Naval Facilities Engineering Systems Command

NAVFAC NORTHWEST

EARLY CONTRACTOR INVOLVEMENT

27 September 2024

NAVFAC Naval Facilities Engineering Systems Command

Benefits of Early Contractor Involvement (ECI)

Construction Contractors provide input during the design phase of project development

- Identify potential construction challenges during design allowing the designer of record to adjust the design to minimize construction risks and the facilitate the most efficient construction means, methods, and sequencing.
- Construction contractors can offer innovative approaches and value engineering strategies based on practical experience, which can be incorporated in the design to improve the final product.
- Reduce risk of cost and schedule growth (Cost and Schedule Risk Analysis).

What differs from Construction Management at Risk (CM@R)?

- Laws, regulations, policies, and procedures applicable to federal/defense contracting contribute to differences
- ECI contracts will contain Federal Acquisition Regulations clauses that may not have equivalents in typical CM@R contracts
- ECI contract award decisions will be based on a best value determination that considers price as well as technical factors

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M2D2 ECI Scope

Perform Constructability Reviews

- Evaluate alternatives for offshore cofferdams for constructability, cost, and schedule
- Evaluate alternatives for upland shoring for constructability, cost, and schedule
- Evaluate alternative methods to complete proposed upland ground improvements to stabilize existing soils
- Review construction access plans and provide recommendations for improvement
- Review proposed construction phasing and provide recommendations to improve efficiency, reduce costs and schedule, and to reduce impacts to shipyard operations
- Provide logistics plans for managing off-site resources and transportation requirements to maintain an efficient pace of construction given the limited on-site space available
- Provide concepts for off-site prefabrication, transportation, and installation of certain M2D2 components
- Suggest actions to address availability of labor to execute work in context with suspected trends and potential shortages
- Suggest actions to minimize material shortages or conditions which would adversely affect cost and scheduling

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ECI Summary of Feedback Received

What was incorporated?

- Double wall cofferdams with deep combi-wall for water cutoff
- Single tied-back reinforced diaphragm shoring/water cutoff wall
- Temporary contractors access pier near the steelyard for materials, equipment and personnel
- Dedicated contractor access through Bremerton Gate
- Use of F-Lot for contractor laydown and staging
- Sinclair Inlet mooring buoys
- Offshore soil characterization for suitability determination

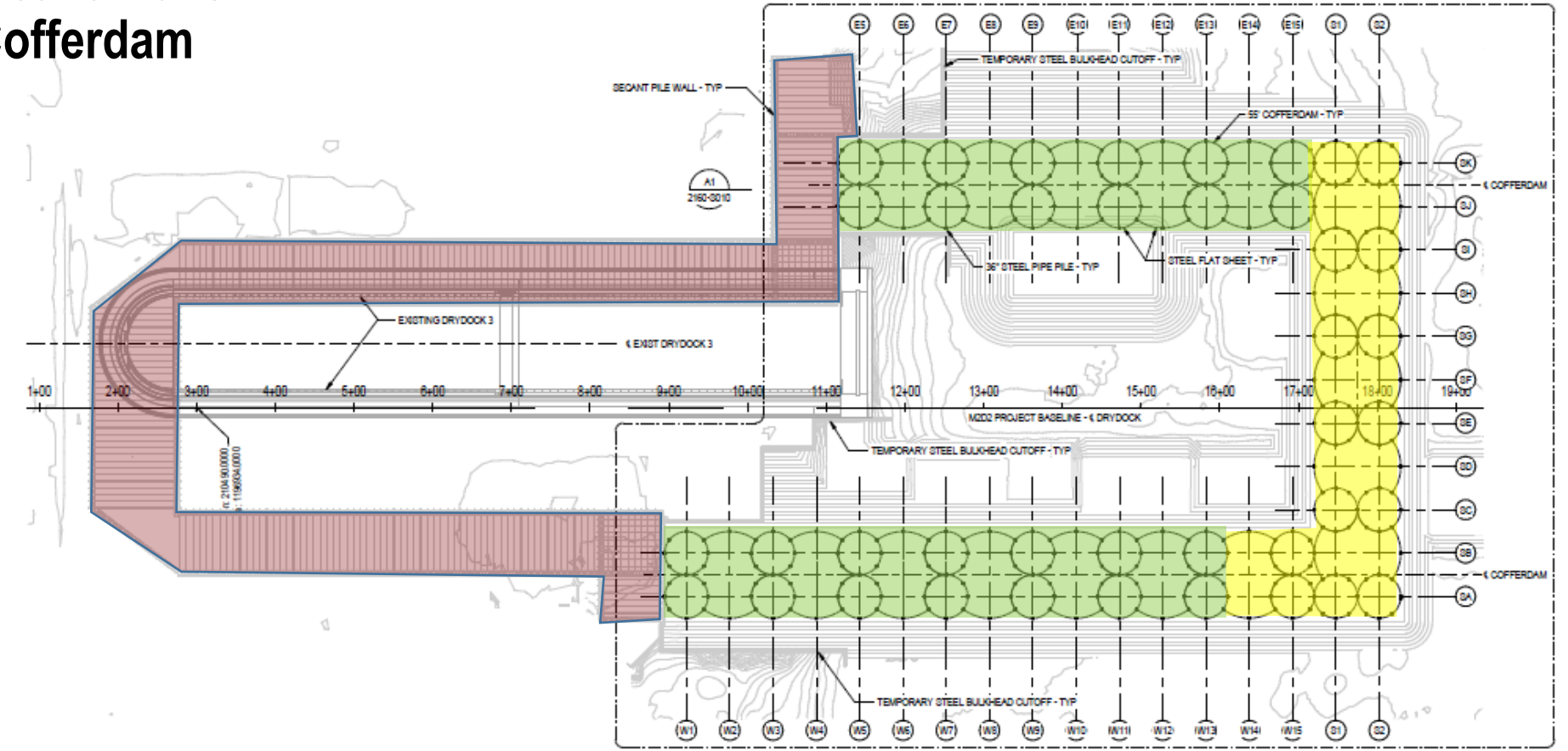
What was dismissed?

