

Resiliency in Action: *Navigating Water's Influence from Concept to Construction*

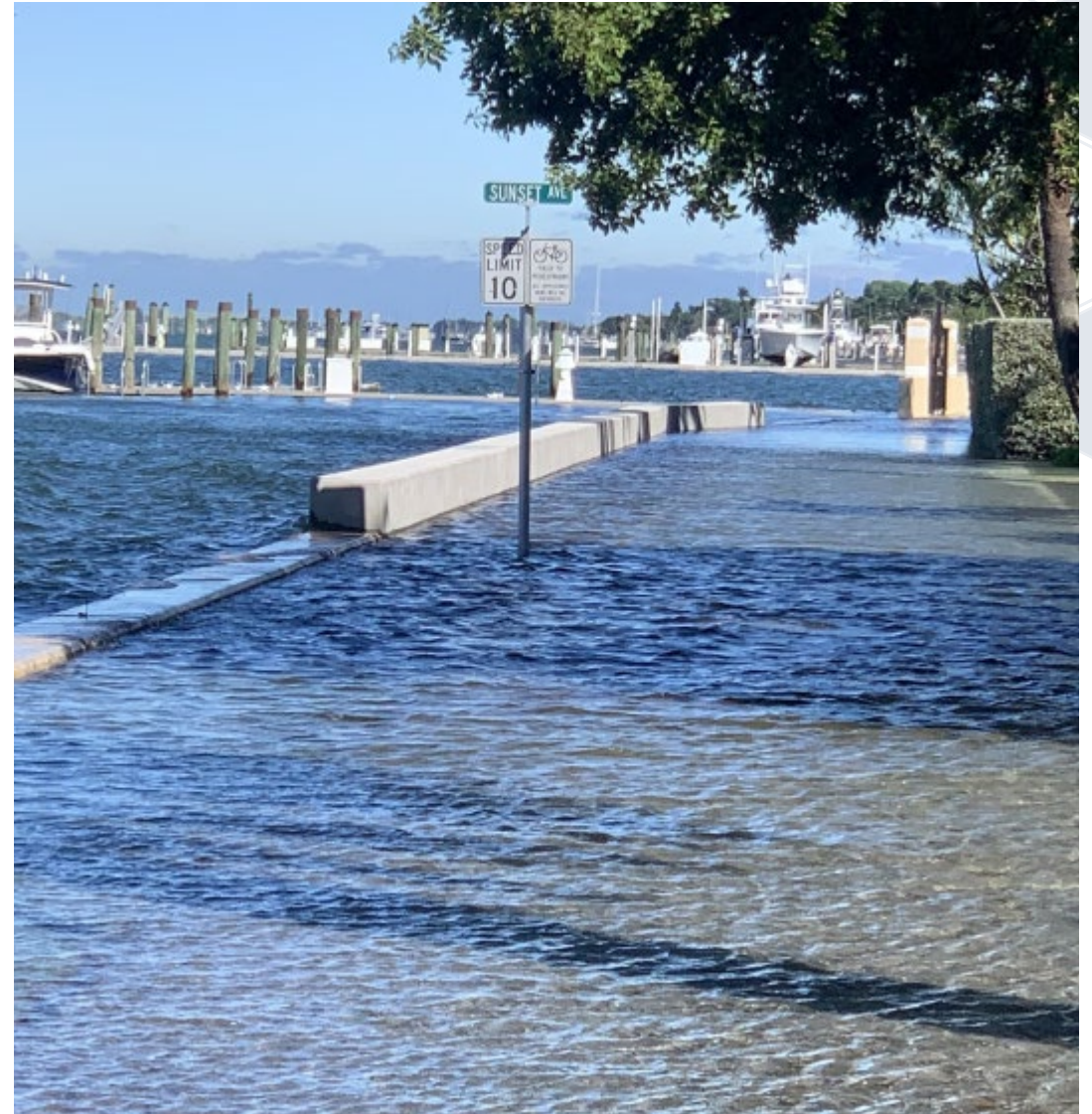
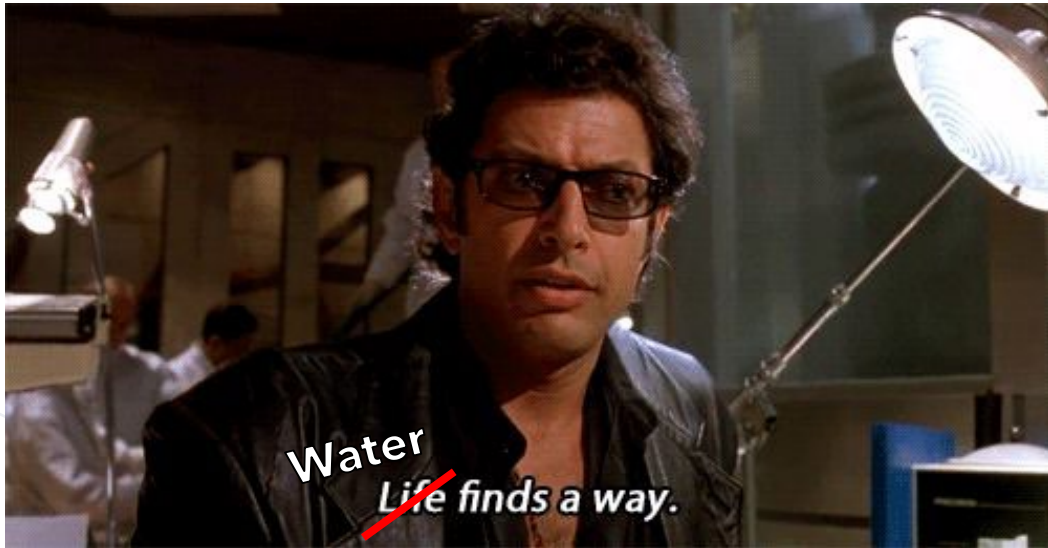
Jordon Cheifet, PE, CFM

