



PCCA Ingleside Passing Vessel Modeling



Discussion Topics

1. Project Goals
2. Model Description and Validation
3. Passing Vessel Model & Setup
4. Analysis Approach & Simulations
5. Results
6. Recommendations

1. Project Goals

- **Conduct** independent engineering study and apply due diligence to accuracy of results
- **Quantify** changes in passing vessel impacts
 - Analyzing water level fluctuations between existing and proposed conditions.
- **Evaluate** potential passing vessel-induced hydrodynamic impacts
 - Ingleside On-the-Bay bulkheads, and shoreline along the LQC and CCSC for existing and potential future improvement.
- **Evaluate** potential effects of Sea Level Rise
 - Future tide/water levels relative to passing vessel hydrodynamic effects.
- **Identify and test** potential structural and non-structural mitigation measures
 - Reducing impacts to the shoreline due to hydrodynamic conditions related to passing vessels.



CORPUS
CHRISTI BAY

INGLESIDE
COVE

LA QUINTA CHANNEL

INGLESIDE COVE
SHORELINE

INGLESIDE
BULKHEADS

EXISTING
REVTMENT

INGLESIDE-ON-THE-BAY

EXISTING
BREAKWATER

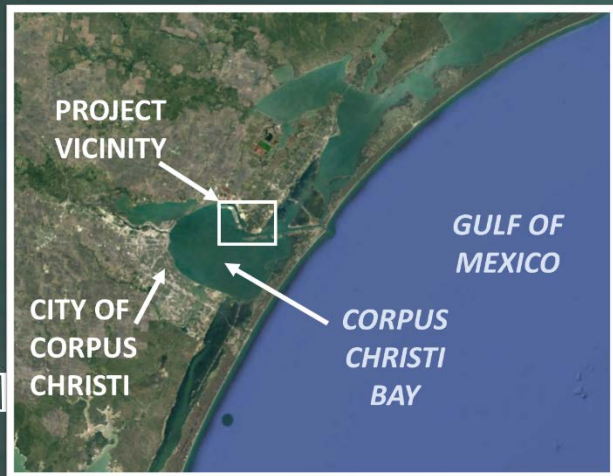
CORPUS CHRISTI SHIP CHANNEL

PROJECT
VICINITY

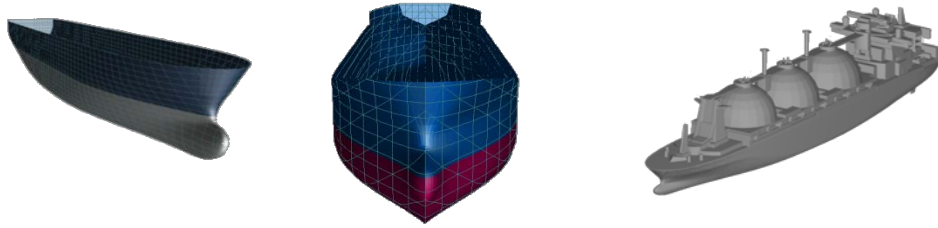
CITY OF
CORPUS
CHRISTI

CORPUS
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BAY

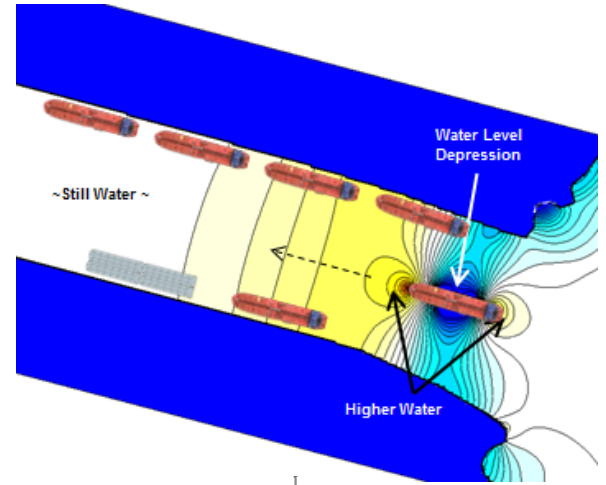
GULF OF
MEXICO



2. Passing Vessel Model Description



- Actual vessel hull shapes
- Verified with Field and Laboratory hydrodynamic testing
- Modeling grid created with new data
- Regional and global expertise - Validation



