

SANIBEL CAUSEWAY: REBUILDING WITH TEAMWORK AND DETERMINATION

WTBA – 2024 ANNUAL CONVENTION

Project Manager

Florida Department of Transportation

Kati Sherrard, PE



Project Manager

Superior Construction

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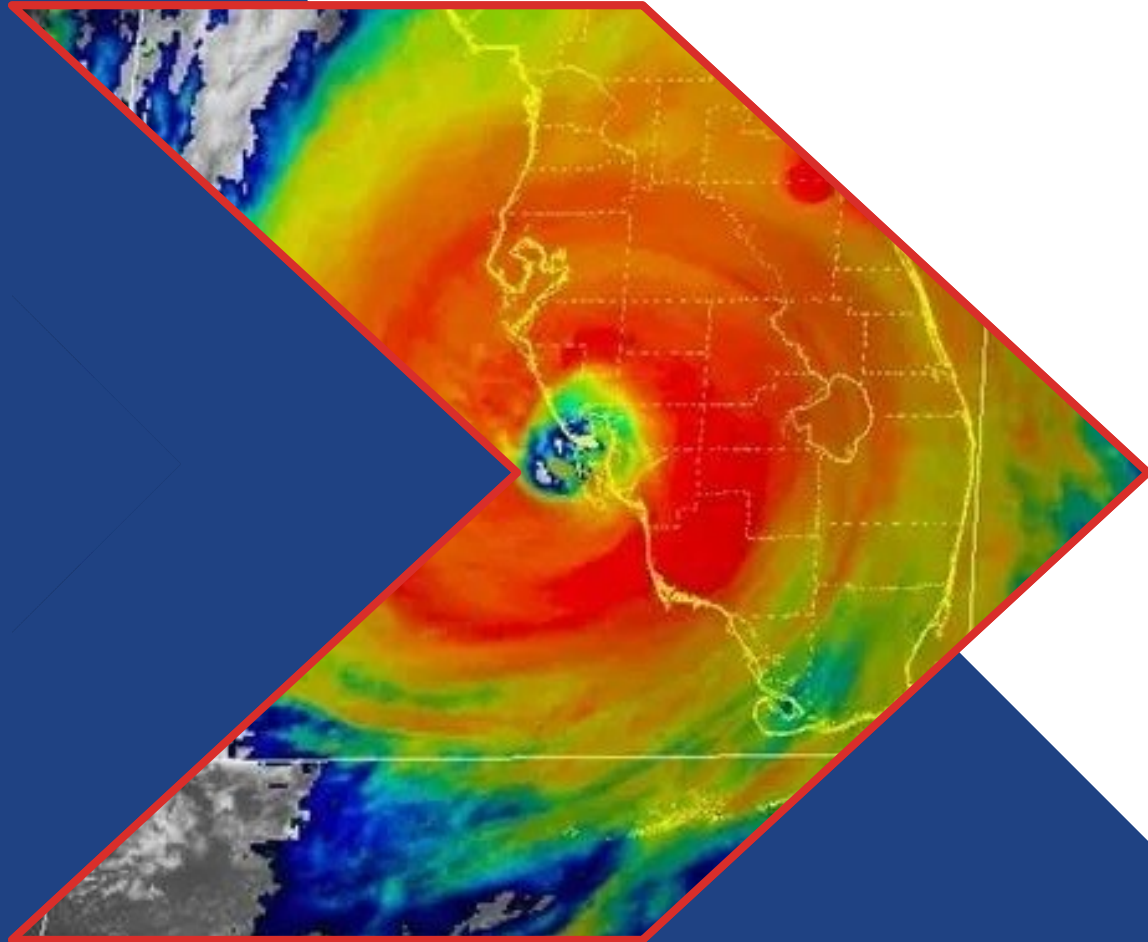


