



Eden Isle Resilience & Flood Risk Reduction

St. Tammany Levee, Drainage, and Conservation District

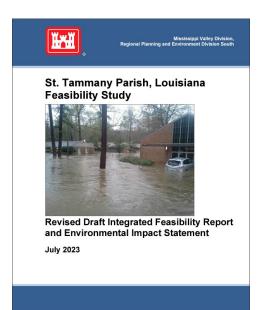
Board Meeting

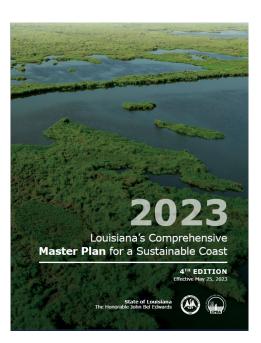
February 20, 2024



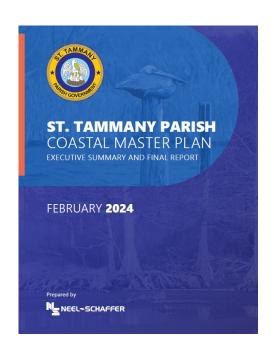
Previous Studies and Planning Efforts

- USACE Feasibility Study
- CPRA Master Plan





- Northshore Hurricane and Flood Protection Plan
 - Identified locations vulnerable to flooding, sources, and mitigation plans
- St. Tammany Parish Coastal Study
 - Inventory of existing flood control assets
 - Gap analysis of vulnerable areas
 - Development of conceptual alternatives





Project Goals

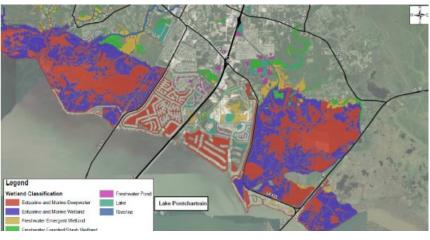
- Increase resiliency following natural disasters
- Increase flood risk reduction opportunities for Eden Isle
- Develop an adaptable resilience solution, so elevation can be increased at a later date.

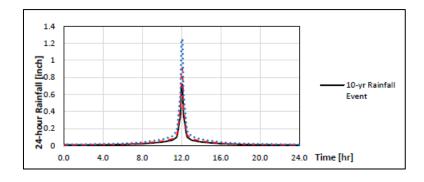


Data Collection

- Topographic and Bathymetric Data
- Geotechnical Information
- Hydraulic and Hydrologic Modeling
- Environmental Data









