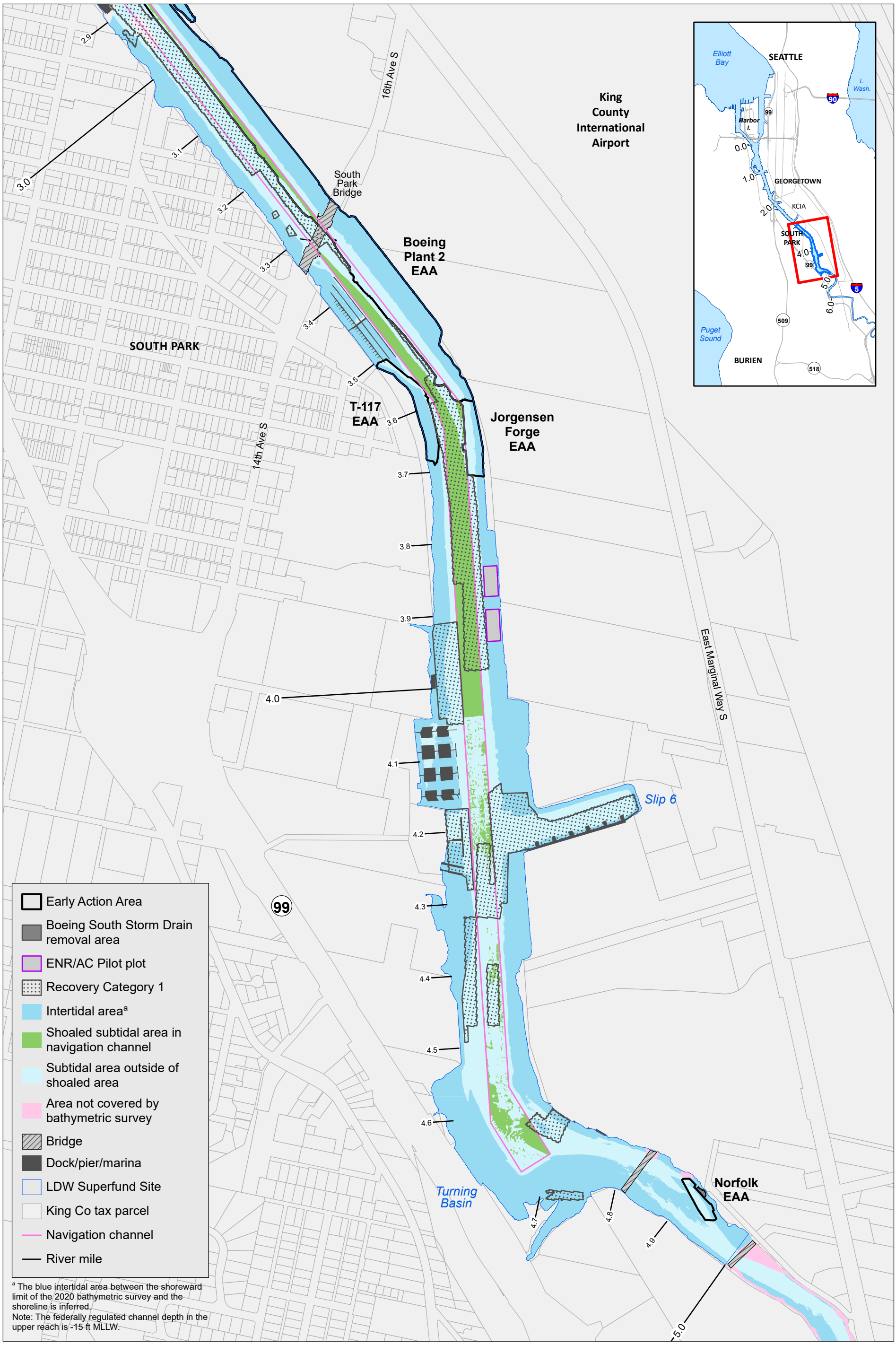

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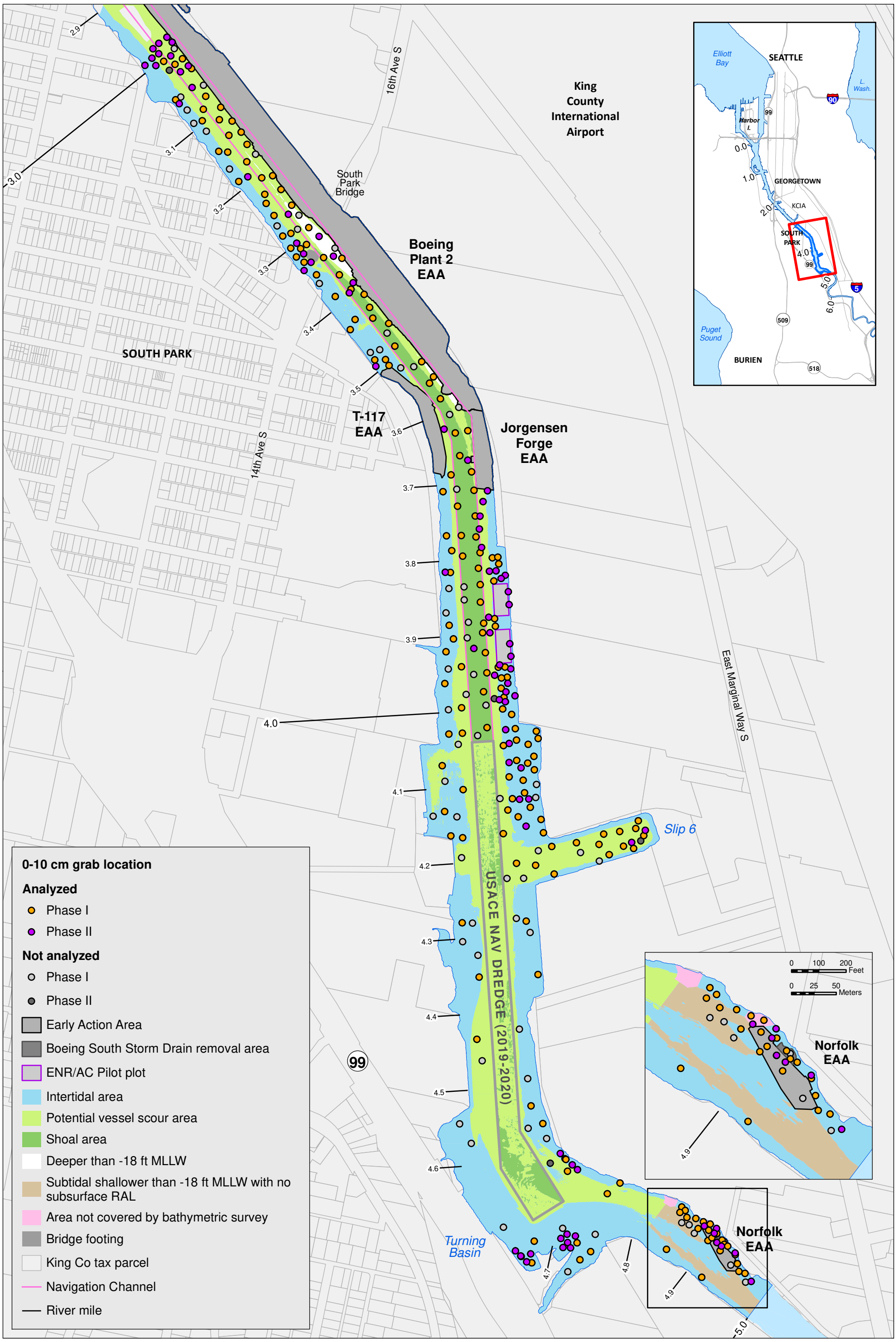
Map 2-1. Upper reach of the LDW

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

DRAFT

Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-1 7059 Upper Reach.mxd



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N

0 500 1,000 Feet

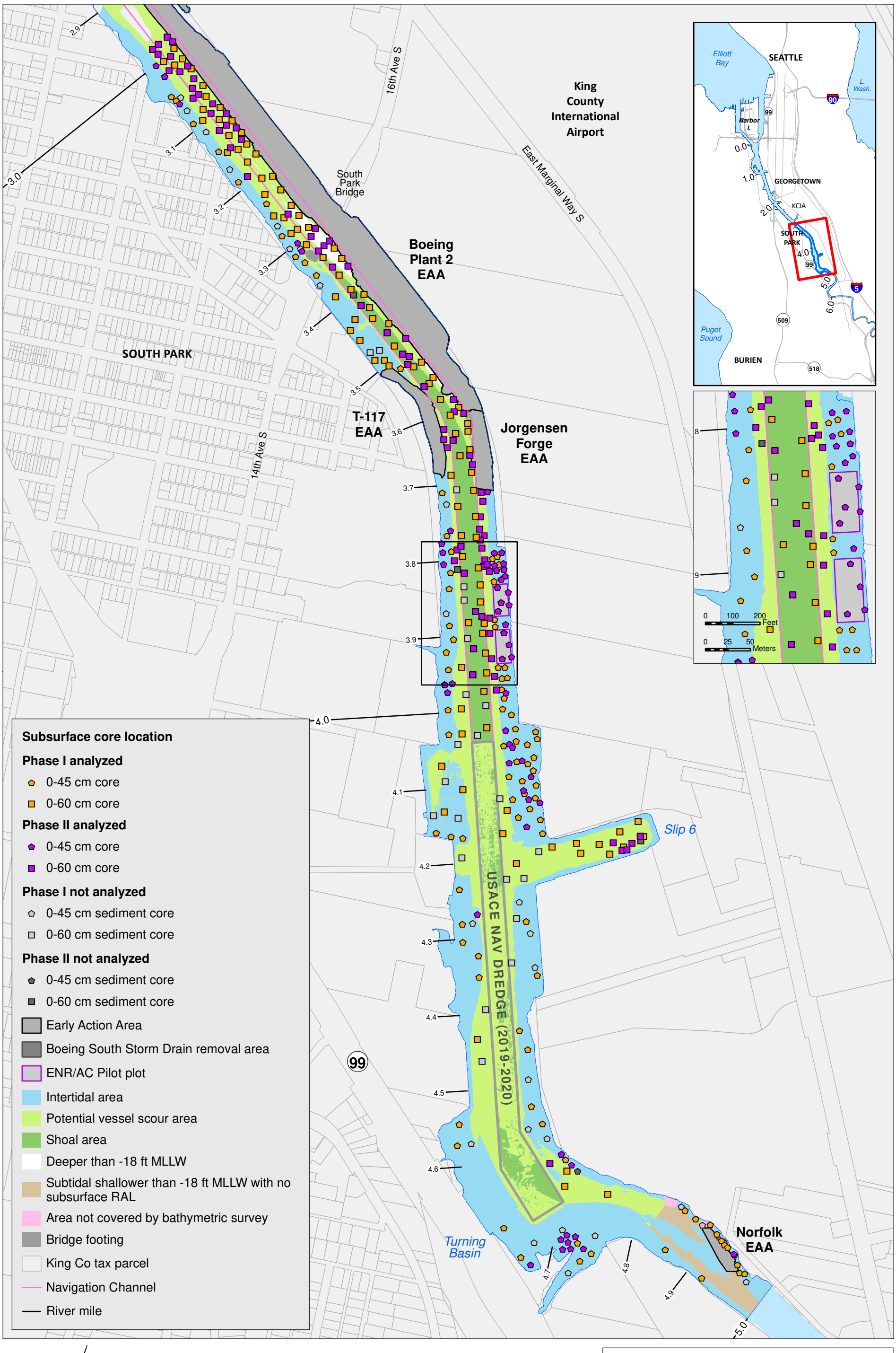
0 200 400 Meters

Map 2-2a. Phase I and II PDI surface sediment chemistry sample locations

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

DRAFT

Prepared by craigh, 2/9/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-2a 7234 Phase I PDI locations - surface.mxd



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Lower Duwamish Waterway Group

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N

0 500 1,000 Feet

0 200 400 Meters

Map 2-2b. Phase I and II PDI subsurface sediment chemistry sample locations and intervals

