

# Removal Action Alternatives Briefing

## Arkema Sediment NTCRA

Presented to:  
EPA & Stakeholders

By:  
Integral Consulting Inc.  
on behalf of  
Retia USA/Legacy Site  
Services, LLC



February 16, 2012



# Overview

- EE/CA Approach
- Site Characteristics
- Removal Action Objectives & Boundaries
- Removal Action Technologies
- Preliminary Removal Action Alternatives
- Key EE/CA Considerations
- Preliminary Schedule
- Q & A



# EE/CA Approach

- Objective: Develop practical range of removal alternatives with sufficient level of engineering and cost detail to facilitate selection of preferred alternative
- Comply with requirements of AOC, EE/CA Work Plan, and NTCRA guidance, EPA Sediment Remediation Guidance (2005), and OSWER Directives
- Draw on knowledge from recent/ongoing sites (e.g., Gasco, Zidell, M&B, Slip 4, Hylebos, T-117, Boeing Plant 2, Lower Duwamish, Fox River, Grasse River, and Hudson River)
- Integrate the EE/CA such that:
  - Arkema RAA will be integrated with Portland Harbor remedy
  - Arkema sequencing will be consistent with Portland Harbor FS
- Consult with LWG FS expert committee

# Site Characteristics - Physical



integral  
solutions

FEATURE SOURCES:  
Aerial: Metro, 2007  
Property Boundaries: Metro RUS

0 250 500 Feet

**Map Features**

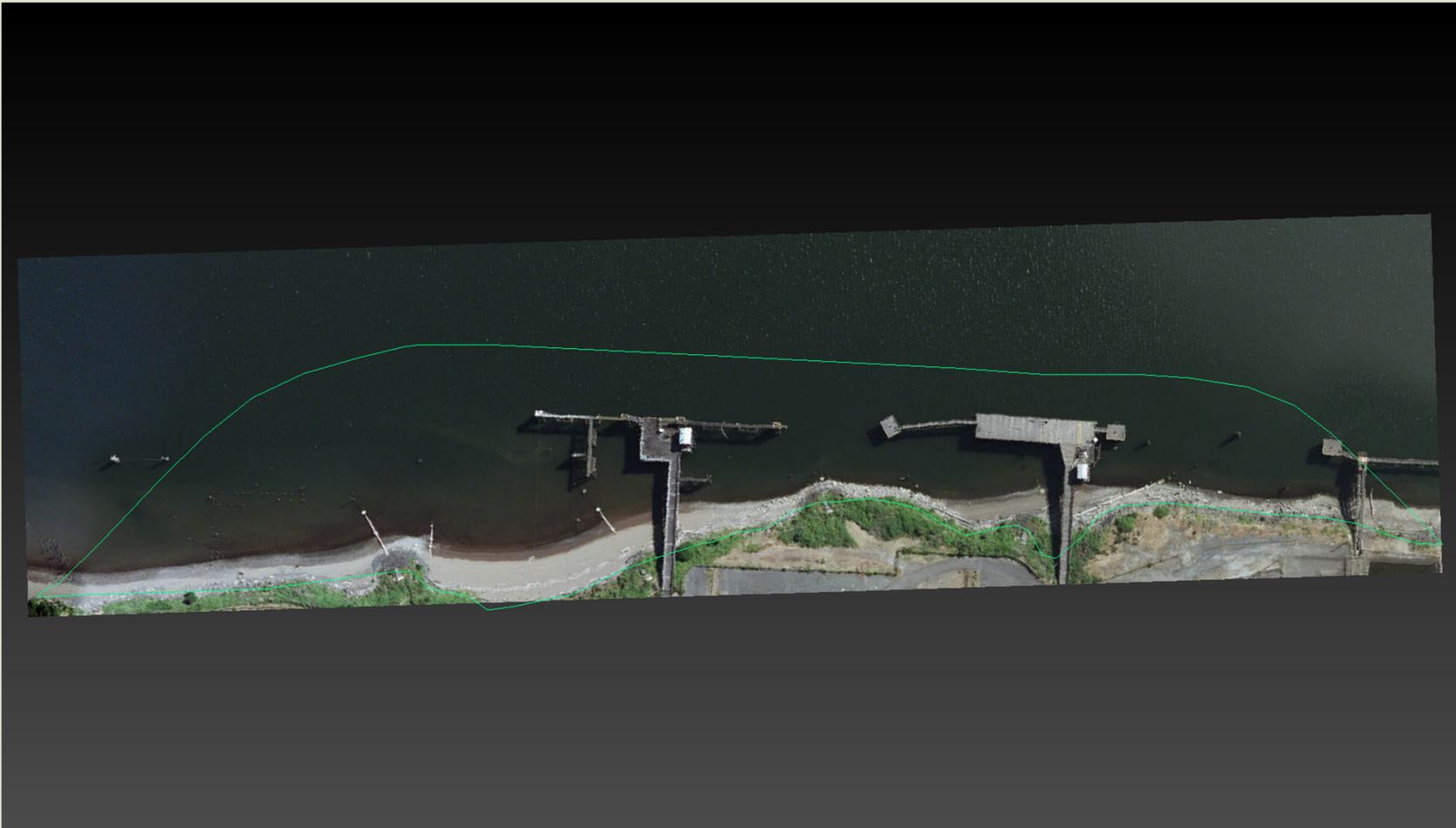
- EPA Directed Horizontal RAA Boundary
- AOPC 14
- River Miles
- - - Navigation Channel
- Waterfront Taxlots
- Doane Lake (Current)

