

City of Miami Beach – Public Works Department

Stormwater Modeling and Master Plan Update

Presentation to City Commission

March 13, 2024



AECOM

MIAMIBEACH

Agenda

- 1 Project Objectives
- 2 Stormwater Master Plan Approach
- 3 Neighborhood Improvement Projects
- 4 Proposed Stormwater Infrastructure Summary
- 5 Water Quality Treatment Approach
- 6 Critical Needs Projects
- 7 Implementation Plan

Project Objectives

Update the City's stormwater program:

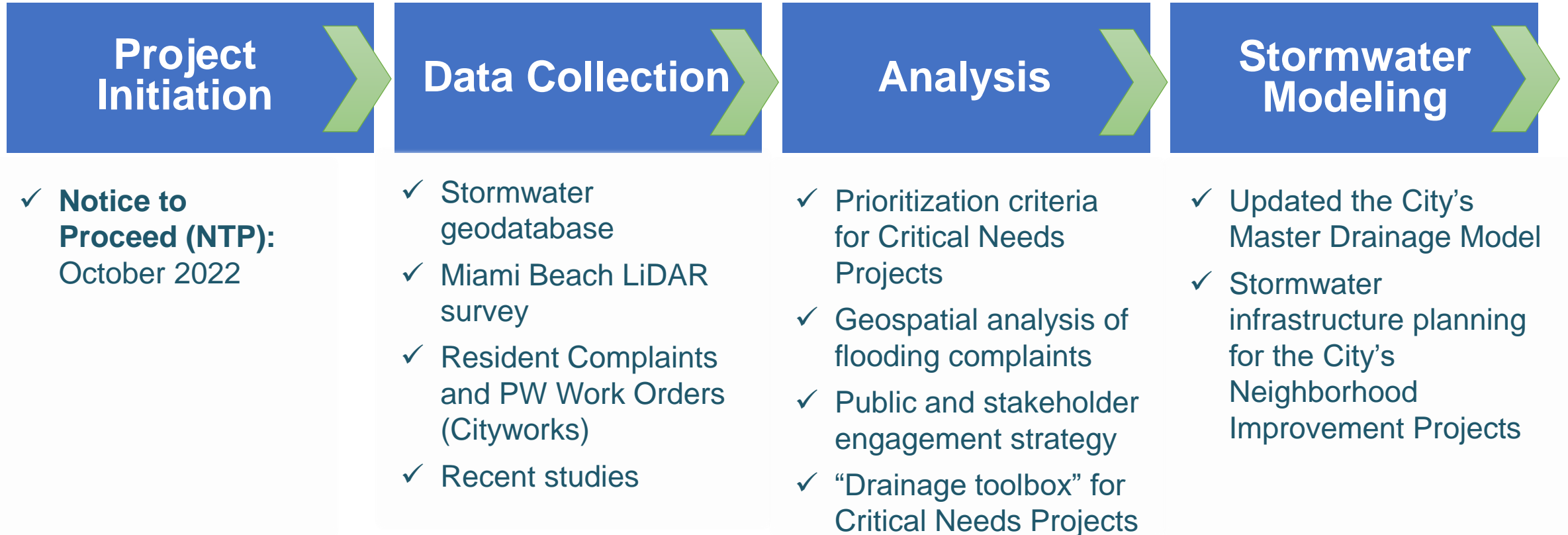
Update the
Citywide
Stormwater
Model

Incorporate
Recent Studies
and Update
Water Quality
Approach

Identify Critical
Needs focused
on the Next
10 Years

Update
Construction
Cost Estimates

Prioritize
Phasing and
Create
Implementation
Plan



Stormwater Master Plan Tasks

We are here



Incorporated Recent and Ongoing Studies

- Road Elevation Strategy
- Neighborhood Project Prioritization
- Blue-Green Stormwater Infrastructure Concept Plan
- Stormwater Facilities Plan
- Seawall Prioritization Plan
- Basin Drainage Reports for Flood Mitigation Study
- Stormwater 20-Year Needs Analysis (HB 53)
- Sea Level Rise Vulnerability Assessment and Adaptation Plan (ongoing)