- Precast float-in concrete cofferdams due to schedule implications
- Offshore water cutoff via jet grouting

ECI Contractors are Engaged and Adding Value

M2D2 15% Design:

- Double Secant Walls
- Circular Cofferdam

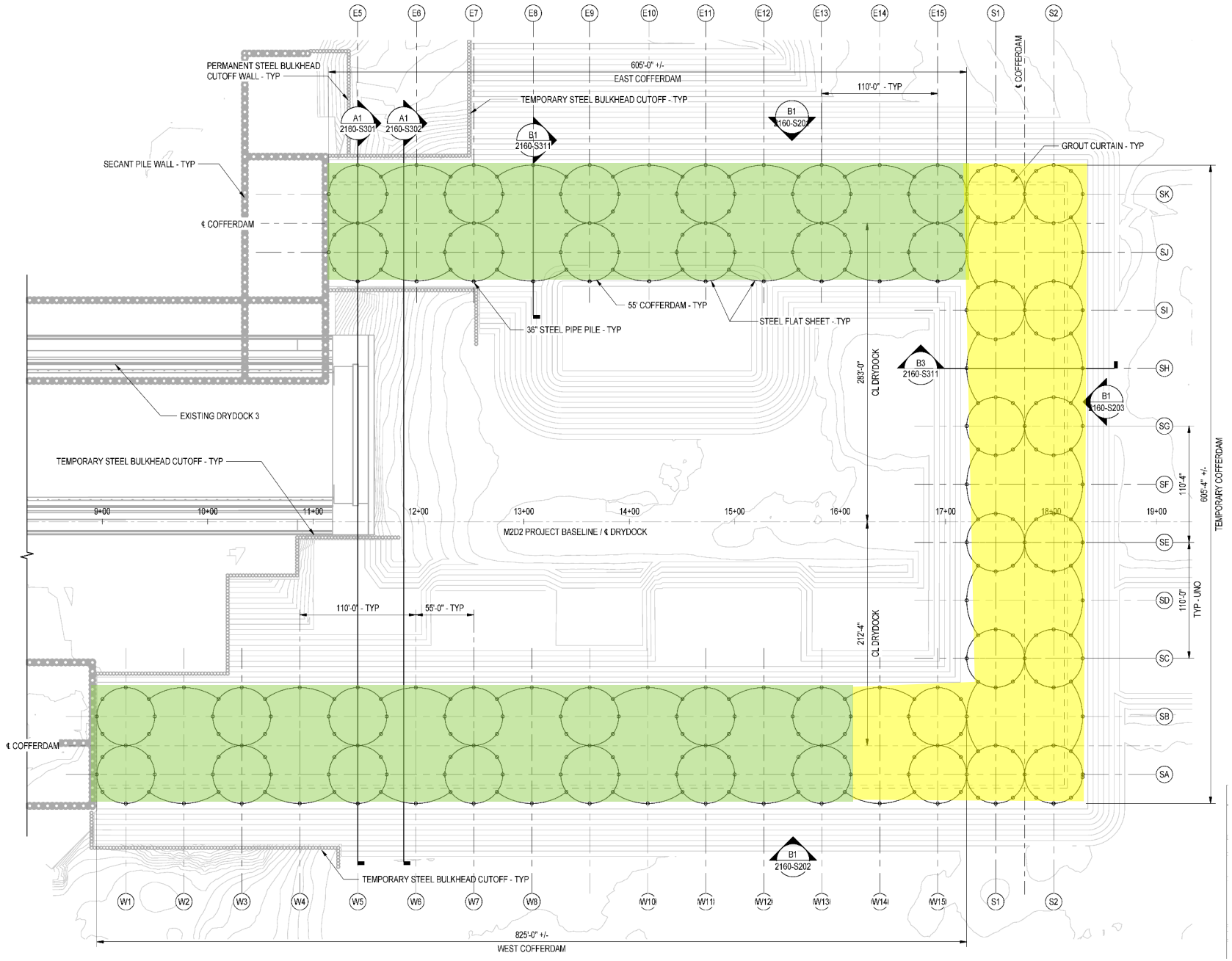


B1 PLAN - OVERALL COFFERDAM LAYOUT
SCALE: 1" = 80'-0"

TRUE NORTH

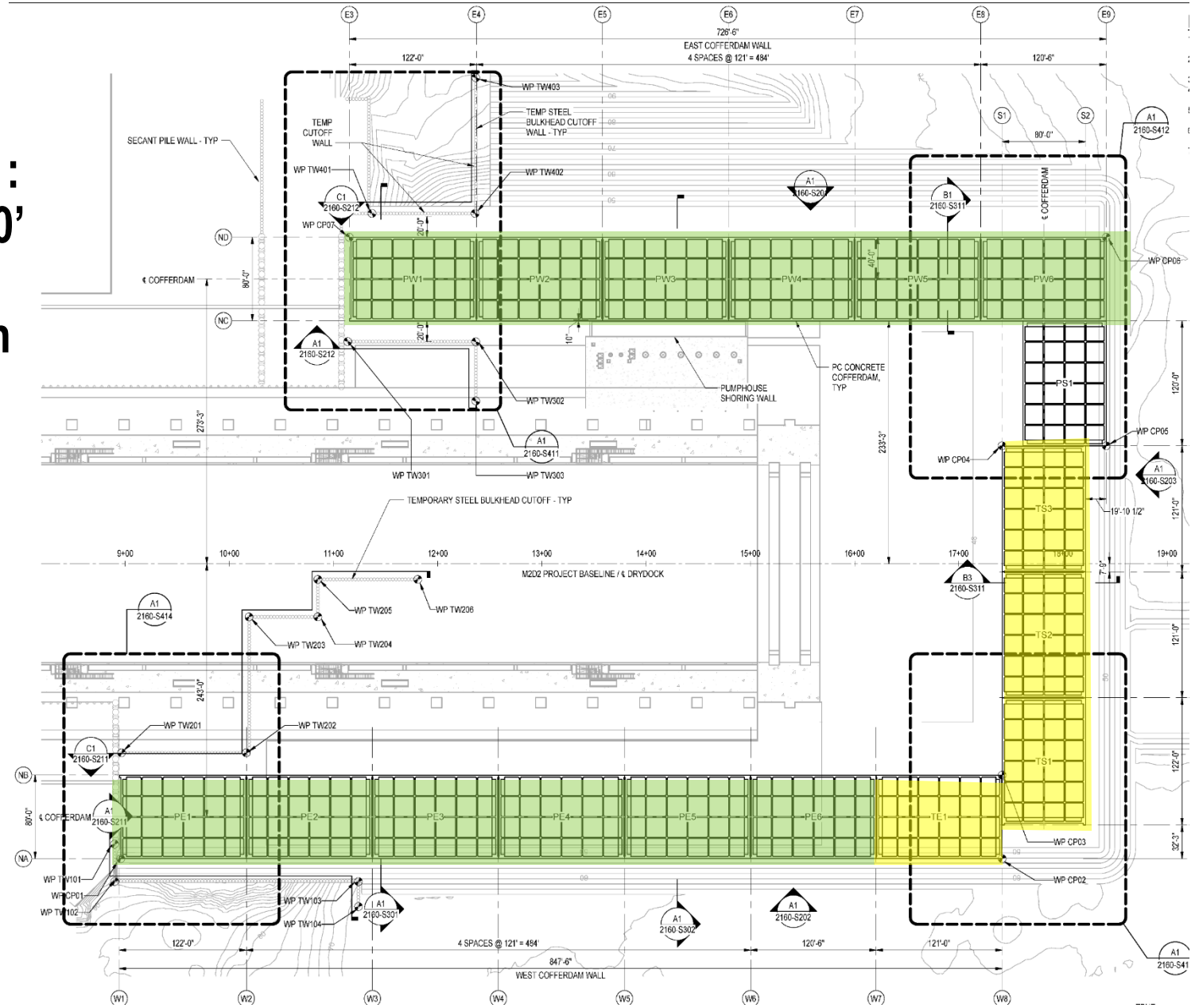
M2D2 15% Design:

- Double Circular Section
- 100’ Connection Section
- Permanent Section
- Temporary Section



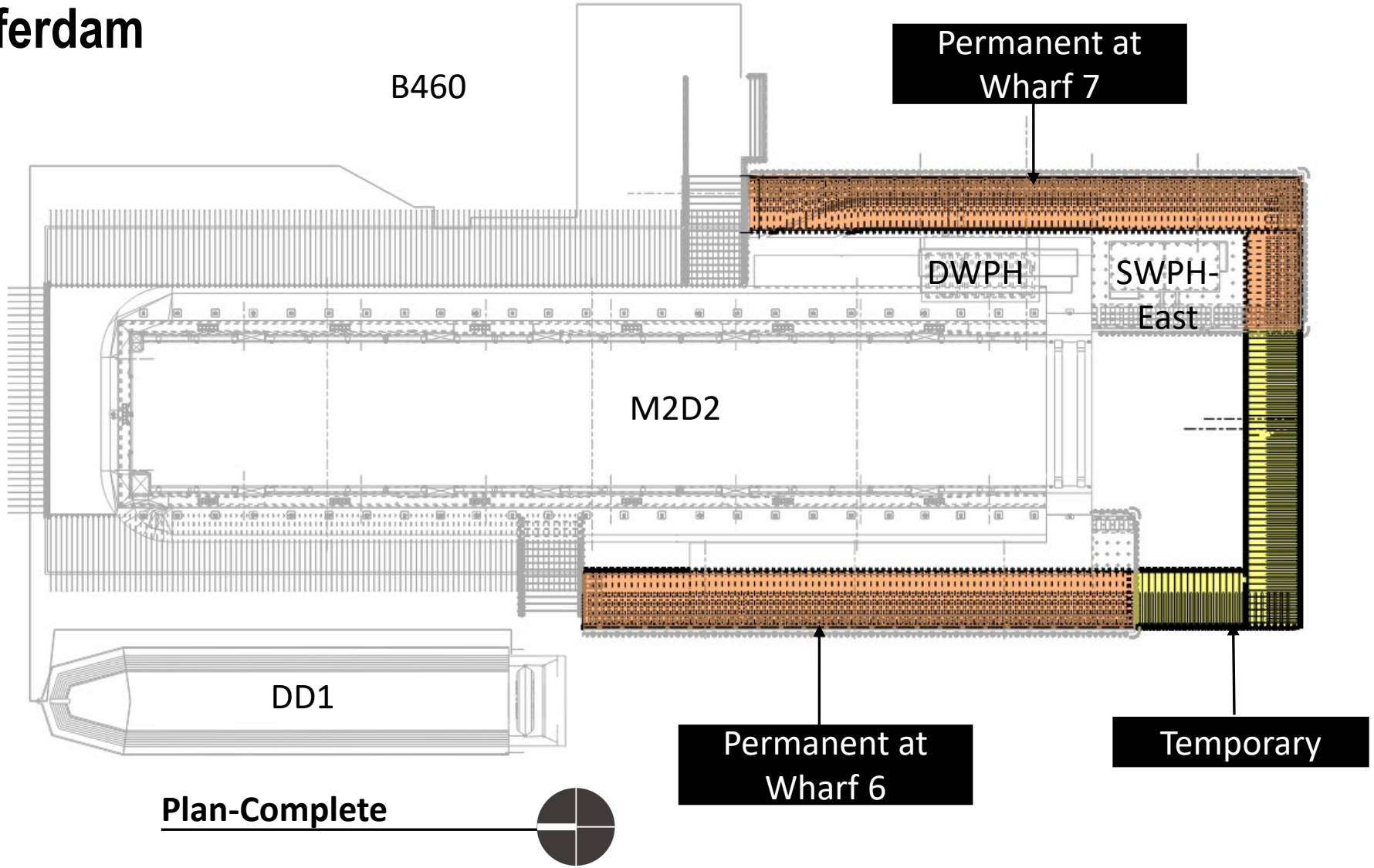
M2D2 Design Alternative #1:

- Modular precast 120’ x 80’ precast caisson
- Designed to ballast down in place
- Permanent Section
- Temporary Section



