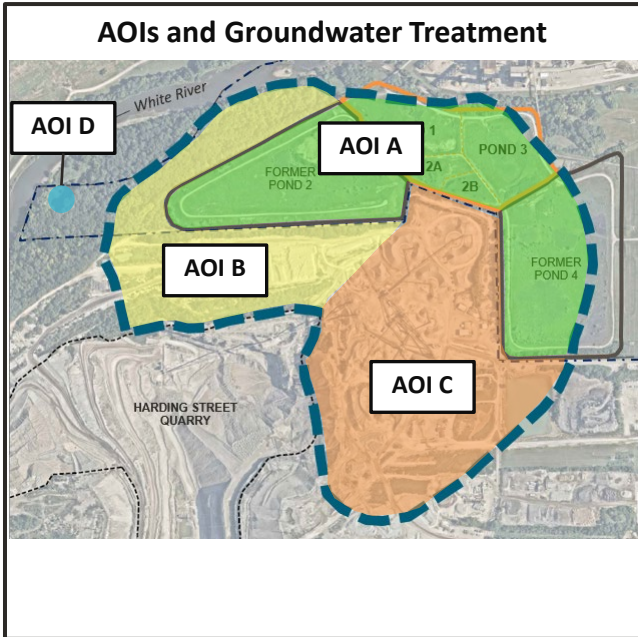
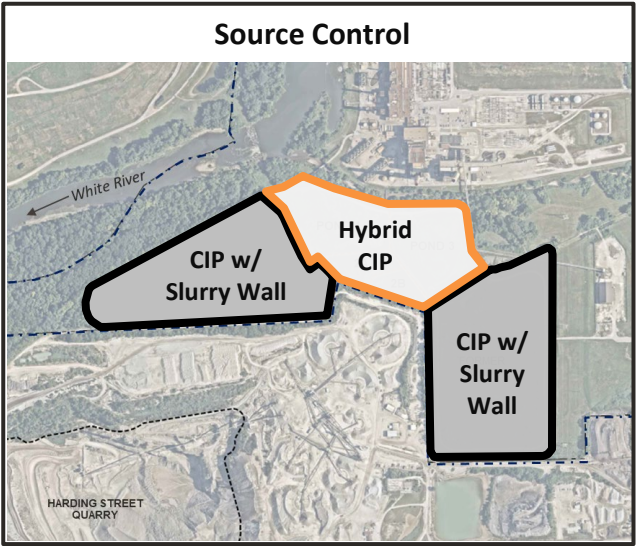
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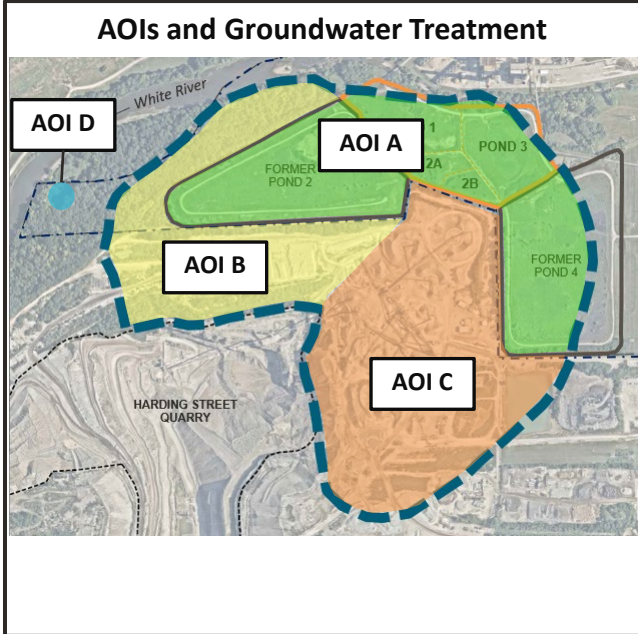
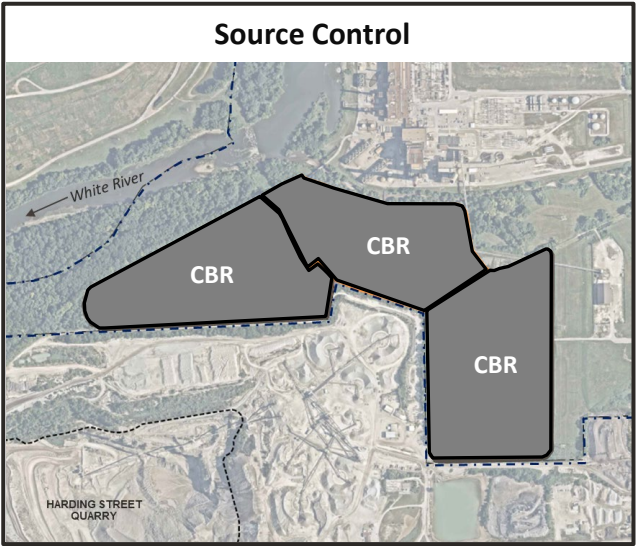
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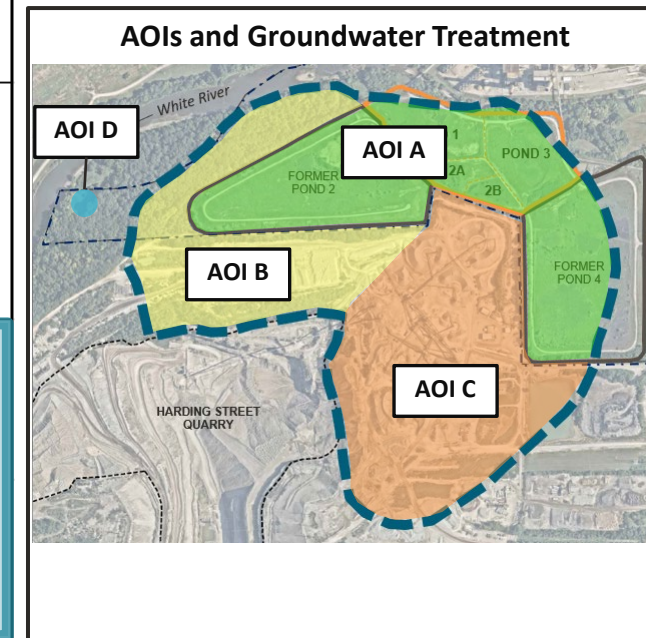
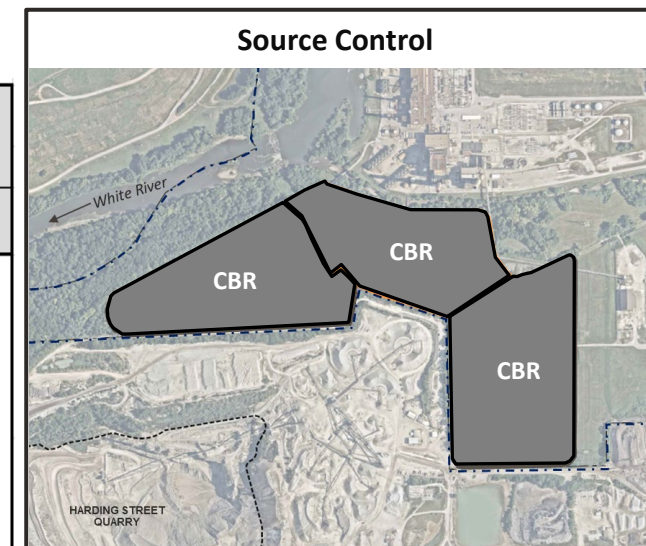
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3A	CBR, Groundwater Pumping, in-ground Treatment and MNA	CBR	CBR	CBR	N/A	Groundwater Pumping and in-ground Treatment	Groundwater Pumping, in-ground Treatment and MNA	MNA
3B	CBR, in-ground Treatment, Water Infiltration and MNA					In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	

