Remediation of Sediment Sites in Washington and British Columbia – Lessons Learned

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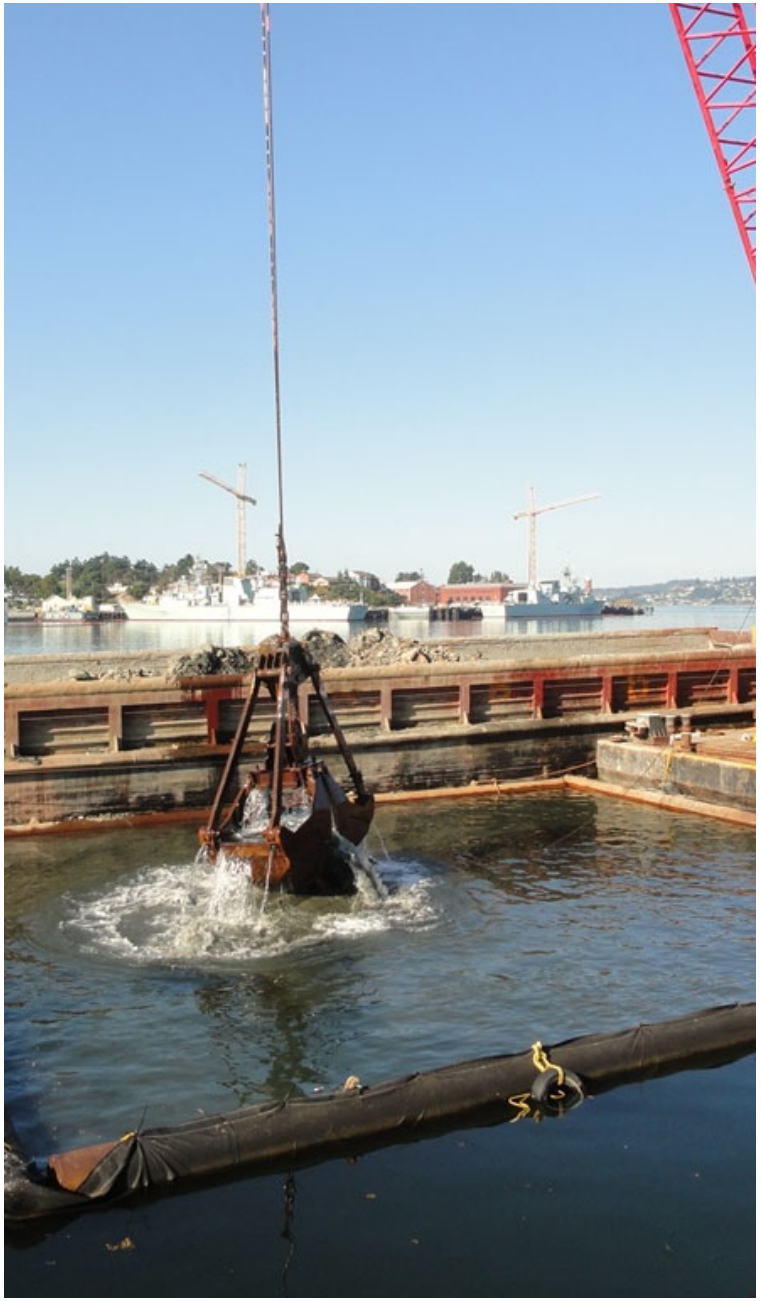
Overview

- Sediment remediation project challenges
  - Site specific, but also common
- Design defines implementation requirements
- How can implementation inform future design?
- Adaptive measures to increase cost and schedule efficiencies

Overview

- Design challenges
- Implementation challenges
- Adaptive management
- Case studies
  - Port Gamble, Washington
  - Esquimalt Harbour, British Columbia



