



Esquimalt Graving Dock: Challenges of Phase 1B Remediation and Construction Update Vancouver Island, BC

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Public Works and
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Presentation Overview

- Site description and background
- Contaminants of concern
- Project phases of work
- Phase 1B remediation approach challenges
- Phase 1B construction update
- Summary

Site Description and Background

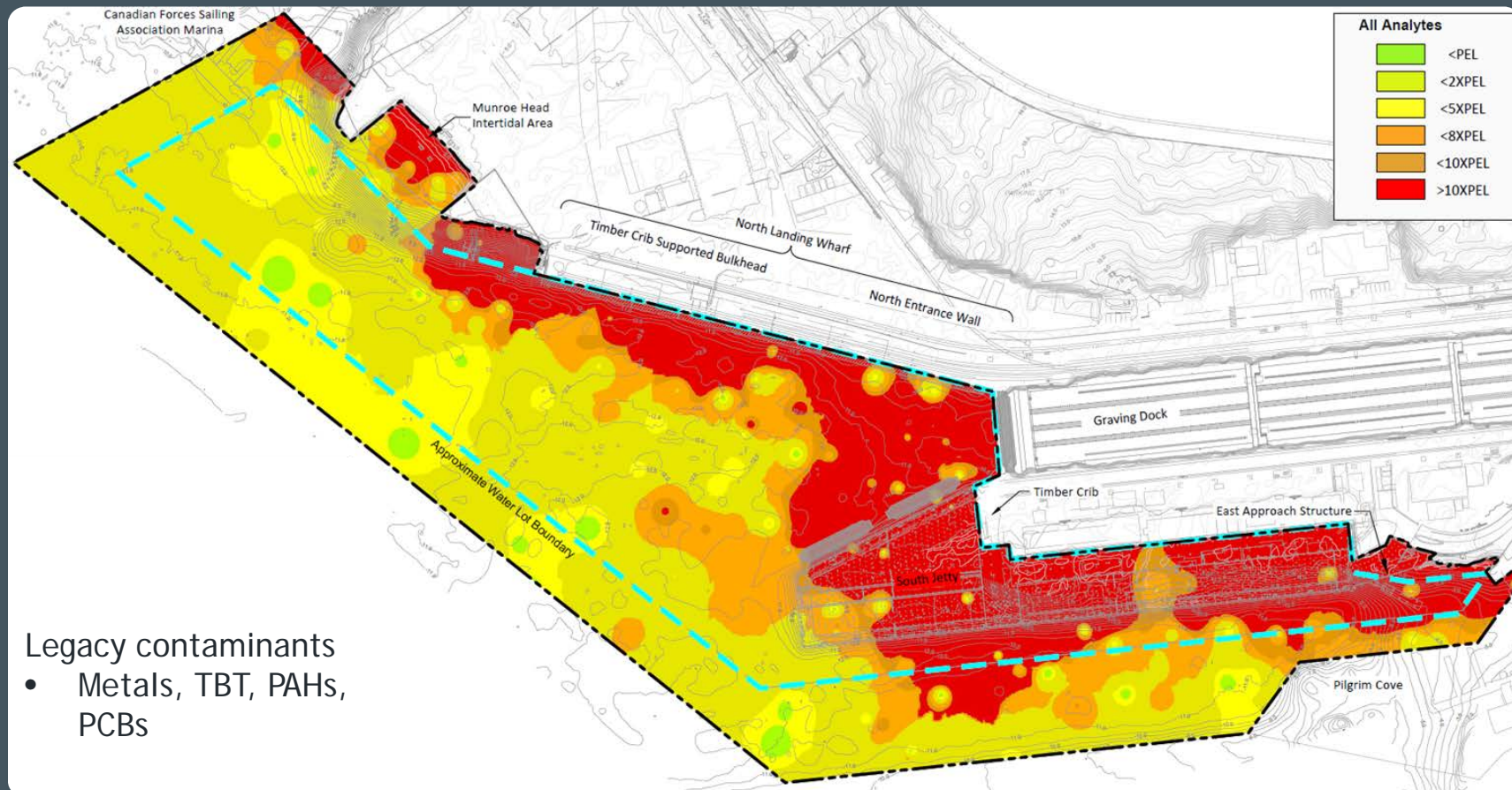


Site Description and Background

- Federal government-operated multi-user ship repair and maintenance facility
- EGD established in 1927; historic contamination since 1850s
- Contamination throughout EGD Waterlot including South Jetty
- South Jetty requires replacement; timeline undetermined



Contaminants of Concern



Project Phases of Work

- Phase 1 remediation
 - South Jetty sheetpile wall installation
 - Open water dredging including buffer areas
 - Shoreline stabilization
 - Habitat compensation
- Phase 2 remediation
 - South Jetty underpier remediation
 - South Jetty replacement to be integrated under separate capital funding

Project Phases of Work



LEGEND:

Remediation Area

Waterlot Boundary

Phase 1 Remediation Area

Phase 2 Remediation Area



SOURCE: Google 2011.

