

# PortMiami Wharves Strengthening Program

AAPA 2013 Facilities Eng. Seminar & Expo



# PortMiami Wharves Strengthening Program



## The Odebrecht Organization

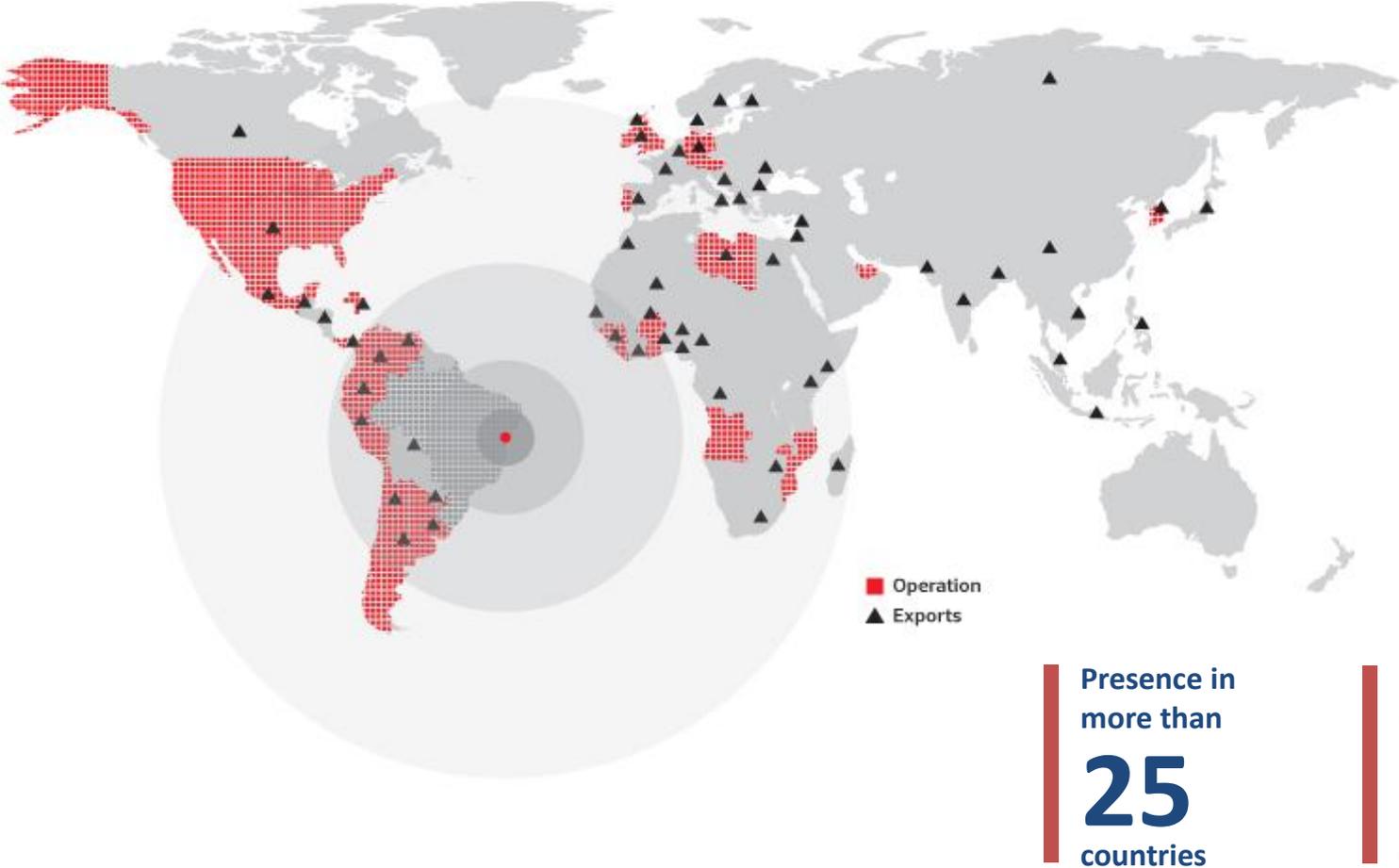
Founded in Brazil in 1944, today the Odebrecht Organization is a diversified business leader laying the groundwork for positive sustainable change worldwide.

The impact of the Odebrecht Organization extends around the world and across a range of enterprises. The depth and breadth of our services create key synergies that set us apart.



