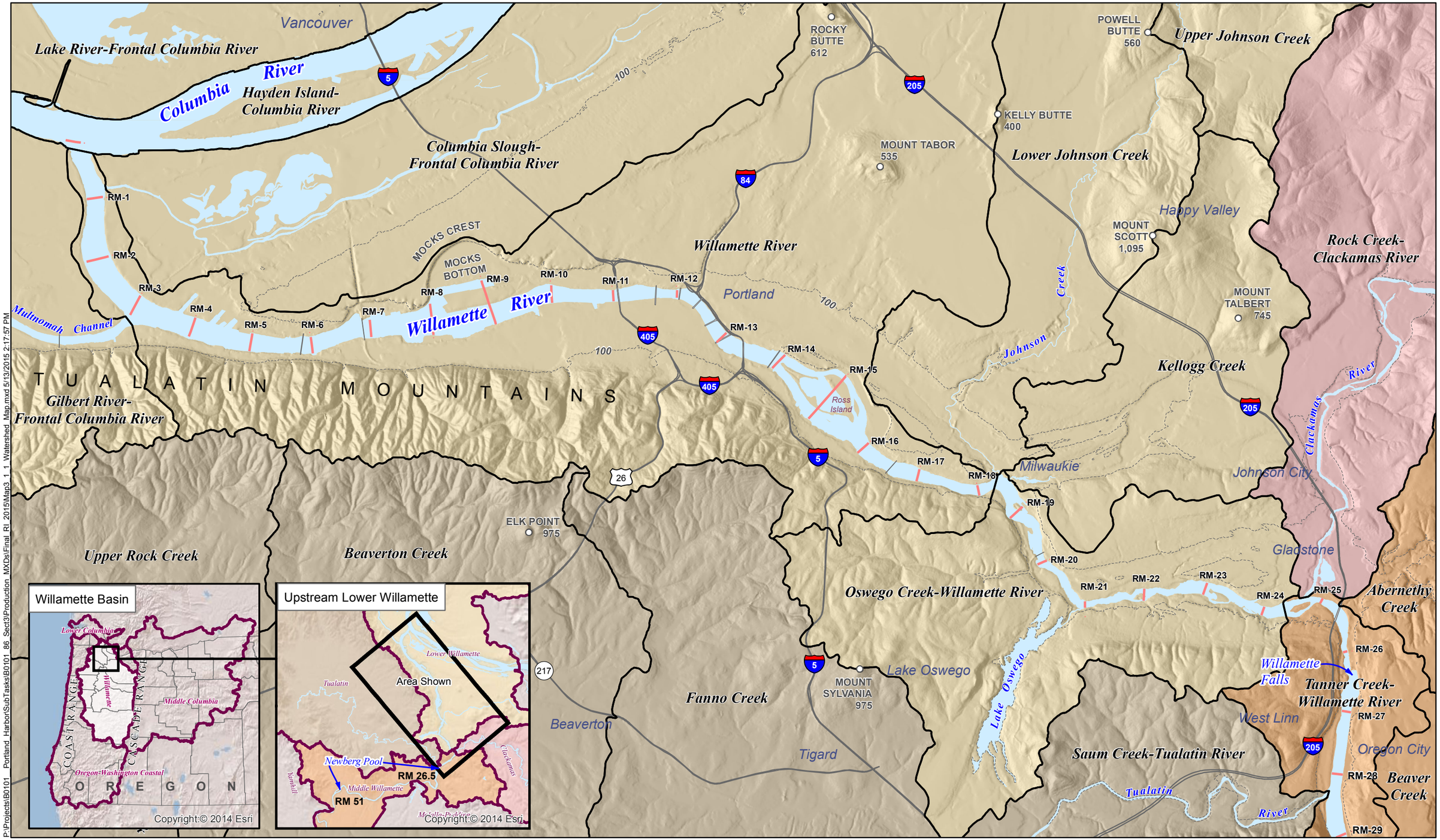

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FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1 2 3 Miles

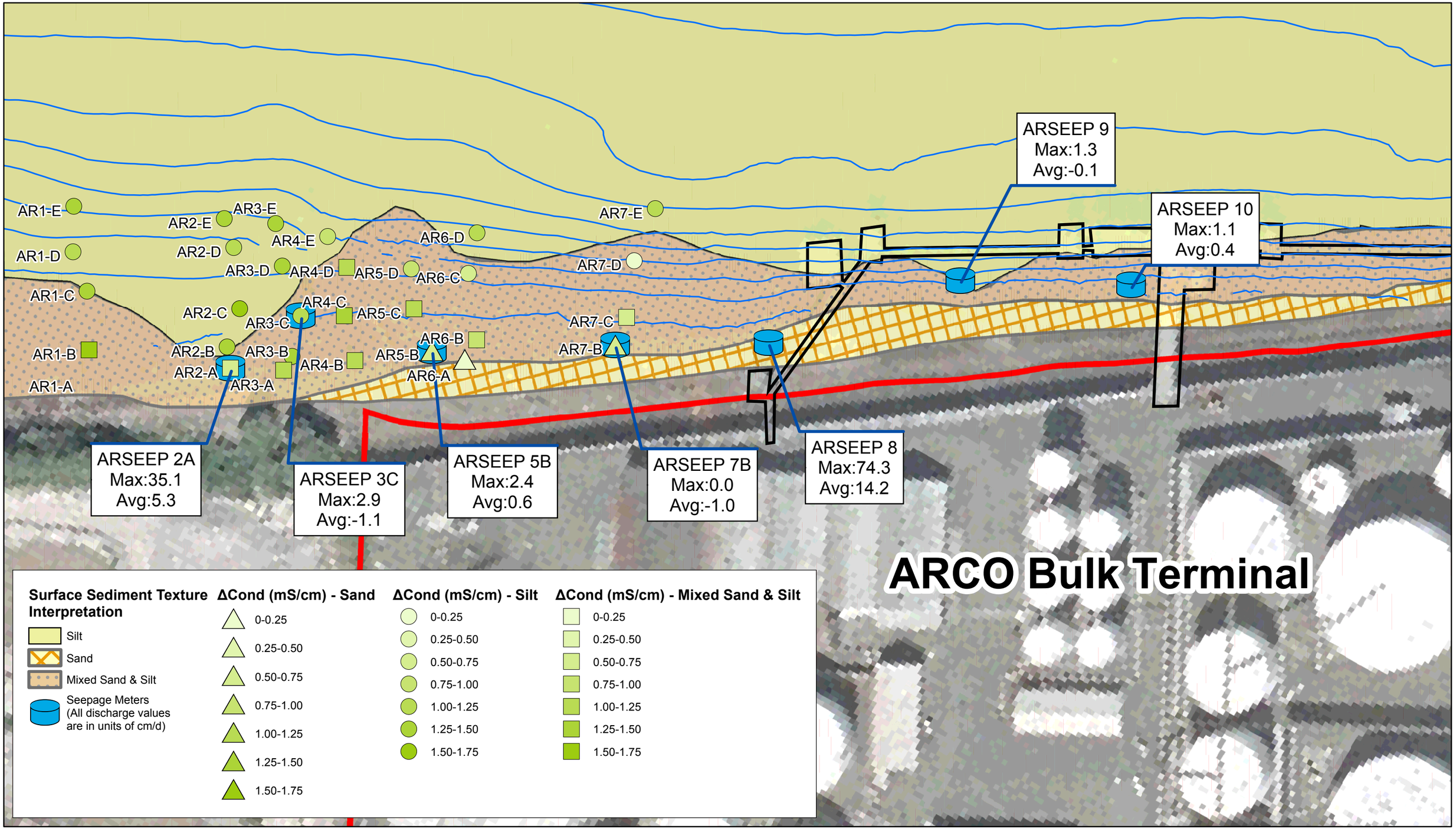
Willamette Watershed Basin

8 Digit Hydrologic Unit Code (HUC)

- Clackamas
- Lower Willamette
- Middle Willamette
- Tualatin

- Sub-Basin Unit - 12 Digit HUC
- 100 Foot Elevation Contour
- River Miles
- Bridges
- Boring Lava Vent and Elevation

Map 3.1-1
Portland Harbor RI/FS
Remedial Investigation Report
Willamette River Watershed and Topography



0 25 50 100 Feet

N

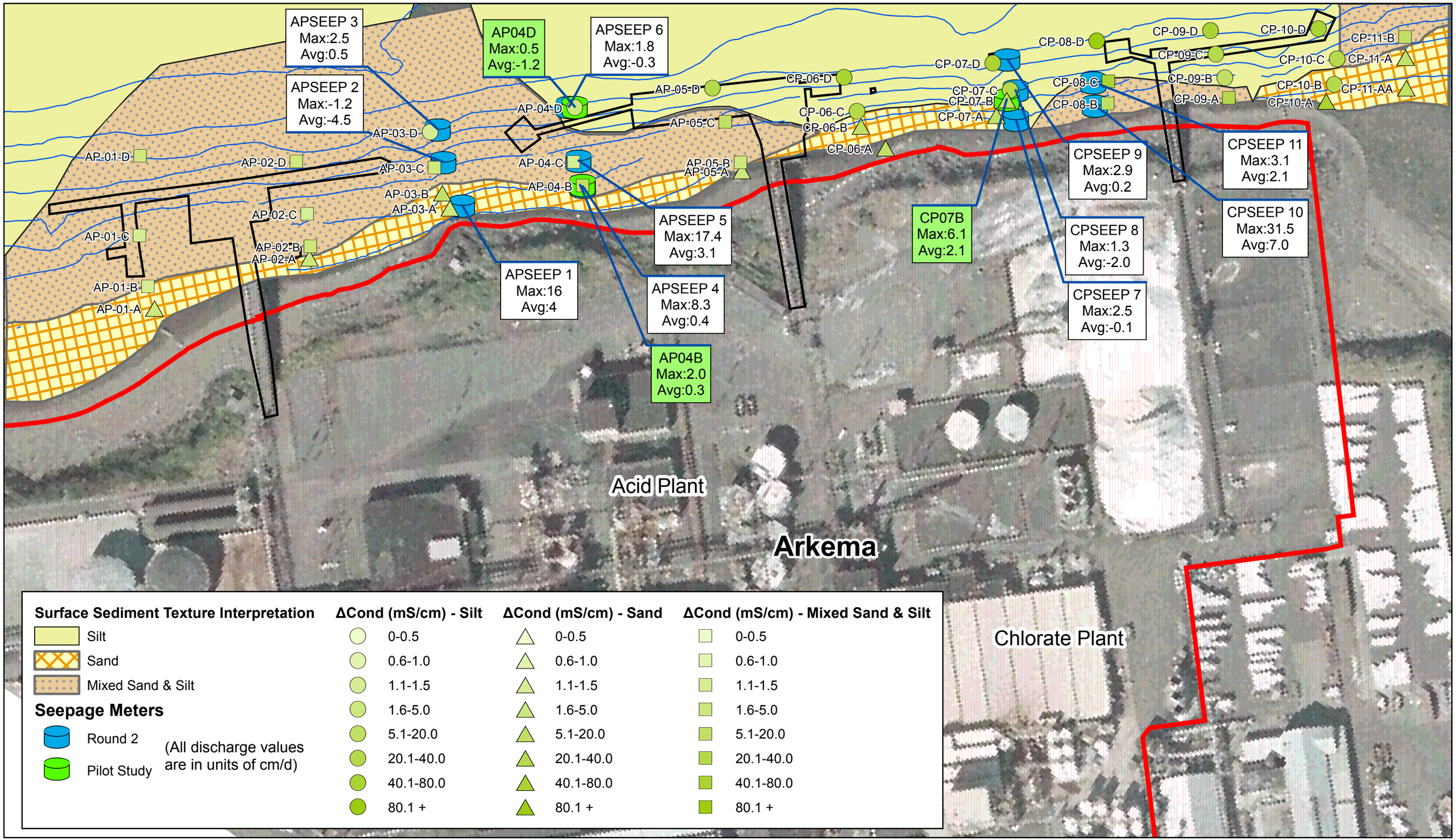
LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2a
Portland Harbor RI/FS
Remedial Investigation Report
ARCO Trident Conductivity Mapping Results



N

0 50 100 200 Feet

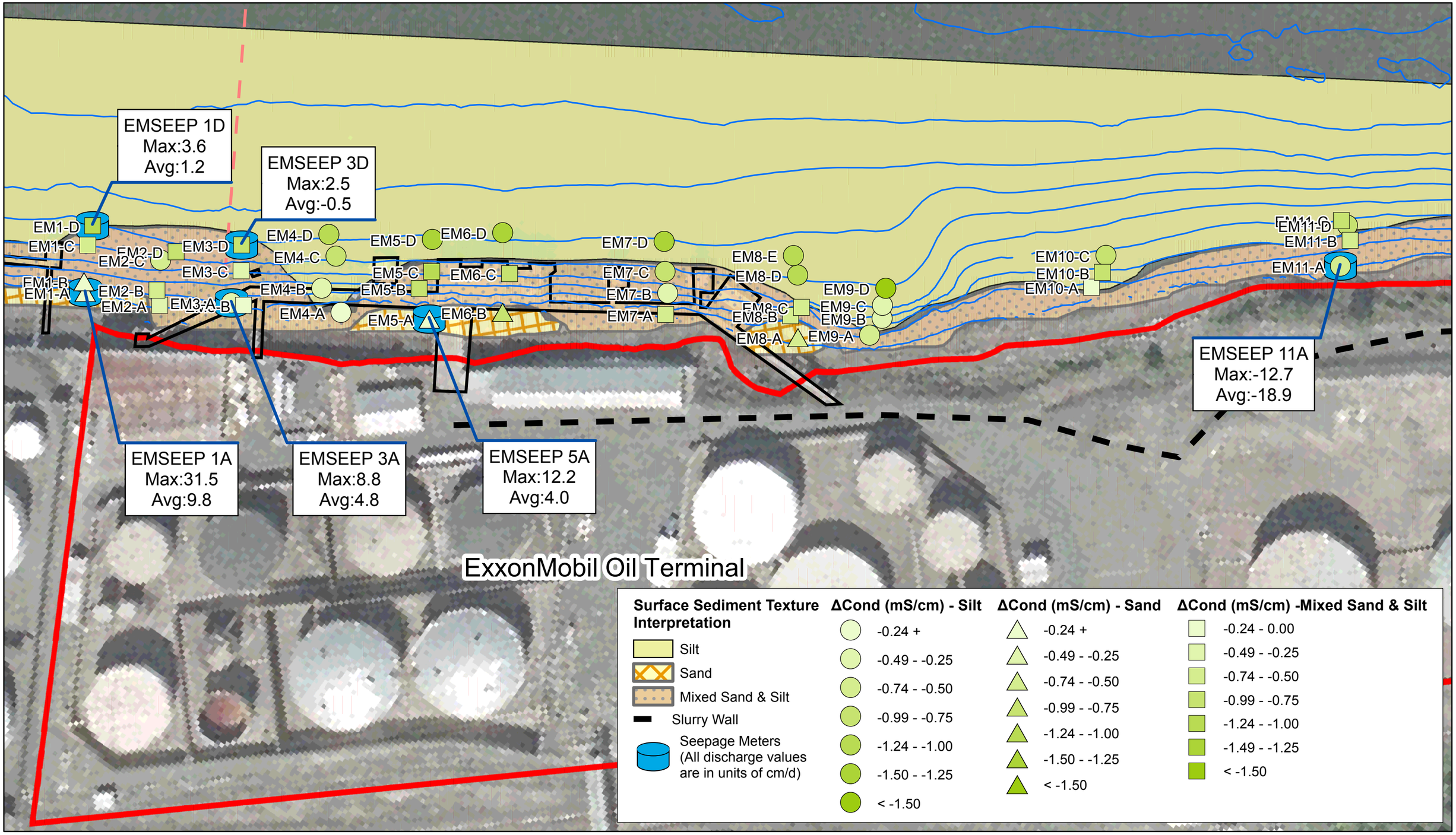
LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2b
Portland Harbor RI/FS
Remedial Investigation Report
Arkema Trident Conductivity Mapping Results