2. Model Validation - Happy Albatross

- Water Level: ~ 2.5' MLT
- Vessel Speed: ~ 9.5 kts
- Light Loaded



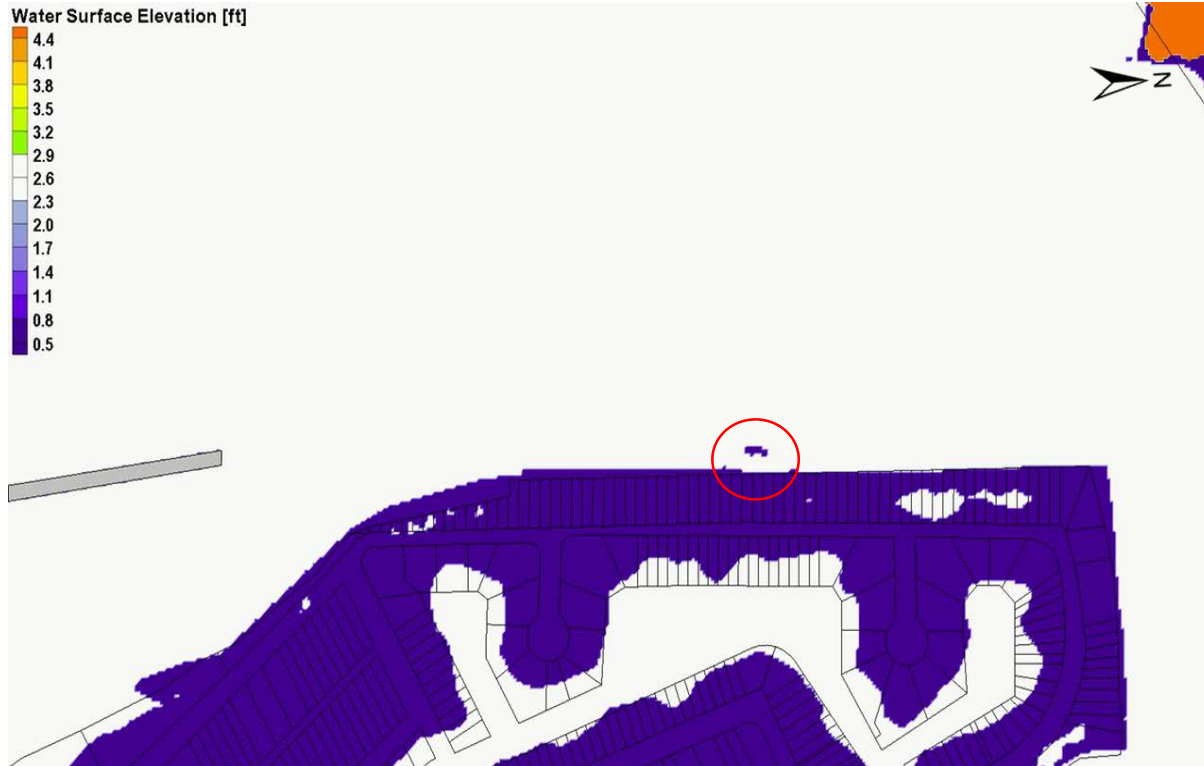
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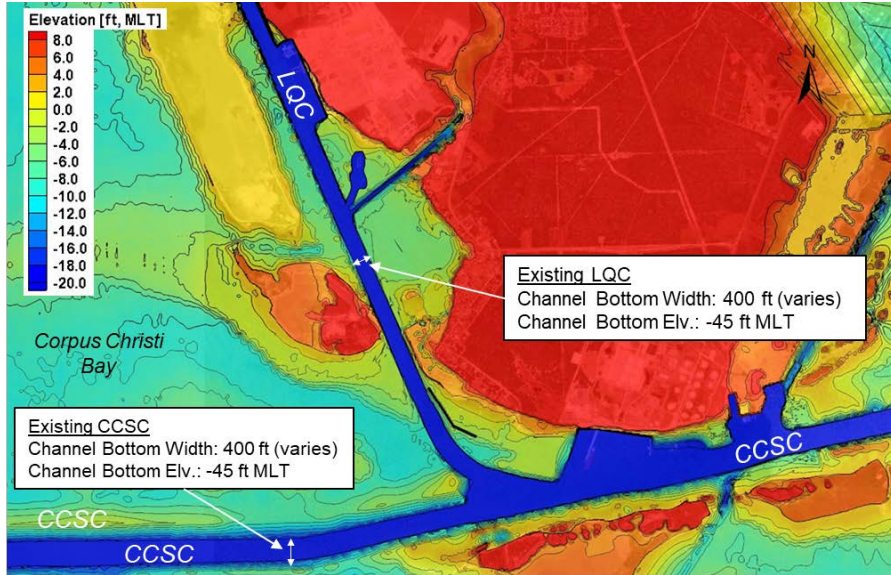


