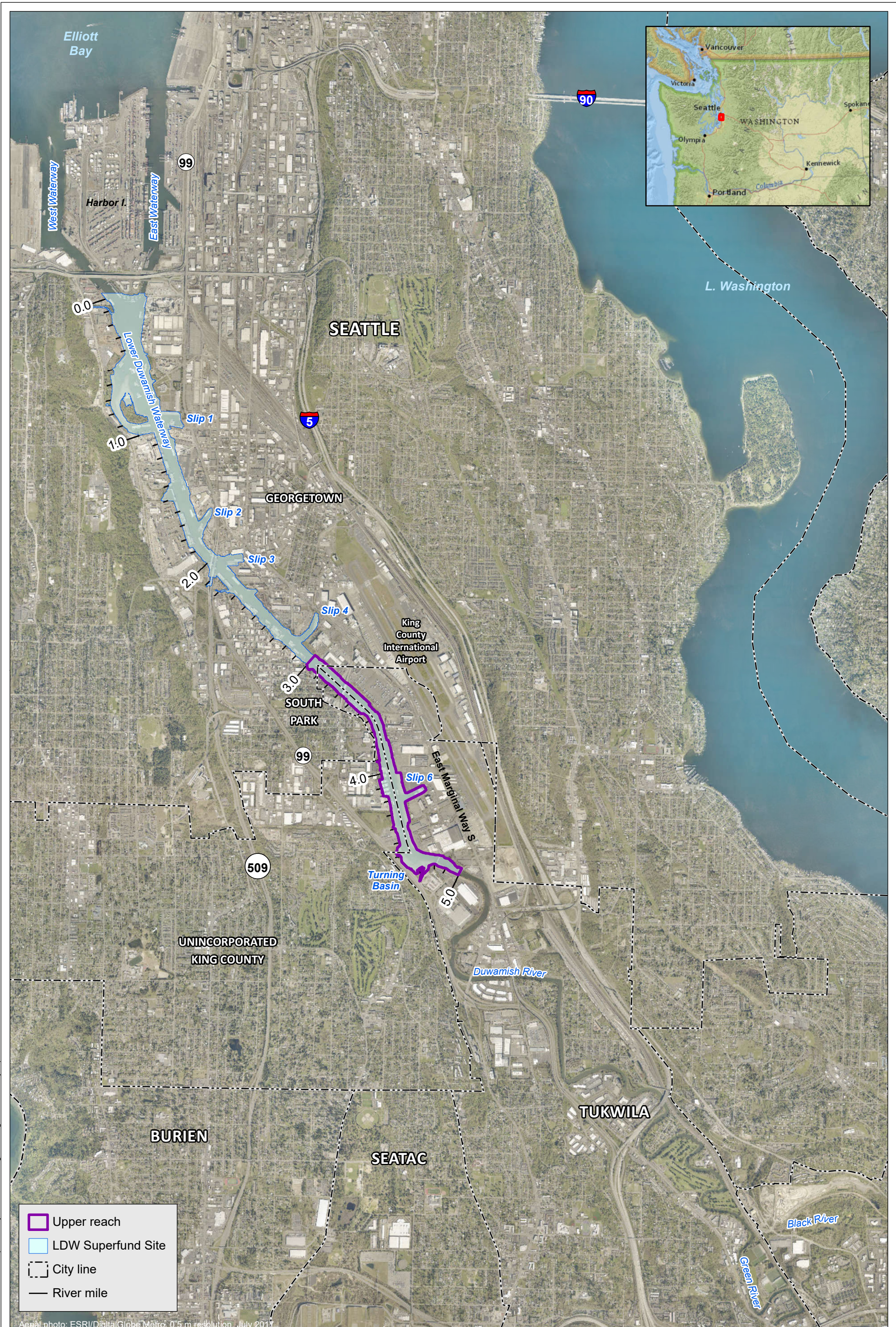


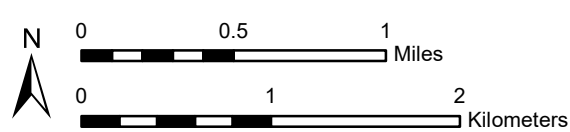
## Figures

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- Upper reach
- LDW Superfund Site
- City line
- River mile

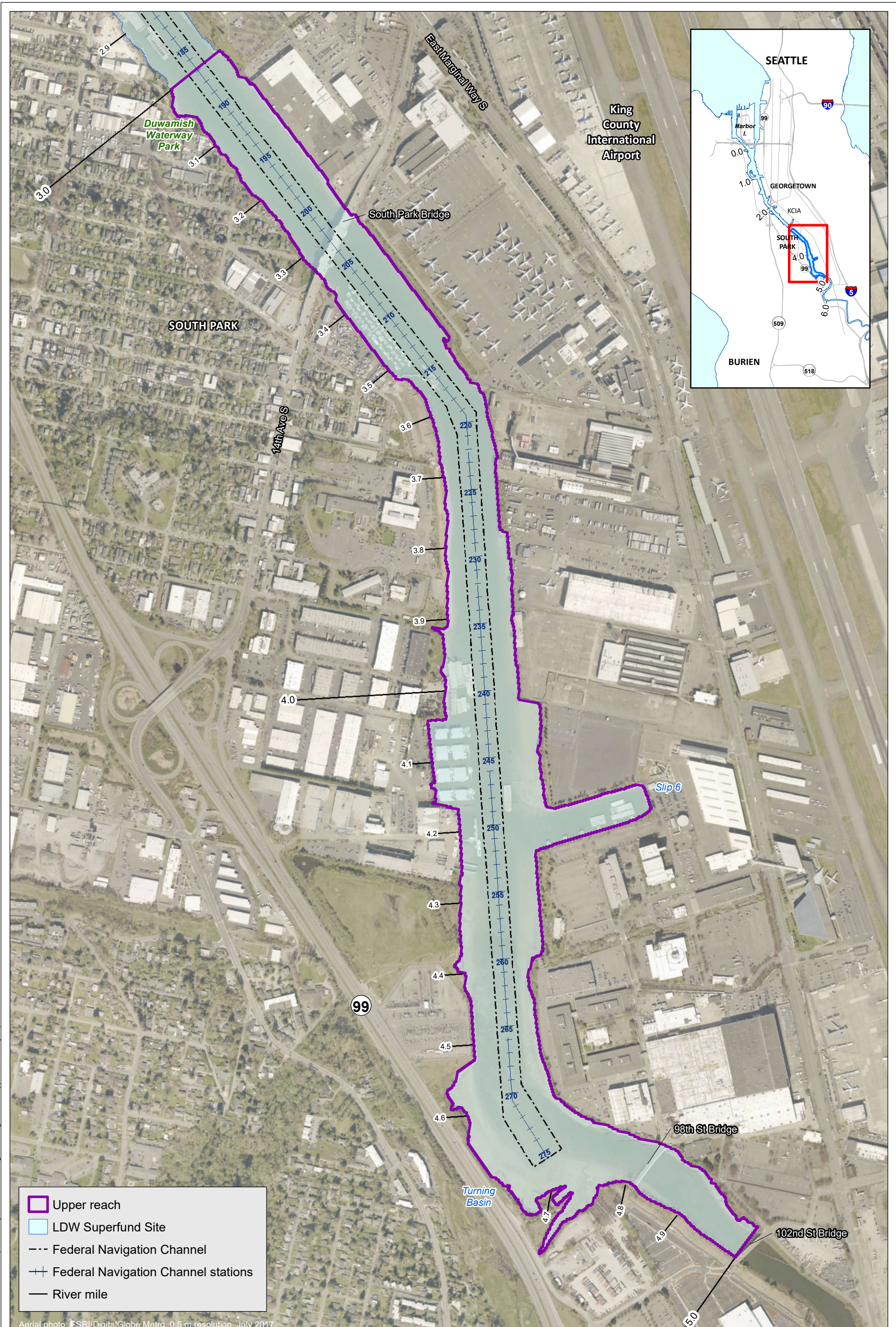


**Figure 2-1. LDW Superfund Site vicinity map**

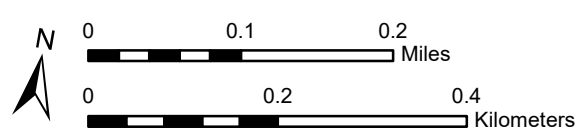
**90% REMEDIAL DESIGN BASIS OF DESIGN**  
**REPORT FOR THE LDW UPPER REACH**     **JULY 24, 2023**

Prepared by craigh.721725.W\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BDR\Fig\_02-1\_7099\_Vicinity\_msp.mxd





Aerial photo: ESRI/DigitalGlobe Metro, 0.5 m resolution, July 2017

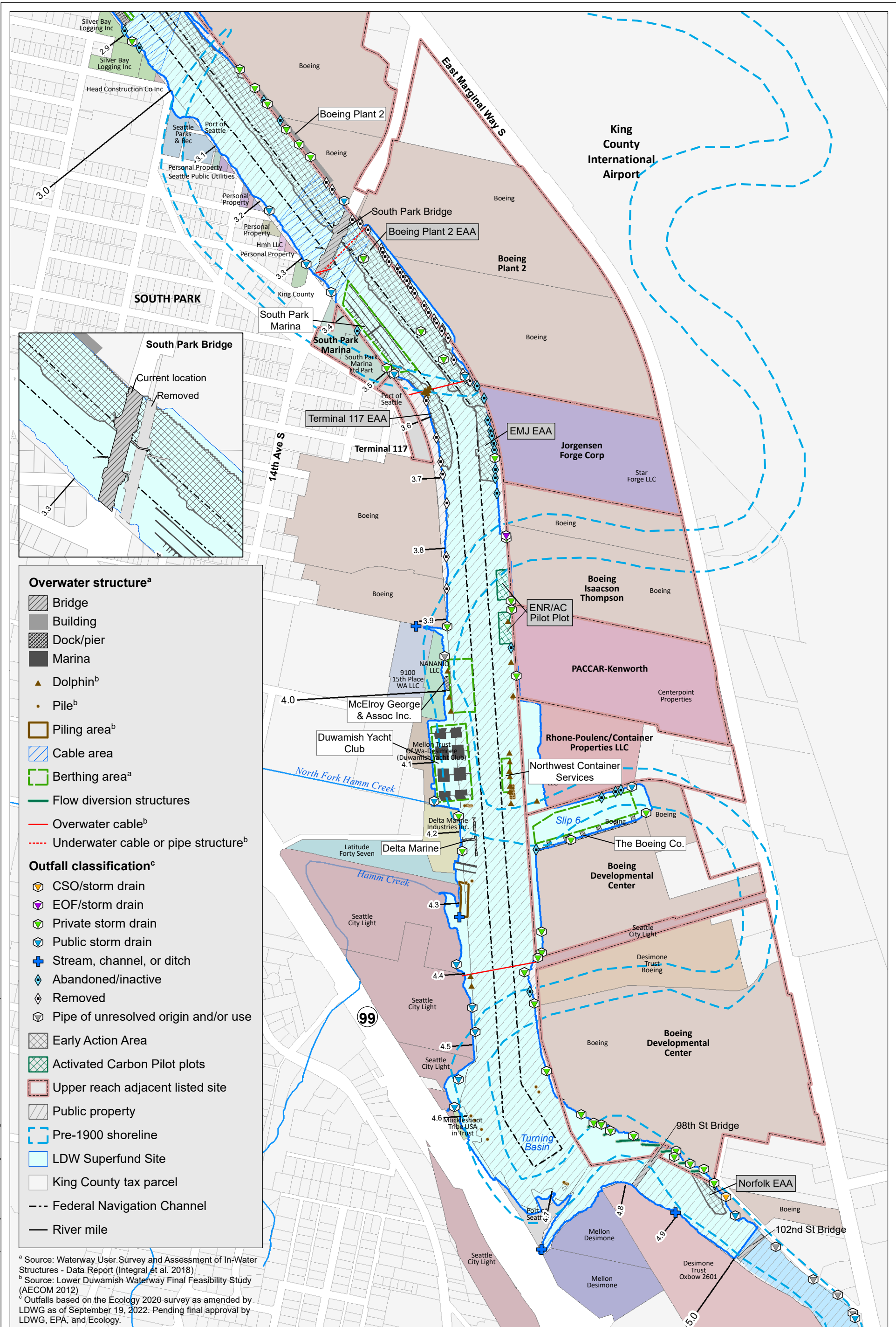


**Figure 2-2. Upper reach vicinity map**

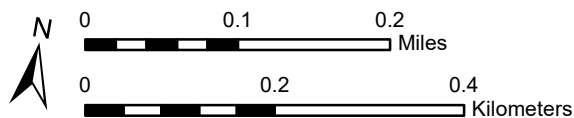
90% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023

Prepared by craigh.712125: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent Design\BDR\Fig 02-2 7099 Upper reach vicinity map.mxd

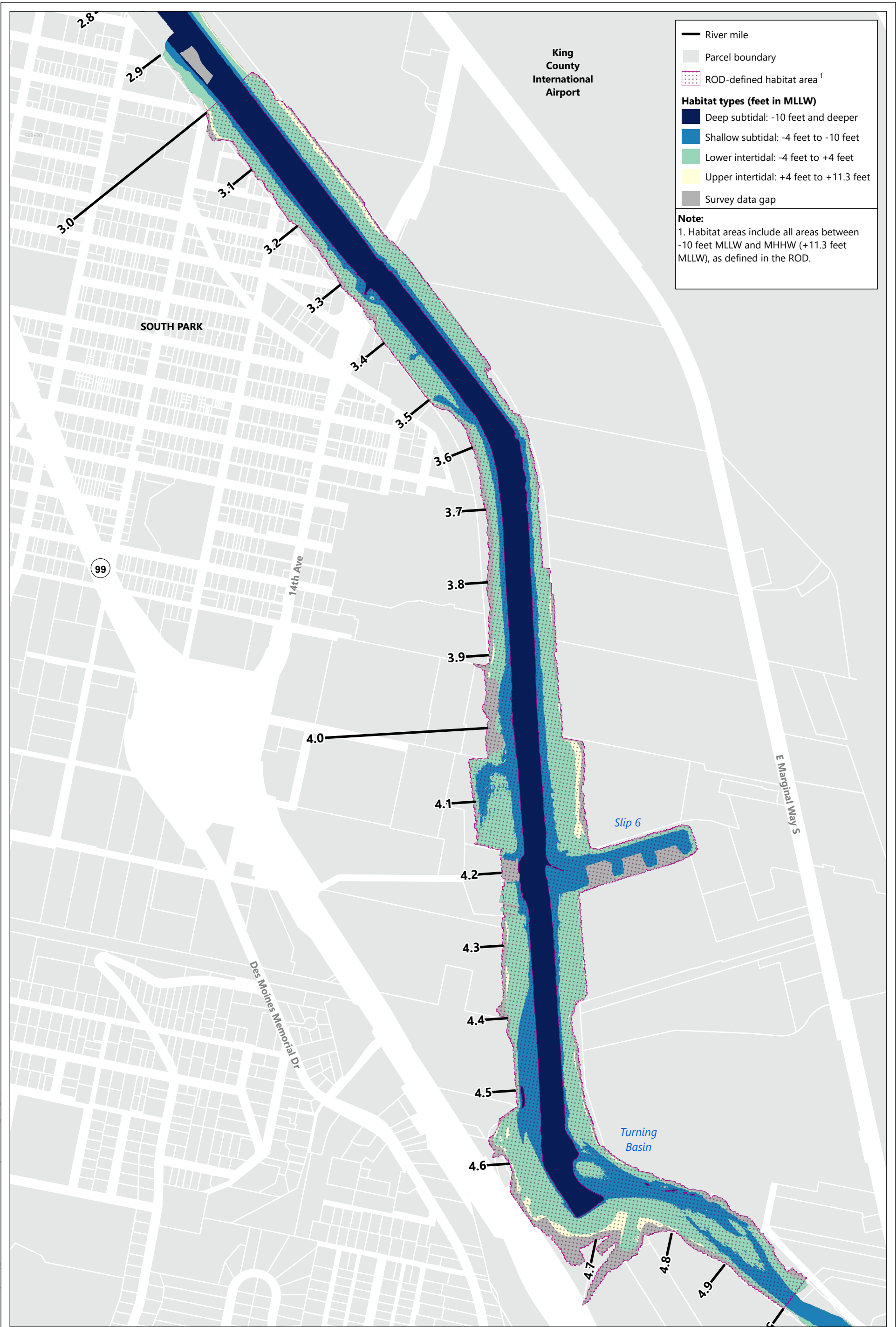




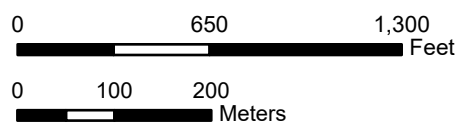
**Figure 2-3. Infrastructure, early action areas, upland sites, and land ownership**



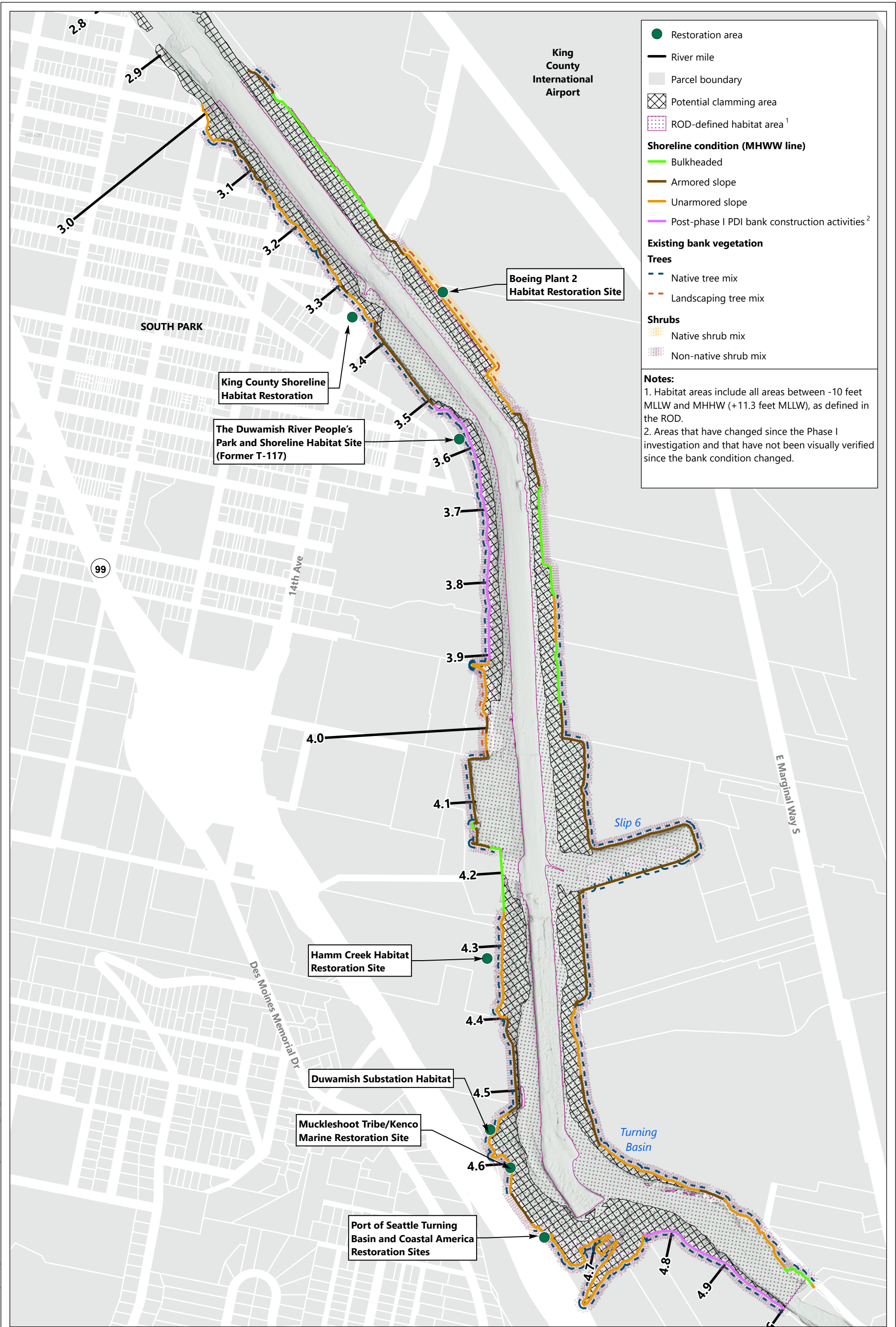




Prepared by Ilanson, 7/24/2023, \\nrcas\GIS\Jobs\KingCounty\_0067\LDW\Maps\Reports\BasisDesign\Report\LDW\_BDR\_90pct.aprx







● Restoration area  
 River mile  
 Parcel boundary  
 Potential clamming area  
 ROD-defined habitat area<sup>1</sup>

**Shoreline condition (MHHW line)**

- Bulkheaded
- Armored slope
- Unarmored slope
- Post-phase I PDI bank construction activities<sup>2</sup>

**Existing bank vegetation**

**Trees**

- Native tree mix
- Landscaping tree mix

**Shrubs**

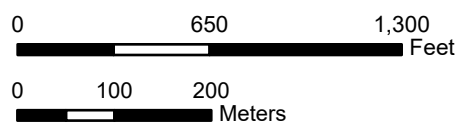
- Native shrub mix
- Non-native shrub mix

**Notes:**

1. Habitat areas include all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW), as defined in the ROD.

2. Areas that have changed since the Phase I investigation and that have not been visually verified since the bank condition changed.

Prepared by JIanson, 7/24/2023, I:\projects\GIS\Jobs\KingCounty\_0067\LDW\Maps\Reports\BasisDesign\Report\LDW\_BDR\_9/24/2023.aprx



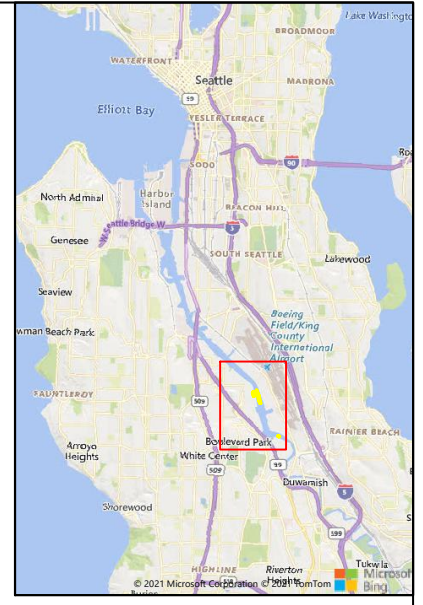
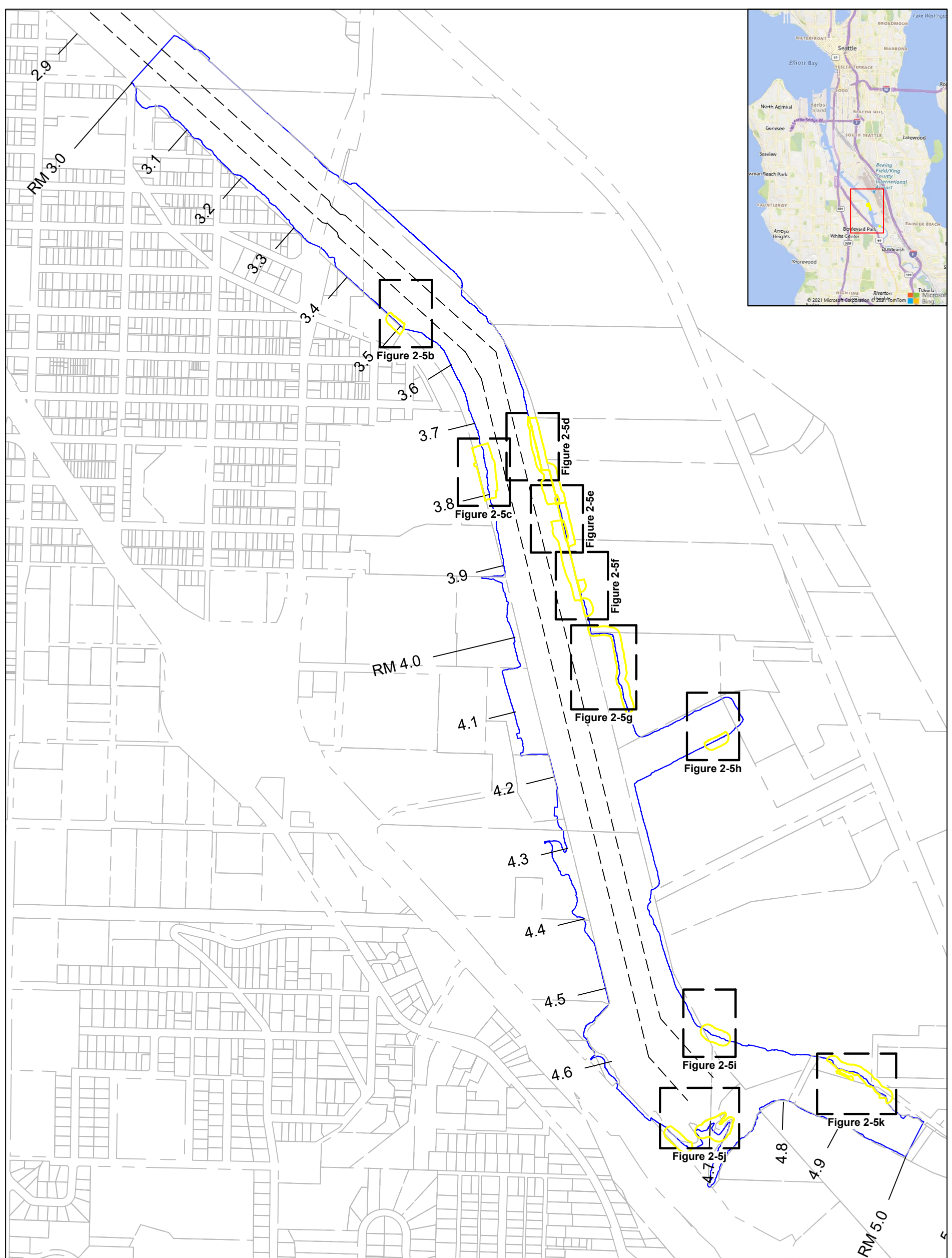
**Figure 2-4b. Existing clamming areas, restoration areas, and shoreline conditions**

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Jul 18, 2023 9:51 am tgriga \\gala\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-01 Survey Merge Overview.dwg Figure 2-5a



**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, North American Datum of 1983/91, U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

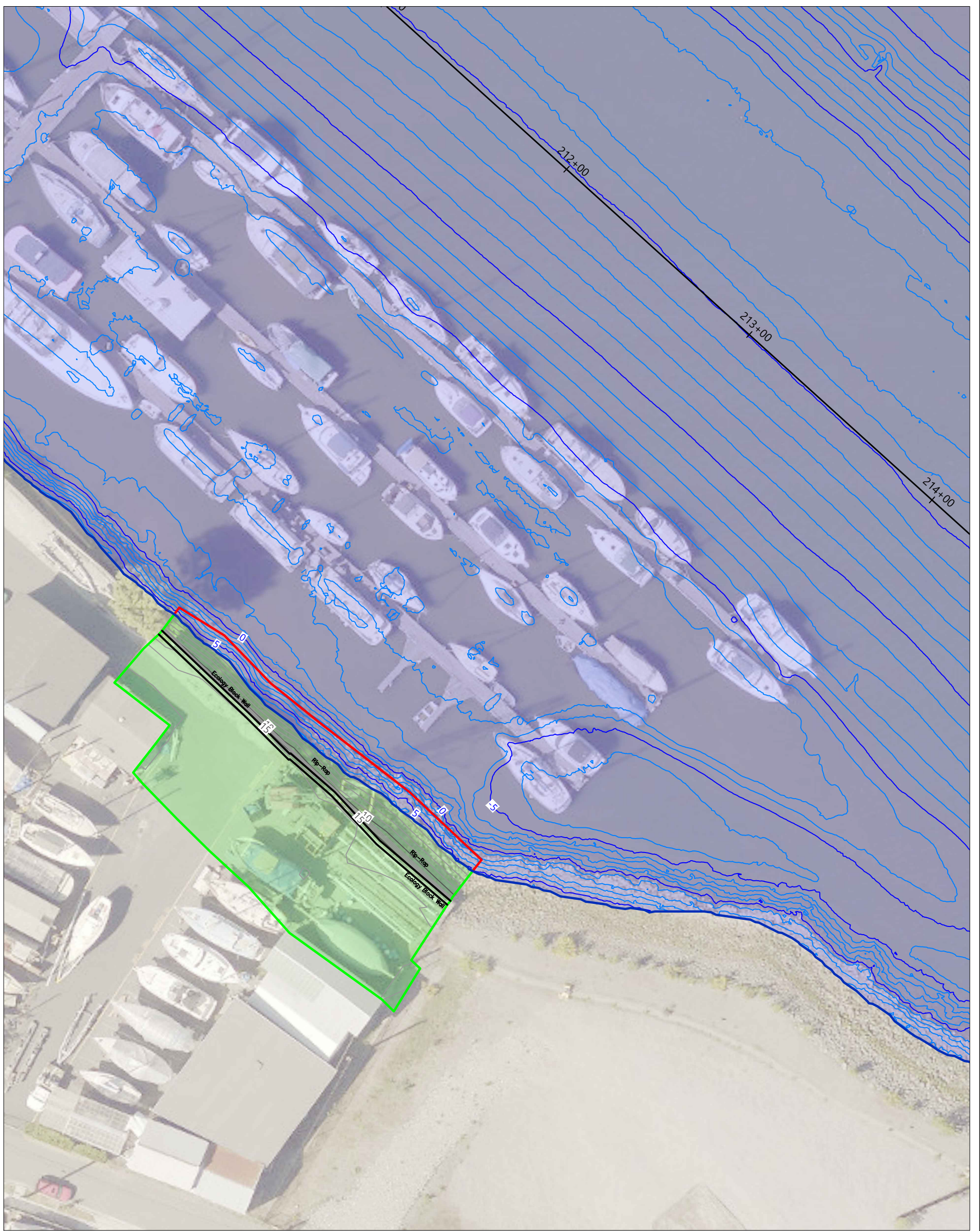
- Legend:**
- Federal navigation channel
  - 250+00 Channel centerline
  - LDW upper reach approximate boundary
  - Topographic survey area
  - Figure extents



**Figure 2-5a. Bathymetric/topographic survey merging overview**

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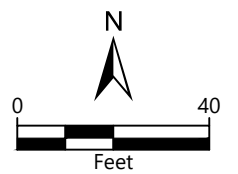
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