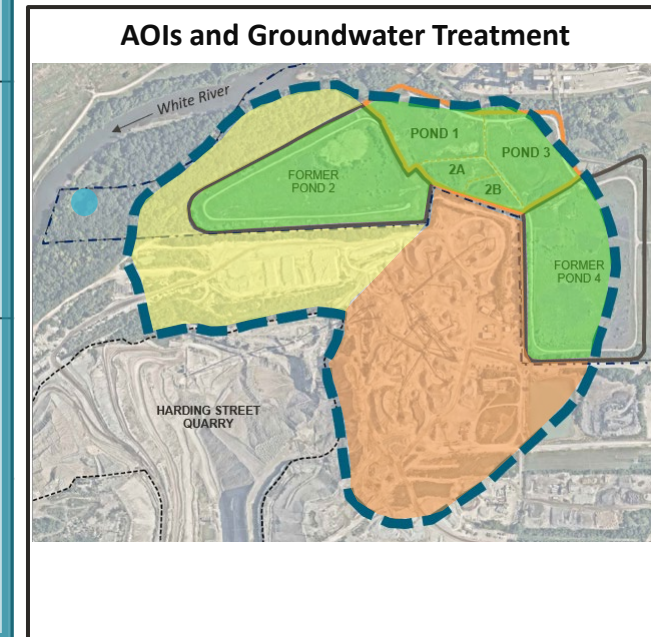


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1A	Hybrid CIP with Capping, CIP with Slurry Wall, Groundwater Pumping, in-ground Treatment and MNA	Hybrid CIP	Hybrid CIP	CIP with Slurry Wall	Slurry Wall (Former Pond 4)	Groundwater Pumping and in-ground Treatment	Groundwater Pumping, in-ground Treatment and MNA	MNA
1B	Hybrid CIP with Capping, CIP with Slurry Wall, in-ground Treatment, Water Infiltration and MNA					In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	
2	Hybrid CIP with Capping, CIP with Slurry Wall, in-ground Treatment, Water Infiltration and MNA	CIP with Slurry Wall	Hybrid CIP	CIP with Slurry Wall	Slurry Wall (Former Pond 2 and Former Pond 4)	In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	MNA
3A	CBR, Groundwater Pumping, in-ground Treatment and MNA	CBR	CBR	CBR	N/A	Groundwater Pumping and in-ground Treatment	Groundwater Pumping, in-ground Treatment and MNA	MNA
3B	CBR, in-ground Treatment, Water Infiltration and MNA					In-ground Treatment	In-ground Treatment, Water Infiltration and MNA	



AOI = Area of interest
CIP = Closure in place

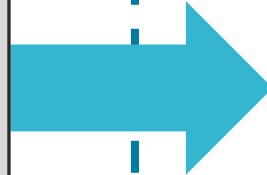
CBR = Closure by removal
MNA = Monitored natural attenuation

Corrective Measures Assessment (CMA): Analysis and Results

How are the Remedial Alternatives Evaluated?

Threshold Criteria (Minimum Requirements)

STEP 1: Potential remedial alternatives are then screened against
Threshold Criteria [257.97(b)]