# PortMiami Wharves Port Strengthening Program

## Odebrecht Organization Worldwide



# PortMiami Wharves Strengthening Program

## Current footprint in the United States

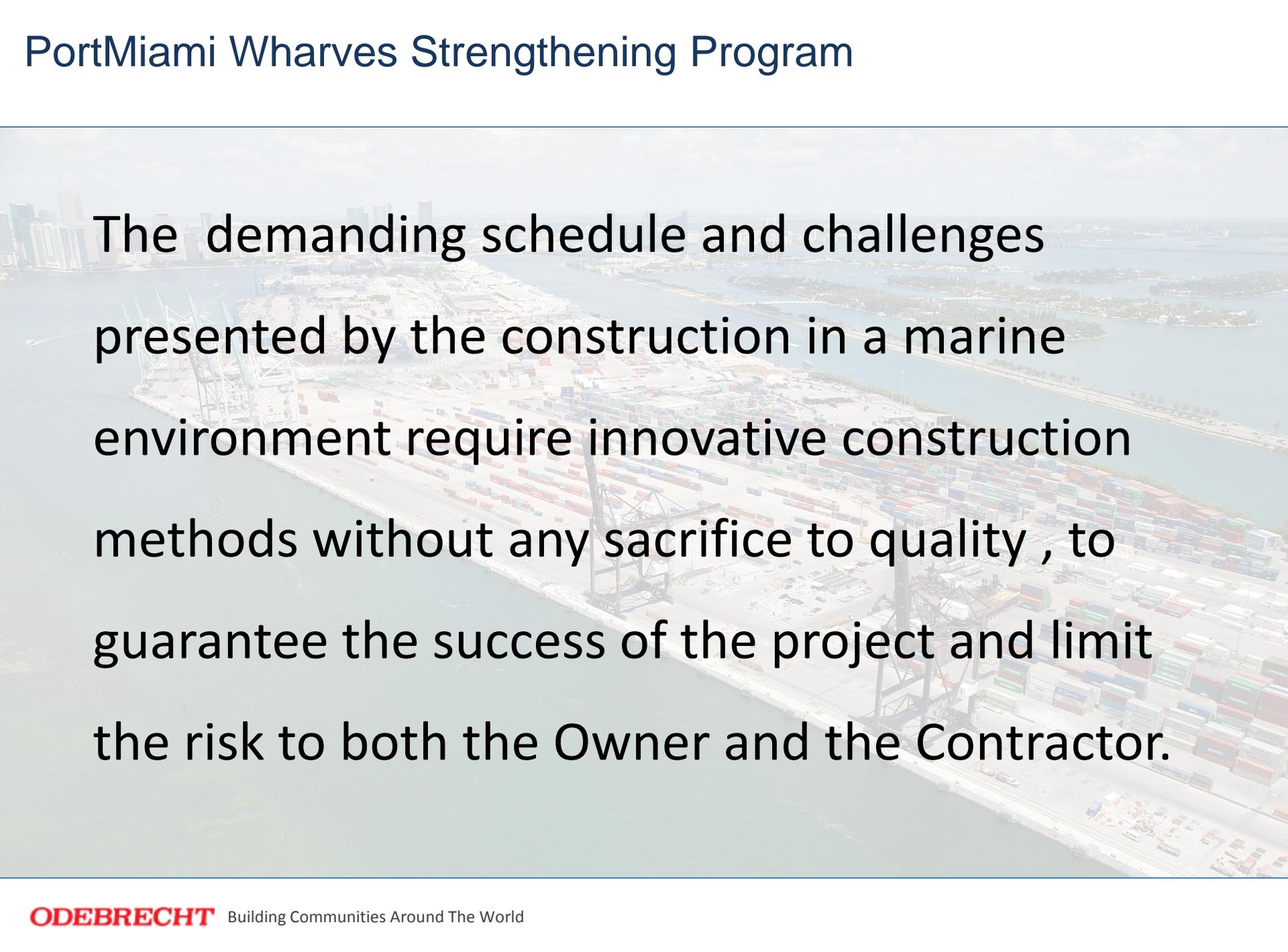


# PortMiami Wharves Strengthening Program



- **Client:** Miami-Dade County Seaport Dept.
- **Contract Type :** LS + Unit Price
- **Contract Cost :** 57 M (\$50.5 + ALLOW.)
- **Scope of Work:** Construction of 6,000 LF/ 2000 meter of Cargo Wharf to allow for the future dredge (50' feet). Improvements of the storm water drainage, upgrade of existing crane rail beam and replacement of (utility service stations, fenders and bollards).
- **NTP:** Sep 2011
- **Schedule Completion Date:** May 2014
- **Duration:** 960 days
- **Number of Subcontractors:** 31
- **Current Status:** Completed 78 %
- **Critical Milestone:** Aug 2013 (To allow Deep Dredge)
- **Liquidated Damages:** US\$ 145,000 per day no cap

# PortMiami Wharves Strengthening Program

An aerial photograph of a large port terminal, likely PortMiami, showing a vast area filled with colorful shipping containers stacked in neat rows. Several large gantry cranes are visible, used for loading and unloading cargo from ships. The port is situated along a body of water, with a city skyline visible in the background under a clear sky.

The demanding schedule and challenges presented by the construction in a marine environment require innovative construction methods without any sacrifice to quality, to guarantee the success of the project and limit the risk to both the Owner and the Contractor.

What was the largest risk and challenge from a Contractors perspective on the project?

**Schedule**

Liquidated Damages \$145,000 per day no cap

# PortMiami Wharves Strengthening Program



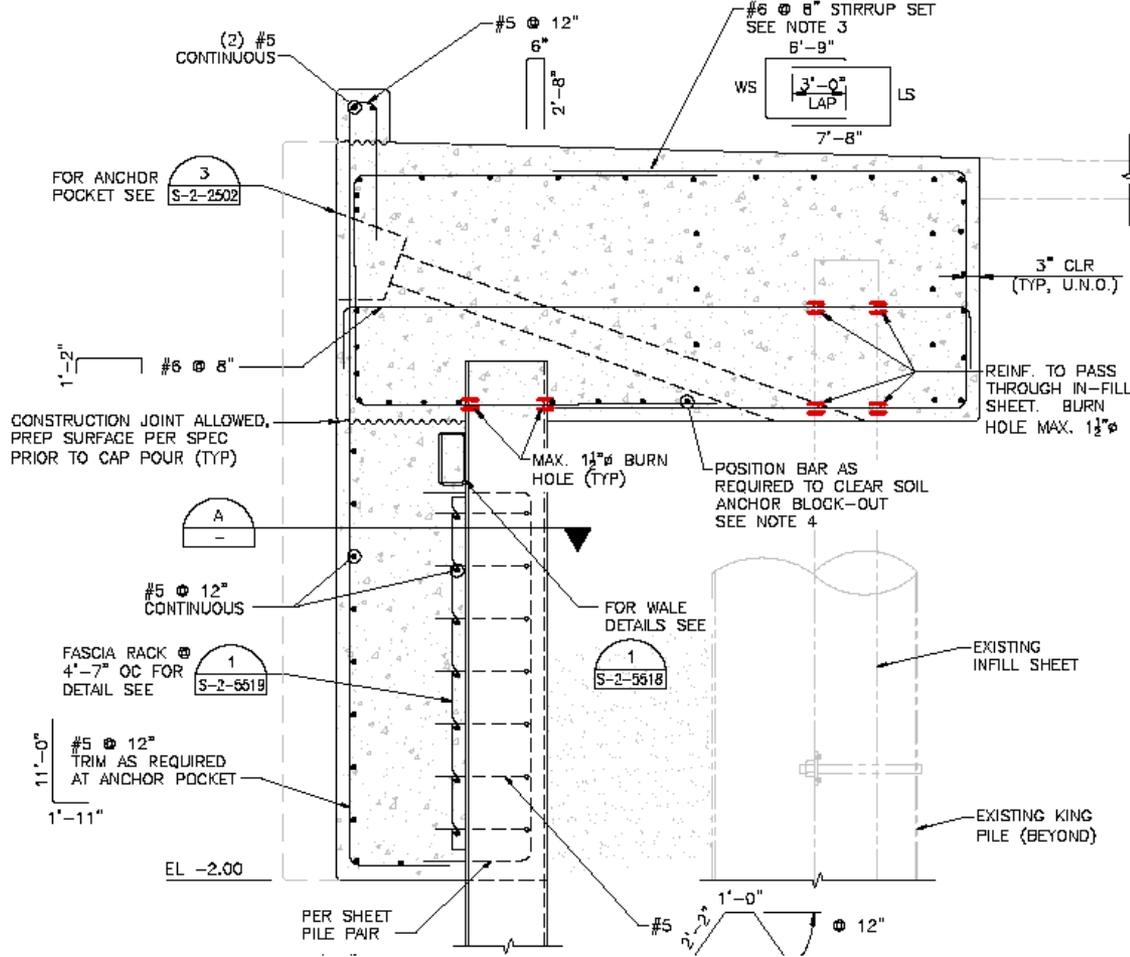
Innovative ideas developed in collaboration with the Port, HDR (Engineer of Record) and Atkins (CEI)

-Precast Stay-In-Place Forming System

-“Rolling Construction”

# PortMiami Wharves Strengthening Program

7" Precast  
Stay-in  
Place  
Form



# PortMiami Wharves Strengthening Program

## Advantages

### Quality

- Superior Concrete Quality over Cast in Place Concrete due to the production of precast panels in a controlled environment
- No risk of washout or honeycomb of exterior concrete due to the tremie placement of concrete
- No rubbing and patching required
- Controlled placement of rebar and accessories to close plant tolerances
- Guarantees consistent concrete cover as specified
- Aesthetic finish matches clients 2035 vision of a cargo port in an urban center

### Schedule

- Delay risks substantially reduced
- Mitigates possible weather impacts
- Fabrication of panels ahead of construction schedule required for the project site
- No formwork removal required
- Adaptable forming system

# PortMiami Wharves Strengthening Program

## Advantages

### Environment

- Minimizes the risk of contaminants to be deposited into the water due to spills from leaking formwork
- Reduces the risk of debris entering the water from the formwork removal operation
- No form oil
- Minimizes the risk of form blow-outs

### Safety

- Less handling of formwork
- Safer operation, Workers stay out of water, less exposure to tidal and boat wake
- No bulky formwork to assemble and lift
- Reduced the time required to work over an active navigational waterway