**City of Miami Beach
Flood Mitigation**

Stormwater Facilities Plan

City of Miami Beach



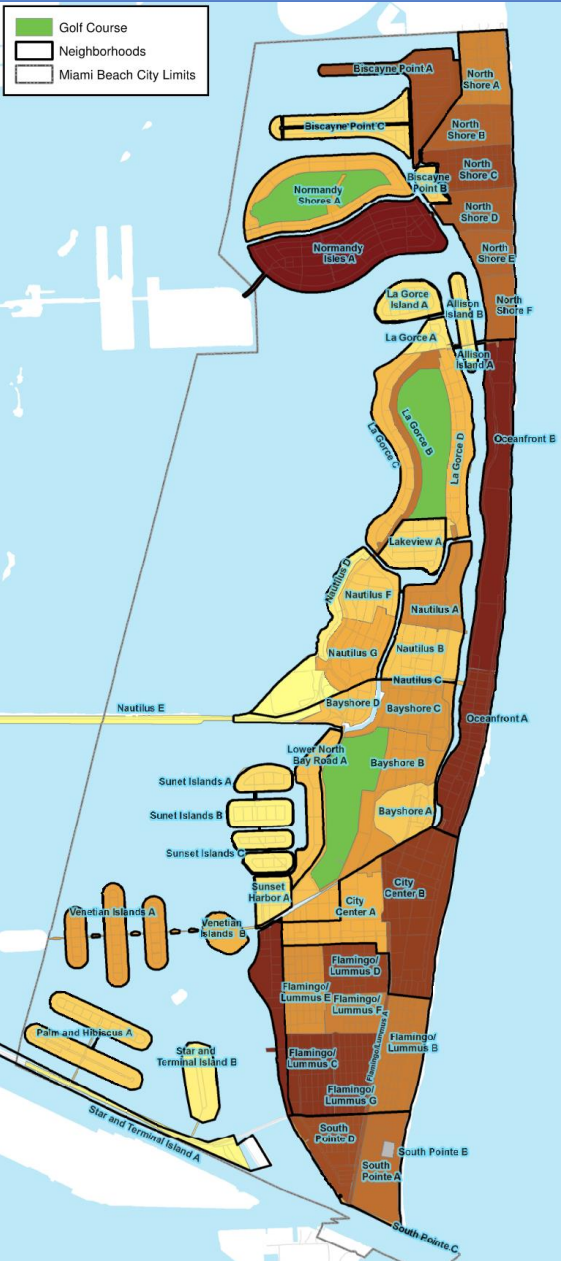
Stormwater Master Plan Approach

A combination of...

- ✓ Neighborhood Improvement Projects
- ✓ Water Quality Projects
- ✓ Critical Needs Projects



Neighborhood Improvement Projects (NIPs)



Holistic projects that involve multiple City services to enhance the quality of life in a neighborhood:

- Stormwater improvements (large pipes and pump station)
- Potable water and wastewater collection improvements
- Roadway improvements
- Aboveground components (sidewalks, street lighting, landscaping, etc.)

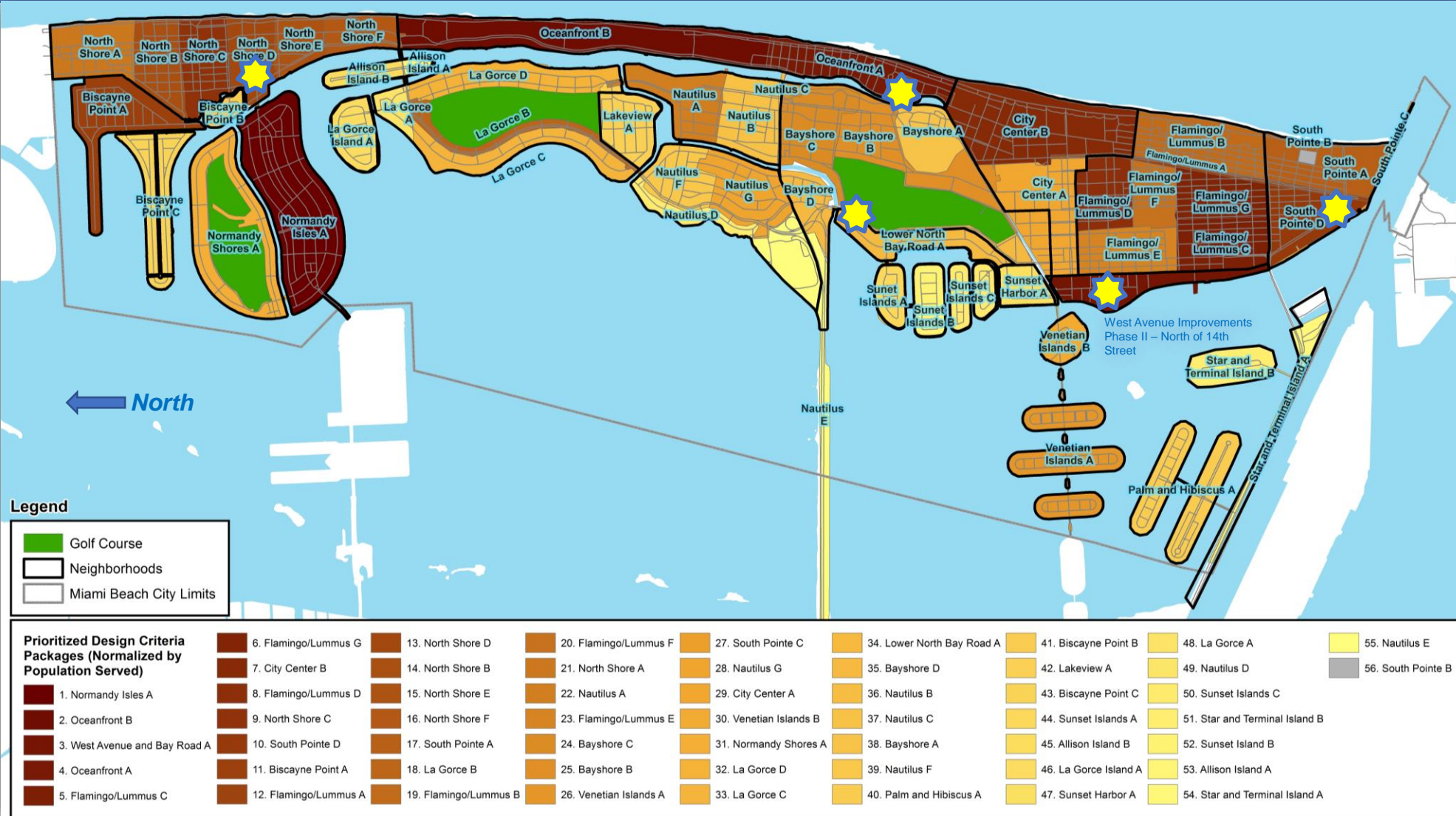
✓ NIPs provide comprehensive long-term tidal and rainfall flood mitigation.

