



Melissa Burns, PE | GHD

Matheson Hammock Park Seawall Project

→ FSBPA 36th National Conference on Beach Preservation Technology
Feb 1-3, 2023

Welcome



Agenda

→ Project Background

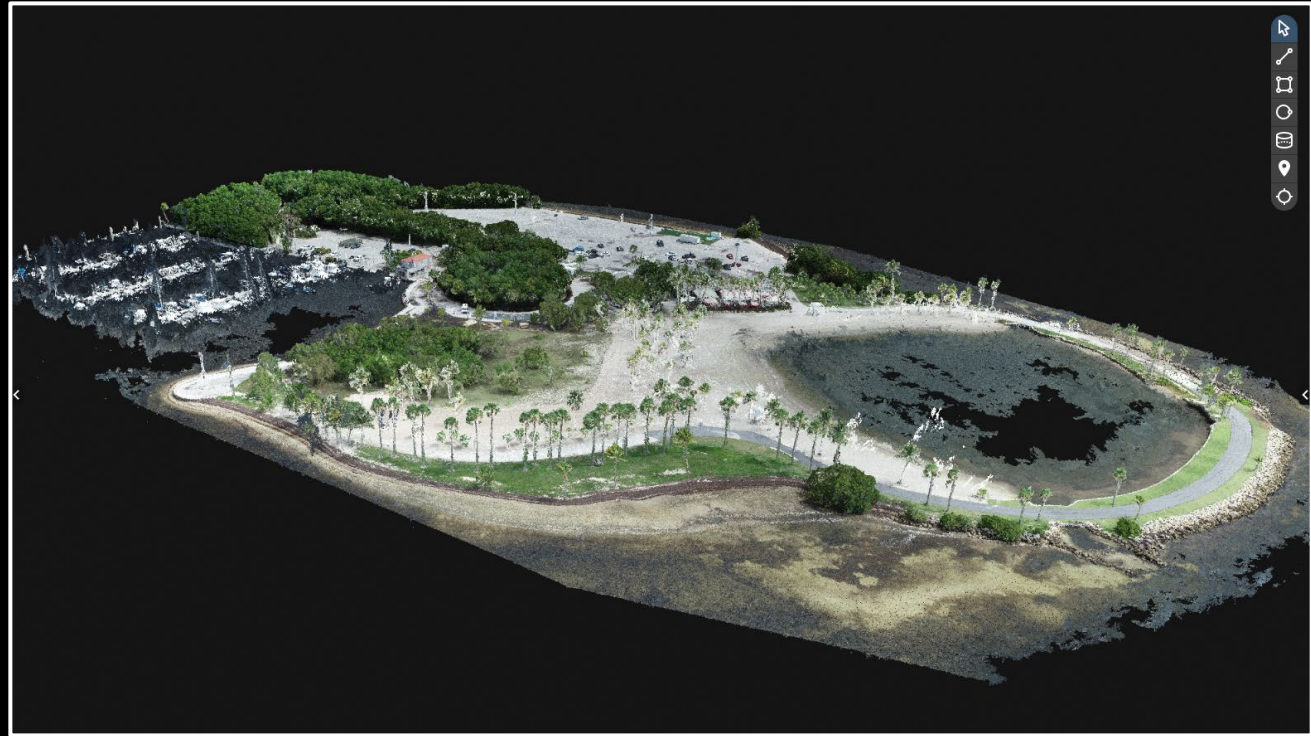
Current Project Status

Challenges and Solutions:

Field Investigations

Top of Wall Evaluation

Schematic Design Concepts

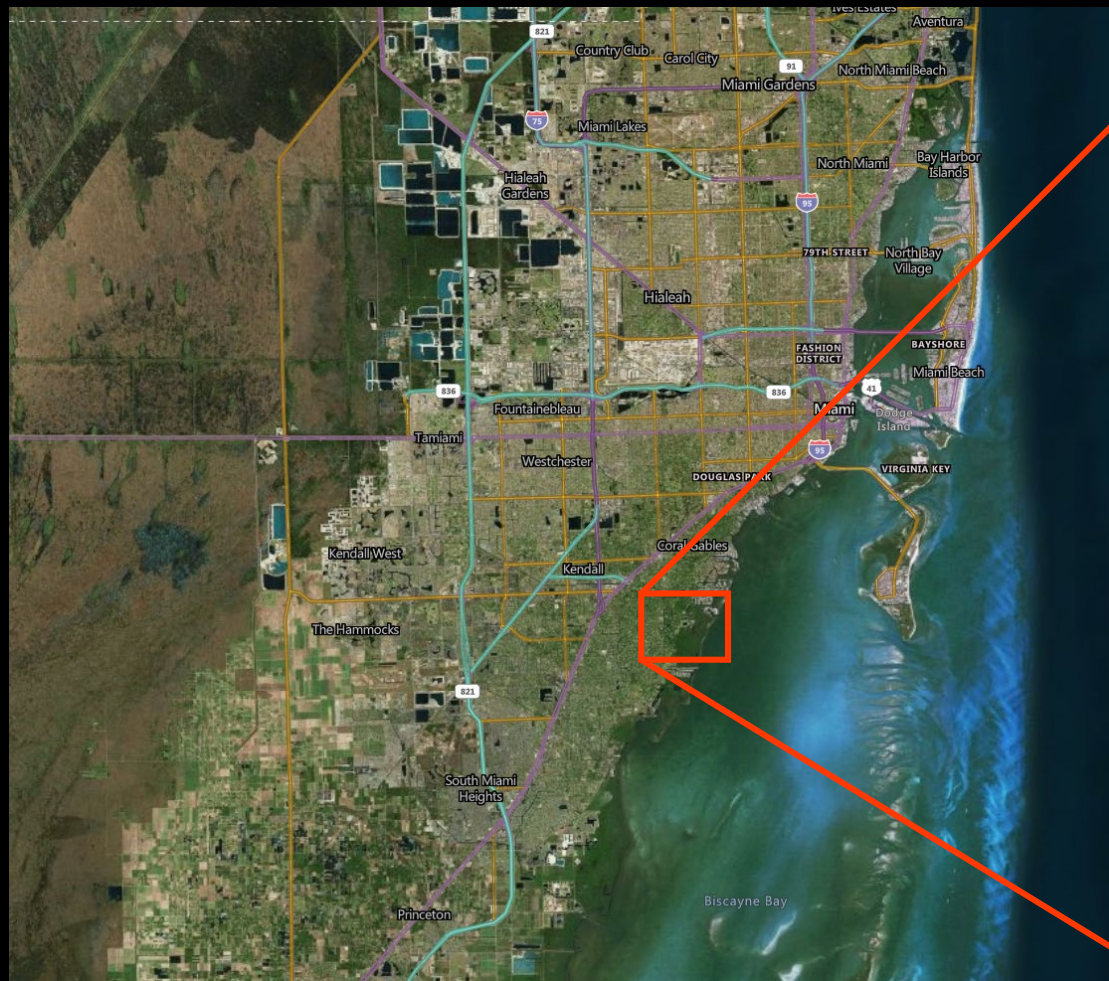


Matheson Hammock Park: High Density Point Cloud from 2022 GHD Drone Survey



MIAMI-DADE COUNTY
PARKS, RECREATION & OPEN SPACES

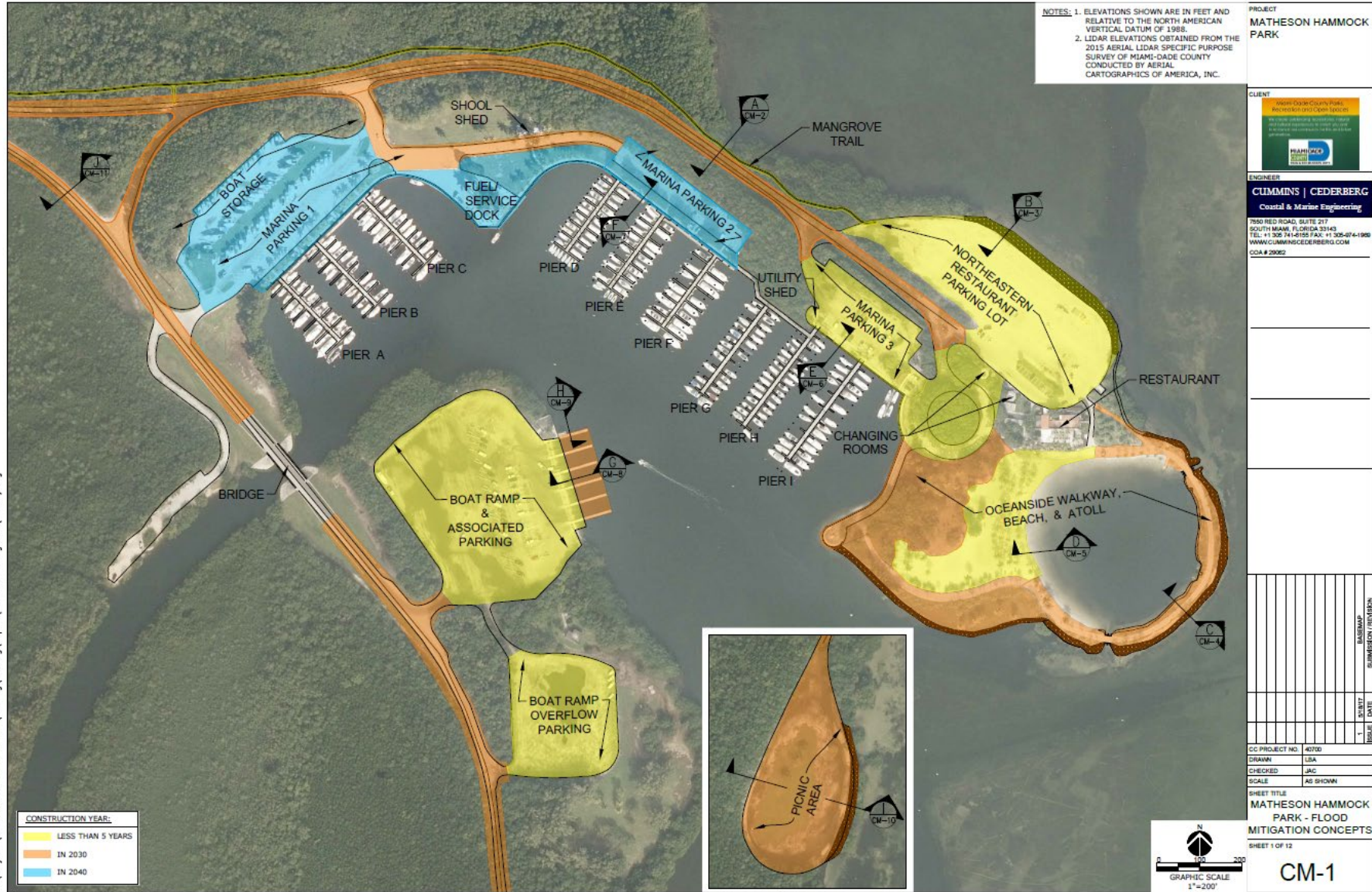
Project Background: Site Location Map



Purpose: improve seawall protection at Matheson Hammock Park



Project Background: Proposed Master Plan Improvements



c:\projects\40700 matheson hammock\drawing\working\sheet\40700-00-new figures.dwg 1/11/2023



Matheson Hammock Seawall Project Background: Project Schedule

	Phase I Schematic Design	Phase II Design Development	Phase III Construction Document Development	Phase IV Bidding & Award of Contract	Phase V Construction Administration
<i>Sub Tasks</i>	Field Investigations	FEMA H&H Study	75% Design Documents	Pre-Bid Meeting	
	Top of Wall Analysis	Design Development	100% Design Documents	RFIs	
	Two seawall alternatives with OPCC	Preparation & Submittal of Permit Package			
<i>Duration</i>	135 days	180 days	120 days	TBD	TBD

