

Innovative Approaches for Assessing Post-Dredge Sediment Data and Residuals Management Decision Making on the Grasse River

Presented by

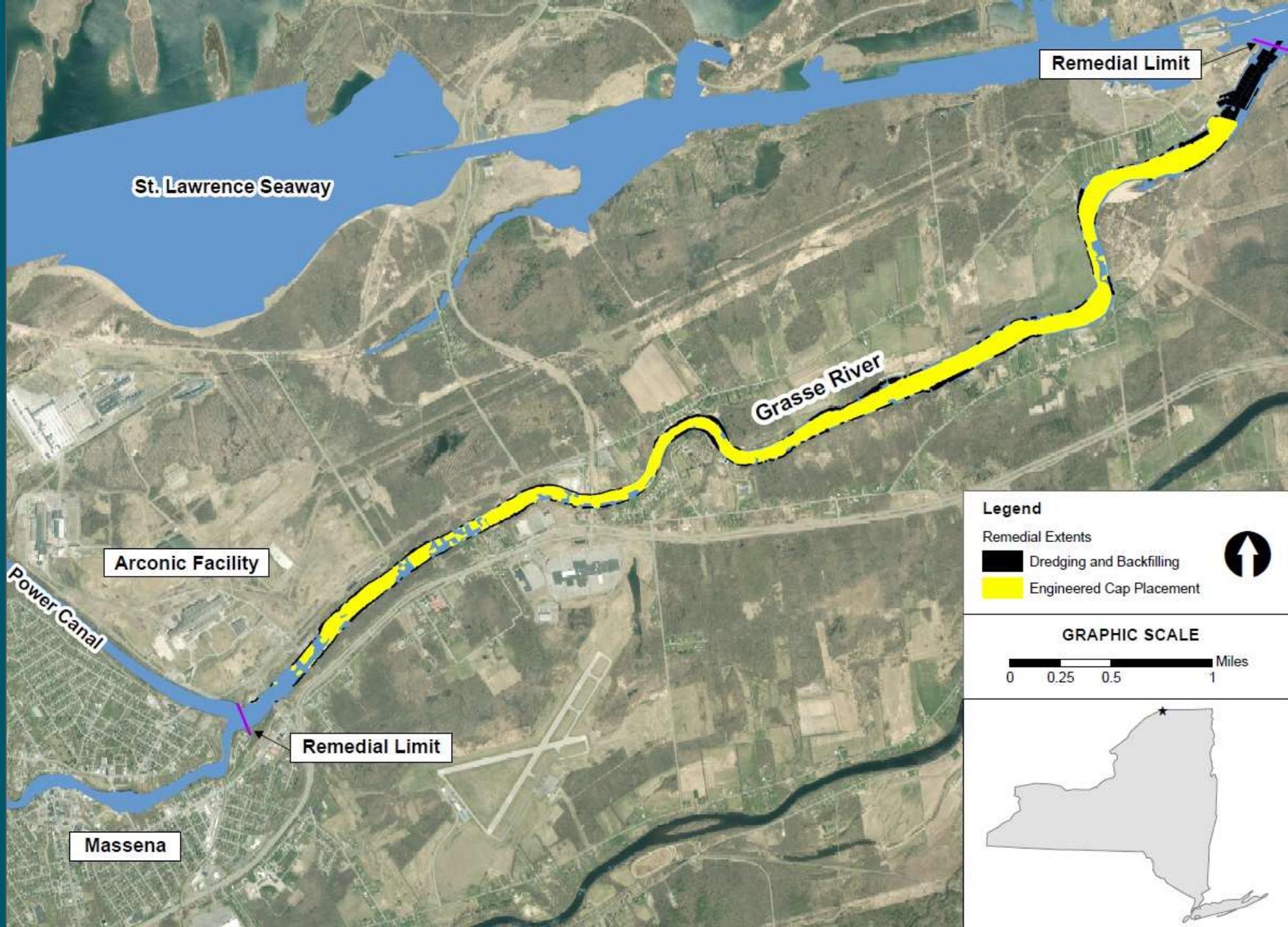
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Remediation Project Overview