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

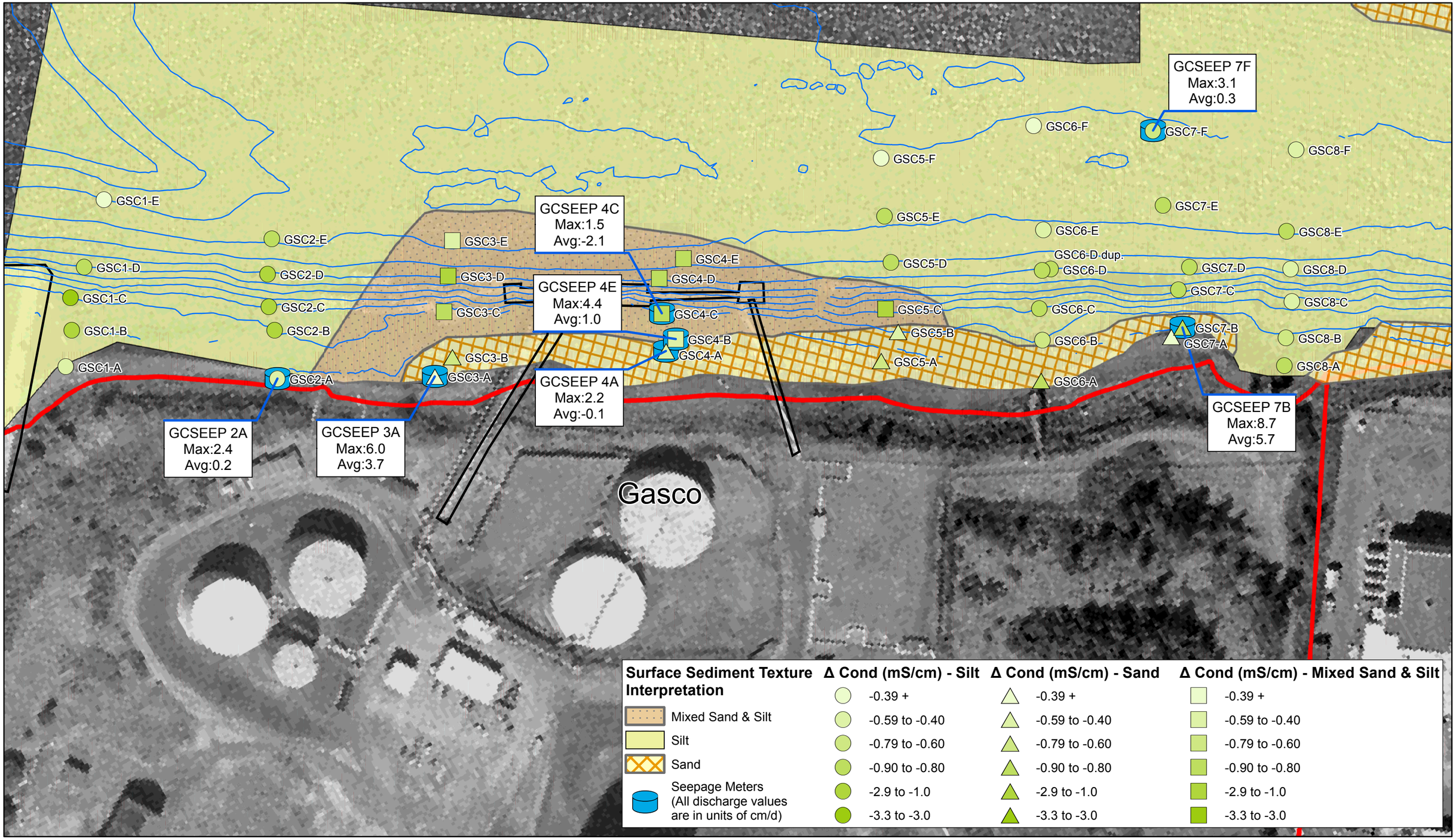
Site Property Boundary

N

0 25 50 100 Feet

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2c
Portland Harbor RI/FS
Remedial Investigation Report
ExxonMobil Trident Conductivity Mapping Results



0 25 50 100 Feet

N

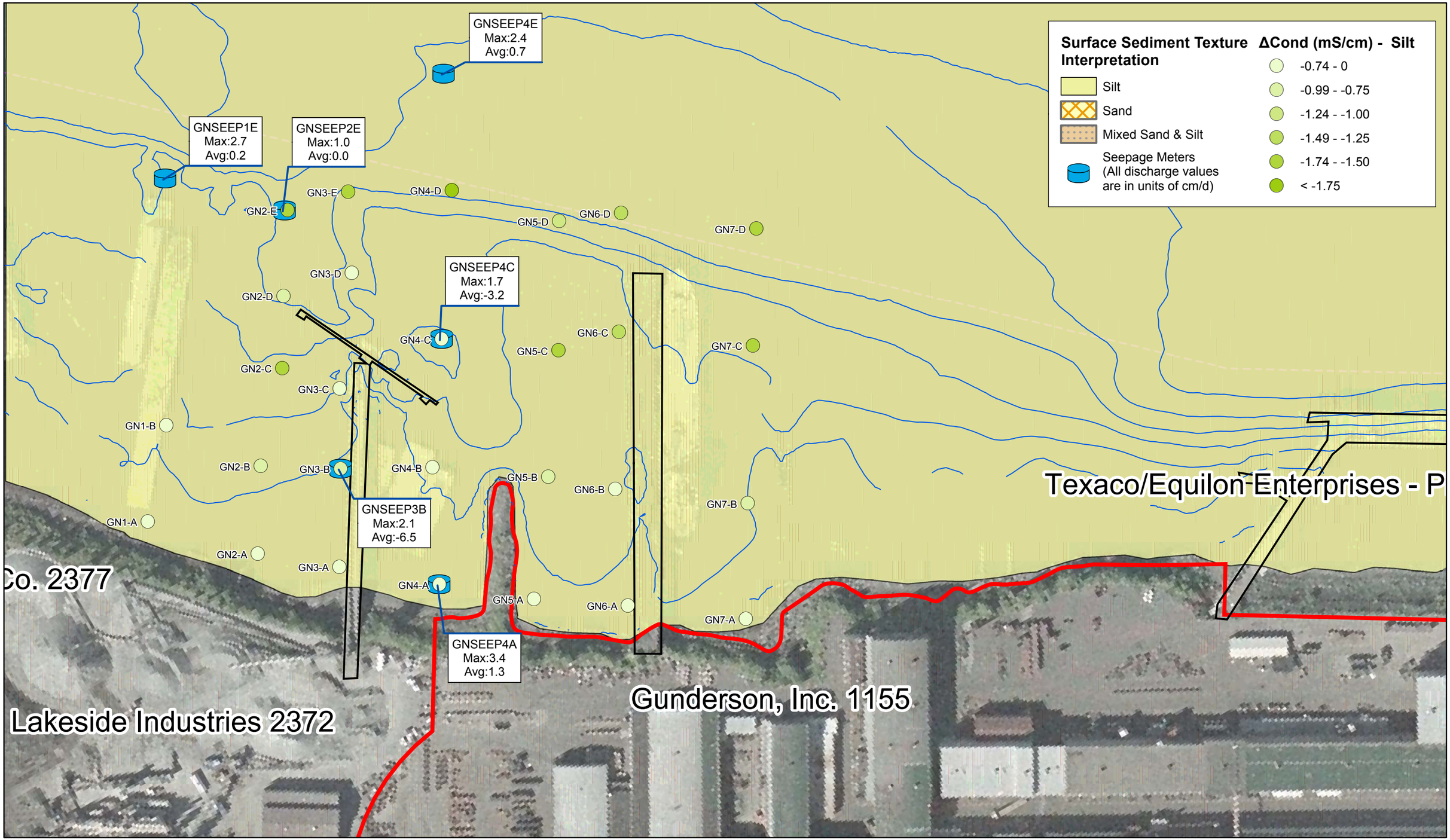
LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2d
Portland Harbor RI/FS
Remedial Investigation Report
Gasco Trident Conductivity Mapping Results



0 50 100 200 Feet

N

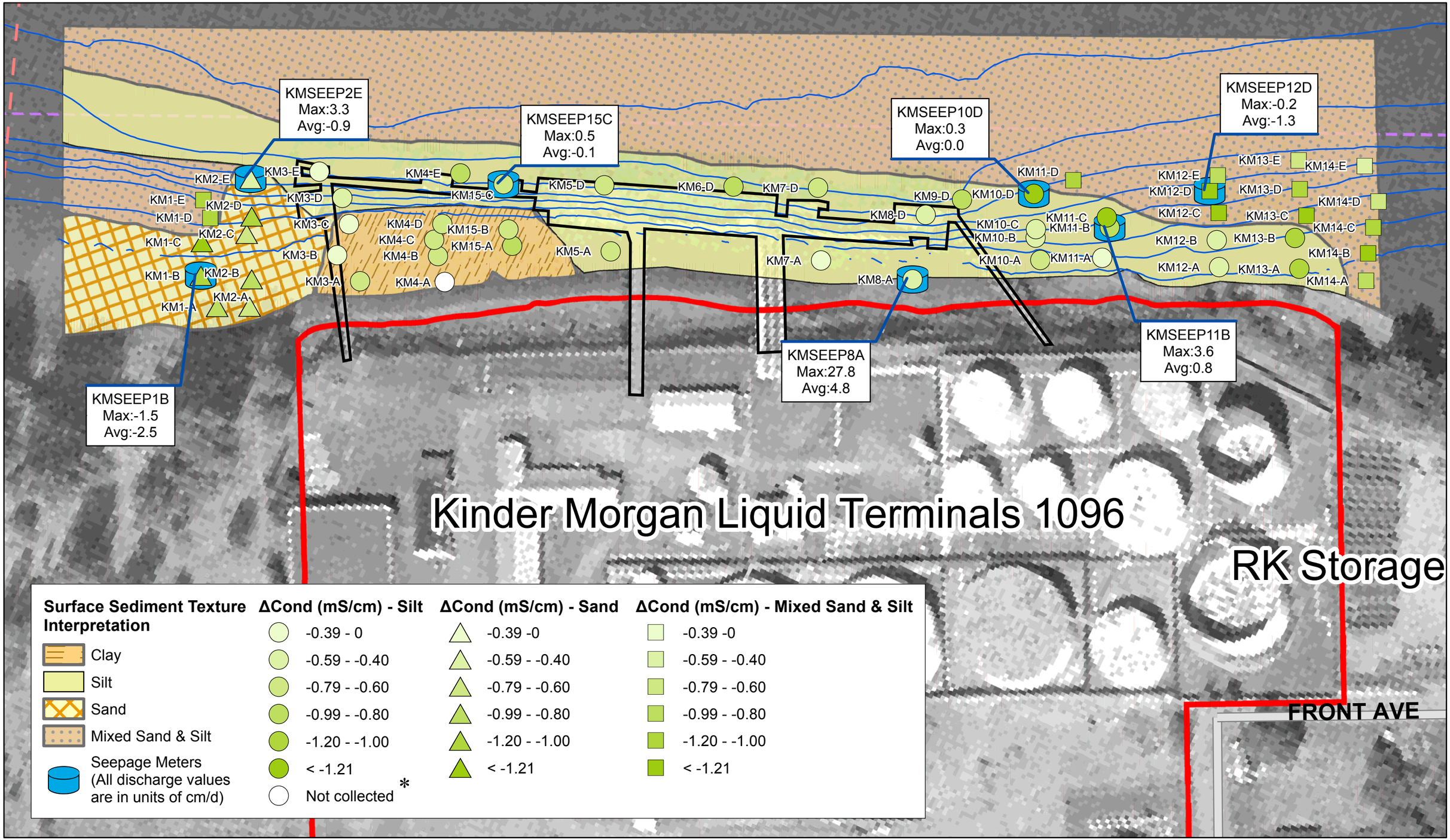
LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2e
Portland Harbor RI/FS
Remedial Investigation Report
Gunderson Trident Conductivity Mapping Results



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

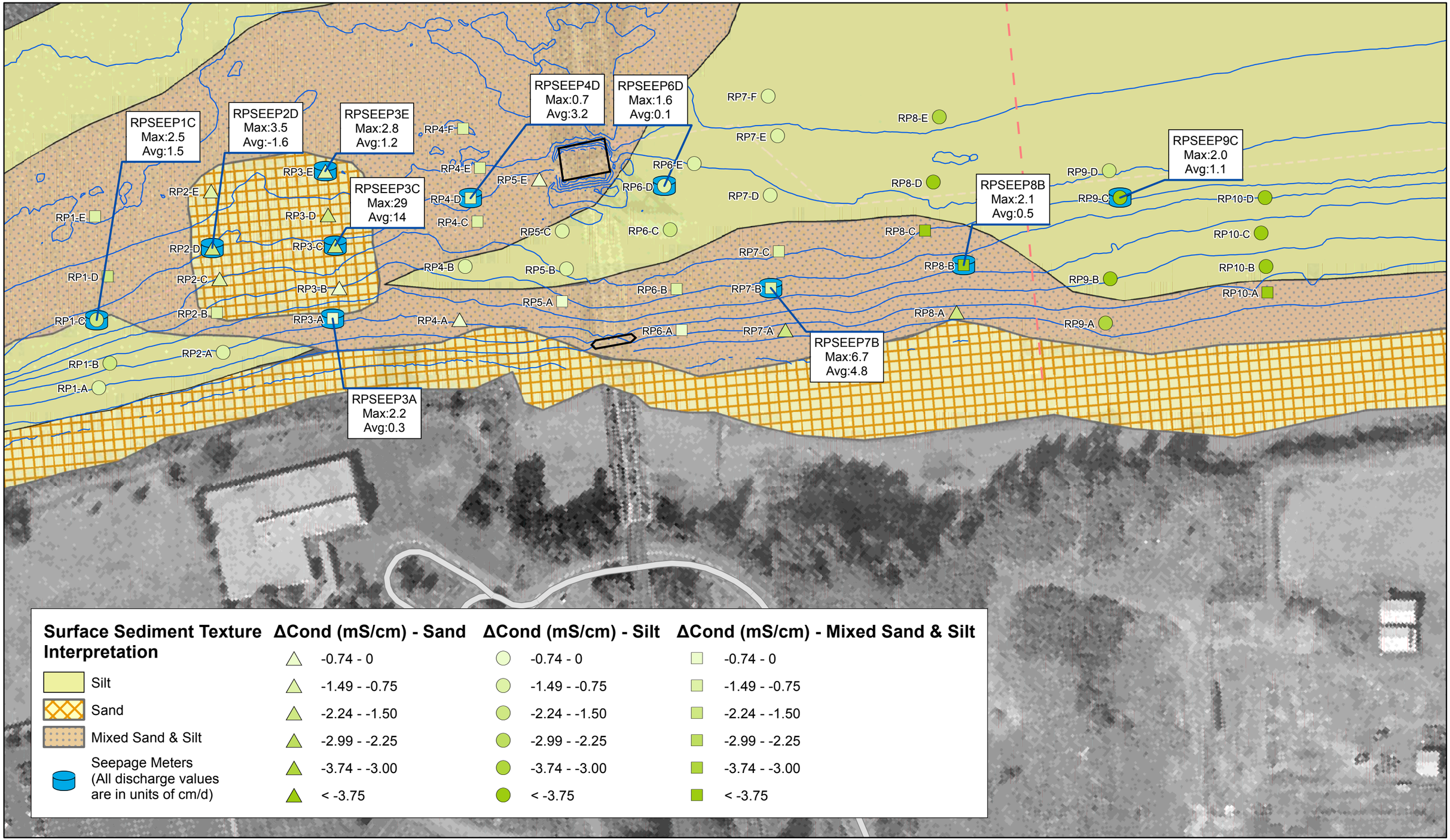
Site Property Boundary

0 25 50 100 Feet

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

* Point KM4-A: 60 cm temperature and conductivity readings could not be collected with the Trident probe due to probe refusal at 30 cm.