- LOA: 480 ft
- Beam: 74 ft
- Max Draft: 31 ft

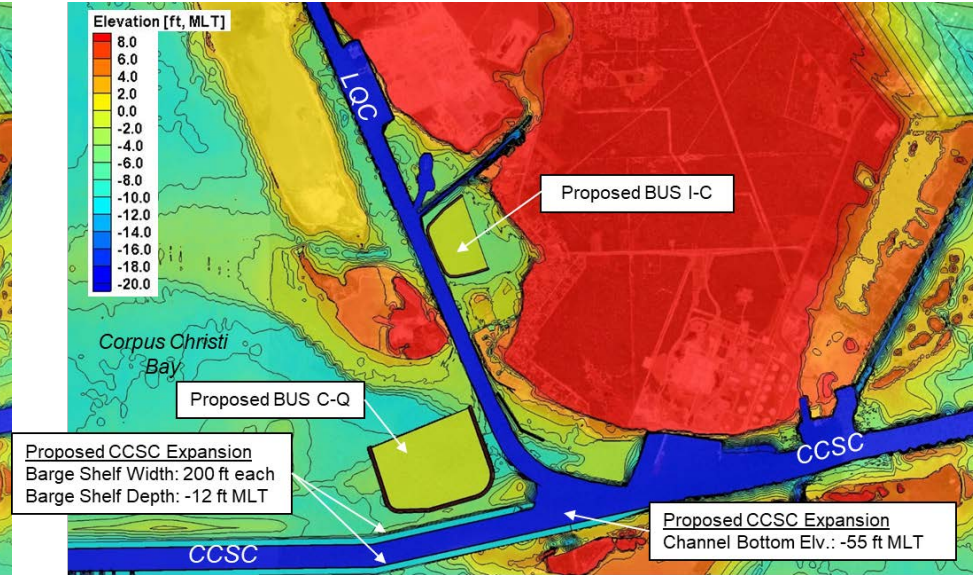
2. Model Validation Results



3. Passing Vessel Model Setup: Model Grid



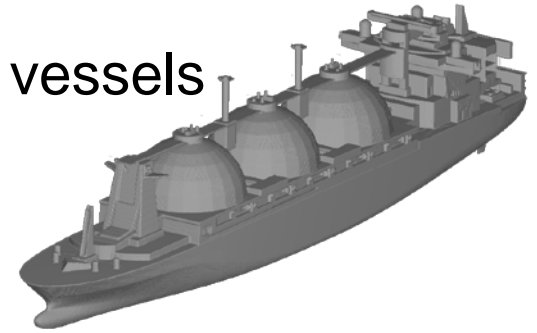
Existing Bathymetry



Proposed Conditions (All Shown)

4. Analysis Approach: Develop a suite of testing vessels

- Largest vessels transiting through the LQC and CCSC
- Determined via AIS data and discussions with PCCA
- All loaded draft conditions to represent **worst-case scenario**



