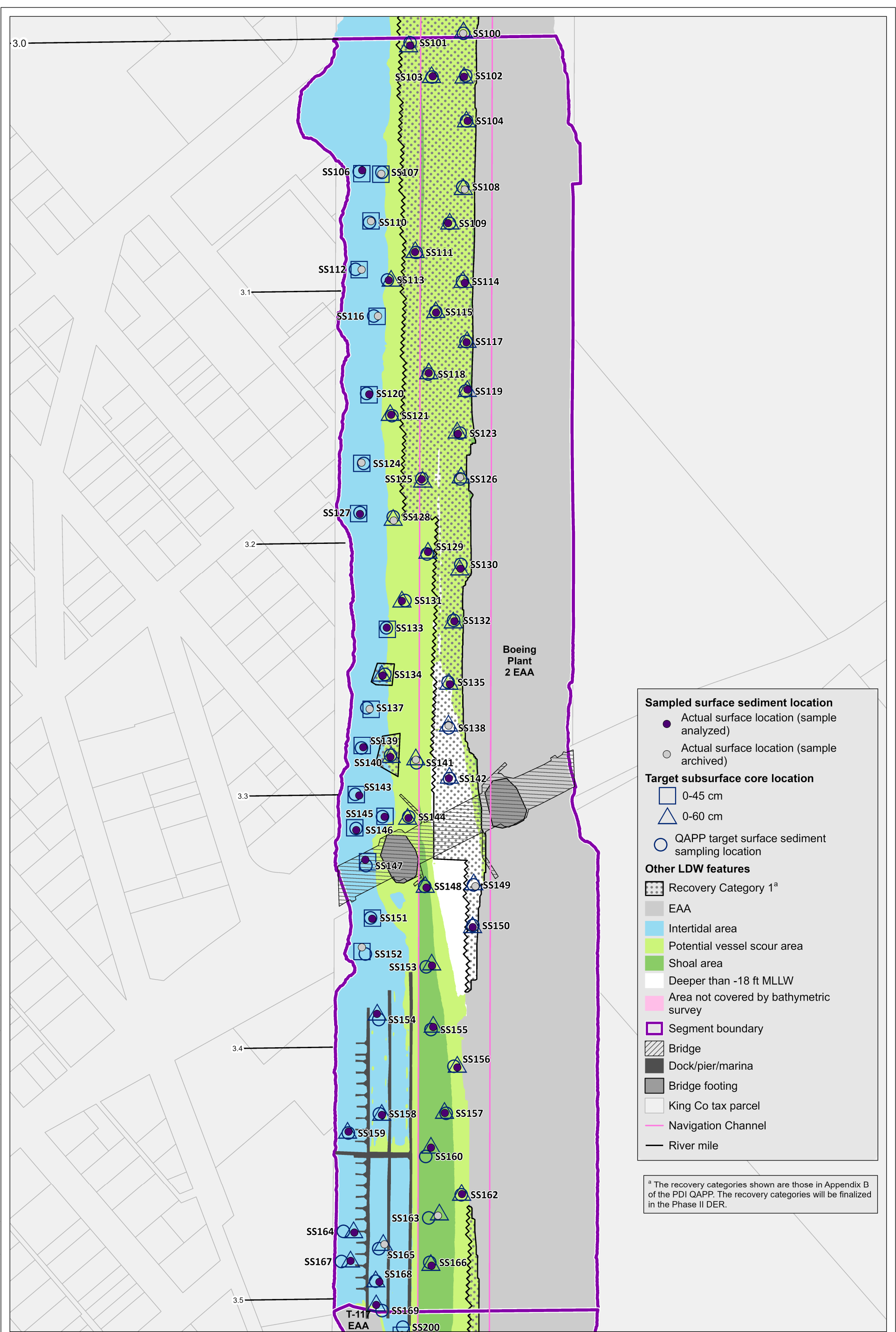


Prepared by craigh, 6/28/21, W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-1 A-2 7257 Targets vs actuals.aprx



**Sampled surface sediment location**

- Actual surface location (sample analyzed)
- Actual surface location (sample archived)

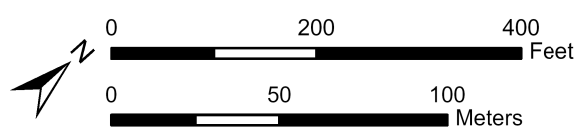
**Target subsurface core location**

- 0-45 cm
- △ 0-60 cm
- QAPP target surface sediment sampling location

**Other LDW features**

- ▨ Recovery Category 1<sup>a</sup>
- EAA
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Area not covered by bathymetric survey
- Segment boundary
- ▨ Bridge
- Dock/pier/marina
- Bridge footing
- King Co tax parcel
- Navigation Channel
- River mile

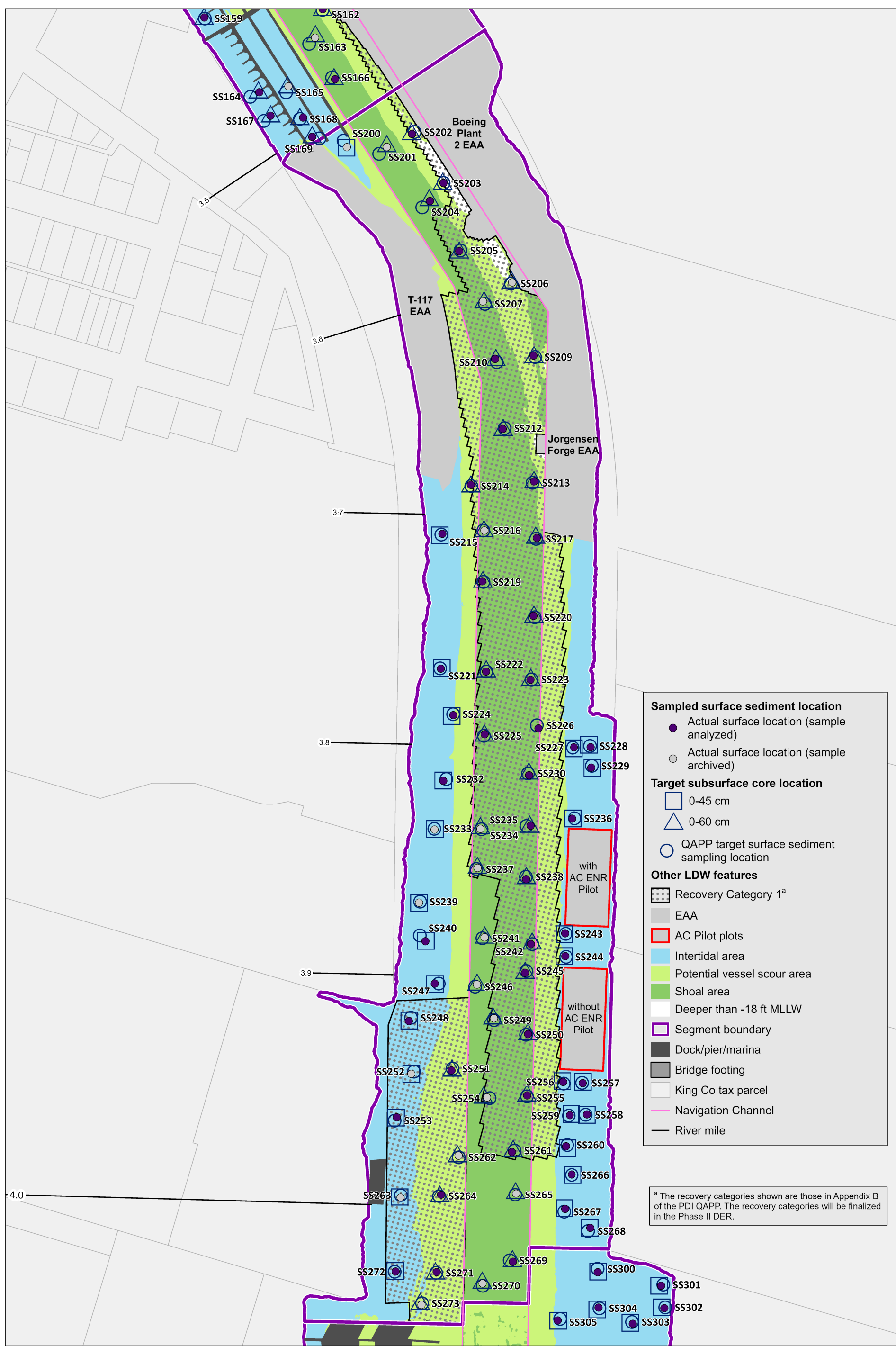
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



**Map A-1a. Target vs. actuals for Phase I PDI surface sediment samples (0-10 cm), Segment 1 (RM 3.0 to RM 3.5)**

PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh, 6/28/21, W:\Projects\Duwamish ACC\GIS\Maps and Analysis\Phase II\QAPP Addendum\Attachment A\Map A-1 A-2 7257 Targets vs actuals.aprx



**Sampled surface sediment location**

- Actual surface location (sample analyzed)
- Actual surface location (sample archived)

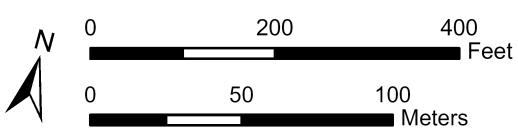
**Target subsurface core location**

- 0-45 cm
- △ 0-60 cm
- QAPP target surface sediment sampling location

**Other LDW features**

- ▨ Recovery Category 1<sup>a</sup>
- EAA
- AC Pilot plots
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Segment boundary
- Dock/pier/marina
- Bridge footing
- King Co tax parcel
- Navigation Channel
- River mile

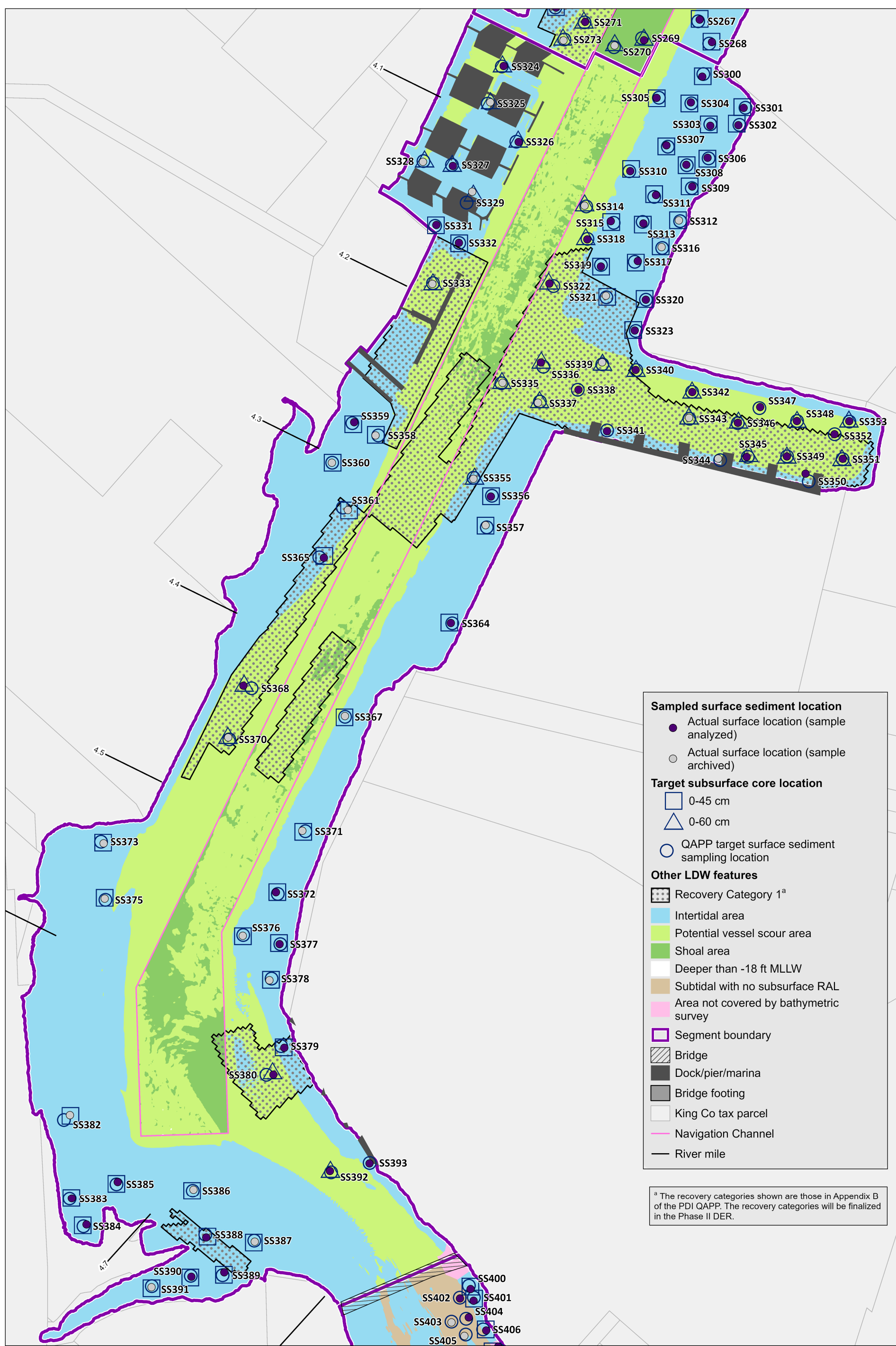
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



**Map A-1b. Target vs. actuals for Phase I PDI surface sediment samples (0-10 cm), Segment 2 (RM 3.5 to RM 4.05)**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

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**Sampled surface sediment location**

- Actual surface location (sample analyzed)
- Actual surface location (sample archived)

**Target subsurface core location**

- 0-45 cm
- △ 0-60 cm
- QAPP target surface sediment sampling location

**Other LDW features**

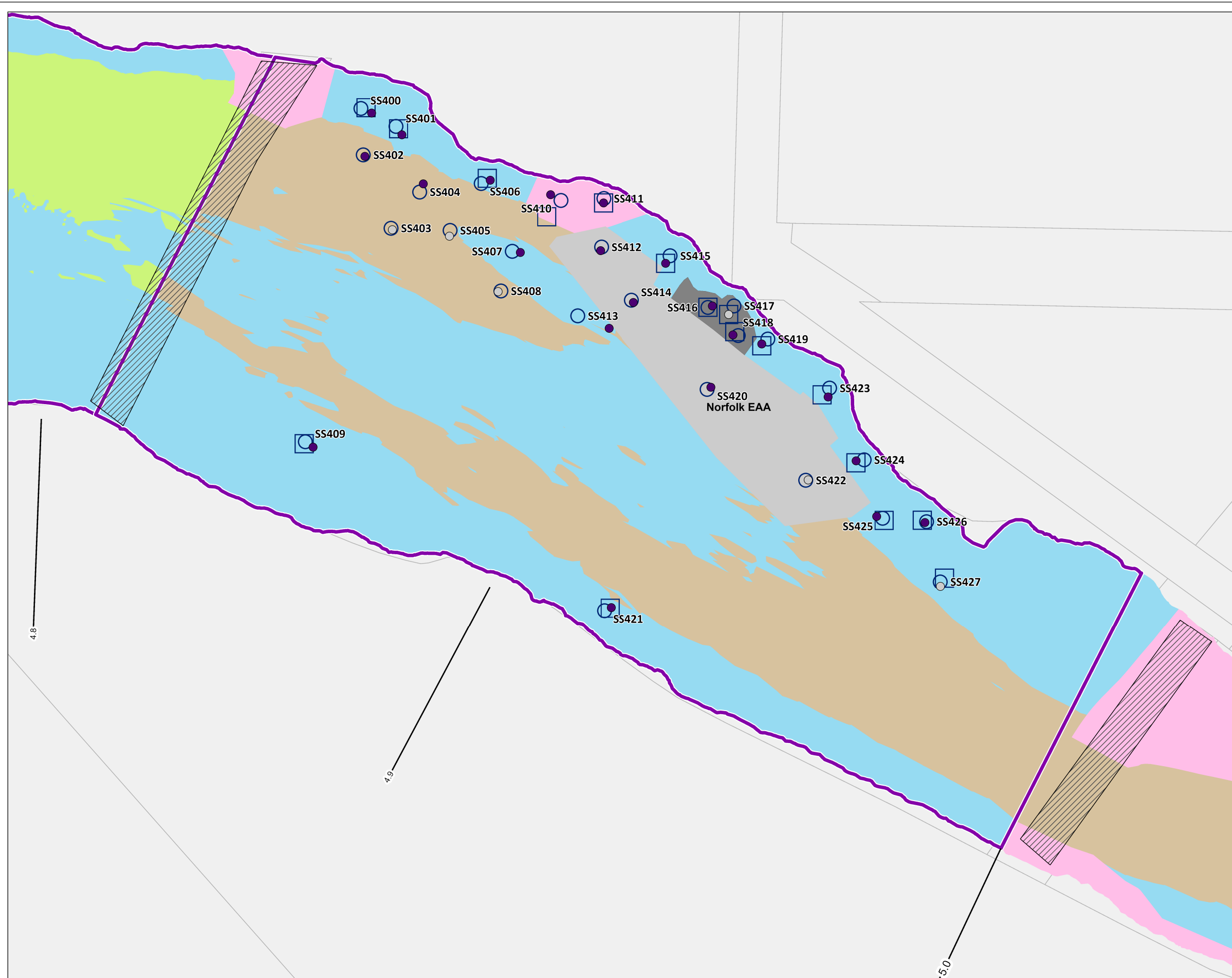
- ▨ Recovery Category 1<sup>a</sup>
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- ▭ Segment boundary
- ▨ Bridge
- Dock/pier/marina
- Bridge footing
- King Co tax parcel
- Navigation Channel
- River mile

<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



**Map A-1c. Target vs. actuals for Phase I PDI surface sediment samples (0-10 cm), Segment 3 (RM 4.05 to RM 4.81)**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Sampled surface sediment location**

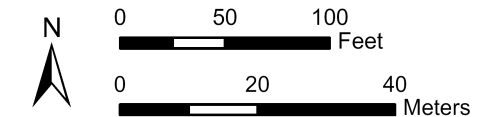
- Actual surface location (sample analyzed)
- Actual surface location (sample archived)

**Target subsurface core location**

- 0-45 cm
- QAPP target surface sediment sampling location

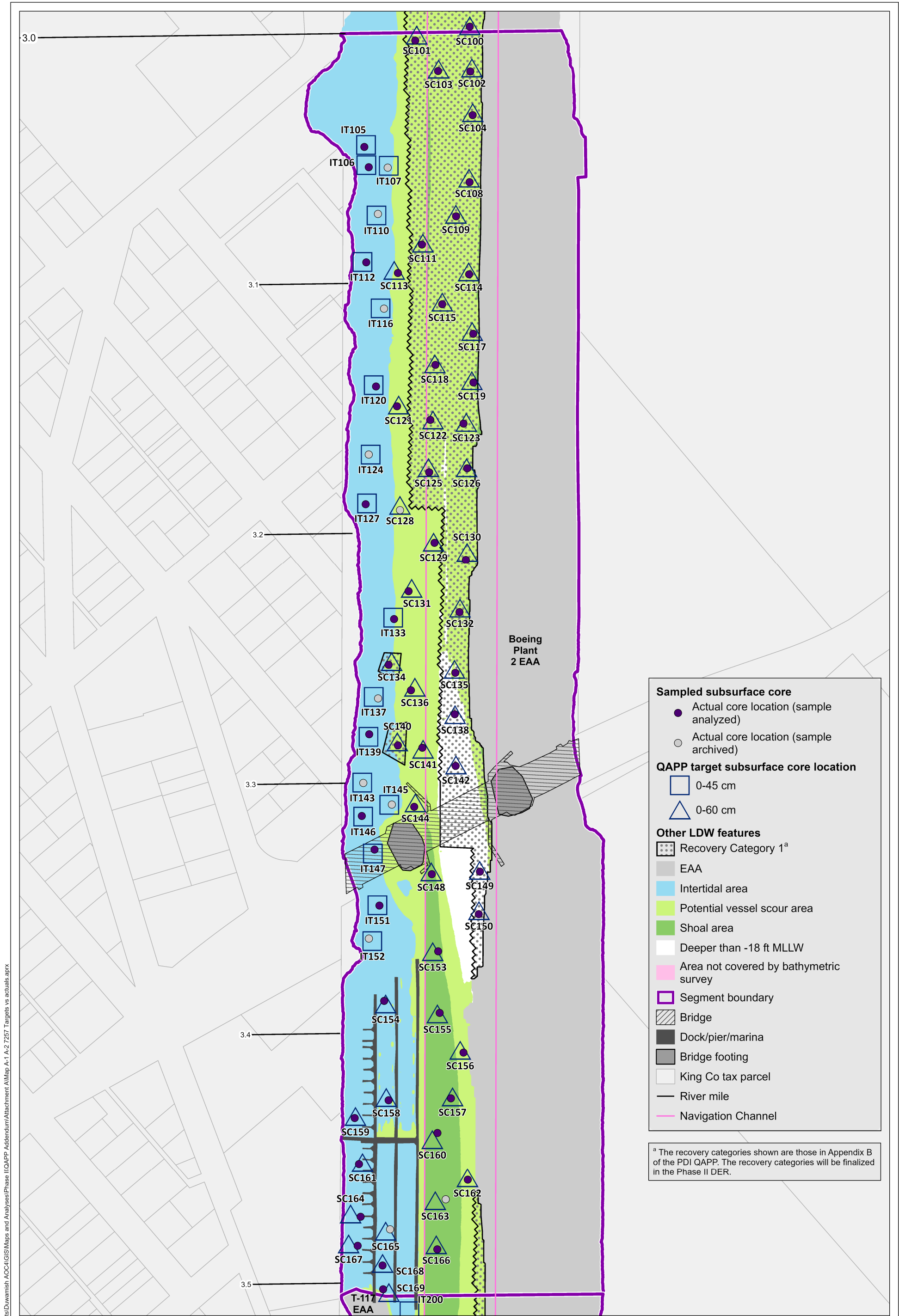
**Other LDW features**

- EAA
- Boeing South Storm Drain removal area
- Intertidal area
- Potential vessel scour area
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- ▭ Segment boundary
- ▨ Bridge
- ▭ King Co tax parcel
- ▭ Navigation Channel
- River mile



**Map A-1d. Target vs. actuals for Phase I PDI surface sediment samples (0-10 cm), Segment 4 (RM 4.81 to RM 5.0)**

PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH



**Sampled subsurface core**

- Actual core location (sample analyzed)
- Actual core location (sample archived)

**QAPP target subsurface core location**

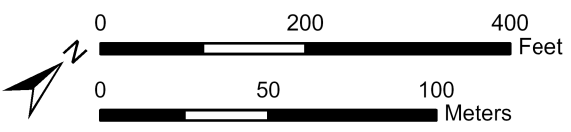
- 0-45 cm
- △ 0-60 cm

**Other LDW features**

- ▨ Recovery Category 1<sup>a</sup>
- EAA
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Area not covered by bathymetric survey
- ▭ Segment boundary
- ▨ Bridge
- Dock/pier/marina
- Bridge footing
- King Co tax parcel
- River mile
- Navigation Channel

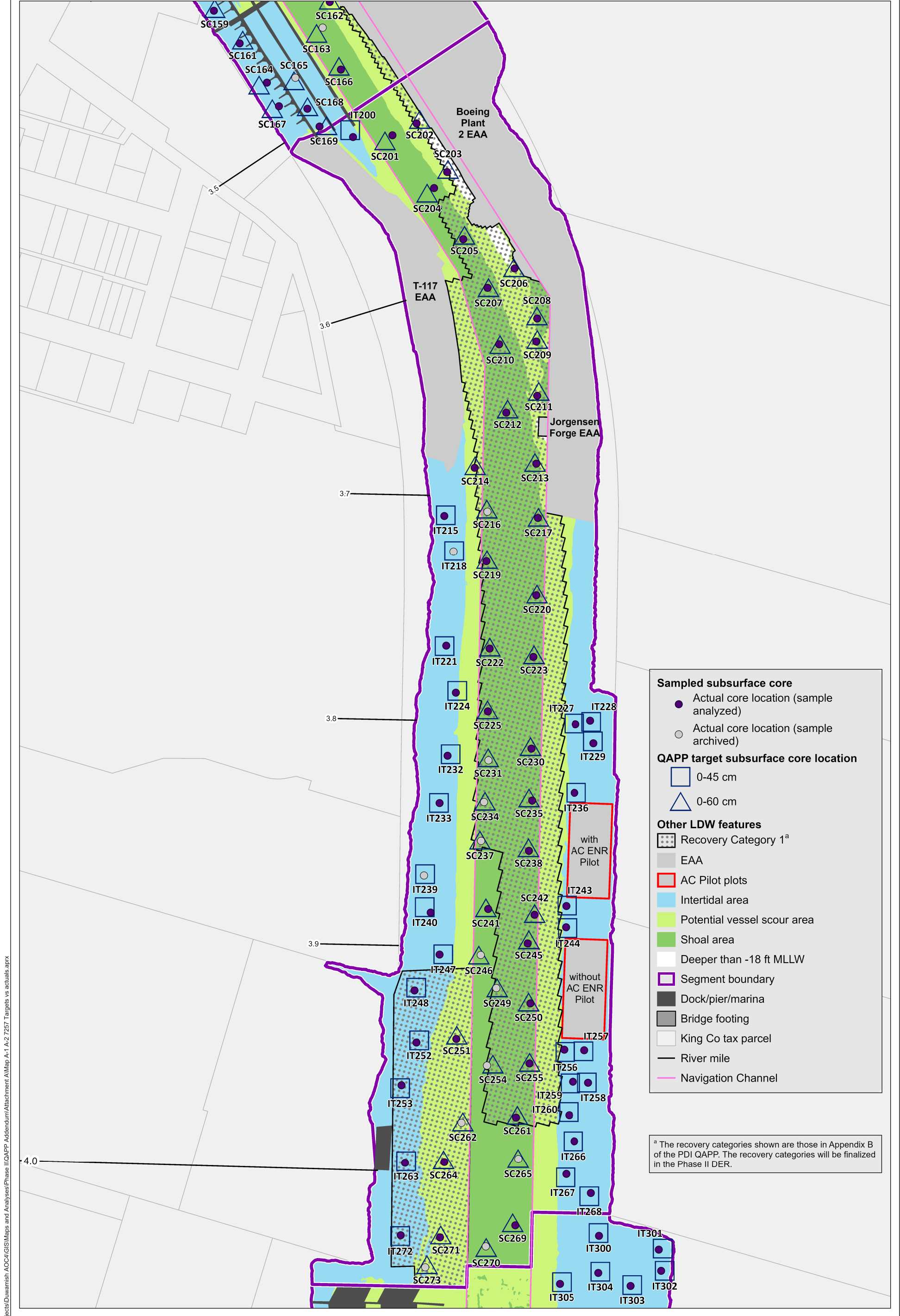
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Prepared by craigh, 6/21/21, W:\Projects\Duwamish ACC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-1 A-2 7257 Targets vs actuals.aprx

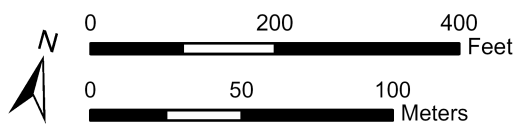


**Map A-2a. Target vs. actual Phase I PDI subsurface core locations, Segment 1 (RM 3.0 to RM 3.5)**

PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH

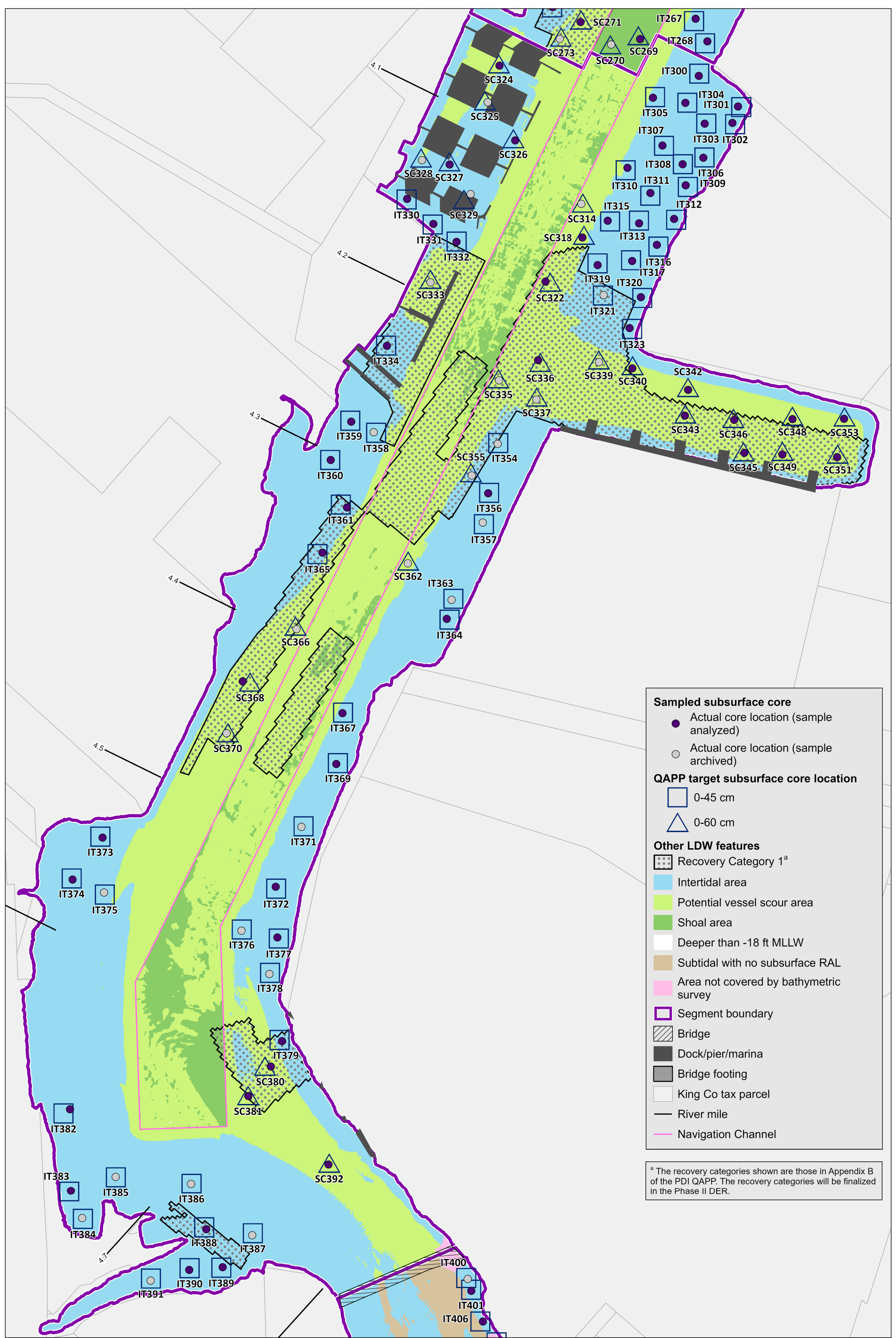


Prepared by craigh, 6/21/21; W:\Projects\Duwamish ACC\GIS\Maps and Analysis\Phase II QAPP Addendum\Attachment A\Map A-1 A-2 7257 Targets vs actuals.aprx



**Map A-2b. Target vs. actual Phase I PDI subsurface core locations, Segment 2 (RM 3.5 to RM 4.05)**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh, 6/21/21, W:\Projects\Duwamish ACC\GIS\Maps and Analysis\Phase II\QAPP Addendum\Attachment A\Map A-1 A-2 7257 Targets vs actuals.aprx



**Sampled subsurface core**

- Actual core location (sample analyzed)
- Actual core location (sample archived)

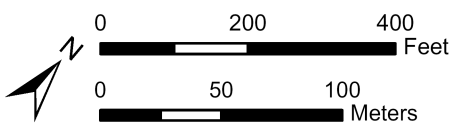
**QAPP target subsurface core location**

- 0-45 cm
- △ 0-60 cm

**Other LDW features**

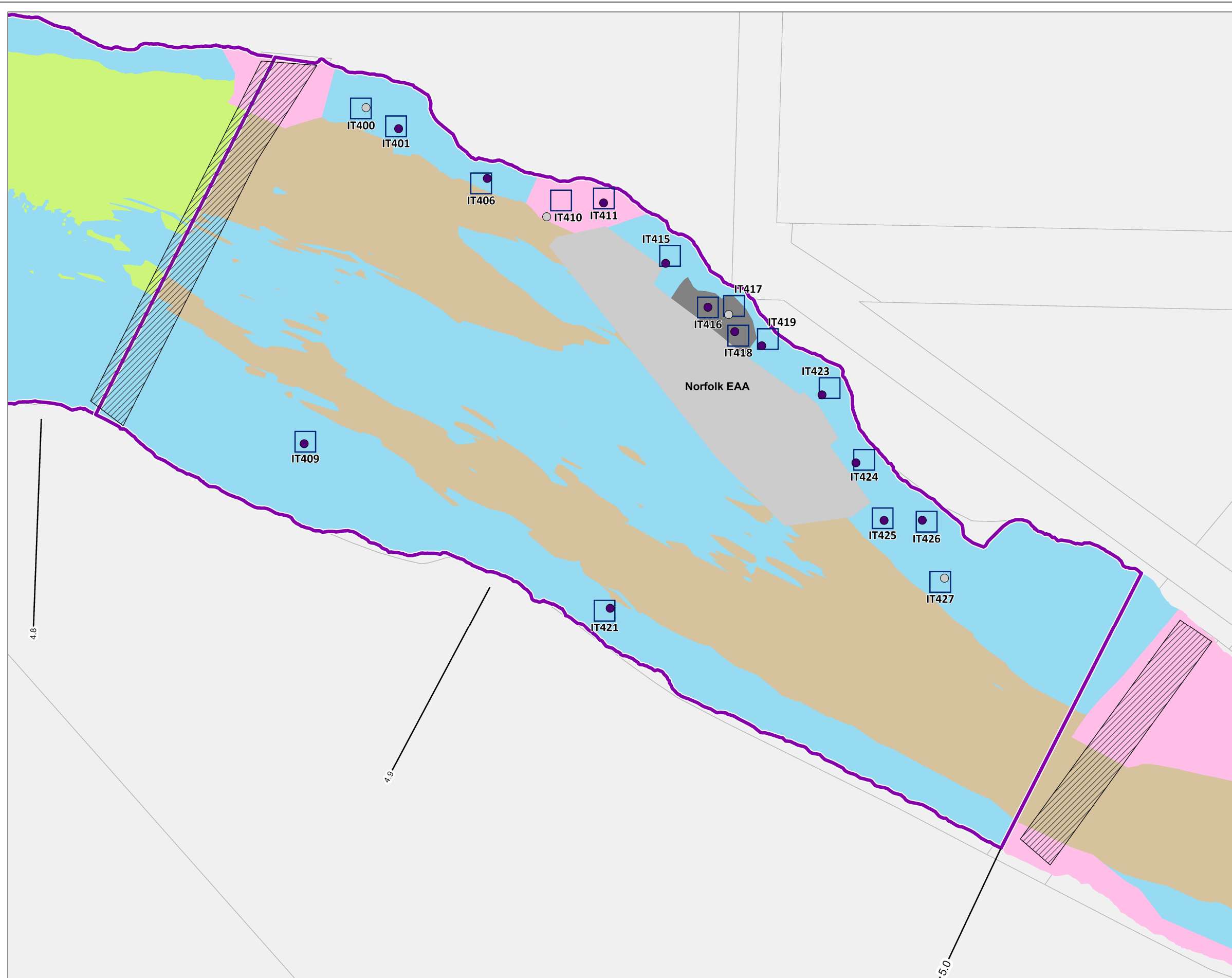
- ▨ Recovery Category 1<sup>a</sup>
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- Segment boundary
- ▨ Bridge
- Dock/pier/marina
- Bridge footing
- King Co tax parcel
- River mile
- Navigation Channel

<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



**Map A-2c. Target vs. actual Phase I PDI subsurface core locations, Segment 3 (RM 4.05 to RM 4.81)**

PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH



**Sampled subsurface core**

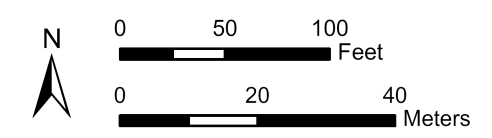
- Actual core location (sample analyzed)
- Actual core location (sample archived)

**QAPP target subsurface core location**

- 0-45 cm

**Other LDW features**

- EAA
- Boeing South Storm Drain removal area
- Intertidal area
- Potential vessel scour area
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- Segment boundary
- ▨ Bridge
- King Co tax parcel
- River mile

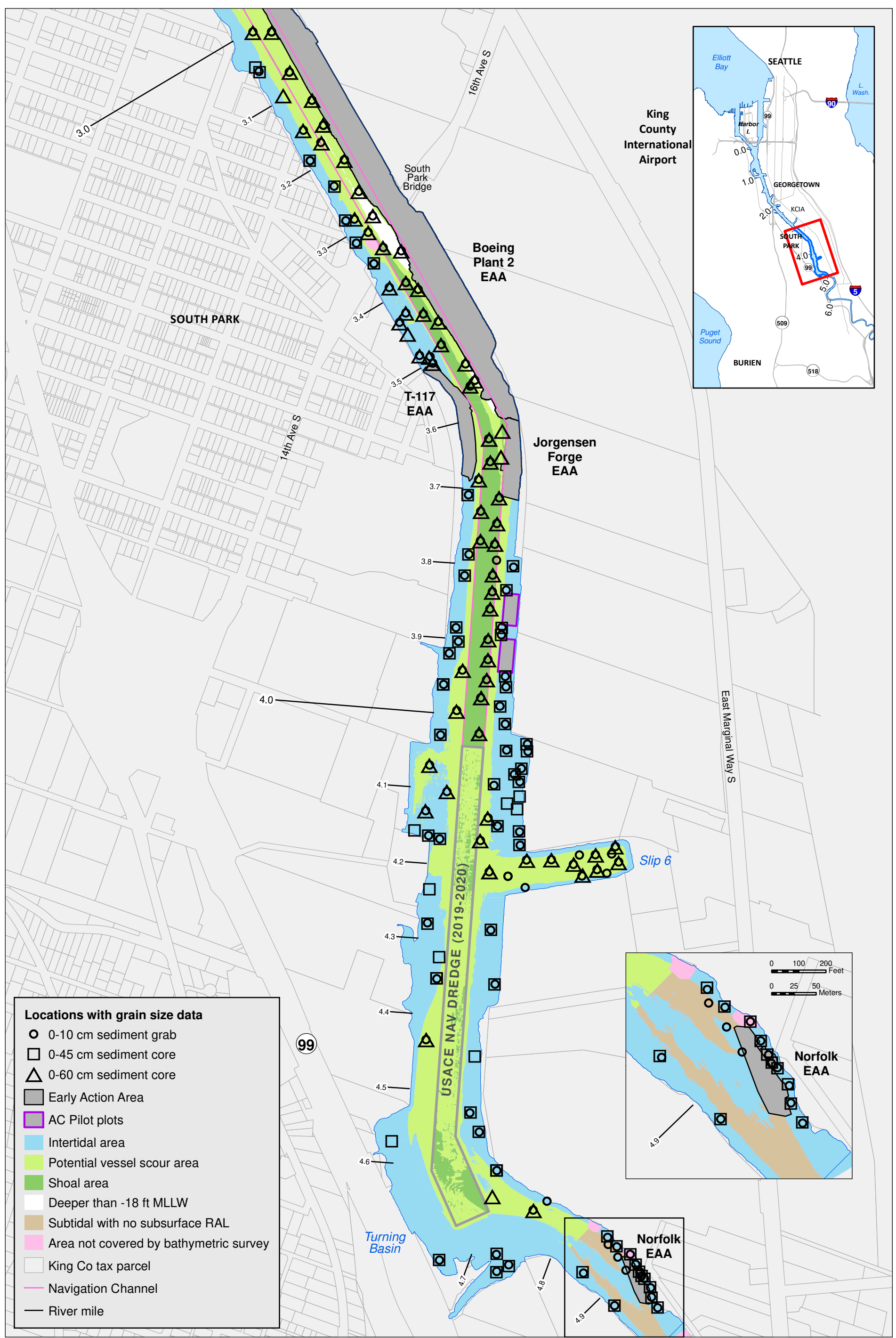


**Map A-2d. Target vs. actual Phase I PDI subsurface core locations, Segment 4 (RM 4.81 to RM 5.0)**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

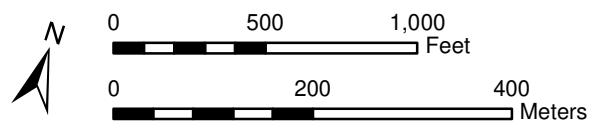
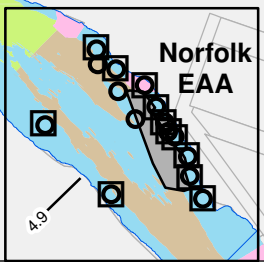
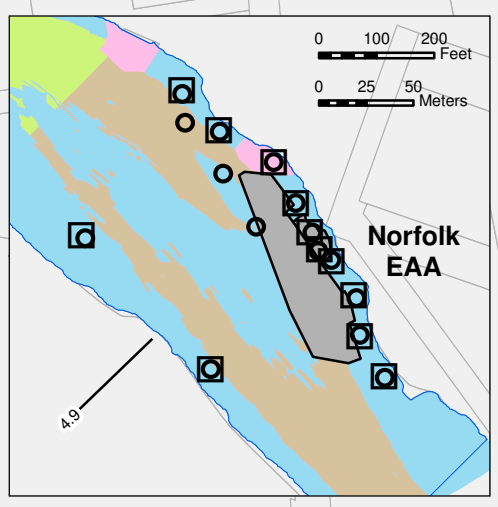


Prepared by craigh. 6/28/21: W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-03 7234 Phase I PDI grain size locations.mxd