FSBPA Conference -
Beach Preservation Technology
Thursday, February 6, 2025



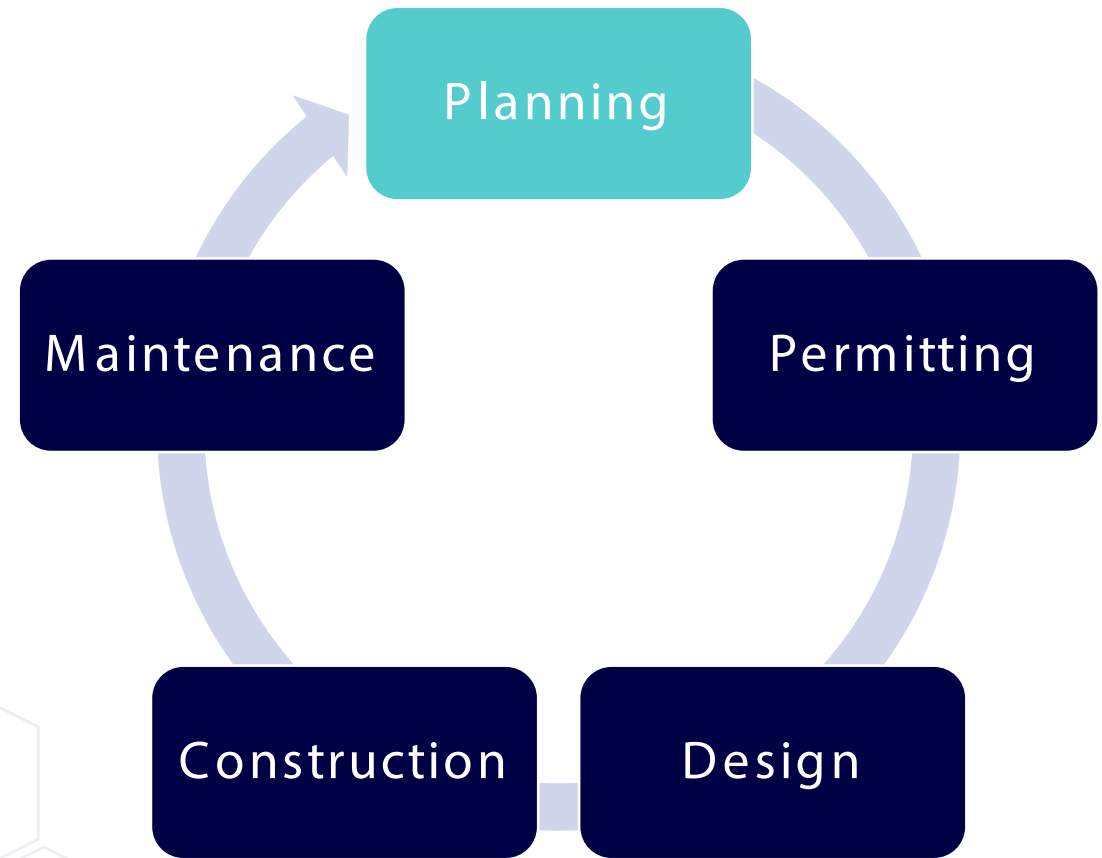
Introduction

- Planning vs. Implementation
- Public Understanding of Risk & Protection
- Design Challenges/Limitations
- Project Example



Source: Town of Palm Beach

Planning vs. Implementation



ReturnInterval KingTides
Flexibility Seawall
Flooding Sustainability
Resilience SeaLevelRise
Recovery StormsStrength
LivingShoreline
SunnyDayFlooding BaseFlood
ClimateChange

Flood Protection ≠ Shoreline Protection

Public Understanding of Risk & Protection

- What does flooding mean to elected officials?

“Wow - Now experts are calling #Harvey a once in 500-year flood! We have an all-out effort going, and going well!”

– Donald Trump, President, Hurricane Harvey

“When you have two 500-year floods within two years of each other, it's pretty clear it's not a 500-year flood.”

– Roy Cooper, NC Governor, Hurricane Florence

“We are at a 1000-year level of rain in parts of the low country. What does that mean? We haven't seen this level of rain in the low country in 1000 years. That's how big this is.”

– Nikki Haley, SC Governor



Public Understanding of Risk & Protection

- What does flooding mean to the public?

“70% of residents living behind a levee designed to provide protection from a 100-year event did not understand their risk”
– Ludy and Kondolf (2012)

“Flooding probability is hard to understand for the public”
– NPR (2019)

“The educated layperson or elected officials, they think, 'Well, you scientists and engineers can't get it straight because we had a 100-year flood two years ago! Why are we having another one? You guys must have your numbers wrong.' It makes people think we don't know what we're doing,”
– Robert Holmes, USGS



Design Challenges

- Will our beautiful rendering solve all our problems?



