Arkema EE/CA Consultation Meeting

August 8, 2008
Portland, Oregon

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Outline

- Site History and Background
- Engineering Evaluation/Cost Analysis (EE/CA)
  - Status and Schedule
  - Purpose
  - Overview of Alternative Analysis
- Section 7 Consultation Process
- Access Agreement Process
- City of Portland Process
- Discussion (Q&A)
- Site Walk
- Wrap-up

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Site History and Background

- Site operations from 1941-2001
- Primarily chlor-alkali production
- DDT production from ~1947-1954
- Other chemical production
  - Ammonium perchlorate (1958-1962)

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0 0.1 0.2
Miles

Figure 2-
Aerial Photograph and Adjacent Propertie

Arkema Site

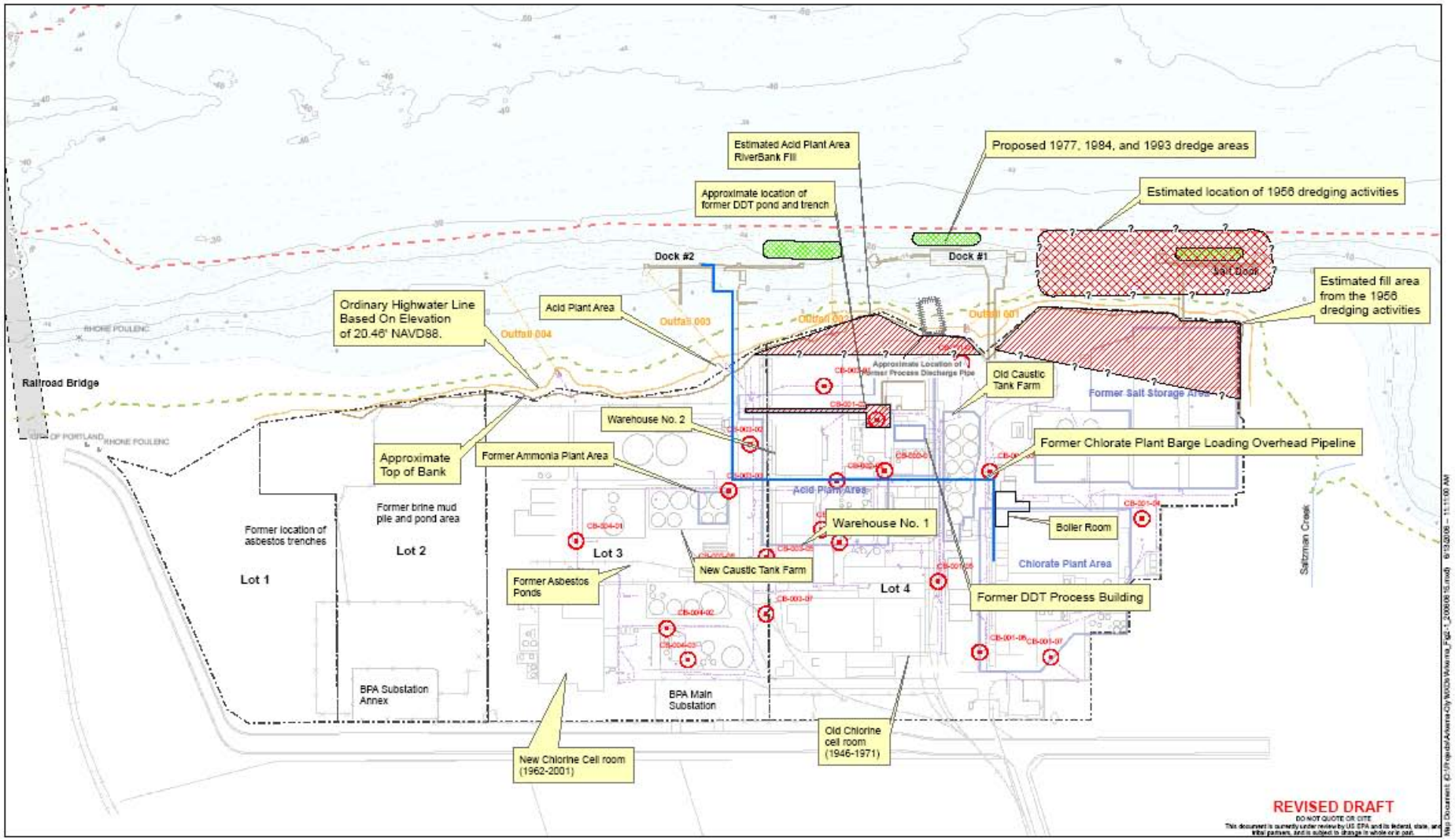

Figure 2-4
Arkema EE/CA
Dredge & Fill and Historical Uses of Site

Site History and Background

- Voluntary Agreement with DEQ (1998)
- Upland RI and Source Control
  - Investigations (1998-2007)
  - Interim RI Report (1999)
  - Upland Interim Removal Actions-Soil (2000-1)
  - Upland In-situ Groundwater IRMs (2003-6)
  - Final RI (2005)
  - Groundwater Source Control IRM (2006-ongoing)
  - Stormwater Source Control IRM (2006-ongoing)
  - Level 2 Ecological Risk Assessment (2008)
  - Human Health Risk Assessment (2008)
- Currently negotiating consent order with DEQ

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Site History and Background

- In-water RI
  - Phase I (1998)
  - Phase II (2002-3)
- EPA Order for NTCRA (2005)
  - EE/CA Work Plans and Negotiations (2005-2008)

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Site History and Background

- Existing In-Water Data
  - ~250 sediment data points
  - ~40 biological samples
  - ~35 transition zone water samples
  - ~10 surface water samples

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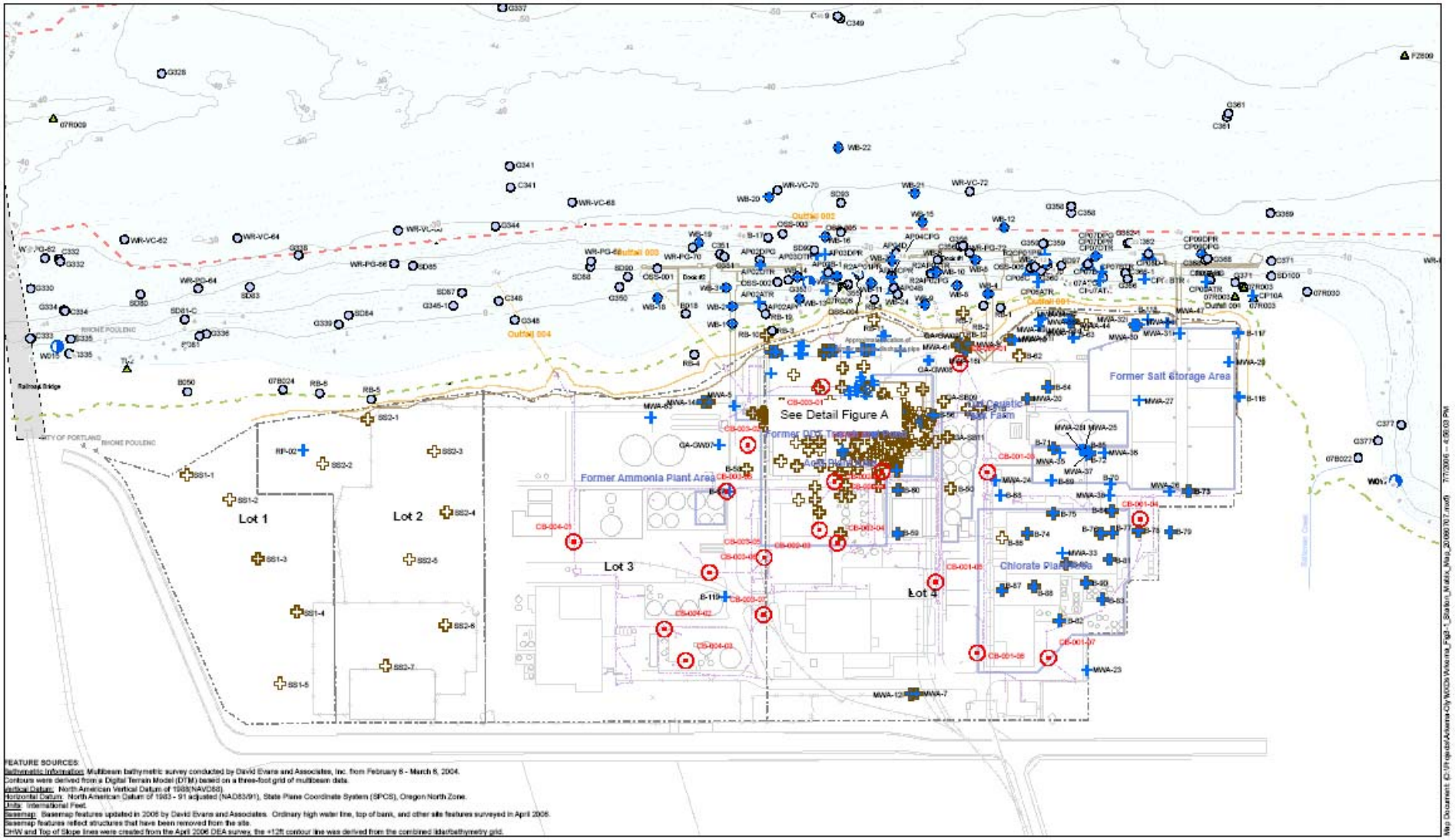