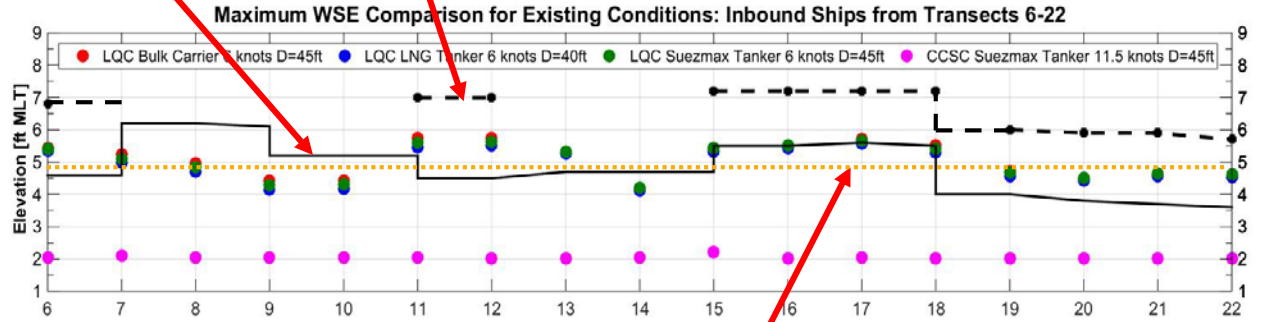
Channel	Ship Hull Type	Ship Name	LOA [ft]	Beam [ft]	Draft [ft]	Modeled Draft [ft]	Speed [kts]
LQC	Bulk Carrier	Castillo de Navia	849	141	48	45	6
LQC	LNG Tanker	N/A	1000	150	38	40	6
LQC	Suezmax Tanker	Cap Pierre	900	157	50	45	6
CCSC	Suezmax Tanker	Cap Pierre	900	157	50	45	11.5
CCSC	Suezmax Tanker	Cap Pierre	900	157	50	52	11.5