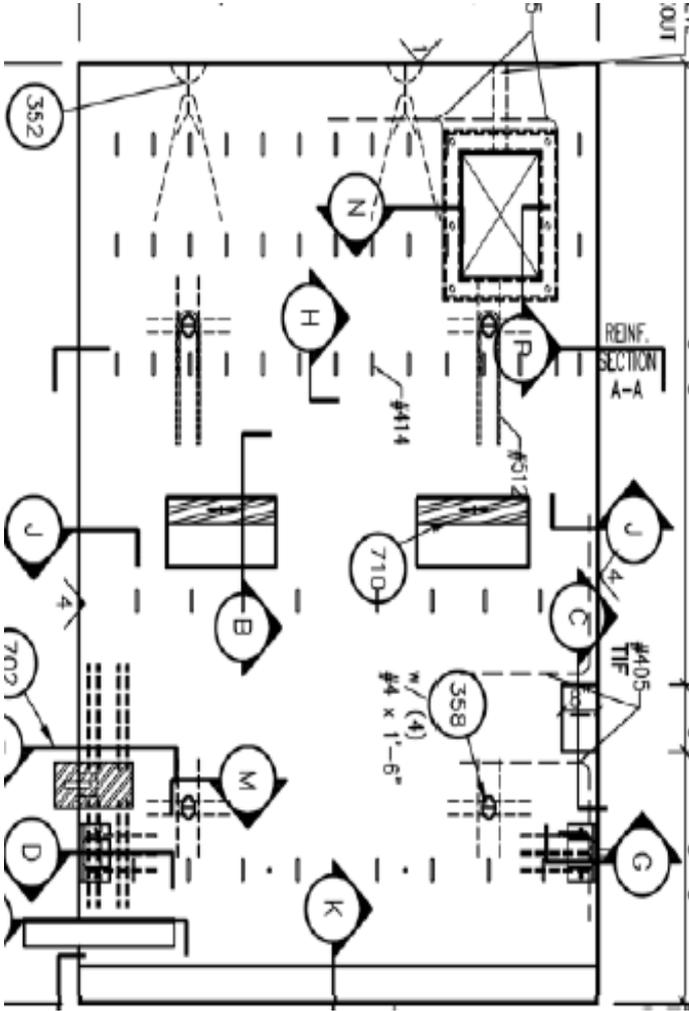
# PortMiami Wharves Strengthening Program

## Challenges:

- System requires close coordination between sheet-piling/ combi-wall, soil anchors and precast block-outs
- Adapting shape of precast panel bottom soffit to as-built sheet pile/ combi-wall profile
- Closure of gap between sheet-pile and precast panel

# PortMiami Wharves Strengthening Program

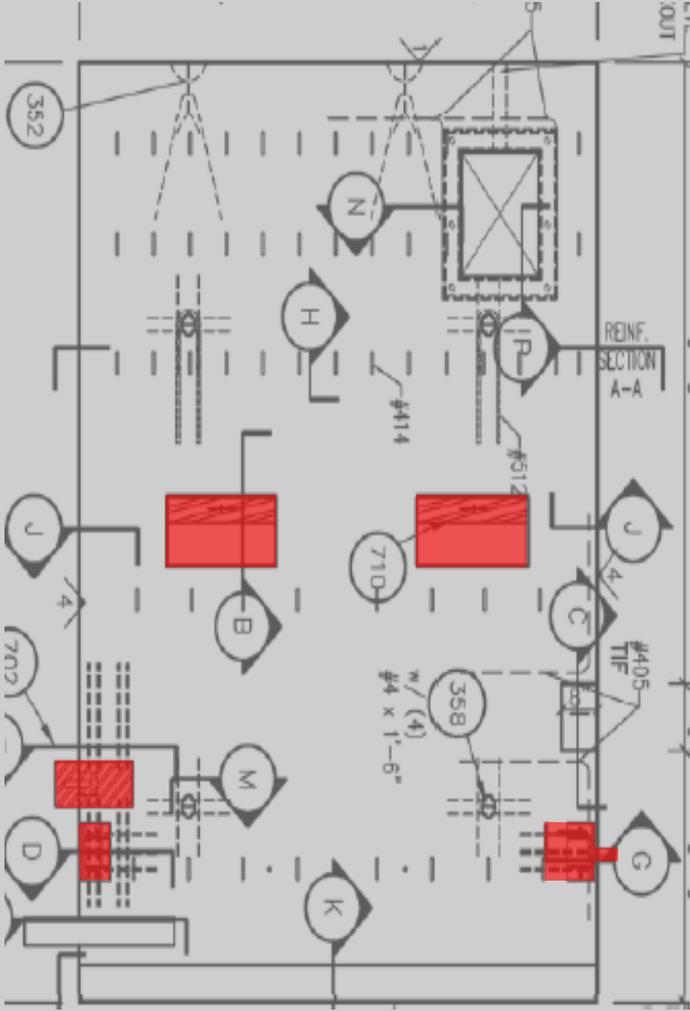
## Backside of Precast Panel



# PortMiami Wharves Strengthening Program

## Backside of Precast Panel Details

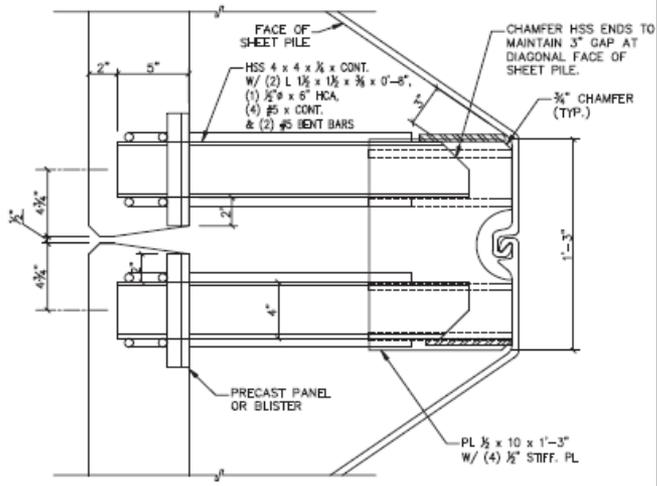
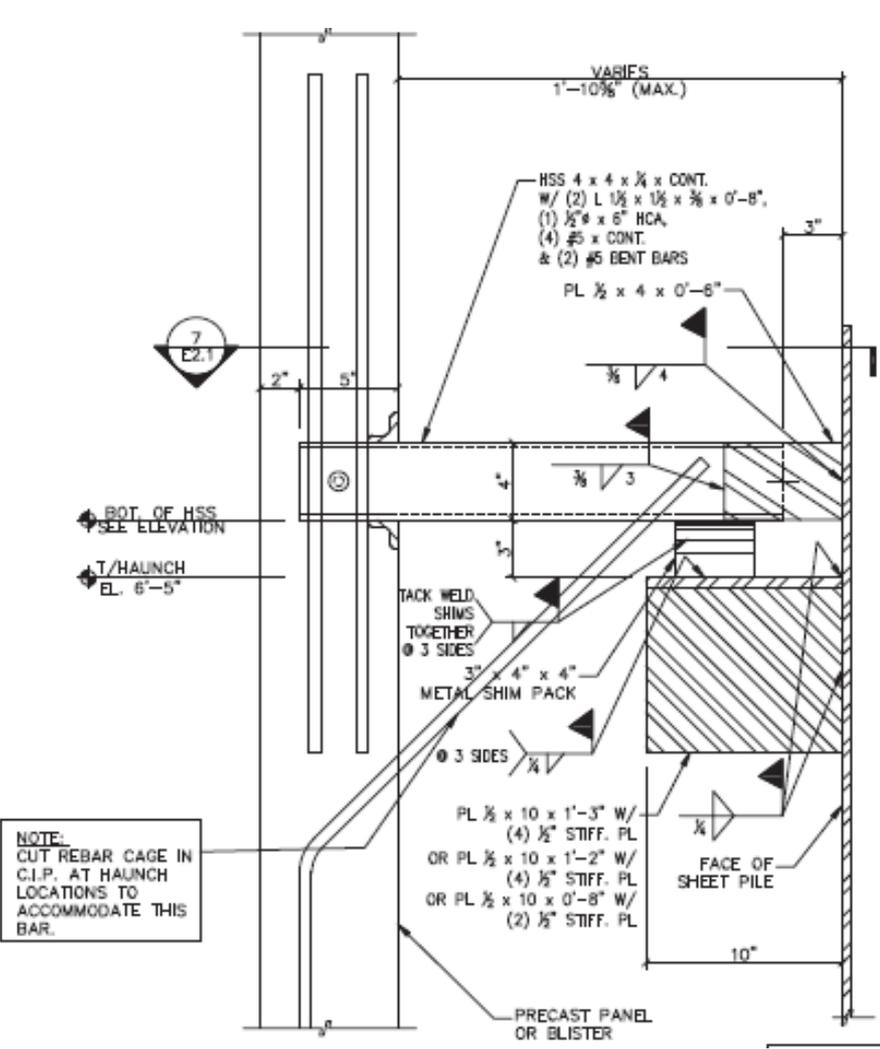
Plate & Brackets  
Rod Connection  
Connecting  
Plate