May 18, 2022

Sept 30, 2022

March 29, 2023

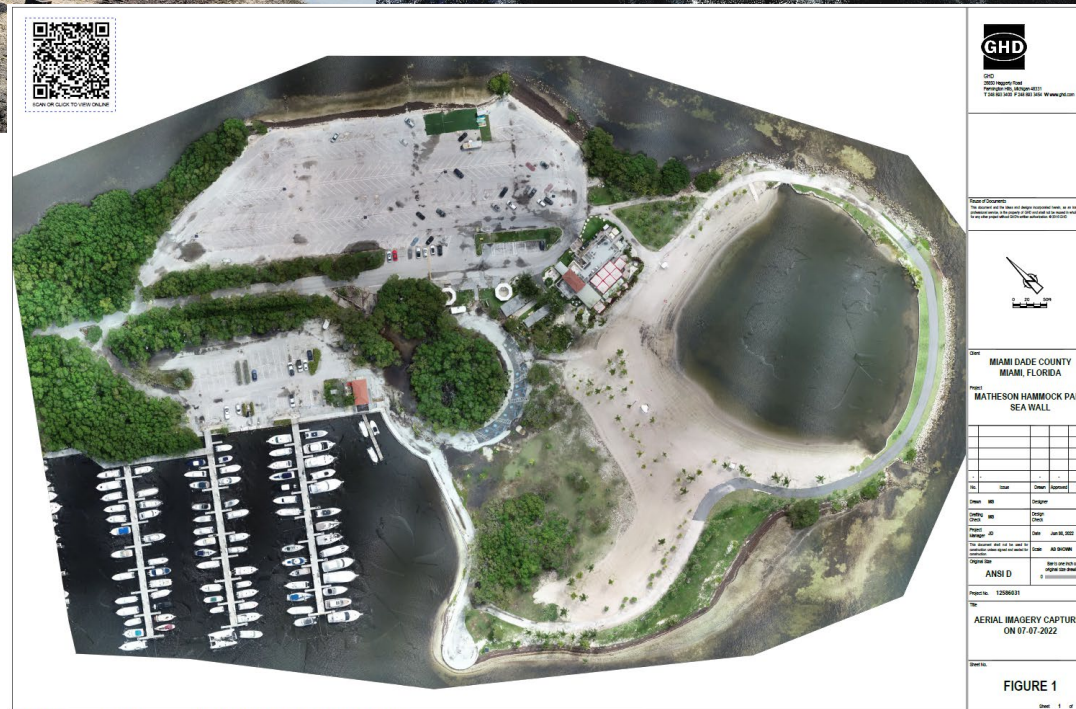
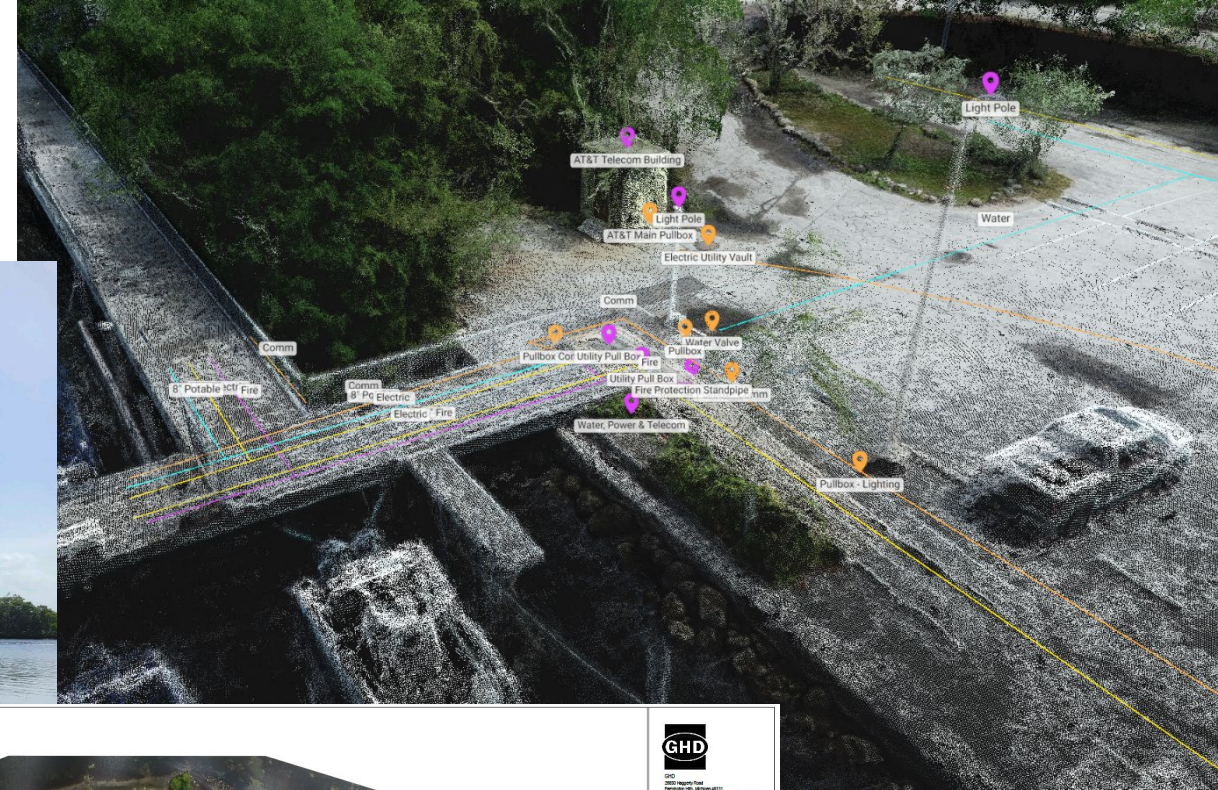
July 27, 2023

Challenges & Solutions

Field Investigations Surveys & Utility Observations

HIGH AREA OF CONFLICT!

- Upland utility observations
 - Water (potable & fire)
 - Steel from in-ground valves to docks
 - Electric
 - AT&T
- Topographic survey
- Bathymetric survey
- Drone survey
 - Photogrammetry
 - 3D Point Cloud
 - Bare Ground Surface
- Benthic resource survey
- Geotechnical Investigation



*Thorough Survey =
Thorough Feasibility
Analysis*



Matheson Hammock Seawall

Top of Wall Analysis

Local Municipal Requirements

Municipality	Top of Wall Requirement (ft, NAVD-88)
City of Miami Beach	5.7 (public walls)
	4.0 (private walls)
City of Ft Lauderdale	3.9 (minimum)
	5.0 (recommended)
Broward County	4.0 (by 2035)
	5.0 (by 2050)
Miami-Dade County	3.4 (required minimum)
	6.0 (proposed)

Stillwater Flood Elevations

Return Period	Stillwater Flood Elevation (ft, NAVD-88)
Hurricane Andrew (1992)*	15.4
500-yr	12.2
Great Miami Hurricane (1926)**	11.7
100-yr	9.2
50-yr	7.7
25-yr	3.7
10-yr	3.2
King Tide (10-05-2017)	2.3

GHD Recommendations

- Constructed top of wall = +5ft, NAVD-88
 - > 2017 King Tide past 2060
 - > 25-yr event past 2040
 - ~3ft public bench above existing grade
- Future top of wall = +8ft, NAVD-88
 - Complies with Miami-Dade County's proposed top of wall guidance
 - > 25-yr event past 2080

Sea Level Rise Projections

Datum: Feet 1992 MSL		
Year	NOAA 2017 Int-High	NOAA 2022 Int-High*
2040	1.45	0.99
2050	2.01	1.38
2060	2.63	1.97
2070	3.38	2.69
2080	4.24	3.48
2090	5.19	4.37
2100	6.21	5.42