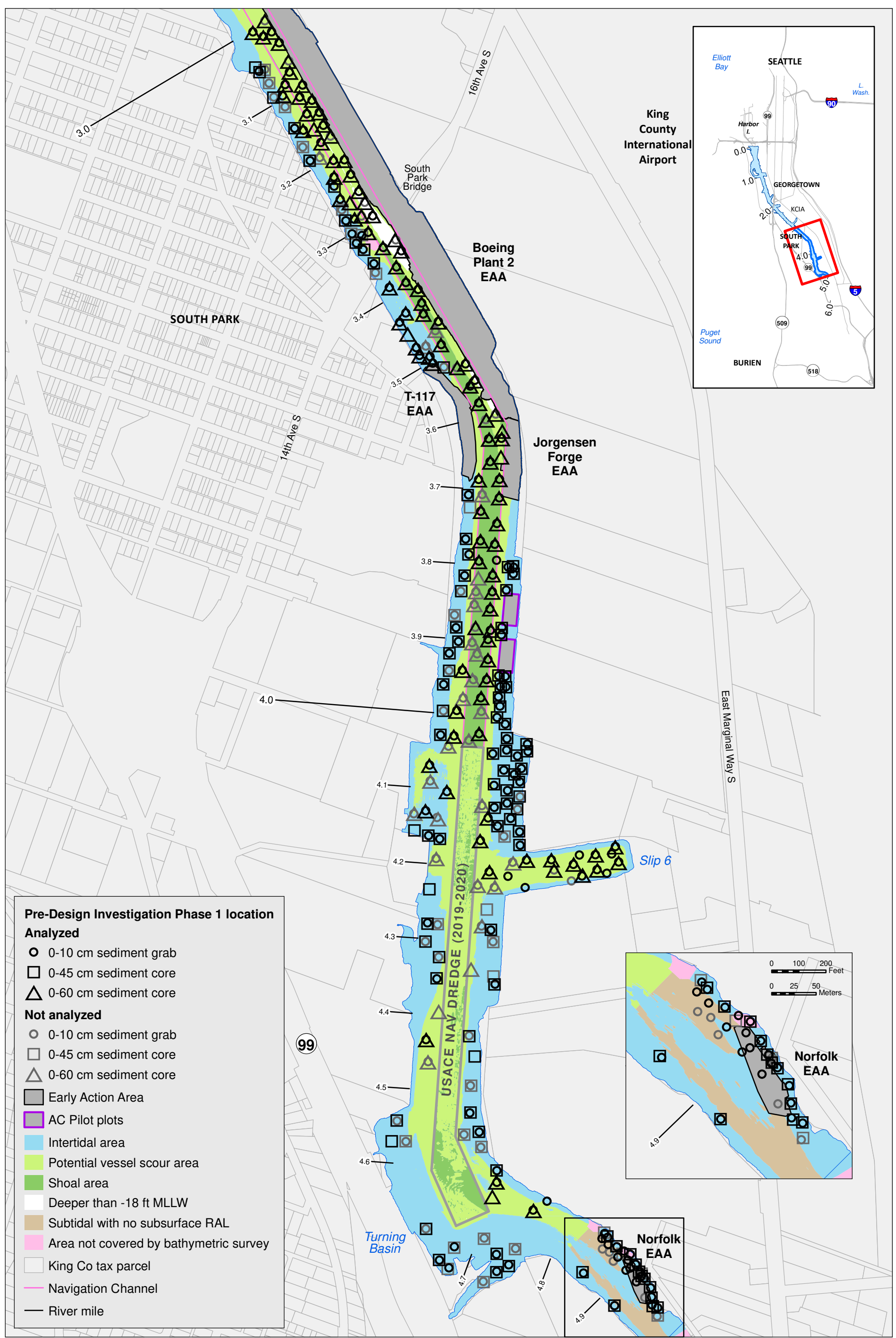


**Locations with grain size data**

- 0-10 cm sediment grab
- 0-45 cm sediment core
- △ 0-60 cm sediment core
- Early Action Area
- AC Pilot plots
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- King Co tax parcel
- Navigation Channel
- River mile



Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-04 7234 Phase I PDI locations.mxd



**Pre-Design Investigation Phase 1 location**

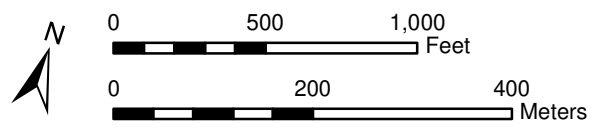
**Analyzed**

- 0-10 cm sediment grab
- 0-45 cm sediment core
- △ 0-60 cm sediment core

**Not analyzed**

- 0-10 cm sediment grab
- 0-45 cm sediment core
- △ 0-60 cm sediment core

- Early Action Area
- AC Pilot plots
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- King Co tax parcel
- Navigation Channel
- River mile

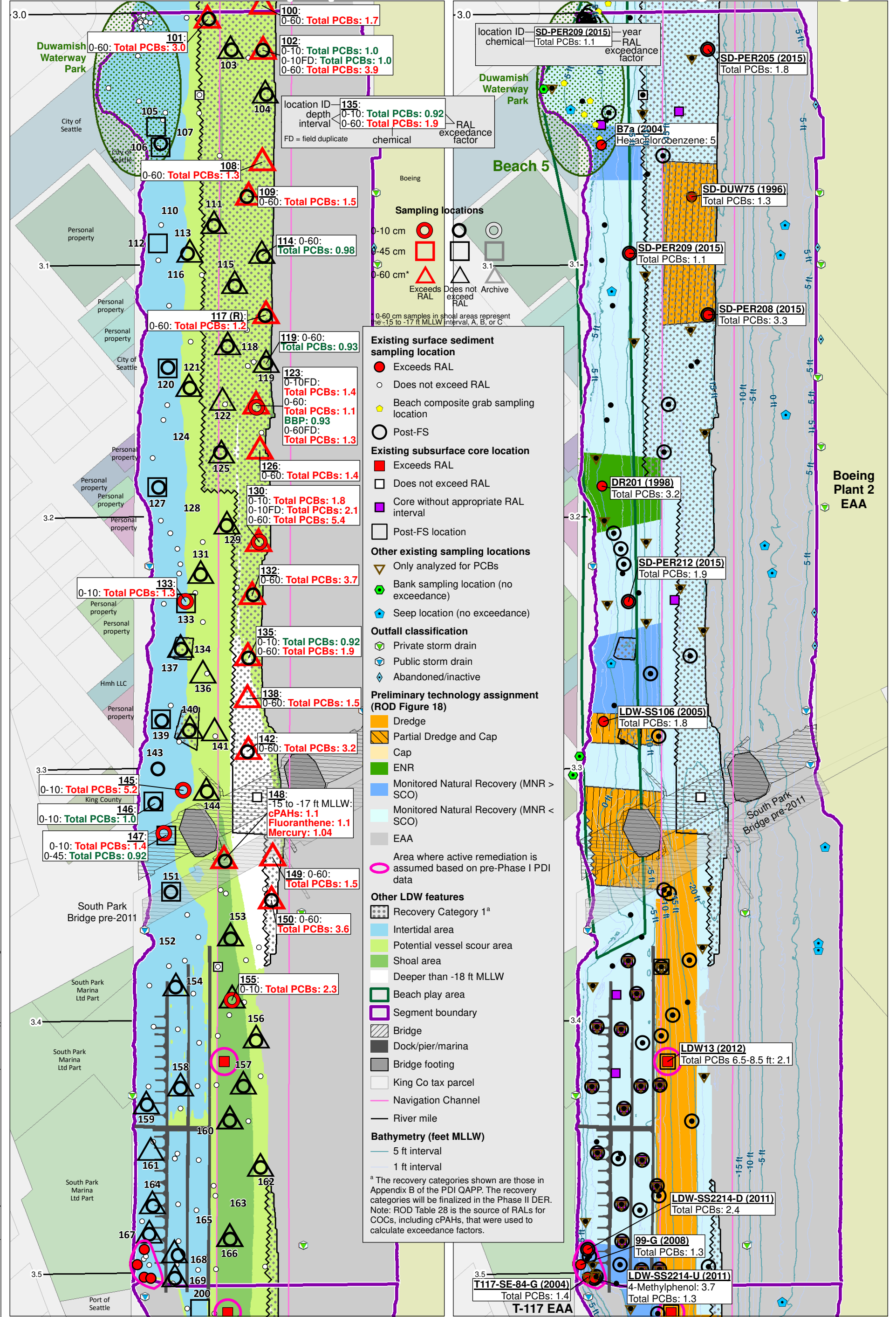


**Map A-4. Phase I PDI sediment sampling locations and intervals (2020)**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Phase I PDI Results (2020)

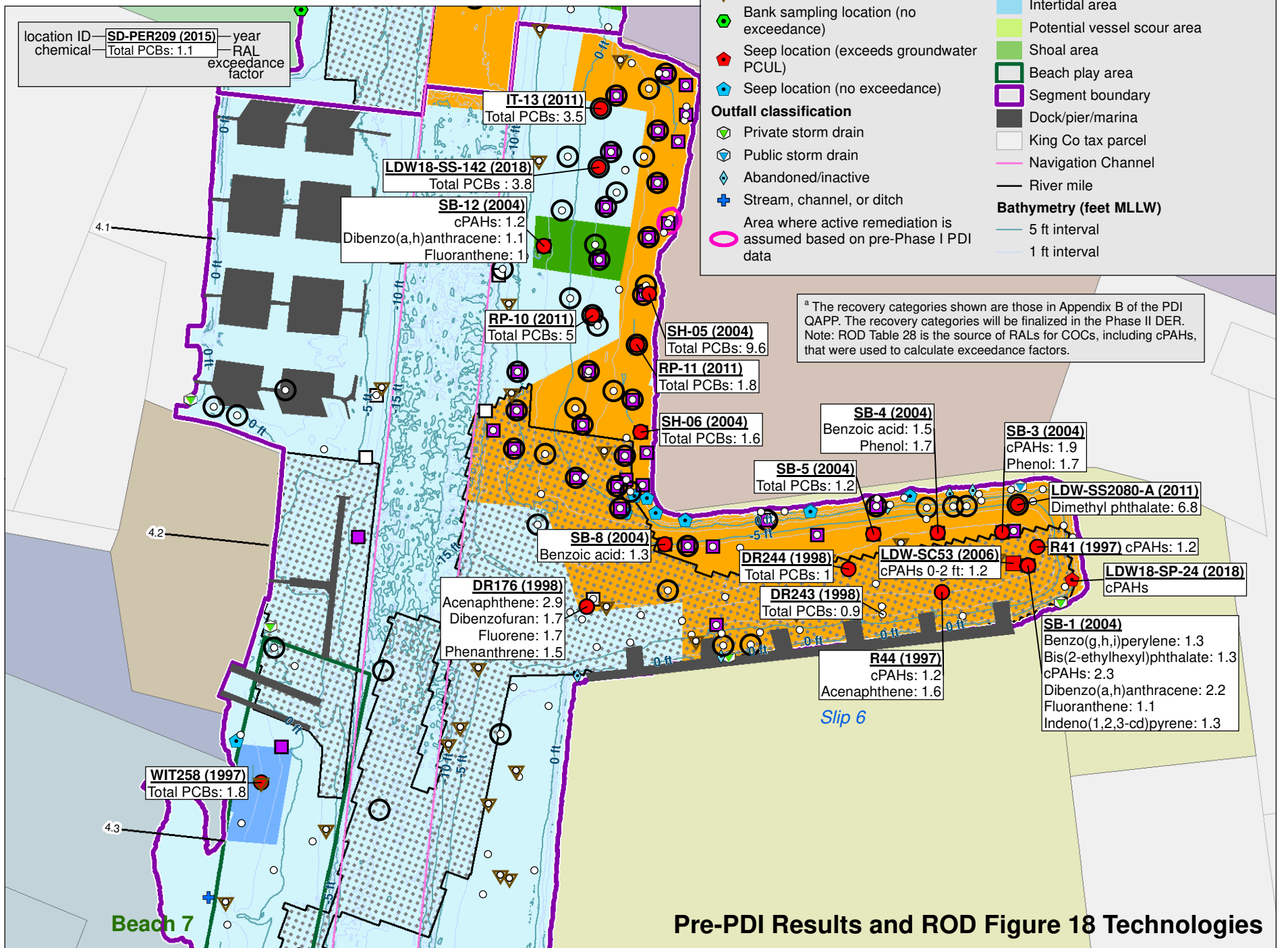
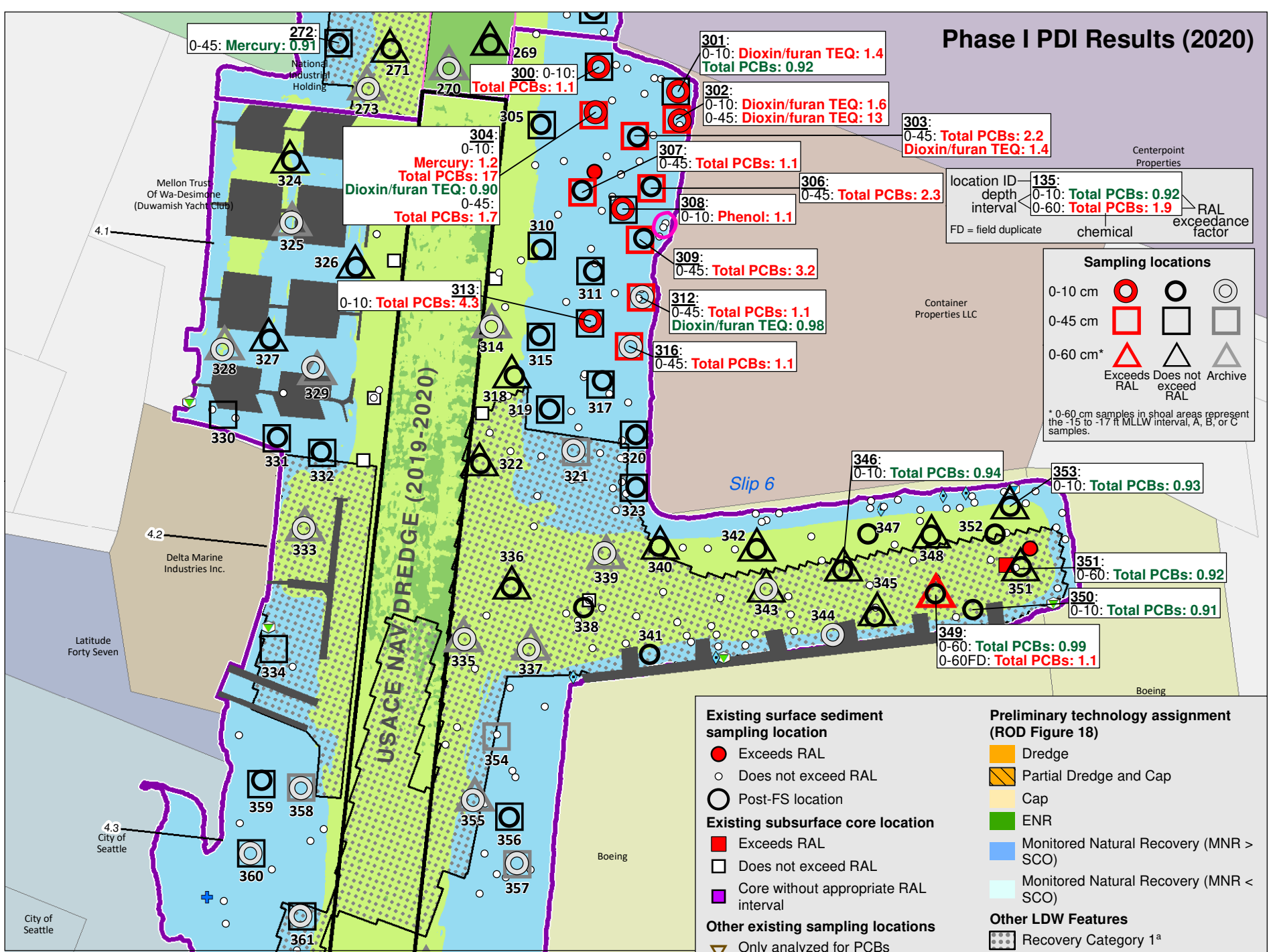
Pre-PDI Results and ROD Figure-18 Technologies



Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-05a 7172 Upper Reach Ph1 Data - Segment 1.mxd

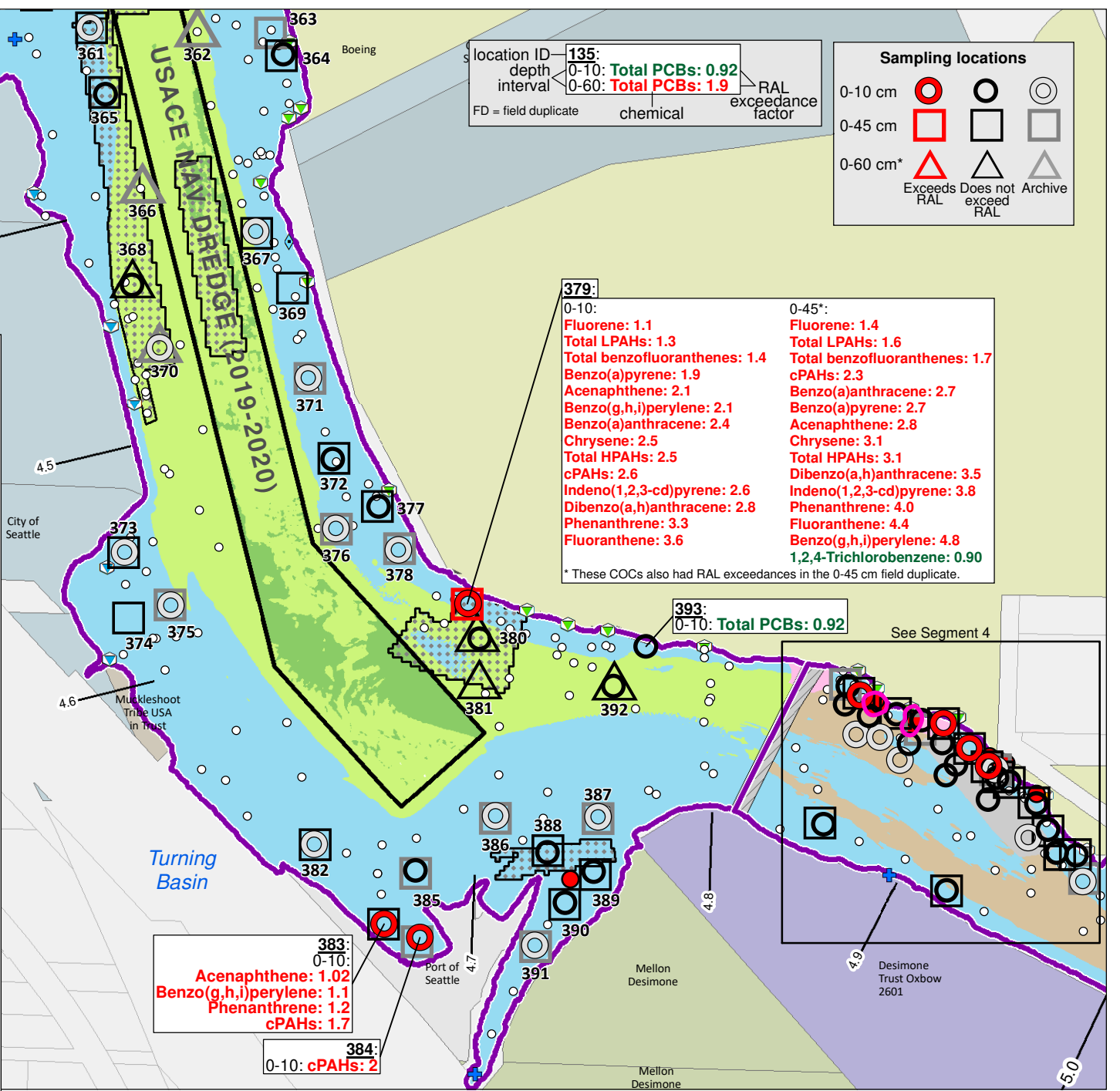


# Phase I PDI Results (2020)

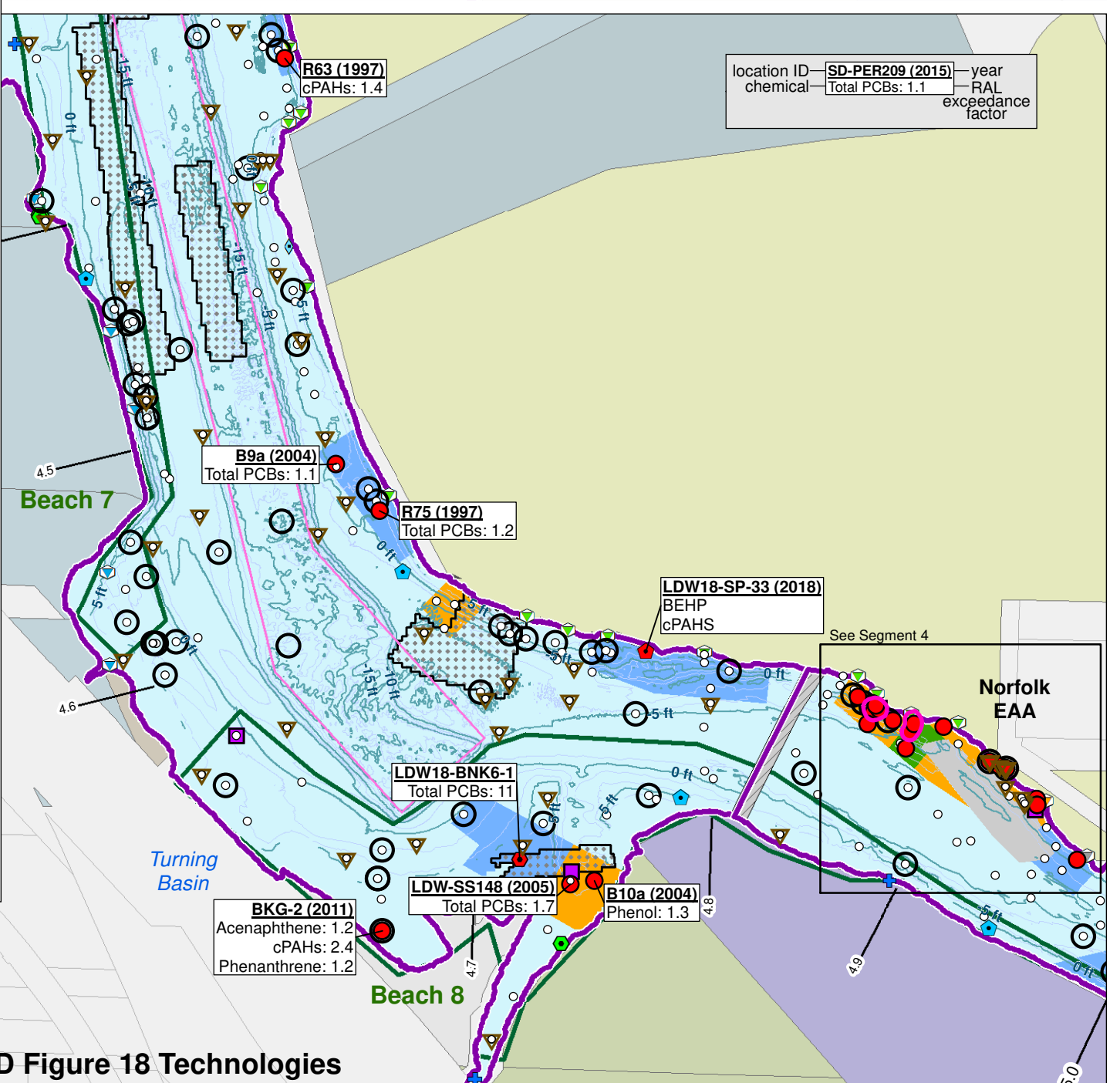


# Phase I PDI Results (2020)

- Existing surface sediment sampling location**
- Exceeds RAL
  - Does not exceed RAL
  - Post-FS location
- Existing subsurface core location**
- Core without appropriate RAL interval
- Other existing sampling locations**
- ▽ Only analyzed for PCBs
  - Bank sampling location (exceeds RAL)
  - Bank sampling location (no exceedance)
  - ◆ Seep location (exceeds groundwater PCUL)
  - ◆ Seep location (no exceedance)
- Outfall classification**
- ◇ CSO/storm drain
  - ◇ Private storm drain
  - ◇ Public storm drain
  - ◇ Pipe of unresolved origin and/or use
  - ◇ Abandoned/inactive
  - ◇ Stream, channel, or ditch
- Preliminary technology assignment (ROD Figure 18)**
- Dredge
  - ENR
  - Monitored Natural Recovery (MNR > SCO)
  - Monitored Natural Recovery (MNR < SCO)
  - EAA
  - Area where active remediation is assumed based on pre-Phase I PDI data
- Other LDW features**
- Recovery Category 1<sup>a</sup>
  - Intertidal area
  - Potential vessel scour area
  - Shoal area
  - Deeper than -18 ft MLLW
  - Subtidal with no subsurface RAL
  - Area not covered by bathymetric survey
  - Beach play area
  - Segment boundary
  - Bridge
  - Dock/pier/marina
  - King Co tax parcel
  - Navigation Channel
  - River mile
- Bathymetry (feet MLLW)**
- 5 ft interval
  - 1 ft interval
- <sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER. Note: ROD Table 28 is the source of RALs for COCs, including cPAHs, that were used to calculate exceedance factors.

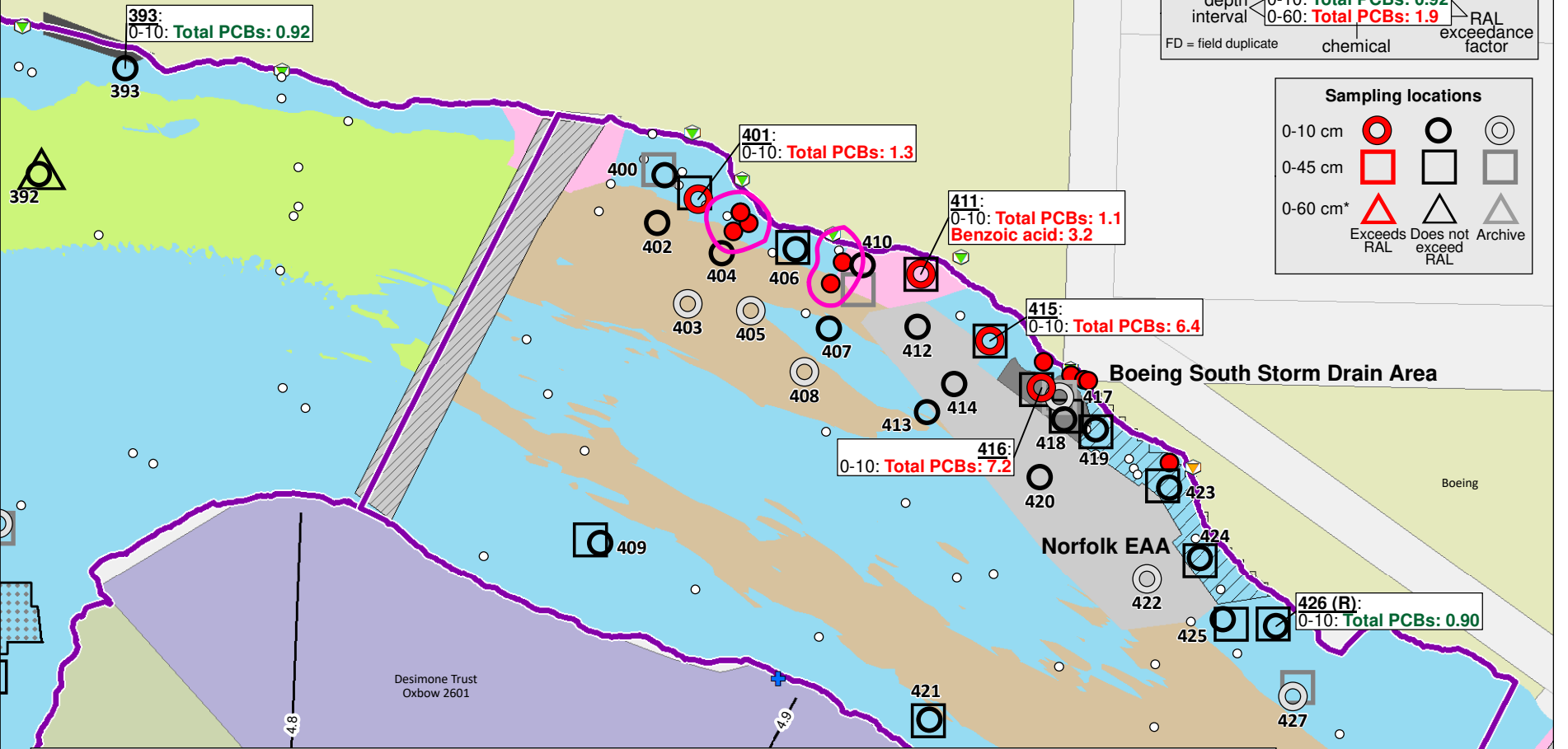


- Pre-PDI Results and ROD Figure 18 Technologies**
- location ID** | **chemical** | **year** | **RAL exceedance factor**
- SD-PER209 (2015): Total PCBs: 1.1
- R63 (1997):** cPAHs: 1.4
- B9a (2004):** Total PCBs: 1.1
- R75 (1997):** Total PCBs: 1.2
- LDW18-SP-33 (2018):** BEHP, cPAHs
- LDW18-BNK6-1:** Total PCBs: 11
- BKG-2 (2011):** Acenaphthene: 1.2, cPAHs: 2.4, Phenanthrene: 1.2
- LDW-SS148 (2005):** Total PCBs: 1.7
- B10a (2004):** Phenol: 1.3



Prepared by craigh.6/28/21: W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-05d 7172 Upper Reach Ph1 Data - Segment 3b.mxd

# Phase I PDI Results (2020)

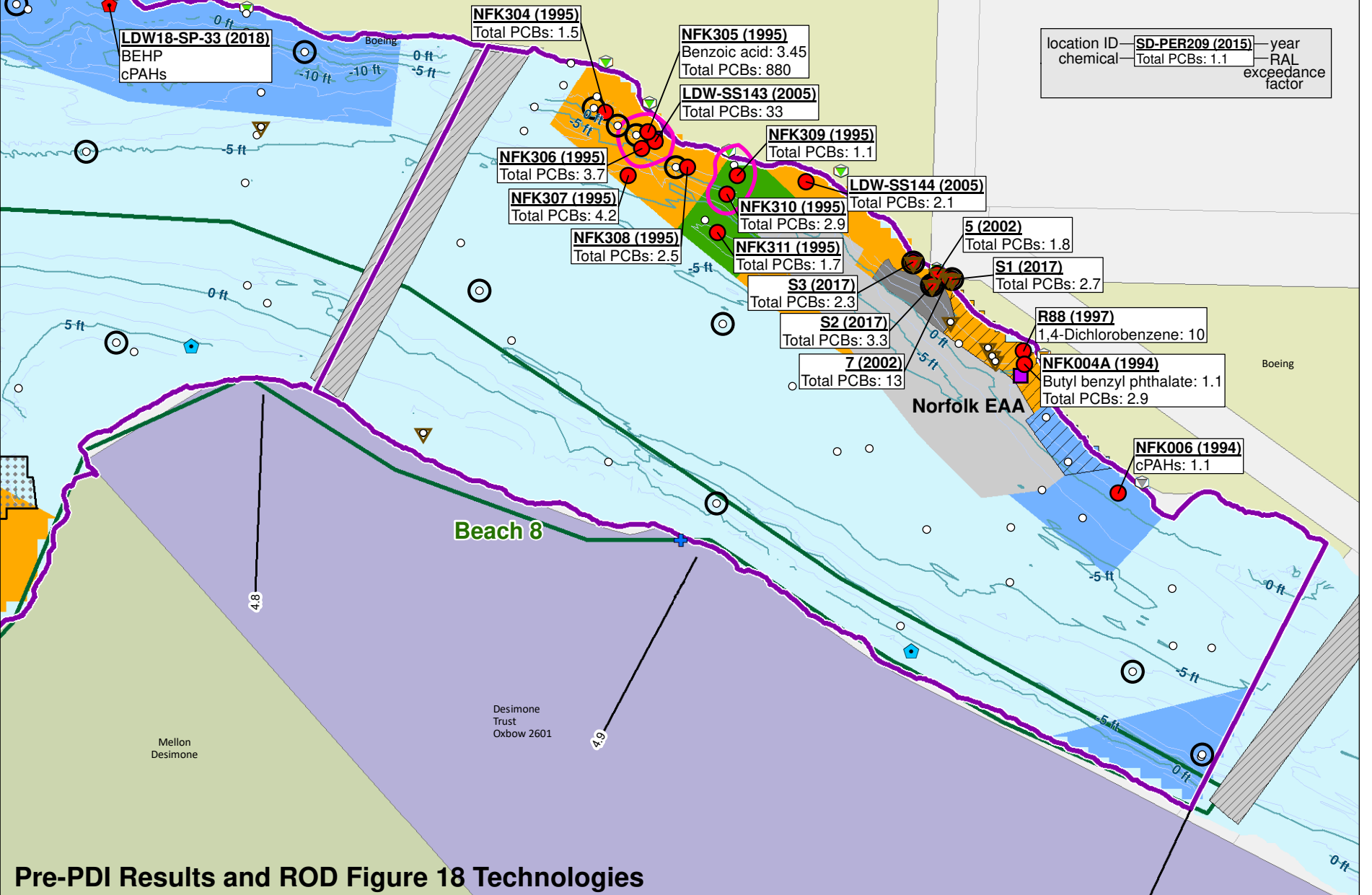


- Existing surface sediment sampling location**
- Exceeds RAL
  - Does not exceed RAL
  - Post-FS location
- Existing subsurface core location**
- Core without appropriate RAL interval
- Other existing sampling locations**
- Only analyzed for PCBs
  - Seep location (exceeds groundwater PCUL)
  - Seep location (no exceedance)
  - Area where active remediation is assumed based on pre-Phase I PDI data

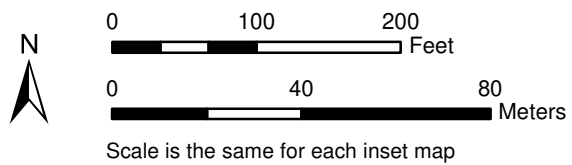
- Outfall classification**
- CSO/storm drain
  - Private storm drain
  - Pipe of unresolved origin and/or use
  - Abandoned/inactive
  - Stream, channel, or ditch
- Preliminary technology assignment (ROD Figure 18)**
- Dredge
  - ENR
  - Monitored Natural Recovery (MNR > SCO)
  - Monitored natural recovery (MNR < SCO)
  - EAA
  - Boeing South Storm Drain dredged area

- Other LDW features**
- Recovery Category 1<sup>a</sup>
  - Intertidal area
  - Potential vessel scour area
  - Subtidal with no subsurface RAL
  - Area not covered by bathymetric survey
  - Norfolk EAA area of uncertainty<sup>c</sup>
  - Beach play area
  - Segment boundary
  - Bridge
  - Dock/pier/marina
  - King Co tax parcel
  - River mile
- Bathymetry (feet MLLW)**
- 5 ft interval
  - 1 ft interval

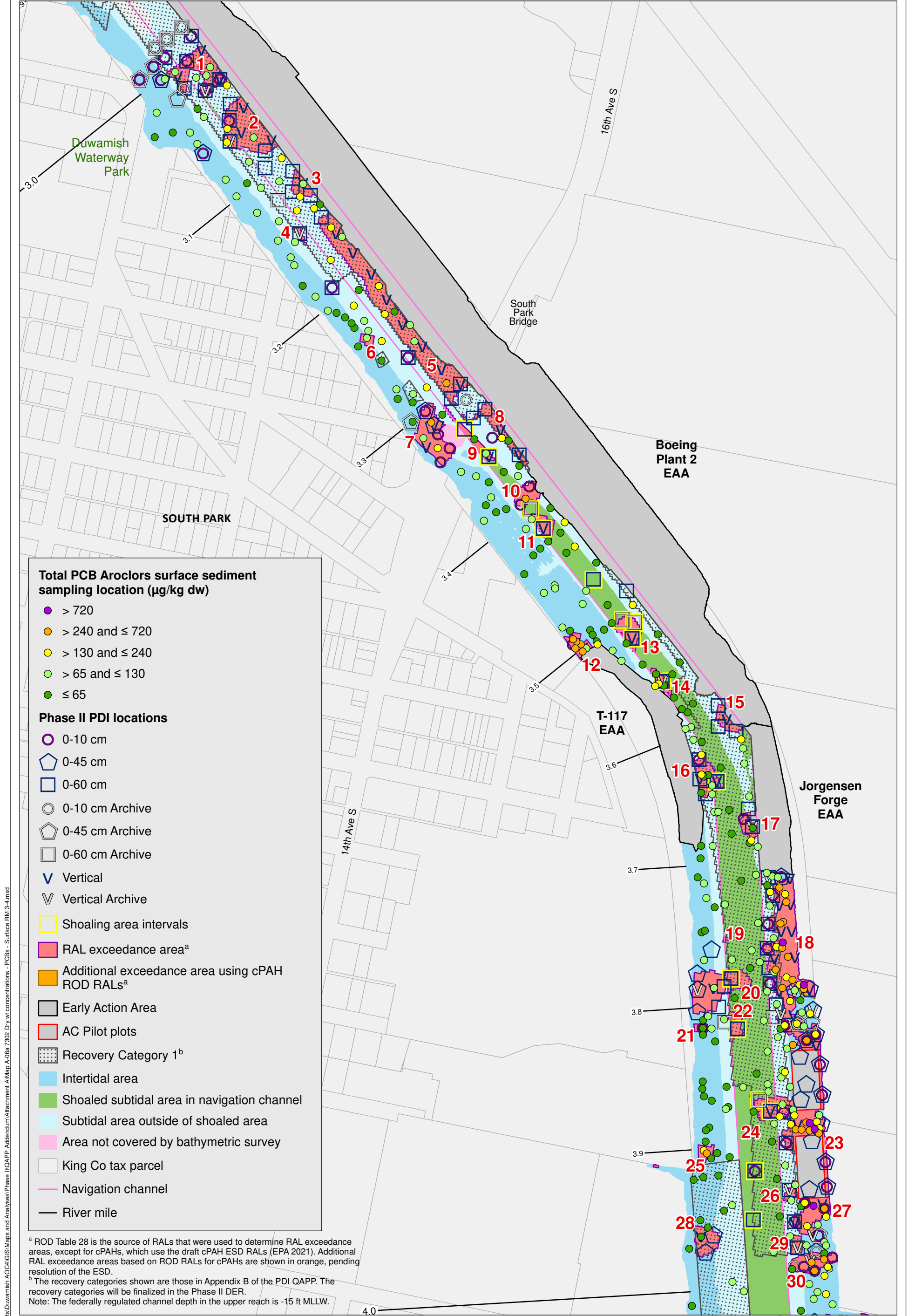
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER. Note: ROD Table 28 is the source of RALs for COCs, including cPAHs, that were used to calculate exceedance factors.