Map 3.1-2f
Portland Harbor RI/FS
Remedial Investigation Report
Kinder Morgan Linnton Trident Conductivity Mapping Results



0 50 100 200 Feet

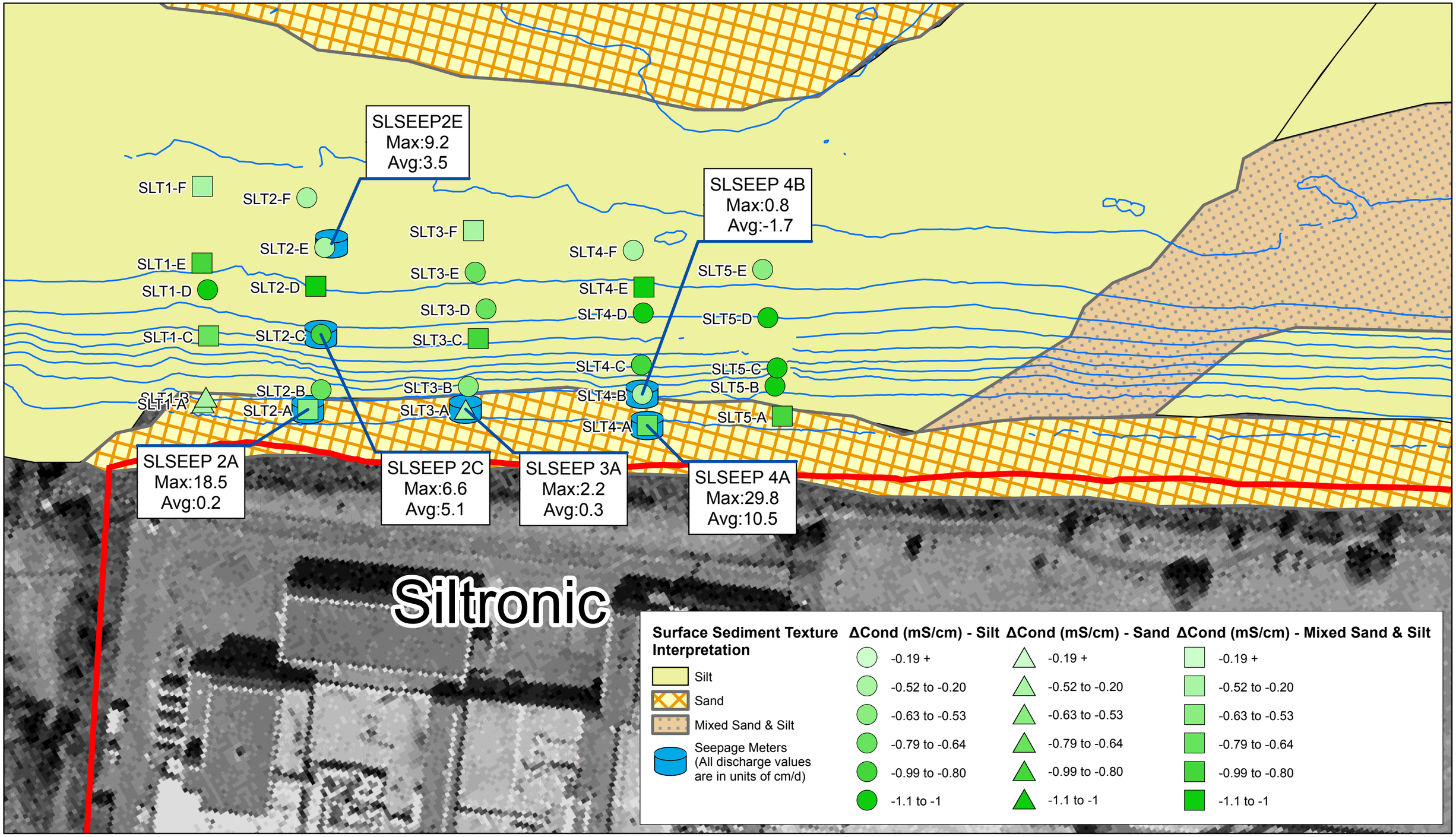
N

LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary
- River Miles

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2g
Portland Harbor RI/FS
Remedial Investigation Report
Rhone Poulenc Trident Conductivity Mapping Results



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

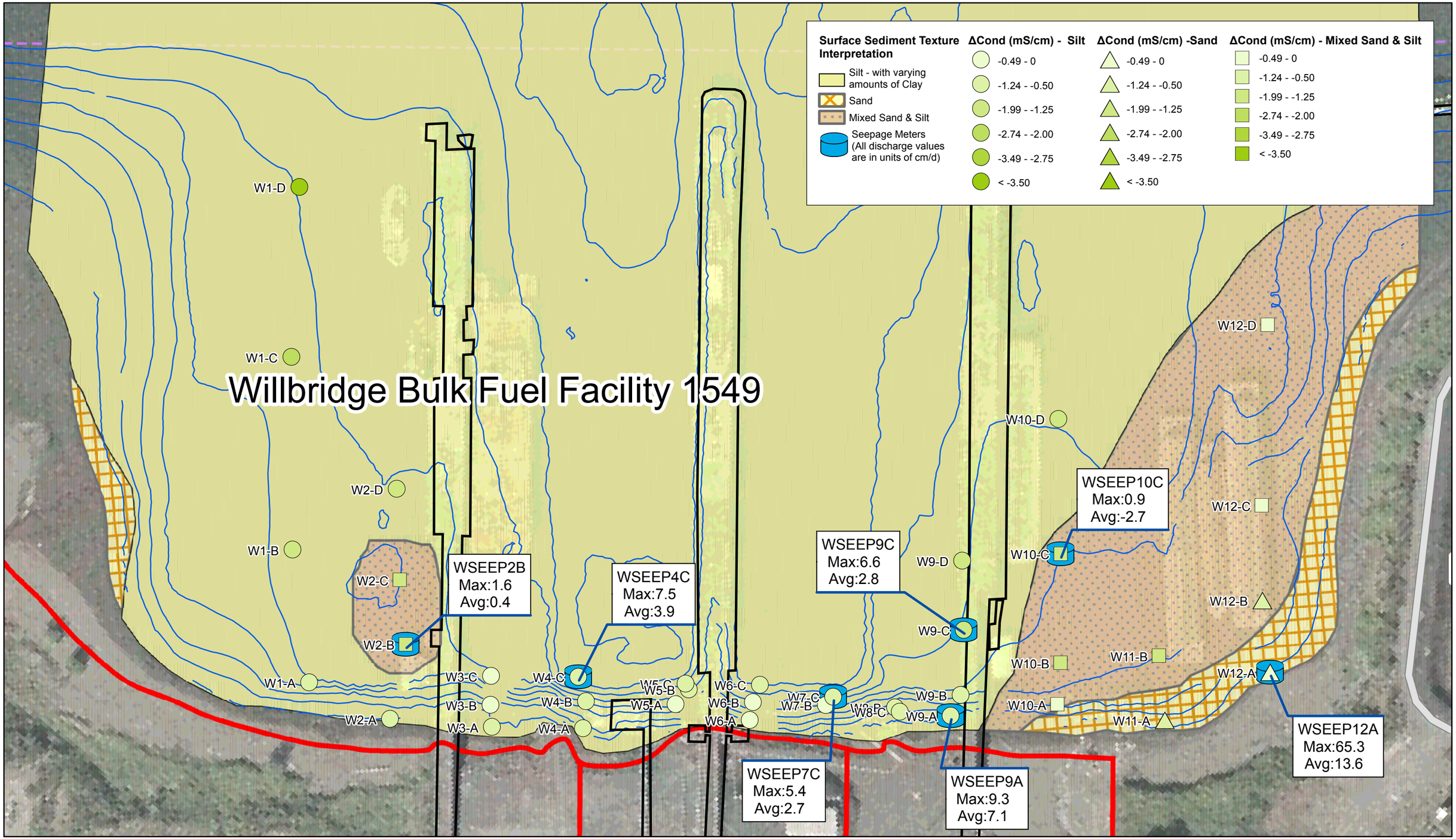
Site Property Boundary

N

0 25 50 100 Feet

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2h
Portland Harbor RI/FS
Remedial Investigation Report
Siltronic Trident Conductivity Mapping Results



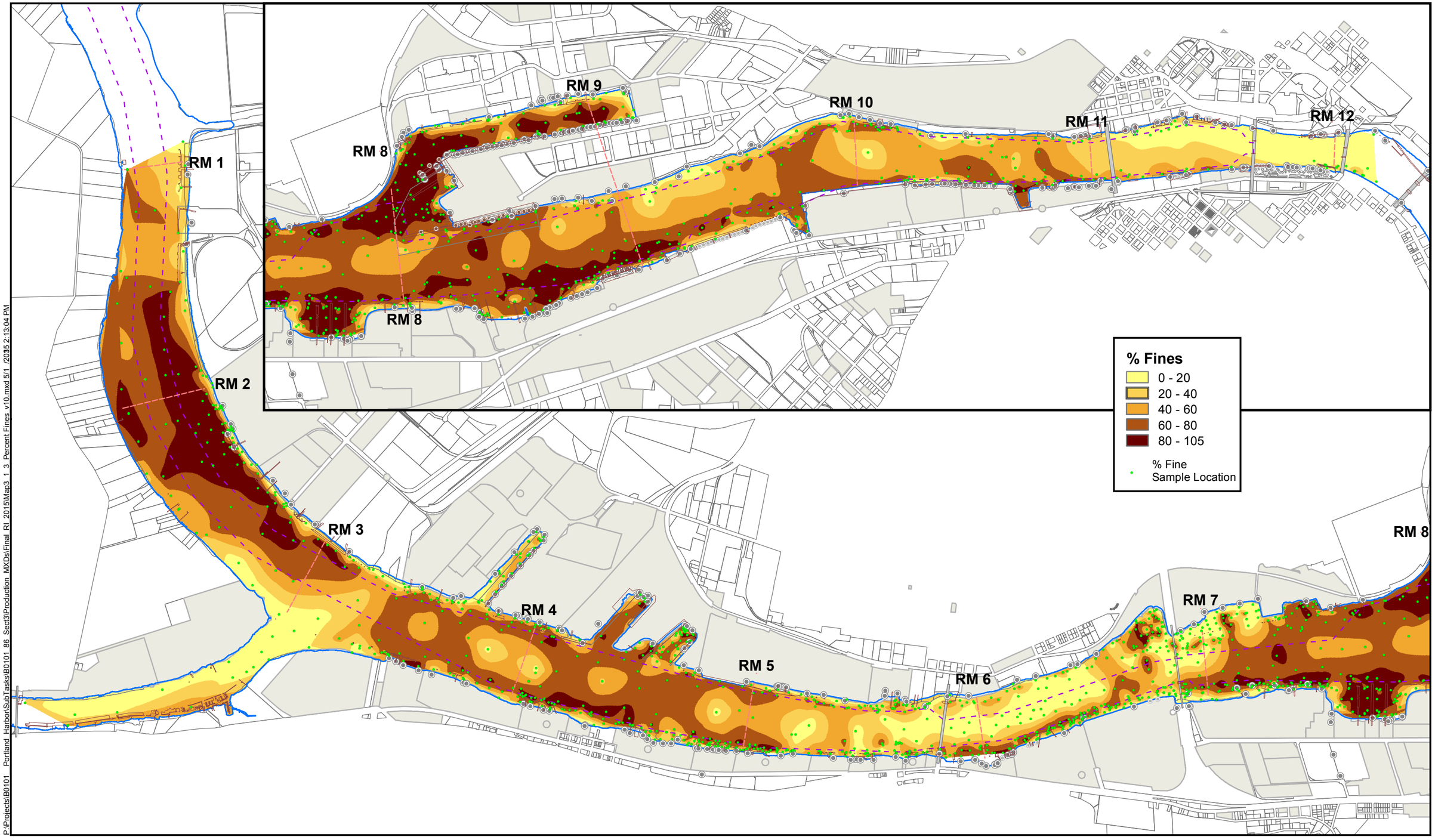
LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

FEATURE SOURCES:
Aerial Photo: Spencer B. Cross, October 2001.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

Map 3.1-2i
Portland Harbor RI/FS
Remedial Investigation Report
Willbridge Trident Conductivity Mapping Results



FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

N

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

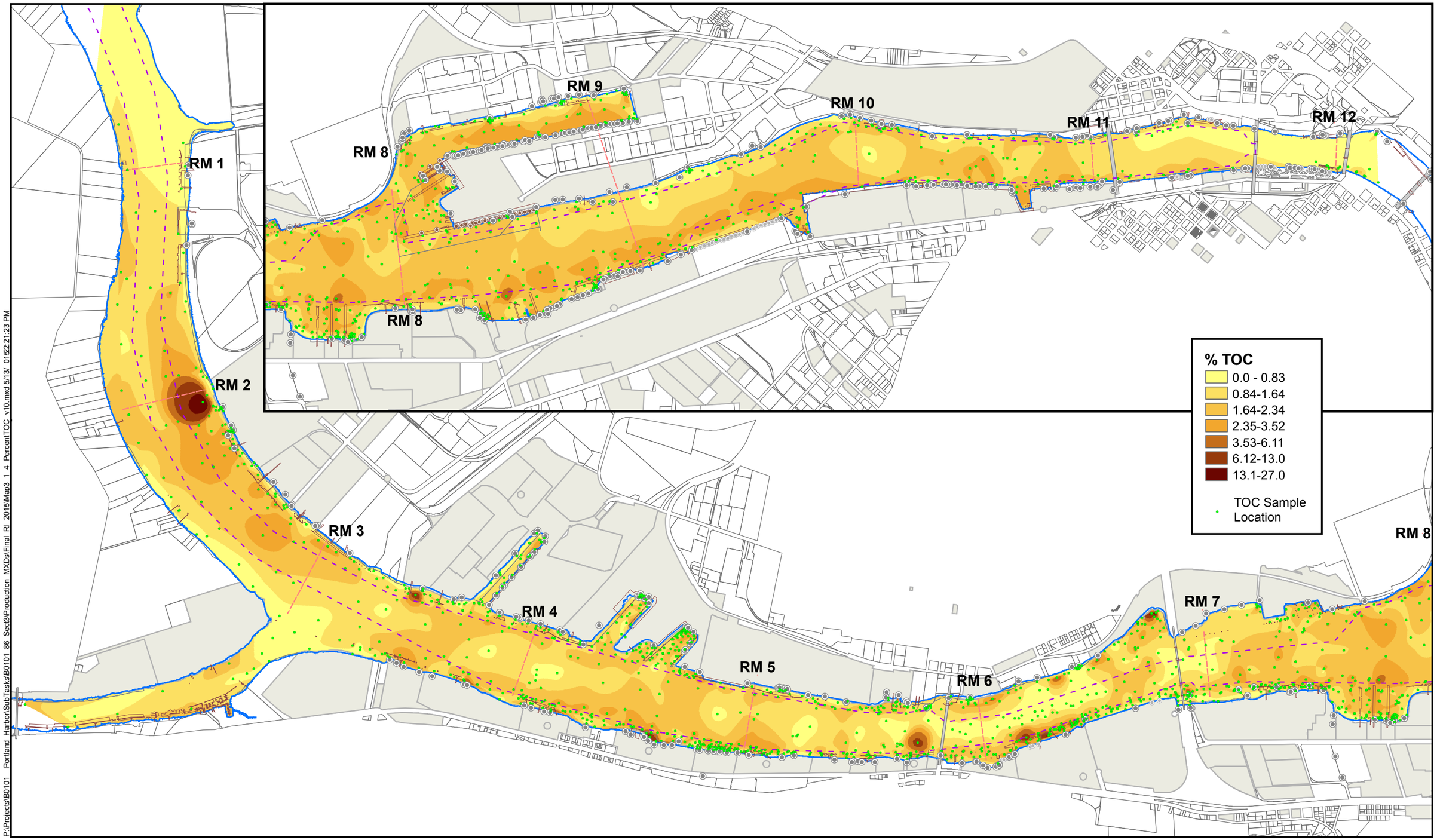
- River Miles
- Docks and Structures
- Navigation Channel
- Bridges
- River Edge +13 ft NAVD

Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-3
Portland Harbor RI/FS
Remedial Investigation Report
Contoured Surface Sediment Texture, Percent Fines



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N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