Seawall Freeboard for Combined Stillwater Flood Events + RSLR (ft)					
Return Period	Wall Elevation (ft, NAVD-88)	2040	2060	2080	2100
100-yr	+2.0 Approximate existing top of wall elevation	-8.19	-9.17	-10.68	-12.62
50-yr		-6.69	-7.67	-9.18	-11.12
25-yr		-2.69	-3.67	-5.18	-7.12
10-yr		-2.19	-3.17	-4.68	-6.62
2017 King Tide		-1.26	-2.24	-3.75	-5.69
100-yr	+3.0	-7.19	-8.17	-9.68	-11.62
50-yr		-5.69	-6.67	-8.18	-10.12
25-yr		-1.69	-2.67	-4.18	-6.12
10-yr		-1.19	-2.17	-3.68	-5.62
2017 King Tide		-0.26	-1.24	-2.75	-4.69
100-yr	+4.0	-6.19	-7.17	-8.68	-10.62
50-yr		-4.69	-5.67	-7.18	-9.12
25-yr		-0.69	-1.67	-3.18	-5.12
10-yr		-0.19	-1.17	-2.68	-4.62
2017 King Tide		0.74	-0.24	-1.75	-3.69
100-yr	+5.0**	-5.19	-6.17	-7.68	-9.62
50-yr		-3.69	-4.67	-6.18	-8.12
25-yr		0.31	-0.67	-2.18	-4.12
10-yr		0.81	-0.17	-1.68	-3.62
2017 King Tide		1.74	0.76	-0.75	-2.69
100-yr	+6.0	-4.19	-5.17	-6.68	-8.62
50-yr		-2.69	-3.67	-5.18	-7.12
25-yr		1.31	0.33	-1.18	-3.12
10-yr		1.81	0.83	-0.68	-2.62
2017 King Tide		2.74	1.76	0.25	-1.69
100-yr	+7.0	-3.19	-4.17	-5.68	-7.62
50-yr		-1.69	-2.67	-4.18	-6.12
25-yr		2.31	1.33	-0.18	-2.12
10-yr		2.81	1.83	0.32	-1.62
2017 King Tide		3.74	2.76	1.25	-0.69
100-yr	+8.0***	-2.19	-3.17	-4.68	-6.62
50-yr		-0.69	-1.67	-3.18	-5.12
25-yr		3.31	2.33	0.82	-1.12
10-yr		3.81	2.83	1.32	-0.62
2017 King Tide		4.74	3.76	2.25	0.31

*Pink cells indicate scenarios where the water surface elevation exceeds the top of wall.

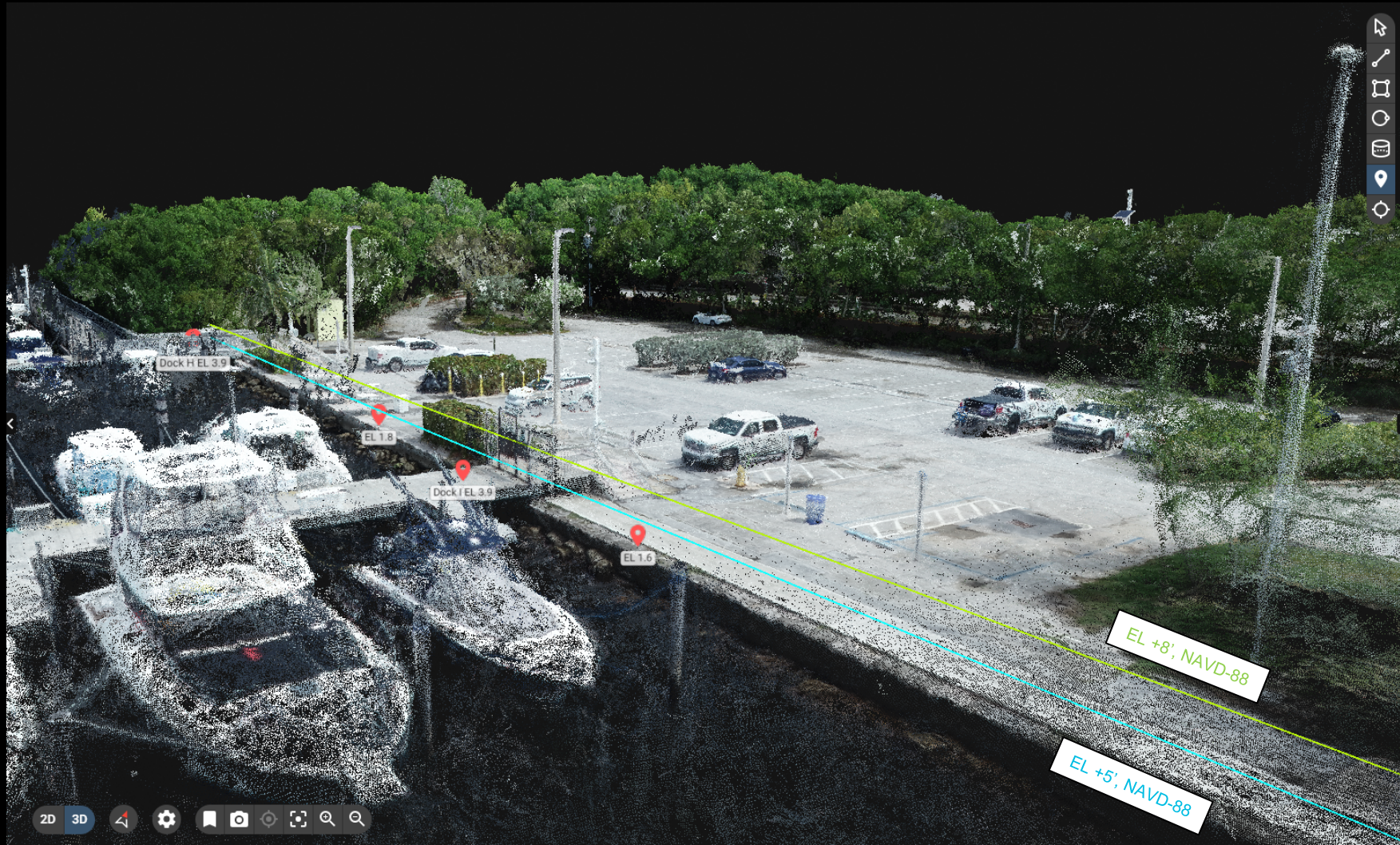
**Blue cell indicates recommended constructed wall elevation.

