Attachment 2.0

Productivity Schedule Backup

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 River Mile	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						1			11	No	4,432	207	1
			2	W	RM 193.5 - 193.75	3			13,193	13,193	0	1			2	No	872	1,096	0
			3	W	RM 192.5 - 193.5 W	4a			50,000	42,964	7,036	0			7	Yes	2,287	2,225	0
						5			80,336	80,336	0	0			0	No			
			5	W	RM 191.5 - 192.5 W	9			48,188	45,055	3,132	0			12	No	460	468	0
						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	3,131	3,042	0
			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
						18						0			0	No			
			10	W	RM 189.5 - 190.5 W	17a			194,682	39,939	154,743	0			27	Yes	13,430	3,048	0
			12	W	RM 188.5 - 189.5 W	17b			68,475	61,396	7,079	0			13	Yes	2,375	2,618	0
						29						0			3	Yes	884	1,019	0
						30						0			0	No			
						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	34	25	No	3,424	3,629	1
			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			
			7	E	RM 190.5 - 191.5 E	12			153,868	151,662	2,207	0			5	No	2,414	2,714	0
						13						0			0	No			
						14						0			3	No	950	1,191	0
			13	W	RM 187.5 - 188.5	32	2	TI Dam to Fort Miller Dam / Lock 6	13,026	12,936	90	0			4	No	1,386	1,254	0
			14	W	RM 186.5 - 187.5	33			40,461	34,682	5,779	0			11	Yes	1,277	1,786	1
						34						0			8	No	1,763	1,852	0
			18	W	RM 183.25 - 184.25 W	40		Fort Miller Dam / Lock 6 to Northumberland Dam	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		
						21						0			16	No	2,582	2,660	2
						22						0			2	No	1,010	1,010	1
			11	E	RM 188.5 - 189.5 E	22a			142,611	129,564	13,047	0			4	No	980	1,333	1
						23						0			0	No	290		
						24						0			4	No	1,406	1,737	0
						25						1			4	No	305	1,391	0
						26						0			0	No	696		
						27						0			2	No	614	559	0
						28						0			0	No			
			15	E	RM 185.25 - 186.25	35	2	Fort Miller Dam / Lock 6 to Northumberland Dam	253,793	247,865	5,928	1			23	No	3,006	2,557	5
						36						0			0	No			
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*	3	Lock 5 to Lock 4 / Stillwater Dam	9,023	9,023	0	0			0	No			
			20	NAV	RM 175.0 - 175.25	43*			9,023	9,023	0	0			0	No			
			21	NAV	RM 171.5 - 172.0	44*			9,023	9,023	0	0			0	No			
			22	E	RM 169.25 - 170.25	45*			9,023	9,023	0	0			0	No			
						46*			9,023	9,023	0	0			0	No			
						47			224,806	166,434	58,372	0			31	Yes	4,640	4,936	1
			23	NAV	RM 167.0 - 167.5	48*		Lock 4 / Stillwater Dam to Lock 3	9,023	9,023	0	0			0	No			
			25	NAV	RM 164.25- 165.0	51*			9,023	9,023	0	0			0	No			
			26	NAV	RM 164.0 - 164.25	52*		Lock 3 to Lock 2	9,023	9,023	0	0			0	No			
			28	NAV	RM 162.25 - 162.75	56*		Lock 2 to Lock 1	9,023	9,023	0	0			0	No			
			29	NAV	RM 159.25 - 159.75	57*			9,023	9,023	0	0			0	No			
			30	NAV	RM 158.5 - 159.25	58*		Lock 1 to Federal Dam	9,023	9,023	0	0			0	No			
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

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

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 River Mile	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			207	0	2		1	1					2,549			1,663	20	200
			2	W	RM 193.5 - 193.75	3			409	687	1				1				426			426	20	
			3	W	RM 192.5 - 193.5 W	4a			546	1,679	1		1			1			304			304		
						5										1								
			5	W	RM 191.5 - 192.5 W	9			167	301	0								46			414		
						10			520	905	1		1						382			574		
						11			335	1,315	1		1						365	731		365		
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		
			8	W	RM 190.5 - 191.5 W	15			449	1,103	0								519	100		519		
						16			358	1,667	0								467			1,400		
						17			397	1,130	0								987			284		150
						18																		
			10	W	RM 189.5 - 190.5 W	17a			509	2,539	0					1			6,565	100		6,565		200
			12	W	RM 188.5 - 189.5 W	17b			261	2,358	0								713			1,663		
						29			215	803	0								215	400		239		30
						30																		
						31			100	507	0								122	100				
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			1,198	1,198		1,027		
			6	E	RM 191.5 - 192.5 E	7			1,018	5,057	7		7						7,832			2,727		350
						8																		
			7	E	RM 190.5 - 191.5 E	12			362	2,352	0								1,772	400		241		
						13																		
						14			360	831	0								660	100		190		
			13	W	RM 187.5 - 188.5	32	2	TI Dam to Fort Miller Dam / Lock 6	418	835	0								1,109			277		
			14	W	RM 186.5 - 187.5	33			333	1,454	1		1						1,022			255		
						34			363	1,489	0								1,486			176		100
			18	W	RM 183.25 - 184.25 W	40		Fort Miller Dam / Lock 6 to Northumberland Dam			1		1						200	850		511		
						41			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			449	2,211	0		2						421	800	100	1,262		
						22			0	1,010	0		1						202		200	608		
			11	E	RM 188.5 - 189.5 E	22a			475	858	0		1						685	50		245		
						23													145			145		
						24			604	1,133	0								1,265			141		
						25			775	616	1						1		274			30	600	
						26													696					
						27			100	459	0								207	200		207		
						28																		
			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 5)	447,387	2,412,147	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		
			17	E	RM 183.25 - 184.25 E	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*																		
			22	E	RM 169.25 - 170.25	45*																		
						46*																		
						47			588	4,348	1		1						2,220	200		2,220		
			23	NAV	RM 167.0 - 167.5	48*		Lock 4 / Stillwater Dam to Lock 3																
			25	NAV	RM 164.25- 165.0	51*																		
			26	NAV	RM 164.0 - 164.25	52*		Lock 3 to Lock 2																
			28	NAV	RM 162.25 - 162.75	56*		Lock 2 to Lock 1																
			29	NAV	RM 159.25 - 159.75	57*																		
			30	NAV	RM 158.5 - 159.25	58*		Lock 1 to Federal Dam																
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			600		1,932	900	
			27	W	RM 163.25 - 164.25	53*		Lock 3 to Lock 2																
						54			576	882	2							3	778			207		50
						55			864	0	4						1	7	133	1,864		666		400

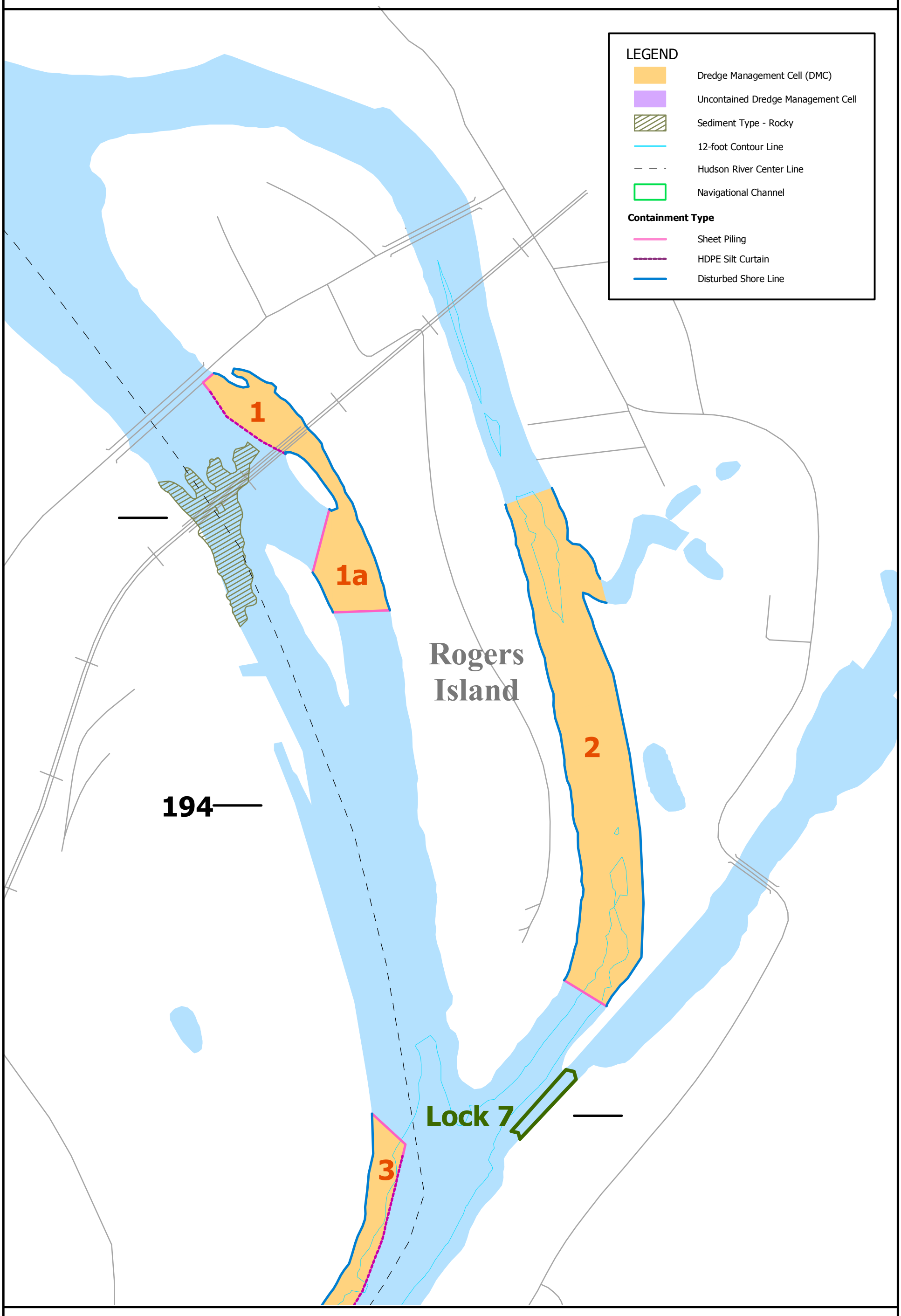
Note: Represents areas where no containment will be needed; area either in channel (navigational dredging) or behind rock outcrop