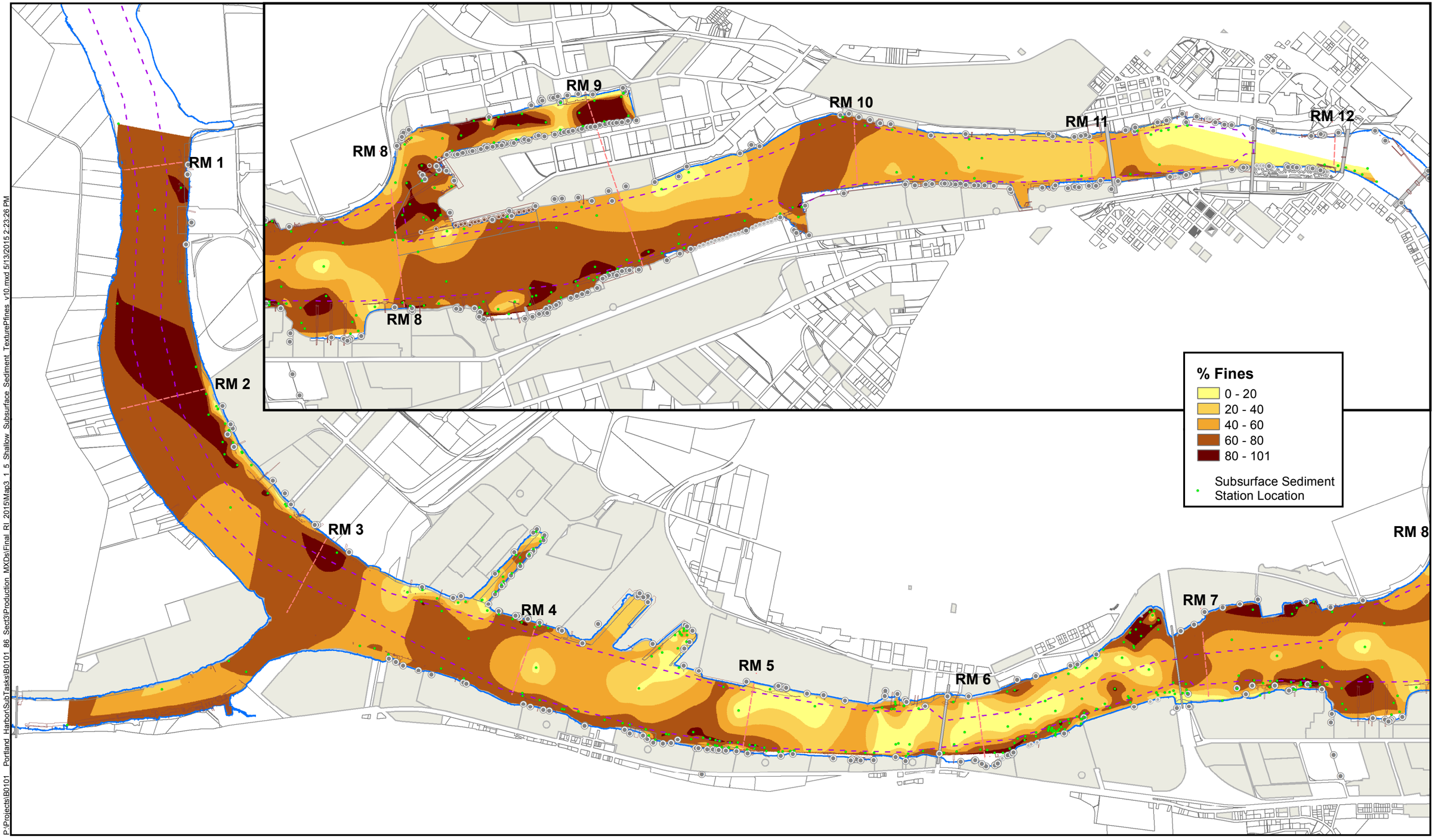
0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features
- River Miles
- Bridges
- Docks and Structures
- Navigation Channel
- River Edge +13 ft NAVD

Outfalls
- Outfall
- Dock Drain
- Roof Drain

- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-4
Portland Harbor RI/FS
Remedial Investigation Report
Contoured Surface Sediment Total Organic Carbon Content, Percent TOC



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FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

N

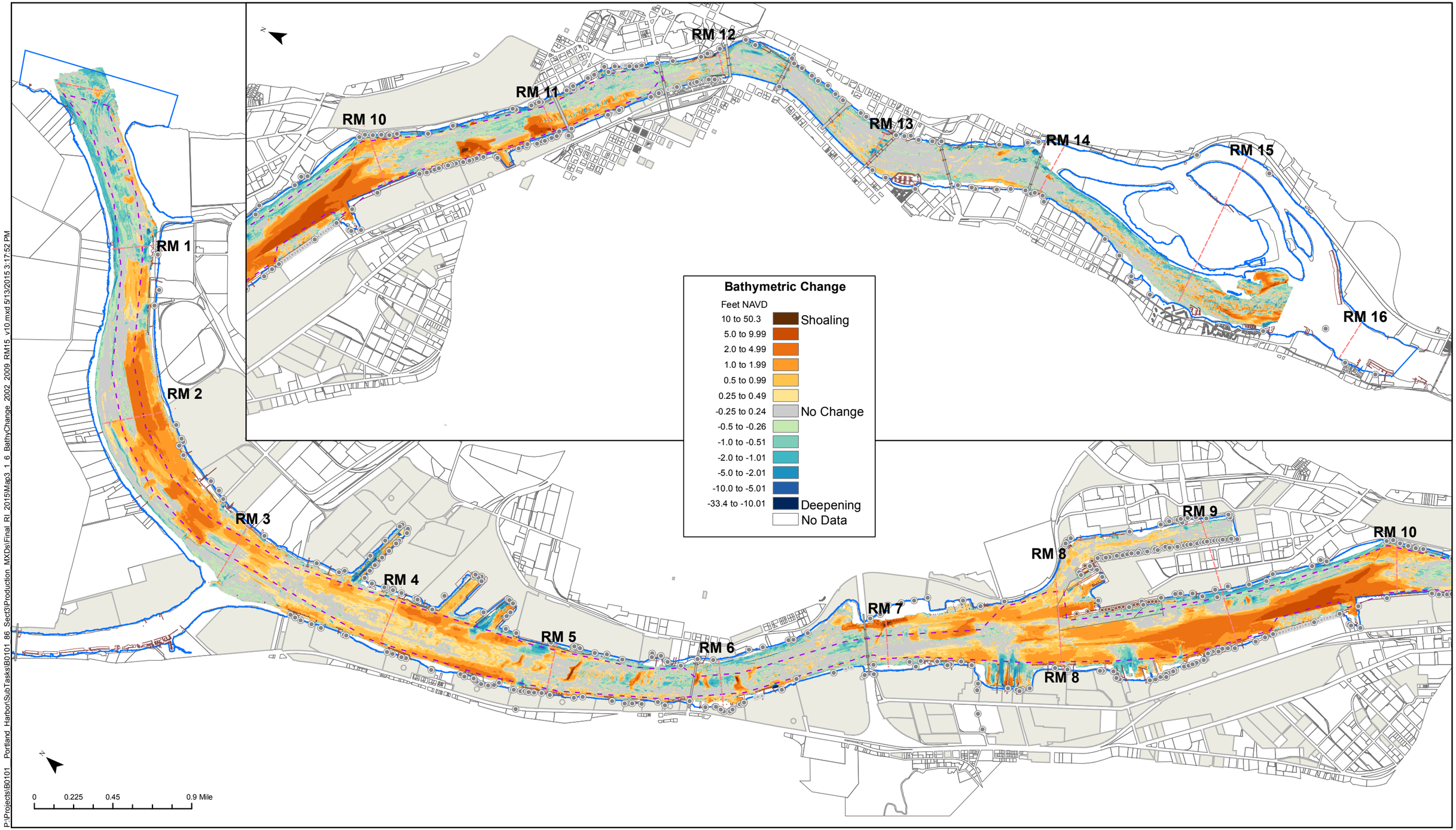
0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features
- River Miles
- Bridges
- Docks and Structures
- Navigation Channel
- River Edge +13 ft NAVD

Outfalls
- Outfall
- Dock Drain
- Roof Drain

- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-5
Portland Harbor RI/FS
Remedial Investigation Report
Shallow (30 cm) Subsurface Sediment Texture



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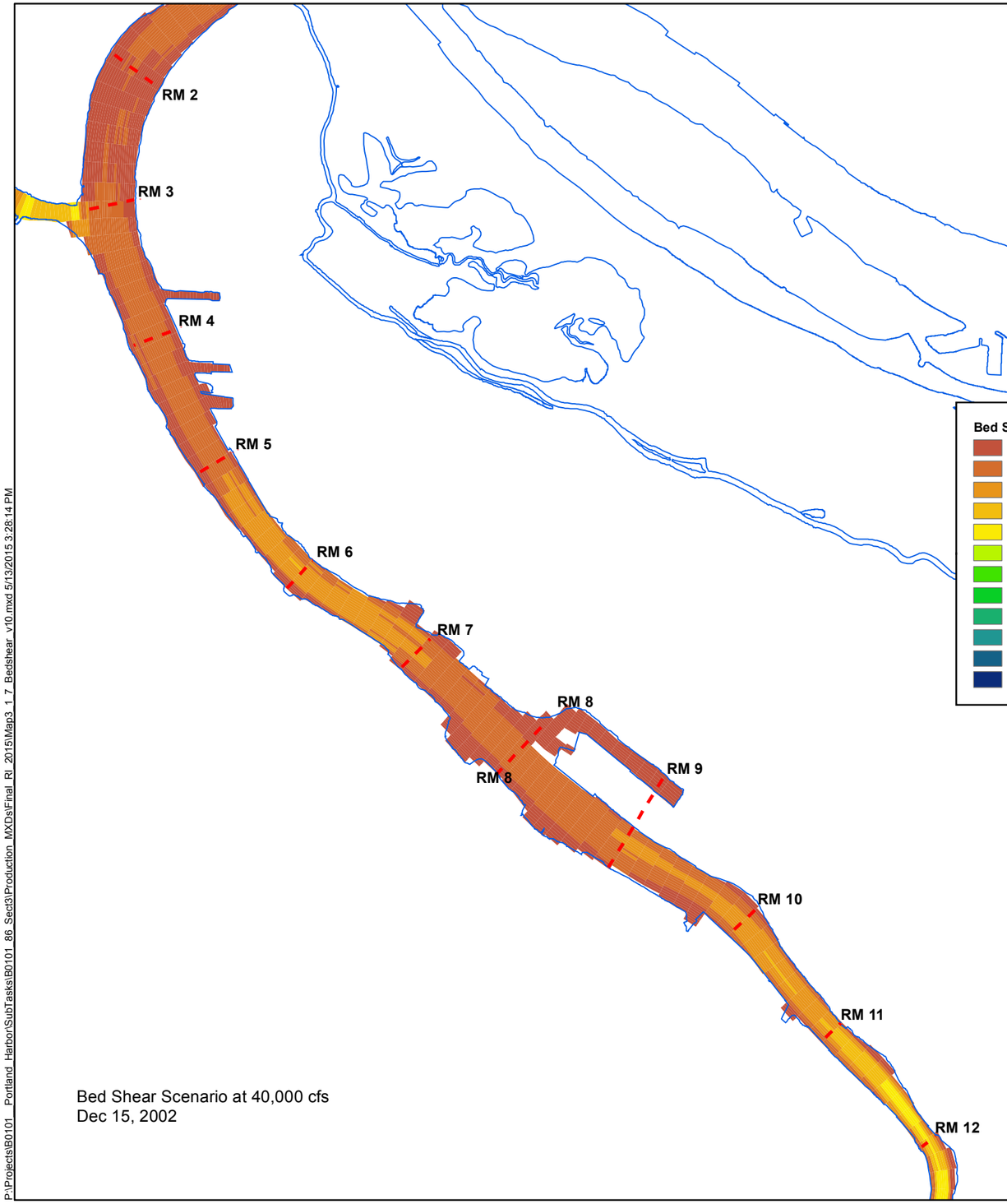
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

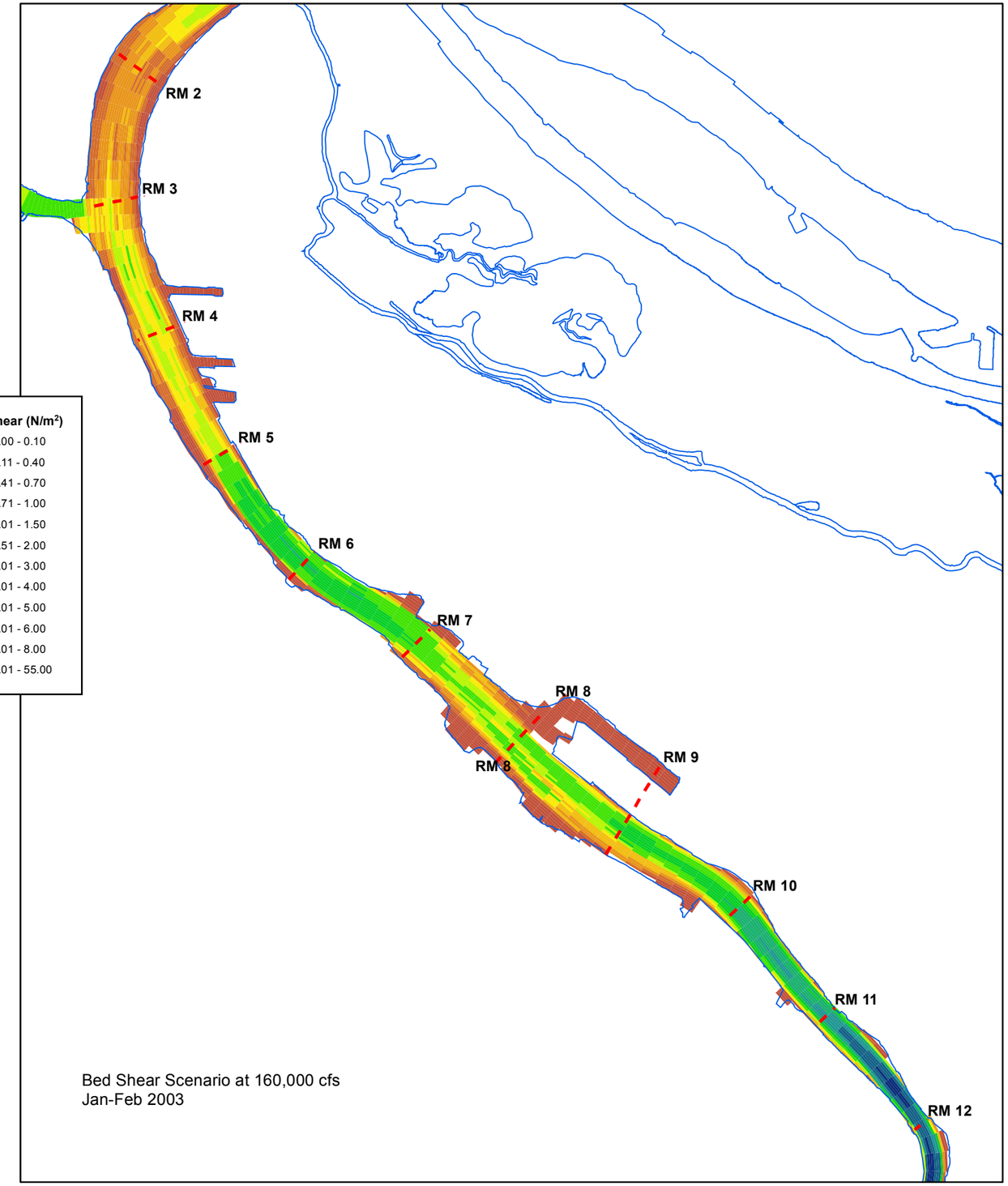
Map Features
- River Miles
- Bridges
- Docks and Structures
- Navigation Channel

Outfalls
- Outfall
- Dock Drain
- Roof Drain

- Upland ECSI Sites (2008)
- Waterfront Taxlots
- River Edge +13 ft NAVD

Map 3.1-6
Portland Harbor RI/FS
Remedial Investigation Report
Bathymetric Change
January 2002 to January 2009





Bed Shear (N/m^2)

- 0.00 - 0.10
- 0.11 - 0.40
- 0.41 - 0.70
- 0.71 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00
- 6.01 - 8.00
- 8.01 - 55.00

N

0 0.5 1 2 Miles

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.
Bed shear: West Consultants.