***Green cell indicates recommended design wall elevation (PROS will have the ability to increase the wall elevation by 3 feet)



Matheson Hammock Seawall

Top of Wall Visualization: Early Conflict Identification

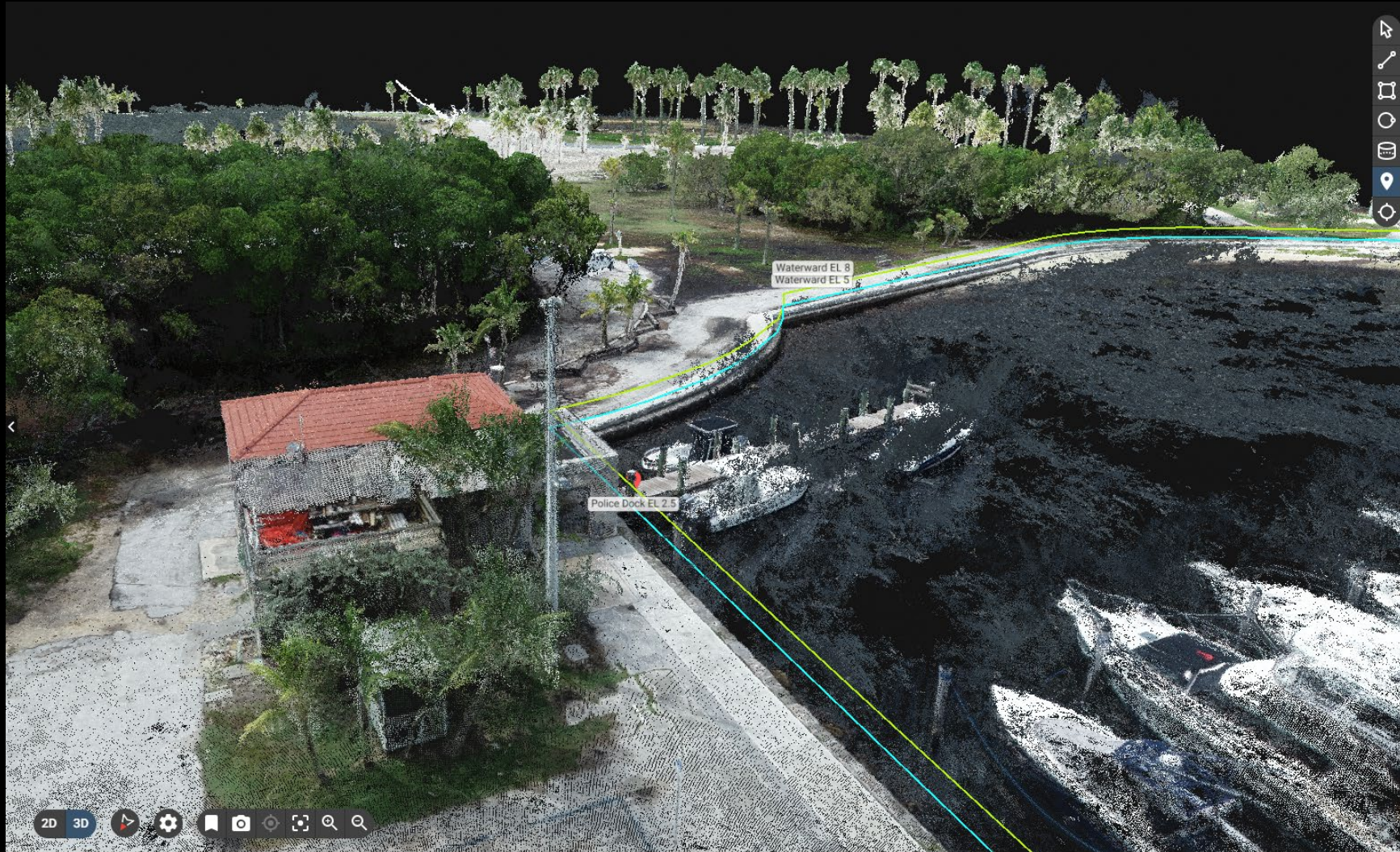


Matheson Hammock Park: High Density Point Cloud from 2022 GHD Drone Survey



Matheson Hammock Seawall

Top of Wall Visualization: Early Conflict Identification



Matheson Hammock Park: High Density Point Cloud from 2022 GHD Drone Survey

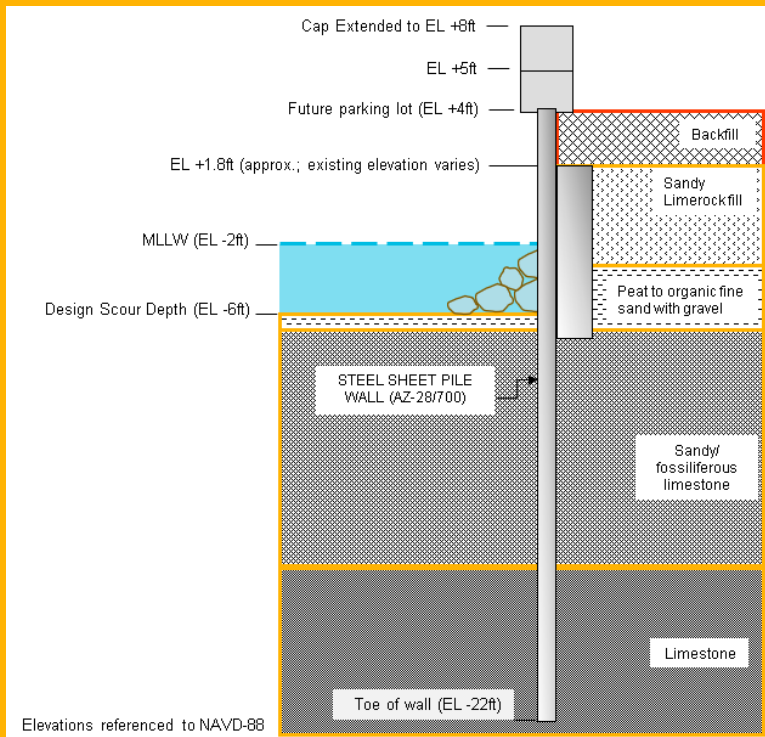
Phase I Schematic Design Concepts

Design Considerations

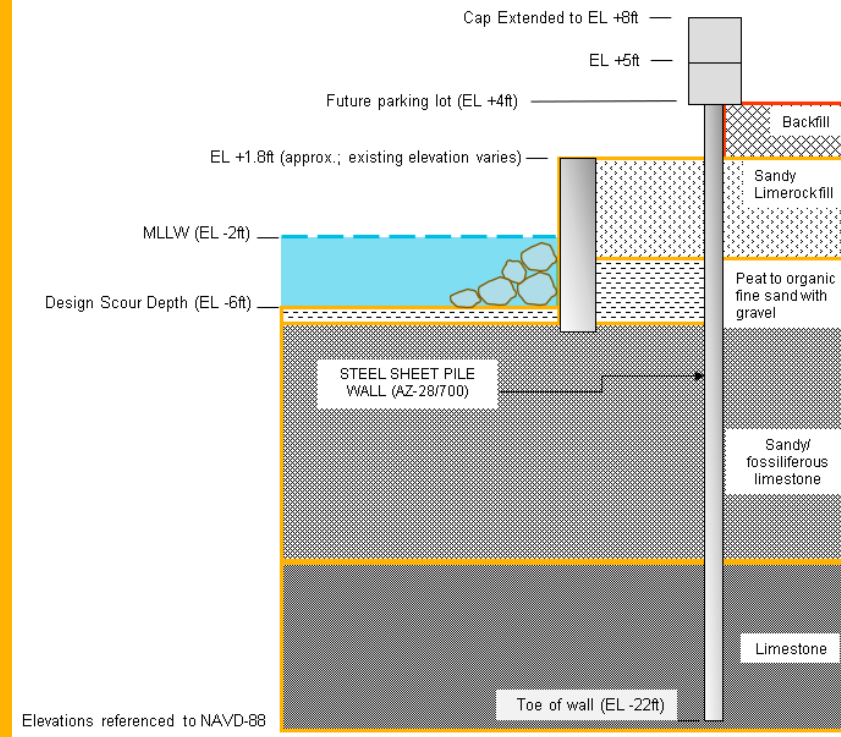
- Design life
 - 50 years
- Upland Conflicts
 - Utilities
 - Historic Building
 - Parking lot & misc. structures (fish cleaning tables)
- Structural
 - Top of wall elevation – **ADAPTIVE!**
 - Future parking lot elevation = +4ft, NAVD-88
 - Scour: low risk along waterward face due to riprap and vessels' operating at slow speed/no wake
 - Loads: vehicular, construction equipment, pedestrian
- Corrosion
 - 0.0015 inches/year (FDOT Guideline)
- Drainage
 - 9.43 in./hr (15-minute intensity)
- Access
 - Continuity of service during construction
 - ADA access
 - Security gates
- Installation Methods
 - Non-vibratory methods (e.g. pre-drilling or press-in)
- Aesthetics
 - Oolitic limestone façade / tile