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200 100 0 200 Feet

1 inch equals 233.333333 feet

Tissue
Sediment
Soil
Pore Water
Surface Water
Groundwater
Catch Basins
River
Navigation Channel
Bridges
12ft_Contour
Bathymetry (2, 10 ft)
Index Contour
2' contour
Ordinary High Water
Top of Bank
E-Sewer-L
Storm Drain

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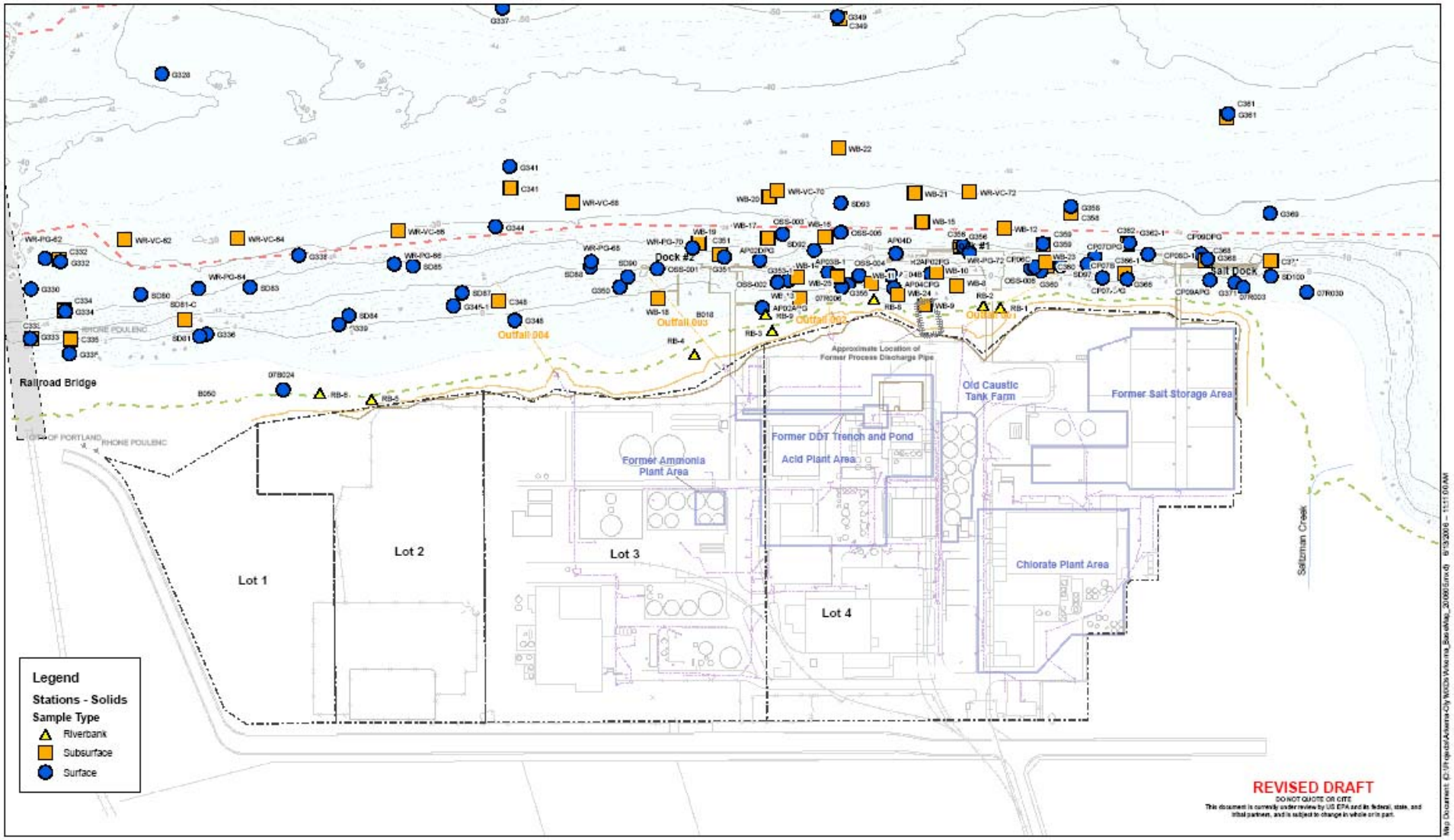
This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Figure 3-1a
Arkema EE/CA
Historical Station Locations
(All Samples)



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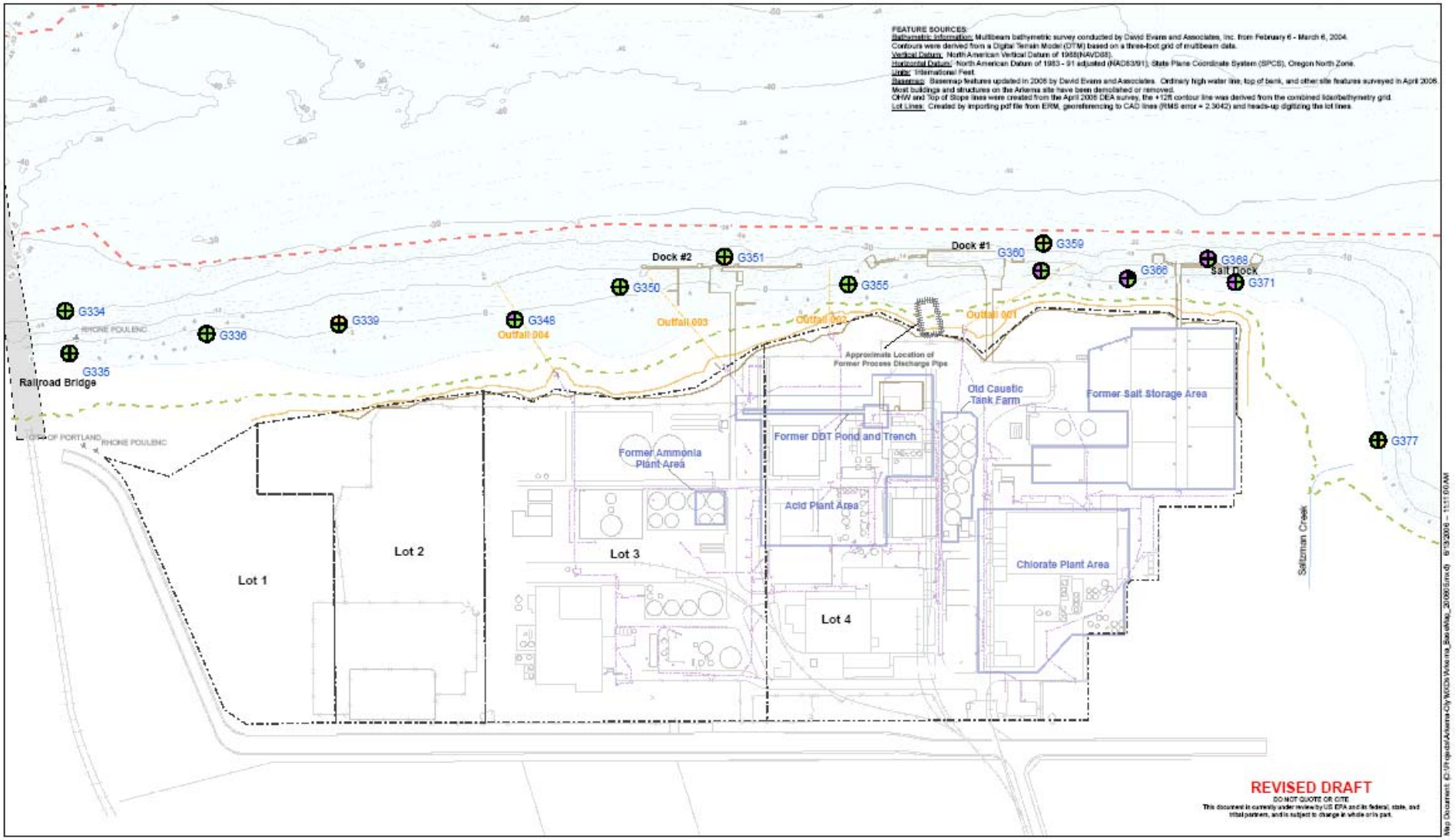
200 100 0 200 Feet

FEATURE SOURCES:
Bathymetric Information: Multibeam bathymetric survey conducted by David Evans and Associates, Inc. from February 6 - March 6, 2004.
Contours were derived from a Digital Terrain Model (DTM) based on a three-foot grid of multibeam data.
Vertical Datum: North American Vertical Datum of 1988(NAVD88).
Horizontal Datum: North American Datum of 1983 - 91 adjusted (NAD83/91), State Plane Coordinate System (SPCS), Oregon North Zone.
Units: International Feet.
Basemap: Basemap features updated in 2008 by David Evans and Associates. Ordinary high water line, top of bank, and other site features surveyed in April 2006.
Most buildings and structures on the Arkema site have been demolished or removed.
OHW and Top of Slope lines were created from the April 2006 DEA survey, the +12ft contour line was derived from the combined tide/bathymetry grid.
Lot Lines: Created by importing pdf file from ERM, georeferencing to CAD lines (RMS error = 2.3042) and heads-up digitizing the lot lines.