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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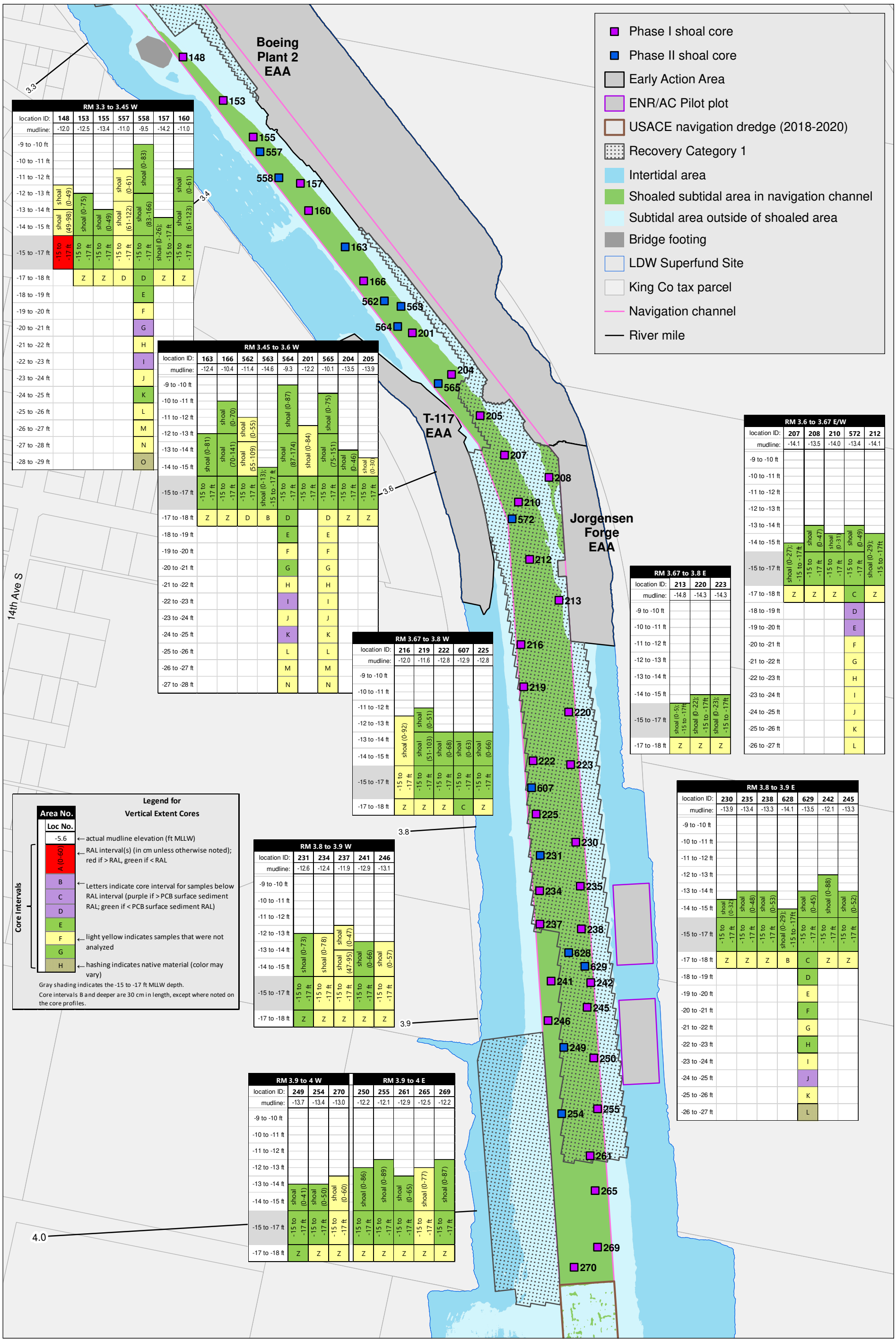
Phase I shoal core
Phase II shoal core
Early Action Area
ENR/AC Pilot plot
USACE navigation dredge (2018-2020)
Recovery Category 1
Intertidal area
Shoaled subtidal area in navigation channel
Subtidal area outside of shoaled area
Bridge footing
LDW Superfund Site
King Co tax parcel
Navigation channel
River mile
Boeing Plant 2 EAA
T-117 EAA
Jorgensen Forge EAA
14th Ave S
3.3
3.4
3.6
3.8
3.9
4.0
148
153
155
557
558
157
160
163
166
562
563
564
201
204
565
205
207
208
210
572
212
213
216
219
220
222
223
607
225
230
231
234
235
237
238
628
629
241
242
245
246
249
250
254
255
261
265
269
270
RM 3.3 to 3.45 W
RM 3.45 to 3.6 W
RM 3.6 to 3.67 E/W
RM 3.67 to 3.8 E
RM 3.67 to 3.8 W
RM 3.8 to 3.9 W
RM 3.8 to 3.9 E
RM 3.9 to 4 W
RM 3.9 to 4 E
Legend for Vertical Extent Cores
Area No.
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 > PCB surface sediment RAL; green if < PCB surface sediment RAL)
F ← light yellow indicates samples that were not analyzed
H ← hashing indicates native material (color may vary)
Core Intervals
Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.
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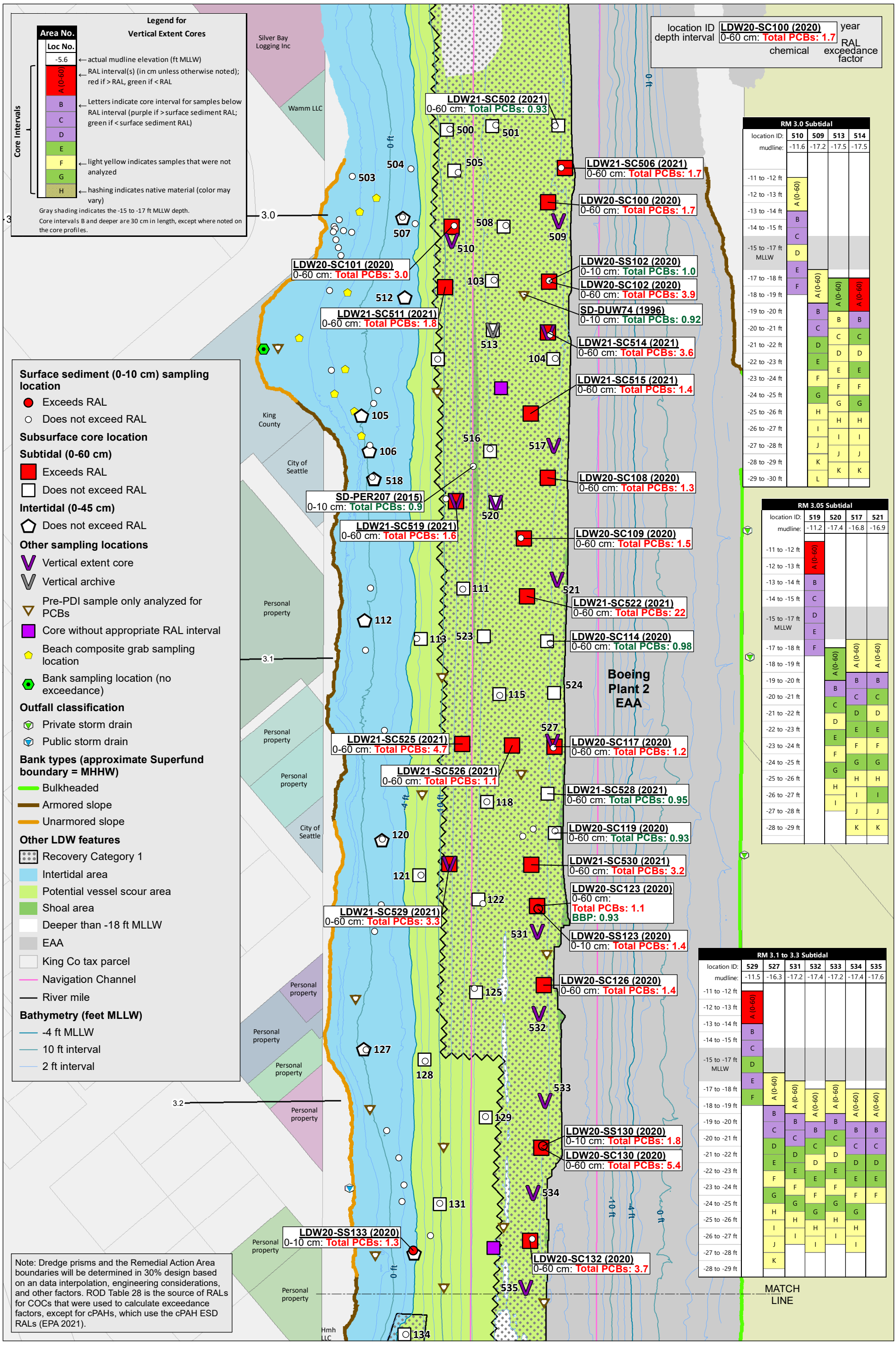
N
0 200 400 Feet
0 50 100 Meters
Map 2-3. Phase I and II PDI shoal sample chemistry locations and intervals
Pre-Design Investigation Data Evalutation Report for the LDW Upper Reach
DRAFT
Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-3 7361 Shoaling cores.mxd


Legend for Vertical Extent Cores
Area No.
Loc No.
-5.6
actual mudline elevation (ft MLLW)
Core Intervals
A (0-60)
RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
B
C
D
E
F
G
H
Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
light yellow indicates samples that were not analyzed
hashing indicates native material (color may vary)
Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.
location ID LDW20-SC100 (2020)
depth interval 0-60 cm: Total PCBs: 1.7
year
chemical
RAL exceedance factor
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)
Does not exceed RAL
Other sampling locations
Vertical extent core
Vertical archive
Pre-PDI sample only analyzed for PCBs
Core without appropriate RAL interval
Beach composite grab sampling location
Bank sampling location (no exceedance)
Outfall classification
Private storm drain
Public storm drain
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
Navigation Channel
River mile
Bathymetry (feet MLLW)
-4 ft MLLW
10 ft interval
2 ft interval
Silver Bay Logging Inc
Wamm LLC
King County
City of Seattle
Personal property
Boeing Plant 2 EAA
Hmh LLC
3.0
3.1
3.2
LDW21-SC502 (2021) 0-60 cm: Total PCBs: 0.93
LDW21-SC506 (2021) 0-60 cm: Total PCBs: 1.7
LDW20-SC100 (2020) 0-60 cm: Total PCBs: 1.7
LDW20-SS102 (2020) 0-10 cm: Total PCBs: 1.0
LDW20-SC102 (2020) 0-60 cm: Total PCBs: 3.9
SD-DUW74 (1996) 0-10 cm: Total PCBs: 0.92
LDW21-SC514 (2021) 0-60 cm: Total PCBs: 3.6
LDW21-SC515 (2021) 0-60 cm: Total PCBs: 1.4
LDW20-SC108 (2020) 0-60 cm: Total PCBs: 1.3
LDW20-SC101 (2020) 0-60 cm: Total PCBs: 3.0
LDW21-SC511 (2021) 0-60 cm: Total PCBs: 1.8
SD-PER207 (2015) 0-10 cm: Total PCBs: 0.9
LDW21-SC519 (2021) 0-60 cm: Total PCBs: 1.6
LDW20-SC109 (2020) 0-60 cm: Total PCBs: 1.5
LDW21-SC522 (2021) 0-60 cm: Total PCBs: 22
LDW20-SC114 (2020) 0-60 cm: Total PCBs: 0.98
LDW21-SC525 (2021) 0-60 cm: Total PCBs: 4.7
LDW20-SC117 (2020) 0-60 cm: Total PCBs: 1.2
LDW21-SC526 (2021) 0-60 cm: Total PCBs: 1.1
LDW21-SC528 (2021) 0-60 cm: Total PCBs: 0.95
LDW20-SC119 (2020) 0-60 cm: Total PCBs: 0.93
LDW21-SC530 (2021) 0-60 cm: Total PCBs: 3.2
LDW20-SC123 (2020) 0-60 cm: Total PCBs: 1.1 BBP: 0.93
LDW21-SC529 (2021) 0-60 cm: Total PCBs: 3.3
LDW20-SS123 (2020) 0-10 cm: Total PCBs: 1.4
LDW20-SC126 (2020) 0-60 cm: Total PCBs: 1.4
LDW20-SS130 (2020) 0-10 cm: Total PCBs: 1.8
LDW20-SC130 (2020) 0-60 cm: Total PCBs: 5.4
LDW20-SS133 (2020) 0-10 cm: Total PCBs: 1.3
LDW20-SC132 (2020) 0-60 cm: Total PCBs: 3.7
MATCH LINE
RM 3.0 Subtidal
RM 3.05 Subtidal
RM 3.1 to 3.3 Subtidal
Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).
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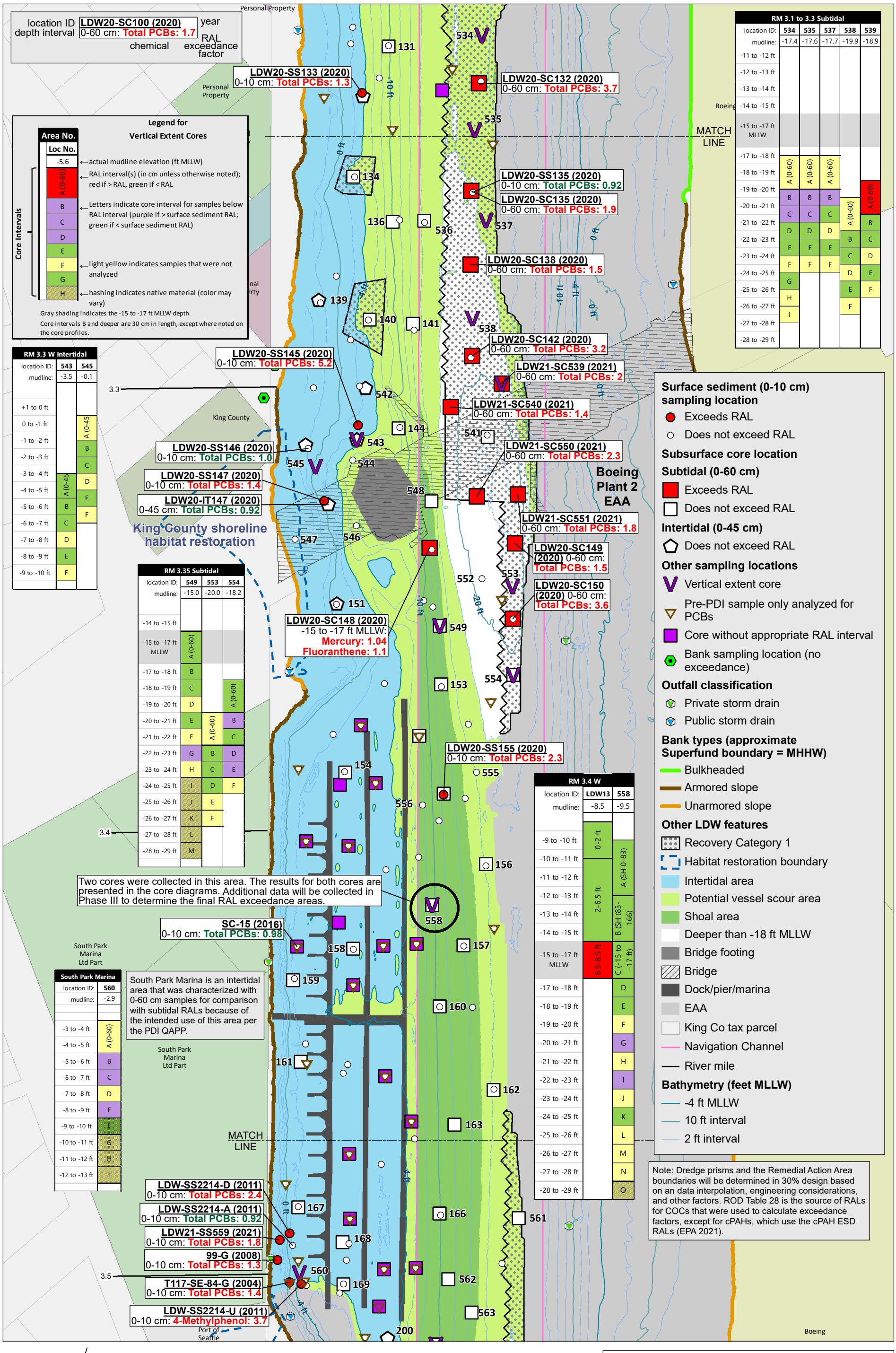
Lower Duwamish Waterway Group
Port of Seattle / City of Seattle / King County / The Boeing Company
0 100 200 Feet
0 25 50 Meters
Map 2-4a. RAL exceedances and vertical extent core results, RM 3.0 to RM 3.2
Pre-Design Investigation Data Evalutation Report for the LDW Upper Reach
DRAFT
Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-4a 7172 Upper Reach Ph2 Prelim Data - RM 3.0-3.2.mxd



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0 100 200 Feet

0 25 50 Meters

Map 2-4b. RAL exceedances and vertical extent core results, RM 3.2 to RM 3.5

Pre-Design Investigation Data Evalutation Report for the LDW Upper Reach

DRAFT

Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-4b 7172 Upper Reach Ph2 Prelim Data - RM 3.2-3.5.mxd

South Park Marina is an intertidal area that was characterized with 0-60 cm samples for comparison with subtidal RALs because of the intended use of this area per the PDI QAPP.

Two cores were collected in this area. The results for both cores are presented in the core diagrams. Additional data will be collected in Phase III to determine the final RAL exceedance areas.

South Park Marina

location ID:	560
mudline:	-2.9
-3 to -4 ft	A (0-60)
-4 to -5 ft	
-5 to -6 ft	B
-6 to -7 ft	C
-7 to -8 ft	D
-8 to -9 ft	E
-9 to -10 ft	F
-10 to -11 ft	G
-11 to -12 ft	H
-12 to -13 ft	I

RM 3.5 to 3.55 W

location ID:	LDW14	564	565
mudline:	-8.2	-9.3	-10.1
-8 to -9 ft	0-2 ft		
-9 to -10 ft			
-10 to -11 ft	2-4 ft	A (SH 0-87)	A (SH 0-75)
-11 to -12 ft			
-12 to -13 ft	4-6.7 ft		
-13 to -14 ft		B (SH 87-174)	B (SH 75-151)
-14 to -15 ft			
-15 to -17 ft MLLW	6.7-8.7 ft	C (-15 to -17 ft)	C (-15 to -17 ft)
-17 to -18 ft		D	D
-18 to -19 ft		E	E
-19 to -20 ft		F	F
-20 to -21 ft		G	G
-21 to -22 ft		H	H
-22 to -23 ft		I	I
-23 to -24 ft		J	J
-24 to -25 ft		K	K
-25 to -26 ft		L	L
-26 to -27 ft		M	M
-27 to -28 ft		N	N

Legend for Vertical Extent Cores

Area No.
Loc No.
-5.6 ← actual mudline elevation (ft MLLW)
Core Intervals: A (0-60), B, C, D, E, F, G, H
← 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)
← light yellow indicates samples that were not analyzed
← hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

RM 3.6-3.65 W

location ID:	571	T117-SE-35-SC	572
mudline:	-7.0	-11.0	-13.4
-7 to -8 ft	A (0-60)		
-8 to -9 ft			
-9 to -10 ft	B		
-10 to -11 ft	C		
-11 to -12 ft	D	0-2 ft	
-12 to -13 ft	E		
-13 to -14 ft		2-4 ft	A (SH 0-49)
-14 to -15 ft			
-15 to -17 ft MLLW		4-6 ft	B (-15 to -17 ft)
-17 to -18 ft		6-8 ft	C
-18 to -19 ft			D
-19 to -20 ft		8-10 ft	E
-20 to -21 ft			F
-21 to -22 ft			G
-22 to -23 ft			H
-23 to -24 ft			I
-24 to -25 ft			J
-25 to -26 ft			K
-26 to -27 ft			L

RM 3.6-3.7 E

location ID:	568	576
mudline:	-18.4	-16.5
-15 to -17 ft MLLW		
-17 to -18 ft		A (0-60)
-18 to -19 ft		
-19 to -20 ft	A (0-60)	B
-20 to -21 ft		C
-21 to -22 ft	B	D
-22 to -23 ft	C	E
-23 to -24 ft	D	F
-24 to -25 ft	E	G
-25 to -26 ft	F	H
-26 to -27 ft		I
-27 to -28 ft		J
-28 to -29 ft		K
-29 to -30 ft		L
-30 to -31 ft		M

RM 3.7-3.85 E Subtidal

location ID:	577	584
mudline:	-11.3	-3.8
-4 to -5 ft		A (0-60)
-5 to -6 ft		
-6 to -7 ft		B
-7 to -8 ft		C
-8 to -9 ft		D
-9 to -10 ft		E
-10 to -11 ft		
-11 to -12 ft	A (0-60)	
-12 to -13 ft		
-13 to -14 ft	B	
-14 to -15 ft	C	
-15 to -17 ft MLLW	D	
	E	
-17 to -18 ft	F	

RM 3.7-3.85 E Intertidal

location ID:	579	581	582	585
mudline:	-0.7	-2.8	-0.2	-1.8
+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			A (0-45)	
-1 to -2 ft	A (0-45)		B	
-2 to -3 ft	B		C	A (0-45)
-3 to -4 ft	C	A (0-45)	D	B
-4 to -5 ft	D	B	E	C
-5 to -6 ft	E	C	F	D
-6 to -7 ft	F	D		E
-7 to -8 ft		E		F
-8 to -9 ft		F		
-9 to -10 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)
- Does not exceed RAL

Other sampling locations
- Vertical extent core
- Vertical archive
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval

Outfall classification
- Private storm drain
- Public storm drain

Bank types (approximate Superfund boundary = MHHW)
- Bulkheaded
- Armored slope
- 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
- Deeper than -18 ft MLLW
- Dock/pier/marina
- EAA
- King Co tax parcel
- Navigation Channel
- River mile

Bathymetry (feet MLLW)
- -4 ft MLLW
- 10 ft interval
- 2 ft interval

Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).