✓ Prioritized NIPs List Adopted by Commission in 2020 and incorporated into this Master Plan.

Neighborhood Improvement Projects

★ Ongoing Projects:

1. Indian Creek Improvements
2. West Avenue Improvements Phase II – North of 14th St
3. FDOT Alton Road (Michigan Avenue to 43rd Street)
4. First Street and South Pointe Stormwater Improvements
5. North Shore D & Town Center Improvements

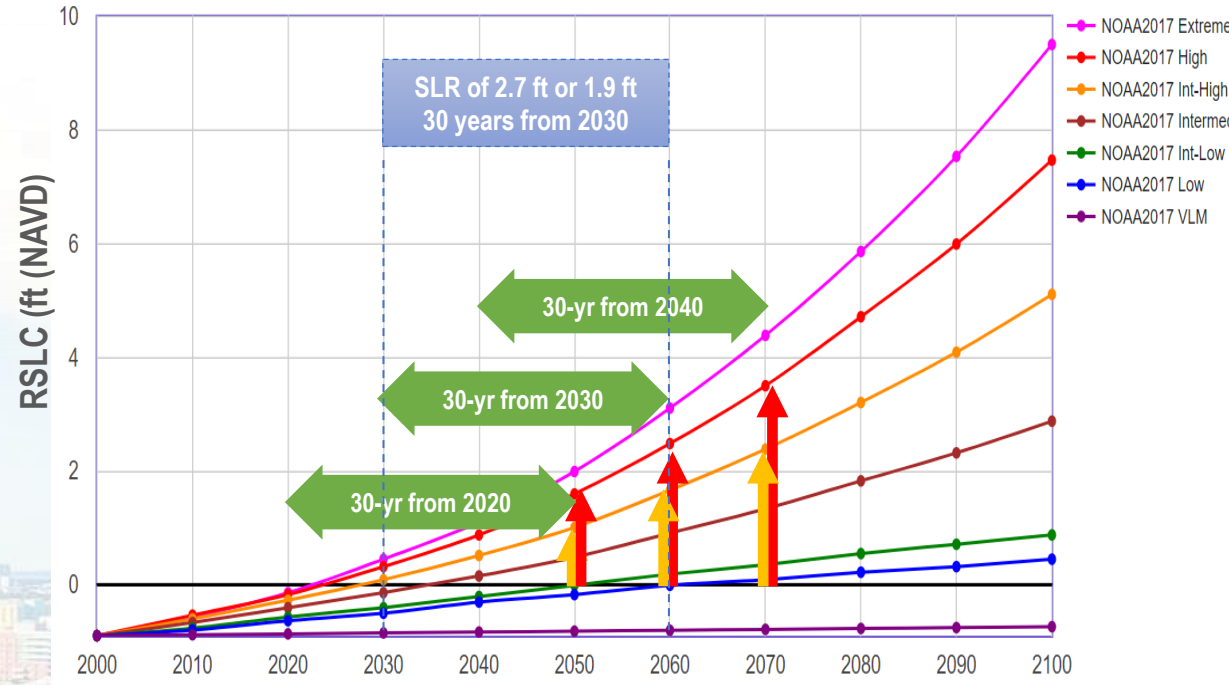


DESIGN STORM
 10-year, 24-hour Storm

ROADWAY DESIGN LIFE/RESILIENCE
 30 years

SEA LEVEL RISE PROJECTION
 NOAA Intermediate High

Relative Sea Level Change Scenarios for Miami Beach (NOAA, 2017)