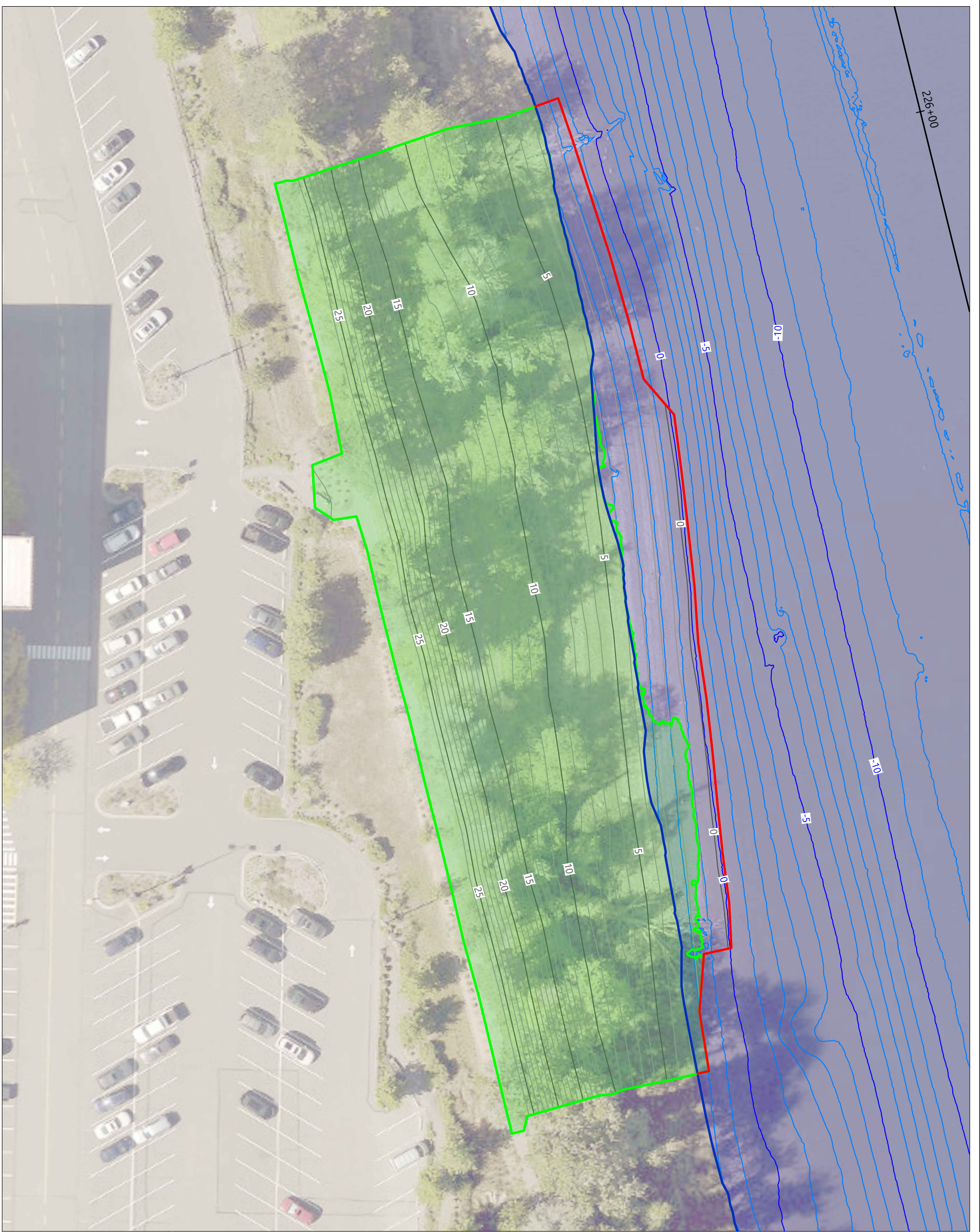
- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



**Figure 2-5b. Bathymetric/topographic merging plan**

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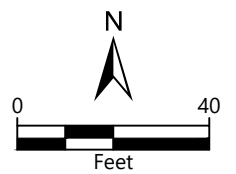
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)

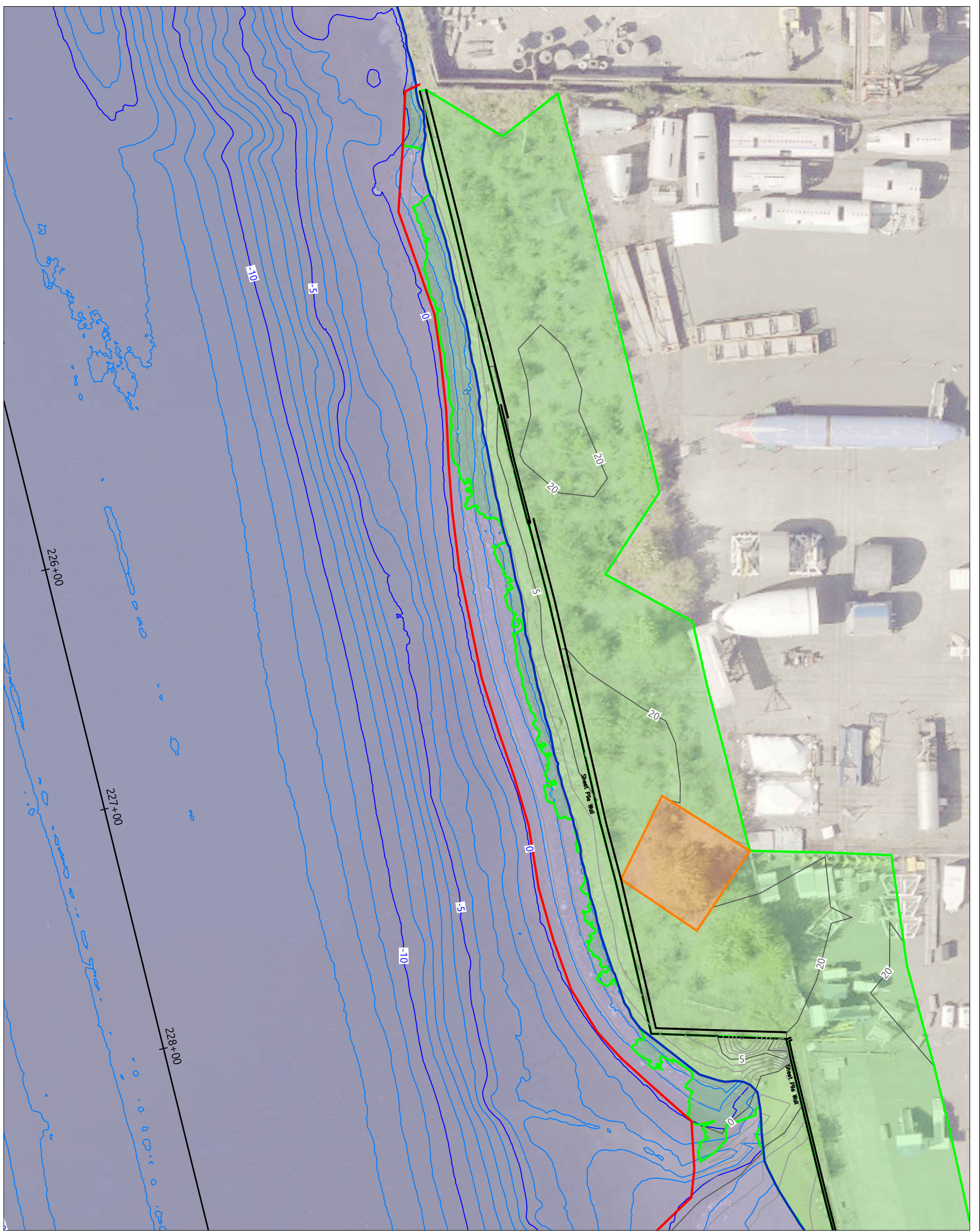


**Figure 2-5c. Bathymetric/topographic merging plan**

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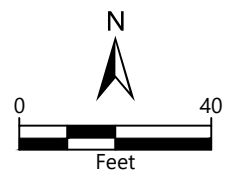
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

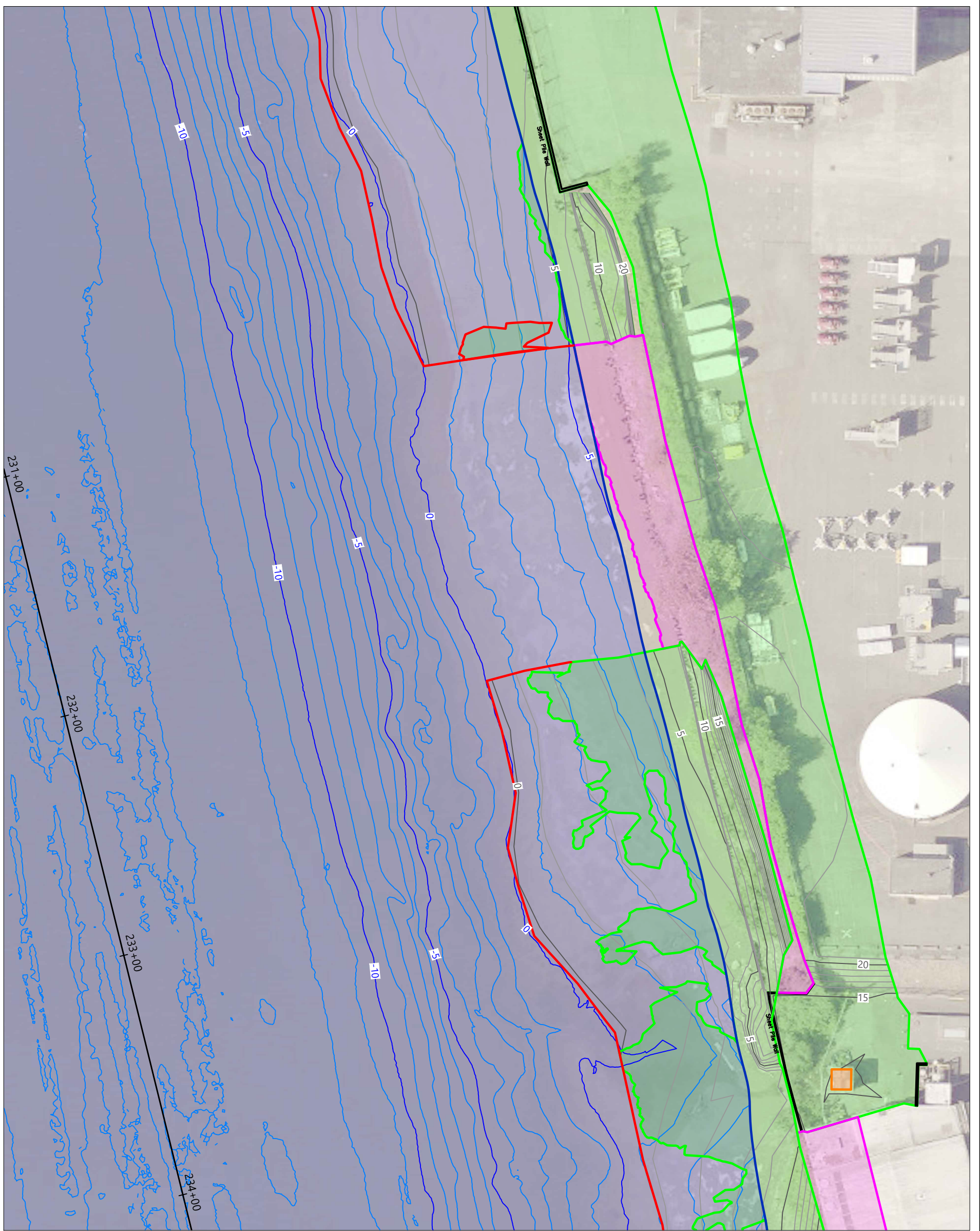
- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- Data gap filled via interpolation
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



**Figure 2-5d. Bathymetric/topographic merging plan**

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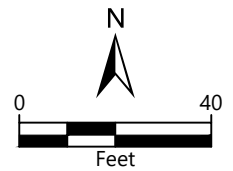
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- 2016 Puget Sound LiDAR Consortium Survey LiDAR data (used to fill in gap between bathymetric and topographic surveys)
- Data gap filled via interpolation
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' Intervals)
- Topographic survey contours (1' & 5' Intervals)

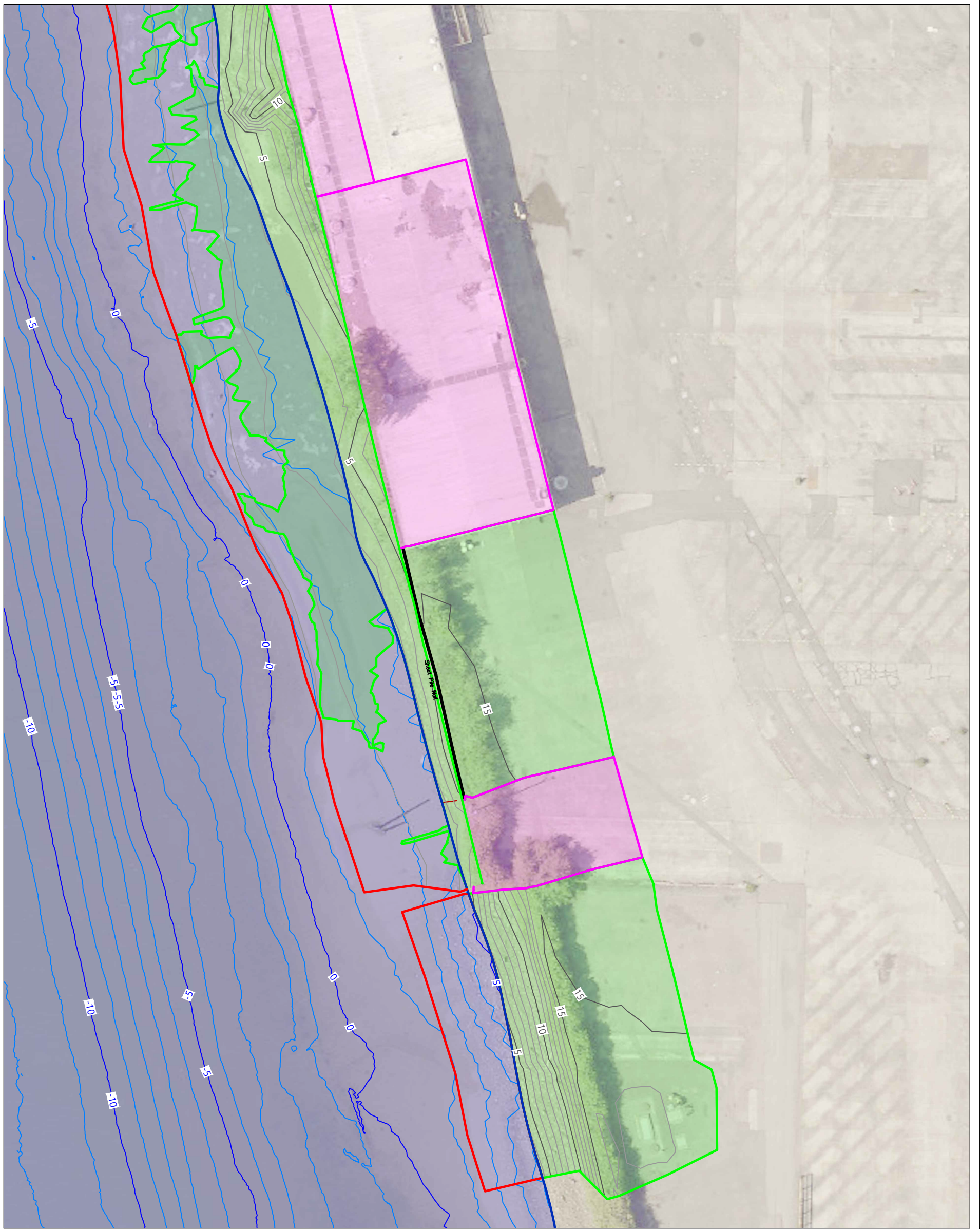


**Figure 2-5e. Bathymetric/topographic merging plan**

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JULY 24, 2023



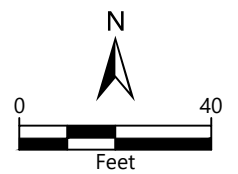
Jul 18, 2023 9:49am tgriga \\gala\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-028 BODR Bath Bank Topo Merge.dwg Figure 2-5f



**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.  
**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181  
**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- 2016 Puget Sound LiDAR Consortium survey LiDAR data (used to fill in gap between bathymetric and topographic surveys)
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



**Figure 2-5f. Bathymetric/topographic merging plan**  
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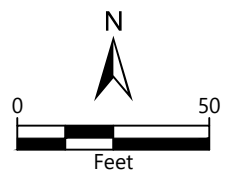
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

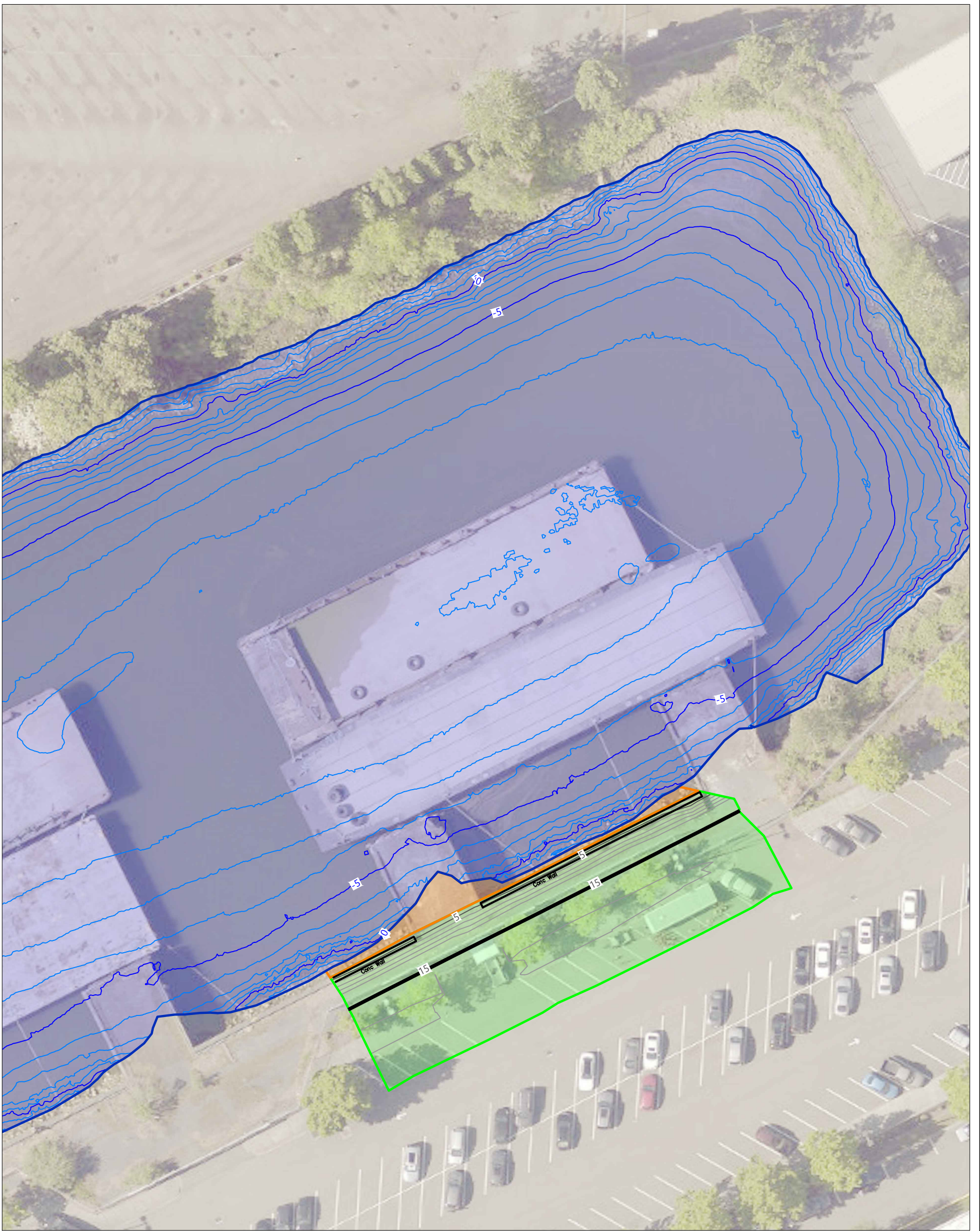
**Legend:**

- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- Data gap filled via interpolation
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



**Figure 2-5g. Bathymetric/topographic merging plan**





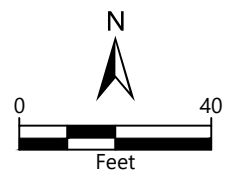
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

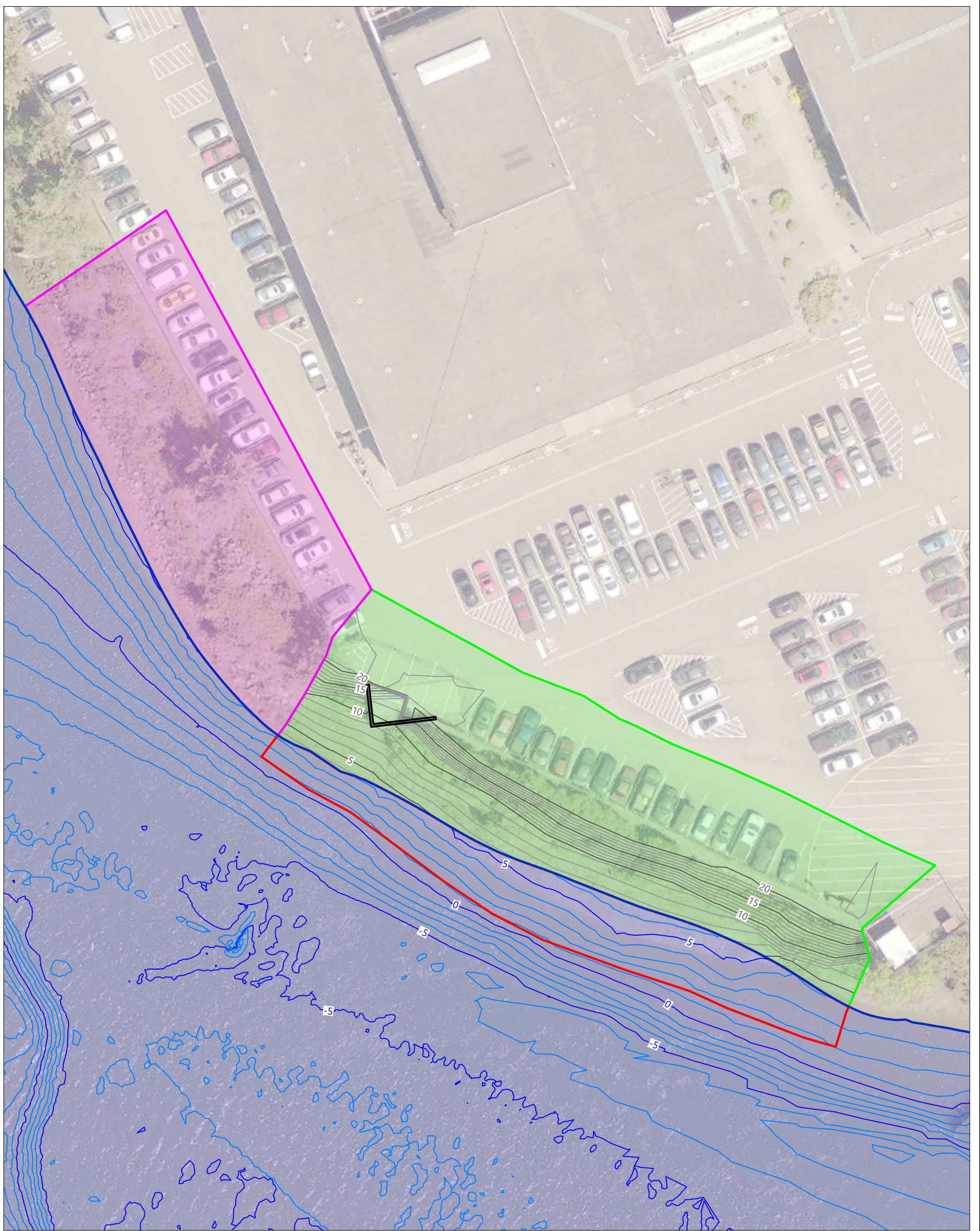
- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- Data gap filled via interpolation
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



**Figure 2-5h. Bathymetric/topographic merging plan**

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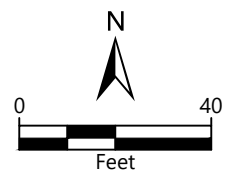
**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)

**Legend:**

- 2019/2020 Northwest Hydro bathymetric survey extent
- 2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
- 2016 Puget Sound LiDAR Consortium survey LiDAR data (used to fill in gap between bathymetric and topographic surveys)
- Area where bathymetric survey overrides topographic survey
- Bathymetric survey contours (1' & 5' intervals)
- Topographic survey contours (1' & 5' intervals)



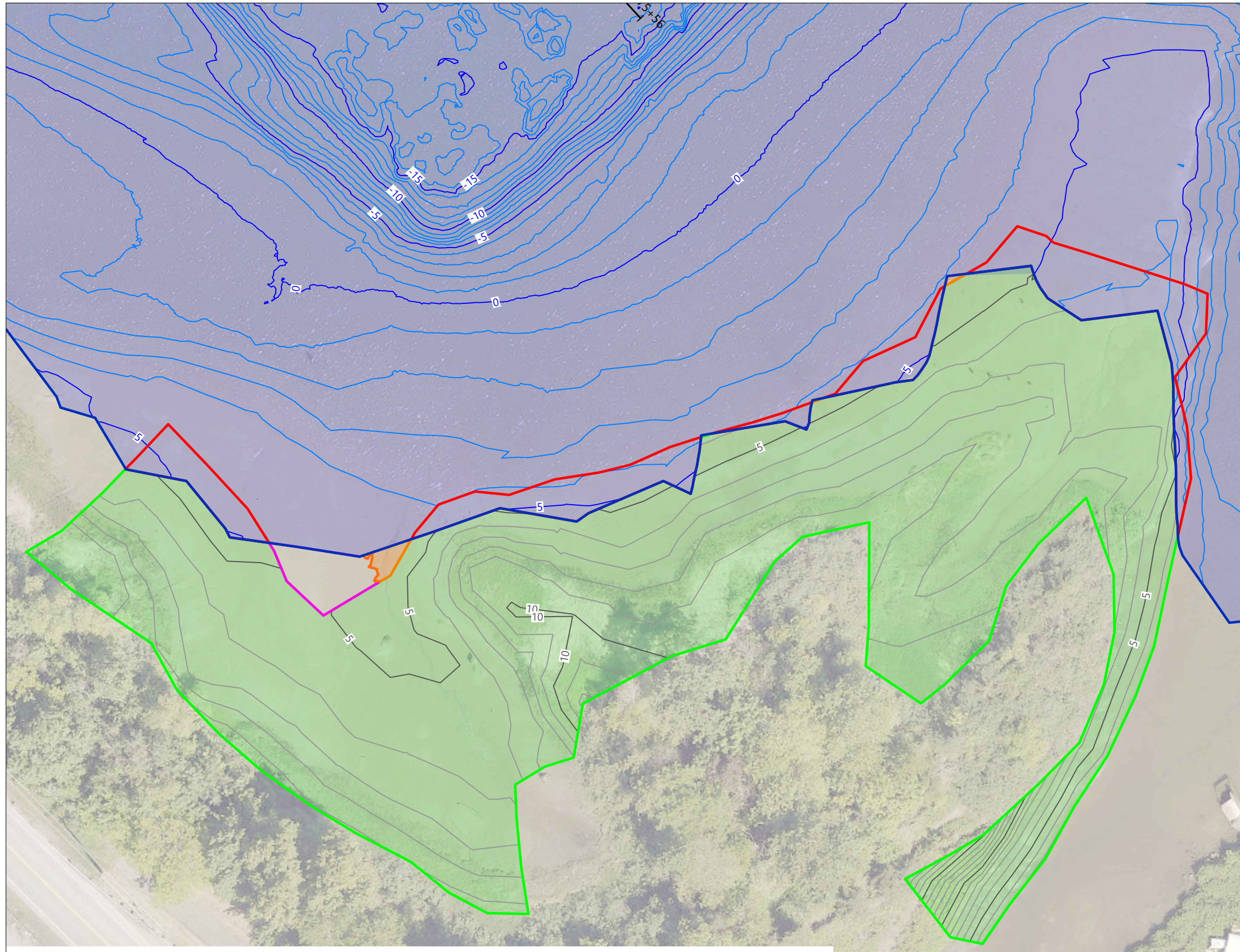
**Figure 2-5i. Bathymetric/topographic merging plan**

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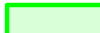




JULY 24, 2023



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-028 BODR Bath\Bank Topo Merge.dwg Figure 2-5j  
Jul 18, 2023 9:56am ltrida



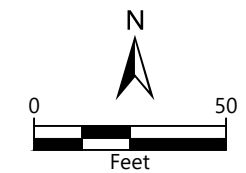
**Legend:**

-  2019/2020 Northwest Hydro bathymetric survey extent
-  2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
-  Area without PDI survey data filled via interpolation
-  Area where bathymetric survey overrides topographic survey
-  Bathymetric survey contours (1' & 5' intervals)
-  Topographic survey contours (1' & 5' intervals)

**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

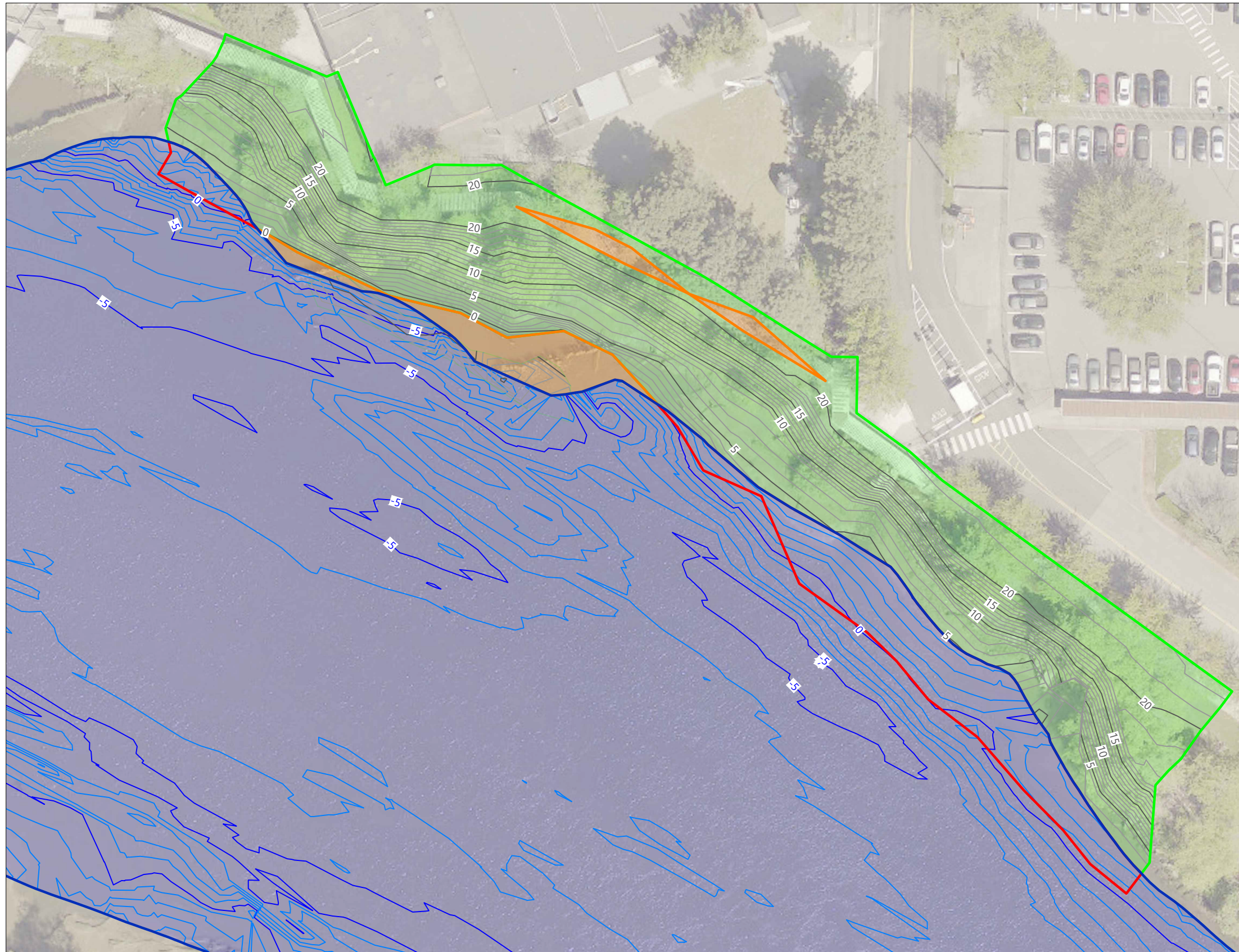
**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)




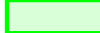



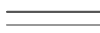
**Figure 2-5j. Bathymetric/topographic merging plan**



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-028 BODR Bath\Bank Topo Merge.dwg Figure 2-5k  
Jul 18, 2023 9:50am Iridia



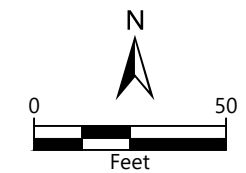
**Legend:**

-  2019/2020 Northwest Hydro bathymetric survey extent
-  2021/2022 True North bank topographic survey extent (not shown where bathymetric survey overrides topo)
-  Area without PDI survey data filled via interpolation
-  Area where bathymetric survey overrides topographic survey
-  Bathymetric survey contours (1' & 5' intervals)
-  Topographic survey contours (1' & 5' intervals)

**Source:** Topographic survey by True North Land Surveying, Inc. performed between June 30, 2021, and August 10, 2021. Additional survey by True North performed on October 5 and 6, 2022. Bathymetric survey by Northwest Hydro performed between April 18, 2019, and May 15, 2019. Additional survey by Northwest Hydro performed June 2020. LiDAR survey from Puget Sound LiDAR Consortium dated 2016. Composite data updated December 2020 and November 2022.