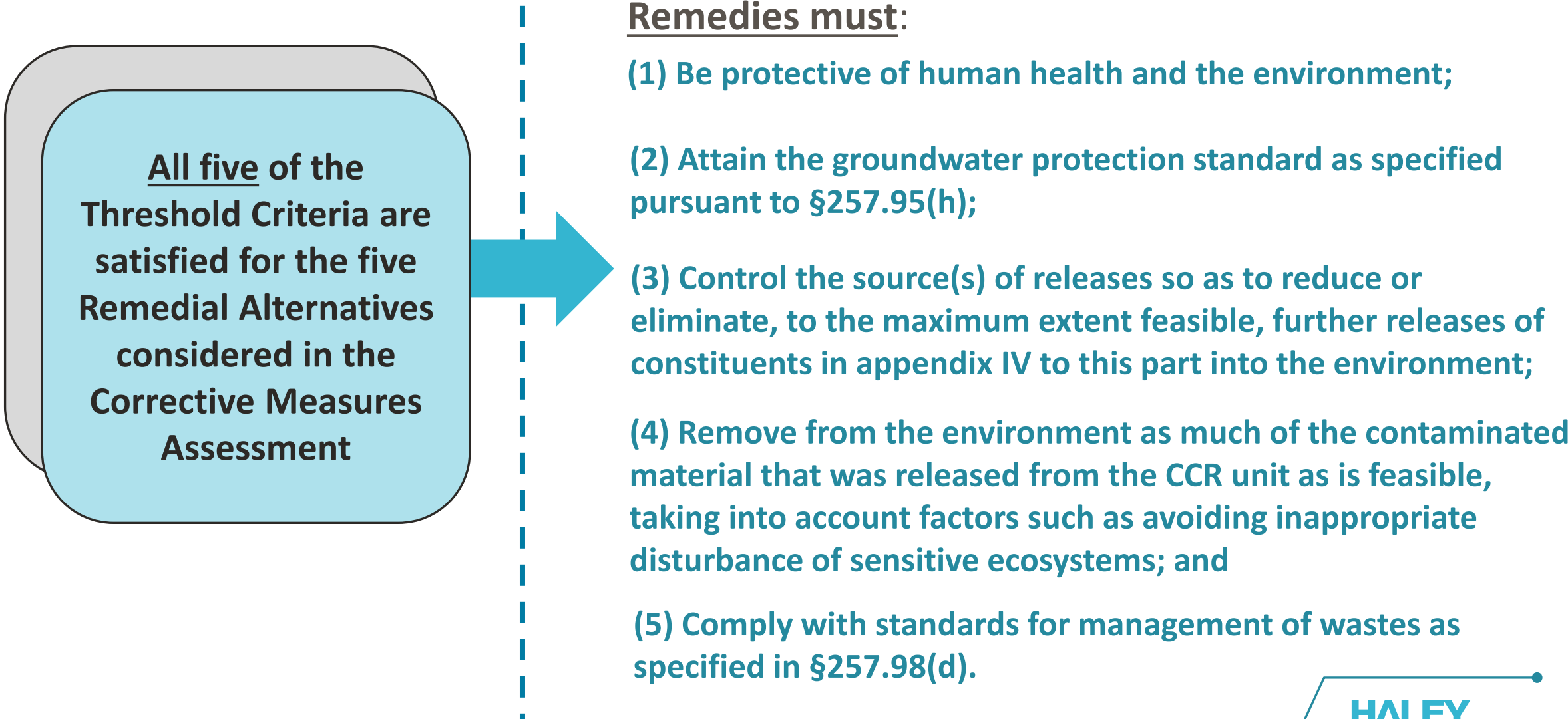


Remedies must:

- (1) Be protective of human health and the environment;
- (2) Attain the groundwater protection standard as specified pursuant to §257.95(h);
- (3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment;
- (4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
- (5) Comply with standards for management of wastes as specified in §257.98(d).

How are the Remedial Alternatives Evaluated?

Threshold Criteria (Minimum Requirements)



**All five of the
Threshold Criteria are
satisfied for the five
Remedial Alternatives
considered in the
Corrective Measures
Assessment**

Remedies must:

- (1) Be protective of human health and the environment;**
- (2) Attain the groundwater protection standard as specified pursuant to §257.95(h);**
- (3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment;**
- (4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and**
- (5) Comply with standards for management of wastes as specified in §257.98(d).**

How are Remedial Alternatives Evaluated?

Balancing Criteria (Effectiveness and Performance)

STEP 2: Once these remedial alternatives are demonstrated to meet the Threshold Criteria, they are then further evaluated with respect to the **Balancing Criteria [257.97(c)]**

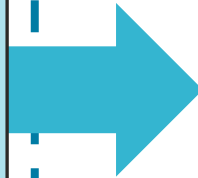


- (1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful;
- (2) The effectiveness of the remedy in controlling the source to reduce further releases;
- (3) The ease or difficulty of implementing a potential remedy(s); and
- (4) The degree to which community concerns are addressed by a potential remedy(s).

How are Remedial Alternatives Evaluated?

Balancing Criteria (Effectiveness and Performance)

The five Remedial Alternatives were evaluated against the first three Balancing Criteria in CMA