Phase 1A – South Jetty Sheetpile Wall

- Sheetpile wall isolates underpier contamination for future Phase 2 remediation
- Constructed November 2012 to April 2013



Phase 1B – Open-water Dredging

- Dredging and disposal
 - 150,000 m³
- In-water slope armoring
 - 25,000 m³
- Residuals management cover placement
 - 45,000 m³
- Structure demolition/
temporary relocations
- Construction June 2013 to March 2014



Phases 1C and 2

- Phase 1C – Habitat Compensation
 - Offsets impacts of alteration and isolation of underpier habitat
 - Off-site location within Esquimalt Harbour
 - Construction underway
- Phase 2 – Underpier Remediation
 - 40,000 m³ of contaminated sediment removal
 - Conducted in parallel with jetty reconstruction in next 10 years

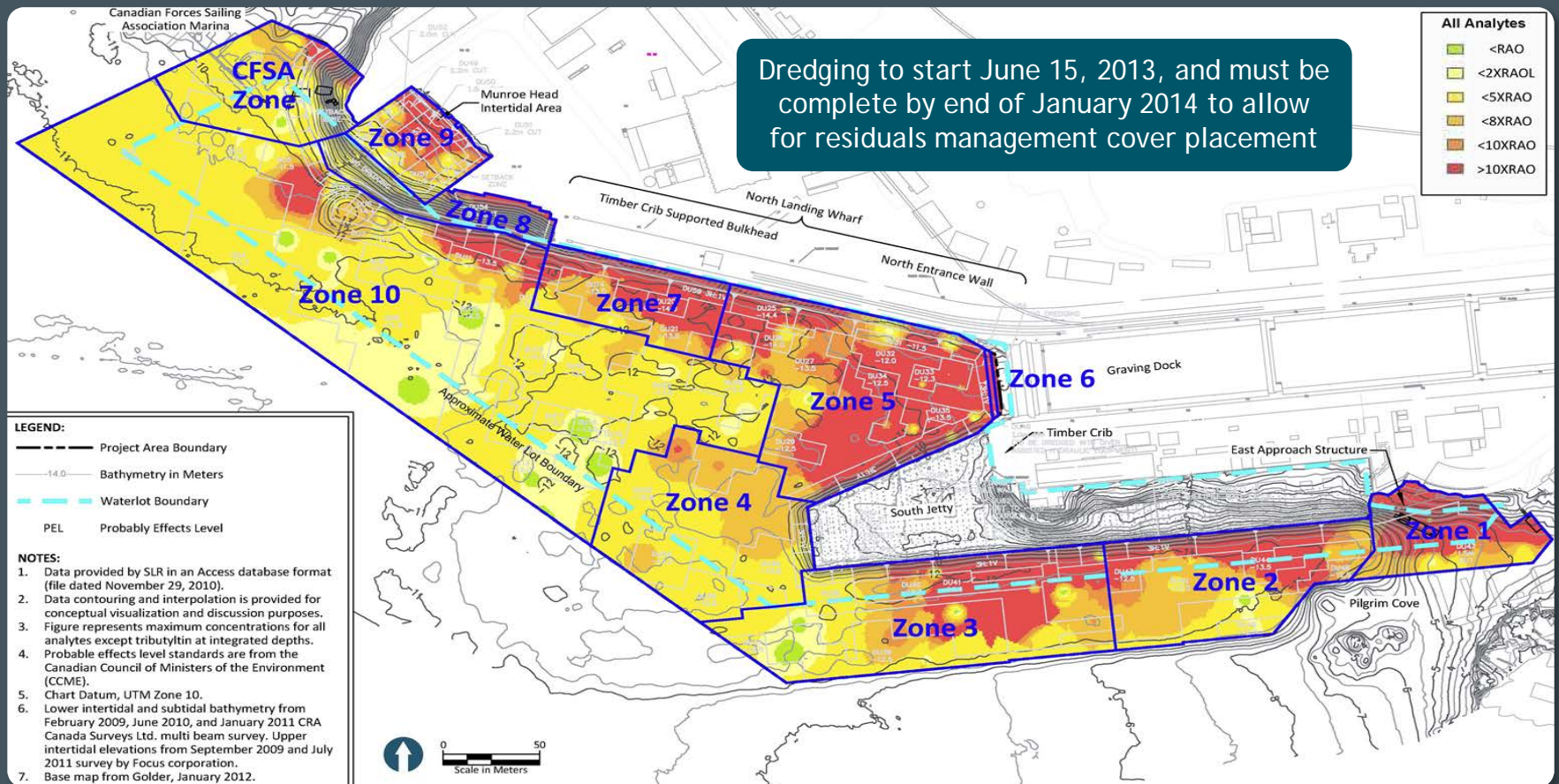
Phase 1B Remediation Approach Challenges

- Implementation of remediation work at an active shipyard facility
 - Remediation completed around operational needs
- Work sequencing plan
- Adaptive management of design
- Risk management approach

