

Attachment 2.0

Productivity Schedule Backup

Key inputs to the Project Schedule include production rates for various tasks or activities and quantities. This Attachment 2 discusses the development of quantities used for input to the Project Schedule. The quantities associated with site preparation, dredging, and site restoration, are shown in Table 2-1.

To develop the schedule and associated quantities, the upper Hudson River site was first segmented into smaller “sites,” which generally are indicated by river mile and a shoreline qualifier, which indicates if the site is on the eastern or western shore of the river. A sequence of remediation was developed, and where appropriate, each river mile site was further divided into sub-sites, or dredging management cells (DMC). The DMCs are shown on Figure 2-1.

Dredging Equipment

Attachment 3 summarizes an evaluation of applicable dredge equipment for the Hudson River. For the purposes of this productivity schedule, the working limits of large mechanical dredging equipment were identified and associated quantities estimated.

Dredging Quantities

For the development of the Project Schedule, quantities for each site or DMC, where appropriate, were determined using Arc View GIS information from the FS and by visual inspection of black and white aerial photography (1 inch = 400 feet) taken in the spring of 2002 to facilitate site preparation and restoration quantities for the Project Schedule. Site preparation, mechanical dredging, and site restoration, and total dredging quantities are presented in Table 2-1. DMCs are presented in Figure 2-1.

Containment Barriers

Placement of containment barriers was configured conceptually and is shown on Figure 2-1. Sheet piling is depicted perpendicular to flow and HDPE is shown parallel to flow. It is anticipated that containment would not be used within the navigational channel or at the mouth or any significant tributary.

Obstructions

Obstructions that would be expected to be encountered during dredging such as bridges, docks, sewer/stormwater outfalls, boat launches, power lines, lock walls, and lock ballards were identified and quantified through inspection of the Spring 2002 black and white aerial photograph. These quantities were then used to calculate the additional duration needed for site preparation and site restoration.

Shoreline Characteristics

Shoreline features, such as trees, large rocks/rip rap, small rocks/ sand, residential/man made structures, concrete structures, and stream/river inlets were determined through visual inspection of the black and white aerial photographs. Using the calculated shoreline length from Arc View GIS, an estimate of each quantity was made (see Table 2-1).

Table: 2-1

Productivity Schedule Backup

PRODUCTIVITY SCHEDULE BACKUP TABLE

Dredging Year	Seasonal Volume Dredged (CY)	Cumulative Volume Dredged (CY)	Site Location						Dredging				Restoration													
			Dredge Site Number	Site Location E=East, W=West, NAV=Nav, Channel	Location by Mile	River	Dredge Management Cell (DMC)	River Section	Pool Location Description	Total Volume of Dredging (CY)	Volume By Production Equipment (CY)	Volume By Alternative Equipment (CY)	Additional Dredging Around Obstructions (Days on Critical Path)	Total Standard Backfill (AC)	Total Critical Backfill (AC)	DMC Backfill (AC)	Does DMC contain "critical" area that requires additional backfill to meet pre-dredge grade?	Restore Shoreline (LF)	Remove Containment (LF)	Additional Duration for Replacing Obstructions (Days on Critical Path)						
Phase 1 (Year 1)	268,977	268,977	1	E & W	Around Rogers Island (RM 193.75 - 194.5)	1	1	Thompson Island Pool	77,261	64,517	12,743	1	39	11	4	Yes	2,119	527	0							
						1a						0			Included in above	513	0									
			2	W	RM 193.5 - 193.75	2			4a	13,193	13,193	0			1	11	No	4,432	207	1						
						3				50,000	42,964	7,036			0	2	No	872	1,096	0						
			3	W	RM 192.5 - 193.5 W	4a			80,336	80,336	0	0			7	Yes	2,287	2,225	0							
						5			48,188	45,055	3,132	0			0	No			0							
			9	0	12	No						460			468	0										
			5	W	RM 191.5 - 192.5 W	10						0			12	No	956	1,425	1							
						11						0			3	No	1,461	1,650	1							
			Phase 2 (Year 2)	529,440	798,417	5						W			RM 192.5 - 193.5 W	4b	1	Thompson Island Pool	137,476	118,131	19,345	0	11	67	18	Yes
						8			W	RM 190.5 - 191.5 W	15	128,807			125,207	3,600			0	5	No	1,137			1,552	0
16	0	6					No	1,866			2,025		0													
17	0	4					Yes	1,421			1,527		0													
10 ⁽¹⁾	W	RM 189.5 - 190.5 W				17a	194,682	39,939	154,743	0	0	No			0											
						17b				0	13	Yes	2,375	2,618	0											
12	W	RM 188.5 - 189.5 W				29				68,475	61,396	7,079	0	3	Yes	884			1,019	0						
						30							0	0	No					0						
						31							0	3	Yes	222			607	0						
						Phase 2 (Year 3)	601,810	1,400,227	4				E	RM 192.5 - 193.5 E	6	1			Thompson Island Pool	54,409	52,828	1,581			0	52
6	E	RM 191.5 - 192.5 E							7	244,803	179,746	65,057	0	23	Yes					10,910	6,075	7				
			8	0	0				No						0											
			12	0	5				No				2,414	2,714	0											
7	E	RM 190.5 - 191.5 E	13	153,868	151,662				2,207	0	0	No			0											
			14	0	3				No	950	1,191	0														
13	W	RM 187.5 - 188.5	32	13,026	12,936				90	0	4	No	1,386	1,254	0											
			33							0	11	Yes	1,277	1,786	1											
34	40,461	34,682	5,779							0	8	No	1,763	1,852	0											
18	W	RM 183.25 - 184.25 W	40	95,243	93,402				1,840	0	3	No	1,561		1											
			41							0	4	No	1,397	1,703	3											
Phase 2 (Year 4)	564,533	1,964,760	9			E	RM 189.5 - 190.5 E	19		1	Thompson Island Pool	168,129	163,985	4,143	0	62	0	5	No	709	931	0				
				20	0			2	No						407				0							
				21	0			16	No						2,582			2,660	2							
			11	E	RM 188.5 - 189.5 E	22	142,611	129,564	13,047			0	2	No	1,010			1,010	1							
						22a						0	4	No	980			1,333	1							
						23						0	0	No	290				0							
						24						0	4	No	1,406			1,737	0							
						25						1	4	No	305			1,391	0							
			15	E	RM 185.25 - 186.25	26						253,793	247,865	5,928	0			0	No	696		0				
						27									0			2	No	614	559	0				
						28	0	0	No										0							
35	253,793	247,865				5,928	1	23	No	3,006	2,557				5											
36							0	0	No						0											
Phase 2 (Year 5)			447,387	2,412,147	16		E	RM 184.25 - 185.25	37	2	Fort Miller Dam / Lock 6 to Northumberland Dam	30,168	30,168	0	0	3	50	3	No	2,241	2,459	0				
	17	E			RM 183.25 - 184.25 E	38	93,160	79,307	13,853			0	13	Yes	1,845			2,321	0							
						39						0	6	Yes	2,027			1,365	0							
						19					NAV	RM 176.75 - 177.25	42*	Lock 5 to Lock 4 / Stillwater Dam	9,023			9,023	0	0	0	No			0	
	43*	9,023			9,023		0	0	0				No						0							
	44*	9,023			9,023		0	0	0				No						0							
	21	NAV			RM 171.5 - 172.0	45*	9,023	9,023	0		0	0	No						0							
						46*	9,023	9,023	0		0	0	No						0							
						47	224,806	166,434	58,372		0	0	No						0							
	22	E			RM 169.25 - 170.25	48*	3	Lock 4 / Stillwater Dam to Lock 3	9,023	9,023	0	0	31	Yes	4,640			4,936	1							
						51*			9,023	9,023	0	0	0	No					0							
						52*			9,023	9,023	0	0	0	No					0							
						56*			9,023	9,023	0	0	0	No					0							
						57*			9,023	9,023	0	0	0	No					0							
	28	NAV			RM 162.25 - 162.75	58*		Lock 2 to Lock 1	9,023	9,023	0	0														
29	NAV	RM 159.25 - 159.75																								
30	NAV	RM 158.5 - 159.25																								
Phase 2 (Year 6)	237,860	2,650,000	24	W	RM 165.75 - 166.75	49*	3	Lock 4 / Stillwater Dam to Lock 3	9,023	9,023	0	1	0	63	0	No										
						50			144,966	50,648	94,317	1			31	Yes	3,432	3,711	0							
			27	W	RM 163.25 - 164.25	53*		Lock 3 to Lock 2	9,023	9,023	0	0			0	No										
						54			74,848	31,261	43,588	2			16	Yes	1,035	1,458	0							
						55						4			16	Yes	2,663	864	0							
(1)Of the volume dredged by alternative equipment, 93,300 cy are dredged by a production dredge or other dredge operating at a production rate of 82 cy per hour. Represents areas where no containment will be needed; area either in channel (navigational dredging) or behind rock outcrop																										
* Volume for this DMC is assumed to be 1/13th of Total Navigational Dredging Volume in River Section 3																										

PRODUCTIVITY SCHEDULE BACKUP TABLE

Dredging Year	Seasonal Volume Dredged (CY)	Cumulative Volume Dredged (CY)	Site Location						Site Preparation																			
			Dredge Site Number	Site Location E=East, W=West, NAV=Nav. Channel	Location by Mile	River	Dredge Management Cell (DMC)	River Section	Pool Location Description	Install Steel Sheet Piling (LF)	Install HDPE Silt Barriers (LF)	Additional Schedule Duration Due to Obstructions (Days on Critical Path)	Number of Obstructions by Obstruction Type							Shoreline Characteristics (LF)								
													Bridges	Docks	WWTP Outlet	Boat Launch	Power Lines	Lock Wall	Lock Ballards	Trees	Rip Rap / Large Rocks	Residential / Man Made	Natural Shore / Small rocks	Concrete Structures	Stream Inlet			
Phase 1 (Year 1)	268,977	268,977	1	E & W	Around Rogers Island (RM 193.75 - 194.5)	1	1	Thompson Island Pool	111	416	1	2							710			710						
						1a			513	0	0						350			350								
			2		0	2			1	1				2,549			1,663	20	200									
			3	W	RM 193.5 - 193.75	3							426			426	20											
			4a	546	1,679	1				1			304			304												
			5								1																	
			9			0							46			414												
			11	W	RM 191.5 - 192.5 W	10				1			382			574												
Phase 2 (Year 2)	529,440	798,417	5	W	RM 192.5 - 193.5 W	4b	1	Thompson Island Pool	189	2,853	0						1,261			1,261								
						15			449	1,103	0					519	100		519									
			16		1,667	0							467			1,400												
			17		1,130	0							987			284		150										
			18																									
			10 ⁽¹⁾	W	RM 189.5 - 190.5 W	17a						1		6,565	100		6,565		200									
			17b		2,358	0							713			1,663												
			29		803	0							215	400		239		30										
30																												
31			0																									
Phase 2 (Year 3)	601,810	1,400,227	4	E	RM 192.5 - 193.5 E	6	1	Thompson Island Pool	136	3,493	1		1				1,198	1,198		1,027								
						7			1,018	5,057	7		7				7,832			2,727		350						
			8																									
			12											1,772	400		241											
			14																									
			13	W	RM 187.5 - 188.5	32			2	TI Dam to Fort Miller Dam / Lock 6	418	835	0					1,109			277							
			33		333	1,454					1		1			1,022			255									
			34	W	RM 186.5 - 187.5	34						363	1,489	0				1,486			176		100					
40																												
41	W	RM 183.25 - 184.25 W	41		Fort Miller Dam / Lock 6 to Northumberland Dam		1		1		200	850		511														
383	1,320	3	3			101		101	1,824																			
Phase 2 (Year 4)	564,533	1,964,760	9	E	RM 189.5 - 190.5 E	19	1	Thompson Island Pool	413	517	0							177			390							
						20										407												
			21		2,211	0				2			421	800	100	1,262												
			22		1,010	0				1			202		200	608												
			22a		858	0				1			685	50		245												
			23																									
			24										145			145												
			25		1,133	0							1,265			141												
775	616	1				1		274			30	600																
Phase 2 (Year 5)	447,387	2,412,147	11	E	RM 188.5 - 189.5 E	26	3	Lock 5 to Lock 4 / Stillwater Dam																				
						27										696												
			28		459	0							207	200		207												
			35																									
			36																									
			15	E	RM 185.25 - 186.25	35			2	Fort Miller Dam / Lock 6 to Northumberland Dam	506	2,052	6		5				2		301	300		2,255	800	150		
			36																									
			Phase 2 (Year 6)	237,860	2,650,000	16			E	RM 184.25 - 185.25	37	2	Fort Miller Dam / Lock 6 to Northumberland Dam	331	2,128	0							1,468	100		672		
38	957	1,364					0										1,291			553								
39	170	1,195				0					140	1,200		57														
19	NAV	RM 176.75 - 177.25				42*	3	Lock 5 to Lock 4 / Stillwater Dam																				
20	NAV	RM 175.0 - 175.25				43*																						
21	NAV	RM 171.5 - 172.0				44*																						
45*																												
22	E	RM 169.25 - 170.25				46*																						
47																												
23	NAV	RM 167.0 - 167.5				48*	3	Lock 4 / Stillwater Dam to Lock 3	588	4,348	1		1					2,220	200		2,220							
25	NAV	RM 164.25- 165.0				51*																						
26	NAV	RM 164.0 - 164.25				52*																						
28	NAV	RM 162.25 - 162.75	56*																									
29	NAV	RM 159.25 - 159.75	57*																									
30	NAV	RM 158.5 - 159.25	58*																									
Phase 2 (Year 6)	237,860	2,650,000	24	W	RM 165.75 - 166.75	49*	3	Lock 4 / Stillwater Dam to Lock 3			1				1						20							
						50				619	3,092	1					2			900								
			53*																									
27	W	RM 163.25 - 164.25	54	3	Lock 3 to Lock 2	576	882	2						3	778		207		50									
55																												
									864	0	4					1	7	133	1,864		666		400					