Map Features

River Miles

Map 3.1-7
Portland Harbor RI/FS
Remedial Investigation Report
Study Area Bed Shear Model Predictions

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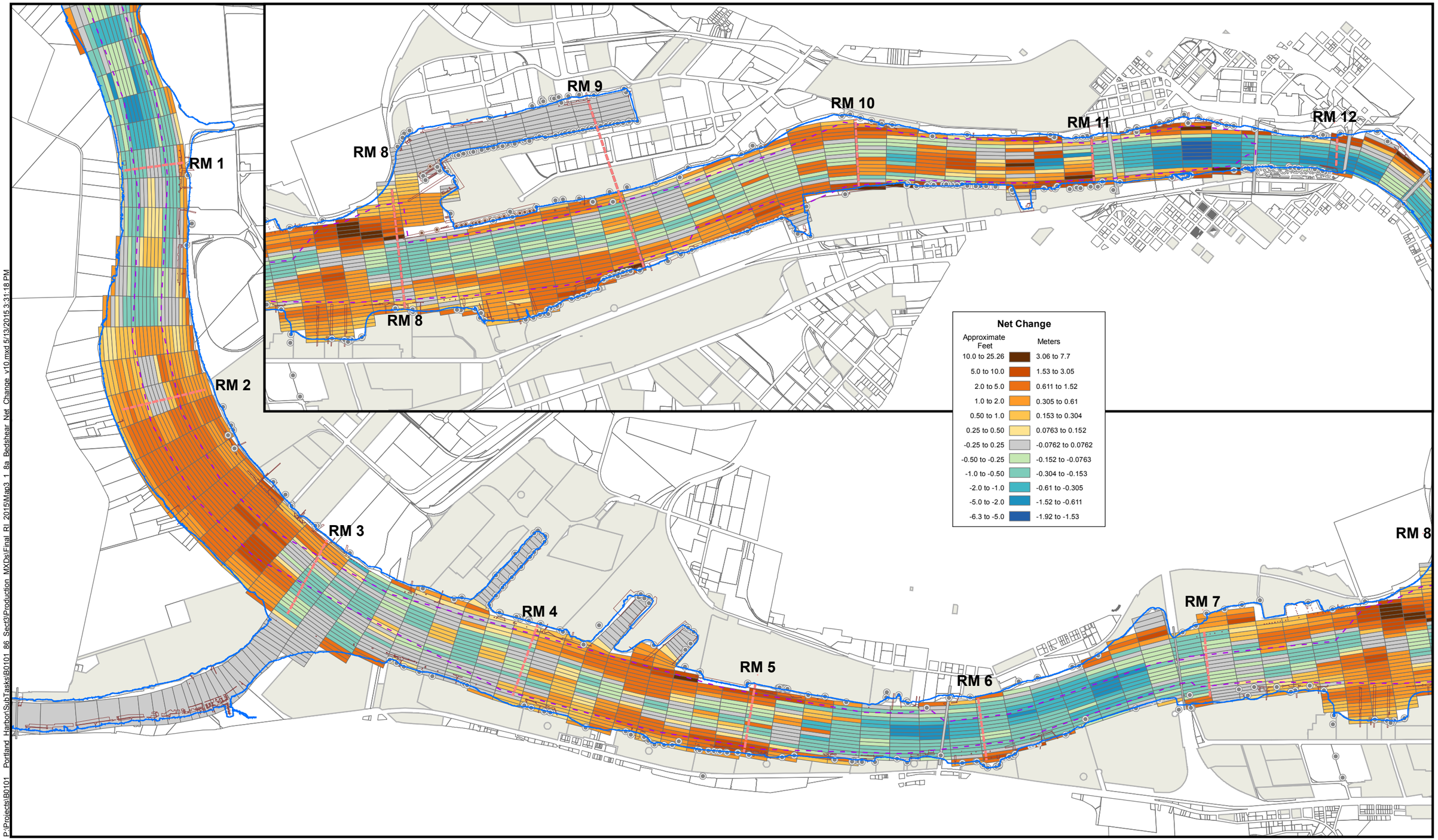

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N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

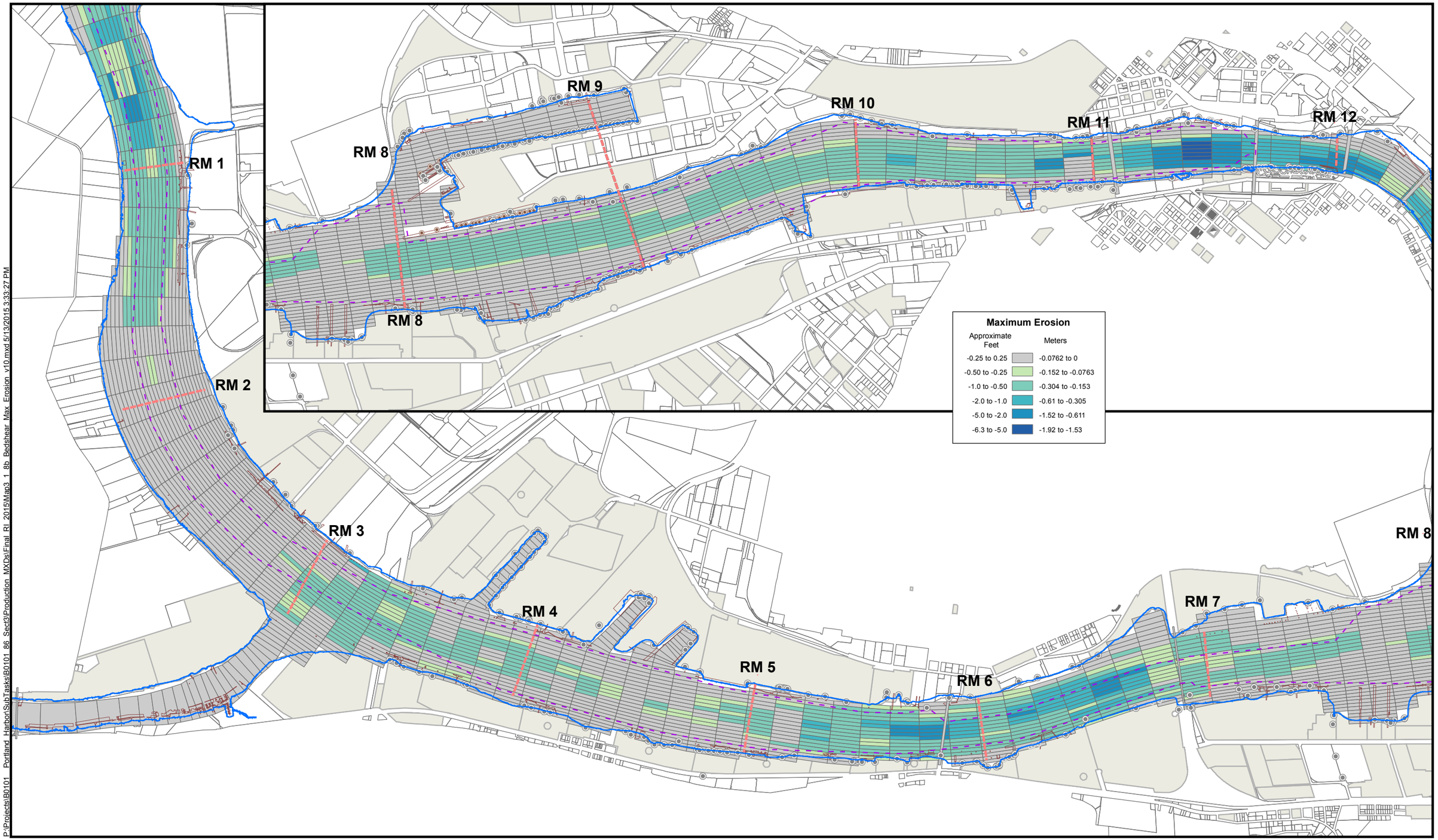
- River Miles
- Navigation Channel
- River Edge +13 ft NAVD

Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-8a
Portland Harbor RI/FS
Remedial Investigation Report
Net Change (High Flow Scenario)



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N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

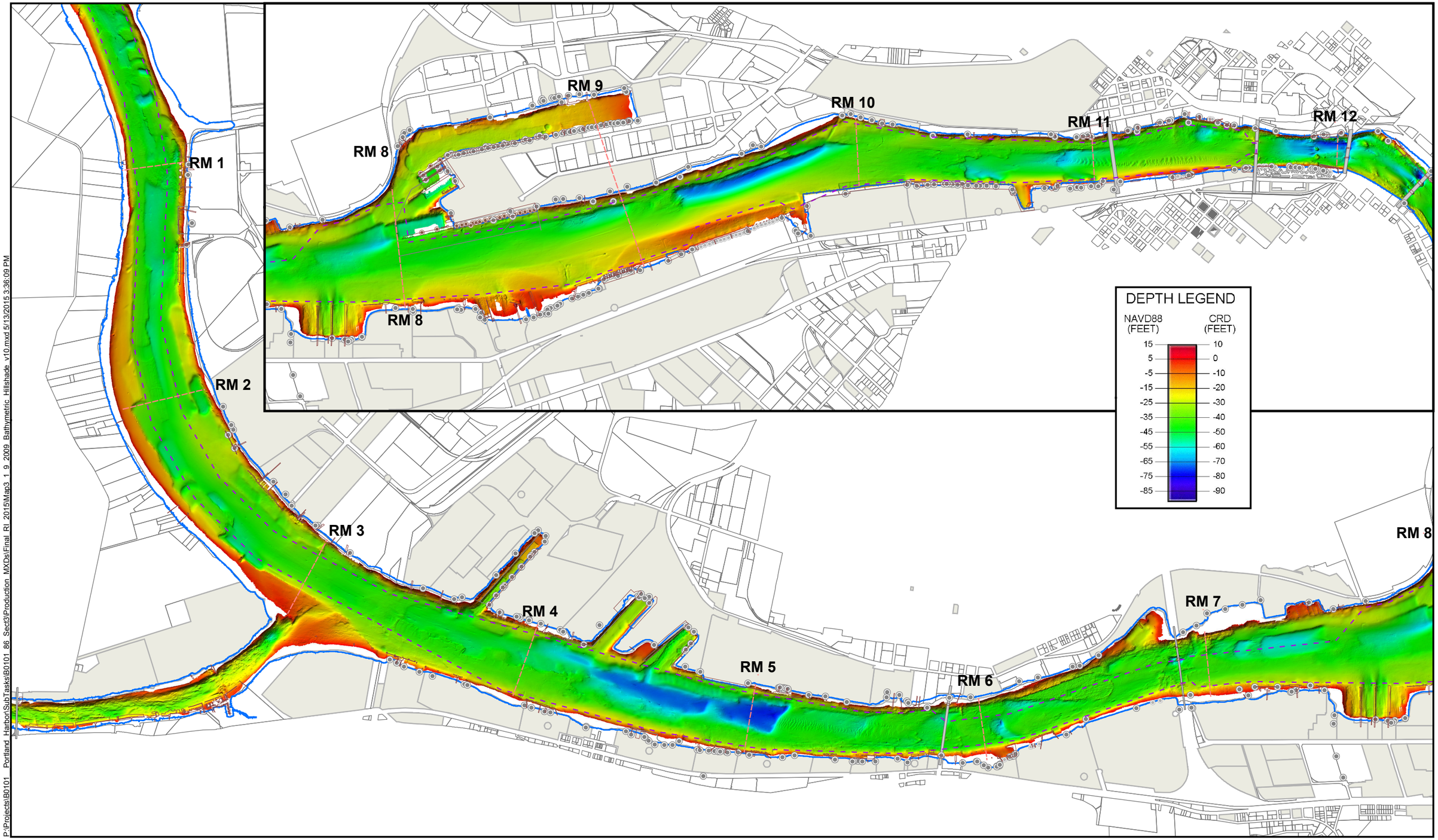
- River Miles
- Navigation Channel
- River Edge +13 ft NAVD

Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-8b
Portland Harbor RI/FS
Remedial Investigation Report
Maximum Erosion



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FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,200 2,400 4,800 Feet