Project Manager

The de Moya Group, Inc

Paul Suellentrop

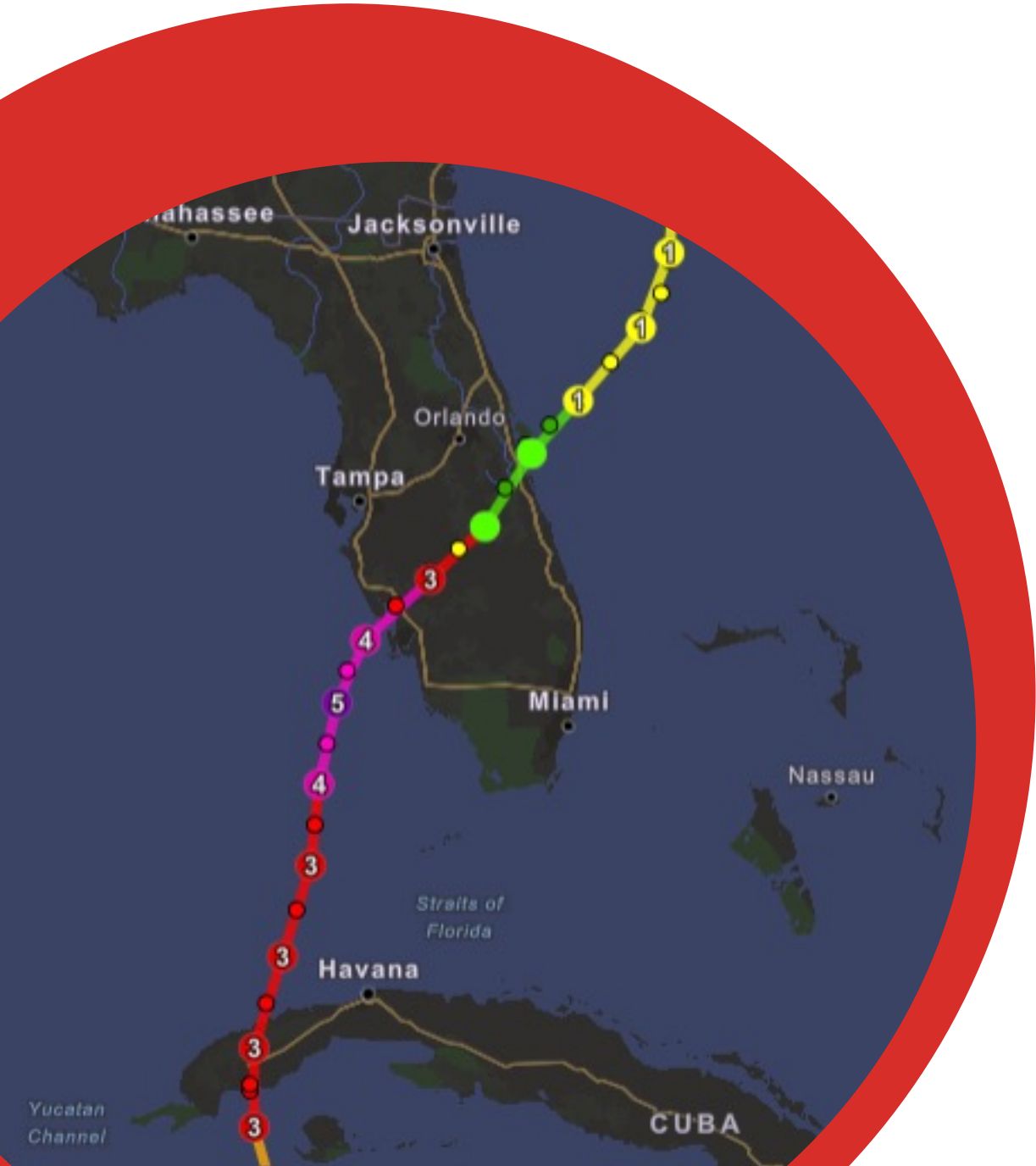




Background

Hurricane Ian & The Sanibel Causeway

Hurricane Ian Statistics



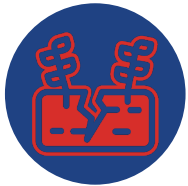
Landfall

- Cuba - Cat. 3
- Lee County, Florida - Cat. 4 (2022 Sep 28)
- Georgetown, South Carolina - Cat. 1



Meteorological

- 150 mph landfall windspeed
- 10 to 15 feet storm surge
- Over 26 inches rainfall
- 14 Florida tornados



Casualty & Damage

- At least 156 fatalities
- Estimated \$112.9 billion in damage

Data Source: National Hurricane Center Tropical Cyclone Report
Graphic Source: U.S. National Weather Service Tampa Bay Area, FL)



Cayo Costa

Pine Island

Cape Coral

Fort Myers

Captiva Island



Project Location

Sanibel Island

Project Location Overview



Port Comfort



End Project

McGregor Blvd.

Sanibel A

Island A

Sanibel B

Island B

Sanibel C

Toll Plaza
Boat Ramp
Barge Access
"Base Camp"

Begin Project



Project Location Overview



BEFORE HURRICANE IAN

Sanibel Causeway Island A & Mainland



AFTER HURRICANE IAN

Sanibel Causeway Island A & Mainland



BEFORE HURRICANE IAN

Sanibel Causeway Island B



AFTER HURRICANE IAN

Sanibel Causeway Island B

Sanibel Causeway & McGregor Blvd. Damages



Approach Failures

Sanibel A - East & West Approach
Sanibel B - East & West Approach
Sanibel C - East Approach



Seawalls

Sanibel A - East & West Side
Sanibel B - East & West Side
Sanibel C - East Side



Island Washouts

Island A - Complete Washout
Island B - Complete Washout



Mainland

McGregor Blvd Eastbound Lanes
Pipe Crossing Failure at Port Comfort



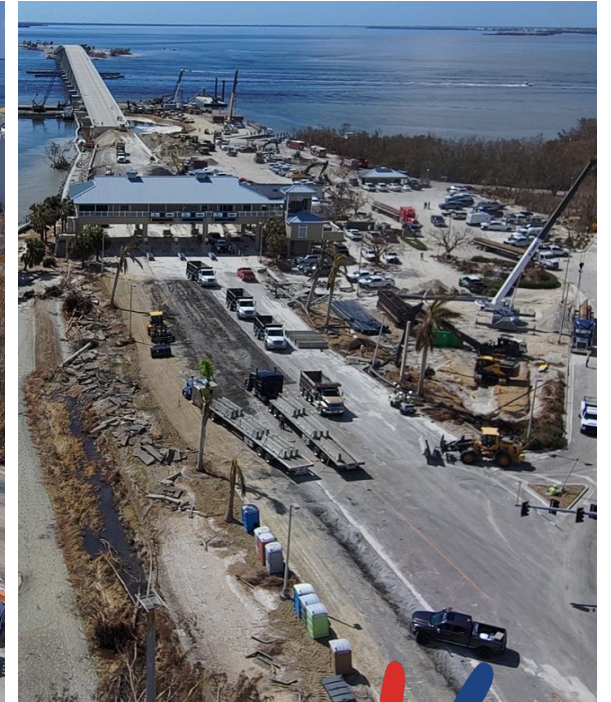
Emergency Repairs

Challenges Faced | Innovative Solutions Found



Mobilization to Project Site

October 5th | Contract Day 1



**Flood of Personnel, Heavy
Equipment & Material Deliveries**

Mobilization to Project Site

October 5th | Contract Day 1

Challenge: Expedited Schedule





OUR GOALS & OBJECTIVES



Restore Access

- Only Vehicular Access to Barrier Islands
- Improved Emergency Response Times
- Maximize for Reconstruction Efforts



Safety First

- No accidents or injuries
- Be cognizant of surroundings
- Address potential hazards