(1)Of the volume dredged by alternative equipment, 93,300 cy are dredged by a production dredge or other dredge operating at a production rate of 82 cy

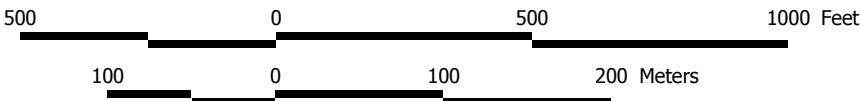
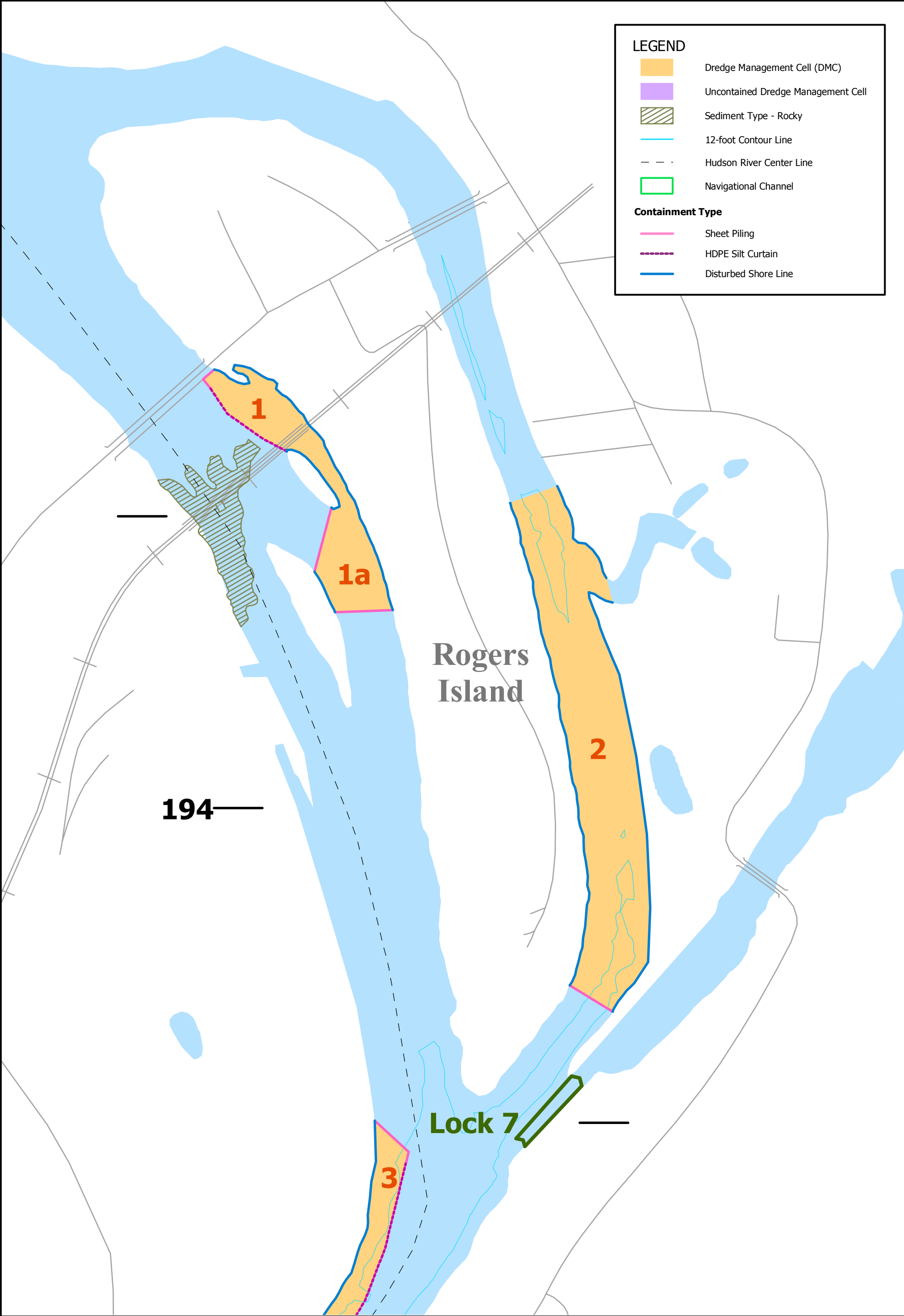
Note: Represents areas where no containment will be needed; area either in channel (navigational dredging) or behind rock outcrop

* Volume for this DMC is assumed to be 1/13th of Total Navigational Dredging Volume in River Section 3