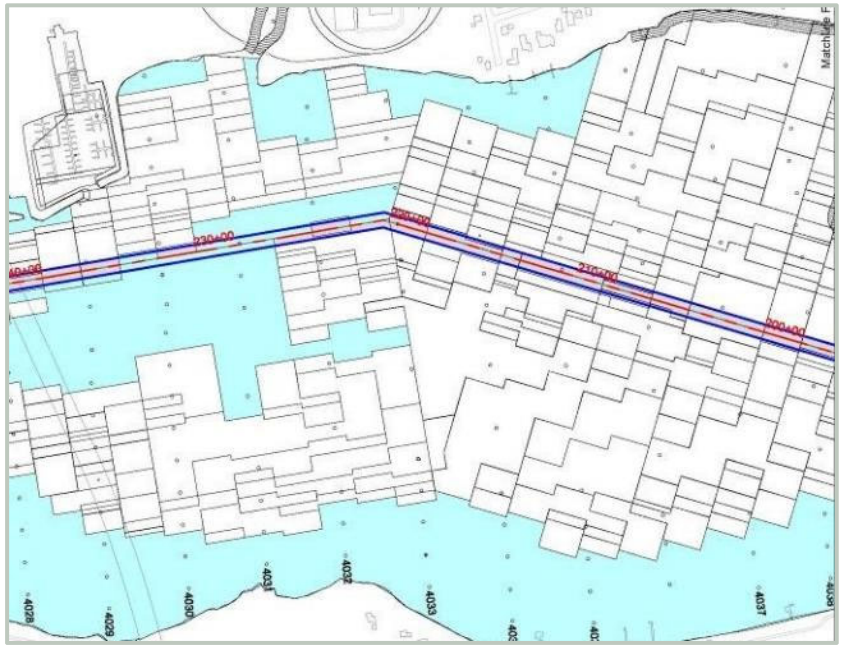
Design Challenges

- How much data is necessary?
- Data accuracy
- Natural site conditions vs. altered use

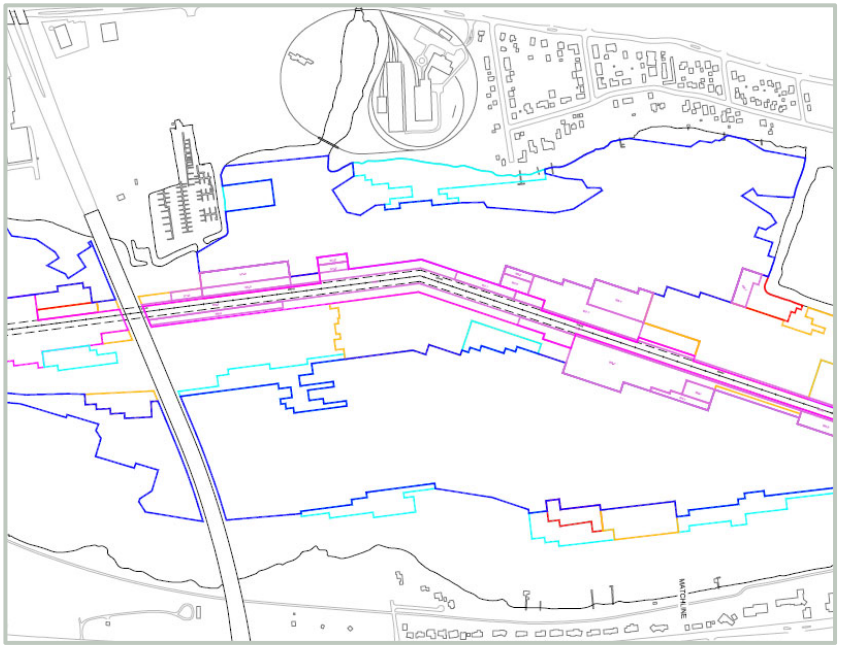
Design Challenges

- Dredge prism delineation
- Desired level of confidence
- Specificity vs. adaptive management