Phase 1B Remediation Approach Challenges

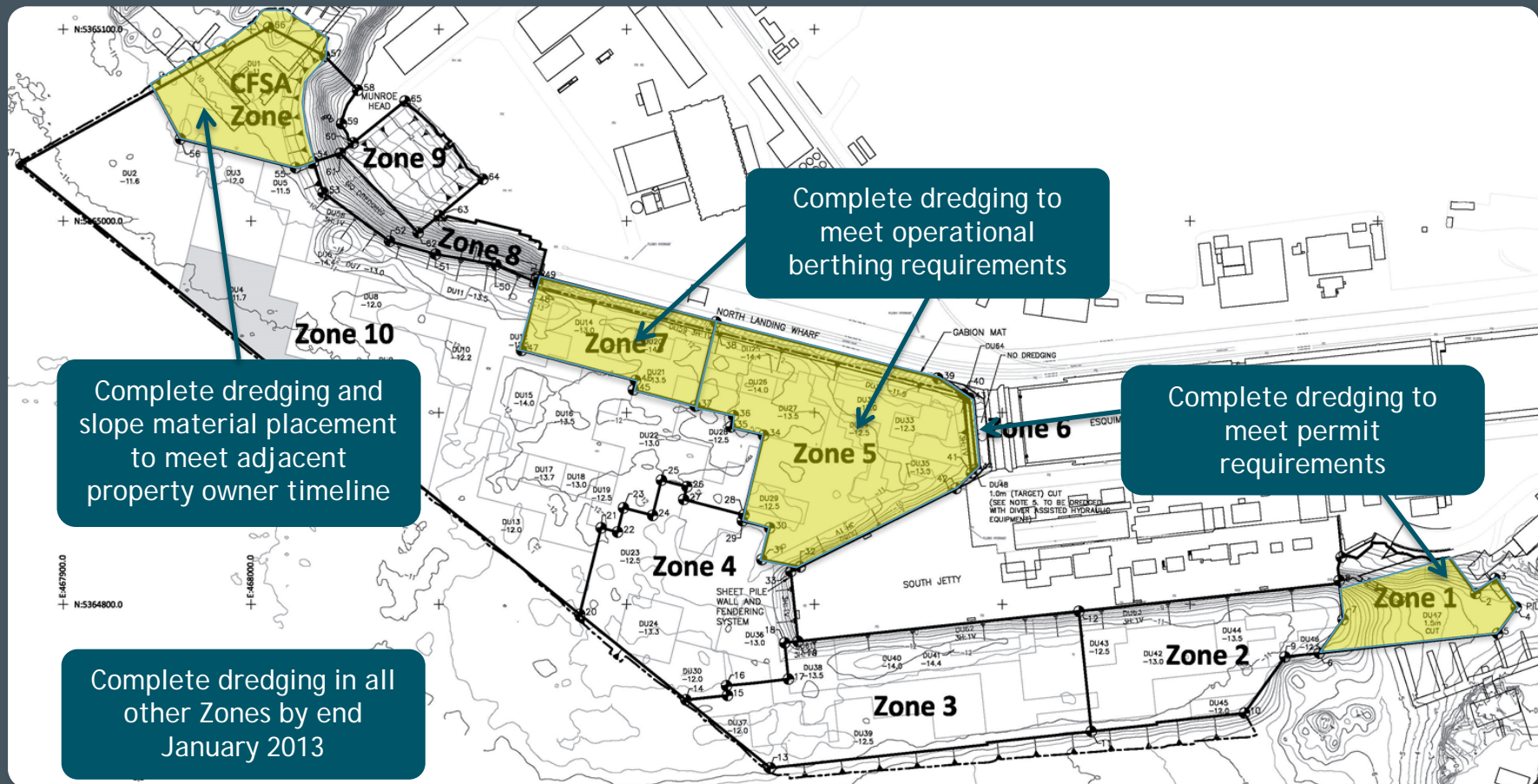
- Site zones and sequencing plan
- Continuous on-site construction oversight
 - Adaptive management for unforeseen changes
- Contingency re-dredging and residuals management strategy
- Risk management plan in design and during construction
 - Development and evolution of contingency budgets as construction is completed

Phase 1B Remediation Approach Challenges (Sequencing)



Initial design approach (through 99%)