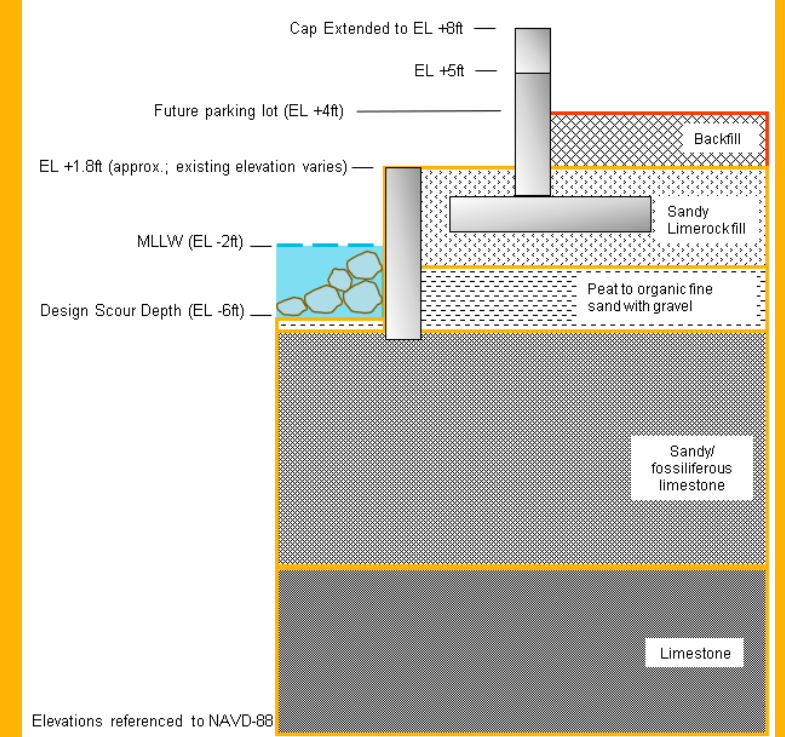
Phase I Schematic Design Concepts



Estimated Construction Cost:
\$2,970,000



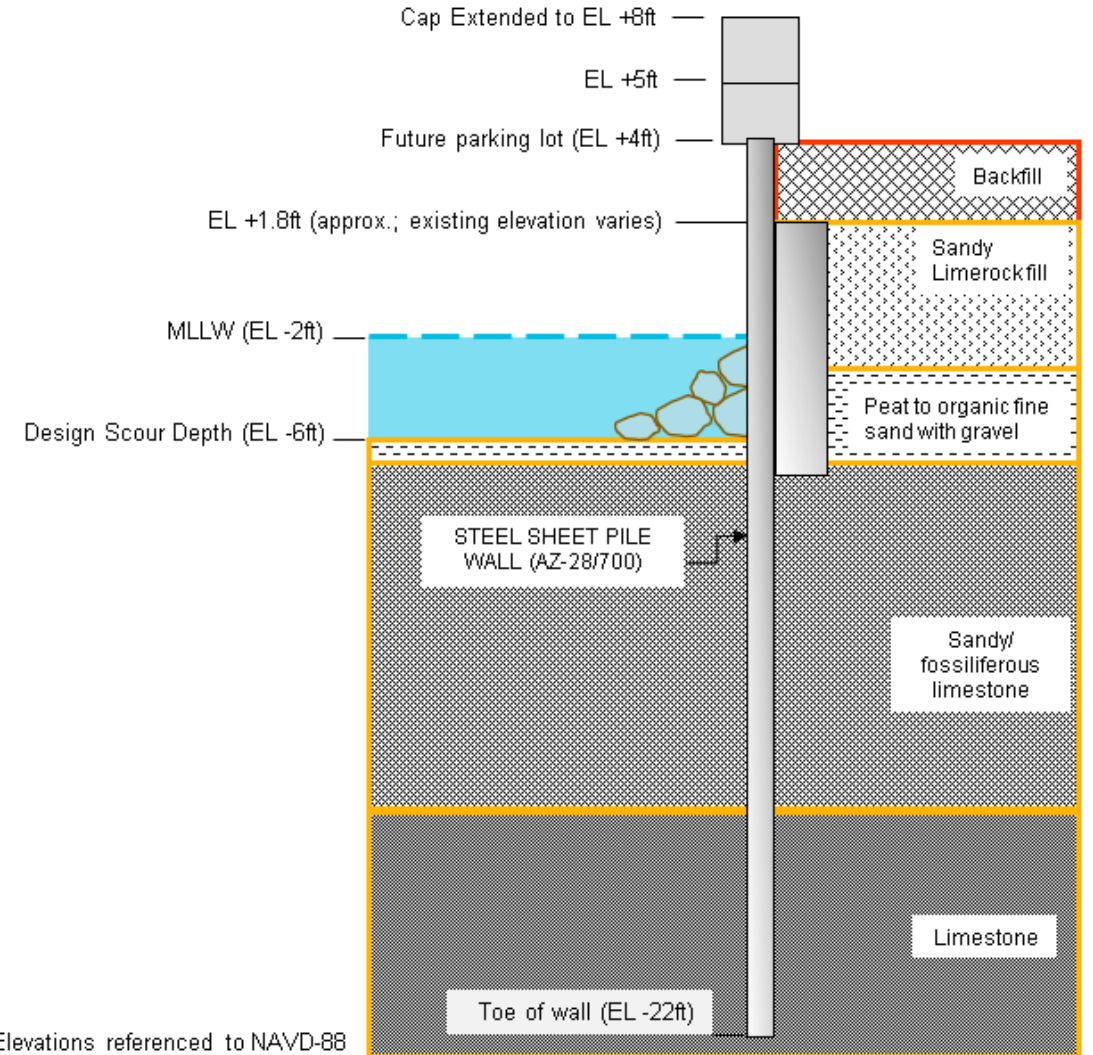
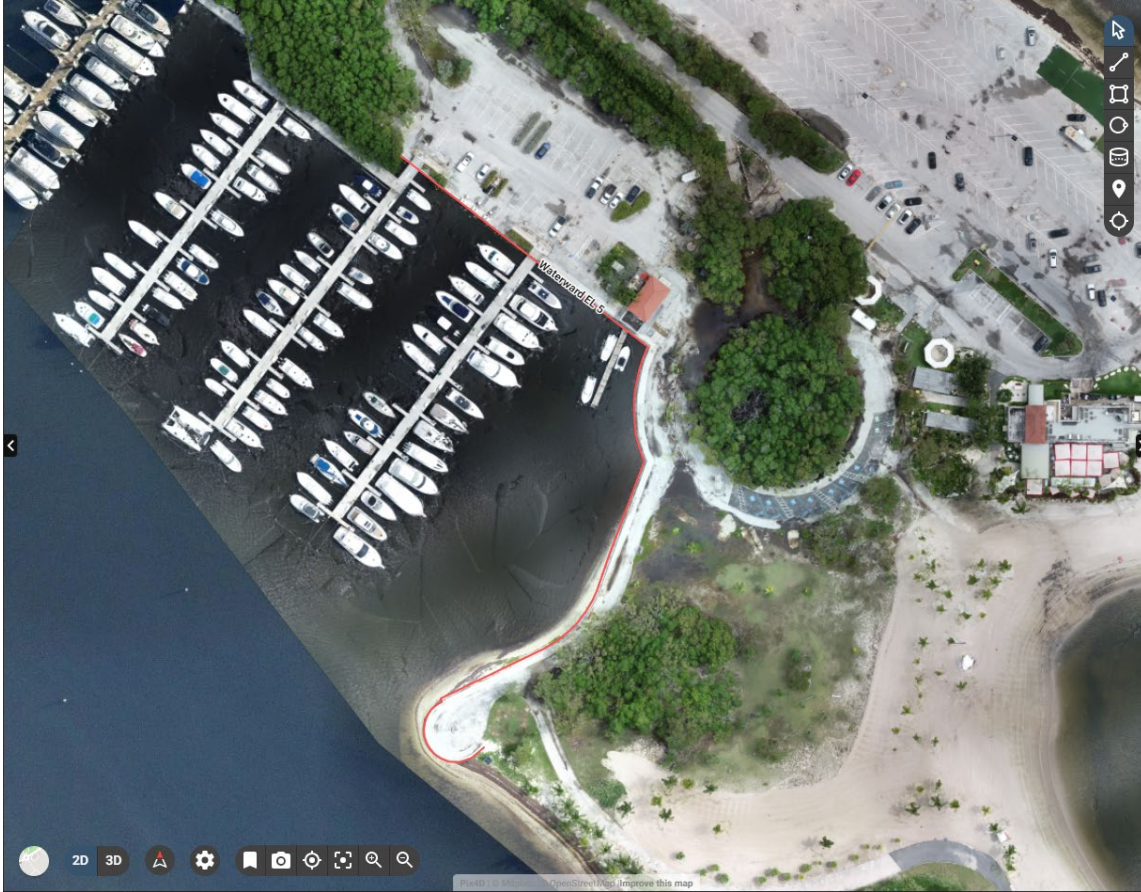
Estimated Construction Cost:
\$3,250,000



Not Recommended for
Further Consideration

Phase I Schematic Design Concepts