# Pre-PDI Results and ROD Figure 18 Technologies



Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-05e 7172 Upper Reach Ph1 Data - Segment 4.mxd



- Total PCB Aroclors surface sediment sampling location ( $\mu\text{g}/\text{kg dw}$ )**
- > 720
  - > 240 and  $\leq$  720
  - > 130 and  $\leq$  240
  - > 65 and  $\leq$  130
  - $\leq$  65
- Phase II PDI locations**
- 0-10 cm
  - 0-45 cm
  - 0-60 cm
  - 0-10 cm Archive
  - 0-45 cm Archive
  - 0-60 cm Archive
  - ∇ Vertical
  - ∇ Vertical Archive
  - Shoaling area intervals
  - RAL exceedance area<sup>a</sup>
  - Additional exceedance area using cPAH ROD RALs<sup>a</sup>
  - Early Action Area
  - AC Pilot plots
  - Recovery Category 1<sup>b</sup>
  - Intertidal area
  - Shoaled subtidal area in navigation channel
  - Subtidal area outside of shoaled area
  - Area not covered by bathymetric survey
  - King Co tax parcel
  - Navigation channel
  - River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

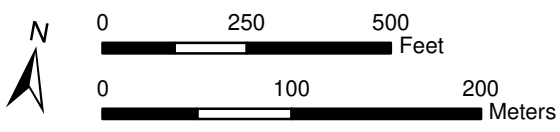
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-06a-7302 Dry wt concentrations - PCBs - Surface RM 3-4.mxd



**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company

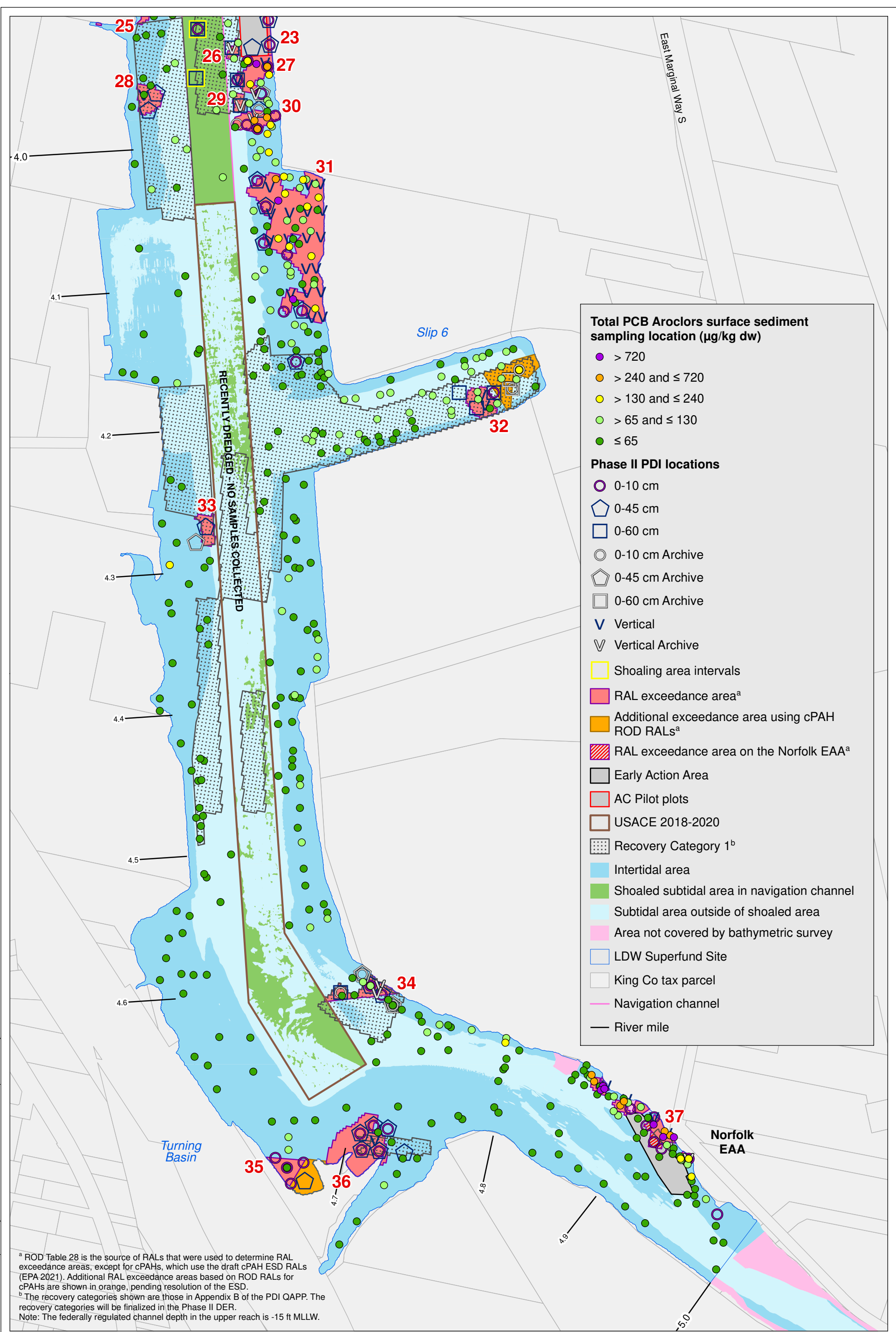


**Map A-6a. Surface sediment total PCB Aroclor concentrations in the design dataset, RM 3.0-4.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-06b-7302 Dry wt concentrations - PCBs - Surface RM 4.5.mxd



**Total PCB Aroclors surface sediment sampling location ( $\mu\text{g}/\text{kg dw}$ )**

- > 720
- > 240 and  $\leq$  720
- > 130 and  $\leq$  240
- > 65 and  $\leq$  130
- $\leq$  65

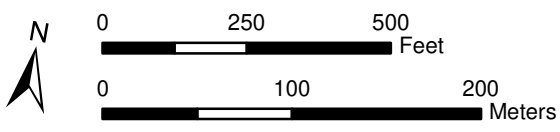
**Phase II PDI locations**

- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- RAL exceedance area on the Norfolk EAA<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas; except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

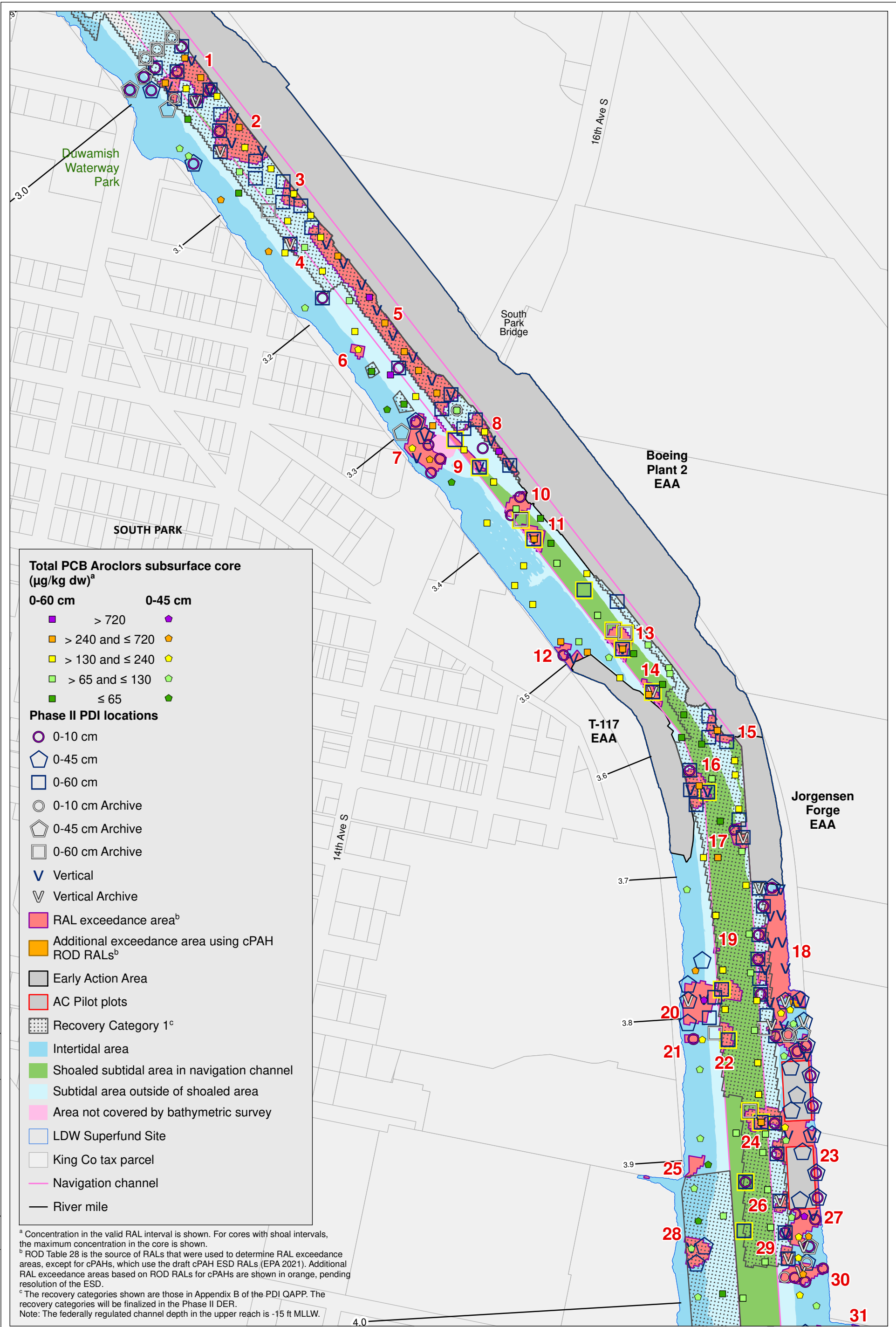
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-6b. Surface sediment total PCB Aroclor concentrations in the design dataset, RM 4.0-5.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Total PCB Aroclors subsurface core (µg/kg dw)<sup>a</sup>**

0-60 cm	0-45 cm
■ > 720	■ > 720
■ > 240 and ≤ 720	■ > 240 and ≤ 720
■ > 130 and ≤ 240	■ > 130 and ≤ 240
■ > 65 and ≤ 130	■ > 65 and ≤ 130
■ ≤ 65	■ ≤ 65

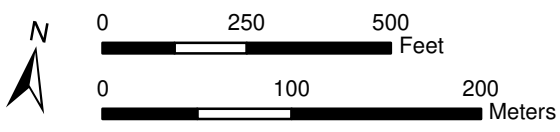
**Phase II PDI locations**

- 0-10 cm
- ◡ 0-45 cm
- ◡ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◡ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive

**Other Site Characteristics**

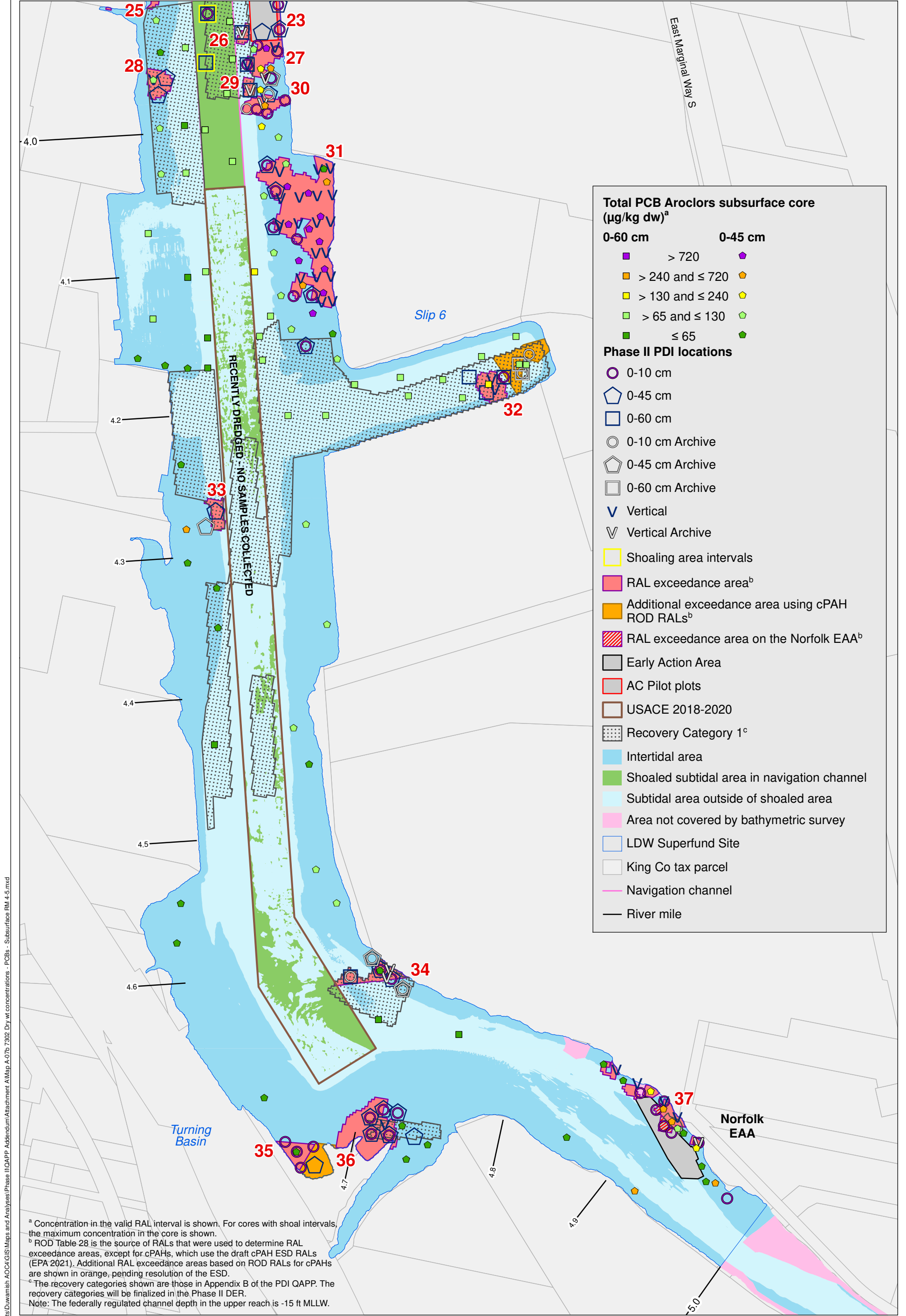
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-7a. Subsurface sediment total PCB Aroclor concentrations in the design dataset, RM 3.0-4.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-07a 7302 Dry wt concentrations - PCBs - Subsurface RM 3-4.mxd



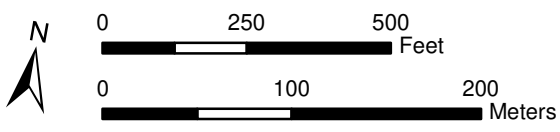
**Total PCB Aroclors subsurface core (µg/kg dw)<sup>a</sup>**

0-60 cm		0-45 cm	
■	> 720	■	> 720
■	> 240 and ≤ 720	■	> 240 and ≤ 720
■	> 130 and ≤ 240	■	> 130 and ≤ 240
■	> 65 and ≤ 130	■	> 65 and ≤ 130
■	≤ 65	■	≤ 65

**Phase II PDI locations**

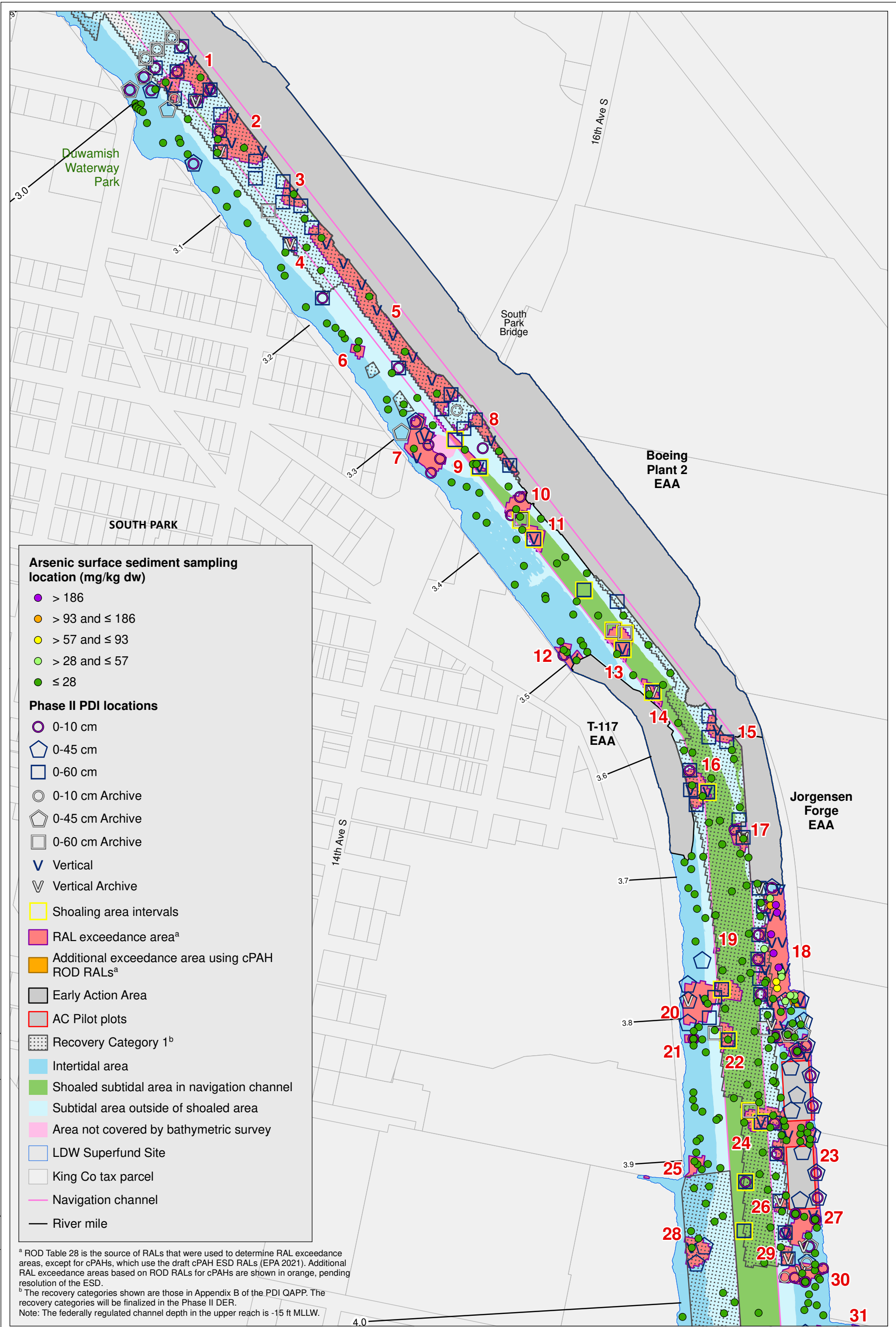
- 0-10 cm
- ◡ 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- RAL exceedance area on the Norfolk EAA<sup>b</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-7b. Subsurface sediment total PCB Aroclor concentrations in the design dataset, RM 4.0-5.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-07b 7302 Dry wt concentrations - PCBs - Subsurface RM 4.0-5.0.mxd



**Arsenic surface sediment sampling location (mg/kg dw)**

- > 186
- > 93 and ≤ 186
- > 57 and ≤ 93
- > 28 and ≤ 57
- ≤ 28

**Phase II PDI locations**

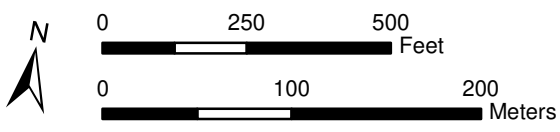
- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

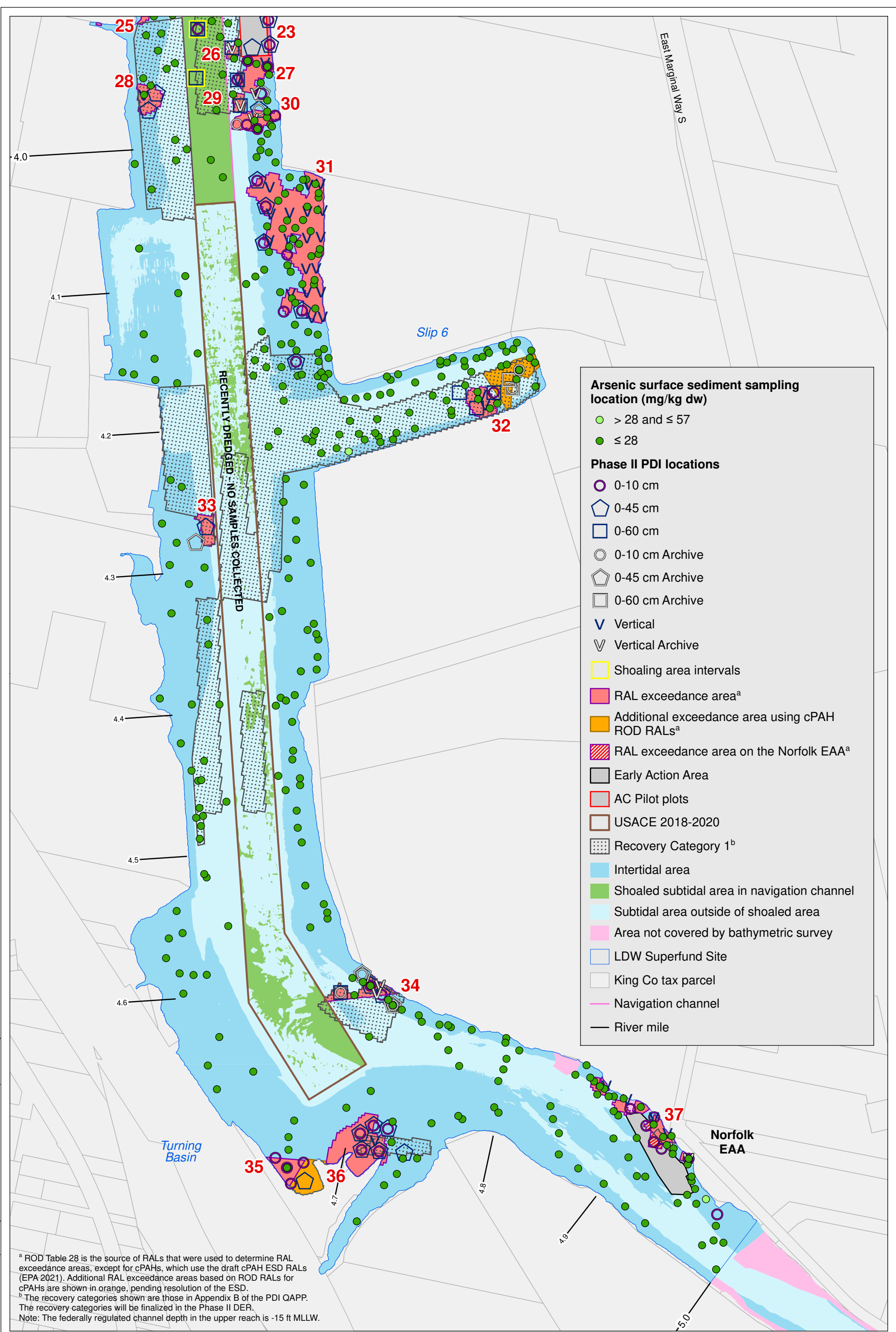
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-08a-7302 Dry wt concentrations - As - Surface RM 3-4.mxd



**Map A-8a. Surface sediment arsenic concentrations in the design dataset, RM 3.0-4.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-08b-7302 Dry wt concentrations - As - Surface RM 4.5.mxd



**Arsenic surface sediment sampling location (mg/kg dw)**

- > 28 and ≤ 57
- ≤ 28

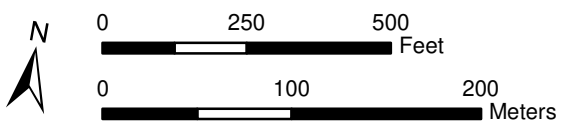
**Phase II PDI locations**

- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- RAL exceedance area on the Norfolk EAA<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

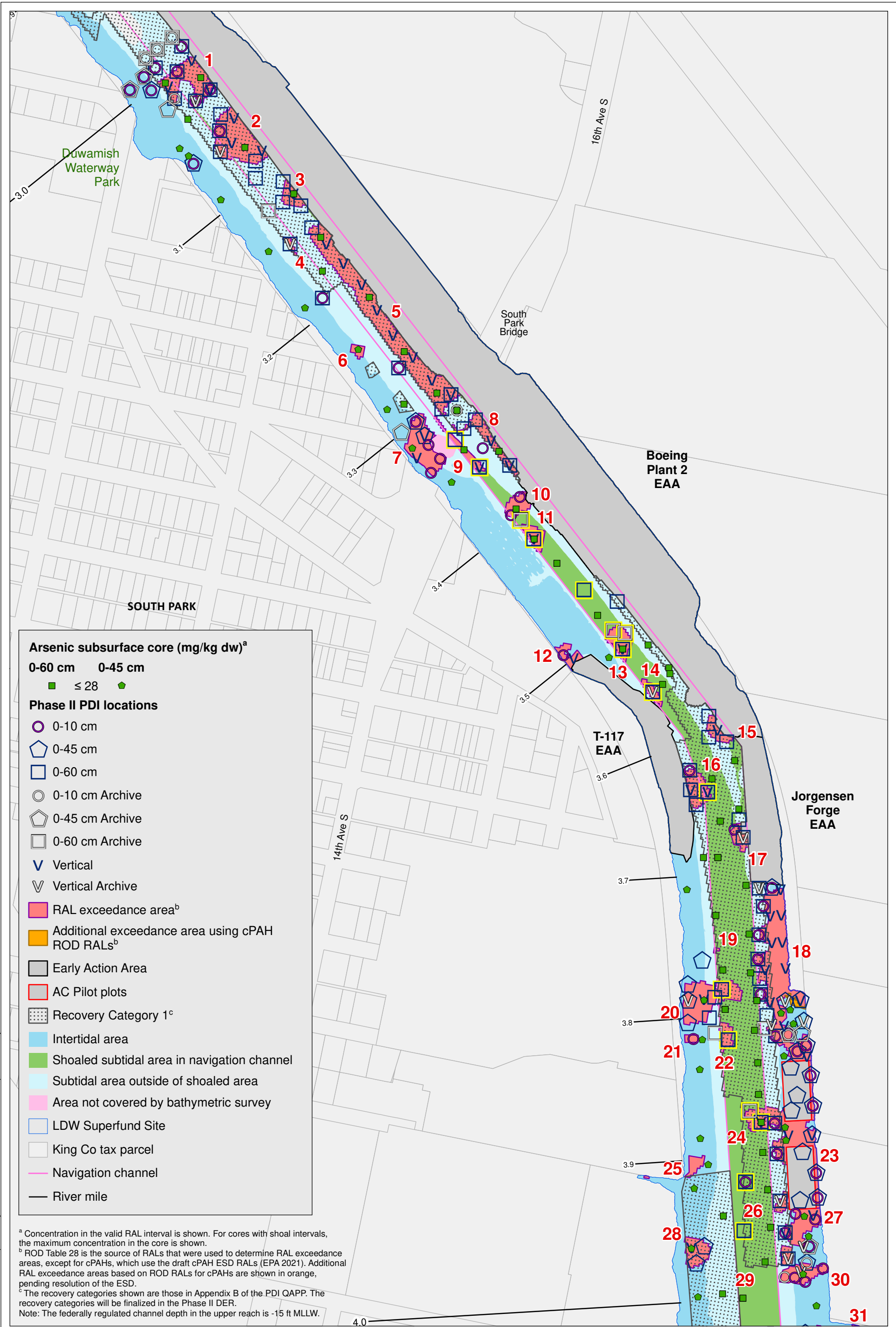
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-8b. Surface sediment arsenic concentrations in the design dataset, RM 4.0-5.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



**Arsenic subsurface core (mg/kg dw)<sup>a</sup>**

0-60 cm	0-45 cm
■ ≤ 28	◆

**Phase II PDI locations**

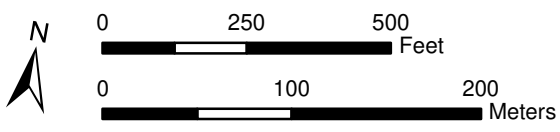
- 0-10 cm
- ◡ 0-45 cm
- ◻ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◻ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive

**Other Symbols:**

- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

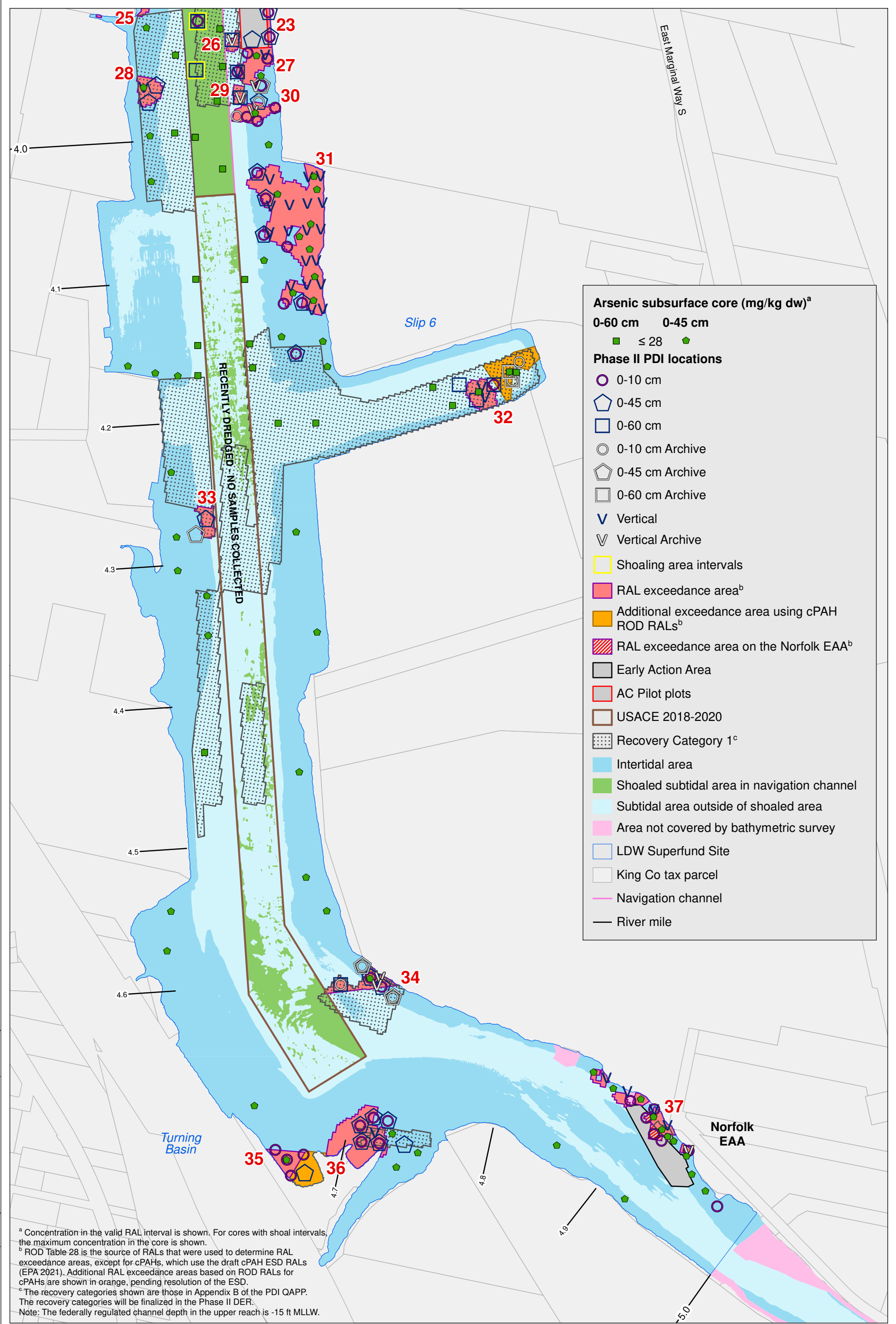
<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-09a-7302 Dry wt concentrations - As - Subsurface RM 3.4.mxd



**Map A-9a. Subsurface sediment arsenic concentrations in the design dataset, RM 3.0-4.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-09b-7302 Dry wt concentrations - As - Subsurface RM 4.5.mxd



**Arsenic subsurface core (mg/kg dw)<sup>a</sup>**

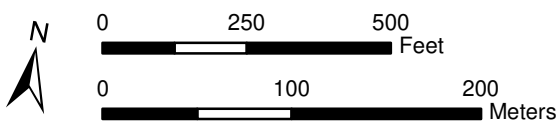
0-60 cm	0-45 cm
■ ≤ 28	◆

**Phase II PDI locations**

- 0-10 cm
- ⬠ 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- ⬠ 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive

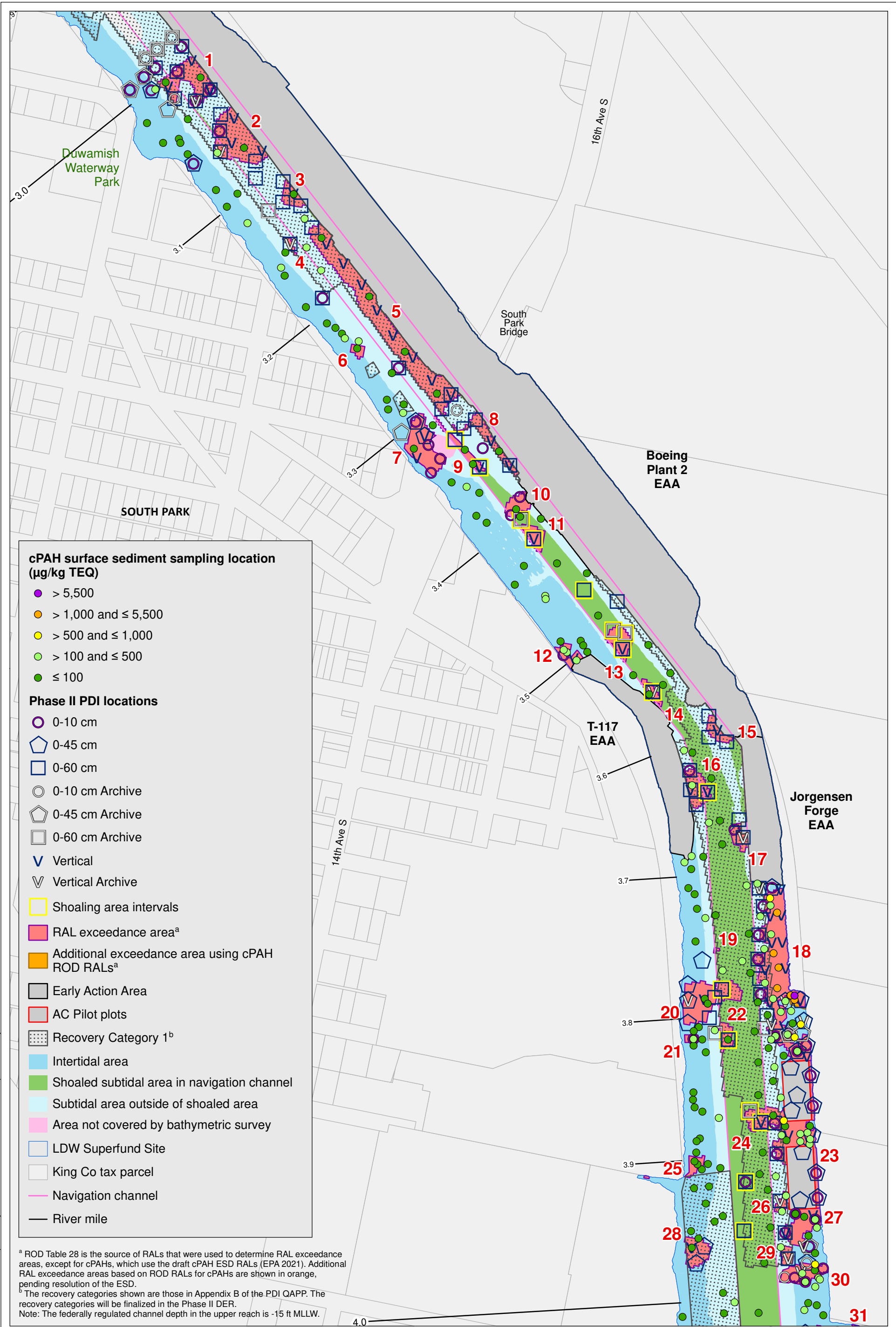
□ Shoaling area intervals  
 ■ RAL exceedance area<sup>b</sup>  
 ■ Additional exceedance area using cPAH ROD RALs<sup>b</sup>  
 ■ RAL exceedance area on the Norfolk EAA<sup>b</sup>  
 ■ Early Action Area  
 ■ AC Pilot plots  
 ■ USACE 2018-2020  
 ■ Recovery Category 1<sup>c</sup>  
 ■ Intertidal area  
 ■ Shoaled subtidal area in navigation channel  
 ■ Subtidal area outside of shoaled area  
 ■ Area not covered by bathymetric survey  
 ■ LDW Superfund Site  
 ■ King Co tax parcel  
 ■ Navigation channel  
 — River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-9b. Subsurface sediment arsenic concentrations in the design dataset, RM 4.0-5.0**

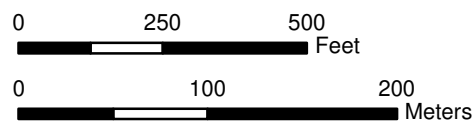
PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-10a\_7302 Dry wt concentrations - cPAH - Surface RM 3-4.mxd



**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company

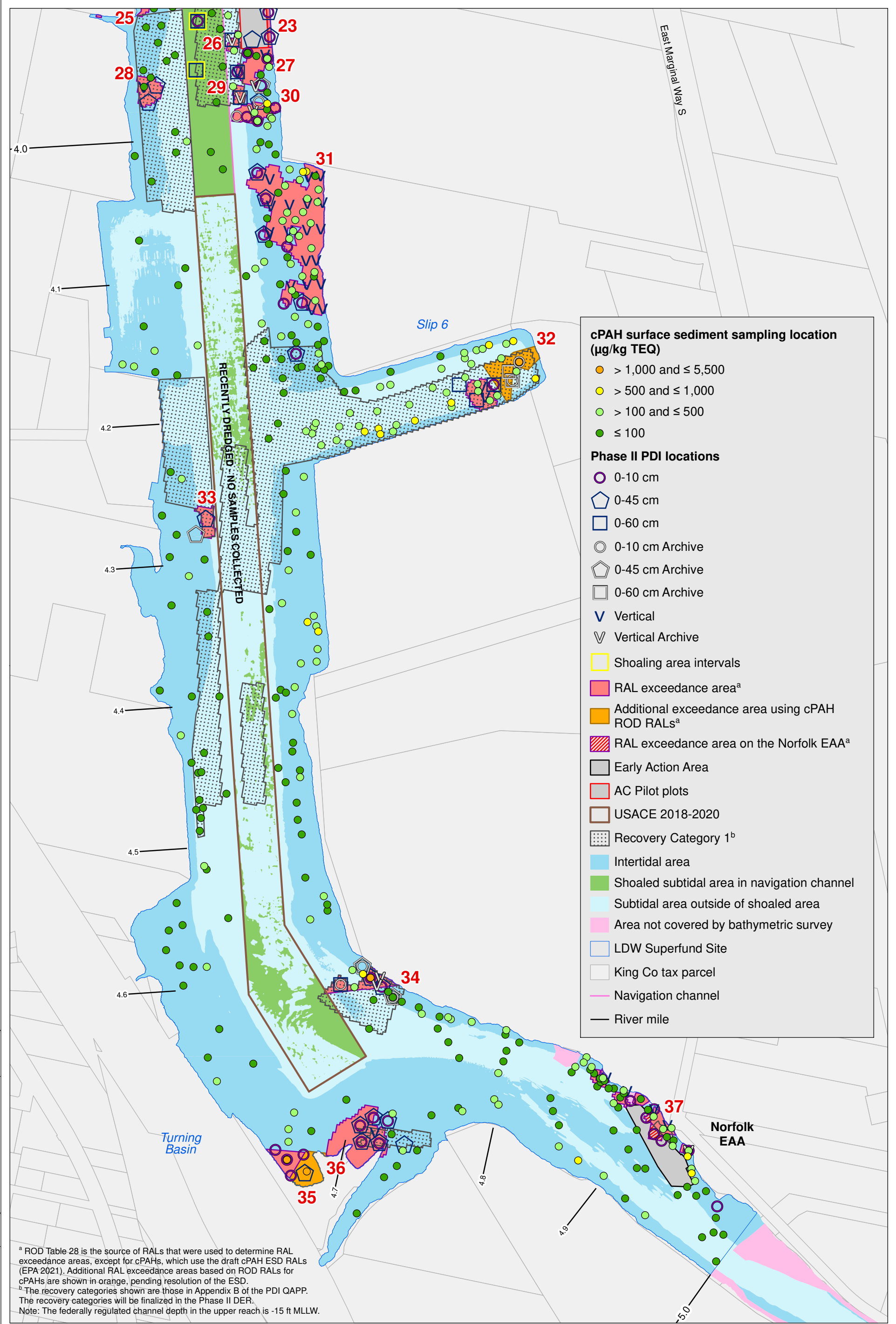


**Map A-10a. Surface sediment cPAH TEQs in the design dataset, RM 3.0-4.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-10b-7302 Dry wt concentrations - cPAH - Surface RM 4.5.mxd



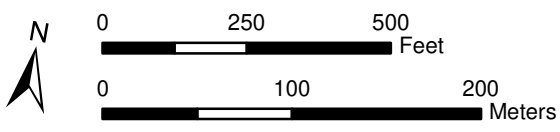
**cPAH surface sediment sampling location (µg/kg TEQ)**

- > 1,000 and ≤ 5,500
- > 500 and ≤ 1,000
- > 100 and ≤ 500
- ≤ 100

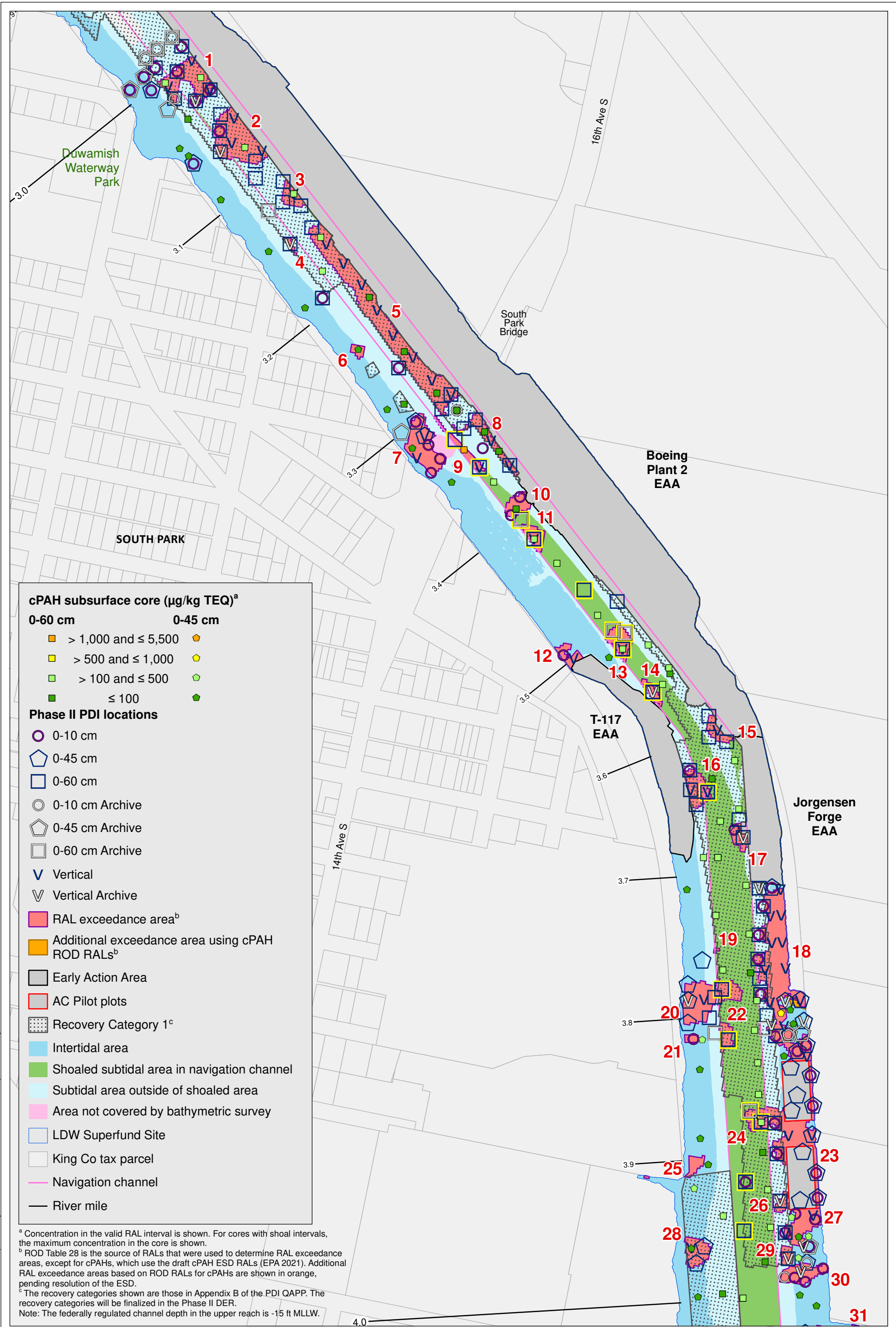
**Phase II PDI locations**

- 0-10 cm
- ◡ 0-45 cm
- ◻ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◻ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- RAL exceedance area on the Norfolk EAA<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-10b. Surface sediment cPAH TEQs in the design dataset, RM 4.0-5.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



**cPAH subsurface core ( $\mu\text{g}/\text{kg TEQ}$ )<sup>a</sup>**

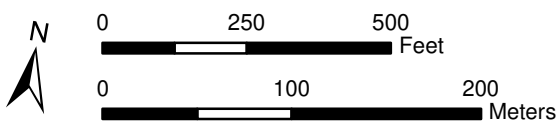
0-60 cm	0-45 cm
<span style="color: orange;">■</span> > 1,000 and $\leq$ 5,500	<span style="color: orange;">◆</span> > 1,000 and $\leq$ 5,500
<span style="color: yellow;">■</span> > 500 and $\leq$ 1,000	<span style="color: yellow;">◆</span> > 500 and $\leq$ 1,000
<span style="color: lightgreen;">■</span> > 100 and $\leq$ 500	<span style="color: lightgreen;">◆</span> > 100 and $\leq$ 500
<span style="color: green;">■</span> $\leq$ 100	<span style="color: green;">◆</span> $\leq$ 100