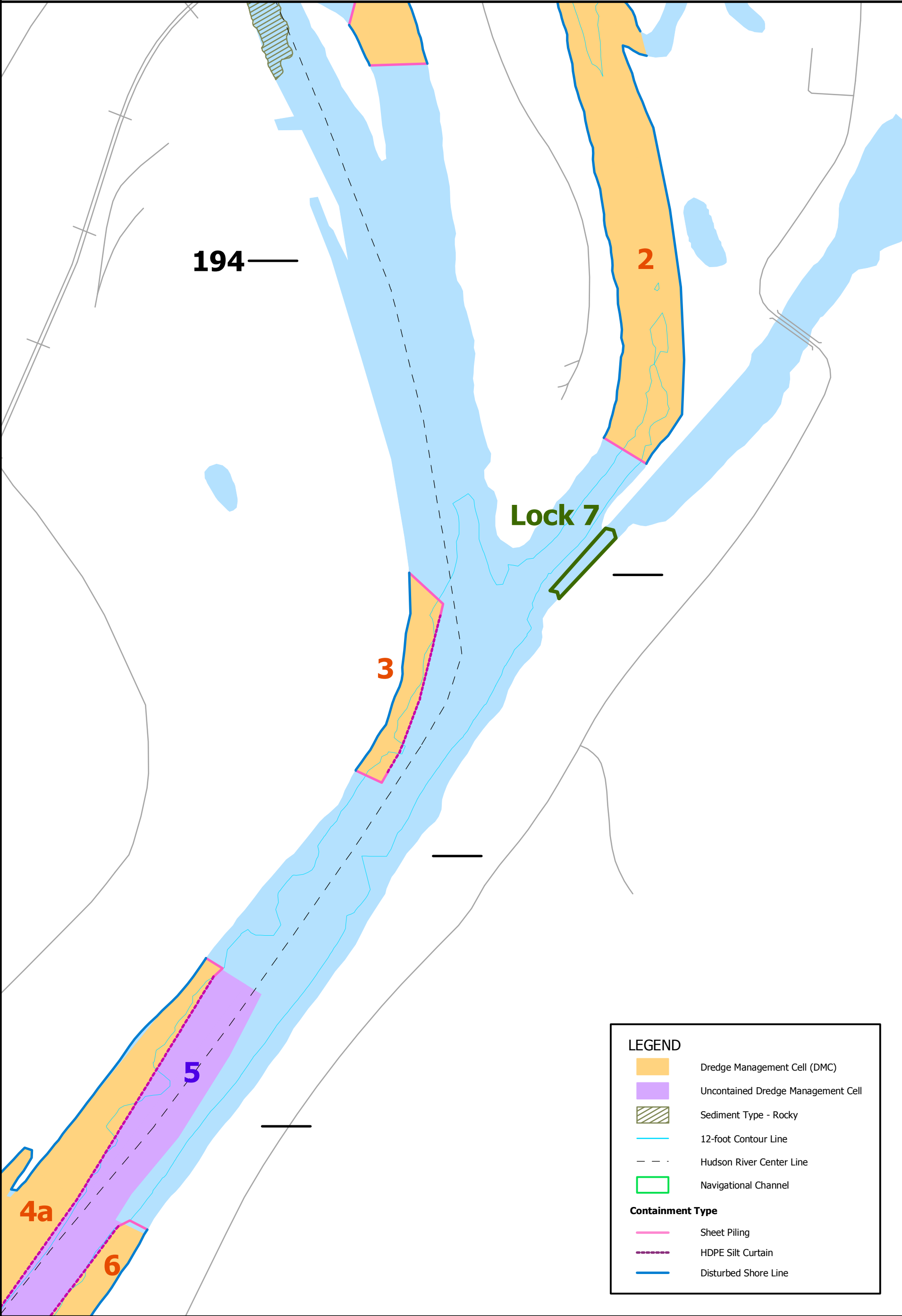
Figure 2-1

Productivity Schedule Containment Types

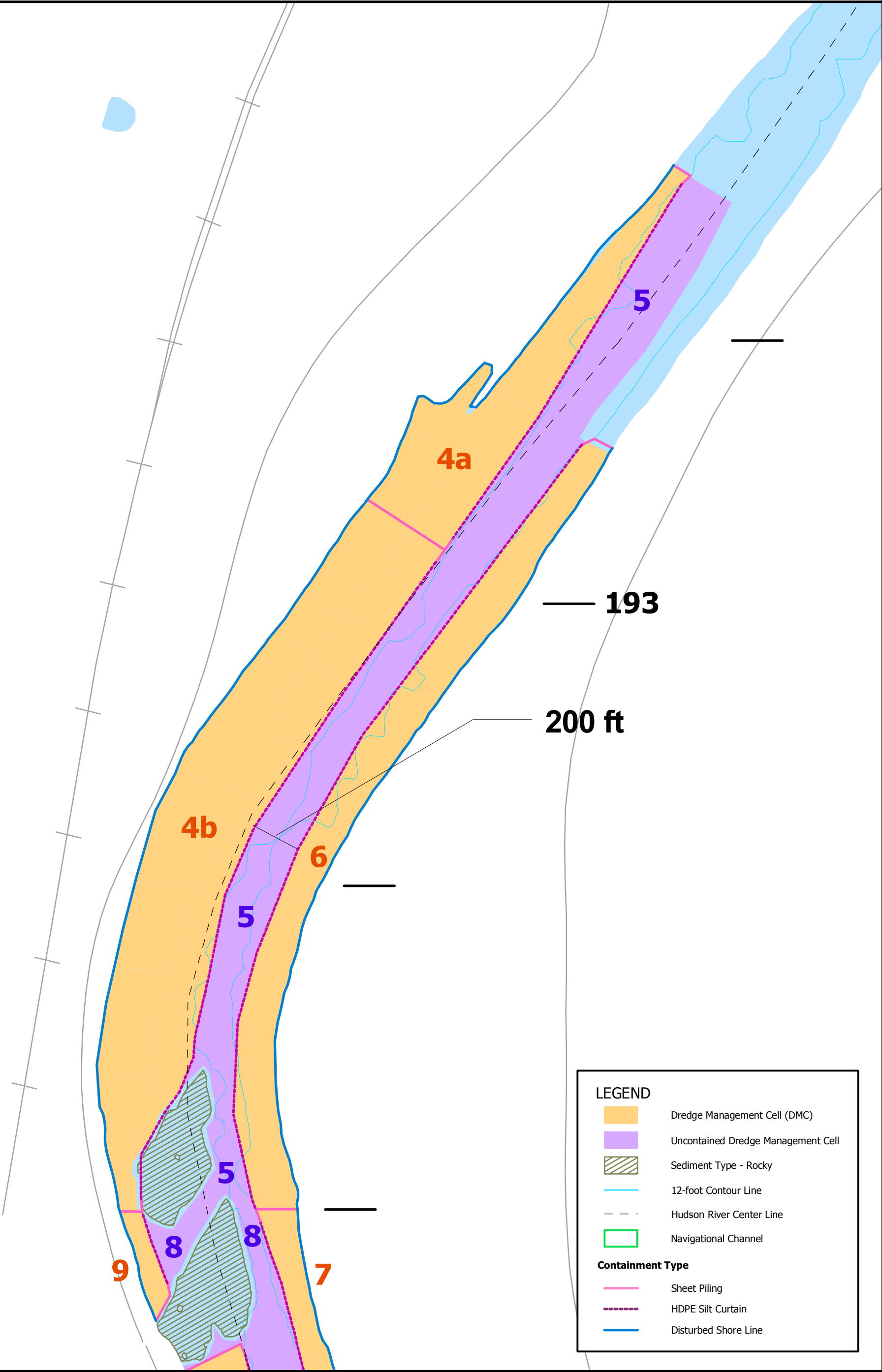
Containment Types - RM 193.75 - 194.5



Containment Types - RM 193.5 - 193.75



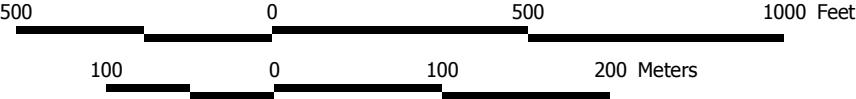
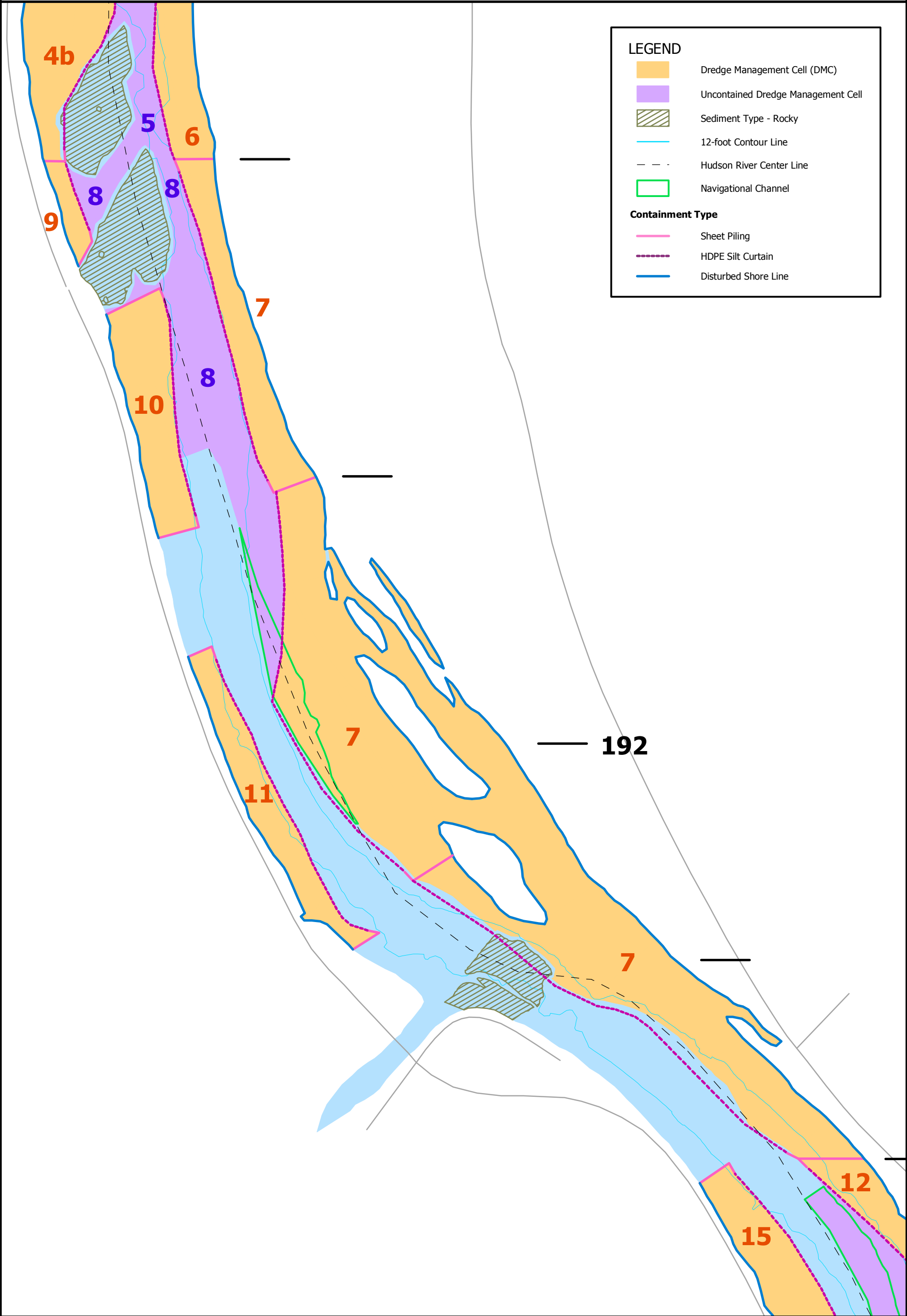
Containment Types - RM 192.5 - 193.5



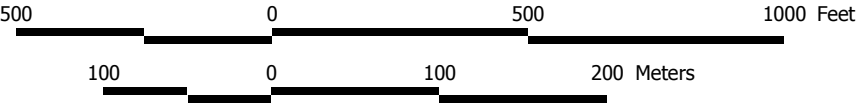
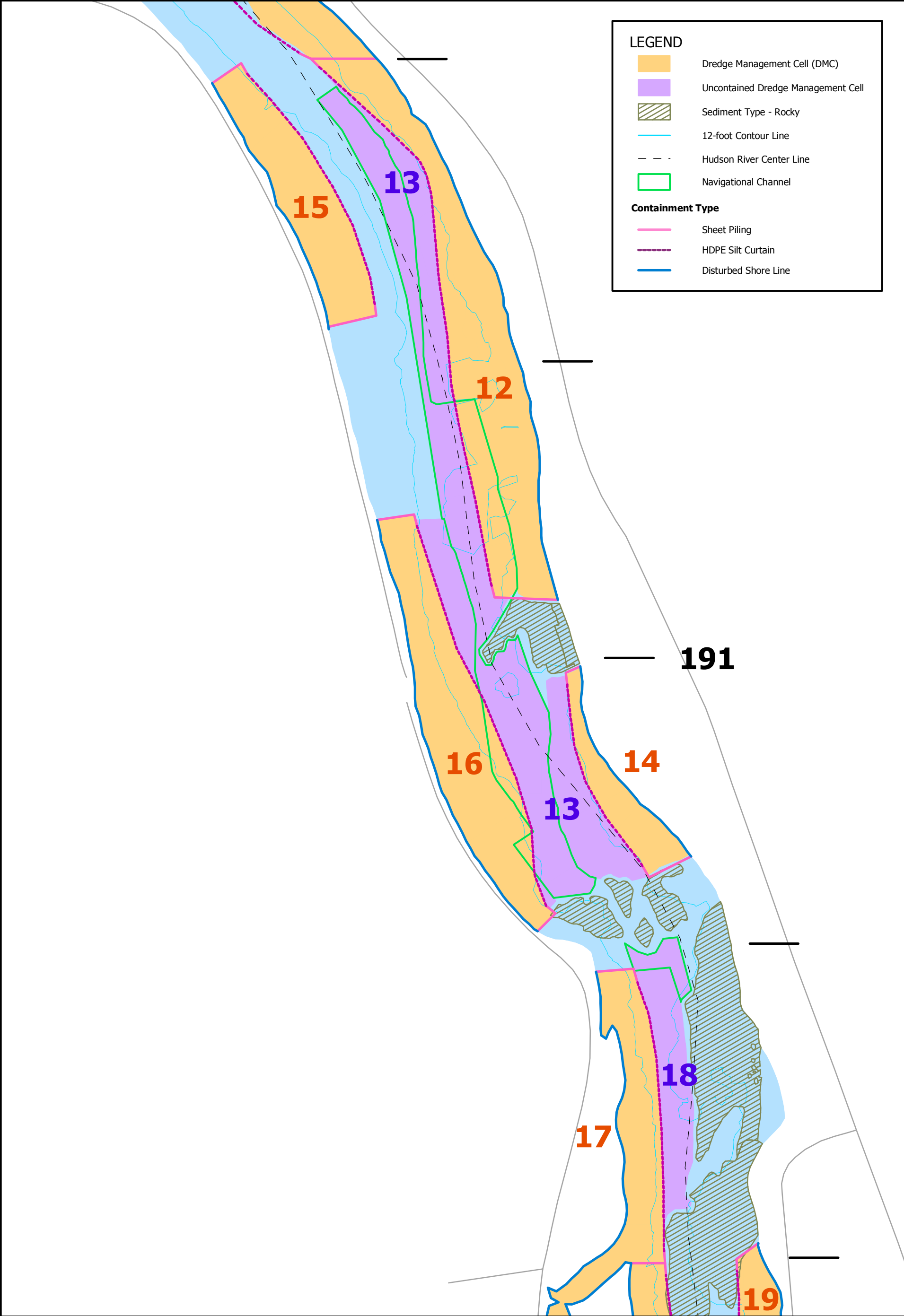
500 0 500 1000 Feet
100 0 100 200 Meters

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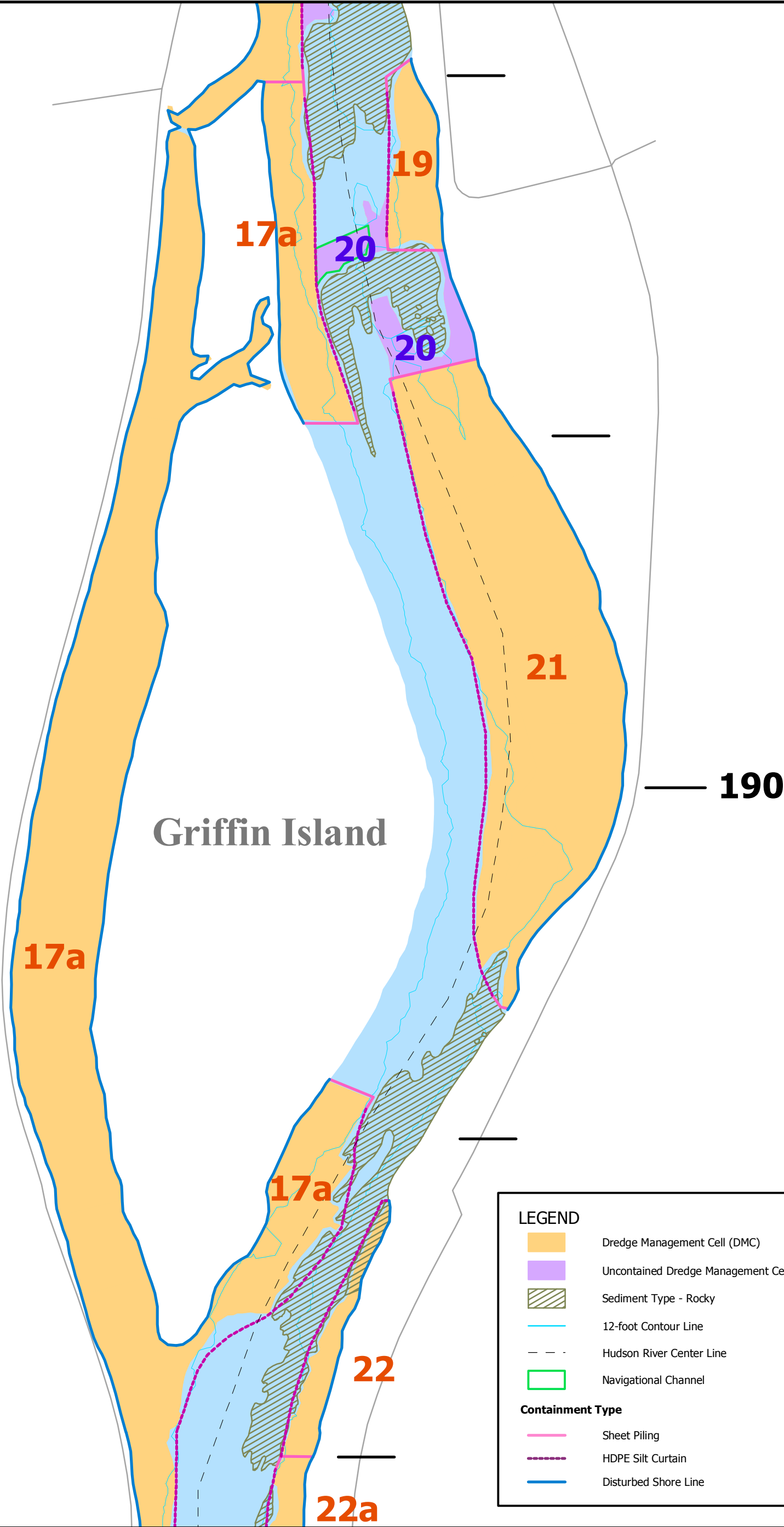
Containment Types - RM 191.5 - 192.5