Ordinary High Water
Top of Bank
E-Sewer-L
Storm Drain
12ft_Contour
Navigation Channel
Property Lines
Bridges
River
Outfalls

Figure 3-2
Arkema Site
Historical Sample Locations
(Sediment and Riverbank Soil Samples)



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200 100 0 200 Feet

Ordinary High Water
Top of Bank
E-Sewer-L
Storm Drain
12ft_Contour
Bridges
Navigation Channel
River
Outfalls
Property Lines

Figure 3-5
Arkema EE/CA
Portland Harbor Stage 2
Bioassay Testing Results

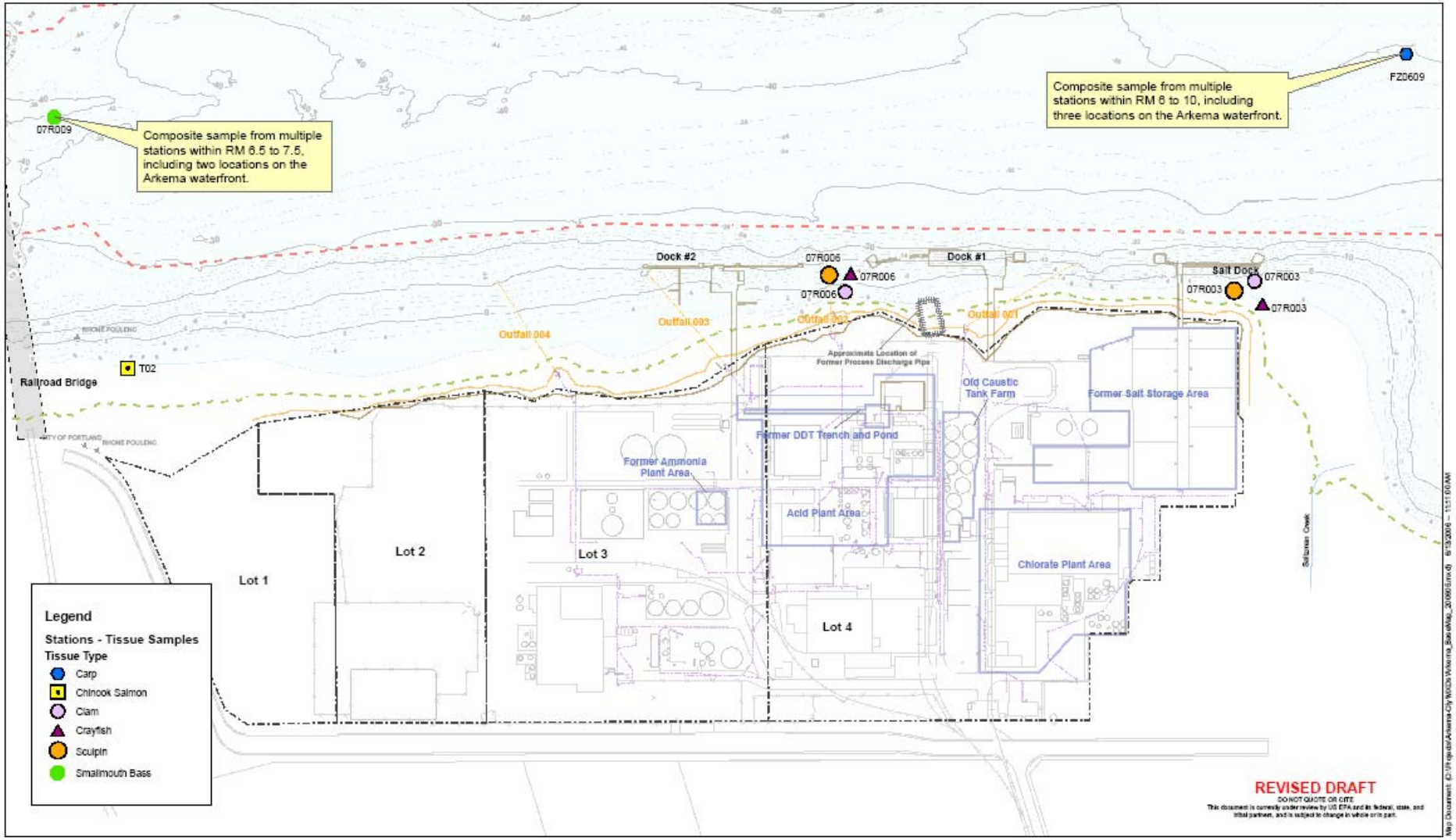
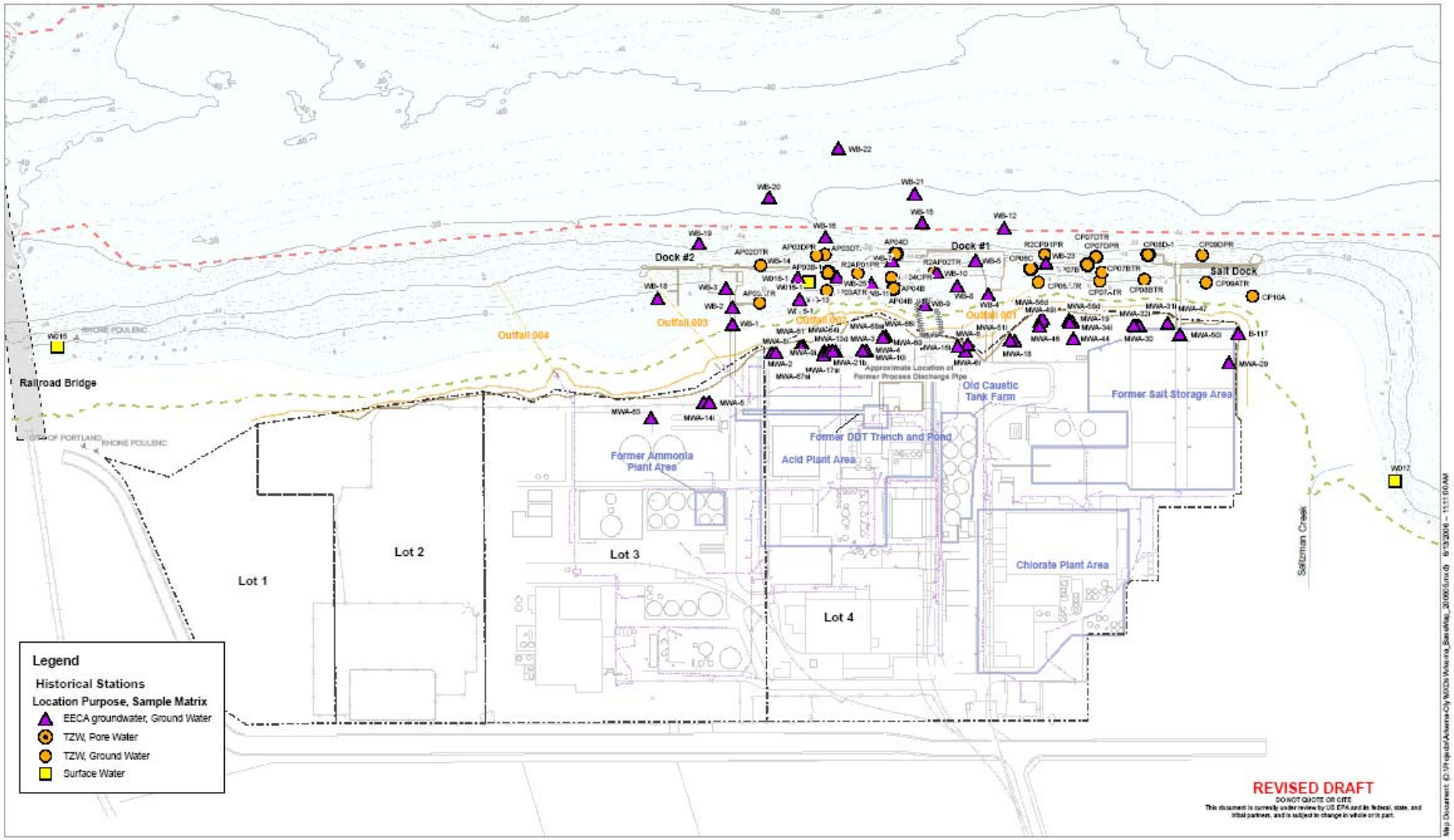


Figure 3-4
Arkema Site
Historical Station Locations
(Tissue Samples)



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200 100 0 200 Feet

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Ordinary High Water
Top of Bank
E-Sewer-L
Storm Drain
12ft_Contour
Navigation Channel
Property Lines
Bridges
River
Outfalls

Figure 3-3
Arkema Site
Historical Station Locations
(Water Samples)

DDT Manufacturing with MPR Pipe Discharge during the Initial Startup Period: Approx. 1947 Natural Recovery: 1948 - Present