Duwamish River People's Park and Shoreline Habitat project

Boeing Plant 2 EAA

T-117 EAA

Jorgensen Forge EAA

Boeing

Star Forge LLC

MATCH LINE

LDW-SS2214-A (2011) 0-10 cm: Total PCBs: 0.92
LDW-SS2214-D (2011) 0-10 cm: Total PCBs: 2.4
LDW21-SS559 (2021) 0-10 cm: Total PCBs: 1.8
99-G (2008) 0-10 cm: Total PCBs: 1.3
T117-SE-84-G (2004) 0-10 cm: Total PCBs: 1.4
LDW-SS2214-U (2011) 0-10 cm: 4-Methylphenol: 3.7
location ID / depth interval: LDW20-SC100 (2020) 0-60 cm: Total PCBs: 1.7 (year, RAL, chemical, exceedance factor)
T117-SE-15-SC
LDW21-SC566 (2021) 0-60 cm: Total PCBs: 4.7
LDW20-SC206 (2020) 0-60 cm: Total PCBs: 1.1
LDW21-SC567 (2021) 0-60 cm: Total PCBs: 1.7
LDW21-SC569 (2021) 0-60 cm: Total PCBs: 0.98
LDW21-SC570 (2021) 0-60 cm: Total PCBs: 1.7
R17 (1997) 0-10 cm: Total PCBs: 1.3
T117-SE-35-SC (2003) 0-60 cm: Total PCBs: 1.3
LDW21-SC573 (2021) 0-60 cm: Total PCBs: 3
LDW20-SC211 (2020) 0-60 cm: Total PCBs: 0.92
LTR-20-2018 (2018) 0-10 cm: Mercury: 1.3
LDW15 (2012) -15 to -17 ft MLLW: Total PCBs: 0.92
LDW20-SS213 (2020) 0-10 cm: Total PCBs: 1.1
LDW21-SS578 (2021) 0-10 cm: Arsenic: 0.94
SD-502G (2012) 0-10 cm: Total PCBs: 2.3
PMU-2-2018 (2018) 0-10 cm: Arsenic: 3.5 Total PCBs: 0.96
PMU-1-2018 (2018) 0-10 cm: Total PCBs: 0.93
LDW21-SC580 (2021) 0-60 cm: Total PCBs: 4
LDW-SS112 (2005) 0-10 cm: BBP: 1.2 Total PCBs: 2.2 Arsenic: 8.4
LDW18-SS-134 (2018) 0-10 cm: Arsenic: 2.5
SD-504G (2012) 0-10 cm: Total PCBs: 1.8 Arsenic: 12
LDW18-SS-185 (2018) 0-10 cm: Total PCBs: 1.8
SD-505G (2012) 0-10 cm: BEHP: 0.96

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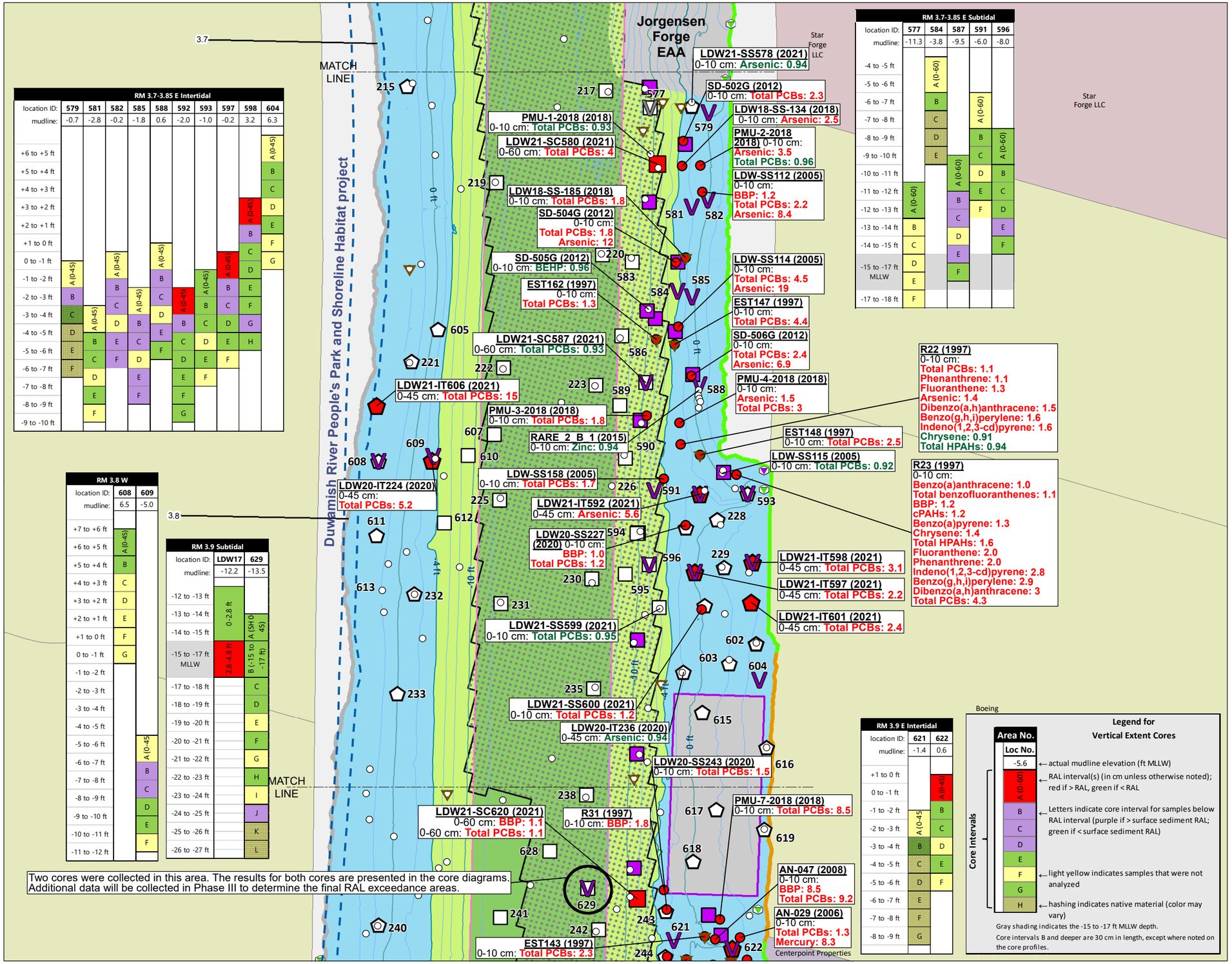
0 100 200 Feet
0 25 50 Meters

Map 2-4c. RAL exceedances and vertical extent core results, RM 3.5 to RM 3.7

Pre-Design Investigation Data Evalutation Report for the LDW Upper Reach

DRAFT

Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-4c 7172 Upper Reach Ph2 Prelim Data - RM 3.5-3.7.mxd



RM 3.7-3.85 E Intertidal

location ID:	579	581	582	585	588	592	593	597	598	604
mudline:	-0.7	-2.8	-0.2	-1.8	0.6	-2.0	-1.0	-0.2	3.2	6.3
+6 to +5 ft										A (0-45)
+5 to +4 ft										B
+4 to +3 ft										C
+3 to +2 ft									A (0-45)	D
+2 to +1 ft									B	E
+1 to 0 ft									C	F
0 to -1 ft			A (0-45)		A (0-45)			A (0-45)	D	G
-1 to -2 ft	A (0-45)		B		B		A (0-45)	B	E	
-2 to -3 ft	B		C	A (0-45)	C	A (0-45)	B	C	F	
-3 to -4 ft	C	A (0-45)	D	B	D	B	C	D	G	
-4 to -5 ft	D	B	E	C	E	C	D	E	H	
-5 to -6 ft	E	C	F	D	F	D	E	F		
-6 to -7 ft	F	D		E		E	F			
-7 to -8 ft		E		F		F				
-8 to -9 ft		F				G				
-9 to -10 ft										

RM 3.7-3.85 E Subtidal

location ID:	577	584	587	591	596
mudline:	-11.3	-3.8	-9.5	-6.0	-8.0
-4 to -5 ft		A (0-60)			
-5 to -6 ft					
-6 to -7 ft		B		A (0-60)	
-7 to -8 ft		C			
-8 to -9 ft		D		B	A (0-60)
-9 to -10 ft		E	A (0-60)	C	
-10 to -11 ft				D	B
-11 to -12 ft	A (0-60)		B	E	C
-12 to -13 ft			C	F	D
-13 to -14 ft	B		D		E
-14 to -15 ft	C		E		F
-15 to -17 ft MLLW	D		F		
-17 to -18 ft	E				
	F				

RM 3.8 W

location ID:	608	609
mudline:	6.5	-5.0
+7 to +6 ft		
+6 to +5 ft	A (0-45)	
+5 to +4 ft	B	
+4 to +3 ft	C	
+3 to +2 ft	D	
+2 to +1 ft	E	
+1 to 0 ft	F	
0 to -1 ft	G	
-1 to -2 ft		
-2 to -3 ft		
-3 to -4 ft		
-4 to -5 ft		
-5 to -6 ft		A (0-45
-6 to -7 ft		B
-7 to -8 ft		C
-8 to -9 ft		D
-9 to -10 ft		E
-10 to -11 ft		F
-11 to -12 ft		

RM 3.9 Subtidal

location ID:	LDW17	629
mudline:	-12.2	-13.5
-12 to -13 ft	0-2.8 ft	
-13 to -14 ft		A (SHO 45)
-14 to -15 ft		
-15 to -17 ft MLLW	2.8-4.8 ft	B (-15 to -17 ft)
-17 to -18 ft		C
-18 to -19 ft		D
-19 to -20 ft		E
-20 to -21 ft		F
-21 to -22 ft		G
-22 to -23 ft		H
-23 to -24 ft		I
-24 to -25 ft		J
-25 to -26 ft		K
-26 to -27 ft		L

RM 3.9 E Intertidal

location ID:	621	622
mudline:	-1.4	0.6
+1 to 0 ft		
0 to -1 ft		A(0-45)
-1 to -2 ft	A (0-45	B
-2 to -3 ft		C
-3 to -4 ft	B	D
-4 to -5 ft	C	E
-5 to -6 ft	D	F
-6 to -7 ft	E	
-7 to -8 ft	F	
-8 to -9 ft	G	

Boeing

Legend for Vertical Extent Cores

Area No.
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, C, D, E, F, G, H ← Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
F ← light yellow indicates samples that were not analyzed
H ← hashing indicates native material (color may vary)
Core Intervals

Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

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
- Vertical archive
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval

Outfall classification
- EOF/storm drain
- Private storm drain

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
- Navigation Channel
- River mile

Bathymetry (feet MLLW)
- -4 ft MLLW
- 10 ft interval
- 2 ft interval

Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).

N
0 100 200 Feet
0 25 50 Meters

Map 2-4d. RAL exceedances and vertical extent core results, RM 3.7 to RM 3.85

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH **DRAFT**

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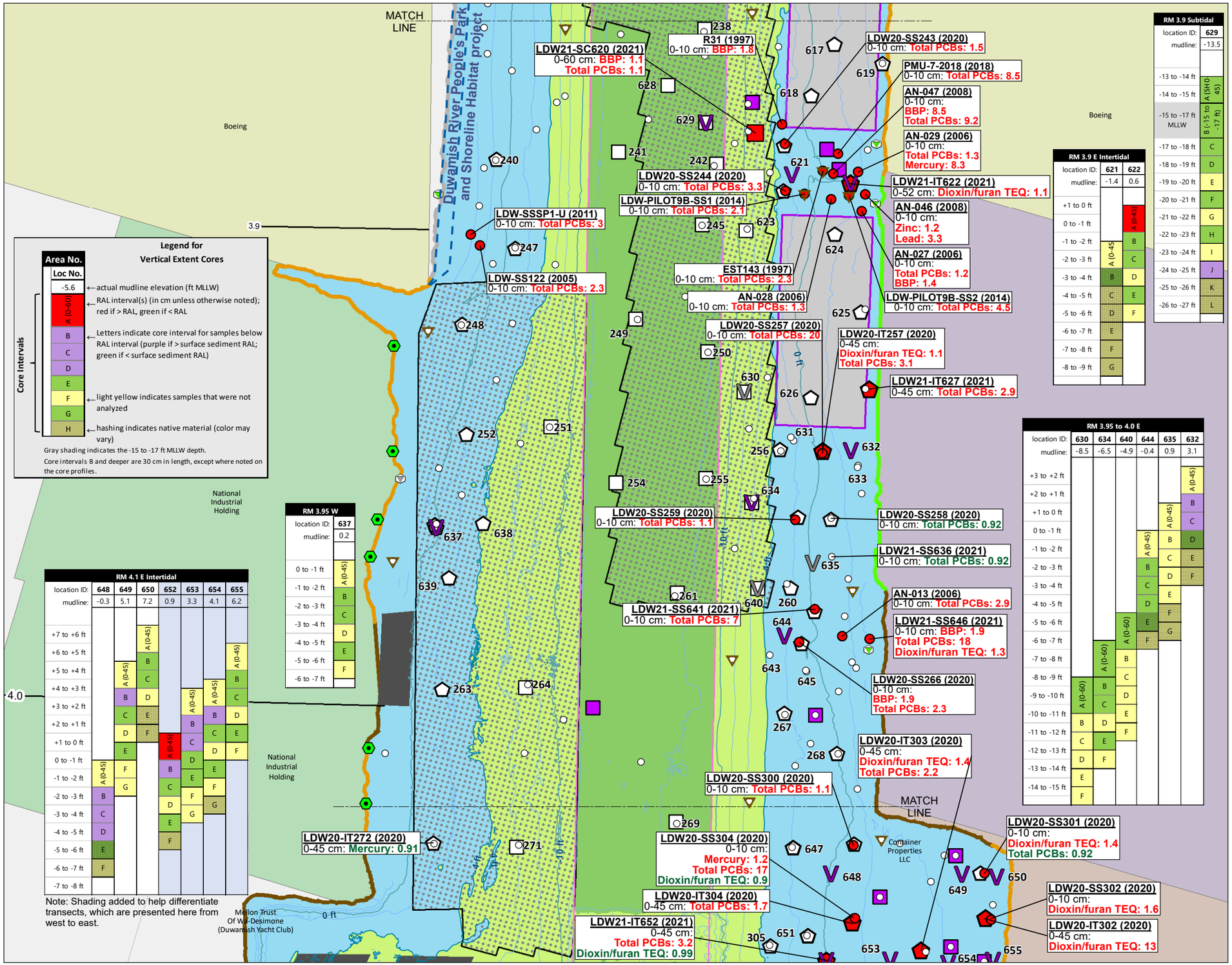
ANCHOR QEA

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

Prepared by craigh, 2/21/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-4d 7172 Upper Reach Ph2 Prelim Data - RM 3.7-3.85.mxd



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
- Vertical archive
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval
- Bank sampling location (no exceedance)

Outfall classification
- Private storm drain
- Pipe of unresolved origin and/or use
- Stream, channel, or ditch

Bank types (approximate Superfund boundary = MHHW)
- Bulkheaded
- Armored slope
- 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
- Dock/pier/marina
- ENR/AC Pilot plot
- King Co tax parcel
- Navigation Channel
- River mile

Bathymetry (feet MLLW)
- -4 ft MLLW
- 10 ft interval
- 2 ft interval

Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).