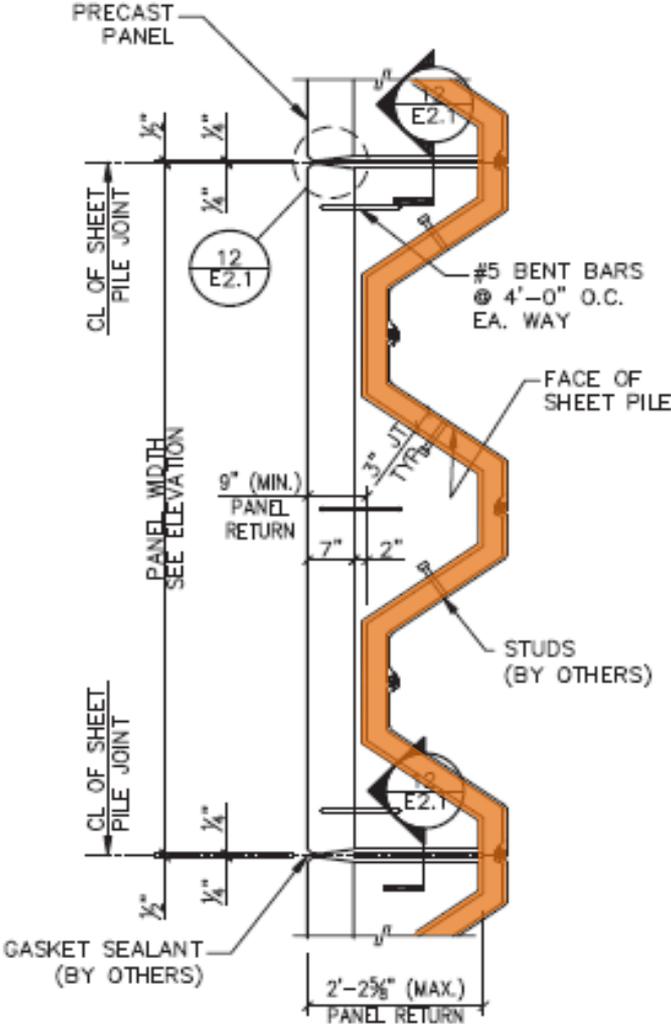
# PortMiami Wharves Strengthening Program

## Precast Panel Seats



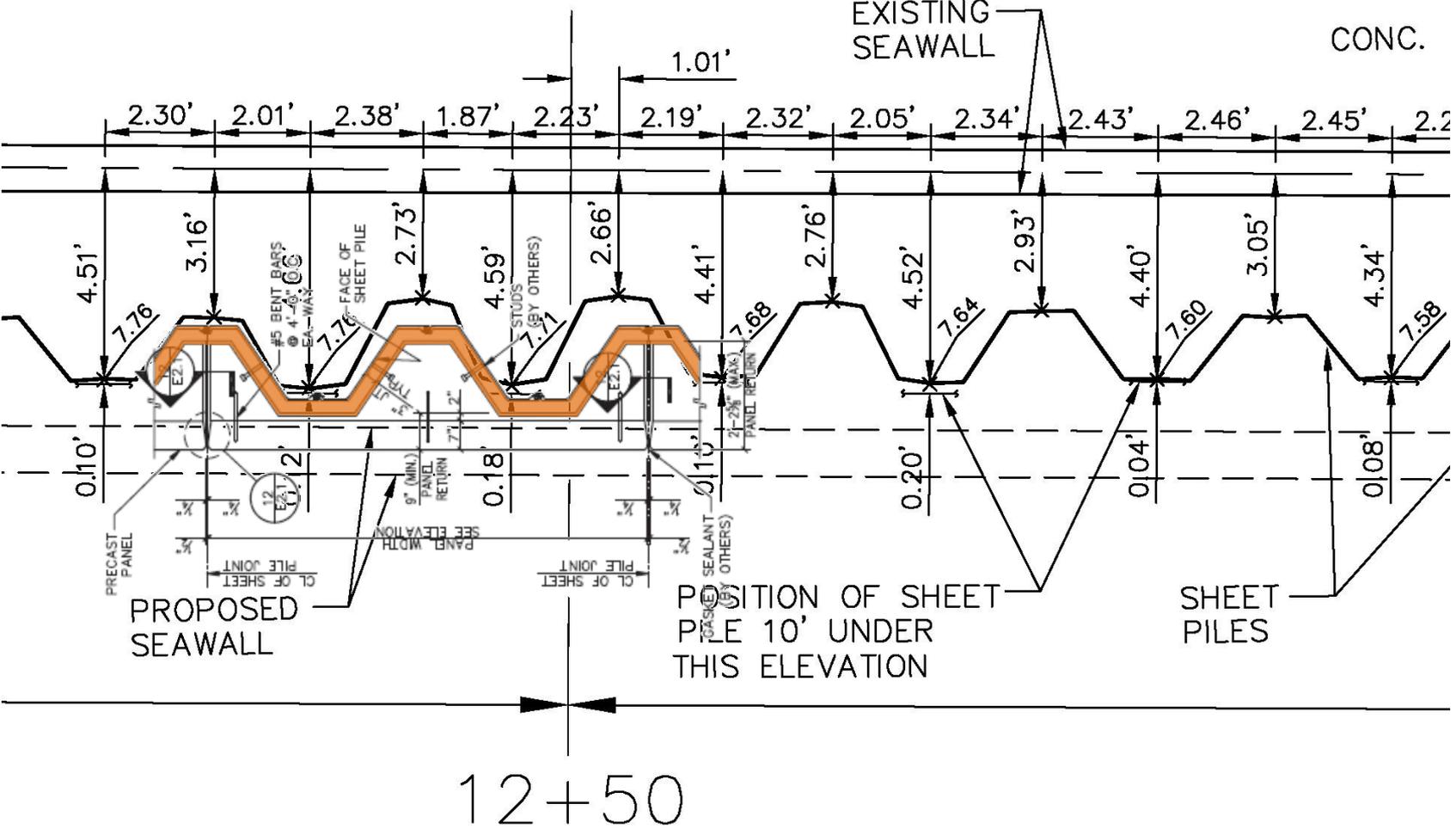
# PortMiami Wharves Strengthening Program

## Gap Between Precast Panel and Sheetpile



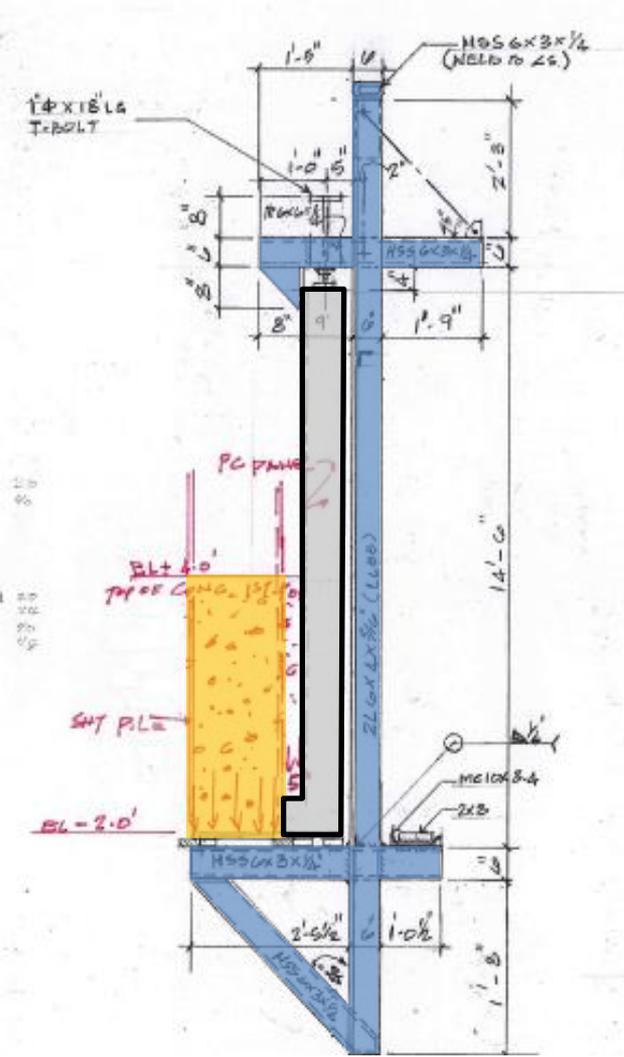
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## Sheet pile Installation As-Built