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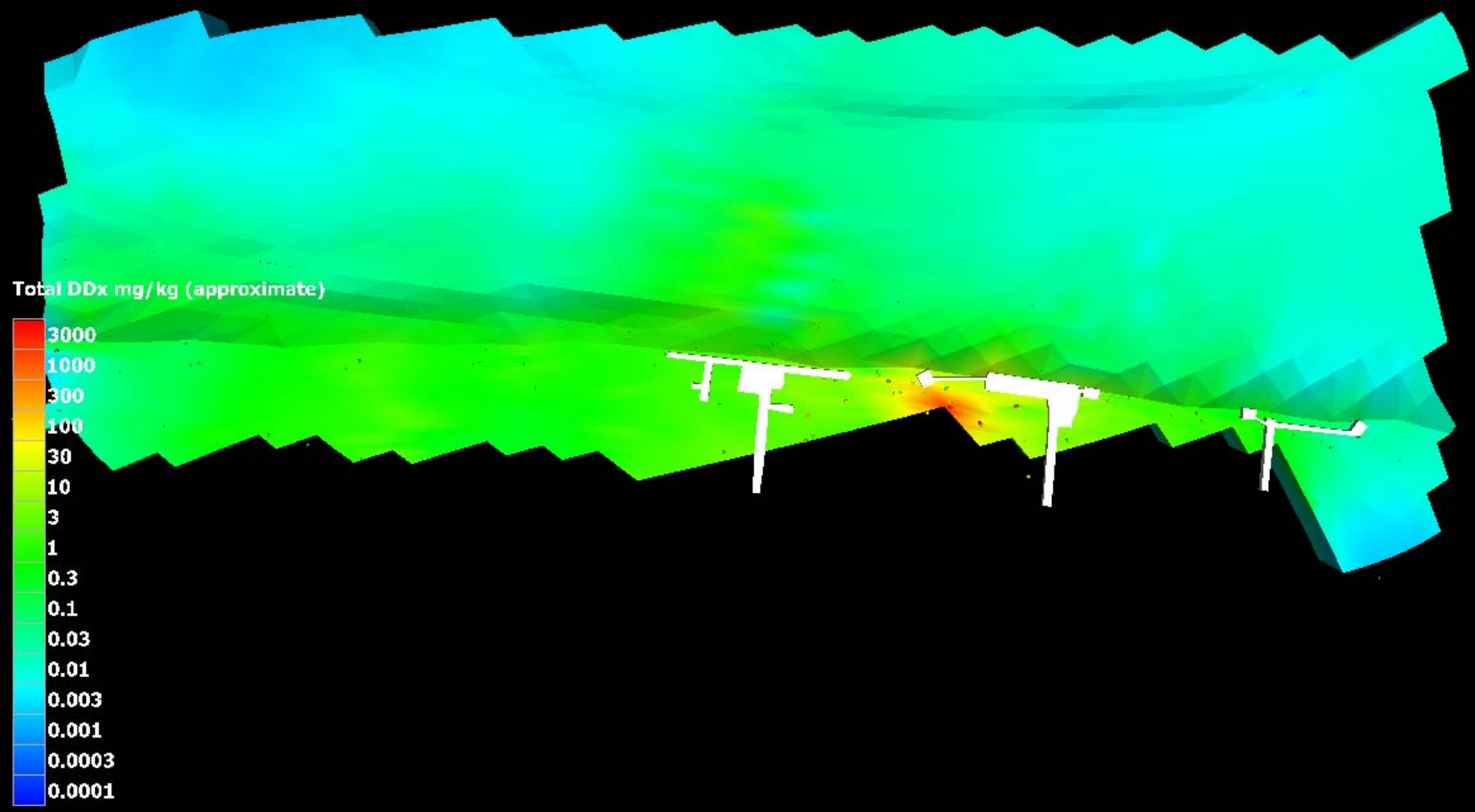
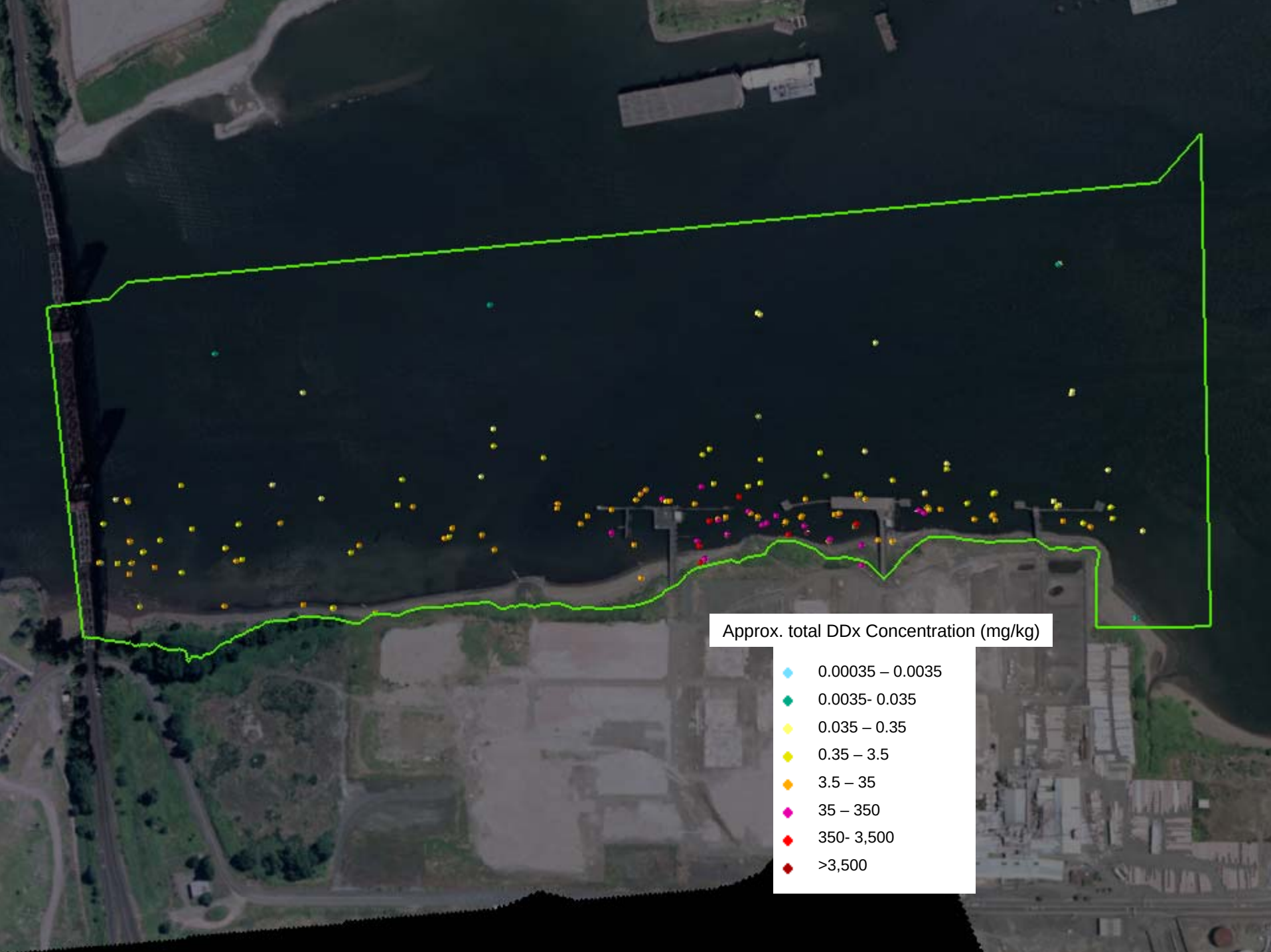
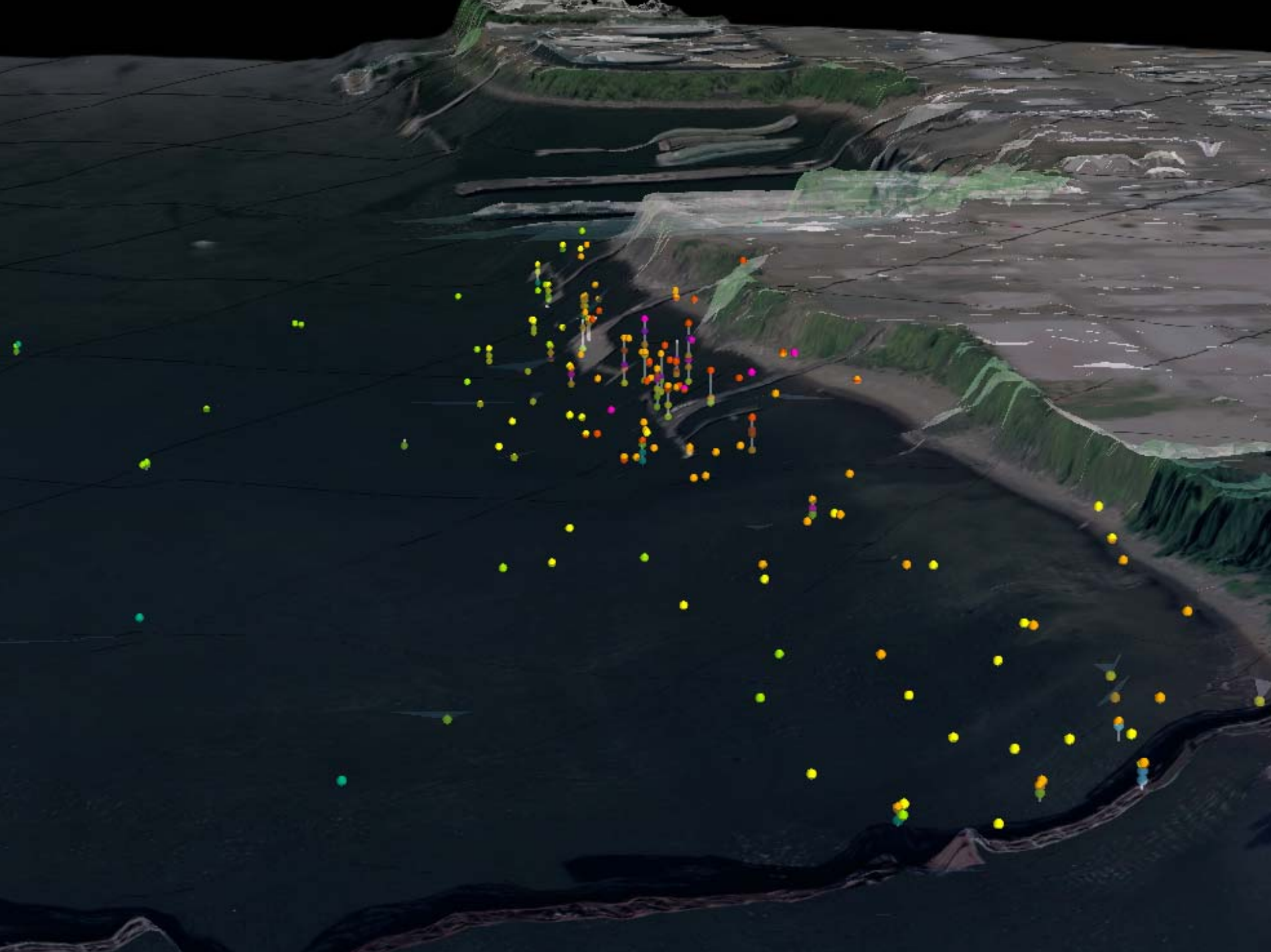