	Proposed Edge of Pavement Elevation		
Road Type / Construction Start	2025	2030	2035
Arterial and Local Roads*	4.2'	4.5'	4.9'
Emergency (FDOT) Roads	5.2'	5.7'	6.2'

* 1 ft road thickness above bottom of road base.

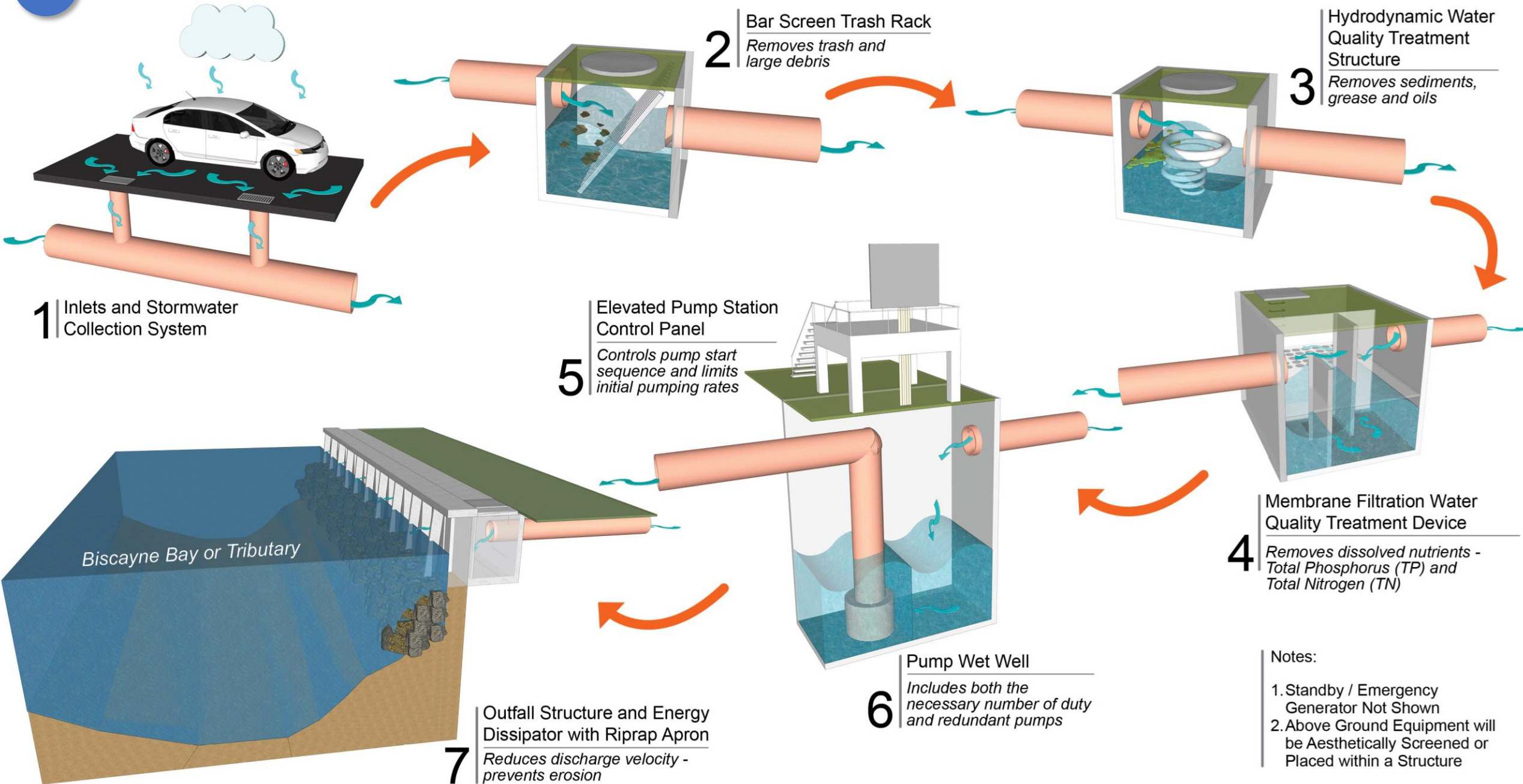
Proposed Stormwater Infrastructure Summary