* 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

194

2

Lock 7

3

5

4a

6

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

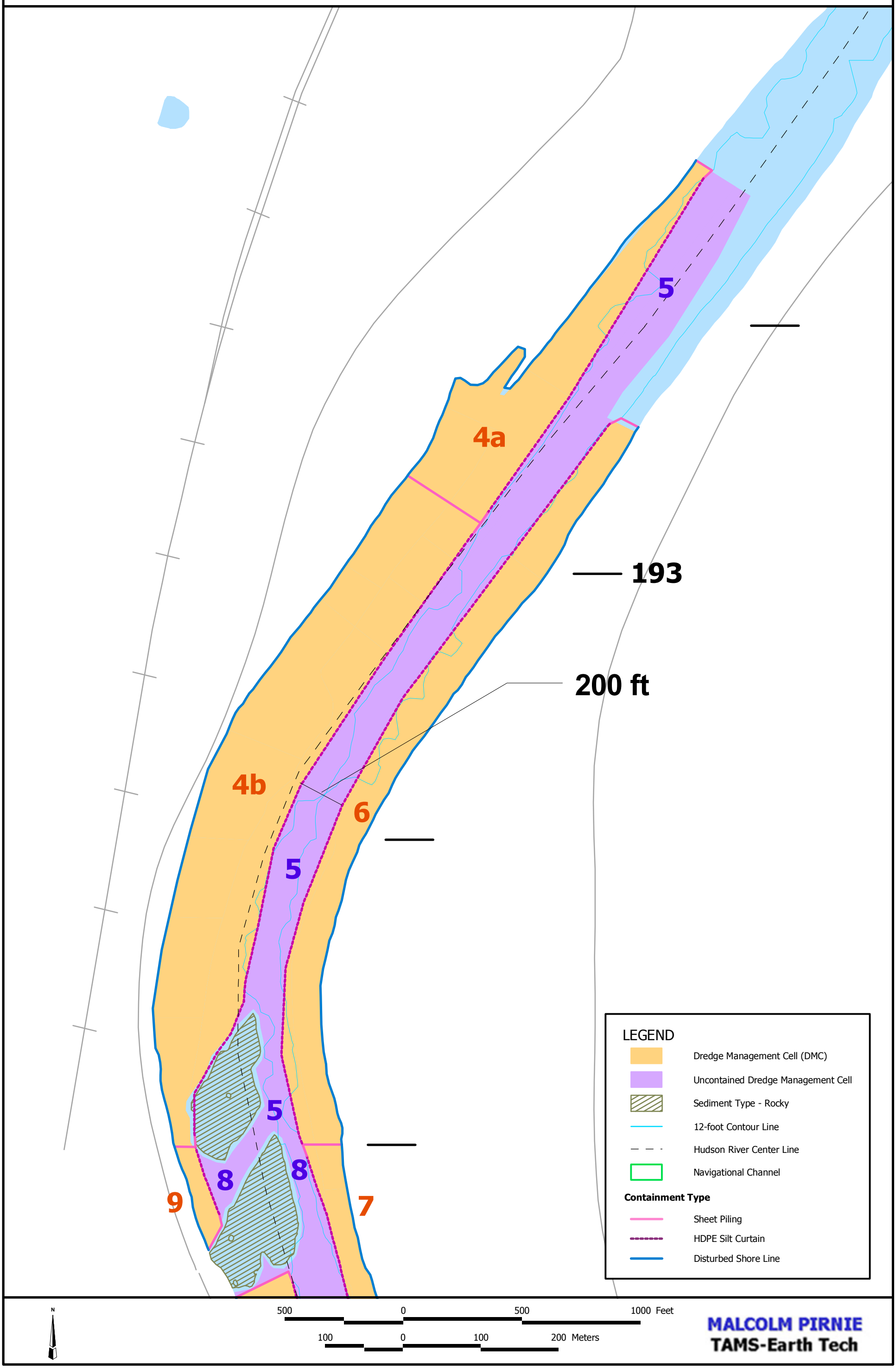
N

500 0 500 1000 Feet

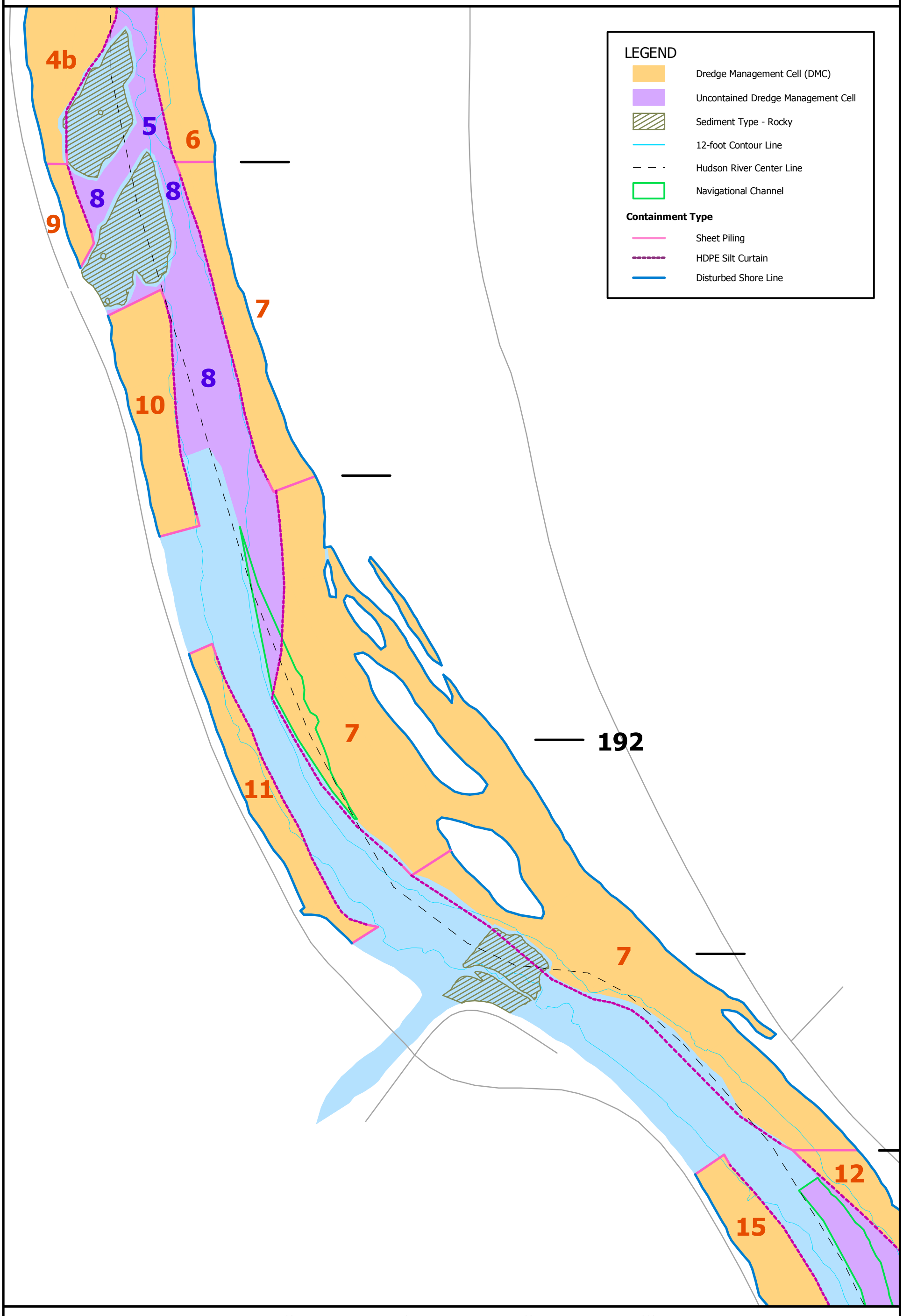
100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