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## Steel Form to Close the Gap



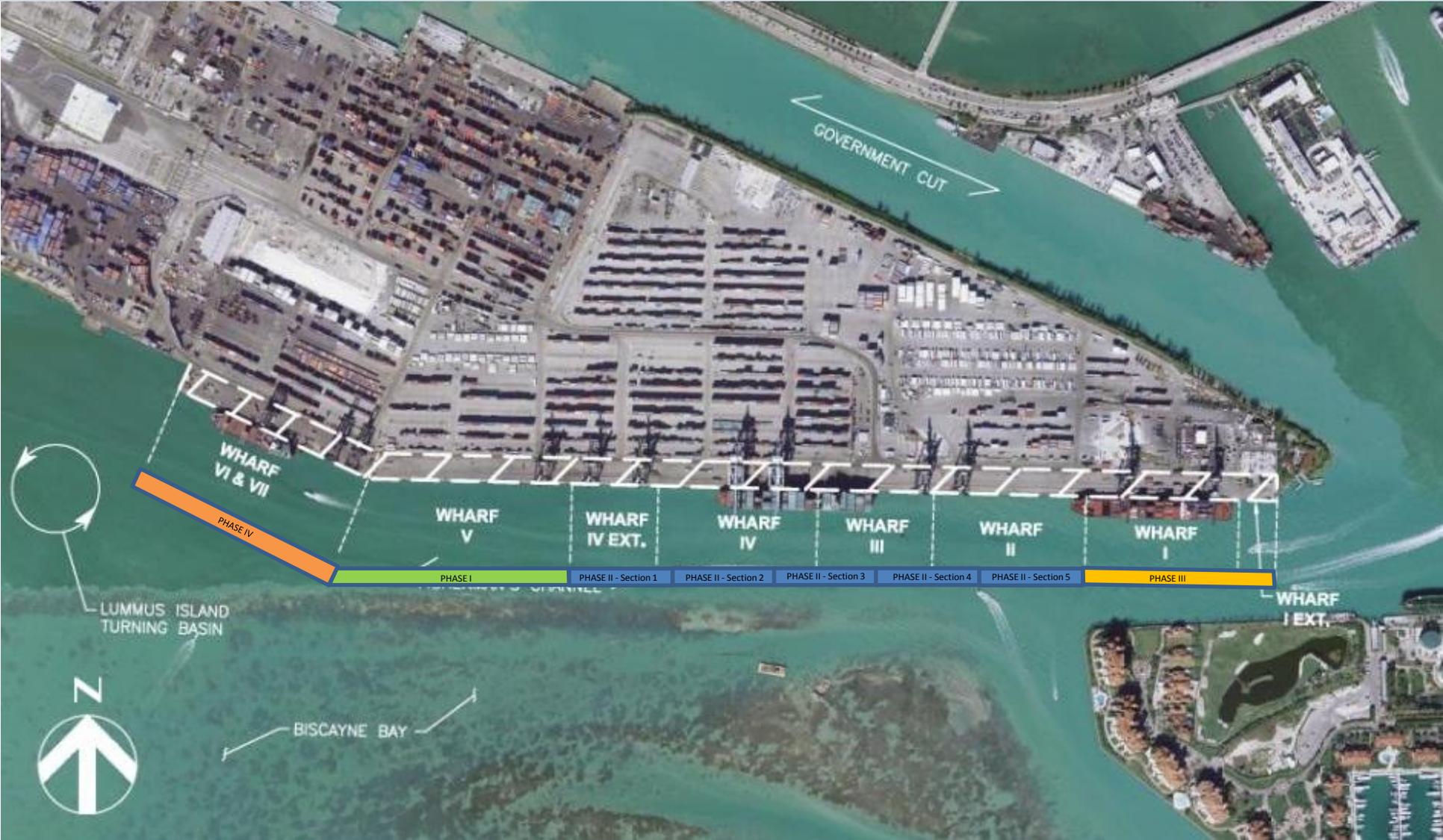
# PortMiami Wharves Strengthening Program

## Precast Gap Filling



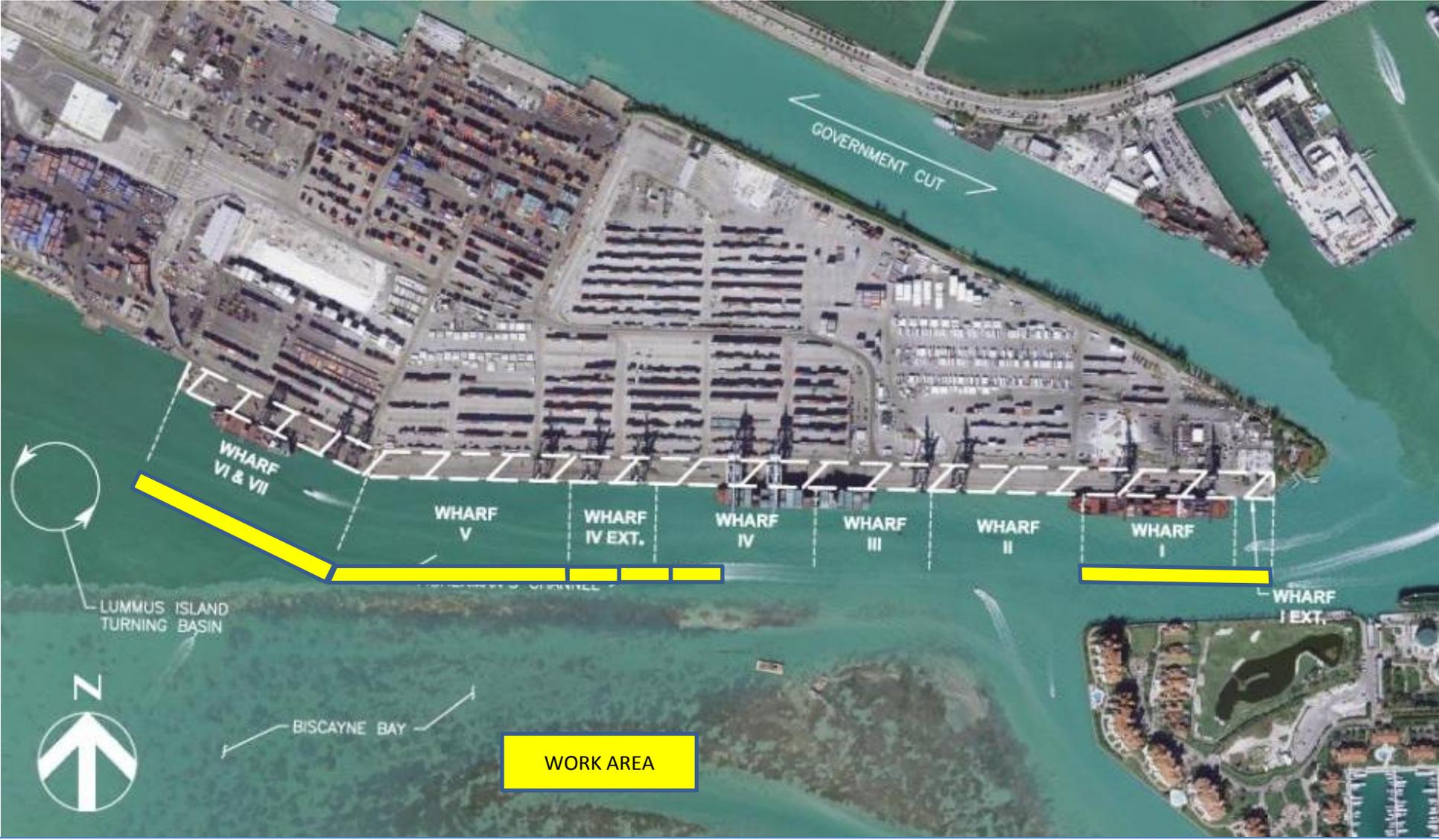
# PortMiami Wharves Strengthening Program