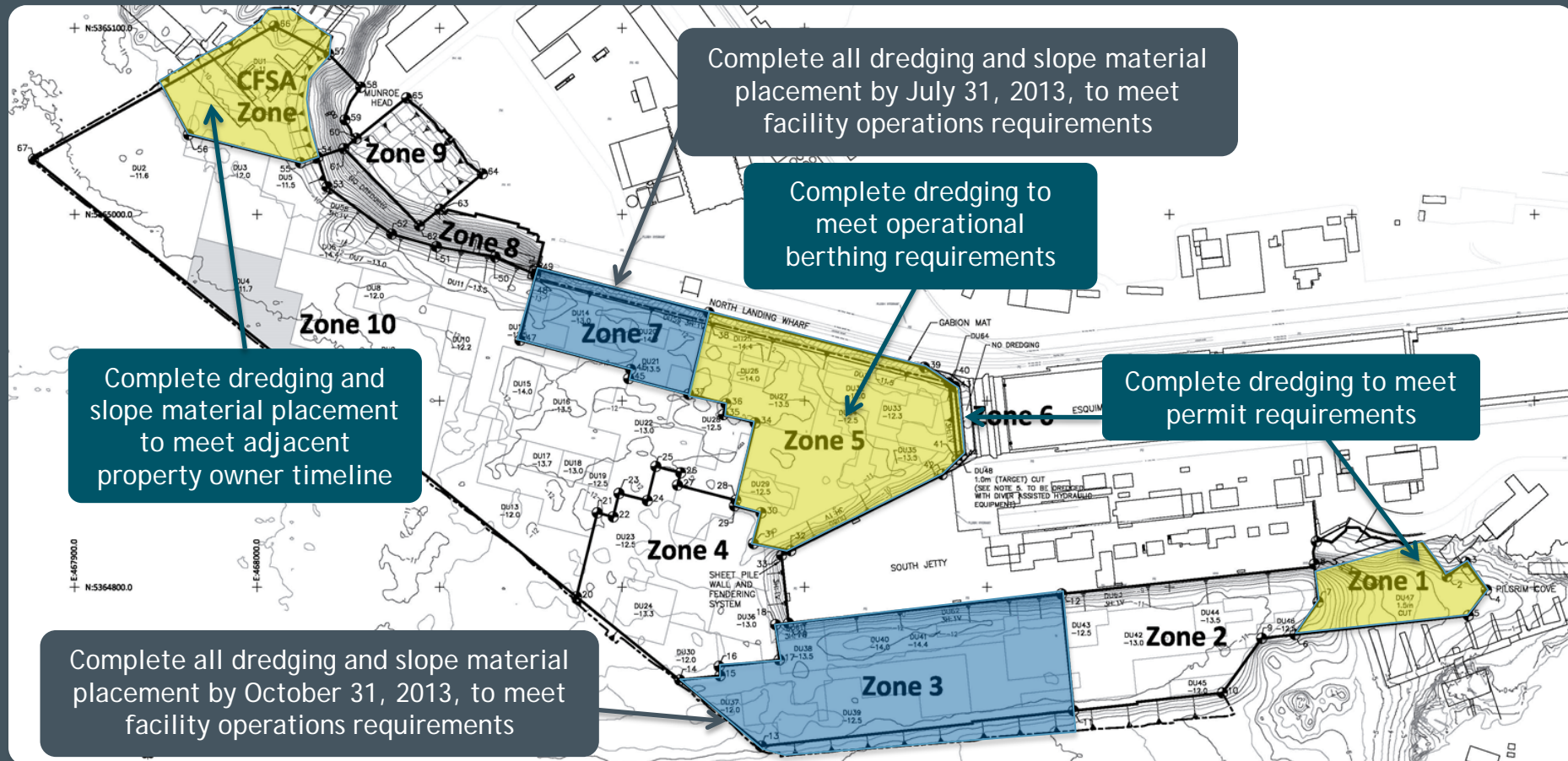
Phase 1B Remediation Approach Challenges (Sequencing)



Complete dredging in Zones 1, 5, 7, 6, and CFSA by October 1, 2013 (100%)