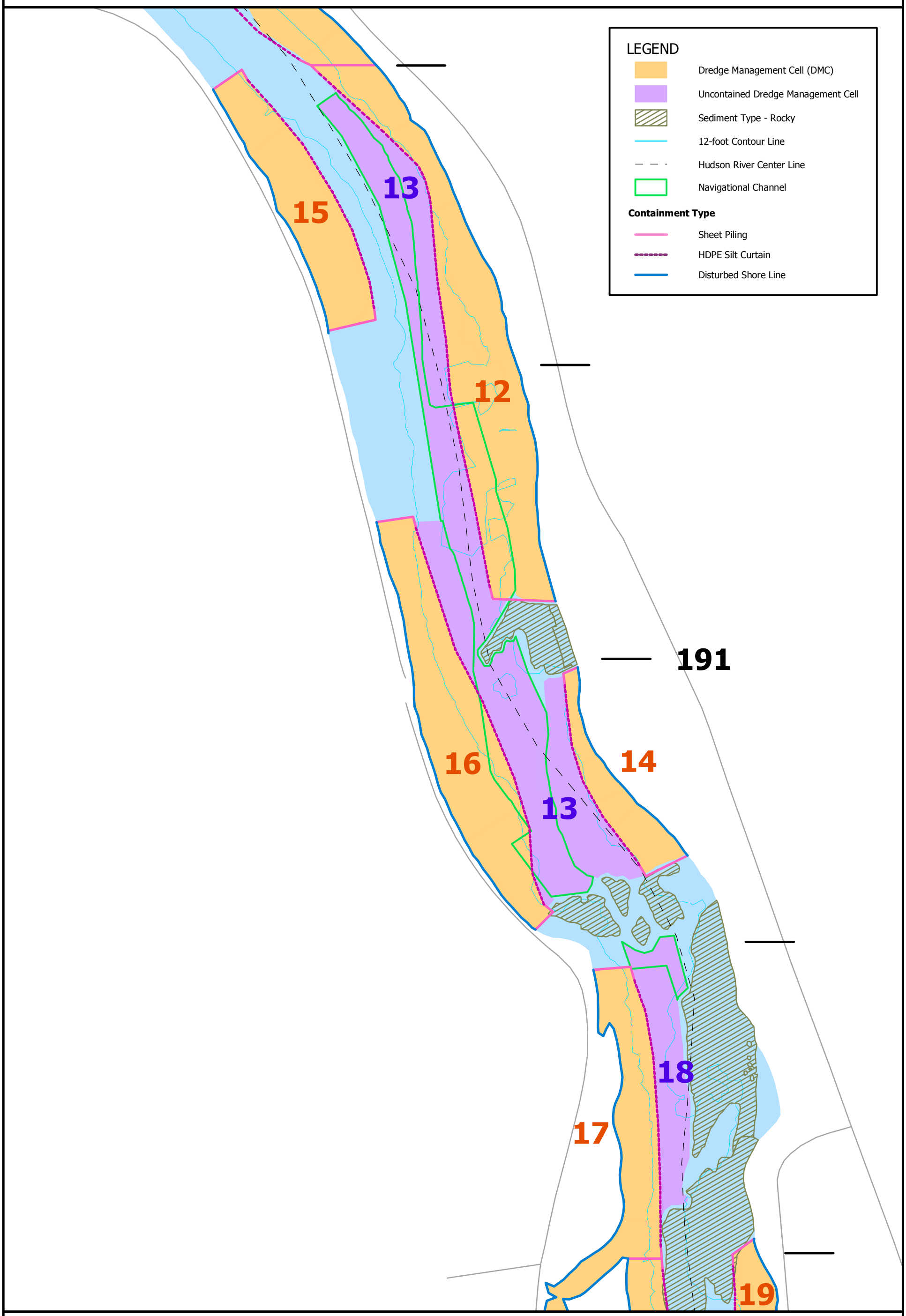
Containment Types - RM 192.5 - 193.5



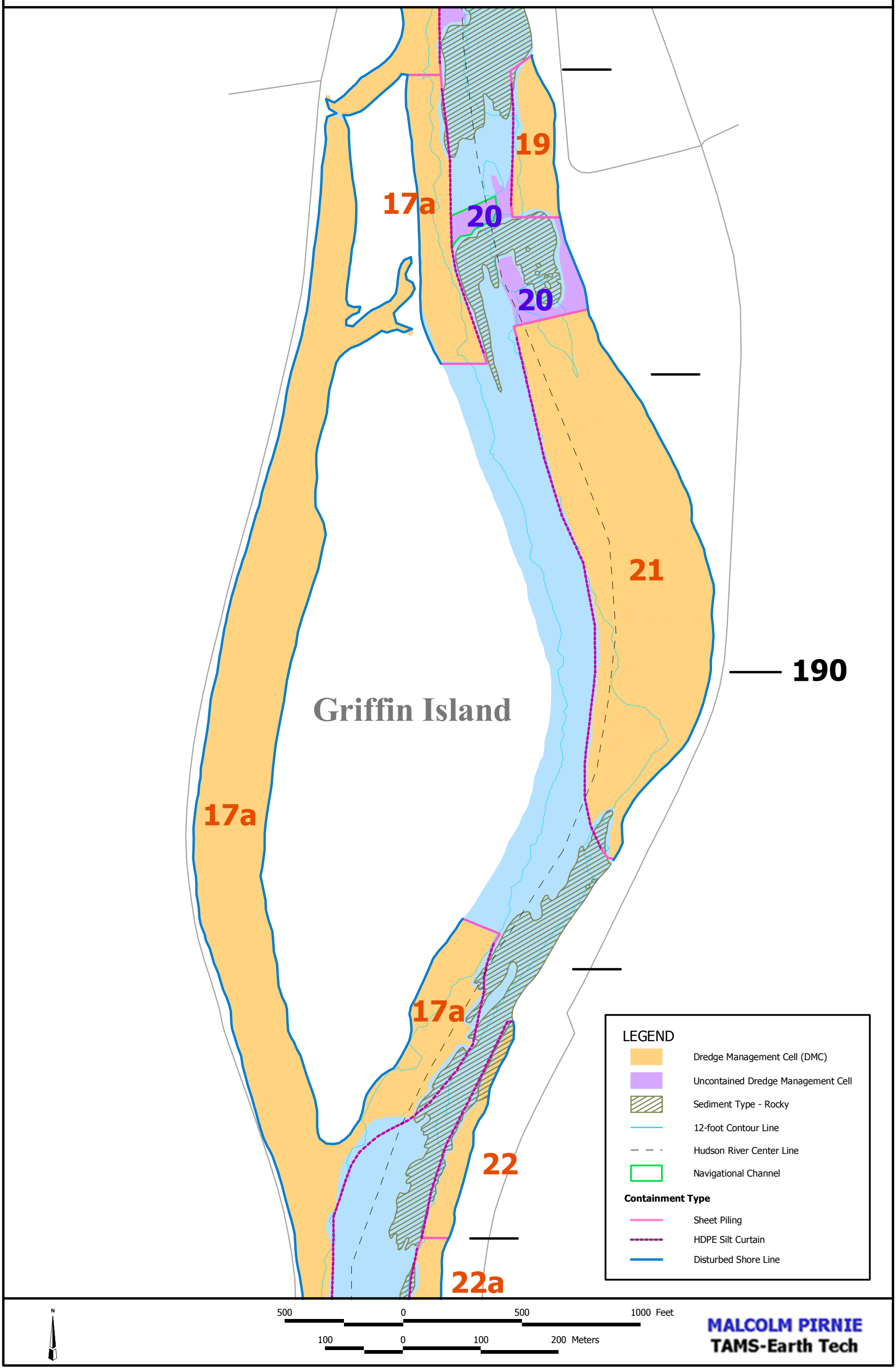
Containment Types - RM 191.5 - 192.5



Containment Types - RM 190.5 - 191.5



Containment Types - RM 189.5 - 190.5



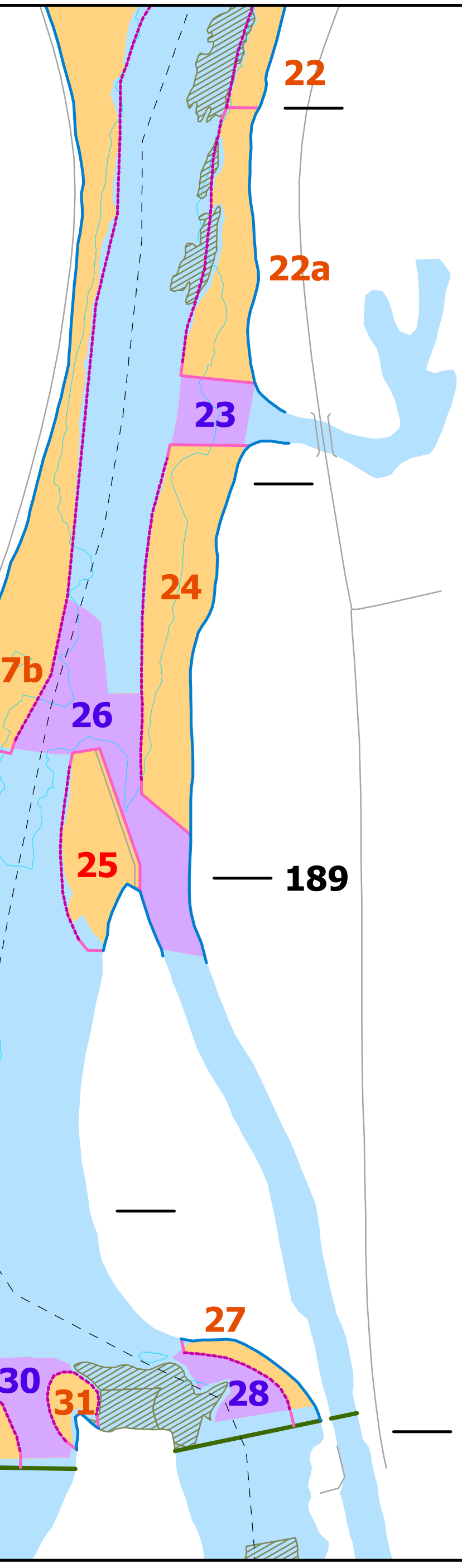
