

 Hollywood, FL

 June 13-14, 2024

2024 TRANSPORTATION SYMPOSIUM

Transportation Resilience Delivered: District Case Studies

Tony Frye, State Transportation
Resilience Officer

FDOT Office of Environmental Management



Federal Protect program

- Promoting Resilience Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT)
 - Included in the Infrastructure Investment and Jobs Act (November 2021)
 - Statutory Emphasis on Incremental Improvements and Natural Hazards
 - Between \$250 and \$300 Million Annually to Competitive Discretionary Grants Nationally



Existing Resilience tools

- Sea Level Scenario Sketch Planning Tool (Planning)
 - <https://sls.geoplan.ufl.edu/>
- RAP Data Viewer (Planning)
 - [Link](#)
- Environmental Screening Tool (EST) Area of Interest (AOI) Tool Resilience Report (Project Development and Environment)
 - <https://www.florida-transportation.com/est/secure/> (Access Limited)
- Project Suite (PSEE) Resilience Tracker Module (Design)
 - <https://projectsuite.dot.state.fl.us/Pages/Home/Home.aspx>

FDOT Resilience Activities

- PSEE Resilience Tracker Module Available for Use in All Projects
- ETDM Resilience Reports Available for Use in Project Development
- PD&E Manual Resilience Chapter (July 2025)
- Development of Statewide Resilience Website



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District 4 Case Study



Brad Salisbury, P.E.

Lindsey Koren, P.E. (RS&H)

FDOT District 4

District Four Resiliency

Tidal Flooding on SR A1A in Hollywood

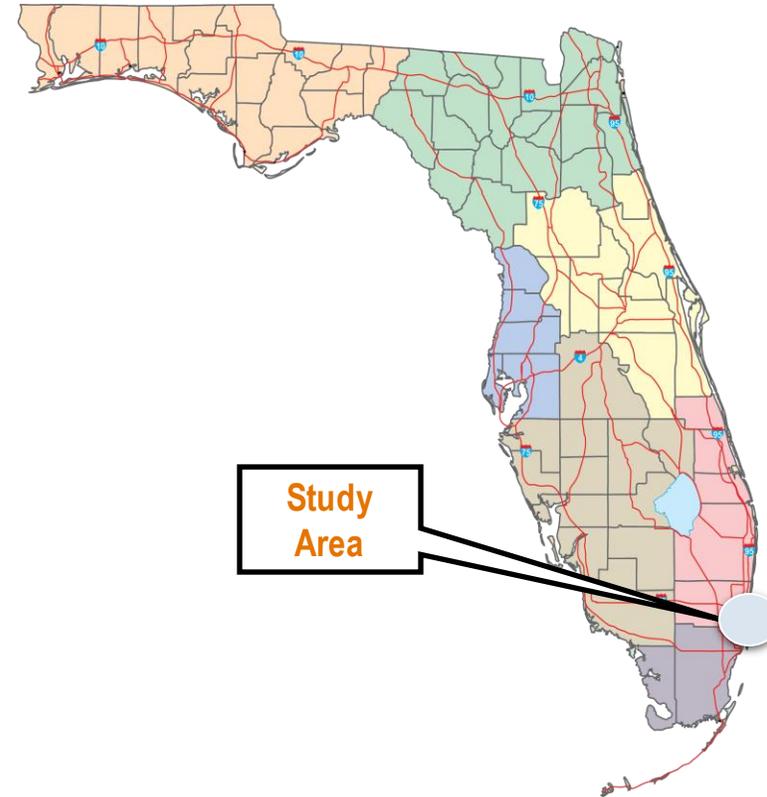


Partners in Improving Resiliency



Accelerated Timeline

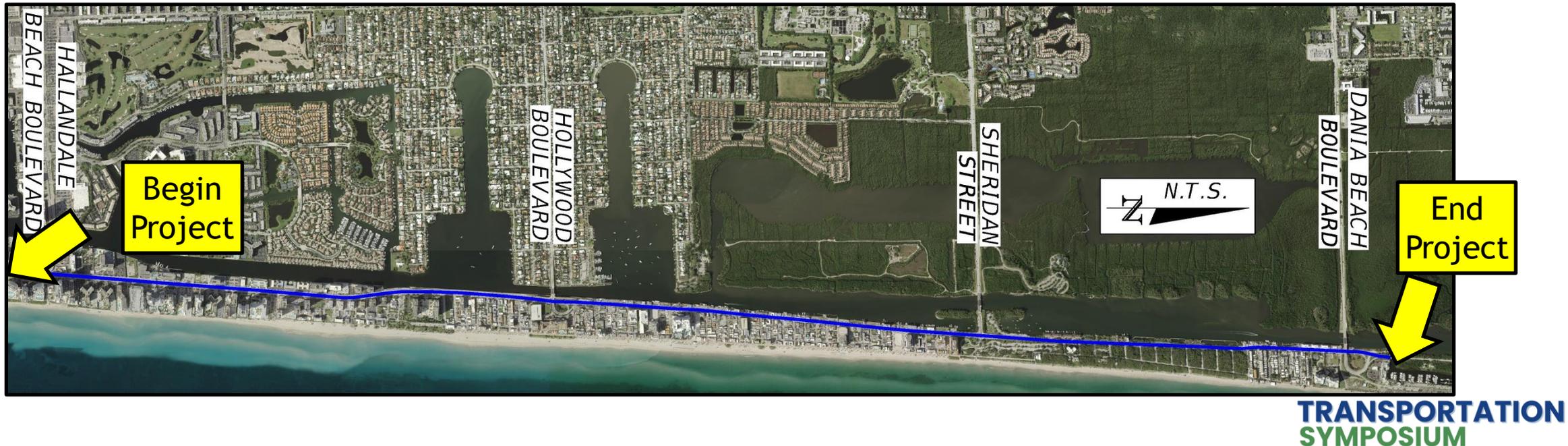
- FY21 - A1A Corridor Study
- FY21- Pilot Project Programming
- FY22 – Design
- FY25 - Construction



Corridor Study

Existing Conditions Report

- Field Observations
- Seawalls
- Low Road Elevations
- Potential Overflow Locations
- Storm Sewer Systems
- Outfalls
- Contributing Areas
- Land Use
- Create Model of System



Field Observations



October 2020 King Tide Flooding



October 2019 King Tide Flooding

Seawalls



Hydrological Modeling

Using:

- LIDAR Data
- CADD Files
- ICPR4 Modeling



Alternatives Report

- Review of existing backflow prevention devices
- Proposed remedies:
 - Prevention
 - Raise low seawalls
 - Construct new seawalls where none exist
 - Attenuation
 - Repair or replace backflow preventers
 - Repair or replace leaking structures
 - Pump stations to remove tidal flows
 - Restoration
 - Raise/reconstruct low side streets
 - Raise/reconstruct SR-A1A

FDOT FLORIDA DEPARTMENT OF
TRANSPORTATION

SR A1A Tidal Flooding Study Alternatives Report

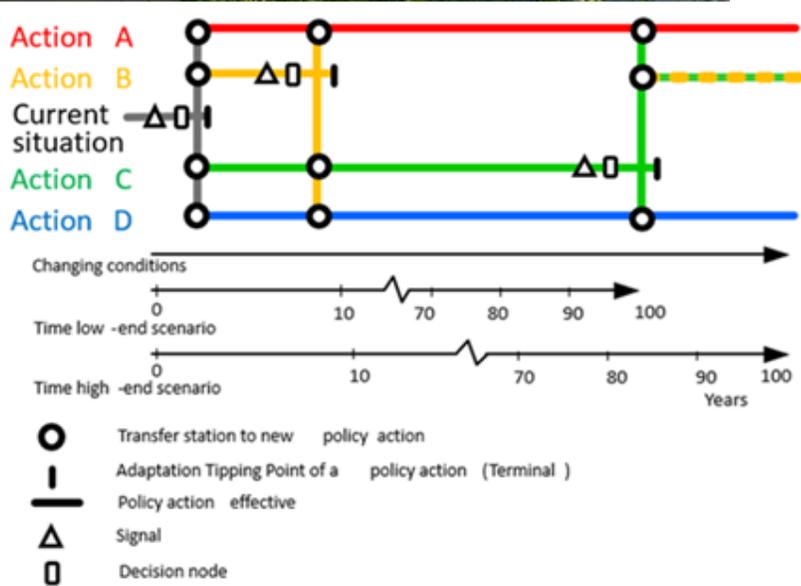
SR A1A (North Ocean Drive) From South of Hallandale
Beach Boulevard to North of Dania Beach Boulevard
Broward County, Florida



FPID: 229966-9-32-01 August 2020

www.dot.state.fl.us

Accommodating Future Expansion with Today's Design

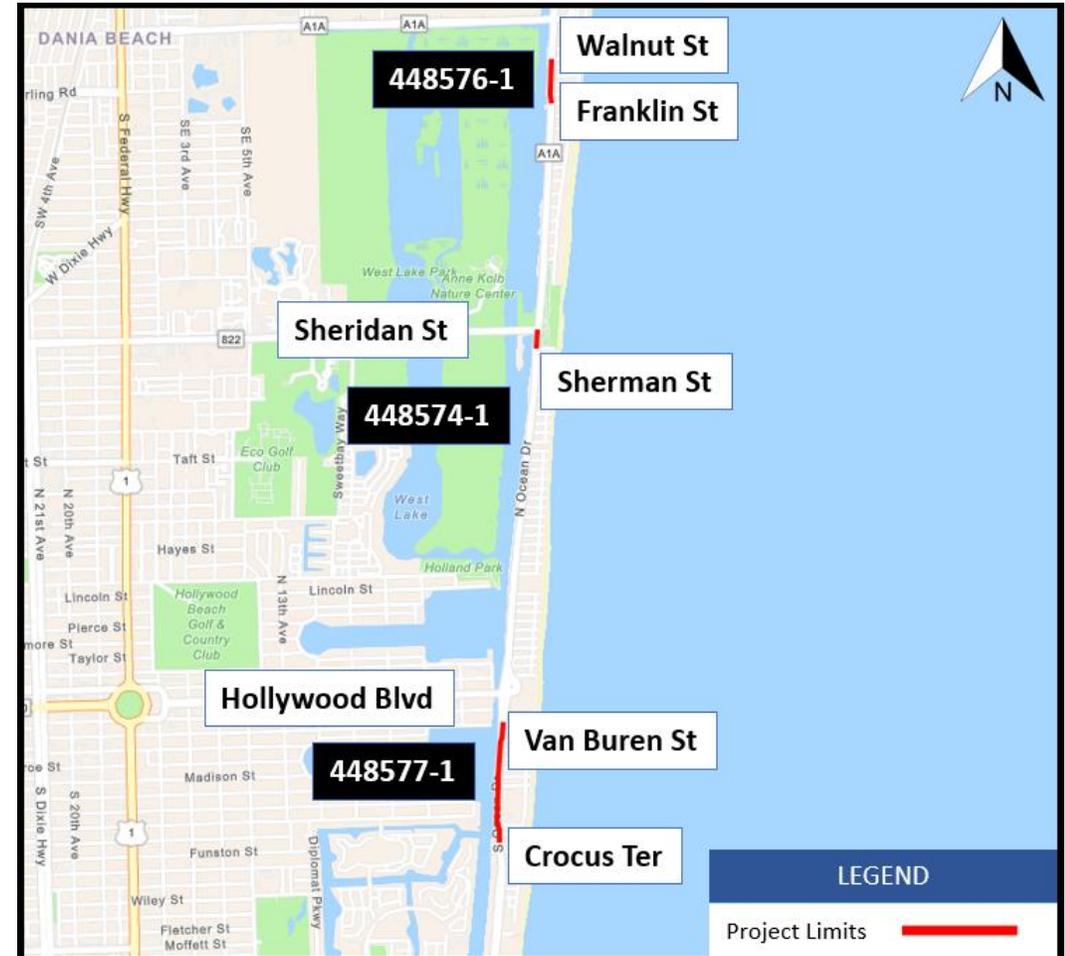


Time horizon	100 years			
Pathway	Costs	Benefits	Co-benefits	
1	+++	+	0	
2	+++++	0	0	
3	+++	0	0	
4	+++	0	0	
5	0	0	-	
6	++++	0	-	
7	+++	0	-	
8	+	+	---	
9	++	+	---	

Pathways that are not necessary in the low-end scenario

Project Programming

- Mid Term Improvements
 - Seawall Installation to 5' NAVD within FDOT Right-of-Way (Broward County 2050 Ordinance)
 - Pipe Lining and Replacement of Drainage Structures
 - Pump Station Installation at 4 High Priority Drainage Basins
- Funding Partnerships for Design and Construction of the Pump Stations with Broward County and the City of Hollywood