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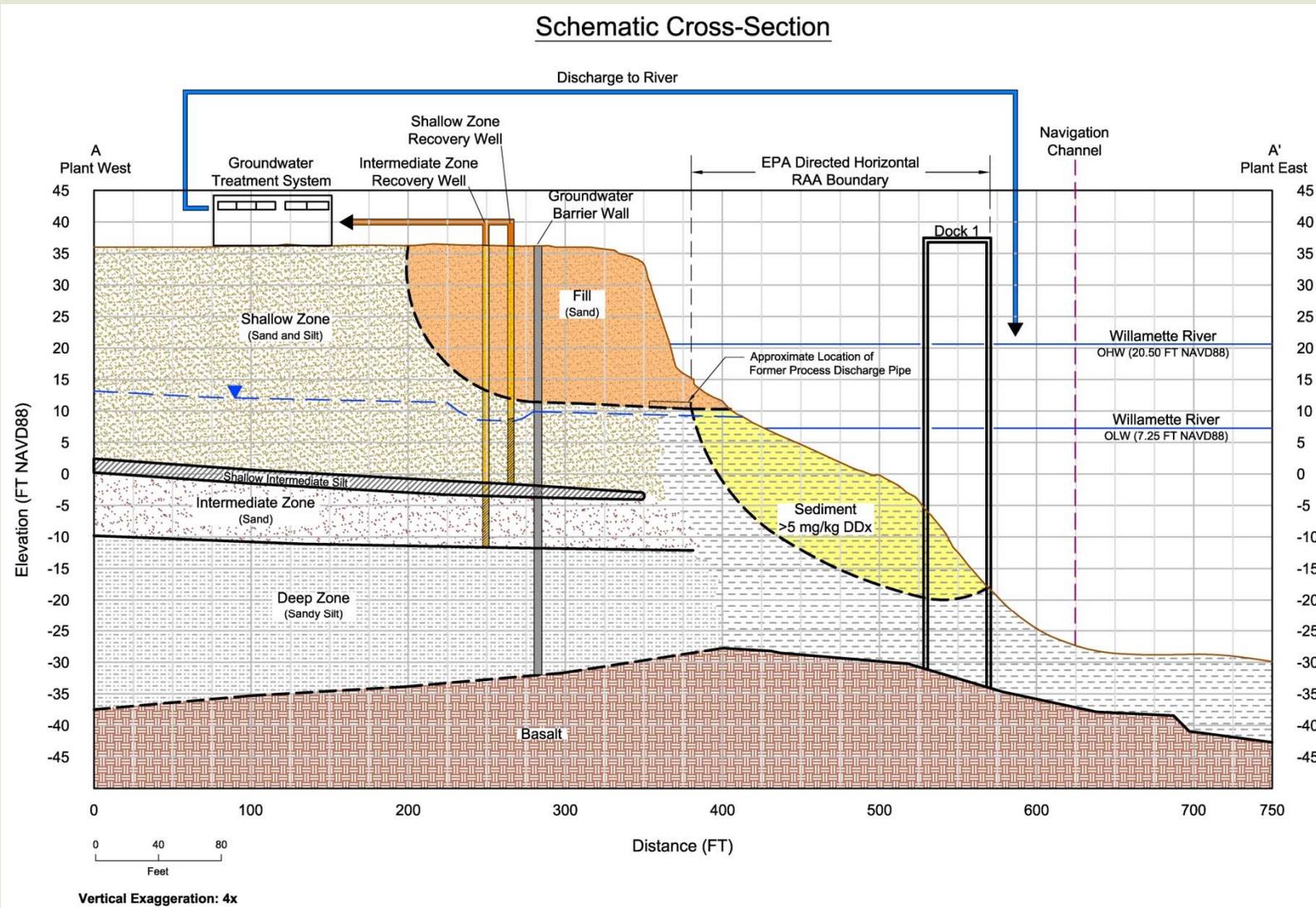
**Figure 1-1**  
Aerial Photograph and Adjacent Properties  
Arkema Early Action  
Removal Action Area Characterization Report

INC.