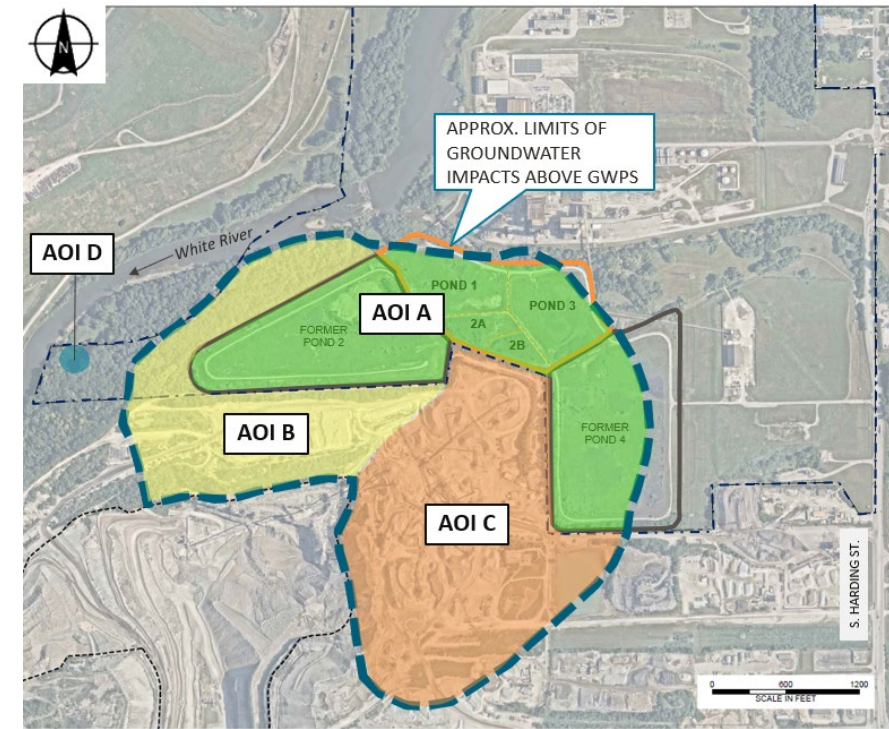


- (1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful;
- (2) The effectiveness of the remedy in controlling the source to reduce further releases;
- (3) The ease or difficulty of implementing a potential remedy(s); and
- (4) The degree to which community concerns are addressed by a potential remedy(s).

Summary of CMA Balancing Criteria Analysis

Balancing Criteria #1 - The long- and short-term effectiveness and protectiveness of the remedy(s), along with the degree of certainty that the remedy will prove successful.

- All alternatives are effective and protective of human health and the environment.
- Alternatives 1A and 3A use groundwater pumping, which is expected to remain effective over time. For those alternatives with hydraulic containment, if pumped water requires above-ground treatment, it may generate a waste stream that must be appropriately managed and disposed of.
- All alternatives include some form of in-situ, or in-ground, treatment to address arsenic and molybdenum, with pilot testing needed to confirm the best methods.
- In Area of Interest D, where arsenic is only slightly above standards, all alternatives include monitored natural attenuation (or MNA), which is projected to reduce concentrations over time after source control is in place.
- Alternatives with Closure by Removal would be protective long-term but involve short-term risks during excavation and offsite transport.



AOI A	WITHIN ASH POND SYSTEM <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI B	ADJACENT TO FORMER POND 2 <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI C	DOWNGRADIENT OF PONDS 1, 2A, 2B, 3 AND FORMER POND 4 <ul style="list-style-type: none">• ARSENIC, LITHIUM, MOLYBDENUM
AOI D	ISOLATED AREA NEAR MW-18 WELL CLUSTER <ul style="list-style-type: none">• ARSENIC

Summary of CMA Balancing Criteria Analysis

Balancing Criteria #2 - The effectiveness of the remedy in controlling the source to reduce further releases.

- Hybrid Closure in Place, Closure in Place with a slurry wall, and Closure by Removal all effectively minimize the risk of further releases either by isolating CCR onsite above the seasonal high groundwater table, by constructing a low-permeability cement-bentonite slurry wall, or by excavating CCR material and transferring it to an offsite lined landfill or facility for beneficial use.