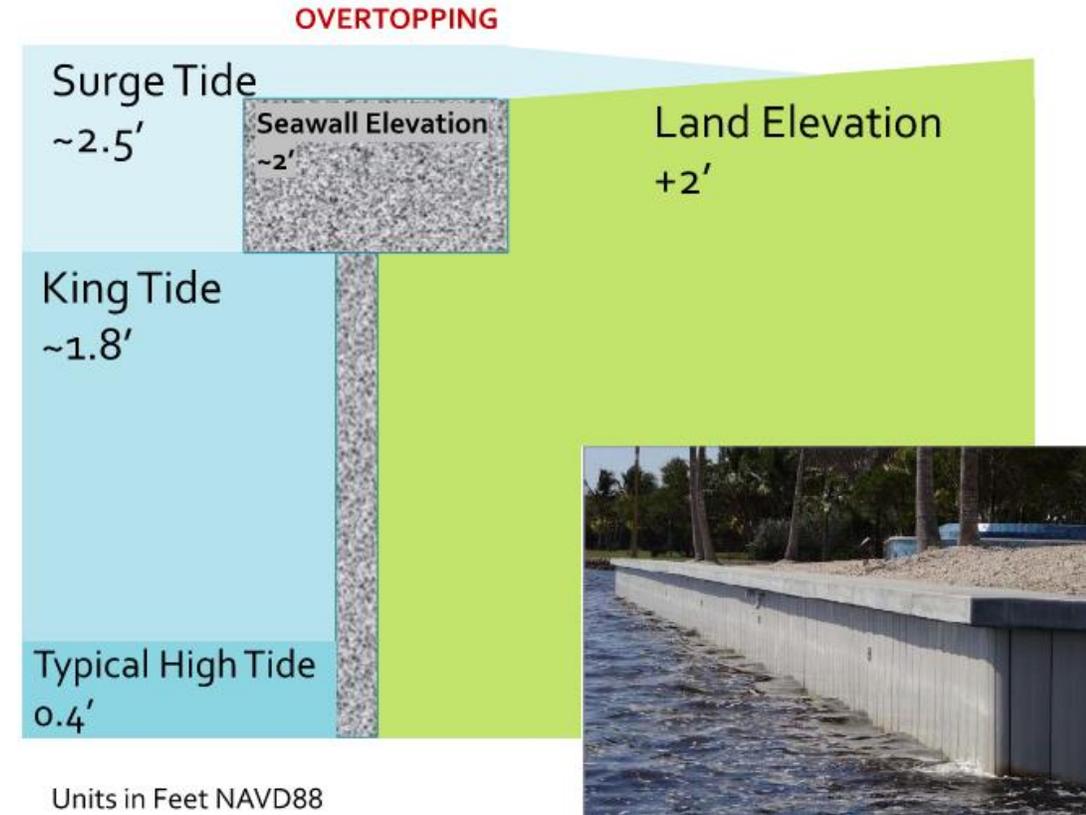
Design Process

Date	Milestone
August 2022	Notice to Proceed
November 2022	Value Engineering Workshop
November 2022	Final Survey Received
December 2022	City of Hollywood Board Meeting
December 2022	Conceptual Drainage Report (Alternatives Analysis)
February 2023	Initial Engineering (30%)
June 2023	Permit Submittals – USACE, SFWMD
July 2023	Constructability (60%)
October 2023	Public Meeting
December 2023	Biddability (90%)
June 2024	Production (S&S)
September 2024	Letting

- Complex design performed on an accelerated schedule tied to local, state, federal funding and other resilience grants.