Summary of Storm Surge Elevations for Eden Isle

Table 3: Published Storm Surge Elevations

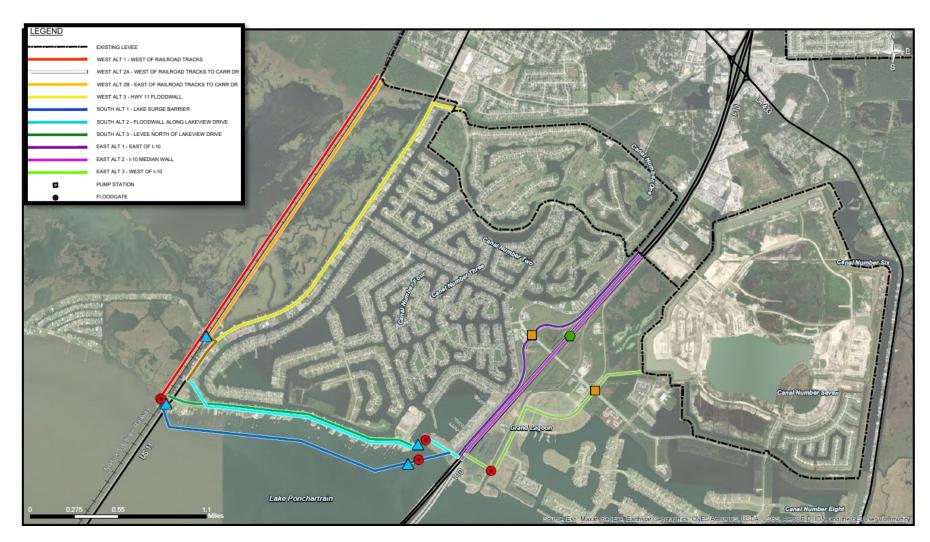
Source		100-yr	50-yr	25-yr	Note		
FWOP - Data on Storm Water Levels without Flood Risk Reduction Project (Eden Isle Lakefront Location)							
FEMA - Data from FEMA Sources							
FEMA FIS							
FEMA Flood Insurance Study (FIS), City of Slidell, St. Tammany Parish, Louisiana, Panel 535 of 600, 1999	Stidell Flood Insurance Study (FIS), 1999 (Lake Pondhartrain)	9 ft, NGVO	8.1 ft, NGVD		Water Surface Elevation (Probably without wave)		
EMA Effective FIRM							
FEMA Flood Insurance Rate Map (FIRM), St. Tammany Parish, Louisiana, Panel 535 of 600, 1951	FIRM 1991 [Based on USACE ADCIRC and STWAVE Results] at Location A (Levee)	14 ft, NGVD			Base Flood Elevation (Still Water Elevation+Wave Setup)		
EMA DFIRM							
FEMA Flood Incurance Rate Map (DFIRM), St. Tammany Porish, Louisiana,	Preliminary DFIRM 2008 (Based on USACE ADCIRC and STWAVE Results) at Point 1	13 ft. NAV088			Base Flood Elevation (Still Water Elevation+Wave Serup)		
	Preliminary DFIRM 2008 [Based on USACE ADCIRC and STWAVE Results] at Point 2	15 ft, NAV088			Base Flood Elevation (Still Water Elevation+Ware Serup)		
2010-2012 USACE - Storm Surge Data from U	ISACE Planning Study						
ESTO ESTE SOME Storm surge butte from t	[LACPR West Slidell (West Slidell Vicinity)	10 ft, NAVD88			Water Level		
Hurricane Issac With and Without 2012 900 yr HSDRRS Evaluation , 2013	LACPR East Shife II (East Shidell Vicinity)	12.2 ft, NAVOSS	_	_	Water Level		
	DHO-R Case Simeli (case Siden Violity)	JELET, NAVODO			water cover		
2017 CPRA - Storm Surge Data from 2017 CP R. Tammany Parish Coastal Protection Project (PO-167) 2020-2021	PRA Master Plan Model (Wave Information \	/aries)					
	FEMA WHAFIS (Transect 73)	10.5 ft, NAVD88	8.3 t., NAVD88		Still Water Elevation, No Wave		
	FEMA WHARIS (Transact 74)	10.5 ft, NAVDB8			Still Water Revation, No Wave		
	FEMA WHAFIS (Transect 75)	10.5 ft, NAVDB8			Still Water Blevation, No Wave		
. Tammany Panish Coastal Protection Project (PD-167)-Task III, GEC and MSI, 2020	St. Tammany Parish Reanalysis (Transect 75)	10.3 ft, NAVO88			Still Water Bevaldon, No Wave		
	St. Tammany Parish Reanalysis (Transect 74)	10.5 ft, NAVDB8			Still Water Revation, No Wave		
	St. Tammany Parish Reanalysis (Transect 7S)	10.5 ft, NAVDB8			Still Water Bevasion, no worse		
	St. Tammarty Parish Reanalysis (Transect 75) GEC & NS [Based on FEMA WHAFIS AND ST. Tammarty Reanalysis Results]	10.5 ft, NAVDB8	10.9 ft, NAVD88				
t. Tammary Parkh Coastal Protection Project (PO-167)-Pump Station Requirments for		10.5 ft, NAVDB8 11.12 ft, NAVD88	10.9 ft, NAVD88 9.81 ft, NAVD88	8.33 ft, NAVD88	Still Water Bevation, No Wave		
	GEC & NS [Based on FEMA WHAFIS AND ST. Tammany Reanalysis Results]			8.33 ft, NAVD88 8.17 ft, NAVD88	Still Water Bevation, No Wave Levee Crest Elevation (Still Water Elevation + Maximum Wave Runup + 1 ft Freeboard)		
roposed Coastal Protection Projects, GEC and NSI, 2021.	GEC & N9 (Based on FEMA WHAFS AND ST. Tammany Reanalysis Results) CPRA 2017 Misbir Plan, CLARA MODEL (Point 7941.1)	11.12 ft, NAVD88	9.81 ft, NAVD68		Still Wister Bevaldon, No Wisse Lever Cress Elevation (Still Water Elevation + Maximum Wave-Runup + 1 ft Freeboard) Storm Surge-Wiston English (2005 Current Condition)		
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Recurrence Interval	Approximate* Elevation (NAVD 88)
100-year	+18.0′
50-year	+11.0′
25-year	+8.5′