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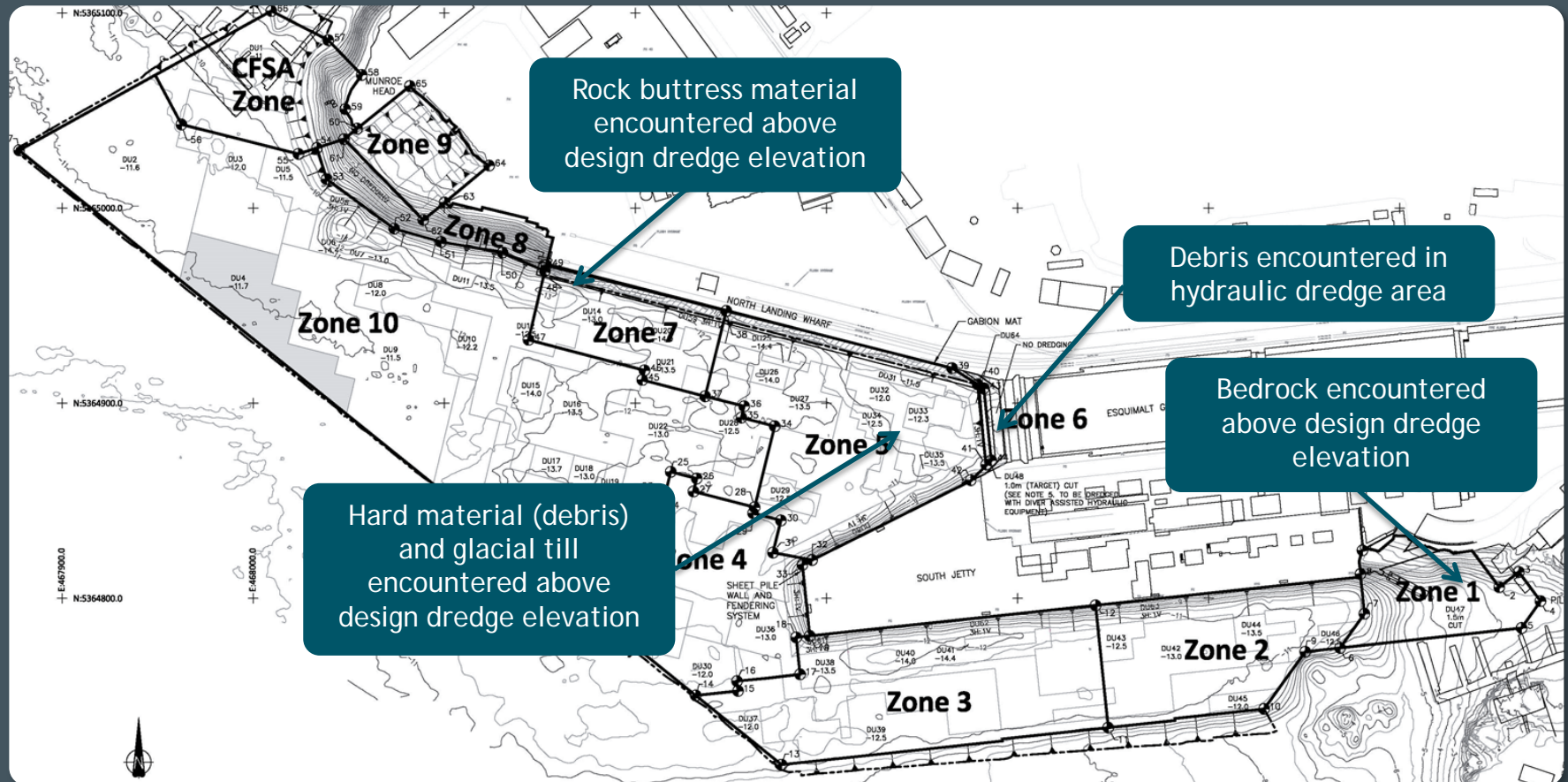
Phase 1B Remediation Approach Challenges (Adaptive Management)



Adaptive management due to operational needs following start of work

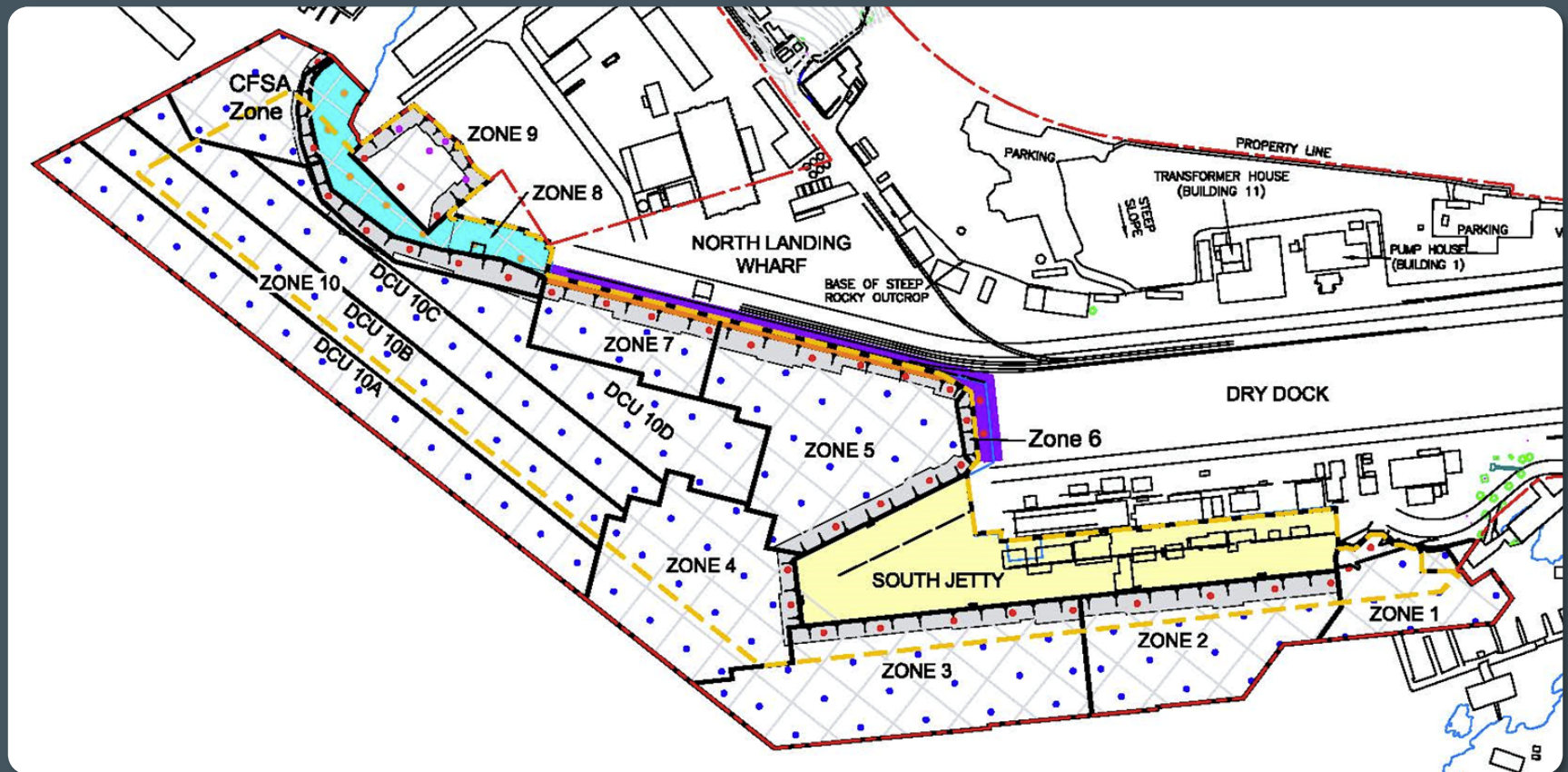
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Phase 1B Remediation Approach Challenges (Adaptive Management)