# Site Characteristics - Physical



# Arkema Site Schematic Cross-Section





FEATURE SOURCES:  
Aerial: Metro, June-July 2009



Photo Location

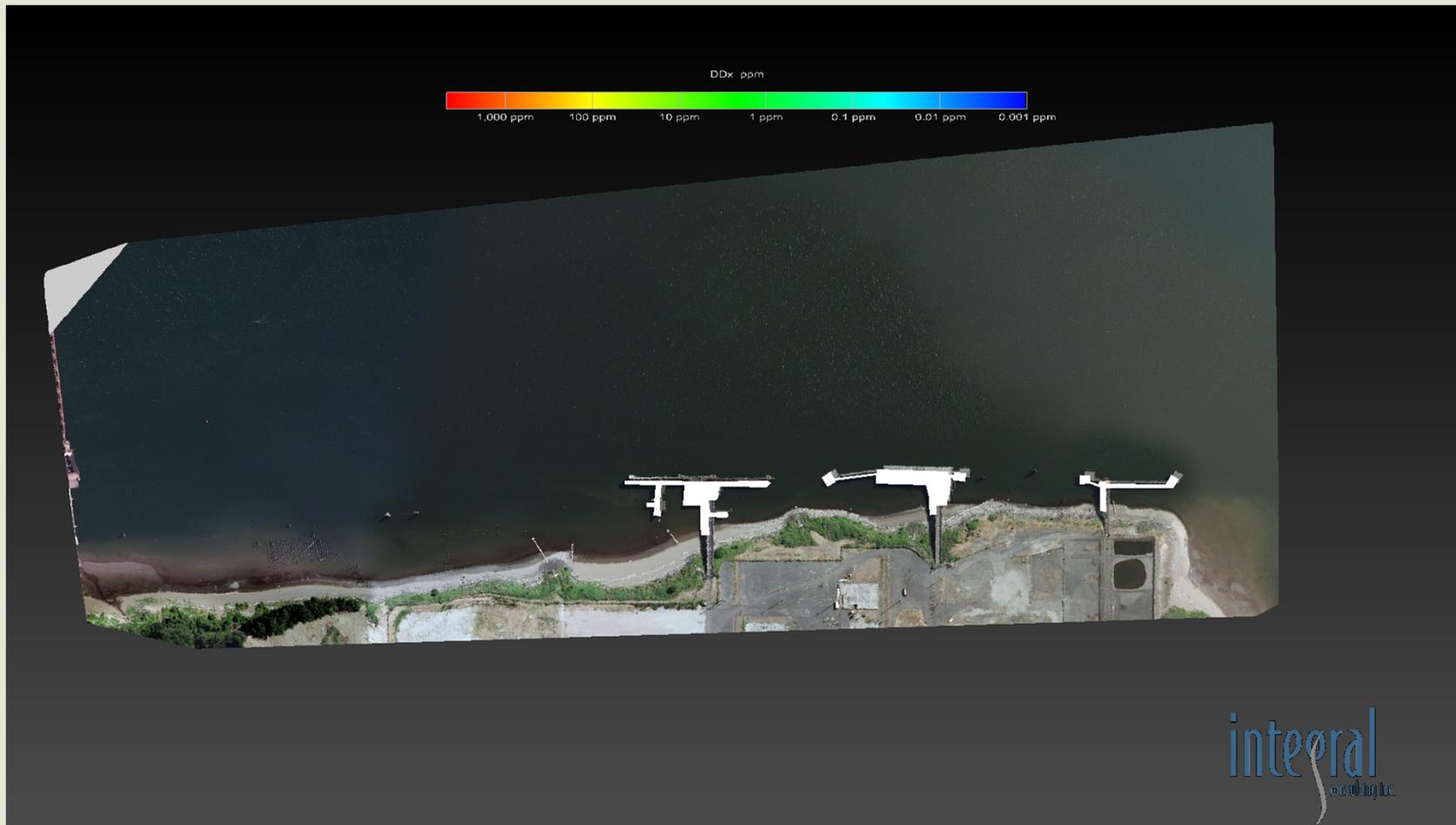
- Property and Lot Boundary
- Storm Drain
- 12ft Contour
- Navigation Channel