Map Features

- River Miles
- Docks and Structures
- Navigation Channel

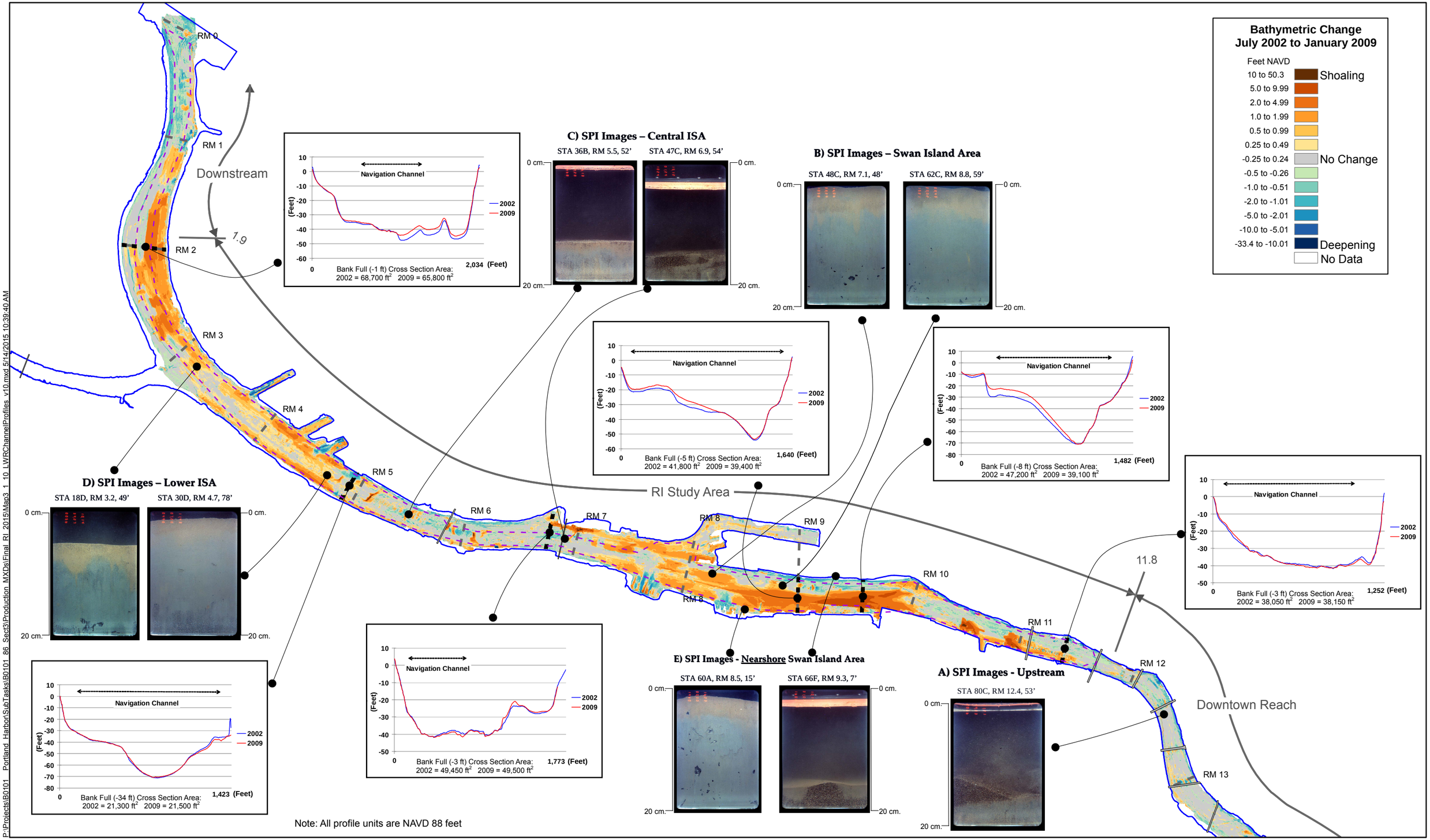
Outfalls

- Outfall
- Dock Drain
- Roof Drain

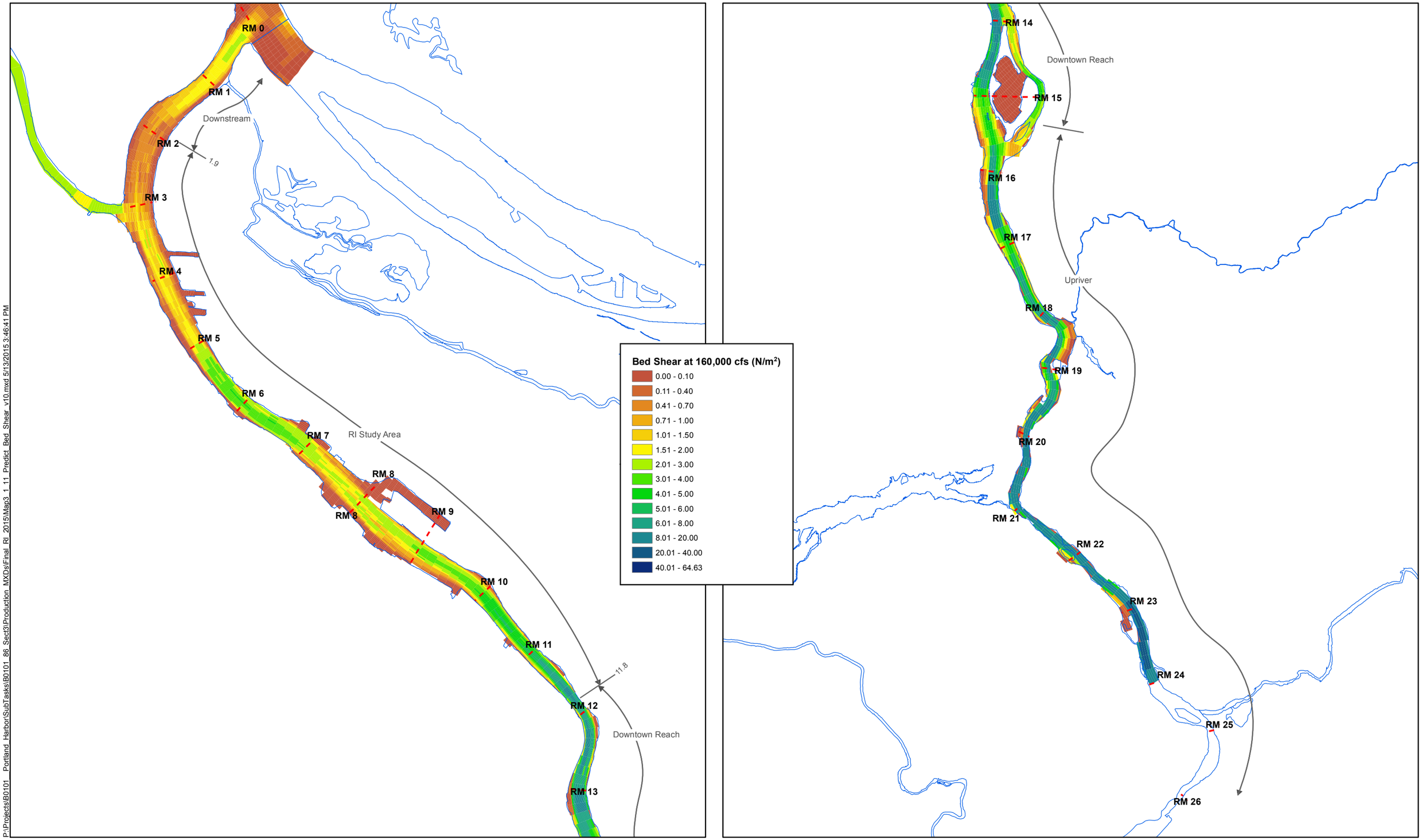
- Bridges
- River Edge +13 ft NAVD
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Note: Willamette River Channel Surveyed 2009; Multnomah Channel Surveyed 2007.

Map 3.1-9
Portland Harbor RI/FS
Remedial Investigation Report
2009 Bathymetric Hillshade



Map 3.1-10
Portland Harbor RI/FS
Remedial Investigation Report
Lower Willamette River
Channel Profiles



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N

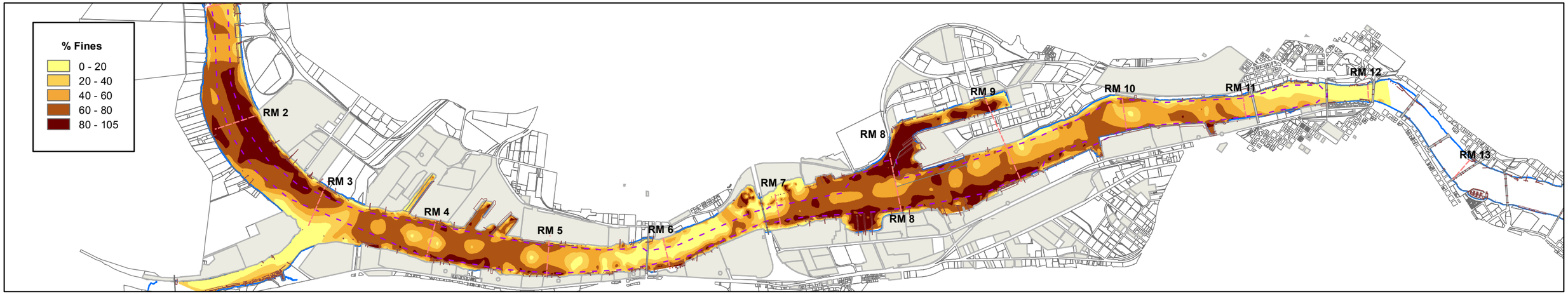
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.
Bed shear: WEST Consultants.

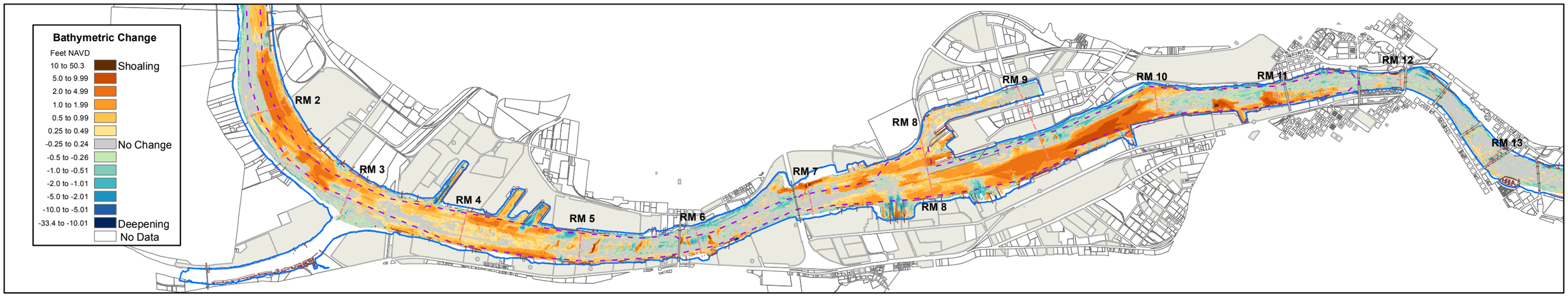
0 3,100 6,200 12,400 Feet

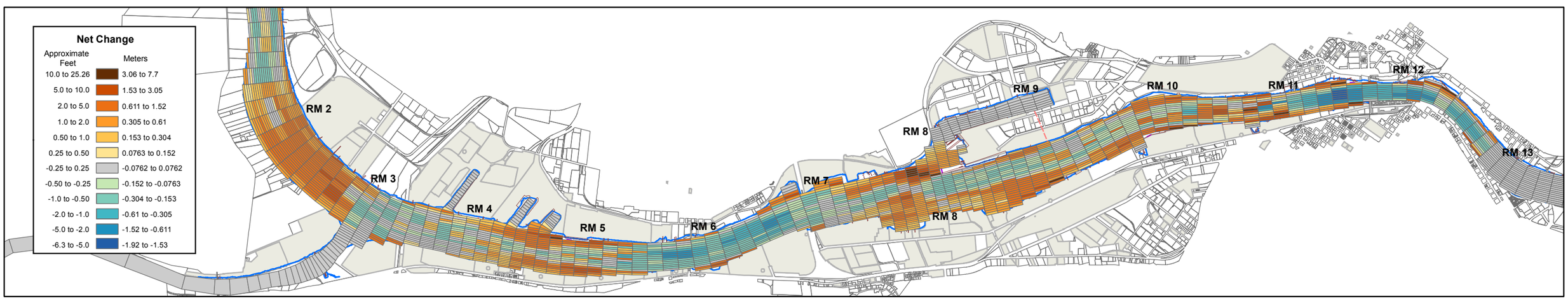
Map Features

River Miles

Map 3.1-11
Portland Harbor RI/FS
Remedial Investigation Report
Predicted Bed Shear Stresses and
Sediment Transport Regimes







N

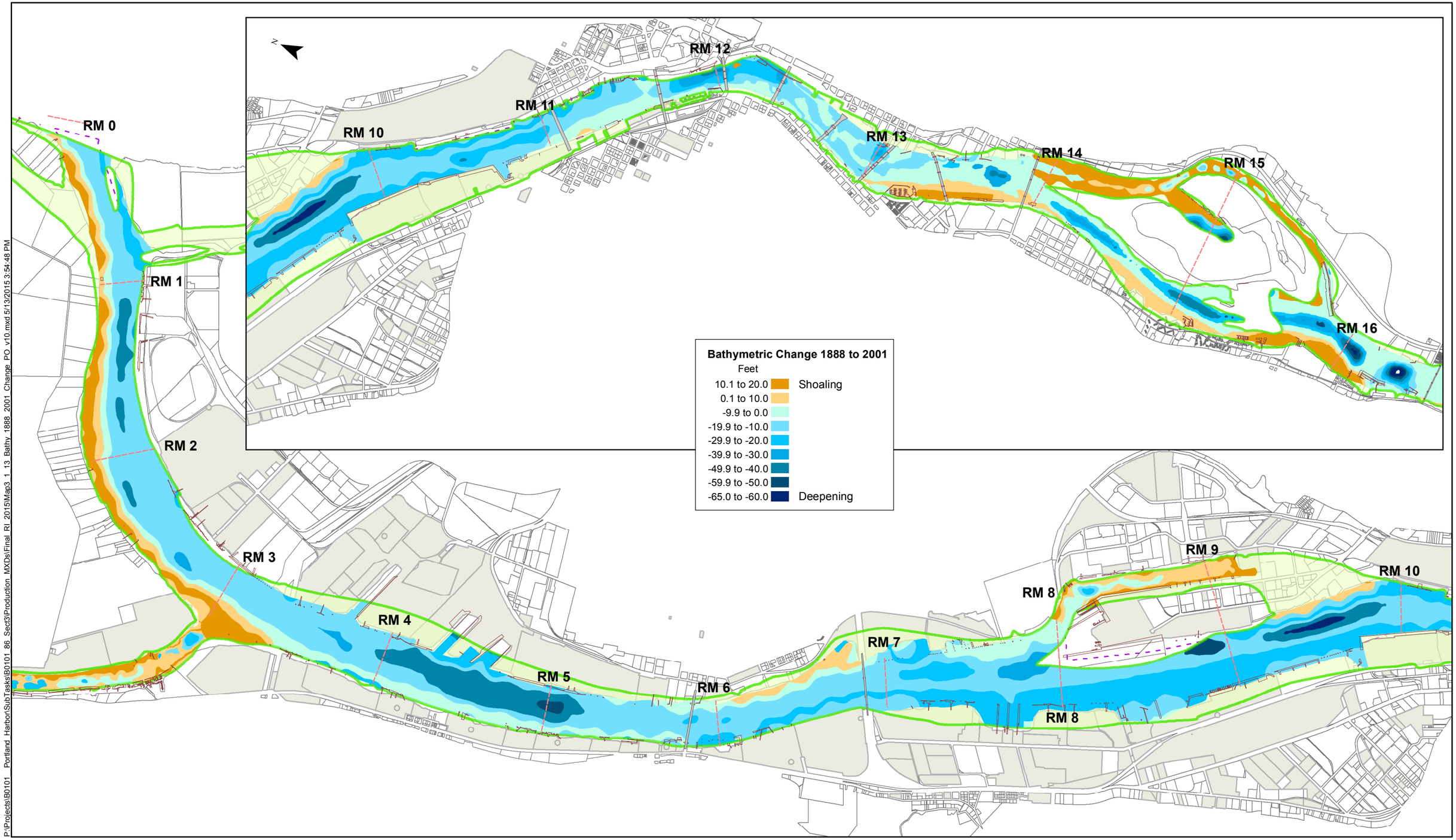
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 0.25 0.5 1 Mile

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-12
Portland Harbor RI/FS
Remedial Investigation Report
Study Area Grain Size, 2002-2009 Bathymetric Change, and Modeled Net Change (High Flow Scenario)



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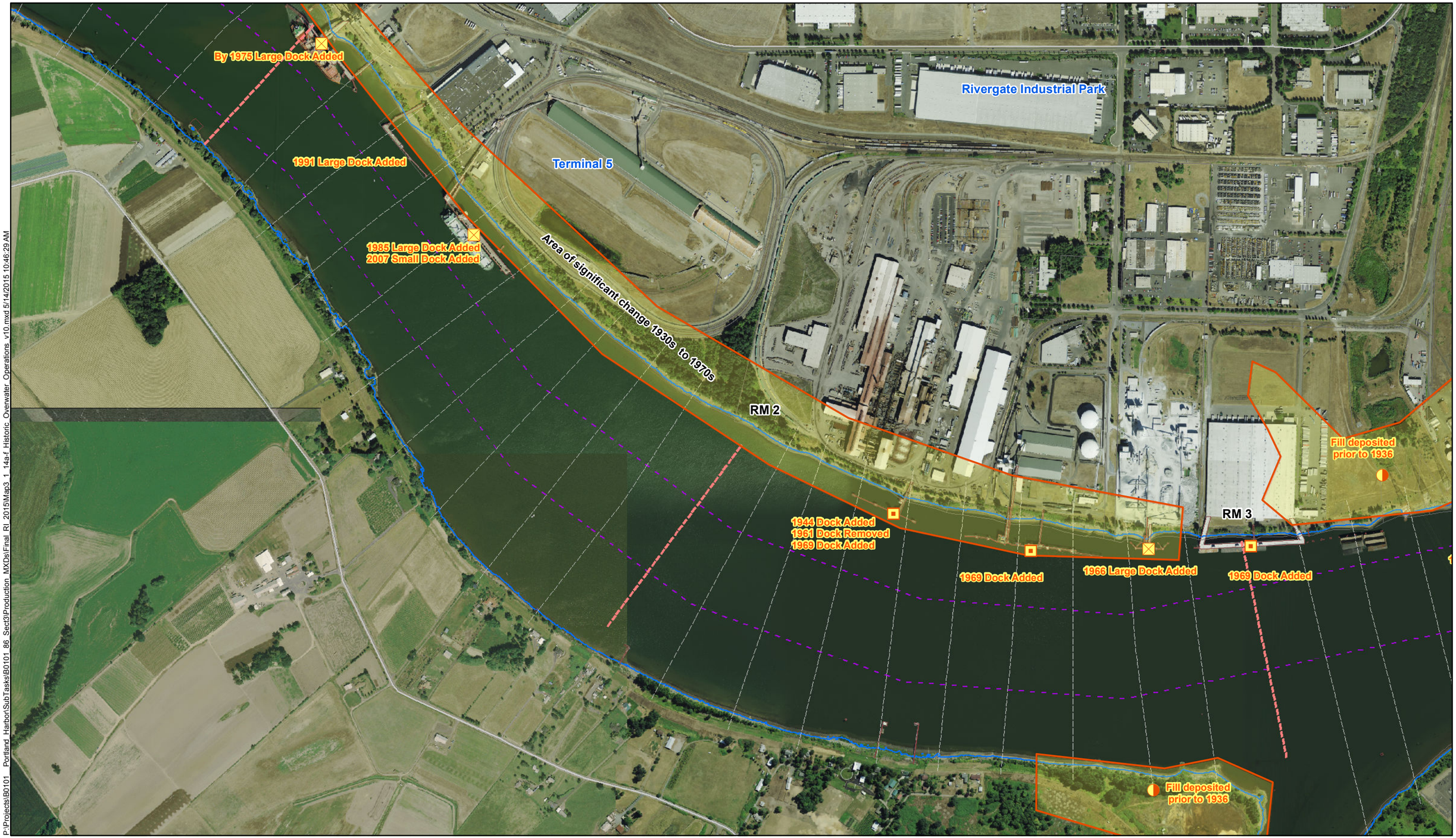
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: City of Portland.