- 48 existing, with 33 stormwater pump stations proposed to remain
 - Including Best Management Practices (BMP) water quality treatment
- Proposed 83 stormwater pump stations
 - Including Best Management Practices (BMP) water quality treatment
- Approx. 104 miles of proposed large stormwater pipes
- 2024 budgetary estimate for the proposed NIPs: **\$3.7 Billion** (City ROW)



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Water Quality Treatment Approach (*doubles nutrient removal*)



1 Inlets and Stormwater Collection System

2 Bar Screen Trash Rack
Removes trash and large debris

3 Hydrodynamic Water Quality Treatment Structure
Removes sediments, grease and oils

5 Elevated Pump Station Control Panel
Controls pump start sequence and limits initial pumping rates

4 Membrane Filtration Water Quality Treatment Device
Removes dissolved nutrients - Total Phosphorus (TP) and Total Nitrogen (TN)

6 Pump Wet Well
Includes both the necessary number of duty and redundant pumps

7 Outfall Structure and Energy Dissipator with Riprap Apron
Reduces discharge velocity - prevents erosion

Notes:

- Standby / Emergency Generator Not Shown
- Above Ground Equipment will be Aesthetically Screened or Placed within a Structure

Ongoing Water Quality Projects

★ Ongoing

1. PS #24 Water Quality Improvements
2. Portable **Treatment** Devices *(for rainy season temp. pumps)*
3. Park View Outfall Water Quality Improvements
4. PS #32 Water Quality Improvements
5. PS #10 Odor and Water Quality Improvements

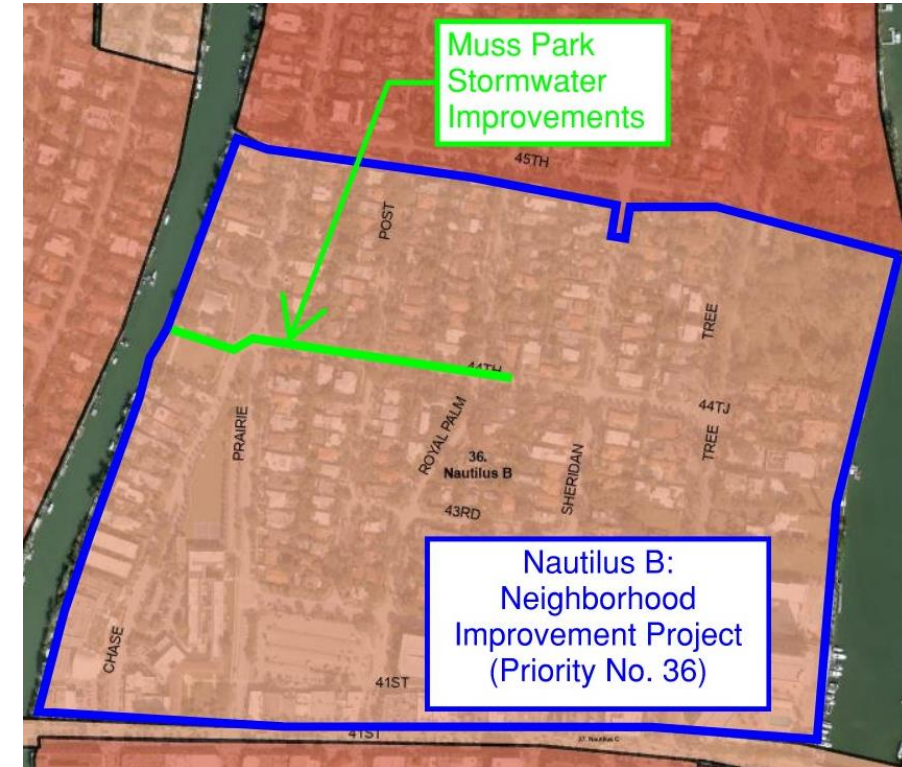


What is a Critical Needs Stormwater Project?

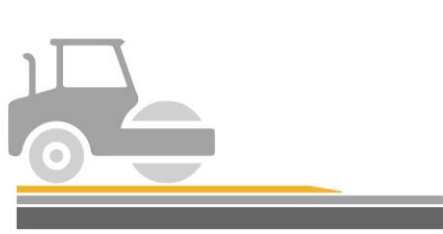
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- Smaller project aimed at addressing nuisance flooding to provide both **beneficial** and **cost-effective** solutions within targeted areas.
- **Complimentary** and **adaptable** to the future NIPs (not throw-away...)
- Includes a variety of solutions available in the “Drainage Toolbox”.