^{*}Elevations vary among models, locations, methods, features, etc.



All Alignments Considered

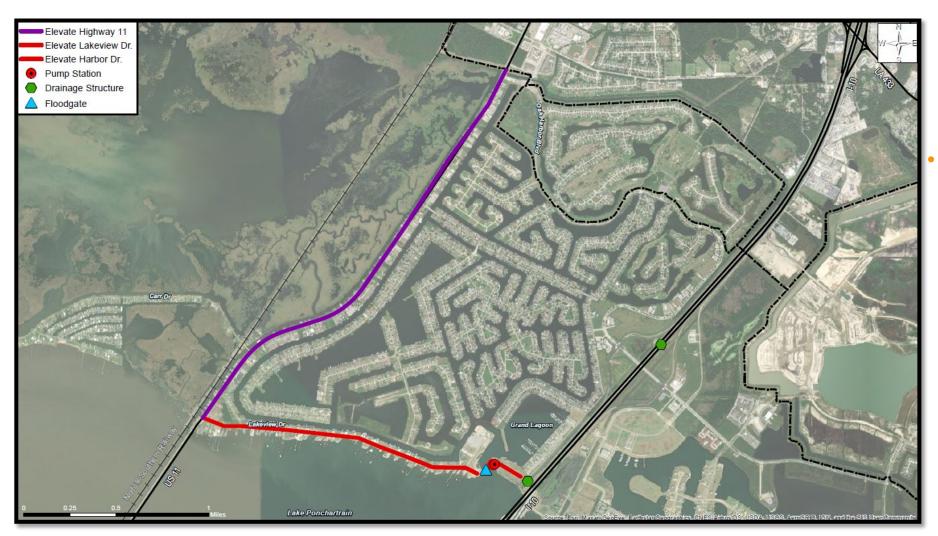


Level of Protection	Cost Range of Different Levels of Protection
25-year	\$117M - \$281M
50-year	\$618M - \$799M
100-year	\$730M - \$3.3B

 In addition to financial costs, significant environmental and landrights challenges for increasing levels of protection.



Draft Preferred Initial Project Features



- Takes Advantage of Existing Infrastructure Elevations
 - Oak Harbor Levee (+12')
 - I-10 (+10.7 to +12.7')
 - Highway 11 (+5' to +8')
 - Lakeview Dr. (+5' to +6.5')



25-YR to 50-YR Flood Risk Reduction & Resilience Options



Highway 11 Option 1 – Spot Elevation Increases

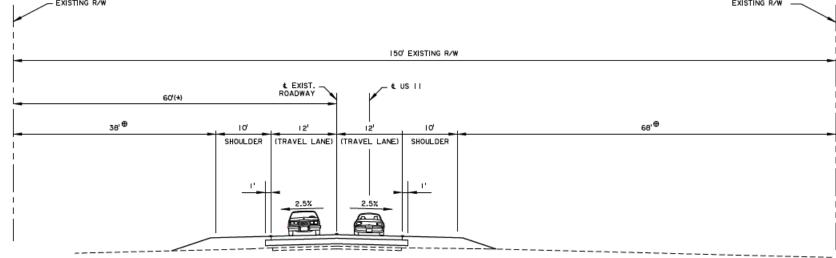
PROS:

- Least expensive option (\$14-\$19M)
- Limited encroachment on existing structures

CONS:

 Future floodwall would require road demolition and rebuild







Highway 11 Option 2 – Median Space for Future Floodwall

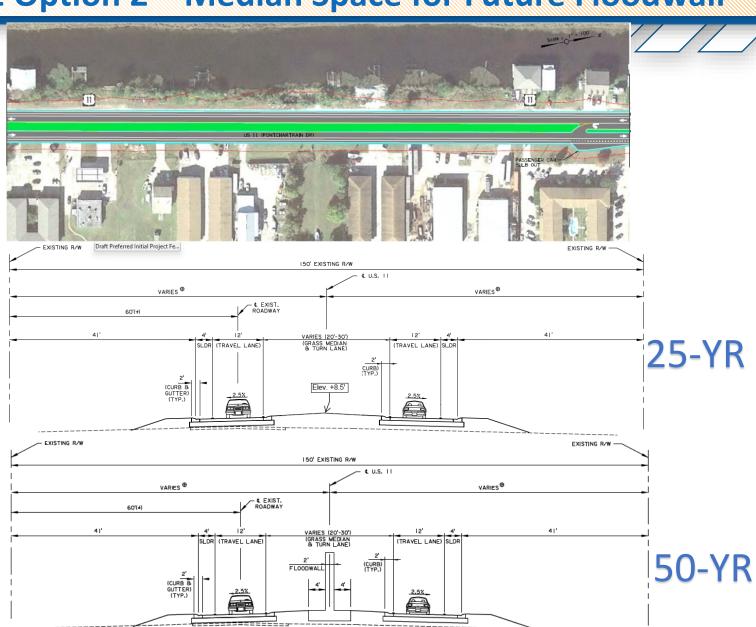
PROS:

- Construction costs (\$26-35M) are cheaper because of the time value of money.
- Allows for installation of floodwall at a later date with limited impacts to the road.

CONS:

- More expensive than Option 1
- More encroachment on existing structures

*OPTION 2 IS THE RECOMMENDED OPTION





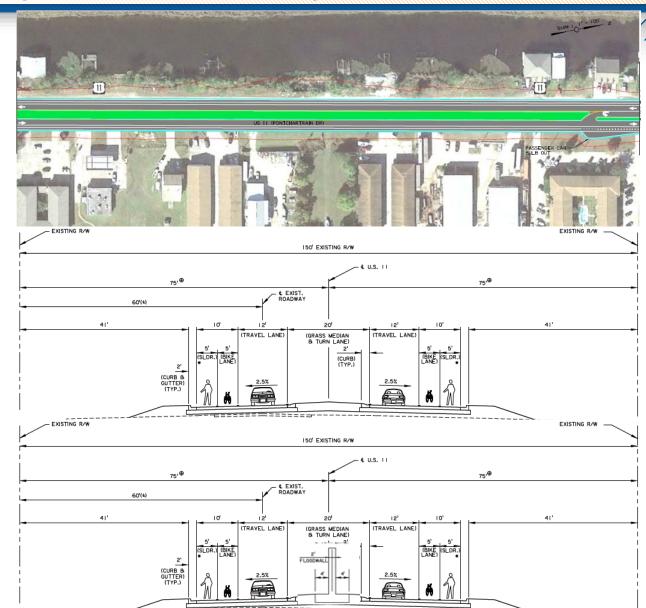
Highway 11 Option 3 – Median Space with Pedestrian Lanes

PROS:

- Previously preferred option by DOTD.
- Allows for installation of floodwall at a later date with limited impacts to the road.

CONS:

- Most expensive option (\$30-41M)
- Most encroachment on existing structures



25-YR

50-YR



Lakeview Drive – Option 1

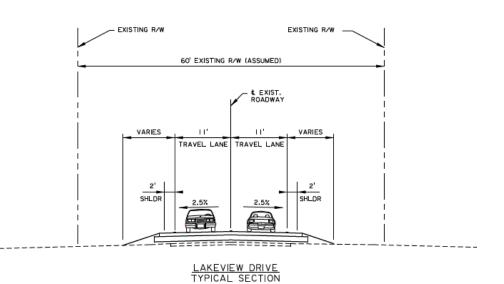
PROS:

Cheapest option (\$9M - \$12M).