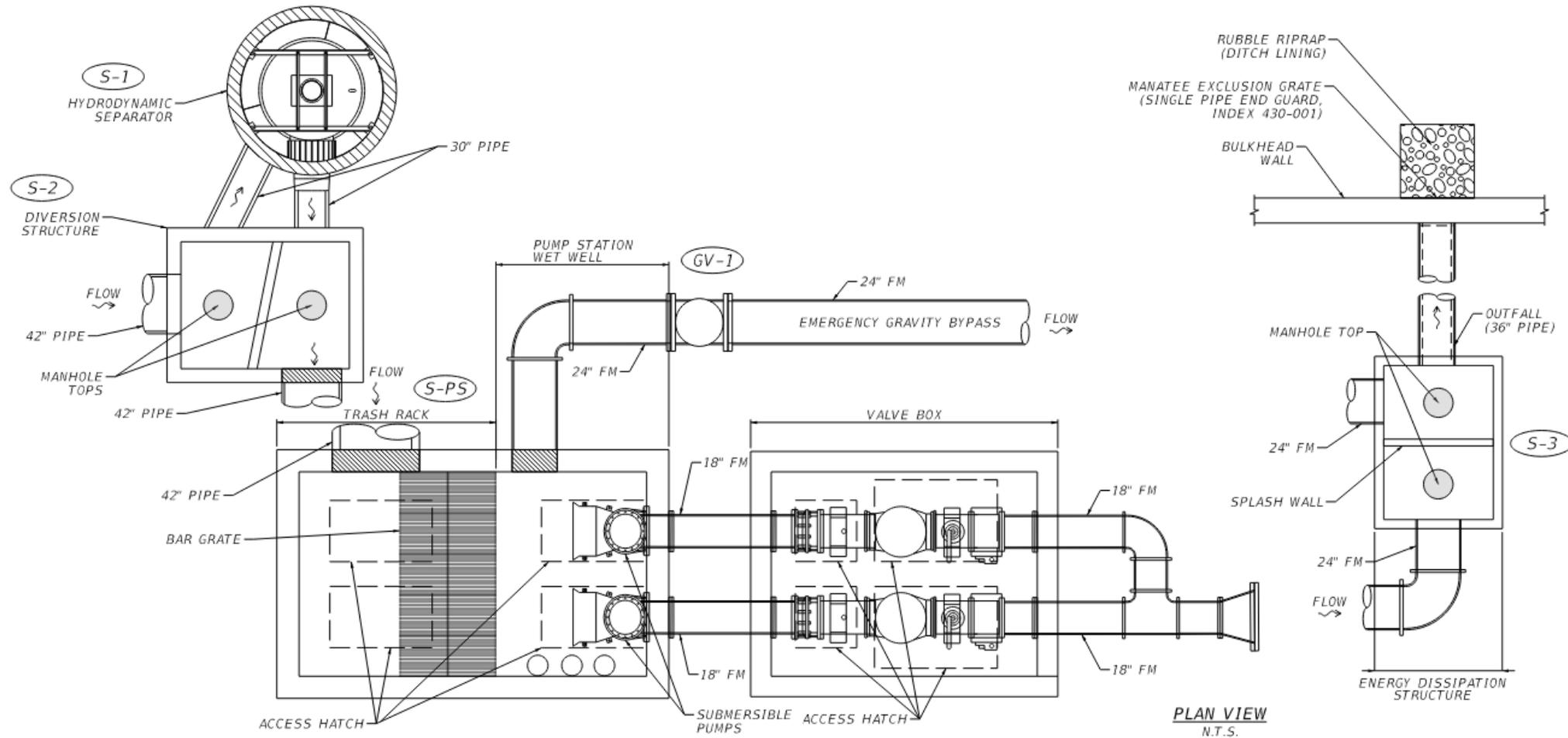
Design Development

- Stormwater Model (ICPR4) development:
 - Refine existing conditions using design survey
 - Add pump station model inputs
 - Model multiple tailwater alternatives - *Design High Water, King Tides, Surge Tide*
 - Propose storm drain hydraulic upgrades to maximize pump stations' effectiveness
 - Model new seawalls as overland weirs
 - Consideration of construction funding, cost/benefit of larger pump stations
 - Present alternatives analysis to District 4 Drainage Office for review and approval



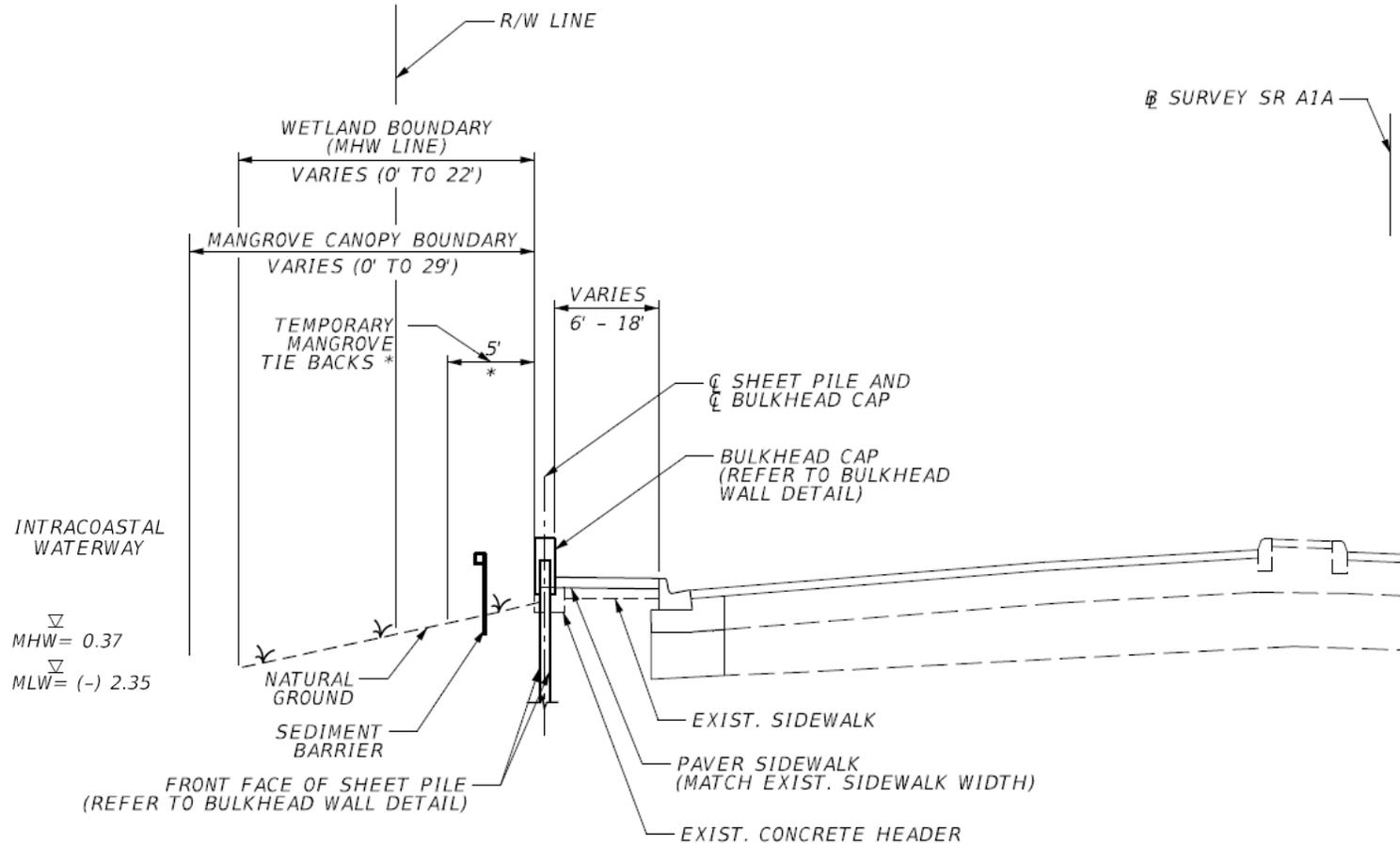
From "Proposed Minimum Seawall Height Policy" – Broward County Environmental Planning and Community Resilience Division

Design Typical



Typical Detail - Pump Station System

Design Typical (cont.)



Typical Detail - Bulkhead Wall

Design Challenges

- Develop Construction Plans with consideration of:
 - 3 Projects, 2 Consultants, 6 Total FPIDs
 - 6+ Disciplines
 - 6+ Funding Sources
 - Cost/Benefit Analysis
 - Limited ROW
 - Maintenance Agreements
 - Existing FDOT infrastructure
 - Major utility infrastructure on a barrier island
 - (3) Technical Special Provisions, (1) Modified Special Provision, (4) New Pay Items
 - U.S. Army Corps of Engineers, South Florida Water Management District Permits
 - Fulfill short-term purpose and need, with long-term vision in mind

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Resilience Case Study SR 907/Alton Road



Kevin Lopez, P.E.