0 1,200 2,400 4,800 Feet

Map Features

- 1888 Shoreline
- River Miles
- Navigation Channel
- Bridges
- Docks and Structures
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-13
Portland Harbor RI/FS
Remedial Investigation Report
Bathymetric Change 1888 to 2001



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N

FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

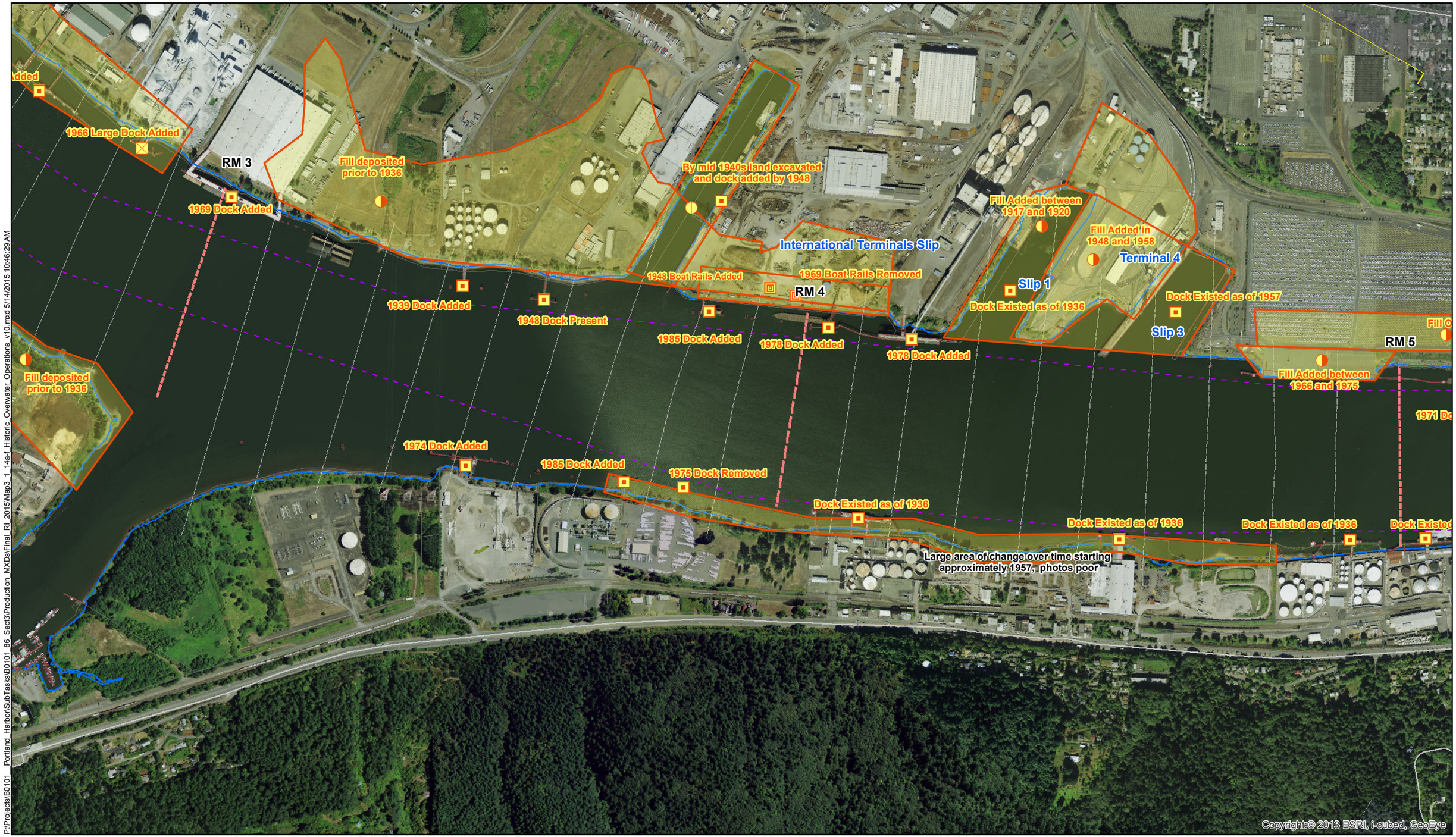
0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14a
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and Overwater Operations



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FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

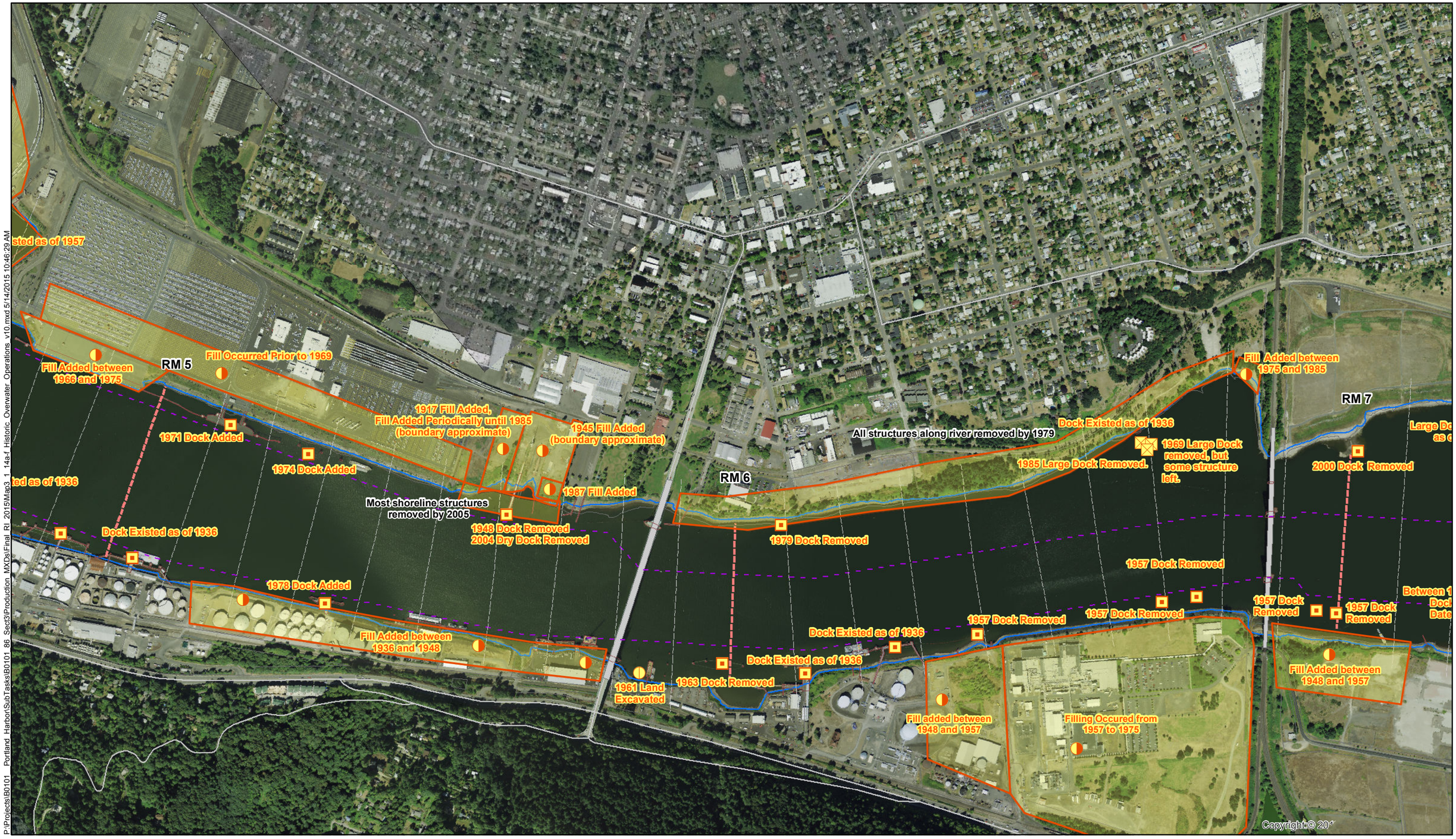
0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14b
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and Overwater Operations



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N

FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

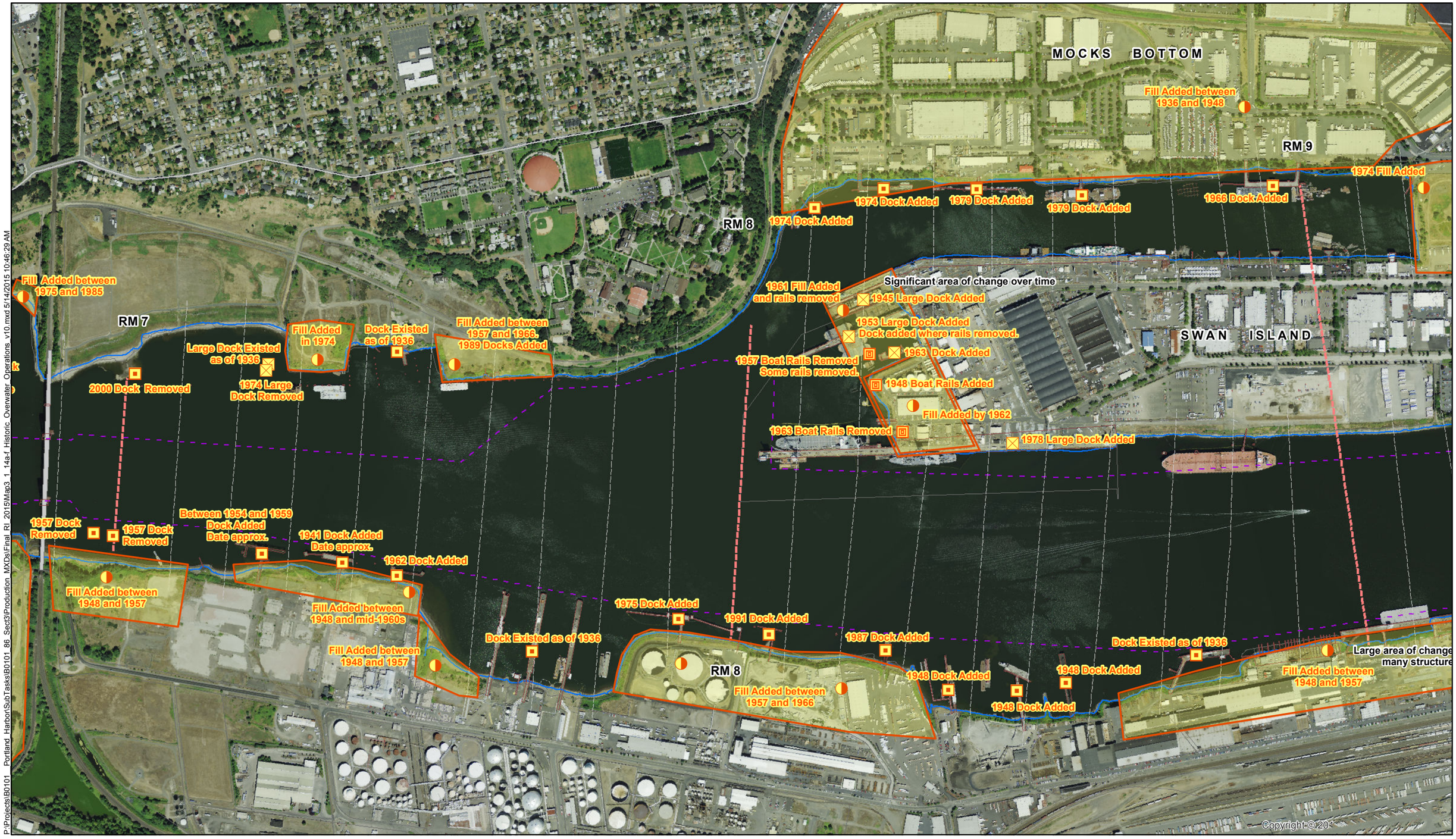
0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14c
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and Overwater Operations



FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

N

0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14d
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and Overwater Operations

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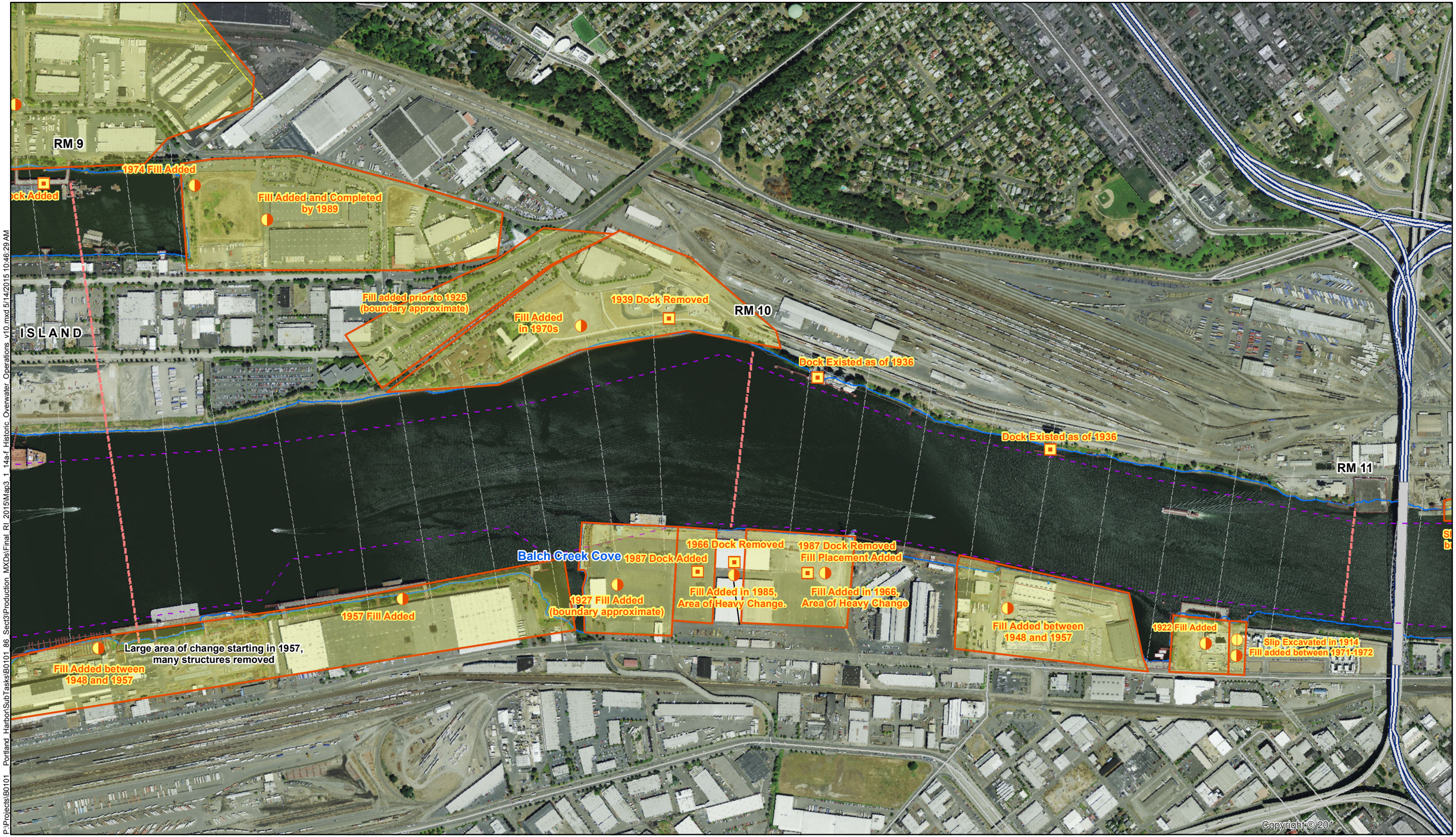

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FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14e
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and Overwater Operations

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N

FEATURE SOURCES:
Channel & River Miles: US Army Corps of Engineers.
Aerial Images: RLIS 2007 and USGS 2002 (provided by ESRI, i-cubed)
Historical Aerial photos for 1936, 1948, 1957, 1966, 1975, 1985, 1995, 2001: Port of Portland.