Containment Types - RM 190.5 - 191.5



Containment Types - RM 189.5 - 190.5



500 0 500 1000 Feet
100 0 100 200 Meters

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Containment Types - RM 188.5 - 189.5

LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudwon River Center Line

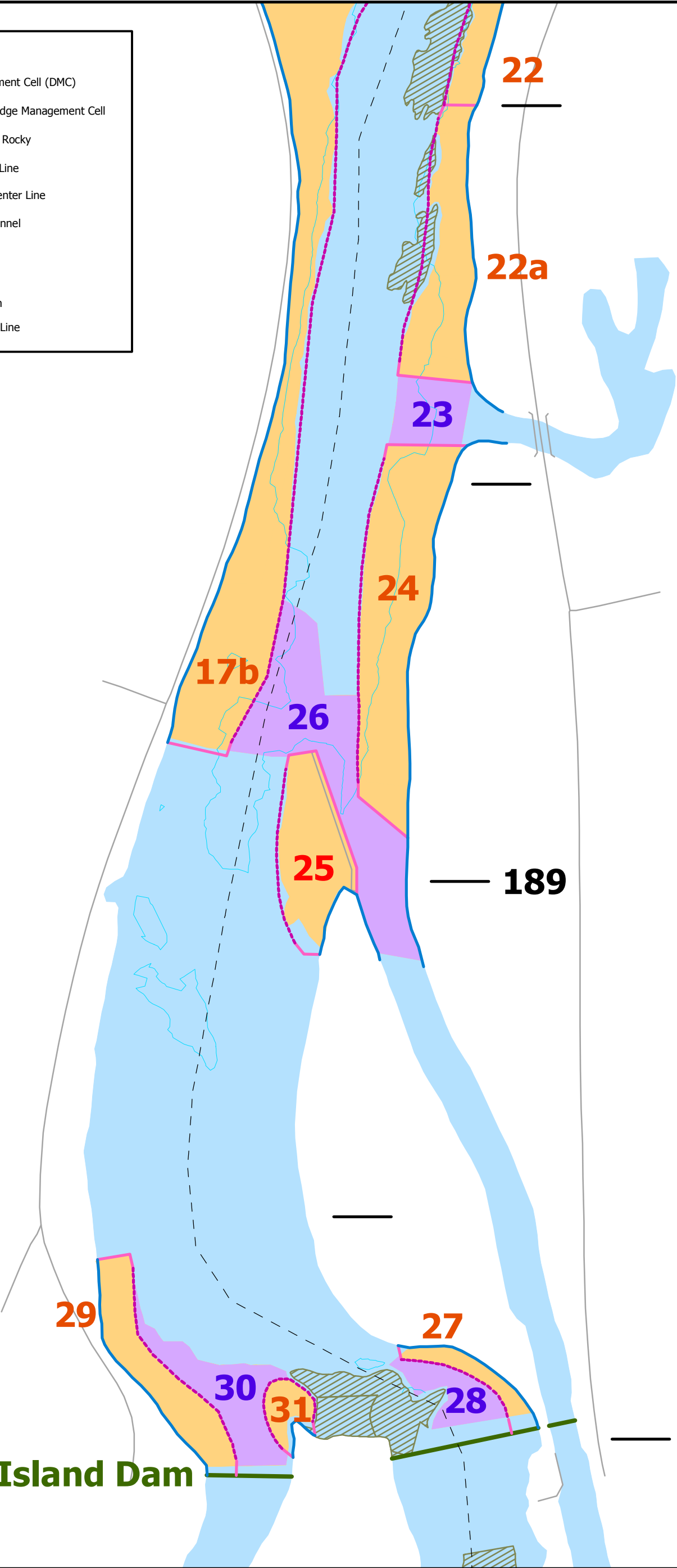
Navigational Channel

Containment Type

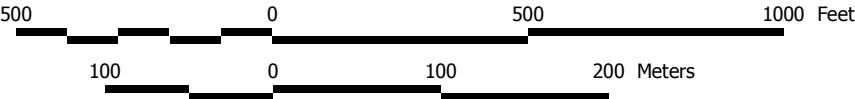
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



Thompson Island Dam



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Containment Types - RM 187.5 - 188.5

Thompson Island Dam

Thompson Island

188

LEGEND

- Dredge Management Cell (DMC)
- Uncontained Dredge Management Cell
- Sediment Type - Rocky
- 12-foot Contour Line
- Hudson River Center Line
- Navigational Channel
- Containment Type

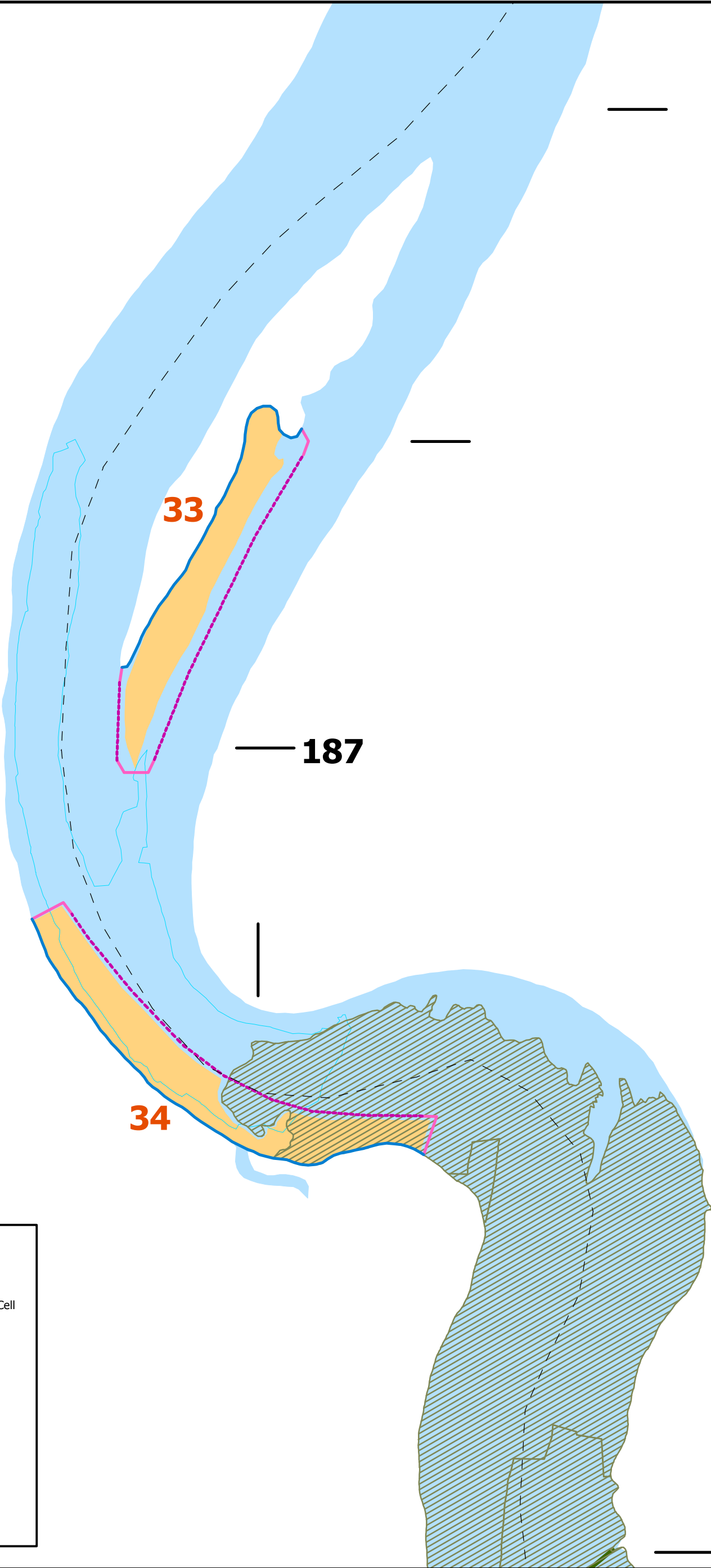
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



Containment Types - RM 186.5 - 187.5



LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudson River Center Line

Navigational Channel

Containment Type

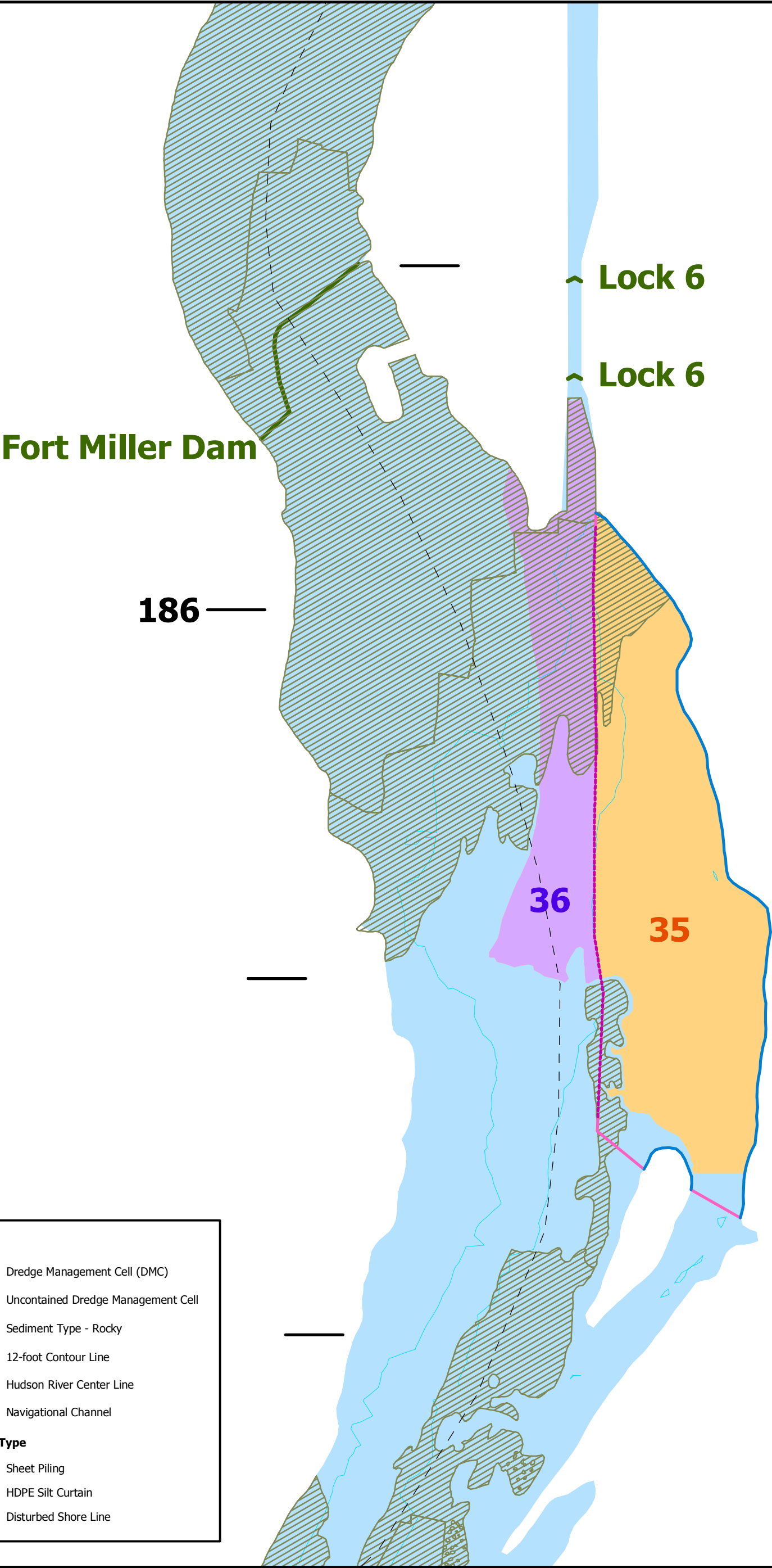
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