Recommended Alternative



Elevations referenced to NAVD-88

Conceptual Schematic - NTS

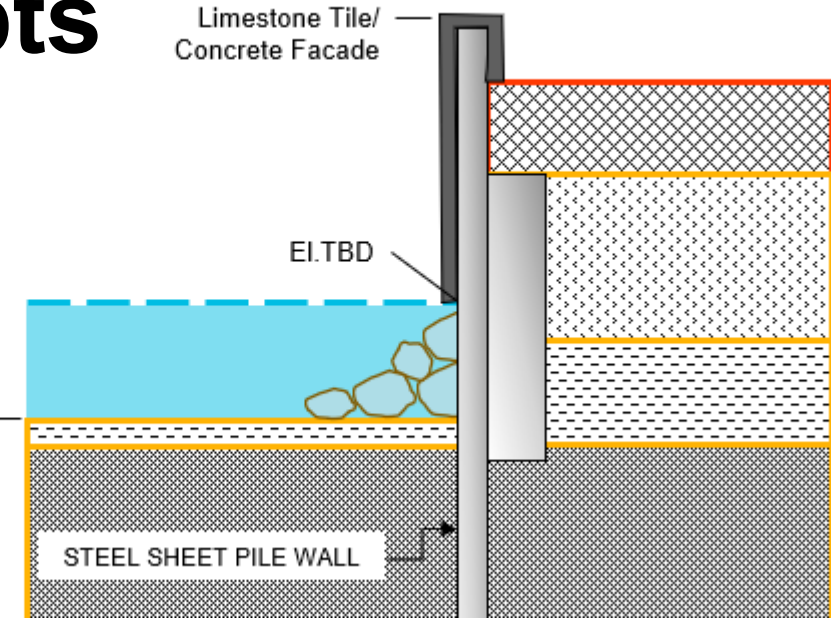
Phase I Schematic Design Concepts

Steel Sheetpile – Oolitic Limestone Facade

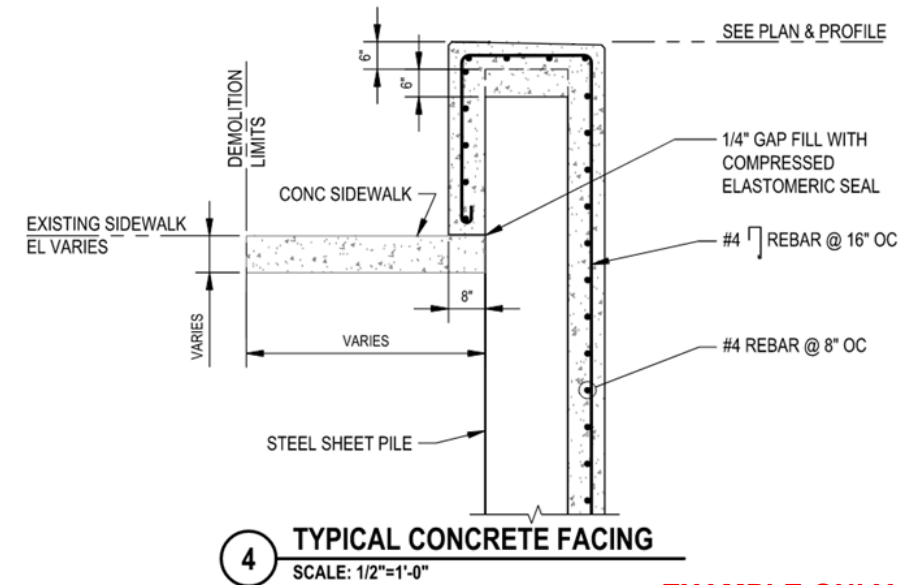
Keystone Oolitic Limestone tile options



Design Scour Depth (EL -6ft)