CONS:

- Limits the ability to add a floodwall at a later date.
- Design and encroachment challenges





(ROADWAY CLASSIFICATION - URBAN LOCAL) (DESIGN SPEED - 25 MPH)

Lakeview Drive – Option 2

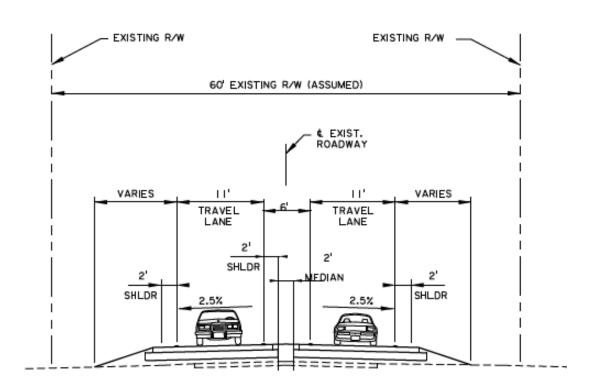
PROS:

More space to add a floodwall at a later date.

CONS:

- More expensive (\$10M \$13M)
- Additional design and encroachment challenges
 - ROW Extents Unknown

*OPTION 2 IS THE RECOMMENDED OPTION





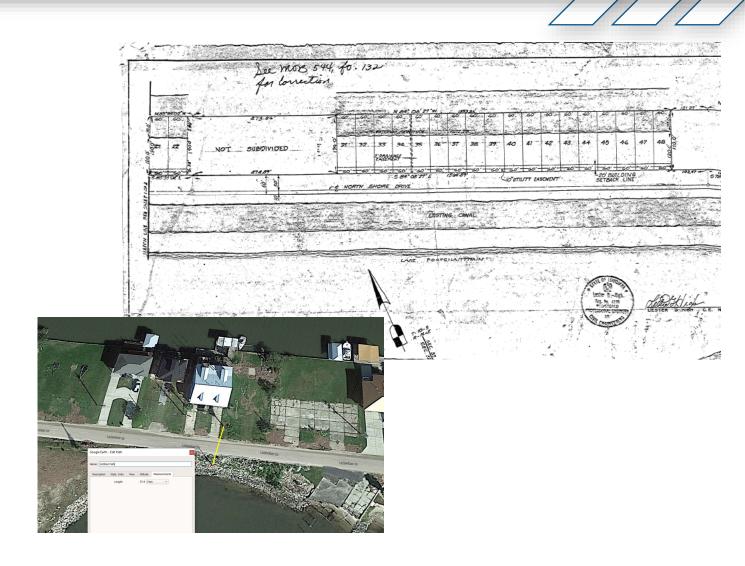
Design Challenges



Lakeview Drive – Unknowns and Design Challenges

RIGHT-OF-WAY

- Exact footprint of right-of-way unknown
 - Historic maps from the Parish, tax maps, Google Earth
 - ROW width may dictate top width of embankment
 - If inadequate width, retaining walls or ROW acquisition may be necessary
 - A ROW survey will be required to accurately determine design parameters