Containment Types - RM 185.25 - 186.25



LEGEND

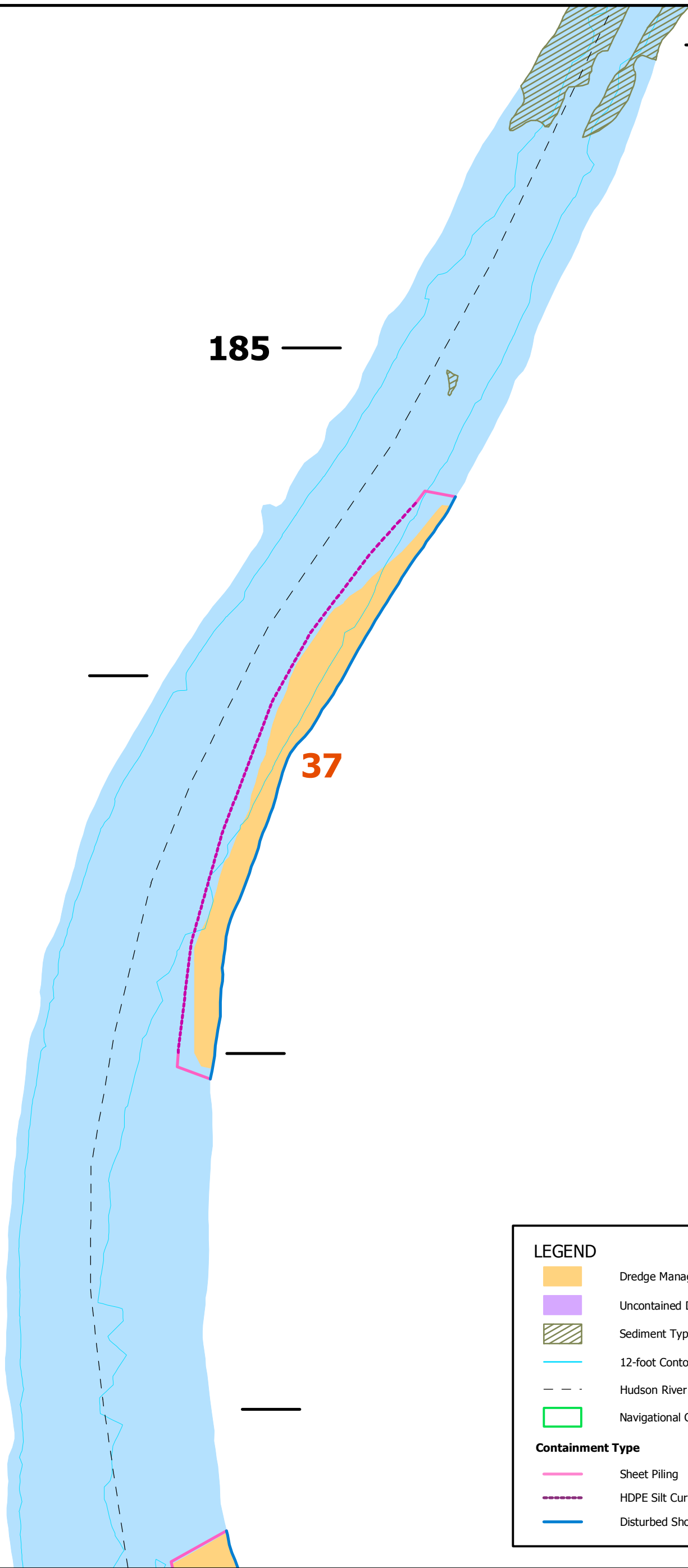
- Dredge Management Cell (DMC)
- Uncontained Dredge Management Cell
- Sediment Type - Rocky
- 12-foot Contour Line
- Hudson River Center Line
- Navigational Channel

Containment Type

- Sheet Piling
- HDPE Silt Curtain
- Disturbed Shore Line



Containment Types - RM 184.25 - 185.25



LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudson River Center Line

Navigational Channel

Containment Type

Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



5000500 Feet

1000100200 Meters

Containment Types - RM 183.25 - 184.25

184

40

38

40

39

41

Northumberland Dam

LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudson River Center Line

Navigational Channel

Containment Type

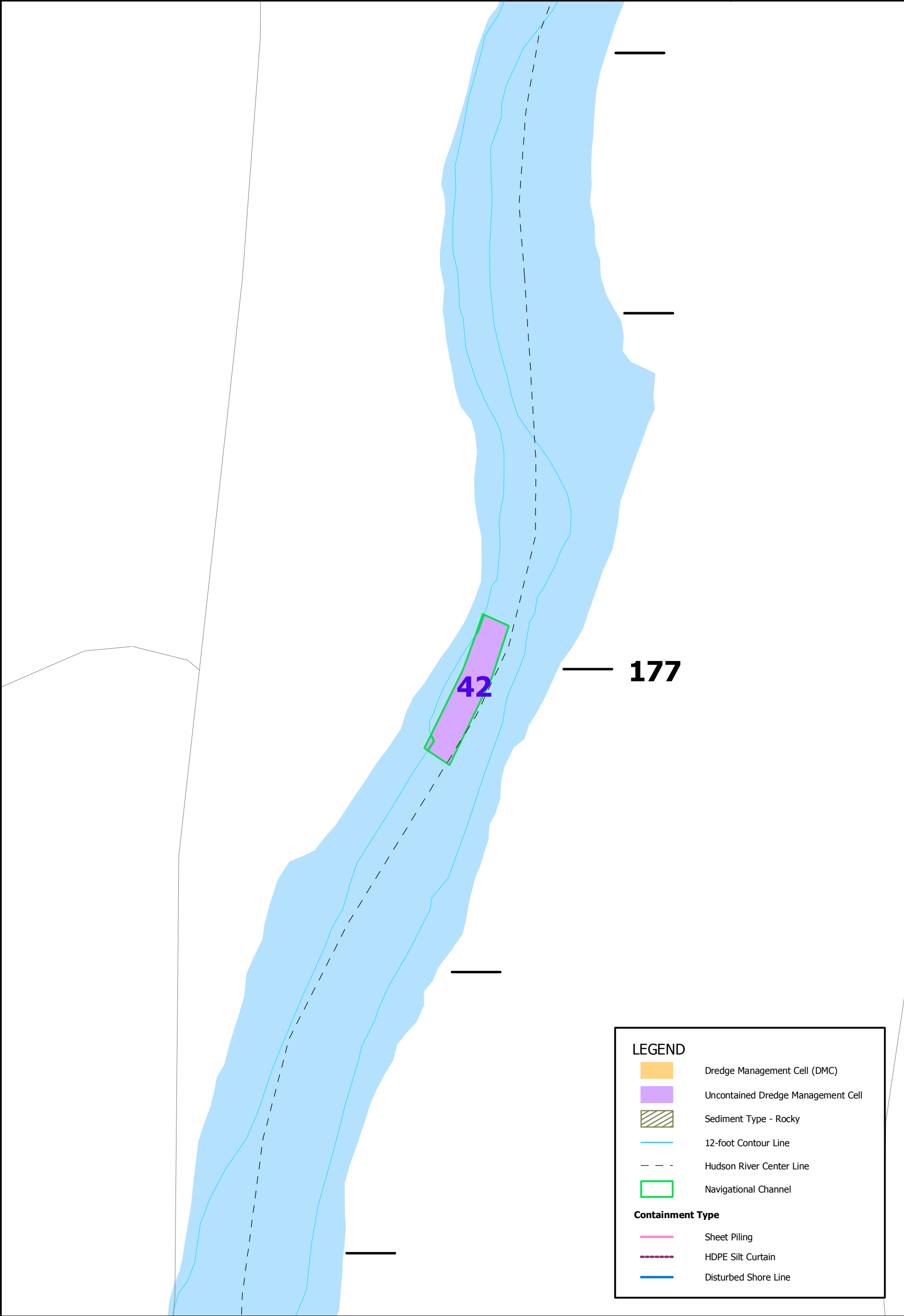
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line