N

0 100 200 Feet

0 25 50 Meters

Map 2-4e. RAL exceedances and vertical extent core results, RM 3.85 to RM 4.05

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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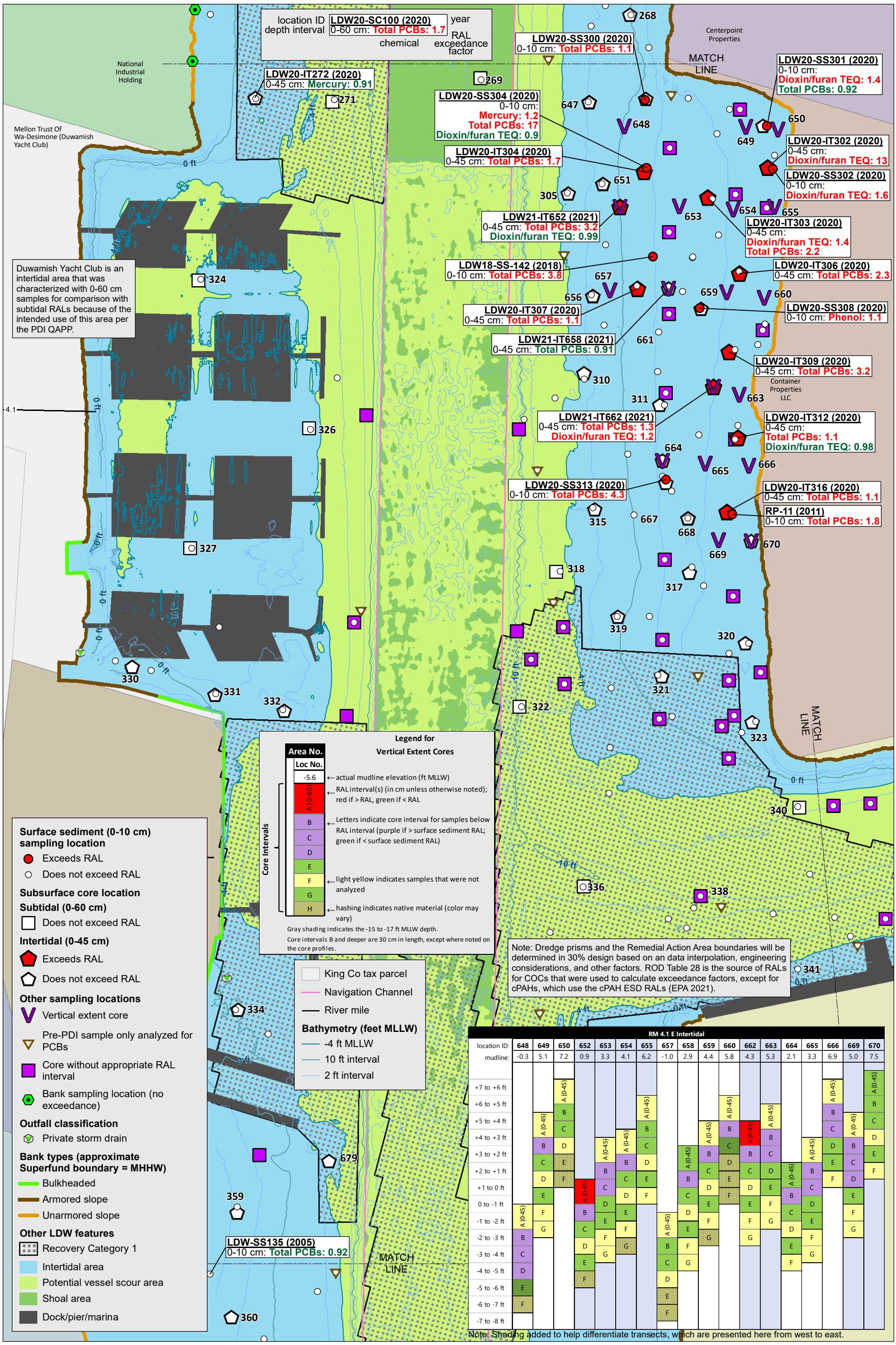

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N

0 100 200 Feet

0 25 50 Meters

Map 2-4f. RAL exceedances and vertical extent core results, RM 4.05 to RM 4.3

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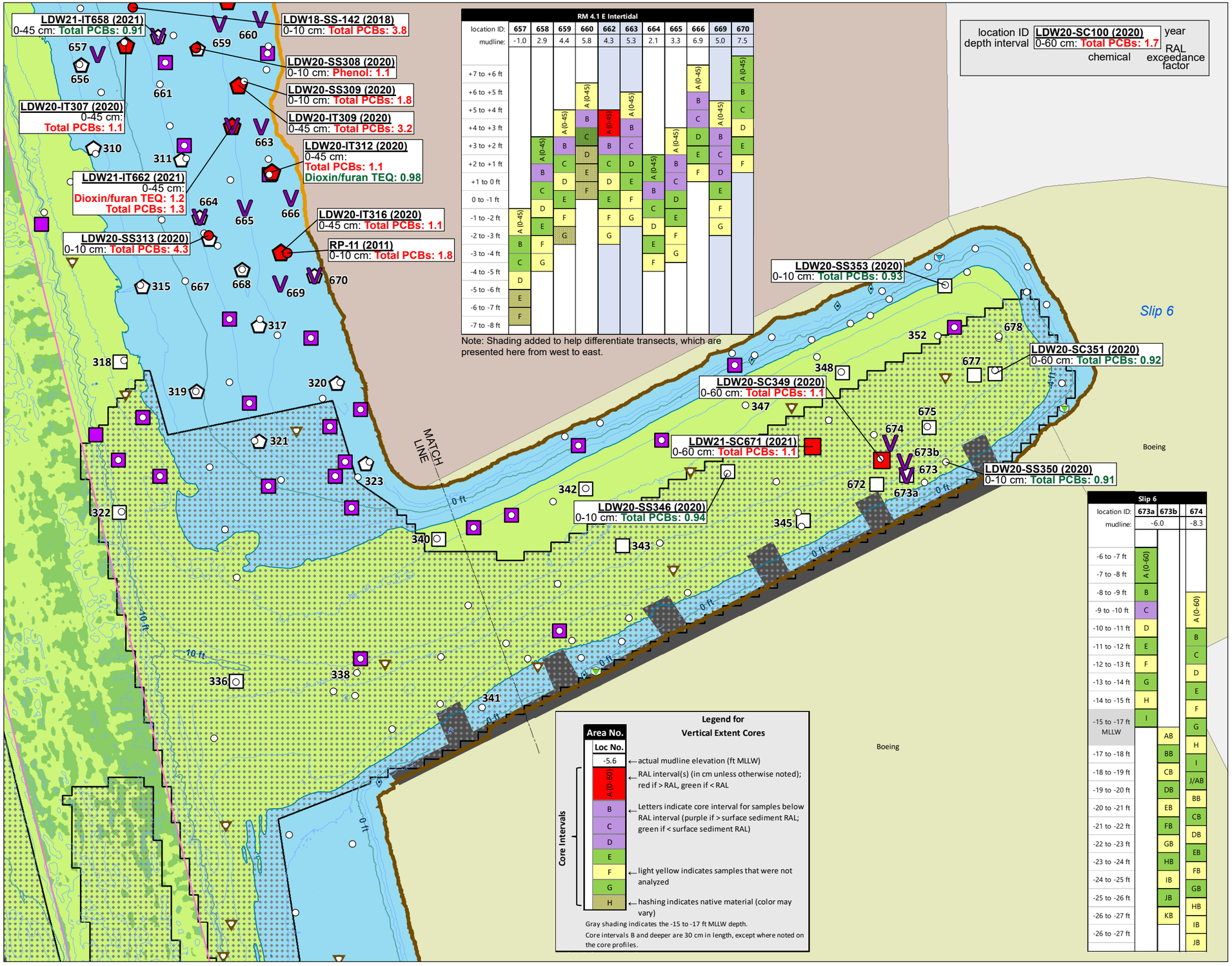

RM 4.1 E Intertidal

location ID:	657	658	659	660	662	663	664	665	666	669	670
mudline:	-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				A (0-45)		A (0-45)			C		C
+4 to +3 ft			A (0-45)	B	A (0-45)	B			D	A (0-45)	D
+3 to +2 ft		A (0-45)	B	C	B	C		A (0-45)	E	B	E
+2 to +1 ft		B	C	D	C	D	A (0-45)	B	F	C	F
+1 to 0 ft		C	D	E	D	E	B	C		D	
0 to -1 ft		D	E	F	E	F	C	D		E	
-1 to -2 ft	A (0-45)	E	F		F	G	D	E		F	
-2 to -3 ft	B	F	G		G		E	F		G	
-3 to -4 ft	C	G					F	G			
-4 to -5 ft	D										
-5 to -6 ft	E										
-6 to -7 ft	F										
-7 to -8 ft											

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

Slip 6

location ID:	673a	673b	674
mudline:	-6.0		-8.3
-6 to -7 ft	A (0-60)		
-7 to -8 ft			
-8 to -9 ft	B		
-9 to -10 ft	C		A (0-60)
-10 to -11 ft	D		B
-11 to -12 ft	E		C
-12 to -13 ft	F		D
-13 to -14 ft	G		E
-14 to -15 ft	H		F
-15 to -17 ft MLLW	I		G
-17 to -18 ft		AB	H
-18 to -19 ft		BB	I
-19 to -20 ft		CB	J/AB
-20 to -21 ft		DB	BB
-21 to -22 ft		EB	CB
-22 to -23 ft		FB	DB
-23 to -24 ft		GB	EB
-24 to -25 ft		HB	FB
-25 to -26 ft		IB	GB
-26 to -27 ft		JB	HB
-26 to -27 ft		KB	IB
			JB

Legend for Vertical Extent Cores

Area No.
Loc No.
-5.6 ← actual mudline elevation (ft MLLW)
Core Intervals: A (0-60), B, C, D, E, F, G, H
← 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)
← light yellow indicates samples that were not analyzed
← hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

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

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

Outfall classification
- 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
- Navigation Channel
- River mile

Bathymetry (feet MLLW)
- -4 ft MLLW
- 10 ft interval
- 2 ft interval

Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).

N

0 100 200 Feet

0 25 50 Meters

Map 2-4g. RAL exceedances and vertical extent core results, Slip 6

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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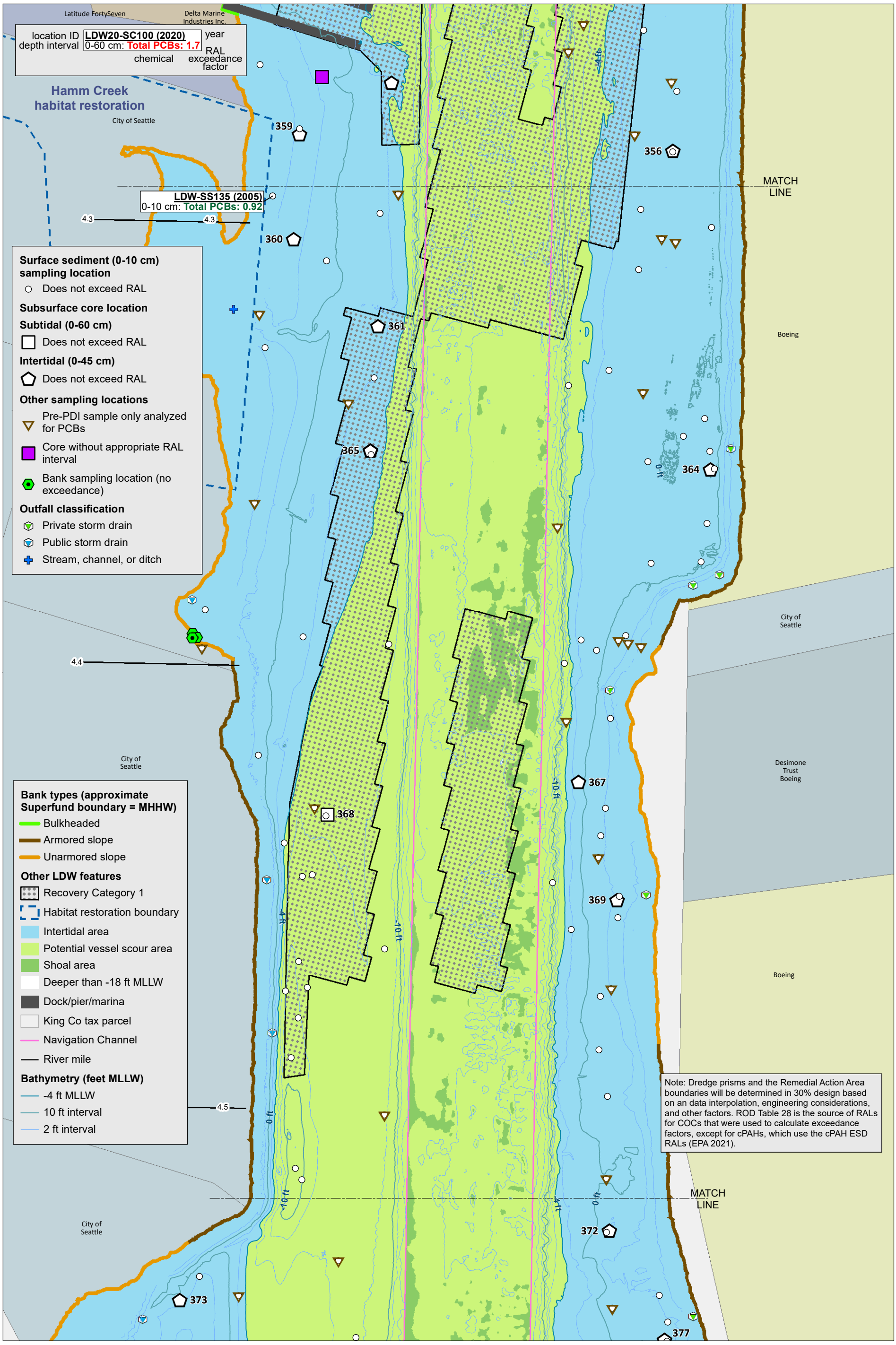

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N

0 100 200 Feet

0 25 50 Meters

Map 2-4h. RAL exceedances and vertical extent core results, RM 4.3 to RM 4.55

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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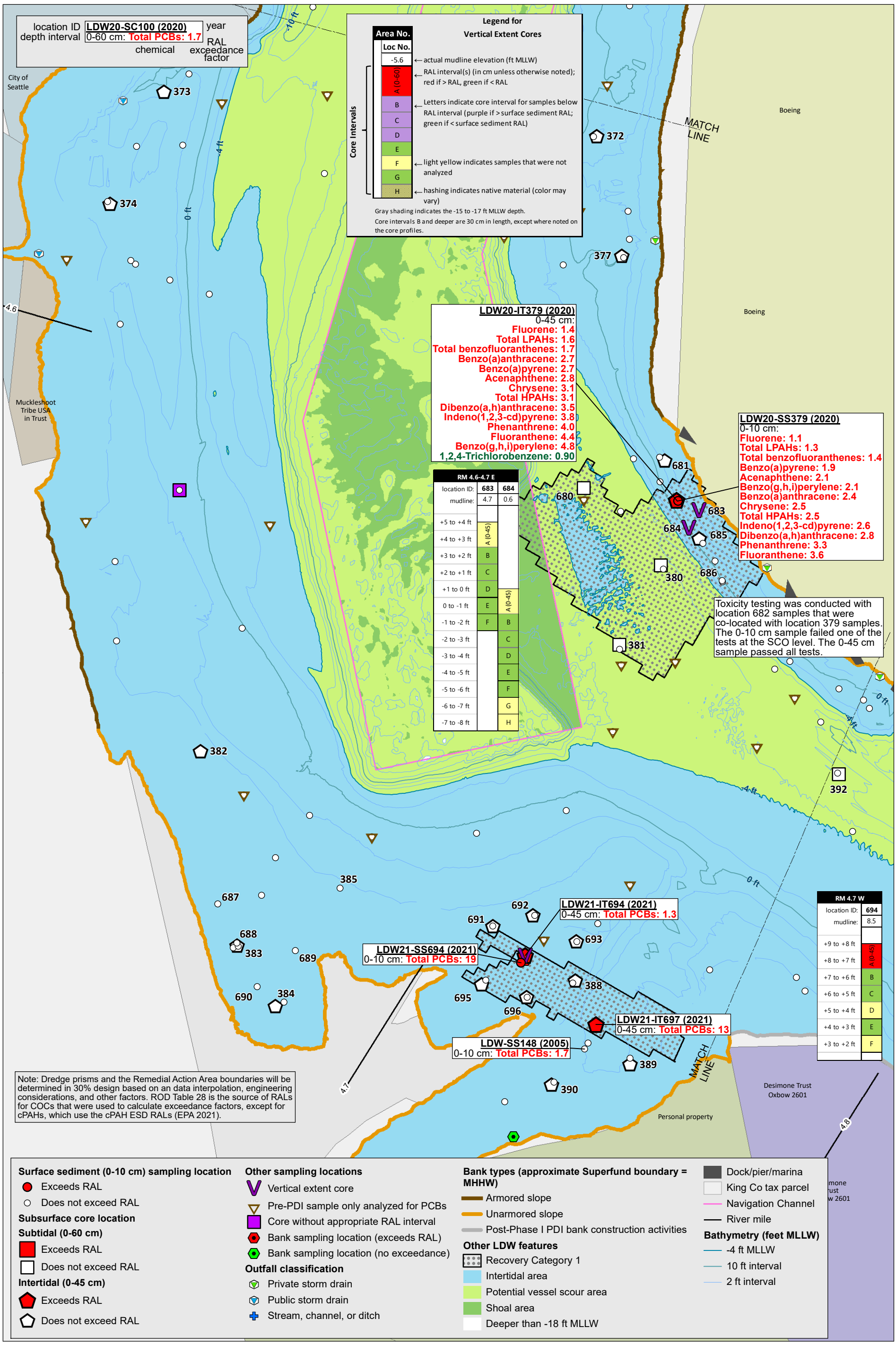