CONCEPTUAL SCHEMATIC - NTS

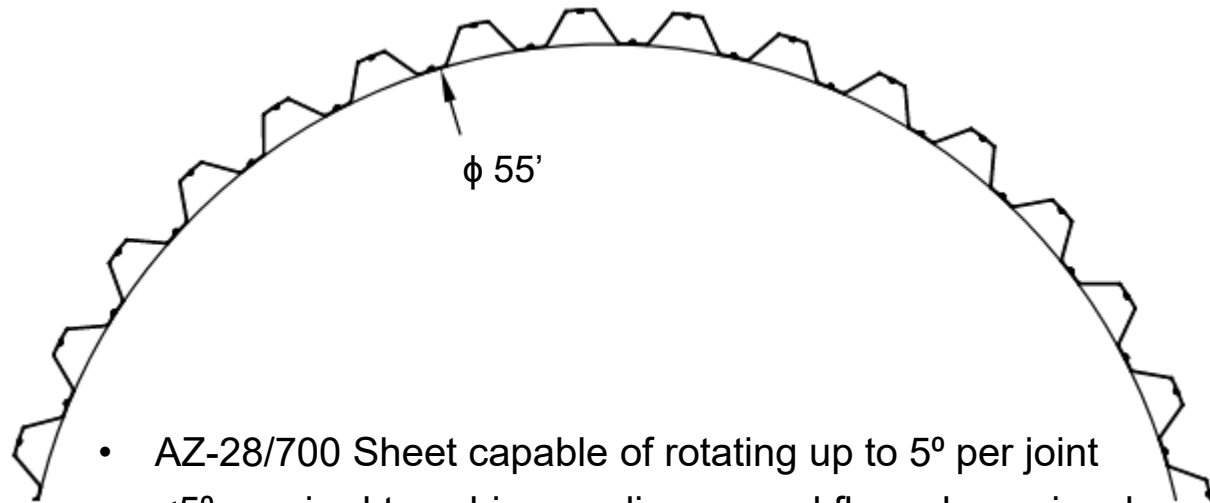


4 TYPICAL CONCRETE FACING
SCALE: 1/2"=1'-0"

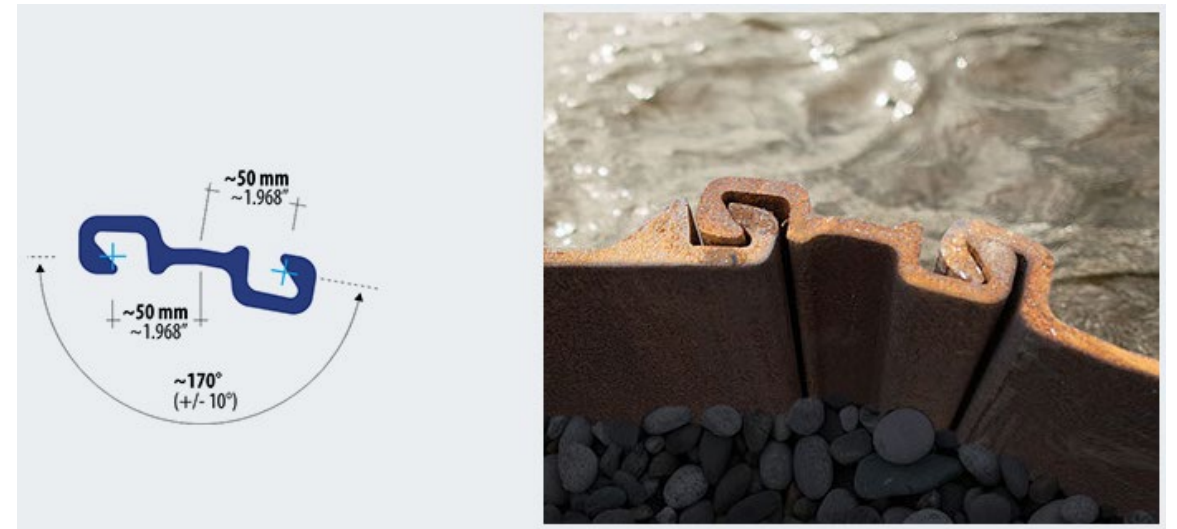
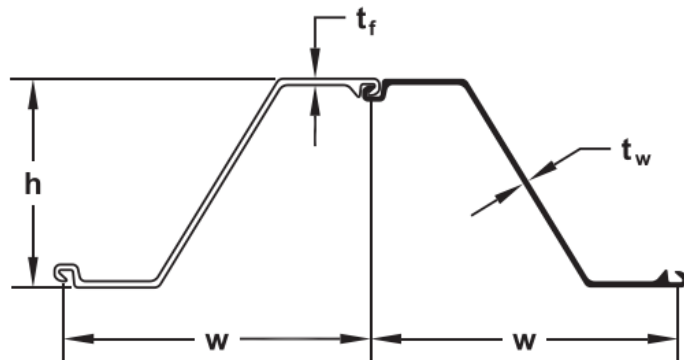
EXAMPLE ONLY

Phase I Schematic Design Concepts

Steel Sheetpile – Flagpole Peninsula



- AZ-28/700 Sheet capable of rotating up to 5° per joint
- $<5^\circ$ required to achieve radius around flagpole peninsula
- Alternatively, LL S170 Connector may be used



Phase I Schematic Design Concepts

Steel Sheetpile – Dock Access



Existing site access to remain unchanged.

Phase I Schematic Design Concepts

Steel Sheetpile – Flood Gates

– Purpose

- Access to dock remains unchanged and at existing elevation
- Flood gate provides protection at proposed top of wall elevation
- Layout
 - Full wall height (top of gate at either +5' or +8')
 - Chainlink fence remains landward of flood gate for daily use
 - Flood gate can be closed for extreme events only

– Types

- Swing gate (recommended)
 - Ease of use
 - Minimal maintenance
 - Requires space for swing radius
- Slide gate
 - Reduced footprint
 - Additional maintenance





*** Thank You**

Waterward El 5

→ ghd.com



Contacts

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GHD

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Miami-Dade County

Parks, Recreation and Open Spaces Department