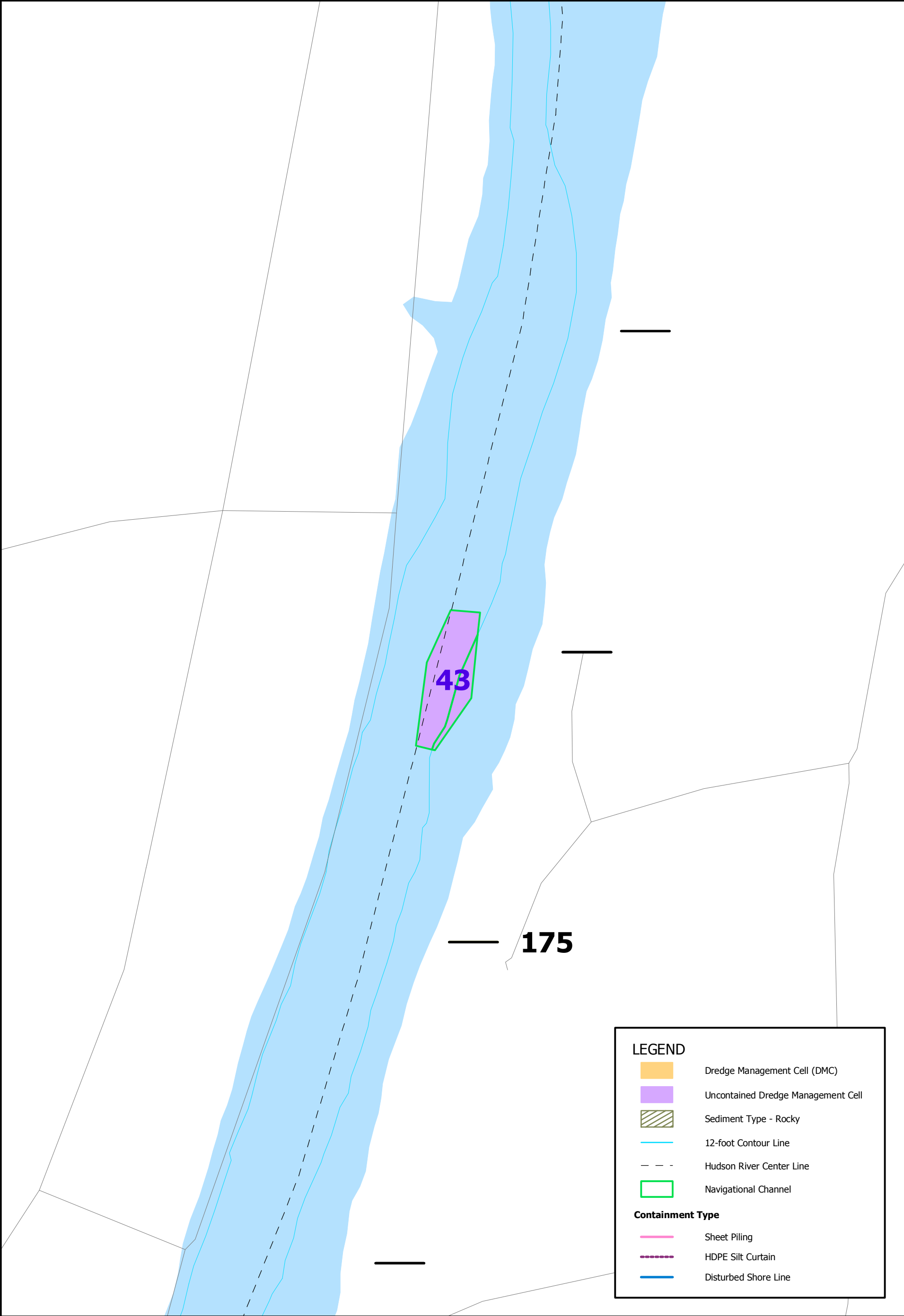


Containment Types - RM 176.5 - 177.5



500 0 500 Feet
100 0 100 200 Meters

Containment Types - RM 174.75 - 175.75



Containment Types - RM 171.25 - 172.25

LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudson River Center Line

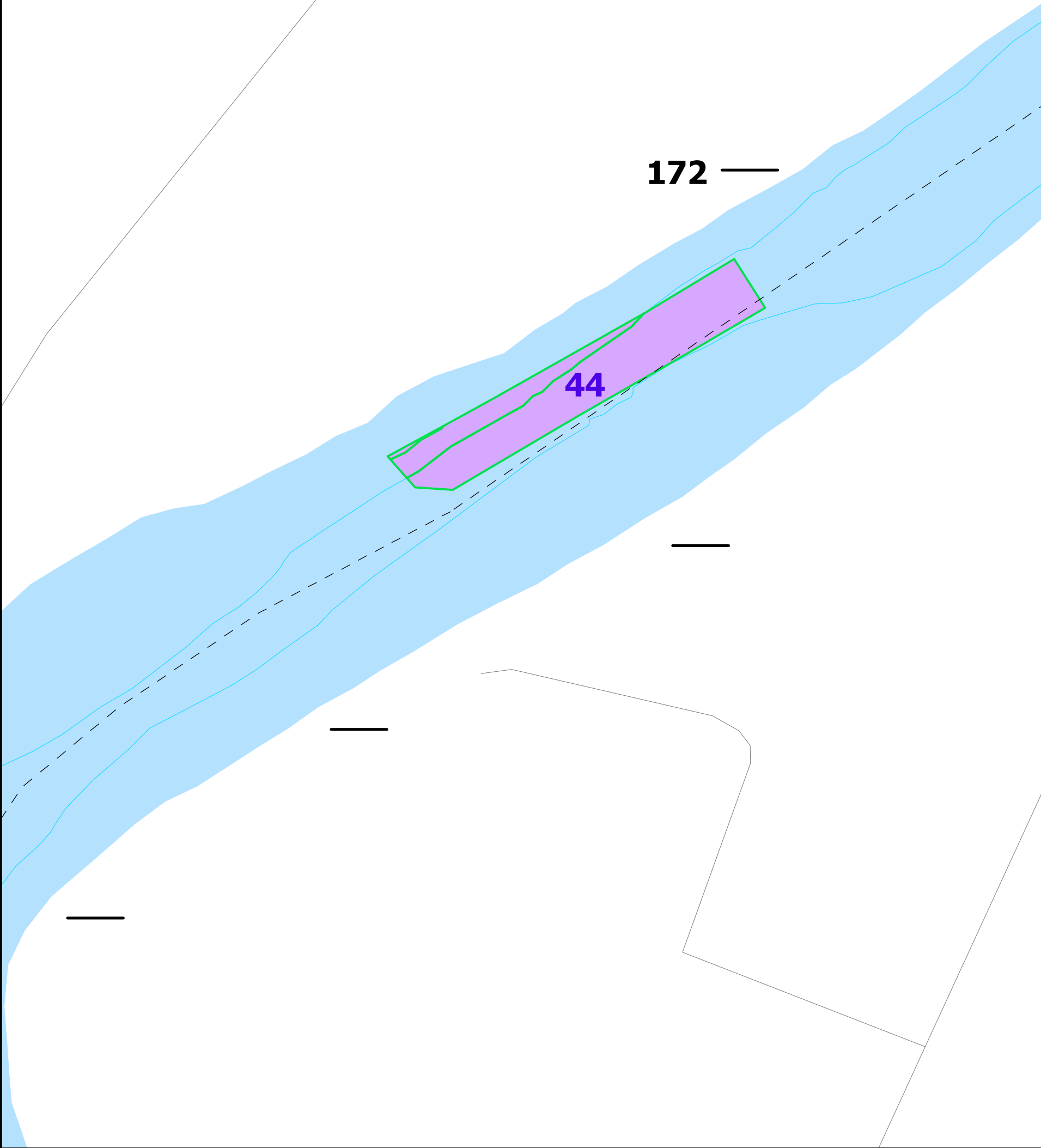
Navigational Channel

Containment Type

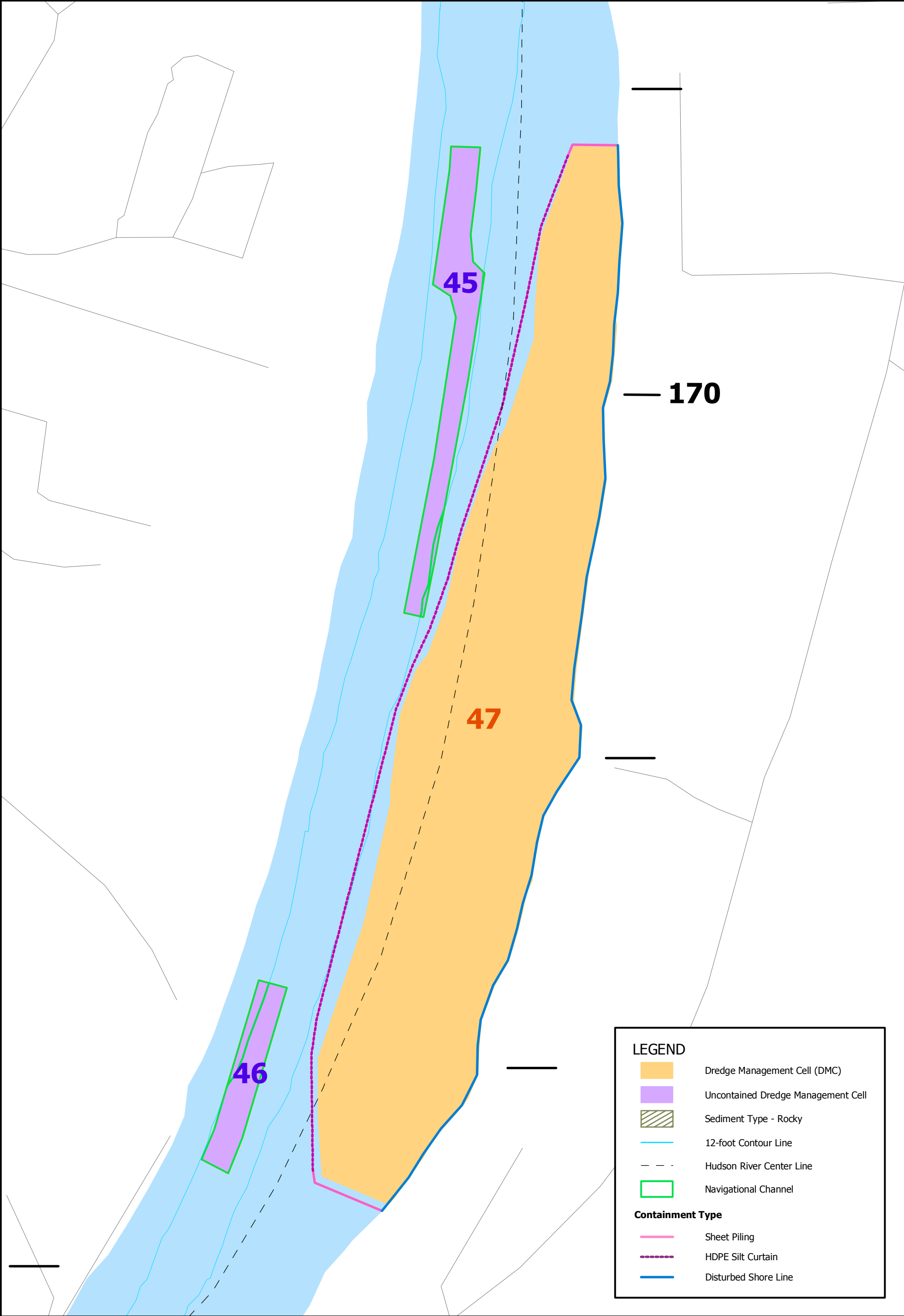
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line

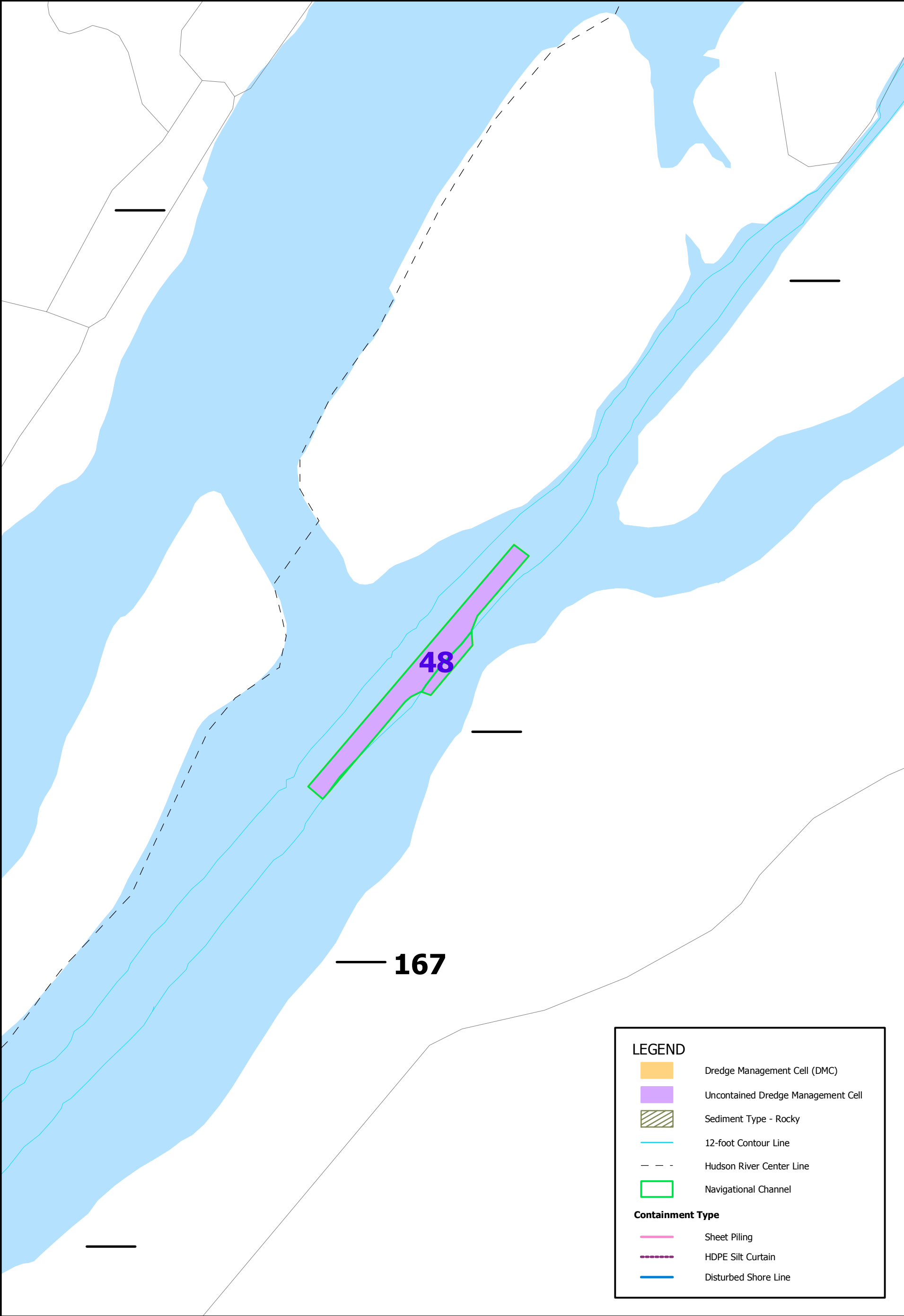


Containment Types - RM 169.25 - 170.25



500 0 500 Feet
100 0 100 200 Meters

Containment Types - RM 166.75 - 167.75



500 0 500 Feet
100 0 100 200 Meters

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Containment Types - RM 165.75 - 166.75

LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudwon River Center Line

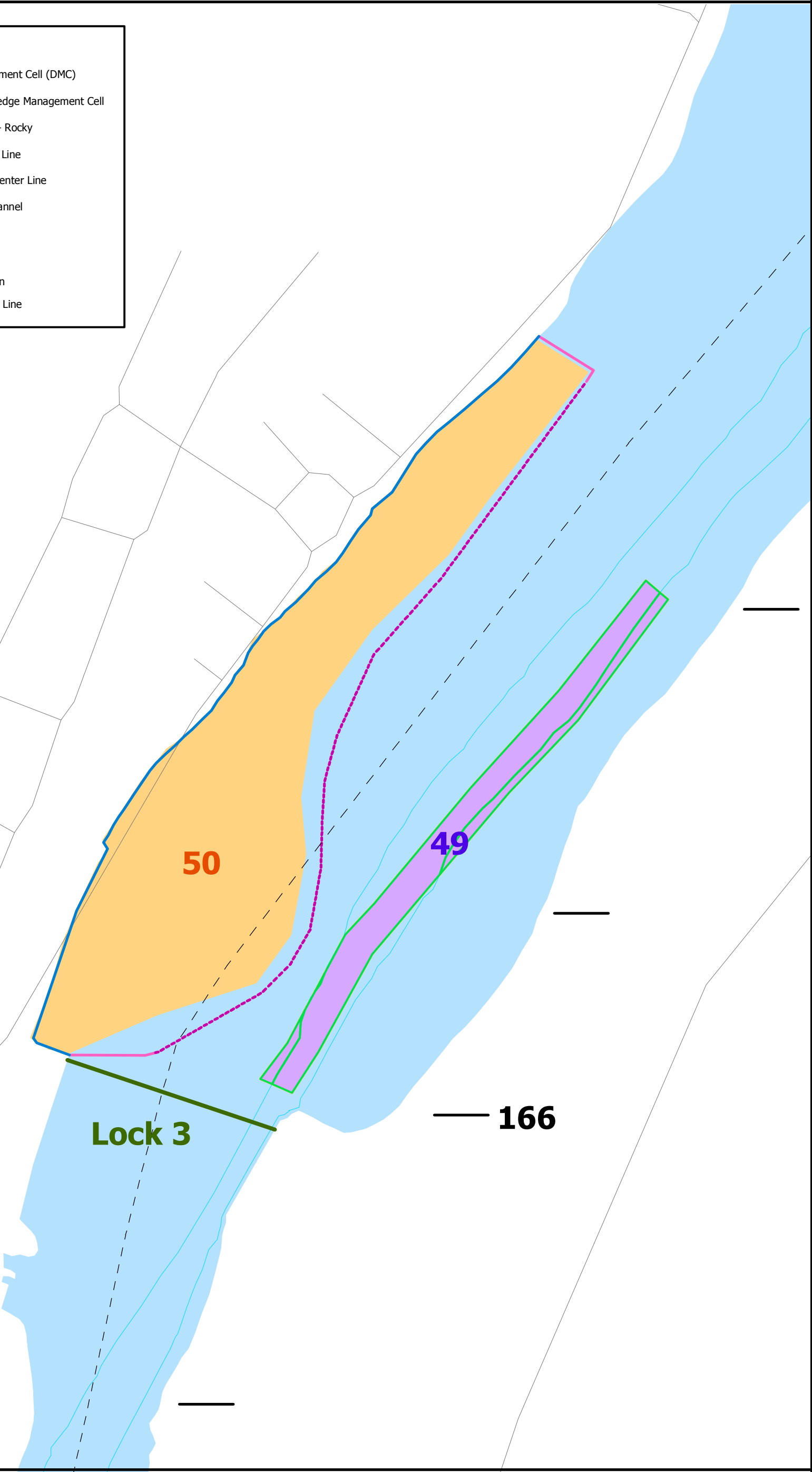
Navigational Channel

Containment Type

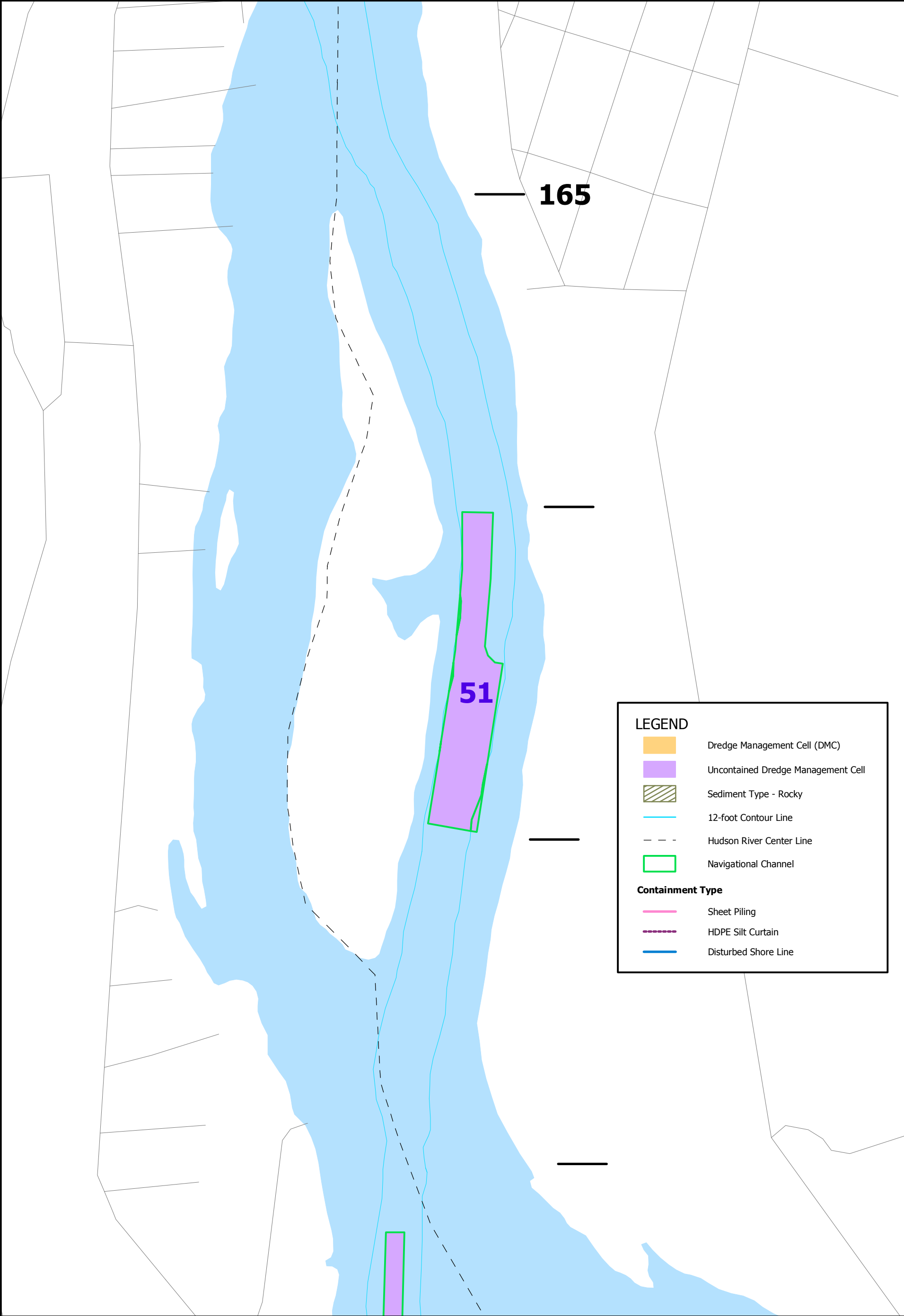
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



Containment Types - RM 164.25 - 165.25



LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudson River Center Line

Navigational Channel

Containment Type

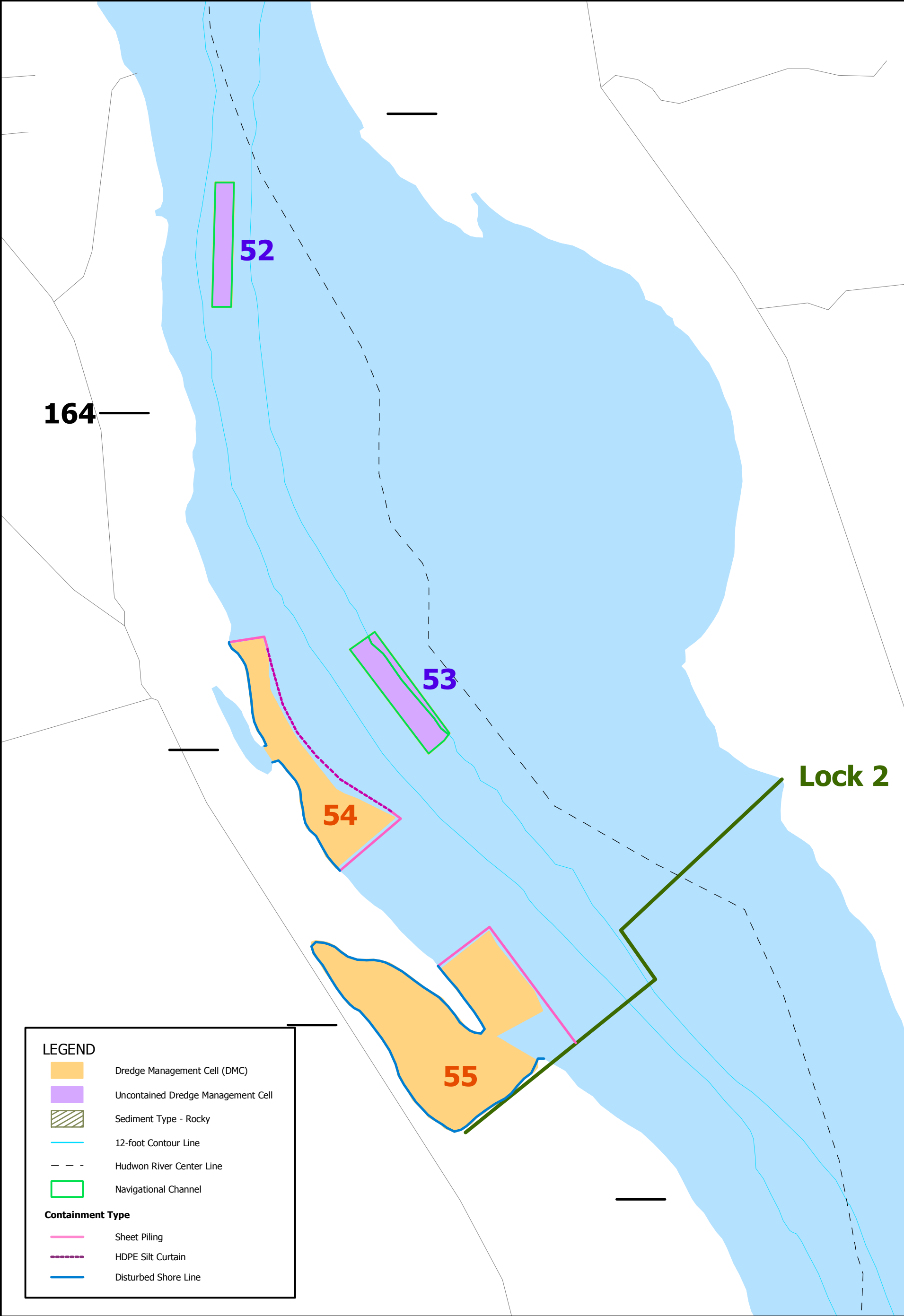
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



Containment Types - RM 163.25 - 164.25



LEGEND

Dredge Management Cell (DMC)