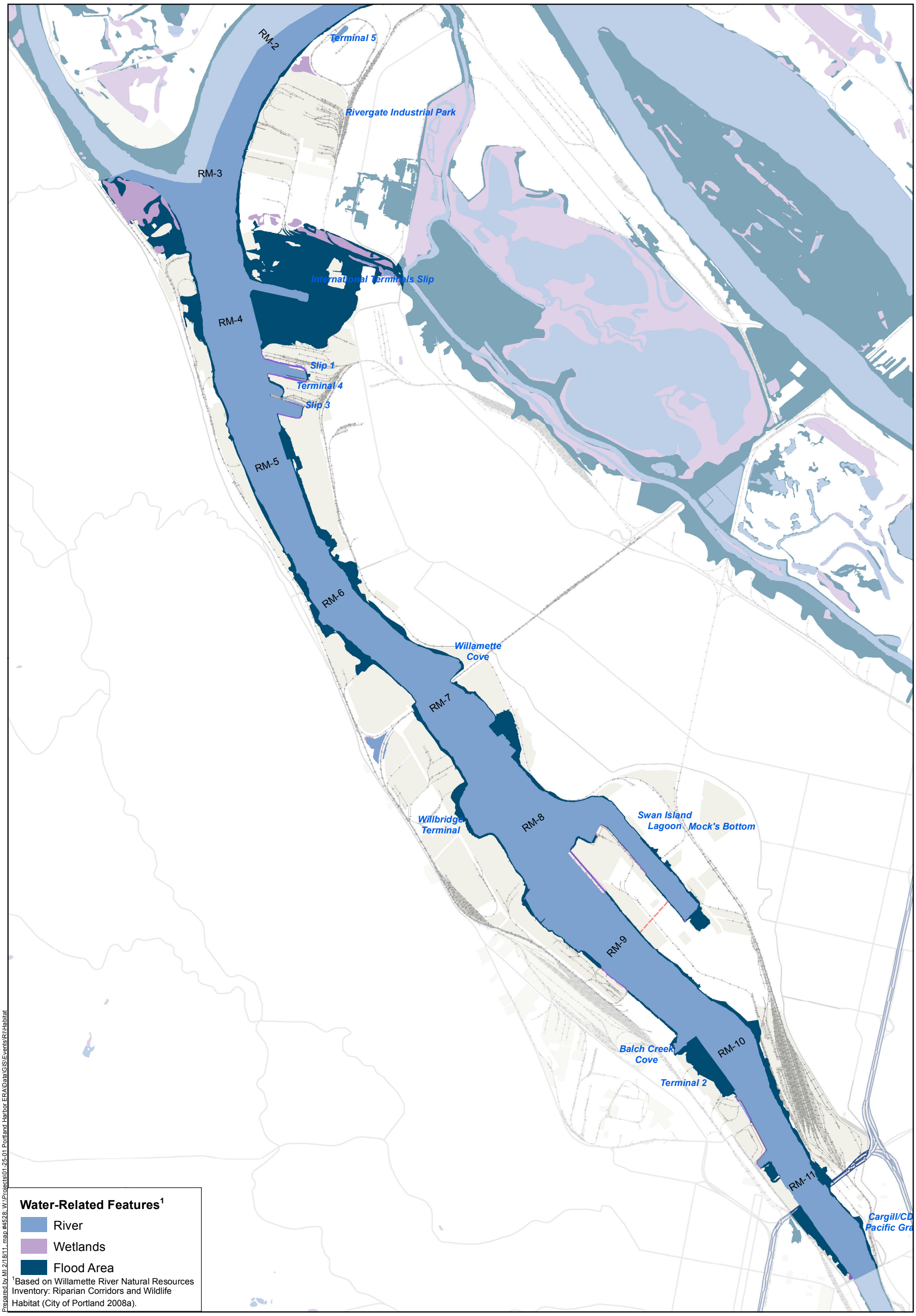
0 250 500 1,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Docks and Structures
- Bridges
- Freeways
- Boat Rails
- Dock
- Fill Placement
- Land Excavated
- Large Dock
- Areas of Change

Label Note:
The dates of the points and polygon features were labeled based on dates taken from the historic composite images. For example if a dock was not present in 1936 but was present in 1948, then it was labeled as 1948.

Map 3.1-14f
Portland Harbor RI/FS
Remedial Investigation Report
Historical Fill Placement and
Overwater Operations



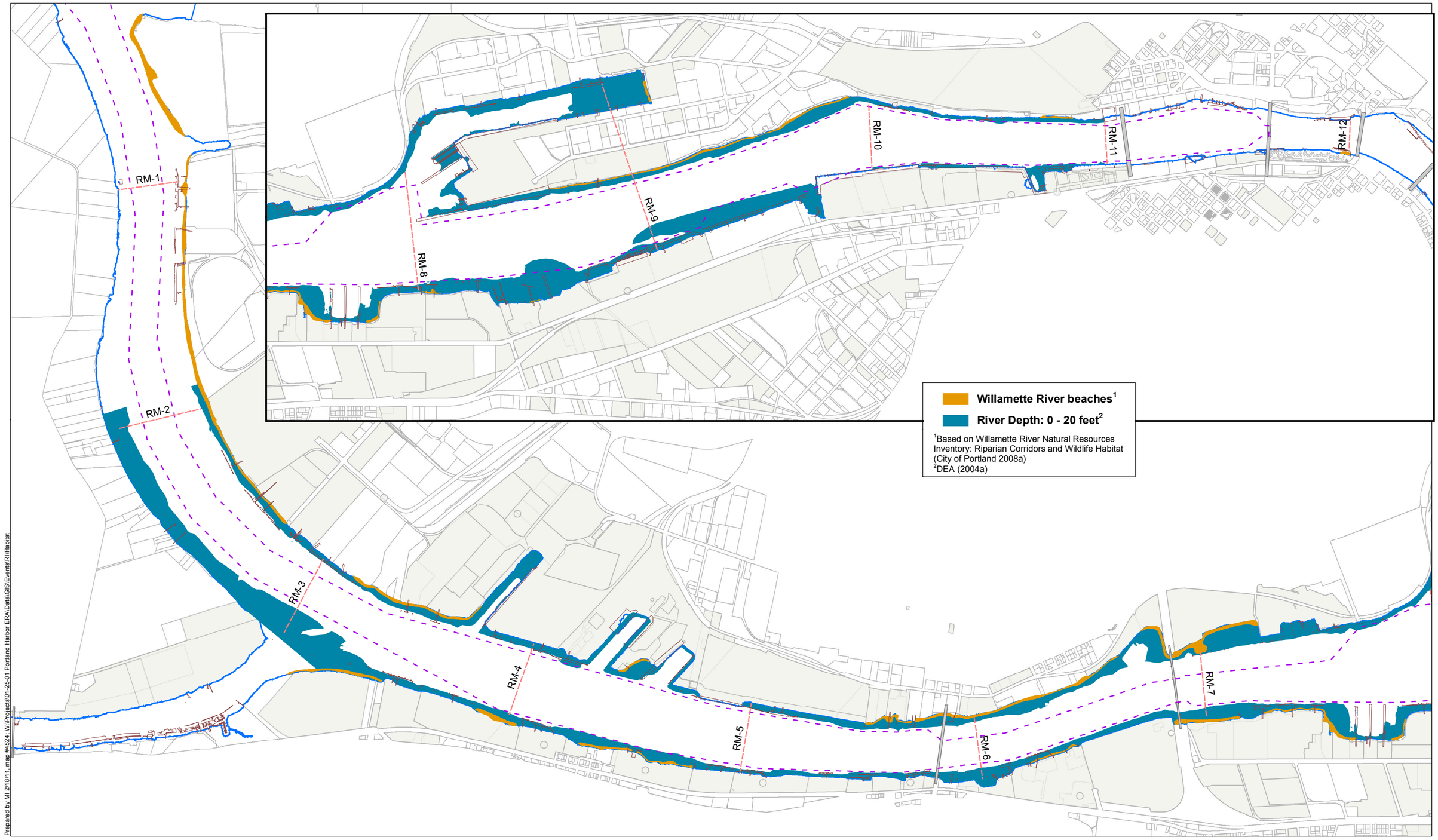
N

0 1,000 2,000 3,000 4,000 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Freeway
Arterial
Railroad
Bridge
Upland Site (2008)
Dock or Structure
River Mile
Navigation Channel
River or slough

Map 3.1-15
Portland Harbor RI/FS
Remedial Investigation Report
Water-Related Features within the North Reach



N

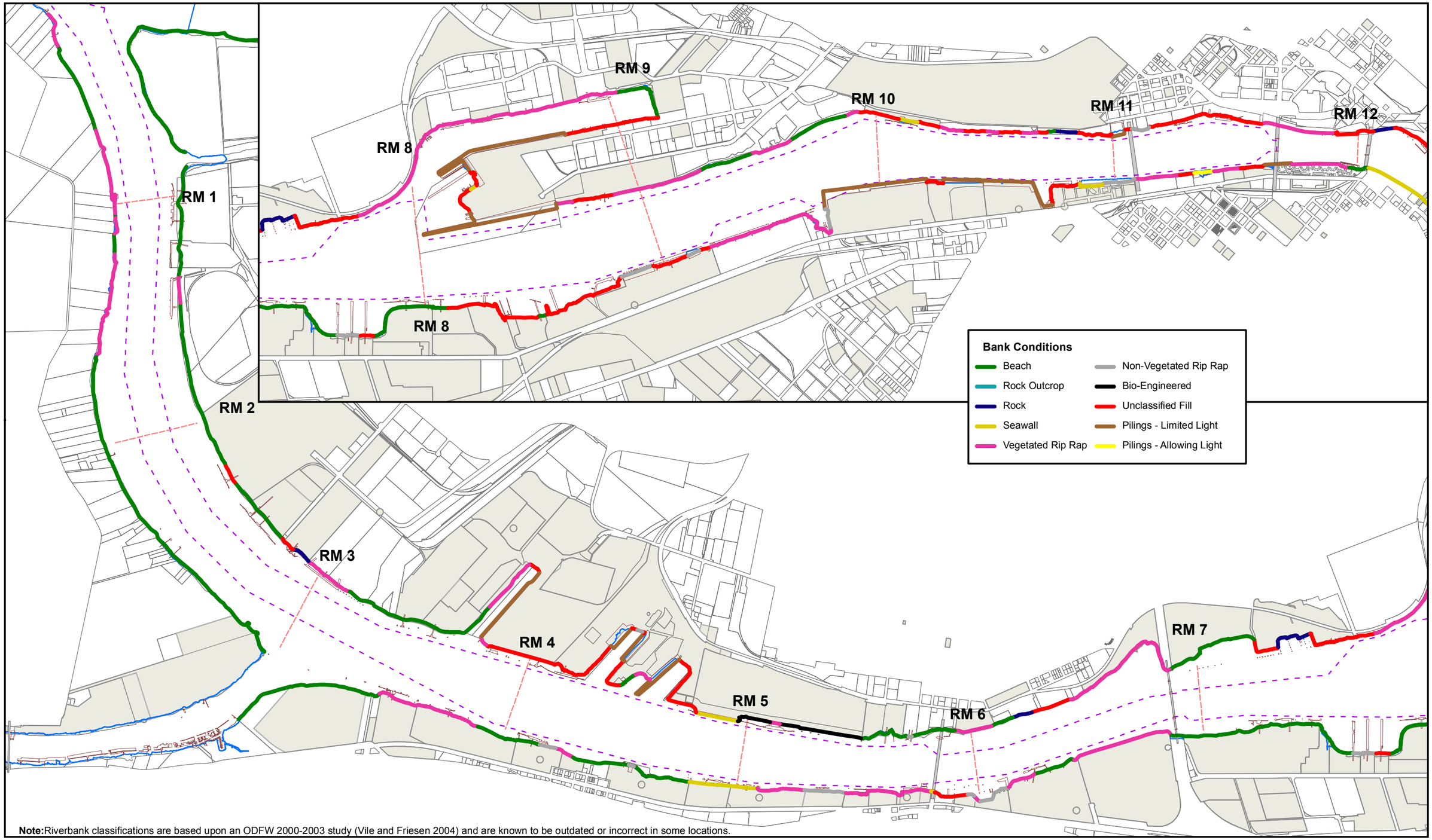
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

- River Mile
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Waterfront Taxlot
- Upland ECSI Site (2008)

Map 3.1-16
Portland Harbor RI/FS
Remedial Investigation Report
Shallow-water Areas and Beaches in the Study Area



Note: Riverbank classifications are based upon an ODFW 2000-2003 study (Vile and Friesen 2004) and are known to be outdated or incorrect in some locations.

N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

- River Miles
- Docks and Structures
- Navigation Channel
- River Edge +13 ft NAVD
- Upland ECSI Sites (2008)
- Waterfront Taxlots

Map 3.1-17
Portland Harbor RI/FS
Remedial Investigation Report
Riverbank Types

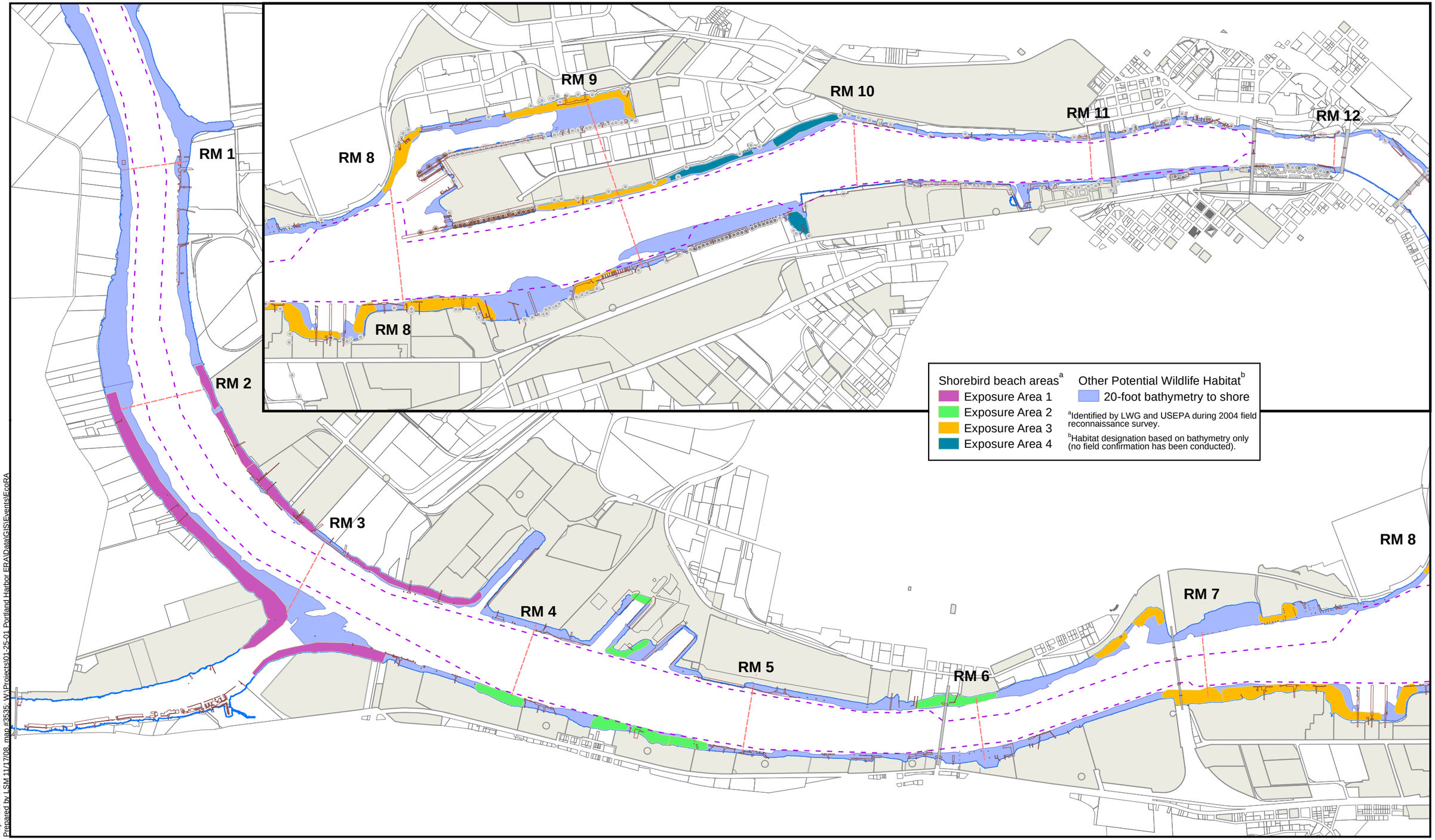
N

0 1,000 2,000 3,000 4,000 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Freeway
Arterial
Railroad
Bridge
Upland Site (2008)
Dock or Structure
River Mile
Navigation Channel
River or slough

Map 3.1-18
Portland Harbor RI/FS
Remedial Investigation Report
Vegetation Features within the North Reach



Map Document:
Prepared by LSM 11/17/08, map #535, W:\Projects\01-25-01 Portland Harbor ERA\Data\GIS\Events\EcoRA

N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.
Shorebird Beach Source: Windward 2004

0 1,000 2,000 3,000 4,000 5,000 Feet

Map features

- River Mile
- Navigation Channel
- River Edge
- Bridge
- Dock or Structure
- Waterfront Taxlot
- Upland Site (2008)

Map 3.1-19
Portland Harbor RI/FS
Remedial Investigation Report
Wildlife Habitat in the Study Area