Engineered Dredge Prism Design



Neatline Dredge Design

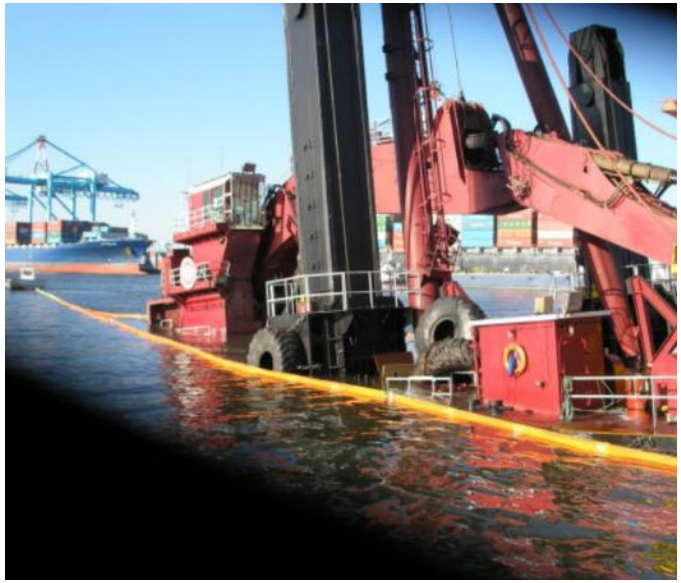


Implementation Challenges

- Unforeseen conditions
- Differing site conditions
- Re-design requirements
- Cost negotiations

Implementation Challenges

- Force majeure
- Changed conditions
- Contract document inconsistencies
- Contractor direction for completion of work
- Unknown acceptance of risk
- Others



Adaptive Management

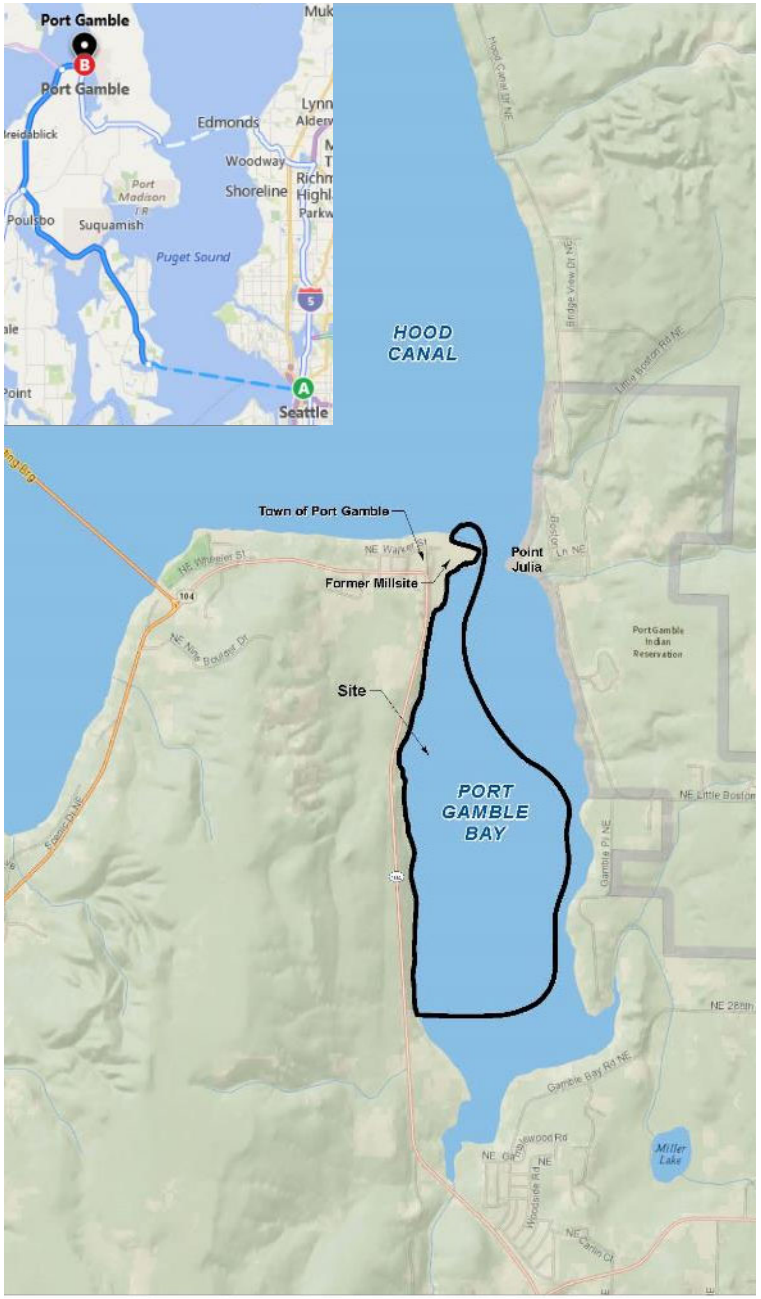
- Build flexibility into design
- Quantify/share risk appropriately
- Maintain contractor relationship
- Understand project limitations