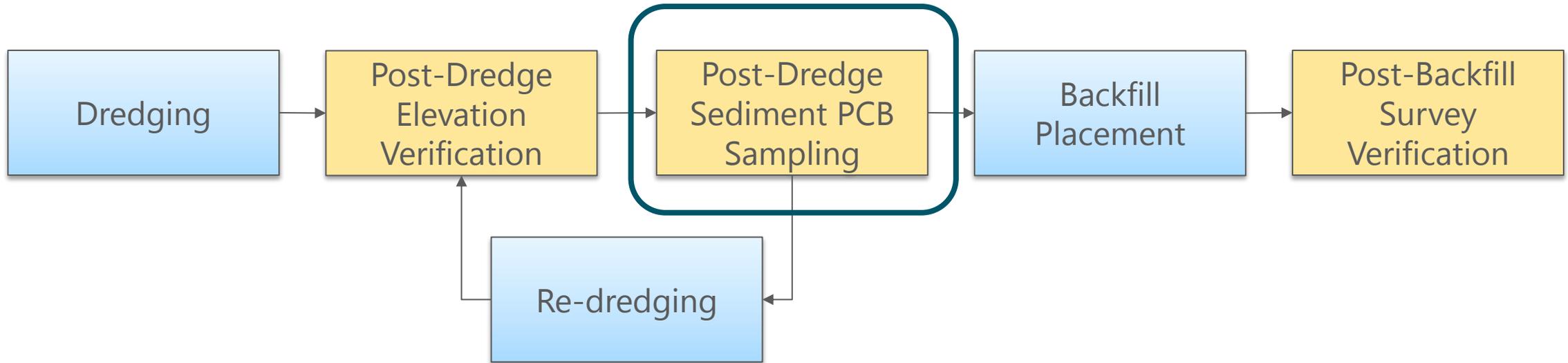
Project Challenges

- Demanding Construction Schedule
- Sediment Cleanup Objectives
- Quality Control
- Need for Expedited Agency Stakeholder Review



Dredge Verification Overview

- 77 Dredge Management Units (DMUs)



Example Survey Verification Figure

Post Dredge Target Locations

⊙ Post-Dredge Verification (V)

Average Elevation Difference Relative to Target Cutline (10x10 Grid - inches)