## Original Phasing



# PortMiami Wharves Strengthening Program

## Rolling Sections



# PortMiami Wharves Strengthening Program

## Rolling Construction

### Advantages

- Continues Construction of schedule critical activities “Production Line”
- Minimized impacts to the Port’s Cargo Operation
- Eliminated Learning Curve

### Challenges

- Required close coordination between all construction trades
- Optimization of all construction activities and associated durations
- Failure of a single trade could potentially stop the “Production Line”

# Construction Sequence



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Environment: 185 Coral were Surveyed and Successfully Relocated



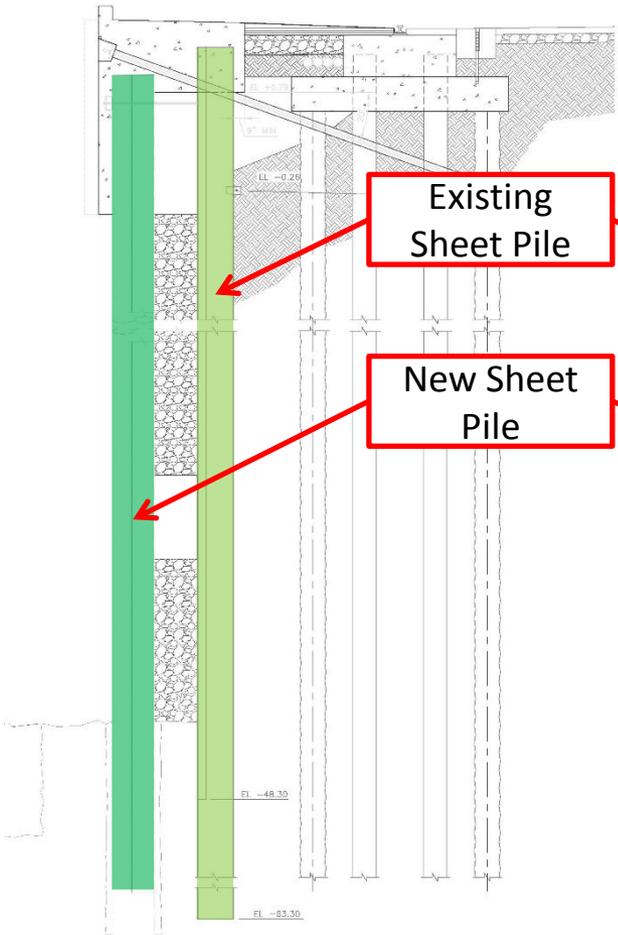
# PortMiami Wharves Strengthening Program

Major Activities 1. Fender and Bollard Demolition



# PortMiami Wharves Strengthening Program

## Major Activities 2. Sheet/King Pile Installation



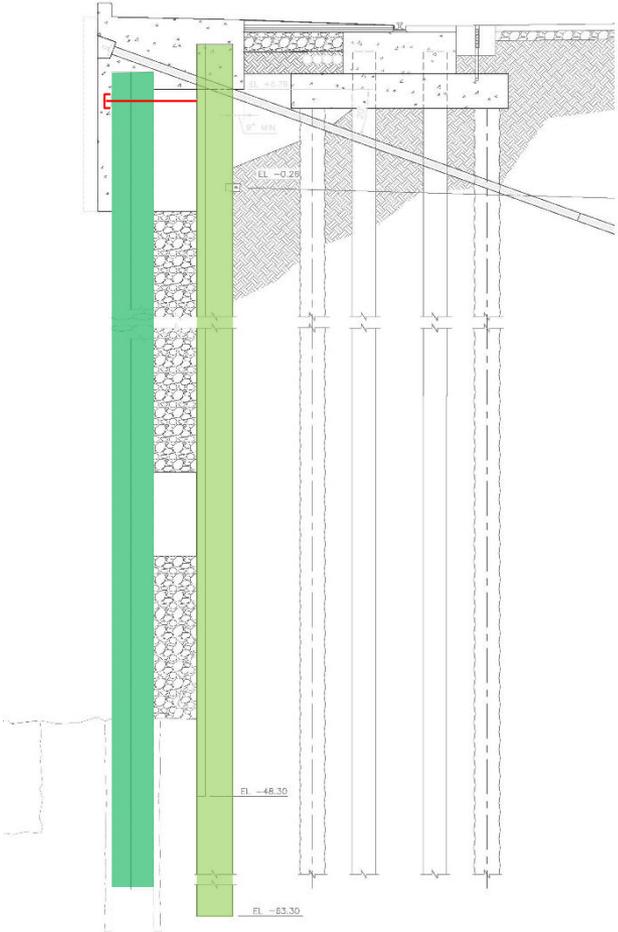
Existing Sheet Pile

New Sheet Pile



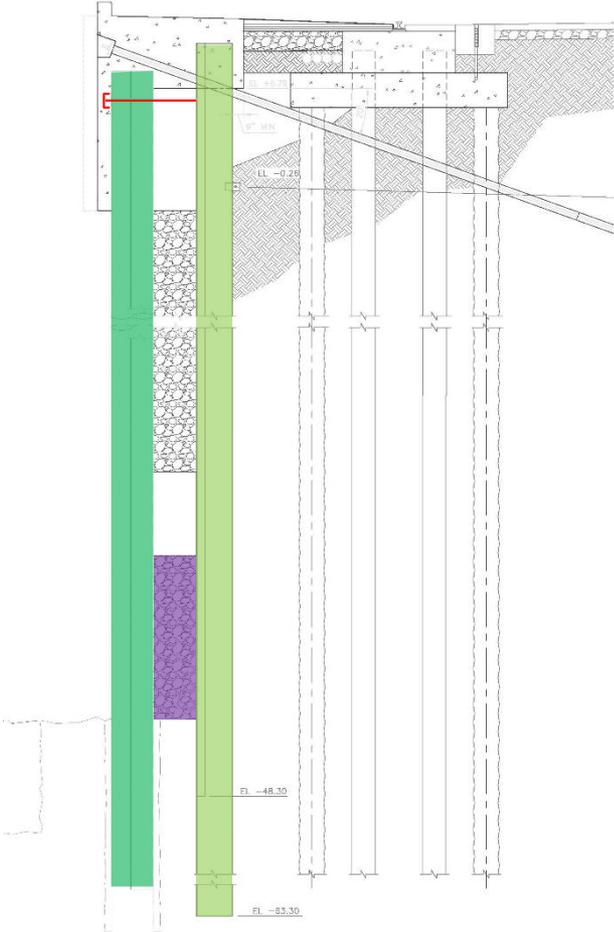
# PortMiami Wharves Strengthening Program