Case Study – Port Gamble

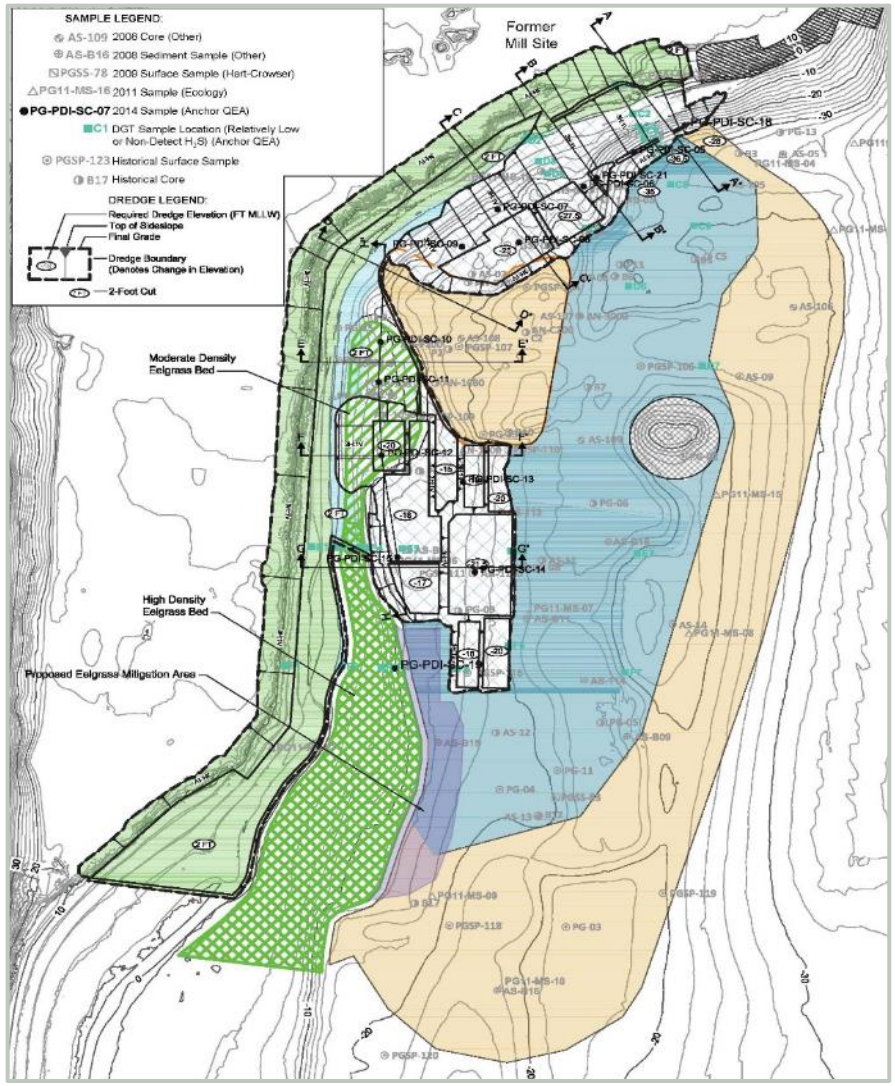
- Washington State Department of Ecology remediation site
- Former industrial mill
- Mill operations altered natural sediment conditions
- Two-season construction project