■ > 3" Above Target Elevation

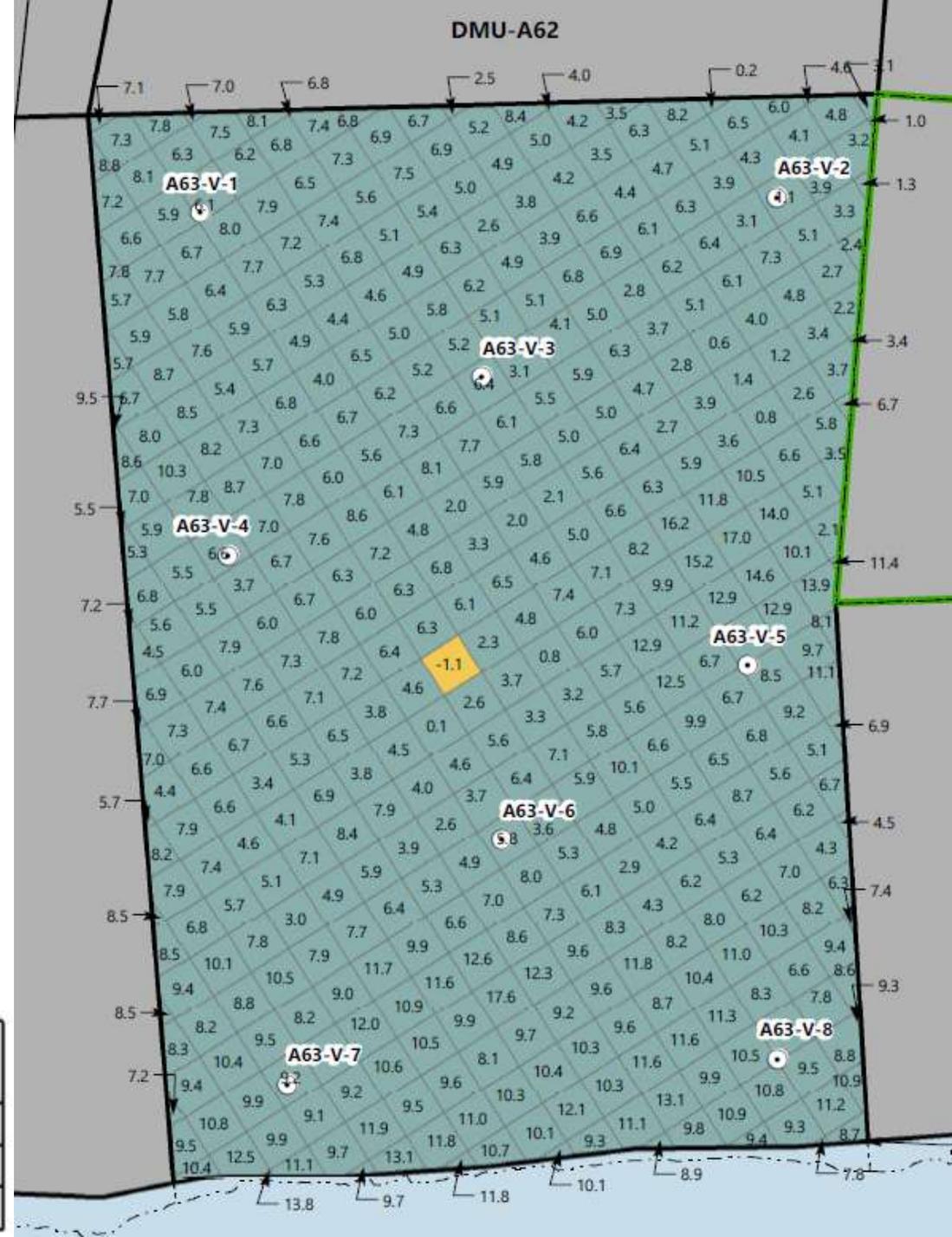
■ > 0 to 3" Above Target Elevation

■ At or Below Target Elevation

■ Excluded Cells (see Note 4)

Summary Statistics: DMU-A63

Post Dredge Elevation Relative to Target Cutline	Percent of Area (rounded)	Specification Requirement
> 3" Above Target Elevation	0 %	0 %
> 0 to 3" Above Target Elevation	0.3 %	<= 5 %
At or Below Target Elevation	99.7%	>= 95 %



Post-Dredge PCB Sampling Verification

- Sampling density: 8 cores/acre
- Re-dredging was required if the DMU average for a 6-inch interval exceeded the project cleanup criteria
 - Re-dredge prisms targeted the sampling locations causing the exceedance
 - Delineated using Thiessen polygons
 - Not required where the previous dredge pass encountered high subgrade (e.g., hard clay or rock)
- Once PCB levels were met, dredging for a given DMU was complete and backfill was placed



On-Site Laboratory

- Pace Analytical Services, LLC
- Dedicated staff
- Quality controls
- Results reported within 24 to 48 hours
- 2019 to 2021:
 - ~2,000 sediment samples
 - >500 locations

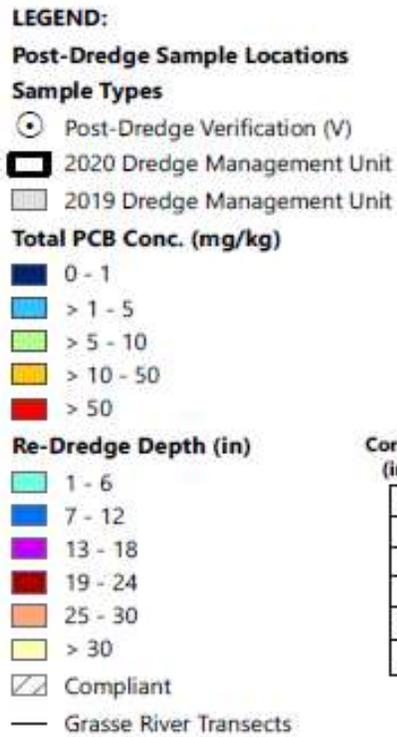


Innovations in Data Management

- Anchor QEA developed customized applications to enable automated data loading, quality review, and reporting
 - Field data: sample IDs, COCs, and field measurements
 - Lab data: analytical results, data validation, and data reporting
 - Significantly reduced data processing time and critical to ensuring high-quality data