Approx. total DDx Concentration (mg/kg)
0.00035 – 0.0035
0.0035- 0.035
0.035 – 0.35
0.35 – 3.5
3.5 – 35
35 – 350
350- 3,500
>3,500



Current EE/CA Status and Proposed Schedule

- Work Plan Addendum (submitted July 22nd)
- FSP, QAPP, HASP (due August 21st)
- Agency review, comments and finalization of WP, FSP, QAPP, HASP (Oct 2008)
- Additional EE/CA Characterization (2008-9)
- Receive and Report Data (March 2009)
- Submit Draft EE/CA Report (Oct 2009)

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Purpose of the EE/CA

- OSWER Directive 9200.1-90, *Response to Regional Request Regarding Sediment Cleanup at May 2008 Superfund Division Directors Meeting*, July 3, 2008.
  - "EPA's policy has been and continues to be that there is no presumptive remedy for any contaminated sediment site, regardless of the contaminant or level of risk."
  - "In short, OSRTI believes that dredging, while not a presumptive remedy, should be considered on an equal footing with other remedial options."

- From the Statement of Work in the Consent Order
  - Arkema/LSS shall evaluate
    - » Technologies for sediment remediation including capping, dredging, treatment, including any necessary treatability testing, and disposal (on-site and off-site);
    - » Identification and Analysis of Removal Action Alternatives, including the identification and analysis of disposal facility or containment options;

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Purpose of the EE/CA

- In short, LSS will evaluate sediment remediation options in accordance with our Consent Order and EPA guidance to ensure that all options are evaluated on an equal footing in the EE/CA Report.

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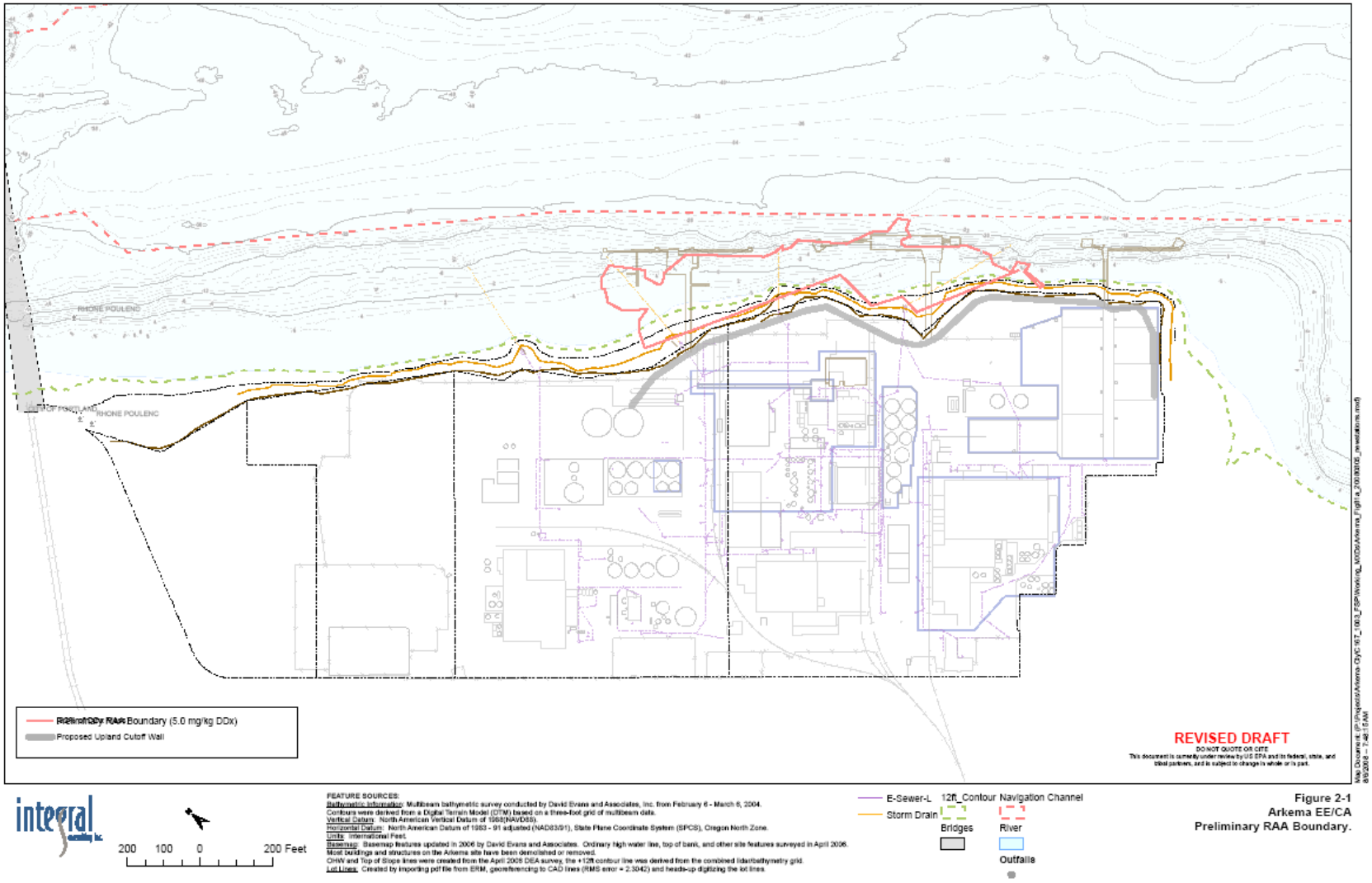
Preliminary RAA Boundary



EE/CA Alternatives Analysis

- Removal Action Technologies
  - Dredging
  - Capping, Thin-layer Placement
  - Natural Recovery
- Removal Action Disposal Alternatives
  - CDF (nearshore and upland)
  - Offsite landfill
- The following slides present <u>conceptual examples</u> of these elements