Case Study – Port Gamble

- Structure demolition
- Wood waste/timber piling removal
- Engineered sediment cap construction

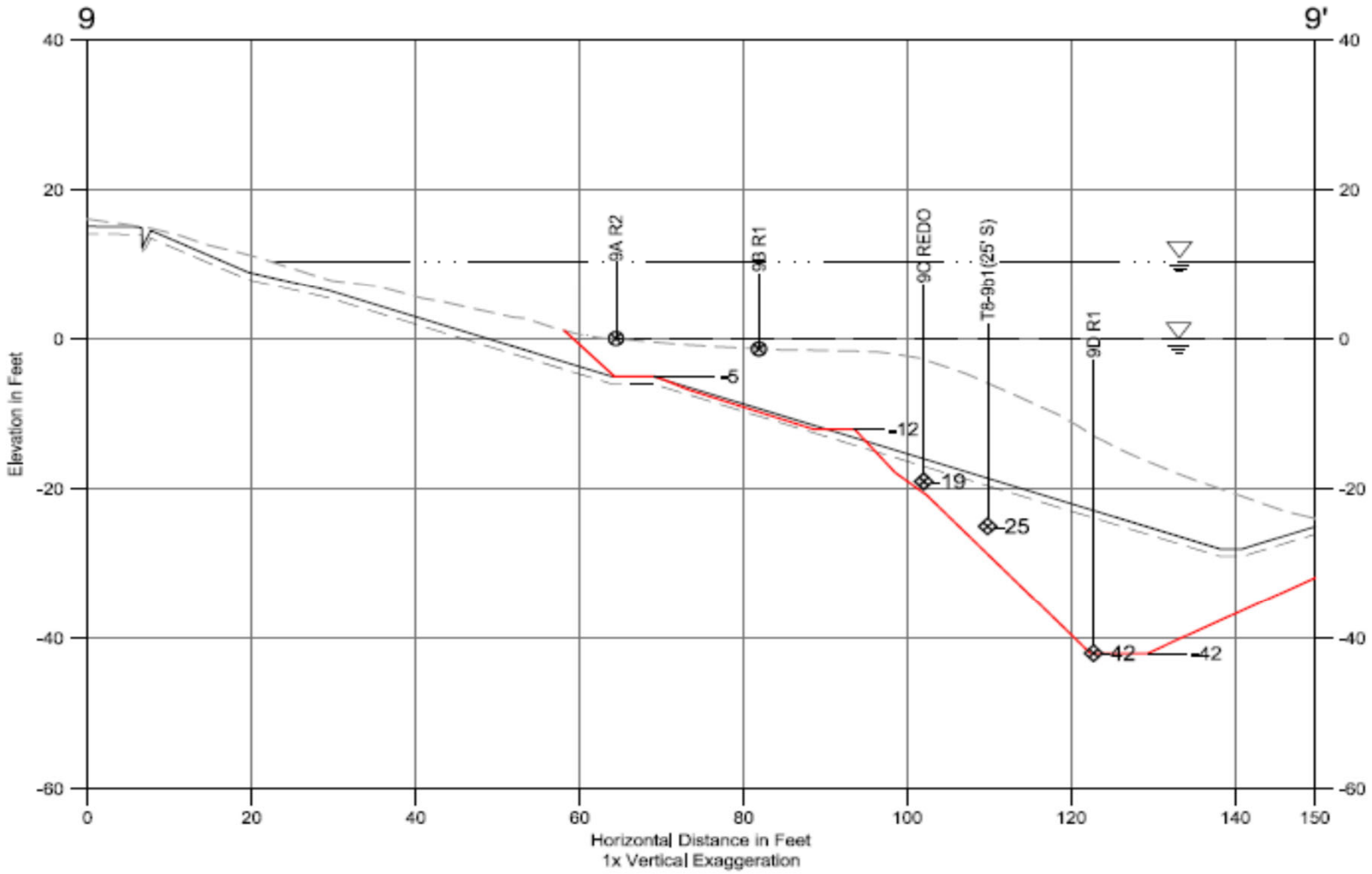


Case Study – Port Gamble



- Significant dataset to inform dredge prism design
- Cores to delineate nearshore wood waste
- Nearshore waste removal objective