Support

- Support the community
- Support each other

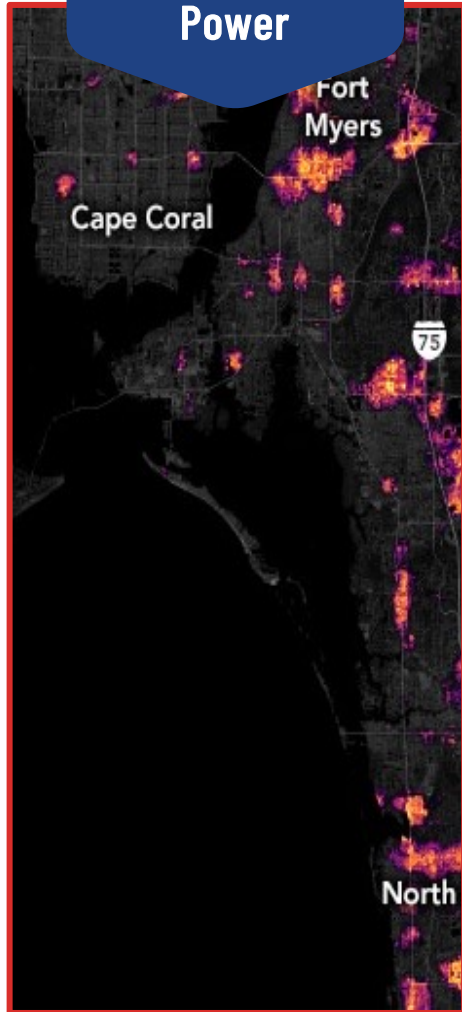


Reduce Rework

- Maintain Access
- FDOT Approved Pits & Materials

Initial Logistical Challenges

Power



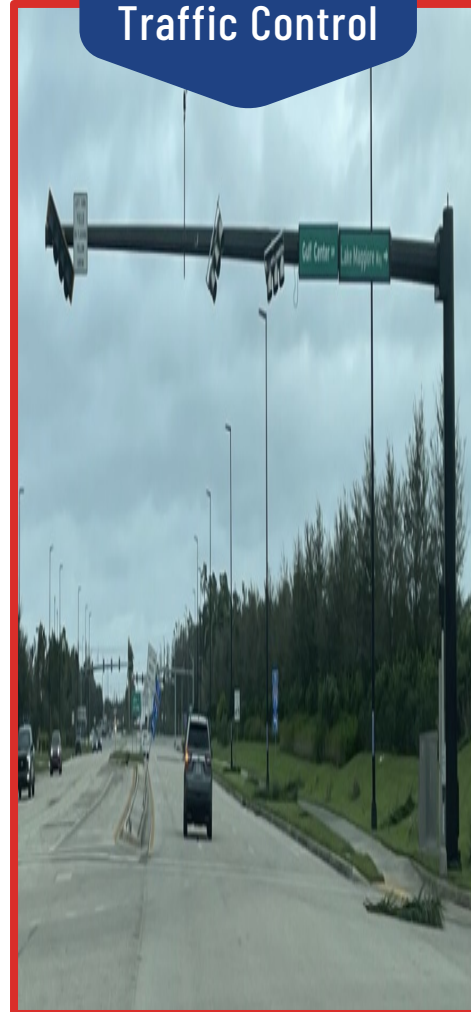
Communications



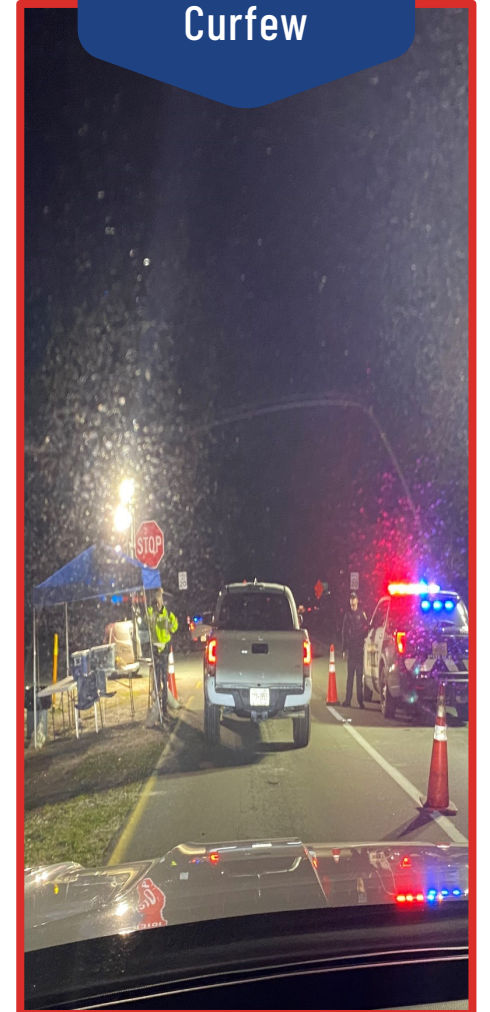
Lodging



Traffic Control

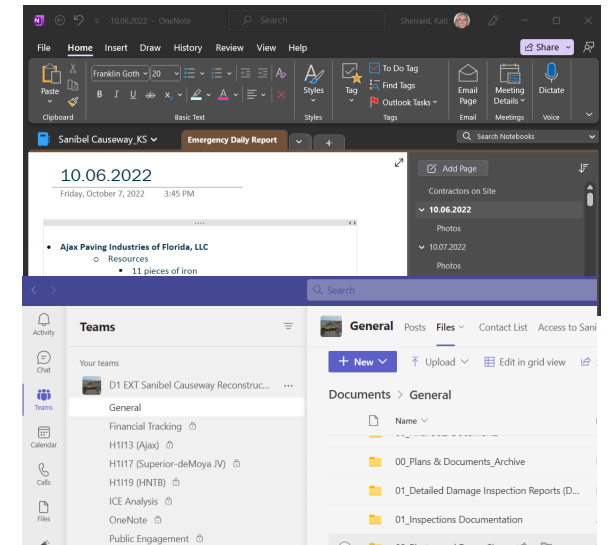
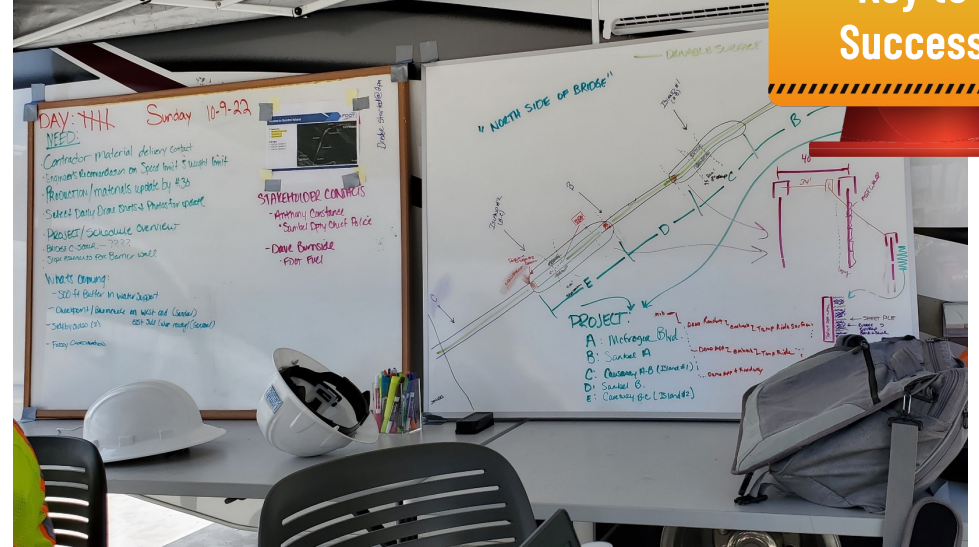


Curfew



Communication

Challenge: Maintaining Clear Communication



Punta Rassa Boat Ramp

Challenge: Traffic Control | Mobilization to Causeway Islands

Importance of Staging Area

- One way in and out through project
- Barge loading
- Multiple agency launch point
- Operational boat ramp
- Base camp for project team
- Water access to Island A & Island B



Expedited Engineering Analysis

Challenge: Adapting to Conditions

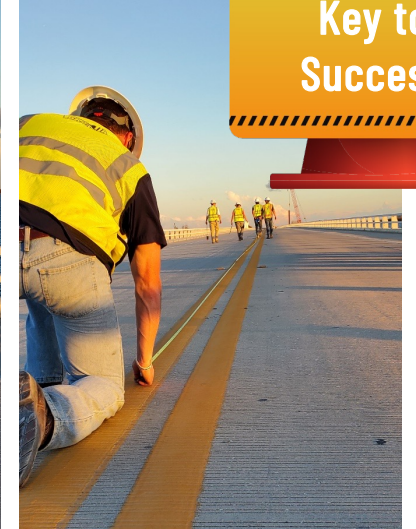
Frequent & Collaborative Coordination

- Lee County
- FDOT District Office
- FDOT Central Office

On-site decisions

- Morning “huddles”
- Reconstruction decisions made by technical experts
- Daily design and construction meetings

Bi-weekly permit agency meetings



McGregor Boulevard – Damage Assessment

Damages

- Complete washout of eastbound lanes
- Localized damage in westbound lanes
- Signalization and lighting damage
- Drainage system failures