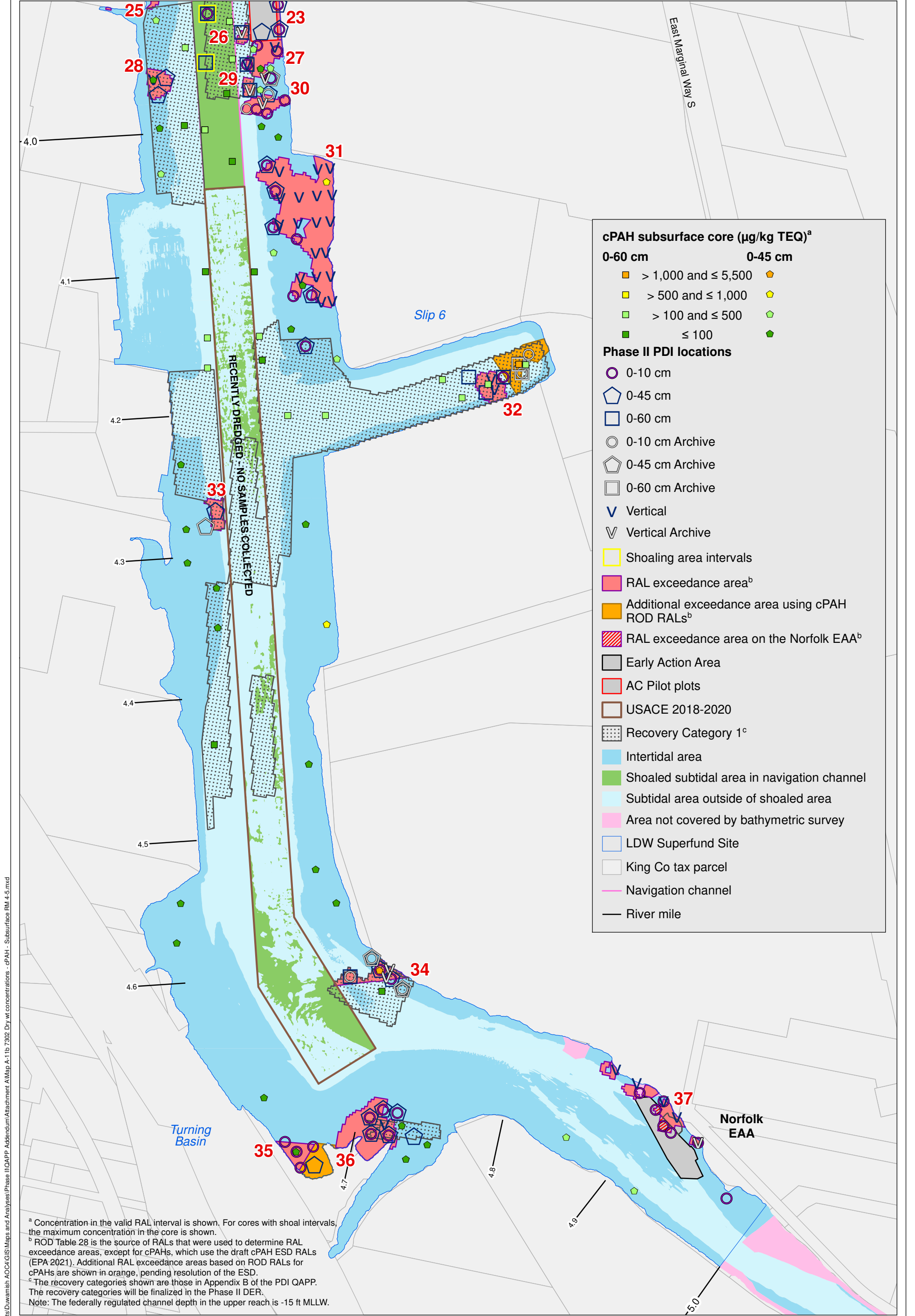
**Phase II PDI locations**

- 0-10 cm
- ◡ 0-45 cm
- ◡ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◡ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21: W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-11a 7302 Dry wt concentrations - cPAH - Subsurface RM 3-4.mxd





**cPAH subsurface core ( $\mu\text{g}/\text{kg TEQ}$ )<sup>a</sup>**

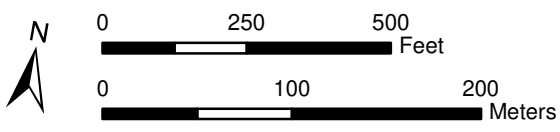
0-60 cm	0-45 cm
<span style="color: orange;">■</span> > 1,000 and $\leq$ 5,500	<span style="color: orange;">◆</span>
<span style="color: yellow;">■</span> > 500 and $\leq$ 1,000	<span style="color: yellow;">◆</span>
<span style="color: lightgreen;">■</span> > 100 and $\leq$ 500	<span style="color: lightgreen;">◆</span>
<span style="color: green;">■</span> $\leq$ 100	<span style="color: green;">◆</span>

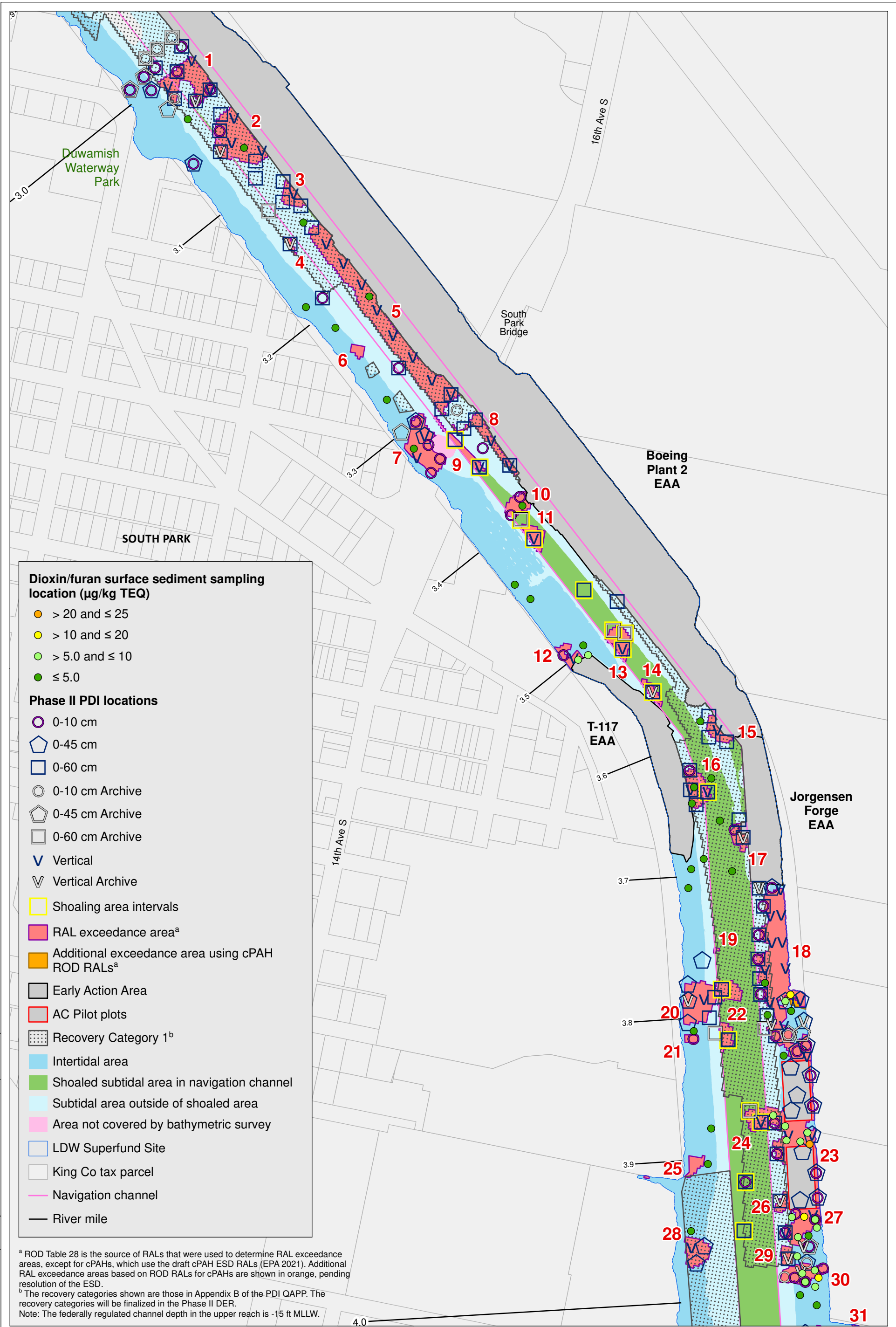
**Phase II PDI locations**

- 0-10 cm
- ◡ 0-45 cm
- ◡ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◡ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- RAL exceedance area on the Norfolk EAA<sup>b</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh.6/28/21: W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-11b 7302 Dry wt concentrations - cPAH - Subsurface RM 4.0-5.0.mxd





**Dioxin/furan surface sediment sampling location ( $\mu\text{g}/\text{kg}$  TEQ)**

- > 20 and  $\leq$  25
- > 10 and  $\leq$  20
- > 5.0 and  $\leq$  10
- $\leq$  5.0

**Phase II PDI locations**

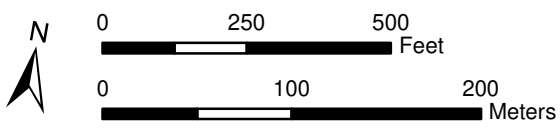
- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

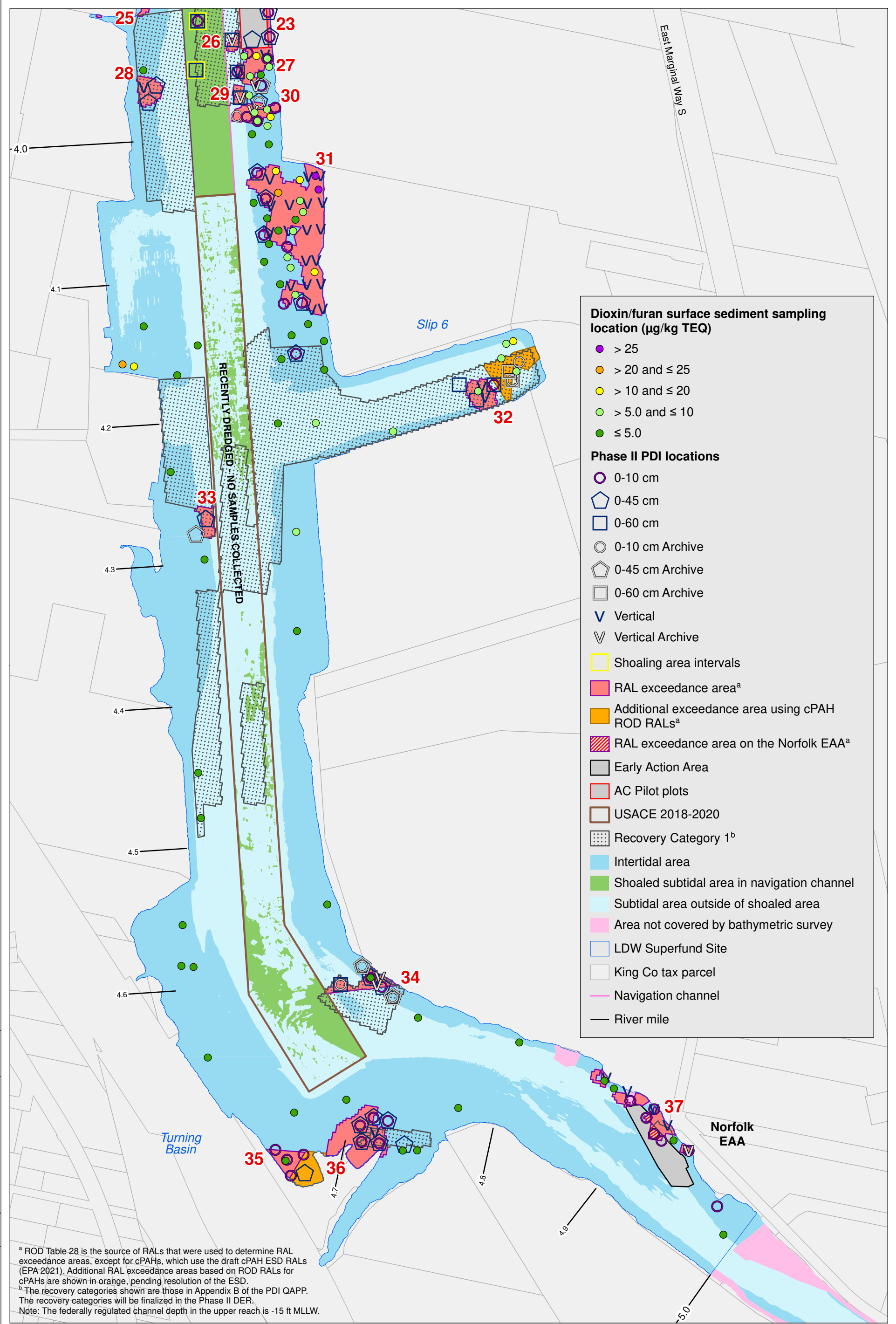
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-12a 7302 Dry wt concentrations - DF - Surface RM3-4.mxd



**Map A-12a. Surface sediment dioxin/furan TEQs in the design dataset, RM 3.0-4.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II QAPP Addendum\Attachment A\Map A-12b-7302 Dry wt concentrations - DF - Surface RM 4.5.mxd



**Dioxin/furan surface sediment sampling location ( $\mu\text{g}/\text{kg}$  TEQ)**

- > 25
- > 20 and  $\leq$  25
- > 10 and  $\leq$  20
- > 5.0 and  $\leq$  10
- $\leq$  5.0

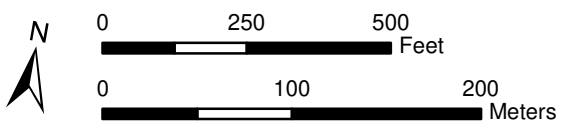
**Phase II PDI locations**

- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-10 cm Archive
- 0-45 cm Archive
- 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- RAL exceedance area on the Norfolk EAA<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.

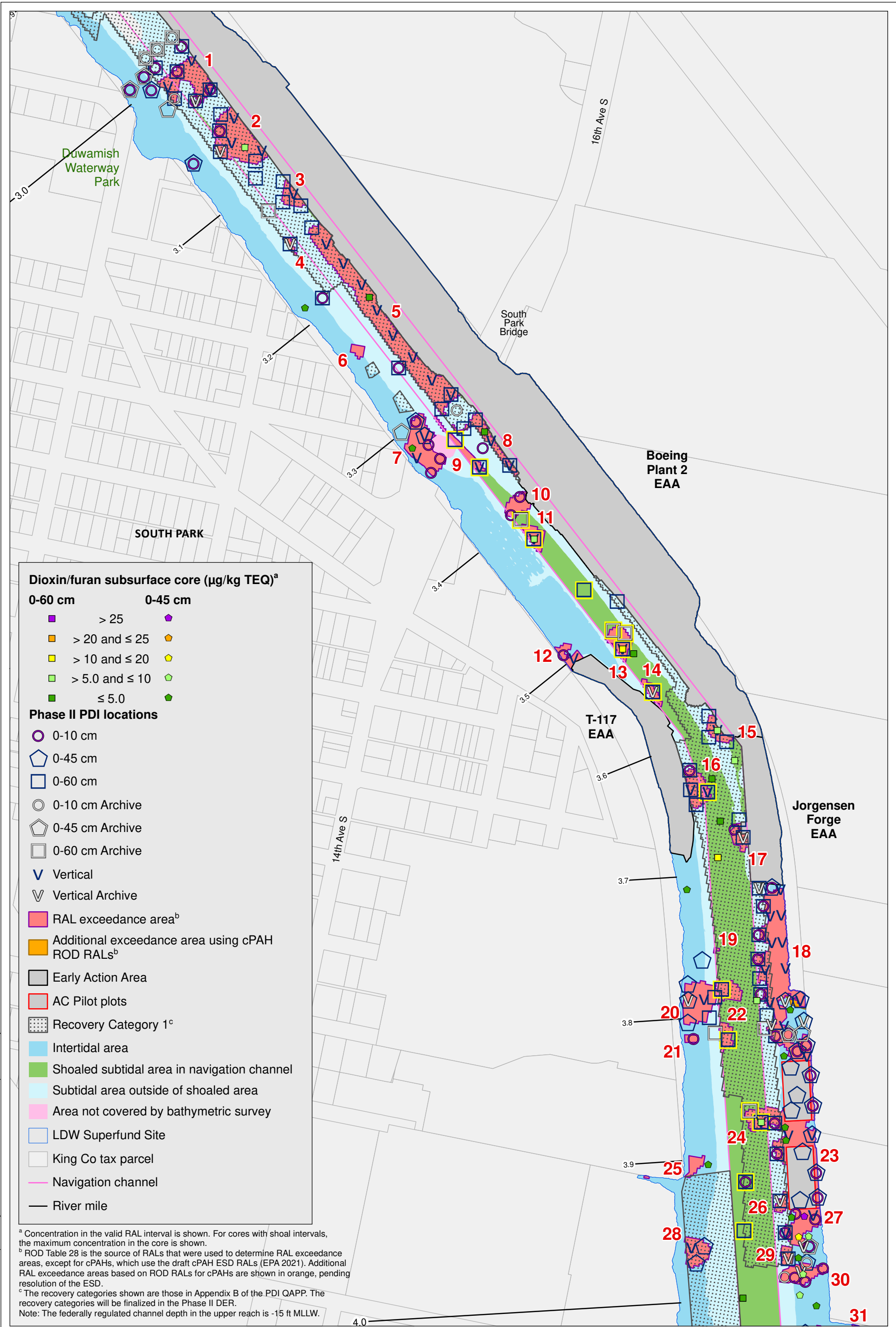
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-12b. Surface sediment dioxin/furan TEQs in the design dataset, RM 4.0-5.0**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Dioxin/furan subsurface core ( $\mu\text{g}/\text{kg}$  TEQ)<sup>a</sup>**

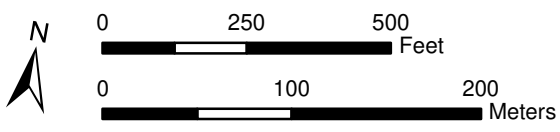
0-60 cm	0-45 cm
<span style="color: purple;">■</span> > 25	<span style="color: purple;">■</span> > 25
<span style="color: orange;">■</span> > 20 and $\leq$ 25	<span style="color: orange;">■</span> > 20 and $\leq$ 25
<span style="color: yellow;">■</span> > 10 and $\leq$ 20	<span style="color: yellow;">■</span> > 10 and $\leq$ 20
<span style="color: lightgreen;">■</span> > 5.0 and $\leq$ 10	<span style="color: lightgreen;">■</span> > 5.0 and $\leq$ 10
<span style="color: green;">■</span> $\leq$ 5.0	<span style="color: green;">■</span> $\leq$ 5.0

**Phase II PDI locations**

- 0-10 cm
- ◡ 0-45 cm
- ◡ 0-60 cm
- 0-10 cm Archive
- ◡ 0-45 cm Archive
- ◡ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- Early Action Area
- AC Pilot plots
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

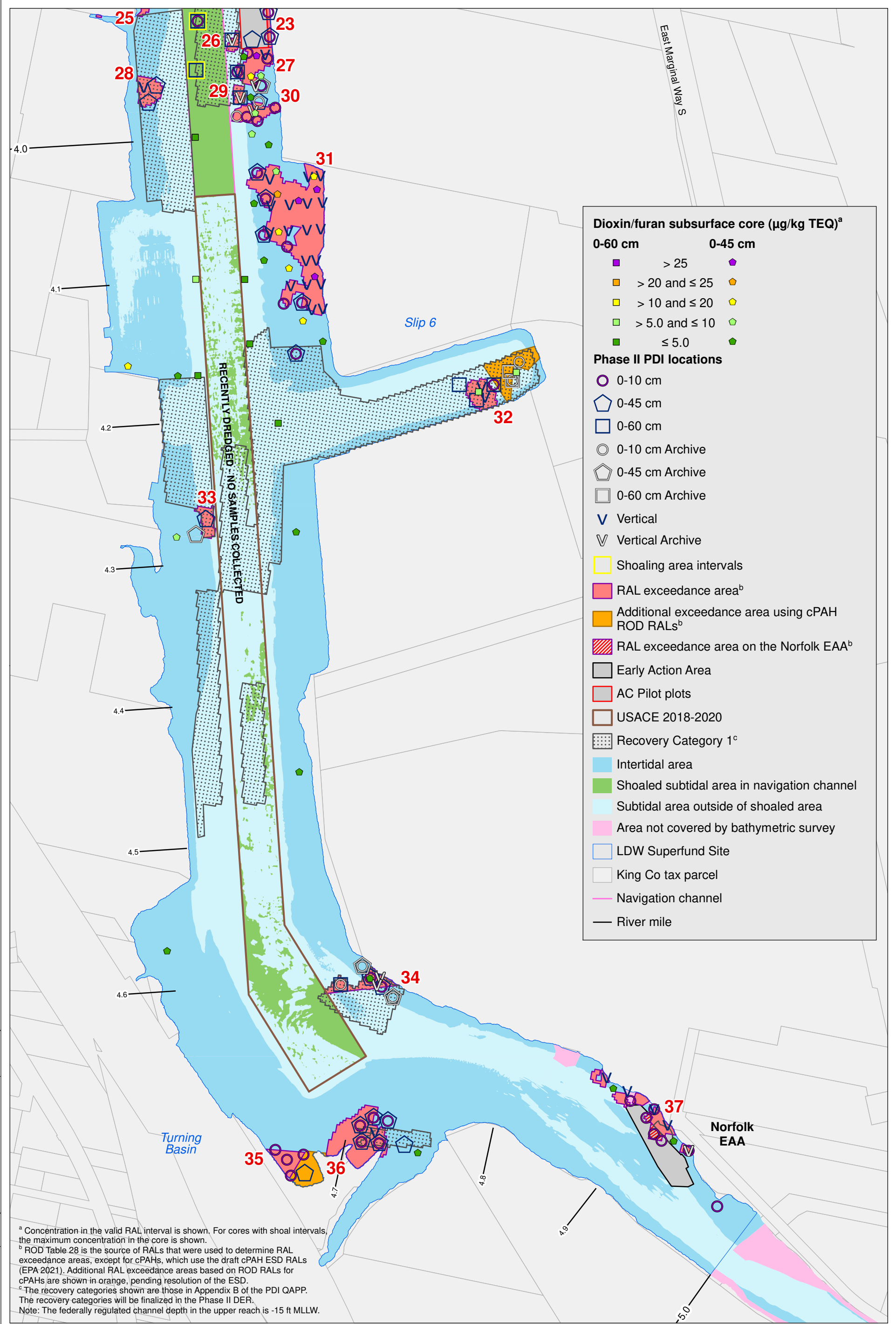
<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-13a\_7302 Dry wt concentrations - DF - Subsurface RM 3-4.mxd



**Map A-13a. Subsurface sediment dioxin/furan TEQs in the design dataset, RM 3.0-4.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-13b 7302 Dry wt concentrations - DF - Subsurface RM 4.0-5.0.mxd



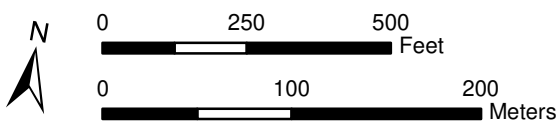
**Dioxin/furan subsurface core ( $\mu\text{g}/\text{kg TEQ}$ )<sup>a</sup>**

0-60 cm	0-45 cm
<span style="color: purple;">■</span> > 25	<span style="color: purple;">◆</span> > 25
<span style="color: orange;">■</span> > 20 and $\leq$ 25	<span style="color: orange;">◆</span> > 20 and $\leq$ 25
<span style="color: yellow;">■</span> > 10 and $\leq$ 20	<span style="color: yellow;">◆</span> > 10 and $\leq$ 20
<span style="color: lightgreen;">■</span> > 5.0 and $\leq$ 10	<span style="color: lightgreen;">◆</span> > 5.0 and $\leq$ 10
<span style="color: green;">■</span> $\leq$ 5.0	<span style="color: green;">◆</span> $\leq$ 5.0

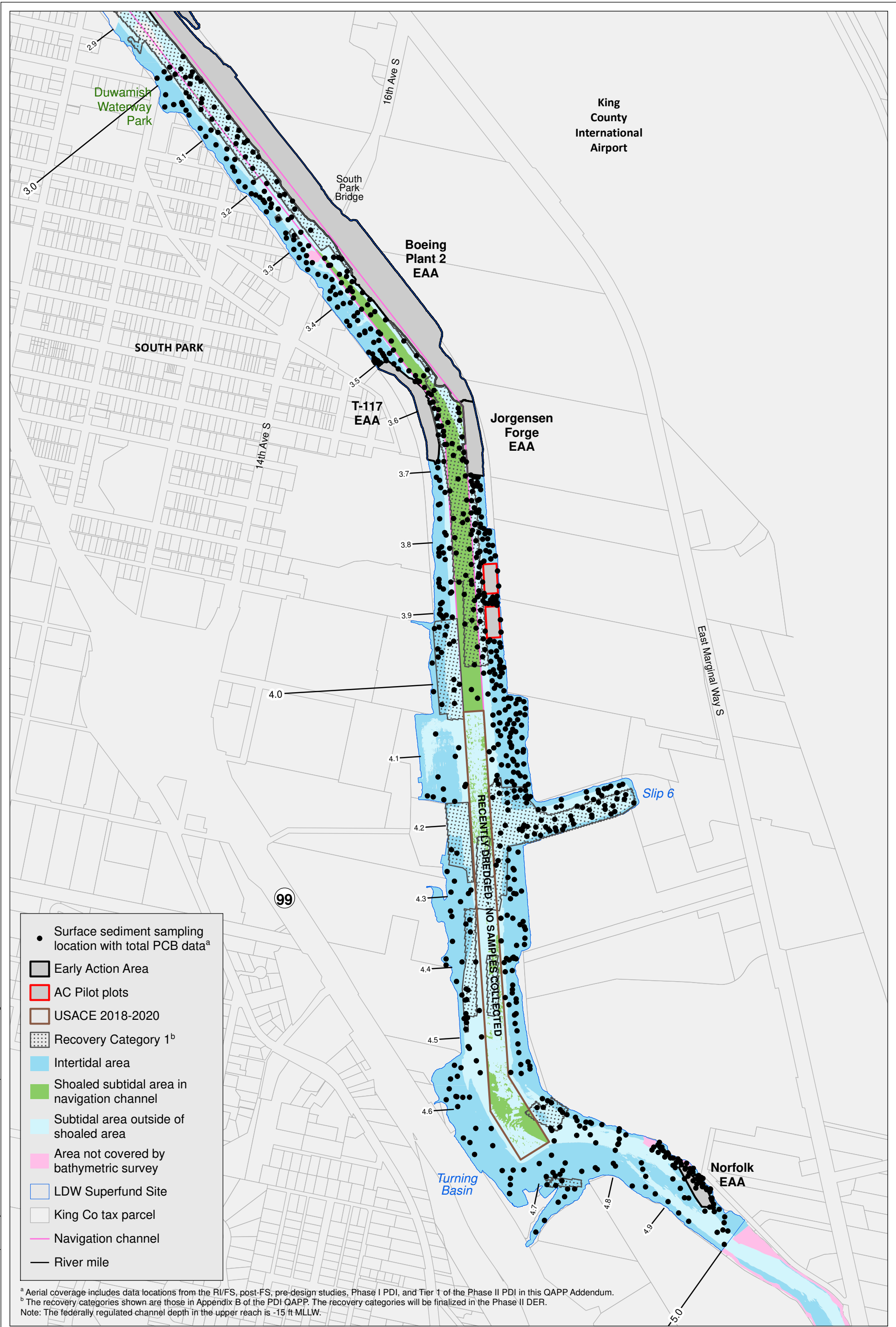
**Phase II PDI locations**

- 0-10 cm
- ◐ 0-45 cm
- ◑ 0-60 cm
- 0-10 cm Archive
- ◐ 0-45 cm Archive
- ◑ 0-60 cm Archive
- ∇ Vertical
- ∇ Vertical Archive
- Shoaling area intervals
- RAL exceedance area<sup>b</sup>
- Additional exceedance area using cPAH ROD RALs<sup>b</sup>
- RAL exceedance area on the Norfolk EAA<sup>b</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>c</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Concentration in the valid RAL interval is shown. For cores with shoal intervals, the maximum concentration in the core is shown.  
<sup>b</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD.  
<sup>c</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

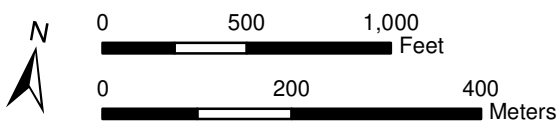


**Map A-13b. Subsurface sediment dioxin/furan TEQs in the design dataset, RM 4.0-5.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



- Surface sediment sampling location with total PCB data<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

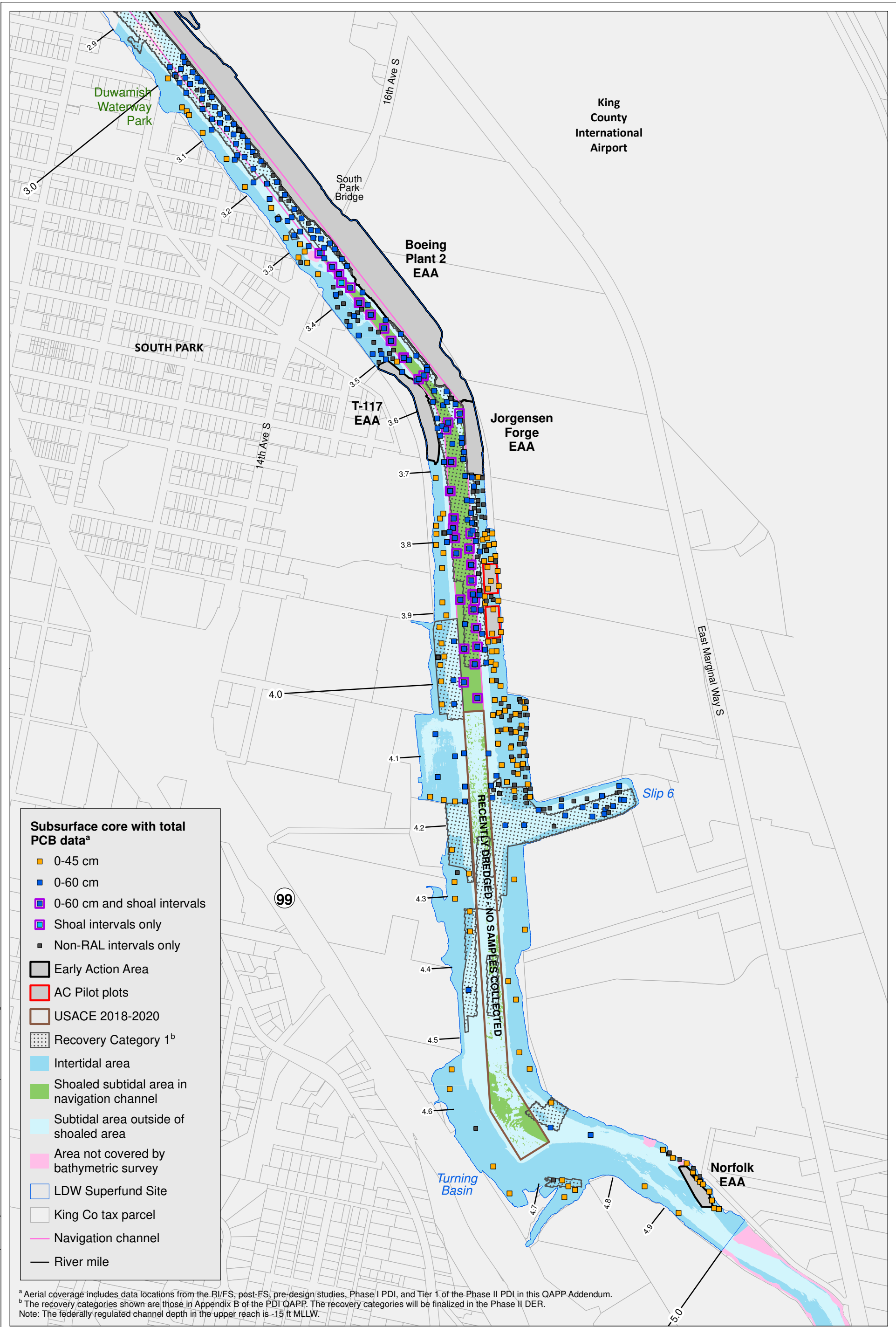


**Map A-14. Areal coverage of total PCB data in the post-Phase II surface design dataset**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-14 7297 Areal coverage - PCBs - Surface.mxd



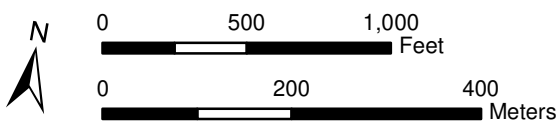


**Subsurface core with total PCB data<sup>a</sup>**

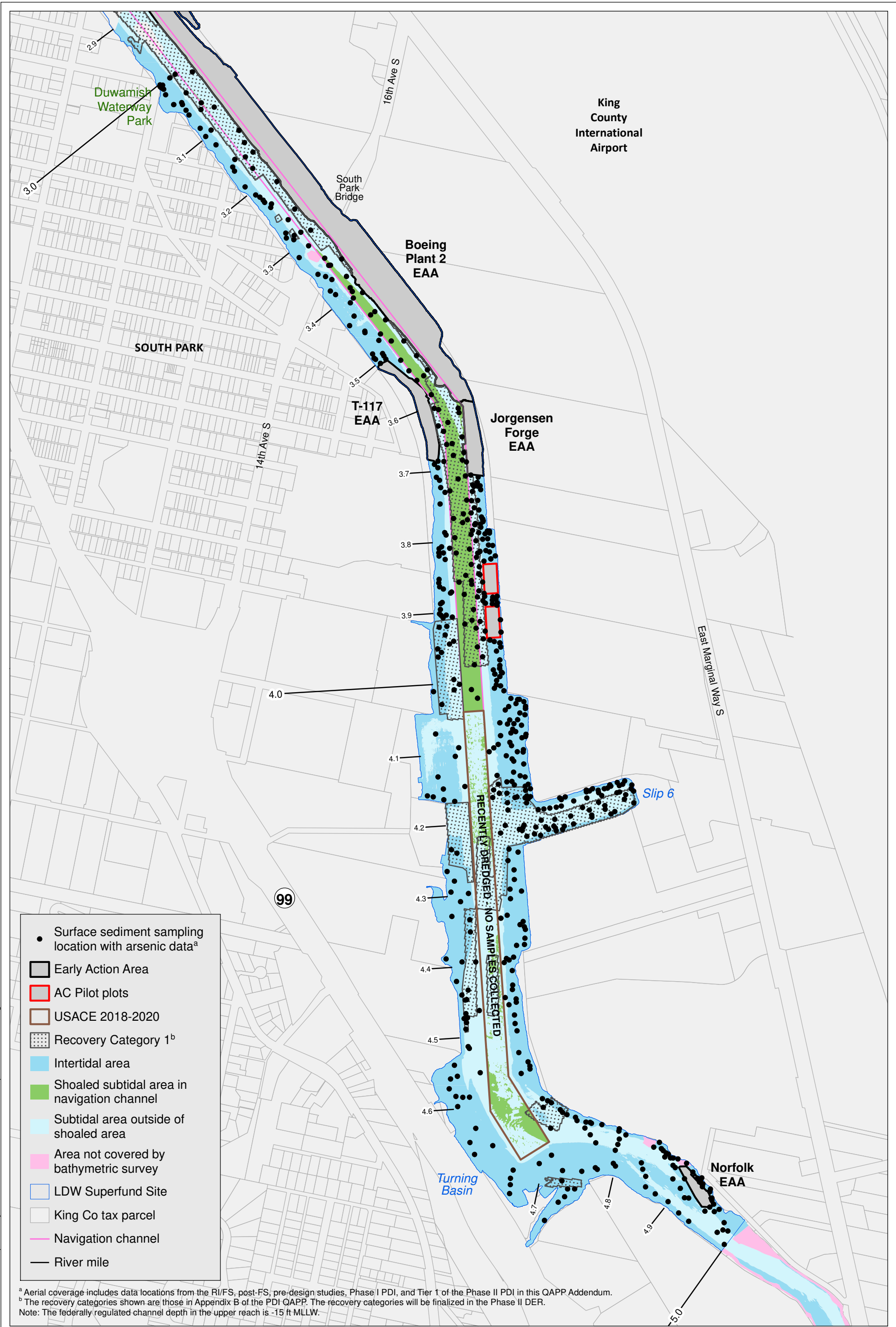
- 0-45 cm
- 0-60 cm
- 0-60 cm and shoal intervals
- Shoal intervals only
- Non-RAL intervals only
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACQ\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-15 7297 Areal coverage - PCBs - Subsurface.mxd



**Map A-15. Areal coverage of total PCB data in the post-Phase II subsurface design dataset**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

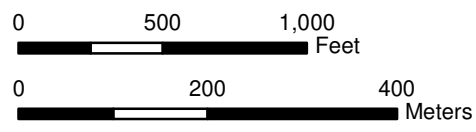


- Surface sediment sampling location with arsenic data<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



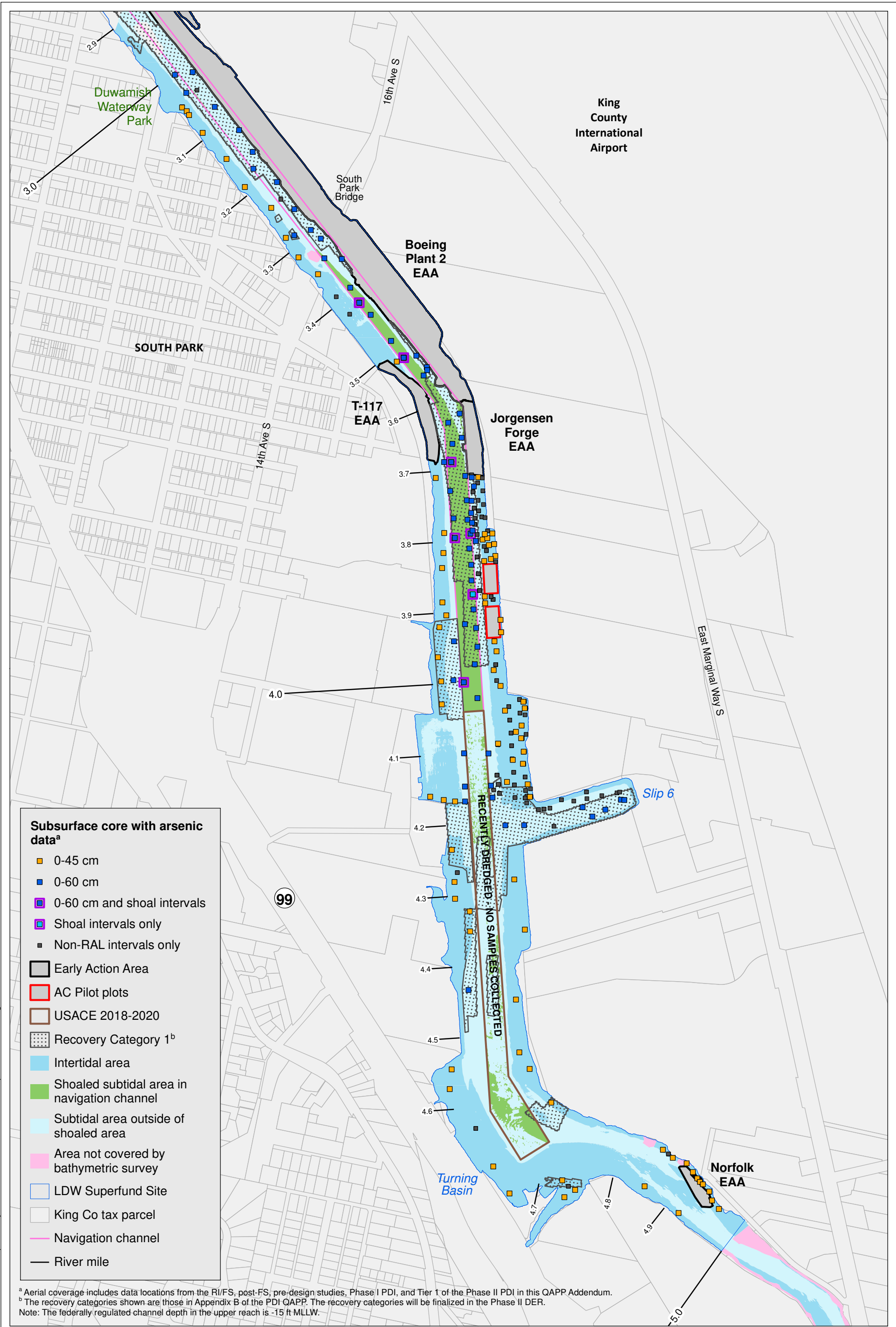
**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company



**Map A-16. Areal coverage of arsenic data in the post-Phase II surface design dataset**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

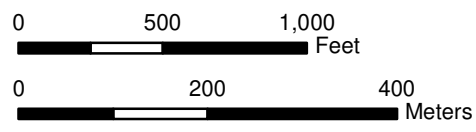
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-16 7297 Areal coverage - As - Surface.mxd