FDOT District 6

Introduction



Kevin Lopez
Internal Design Roadway
Project Manager
FDOT District 6

Project Information

Purpose and Need:

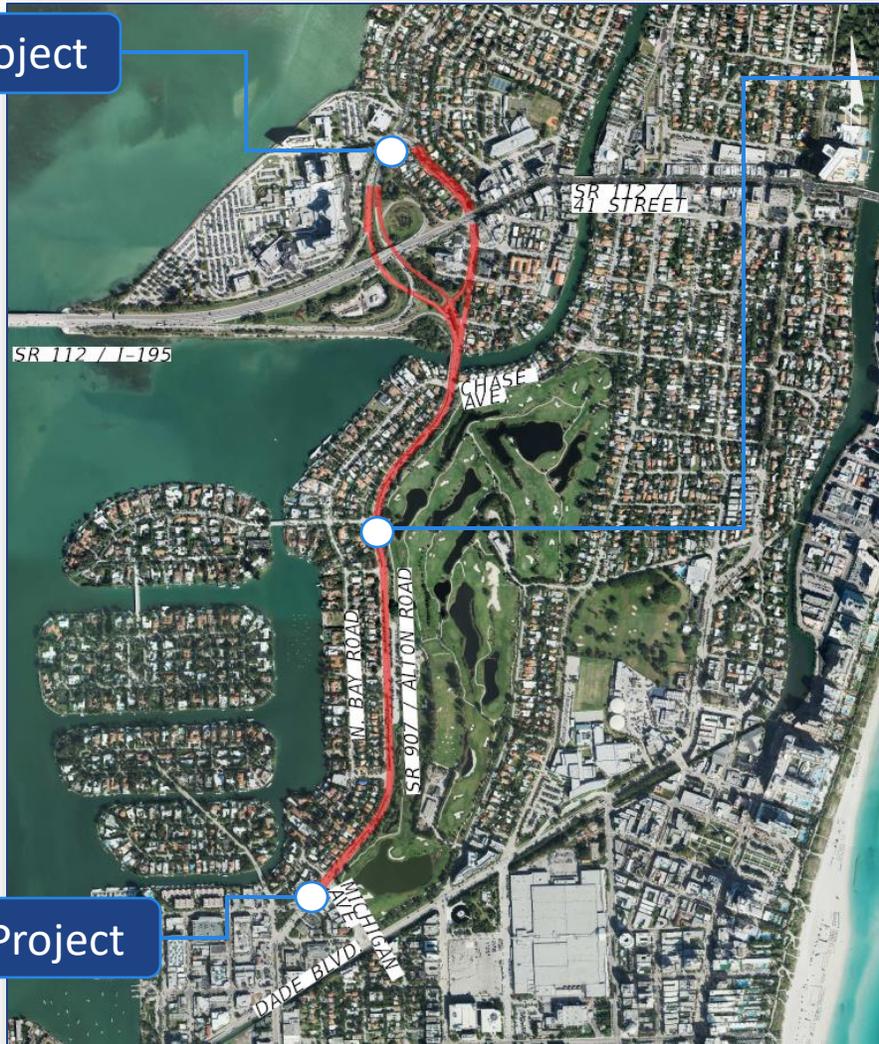
- Extending and preserving the pavement service life
- Enhancing safety along the road
- Raising the road and adding two drainage pump stations
- Improving pedestrian and bicyclist safety

Municipality in the area:

MIAMIBEACH

Project Location

End Project

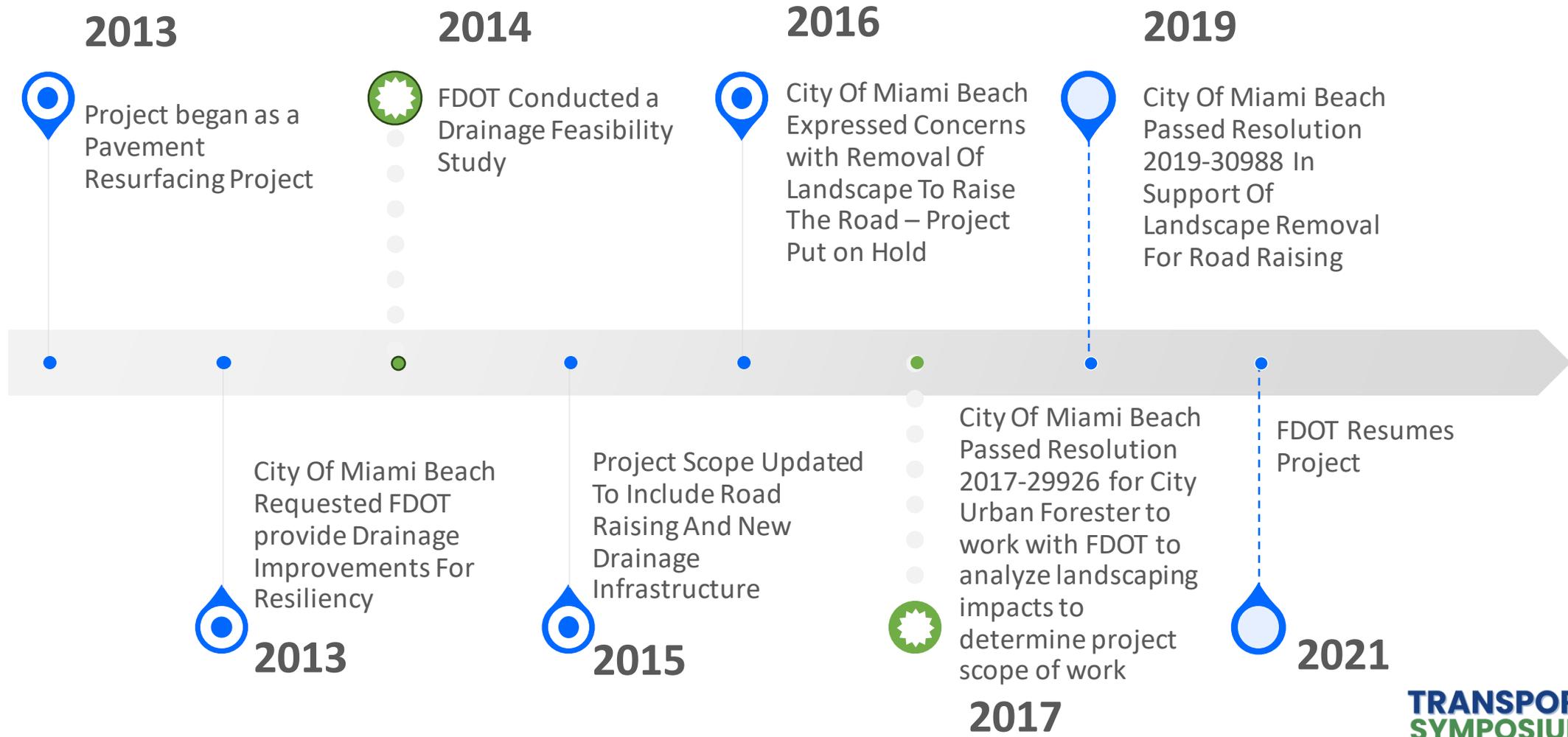


Begin Project

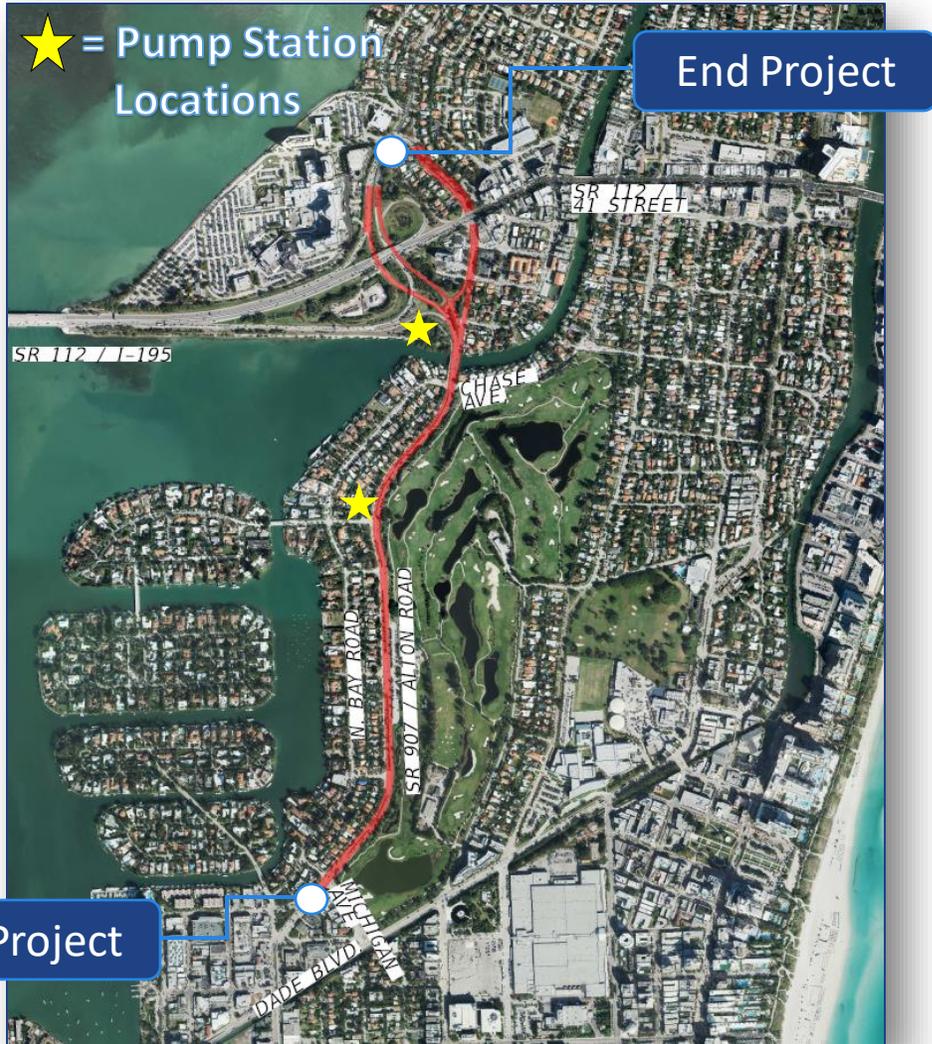
Proposed Improvements

- Repaving and restriping the road
- Adding bicycle/pedestrian path along the east side
- Adding new lighting system
- Adding pump station and new drainage infrastructure
- Widening the Shoulder
- Landscape modifications
- Improving pedestrian safety features
- Modifying pedestrian signalization
- Improving signing and marking

Project History



Drainage Improvements

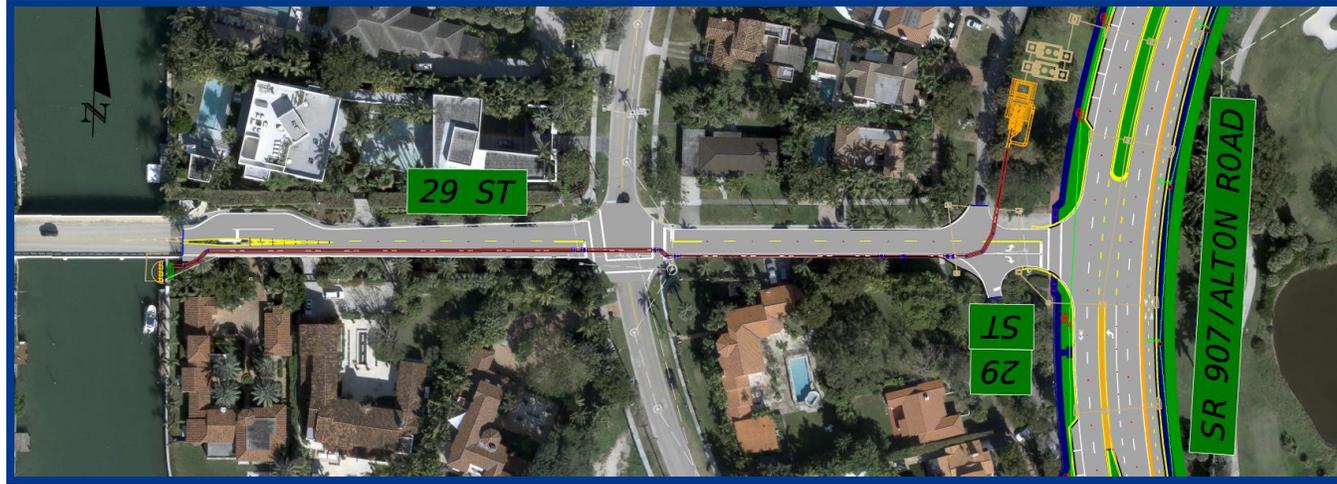


Collaboration and Partnership:

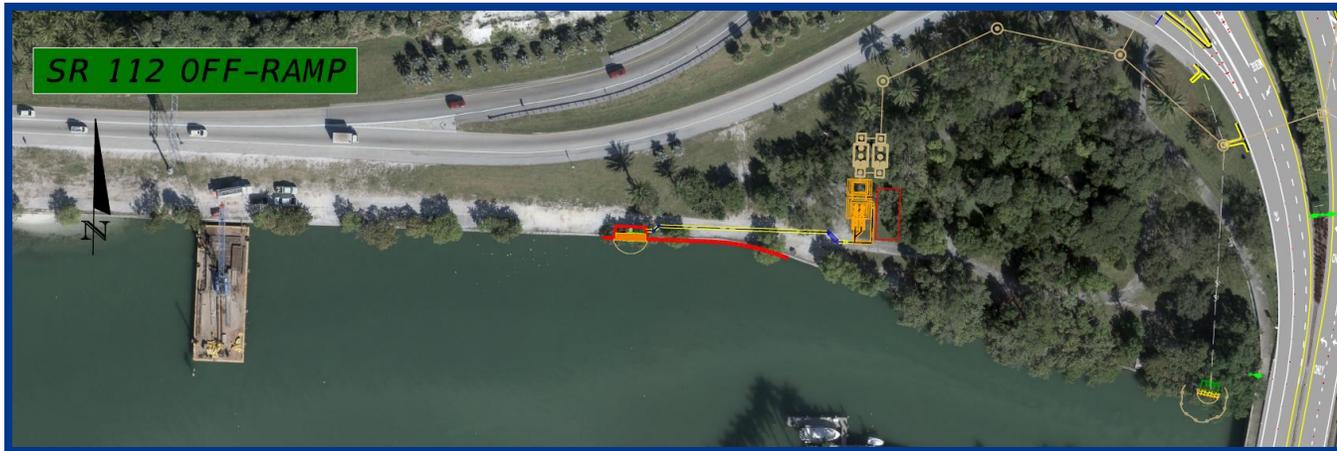
- Address City of Miami Beach Concerns
 - Public Outreach
- Maintenance Agreement
- PD&E Commitments
- Additional Scope
- Permitting Efforts

Drainage Improvements

PS-100: W 29 St



PS-200: SR 112/I-195 Interchange



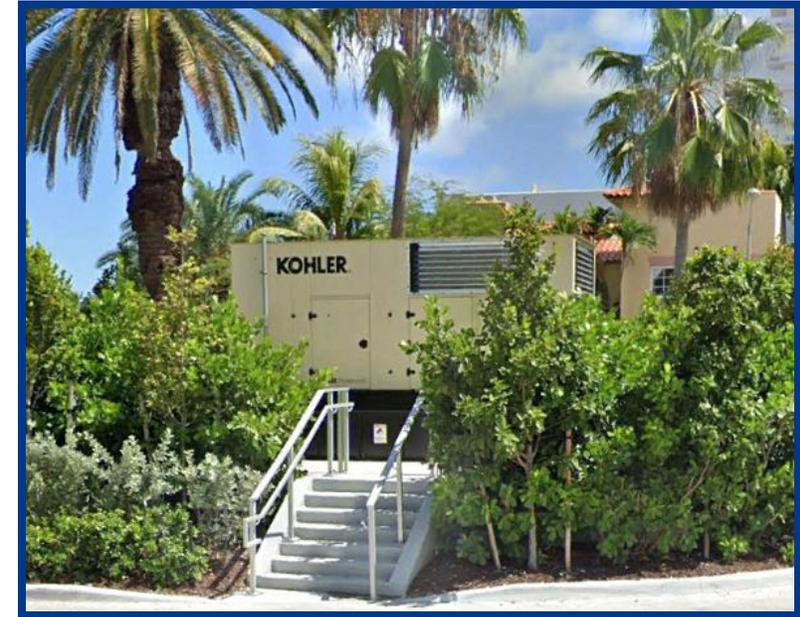
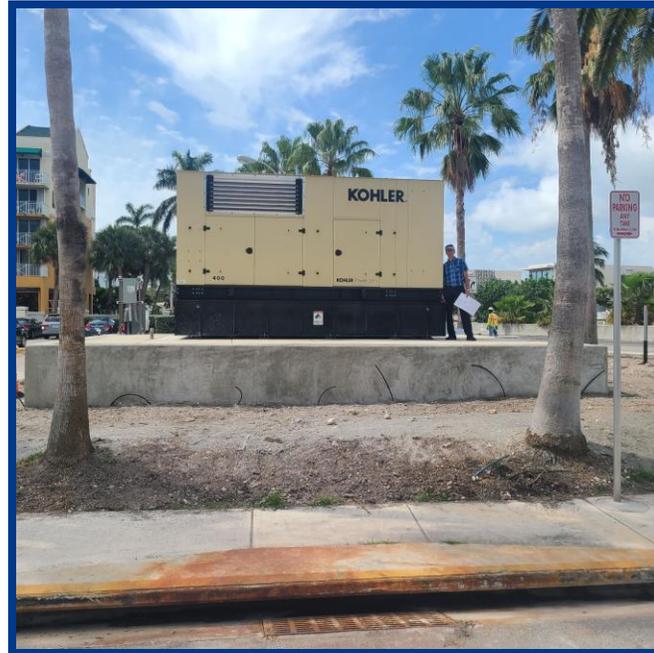
Resiliency Impacts

Road Raising:

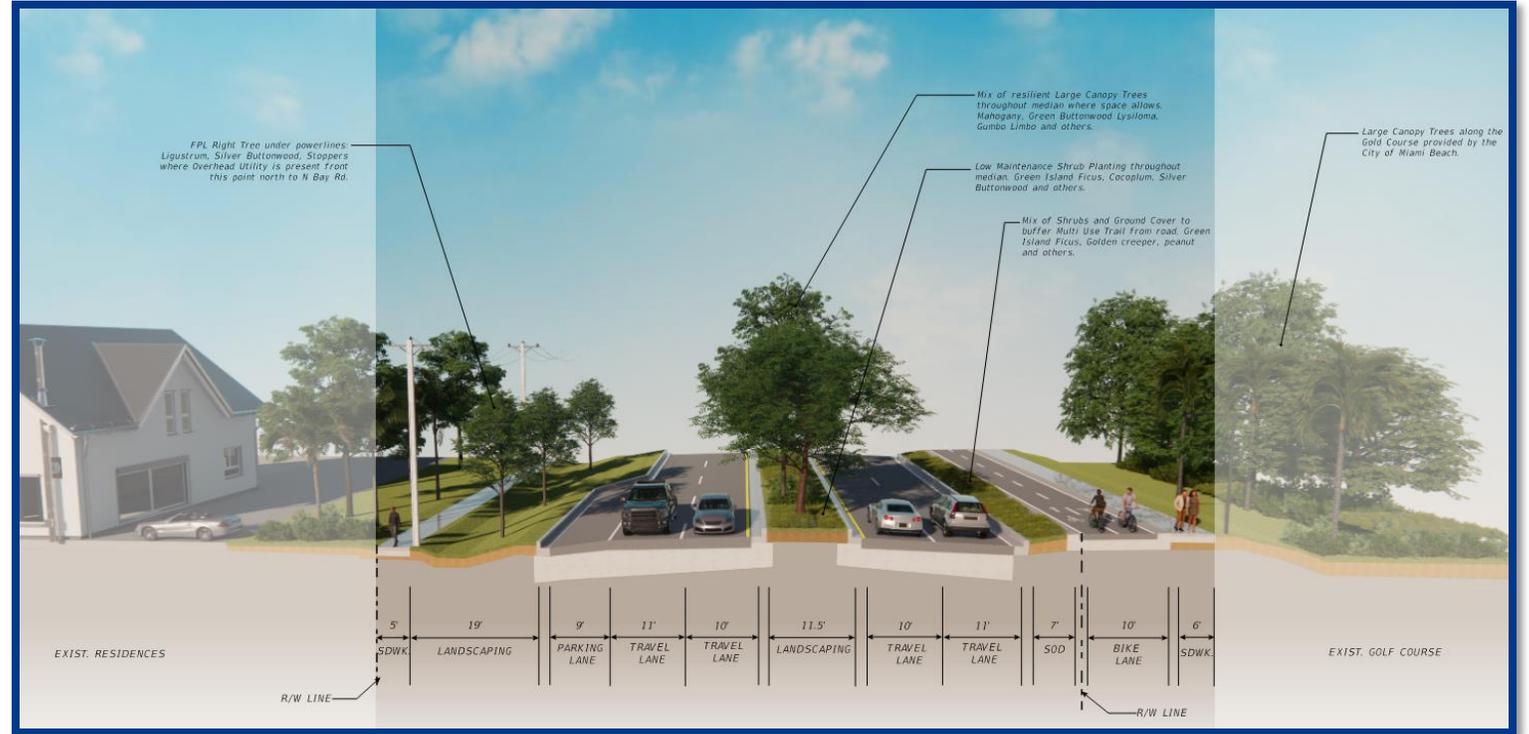
- No Harmonization into Private Property (Historic District)
- Removal of Existing Landscape
 - Additional Inlets needed at swales
- Significant Public Outreach
 - Elected Officials Buy-In

Pump Stations:

- Right-of-Way
- Maintenance Agreement
- BABAA Requirements
- Aesthetics



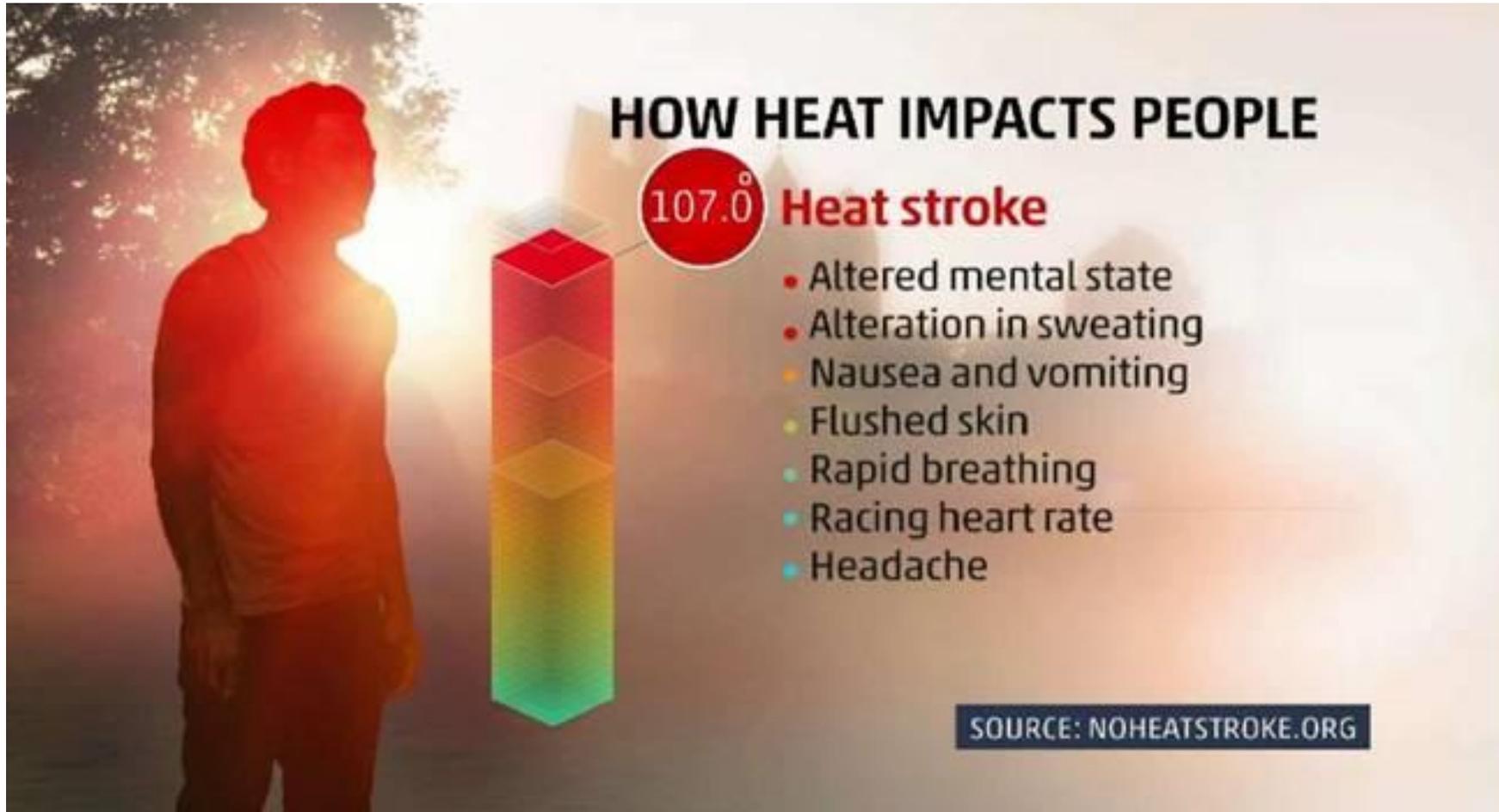
Landscaping Impacts



Commitment to the City of Miami Beach:

- Substantial standalone landscape project will be programmed to immediately follow the Roadway Project to restore the impacted landscape of the corridor

Safety Message



Contact Us



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