Repairs Needed Immediately

- Provide for deliveries
- Access to boat ramp and barges
- Staging area for barge traffic & construction equipment



McGregor Boulevard Repairs

October 7th | Contract Day 3

Challenge: Power & Traffic Control

Daytime Paving Operation

Disruptions to Batching Operations

- AJAX Alico Rd asphalt plant loses power multiple times
- Power company disconnects power while reestablishing electric in local community
- FDOT contacts power company through Emergency Operations Center

Utility Company Lane Closure

- Utility repair begins on McGregor Blvd. during paving operation
- Lane closure with flagging operation set up by Utility Company in work zone



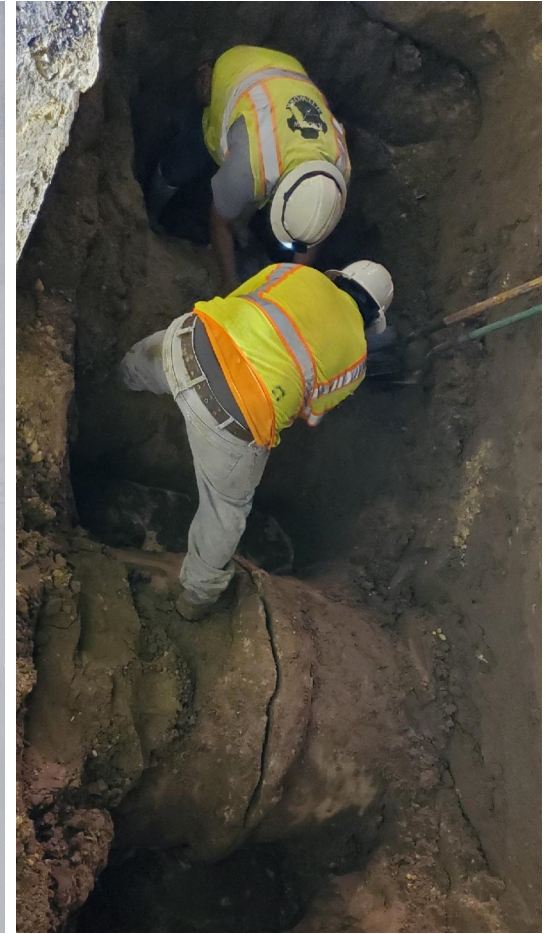
McGregor Boulevard Repairs

October 8th | Contract Day 4

Challenge: Depression Forms in Roadway

Port Comfort Pipe Crossing Failures

- Not initially identified
- Aerial footage shows loss of material
- Required investigation and repair
- AJAX crews mobilize to location & install temporary repairs



Sanibel A - Damage Assessment

Bridge Approach | MSE Wall Failures

- East & West approaches

Seawall Failures

- East & West abutment

Roadway Failures

- Vicinity of Toll Plaza
- Roadway access under Sanibel A at western abutment



Sanibel A Repairs

October 5th – 6th | Contract Day 1 & 2

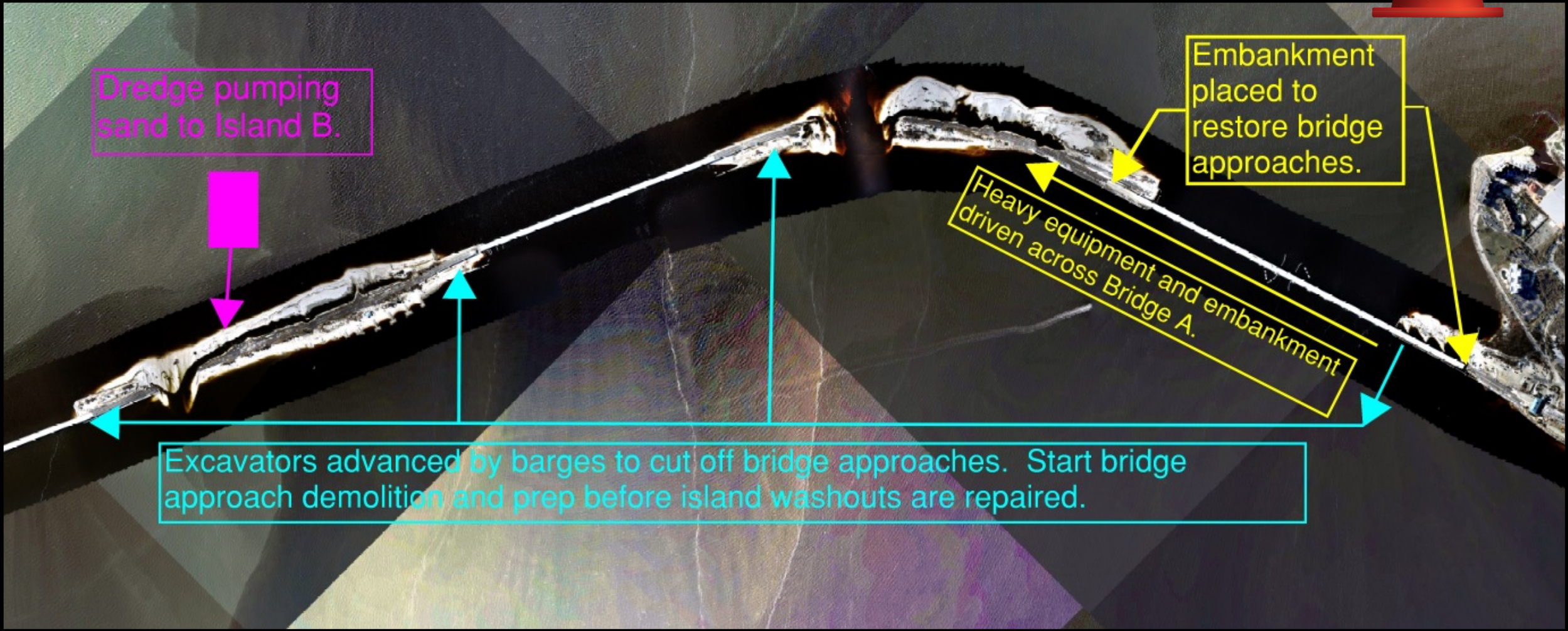
Challenge: Drainage from Bridge at Fill Areas. Access to Island A.