<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



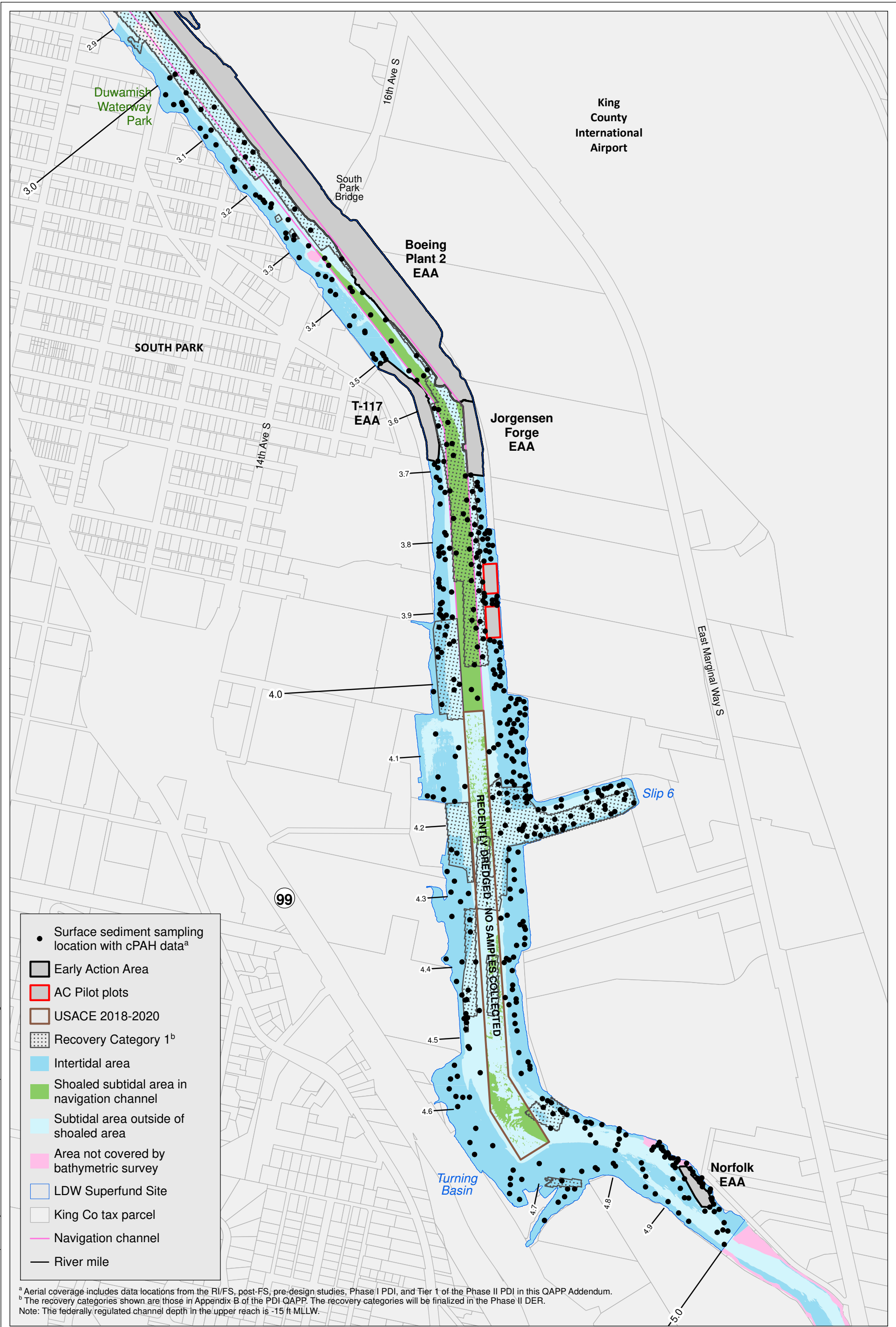
**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company



**Map A-17. Areal coverage of arsenic data in the post-Phase II subsurface design dataset**

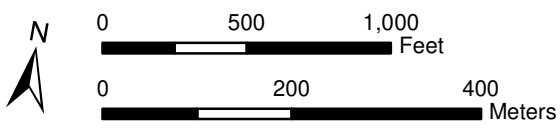
PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-17 7297 Areal coverage - As - Subsurface.mxd



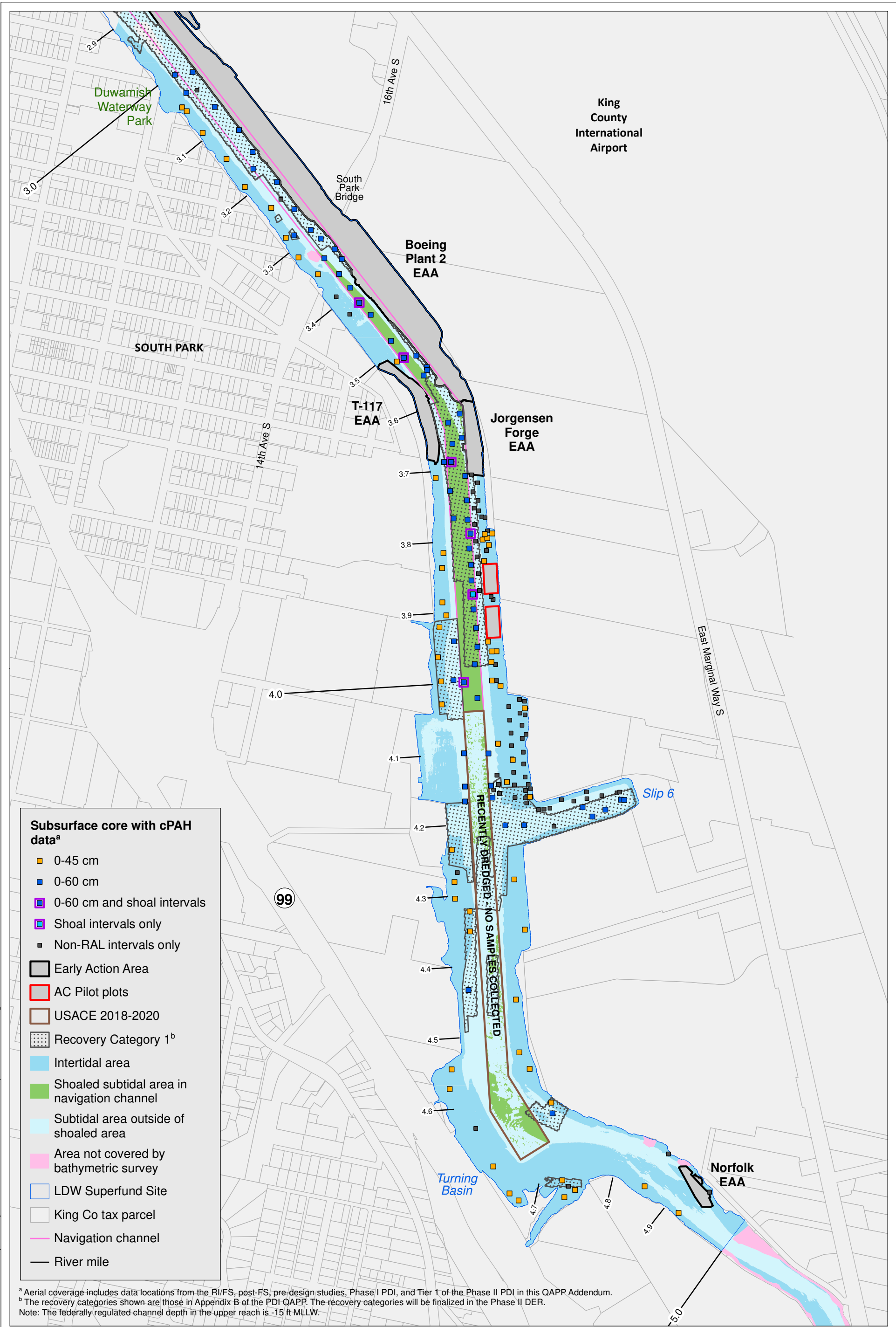
- Surface sediment sampling location with cPAH data<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI-QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-18. Areal coverage of cPAH data in the post-Phase II surface design dataset**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-18 7297 Areal coverage - cPAH - Surface.mxd

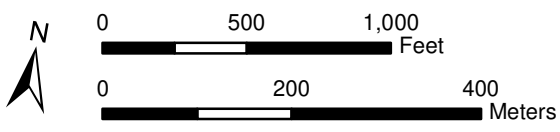


**Subsurface core with cPAH data<sup>a</sup>**

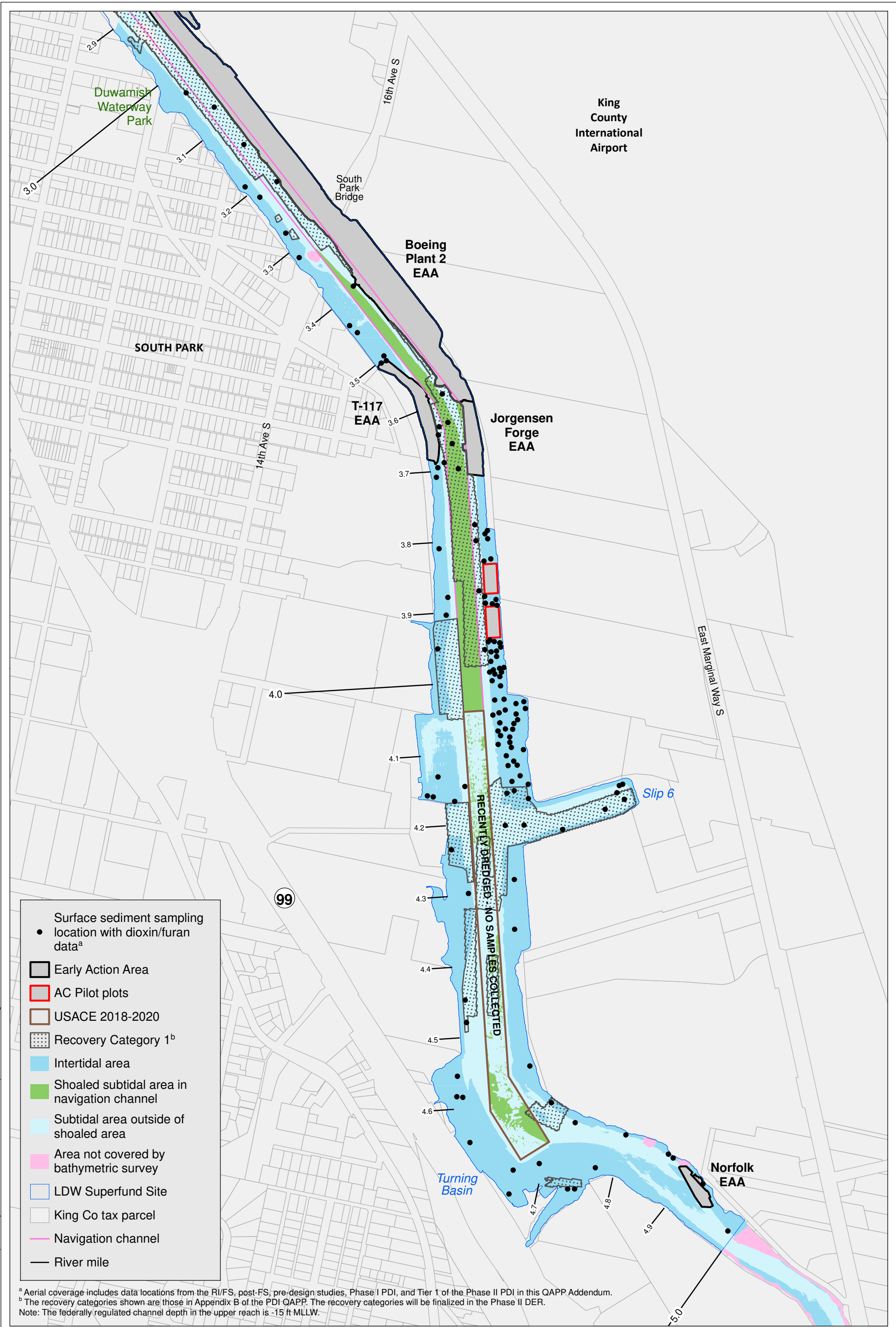
- 0-45 cm
- 0-60 cm
- 0-60 cm and shoal intervals
- Shoal intervals only
- Non-RAL intervals only
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-19 7297 Areal coverage - cPAH - Subsurface.mxd

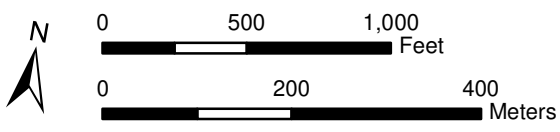


**Map A-19. Areal coverage of cPAH data in the post-Phase II subsurface design dataset**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



- Surface sediment sampling location with dioxin/furan data<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

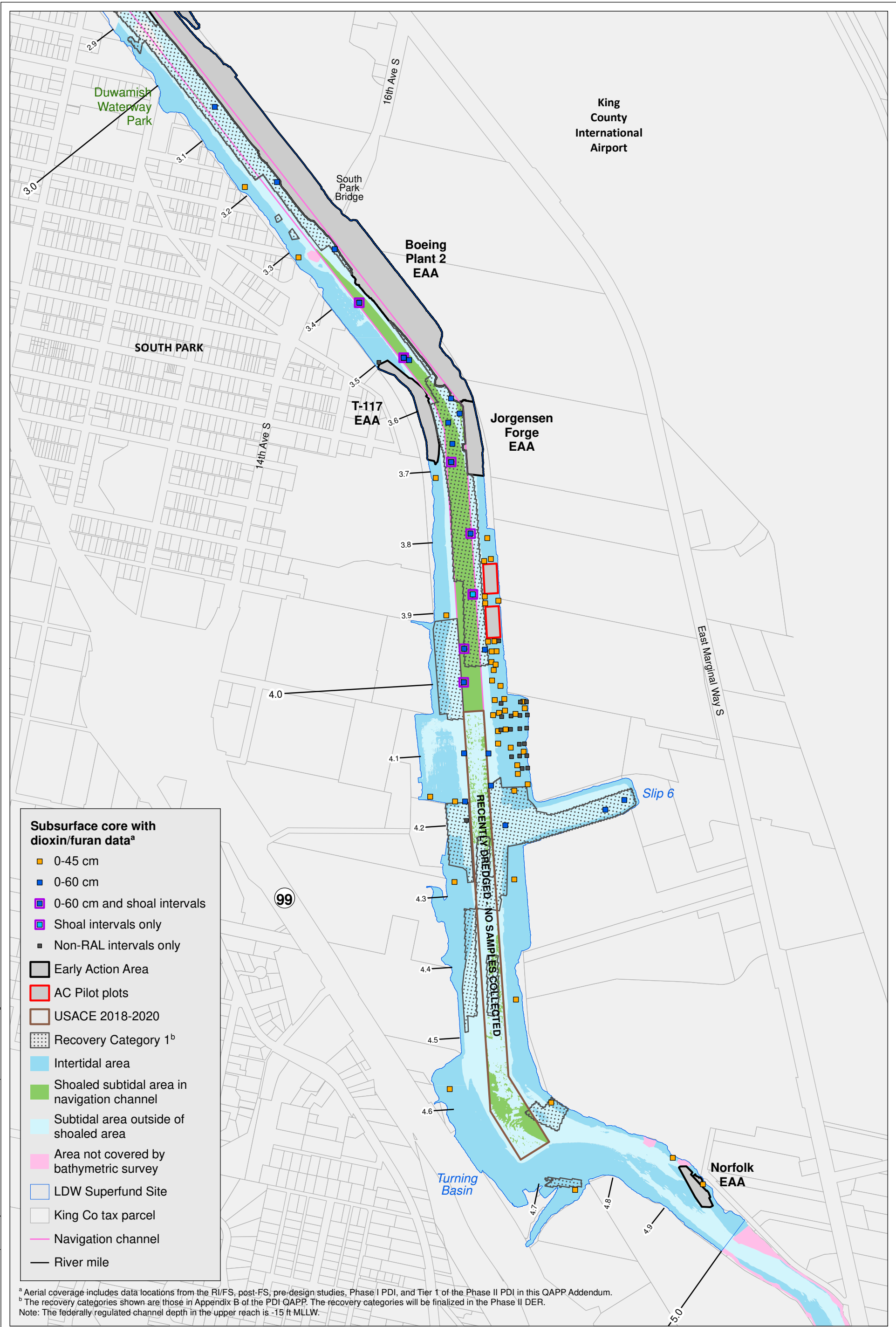
<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-20. Areal coverage of dioxin/furan data in the post-Phase II surface design dataset**

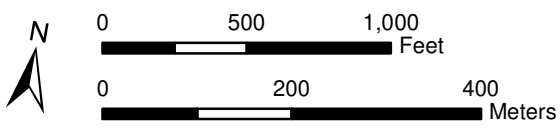
PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-20 7297 Areal coverage - DF - Surface.mxd



- Subsurface core with dioxin/furan data<sup>a</sup>**
- 0-45 cm
  - 0-60 cm
  - 0-60 cm and shoal intervals
  - Shoal intervals only
  - Non-RAL intervals only
- Other symbols:**
- Early Action Area
  - AC Pilot plots
  - USACE 2018-2020
  - Recovery Category 1<sup>b</sup>
  - Intertidal area
  - Shoaled subtidal area in navigation channel
  - Subtidal area outside of shoaled area
  - Area not covered by bathymetric survey
  - LDW Superfund Site
  - King Co tax parcel
  - Navigation channel
  - River mile

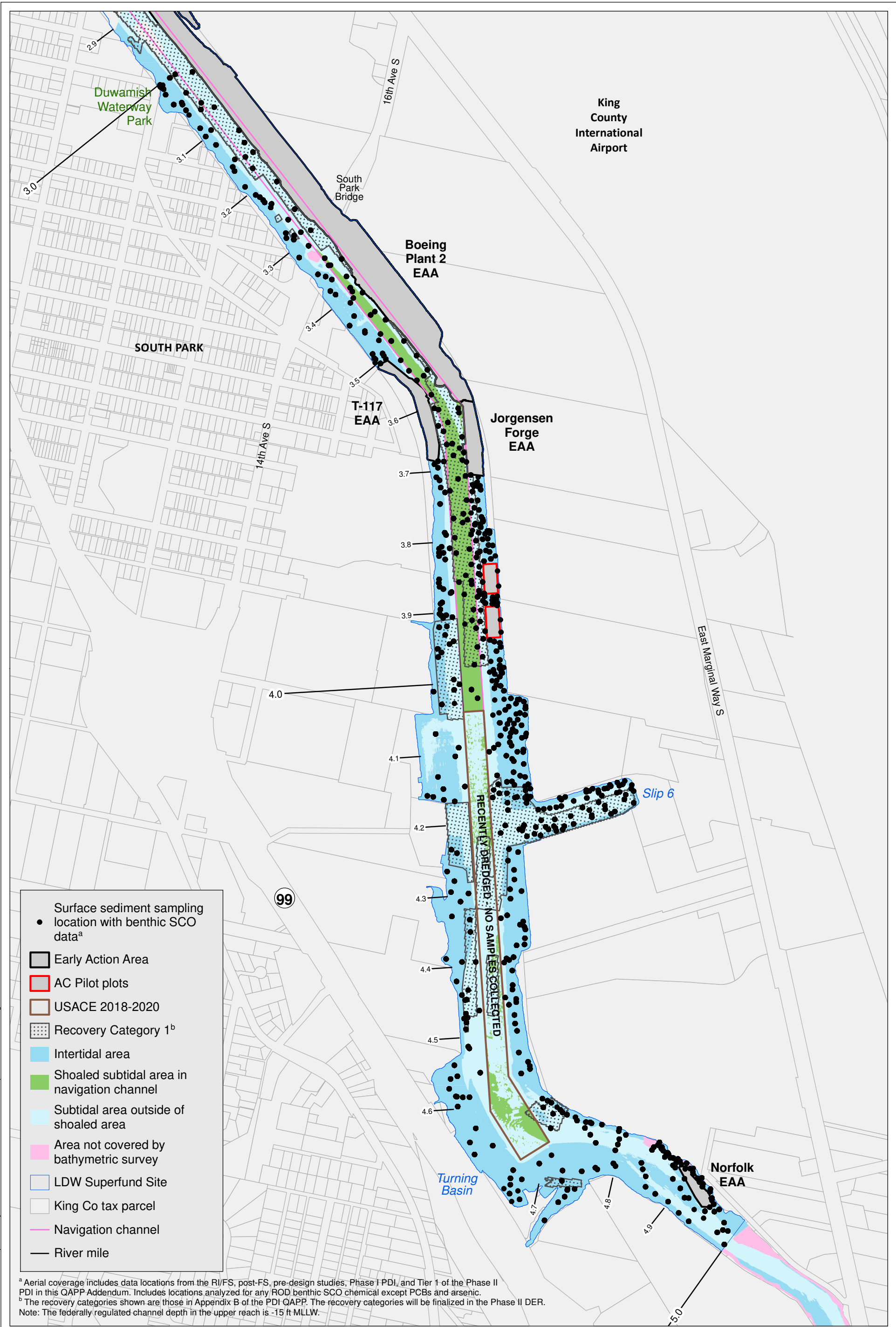
<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.



**Map A-21. Areal coverage of dioxin/furan data in the post-Phase II subsurface design dataset**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
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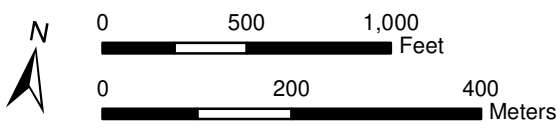
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-21 7297 Areal coverage - DF - Subsurface.mxd



- Surface sediment sampling
  - location with benthic SCO data<sup>a</sup>
- Early Action Area
- AC Pilot plots
- USACE 2018-2020
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Shoaled subtidal area in navigation channel
- Subtidal area outside of shoaled area
- Area not covered by bathymetric survey
- LDW Superfund Site
- King Co tax parcel
- Navigation channel
- River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum. Includes locations analyzed for any ROD benthic SCO chemical except PCBs and arsenic.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

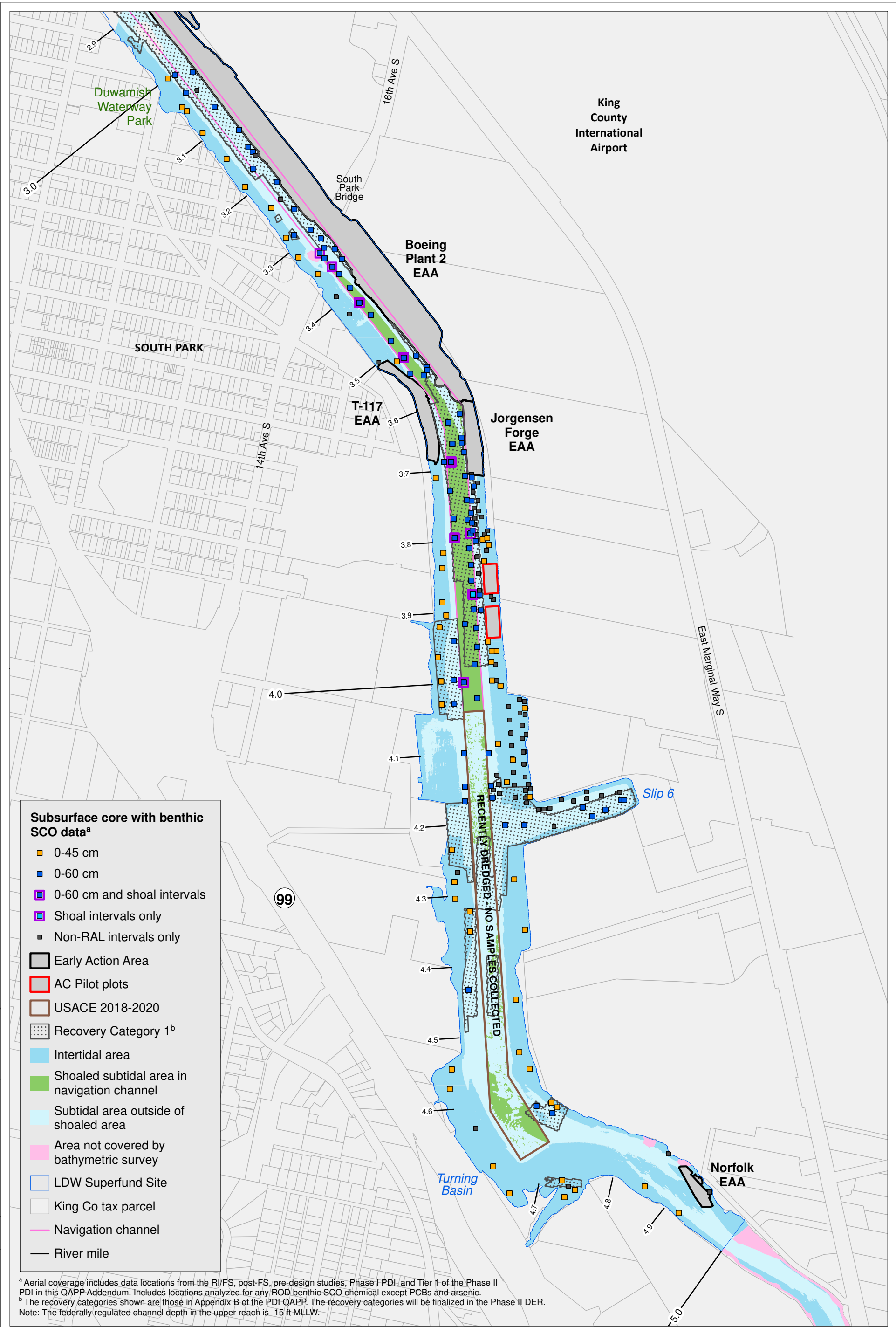
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-22 7297 Areal coverage - Benthic SCO - Surface.mxd



**Map A-22. Areal coverage of benthic SCO data in the post-Phase II surface design dataset**

PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH

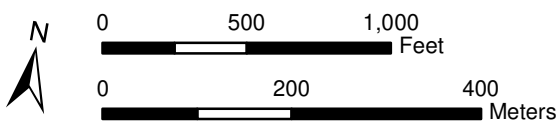




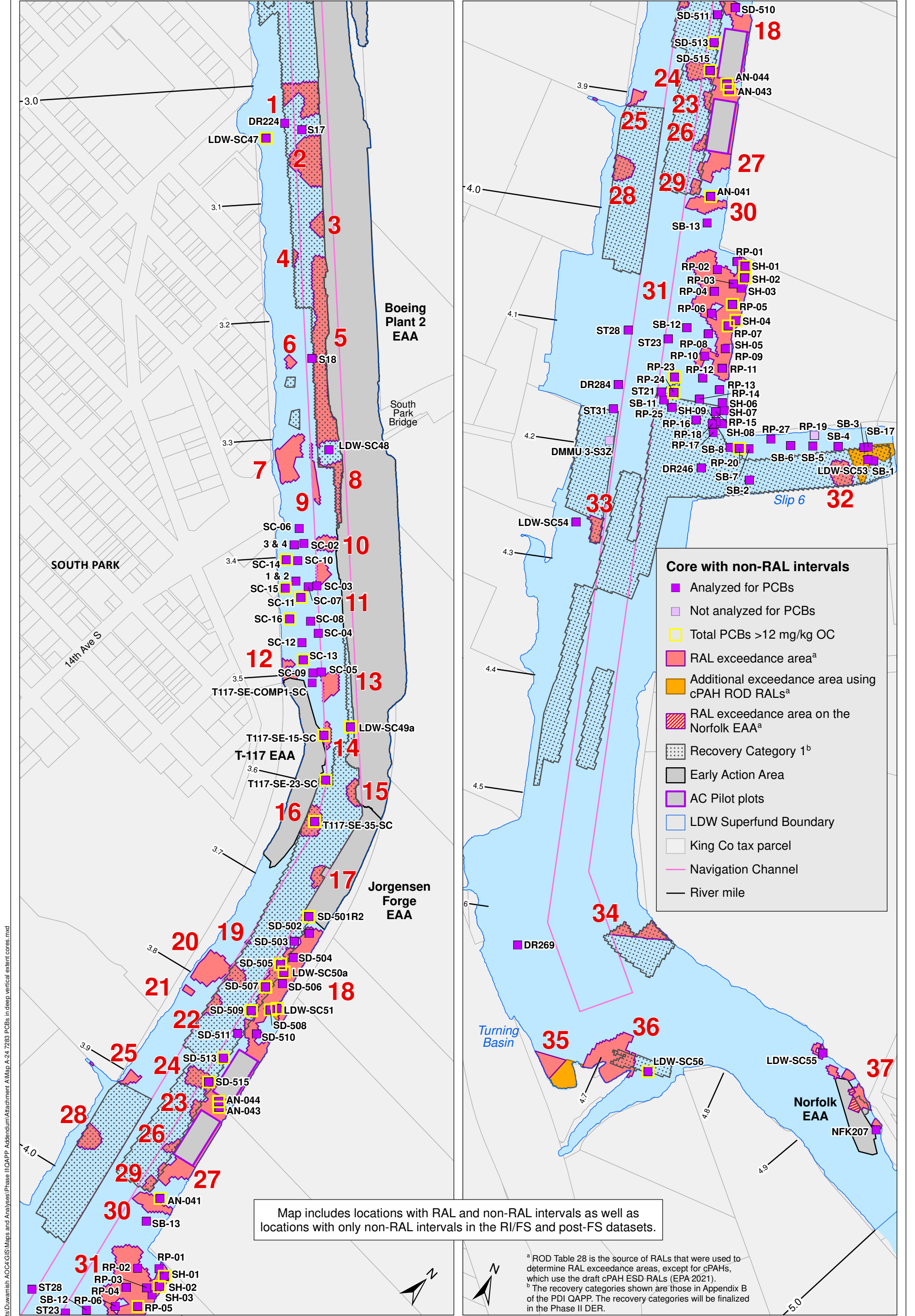
- Subsurface core with benthic SCO data<sup>a</sup>**
- 0-45 cm
  - 0-60 cm
  - 0-60 cm and shoal intervals
  - Shoal intervals only
  - Non-RAL intervals only
- Other Features:**
- Early Action Area
  - AC Pilot plots
  - USACE 2018-2020
  - Recovery Category 1<sup>b</sup>
  - Intertidal area
  - Shoaled subtidal area in navigation channel
  - Subtidal area outside of shoaled area
  - Area not covered by bathymetric survey
  - LDW Superfund Site
  - King Co tax parcel
  - Navigation channel
  - River mile

<sup>a</sup> Aerial coverage includes data locations from the RI/FS, post-FS, pre-design studies, Phase I PDI, and Tier 1 of the Phase II PDI in this QAPP Addendum. Includes locations analyzed for any ROD benthic SCO chemical except PCBs and arsenic.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note: The federally regulated channel depth in the upper reach is -15 ft MLLW.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment A\Map A-23 7297 Areal coverage - Benthic SCO - Subsurface.mxd

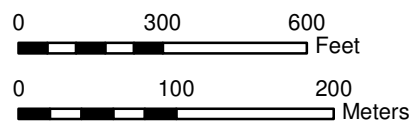


**Map A-23. Areal coverage of benthic SCO data in the post-Phase II subsurface design dataset**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH



Map includes locations with RAL and non-RAL intervals as well as locations with only non-RAL intervals in the RI/FS and post-FS datasets.

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021).  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



Scale is the same for each inset map

Prepared by craigh.6/28/21: W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP\_Addendum\Attachment A\Map A-24\_7263\_PCBs in deep vertical extent cores.mxd

**Phase II PDI sampling locations**

- 0-10 cm
- 0-45 cm
- 0-60 cm
- 0-60 cm Archive

**SMS status of total PCBs or arsenic in surface sediment inside the AC Pilot Areas**

- > CSL, detect
- > SCO and ≤ CSL, detect
- < SCO or non-detect
- Subsurface core inside the AC Pilot Areas
- Surface sediment sampling location outside the AC Pilot Areas
- Subsurface core outside the AC Pilot Areas
- AC Pilot plots
- LDW Superfund Site
- King Co tax parcel
- Navigation Channel

Surface Total PCB Aroclors				
Location	Dry Weight (µg/kg)	OC Norm (mg/kg OC)	TOC	SCO EF
SD-512G	450	24	1.85	2
LDW-PILOT9A-SS1	710	42	1.7	3.5
LDW-PILOT9A-SS2	230	16	1.41	1.3
PMU-6-2016	1,040 J	67.1	1.55	5.6
PMU-6-2015	2,600	120	2.12	10
LDW-SS119	880 J	59	1.5	4.9
SD-514G	1,290	72.5	1.78	6
LDW-PILOT9A-SS4	3,300	150	2.18	13
LDW-PILOT9A-SS3	450	29	1.54	2.4

Subsurface Total PCB Aroclors					
Location	Upper Depth (ft)	Lower Depth (ft)	Dry Weight (µg/kg)	OC Norm (mg/kg OC)	TOC
SD-512	2	3	110 J	5.9	1.86
SD-512	4	5	19 U	1.1	1.79
SD-512	6	7	20 U		0.104
LDW-PILOT9A-SC1	0	1.5	4,000	190	2.13
SD-514	2	3	18 U	1.1	1.71

Surface Arsenic		
Location	Dry Weight (mg/kg)	SCO EF
SD-512G	19.5	0.34
PMU-6-2016	10.1	0.18
PMU-6-2015	11.3 J	0.2
LDW-SS119	10.9	0.19
SD-514G	15.6	0.27

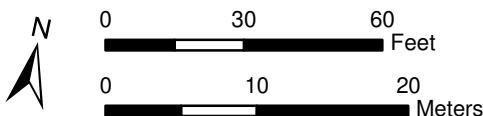
Subsurface Arsenic			
Location	Upper Depth (ft)	Lower Depth (ft)	Dry Weight (µg/kg)
SD-512	2	3	290
SD-512	4	5	5.2
SD-512	6	7	0.9
SD-514	2	3	5.1

Surface Arsenic		
Location	Dry Weight (mg/kg)	SCO EF
LDW-SS120	15.6	0.27
AN-026	13.7	0.24
AN-025	10.0	0.18
LDW-SS121	23.1	0.41
AN-023	8.9	0.16
DR236	8.4	0.15
AN-022	8.5	0.15
RARE_1_A_1	9.2 J	0.16
RARE_1_A_1	6.9 J	0.12
RARE_1_A_1	6.0	0.11
RARE_1_A_2	7.2	0.13
RARE_1_A_2	9.5 J	0.17
RARE_1_A_2	7.1 J	0.12
RARE_1_A_3	6.6 J	0.12
RARE_1_A_3	6.9	0.12
RARE_1_A_3	9.2 J	0.16
RARE_1_A_4	6.8	0.12
RARE_1_A_4	6.4	0.11
RARE_1_A_4	6.5	0.11
R35	8.8	0.15
RARE_1_A_5	5.4	0.095
RARE_1_A_5	6.5	0.11
RARE_1_A_5	5.3	0.093
RARE_1_A_6	5.8	0.1
RARE_1_A_6	7.1	0.12
RARE_1_A_6	4.9	0.086
RARE_1_B_1	9.3 J	0.16
RARE_1_B_1	6.6 J	0.12
RARE_1_B_1	6.0	0.11
AN-021	7.7	0.14
RARE_1_B_2	6.9 J	0.12
RARE_1_B_2	7.7	0.14
RARE_1_B_2	9.9 J	0.17
RARE_1_B_3	7.6 J	0.13
RARE_1_B_3	8.6 J	0.15
RARE_1_B_3	10.7 J	0.19
RARE_1_B_4	9.4 J	0.16
RARE_1_B_4	6.9 J	0.12
RARE_1_B_4	8.2 J	0.14
RARE_1_B_5	10.8 J	0.19
RARE_1_B_5	8.3 J	0.15
RARE_1_B_5	8.0 J	0.14
RARE_1_B_6	9.2 J	0.16
RARE_1_B_6	7.0 J	0.12
RARE_1_B_6	6.3 J	0.11
AN-020	10.4	0.18

Surface Total PCB Aroclors				
Location	Dry Weight (µg/kg)	OC Norm (mg/kg OC)	TOC	SCO EF
LDW-SS120	630 J	32	1.94	2.7
AN-025	560 J	35	1.62	2.9
LDW-PILOT9B-SS4	620	49	1.27	4.1
LDW-PILOT9B-SS3	420	24	1.74	2
LDW-SS121	1,060 J	57	1.86	4.8
AN-023	190	16	1.18	1.3
DR236	129	15	0.85	1.3
AN-022	420	27	1.55	2.3
AN-021	390	27	1.43	2.3

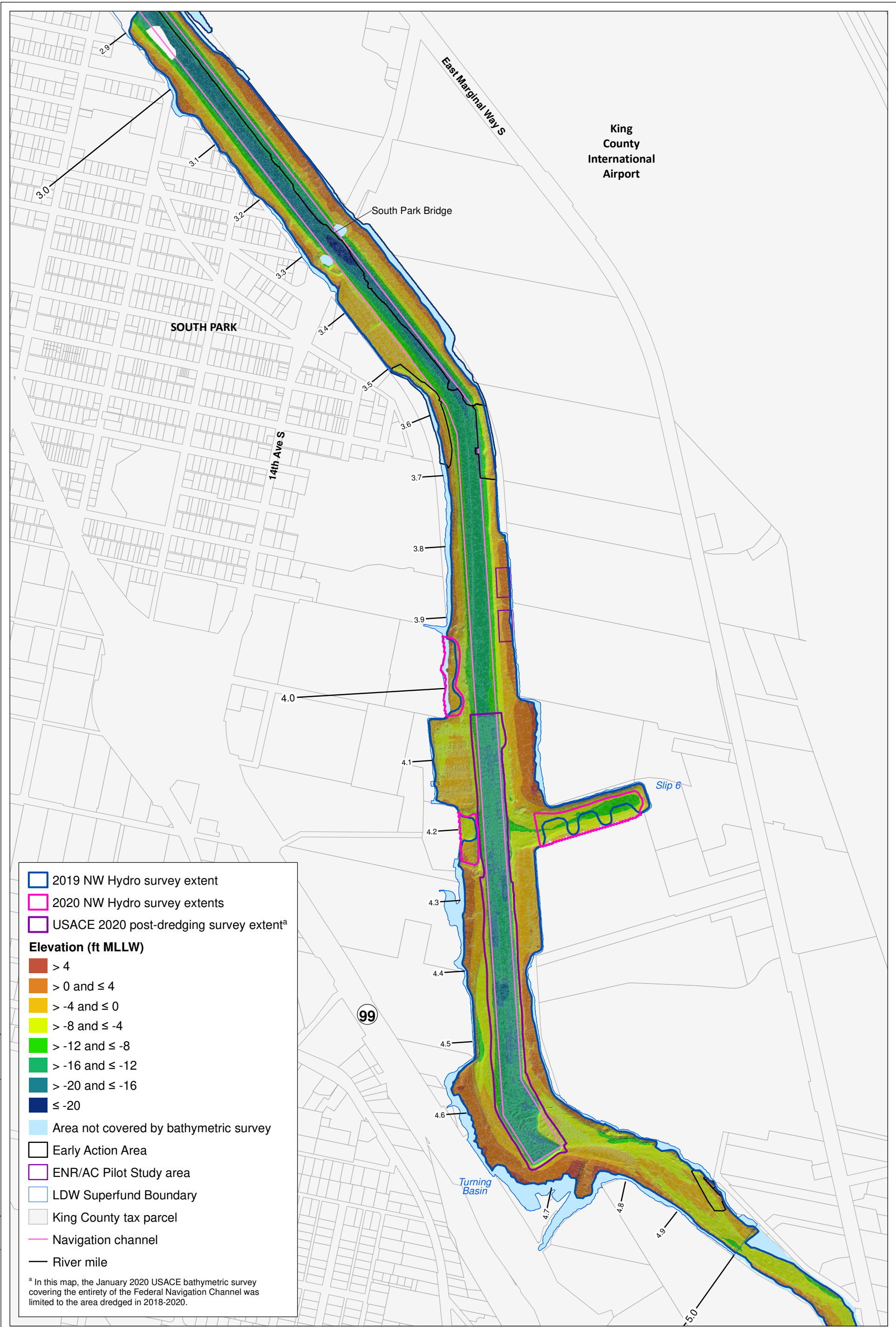
Subsurface Total PCB Aroclors					
Location	Upper Depth (ft)	Lower Depth (ft)	Dry Weight (µg/kg)	OC Norm (mg/kg OC)	TOC
LDW-SC52	0	1	3,000 J	130	2.37
LDW-SC52	1	2	65	2.4	2.73
LDW-SC52	2	4	4.0 U		0.375
LDW-PILOT9B-SC1	0	1.5	2,900	110	2.68
AN-042	0	1	1,500	97	1.55
AN-042	1	2	1,400	67	2.1
AN-042	2	3	220	9.5	2.32
AN-042	3	4	11	0.34	3.23

Subsurface Arsenic			
Location	Upper Depth (ft)	Lower Depth (ft)	Dry Weight (µg/kg)
LDW-SC52	0	1	17
LDW-SC52	1	2	28
LDW-SC52	2	4	6 U
AN-042	0	1	8.8
AN-042	1	2	14.8
AN-042	2	3	33.9
AN-042	3	4	9.6
AN-042	4	5	5.1
AN-042	5	5.8	1.3



**Map A-25. Pre-construction data for total PCBs and arsenic in the ENR/AC Pilot Intertidal Plots**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



- 2019 NW Hydro survey extent
- 2020 NW Hydro survey extents
- USACE 2020 post-dredging survey extent<sup>a</sup>