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0 100 200 Feet
0 25 50 Meters

Map 2-4i. RAL exceedances and vertical extent core results, RM 4.55 to RM 4.8

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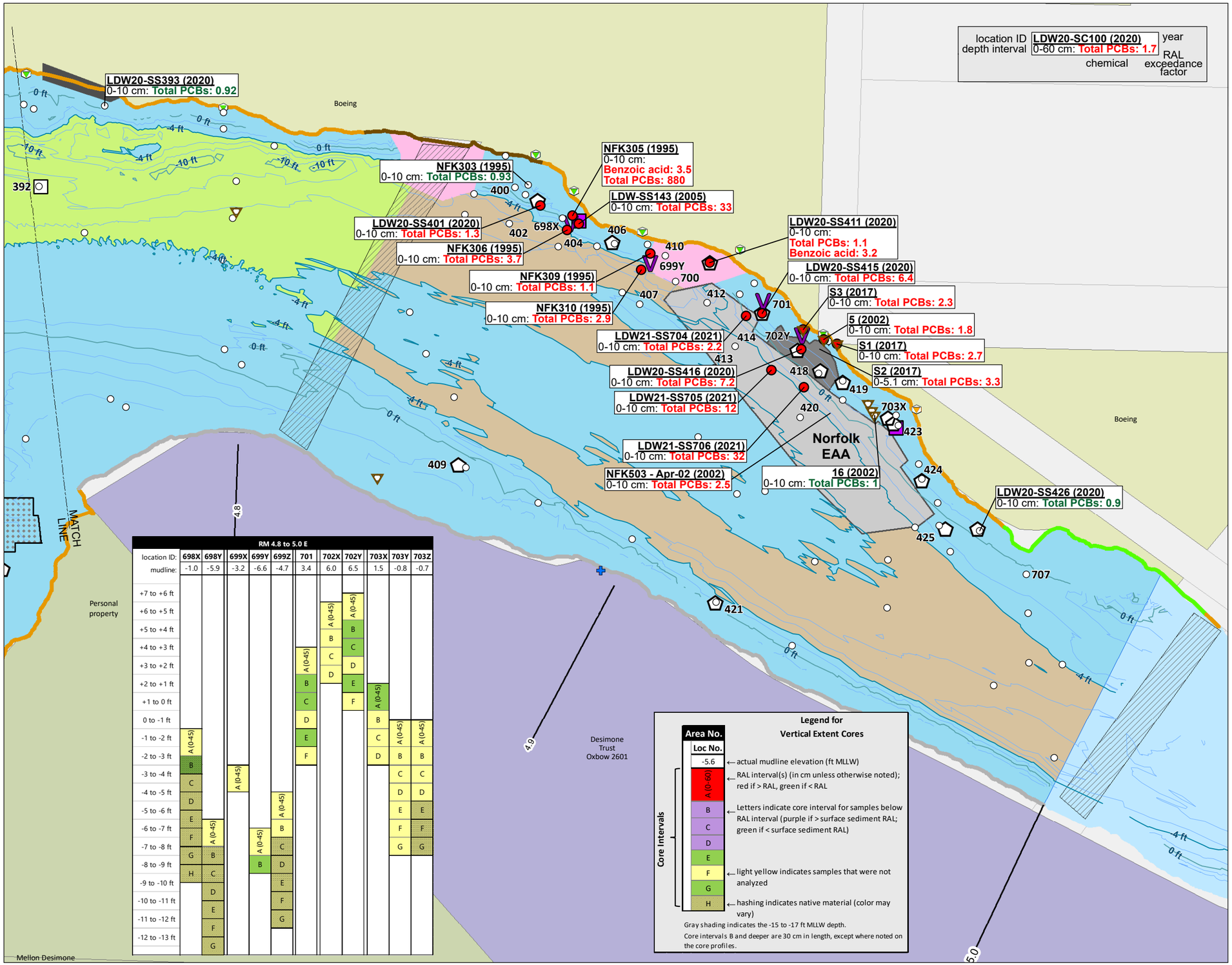

RM 4.8 to 5.0 E												
location ID:	698X	698Y	699X	699Y	699Z	701	702X	702Y	703X	703Y	703Z
mudline:	-1.0	-5.9	-3.2	-6.6	-4.7	3.4	6.0	6.5	1.5	-0.8	-0.7
+7 to +6 ft											
+6 to +5 ft							A (0-45)	A (0-45)			
+5 to +4 ft							B	B			
+4 to +3 ft						A (0-45)	C	C			
+3 to +2 ft						B	D	D			
+2 to +1 ft						C		E	A (0-45)		
+1 to 0 ft						D		F	B		
0 to -1 ft						E			C	A (0-45)	A (0-45)
-1 to -2 ft	A (0-45)					F			D	B	B
-2 to -3 ft	B									C	C
-3 to -4 ft	C		A (0-45)							D	D
-4 to -5 ft	D				A (0-45)					E	E
-5 to -6 ft	E				B					F	F
-6 to -7 ft	F	A (0-45)		A (0-45)	C					G	G
-7 to -8 ft	G	B		B	D						
-8 to -9 ft	H	C			E						
-9 to -10 ft		D			F						
-10 to -11 ft		E			G						
-11 to -12 ft		F									
-12 to -13 ft		G									

Legend for Vertical Extent Cores

Area No.
Loc No.
-5.6 ← actual mudline elevation (ft MLLW)

Core intervals:
A (0-60) ← RAL interval(s) (in cm unless otherwise noted); red if > RAL, green if < RAL
B, C, D, E ← Letters indicate core interval for samples below RAL interval (purple if > surface sediment RAL; green if < surface sediment RAL)
F ← light yellow indicates samples that were not analyzed
G, H ← hashing indicates native material (color may vary)

Gray shading indicates the -15 to -17 ft MLLW depth.
Core intervals B and deeper are 30 cm in length, except where noted on the core profiles.

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
- Pre-PDI sample only analyzed for PCBs
- Core without appropriate RAL interval

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

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

Note: Dredge prisms and the Remedial Action Area boundaries will be determined in 30% design based on an data interpolation, engineering considerations, and other factors. 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).

N

0 100 200 Feet

0 25 50 Meters

Map 2-4j. RAL exceedances and vertical extent core results, RM 4.8 to RM 5.0

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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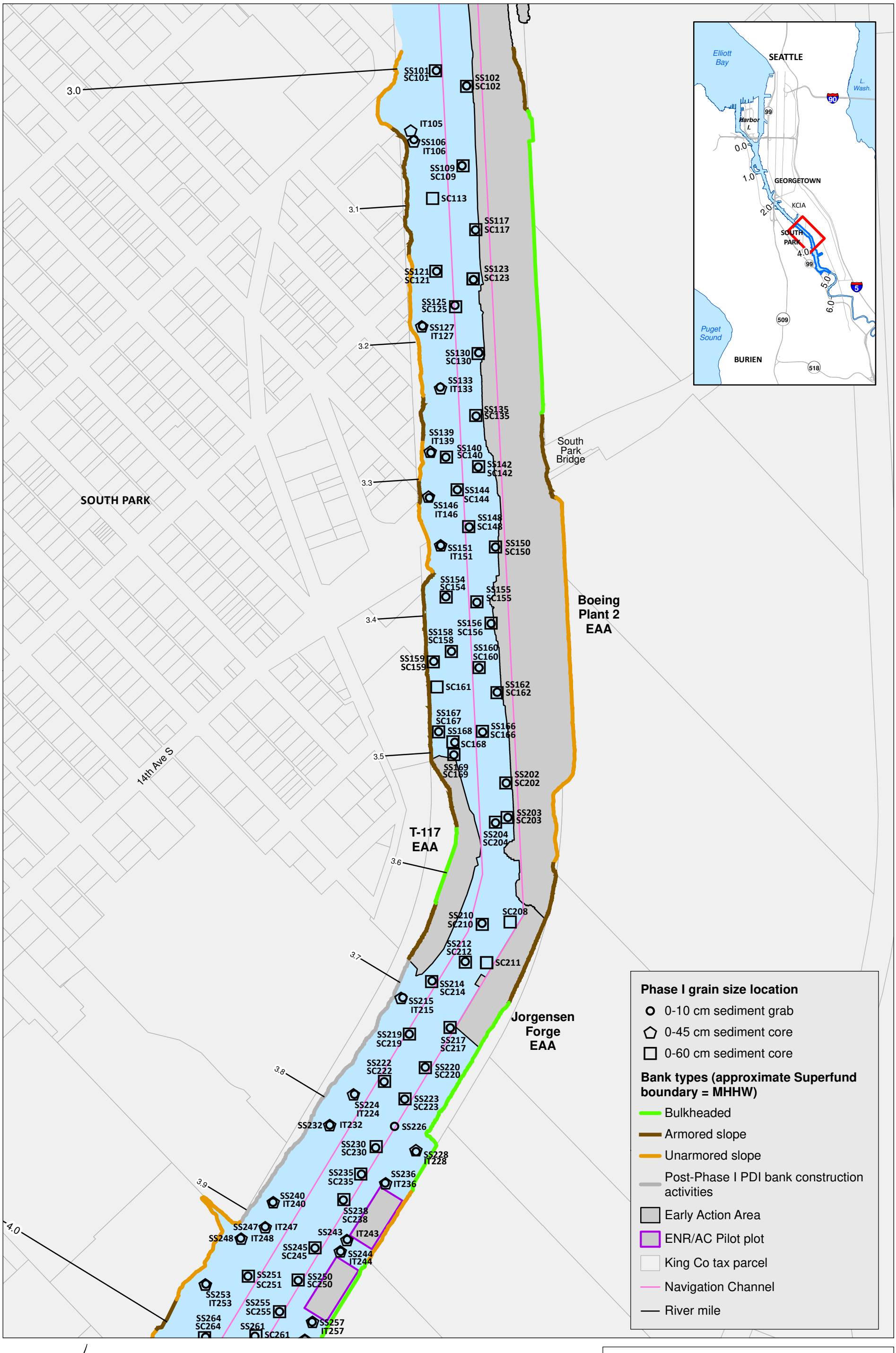

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Map 2-5a. Phase I Geotechnical data locations, RM 3.0 to RM 4.0

PRE-DESIGN INVESTIGATION DATA EVALUTATION REPORT FOR THE LDW UPPER REACH

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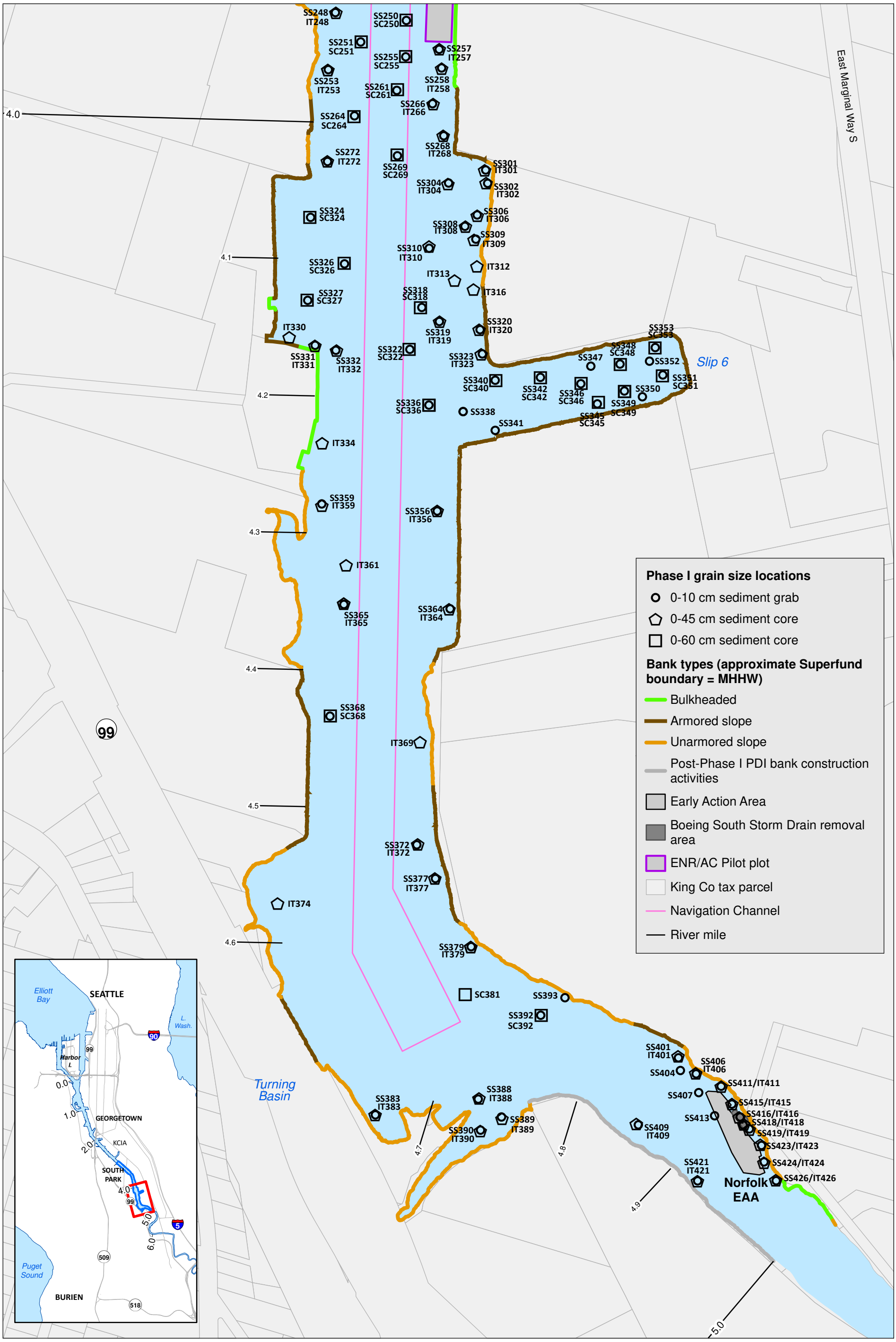