Case Study – Port Gamble



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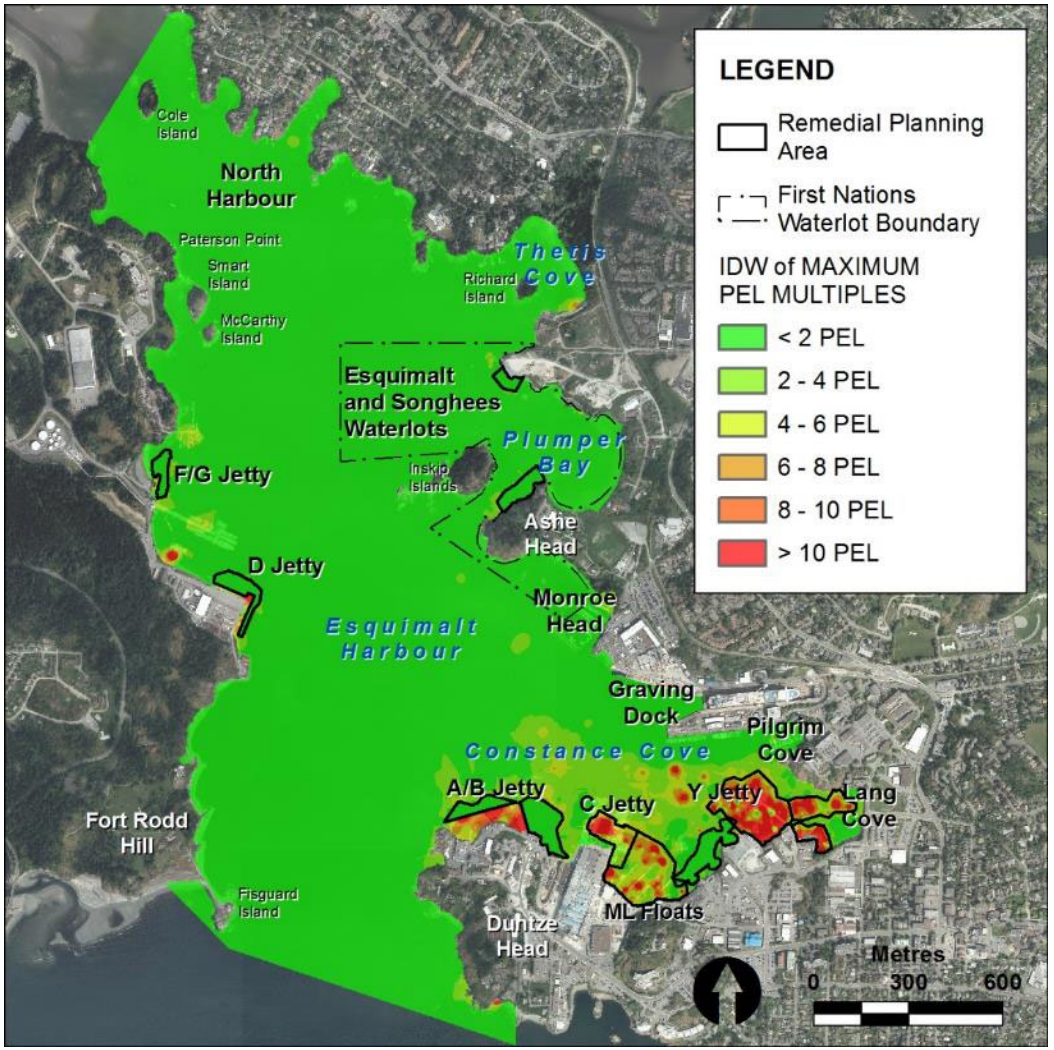
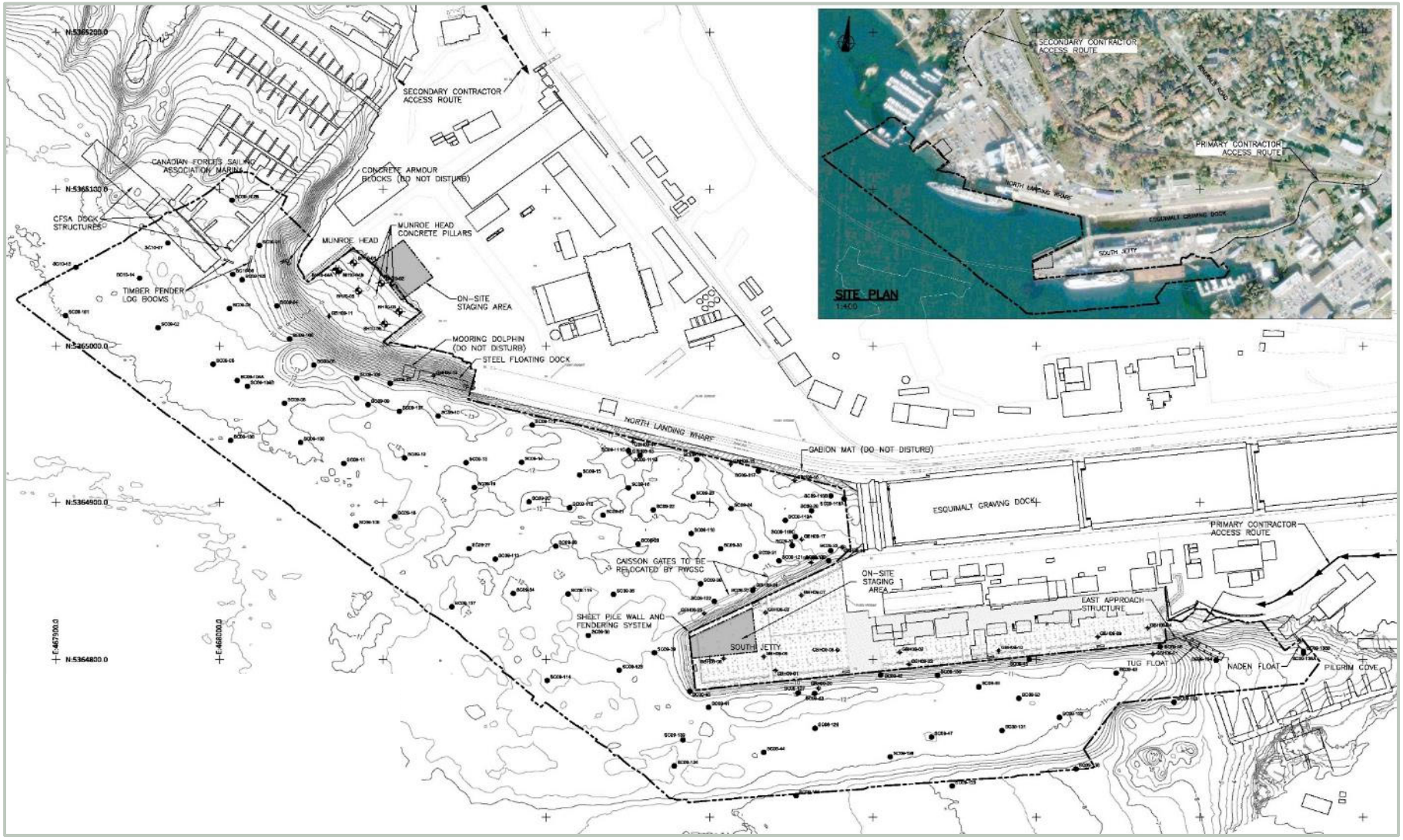
Case Study – Esquimalt Harbour