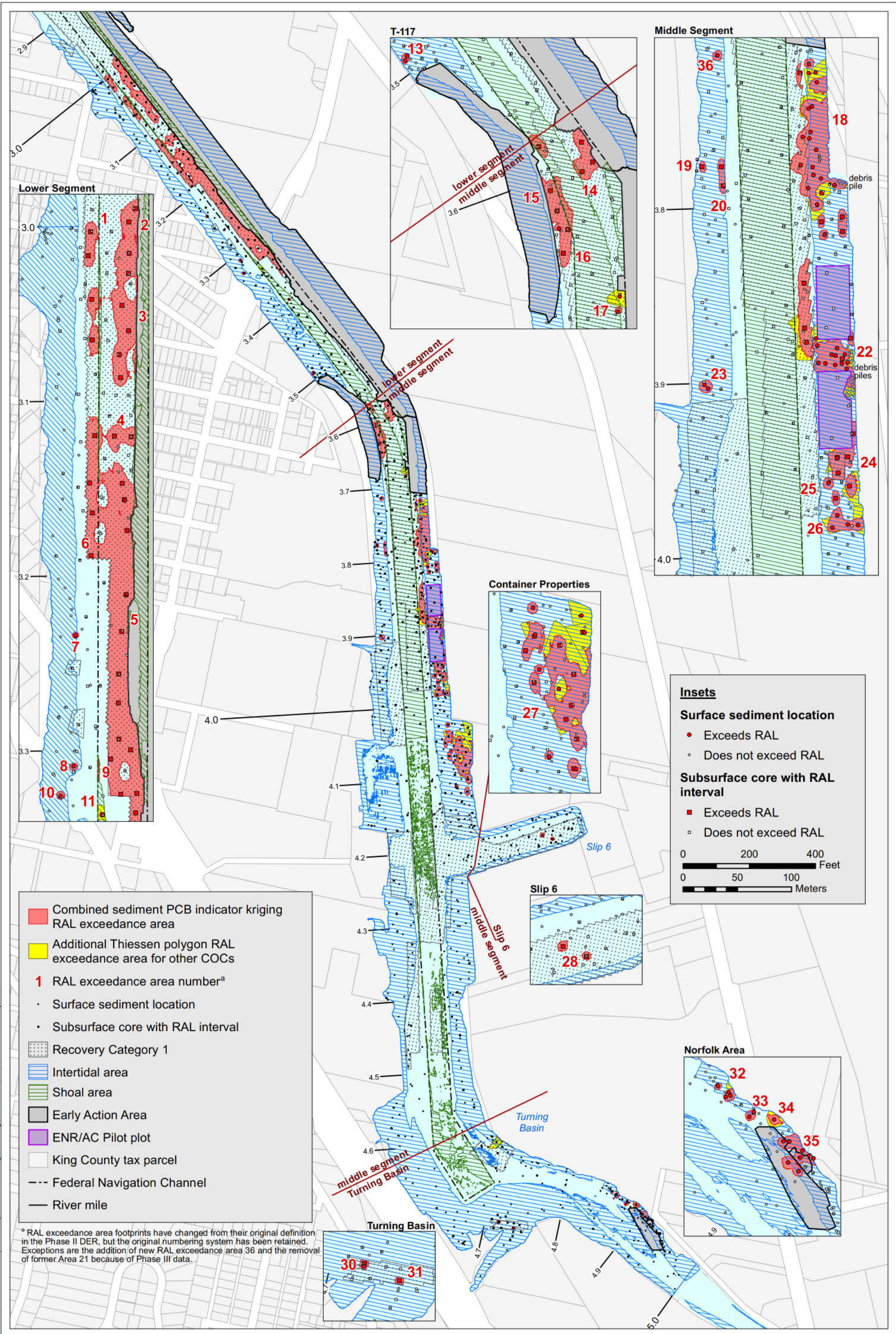
**Horizontal Datum:** Washington State Plane, North Zone, NAD83 (2011), U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181

**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW converted from NAVD88 (NAVD88 + 2.34' to MLLW)



**Figure 2-5k. Bathymetric/topographic merging plan**





- Combined sediment PCB indicator kriging RAL exceedance area
- Additional Thiessen polygon RAL exceedance area for other COCs
- 1** RAL exceedance area number<sup>a</sup>
- Surface sediment location
- Subsurface core with RAL interval
- Recovery Category 1
- Intertidal area
- Shoal area
- Early Action Area
- ENR/AC Pilot plot
- King County tax parcel
- Federal Navigation Channel
- River mile

<sup>a</sup> RAL exceedance area footprints have changed from their original definition in the Phase II DER, but the original numbering system has been retained. Exceptions are the addition of new RAL exceedance area 36 and the removal of former Area 21 because of Phase III data.

**Insets**

**Surface sediment location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core with RAL interval**

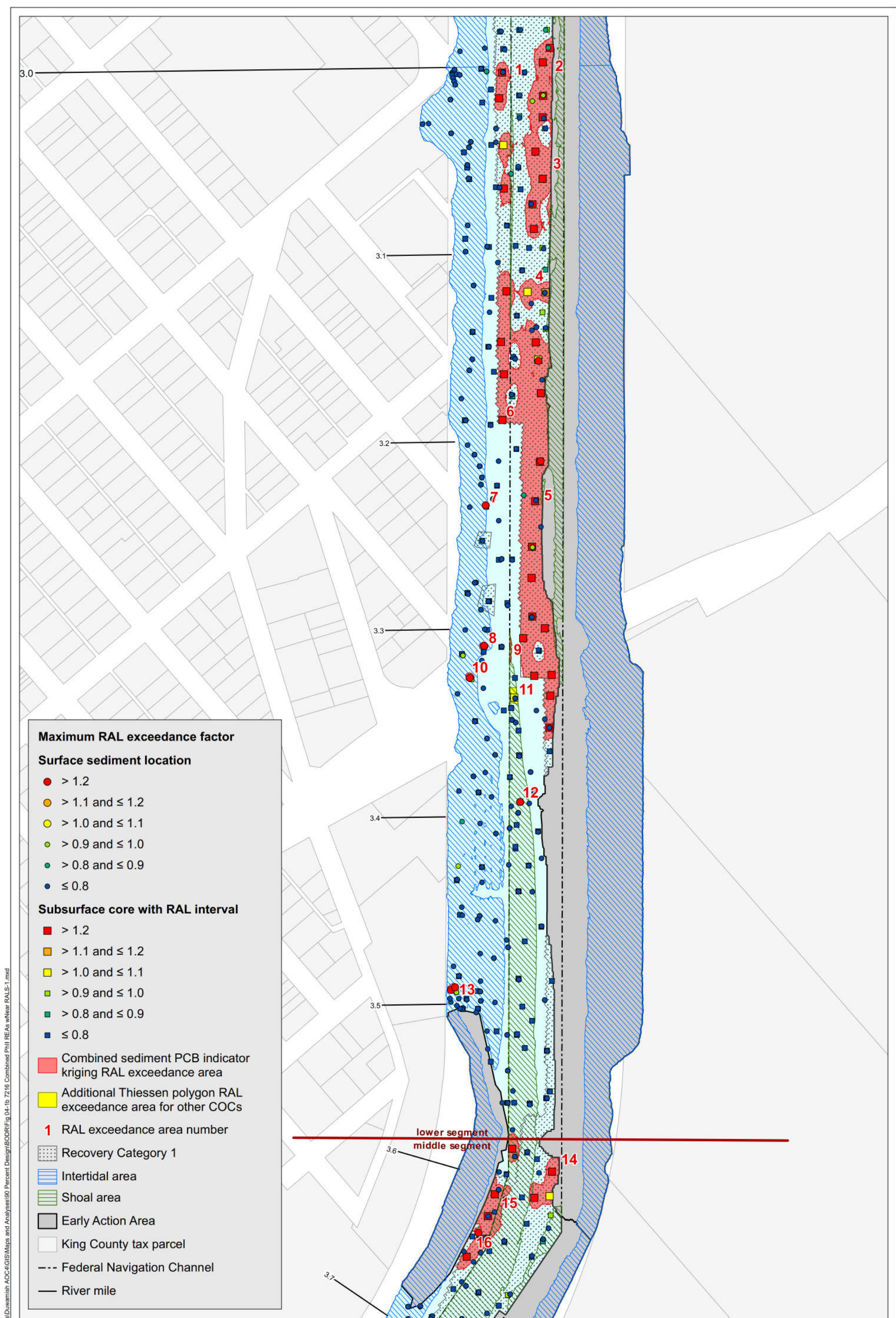
- Exceeds RAL
- ◻ Does not exceed RAL

0 200 400 Feet  
0 50 100 Meters

**Figure 4-1a. Total PCB combined surface and subsurface sediment indicator kriging interpolation with Thiessen polygons for other COCs**  
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JULY 24, 2023

Prepared by craigh.72123: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig\_04-1a\_7216\_Combined\_Phil\_REAs\_w\_ThPols.mxd



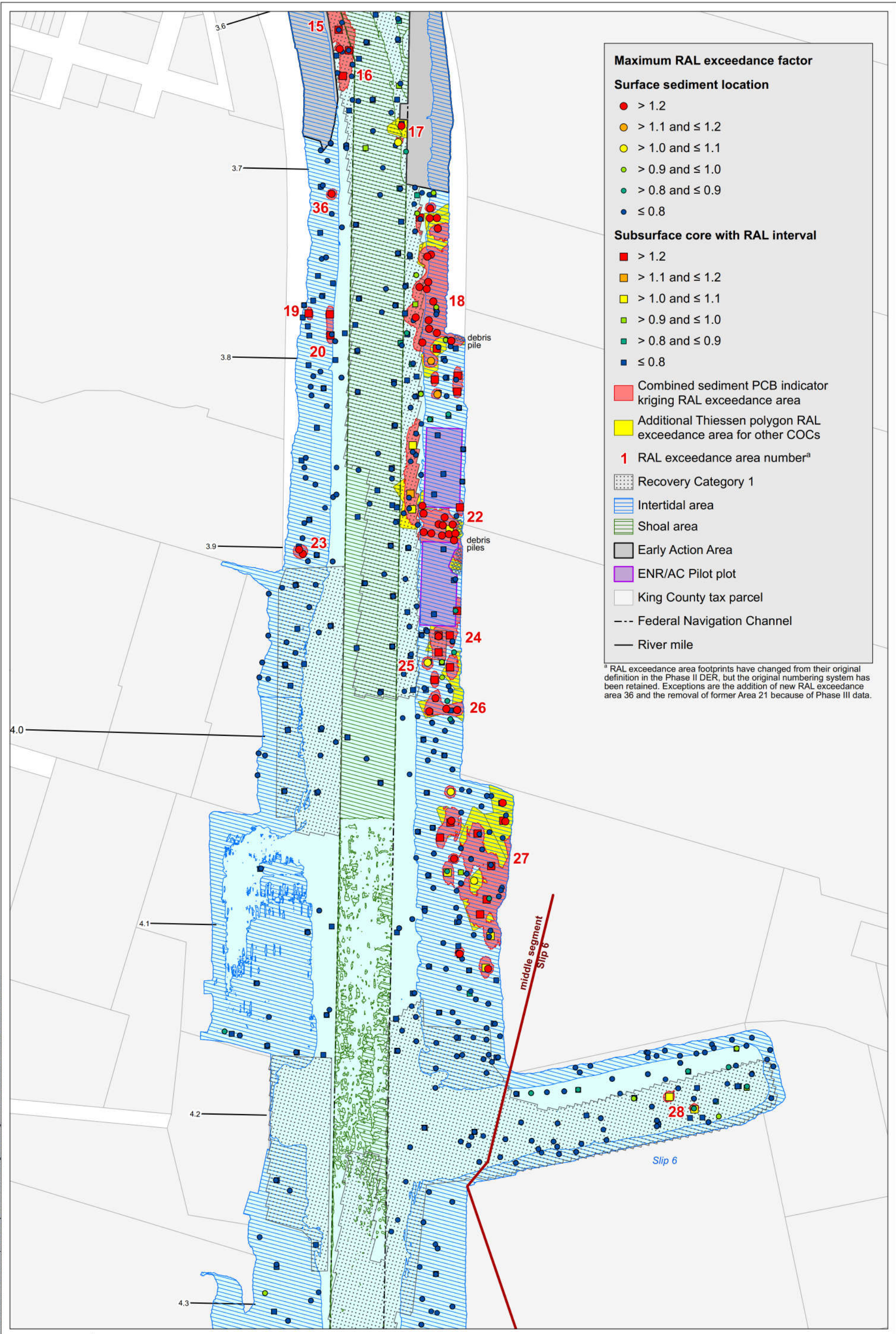


Prepared by craigh. 7/21/23. W:\Projects\Duwamish ACC\GIS\Maps and Analyses\90 Percent Design\BODR\Fig 04-1b 7216 Combined Phil REAs wNear RALS-1.mxd



**Figure 4-1b. Combined RAL exceedance areas (PCB interpolation and Thiessen polygons for other COCs) with RAL exceedances, RMs 3.0 to 3.7**  
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 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023



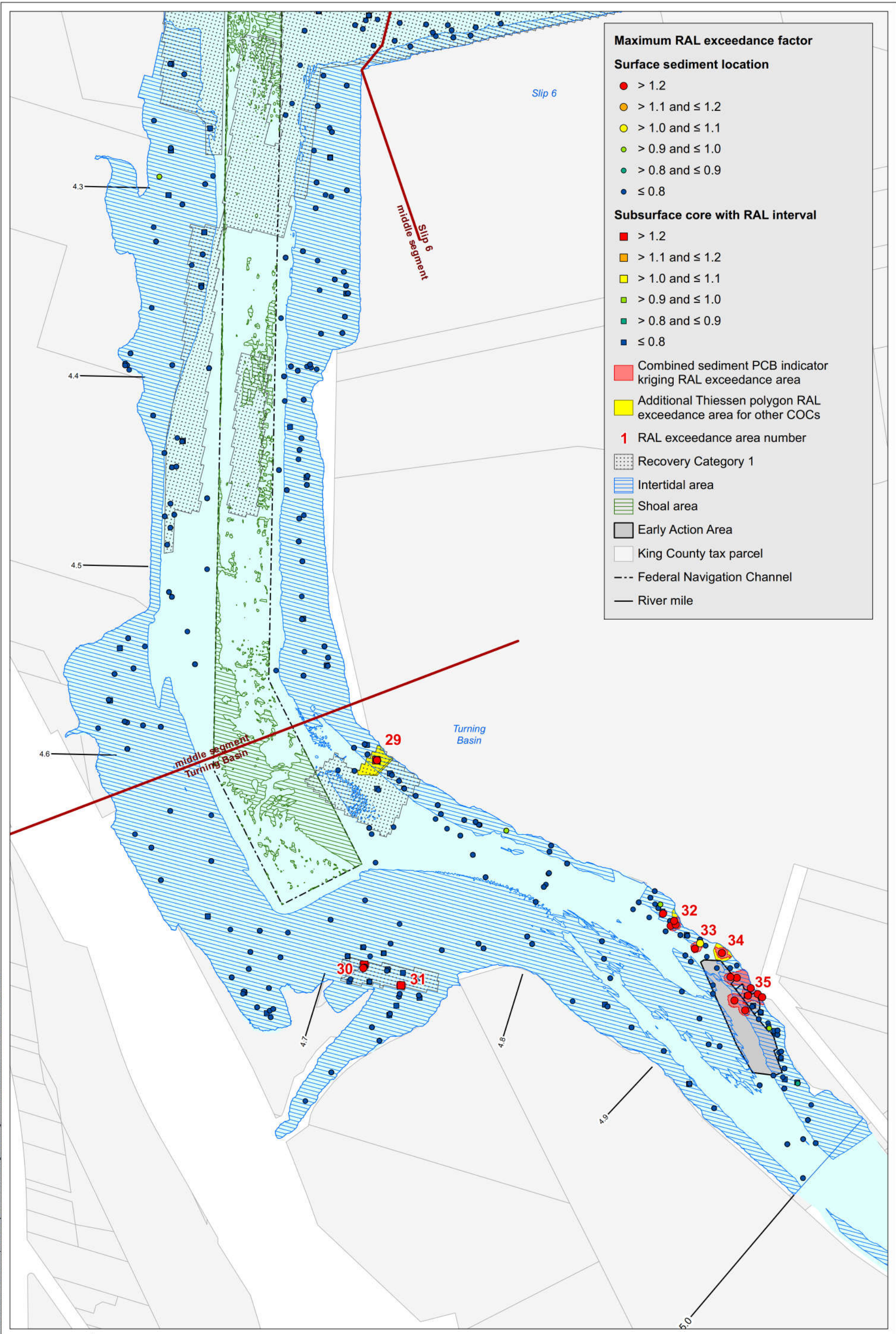


Prepared by craigh.72125; W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig 04-1c 7216\_Combined\_Phil\_REAs\_wNear\_RALS-2.mxd



**Figure 4-1c. Combined RAL exceedance areas (PCB interpolation and Thiessen polygons for other COCs) with RAL exceedances, RMs 3.7 to 4.3**  
 90% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW UPPER REACH JULY 24, 2023





**Maximum RAL exceedance factor**

**Surface sediment location**

- > 1.2
- > 1.1 and ≤ 1.2
- > 1.0 and ≤ 1.1
- > 0.9 and ≤ 1.0
- > 0.8 and ≤ 0.9
- ≤ 0.8

**Subsurface core with RAL interval**

- > 1.2
- > 1.1 and ≤ 1.2
- > 1.0 and ≤ 1.1
- > 0.9 and ≤ 1.0
- > 0.8 and ≤ 0.9
- ≤ 0.8

■ Combined sediment PCB indicator kriging RAL exceedance area

■ Additional Thiessen polygon RAL exceedance area for other COCs

1 RAL exceedance area number

▨ Recovery Category 1

▨ Intertidal area

▨ Shoal area

▨ Early Action Area

▨ King County tax parcel

--- Federal Navigation Channel

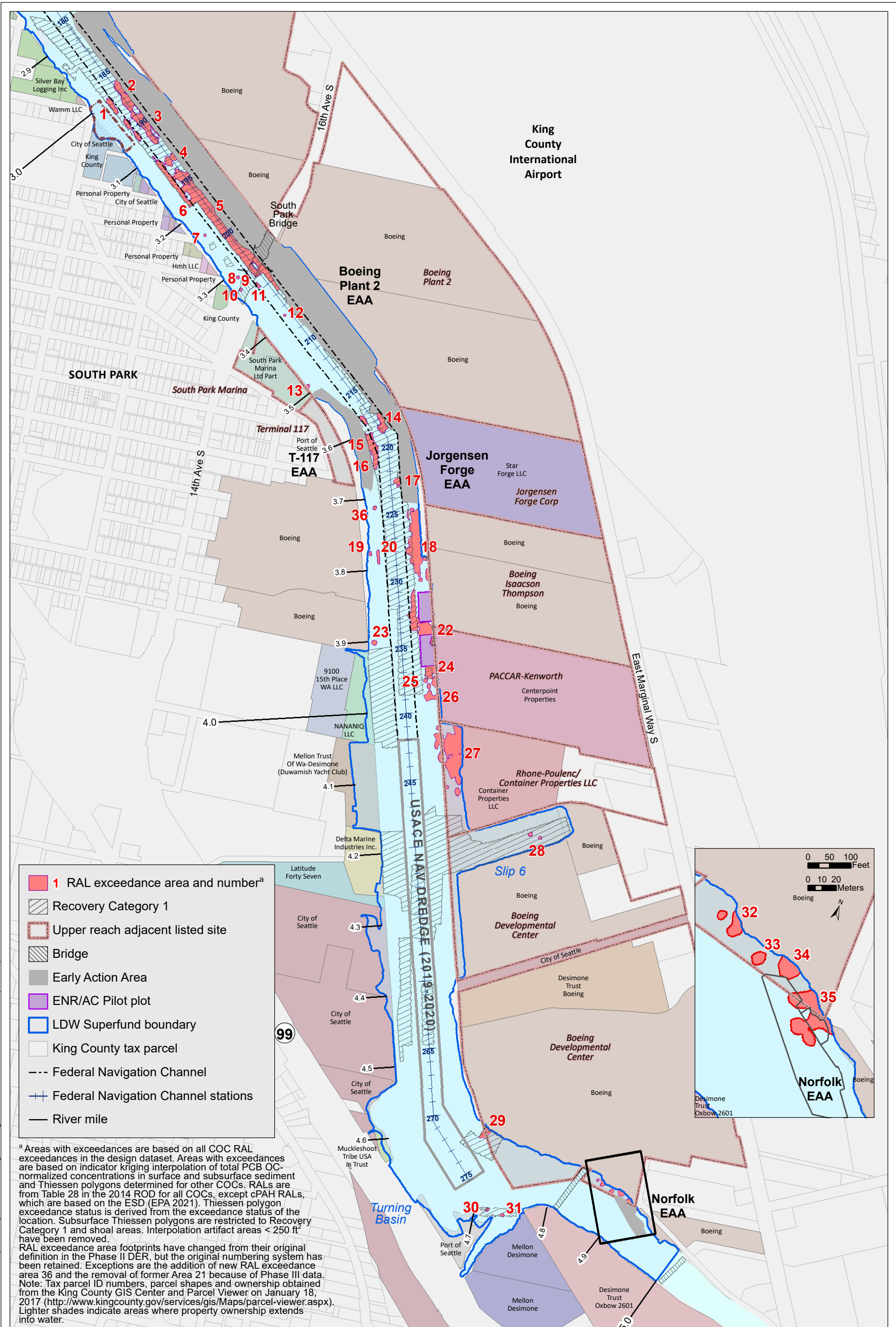
— River mile

Prepared by craigh.721225: W:\Projects\Duwamish\_AOC\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig 04-1d 7216\_Combined\_Phil\_REAs\_wNear\_RALS-3.mxd

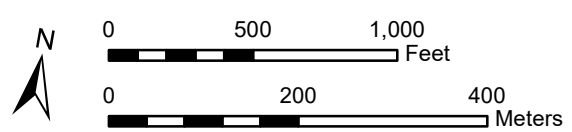


**Figure 4-1d. Combined RAL exceedance areas (PCB interpolation and Thiessen polygons for other COCs) with RAL exceedances, RMs 4.3 to 5.0**  
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 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023





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

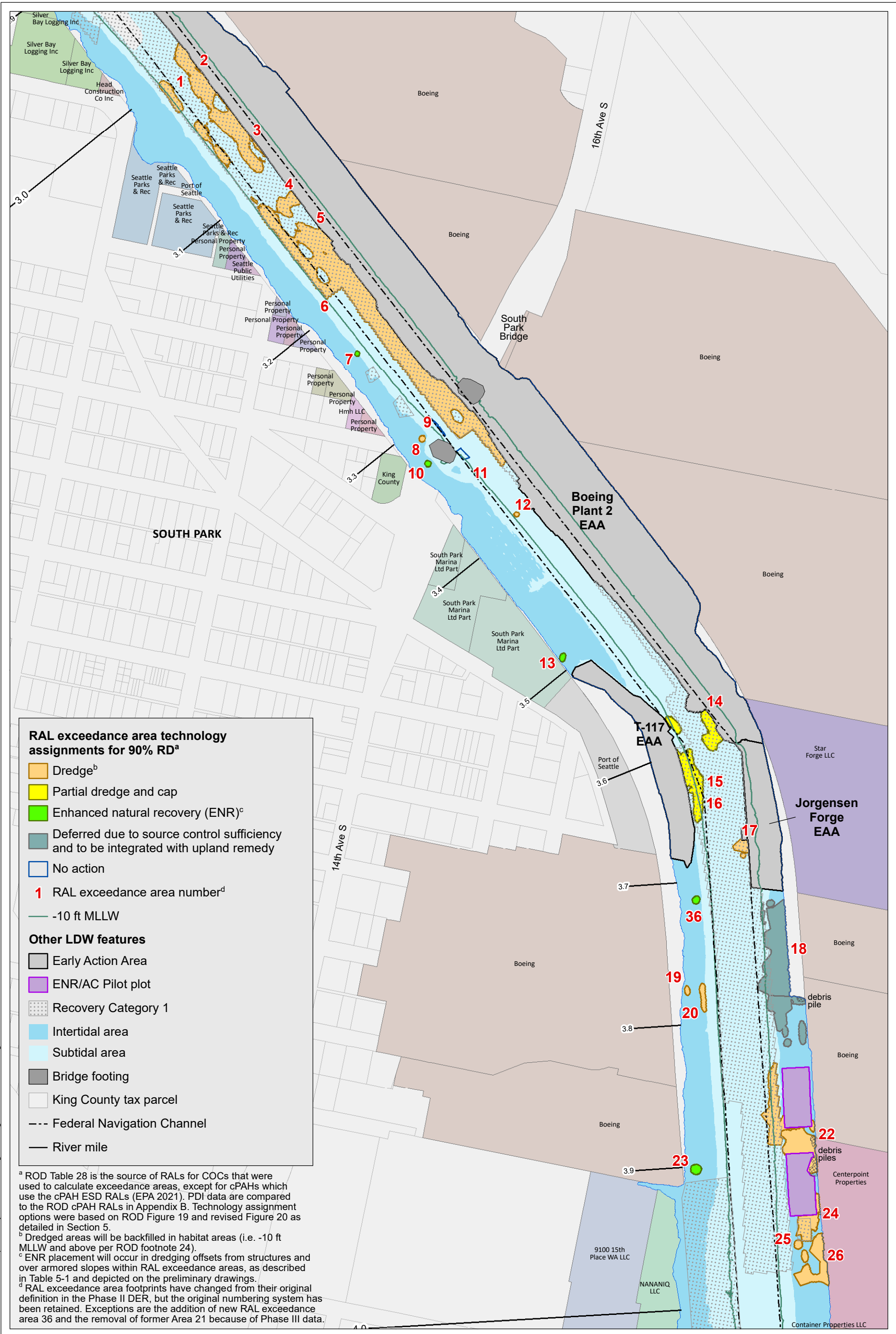


**Figure 4-2. RAL exceedance areas in the upper reach**

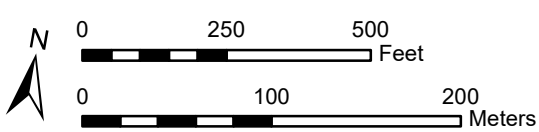
**90% REMEDIAL DESIGN BASIS OF DESIGN**  
**REPORT FOR THE LDW UPPER REACH**      **JULY 24, 2023**

Prepared by craigh. 7/21/23: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig 04-2\_7259\_Prelim\_RAL\_exceedance\_areas\_wfPropOwnership.mxd





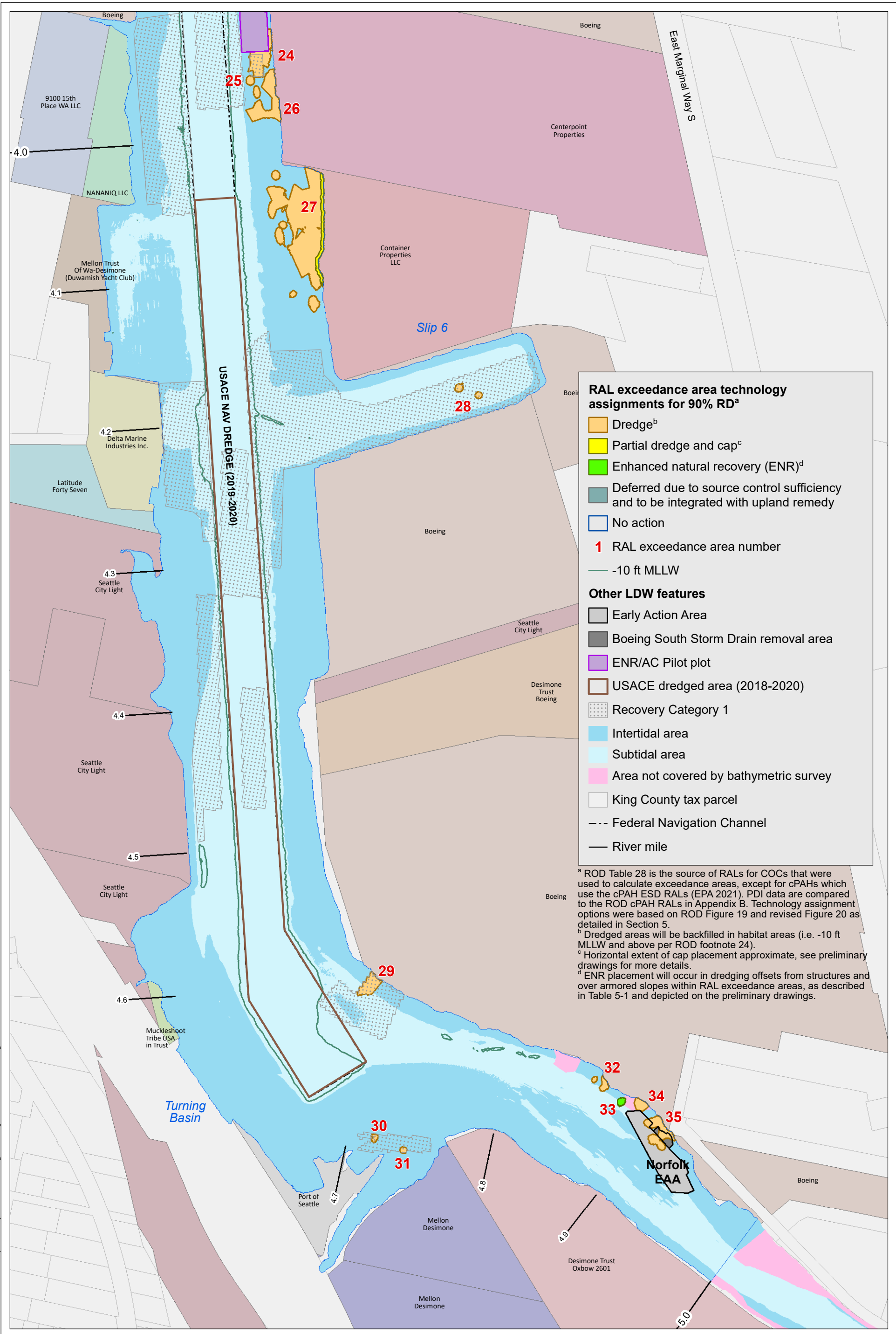
Prepared by craigh.712125:W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig\_05-1a\_7392\_REA\_tech\_assignments\_RM\_3-4.mxd



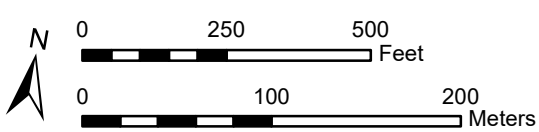
**Figure 5-1a. Technology assignment by RAL exceedance area, RMs 3.0 to 4.0**

90% REMEDIAL DESIGN BASIS OF DESIGN  
 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023