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N

0 250 500 Feet

0 100 200 Meters

Map 2-5b. Phase I Geotechnical data locations, RM 4.0 to RM 5.0

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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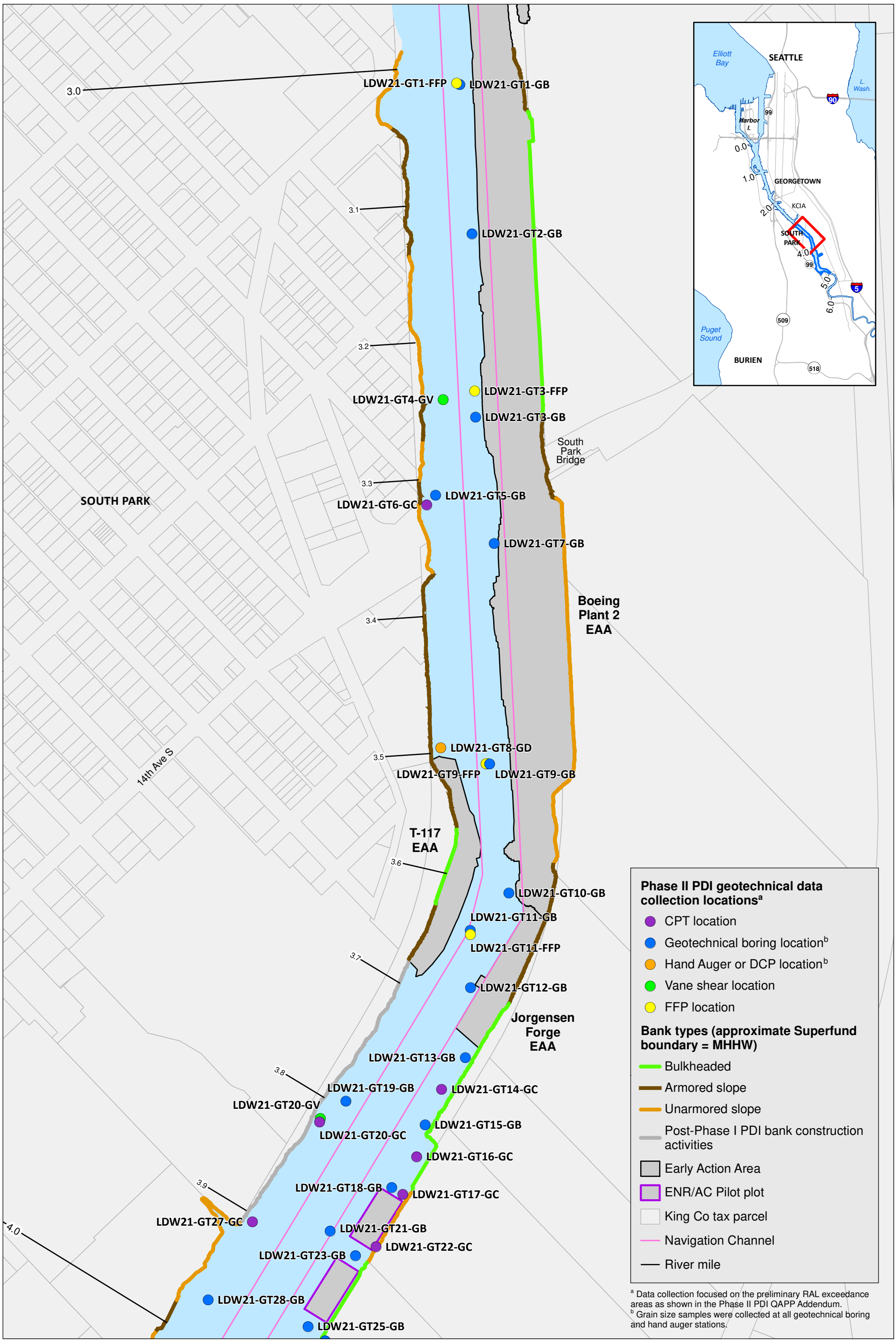

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Map 2-5c. Phase II geotechnical data locations, RM 3.0 to RM 4.0

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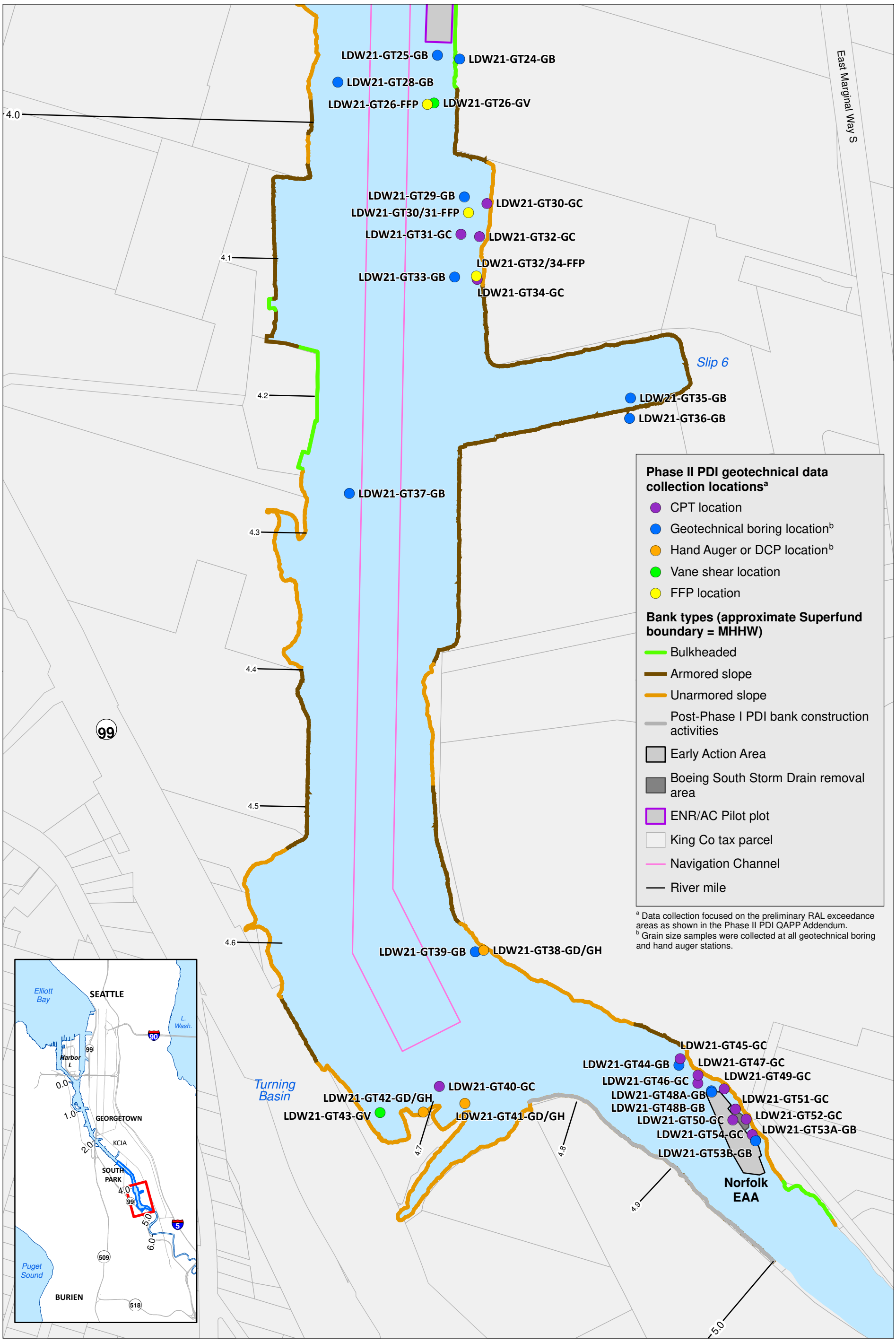

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Map 2-5d. Phase II Geotechnical data locations, RM 4.0 to RM 5.0

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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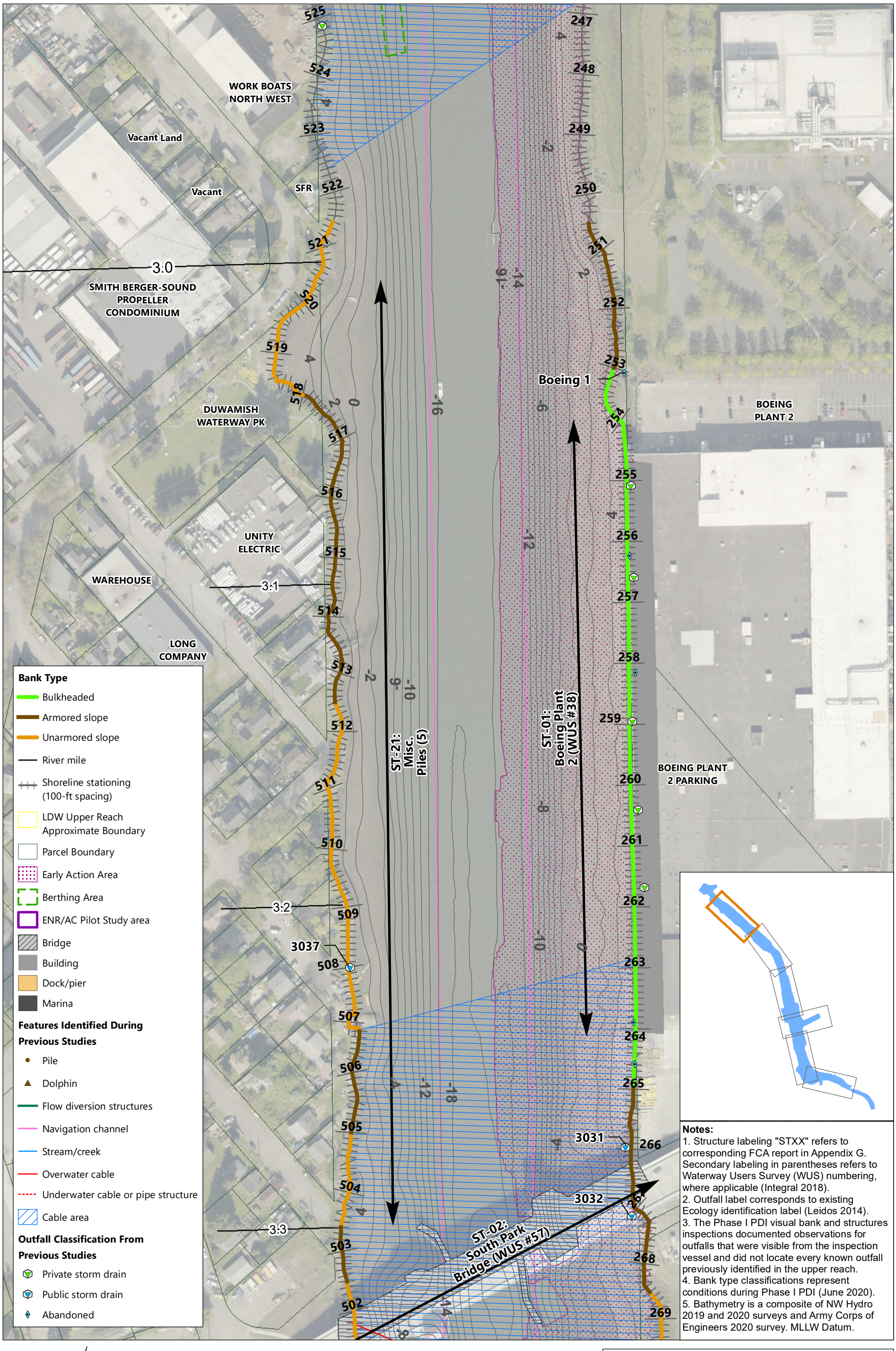
Prepared by craigh, 2/18/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-5d 7281 Geotech locations PhII RM4-5.mxd



Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
2. Outfall label corresponds to existing Ecology identification label (Leidos 2014).
3. The Phase I PDI visual bank and structures inspections documented observations for outfalls that were visible from the inspection vessel and did not locate every known outfall previously identified in the upper reach.
4. Bank type classifications represent conditions during Phase I PDI (June 2020).
5. Bathymetry is a composite of NW Hydro 2019 and 2020 surveys and Army Corps of Engineers 2020 survey. MLLW Datum.

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0 100 200 Feet
0 20 40 Meters

Map 2-6a
Phase I visual bank and structures inspections overview, RM 3.0 to RM 3.35

Pre-Design Investigation Data Evaluation Report for the LDW Upper Reach

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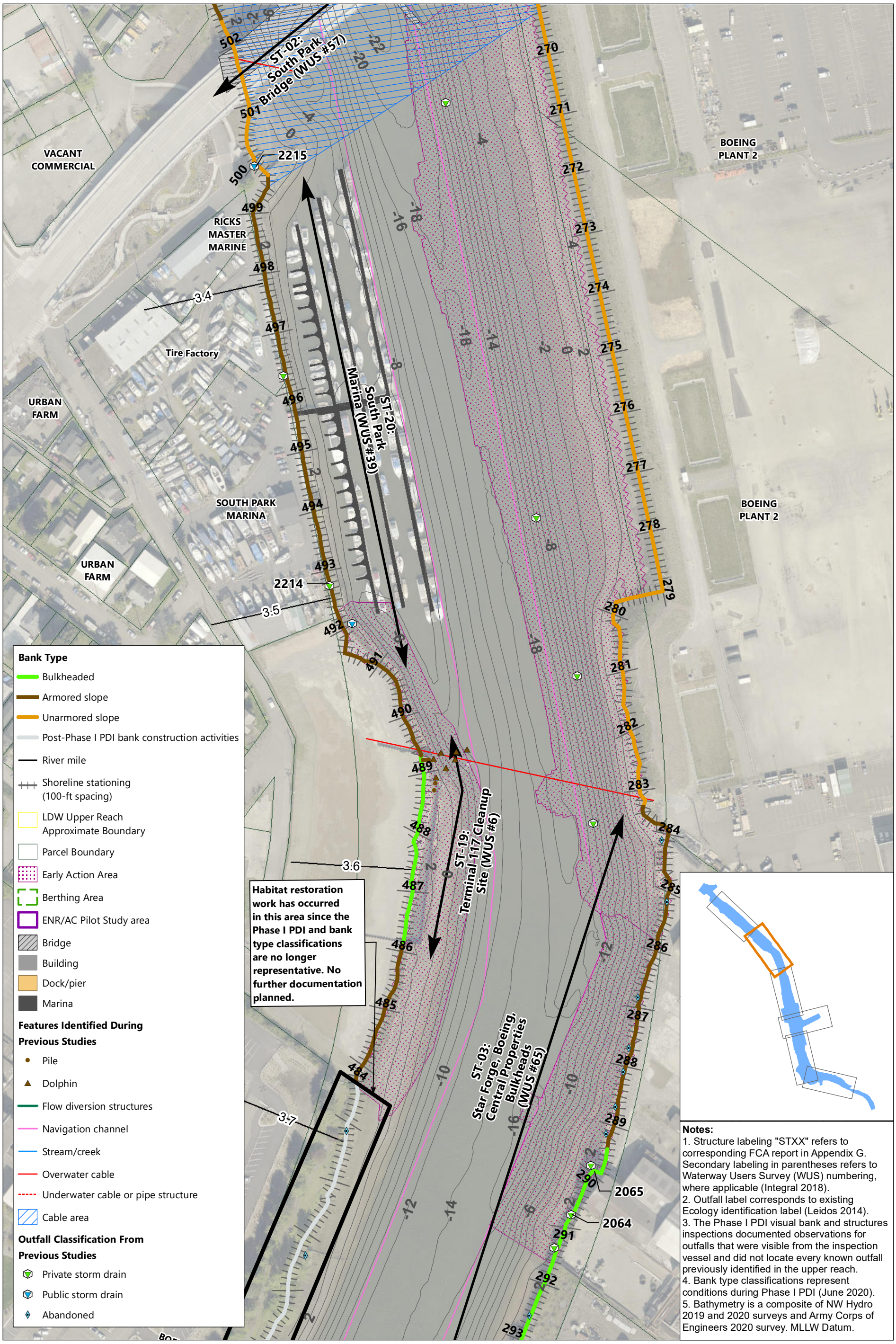
Prepared by hromer, 2/16/2022; \\orcas\GIS\Jobs\KingCounty_0087\LDW\Maps\DataEvaluationReport\LDW_AQ_DER_Fig2_4af_W_VisualBankStructureInspectionOverview.mxd



Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
2. Outfall label corresponds to existing Ecology identification label (Leidos 2014).
3. The Phase I PDI visual bank and structures inspections documented observations for outfalls that were visible from the inspection vessel and did not locate every known outfall previously identified in the upper reach.
4. Bank type classifications represent conditions during Phase I PDI (June 2020).
5. Bathymetry is a composite of NW Hydro 2019 and 2020 surveys and Army Corps of Engineers 2020 survey. MLLW Datum.