0 75 150 Feet

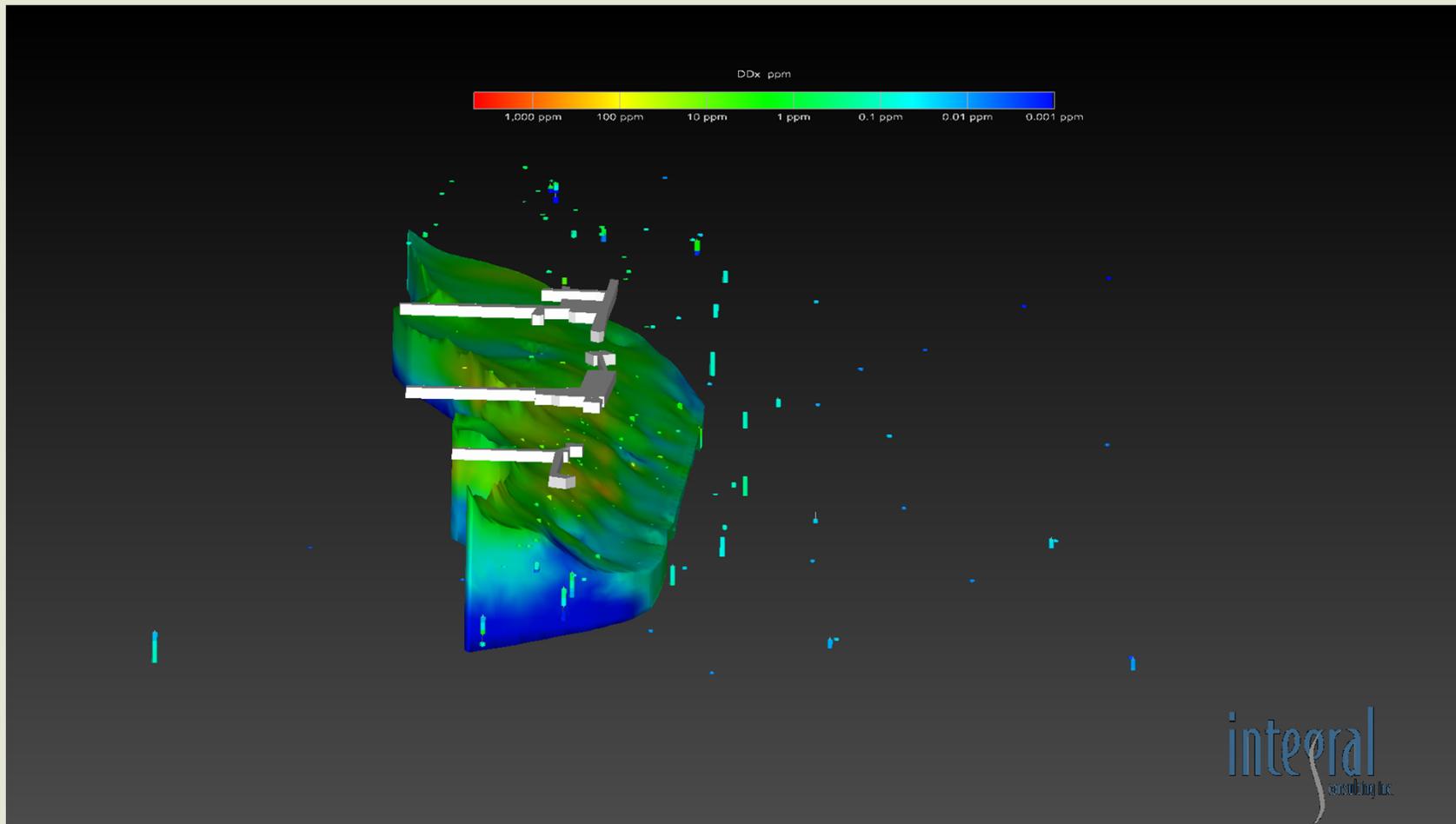
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**Figure 3-8**  
Visual Surface Debris Survey  
Selected Photos with Locations  
Arkema Early Action  
Removal Action Area Characterization Report

# Site Characteristics - Chemical



# Site Characteristics - Chemical



# COI Summary

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- DDx
- Other COI
  - PCDD/F, hexachlorobenzene, PCBs, total chlordanes, tributyltin, and lindane (gamma-hexachlorocyclohexane)

# Removal Action Objectives and Cleanup Boundaries

- Removal Action Objectives
  - RAOs set forth in Consent Order
- Horizontal Removal Action Area Boundary has been defined (5 ppm DDx)
- Vertical boundary to be determined. Evaluation of alternatives to include a range of concentrations for DDx and other COIs as well as engineering/practicability constraints
- Removal action will align with Portland Harbor process including:
  - FS alternatives/technologies/elements
  - RAOs, PRGs, RALs for potential vertical boundary evaluation
  - Schedule

# Removal Action Technologies - Approach

- Evaluate technologies identified in the AOC and EE/CA WP
- Maintain consistency with technologies & remedial strategies set forth in Portland Harbor FS
- Focus on proven and innovative technologies with demonstrated success at similar sites
- Technology screening will be streamlined in accordance with NTCRA guidance

# Preliminary Removal Action Technologies

Response Action	Potential Technologies
Institutional Controls	Government & proprietary controls, enforcement tools, information devices
MNR/EMNR	MNR: Physical, chemical, biological monitoring EMNR: Thin-layer placement, including possible amendments (GAC)
Containment	Conventional granular caps, reactive caps, partial dredge and cap, armoring Focused confined nearshore disposal facility (CDF)

# Preliminary Removal Action Technologies

Response Action	Potential Technologies
Removal	<p><u>Dredge Equipment</u>: Clamshell, fixed-armed dredge, environmental bucket, hydraulic</p> <p><u>WQ Protection</u>: Operational controls/BMPs, silt curtains, rigid containment, innovative barrier systems &amp; combinations</p> <p><u>Residuals Management</u>: Verification sampling, thin-layer placement</p>
Disposal	<p><u>Offsite</u>: Truck, Rail, or Barge to approved landfill</p> <p><u>Onsite</u>: Nearshore CDF</p> <p><u>Other</u> : Port of Portland T-4, Ross Island, Swan Island</p>

# Preliminary Removal Action Technologies

Response Action	Potential Technologies
Treatment	<p><u>In-Situ Treatment:</u> GAC and/or other amendments; As possible stand-alone treatment technology or incorporated into other technologies (caps, EMNR)</p> <p><u>Other:</u> Conventional Treatment of Construction Water</p>
Monitoring	Scope and frequency will vary with alternatives