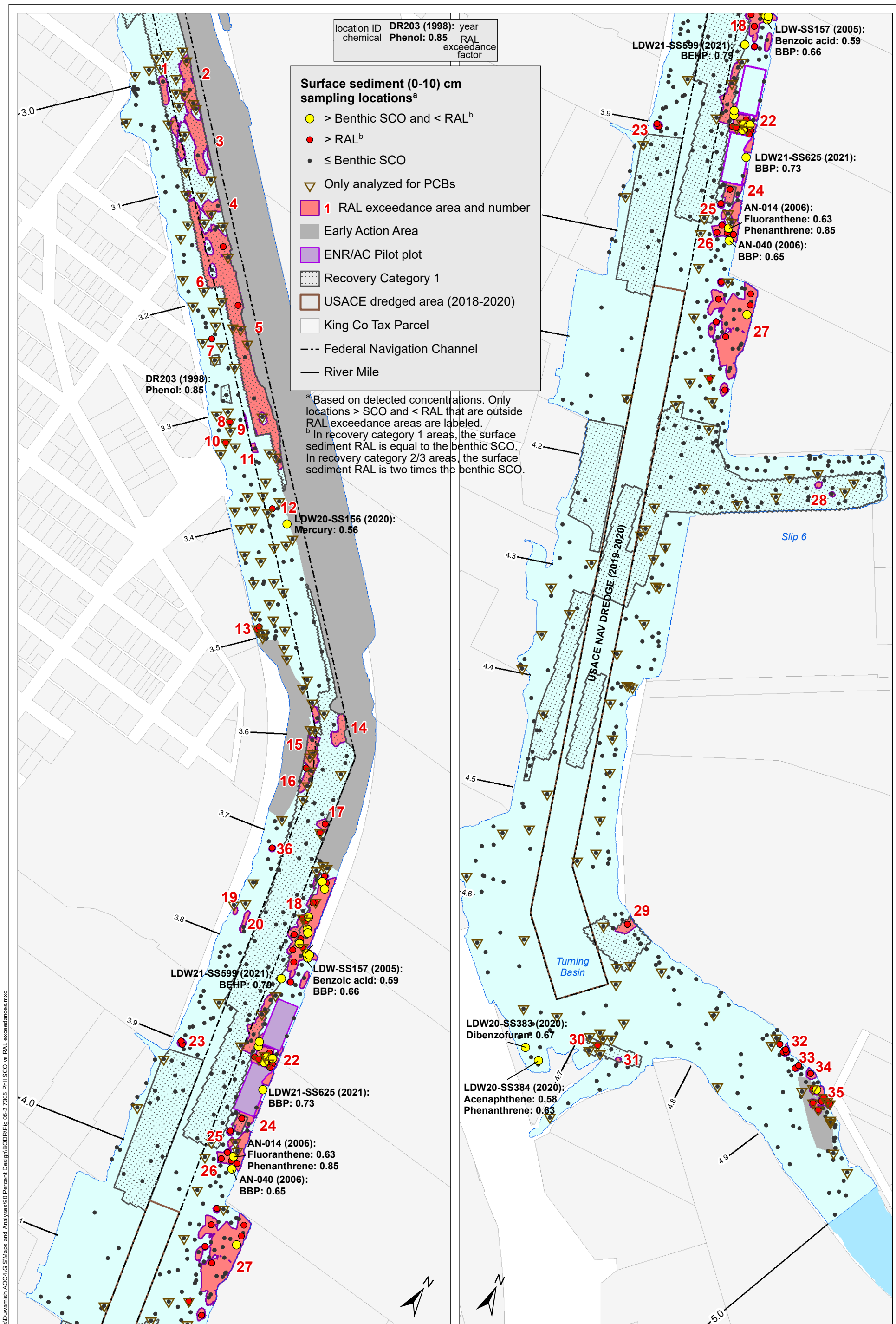
Prepared by craigh.712125.W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent Design\BODR\Fig 05-1b\_7392\_REA\_tech\_assignments\_RM\_4-5.mxd



**Figure 5-1b. Technology assignment by RAL exceedance area, RMs 4.0 to 5.0**

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 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023





Prepared by craigh.712125: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent Design\BODR\Fig 05-2-7905 P111 SCO vs RAL exceedances.mxd



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

0 500 1,000 Feet

0 100 200 Meters

Scale is the same for each inset map

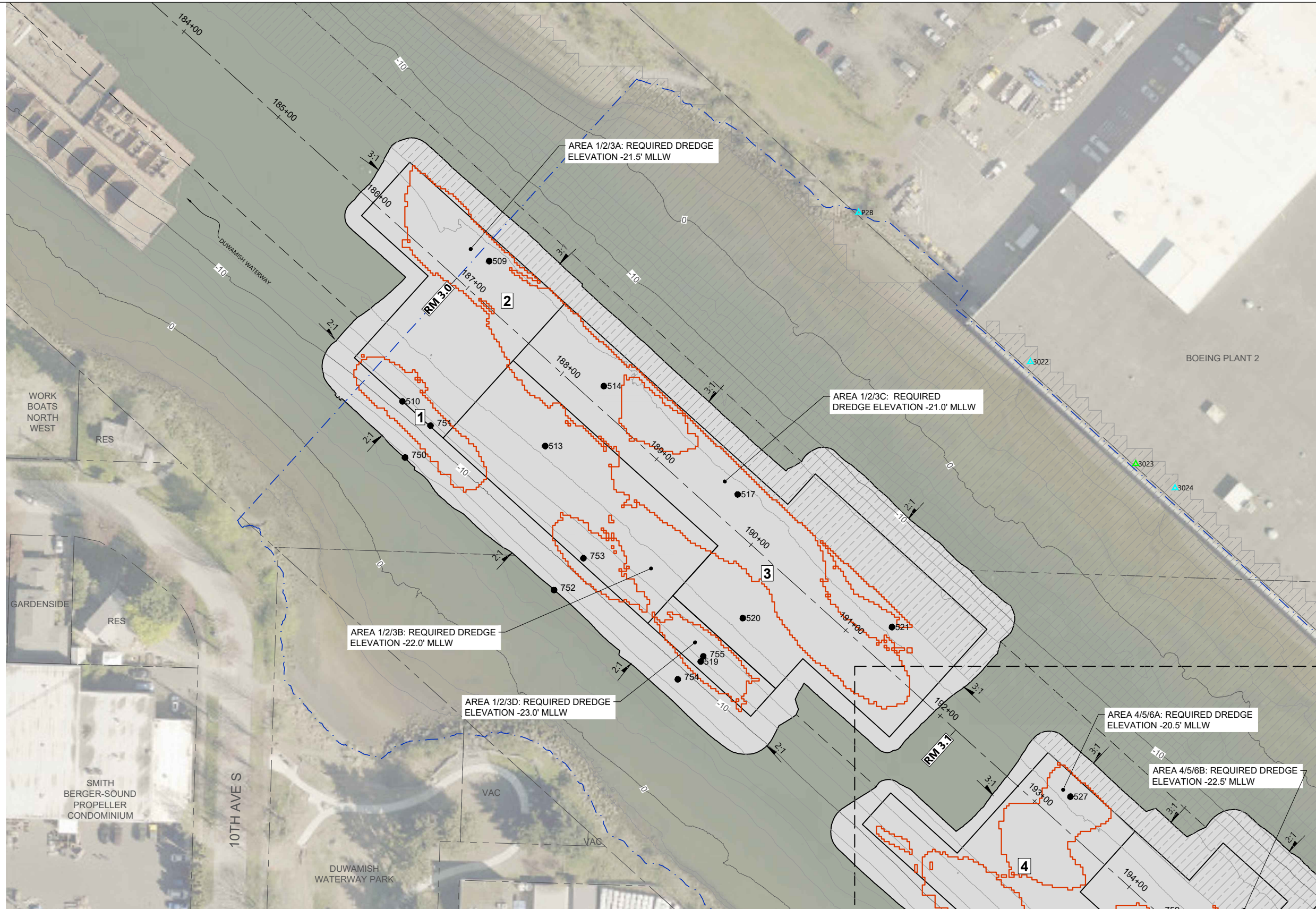
**Figure 5-2. Locations in the upper reach with surface sediment concentrations > benthic SCO and < RAL**

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REPORT FOR THE LDW UPPER REACH

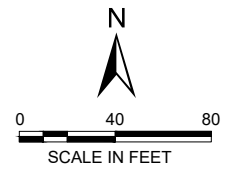
JULY 24, 2023



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-1a  
 Jul 18, 2023 1:38pm Iridgia



- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING

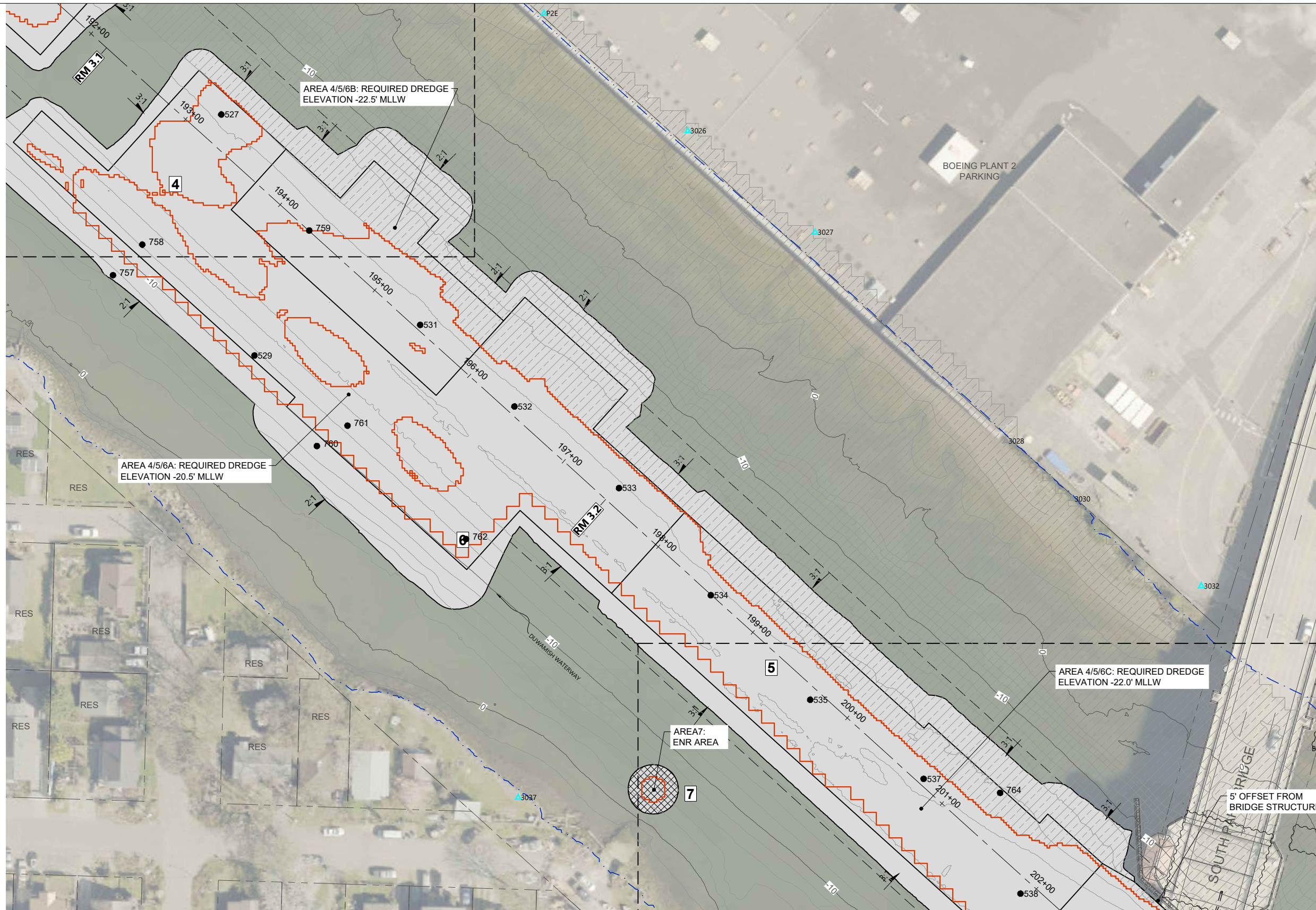


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRL.

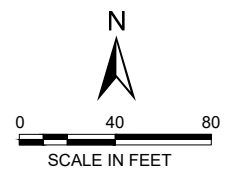
**Figure 6-1a. RAA development (RMs 2.93 to 3.15)**



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- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR



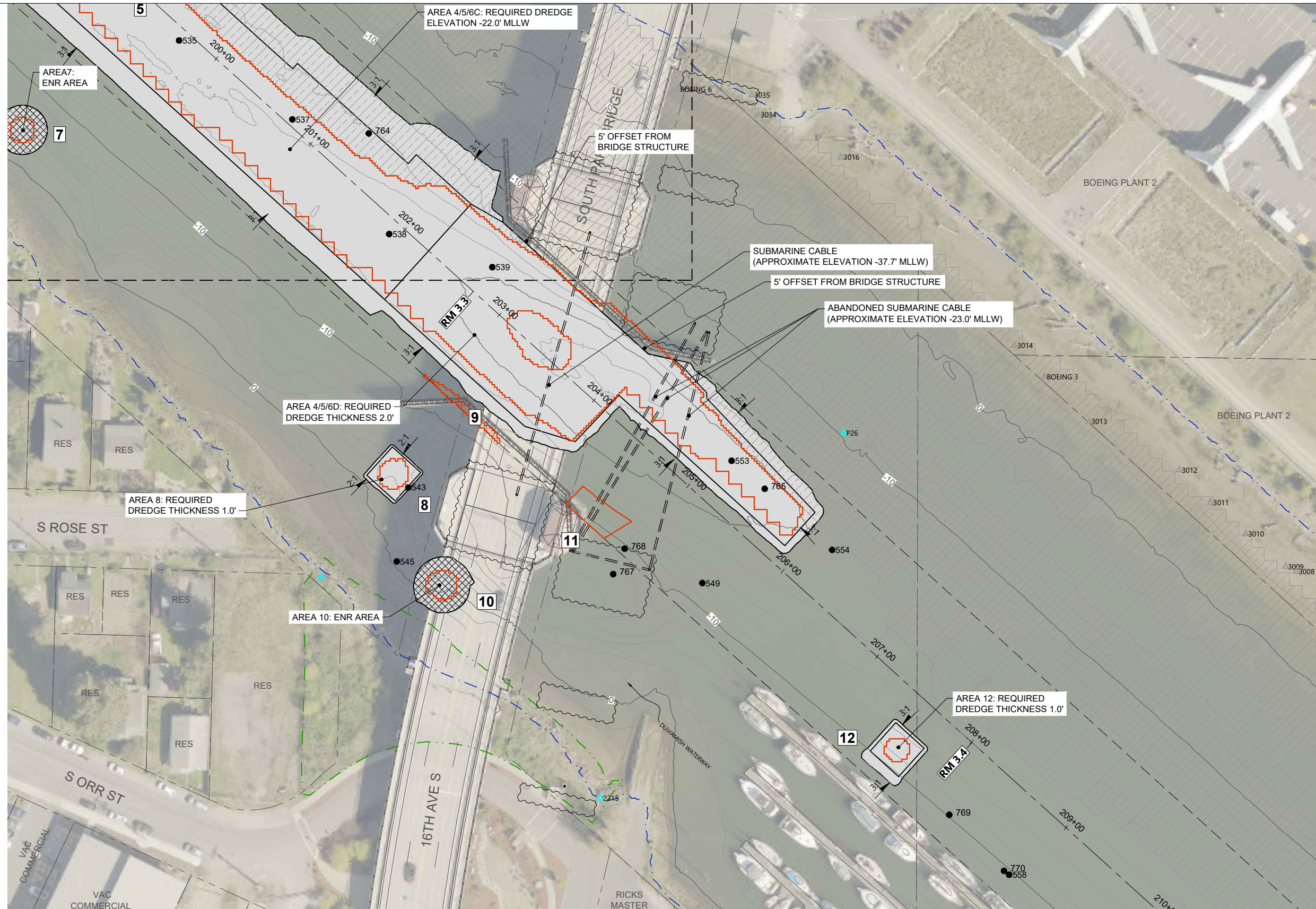
- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
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  3. AERIAL IMAGE BY ESRI.

**Figure 6-1b. RAA development (RMs 3.09 to 3.29)**



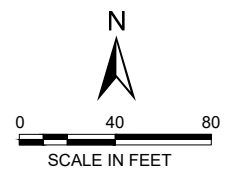


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**LEGEND:**

- USACE CHANNEL CENTERLINE AND STATIONING
- FEDERAL NAVIGATION CHANNEL
- RIVER MILE LABEL
- EARLY ACTION AREA
- LDW UPPER REACH APPROXIMATE BOUNDARY
- KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
- 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
- OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
- EXISTING PILE, APPROXIMATE LOCATION
- EXISTING DOLPHIN, APPROXIMATE LOCATION
- VERTICAL SAMPLE LOCATION
- RAL EXCEEDANCE AREA NUMBER
- RAL EXCEEDANCE AREA (5/26/23)
- REMEDIAL ACTION AREA: DREDGING
- REMEDIAL ACTION AREA: ENR



- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRI.

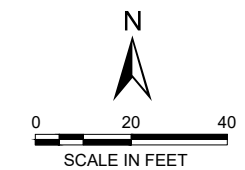
**Figure 6-1c. RAA development (RMs 3.23 to 3.44)**



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- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR

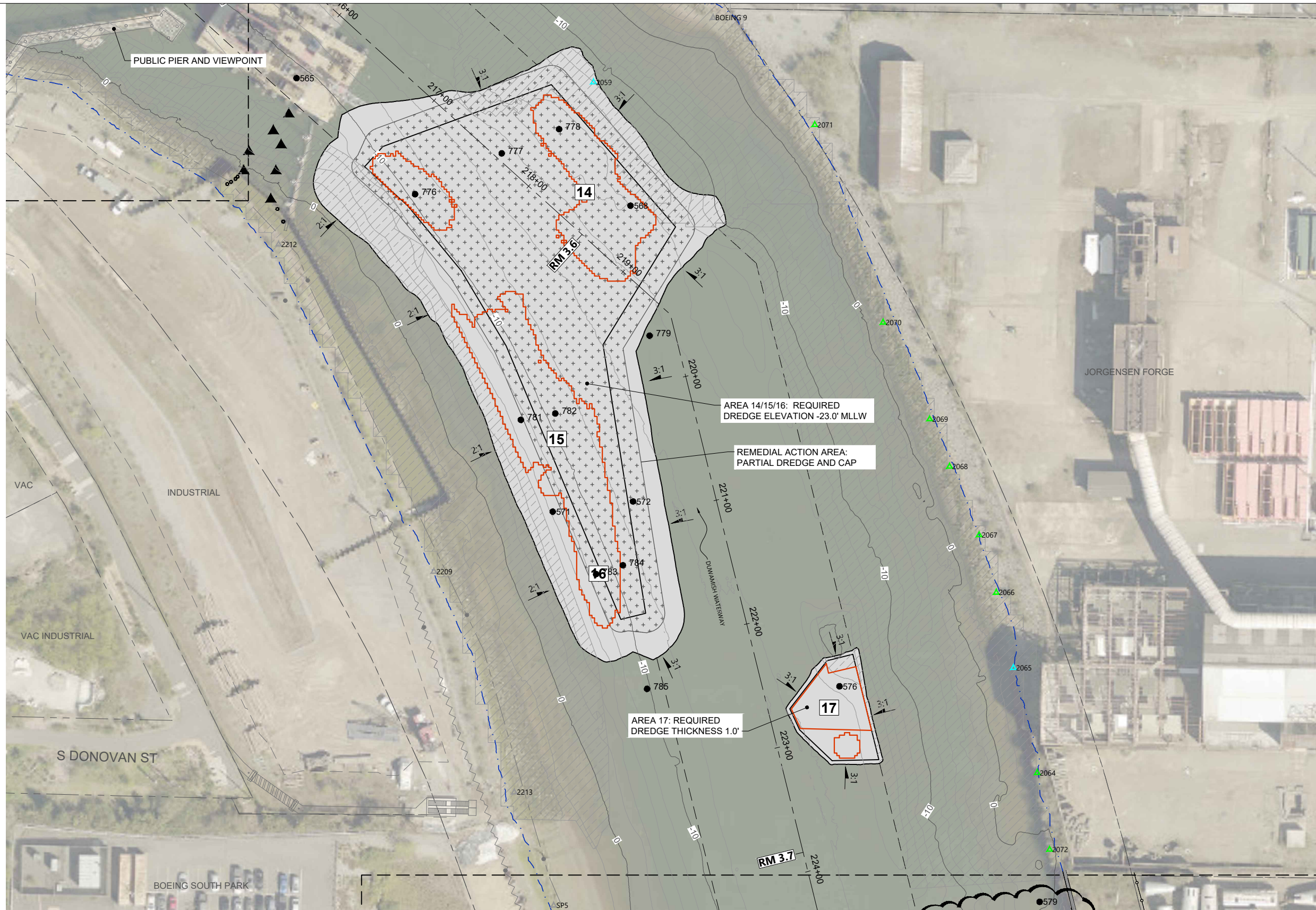


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
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  3. AERIAL IMAGE BY ESRI.

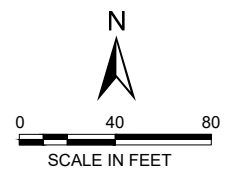
**Figure 6-1d. RAA development (RMs 3.49 to 3.56)**



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-1e  
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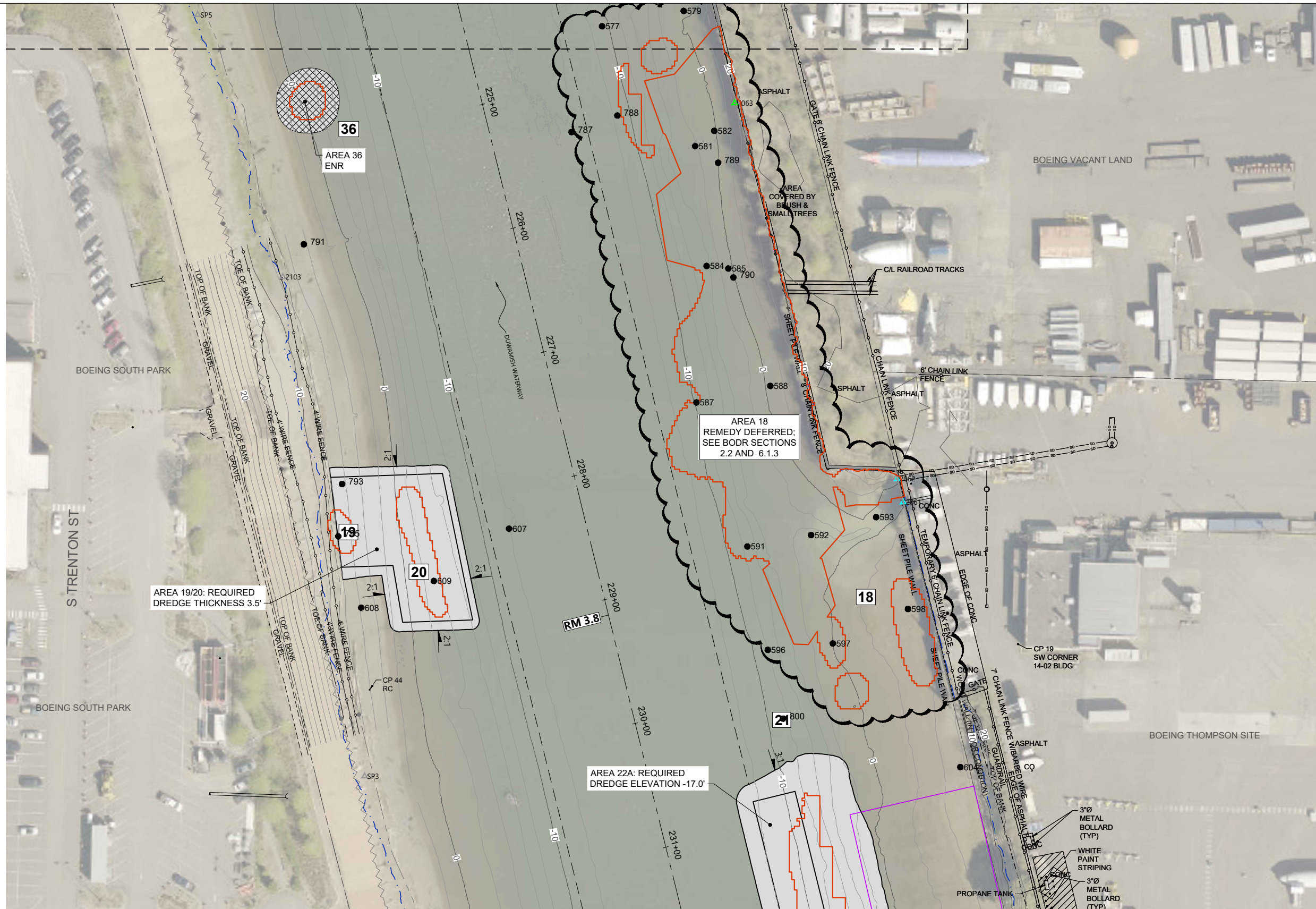
- LEGEND:**
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  - FEDERAL NAVIGATION CHANNEL
  - RM 3.0** RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - 2** RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: PARTIAL DREDGE AND CAP



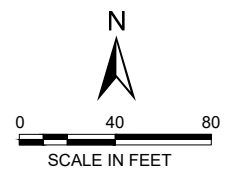
- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
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  3. AERIAL IMAGE BY ESRI.



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- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RM 3.0** RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - 2** RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR

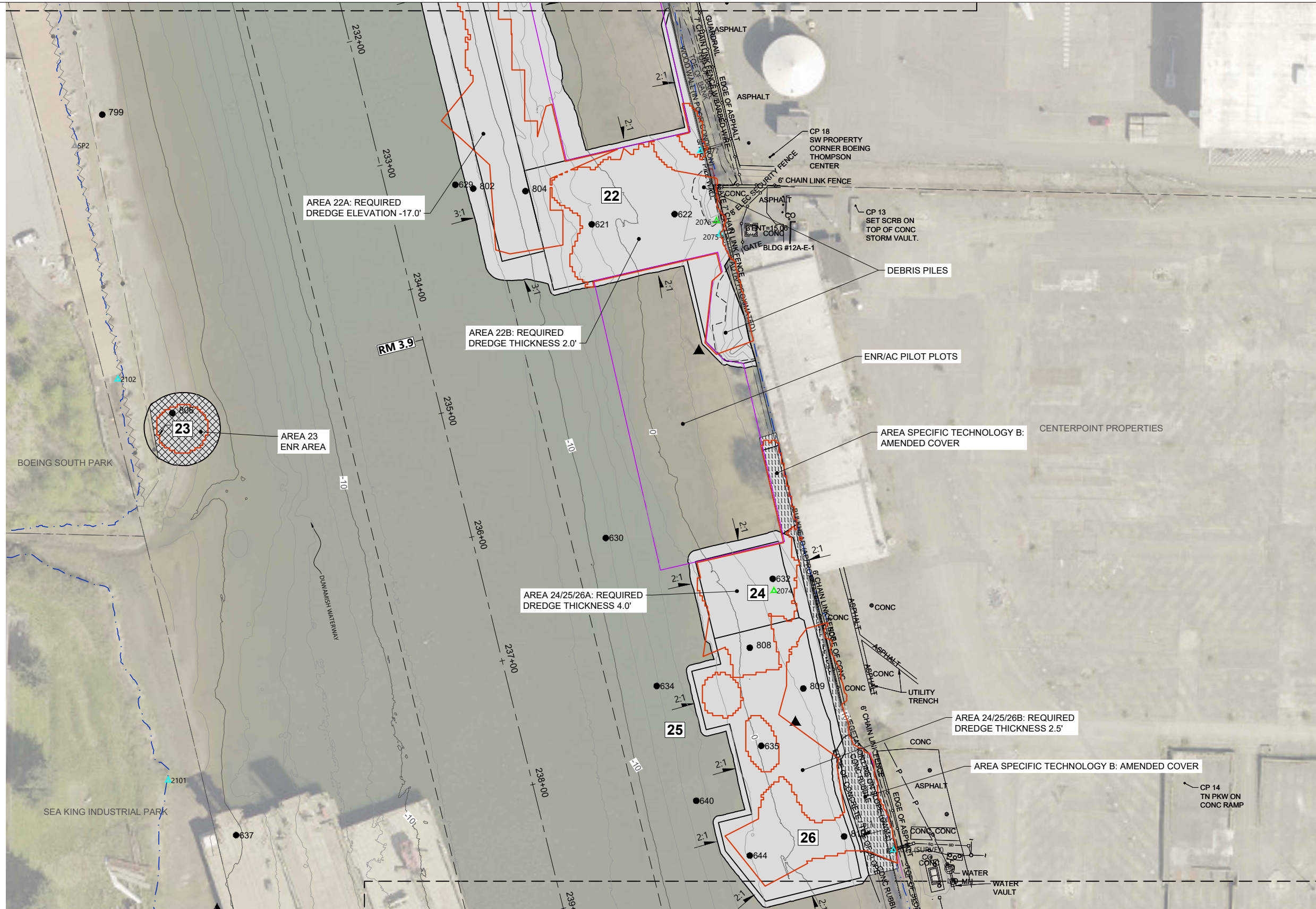


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
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  3. AERIAL IMAGE BY ESRI.

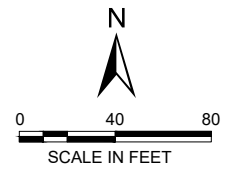
**Figure 6-1f. RAA development (RMs 3.73 to 3.84)**



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- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - RM 3.0**
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - ▲ OUTFALL LOCATION (ACTIVE)
  - ▲ OUTFALL LOCATION (ABANDONED/INACTIVE)
  - ▲ OUTFALL LOCATION (REMOVED)
  - ▲ EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - 2** RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR
  - REMEDIAL ACTION AREA: AREA-SPECIFIC TECHNOLOGY



- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ERSI.

**Figure 6-1g. RAA development (RMs 3.85 to 3.99)**

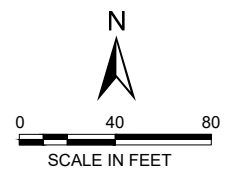




\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering\_Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-1h



- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR
  - REMEDIAL ACTION AREA: ENGINEERED CAP

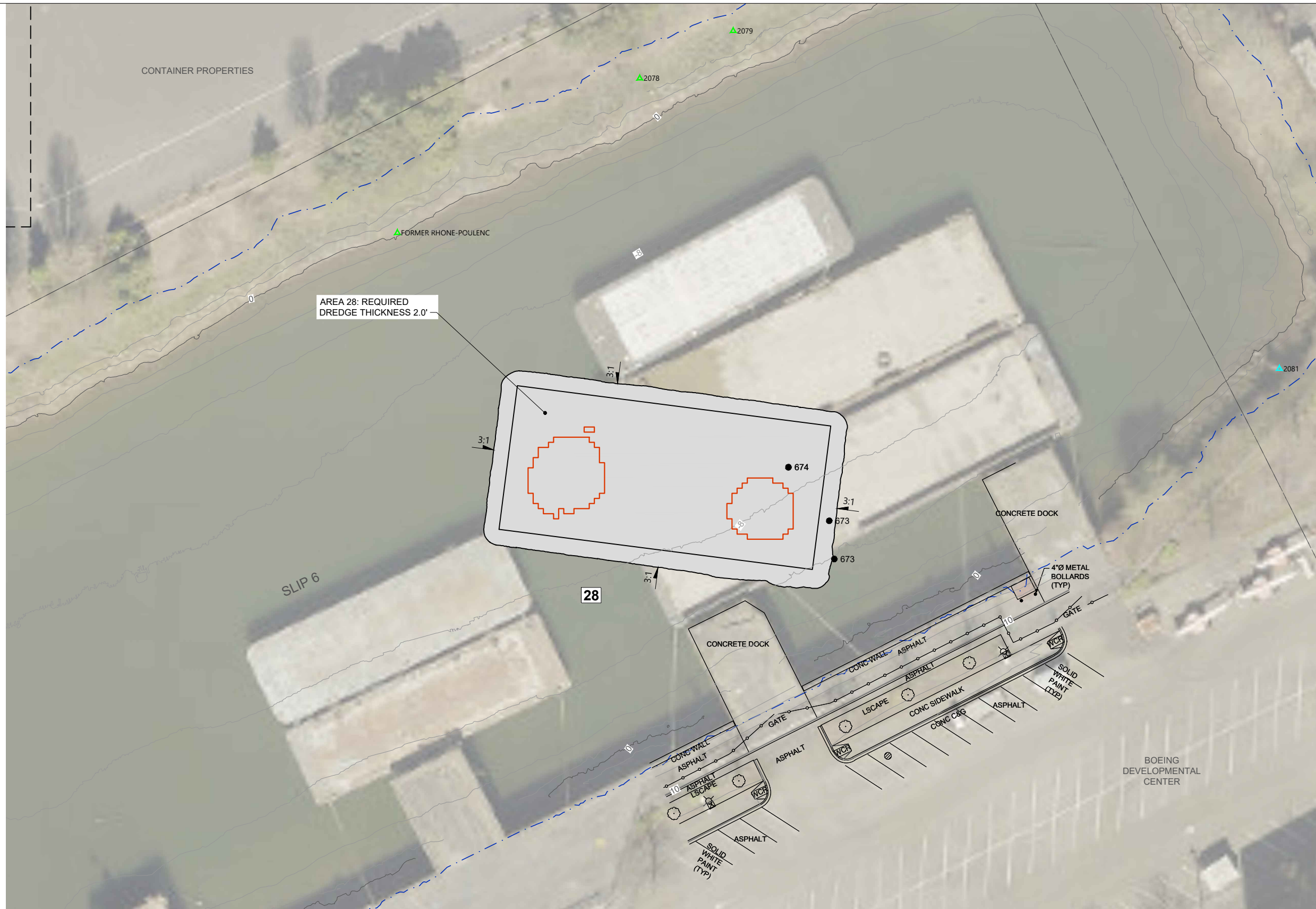


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRI.