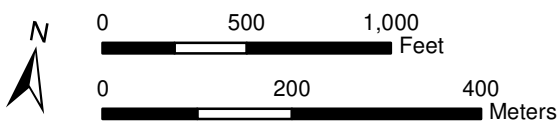
**Elevation (ft MLLW)**

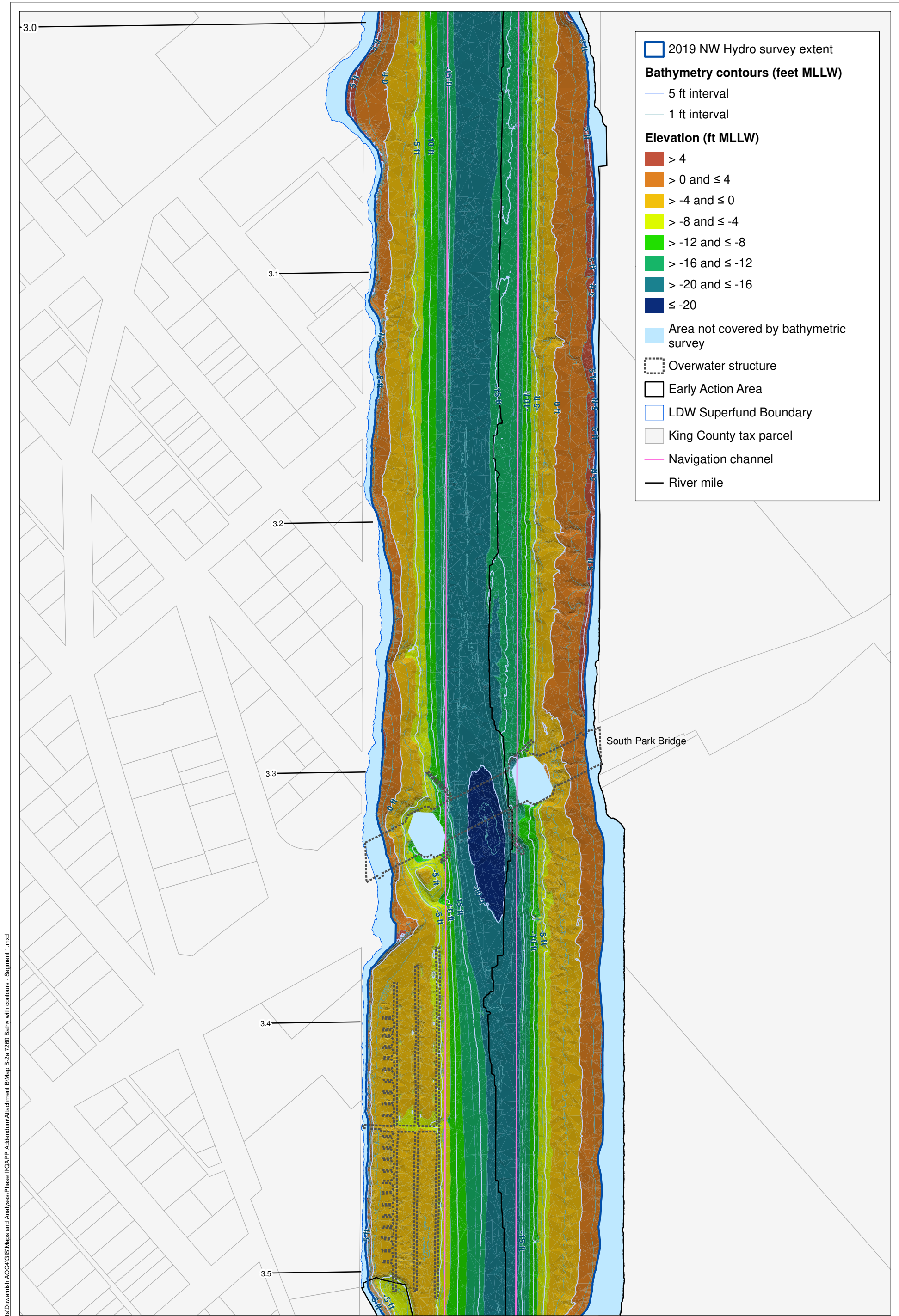
- > 4
- > 0 and ≤ 4
- > -4 and ≤ 0
- > -8 and ≤ -4
- > -12 and ≤ -8
- > -16 and ≤ -12
- > -20 and ≤ -16
- ≤ -20

- Area not covered by bathymetric survey
- Early Action Area
- ENR/AC Pilot Study area
- LDW Superfund Boundary
- King County tax parcel
- Navigation channel
- River mile

<sup>a</sup> In this map, the January 2020 USACE bathymetric survey covering the entirety of the Federal Navigation Channel was limited to the area dredged in 2018-2020.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment B\Map B-1 7260 Bathy with contours.mxd

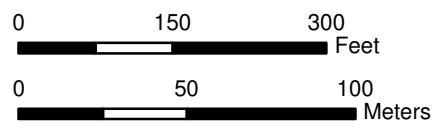




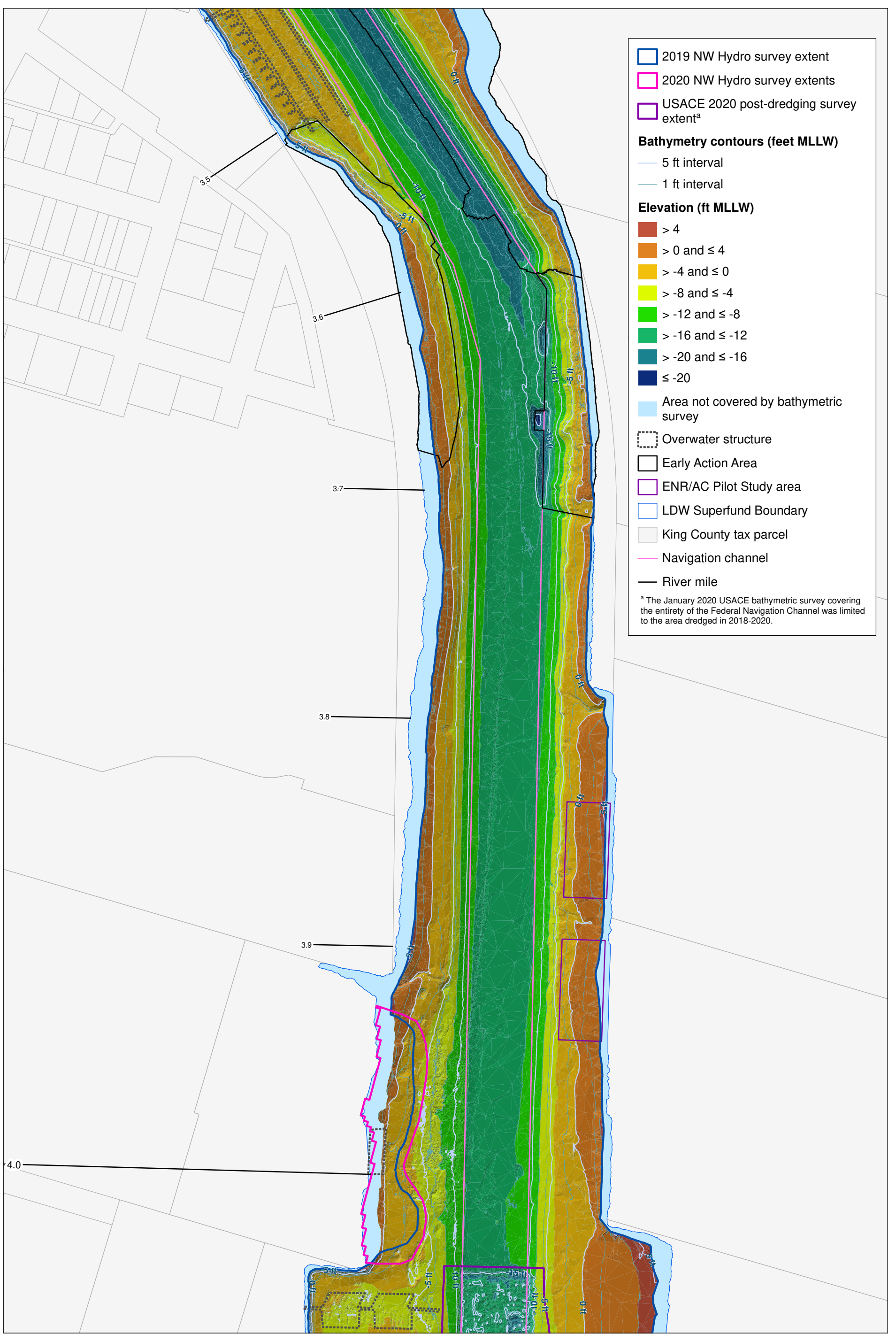
Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II QAPP Addendum\Attachment B\Map B-2a 7260 Bathy with contours - Segment 1.mxd



**Lower Duwamish Waterway Group**  
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**Map B-2a. Bathymetric survey results (combined surveys), Segment 1 (RM 3.0 to RM 3.5)**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH



- 2019 NW Hydro survey extent
- 2020 NW Hydro survey extents
- USACE 2020 post-dredging survey extent<sup>a</sup>

**Bathymetry contours (feet MLLW)**

- 5 ft interval
- 1 ft interval

**Elevation (ft MLLW)**

- > 4
- > 0 and ≤ 4
- > -4 and ≤ 0
- > -8 and ≤ -4
- > -12 and ≤ -8
- > -16 and ≤ -12
- > -20 and ≤ -16
- ≤ -20

- Area not covered by bathymetric survey
- Overwater structure
- Early Action Area
- ENR/AC Pilot Study area
- LDW Superfund Boundary
- King County tax parcel
- Navigation channel
- River mile

<sup>a</sup> The January 2020 USACE bathymetric survey covering the entirety of the Federal Navigation Channel was limited to the area dredged in 2018-2020.

Prepared by craigh. 6/28/21. W:\Projects\Duwamish ACC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment B\Map B-2b 7260 Bathy with contours - Segment 2.mxd



**Windward**  
environmental LLC



**ANCHOR**  
QEA





0 150 300 Feet



0 50 100 Meters

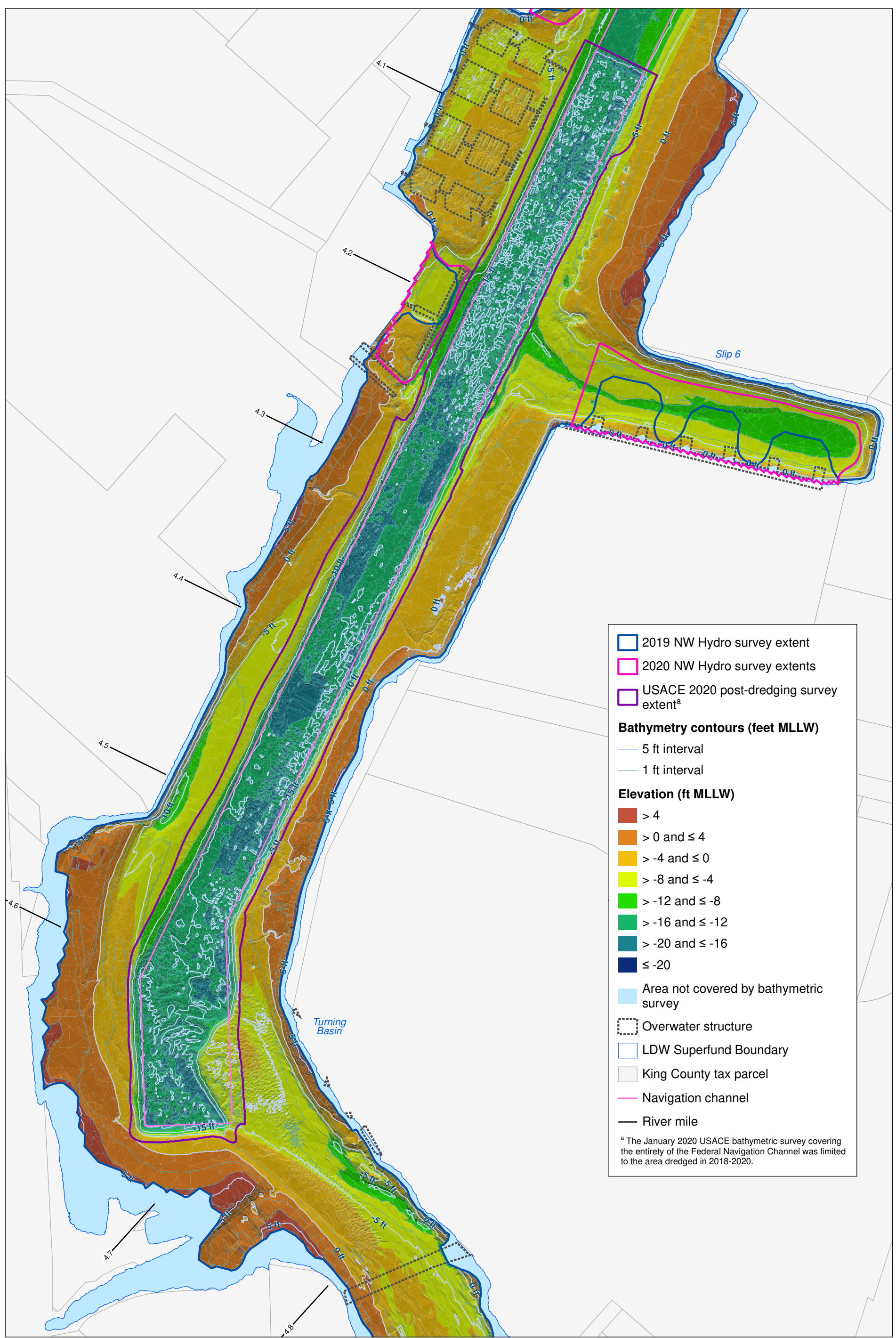
**Lower Duwamish Waterway Group**

Port of Seattle / City of Seattle / King County / The Boeing Company

**Map B-2b. Bathymetric survey results (combined surveys), Segment 2 (RM 3.5 to RM 4.05)**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC\GIS\Maps and Analysis\Phase II\QAPP Addendum\Attachment B\Map B-2c 7560 Bathymetry with contours - Segment 3.mxd



2019 NW Hydro survey extent  
 2020 NW Hydro survey extents  
 USACE 2020 post-dredging survey extent<sup>a</sup>

**Bathymetry contours (feet MLLW)**

5 ft interval  
 1 ft interval

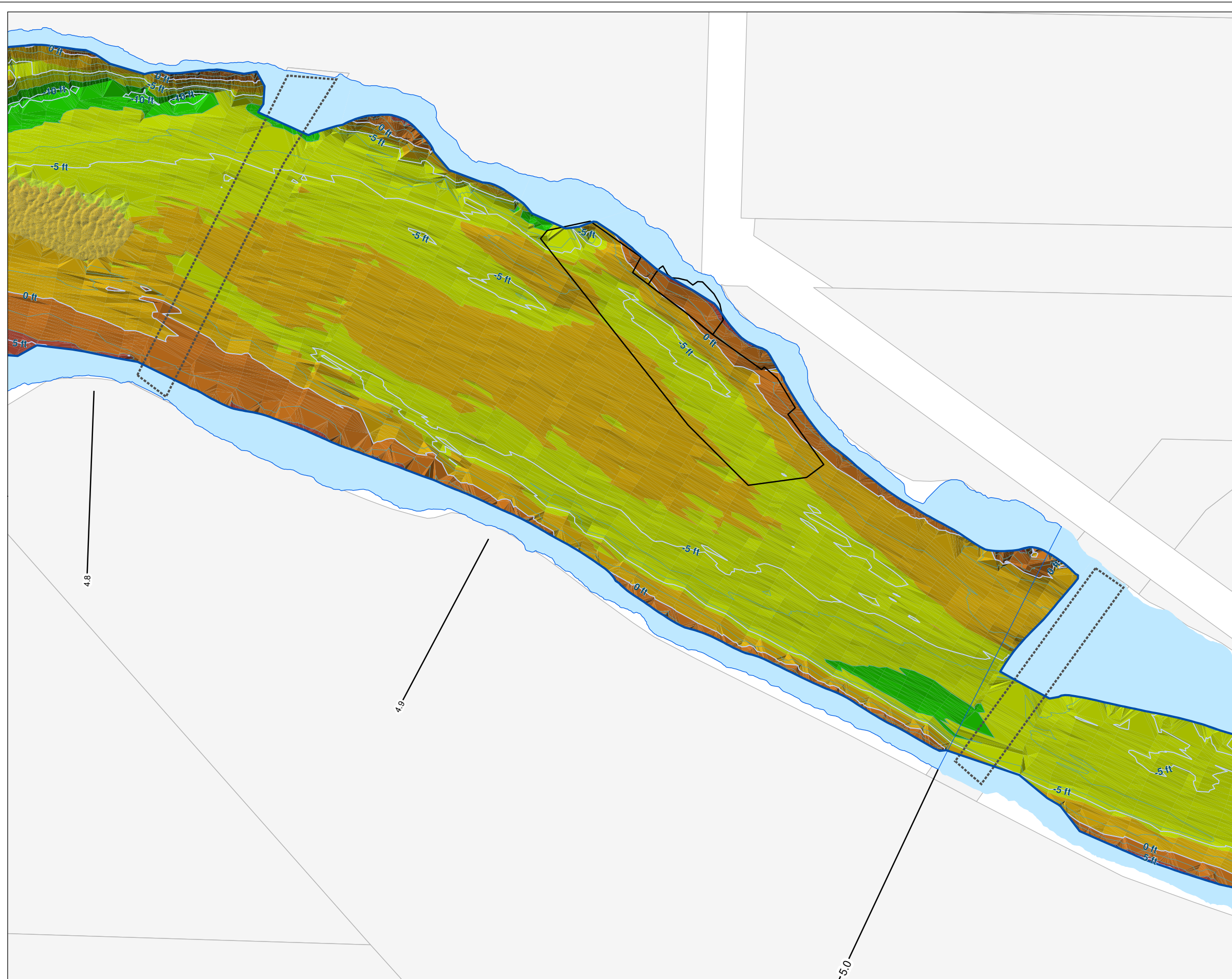
**Elevation (ft MLLW)**


















- > 4
- > 0 and ≤ 4
- > -4 and ≤ 0
- > -8 and ≤ -4
- > -12 and ≤ -8
- > -16 and ≤ -12
- > -20 and ≤ -16
- ≤ -20

Area not covered by bathymetric survey  
 Overwater structure  
 LDW Superfund Boundary  
 King County tax parcel  
 Navigation channel  
 River mile

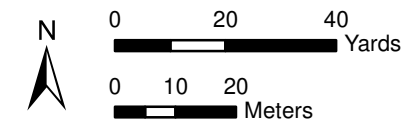
<sup>a</sup> The January 2020 USACE bathymetric survey covering the entirety of the Federal Navigation Channel was limited to the area dredged in 2018-2020.





-  2019 NW Hydro survey extent
- Bathymetry contours (feet MLLW)**
-  5 ft interval
-  1 ft interval
- Elevation (ft MLLW)**
-  > 4
-  > 0 and ≤ 4
-  > -4 and ≤ 0
-  > -8 and ≤ -4
-  > -12 and ≤ -8
-  > -16 and ≤ -12
-  > -20 and ≤ -16
-  ≤ -20
-  Area not covered by bathymetric survey
-  Overwater structure
-  Early Action Area
-  LDW Superfund Boundary
-  King County tax parcel
-  River mile

<sup>a</sup> The January 2020 USACE bathymetric survey covering the entirety of the Federal Navigation Channel was limited to the area dredged in 2018-2020.

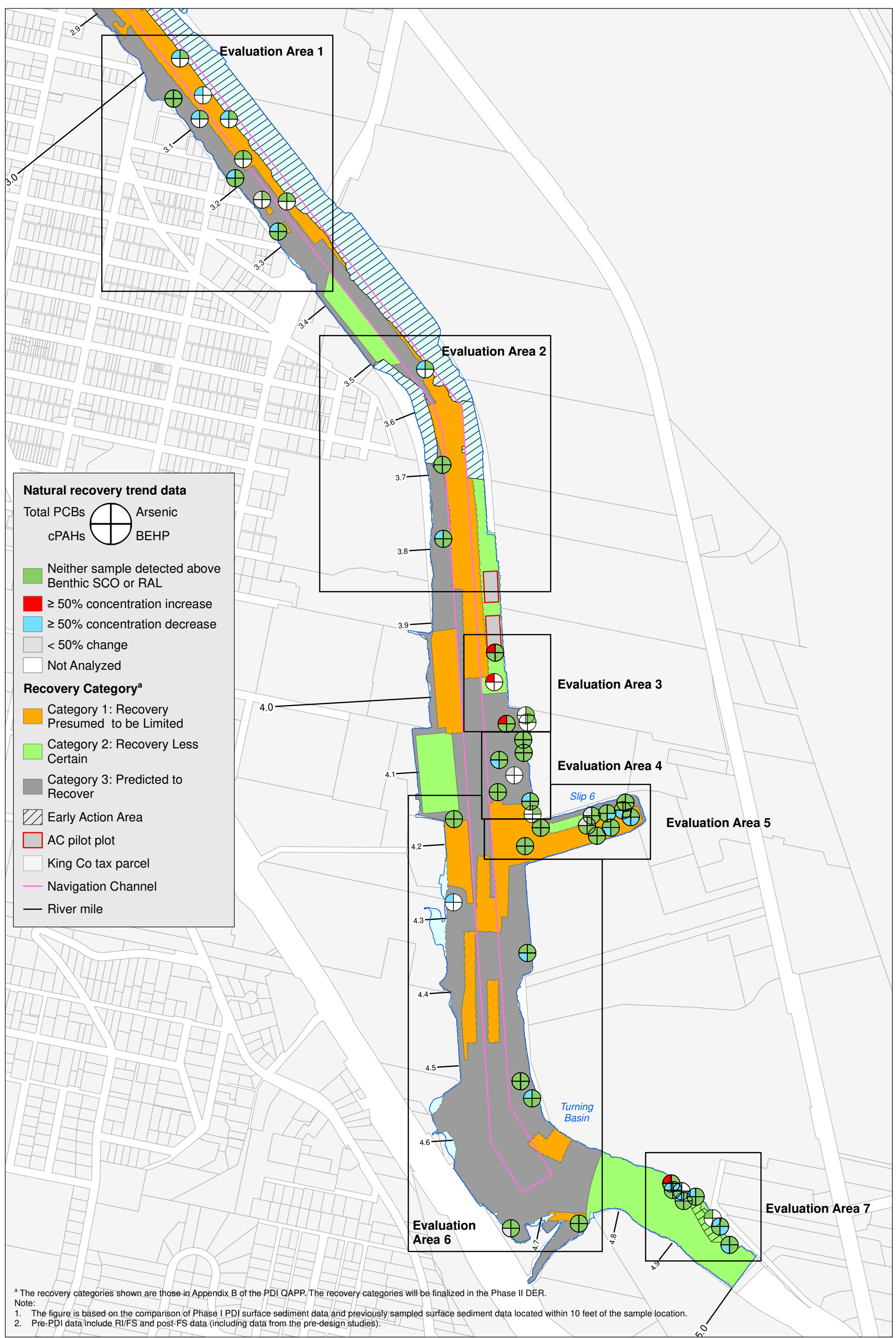


**Map B-2d. Bathymetric survey results (combined surveys), Segment 4 (RM 4.81 to RM 5.0)**

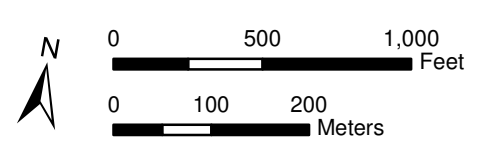
PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



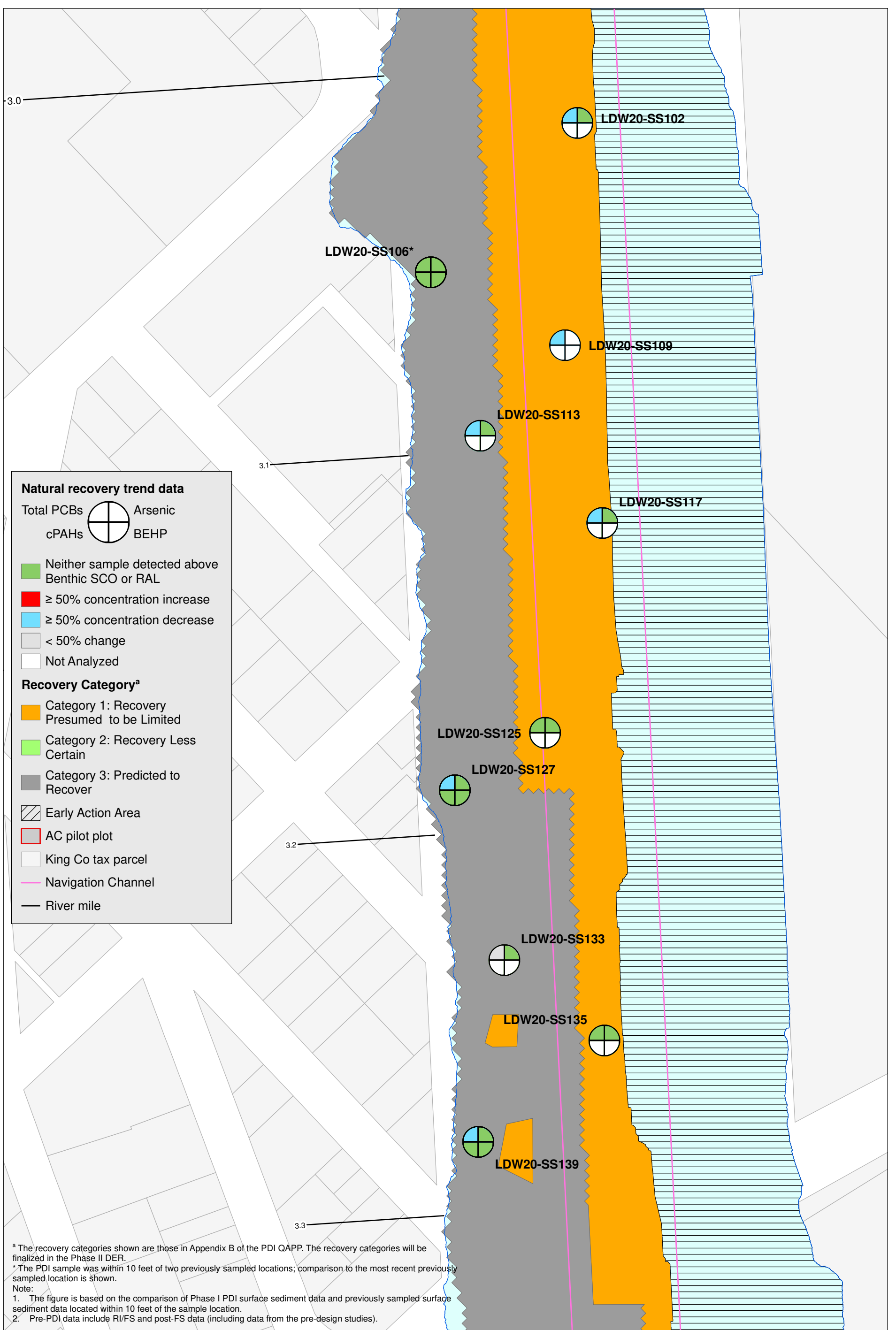
Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map\_C-01\_7246 Contaminant Trends.mxd



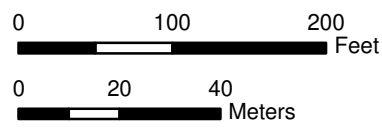
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 Note:  
 1. The figure is based on the comparison of Phase I PDI surface sediment data and previously sampled surface sediment data located within 10 feet of the sample location.  
 2. Pre-PDI data include RI/FS and post-FS data (including data from the pre-design studies).



**Map C-1. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

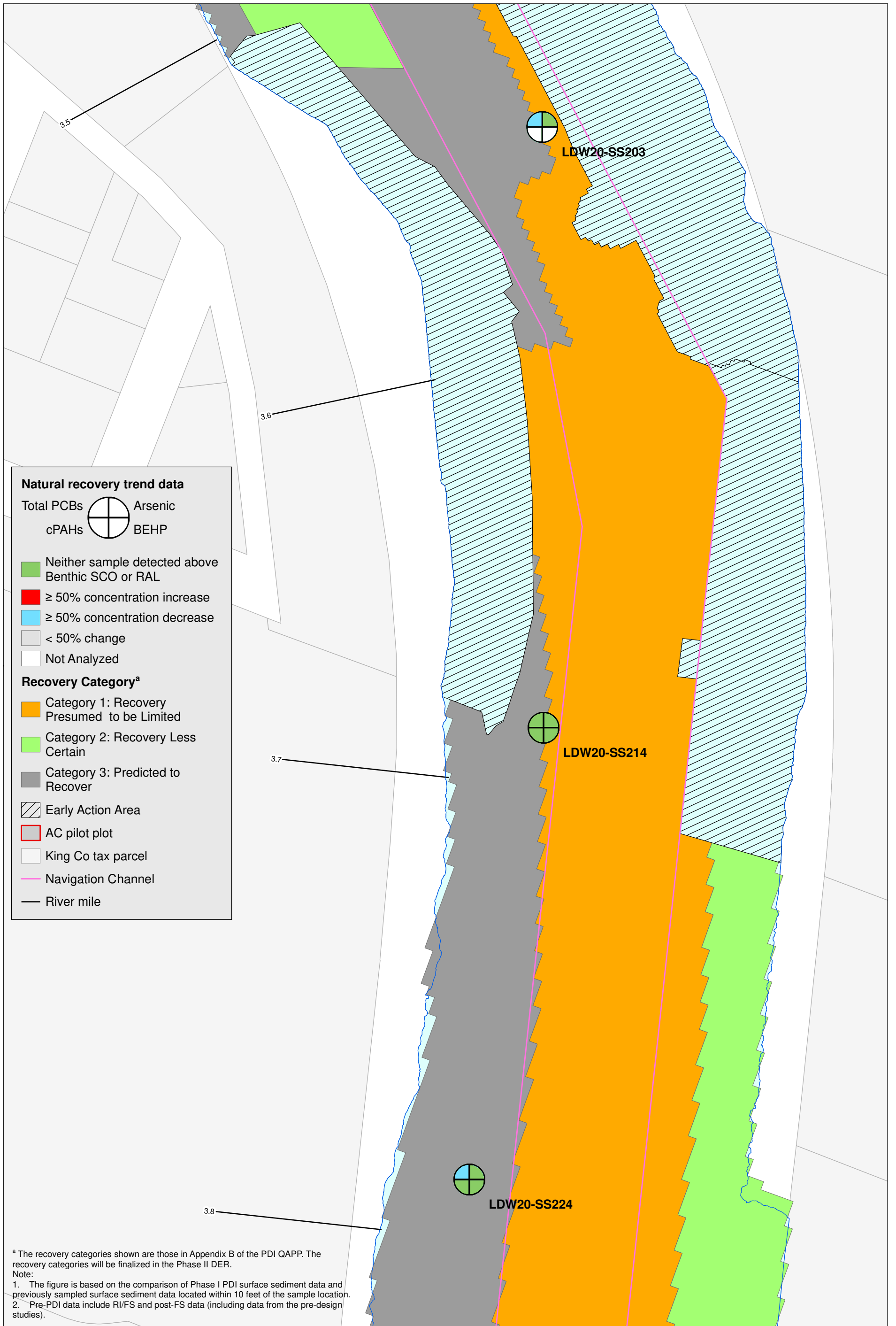


Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map\_C-02\_7246 Contaminant Trends - A1.mxd

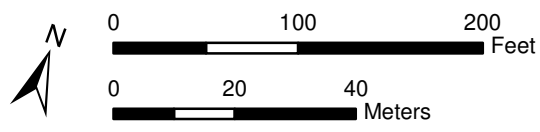


**Map C-2. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations - Evaluation Area 1**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



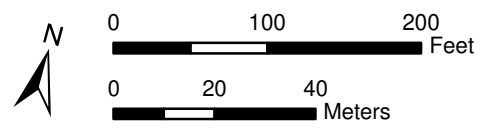
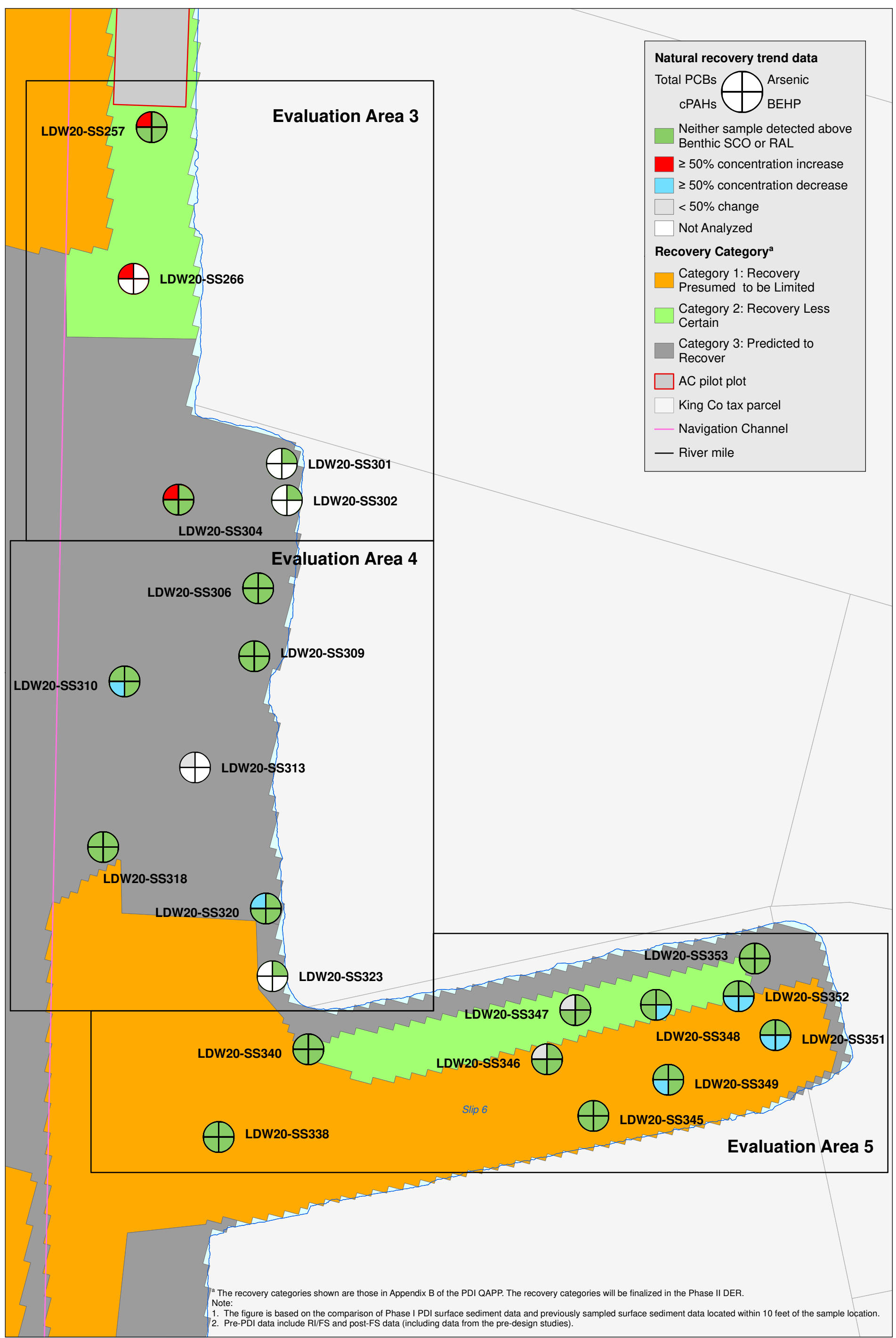
Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map\_C-03\_7246 Contaminant Trends - A2.mxd



**Map C-3. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations - Evaluation Area 2**

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 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map C-04 7246 Contaminant Trends - A3-4-5.mxd

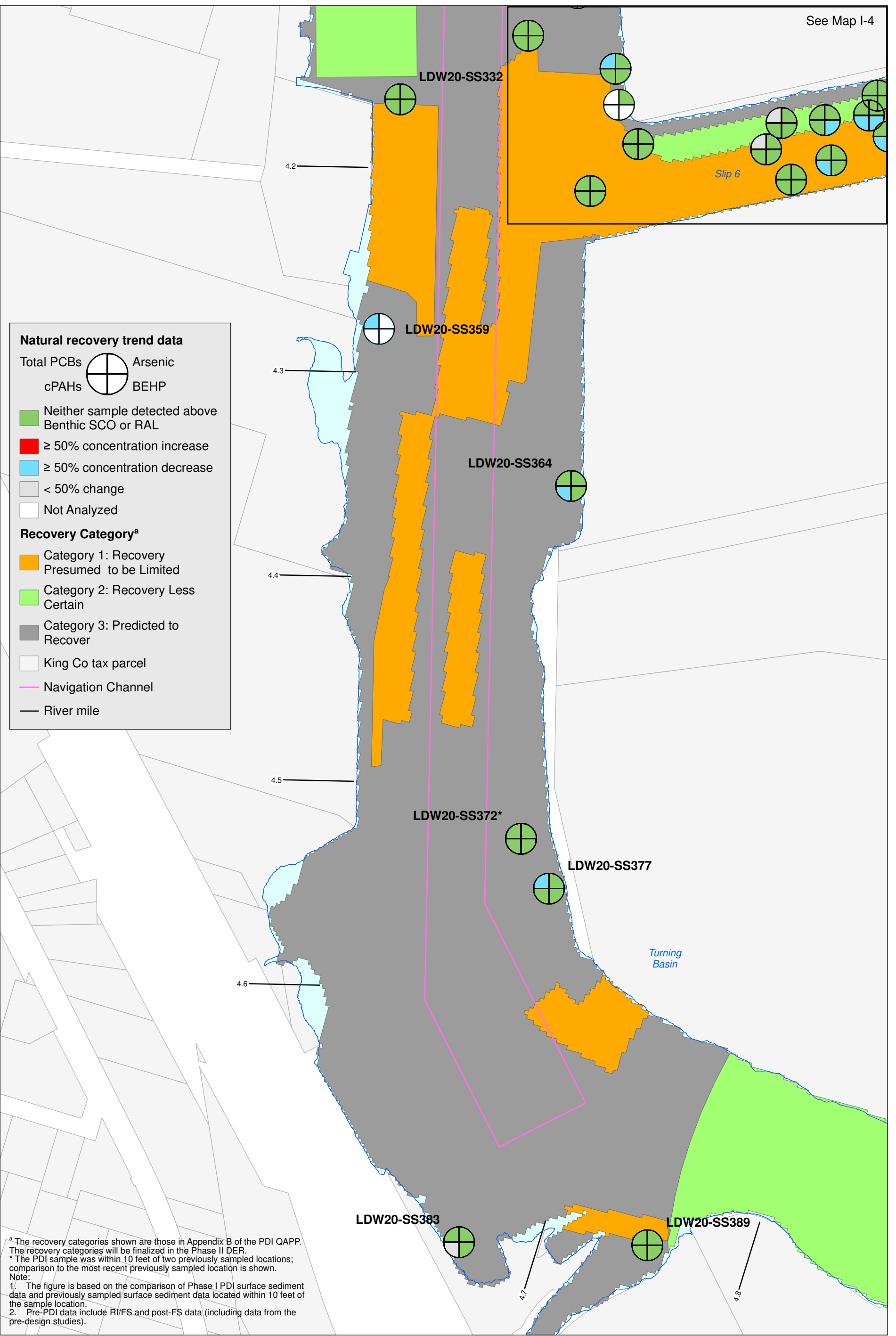


**Map C-4. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations - Evaluation Areas 3, 4, and 5**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



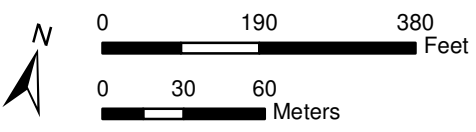
See Map I-4



<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 \* The PDI sample was within 10 feet of two previously sampled locations; comparison to the most recent previously sampled location is shown.  
 Note:  
 1. The figure is based on the comparison of Phase I PDI surface sediment data and previously sampled surface sediment data located within 10 feet of the sample location.  
 2. Pre-PDI data include RI/FS and post-FS data (including data from the pre-design studies).

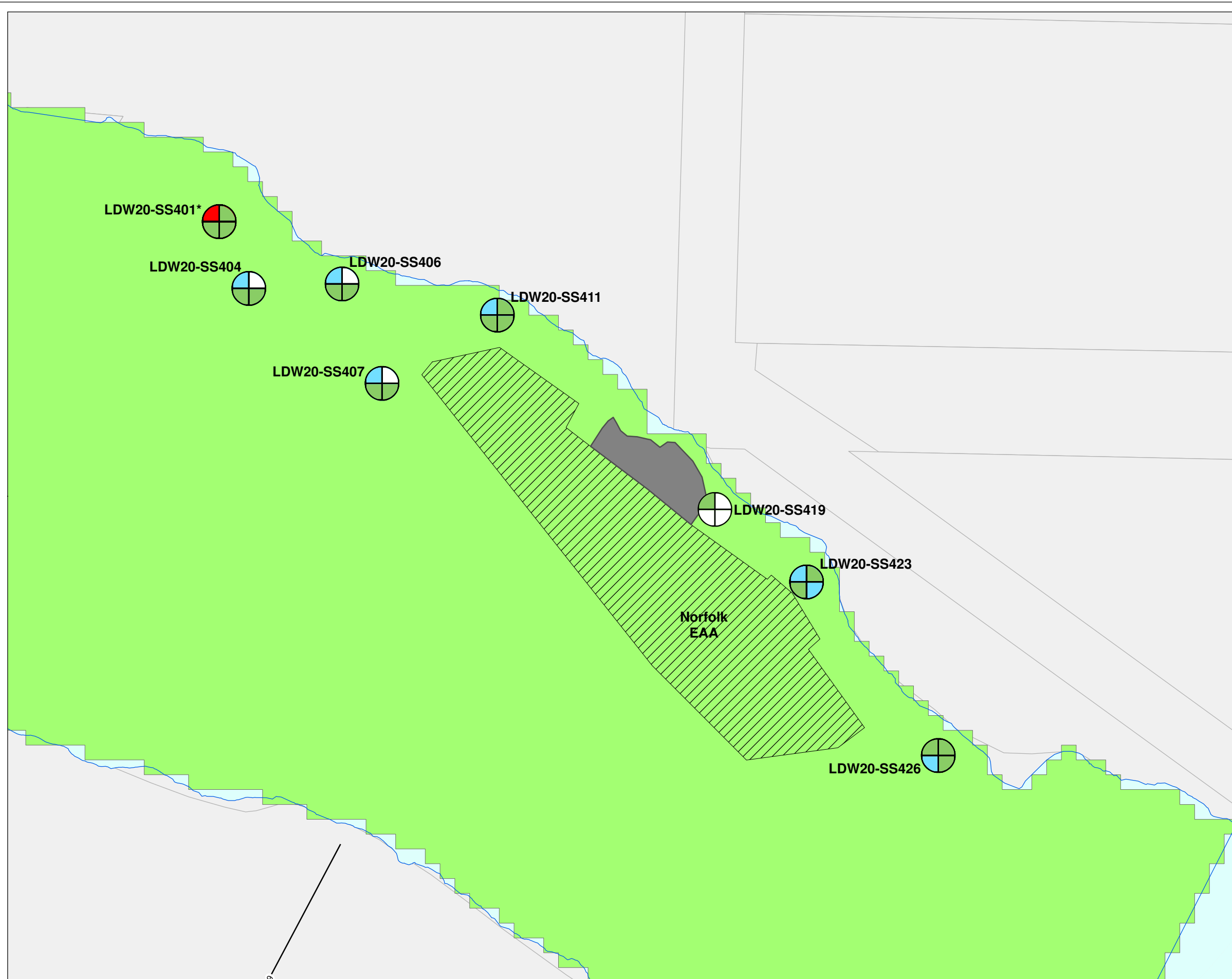


**Lower Duwamish Waterway Group**  
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


**Map C-6. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations - Evaluation Area 6**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map\_C-06\_7246 Contaminant Trends - A6.mxd








**Natural recovery trend data**

Total PCBs  Arsenic  
 cPAHs  BEHP

-  Neither sample detected above Benthic SCO or RAL
-  ≥ 50% concentration increase
-  ≥ 50% concentration decrease
-  < 50% change
-  Not

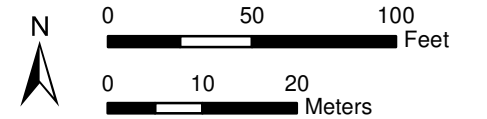
**Recovery Category<sup>a</sup>**

-  Category 2: Recovery Less Certain
-  Boeing South Storm Drain removal area
-  Early Action Area
-  King Co tax parcel
-  River mile

<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
 \* The PDI sample was within 10 feet of two previously sampled locations; comparison to the most recent previously sampled location is shown.