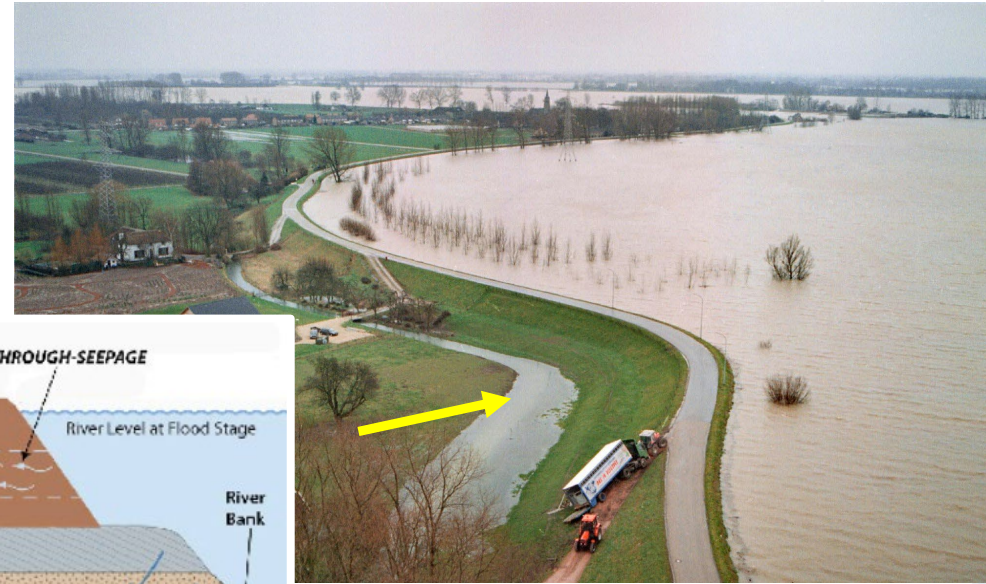
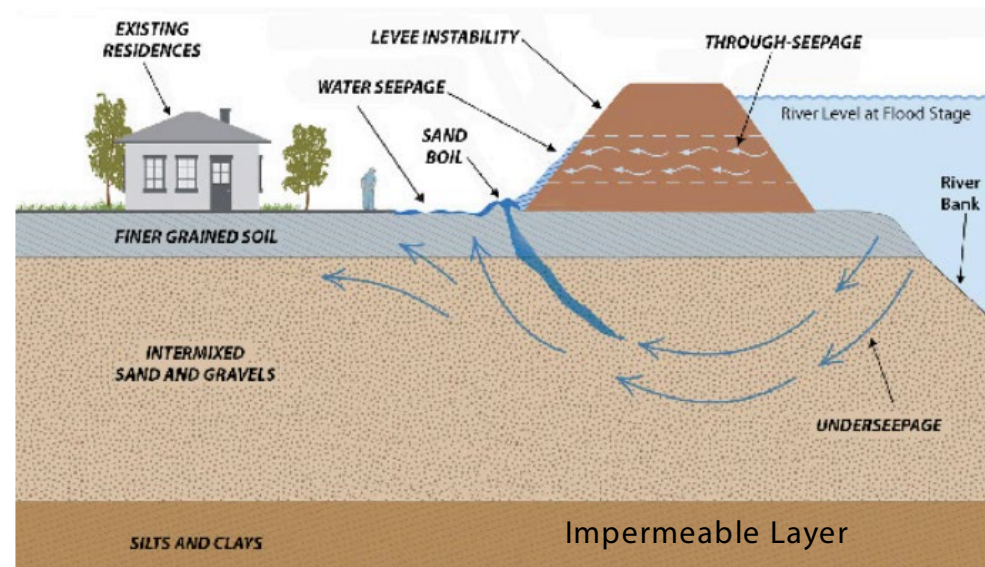
Design Challenges

- Will our beautiful rendering solve all our problems?
 - Revetments/Breakwaters
 - Seepage
 - Expansion Joints
 - Sheet Pile Joints
 - Pile/Panel Configuration
 - Driveways
 - Utilities
 - Marine Resources/Trees