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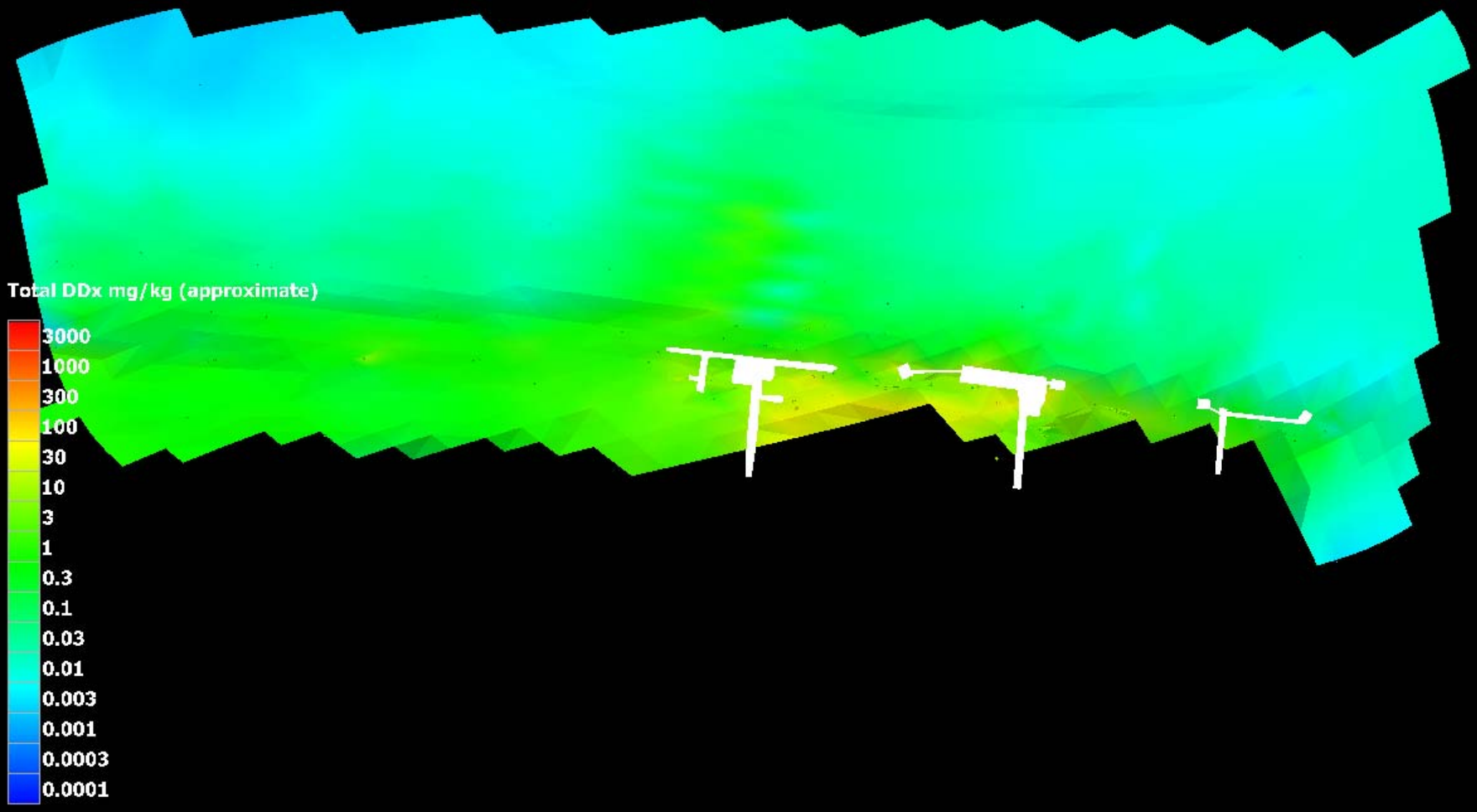
Dredging of +90 Percent of DDx Mass



Placement of a Thin-Layer Cap

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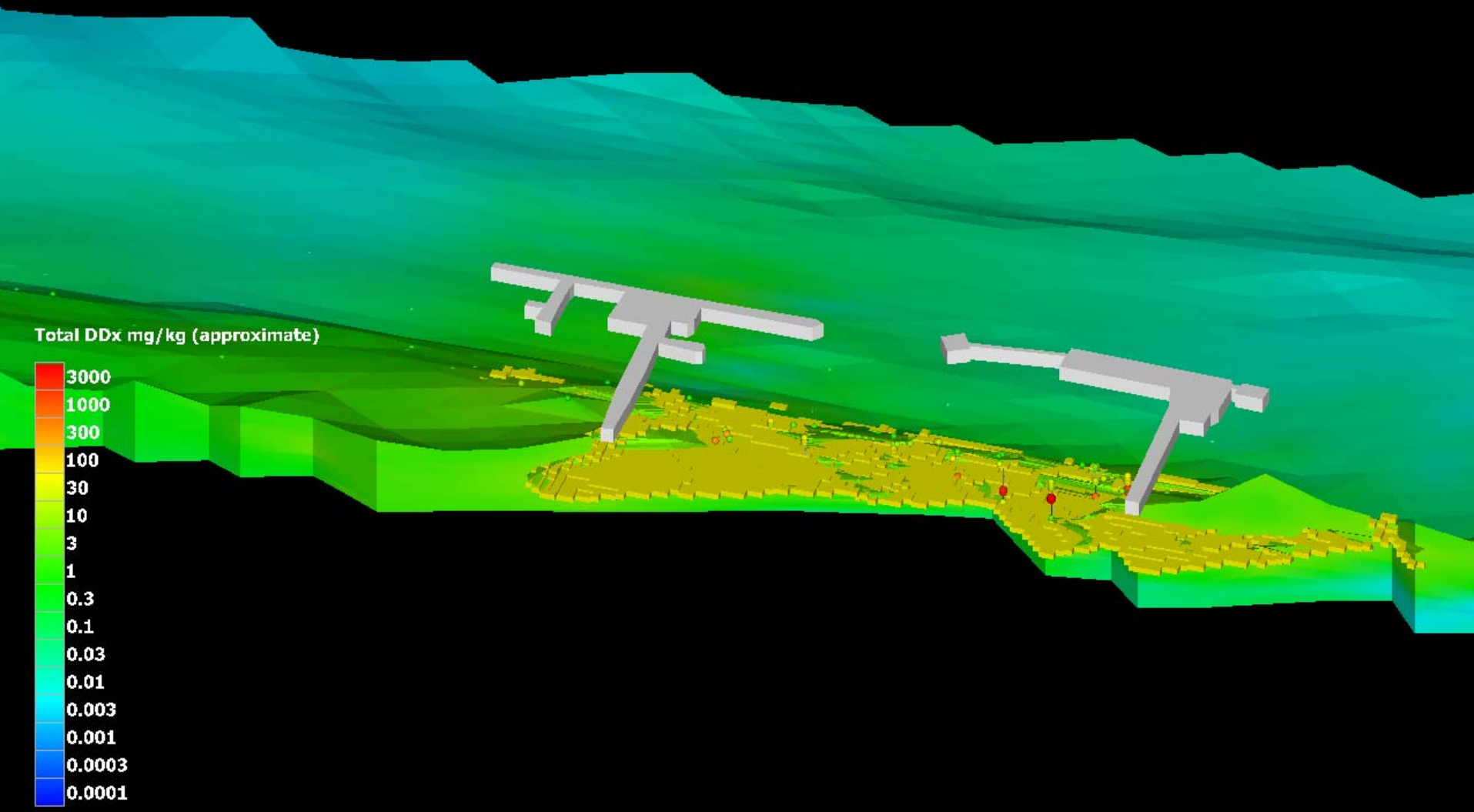

Natural Recovery after Cap Placement

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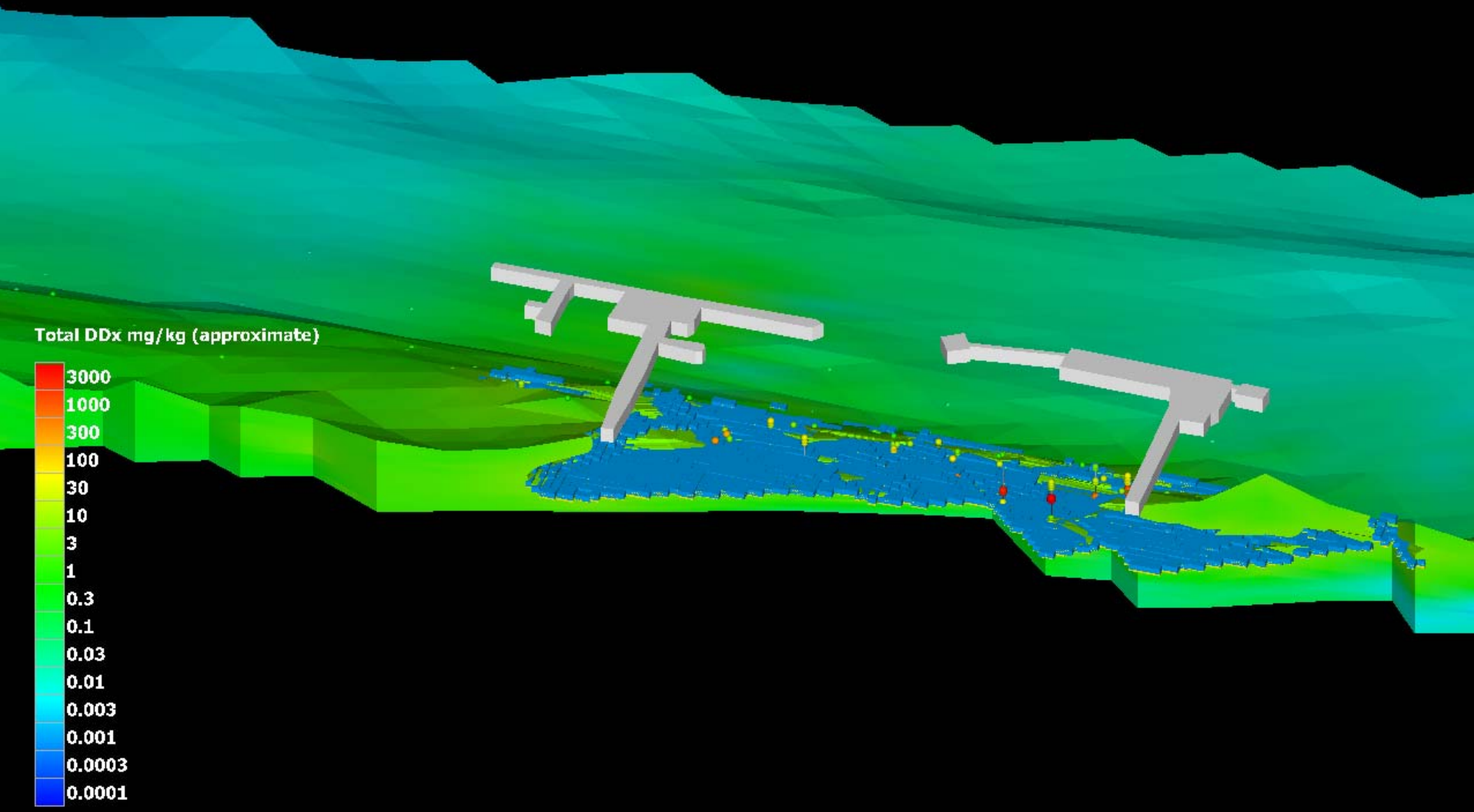