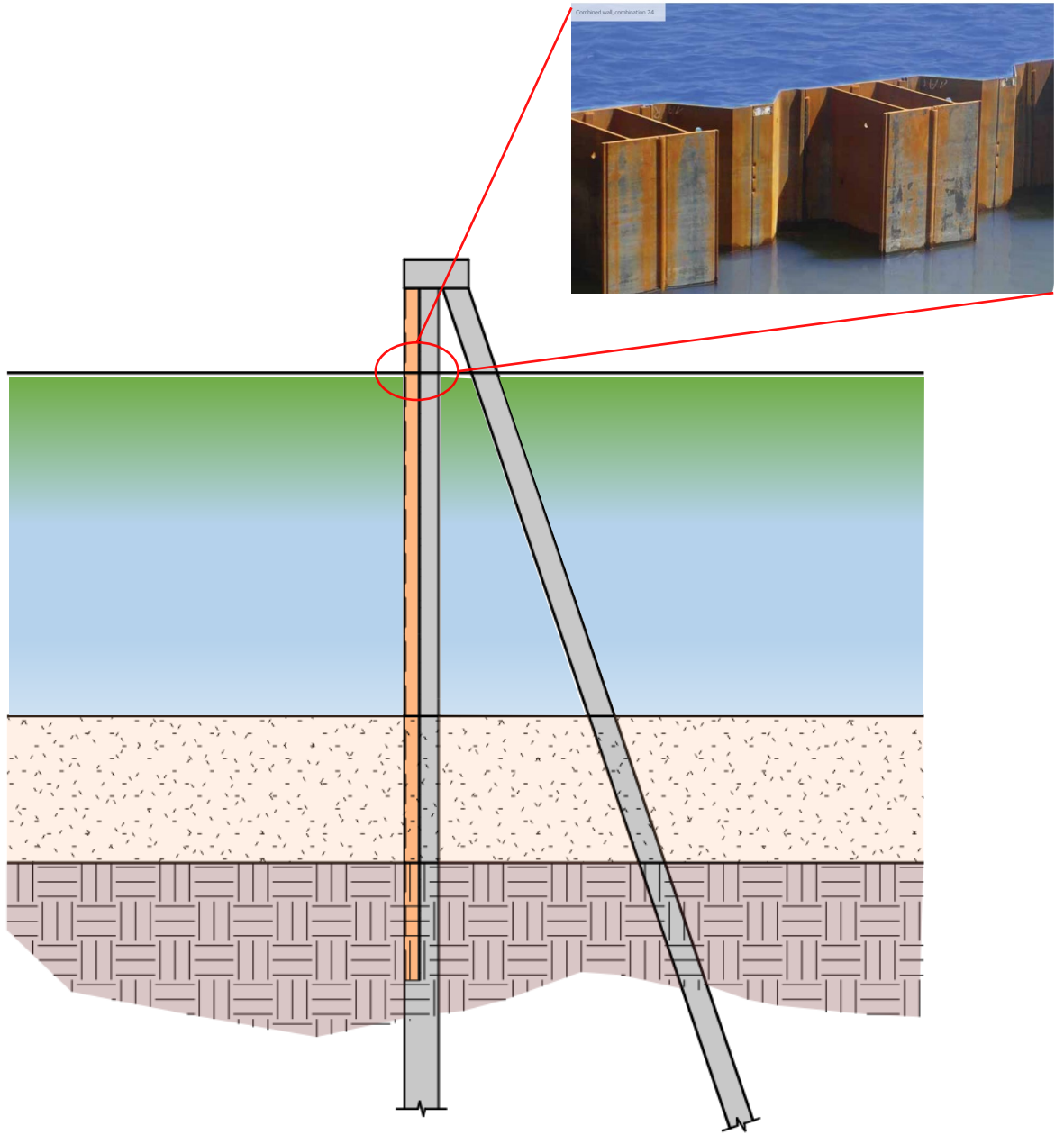
M2D2 Design Alternative #2:

- **Double-Wall Cofferdam**



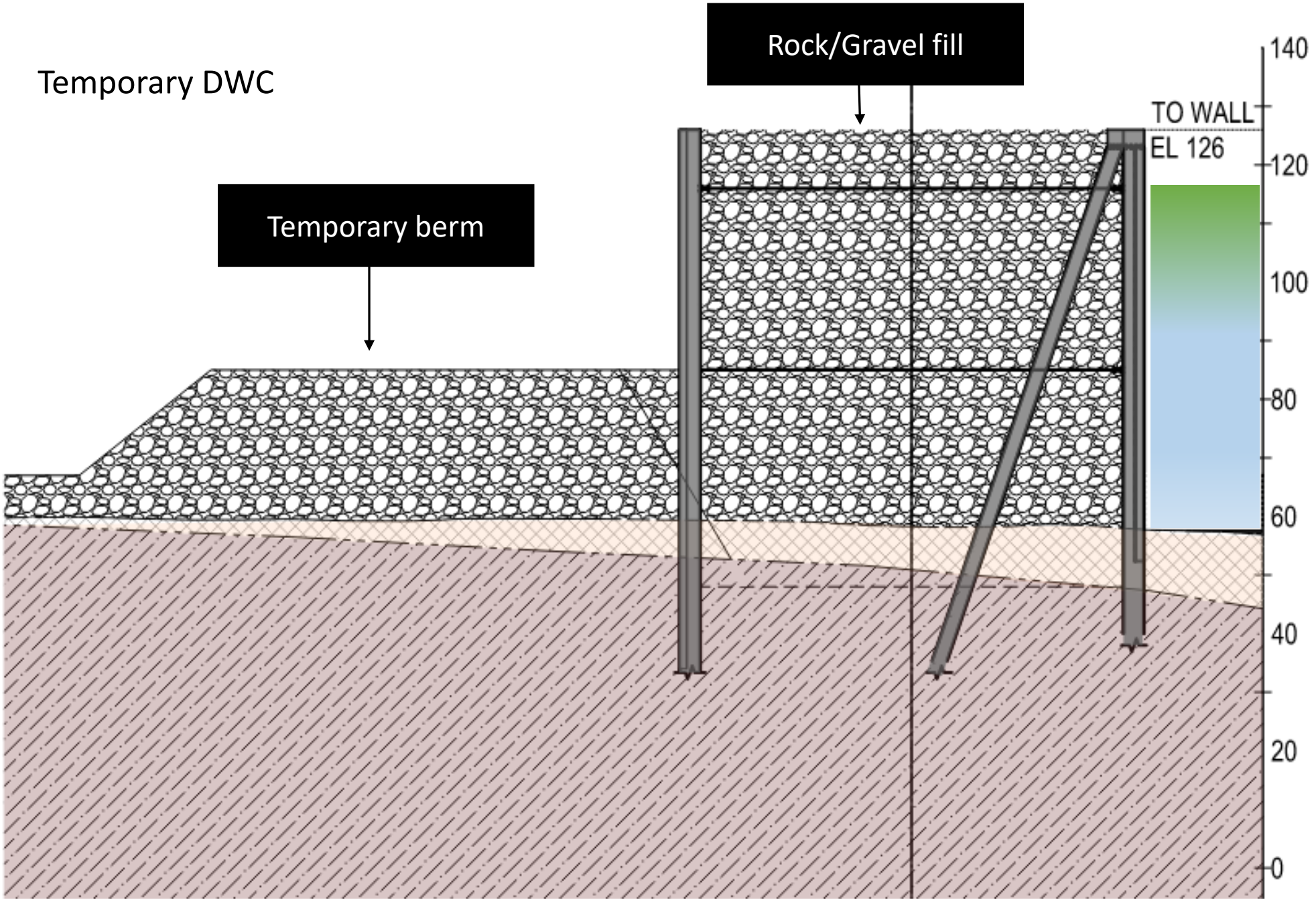
Double Wall Cofferdam

Exterior Combi-wall



Double Wall Cofferdam

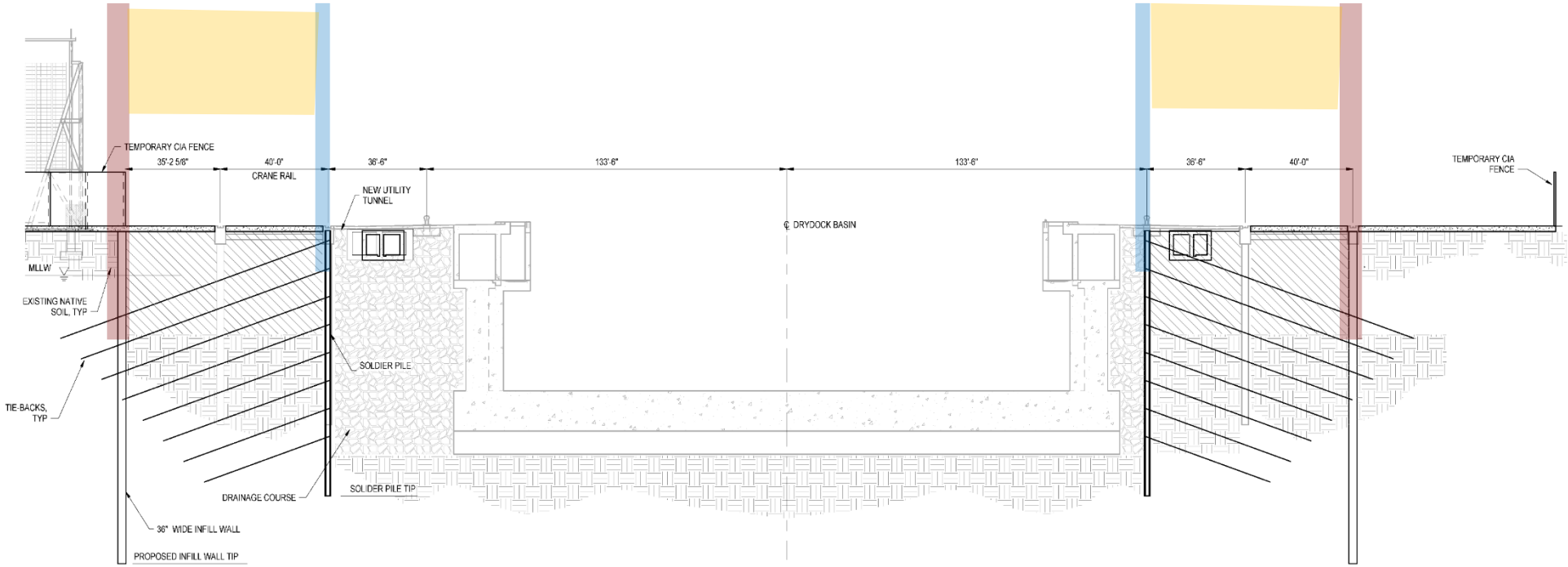
Temporary DWC



Secant Pile Walls

35% Typical Section:

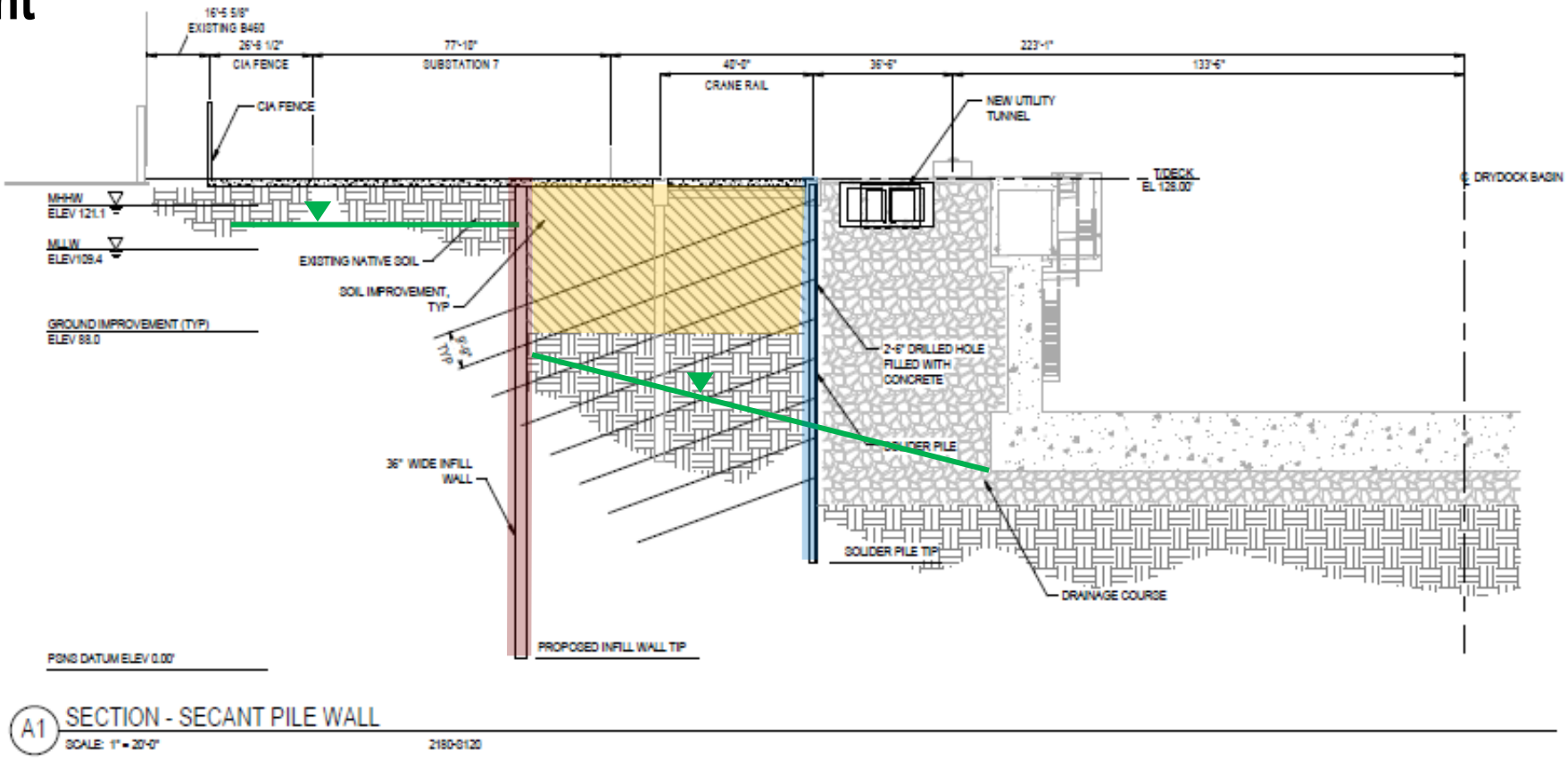
- Outside watertight walls
- Inside soldier pile walls with tiebacks
- Ground Improvements