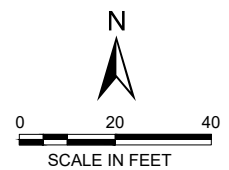
**Figure 6-1h. RAA development (RMs 3.98 to 4.13)**



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-1i  
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- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - ▲ OUTFALL LOCATION (ACTIVE)
  - ▲ OUTFALL LOCATION (ABANDONED/INACTIVE)
  - ▲ OUTFALL LOCATION (REMOVED)
  - ▲ EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - 2 RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING



- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRI.

**Figure 6-1i. RAA development (RMs 4.14 to 4.23)**

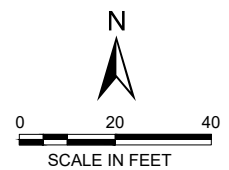


\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-1j



**LEGEND:**

- USACE CHANNEL CENTERLINE AND STATIONING
- FEDERAL NAVIGATION CHANNEL
- RIVER MILE LABEL
- EARLY ACTION AREA
- LDW UPPER REACH APPROXIMATE BOUNDARY
- KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
- 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
- OUTFALL LOCATION (ACTIVE)
- OUTFALL LOCATION (ABANDONED/INACTIVE)
- OUTFALL LOCATION (REMOVED)
- EXISTING PILE, APPROXIMATE LOCATION
- EXISTING DOLPHIN, APPROXIMATE LOCATION
- VERTICAL SAMPLE LOCATION
- RAL EXCEEDANCE AREA NUMBER
- RAL EXCEEDANCE AREA (5/26/23)
- REMEDIAL ACTION AREA: DREDGING

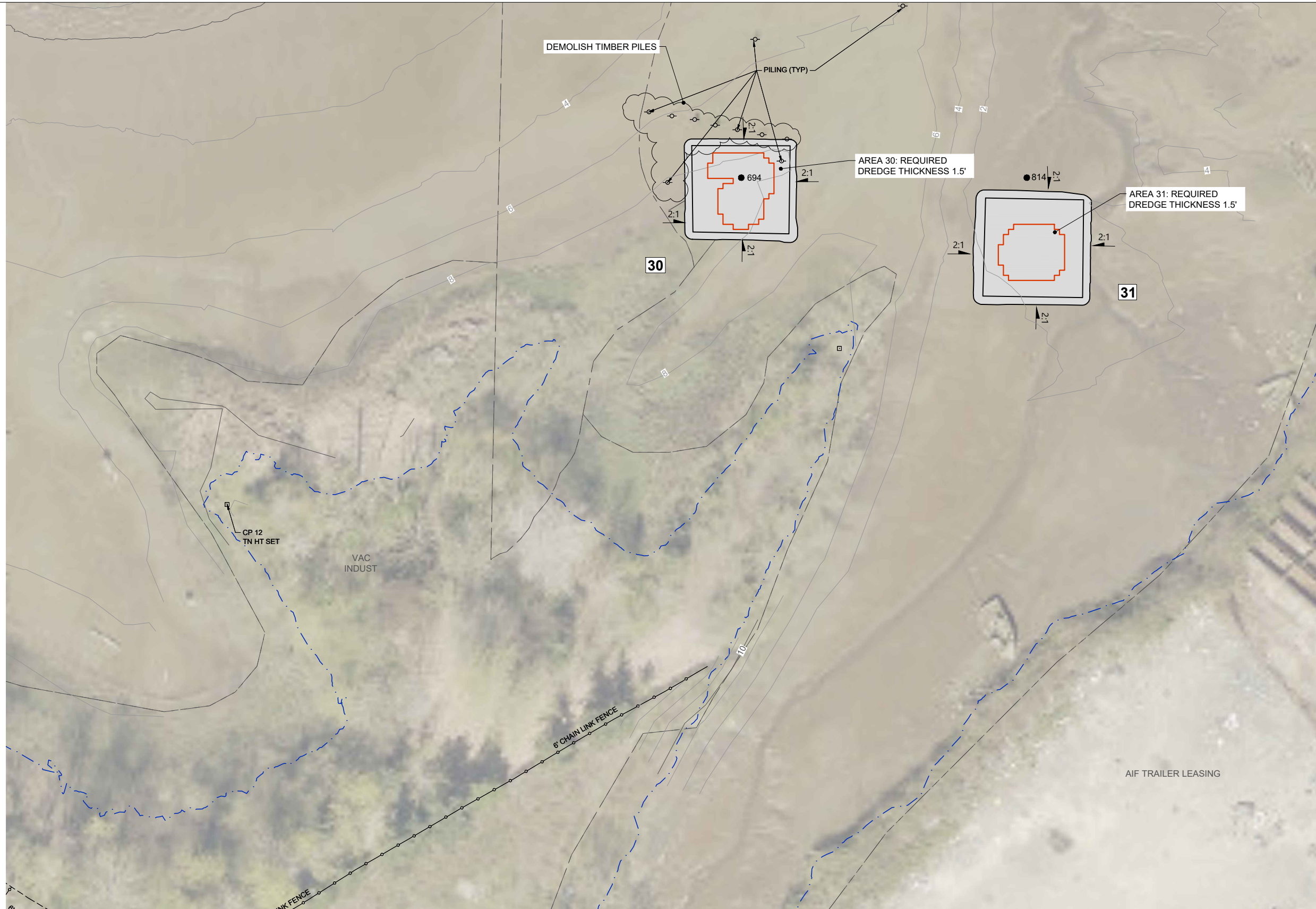


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRI.

**Figure 6-1j. RAA development (RMs 4.57 to 4.66)**

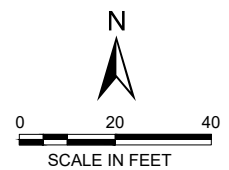


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 Jul 18, 2023 1:45pm Lidija



**LEGEND:**

- USACE CHANNEL CENTERLINE AND STATIONING
- FEDERAL NAVIGATION CHANNEL
- RIVER MILE LABEL
- EARLY ACTION AREA
- LDW UPPER REACH APPROXIMATE BOUNDARY
- KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
- 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
- OUTFALL LOCATION (ACTIVE)
- OUTFALL LOCATION (ABANDONED/INACTIVE)
- OUTFALL LOCATION (REMOVED)
- EXISTING PILE, APPROXIMATE LOCATION
- EXISTING DOLPHIN, APPROXIMATE LOCATION
- VERTICAL SAMPLE LOCATION
- RAL EXCEEDANCE AREA NUMBER
- RAL EXCEEDANCE AREA (5/26/23)
- REMEDIAL ACTION AREA: DREDGING
- REMEDIAL ACTION AREA: ENR

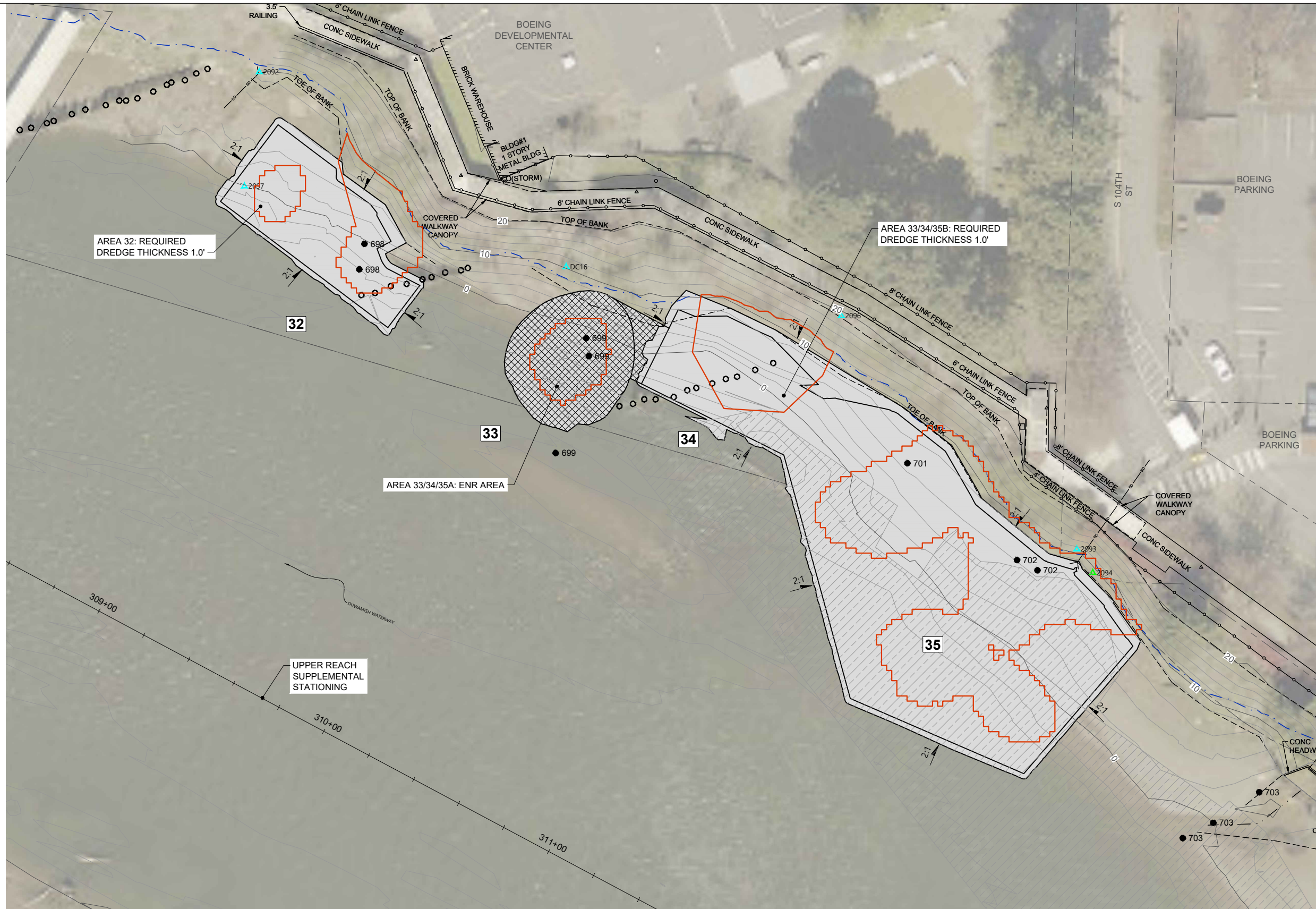


- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW
  3. AERIAL IMAGE BY ESRI.

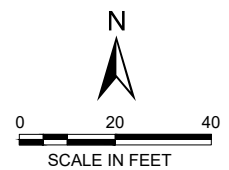
**Figure 6-1k. RAA development (RMs 4.64 to 4.76)**



\\glat\CAD\Projects\0067-King County\LDW Upper Reach\Engineering Services\0067-RP-034-LDWUR BODR Dredge.dwg Figure 6-11



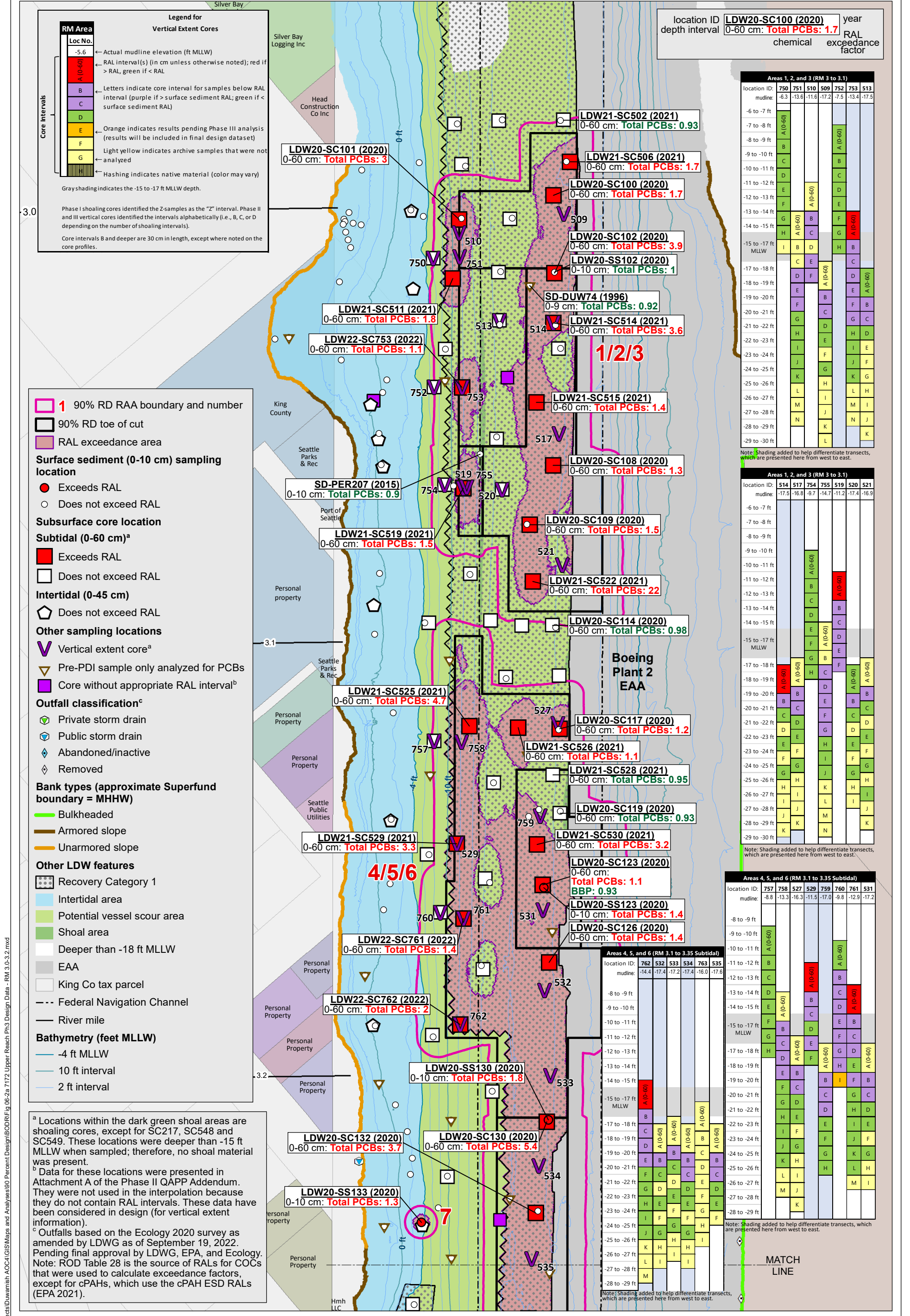
- LEGEND:**
- USACE CHANNEL CENTERLINE AND STATIONING
  - FEDERAL NAVIGATION CHANNEL
  - RIVER MILE LABEL
  - EARLY ACTION AREA
  - LDW UPPER REACH APPROXIMATE BOUNDARY
  - KING COUNTY SHORELINE HABITAT RESTORATION APPROXIMATE EXTENTS
  - 2018 BATHYMETRIC CONTOURS (2' & 10' INTERVALS)
  - OUTFALL LOCATION (ACTIVE)
  - OUTFALL LOCATION (ABANDONED/INACTIVE)
  - OUTFALL LOCATION (REMOVED)
  - EXISTING PILE, APPROXIMATE LOCATION
  - EXISTING DOLPHIN, APPROXIMATE LOCATION
  - VERTICAL SAMPLE LOCATION
  - RAL EXCEEDANCE AREA NUMBER
  - RAL EXCEEDANCE AREA (5/26/23)
  - REMEDIAL ACTION AREA: DREDGING
  - REMEDIAL ACTION AREA: ENR



- NOTES:**
1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83 (2011), U.S. SURVEY FEET
  2. VERTICAL DATUM: MLLW

**Figure 6-11. RAA development (RMs 4.84 to 4.95)**





**Legend for Vertical Extent Cores**

**RM Area**

**Loc No.**

- 5.6 Actual mudline elevation (ft MLLW)
- A (0-60) RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
- B Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
- C
- D
- E Orange indicates results pending Phase III analysis (results will be included in final design dataset)
- F Light yellow indicates archive samples that were not analyzed
- G Hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.

Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).

Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

**1** 90% RD RAA boundary and number

**90% RD toe of cut**

**RAL exceedance area**

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core location**

**Subtidal (0-60 cm)<sup>a</sup>**

- Exceeds RAL
- Does not exceed RAL

**Intertidal (0-45 cm)**

- ⬠ Does not exceed RAL

**Other sampling locations**

- ∇ Vertical extent core<sup>a</sup>
- ▽ Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval<sup>b</sup>

**Outfall classification<sup>c</sup>**

- ◆ Private storm drain
- ◆ Public storm drain
- ◆ Abandoned/inactive
- ◆ Removed

**Bank types (approximate Superfund boundary = MHHW)**

- Bulkheaded
- Armored slope
- Unarmored slope

**Other LDW features**

- Recovery Category 1
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW
- EAA
- King Co tax parcel
- Federal Navigation Channel
- River mile

**Bathymetry (feet MLLW)**

- 4 ft MLLW
- 10 ft interval
- 2 ft interval

<sup>a</sup> Locations within the dark green shoal areas are shoaling cores, except for SC217, SC548 and SC549. These locations were deeper than -15 ft MLLW when sampled; therefore, no shoal material was present.

<sup>b</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).

<sup>c</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology. Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).

location ID **LDW20-SC100 (2020)** year  
 depth interval **0-60 cm: Total PCBs: 1.7** RAL  
 chemical exceedance factor

**Areas 1, 2, and 3 (RM 3 to 3.1)**

location ID:	750	751	510	509	752	753	513
mudline:	-6.3	-13.6	-11.6	-17.2	-7.5	-13.4	-17.5
-6 to -7 ft							
-7 to -8 ft	A (0-60)						
-8 to -9 ft	B						
-9 to -10 ft	C						
-10 to -11 ft	D						
-11 to -12 ft	E						
-12 to -13 ft	F						
-13 to -14 ft	G						
-14 to -15 ft	H						
-15 to -17 ft MLLW	I	B	D		H	B	
-17 to -18 ft	C	E			C		
-18 to -19 ft	D	F	A (0-60)		D		
-19 to -20 ft	E	G			E		
-20 to -21 ft	F	H			F		
-21 to -22 ft	G	I			G		
-22 to -23 ft	H	J			H		
-23 to -24 ft	I	K			I		
-24 to -25 ft	J	L			J		
-25 to -26 ft	K	M			K		
-26 to -27 ft	L	N			L		
-27 to -28 ft	M				M		
-28 to -29 ft	N				N		
-29 to -30 ft							

**Areas 1, 2, and 3 (RM 3 to 3.1)**

location ID:	514	517	754	755	519	520	521
mudline:	-17.5	-16.8	-9.7	-14.7	-11.2	-17.4	-16.9
-6 to -7 ft							
-7 to -8 ft							
-8 to -9 ft							
-9 to -10 ft							
-10 to -11 ft							
-11 to -12 ft							
-12 to -13 ft							
-13 to -14 ft							
-14 to -15 ft							
-15 to -17 ft MLLW							
-17 to -18 ft							
-18 to -19 ft							
-19 to -20 ft							
-20 to -21 ft							
-21 to -22 ft							
-22 to -23 ft							
-23 to -24 ft							
-24 to -25 ft							
-25 to -26 ft							
-26 to -27 ft							
-27 to -28 ft							
-28 to -29 ft							
-29 to -30 ft							

**Areas 4, 5, and 6 (RM 3.1 to 3.35 Subtidal)**

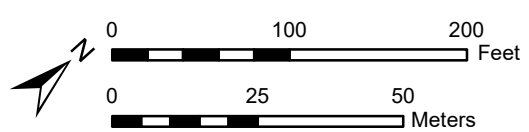
location ID:	757	758	527	529	759	760	761	531
mudline:	-8.8	-13.3	-16.3	-11.5	-17.0	-9.8	-12.9	-17.2
-8 to -9 ft								
-9 to -10 ft								
-10 to -11 ft								
-11 to -12 ft								
-12 to -13 ft								
-13 to -14 ft								
-14 to -15 ft								
-15 to -17 ft MLLW								
-17 to -18 ft								
-18 to -19 ft								
-19 to -20 ft								
-20 to -21 ft								
-21 to -22 ft								
-22 to -23 ft								
-23 to -24 ft								
-24 to -25 ft								
-25 to -26 ft								
-26 to -27 ft								
-27 to -28 ft								
-28 to -29 ft								

**Areas 4, 5, and 6 (RM 3.1 to 3.35 Subtidal)**

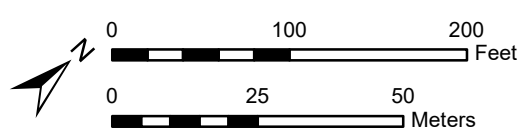
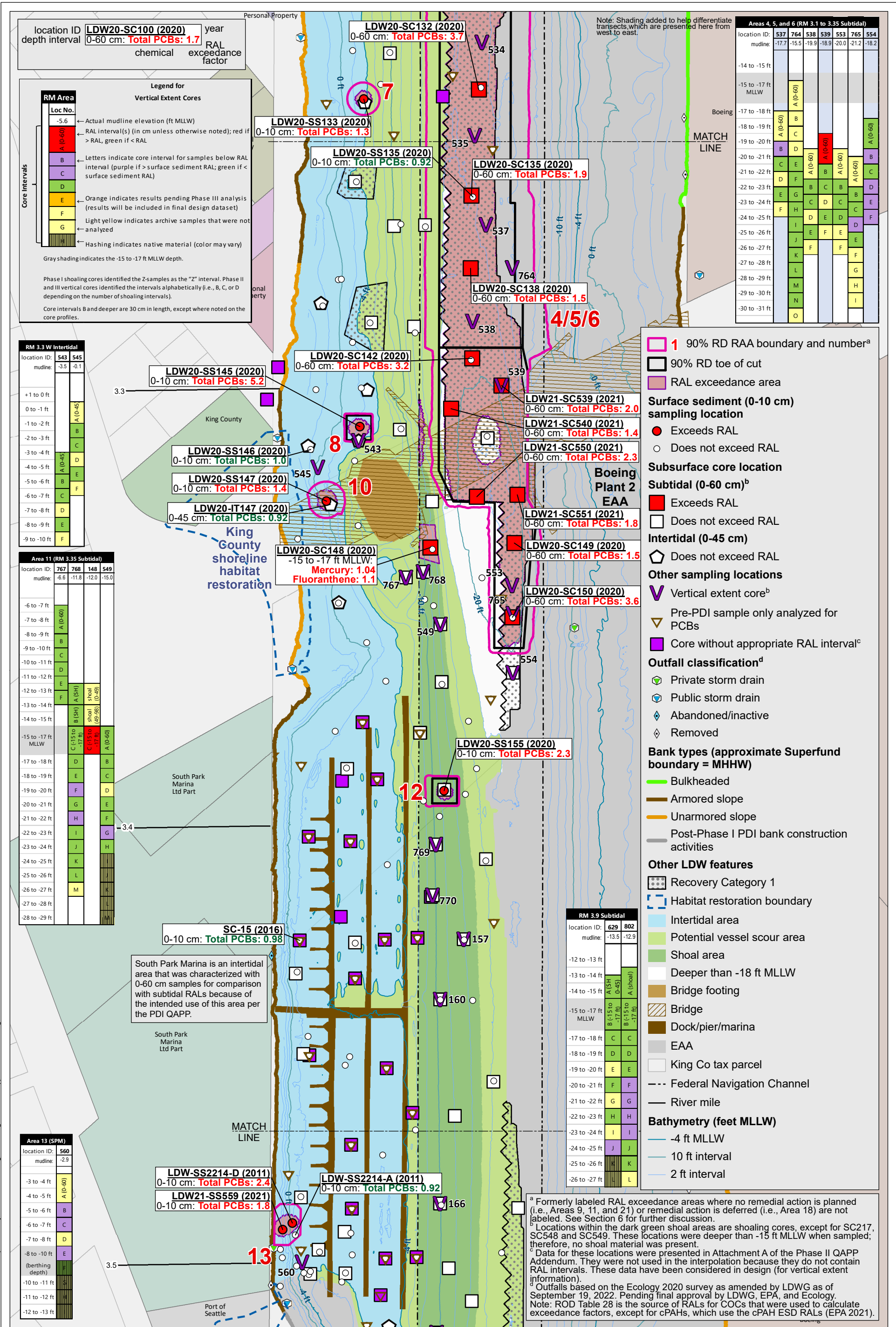
location ID:	762	532	533	534	763	535
mudline:	-14.4	-17.4	-17.2	-17.4	-16.0	-17.6
-8 to -9 ft						
-9 to -10 ft						
-10 to -11 ft						
-11 to -12 ft						
-12 to -13 ft						
-13 to -14 ft						
-14 to -15 ft						
-15 to -17 ft MLLW						
-17 to -18 ft						
-18 to -19 ft						
-19 to -20 ft						
-20 to -21 ft						
-21 to -22 ft						
-22 to -23 ft						
-23 to -24 ft						
-24 to -25 ft						
-25 to -26 ft						
-26 to -27 ft						
-27 to -28 ft						
-28 to -29 ft						

**Figure 6-2a. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 3.0 to 3.2**

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 REPORT FOR THE LDW UPPER REACH  
 JULY 24, 2023



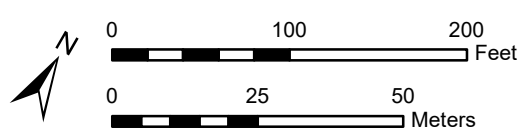
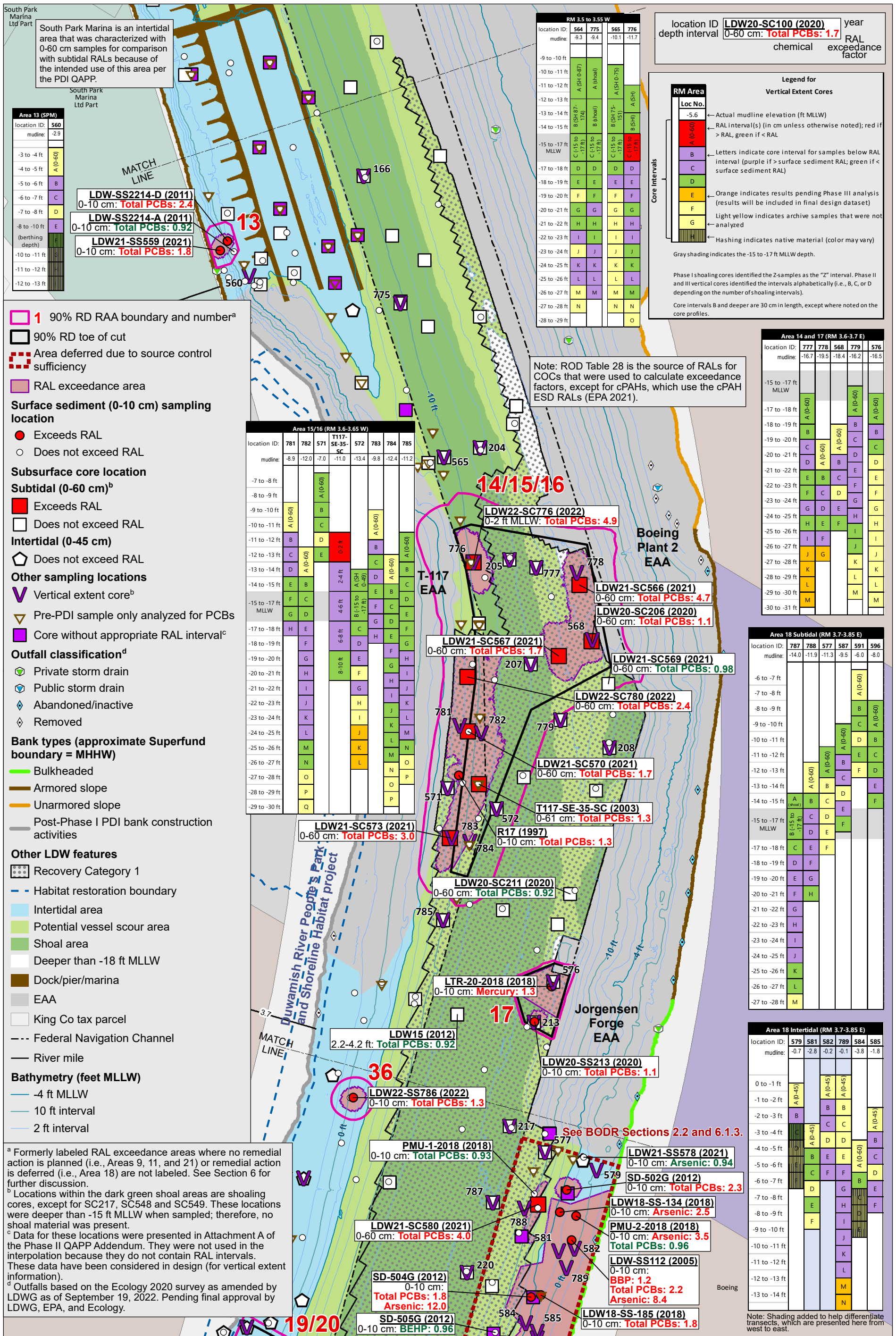




**Figure 6-2b. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 3.2 to 3.5**

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 JULY 24, 2023

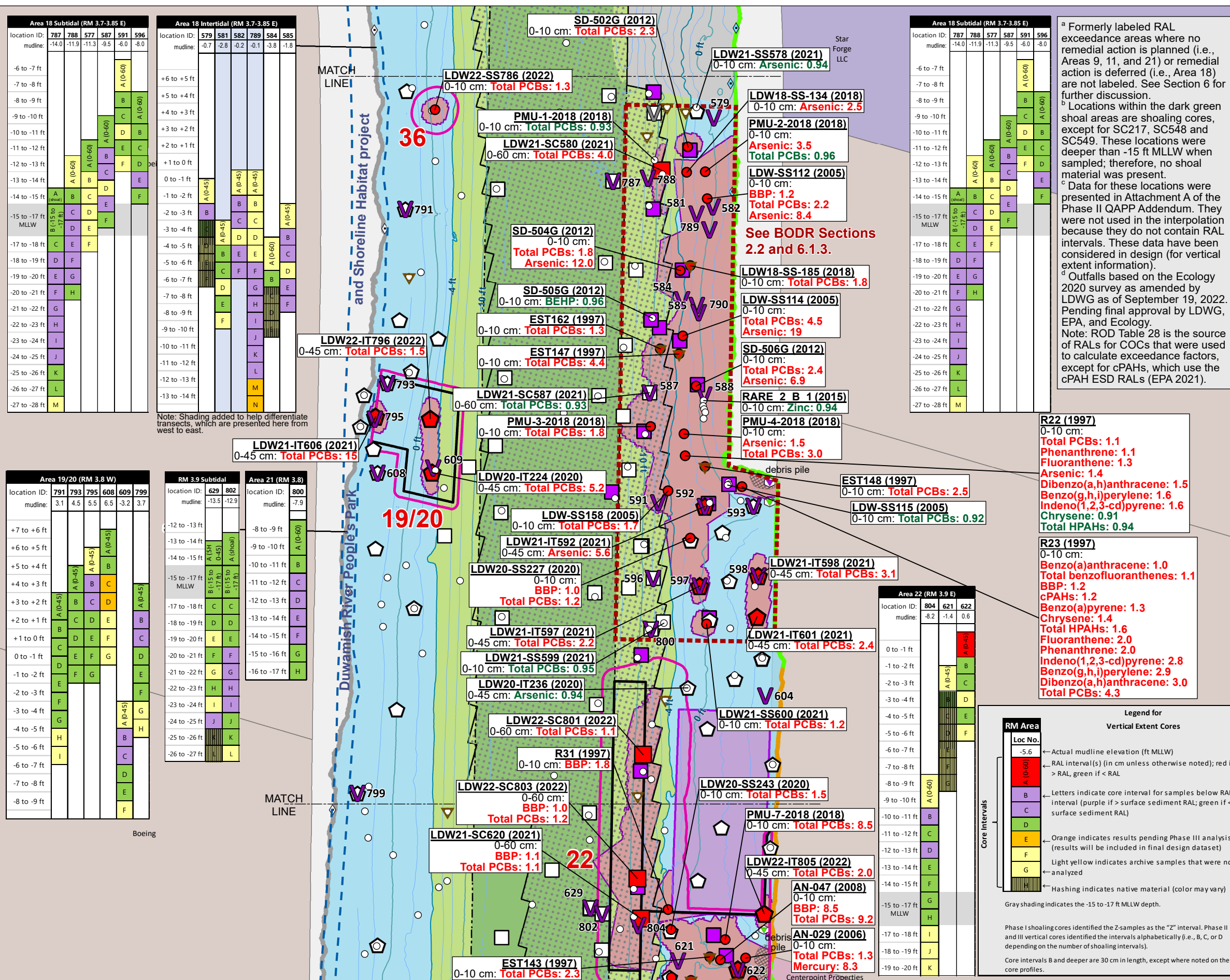




**Figure 6-2c. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 3.5 to 3.7**

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JULY 24, 2023





**1** 90% RD RAA boundary and number<sup>a</sup>

90% RD toe of cut

Area deferred due to source control sufficiency

RAL exceedance area

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core location**

**Subtidal (0-60 cm)<sup>b</sup>**

- Exceeds RAL
- Does not exceed RAL

**Intertidal (0-45 cm)**

- Exceeds RAL
- Does not exceed RAL

**Other sampling locations**

- Vertical extent core<sup>b</sup>
- Vertical archive
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval<sup>c</sup>

**Outfall classification<sup>d</sup>**

- EOF/storm drain
- Private storm drain
- Abandoned/inactive
- Removed

**Bank types (approximate Superfund boundary = MHHW)**

- Bulkheaded
- Unarmored slope
- Post-Phase I PDI bank construction activities

**Other LDW features**

- Recovery Category 1
- Habitat restoration boundary
- Intertidal area
- Potential vessel scour area
- Shoal area
- EAA
- ENR/AC Pilot plot
- King Co tax parcel
- Federal Navigation Channel
- River mile

**Bathymetry (feet MLLW)**

- 4 ft MLLW
- 10 ft interval
- 2 ft interval

**Legend for Vertical Extent Cores**

RM Area	Loc No.
-5.6	← Actual mudline elevation (ft MLLW)
A (0-60)	← RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
B	← Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
C	
D	
E	← Orange indicates results pending Phase III analysis (results will be included in final design dataset)
F	← Light yellow indicates archive samples that were not analyzed
G	← Hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.

Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).

Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

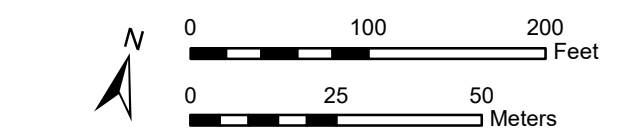
<sup>a</sup> Formerly labeled RAL exceedance areas where no remedial action is planned (i.e., Areas 9, 11, and 21) or remedial action is deferred (i.e., Area 18) are not labeled. See Section 6 for further discussion.

<sup>b</sup> Locations within the dark green shoal areas are shoaling cores, except for SC217, SC548 and SC549. These locations were deeper than -15 ft MLLW when sampled; therefore, no shoal material was present.

<sup>c</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).

<sup>d</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology.

Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).



**Figure 6-2d. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 3.7 to 3.85**

90% REMEDIAL DESIGN BASIS OF DESIGN  
REPORT FOR THE LDW UPPER REACH  
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<sup>a</sup> Locations within the dark green shoal areas are shoaling cores, except for SC217, SC548 and SC549. These locations were deeper than -15 ft MLLW when sampled; therefore, no shoal material was present.  
<sup>b</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).  
<sup>c</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology. Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).

**Legend for Vertical Extent Cores**

RM Area	Loc No.	Actual mudline elevation (ft MLLW)	RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
A (0-60)			
B			
C			
D			
E			
F			
G			

Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL, green if < surface sediment RAL)

Orange indicates results pending Phase III analysis (results will be included in final design dataset)

Light yellow indicates archive samples that were not analyzed

Hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.

Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).

Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

**RM 3.9 Subtidal**

location ID:	629	802
mudline:	-13.5	-12.9
-12 to -13 ft		
-13 to -14 ft	A (0-60)	A (0-60)
-14 to -15 ft	A (0-60)	A (0-60)
-15 to -17 ft MLLW	B (0-15 to -17 ft)	B (0-15 to -17 ft)
-17 to -18 ft	C	C
-18 to -19 ft	D	D
-19 to -20 ft	E	E
-20 to -21 ft	F	F
-21 to -22 ft	G	G
-22 to -23 ft	H	H
-23 to -24 ft	I	I
-24 to -25 ft	J	J
-25 to -26 ft	K	K
-26 to -27 ft	L	L

**Area 23**

location ID:	806
mudline:	3.2
+4 to +3 ft	A (0-45)
+3 to +2 ft	B
+2 to +1 ft	C
0 to -1 ft	D
-1 to -2 ft	E
-2 to -3 ft	F
-3 to -4 ft	G
-4 to -5 ft	H

**RM 4.1 E Intertidal**

location ID:	648	649	650	652	653	654	655
mudline:	-0.3	5.1	7.2	0.9	3.3	4.1	6.2
+7 to +6 ft							
+6 to +5 ft							
+5 to +4 ft							
+4 to +3 ft							
+3 to +2 ft							
+2 to +1 ft							
+1 to 0 ft							
0 to -1 ft							
-1 to -2 ft							
-2 to -3 ft							
-3 to -4 ft							
-4 to -5 ft							
-5 to -6 ft							
-6 to -7 ft							
-7 to -8 ft							

**RM 3.95 W**

location ID:	637
mudline:	0.2
0 to -1 ft	A (0-45)
-1 to -2 ft	B
-2 to -3 ft	C
-3 to -4 ft	D
-4 to -5 ft	E
-5 to -6 ft	F

**RM 3.95 to 4.0 E Subtidal**

location ID:	630	634	640
mudline:	-8.5	-6.5	-4.9
-5 to -6 ft			
-6 to -7 ft			
-7 to -8 ft			
-8 to -9 ft			
-9 to -10 ft			
-10 to -11 ft			
-11 to -12 ft			
-12 to -13 ft			
-13 to -14 ft			
-14 to -15 ft			

**Area 22 (RM 3.9 E)**

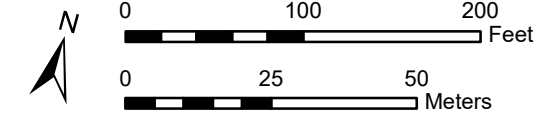
location ID:	804	621	622
mudline:	-8.2	-1.4	0.6
0 to -1 ft			
-1 to -2 ft			
-2 to -3 ft			
-3 to -4 ft			
-4 to -5 ft			
-5 to -6 ft			
-6 to -7 ft			
-7 to -8 ft			
-8 to -9 ft			
-9 to -10 ft			
-10 to -11 ft			
-11 to -12 ft			
-12 to -13 ft			
-13 to -14 ft			
-14 to -15 ft			
-15 to -17 ft MLLW			
-17 to -18 ft			
-18 to -19 ft			
-19 to -20 ft			

**Area 24/25 and Area 26**

location ID:	808	632	809	635	644	810
mudline:	0.4	3.1	1.8	0.9	-0.4	1.5
+3 to +2 ft						
+2 to +1 ft						
+1 to 0 ft						
0 to -1 ft						
-1 to -2 ft						
-2 to -3 ft						
-3 to -4 ft						
-4 to -5 ft						
-5 to -6 ft						
-6 to -7 ft						
-7 to -8 ft						

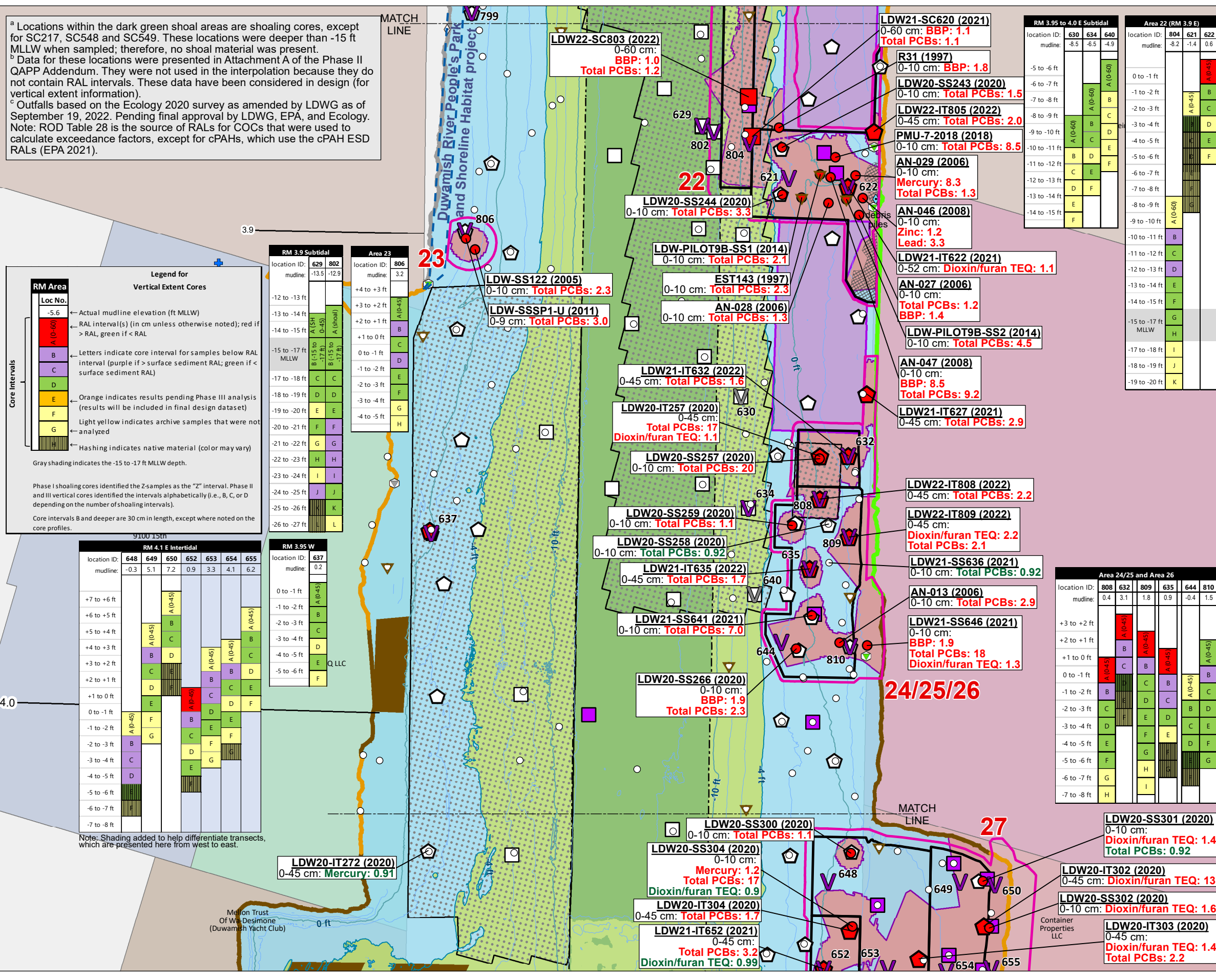
**Legend**

- 1 90% RD RAA boundary and number
- 90% RD toe of cut
- RAL exceedance area
- Surface sediment (0-10 cm) sampling location
  - Exceeds RAL
  - Does not exceed RAL
- Subsurface core location
  - Subtidal (0-60 cm)<sup>a</sup>
    - Exceeds RAL
    - Does not exceed RAL
  - Intertidal (0-45 cm)
    - Exceeds RAL
    - Does not exceed RAL
- Other sampling locations
  - Vertical extent core<sup>a</sup>
  - Vertical archive
  - Pre-PDI sample only analyzed for PCBs
  - Core without appropriate RAL interval<sup>b</sup>
- Outfall classification<sup>c</sup>
  - Private storm drain
  - Stream, channel, or ditch
  - Abandoned/inactive
  - Removed
  - Pipe of unresolved origin and/or use
- Bank types (approximate Superfund boundary = MHHW)
  - Bulkheaded
  - Armored slope
  - Unarmored slope
  - Post-Phase I PDI bank construction activities
- Other LDW features
  - Recovery Category 1
  - King Co tax parcel
  - Habitat restoration boundary
  - Federal Navigation Channel
  - Intertidal area
  - Potential vessel scour area
  - Shoal area
  - Dock/pier/marina
  - ENR/AC Pilot plot
- Bathymetry (feet MLLW)
  - 4 ft MLLW
  - 10 ft interval
  - 2 ft interval

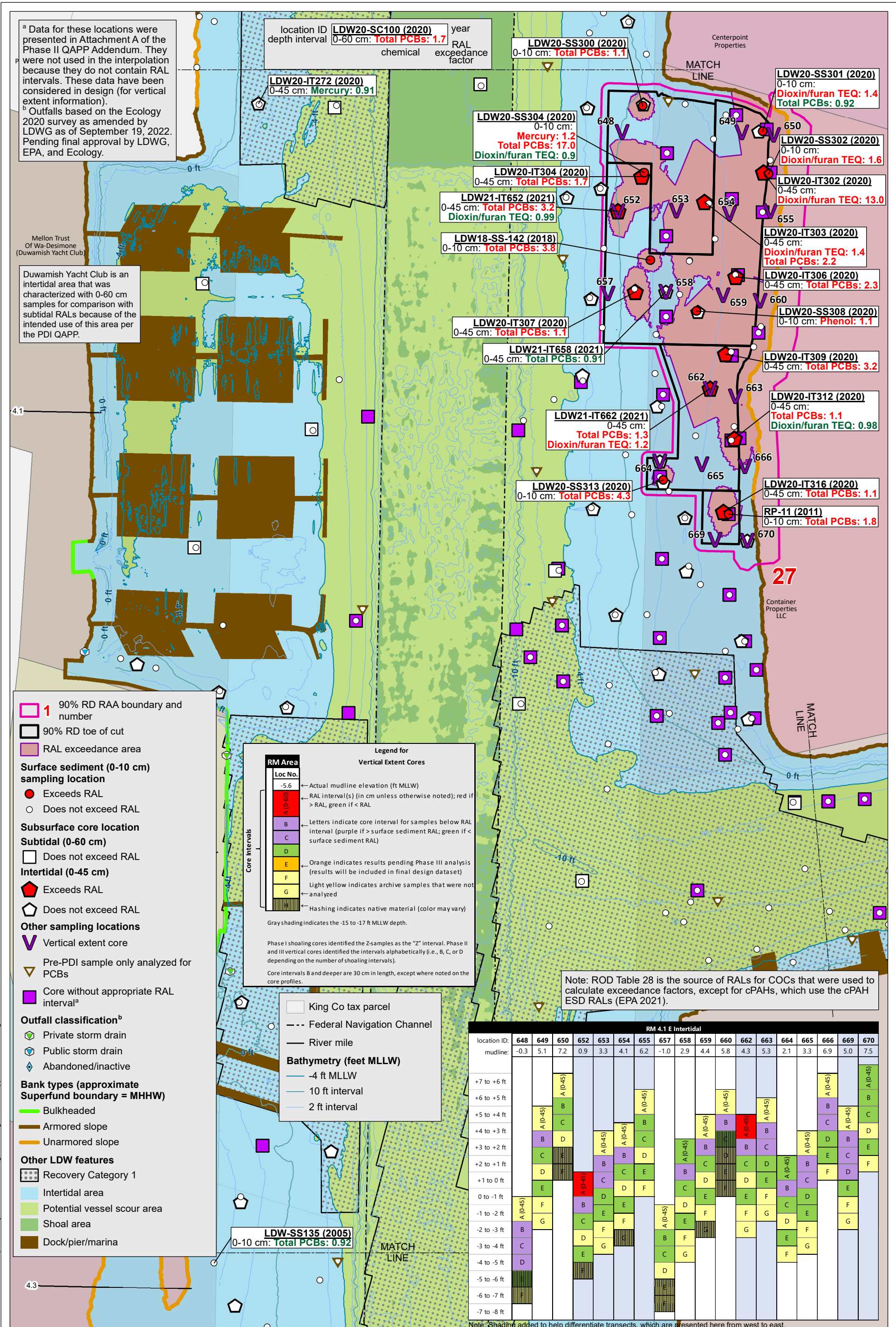


**Figure 6-2e. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 3.85 to 4.05**

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RM 4.1 E Intertidal

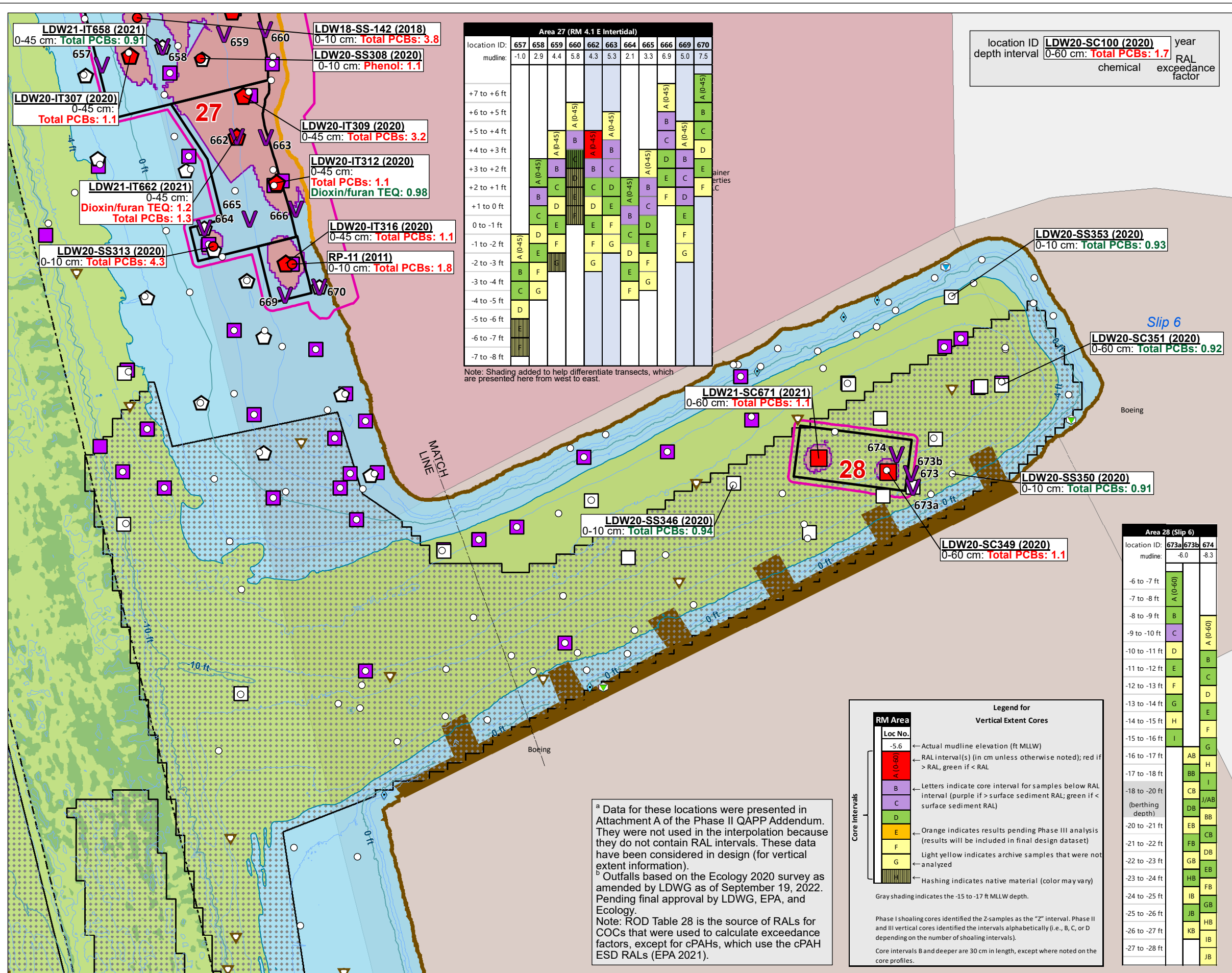
location ID:	648	649	650	652	653	654	655	657	658	659	660	662	663	664	665	666	669	670
mudline:	-0.3	5.1	7.2	0.9	3.3	4.1	6.2	-1.0	2.9	4.4	5.8	4.3	5.3	2.1	3.3	6.9	5.0	7.5
+7 to +6 ft			A (0-45)				A (0-45)											
+6 to +5 ft			B				B											
+5 to +4 ft			C				C											
+4 to +3 ft			D				D											
+3 to +2 ft			E				E											
+2 to +1 ft			F				F											
+1 to 0 ft			G				G											
0 to -1 ft																		
-1 to -2 ft																		
-2 to -3 ft																		
-3 to -4 ft																		
-4 to -5 ft																		
-5 to -6 ft																		
-6 to -7 ft																		
-7 to -8 ft																		

**Figure 6-2f. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 4.05 to 4.3**

90% REMEDIAL DESIGN BASIS OF DESIGN  
REPORT FOR THE LDW UPPER REACH  
JULY 24, 2023

Prepared by craigh.712125: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BOD\Fig 06-2f\712125\_Upper\_Reach\_Ph3\_Design\_Data - RM 4.05-4.3.mxd





**1** 90% RD RAA boundary and number

90% RD toe of cut

RAL exceedance area

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core location**

**Subtidal (0-60 cm)**

- Exceeds RAL
- Does not exceed RAL

**Intertidal (0-45 cm)**

- Exceeds RAL
- Does not exceed RAL

**Other sampling locations**

- Vertical extent core
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval<sup>a</sup>

**Outfall classification<sup>b</sup>**

- Private storm drain
- Public storm drain
- Abandoned/inactive

**Bank types (approximate Superfund boundary = MHHW)**

- Armored slope
- Unarmored slope

**Other LDW features**

- Recovery Category 1
- Intertidal area
- Potential vessel scour area
- Shoal area
- Dock/pier/marina
- King Co tax parcel
- Federal Navigation Channel

**Bathymetry (feet MLLW)**

- 4 ft MLLW
- 10 ft interval
- 2 ft interval

Note: Shading added to help differentiate transects, which are presented here from west to east.

<sup>a</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).

<sup>b</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology.

Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).

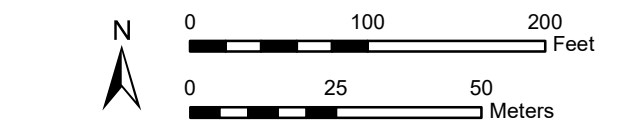
**Legend for Vertical Extent Cores**

**RM Area**

- Loc No.
- 5.6 Actual mudline elevation (ft MLLW)
- A (0-60) RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
- B Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
- C Orange indicates results pending Phase III analysis (results will be included in final design dataset)
- D Light yellow indicates archive samples that were not analyzed
- E Hashing indicates native material (color may vary)
- F Gray shading indicates the -15 to -17 ft MLLW depth.

Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).

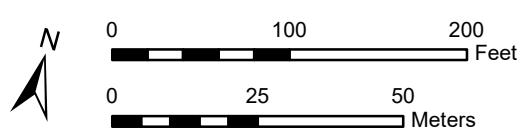
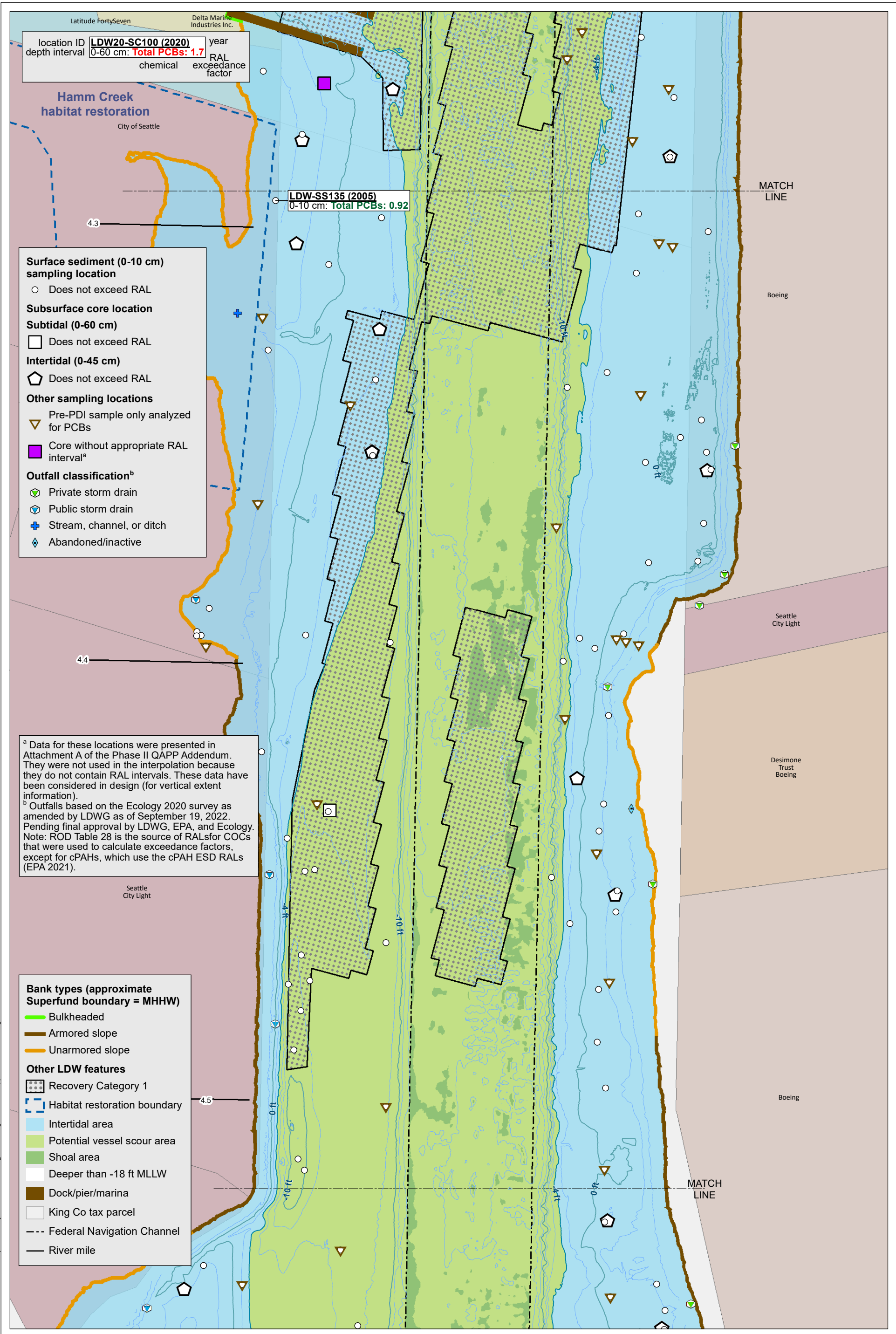
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.



**Figure 6-2g. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from Slip 6**

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REPORT FOR THE LDW UPPER REACH  
JULY 24, 2023



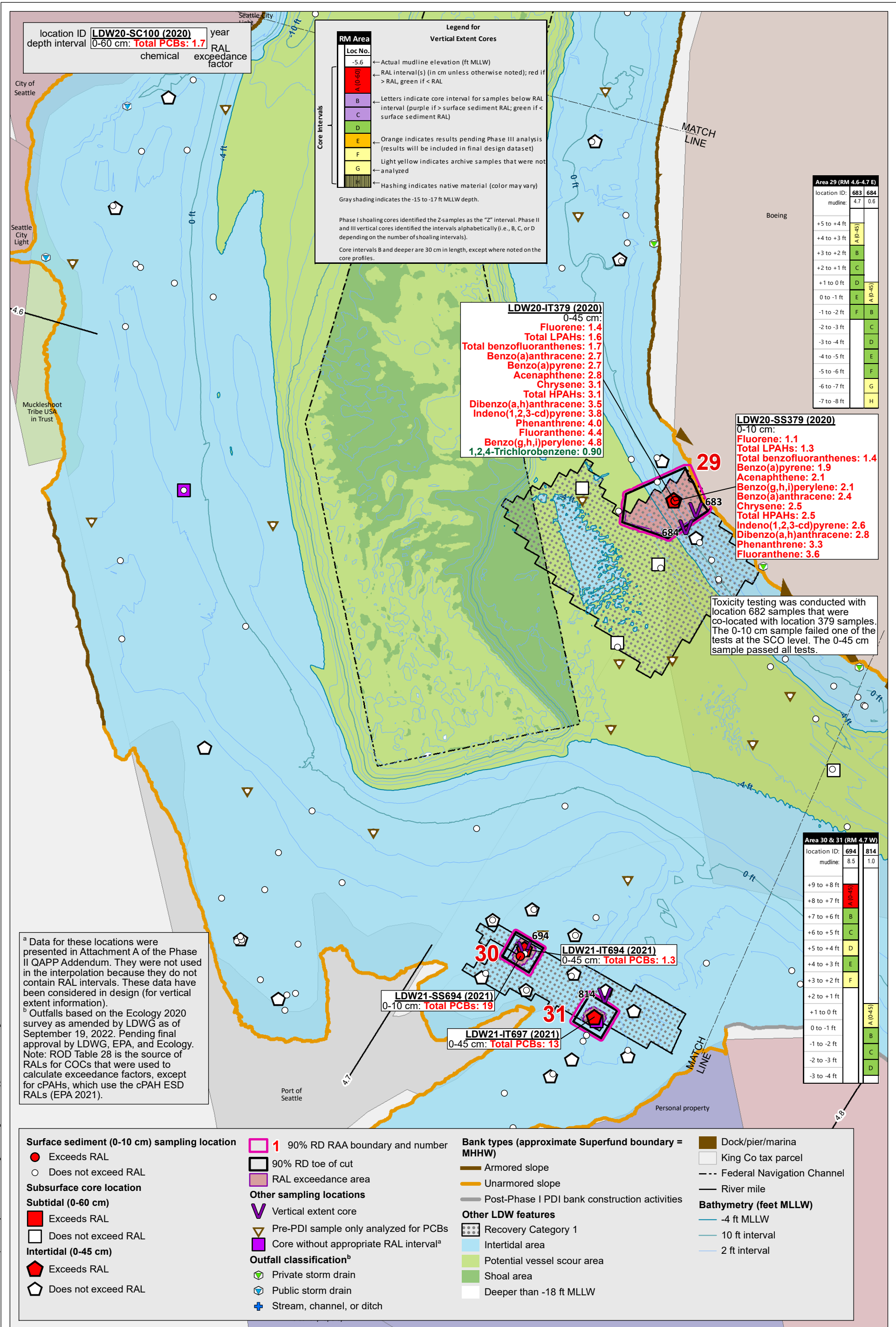


**Figure 6-2h. RAA boundaries, RAL exceedance areas, RAL exceedance locations, and vertical extent data from RMs 4.3 to 4.55**

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Prepared by craigh.712125: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig\_06-2h\_7172\_Upper\_Reach\_Ph3\_Design\_Data\_RM\_4.3-4.5.mxd





location ID **LDW20-SC100 (2020)** year  
 depth interval **0-60 cm: Total PCBs: 1.7** RAL  
 chemical exceedance factor

**Legend for Vertical Extent Cores**

RM Area	Loc No.	Description
-5.6		Actual mudline elevation (ft MLLW)
A (0-60)		RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
B		Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
C		
D		
E		Orange indicates results pending Phase III analysis (results will be included in final design dataset)
F		Light yellow indicates archive samples that were not analyzed
G		
		Hashing indicates native material (color may vary)
		Gray shading indicates the -15 to -17 ft MLLW depth.

Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).  
 Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

**LDW20-IT379 (2020)**  
 0-45 cm:  
 Fluorene: 1.4  
 Total LPAHs: 1.6  
 Total benzofluoranthenes: 1.7  
 Benzo(a)anthracene: 2.7  
 Benzo(a)pyrene: 2.7  
 Acenaphthene: 2.8  
 Chrysene: 3.1  
 Total HPAHs: 3.1  
 Dibenzo(a,h)anthracene: 3.5  
 Indeno(1,2,3-cd)pyrene: 3.8  
 Phenanthrene: 4.0  
 Fluoranthene: 4.4  
 Benzo(g,h,i)perylene: 4.8  
 1,2,4-Trichlorobenzene: 0.90

**LDW20-SS379 (2020)**  
 0-10 cm:  
 Fluorene: 1.1  
 Total LPAHs: 1.3  
 Total benzofluoranthenes: 1.4  
 Benzo(a)pyrene: 1.9  
 Acenaphthene: 2.1  
 Benzo(g,h,i)perylene: 2.1  
 Benzo(a)anthracene: 2.4  
 Chrysene: 2.5  
 Total HPAHs: 2.5  
 Indeno(1,2,3-cd)pyrene: 2.6  
 Dibenzo(a,h)anthracene: 2.8  
 Phenanthrene: 3.3  
 Fluoranthene: 3.6

Toxicity testing was conducted with location 682 samples that were co-located with location 379 samples. The 0-10 cm sample failed one of the tests at the SCO level. The 0-45 cm sample passed all tests.

<sup>a</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).  
<sup>b</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology. Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).

**Area 29 (RM 4.6-4.7 E)**

location ID:	683	684
mudline:	4.7	0.6
+5 to +4 ft		
+4 to +3 ft	A (0-45)	
+3 to +2 ft	B	
+2 to +1 ft	C	
+1 to 0 ft	D	A (0-45)
0 to -1 ft	E	
-1 to -2 ft	F	B
-2 to -3 ft		C
-3 to -4 ft		D
-4 to -5 ft		E
-5 to -6 ft		F
-6 to -7 ft		G
-7 to -8 ft		H

**Area 30 & 31 (RM 4.7 W)**

location ID:	694	814
mudline:	8.5	1.0
+9 to +8 ft	A (0-45)	
+8 to +7 ft	B	
+7 to +6 ft	C	
+6 to +5 ft	D	
+5 to +4 ft	E	
+4 to +3 ft	F	
+3 to +2 ft		A (0-45)
+2 to +1 ft		B
+1 to 0 ft		C
0 to -1 ft		D
-1 to -2 ft		
-2 to -3 ft		
-3 to -4 ft		

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core location**

**Subtidal (0-60 cm)**

- Exceeds RAL
- Does not exceed RAL

**Intertidal (0-45 cm)**

- Exceeds RAL
- Does not exceed RAL

**Other sampling locations**

- ▽ Vertical extent core
- ▽ Pre-PDI sample only analyzed for PCBs
- ▽ Core without appropriate RAL interval<sup>a</sup>

**Outfall classification<sup>b</sup>**

- ▽ Private storm drain
- ▽ Public storm drain
- ▽ Stream, channel, or ditch

**Bank types (approximate Superfund boundary = MHHW)**

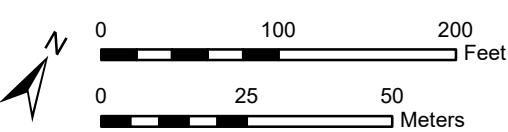
- Armored slope
- Unarmored slope
- Post-Phase I PDI bank construction activities

**Other LDW features**

- Recovery Category 1
- Intertidal area
- Potential vessel scour area
- Shoal area
- Deeper than -18 ft MLLW

**Legend**

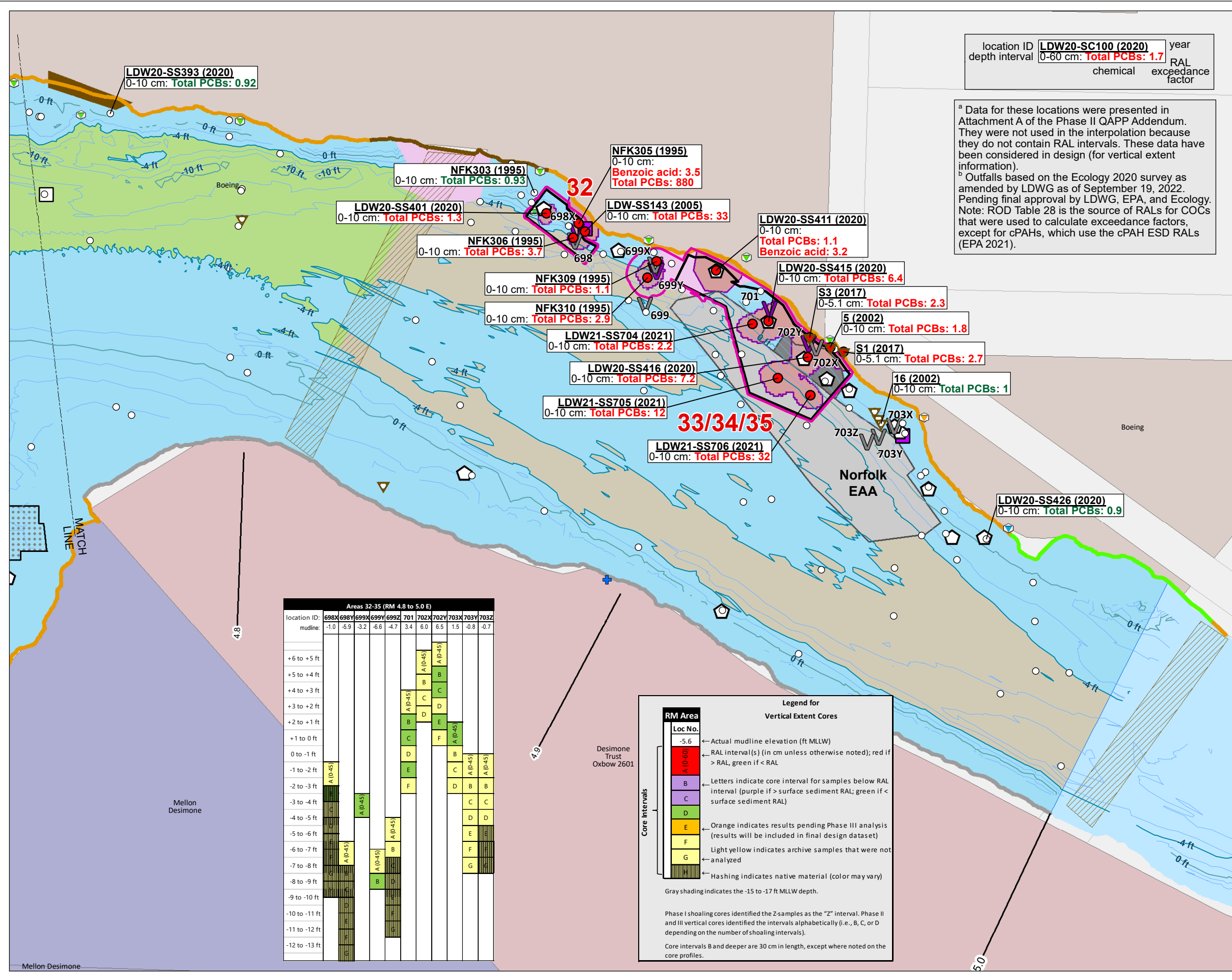
- 1 90% RD RAA boundary and number
- 90% RD toe of cut
- RAL exceedance area
- Dock/pier/marina
- King Co tax parcel
- Federal Navigation Channel
- River mile
- Bathymetry (feet MLLW)
  - 4 ft MLLW
  - 10 ft interval
  - 2 ft interval



**Figure 6-2i. RAL exceedance areas from RM 4.55 to RM 4.8 with RAL exceedances and vertical extent data in the design dataset**  
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 JULY 24, 2023



Prepared by craigh\_7/21/23; W:\Projects\Duwamish AOC\GIS\Maps and Analyses\90 Percent Design\BODR\Fig 06-2j 7172 Upper Reach Ph3 Design Data - RM 4.8-5.0.mxd



location ID	LDW20-SC100 (2020)	year	
depth interval	0-60 cm: Total PCBs: 1.7	chemical	RAL exceedance factor

<sup>a</sup> Data for these locations were presented in Attachment A of the Phase II QAPP Addendum. They were not used in the interpolation because they do not contain RAL intervals. These data have been considered in design (for vertical extent information).  
<sup>b</sup> Outfalls based on the Ecology 2020 survey as amended by LDWG as of September 19, 2022. Pending final approval by LDWG, EPA, and Ecology. Note: ROD Table 28 is the source of RALs for COCs that were used to calculate exceedance factors, except for cPAHs, which use the cPAH ESD RALs (EPA 2021).

**1** 90% RD RAA boundary and number

90% RD toe of cut

RAL exceedance area

**Surface sediment (0-10 cm) sampling location**

- Exceeds RAL
- Does not exceed RAL

**Subsurface core location**

**Subtidal (0-60 cm)**

- Does not exceed RAL

**Intertidal (0-45 cm)**

- Does not exceed RAL

**Other sampling locations**

- Vertical extent core
- Vertical archive
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval<sup>a</sup>

**Outfall classification<sup>b</sup>**

- CSO/storm drain
- Private storm drain
- Public storm drain
- Stream, channel, or ditch
- Abandoned/inactive

**Bank types (approximate Superfund boundary = MHHW)**

- Bulkheaded
- Armored slope
- Unarmored slope
- Post-Phase I PDI bank construction activities

**Other LDW features**

- Recovery Category 1
- Bridge
- Dock/pier/marina
- Intertidal area
- Potential vessel scour area
- Subtidal with no subsurface RAL
- Area not covered by bathymetric survey
- Boeing South Storm Drain removal area
- EAA
- King Co tax parcel
- River mile

**Bathymetry (feet MLLW)**

- 4 ft MLLW
- 10 ft interval
- 2 ft interval

Areas 32-35 (RM 4.8 to 5.0 E)												
location ID:	698X	698Y	699X	699Y	699Z	701	702X	702Y	703X	703Y	703Z	
mudline:	-1.0	-5.9	-3.2	-6.6	-4.7	3.4	6.0	6.5	1.5	-0.8	-0.7	
+6 to +5 ft												
+5 to +4 ft												
+4 to +3 ft												
+3 to +2 ft												
+2 to +1 ft												
+1 to 0 ft												
0 to -1 ft												
-1 to -2 ft												
-2 to -3 ft												
-3 to -4 ft												
-4 to -5 ft												
-5 to -6 ft												
-6 to -7 ft												
-7 to -8 ft												
-8 to -9 ft												
-9 to -10 ft												
-10 to -11 ft												
-11 to -12 ft												
-12 to -13 ft												

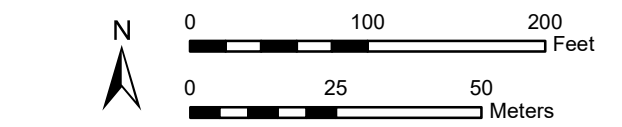
**Legend for Vertical Extent Cores**

**RM Area**

**Loc No.**

- 5.6 Actual mudline elevation (ft MLLW)
- RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
- Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
- Orange indicates results pending Phase III analysis (results will be included in final design dataset)
- Light yellow indicates archive samples that were not analyzed
- Hashing indicates native material (color may vary)
- Gray shading indicates the -15 to -17 ft MLLW depth.

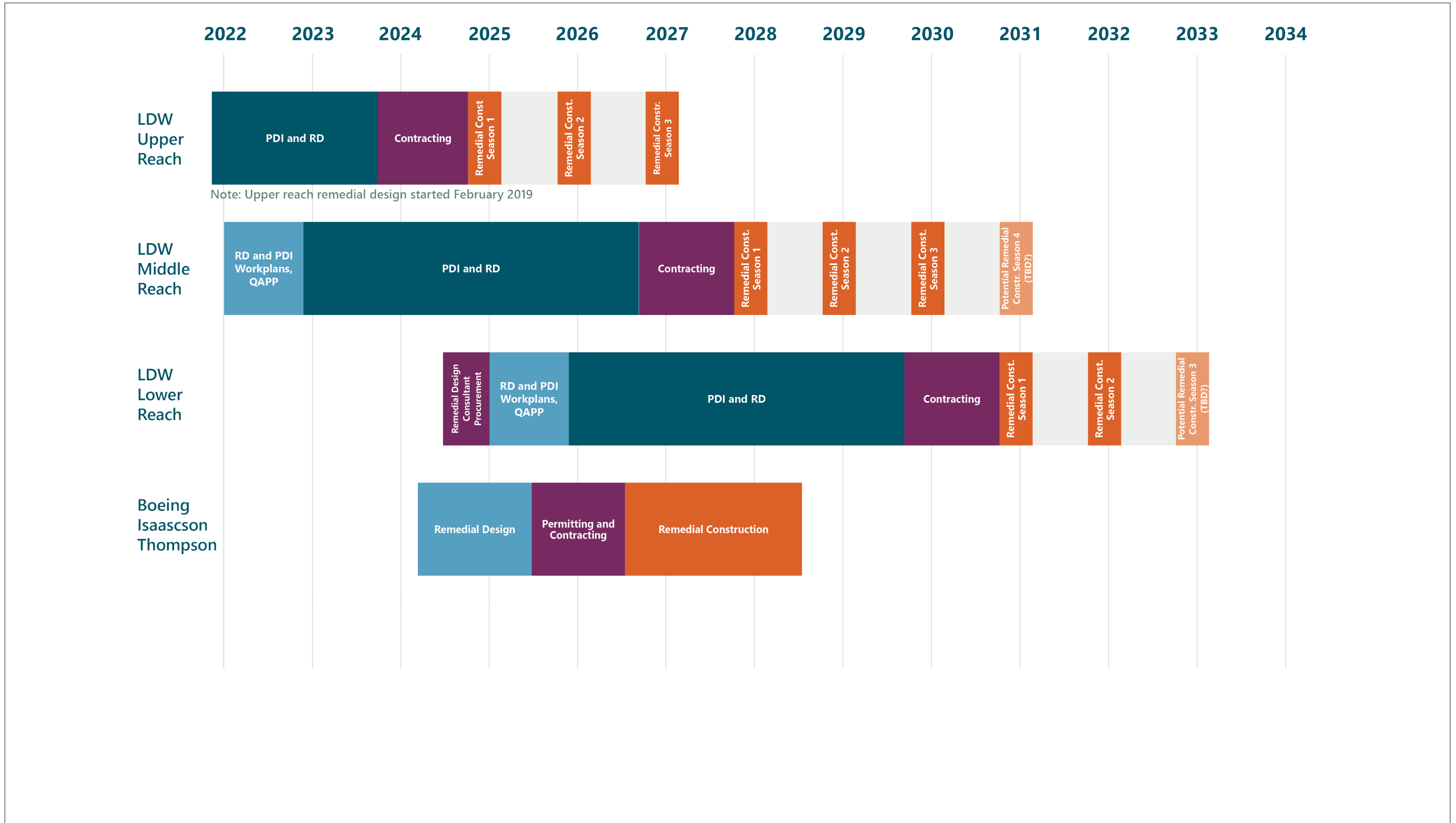
Phase I shoaling cores identified the Z-samples as the "Z" interval. Phase II and III vertical cores identified the intervals alphabetically (i.e., B, C, or D depending on the number of shoaling intervals).  
 Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.



**Figure 6-2j. RAL exceedance areas from RMs 4.8 to 5.0 with RAL exceedances and vertical extent data in the design dataset**

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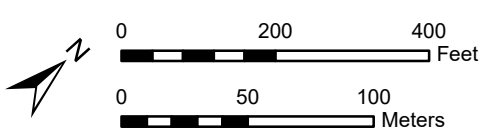
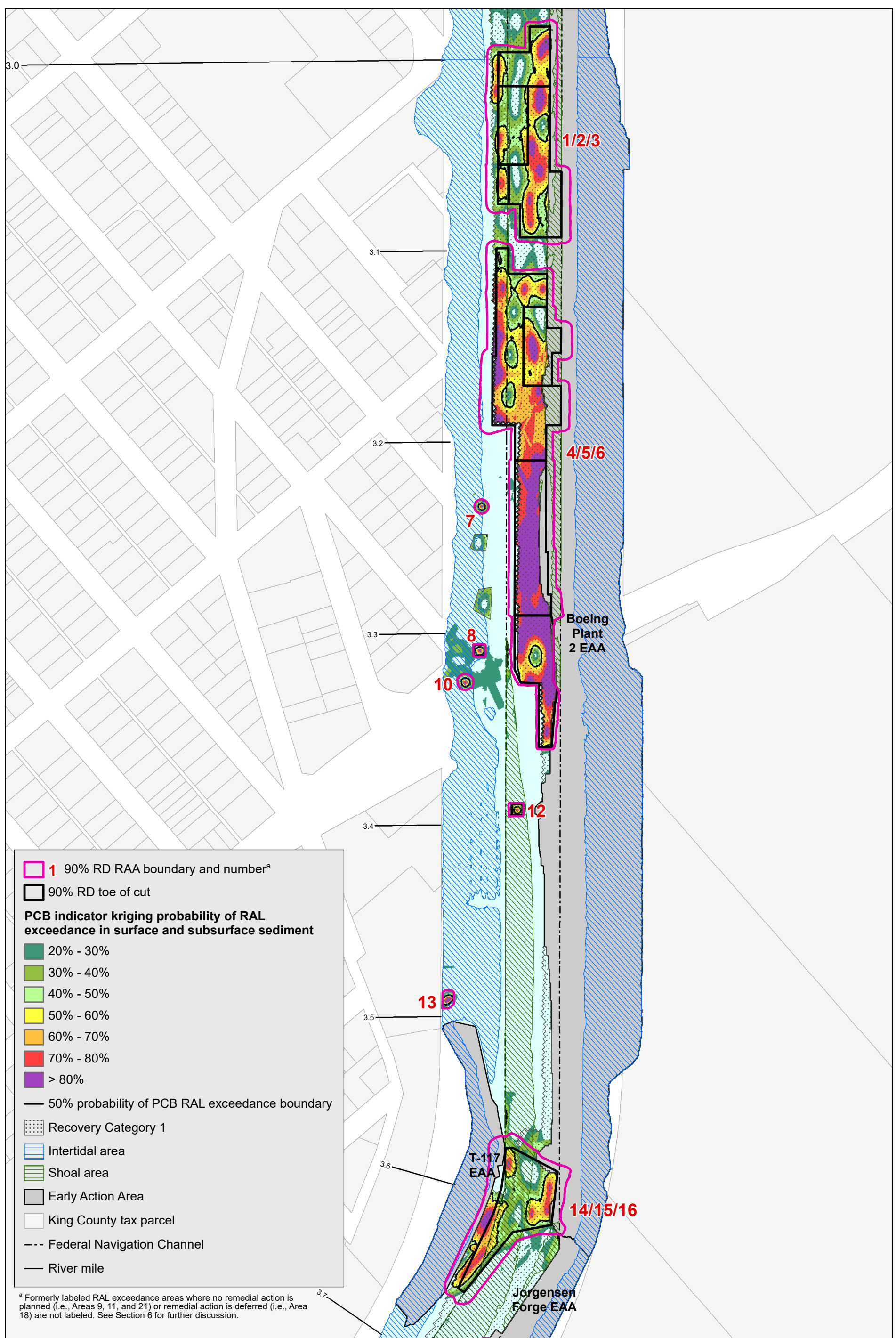


**Figure 6-3**  
**Comparison of Anticipated LDW Superfund and Boeing Isaacson Thompson Cleanup Timelines**

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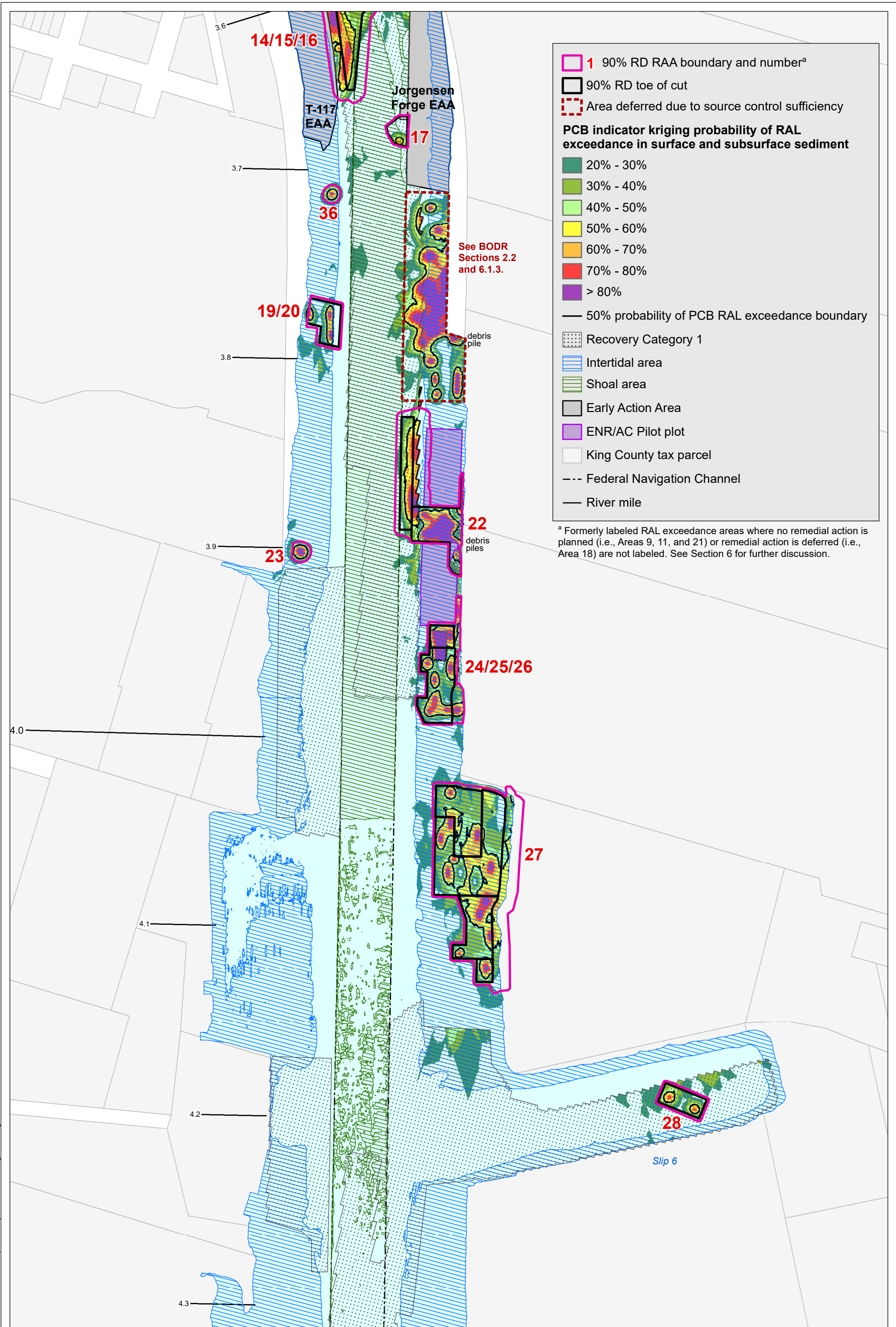


Prepared by craigh\_7/20/23; W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90 Percent Design\BODR\Fig 06-4a 7216 Combined PHILIK wRAAs - RM 3.0 to 3.7.mxd



**Figure 6-4a. Total PCB combined surface and subsurface sediment indicator kriging interpolation with RAA boundaries, RMs 3.0 to 3.7**  
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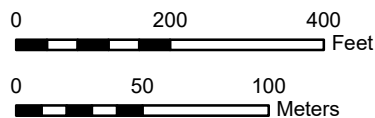




Prepared by craigh\_7/20/23; W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig 06-4b 7216 Combined Phil IK wRAAs - RM 3.7 to 4.3.mxd

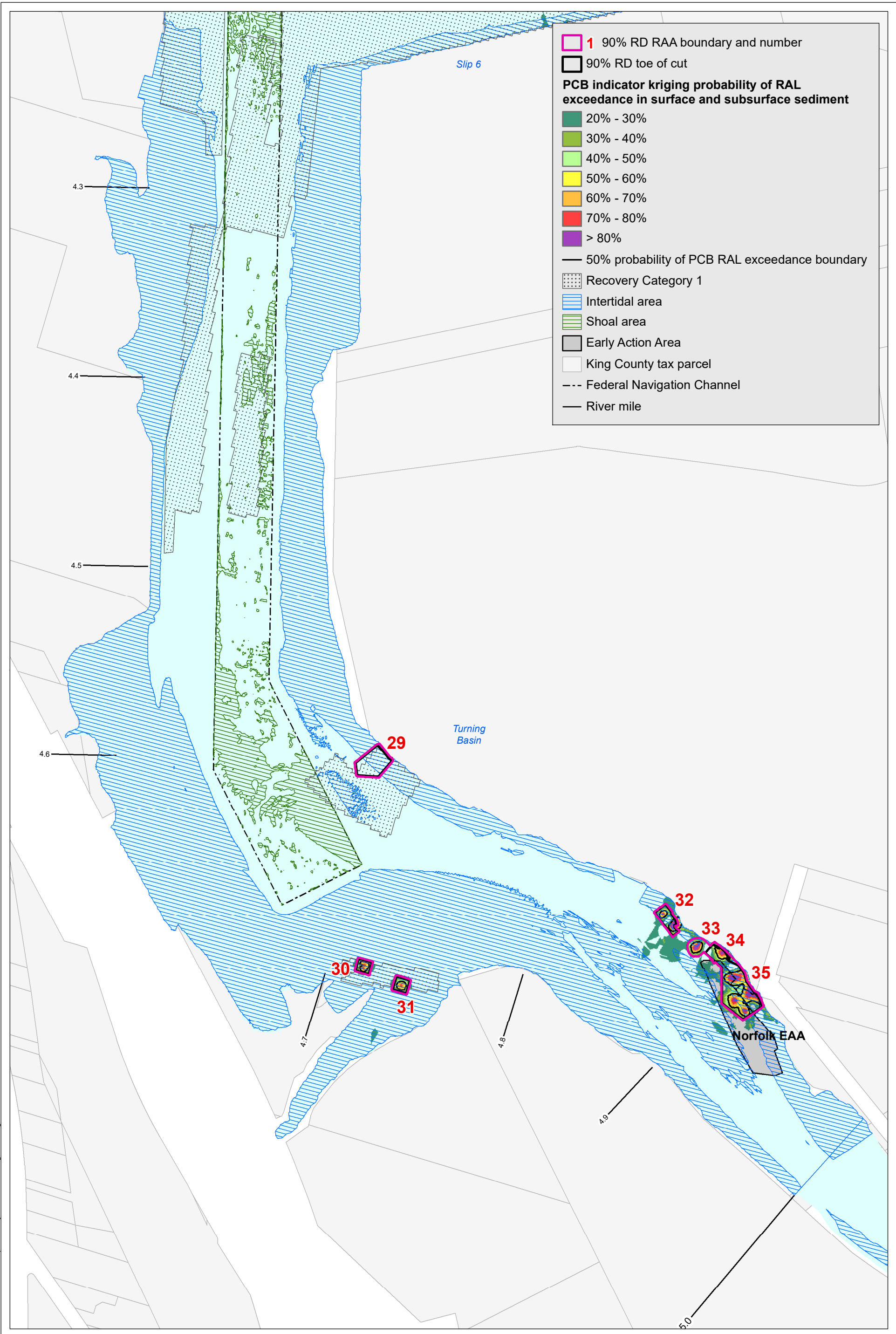


**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company



**Figure 6-4b. Total PCB combined surface and subsurface sediment indicator kriging interpolation with RAA boundaries, RMs 3.7 to 4.3**

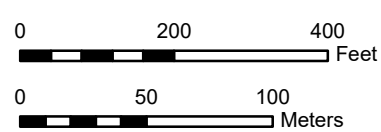




Prepared by craigh\_712125: W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig\_06-4c\_7216\_Combined\_Phil\_IK\_wRAAs - RM\_4.3\_to\_5.0.mxd

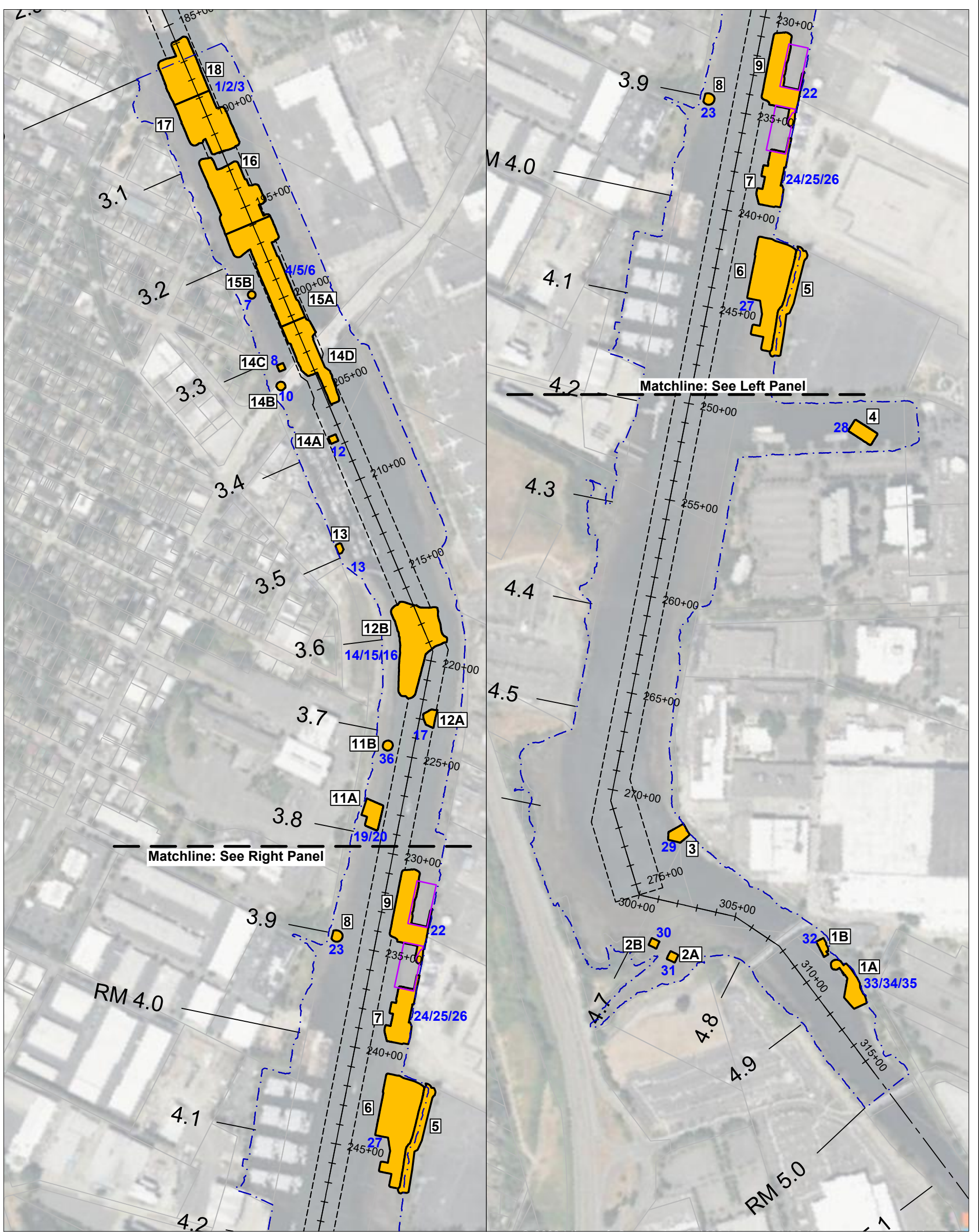


**Lower Duwamish Waterway Group**  
 Port of Seattle / City of Seattle / King County / The Boeing Company



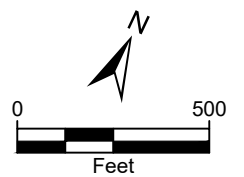
**Figure 6-4c. Total PCB combined surface and subsurface sediment indicator kriging interpolation with RAA boundaries, RMs 4.3 to 5.0**  
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**Horizontal Datum:** Washington State Plane, North Zone, North American Datum of 1983/91, U.S. Survey Feet; WSDOT MON GP17005-176 & GP17005-181  
**Vertical Datum:** Mean Lower Low Water (MLLW), MLLW Converted from NAD88 (NAVD88 + 2.34' to MLLW)  
**Note:** Remedial Action Areas will be developed into Sediment Management Areas at a later design stage.