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0 100 200 Feet

0 20 40 Meters

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Map 2-6b
Phase I visual bank and structures inspections overview, RM 3.35 to RM 3.75

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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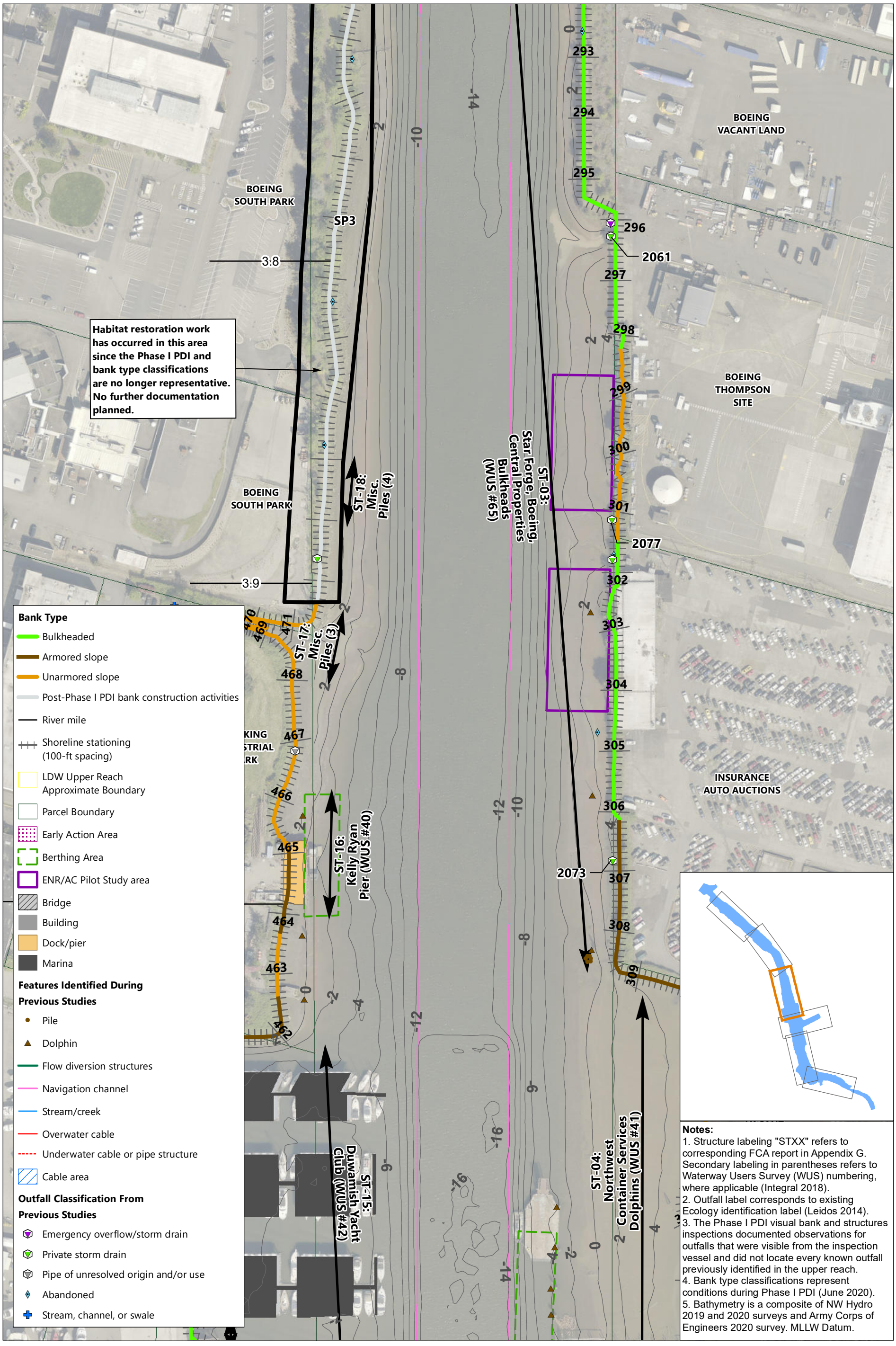
Prepared by hromer, 2/16/2022; \\orcas\GIS\Jobs\KingCounty_0067\LDW\Maps\DataEvaluationReport\LDW_AQ_DER_Fig2_4af_W_VisualBankStructureInspectionOverview.mxd



Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
2. Outfall label corresponds to existing Ecology identification label (Leidos 2014).
3. The Phase I PDI visual bank and structures inspections documented observations for outfalls that were visible from the inspection vessel and did not locate every known outfall previously identified in the upper reach.
4. Bank type classifications represent conditions during Phase I PDI (June 2020).
5. Bathymetry is a composite of NW Hydro 2019 and 2020 surveys and Army Corps of Engineers 2020 survey. MLLW Datum.

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N

0 100 200 Feet

0 20 40 Meters

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Map 2-6c
Phase I visual bank and structures inspections overview, RM 3.75 to RM 4.1

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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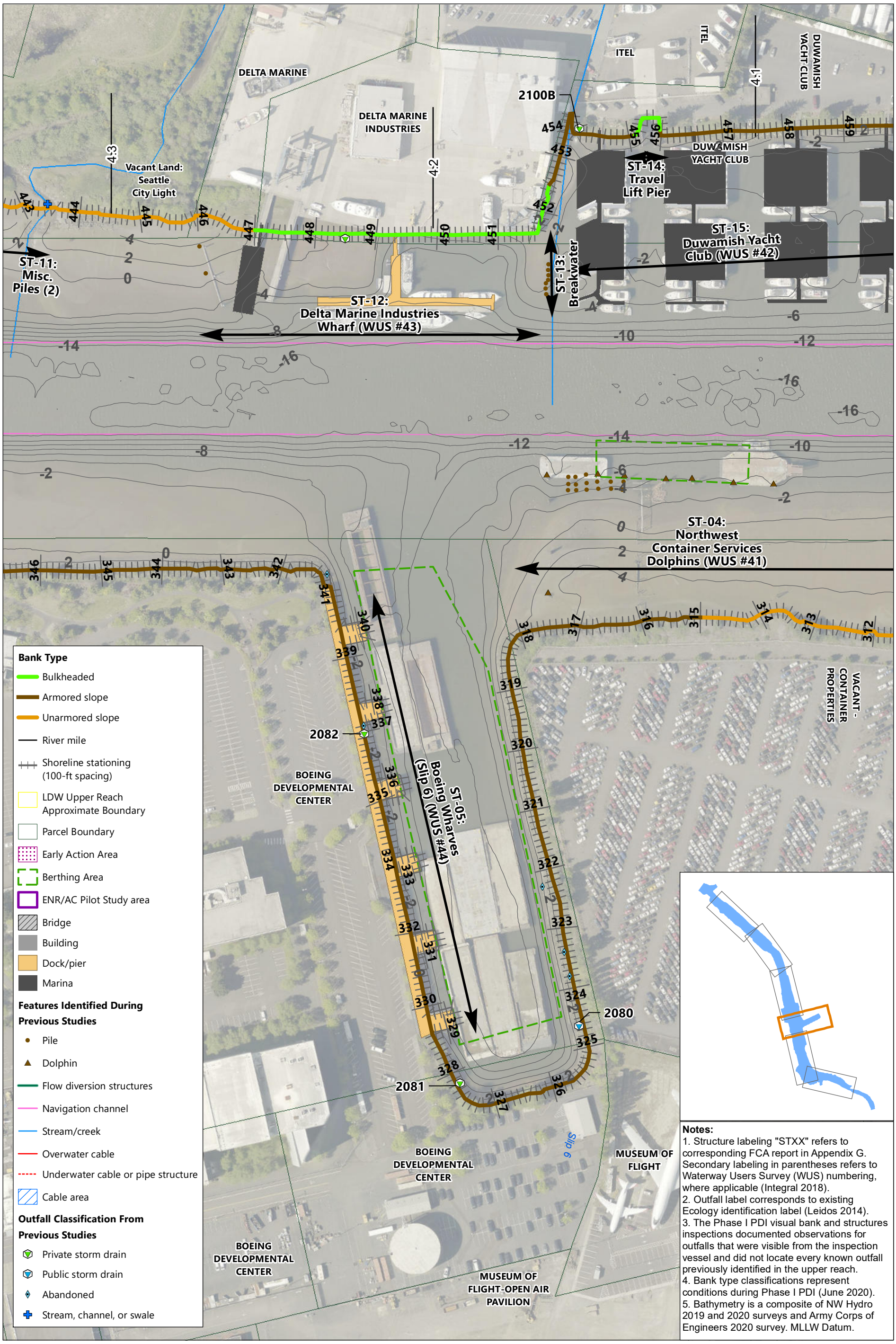

Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
2. Outfall label corresponds to existing Ecology identification label (Leidos 2014).
3. The Phase I PDI visual bank and structures inspections documented observations for outfalls that were visible from the inspection vessel and did not locate every known outfall previously identified in the upper reach.
4. Bank type classifications represent conditions during Phase I PDI (June 2020).
5. Bathymetry is a composite of NW Hydro 2019 and 2020 surveys and Army Corps of Engineers 2020 survey. MLLW Datum.

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0 100 200 Feet
0 20 40 Meters

Map 2-6d
Phase I visual bank and structures inspections overview, RM 4.1 to RM 4.3

PRE-DESIGN INVESTIGATION DATA EVALUATION REPORT FOR THE LDW UPPER REACH

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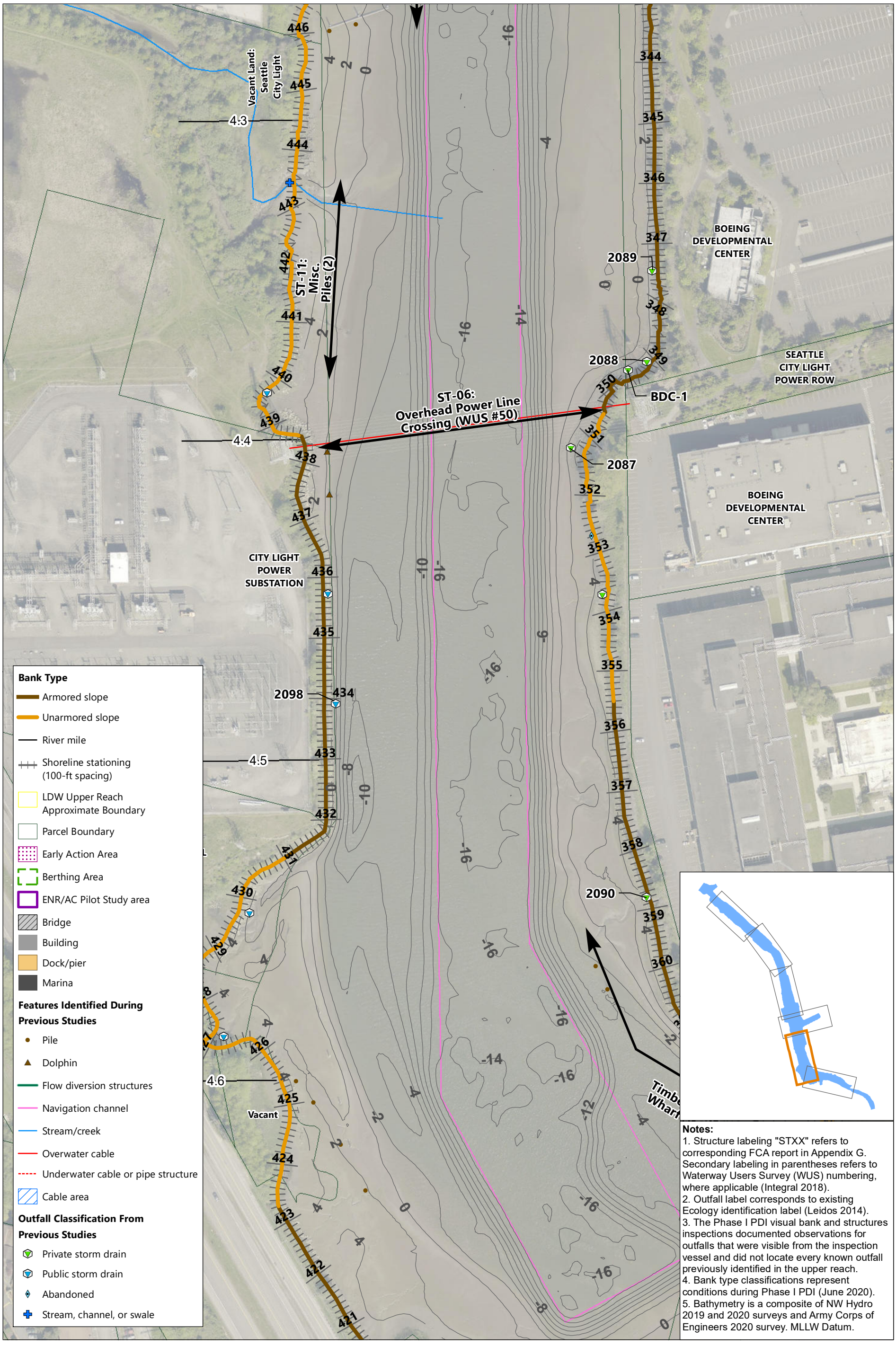
Prepared by hromer, 2/16/2022; \\orcas\GIS\Jobs\KingCounty_0067\LDW\Maps\DataEvaluationReport\LDW_AQ_DER_Fig2_4af_W_VisualBankStructureInspectionOverview.mxd



Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
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N

0 110 220 Feet

0 20 40 Meters

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Map 2-6e
Phase I visual bank and structures inspections overview, RM 4.3 to RM 4.7

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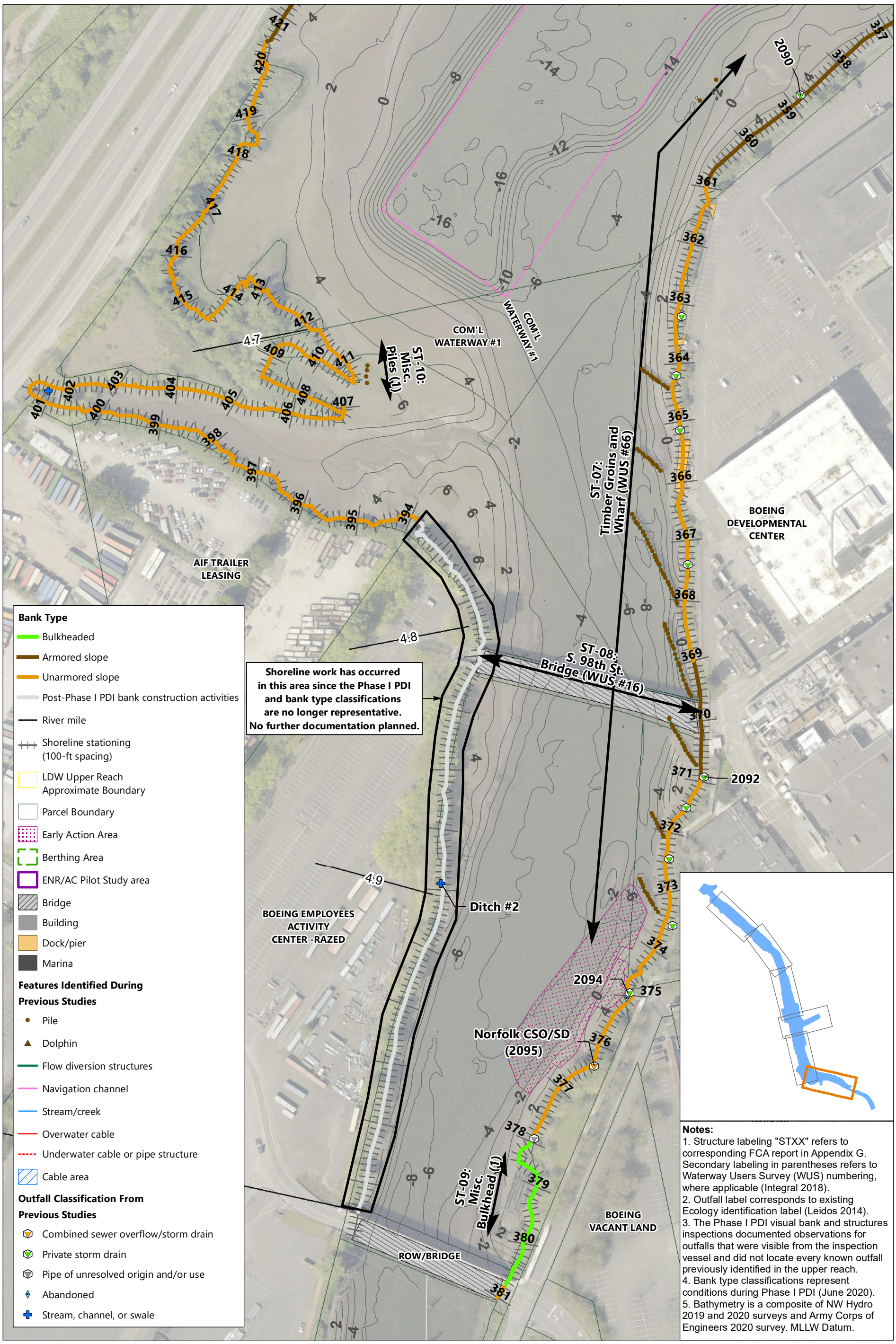

Notes:
1. Structure labeling "STXX" refers to corresponding FCA report in Appendix G. Secondary labeling in parentheses refers to Waterway Users Survey (WUS) numbering, where applicable (Integral 2018).
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0 100 200 Feet
0 20 40 Meters