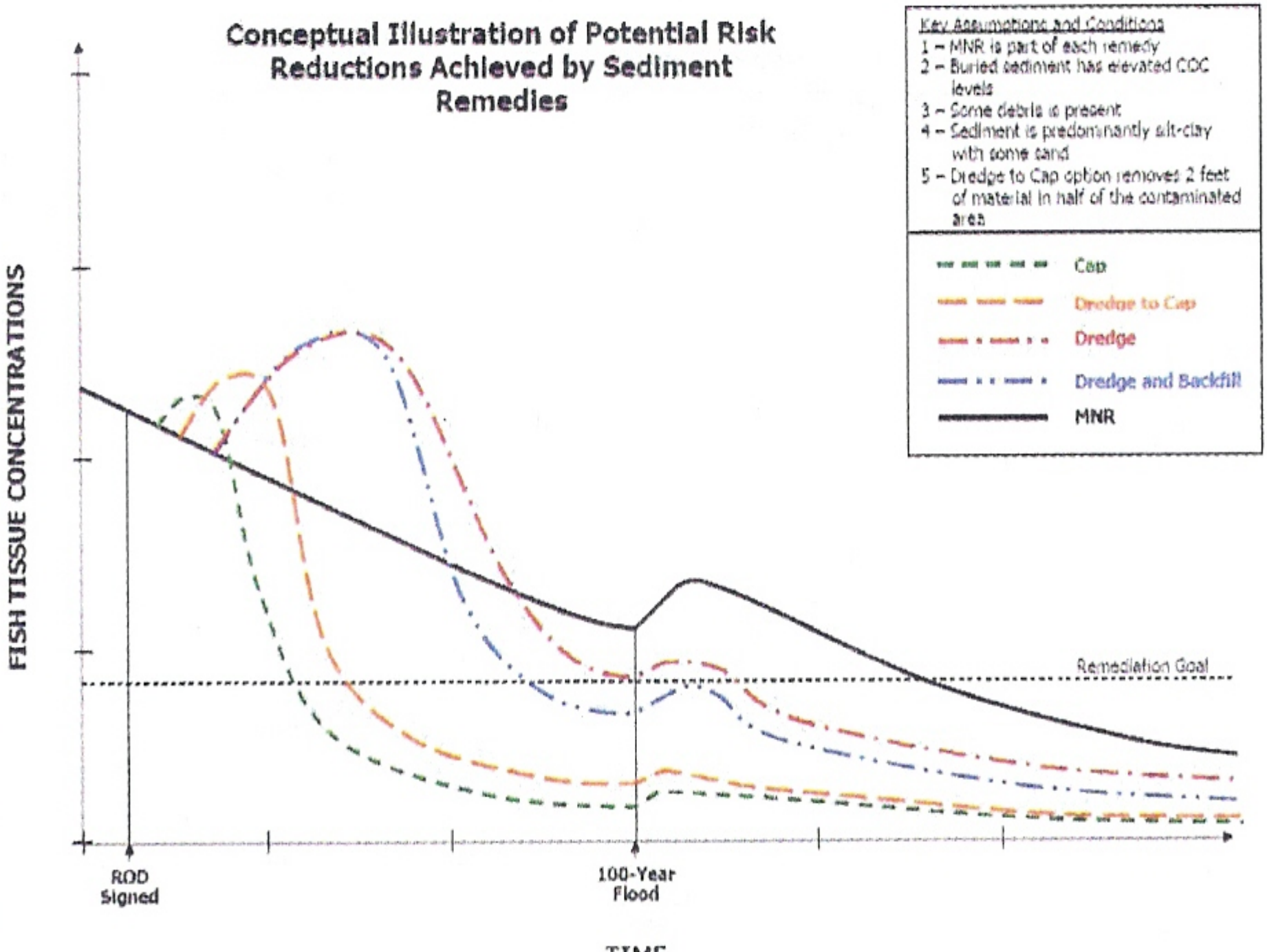
Conceptual Illustration of Potential Risk Reductions Achieved by Sediment Remedies
Key Assumptions and Conditions
1 – MNR is part of each remedy
2 – Buried sediment has elevated COC levels
3 – Some debris is present
4 – Sediment is predominantly silt-clay with some sand
5 – Dredge to Cap option removes 2 feet of material in half of the contaminated area
Cap
Dredge to Cap
Dredge
Dredge and Backfill
MNR
FISH TISSUE CONCENTRATIONS
Remediation Goal
ROD Signed
100-Year Flood
TIME

Conceptual CDF—Key Highlights

- Rigid sheet piling forms an impermeable barrier
- CDF wall keyed into impermeable materials at depth and into upland groundwater barrier wall
- Provides hydraulic containment and potential for treatment of groundwater and sediments
- CDF structure could be integrated to replace aging docks and update and maintain the facility for river dependent industrial use

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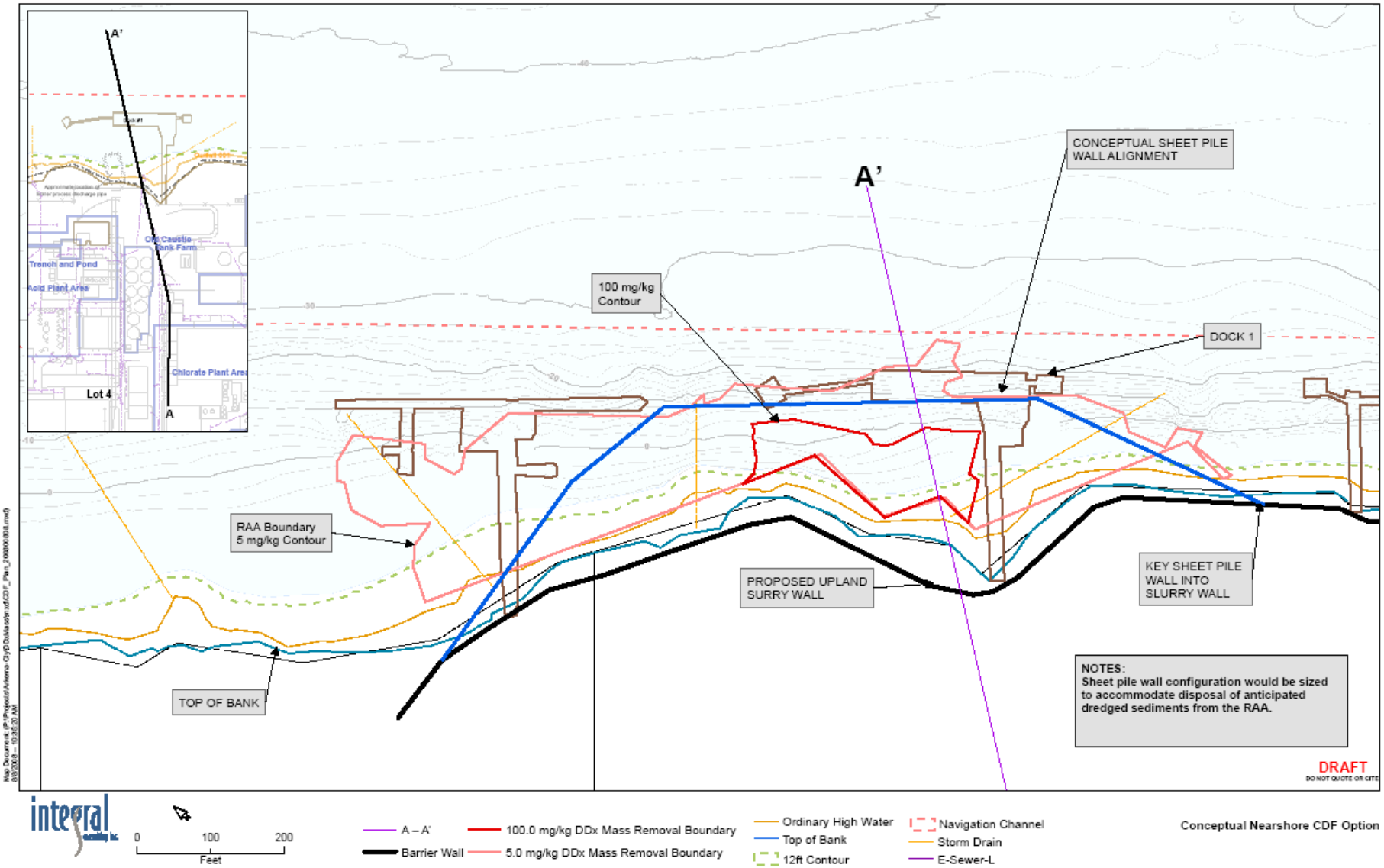
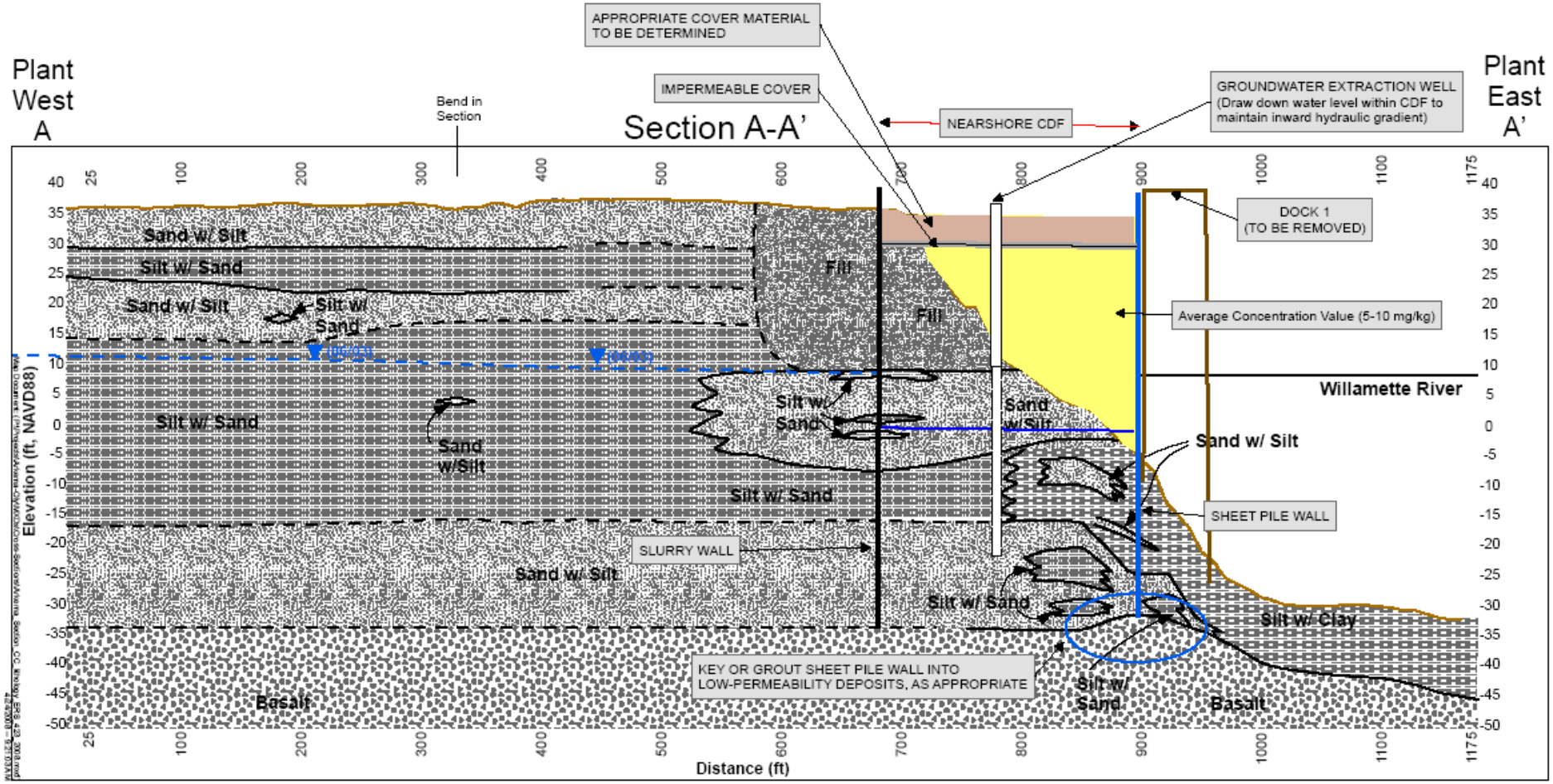
Conceptual CDF—Plan View