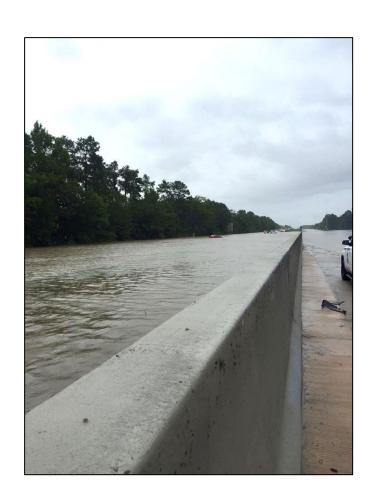


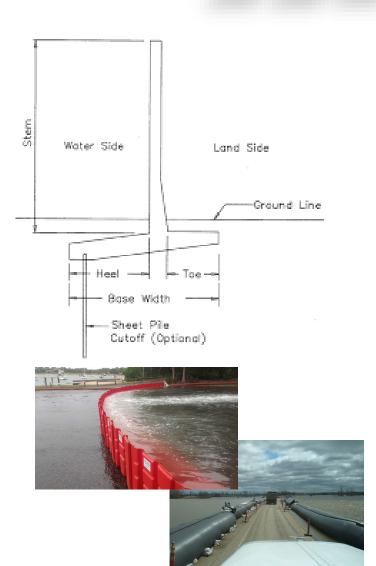


Lakeview Drive – Unknowns and Design Challenges

FLOODWALL

- Foundation design requirements for floodwall / median barrier
 - Wave forces
 - Wall type, footing width, piling depths, determine top of road embankment.
 - Temporary Barriers?



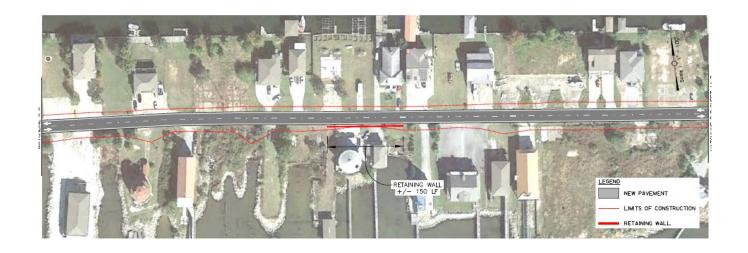


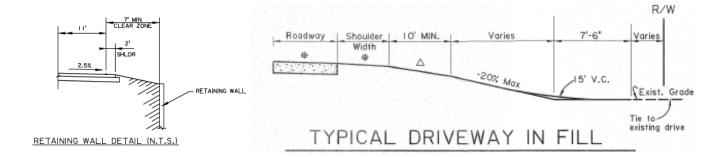


Lakeview Drive – Unknowns and Design Challenges

DRIVEWAYS

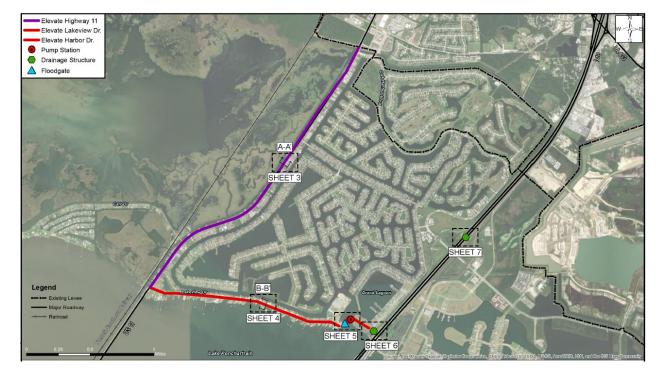
- Design challenges for ingress and egress of driveways
 - Increased elevation presents difficulties for driveway access.
 - Floodwall or median barriers prevent challenges for turning in and out, particularly with boats and trailers.