- Legend:**
- Federal Navigation Channel
  - Channel Centerline
  - LDW Upper Reach Approximate Boundary
  - ENR/AC Pilot Plot Boundary
  - Remedial Action Area Boundary
  - 1/2/3 Remedial Action Area Numbers
  - Sediment Management Area Boundary
  - 17 Sediment Management Area Number

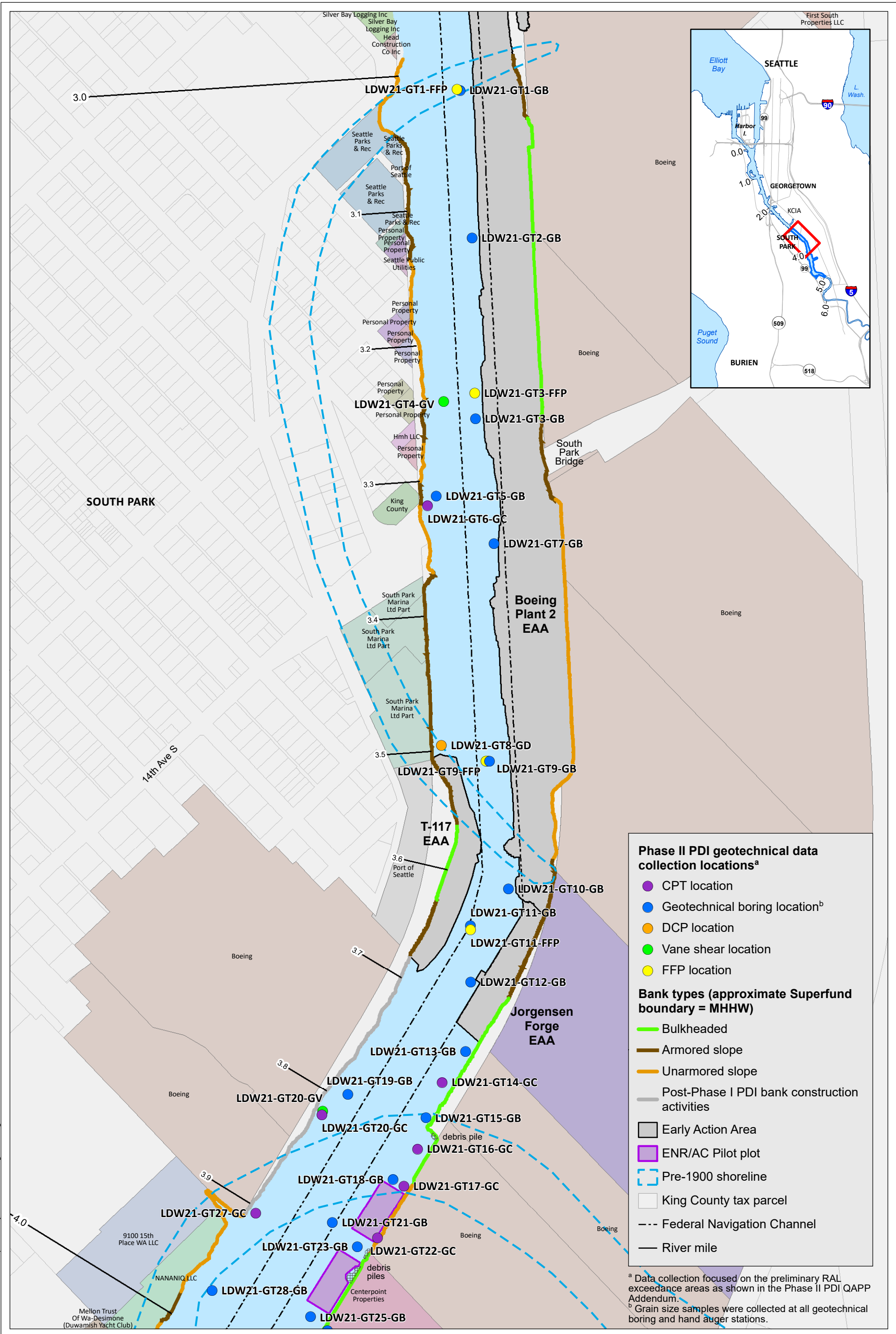


**Figure 7-1  
SMAs and RAAs**

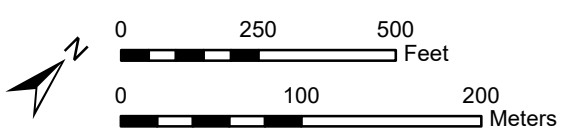
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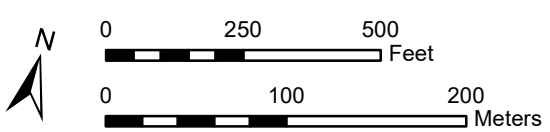
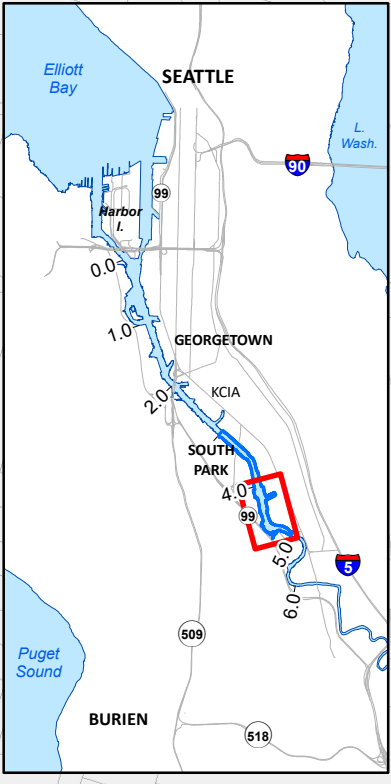
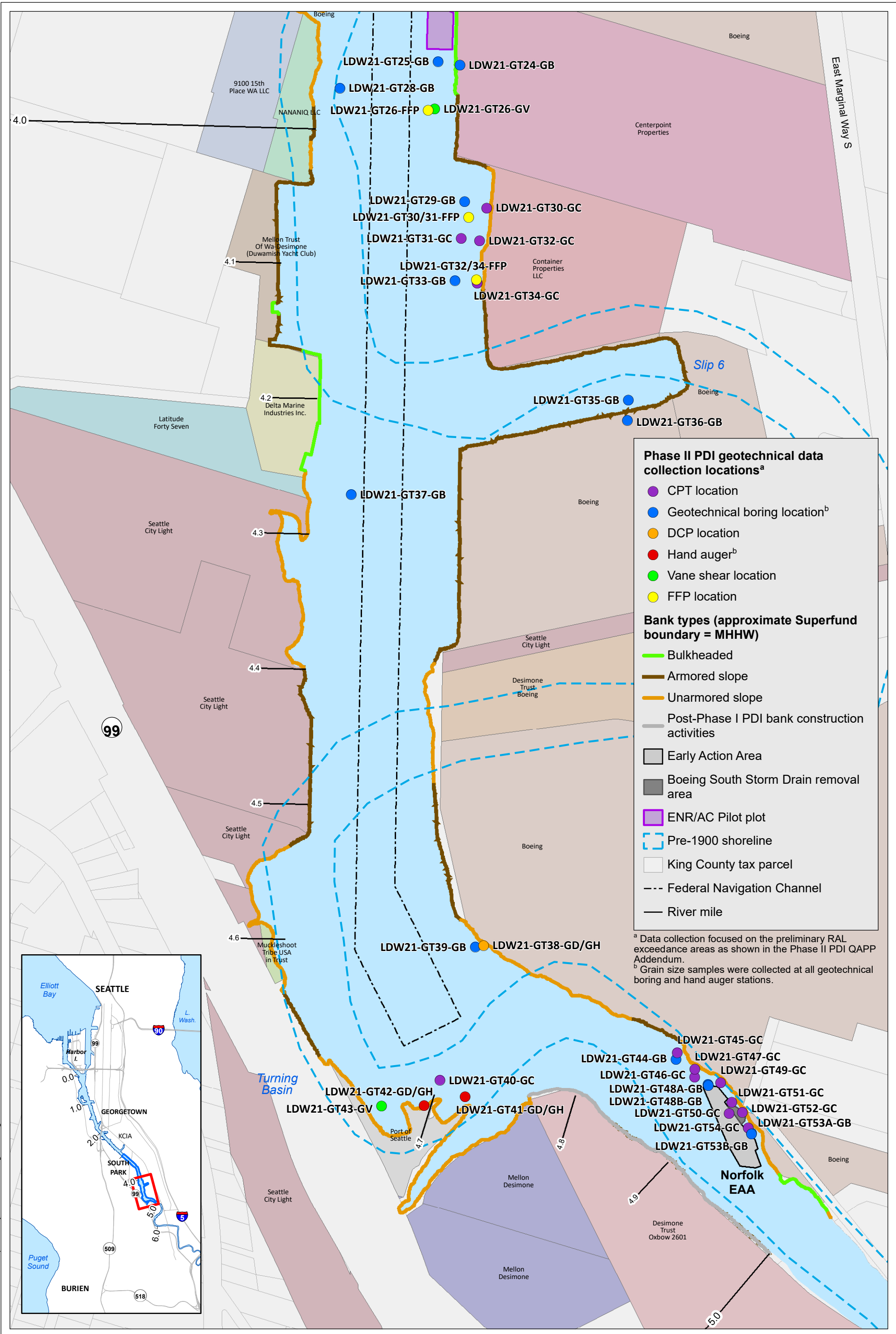
Prepared by craigh.720225.W:\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent\_Design\BODR\Fig\_08-1a\_7281\_PDI\_Geotech\_Locations\_RM3-4.mxd



**Figure 8-1a. Phase II PDI geotechnical data locations, RMs 3.0 to 4.0**

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Prepared by craigh.720225.W\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent Design\BODR\Fig 08-1b-7281 PDI Geotech Locations RM4-5.mxd

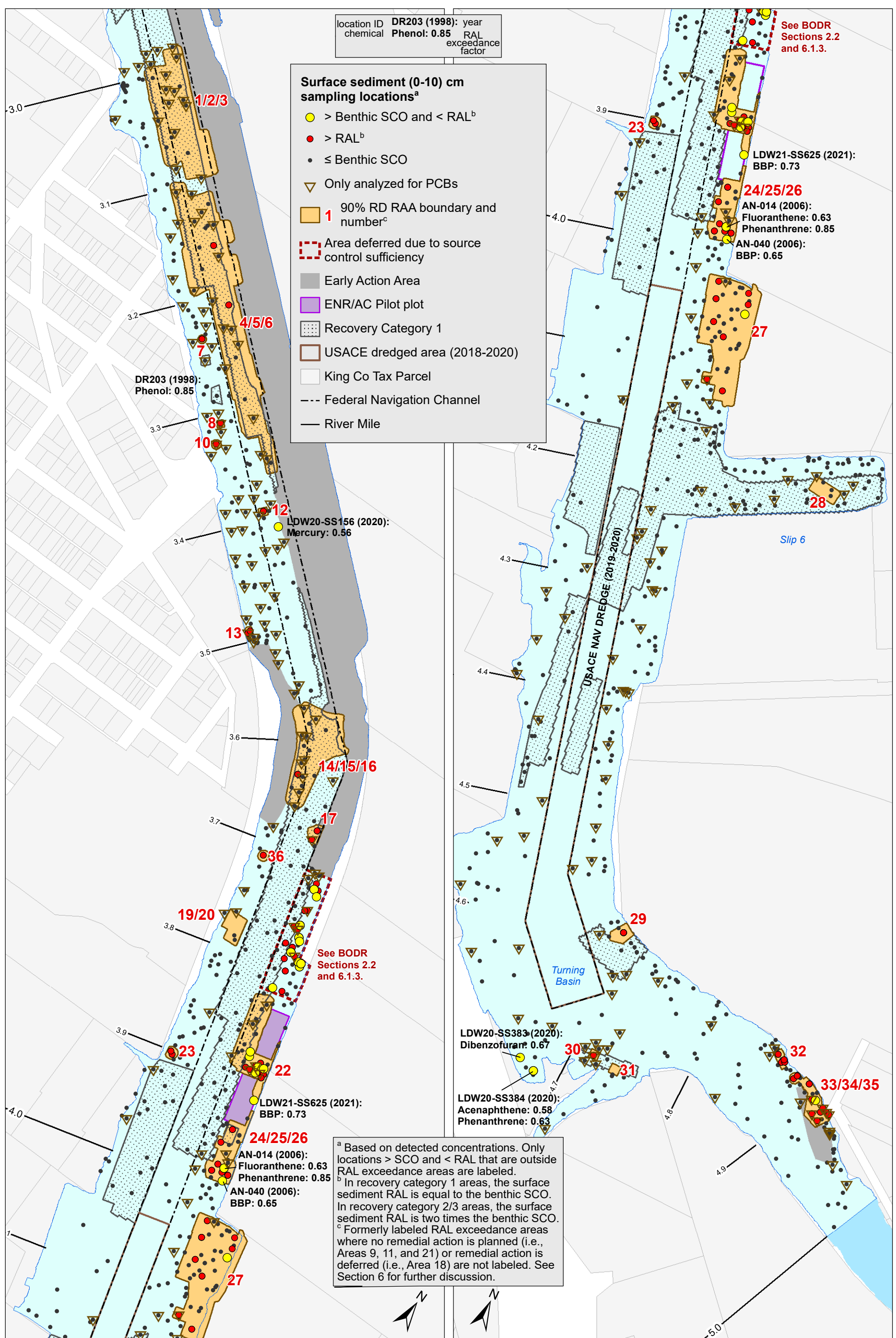


location ID DR203 (1998): year  
 chemical Phenol: 0.85 RAL  
 exceedance factor

See BODR  
 Sections 2.2  
 and 6.1.3.

**Surface sediment (0-10) cm sampling locations<sup>a</sup>**

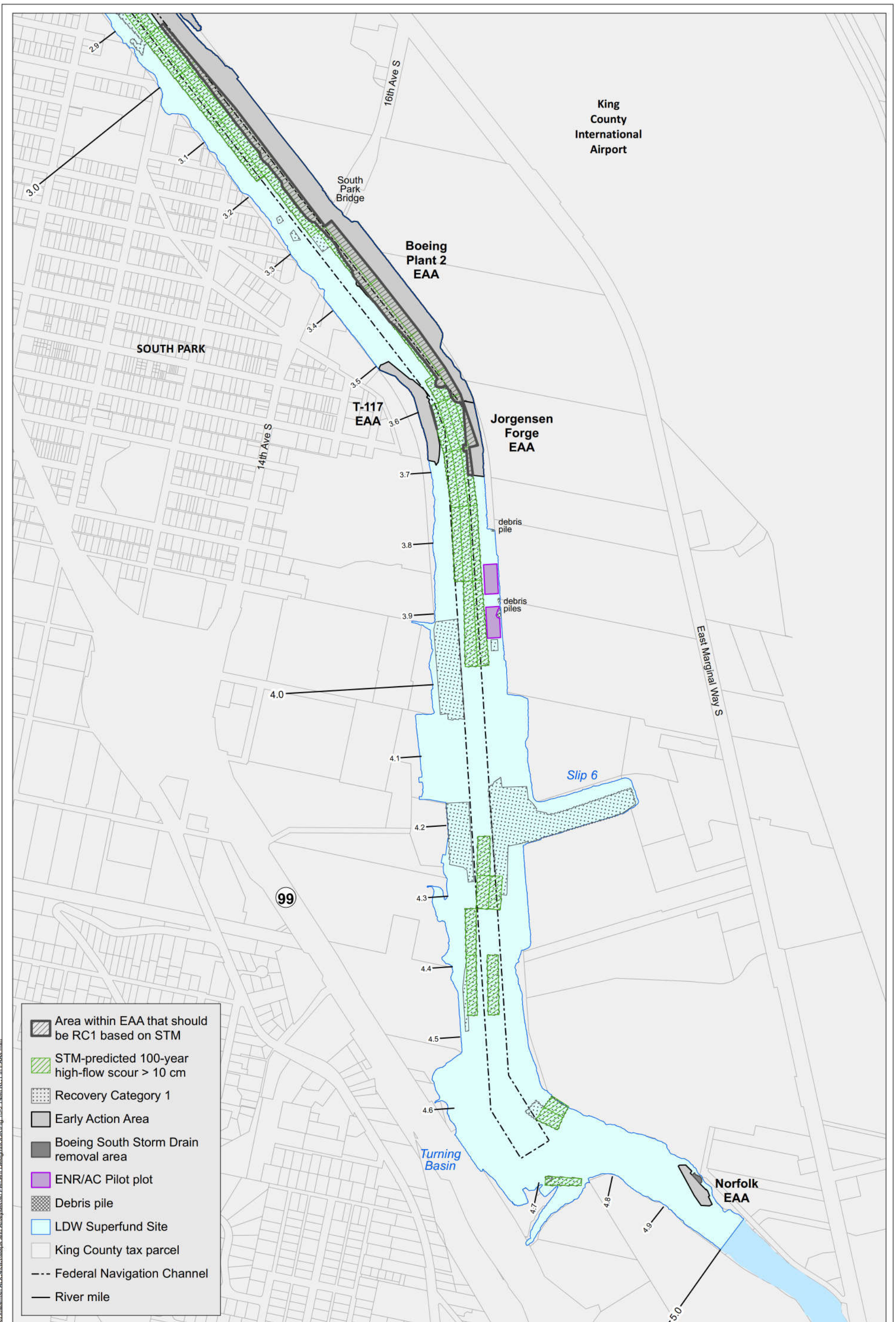
- > Benthic SCO and < RAL<sup>b</sup>
- > RAL<sup>b</sup>
- ≤ Benthic SCO
- ▽ Only analyzed for PCBs
- 1 90% RD RAA boundary and number<sup>c</sup>
- Area deferred due to source control sufficiency
- Early Action Area
- ENR/AC Pilot plot
- Recovery Category 1
- USACE dredged area (2018-2020)
- King Co Tax Parcel
- Federal Navigation Channel
- River Mile



<sup>a</sup> Based on detected concentrations. Only locations > SCO and < RAL that are outside RAL exceedance areas are labeled.  
<sup>b</sup> In recovery category 1 areas, the surface sediment RAL is equal to the benthic SCO. In recovery category 2/3 areas, the surface sediment RAL is two times the benthic SCO.  
<sup>c</sup> Formerly labeled RAL exceedance areas where no remedial action is planned (i.e., Areas 9, 11, and 21) or remedial action is deferred (i.e., Area 18) are not labeled. See Section 6 for further discussion.

Prepared by craigh\_720225\_W\Projects\Duwamish\_AOC4\GIS\Maps and Analyses\90\_Percent Design\BODR\Fig 10-1\_7205\_Phil SCO vs RAL\_exceedances.mxd





Prepared by craigh\_721225\_WU\Projects\Duwamish\_AOC\_dGIS\Maps and Analyses\90\_Percent Design\DOBE\Fig\_10-2\_RCAE.RC1\_in\_EAAs.mxd

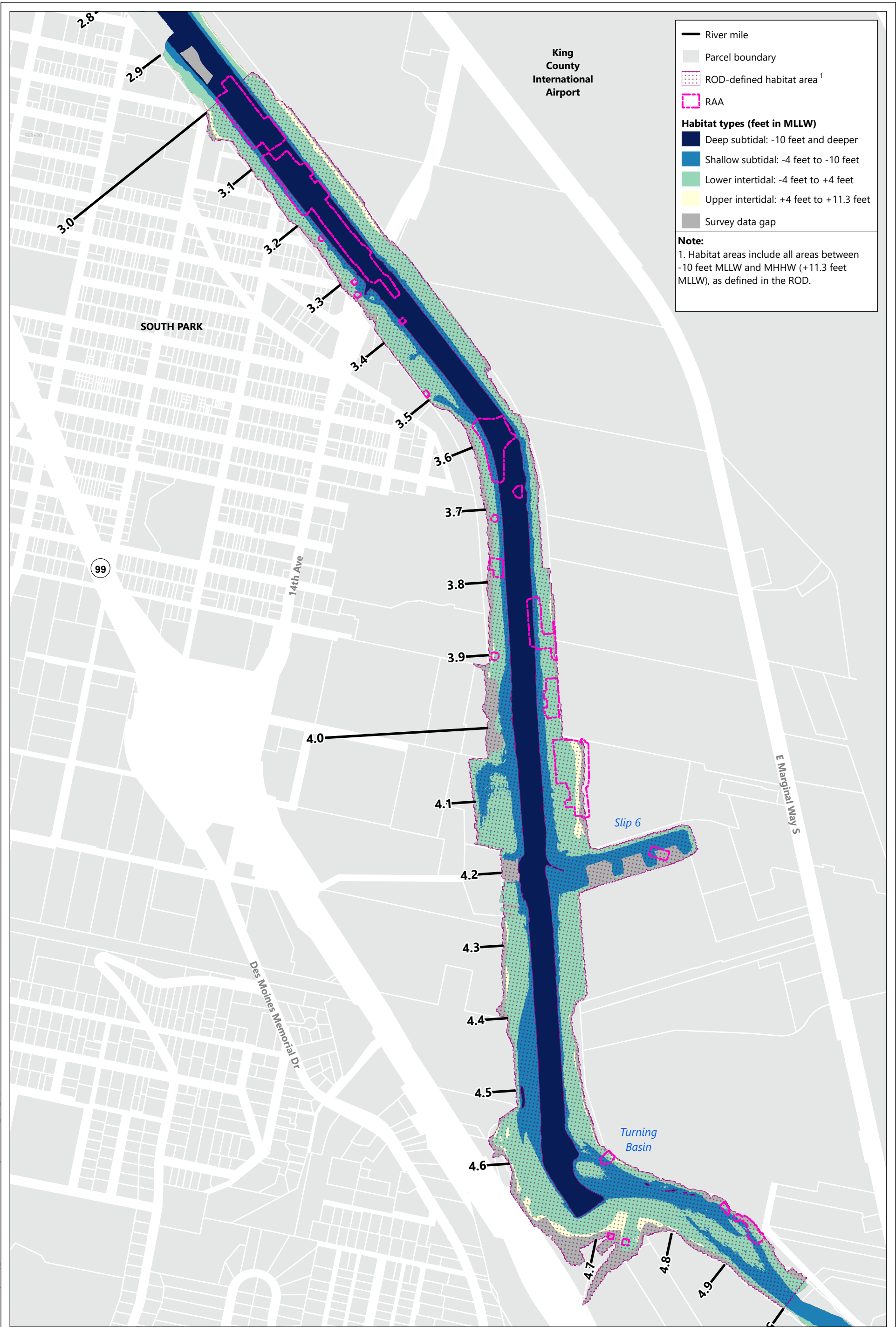
- Area within EAA that should be RC1 based on STM
- STM-predicted 100-year high-flow scour > 10 cm
- Recovery Category 1
- Early Action Area
- Boeing South Storm Drain removal area
- ENR/AC Pilot plot
- Debris pile
- LDW Superfund Site
- King County tax parcel
- Federal Navigation Channel
- River mile



**Figure 10-2. Recovery Category 1 areas in Early Action Areas**

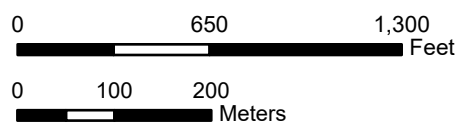
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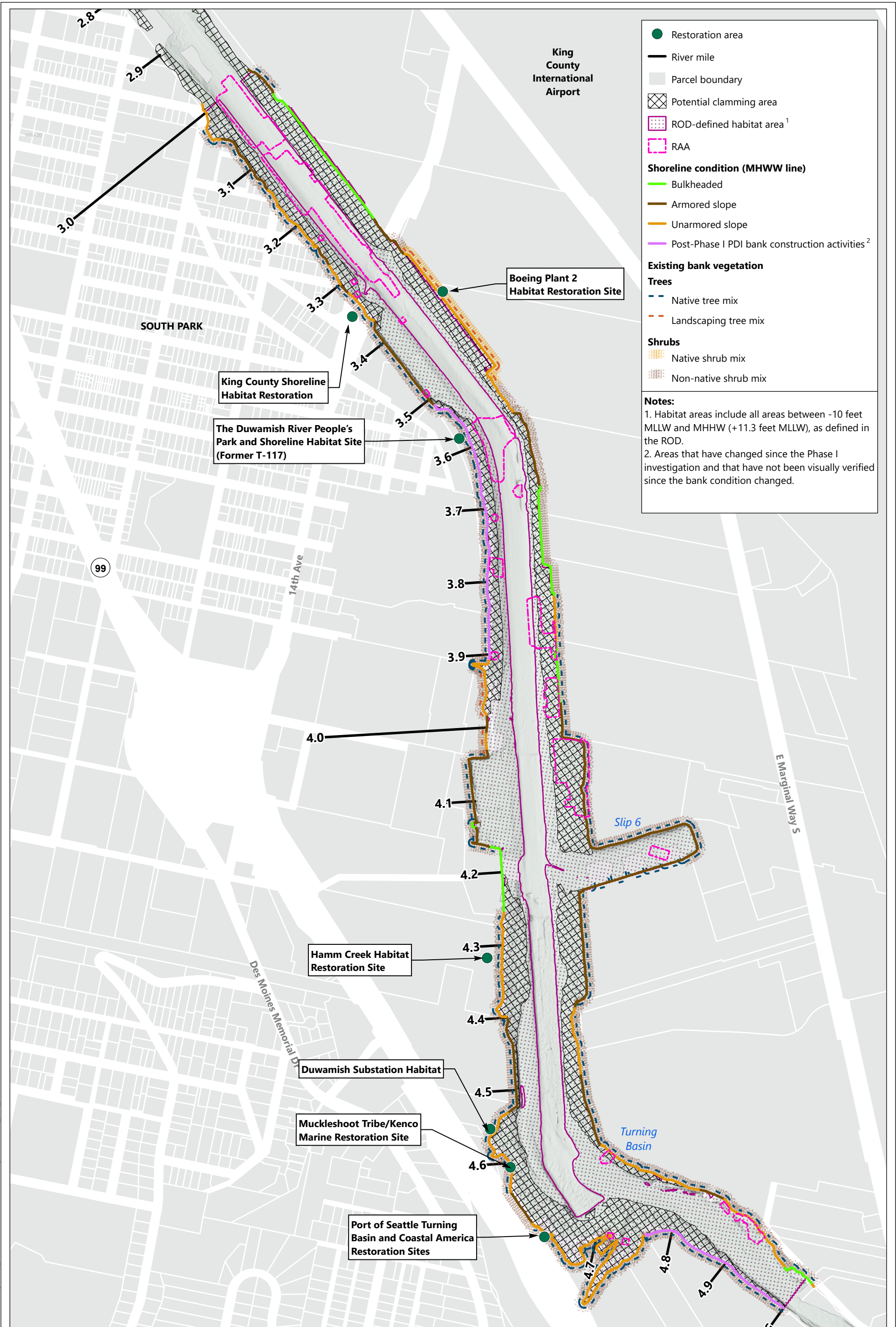
— River mile  
 □ Parcel boundary  
 □ ROD-defined habitat area<sup>1</sup>  
 □ RAA  
**Habitat types (feet in MLLW)**  
 ■ Deep subtidal: -10 feet and deeper  
 ■ Shallow subtidal: -4 feet to -10 feet  
 ■ Lower intertidal: -4 feet to +4 feet  
 ■ Upper intertidal: +4 feet to +11.3 feet  
 ■ Survey data gap  
**Note:**  
 1. Habitat areas include all areas between -10 feet MLLW and MHHW (+11.3 feet MLLW), as defined in the ROD.

Prepared by Ilanson, 7/14/2023, \\nrcas\GIS\Jobs\KingCounty\_0067\LDW\Maps\Reports\BasisDesign\Report\LDW\_BDR\_90pct.aprx



**Figure 11-1a. Habitat types and ROD-defined habitat areas that overlap with RAAs**  
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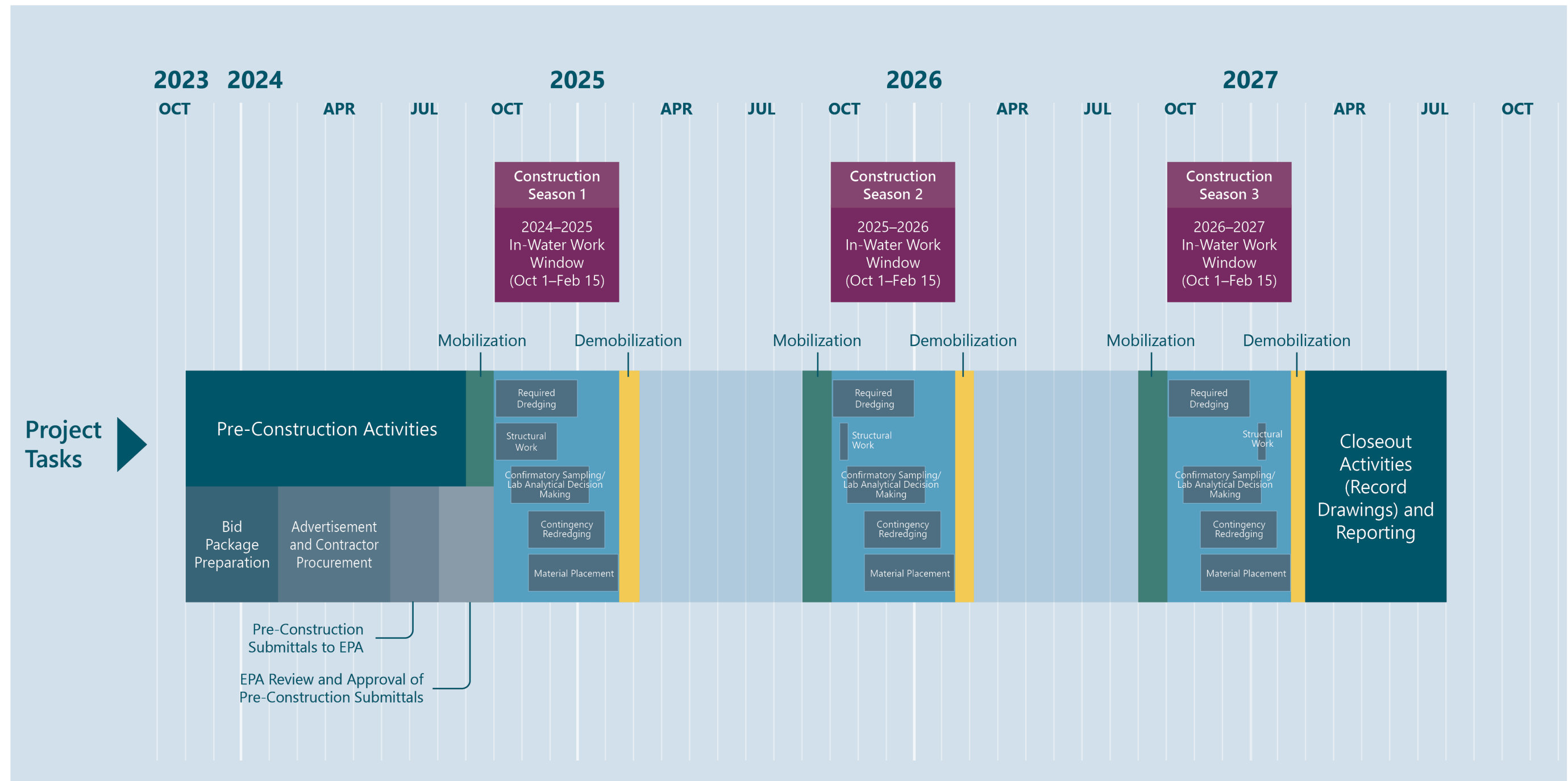


**Figure 11-1b. Clammings and shoreline conditions that overlap with RAAs**

Prepared by JIanson, 7/14/2023, I:\projects\GIS\Jobs\KingCounty\_0067\LDW\Maps\Reports\Basis\Design\Report\LDW\_BDR\_9/9/23.aprx



# LDW Upper Reach-90% RD Conceptual Construction Schedule



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**Figure 13-1**  
**LDW Upper Reach 90% Remedial Design Conceptual Construction Schedule**

90% Remedial Design Basis of Design Report  
for the LDW Upper Reach