5. Results – Existing Conditions



Retaining Wall

Bulkhead



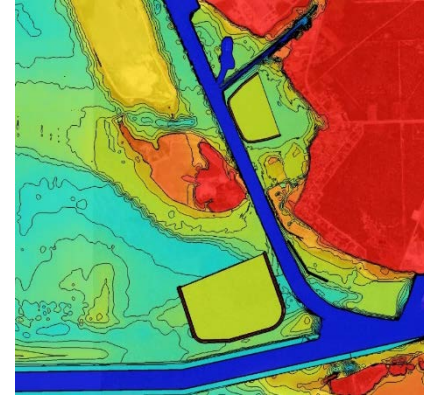
Happy Albatross – 4/5/2018

5. Bulk Carrier Inbound Proposed Conditions (Site C-Q)



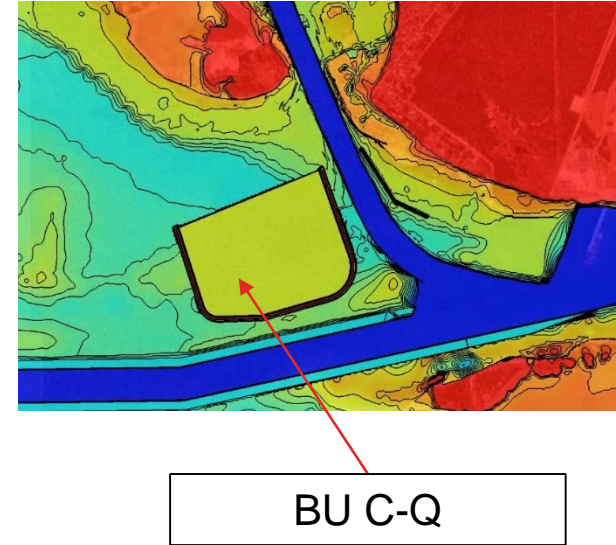
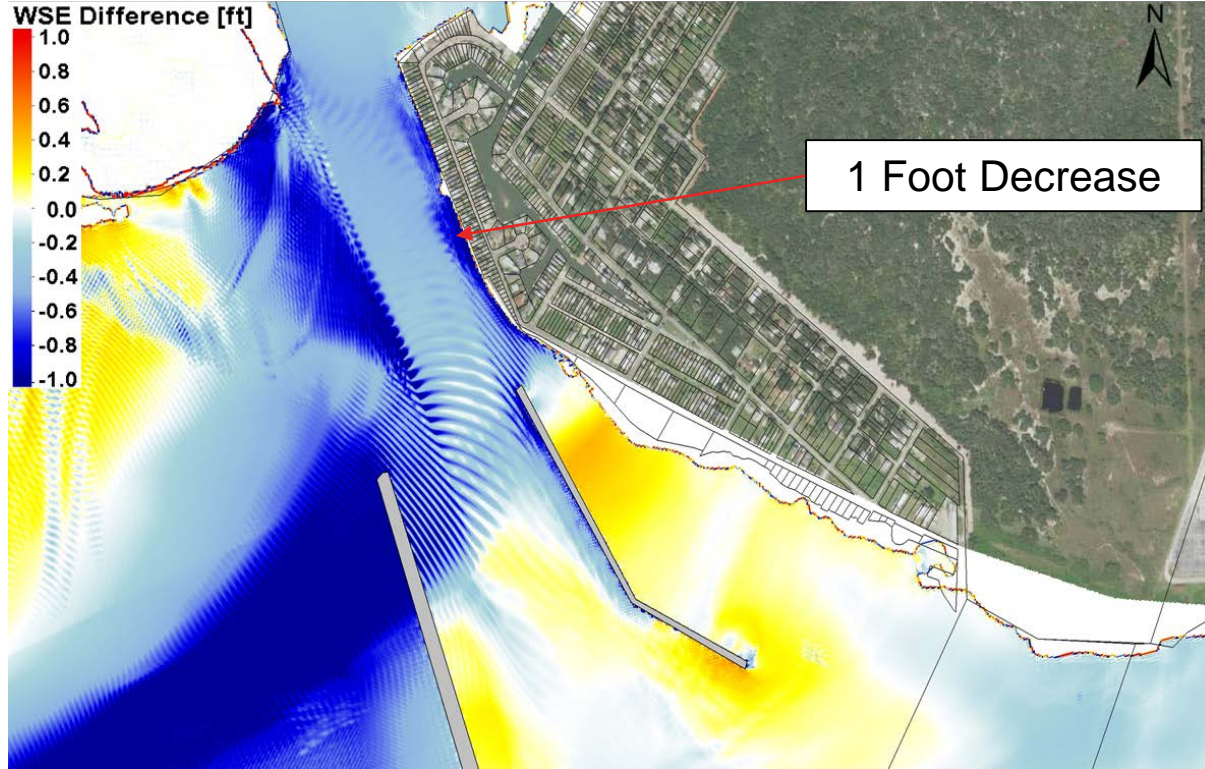
5. Results – Proposed Condition C: CCSC Expansion with BUS Q-C and BUS-IC

- Overall increases in average max WSEs are less than **1.5 inches**
- Averages provided in table are averages across all transects within each Region