**Note:**

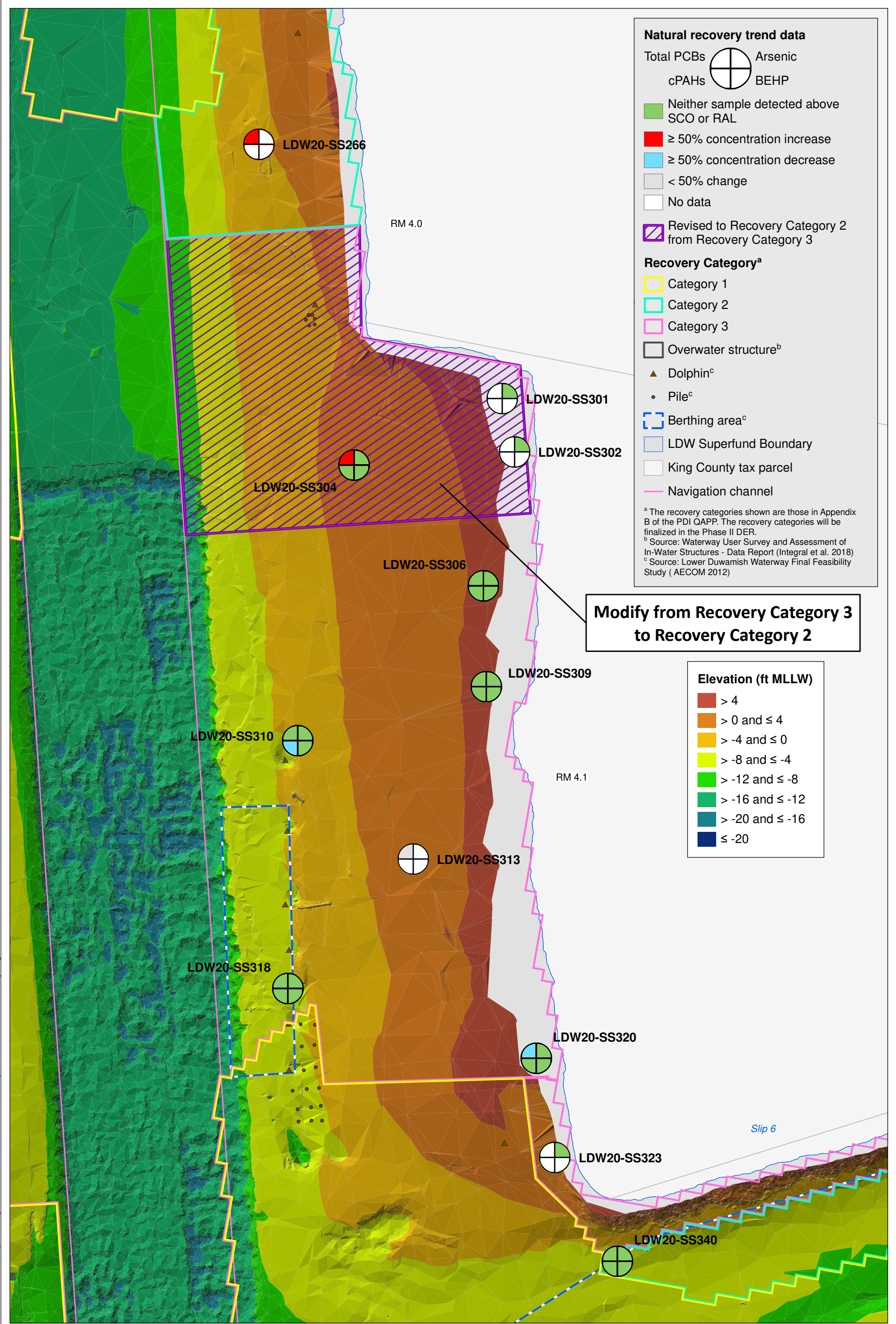
1. The figure is based on the comparison of Phase I PDI surface sediment data and previously sampled surface sediment data located within 10 feet of the sample location.
2. Pre-PDI data include RI/FS and post-FS data (including data from the pre-design studies).



**Map C-7. Comparison between Phase I PDI data and pre-PDI data at re-occupied locations - Evaluation Area 7**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH





**Natural recovery trend data**

Total PCBs Arsenic  
 cPAHs BEHP

Neither sample detected above SCO or RAL  
 ≥ 50% concentration increase  
 ≥ 50% concentration decrease  
 < 50% change  
 No data

Revised to Recovery Category 2 from Recovery Category 3

**Recovery Category<sup>a</sup>**

Category 1  
 Category 2  
 Category 3

Overwater structure<sup>b</sup>  
 Dolphin<sup>c</sup>  
 Pile<sup>c</sup>  
 Berthing area<sup>c</sup>  
 LDW Superfund Boundary  
 King County tax parcel  
 Navigation channel

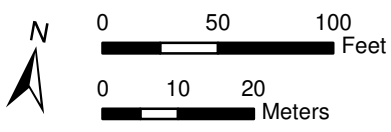
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.  
<sup>b</sup> Source: Waterway User Survey and Assessment of In-Water Structures - Data Report (Integral et al. 2018)  
<sup>c</sup> Source: Lower Duwamish Waterway Final Feasibility Study (AECOM 2012)

**Modify from Recovery Category 3 to Recovery Category 2**

**Elevation (ft MLLW)**

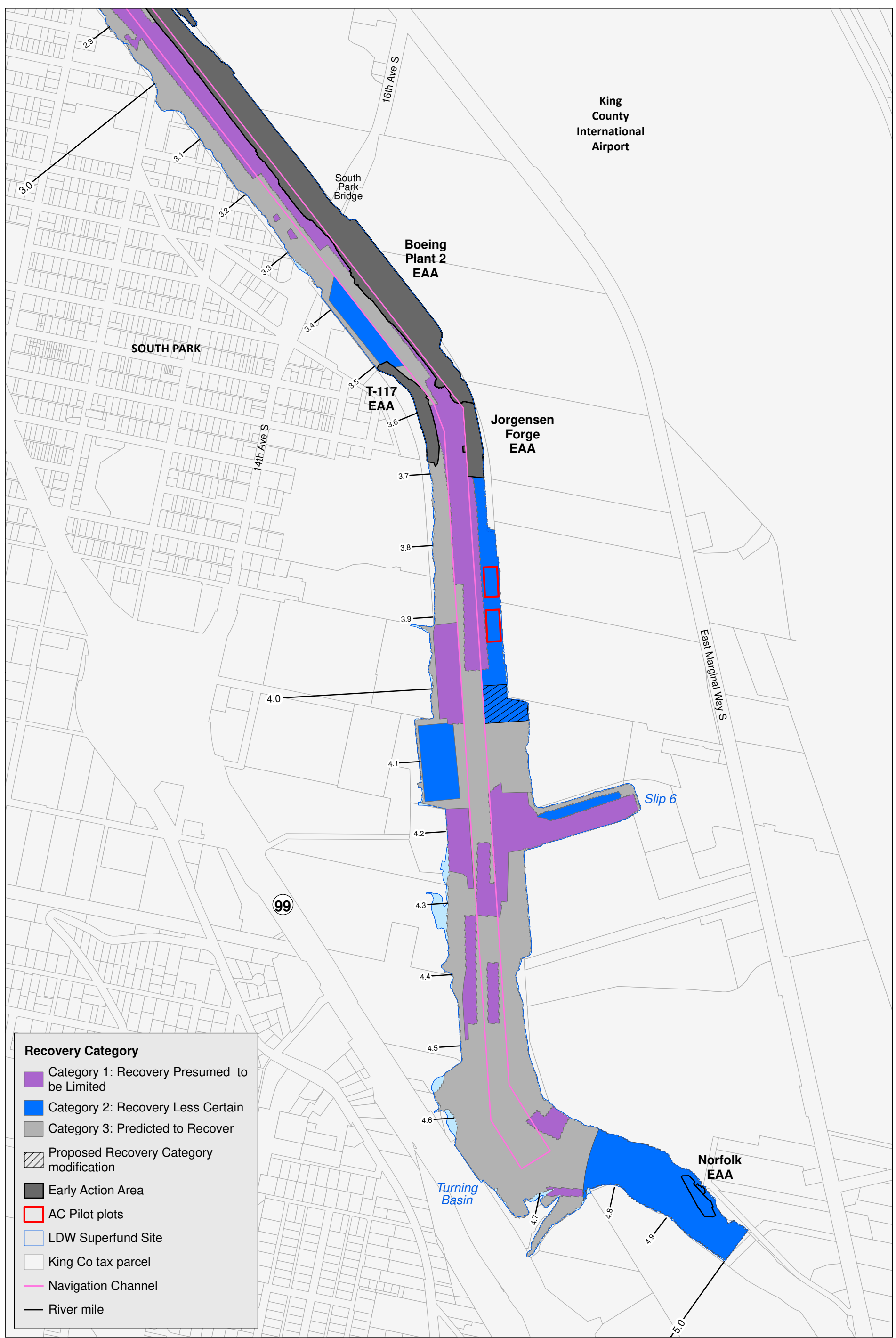
> 4  
 > 0 and ≤ 4  
 > -4 and ≤ 0  
 > -8 and ≤ -4  
 > -12 and ≤ -8  
 > -16 and ≤ -12  
 ≤ -20

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment C\Map\_C-08\_7109 Recommended recovery categories - A4.mxd



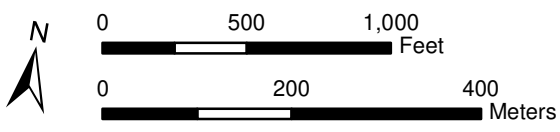


Prepared by craigh. 6/28/21: W:\Projects\Duwamish ACCA\GIS\Maps and Analysis\Phase II\QAPP Addendum\Attachment C\Map\_C-09 7109 Proposed recovery categories.mxd



**Recovery Category**

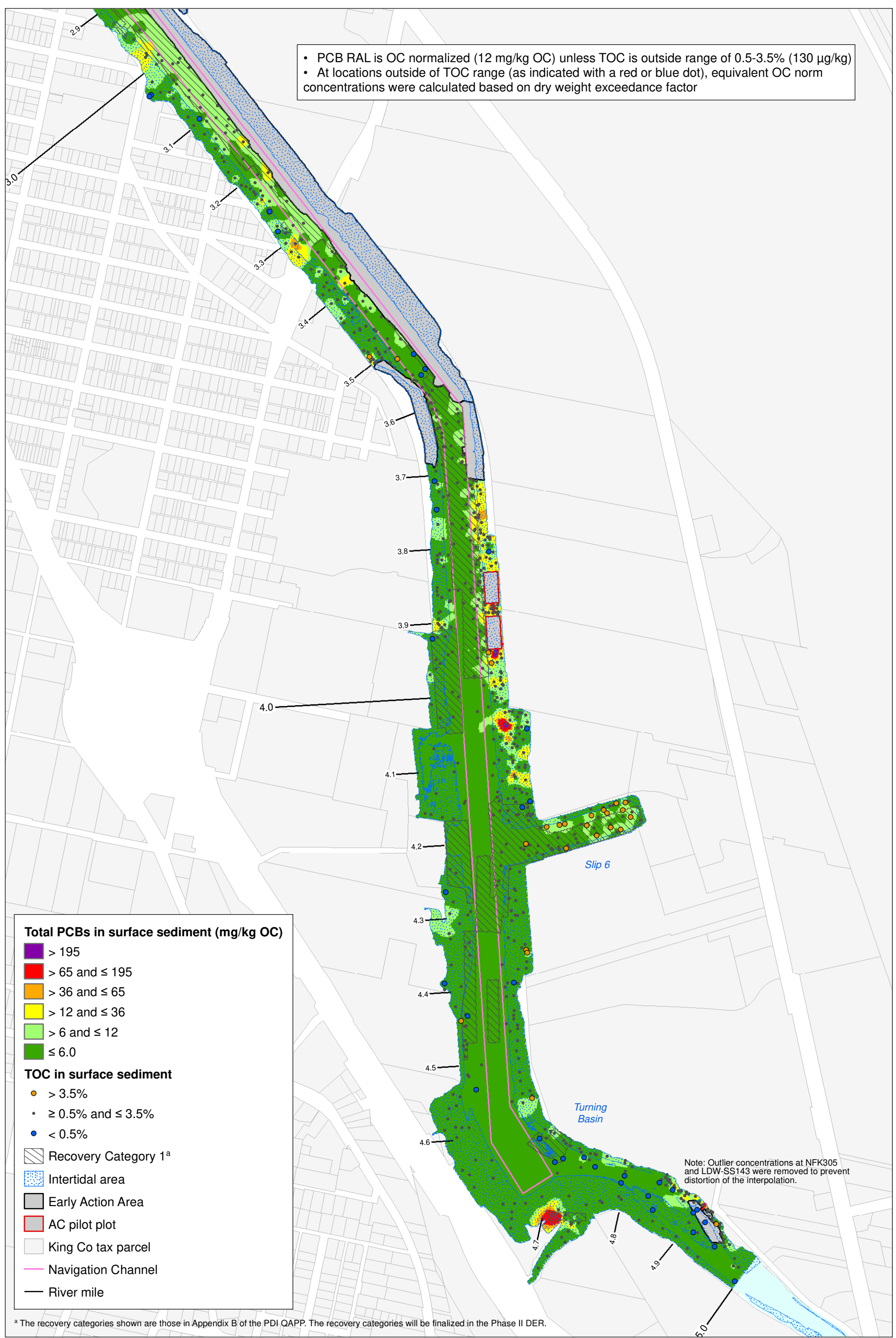
- Category 1: Recovery Presumed to be Limited
- Category 2: Recovery Less Certain
- Category 3: Predicted to Recover
- Proposed Recovery Category modification
- Early Action Area
- AC Pilot plots
- LDW Superfund Site
- King Co tax parcel
- Navigation Channel
- River mile



**Map C-9. Updated recovery categories for the upper reach**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

- PCB RAL is OC normalized (12 mg/kg OC) unless TOC is outside range of 0.5-3.5% (130 µg/kg)
- At locations outside of TOC range (as indicated with a red or blue dot), equivalent OC norm concentrations were calculated based on dry weight exceedance factor



**Total PCBs in surface sediment (mg/kg OC)**

- > 195
- > 65 and ≤ 195
- > 36 and ≤ 65
- > 12 and ≤ 36
- > 6 and ≤ 12
- ≤ 6.0

**TOC in surface sediment**

- > 3.5%
- ≥ 0.5% and ≤ 3.5%
- < 0.5%

- Recovery Category 1<sup>a</sup>
- Intertidal area
- Early Action Area
- AC pilot plot
- King Co tax parcel
- Navigation Channel
- River mile

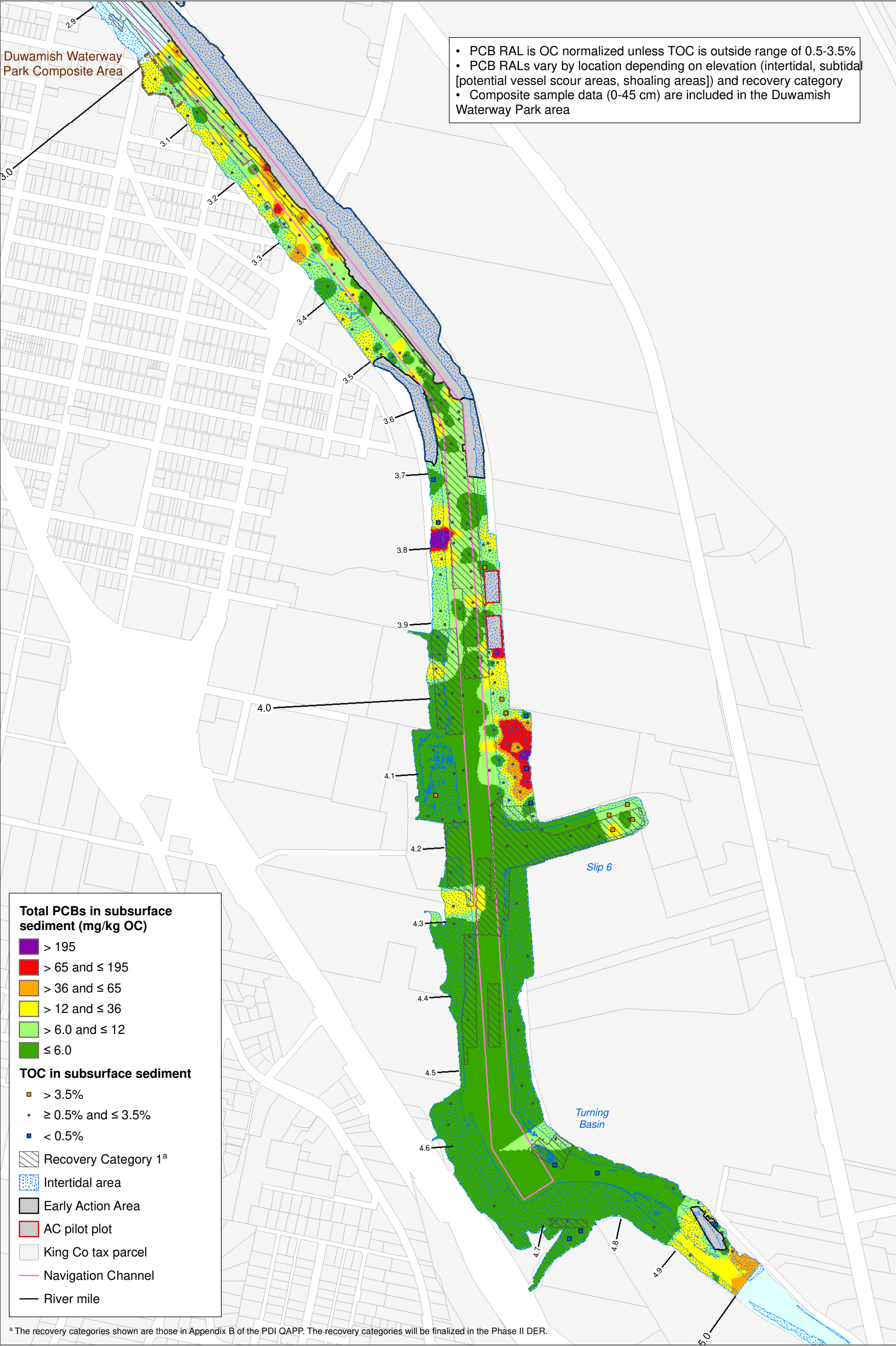
Note: Outlier concentrations at NFK305 and LDW-SS143 were removed to prevent distortion of the interpolation.

<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Prepared by craigh. 6/28/21: W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-1 7216 Surfised total PCB OCnorm IDW.mxd



- PCB RAL is OC normalized unless TOC is outside range of 0.5-3.5%
- PCB RALs vary by location depending on elevation (intertidal, subtidal [potential vessel scour areas, shoaling areas]) and recovery category
- Composite sample data (0-45 cm) are included in the Duwamish Waterway Park area



**Total PCBs in subsurface sediment (mg/kg OC)**

- > 195
- > 65 and ≤ 195
- > 36 and ≤ 65
- > 12 and ≤ 36
- > 6.0 and ≤ 12
- ≤ 6.0

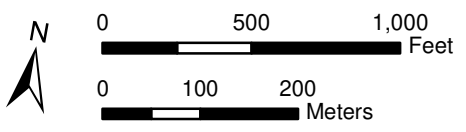
**TOC in subsurface sediment**

- > 3.5%
- ≥ 0.5% and ≤ 3.5%
- < 0.5%

Recovery Category 1<sup>a</sup>  
 Intertidal area  
 Early Action Area  
 AC pilot plot  
 King Co tax parcel  
 Navigation Channel  
 River mile

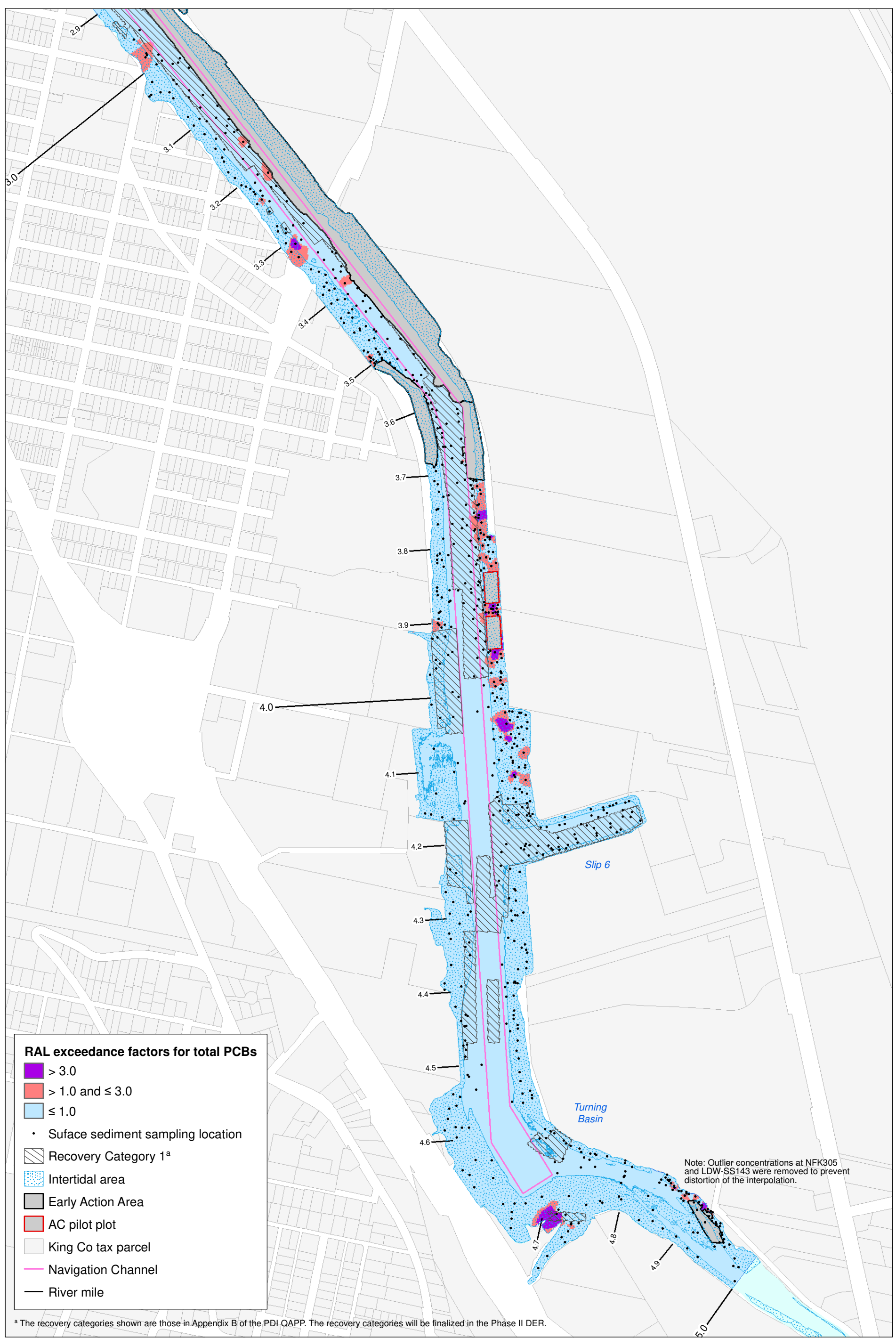
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Prepared by craigh. 6/28/21: W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-2 7216 Subsurf total PCB OCnorm IDW.mxd



**Map E-2. IDW interpolation of total PCB concentrations (mg/kg OC) in subsurface sediment**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

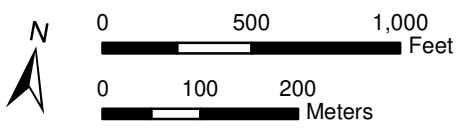


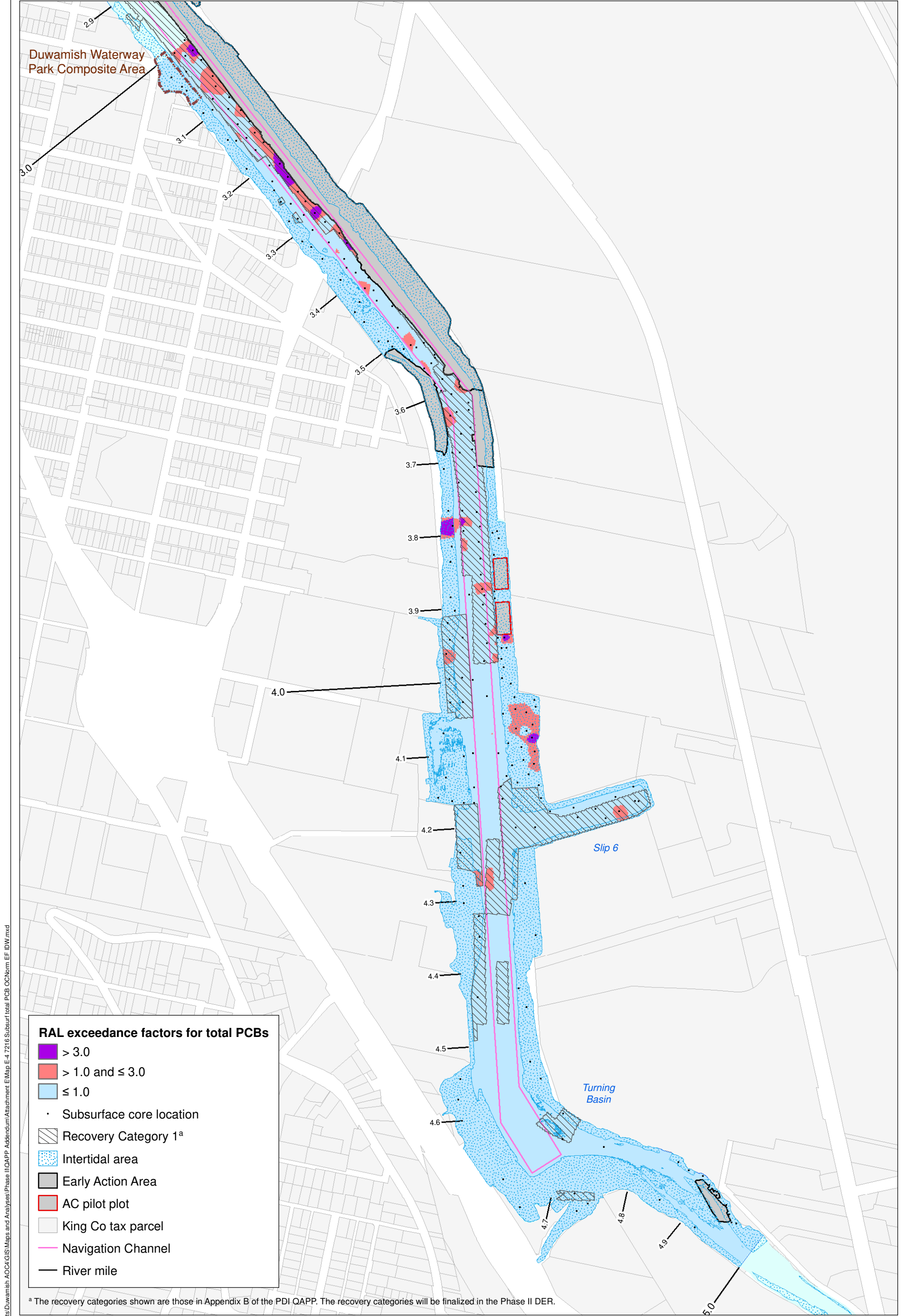
**RAL exceedance factors for total PCBs**

- > 3.0
- > 1.0 and ≤ 3.0
- ≤ 1.0
- Surface sediment sampling location
- Recovery Category 1<sup>a</sup>
- Intertidal area
- Early Action Area
- AC pilot plot
- King Co tax parcel
- Navigation Channel
- River mile

Note: Outlier concentrations at NFK305 and LDW-SS143 were removed to prevent distortion of the interpolation.

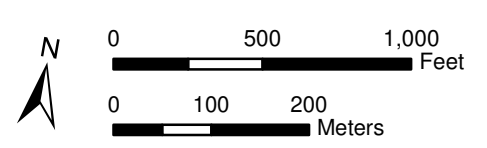
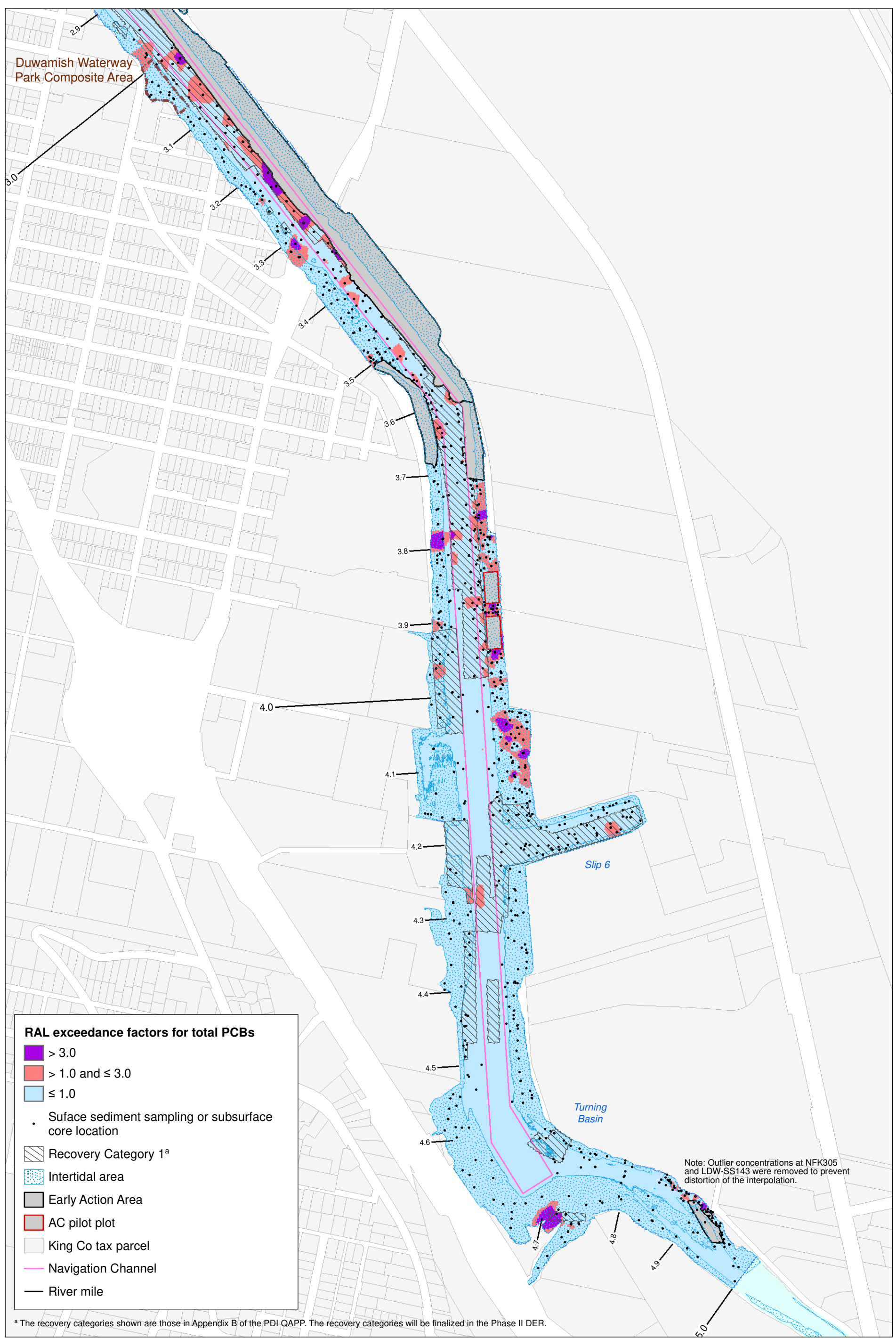
<sup>a</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

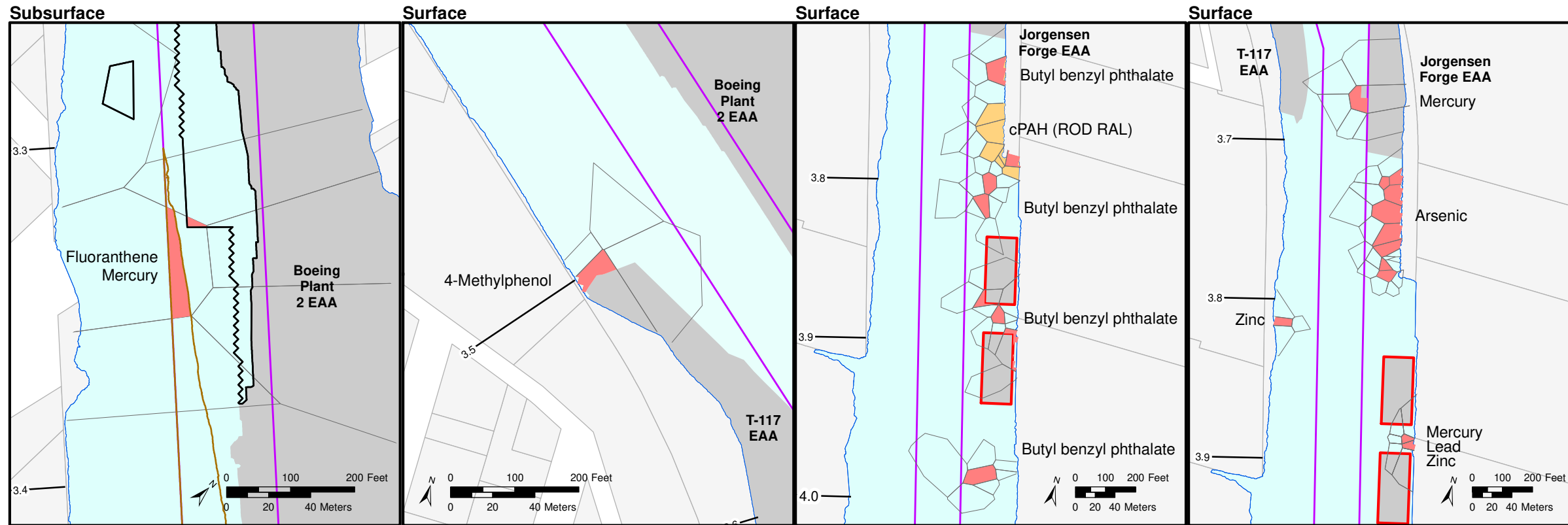




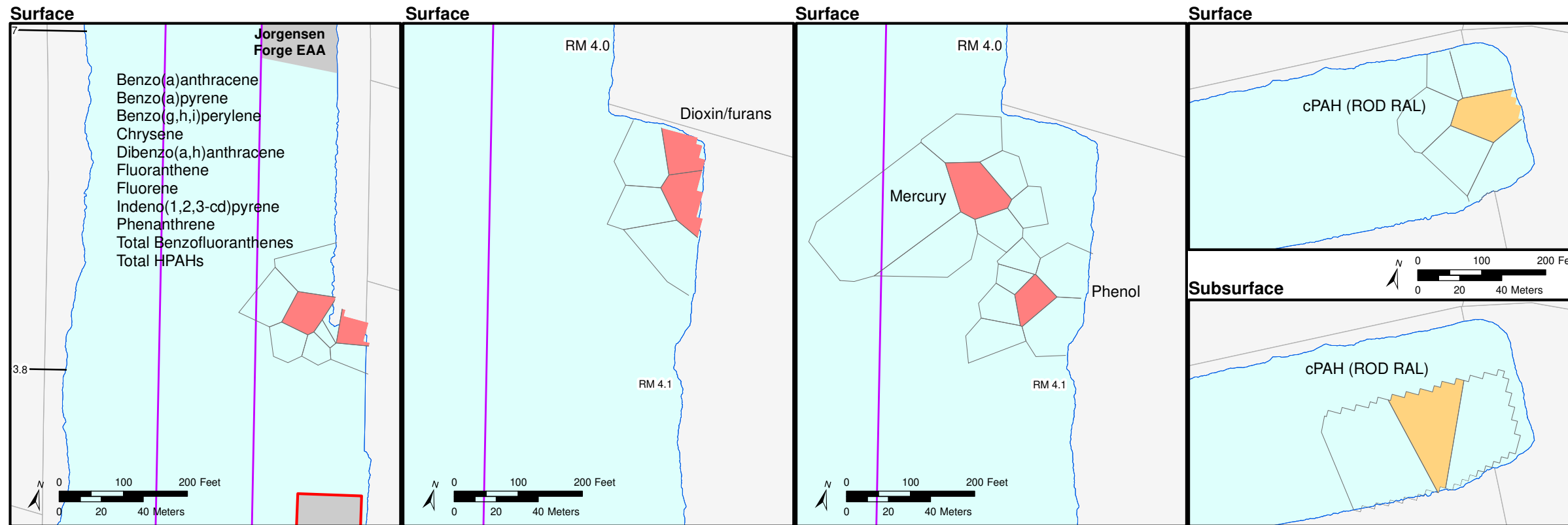
Prepared by craigh. 6/28/21: W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-4 7216 Subsurf total PCB CCHNorm EF IDW.mxd

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\AOC4\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-5 7216 Combined total PCB EF IDW.mxd



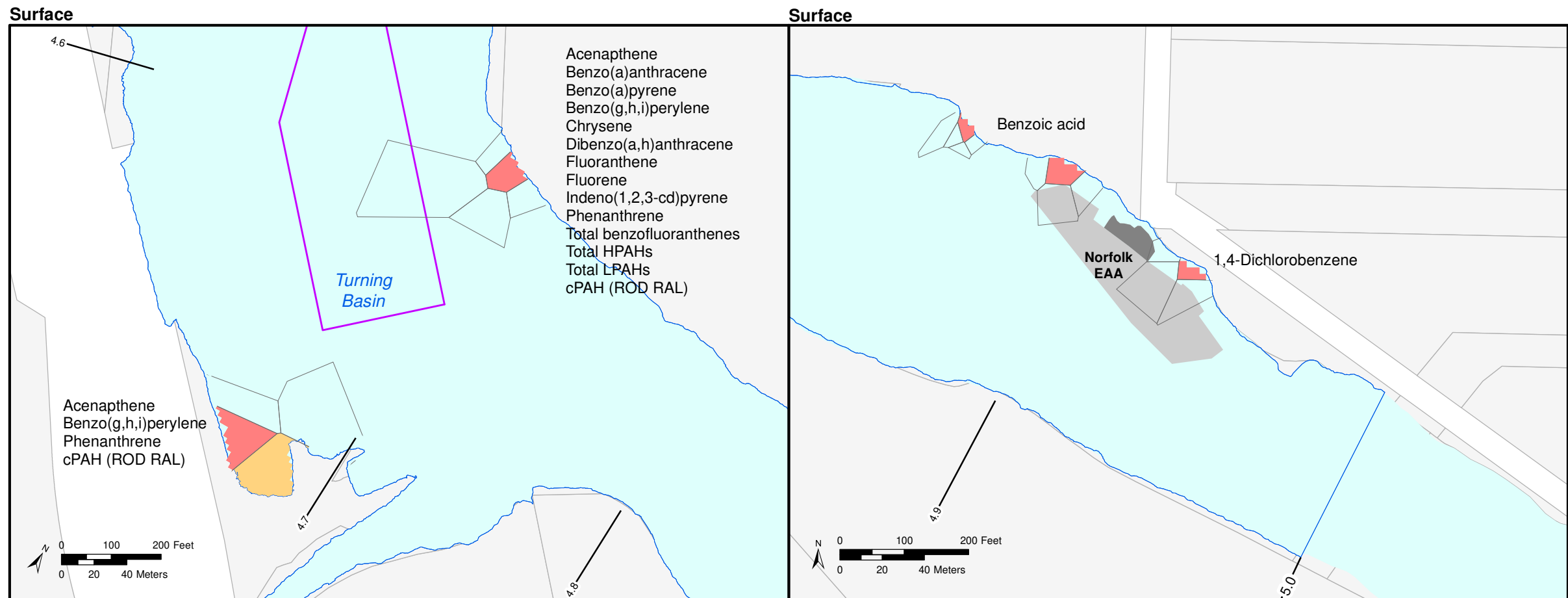
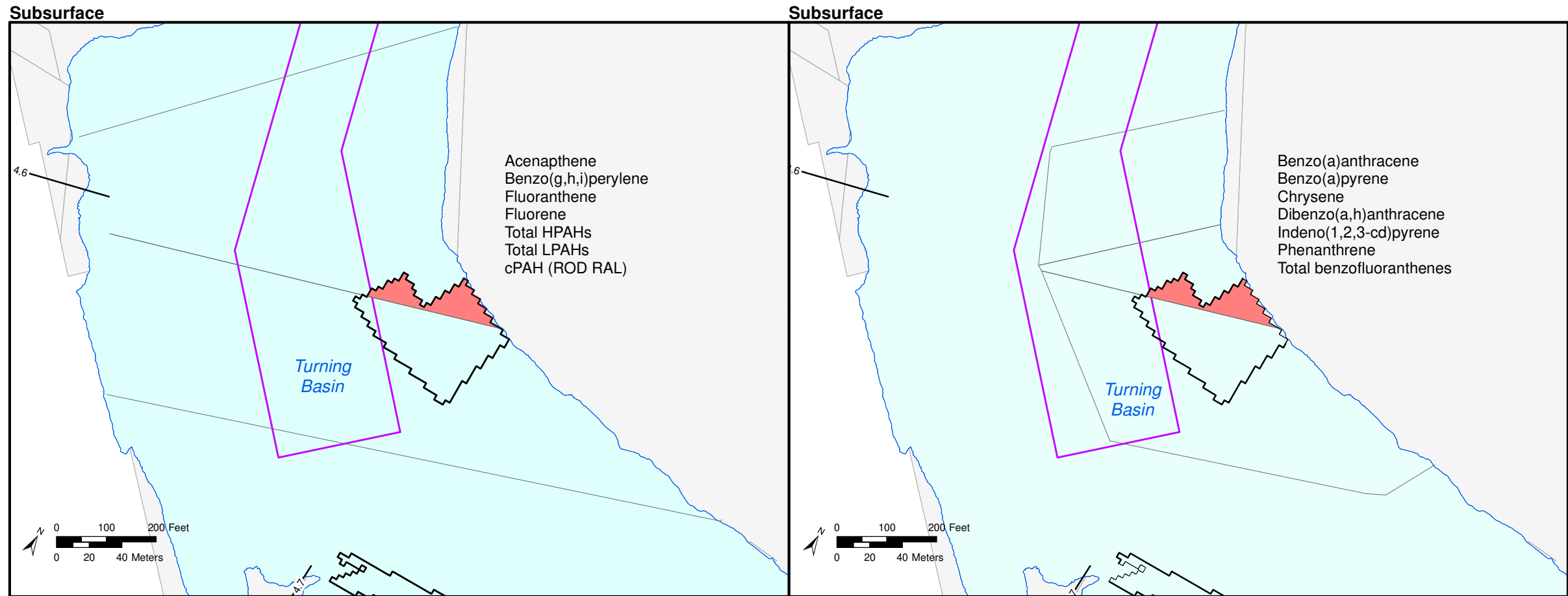


- Thiessen polygon with RAL exceedances<sup>a</sup>
- cPAH Thiessen polygon with RAL exceedance using the ROD RAL<sup>a</sup>
- Non-exceedance Thiessen polygon bounding the RAL exceedance polygons<sup>a</sup>
- Recovery Category 1
- Shoal area
- Early Action Area
- AC Pilot plot
- LDW Superfund Boundary
- King Co tax parcel
- Navigation Channel
- River mile



<sup>a</sup> Thiessen polygon shapes vary between chemicals and sampling depth. For clarity, bounding polygons are limited to those immediately surrounding the RAL exceedance polygons, and RAL exceedance polygons and bounding polygons that have the same pattern are grouped together.