Containment Types - RM 188.5 - 189.5

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



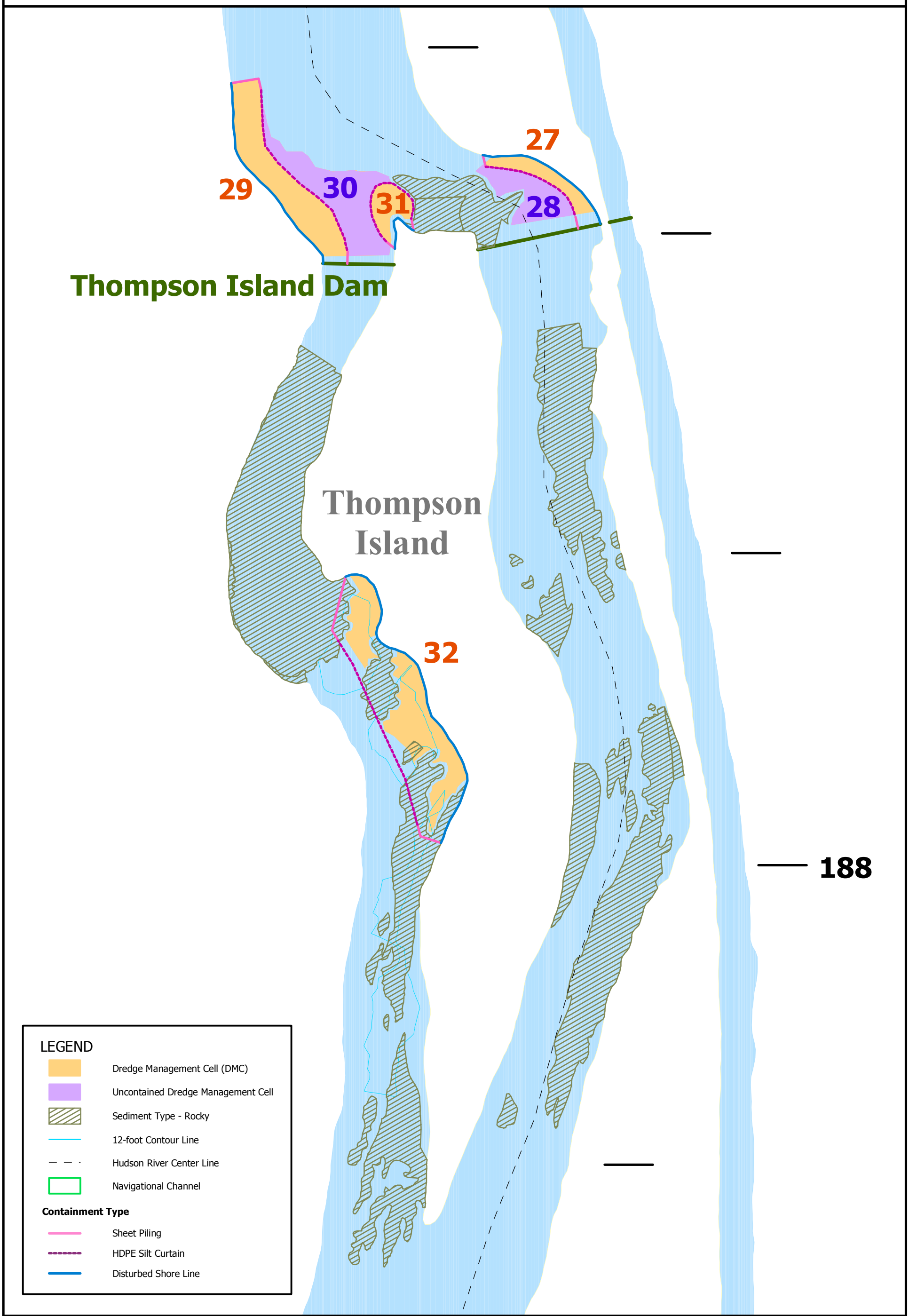
N

500 0 500 1000 Feet

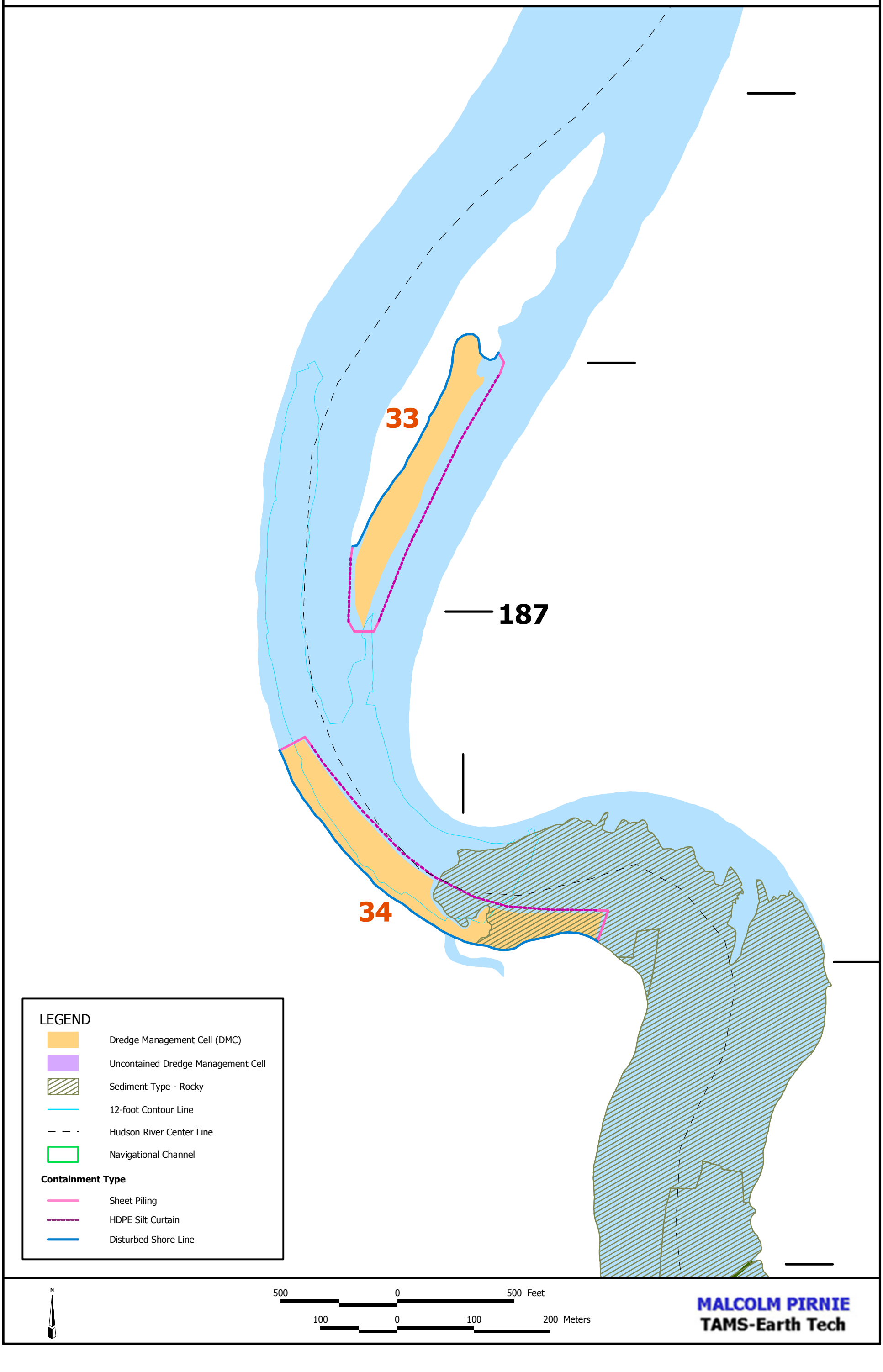
100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