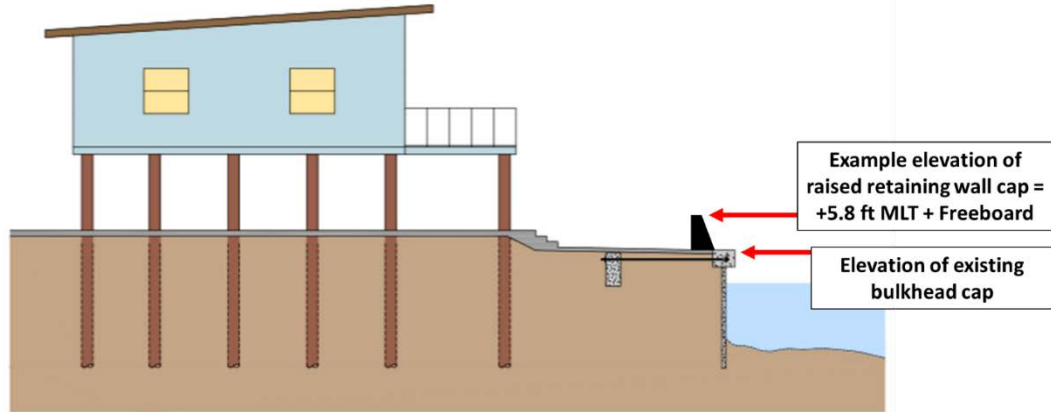
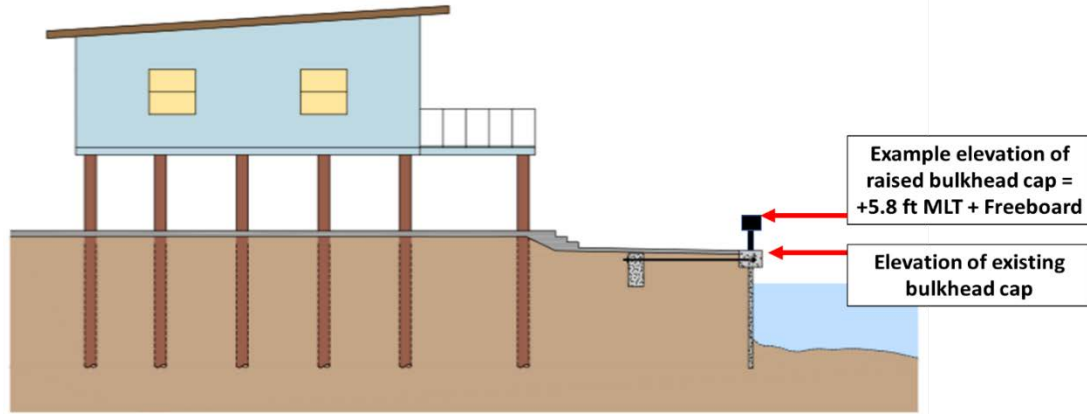


Region Description	% Difference From Existing Conditions	Comments
Ingleside Cove Shoreline	-1.4% (-1.5") decrease	Average decrease within the accuracy of the model
Ingleside On-the-Bay Shoreline	+1.0% (0.61") increase	Average increase within the accuracy of the model
South-facing shoreline adjacent to existing breakwater & revetment	+2.5% (1.5") increase	Average increase within the accuracy of the model

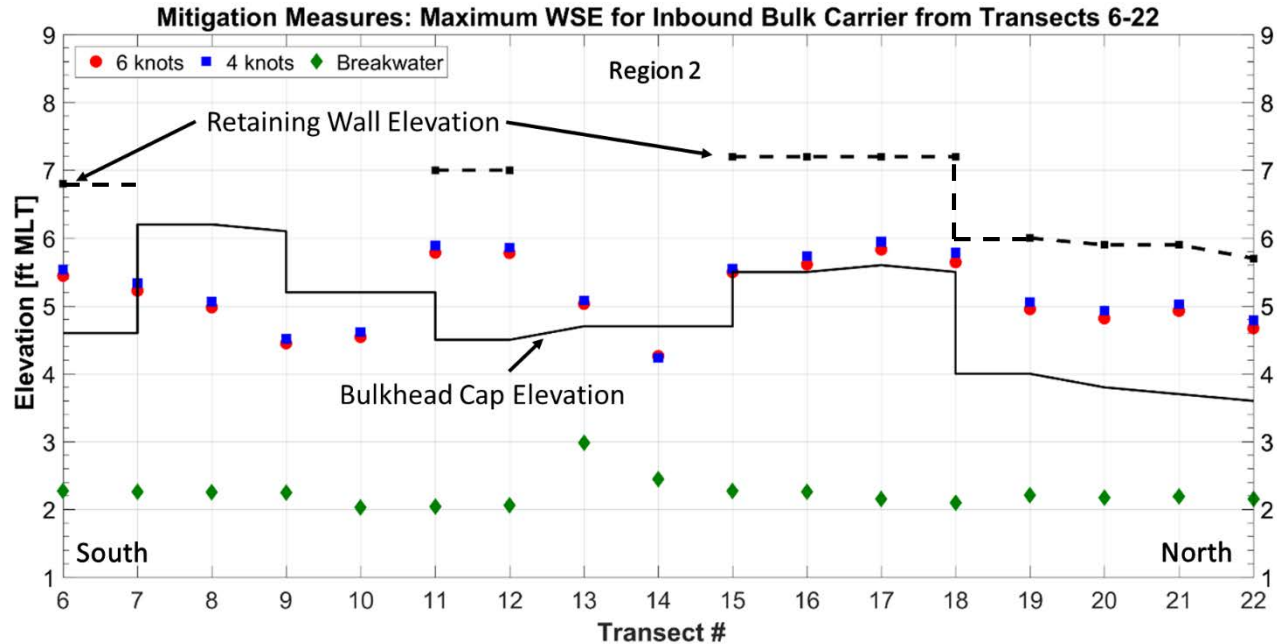
Difference Plot Between CQ and Existing Conditions for CCSC Outbound Tankers