Uncontained Dredge Management Cell

Sediment Type - Rocky

12-foot Contour Line

Hudwon River Center Line

Navigational Channel

Containment Type

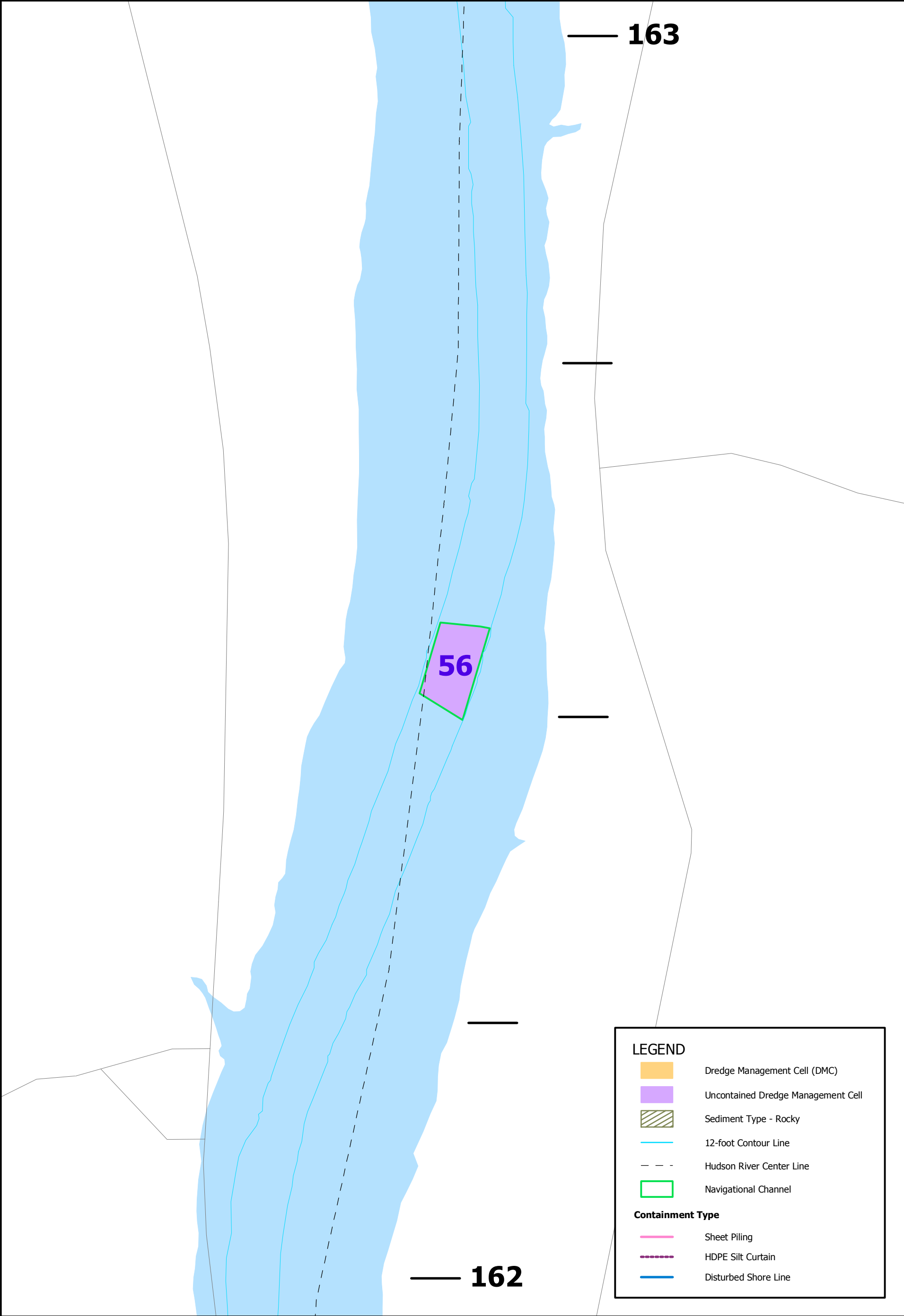
Sheet Piling

HDPE Silt Curtain

Disturbed Shore Line



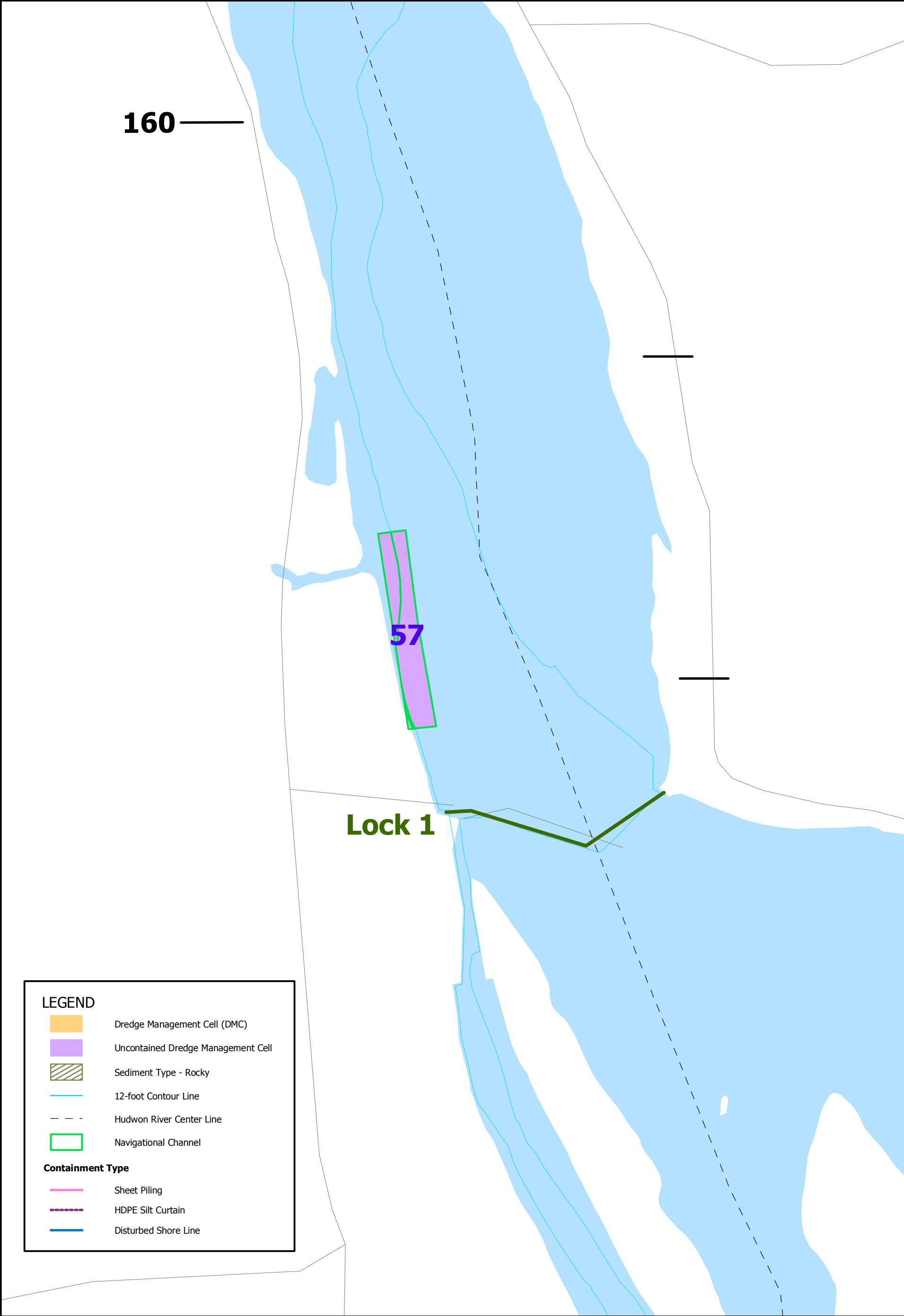
Containment Types - RM 162 - 163



500 0 500 Feet
100 0 100 200 Meters

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Containment Types - RM 159 - 160



LEGEND

-  Dredge Management Cell (DMC)
-  Uncontained Dredge Management Cell
-  Sediment Type - Rocky
-  12-foot Contour Line
-  Hudwon River Center Line
-  Navigational Channel

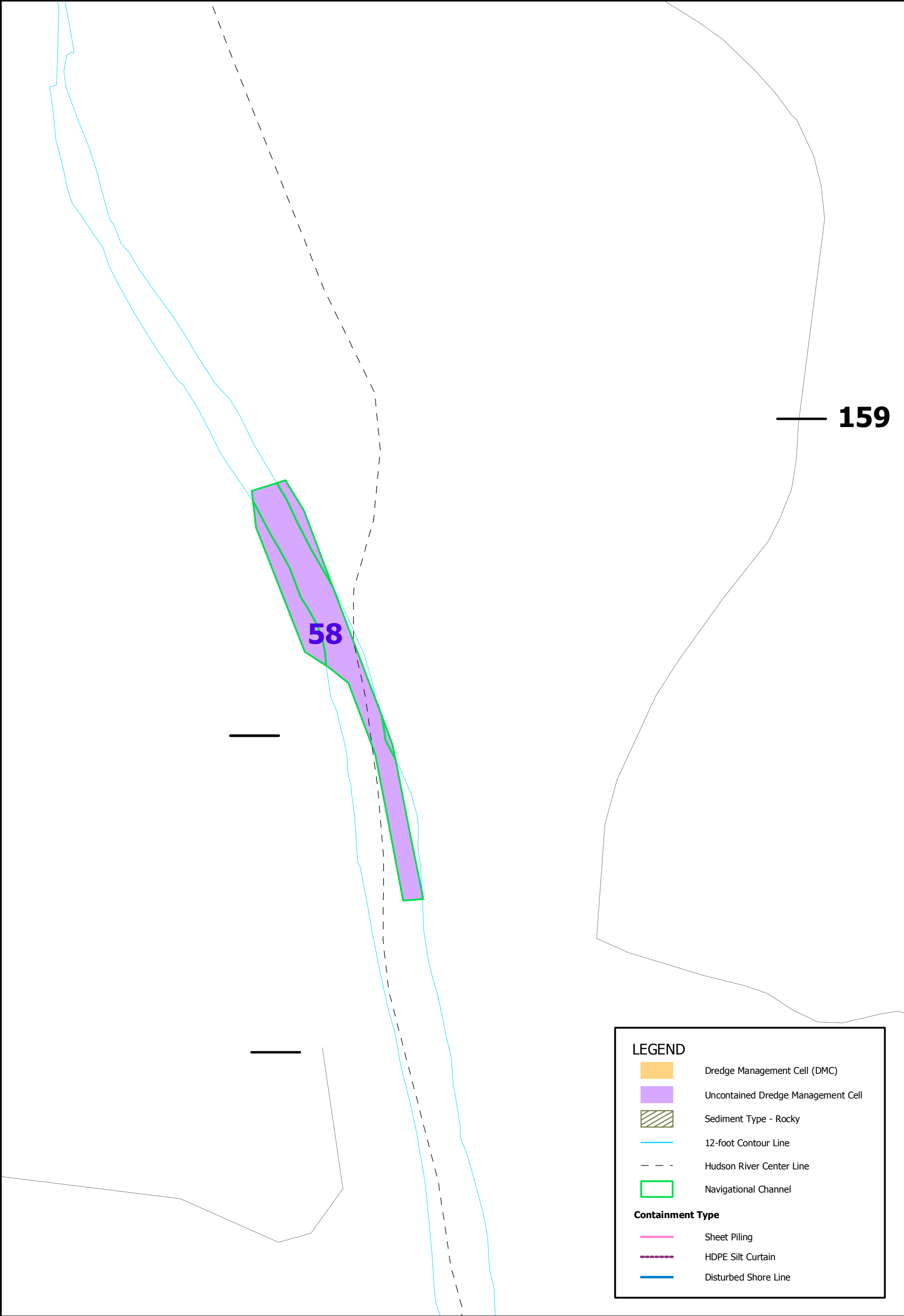
Containment Type

-  Sheet Piling
-  HDPE Silt Curtain
-  Disturbed Shore Line



500 0 500 Feet
100 0 100 200 Meters

Containment Types - RM 158.25 - 159.25



500 0 500 Feet
100 0 100 200 Meters

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