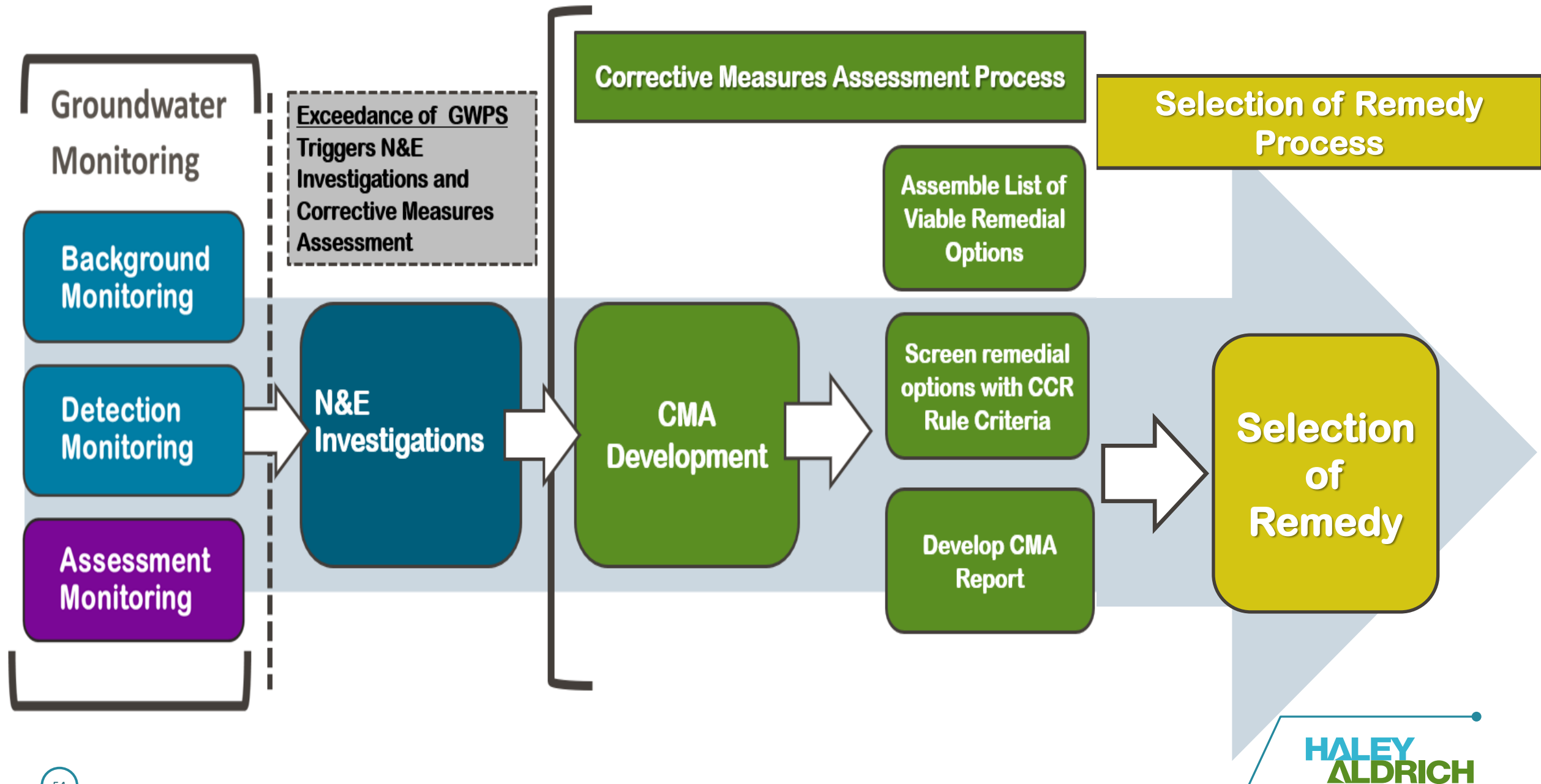
Balancing Criteria #3 - The ease or difficulty of implementing a potential remedy(s).

- For alternatives with Hybrid Closure in Place and Closure in Place with a slurry wall, ongoing maintenance is required for the final cover and pumping systems, but closure equipment is readily available. For those alternatives, the CCR material stays onsite without further treatment or disposal requirements.
- Each of the alternatives involves a combination of groundwater pumping, in-situ treatment, and/or targeted water infiltration systems, some of which could be implemented offsite on the neighboring property to the south.
- Closure by Removal entails significant construction and the need for permits and approvals for complete CCR excavation, transport, and offsite disposal or beneficial use.

Balancing Criteria #4 - The degree to which community concerns are addressed by a potential remedy(s).

Conclusion & Next Steps

What is the process to move from completion of the CMA to Selection of Remedy?



Next steps

The comment period for the CMA will be open for 30 days.

Comments can be submitted via the public meeting website.

<https://www.aesindiana.com/harding-street-cma-meeting>

Public comments will be considered, per the CCR Rule, in the Selection of Remedy process.

Comments and Discussion

<https://www.aesindiana.com/harding-street-cma-meeting>



September 16, 2025

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