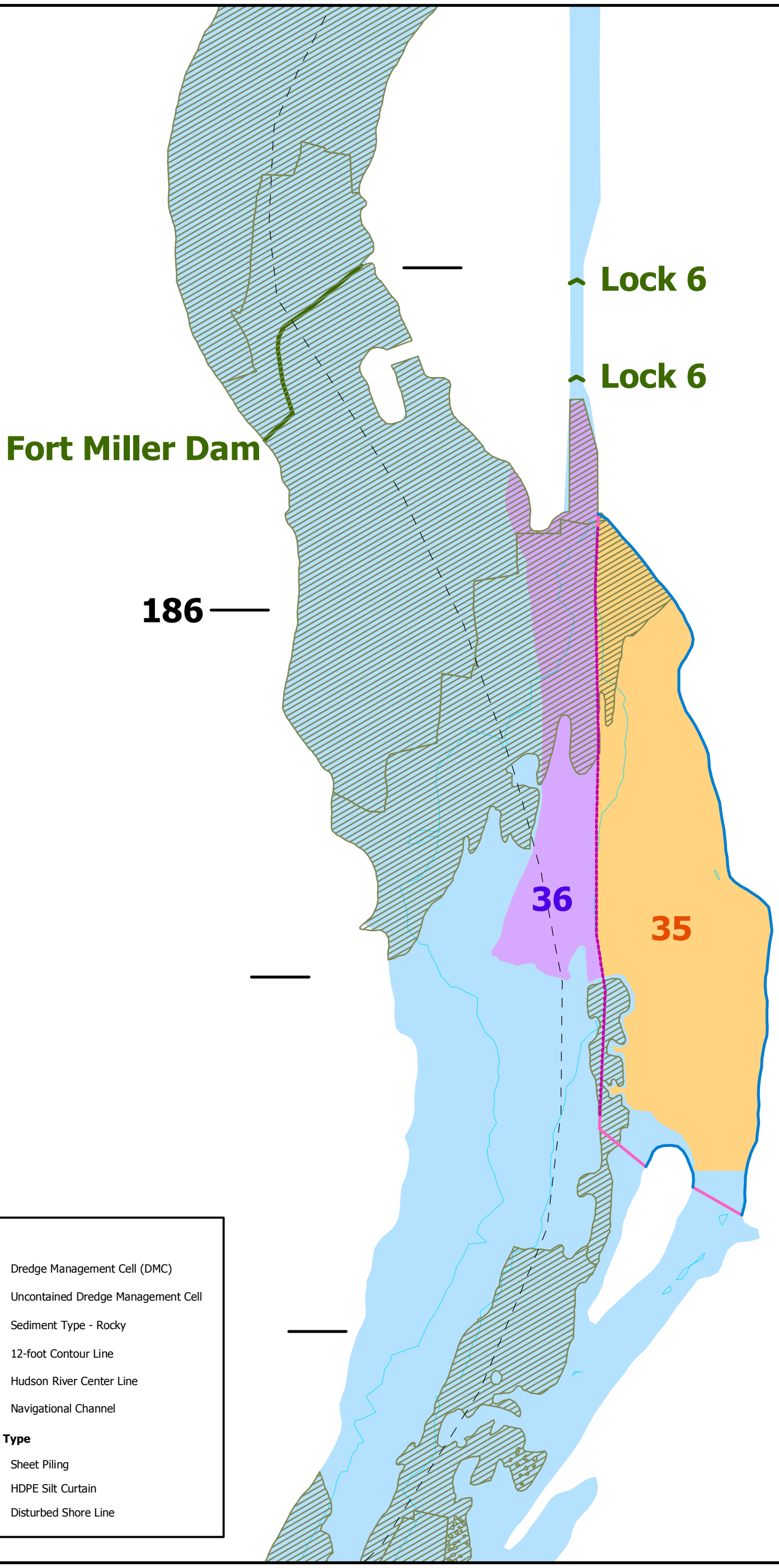
Containment Types - RM 187.5 - 188.5



Containment Types - RM 186.5 - 187.5



Containment Types - RM 185.25 - 186.25



MALCOLM PIRNIE
TAMS-Earth Tech

Containment Types - RM 184.25 - 185.25