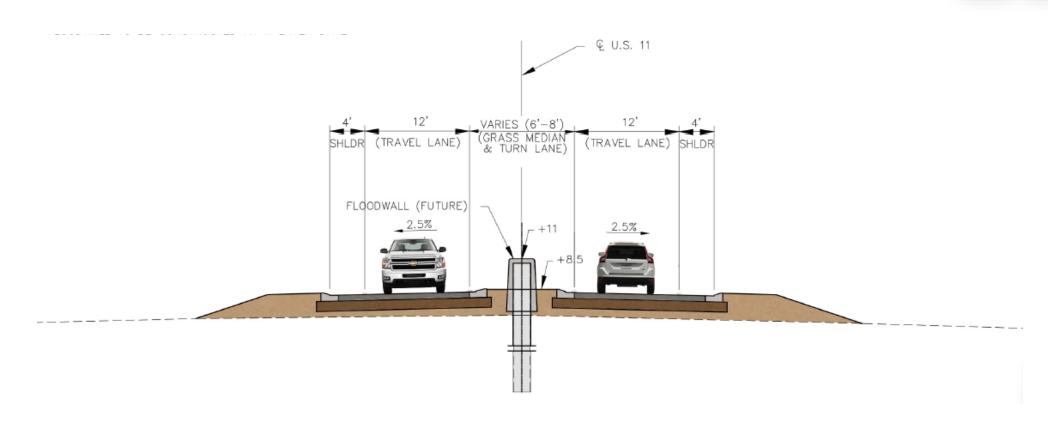




Total Cost Range (\$132M - \$179M)

- Elevate Highway 11 with median Option 2 (DOTD)
- Elevate Lakeview Drive (maximize embankment width) – Option 2
- Grand Lagoon Barge Gate and Pump Station
- Small drainage structure Harbor Drive tiein @ I-10.
- One-way drainage structure Oak Harbor Blvd. @ I-10.