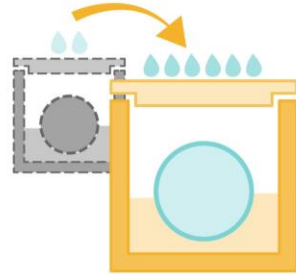
For Example:



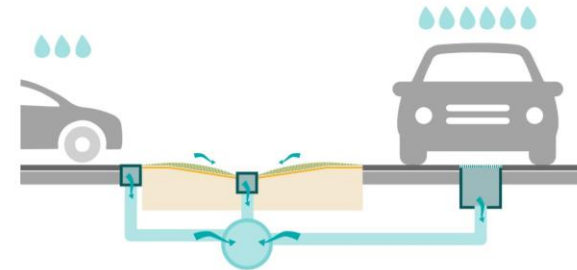
Drainage Toolbox for Critical Needs Projects



Regrading, Repaving, and Minor Road Raising



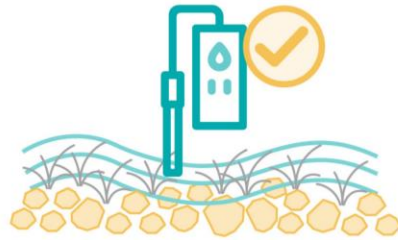
Upsizing Infrastructure



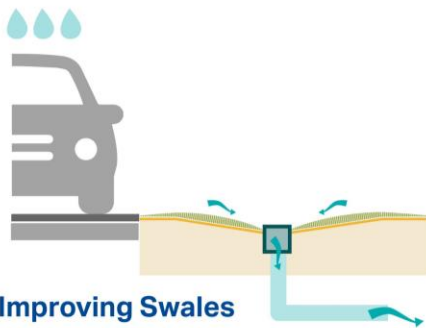
Connecting Drainage Areas



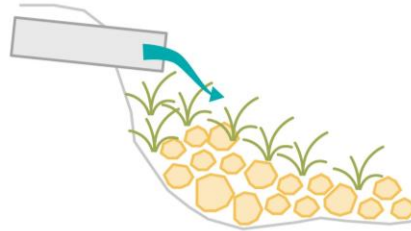
Adding Catch Basins



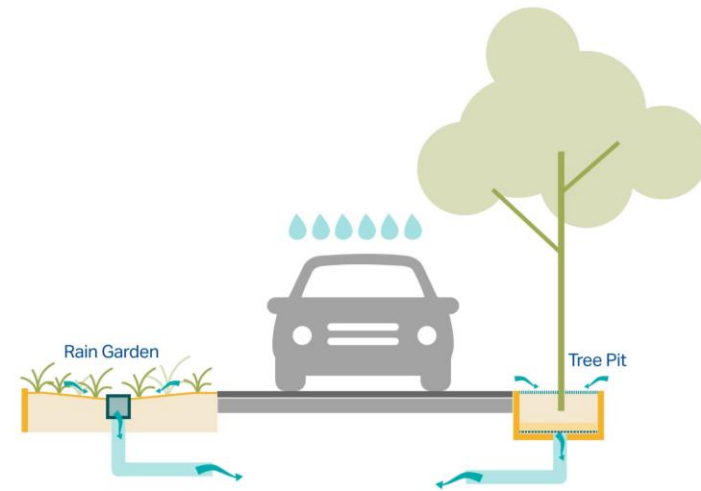
Water Quality Improvements