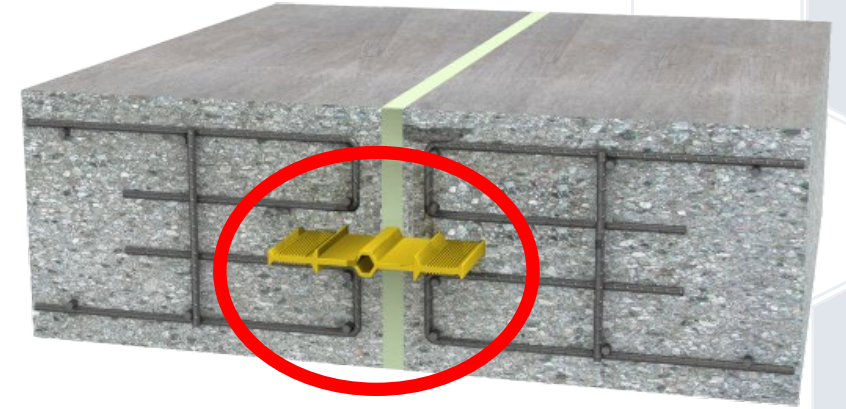
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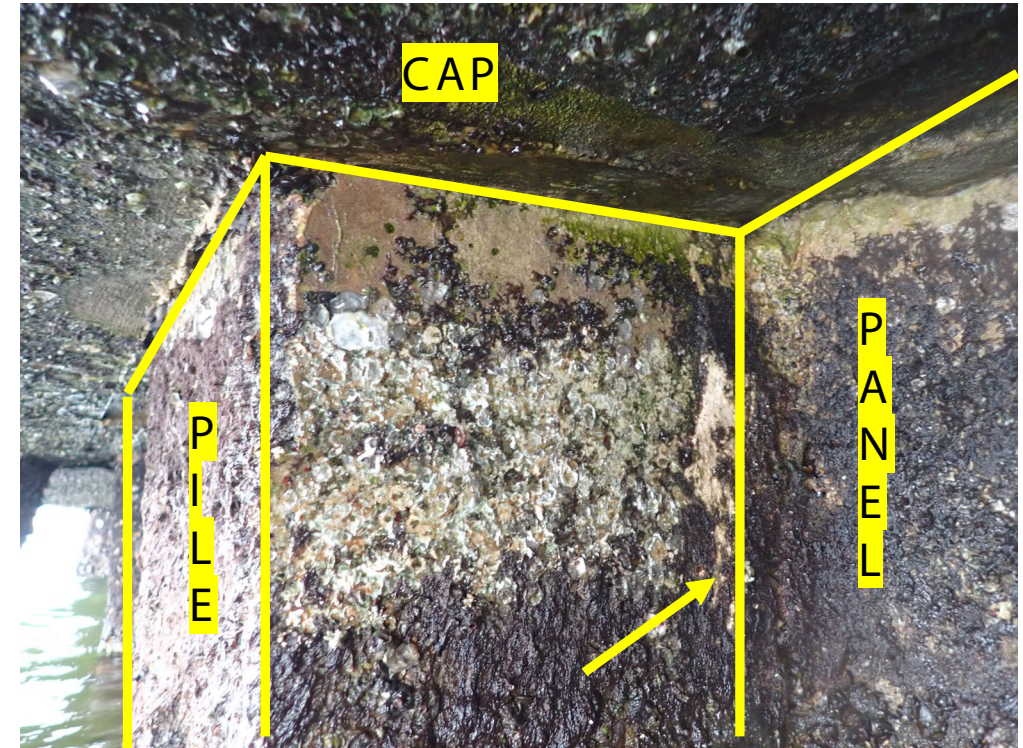
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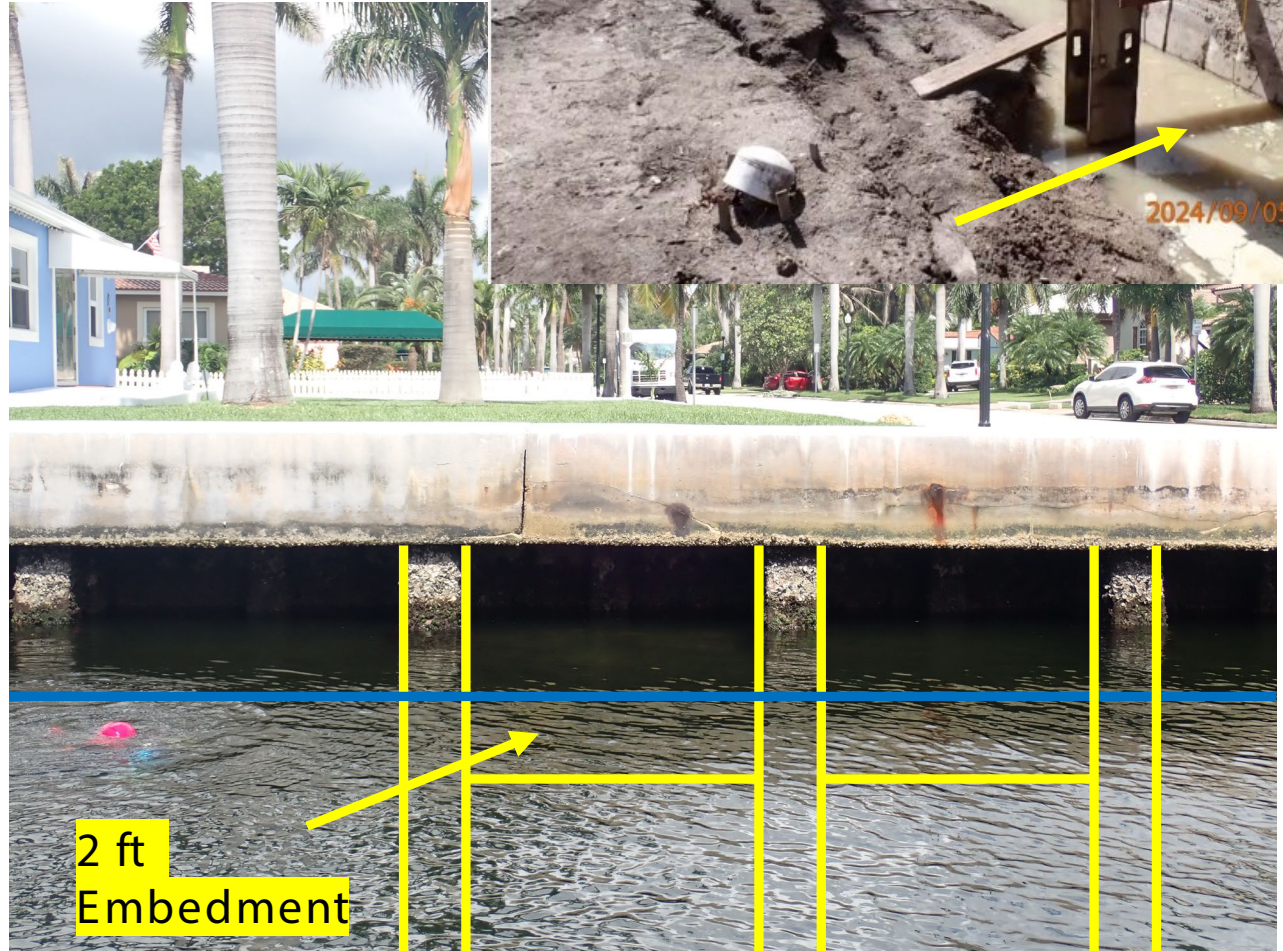
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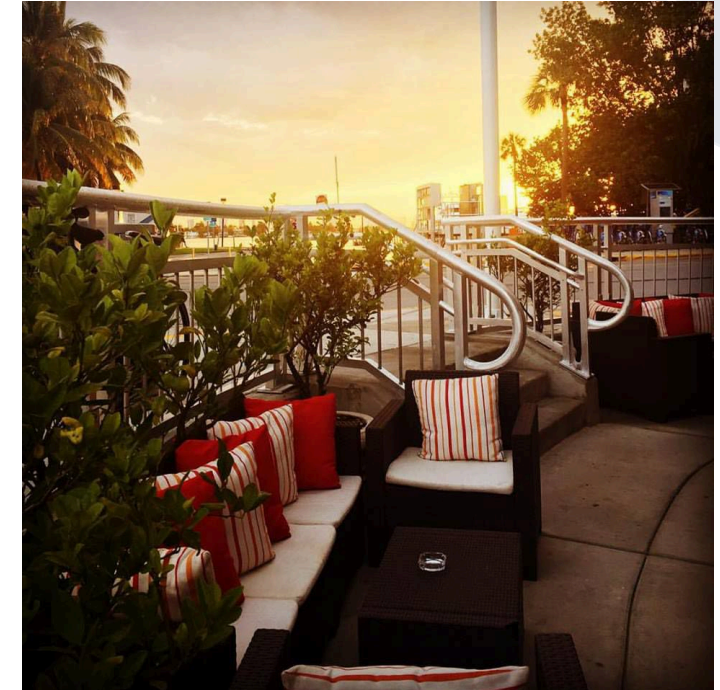