Secant Pile Walls

35% Typical Section:

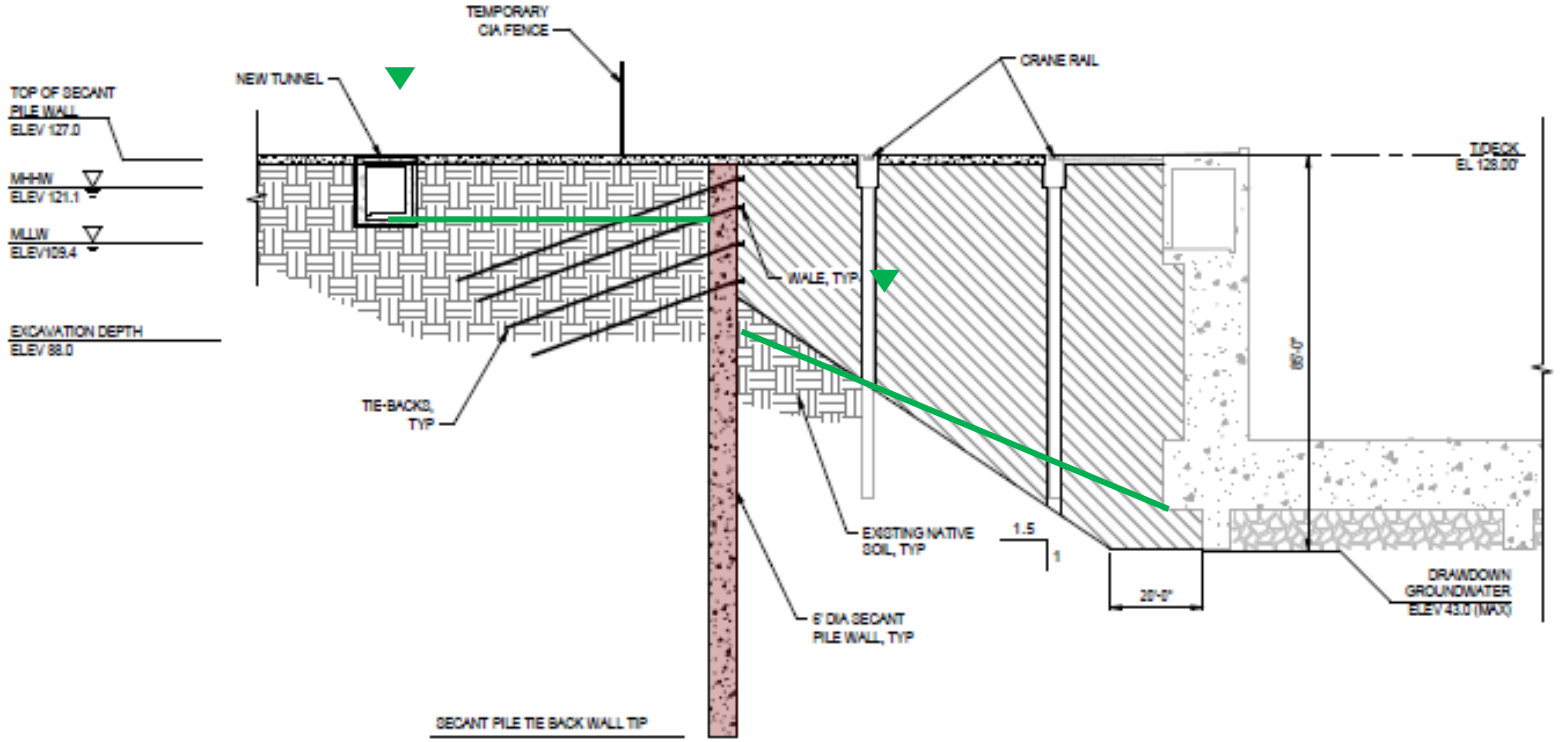
- Outside wall – watertight
- Inside wall – leaky
- Ground Improvement
- Drain Rock



Secant Pile Walls

35% Head Wall:

- Secant tieback wall -watertight
- No inside wall
- Drain Rock

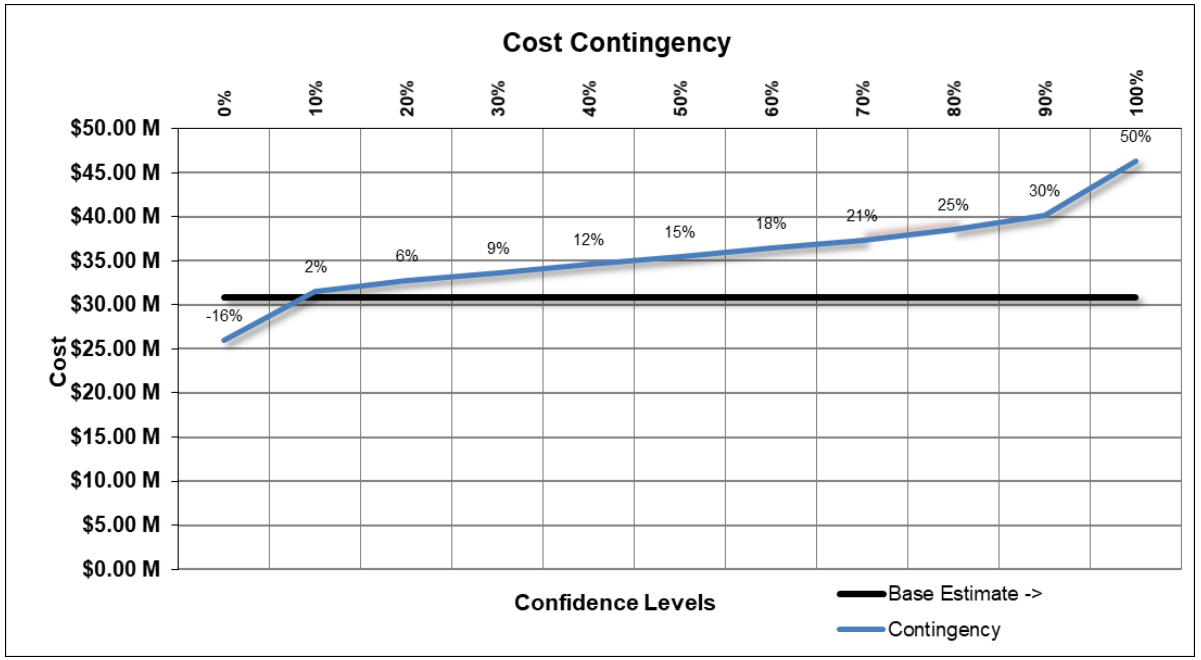


A1 SECTION AT NORTH WALL
SCALE: 1" = 20'-0"

ECI Inputs to Budgeting and Programming via Cost and Schedule Risk Analysis (CSRA)

What is a CSRA?

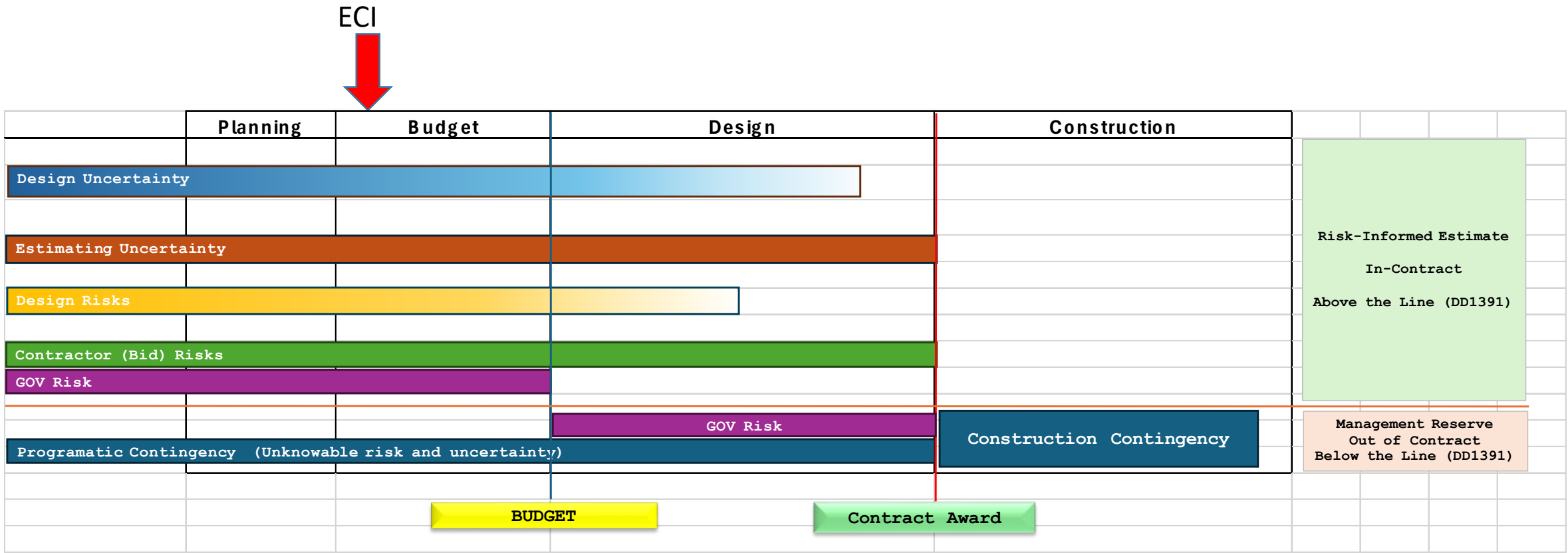
- Is a process by which cost and schedule risk/opportunities are identified, documented, quantified, and managed
- The output of a CSRA process includes a risk register and contingency models that provide a defensible contingency value
- ECI feedback assists in identifying risks, influences the CSRA analysis, and assists in developing the project program cost (budget)



ECI Inputs to Budgeting and Programming via Cost and Schedule Risk Analysis (CSRA)