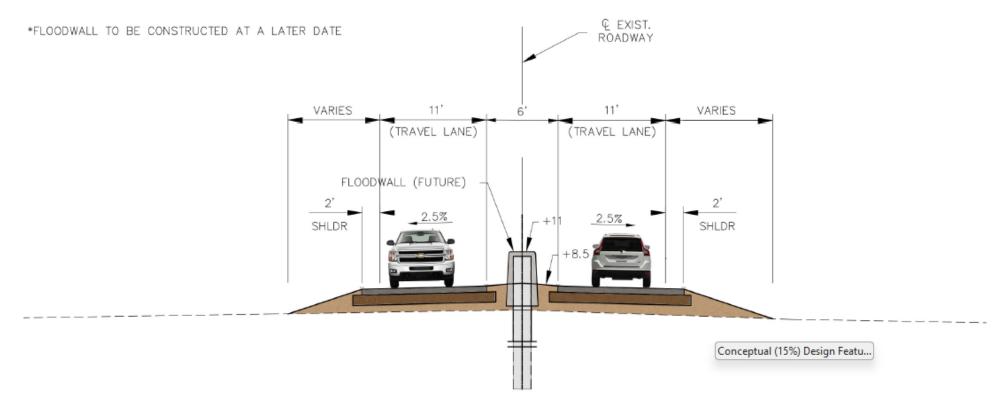




Highway 11 Typical Section

*floodwall to be constructed at later date

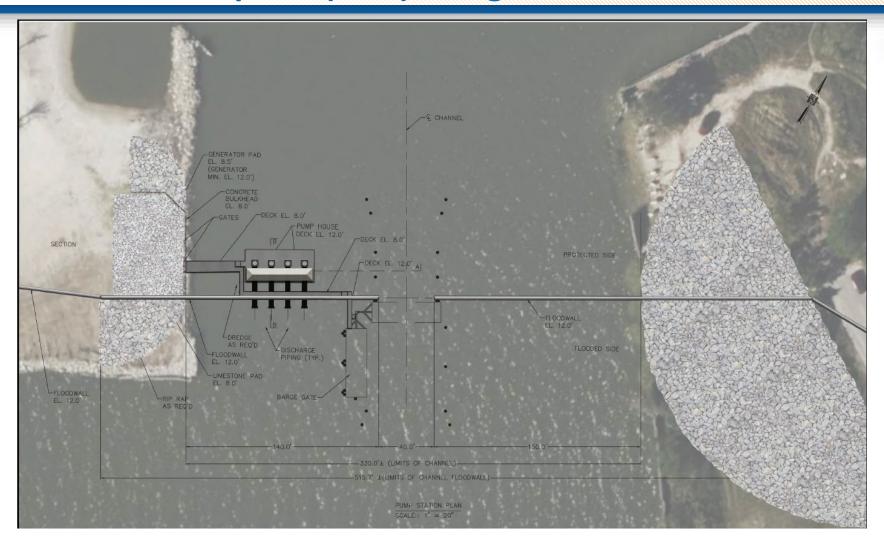




Lakeview Drive Typical Section

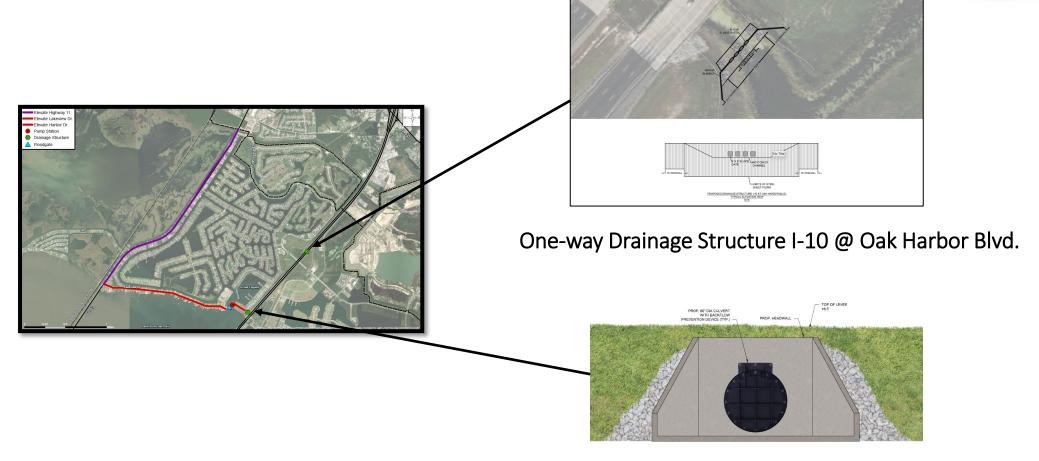
*floodwall to be constructed at later date





Grand Lagoon Barge Gate and Pump Station





One-way Drainage Structure I-10 @ Harbor Dr.



Summary and Recommendations



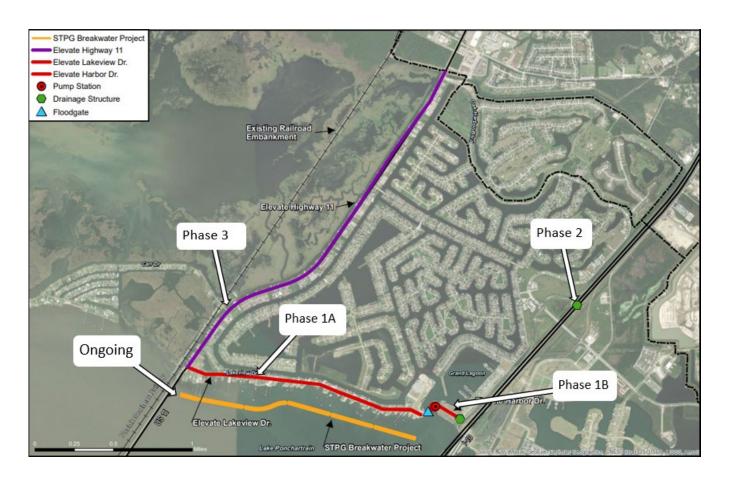
Summary



- Eden Isle can take advantage of their existing infrastructure to improve flood risk resilience.
- Features:
 - Raise existing roads to +8.5' elevation, leave adequate room for future floodwalls.
 - Maximize embankment width along Lakeview Drive
 - Work through Lakeview Drive design challenges
 - Gated structure and pump station at Grand Lagoon.
 - Two drainage structures @ I-10
- Work with DOTD to design, and construct the Highway 11 portion
- Implement in a phased approach



Phased Implementation



- Phase 1A Elevate Lakeview Drive
- Phase 1B Construct Grand Lagoon
 Structure and Pump Station, drainage
 structure, elevate Harbor Drive.
- Phase 2 Construct I-10 Drainage
 Structure
- Phase 3 Work with DOTD to re-initiate the Highway 11 portion
- Phase 4 Evaluate the potential for 50year level of protection at a later date