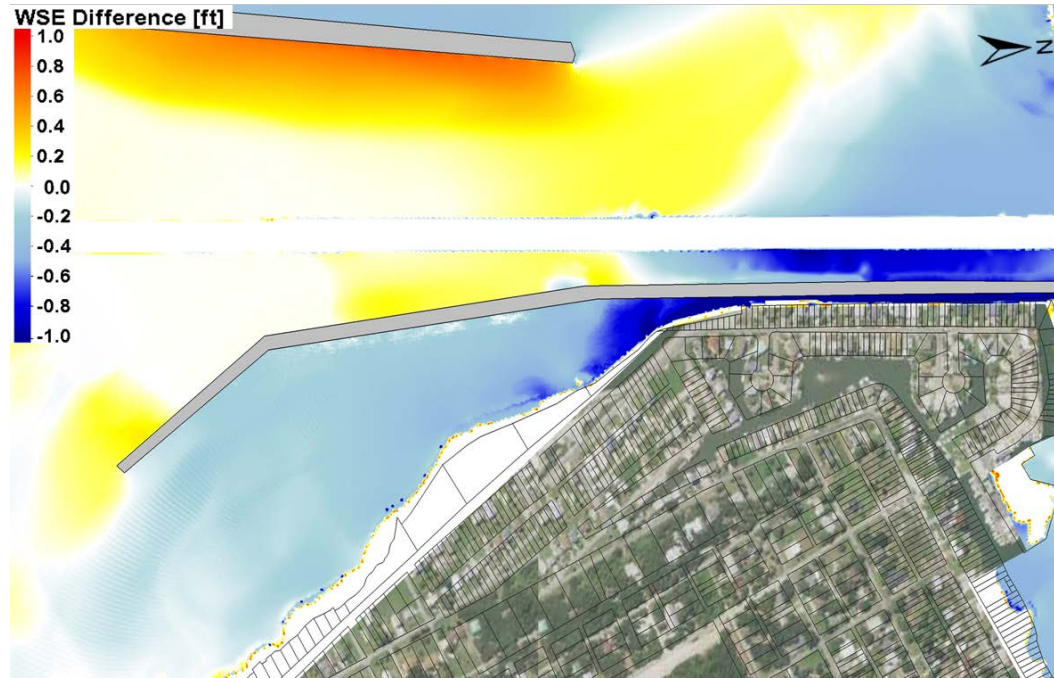
Mitigation Measure A: Increase bulkhead cap/retaining wall elevations within Region 2



Mitigation Measure B: Reduced Vessel Speeds



Mitigation Measure C: Install Protection Structure Seaward of Ingleside On-the-Bay



6. Recommendations

1. Reduce Overtopping Impacts in Region 2

- Raise the bulkhead or retaining wall elevation of the existing bulkheads
- Extend the existing breakwater northward

2. Future Studies:

- Further modeling of proposed mitigation measures:
 - Evaluate Deepening the LQC within Region 2
 - Further discussion of future adjacent Beneficial Use Sites and related modeling

3. Perform detailed project alternatives analysis

- Feasibility and costs



Thank you