**Map E-6a. Thiessen polygons with RAL exceedances of COCs other than PCBs, RM 3.0 to RM 4.1**  
PRE-DESIGN INVESTIGATION PHASE II QAPP ADDENDUM FOR THE LDW UPPER REACH



- Thiessen polygon with RAL exceedances<sup>a</sup>
- cPAH Thiessen polygon with RAL exceedance using the ROD RAL<sup>a</sup>
- Non-exceedance Thiessen polygon bounding the RAL exceedance polygons<sup>a</sup>
- Recovery Category 1
- Early Action Area
- Boeing South Storm Drain
- LDW Superfund Boundary
- King Co tax parcel
- Navigation Channel
- River mile

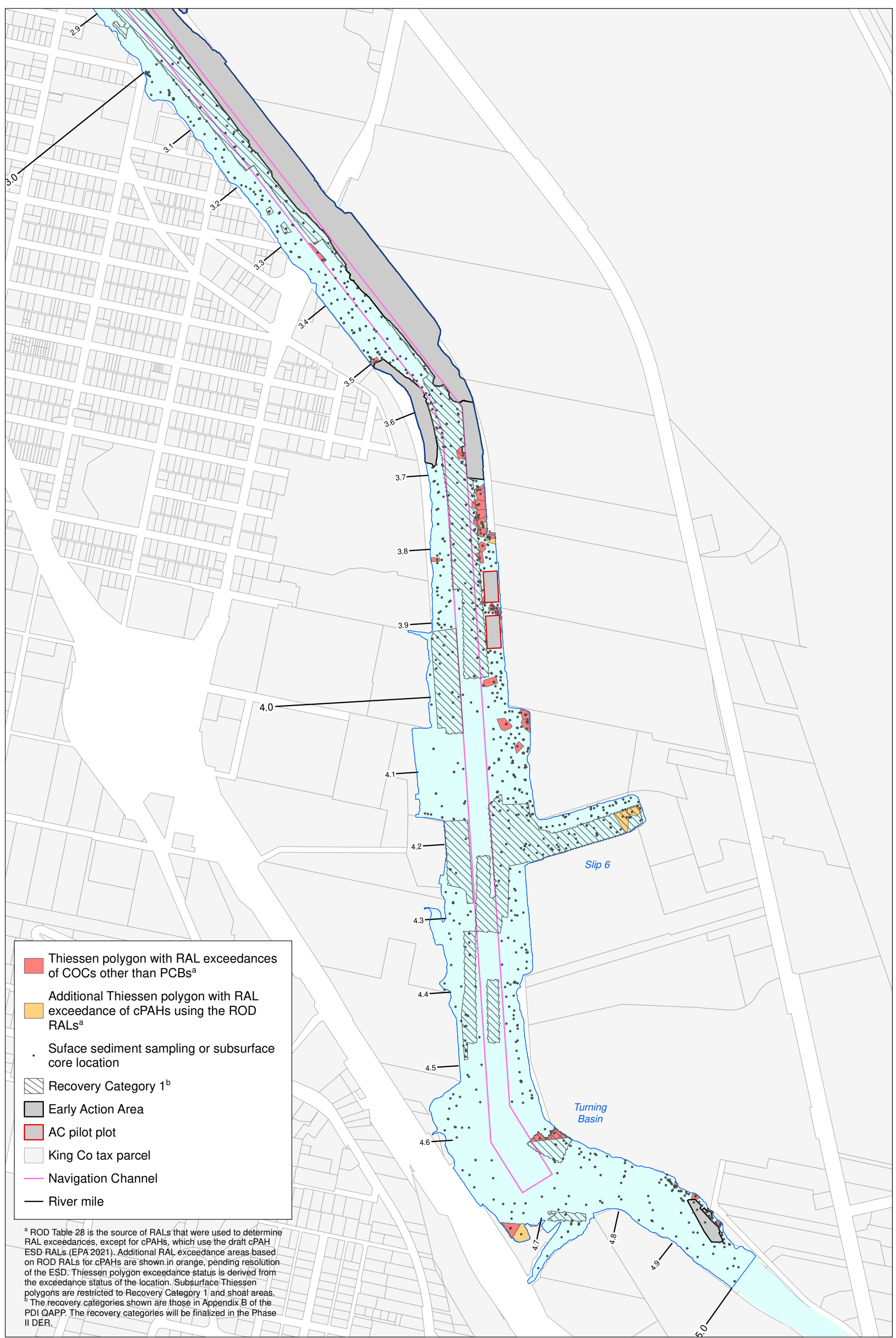
<sup>a</sup> Thiessen polygon shapes vary between chemicals and sampling depth. For clarity, bounding polygons are limited to those immediately surrounding the RAL exceedance polygons, and RAL exceedance polygons and bounding polygons that have the same pattern are grouped together.

**Map E-6b. Thiessen polygons with RAL exceedances of COCs other than PCBs, RM 4.1 to RM 5.0**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH

Prepared by cragh, 6/28/21; W:\Projects\Duwamish AOC\GIS\Maps and Analysis\Phase II\QAPP Addendum\Attachment E\Map E-6b Thiessen polygon extents.mxd

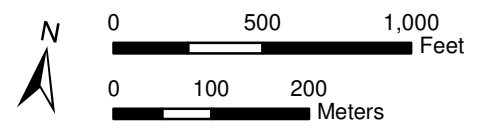


Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-7 7220 Surfaced non-PCB ThiPoly.mxd

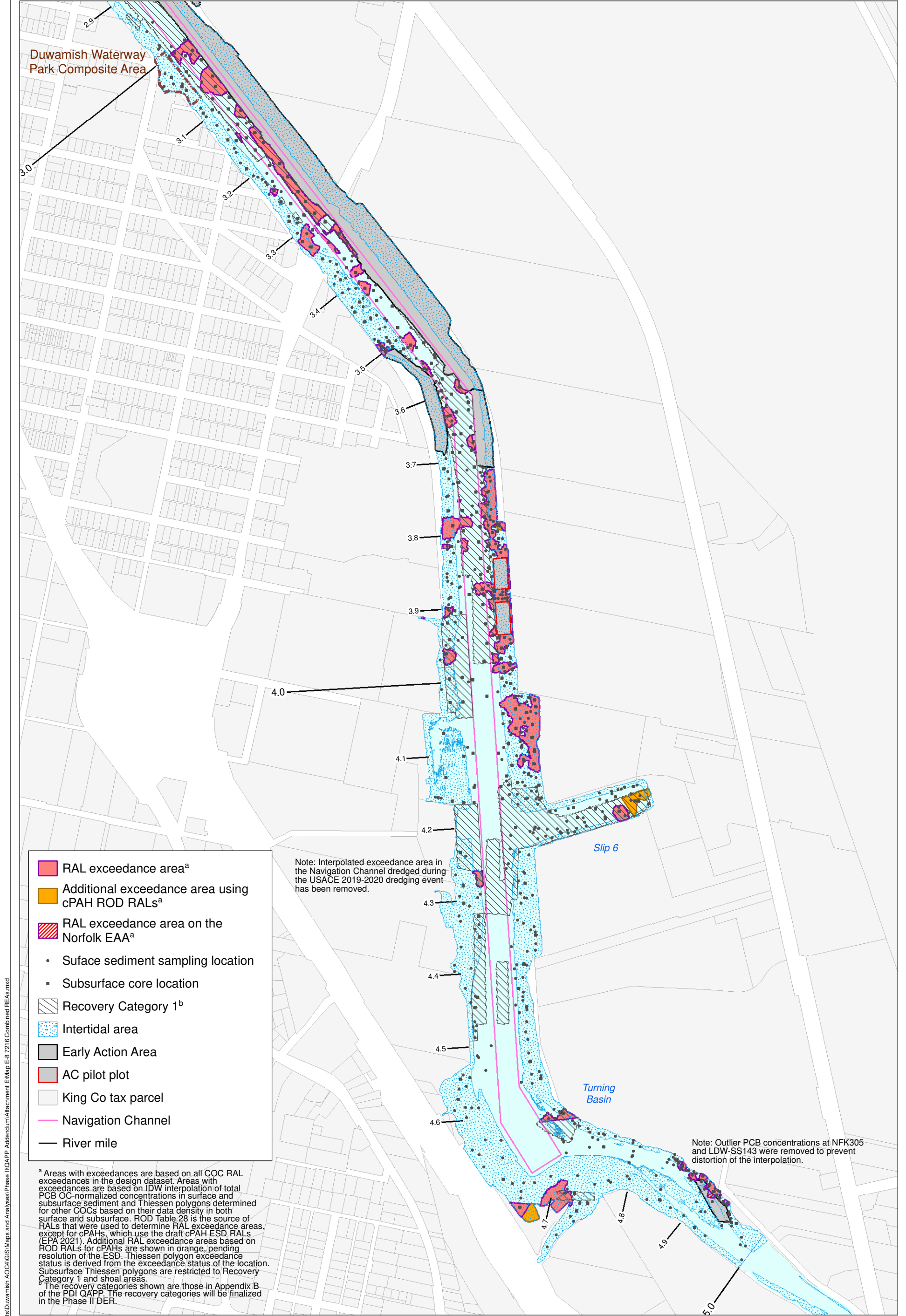


- Thiessen polygon with RAL exceedances of COCs other than PCBs<sup>a</sup>
- Additional Thiessen polygon with RAL exceedance of cPAHs using the ROD RALs<sup>a</sup>
- Surface sediment sampling or subsurface core location
- Recovery Category 1<sup>b</sup>
- Early Action Area
- AC pilot plot
- King Co tax parcel
- Navigation Channel
- River mile

<sup>a</sup> ROD Table 28 is the source of RALs that were used to determine RAL exceedances, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD. Thiessen polygon exceedance status is derived from the exceedance status of the location. Subsurface Thiessen polygons are restricted to Recovery Category 1 and shoal areas.  
<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.



**Map E-7. RAL exceedance areas based on Thiessen Polygons combined for all COCs other than PCBs**  
 PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



- RAL exceedance area<sup>a</sup>
- Additional exceedance area using cPAH ROD RALs<sup>a</sup>
- RAL exceedance area on the Norfolk EAA<sup>a</sup>
- Surface sediment sampling location
- Subsurface core location
- Recovery Category 1<sup>b</sup>
- Intertidal area
- Early Action Area
- AC pilot plot
- King Co tax parcel
- Navigation Channel
- River mile

Note: Interpolated exceedance area in the Navigation Channel dredged during the USACE 2019-2020 dredging event has been removed.

Note: Outlier PCB concentrations at NFK305 and LDW-SS143 were removed to prevent distortion of the interpolation.

<sup>a</sup> Areas with exceedances are based on all COC RAL exceedances in the design dataset. Areas with exceedances are based on IDW interpolation of total PCB OC-normalized concentrations in surface and subsurface sediment and Thiessen polygons determined for other COCs based on their data density in both surface and subsurface. ROD Table 28 is the source of RALs that were used to determine RAL exceedance areas, except for cPAHs, which use the draft cPAH ESD RALs (EPA 2021). Additional RAL exceedance areas based on ROD RALs for cPAHs are shown in orange, pending resolution of the ESD. Thiessen polygon exceedance status is derived from the exceedance status of the location. Subsurface Thiessen polygons are restricted to Recovery Category 1 and shoal areas.

<sup>b</sup> The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

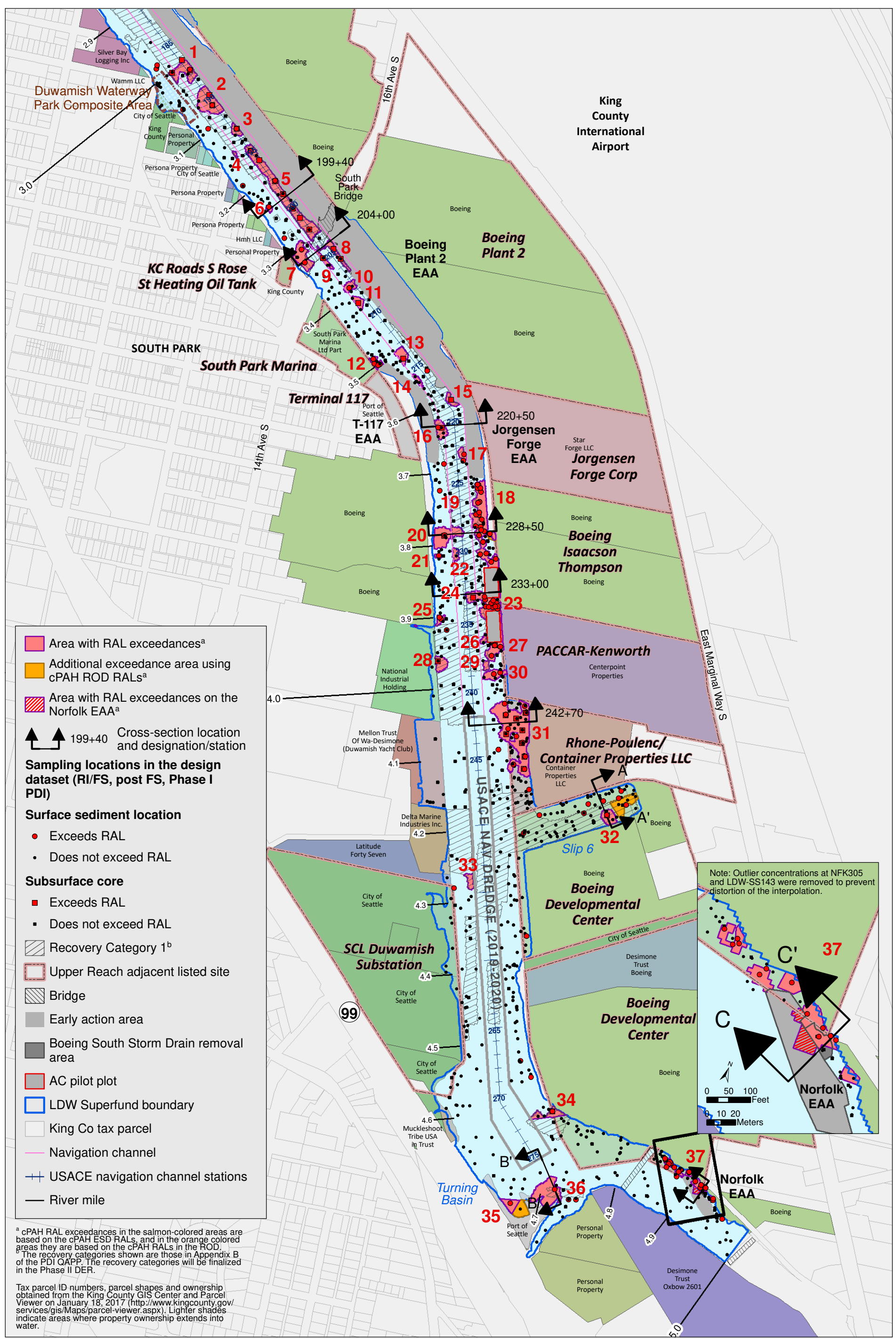


**Map E-8. Areas with RAL exceedances based on the design dataset**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH

Prepared by craigh. 6/28/21. W:\Projects\Duwamish\ACCA\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment E\Map E-8 7216 Combined REAs.mxd

Prepared by craigh. 6/28/21. W:\Projects\Duwamish AOC\GIS\Maps and Analyses\Phase II\QAPP Addendum\Attachment F\Map F-1a 7/29/21 Prelim RAL exceedance areas w/PropOwnership.pxd



**Area with RAL exceedances<sup>a</sup>**

**Additional exceedance area using cPAH ROD RALs<sup>a</sup>**

**Area with RAL exceedances on the Norfolk EAA<sup>a</sup>**

**↑ 199+40 Cross-section location and designation/station**

**Sampling locations in the design dataset (RI/FS, post FS, Phase I PDI)**

**Surface sediment location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core**

- Exceeds RAL
- Does not exceed RAL

▨ Recovery Category 1<sup>b</sup>

▭ Upper Reach adjacent listed site

▭ Bridge

▭ Early action area

▭ Boeing South Storm Drain removal area

▭ AC pilot plot

▭ LDW Superfund boundary

▭ King Co tax parcel

▭ Navigation channel

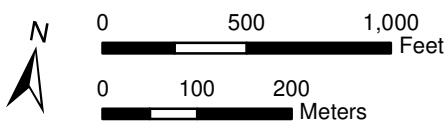
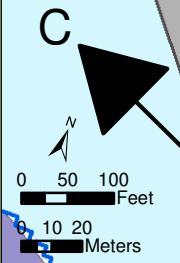
▭ USACE navigation channel stations

▭ River mile

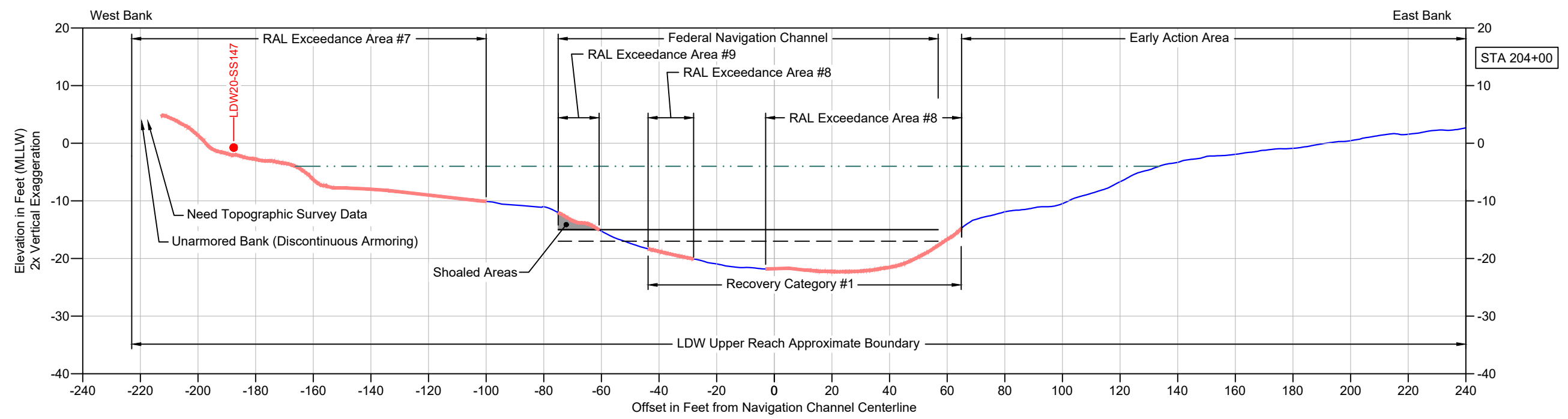
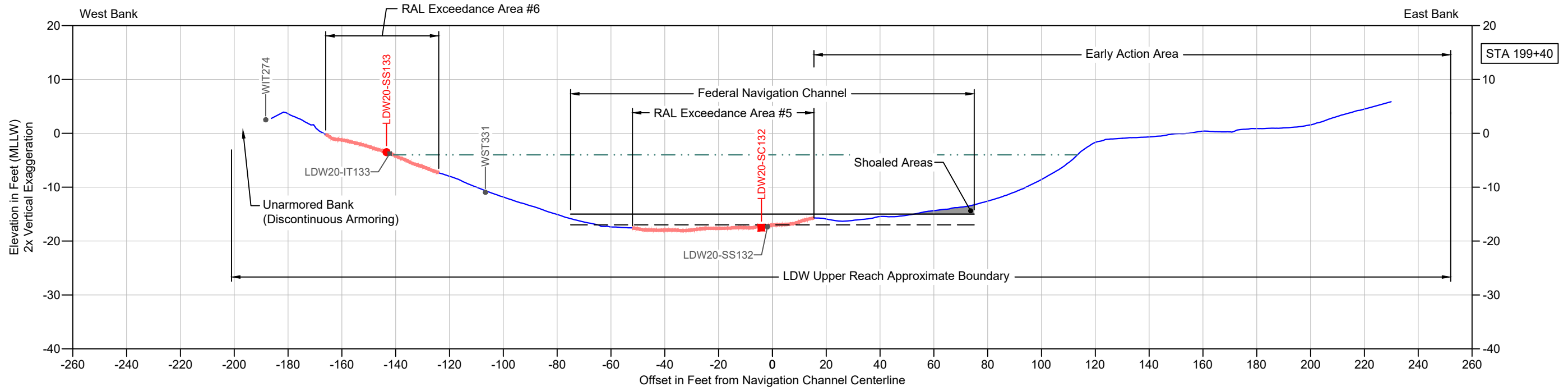
<sup>a</sup> cPAH RAL exceedances in the salmon-colored areas are based on the cPAH ESD RALs, and in the orange colored areas they are based on the cPAH RALs in the ROD. The recovery categories shown are those in Appendix B of the PDI QAPP. The recovery categories will be finalized in the Phase II DER.

Tax parcel ID numbers, parcel shapes and ownership obtained from the King County GIS Center and Parcel Viewer on January 18, 2017 (<http://www.kingcounty.gov/services/gis/Maps/parcel-viewer.aspx>). Lighter shades indicate areas where property ownership extends into water.

Note: Outlier concentrations at NFK305 and LDW-SS143 were removed to prevent distortion of the interpolation.



May 17, 2021 12:46pm.tgdiga \\glatia\CAD\Projects\0067-King County\LDW Upper Reach\Engineering\_Services\0067-RF-016-LDW\_Sections.dwg Map F-1b



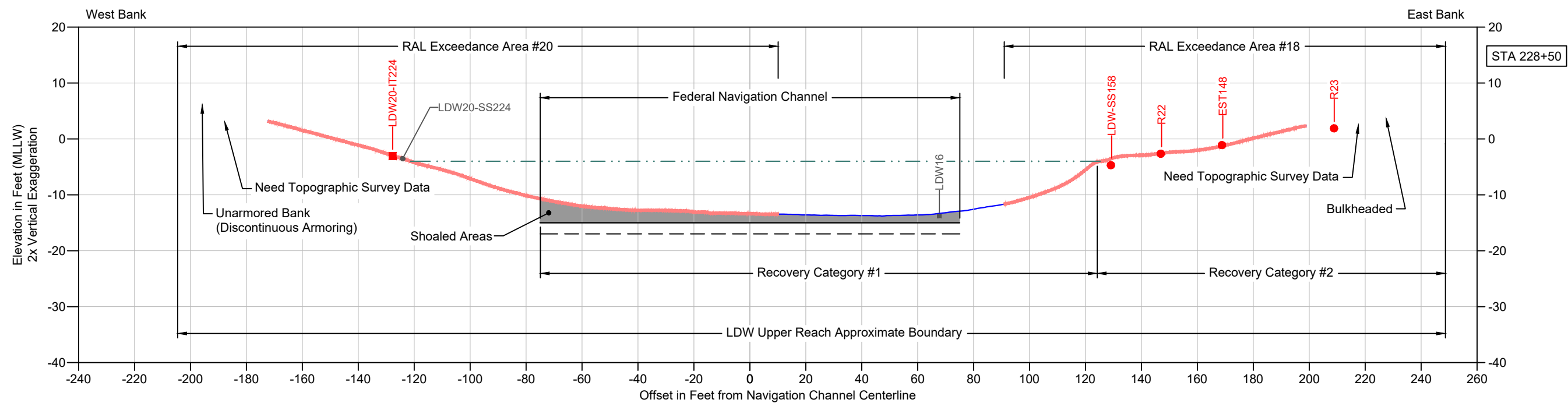
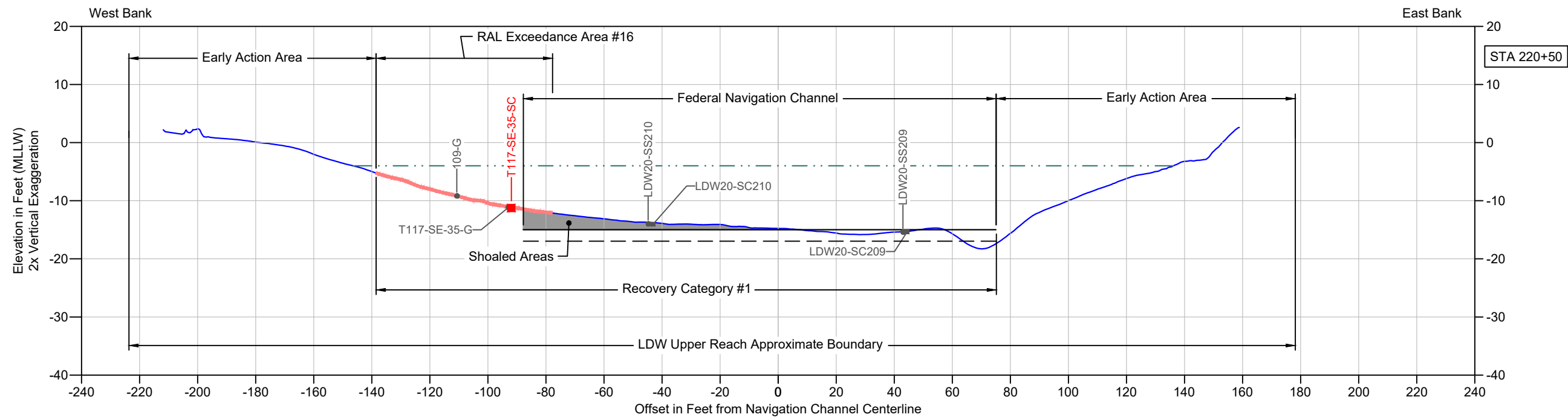
- Legend:**
- Existing Bathymetry (2019/20)
  - Authorized Channel Elevation (-15' MLLW)
  - - - 2' Allowable Overdepth (-17' MLLW)
  - RAL Exceedance Area 12/16/20 Boundaries
  - . . - Intertidal/Subtidal Transition (-4' MLLW)

- Surface Sediment PCB Location**
- Exceeds RAL
  - Does Not Exceed RAL
- Subsurface PCB Core**
- Exceeds RAL
  - Does Not Exceed RAL

- Notes:**
1. Samples shown on each cross section are within 30 feet of the transect
  2. Areas not designated as Recovery Categories 1 or 2 are Recovery Category 3.

**Map F-1b. Cross Sections 199+40 and 204+00**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Legend:**

- Existing Bathymetry (2019/20)
- Authorized Channel Elevation (-15' MLLW)
- - - 2' Allowable Overdepth (-17' MLLW)
- RAL Exceedance Area 12/16/20 Boundaries
- · - · Intertidal/Subtidal Transition (-4' MLLW)

- Surface Sediment PCB Location
  - Exceeds RAL
  - Does Not Exceed RAL
- Subsurface PCB Core
  - Exceeds RAL
  - Does Not Exceed RAL

- Notes:**
1. Samples shown on each cross section are within 30 feet of the transect
  2. Areas not designated as Recovery Categories 1 or 2 are Recovery Category 3.

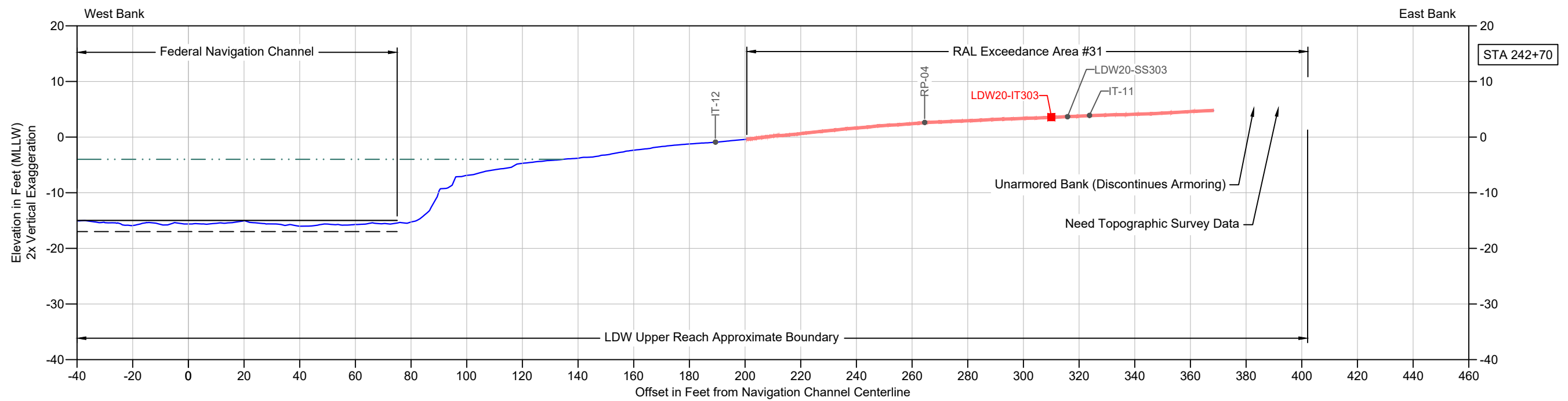
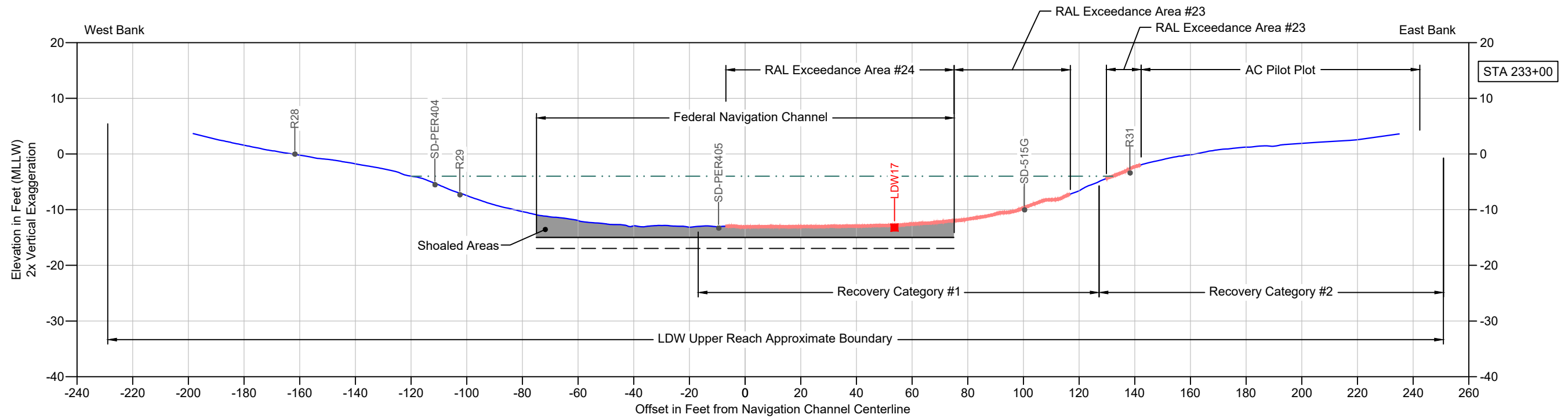
**Map F-1c. Cross Sections 220+50 and 228+50**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Lower Duwamish Waterway Group**  
Port of Seattle / City of Seattle / King County / The Boeing Company

May 17, 2021 12:47pm.tgdga \\glatia\CAD\Projects\0067-King County\LDW Upper Reach\Engineering\_Services\0067-RP-016-LDW\_Sections.dwg Map F-1d



**Legend:**

- Existing Bathymetry (2019/20)
- Authorized Channel Elevation (-15' MLLW)
- - - 2' Allowable Overdepth (-17' MLLW)
- RAL Exceedance Area 12/16/20 Boundaries
- . . - Intertidal/Subtidal Transition (-4' MLLW)

- Surface Sediment PCB Location**
- Exceeds RAL
- Does Not Exceed RAL
- Subsurface PCB Core**
- Exceeds RAL
- Does Not Exceed RAL

- Notes:**
1. Samples shown on each cross section are within 30 feet of the transect
  2. Areas not designated as Recovery Categories 1 or 2 are Recovery Category 3.

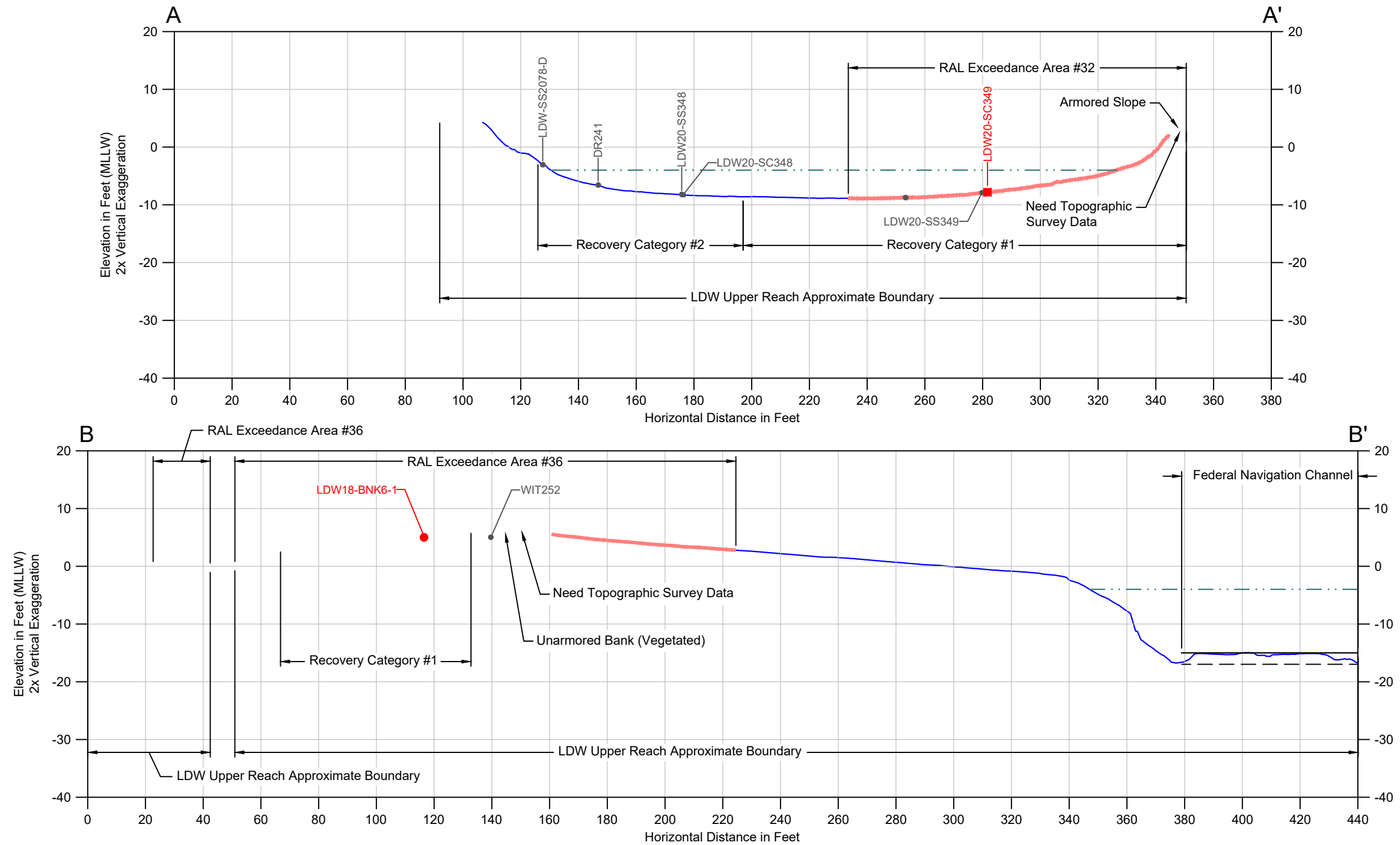
**Map F-1d. Cross Sections 233+00 and 242+70**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH



**Lower Duwamish Waterway Group**  
Port of Seattle / City of Seattle / King County / The Boeing Company

May 17, 2021 12:47pm.tgdga \\glatia\CAD\Projects\0067-King County\LDW Upper Reach\Engineering\_Services\0067-RF-016-LDW\_Sections.dwg Map F-1e



**Legend:**

- Existing Bathymetry (2019/20)
- Authorized Channel Elevation (-15' MLLW)
- - - 2' Allowable Overdepth (-17' MLLW)
- RAL Exceedance Area 12/16/20 Boundaries
- . . - Intertidal/Subtidal Transition (-4' MLLW)

- Surface Sediment PCB Location Exceeds RAL
- Surface Sediment PCB Location Does Not Exceed RAL
- Subsurface PCB Core Exceeds RAL
- Subsurface PCB Core Does Not Exceed RAL

**Notes:**

1. Samples shown on each cross section are within 30 feet of the transect
2. Areas not designated as Recovery Categories 1 or 2 are Recovery Category 3.

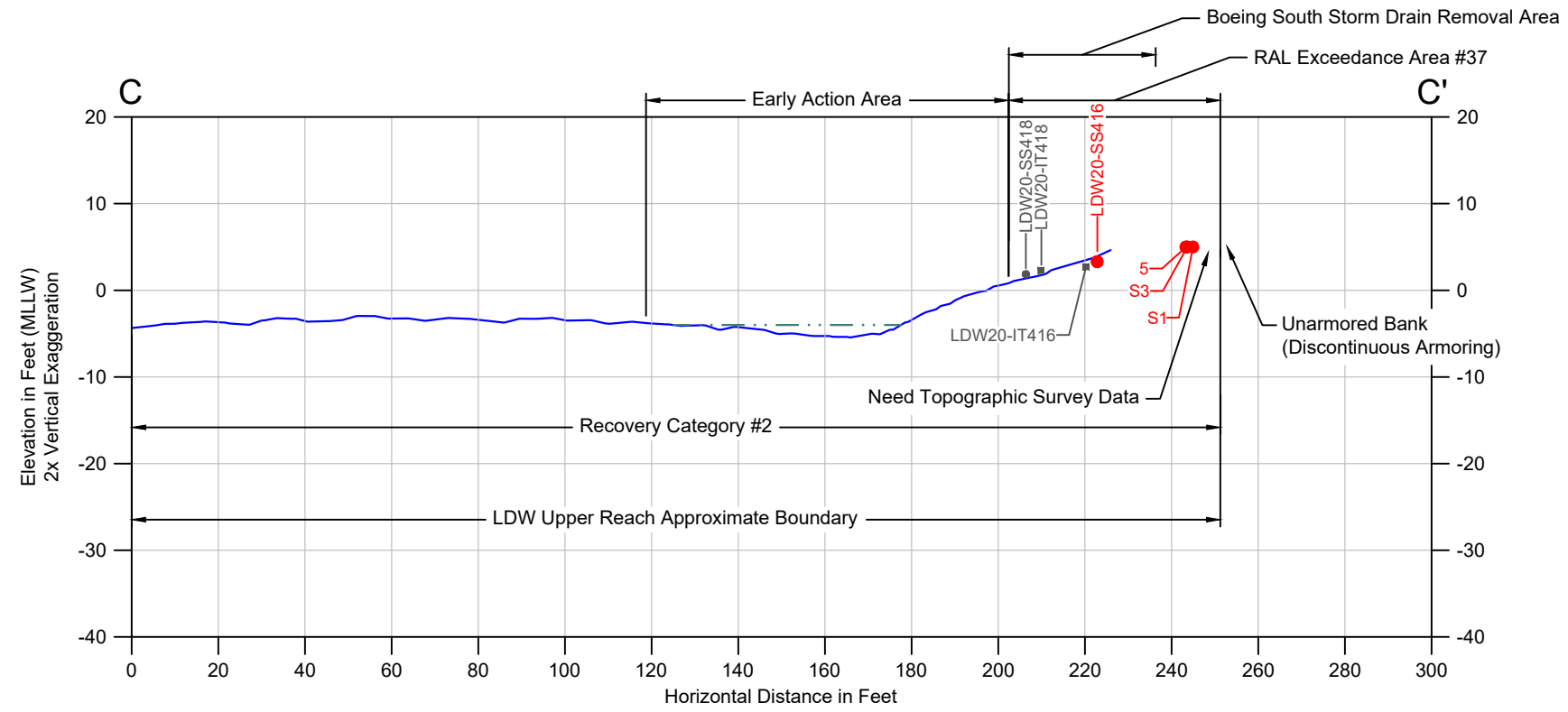
**Map F-1e. Cross Sections A-A' and B-B'**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
 ADDENDUM FOR THE LDW UPPER REACH



**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company

May 17, 2021 12:47pm.tgdga \\glatia\CAD\Projects\0067-King County\LDW Upper Reach\Engineering\_Services\0067-RP-016-LDW\_Sections.dwg Map F-1f



**Legend:**

- Existing Bathymetry (2019/20)
- Authorized Channel Elevation (-15' MLLW)
- - - 2' Allowable Overdepth (-17' MLLW)
- RAL Exceedance Area 12/16/20 Boundaries
- . . - Intertidal/Subtidal Transition (-4' MLLW)

- Surface Sediment PCB Location Exceeds RAL
- Surface Sediment PCB Location Does Not Exceed RAL
- Subsurface PCB Core Exceeds RAL
- Subsurface PCB Core Does Not Exceed RAL

**Notes:**

1. Samples shown on each cross section are within 30 feet of the transect
2. Areas not designated as Recovery Categories 1 or 2 are Recovery Category 3.

**Map F-1f. Cross Section C-C'**

PRE-DESIGN INVESTIGATION PHASE II QAPP  
ADDENDUM FOR THE LDW UPPER REACH