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Longboat Key



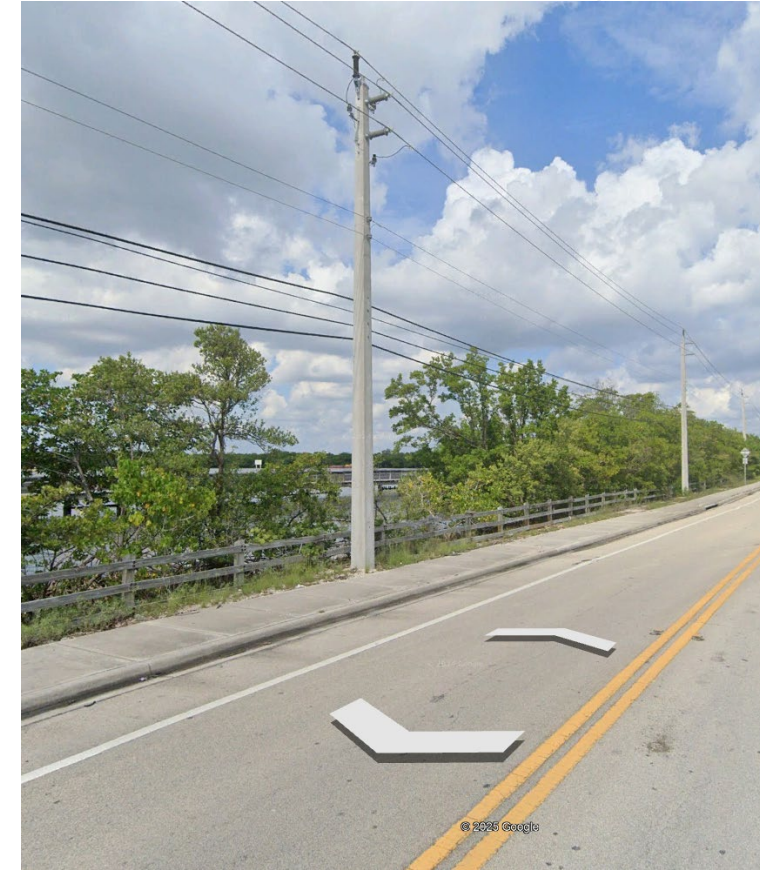
Miami Beach

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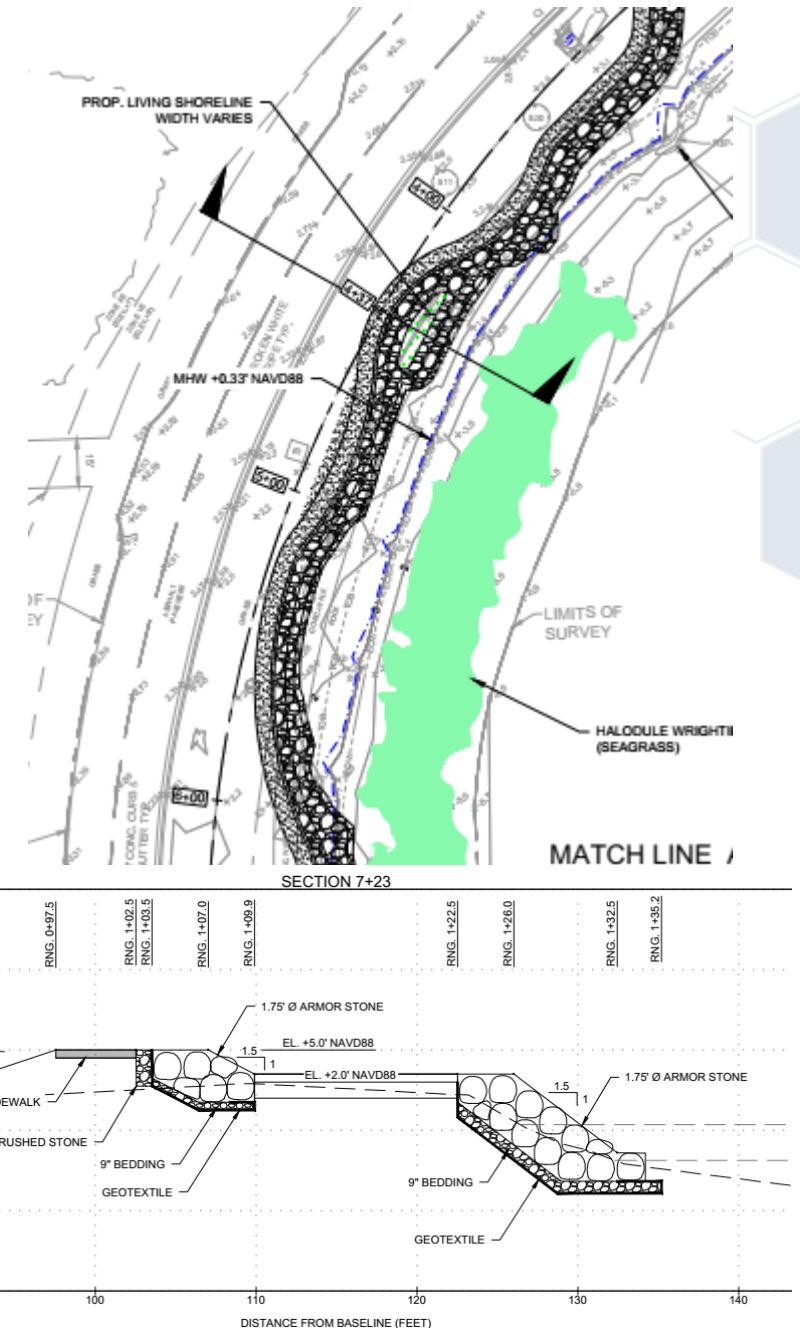
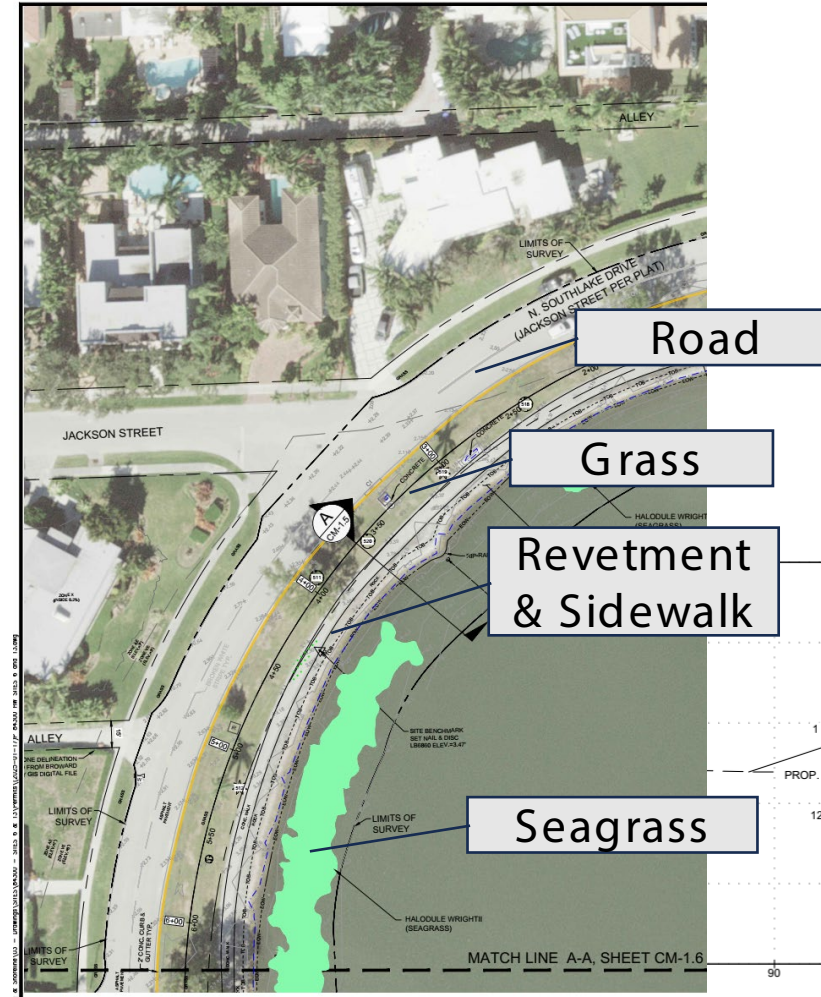
Lakes Neighborhood, Hollywood, FL