Sanibel A Repairs

October 5th - 6th | Contract Day 1 & 2

Solution: Multiple Simultaneous Work Areas Accessed by Water



Island A – Damage Assessment

Complete Washout of Island A

- 800 feet wide
- 8.5 feet deep

Actual Impacts Deeper than Anticipated

- Water levels lower during post storm assessments
- Storm produced significant inland flooding that eventually discharged from Caloosahatchee River into San Carlos Bay

Significant Erosion

Complete Loss of Park Facilities



Island A - Repairs

October 7th - 9th | Contract Day 3-5

Challenge: Tides & Currents

Closing the Cut

- Experienced fill loss at Island cut due to high tides & fast-moving currents
- Constructed rock jetty out ahead of placing material
- Jetty blocked impacts from tides and currents



Island A – Repairs

Challenge: Available Work Area

Available Work Area

- Movement of people and equipment
- Significant volume of deliveries
- Placement of materials



Sanibel B - Damage Assessment

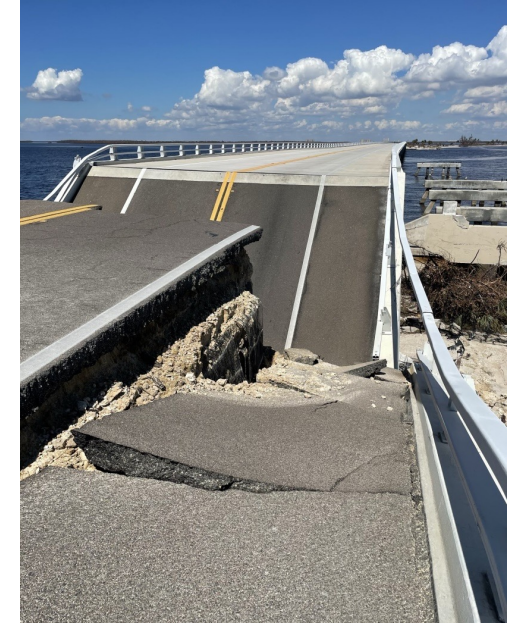
Bridge Approach | MSE Wall Failures

- East & West approaches

Seawall Failures

- East & West abutment

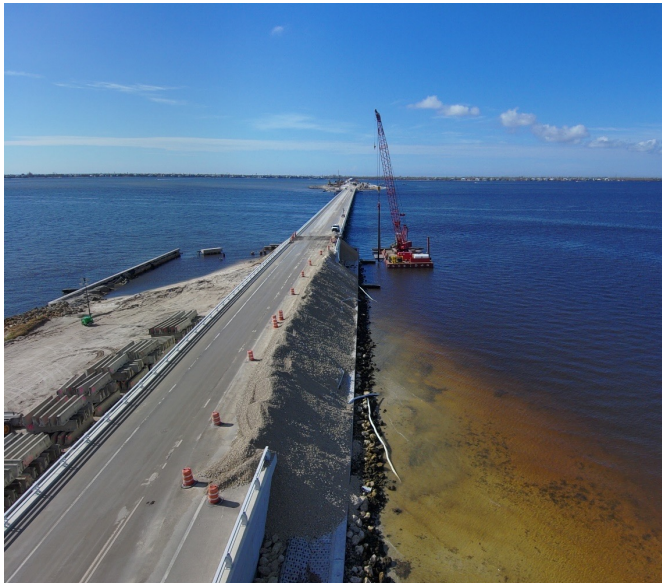
Roadway Failures



Sanibel B - Repairs

October 7th - 10th | Contract Day 3-6

Challenge: Temporary Critical Sheet Pile Wall Needed



Island B – Damage Assessment

Complete Washout of Island A

- 400 feet wide
- 4.5 feet deep
- Significant Erosion
- Complete Loss of Park Facilities
- Priority to fill void
- Water levels and tides “normalized”
- Constant flow of dredge material helping to fill Island B washout



Island B - Repairs

October 8th - 11th | Contract Day 4-7

Challenge: Fill Island B Washout to Access Abutment at Bridge C



Sanibel C - Damage Assessment

Bridge Approach | MSE Wall Failures

- East approach

Seawall Failures

- East abutment



Sanibel C - Repairs

October 9th - 10th | Contract Day 5-6

Challenge: Water Depths Caused by Scour



Utility Convoy Crossing

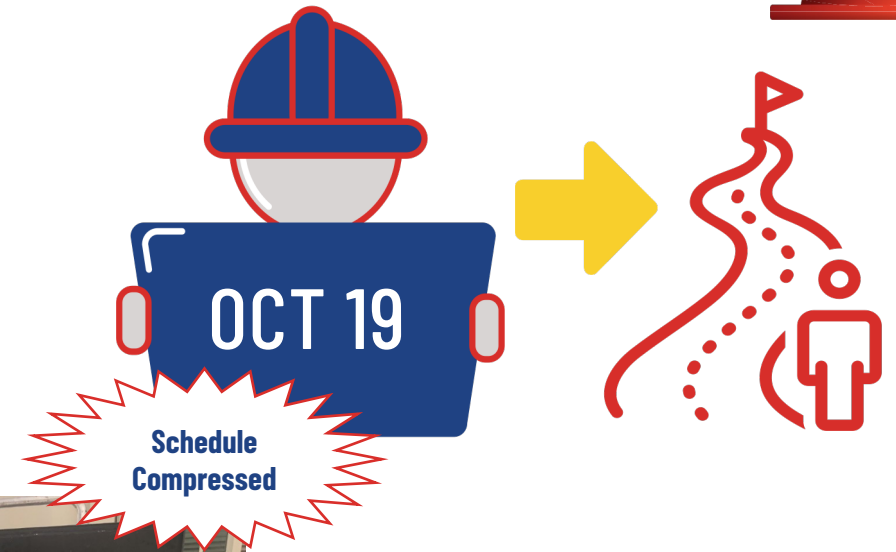
October 11th | Contract Day 7

Challenge: Communication & Coordination



Celebrate Wins Together

October 11th | Contract Day 7



Paving Operation

October 15th - 16th | Contract Day 11 -12

Challenge: Weather

Nighttime Paving Operation

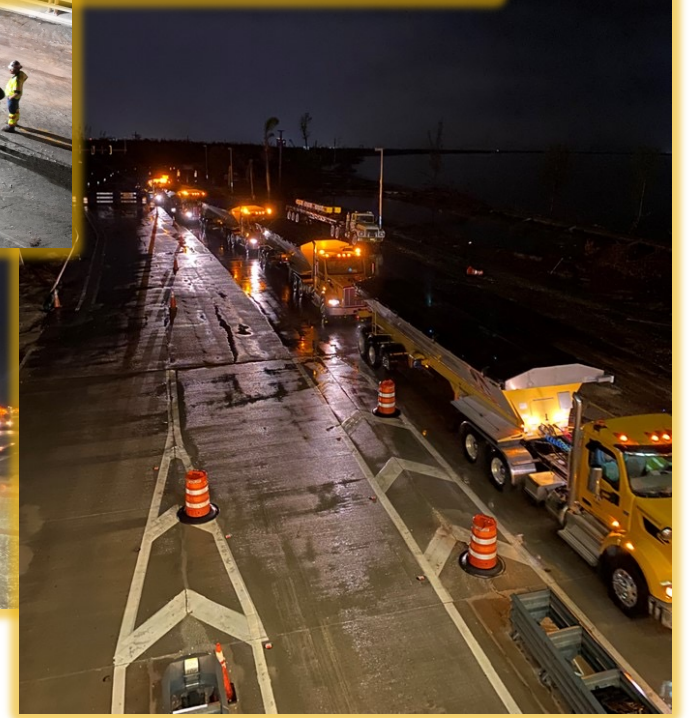
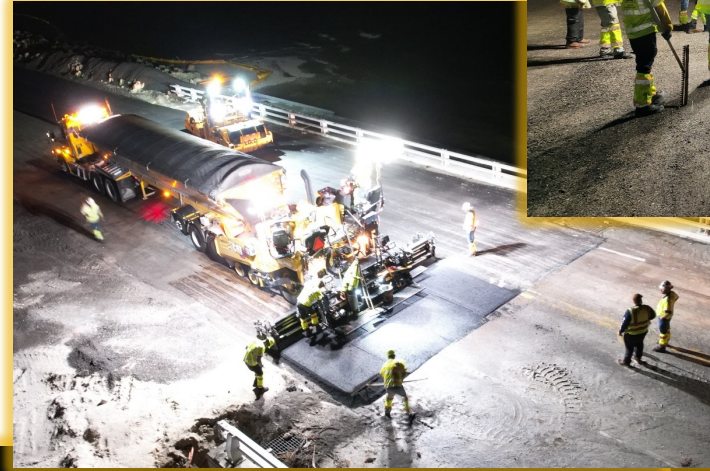
Storm blew in from Gulf of Mexico