Adaptive management due to unforeseen conditions following start of work

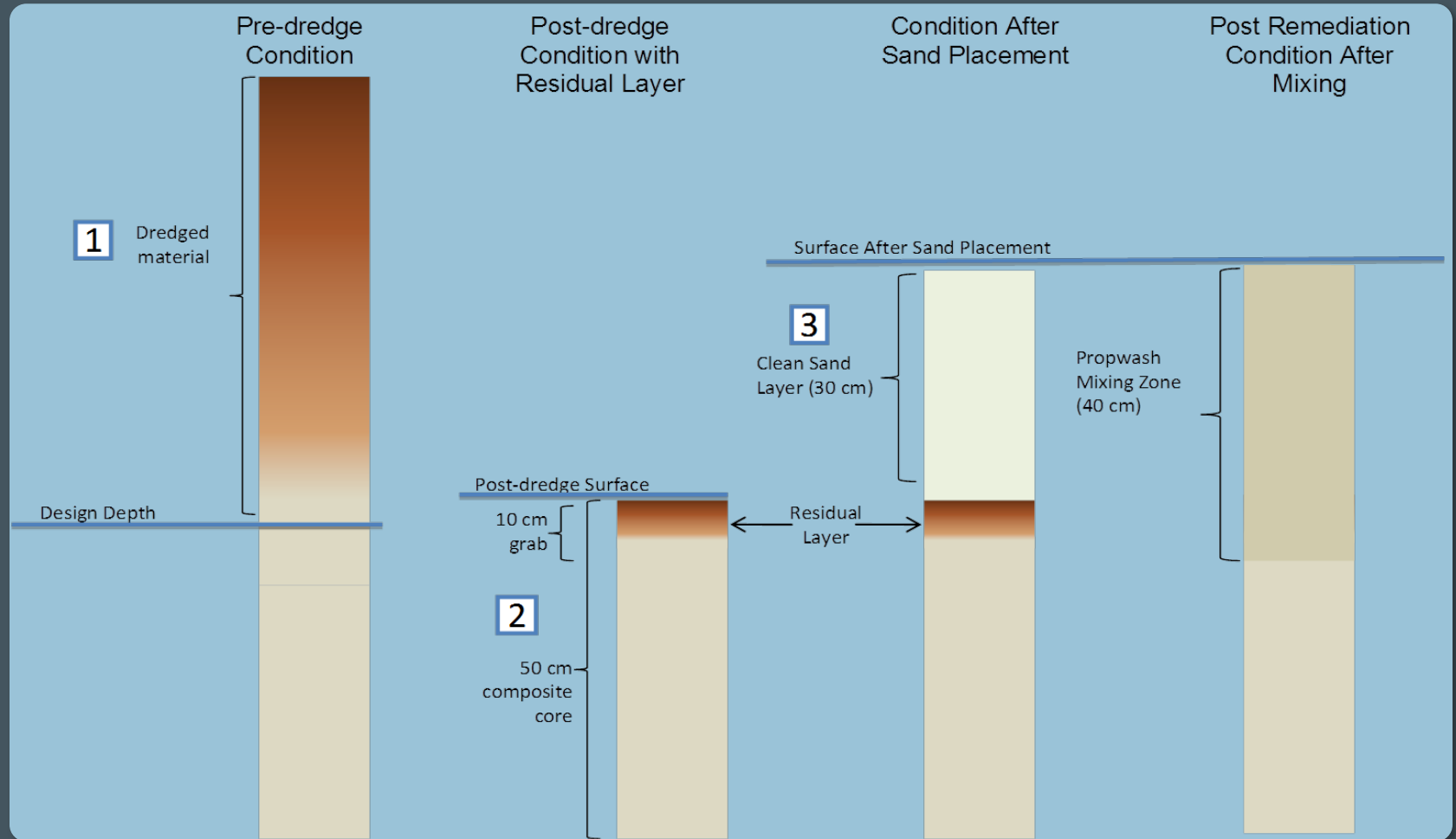
Phase 1B Remediation Approach Challenges (Re-Dredge and Residuals)