REF	Risk Type	Risk/Opportunity Event	Risk Event Description	PDT Discussions on Impact and Likelihood	Likelihood	Impact (C)	Risk Level (C)	Impact (S)	Risk Level (S)	Cost Variance Distributio	Schedule Variance Distributior
1	12 - Civil/Site Design (CV)	NAVFAC and NAVSEA change directions on 40' crane track gage and direct design to go back to 20' gage	The project is designed for 40' crane track gage. A reversal of the decision to use 40' would result in delays and lost design to shift back to the 20' gage shown in the AF&E Study.	This risk is possible but unlikely. It is captured within Risk REF 3.	Unrated		**Unrated**		**Unrated**	N/A -Not Modeled	N/A -Not Modeled
2	17 - Geotechnical / Geology (GG)	Pile driving issues	Pile driving cannot achieve tip elevation and/or misalignment, damage to interlocks, piles, and equipment, due to geotechnical challenges/impacts.	The TPS has provided pile driving information at three separate locations for the site. Platforms 1 and 3 never reached the DWC project design tip elevations, these two platforms needed 20' or more of embedment. Platform 2 reached tip for some piles but the water depth was much deeper and reduced pile embedment in the soil. Only three piles achieved more than 50-ft of embedment for the TPS. Majority of pile embedment for DWC design will be greater. Sheets piles also need to be considered, including reheading, interlock damage, not reaching tip, etc. Base estimate includes reduced productivity assumption for pipe piling. Pre-drilling with full-height silt curtains. Water qual. risk covered elsewhere. Specific to piling. Designers will try to move to pipe piling -- no risk for re-heading. In the best cost estimate, this risk was reduced (low for schedule, reduced impact for modeled cost risk) due to a more conservative base estimate that assumes lower productivity, and redundant measures that reduce risk (e.g., pre-drilling). 0.25 piles/hr in base schedule -- 2 to 3 piles per shift	Possible	Marginal	**Low**	Marginal	**Low**	N/A -Not Modeled	N/A -Not Modeled
3	12 - Civil/Site Design (CV)	Cranes - Changes in criteria, operating envelopes, etc. or switching gage	Changes in criteria, operating envelopes, loads, and track design are possible, as well as electric vs diesel.		Possible	Significant	**Medium**	Significant	**Medium**	Uniform	Uniform
4	15 - Electrical (EE)	Change in industrial power requirements	Industrial requirements could change, resulting in re-design and schedule slip during construction. Existing power grid with planned upgrades (subs F/G, H/Z, and relocation of sub A) could be insufficient. Industrial power requirements could be affected by additional equipment or facilities from the SIOP Area Development Plan.	Largest power demand for the vessels -- not a risk for the construction so much as the operation post commissioning; risk not carried by MCON.	Unlikely	Negligible	**Low**	Marginal	**Low**	N/A -Not Modeled	N/A -Not Modeled
5	17 - Geotechnical / Geology (GG)	Actual depth to very dense material varies from data inferred from geotech exploration program.	Risk: Adverse impact on dredged production rates and costs. Adverse impact on excavation. Uncertainty around the criteria for acceptable dredged bottom prior to tremie concrete placement.	Encountering denser glacial till, glacial till at less depth, or monolithic rock in the clamshell dredge template (too deep for CSD or backhoe) - slower production. No blasting. DWC requires less dredging in the wet. Spatial variability (when dredging well below the fill soils offshore, low risk) and drivability risk (moderate). Opportunity: tremie on top of ESU4. Uncertainty around the criteria for acceptable dredge bottom can be mitigated in specs, and also in discussions with H&A and ECI contractors.	Possible	Negligible	**Low**	Marginal	**Low**	N/A -Not Modeled	N/A -Not Modeled

ECI Inputs to Budgeting and Programming via Cost and Schedule Risk Analysis (CSRA)



CSRA Known Unknowns Examples

- Design Uncertainty – Changes in design criteria
- Estimating Uncertainty – Escalation
- Design Risks – Geotechnical (seepage cutoff)
- Contractor (Bid) Risks – Disposal requirement (post construction award)

ECI Inputs to Budgeting and Programming via Cost and Schedule Risk Analysis (CSRA)

Item	Description	P85
(A)	**Contract Cost Estimate**	**5,075**
	Primary Construction Contract	**5,000**
	Secondary Contract B	50
	Secondary Contract C	25
(B)	**Escalation to Mid-Point of Construction**	**750**
	Confidence Levels (CSRA)	***P85***
(C)	**Bid Risk and Uncertainty**	**800**
(D)	**Project Cost Estimate (A+B+C)**	**6,625**
(F)	**Additional Contracts**	**206**
	AE and Gov't PADS/PCAS (2.5% x (D))	166
	Commissioning/Inspection/Outage Support	40
(G)	**Programmatic Uncertainty**	**500**
(H)	**TOTAL PROGRAM COST (D+E+F+G)**	**7,331**

From MII Cost Estimate

From CSRA*

Owner Contingency

Presented costs are for demonstration purposes only

* ECI feedback assists in identifying risks, influences the CSRA analysis, and assists in developing the project program cost (budget)

Key Action Items to be implemented by the Government

Contracting Related

- Stored Payment Plan
- Economic Price Adjustment
- Material Procurement Requirements
  - Waivers for imported materials such as portland cement, fly ash, aggregate, and steel.
  - Inclusion of FAR Clause 52.225-11 Alt I Buy American – Construction Materials Under Trade Agreements (Deviation 2020-O0019)
  - DFARS 252.247-7023, Transportation of Supplies By Sea
  - DFARS 252.225-7012, Preference for Certain Domestic Commodities
- Limiting the bond to some percentage of the contract value
- Considering early work or breakout packages.

Site Access Related

- Lot F use – upland portion only, no marine construction
- Temporary access pier south of B460
- DLA yard and waterfront for onsite KTR multi-use area.
- Dedicated vehicle access through Bremerton Gate into M2D2 site
- Evaluate if the Government can establish the CDF in advance

Key Action Items to be implemented by the Design Team

Data Access

- As-built & existing document database

Site Access/Logistics

- Engage PSNS and NBK stakeholders to develop workable plans for security, access, staging, and logistics.
- Evaluate options to located Contractor and Government office space on site.
- Remove phasing restrictions from the construction plans.
- Look for ways to decouple and accelerate demolition of Buildings 923, 960 and 1003 to allow cut-off walls to be completed earlier in the project.

Key Action Items to be implemented by the Design Team

Material Handling

- Define disposal requirements for demolition debris.
- Develop a waste management plan for dredge material.

Design Changes

- Single wall upland shoring/cutoff system at all locations
- Removal of jet grouting below DWC
- Removal of batter piles in DWC
- Develop concrete mix specifications with allowable deviations from UFGS 03 31 29, allow greater flexibility in mix designs, particularly when using supplementary cementitious materials.