- Several inches of rain
- Lighting
- Wind gusts greater than 60mph

Paving train retreats to toll plaza

Remobilized when weather cleared

- Placed additional 3,000 tons



Temporary Traffic Control Plans

Challenge: Changing Conditions



Resident & Contractor Access

Iterative and collaborative process to prep for opening

- FDOT
- Lee County
- City of Sanibel

Post Emergency Repair

- Adjustments for checkpoint station changes
- Adjustments public opening January 1, 2023

COUNTY OF RECORD	STATE OF FLORIDA	TEMPORARY TRAFFIC CONTROL		SHEET NO.
LAPORTE A. BRITTON, P.E. LICENSED PROFESSIONAL ENGINEER 7715 N. W. STEVENS BLVD. SUITE 400 LAKELAND, FL 33809	DEPARTMENT OF TRANSPORTATION STATE ROAD DISTRICT 10 CR 867	LEE	PLAN (7)	

This checkpoint moves east. Vehicles not permitted on Sanibel will be diverted into the turn lane to Punta Rassa Rd. via traffic control officer direction.



**Temporary Roadway
Open
October 19, 2022
Contract Day 15**



September 28, 2022

Hurricane Ian
Landfall



October 1, 2022

Begin Prepping for
Emergency Repairs



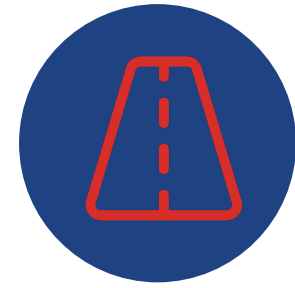
October 4, 2022

Letters of Interest Due
Contractors Selected
Contracts Executed



October 19, 2022

Temporary Roadway
Open to Traffic



September 29, 2022

Begin Damage
Assessments



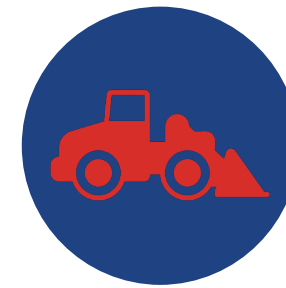
October 2, 2022

Contract Drafted
Industry Contacted
Request for Qualifications Issued



October 5, 2022

Begin Emergency
Repairs



An aerial photograph showing a long, narrow strip of land, likely a causeway or bridge approach, extending from a larger landmass into a large body of water. The road is under construction, with visible sand, gravel, and construction equipment. A white car is driving on the road. In the background, a long bridge spans across the water. The water is dark blue, and the sky is overcast.

24/7 Operation

100+ Crew Per Day

36,000+ Workforce Hours

7 Days for Convoy Crossing

15 Days of Emergency Work



24/7 Material Delivery

- **Embankment**
- **Bedding Stone**
- **Riprap**

Up to 1,000 trucks per day

Multiple dredges mobilized

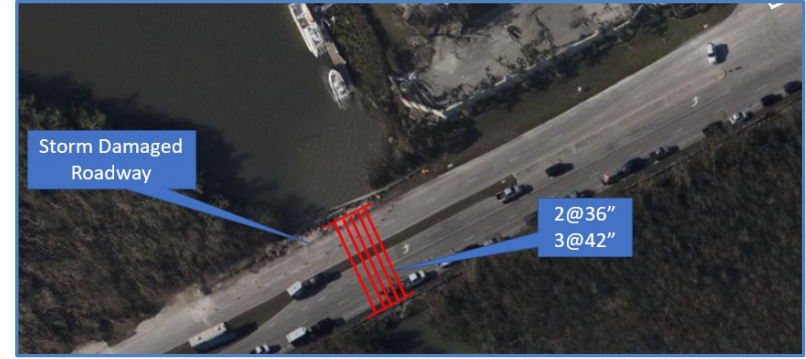
Materials Used:

- **8,200 Loads of Fill**
- **2,400 Loads of Rock**
- **4,000 Tons of Asphalt**



Permanent Repairs

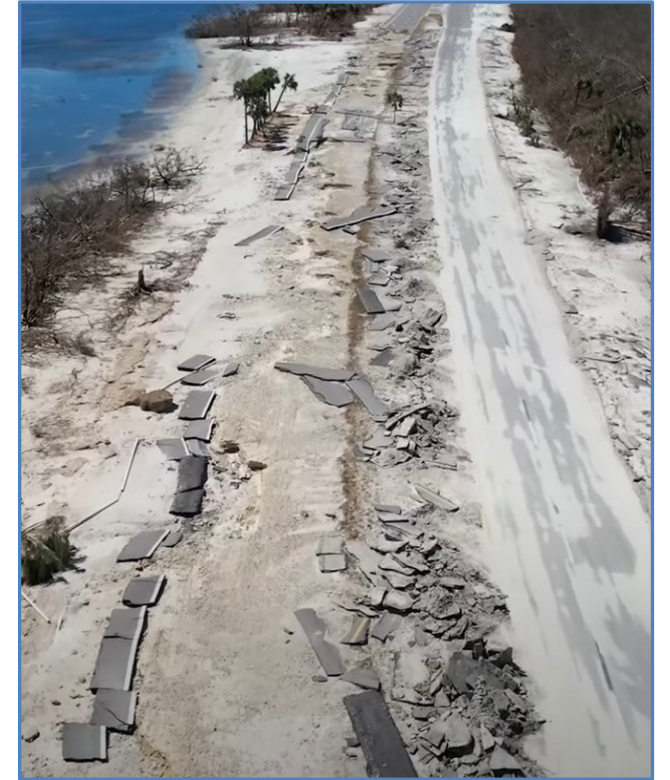
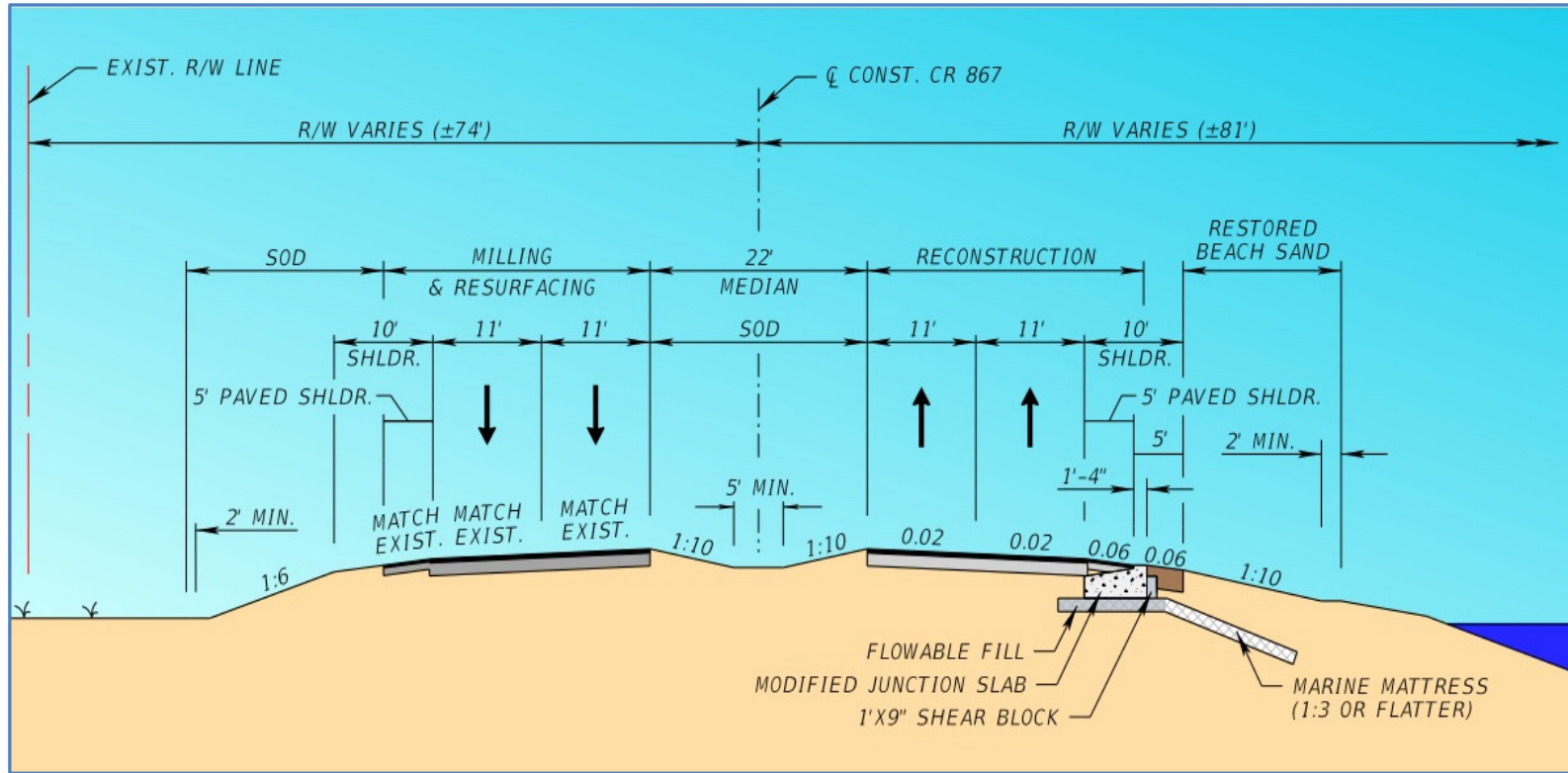
Resilient Design Features



McGregor Blvd Port Comfort Pipe Crossing

Resilient Design Features:

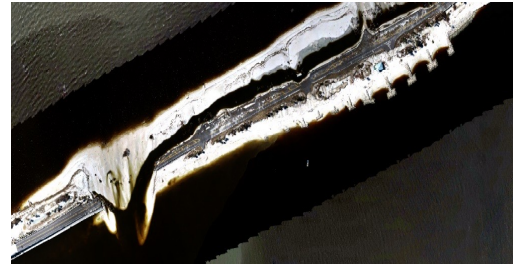
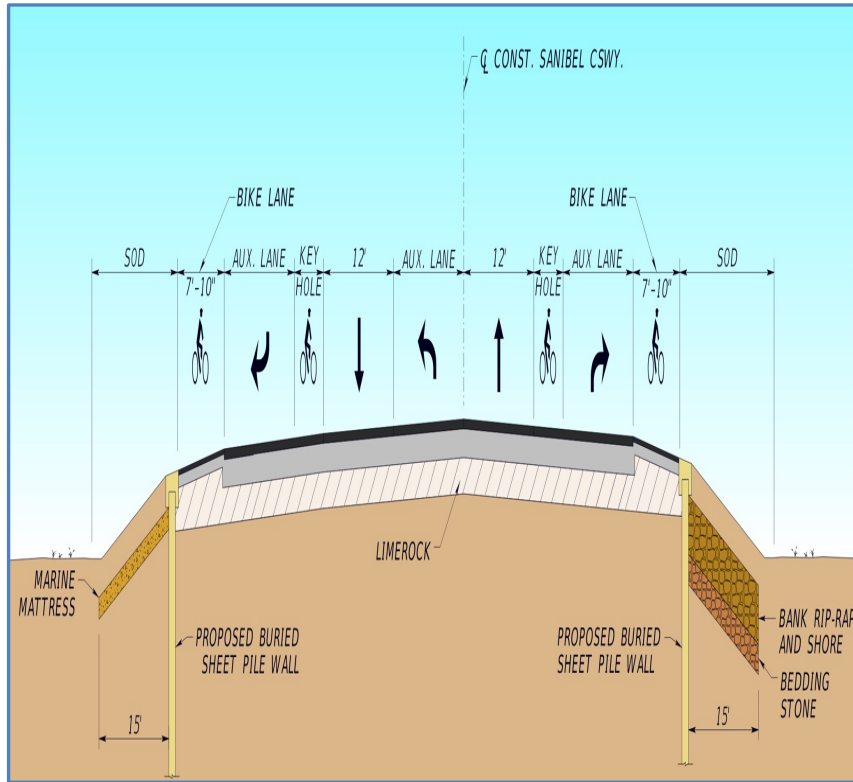
Optimize number and size of pipes



McGregor Blvd Eastbound Pavement Washout

Resilient Design Features:

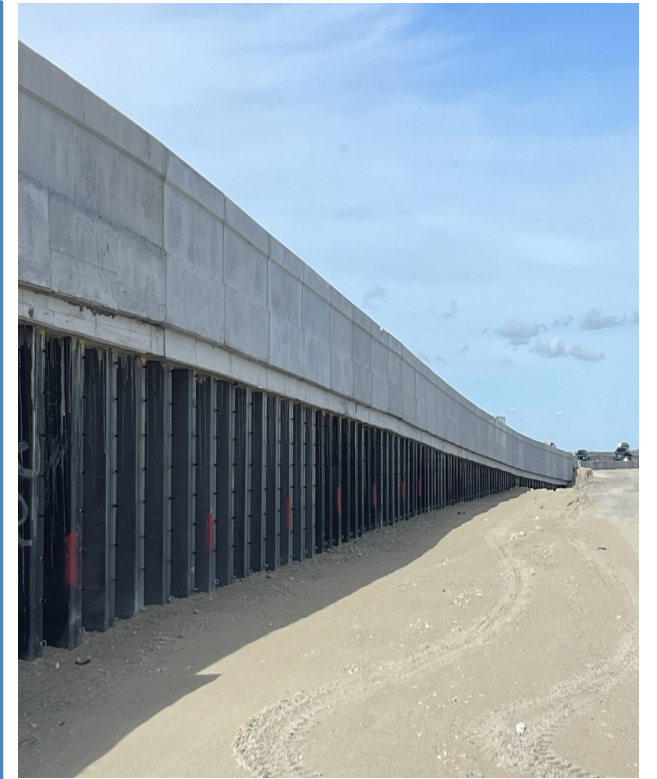
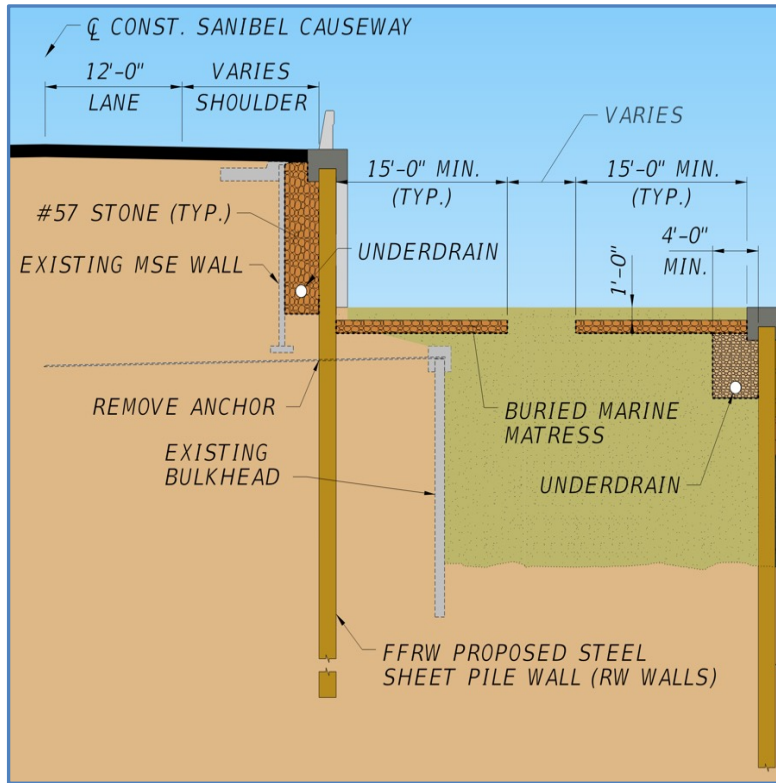
Marine Mattress with modified junction slab to protect edge of pavement



Sanibel Causeway Island Roadways

Resilient Design Features:

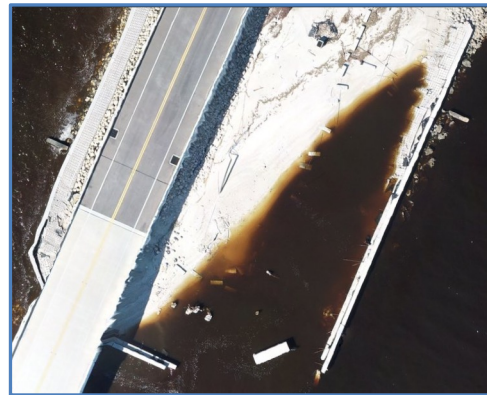
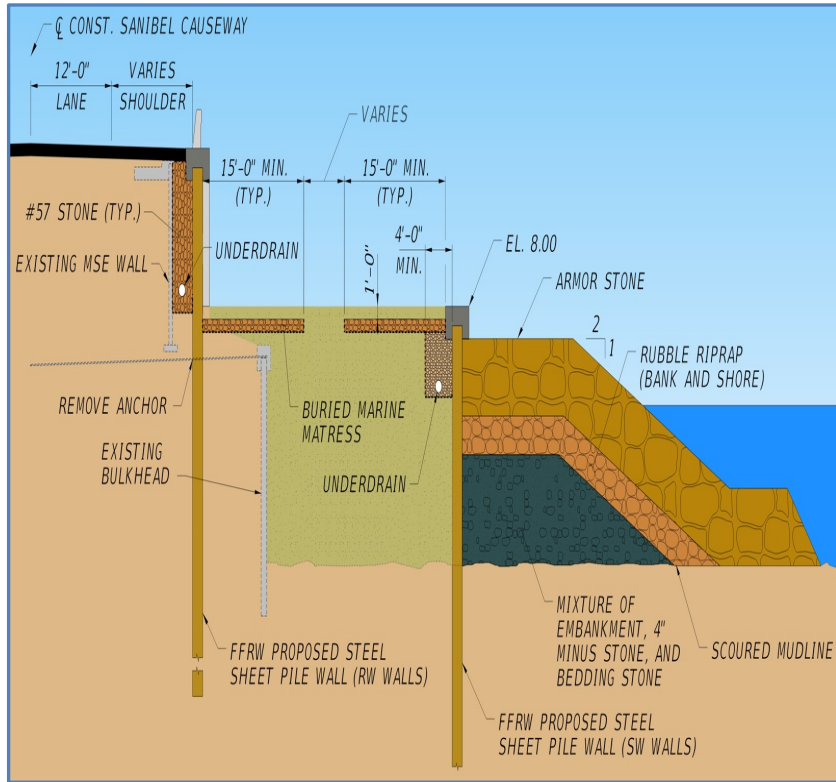
- Causeway elevations raised by 2 feet
- Buried wall protection
- Buried marine mattress and riprap



Sanibel Causeway Bridge Approaches

Resilient Design Features:

- Deep foundations in lieu of Mechanically Stabilized Earth (MSE) walls
- Under drain system
- Toe protection - Marine Mattress



Sanibel Causeway Seawalls

Resilient Design Features:

- Raise seawall cap elevation approximately 3 feet
- Heavy armoring stone protection
- Buried back of wall protection



Summary

Key Takeaways & Lessons Learned

10 Key Takeaways

01 Bring a source of power

02 Bring a source of light

03 Bring a backup communication source

04 Have a vehicle with a GPS map

05 Expect that conditions may be worse than anticipated

06 Identify and layout staging area "Base Camp"

07 Expect "outside" influence

08 Be able to adapt with unforeseen conditions

09 Utilize your resources to divide and conquer

10 Don't expect others to do something you are not willing to do yourself

The Impact We Have On Our Communities