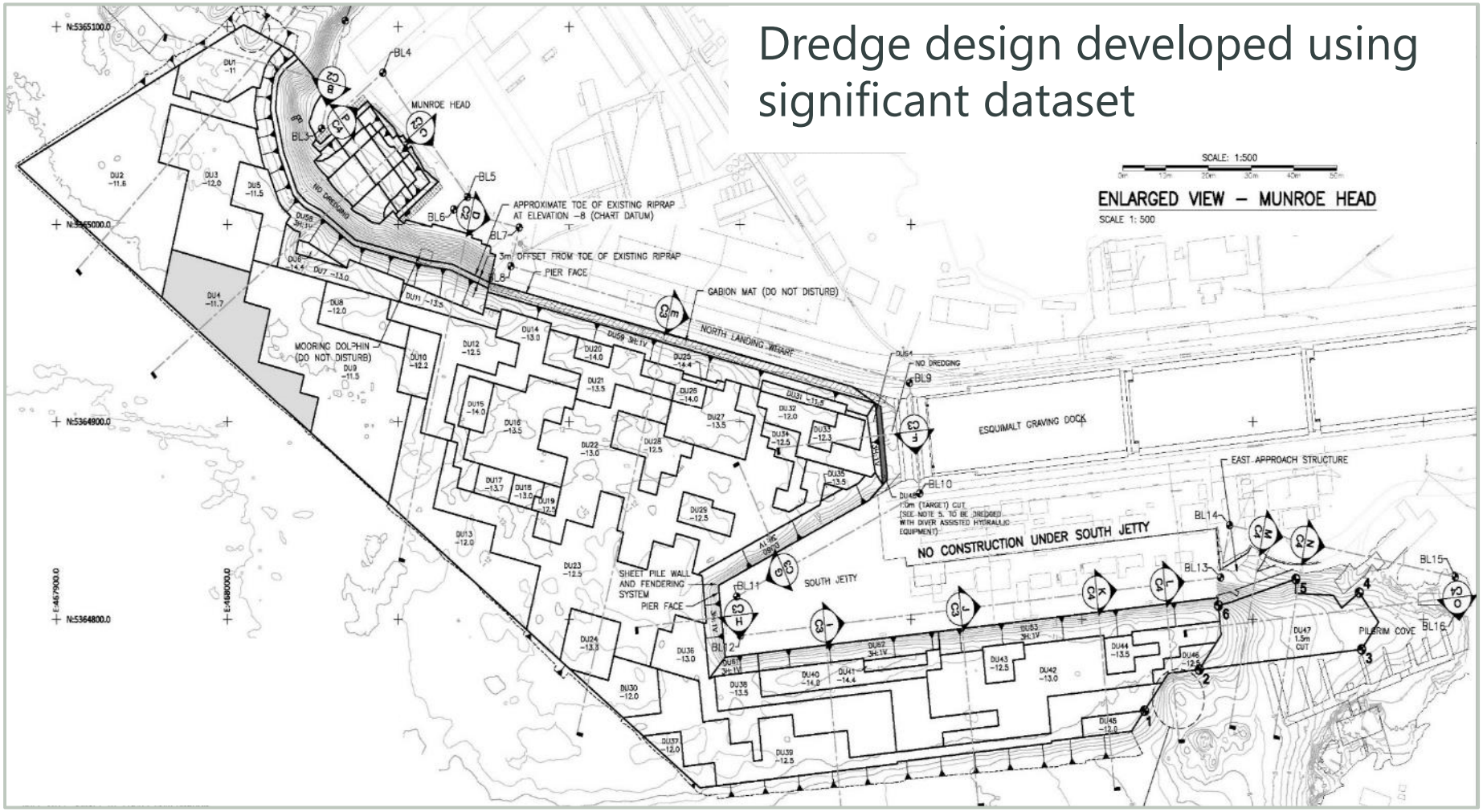
- Vancouver Island, British Columbia
- Canadian Navy and ship repair facilities
- Multiple remediation sites within harbour
- Contaminated sediment removal objective



Case Study – Esquimalt Harbour



Case Study – Esquimalt Harbour



Case Study – Esquimalt Harbour

Case Study – Esquimalt Harbour

- Adaptive management for water quality requirements

Lessons Learned

- Understand project complexity and remediation objectives
- Quantify project risk and define risk tolerance
- Consider common construction lessons learned in design
- Utilize adaptive management approach in construction

Questions/Discussion