## Major Activities 3. Temporary Tie Back Installation



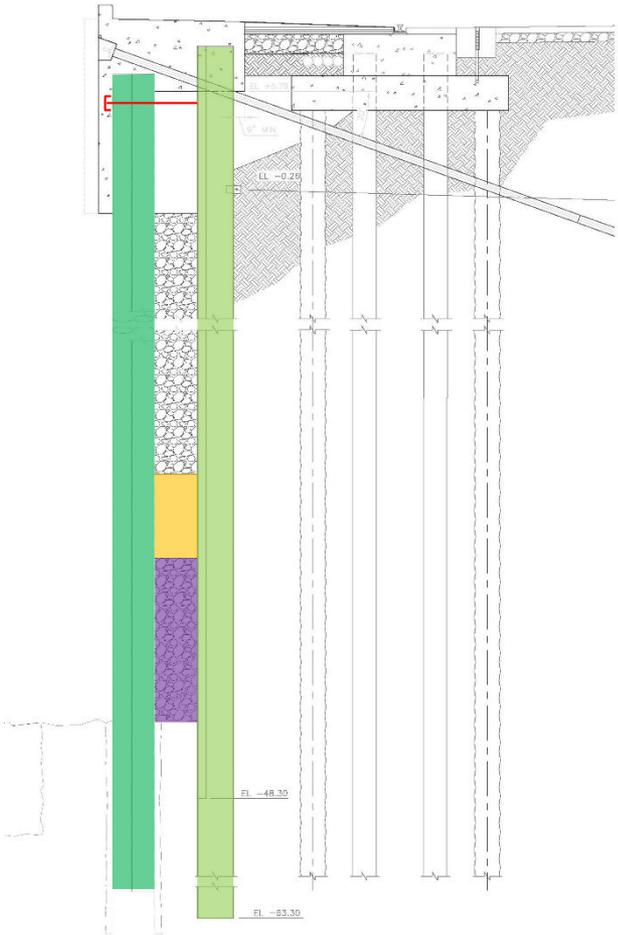
# PortMiami Wharves Strengthening Program

## Major Activities 4. Back Fill with Granular #57 Stone



# PortMiami Wharves Strengthening Program

## Major Activities 5. Back Fill with Un-Reinforced Concrete



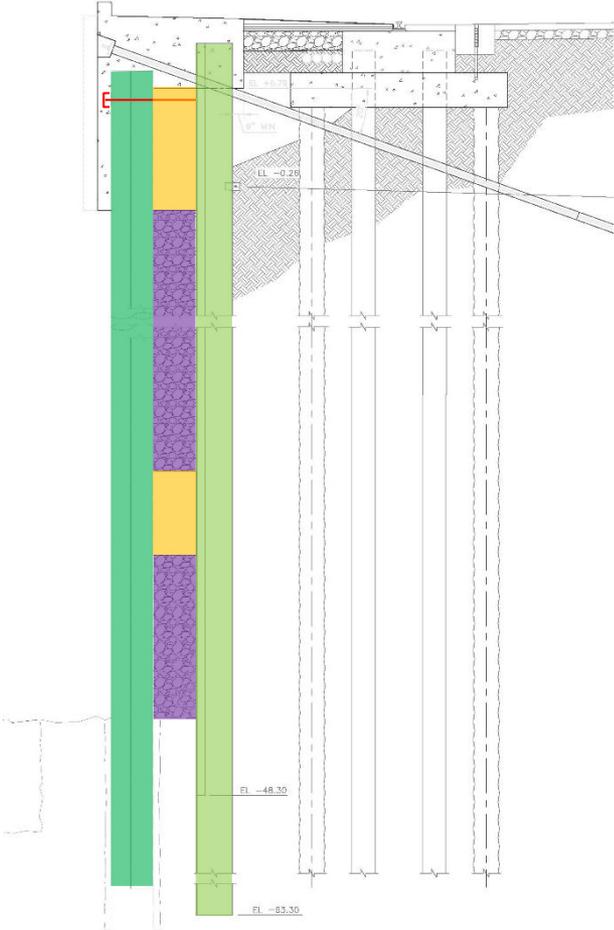
# PortMiami Wharves Strengthening Program

## Major Activities 6. Back Fill with Granular #57 Stone



# PortMiami Wharves Strengthening Program

## Major Activities 7. Back Fill with Un-Reinforced Concrete



# PortMiami Wharves Strengthening Program

## Major Activities 8. Soil Anchor Installation (20/30 Deg.)



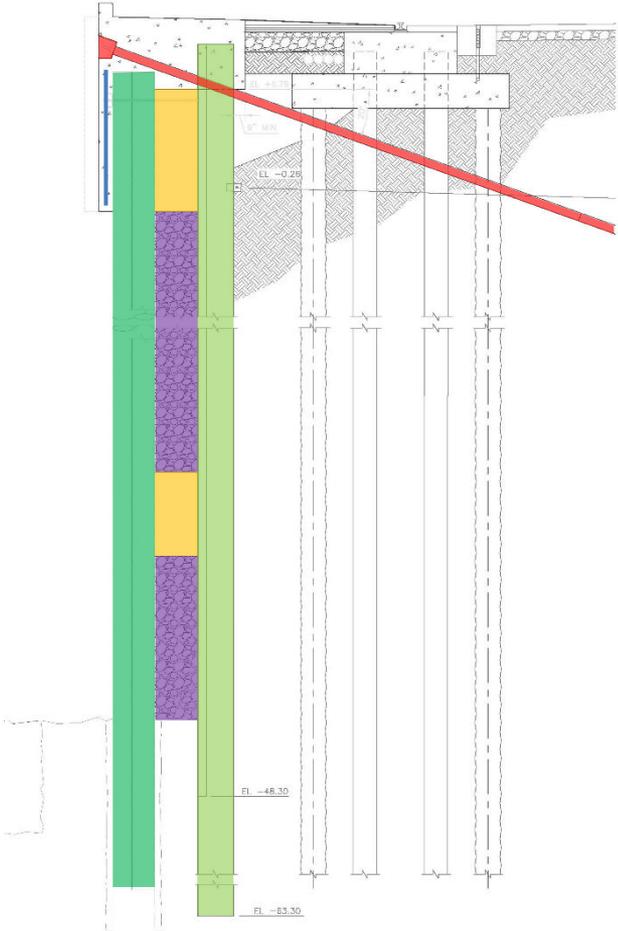
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Major Activities 9. Demolition of Existing Cap Beam



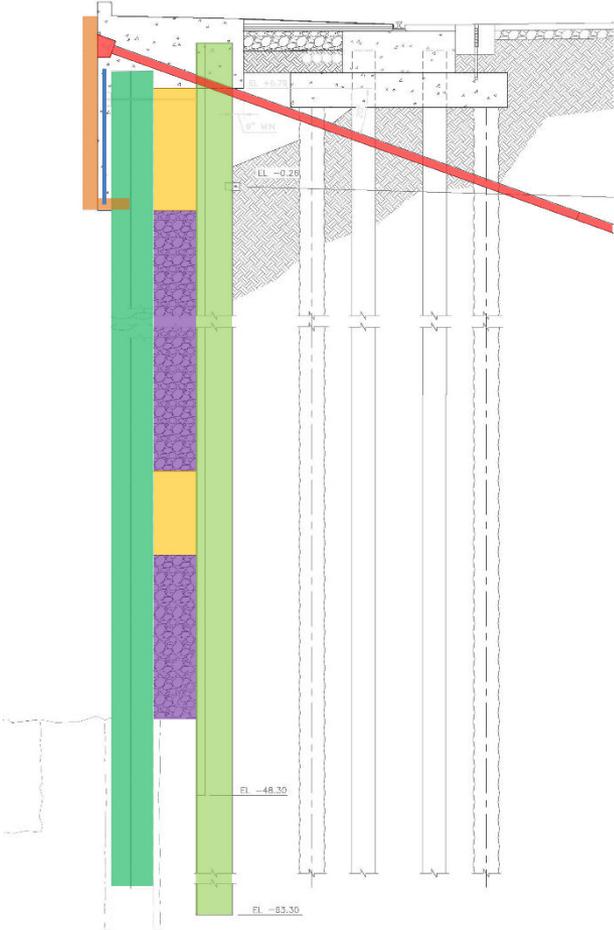
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Major Activities 10. Install Fascia Rebar