North Beach, Hollywood, FL

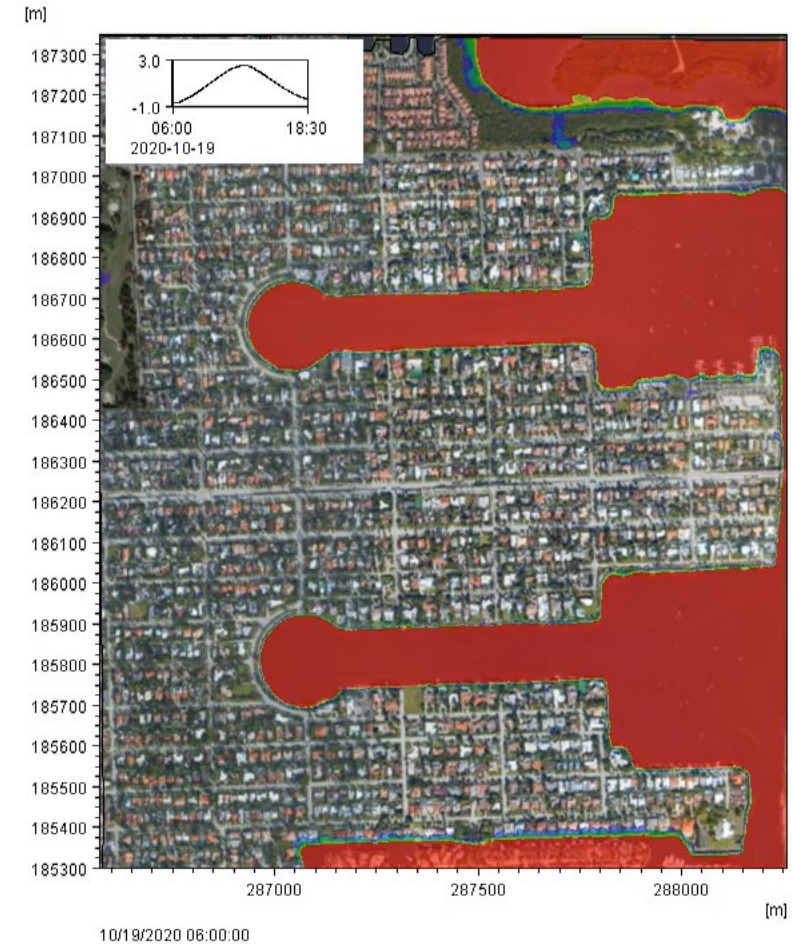
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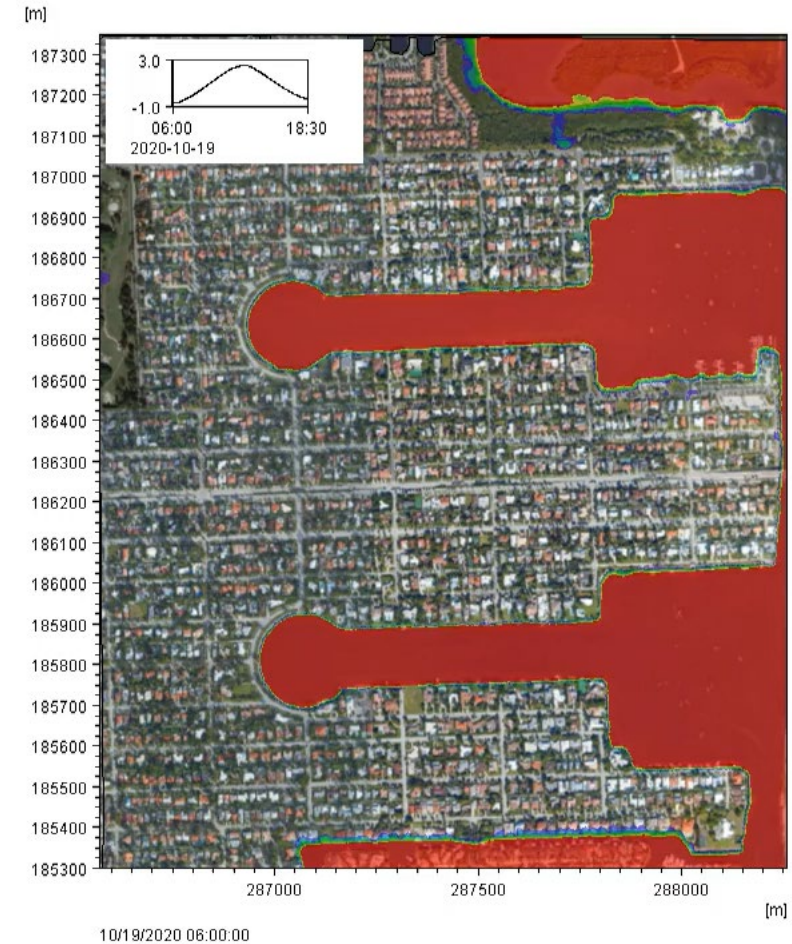
City of Hollywood Tidal Flooding