185

37

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

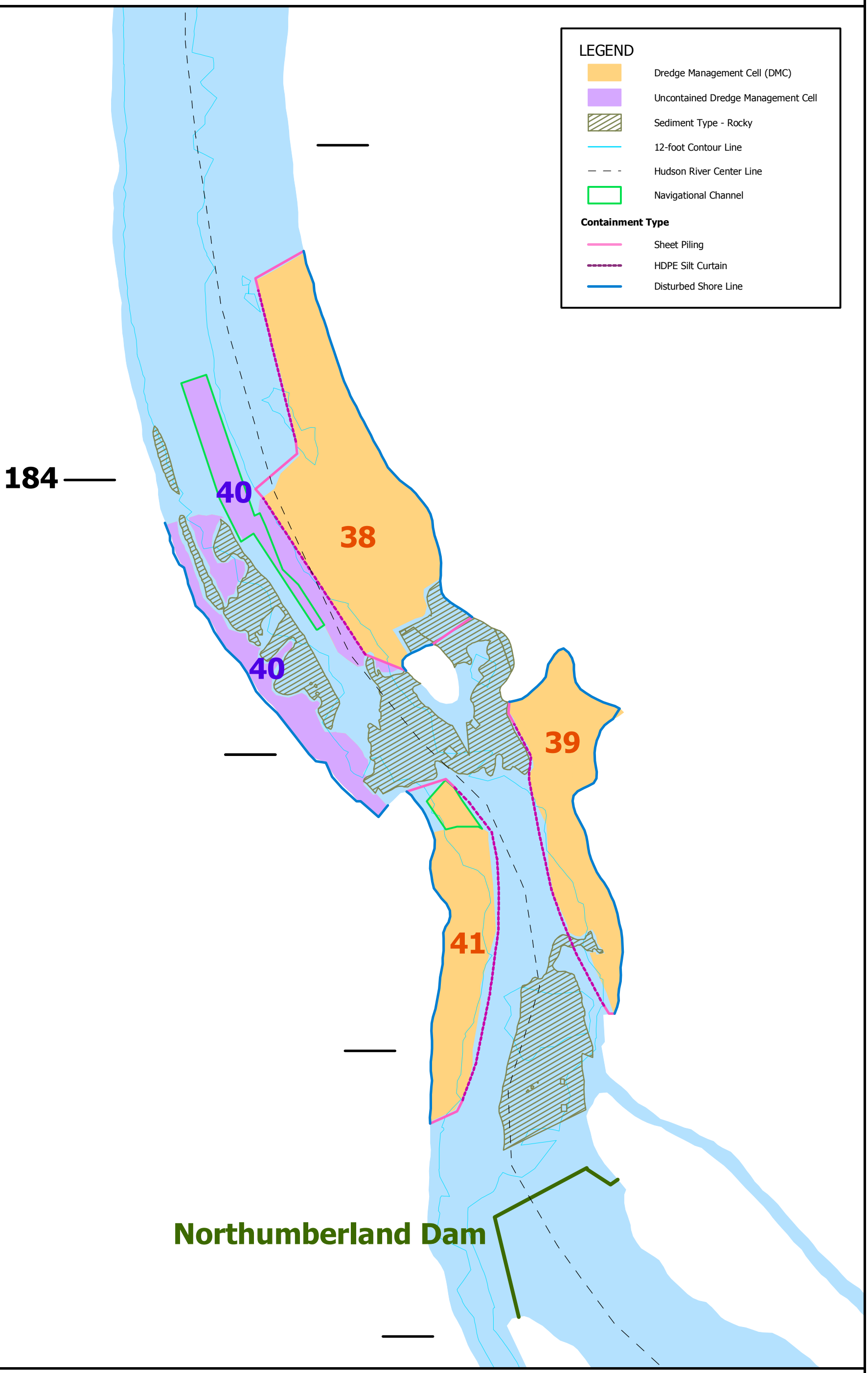
N

500 0 500 Feet

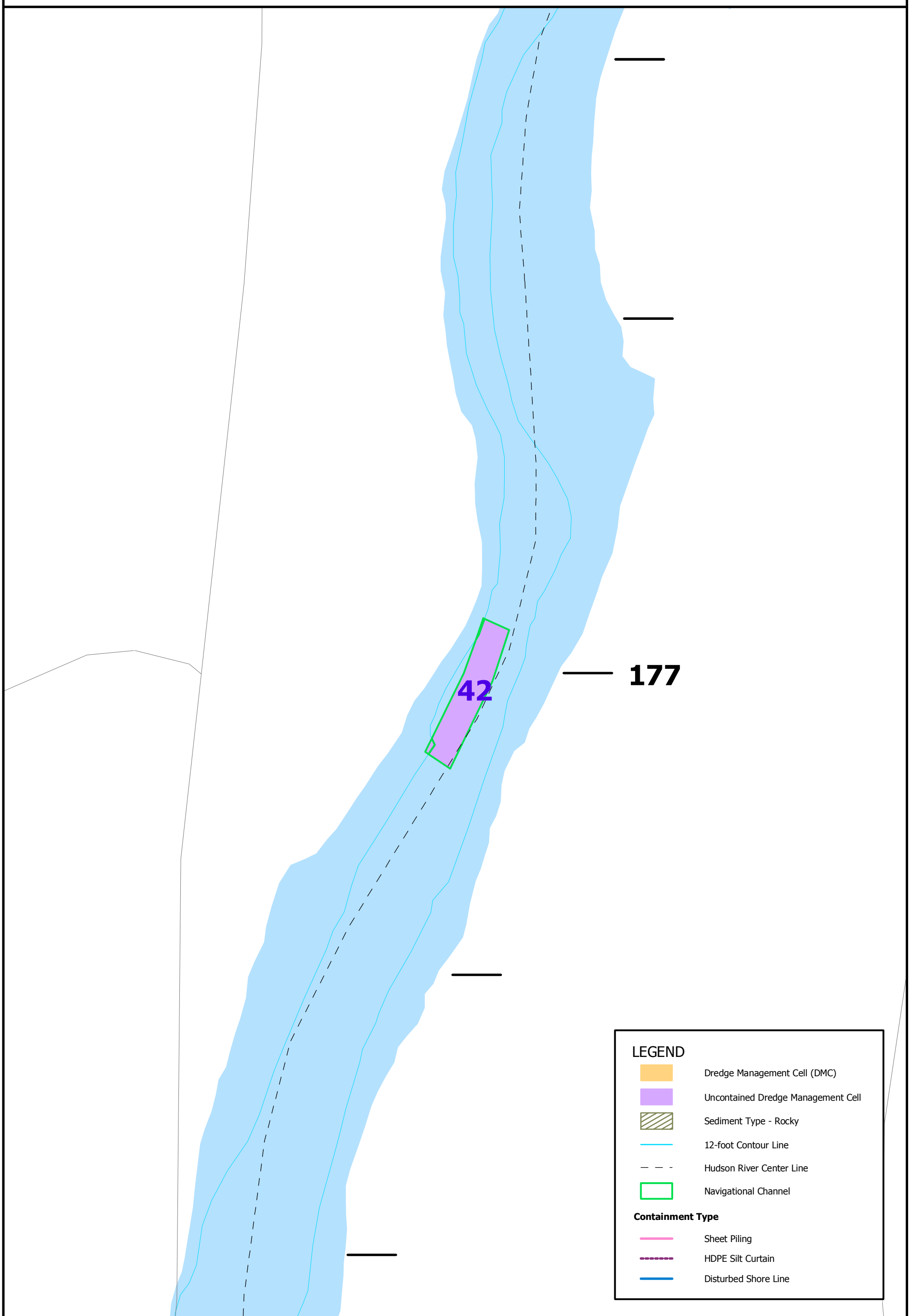
100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