Re-dredge and residuals management - confirmational sampling approach

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Phase 1B Remediation Approach Challenges (Re-Dredge and Residuals)



Phase 1B Remediation Approach Challenges (Re-Dredge and Residuals)

- Assume 10% required dredge volume for contingency re-dredge
- Assume to place residuals management cover material throughout site
- Re-dredging required in 4 of 6 zones completed at the site to date
- Approximately 75% of zone areas completed to date will require residuals management cover material placement

Phase 1B Remediation Approach Challenges (Risk Management)

- Evaluate all potential project risks and assign contingency dollars during design
 - Approximately \$10M reserved at start of construction
- Evaluate risk on a monthly basis during project implementation
- Assign risk reduction where appropriate
- EGD Phase 1B project has reduced contingency budget by 50% since start of construction

Phase 1B Construction Status

- Construction activities initiated in June 2013
 - Dredged approximately 65,000 cubic metres contaminated sediment and debris
 - Placed approximately 15,000 cubic metres slope armour material

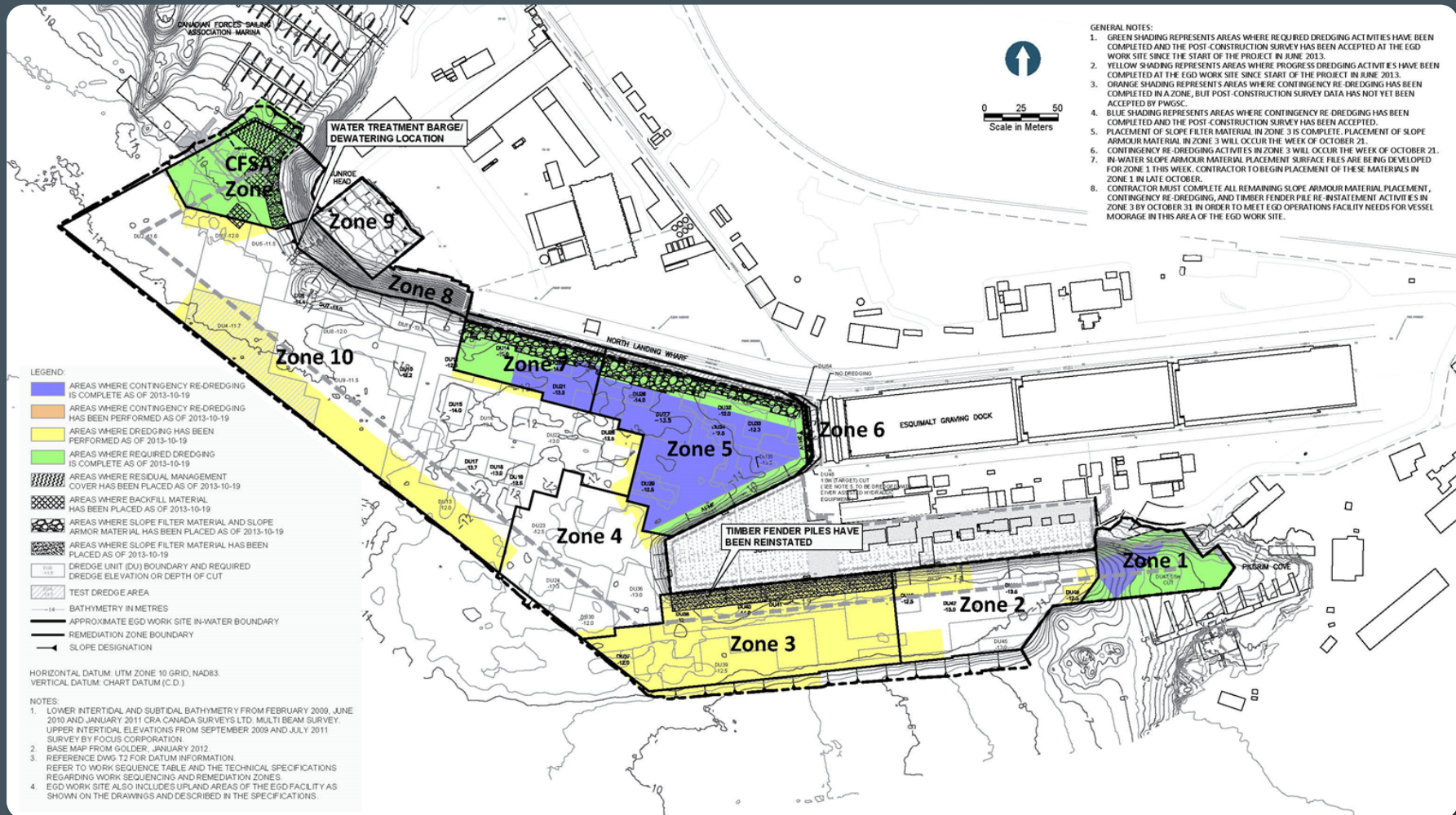


Phase 1B Construction Status

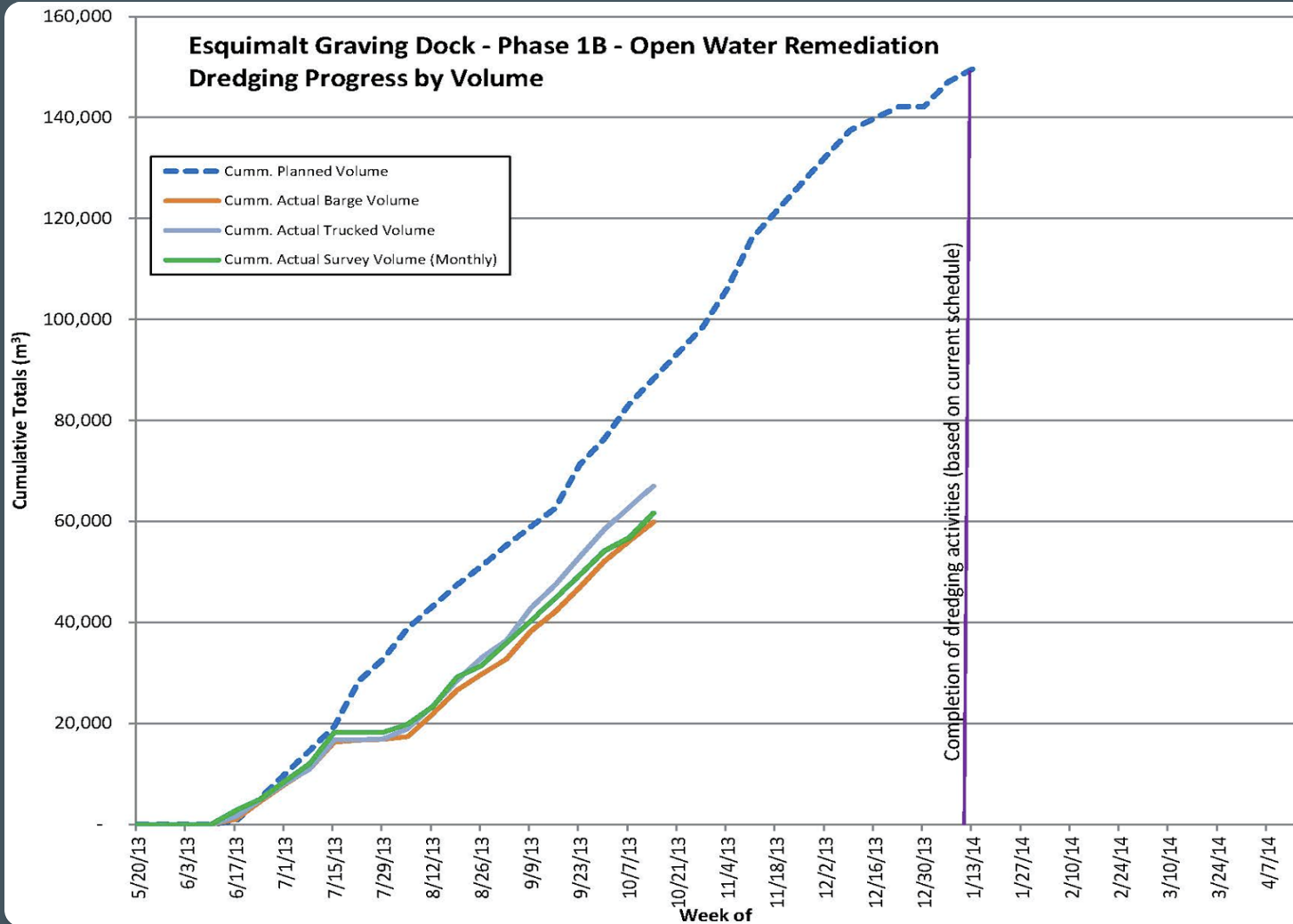
- Offloaded approximately 120,000 tons of material for upland disposal



Phase 1B Construction Status



Phase 1B Construction Status



Summary

- Remediation activities typically dictated by operational requirements
- Develop work sequencing approach in design that meets operational needs
- Allow for adaptive management of the project during construction
- Plan appropriately for risk management and consider risk reduction as project elements are completed

Questions?



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