- Tidal flooding mitigation and shoreline protection project
 - Alleviate tidal flooding during high tide / king tide events
 - Alleviate tidal flooding during storm surge events
 - Alleviate tidal flooding during future sea level rise scenarios
 - Meet requirements of City and County Ordinances
- Stormwater master plan project
 - Analyze performance of existing stormwater management system
 - Identify City areas with consistent flooding problems
 - Recommend stormwater improvements to meet level of service criteria
 - Protect finished floor elevations during 100-Year storm events
 - Protect public roadways during 10-year storm events
 - Provide water quality BMPs to meet regulatory requirements



City of Hollywood Tidal Flooding

- Tidal flooding mitigation and shoreline protection project
 - Notice to Proceed: 2020
 - Currently in Design and Permitting
 - Estimated start of construction: Spring 2025
 - Estimated completion of construction: 2026/2027
 - Grant funding schedule requirements
 - \$28M from GO Bond (\$14M) and Resilient Florida Grant (\$14M)
- Stormwater master plan – The Lakes neighborhood
 - Pending bond funding for CIP Project
 - Pending procurement for CIP project design services
 - Pending procurement for CIP project contractor
 - Estimated earliest start: 2028 (best Case Scenario - unlikely)
 - Estimated earliest completion: 2030+ (best case scenario - unlikely)



City of Hollywood Tidal Flooding

April 12, 2023 Storm

- 100-year storm in Hollywood Lakes neighborhood
- Mapping shows that proposed Stormwater Master Plan improvements are not effective without Tidal Flood Barriers



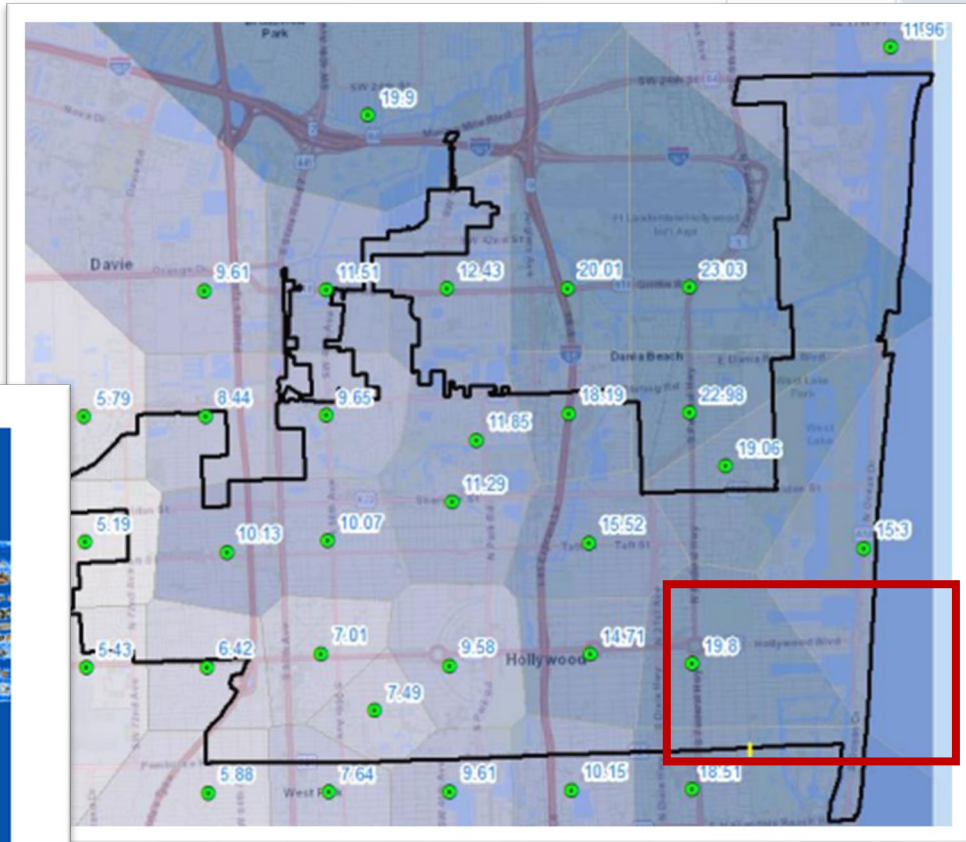
EXISTING CONDITIONS FLOODING*
(TIDE AT EL ~2.5 NAVD)



SWMP CIP*
WITH CITY SHORELINE MITIGATION PROJECT PH 1-3
AND PRIVATE SEAWALL IMPROVEMENTS
(FUTURE TIDES UP TO EL 5 NAVD)



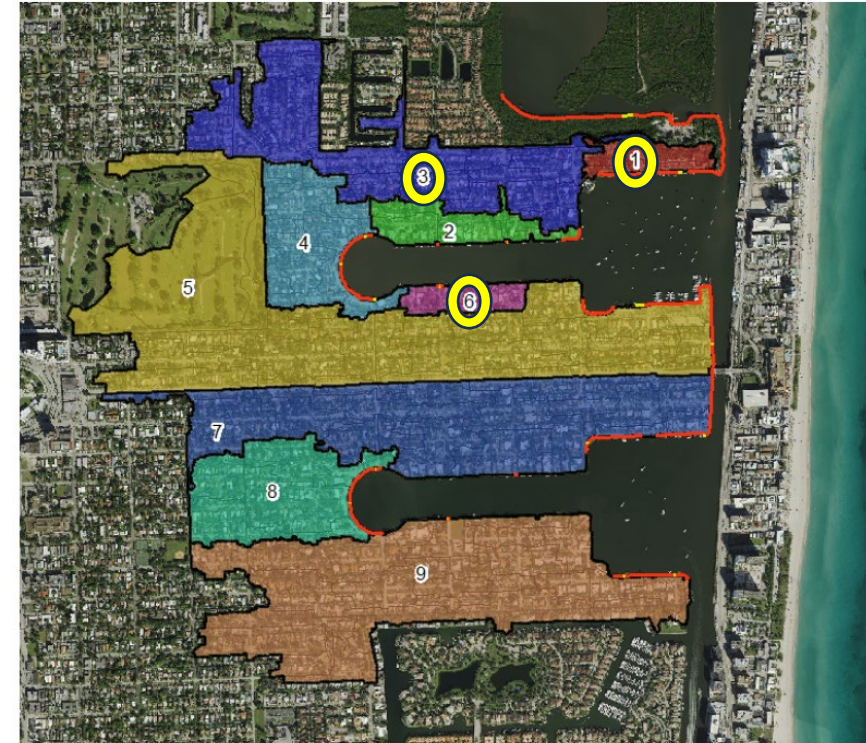
SWMP CIP*
WITHOUT ANY SEAWALL
IMPROVEMENTS
(TIDE AT EL ~2.5 NAVD)