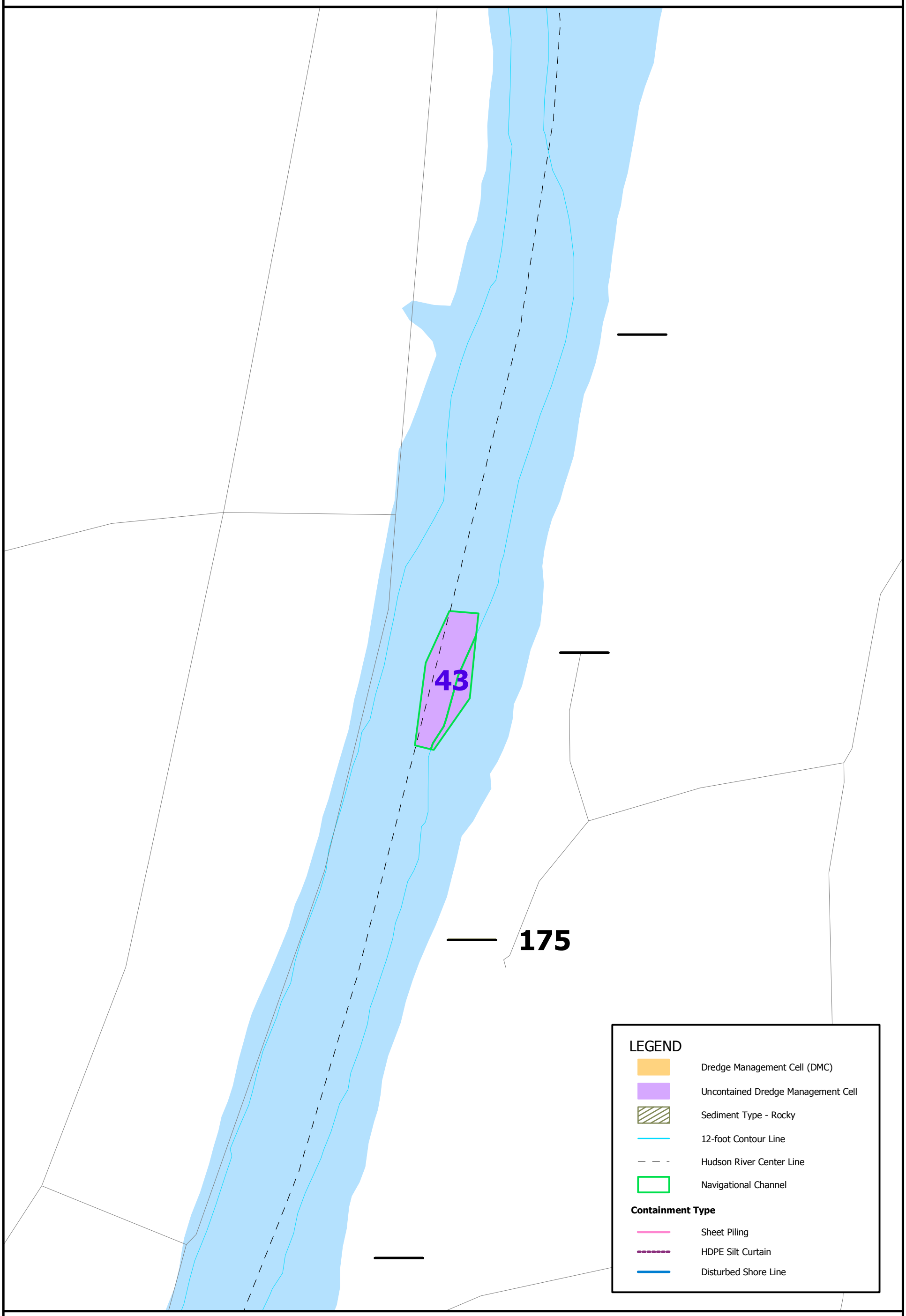
Containment Types - RM 183.25 - 184.25



Containment Types - RM 176.5 - 177.5



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

172

44

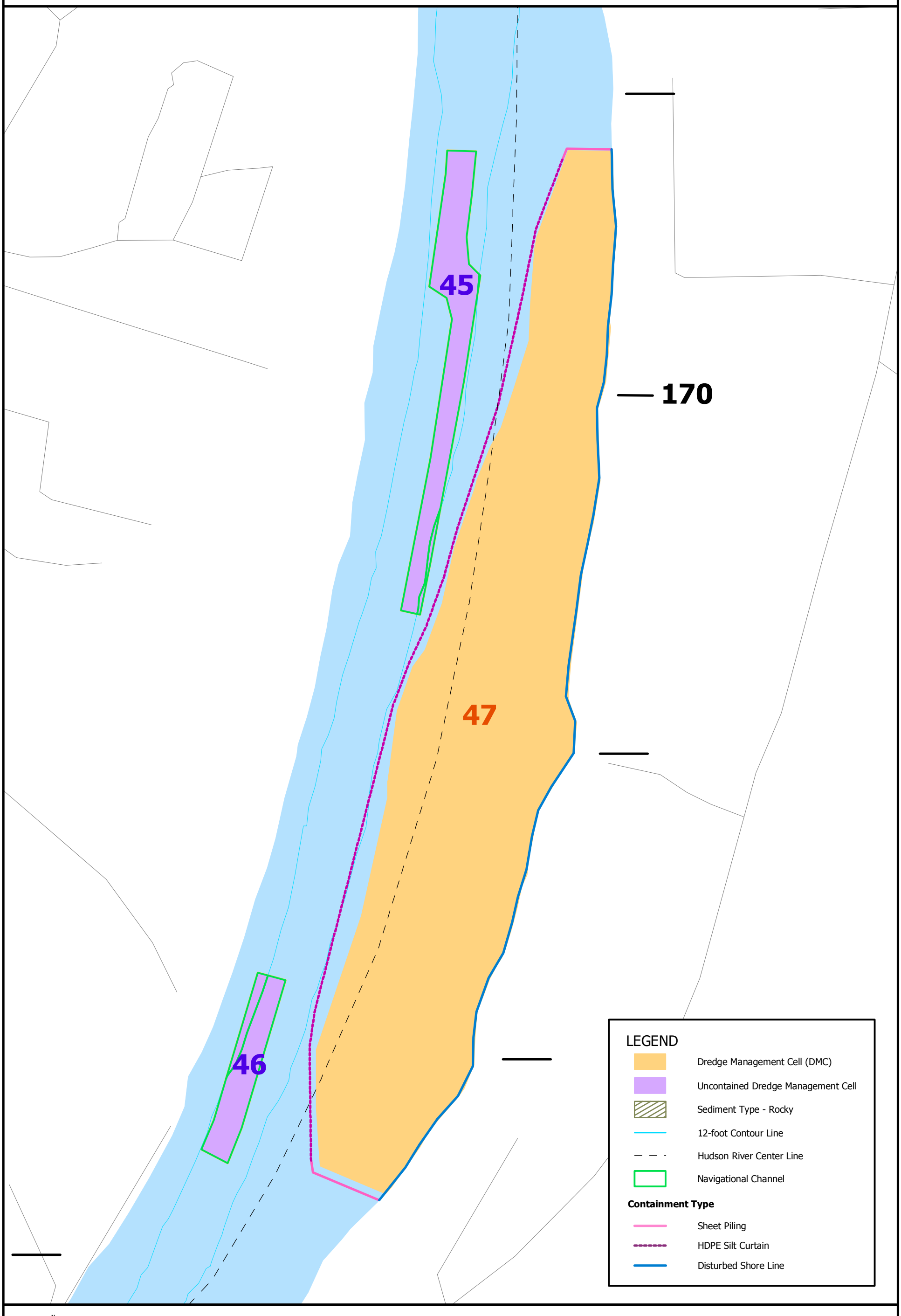
N

500 0 500 Feet

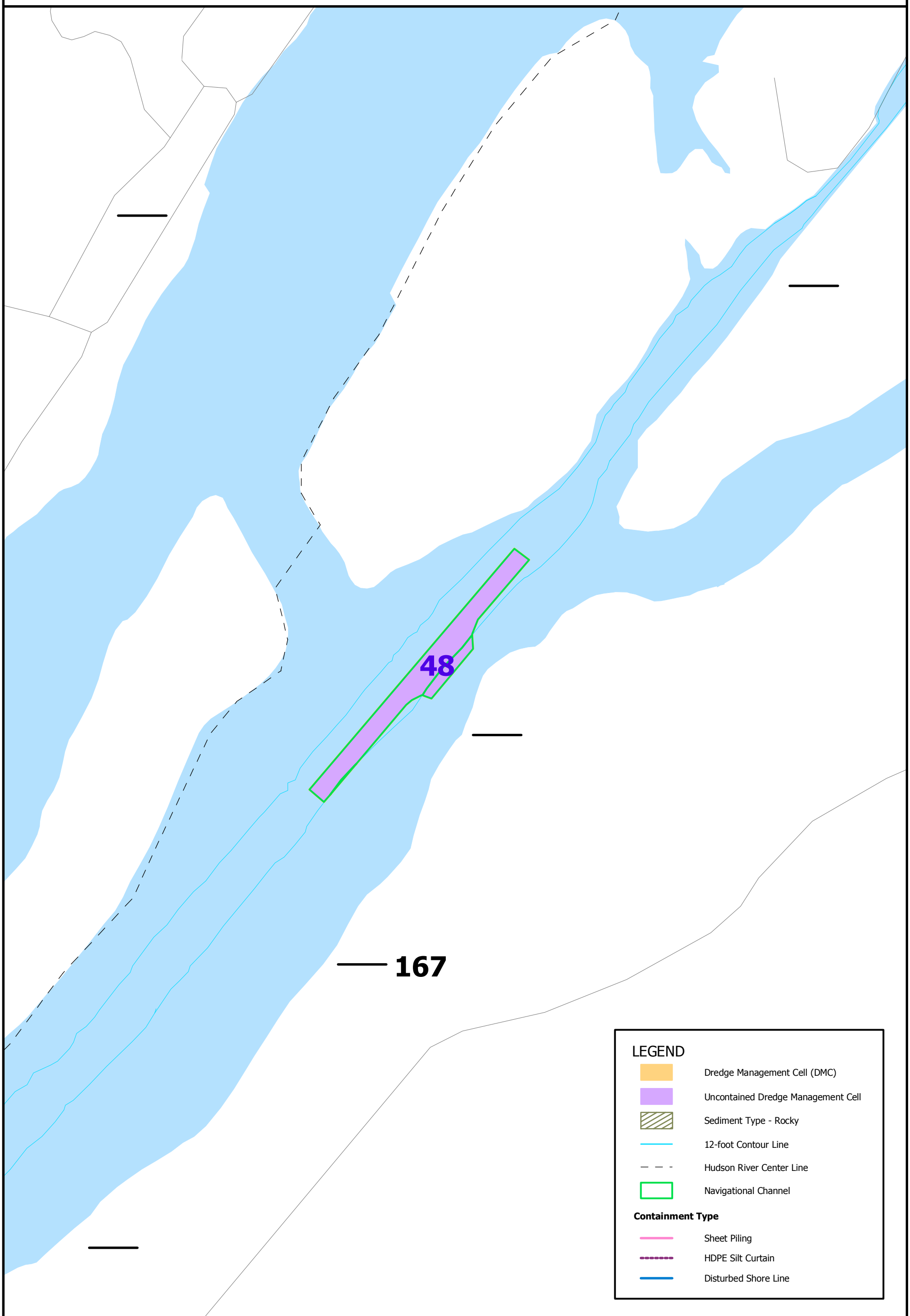
100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