# Preliminary Removal Action Alternatives

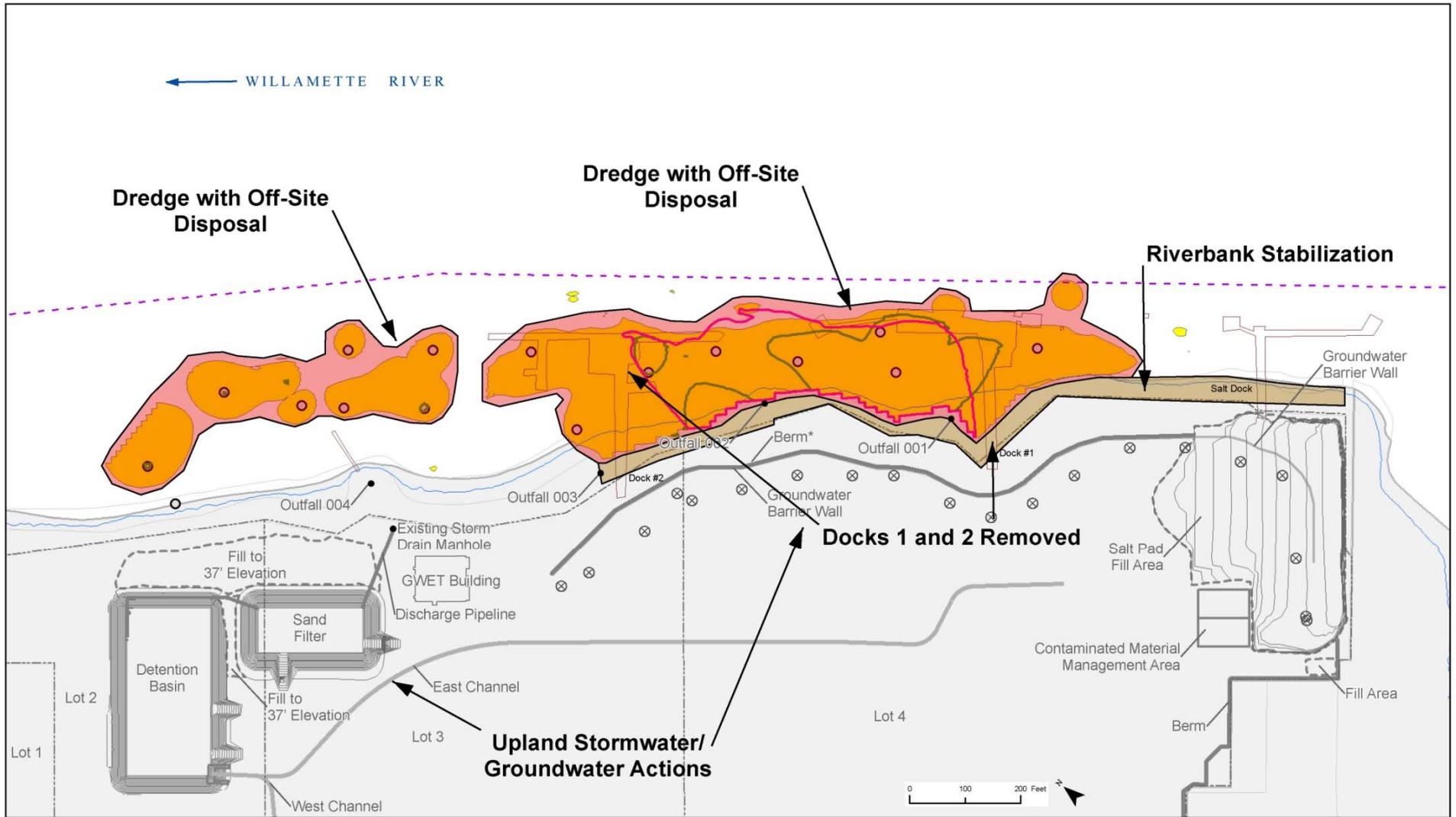
- Alternatives are conceptual, representing spectrum of remedial strategies from containment to removal
- Possible sub-alternatives may be identified during EE/CA (e.g., different technology combinations, cap types, dredge depths, etc.)
- Conceptual Alternatives
  - Removal
  - Removal with Nearshore CDF
  - Removal & Capping
  - Capping