Conceptual CDF—Cross-section View



Section View: Vertical Exaggeration: 5X

Fill
Sand with varying amounts of silt
Silt with varying amounts of fine sand
Silt with some clay and fine sand
Basalt
Inferred soil or geologic contact (queried where uncertain)
Estimated Groundwater Surface Level within CDF
Shallow-zone groundwater surface (approximate) June 2003; based on monitoring well data only.

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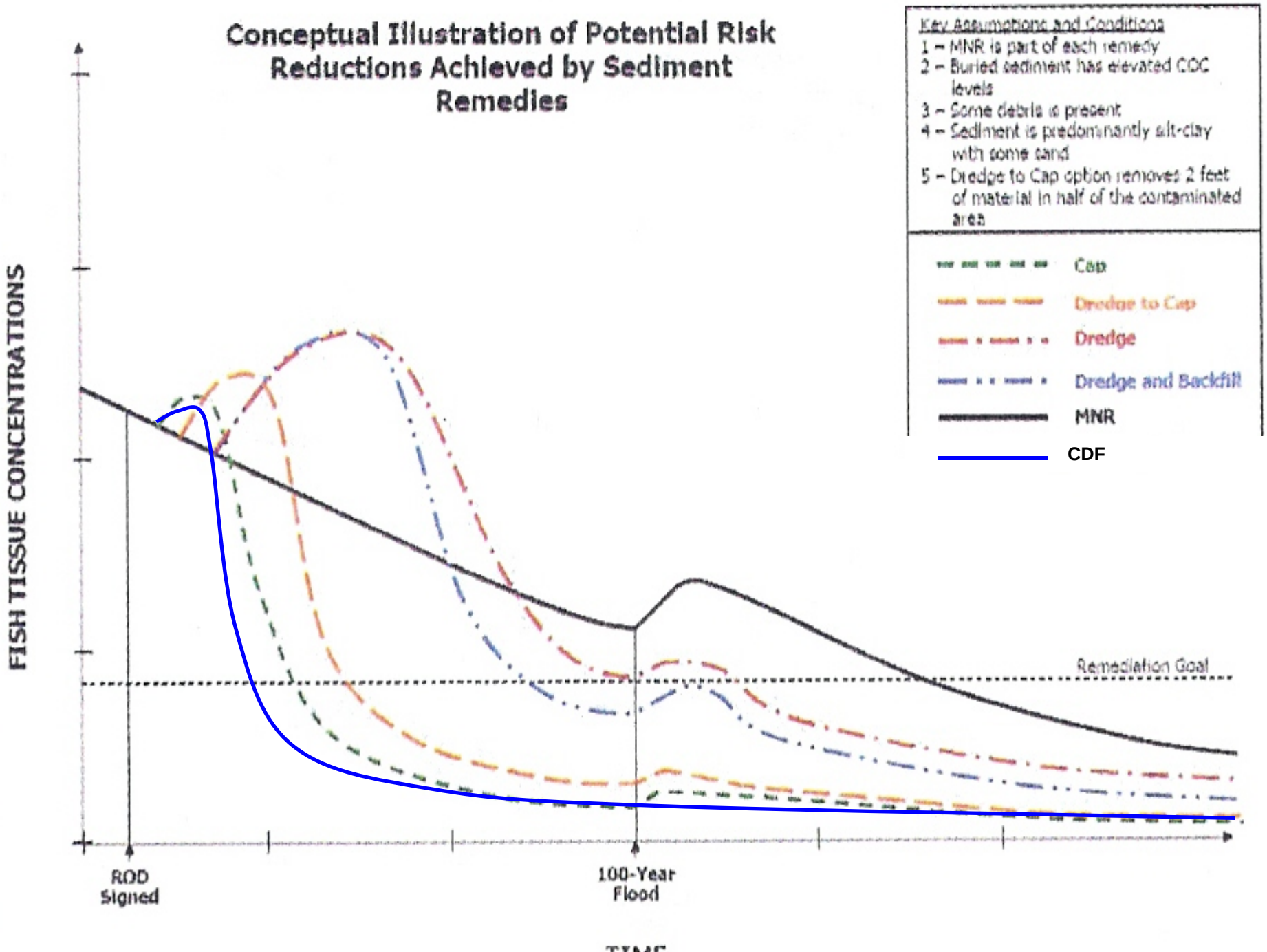
0 50 100 200 Feet

Cross-Section A-A'
Conceptual Nearshore CDF Option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Dredge and Backfill
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FISH TISSUE CONCENTRATIONS
Remediation Goal
ROD Signed
100-Year Flood
TIME

Consultation Process and Site Walk

- Section 7 Consultation Process
- Access Agreement Process
- City of Portland Process
- Discussion (Q&A)
- Site Walk
- Follow-up Q&A and Wrap-up

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Selected Sediment Cleanup References

- EPA 1993a. *Guidance on conducting non-time-critical removal actions under CERCLA*. EPA 540-R-93-057. Office of Emergency and Remedial Response, Washington DC.
- EPA 2002. *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*. OSWER Directive 9285.6-08. February 12, 2002. Office of Solid Waste and Remedial Response, Washington DC.
- *EPA 2005. Contaminated Sediment Remediation Guidance for* Hazardous Waste Sites. OSWER 9355.0-85. December 2005. Office of Solid Waste and Remedial Response, Washington DC. http://www.epa.gov/superfund/resources/sediment/guidance.htm
- EPA 2008. *Response to Regional Request Regarding Sediment Cleanup at May 2008 Superfund Division Directors Meeting*. OSWER Directive 9200.1-90. July 3, 2008. Office of Solid Waste and Remedial Response, Washington DC.
- NRC 2007. *Sediment Dredging at Sediment Megasites: Assessing the Effectiveness*. Committee on Sediment Dredging at Superfund Megasites, National Research Council. ISBN: 0-309-10974-4.

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