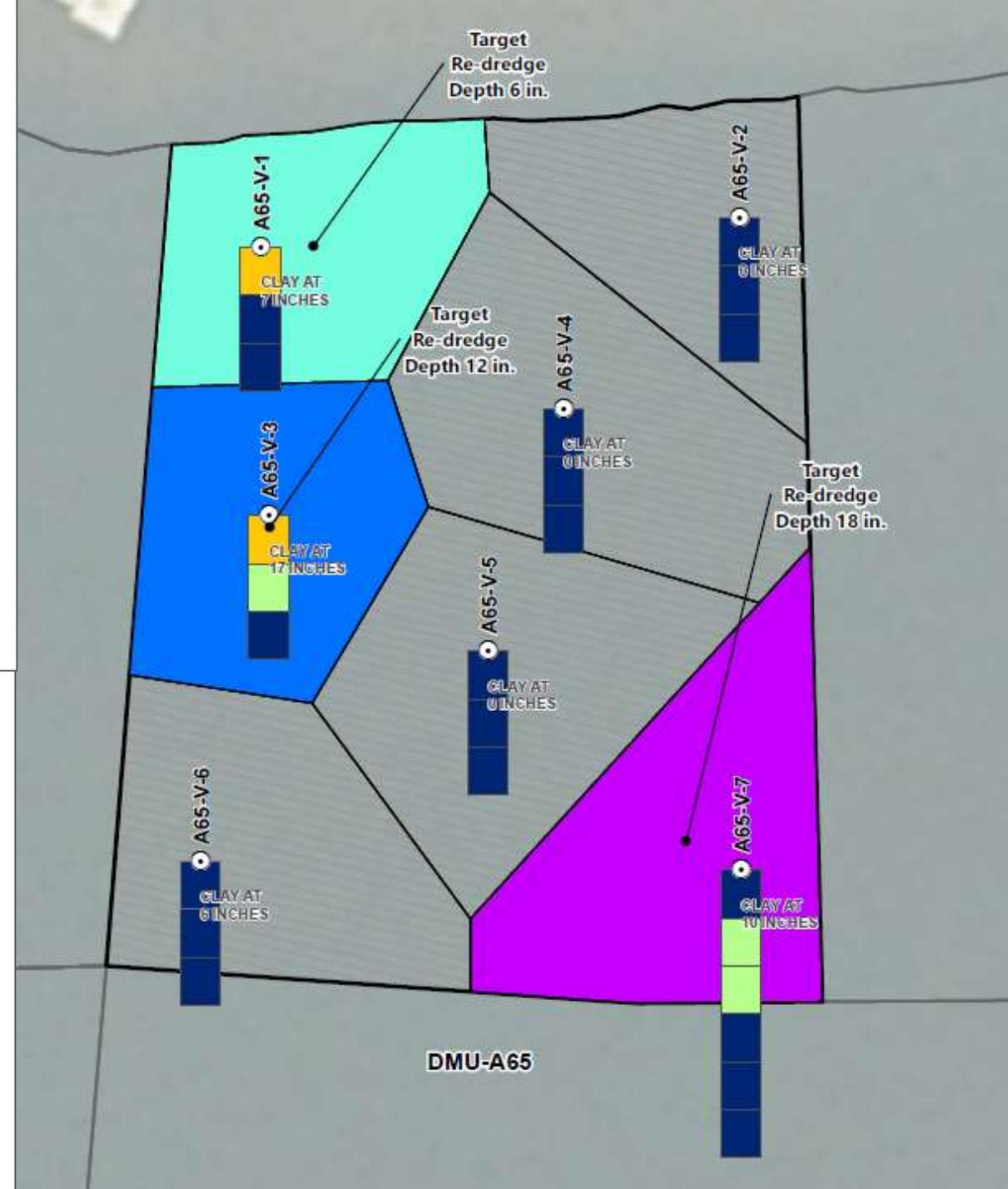


Example PCB Verification Figure



Verification Location Counts	
Sampled Locations	7
Abandoned Locations	0
Locations in Clay/Bedrock	0
Locations > 10 mg/kg at any depth	2
Total Compliant Locations	4
Backfill Locations	NA
Re-Dredge Locations	3

DMU Average Total PCB (mg/kg)	
0 - 6"	7.10
6 - 12"	1.99
12 - 18"	1.42
18 - 24"	ND
24 - 30"	ND
30 - 36"	ND
36 - 42"	NA
42 - 48"	NA



Example PCB Verification Summary Table

Core ID	Depth	TPCB (mg/kg)	Area (sqft)	TPCB x Area
A65-V-1	0-6"	22	4521	99455
A65-V-2		0.7	4016	2811
A65-V-3		32	4687	149990
A65-V-4		0.04	6167	259
A65-V-5		0.04	5858	240
A65-V-6		0.8	5161	4128
A65-V-7		0.07	5809	378
Total			36,218	257261
DMU Average (0-6") (mg/kg)				7.10

Core ID	Depth	TPCB (mg/kg)	Area (sqft)	TPCB x Area
A65-V-1	12-18"	0.04	4,521	190
A65-V-2		0.04	4,016	169
A65-V-3		0.30	4,687	1406
A65-V-4		0.04	6,167	259
A65-V-5		0.04	5,858	234
A65-V-6		0.04	5,161	206
A65-V-7		8.4	5,809	48796
Total			36,218	51261
DMU Average (12-18") (mg/kg)				1.42

Core ID	Depth	TPCB (mg/kg)	Area (sqft)	TPCB x Area
A65-V-1	6-12"	0.04	4,521	190
A65-V-2		0.04	4,016	173
A65-V-3		7.1	4,687	33279
A65-V-4		0.04	6,167	253
A65-V-5		0.04	5,858	240
A65-V-6		0.04	5,161	212
A65-V-7		6.5	5,809	37759
Total			36,218	72105
DMU Average (6-12") (mg/kg)				1.99

Core ID	Depth	TPCB (mg/kg)	Area (sqft)	TPCB x Area
A65-V-1	18-24"	0.00	4,521	0
A65-V-2		0.00	4,016	0
A65-V-3		0.00	4,687	0
A65-V-4		0.00	6,167	0
A65-V-5		0.00	5,858	0
A65-V-6		0.00	5,161	0
A65-V-7		0.04	5,809	238
Total			36,218	238
DMU Average (18-24") (mg/kg)				0.01

Certification Packages

- Developed for each DMU
- Summarized survey and PCB verification data for each dredge pass
- Documented compliance with project requirements
- Standardize packages supported efficient reviews
- Similar tools, automated processing, and certification packages developed for cap and backfill verification



Dredging Completion

- DMUs approved after:
 - First dredge pass: 26 (11.7 acres)
 - Two dredge passes: 40 (26.7 acres)
 - Three dredge passes: 11 (9.6 acres)
- 139 individual rounds of PCB verification evaluations
 - GIS/Python processing: ~5 minutes or less
 - Automated tools also developed for survey processing
 - Significant reduction in processing time
 - Consistent and high-quality verification packages



Keys to Success

- An aggressive schedule was successfully maintained throughout construction
 - ~220,000 cy was dredged at an average rate of 740 cy per day
 - Engineered cap placement: 258 acres
- Successful execution was achieved through early planning and focused coordination between the project team and laboratories
- Customized tools to automate data loading, quality controls, and reporting were critical in the generation of consistent high-quality deliverables, allowing for near real-time residuals management decisions
- Close coordination with the agency team throughout the design and construction was critical in establishing guidelines and achieving efficient decision making



Questions?



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