Map 2-6f
Phase I visual bank and structures inspections overview, RM 4.7 to RM 5.0

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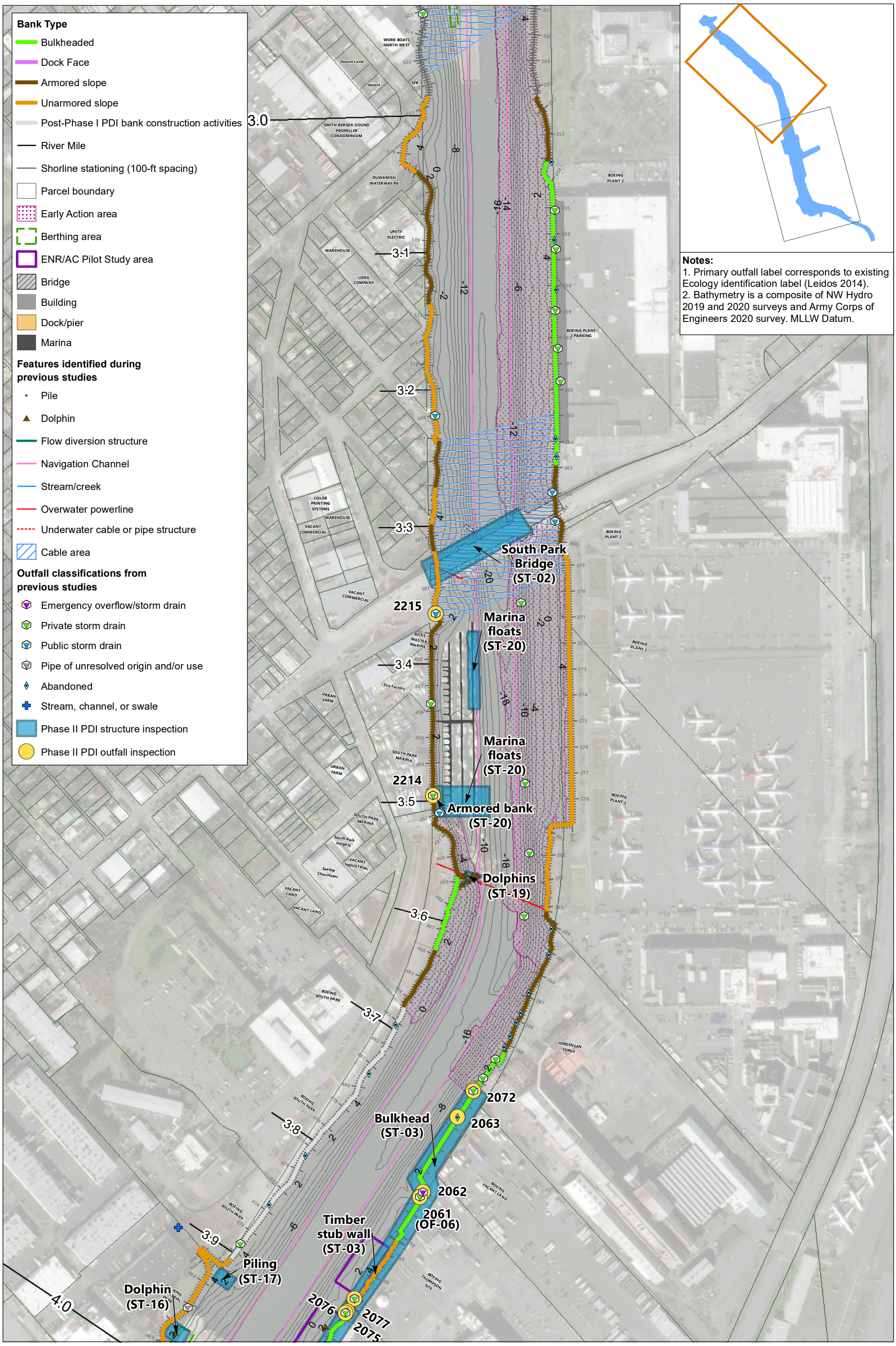

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0 250 500 Feet
0 40 80 Meters

Map 2-7a
Phase II PDI structure and outfall inspection locations, RM 3.0 to RM 4.0

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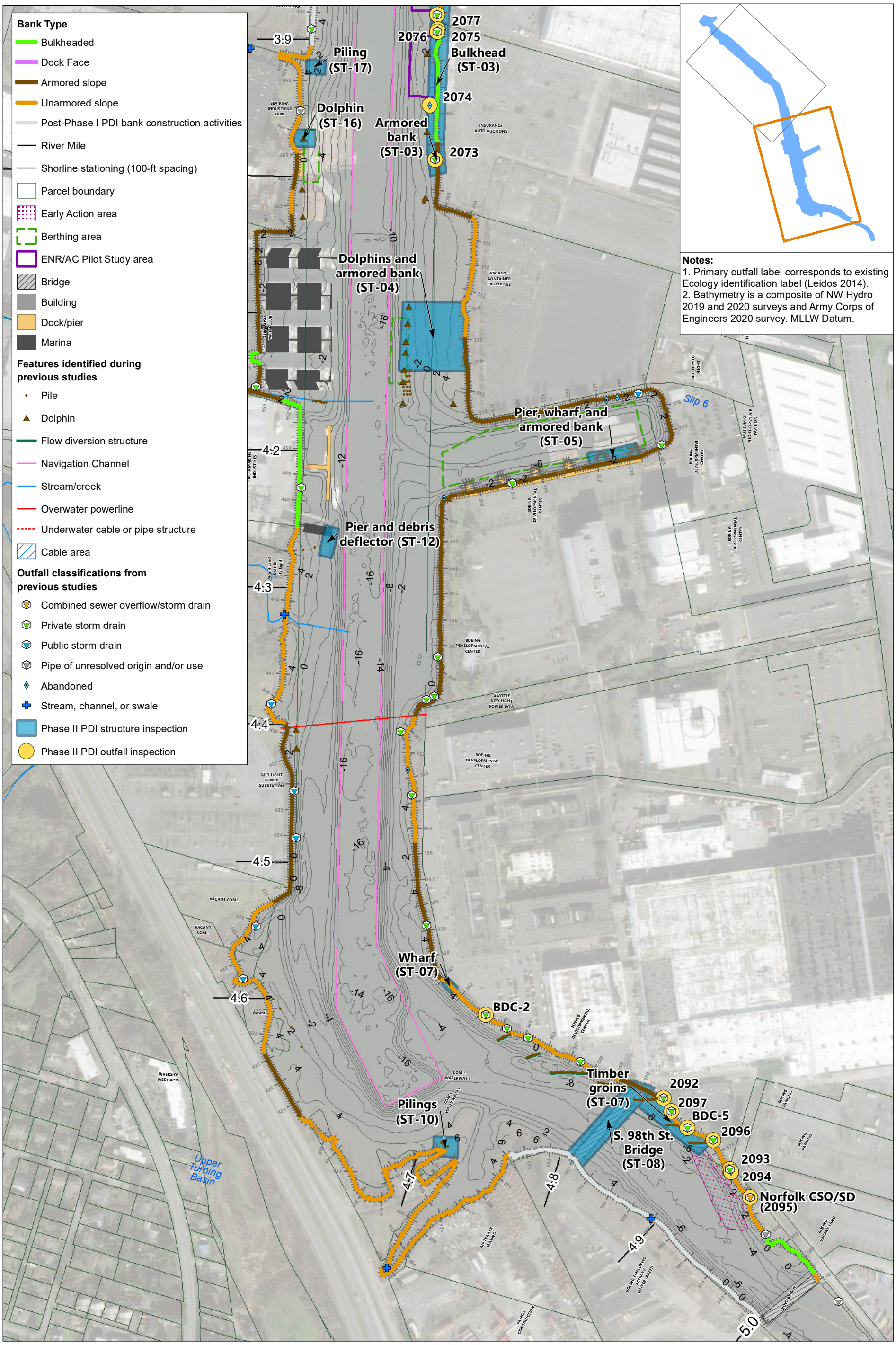

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N

0 250 500 Feet

0 40 80 Meters

Map 2-7b
Phase II PDI structure and outfall inspection locations, RM 4.0 to RM 5.0

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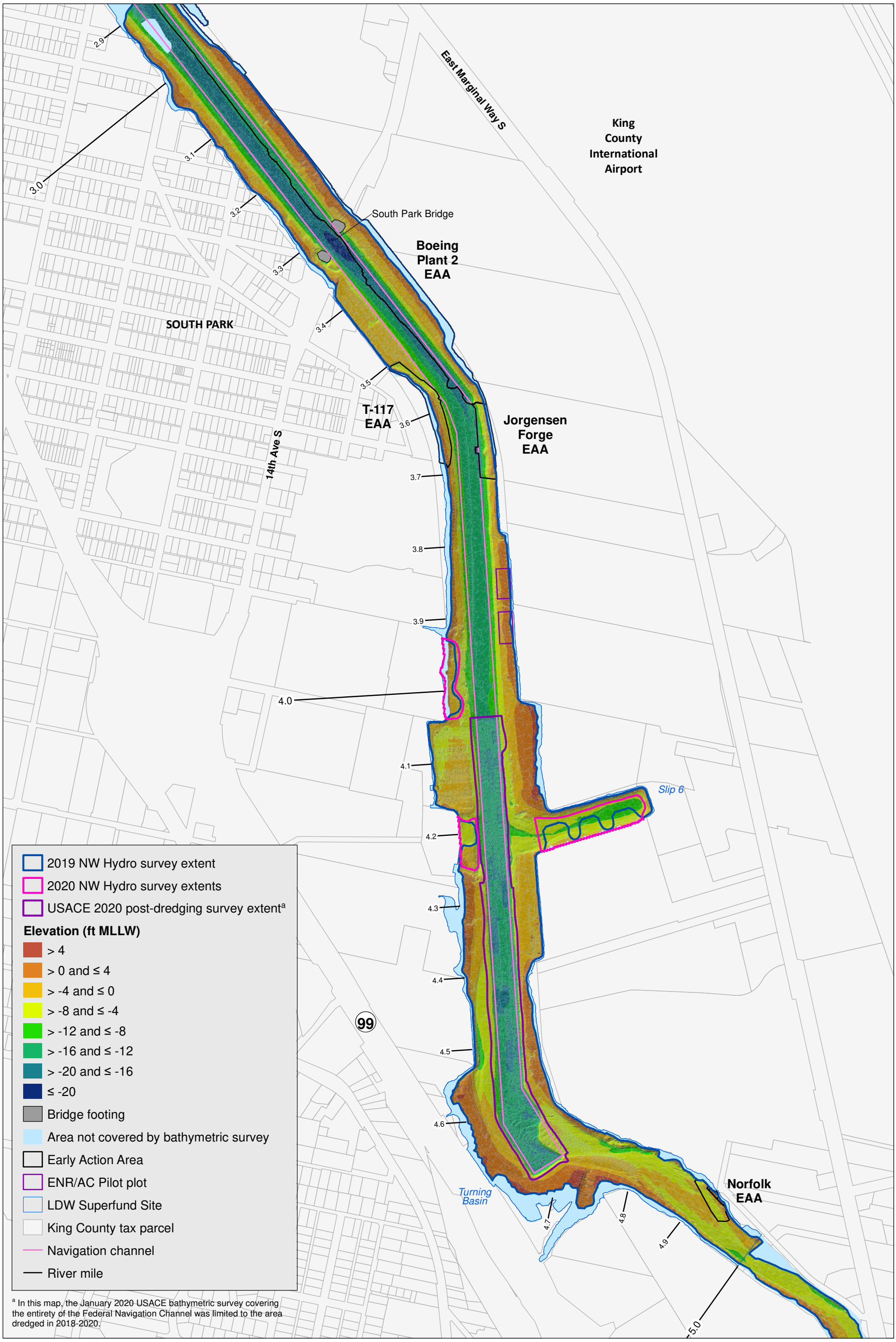

[a] In this map, the January 2020 USACE bathymetric survey covering the entirety of the Federal Navigation Channel was limited to the area dredged in 2018-2020.

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N

0 500 1,000 Feet

0 200 400 Meters

Map 2-8. Bathymetric survey extents

PRE-DESIGN INVESTIGATION DATA EVALUTATION REPORT FOR THE LDW UPPER REACH

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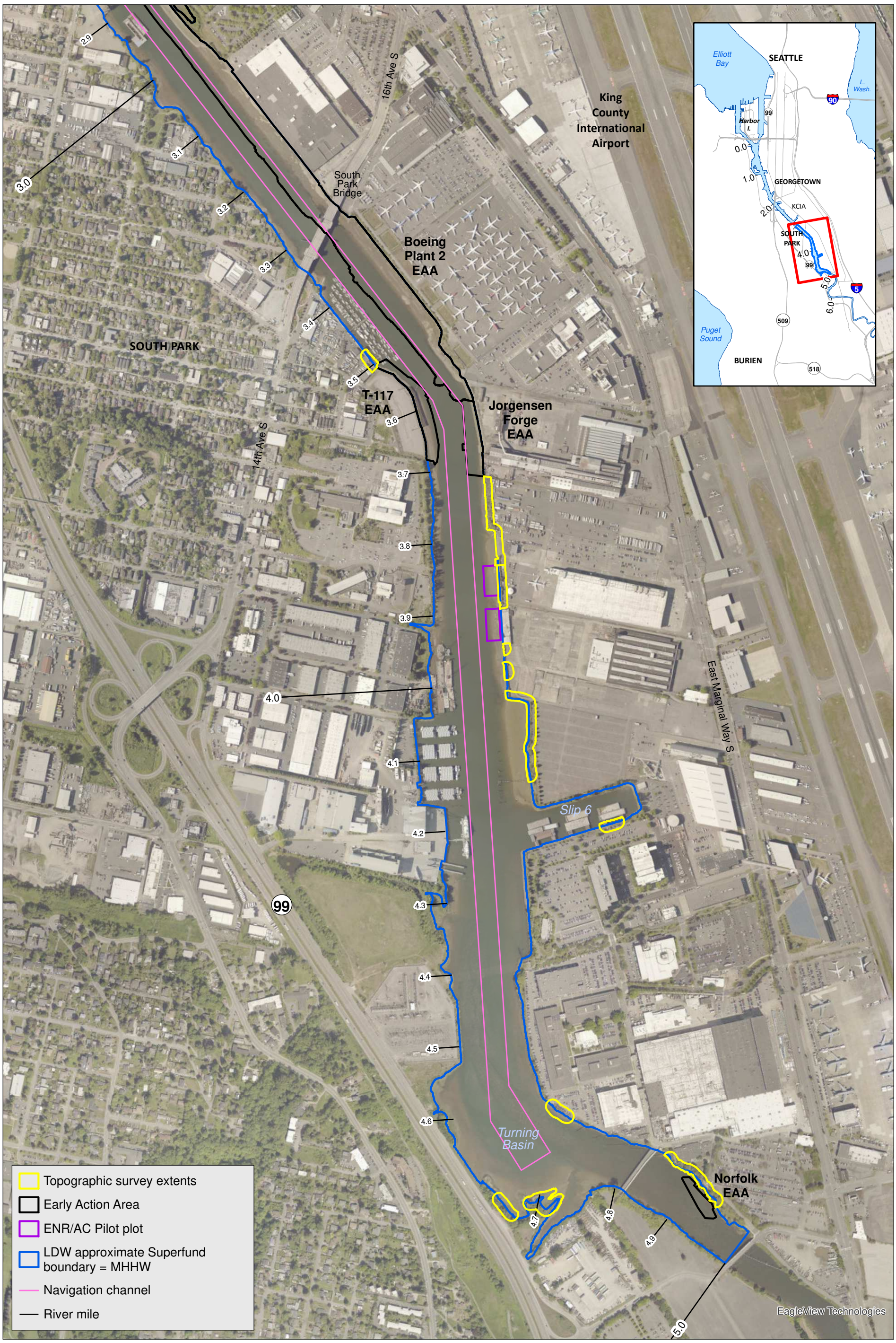
Prepared by craigh, 2/18/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-8 7260 Bathy with contours.mxd



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N

0 500 1,000 Feet

0 200 400 Meters

Map 2-9. Topographic survey extents

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Prepared by: craigh, 2/18/22; W:\Projects\Duwamish AOC4\GIS\Maps and Analyses\Phase II\Data Evaluation Report\Map 2-9 7266 Topo survey extents.mxd

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N

0 380 760 Feet

0 70 140 Meters

Map 2-10
Sediment thickness measurement transect areas

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