# Common Elements

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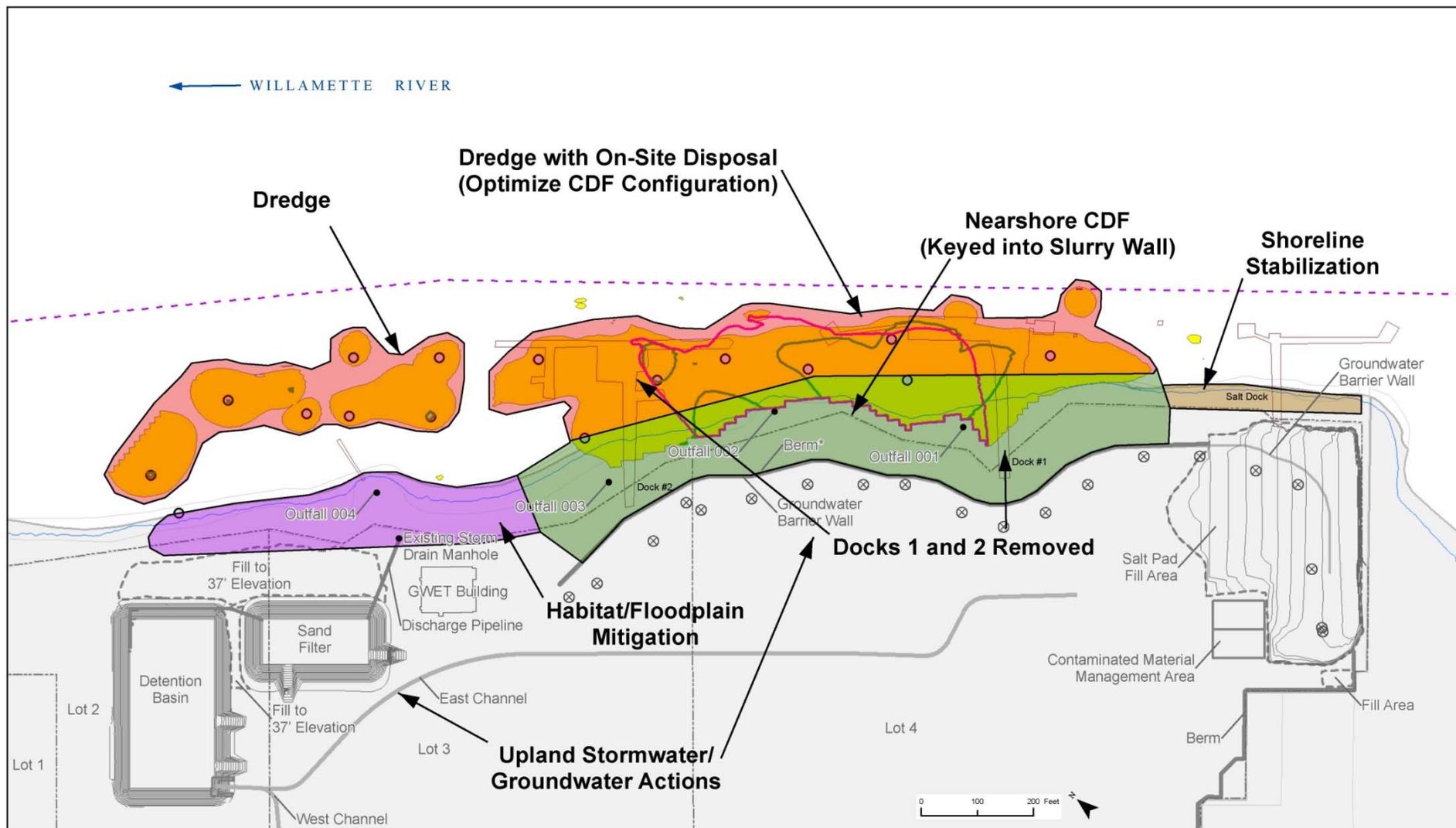
- MNR and EMNR is a component of all alternatives
- Upland source control measures will be complete (slurry wall, groundwater and stormwater treatment, interim cap)
- Evaluation to include leaving (maintaining river-dependent usage) and removing docks
- Stabilization of riverbank slopes
- Habitat/floodway mitigation measures
- Environmental controls, WQ monitoring
- Sediment decant water management and treatment
- Institutional controls, long-term monitoring