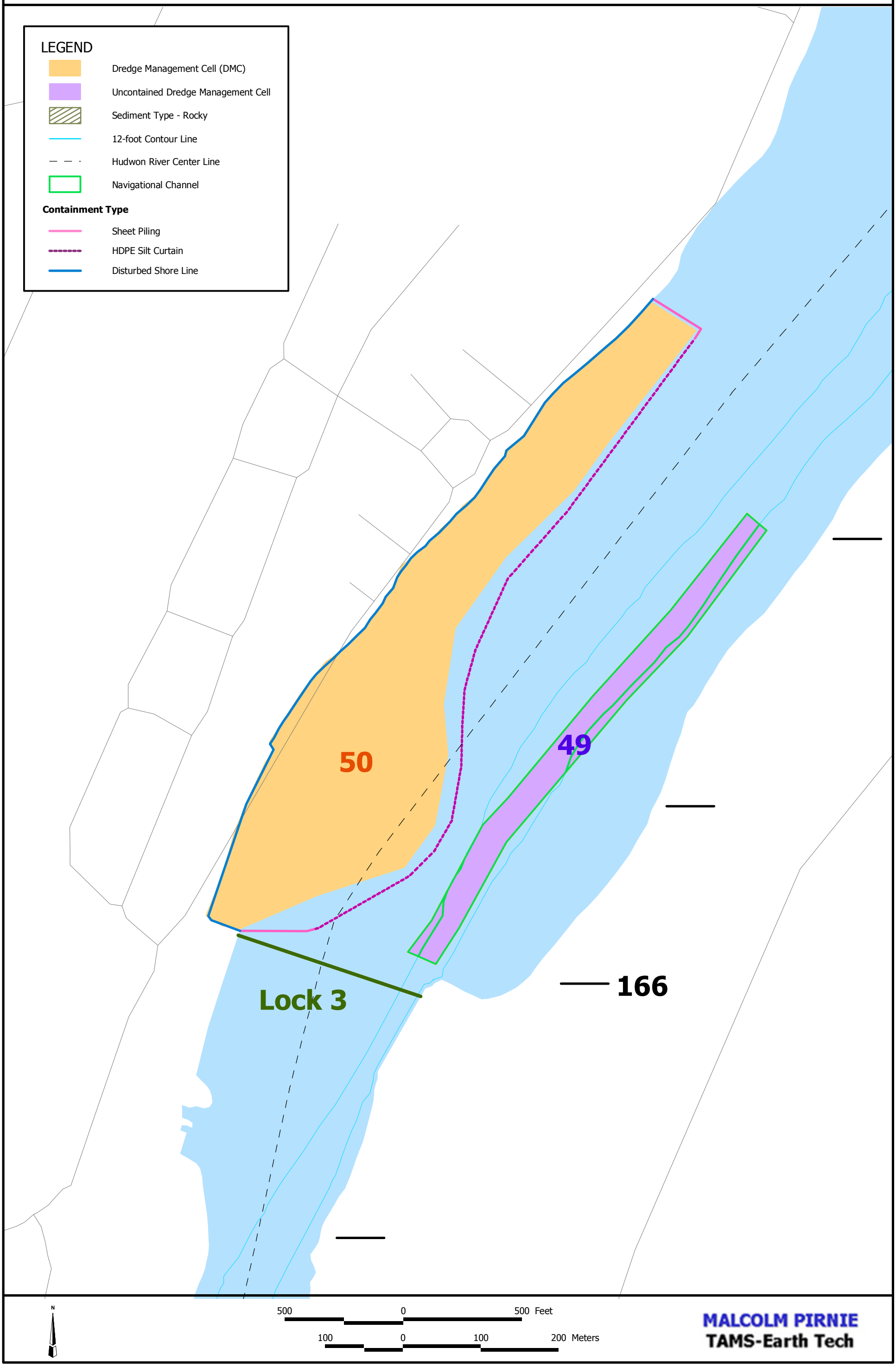
Containment Types - RM 169.25 - 170.25



Containment Types - RM 166.75 - 167.75



Containment Types - RM 165.75 - 166.75



Containment Types - RM 164.25 - 165.25

165

51

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

N

500 0 500 Feet

100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

Containment Types - RM 163.25 - 164.25

52

164

53

54

Lock 2

55

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

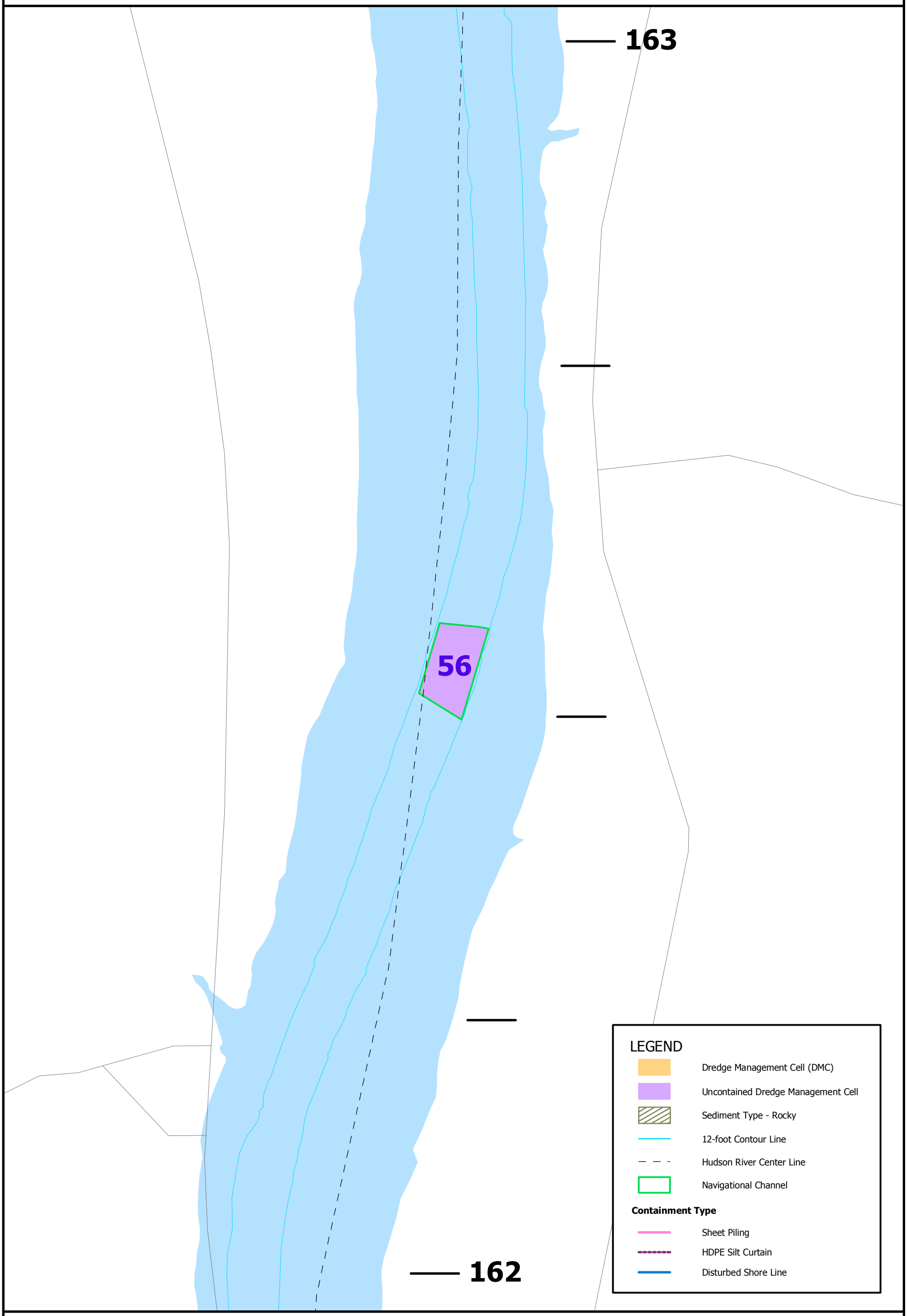
N

500 0 500 Feet

100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

Containment Types - RM 162 - 163



MALCOLM PIRNIE
TAMS-Earth Tech

Containment Types - RM 159 - 160

160

57

Lock 1

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

N

500 0 500 Feet

100 0 100 200 Meters

MALCOLM PIRNIE
TAMS-Earth Tech

Containment Types - RM 158.25 - 159.25