Source: CDM

City of Hollywood Tidal Flooding

Basin #	Existing Condition Max Elevation	100-year Storm w/ Barriers Max Elevation	Change [feet]	Change [inches]
1	2.58	3.29	0.71'	8.5"
2	2.97	3.29	0.32'	3.8"
3	3.58	3.60	0.02'	0.2"
4	3.28	3.36	0.08'	1.0"
5	3.30	3.37	0.07'	0.9"
6	2.50	2.71	0.21'	2.5"
7	3.25	3.25	0.00'	0.0"
8	3.10	3.16	0.06'	0.7"
9	3.41	3.46	0.05'	0.6"

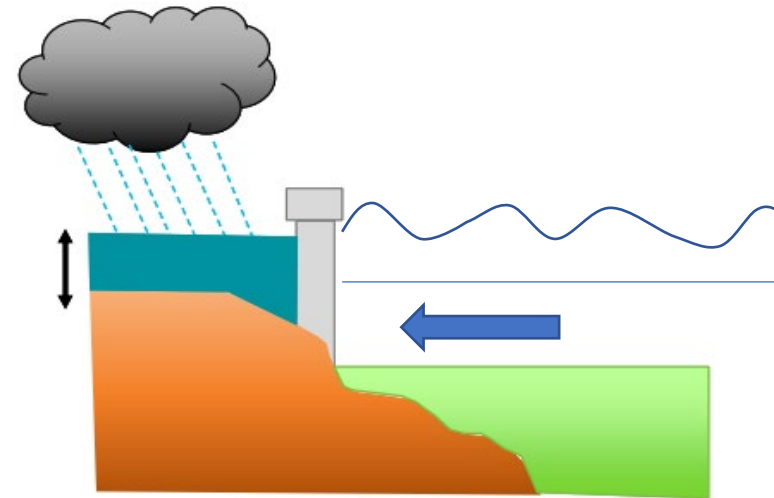


- Assumes all public AND private seawalls are constructed to +5'
- Will all private seawalls be raised before the stormwater master plan is fully implemented?
- Modelling the City tidal flood barriers without raising private seawalls is necessary

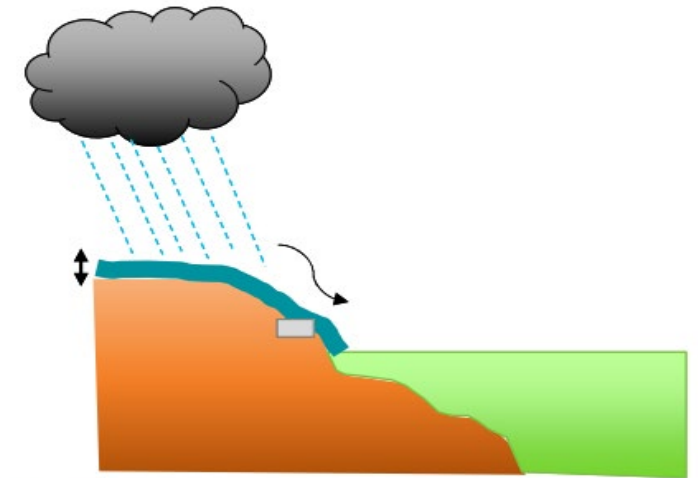
City of Hollywood Tidal Flooding

What do we protect against?

- Chance of flooding on an annual/daily basis
- Daily Tide (2035)
 - +1.7' (100% chance of happening every day)
- King Tide (2035)
 - +3.0' (100% chance of happening every year)
- Storm Surge w/ SLR (2035)
 - +3.0' (10-year storm, 10% chance every year)
 - +3.3' (25-year storm, 4% chance every year)
 - +6.2' (50-year storm, 2% chance every year)
 - +7.0' (100-year storm, 1% chance every year)
- Tidal Flood Barrier Ordinance +5.0' (35-year storm, 3% chance every year)
- Rainfall increase of > 1 inch
 - +3.3' in Basins 1 and 2 (100-year storm, 1% chance every year)
 - +2.7' in Basin 6 (100-year storm, 1% chance every year)



EXACERBATED FLOODING POST SEAWALL



RUNOFF OVERLAND FLOW BEFORE SEAWALL

City of Hollywood Tidal Flooding

- How do we simplify the message to stakeholders?
 - Stormwater is currently managed with temporary pumps. Can't pump the ICW/Ocean.
 - If wait to build tidal flood barriers until pump stations are upgraded, then property will be flooded by king tides and City will lose \$14M grant.
 - Storm surge flooding to 3.3 ft during a 25-year event is 4x more likely to occur than rainfall flooding to 3.3 ft. during a 100-year event in 2035.
 - Tidal flood barriers will provide a net improvement – significantly reducing the potential for flooding, while only slightly increasing the potential for rainfall flooding.
 - The only solution that works in all conditions is constructing tidal flood barriers concurrent with stormwater master plan



City of Hollywood Tidal Flooding

- Stormwater Master Plan proposed 16 openings (25'-100'). What are the optics of building walls with gaps and gap locations?
- Challenges with openings in tidal flood barriers
 - Open or closed during hurricane, king tide, rainfall?
 - What if they occur at the same time?
 - Storm overnight or holiday
 - Automation (power) after a storm, Backup power
 - Access after a storm (flood water, debris)
 - Available space (on-site, off-site)
 - Aesthetics
 - Liability
 - Capital costs, recurring costs, retrofit, maintenance
 - Manpower
 - Not covered by grant
 - Manual gates NOT allowed per City and County Codes



City of Hollywood Tidal Flooding



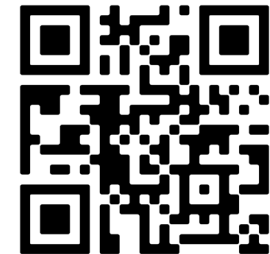
Conclusion

- Manage Expectations
- Understand Limitations
- Internal Communication
- Policy/Regulation Alignment
- Public Outreach & Messaging
- Hard Decisions Ahead
- Working Together

The sky isn't falling, but the water is rising



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 Let's connect!