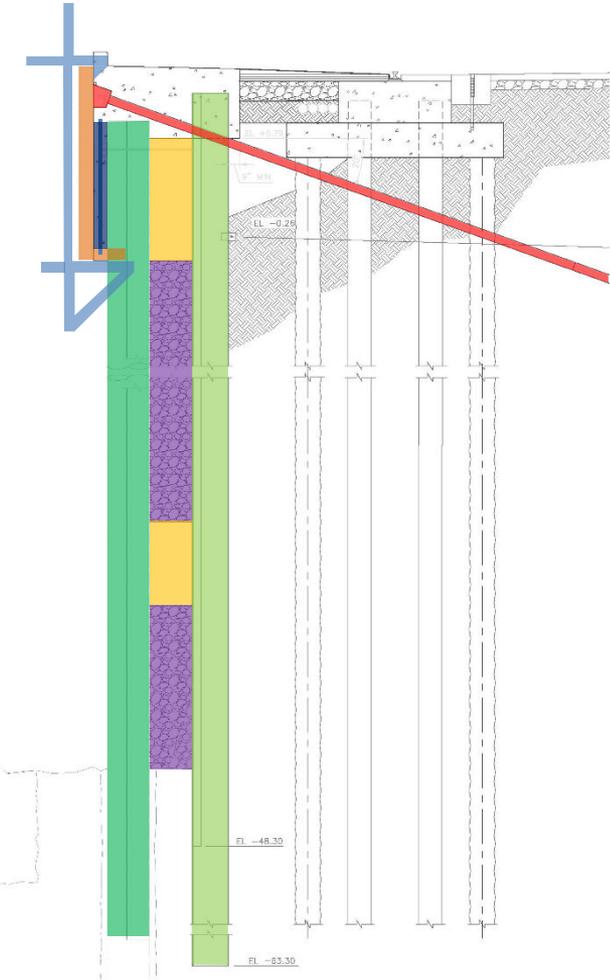
# PortMiami Wharves Strengthening Program

## Major Activities 11. Install Precast Panels



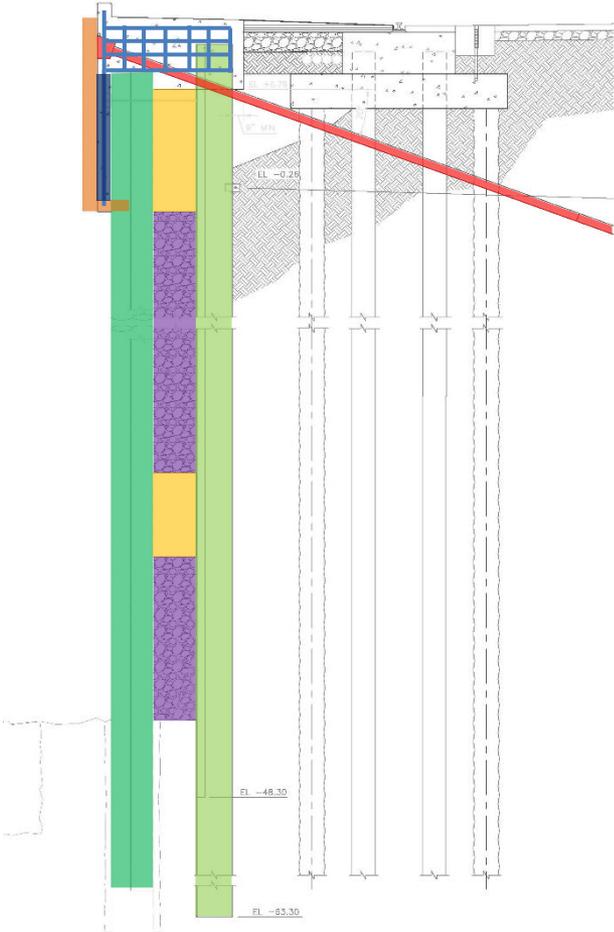
# PortMiami Wharves Strengthening Program

## Major Activities 12. Concrete Pour on Fascia



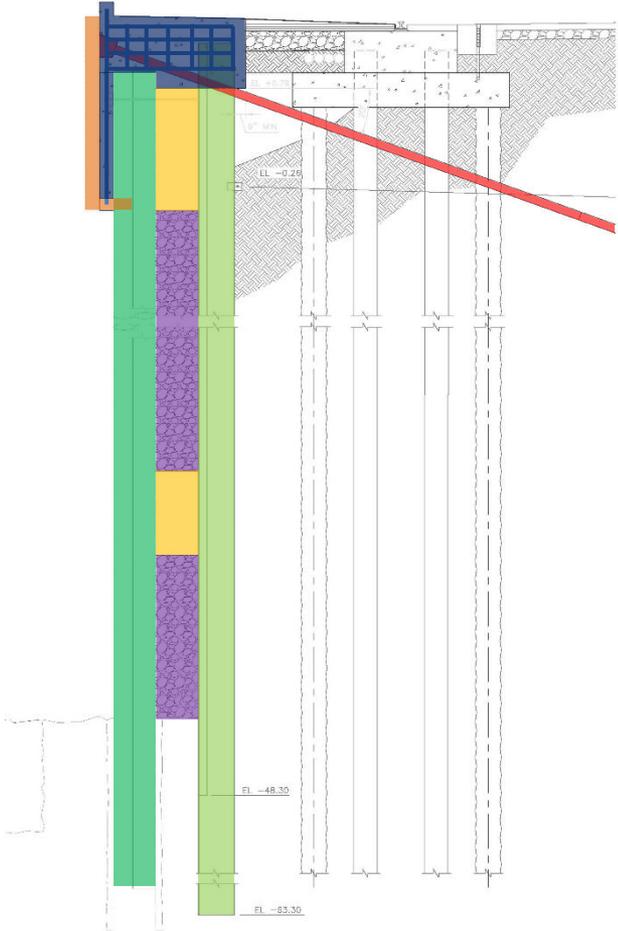
# PortMiami Wharves Strengthening Program

## Major Activities 13. Install Cap Beam Rebar



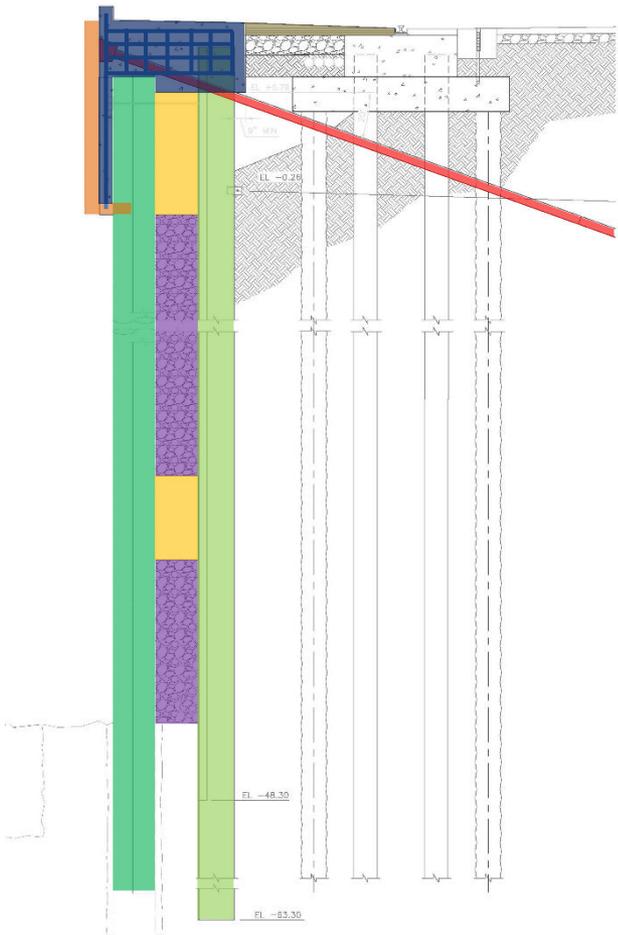
# PortMiami Wharves Strengthening Program

## Major Activities 14. Concrete Placement for new Cap Beam



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## Major Activities 15. Asphalt Paving



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Thank you