# Removal



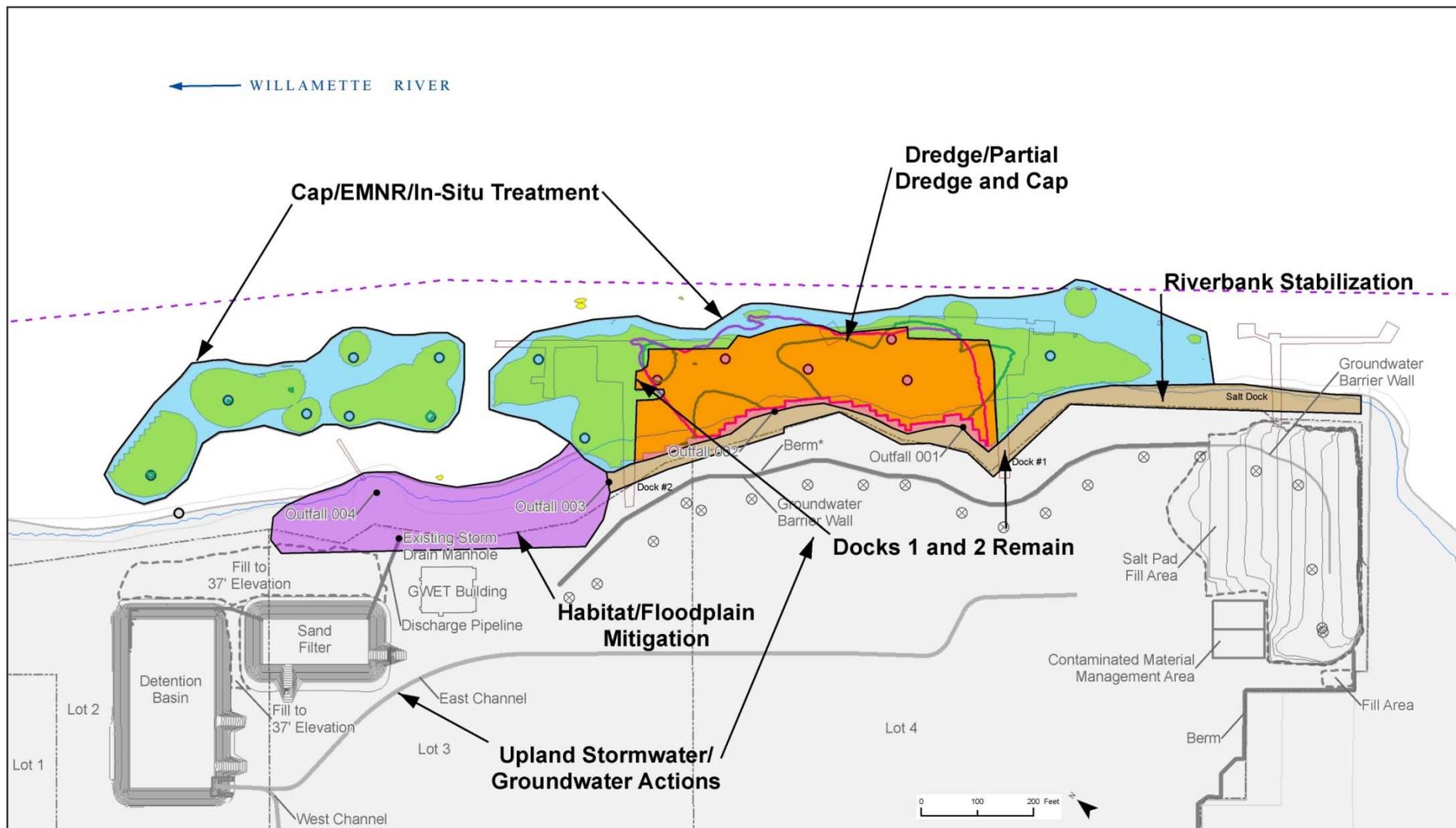
PRELIMINARY WORK PRODUCT. PROPOSED REMOVAL ACTION BOUNDARIES AND ALTERNATIVES ARE CONCEPTUAL FOR DISCUSSION PURPOSES ONLY. SUBJECT TO CHANGE.

# Removal with Confined Disposal Facility



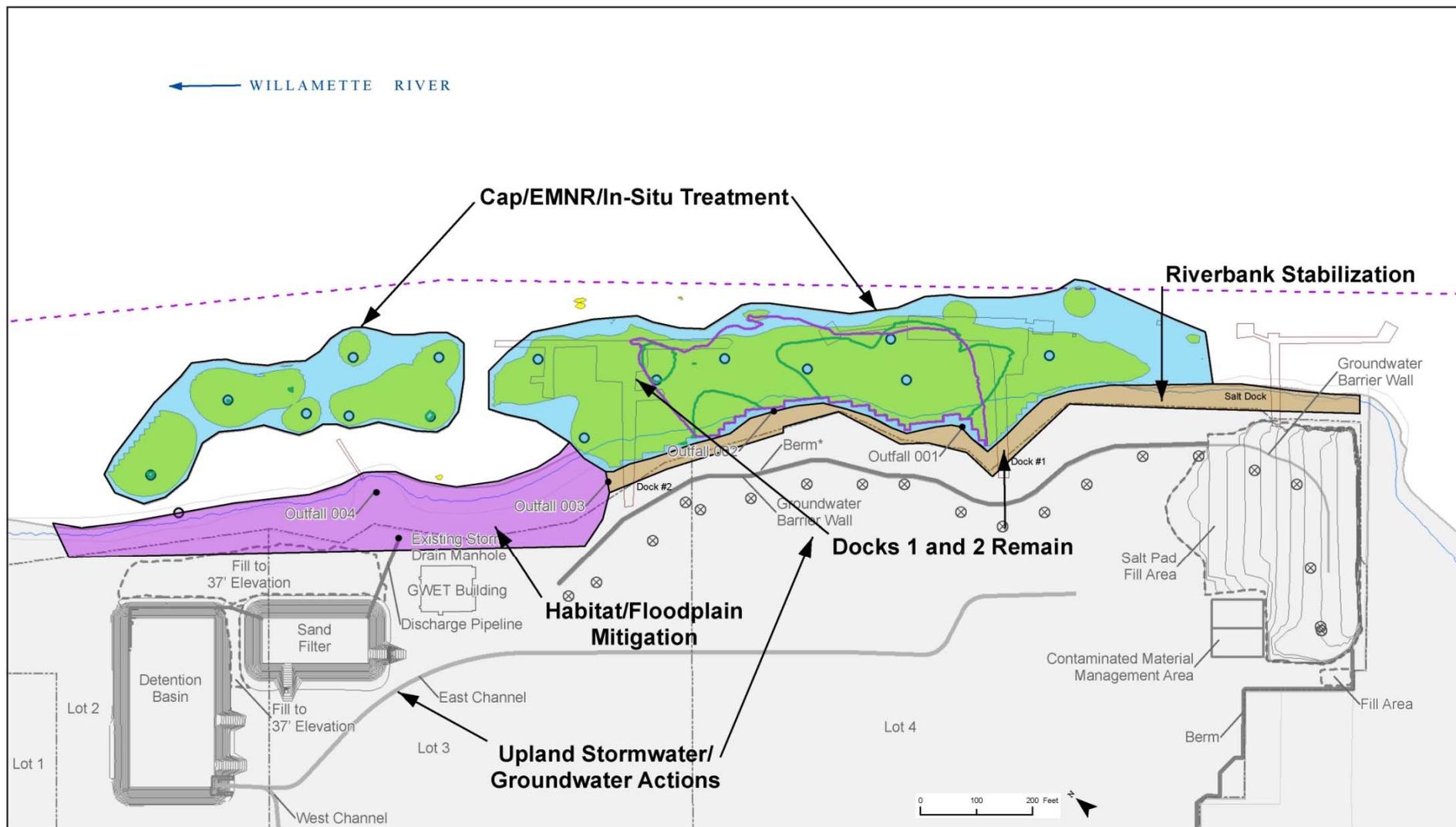
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# Removal and Capping



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# Capping



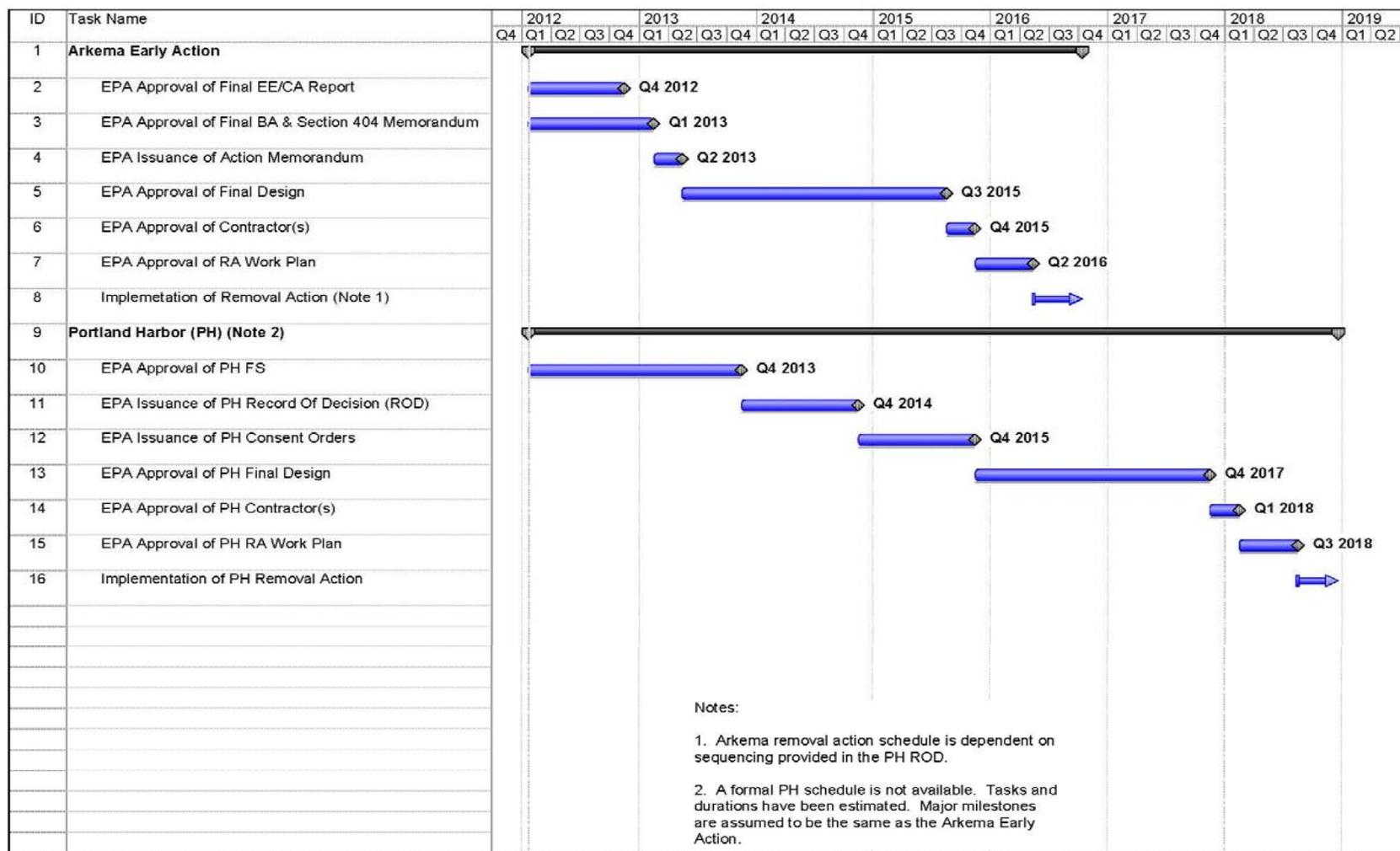
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# Key EE/CA Considerations

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- Feasibility of containment and in-situ remedial technologies
- Water quality protection, residuals management
- Feasibility of preserving docks/maintaining river dependent use
- Integration of upland and in-water remedial actions
- Consistency with Portland Harbor remedial strategy and sequencing
- Source Control and Recontamination from uncontrolled up river sources

# EE/CA and Portland Harbor Integration



# Questions?