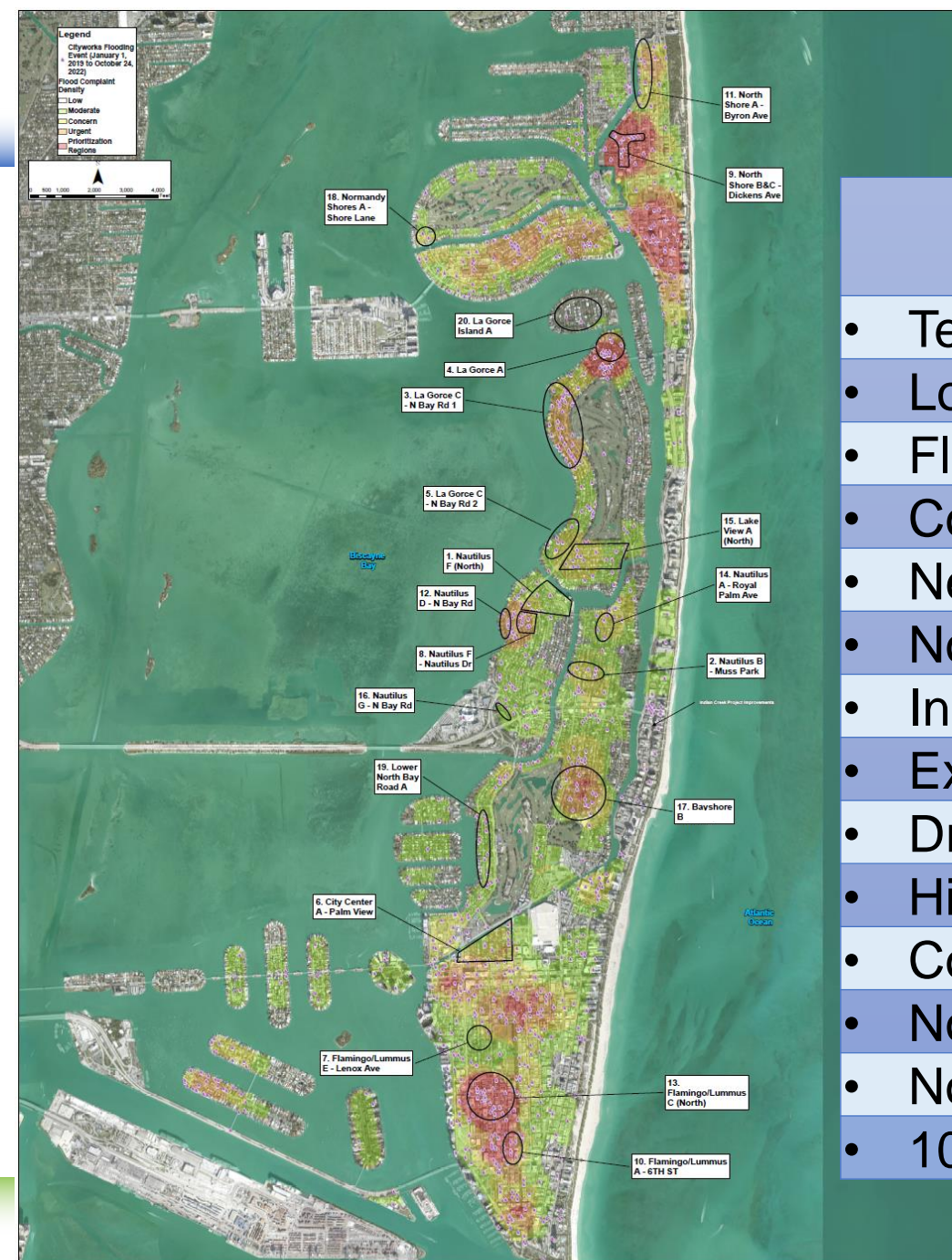
Improving Swales



Enhance Existing Outfalls



Implementing Blue-Green Infrastructure

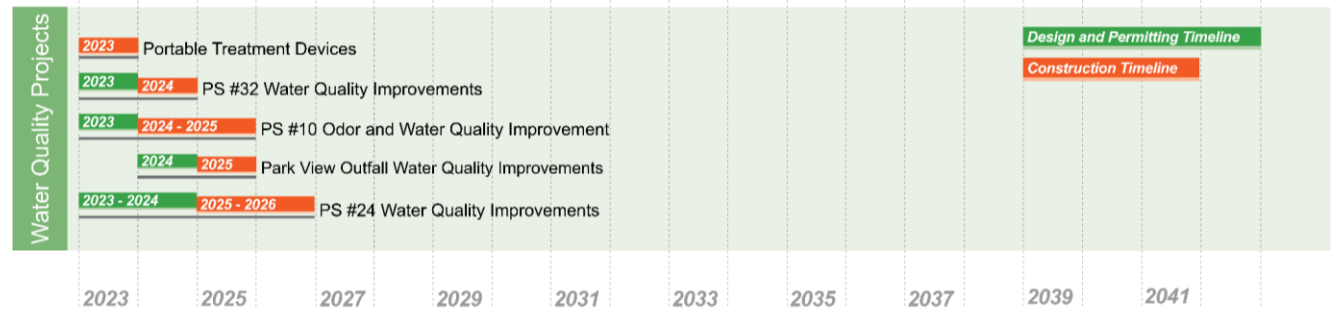
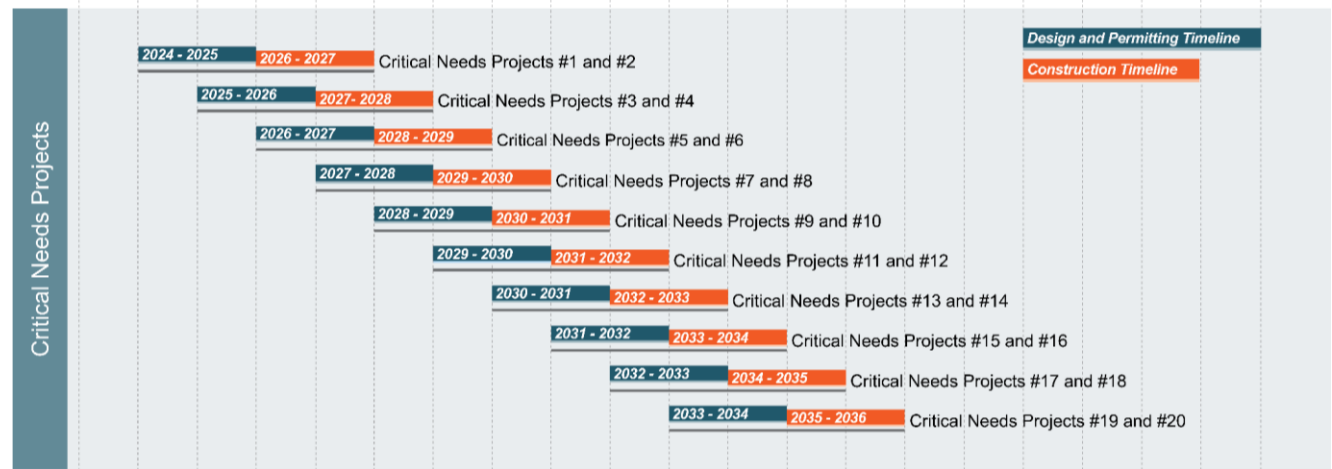
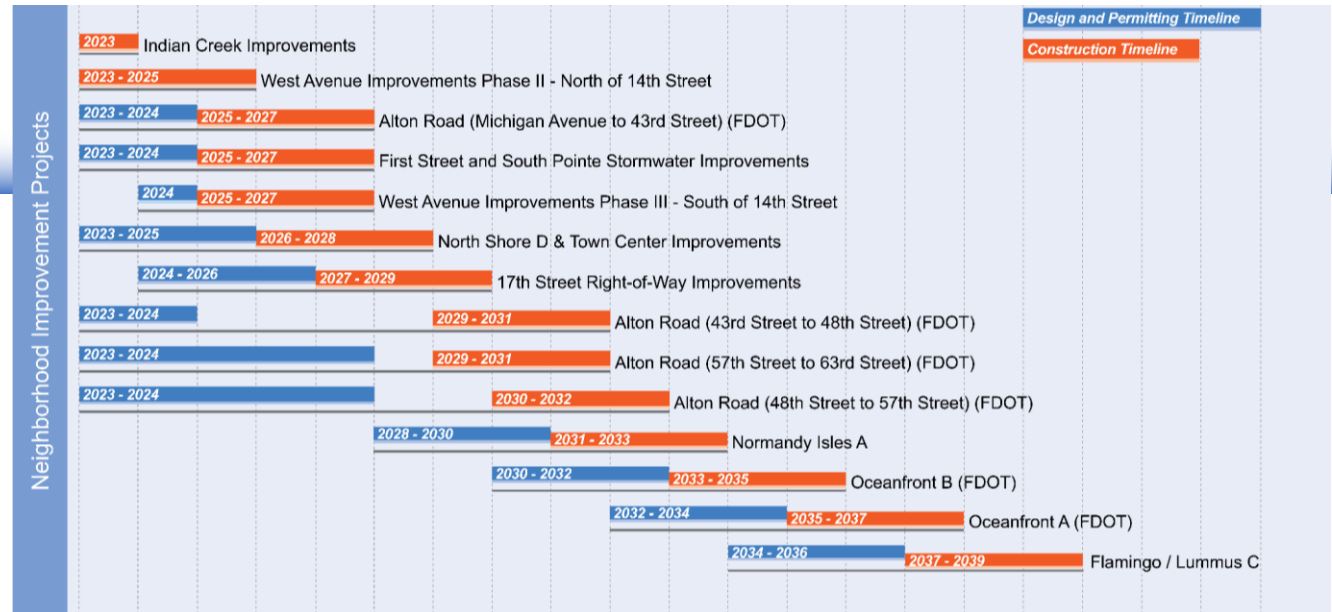


Criteria	Criteria Weighting
• Temporary Pumps Historically Deployed	7
• Low Topography / Tidal Inundation	7
• Flooding Complaints	7
• Constructability/ Ease of Implementation	7
• Neighborhood Improvement Project Ranking	6
• No Improvements in the Last 10 Years	6
• Insufficient Drainage	4
• Exfiltration Trenches	4
• Drainage Wells	4
• Historic District	3
• Community and Emergency Facilities	3
• No Permitting Complexity	3
• No Connection to Outfalls	1
• 10-Year Design Storm Flooding	1

Recommended Critical Needs Projects

Critical Needs Rank	NIP Rank	Critical Needs Project Name	FY 2023 Budgetary Estimate	Anticipated Construction Commencement	Escalated Budgetary Estimate	Critical Needs Score
1	39	Nautilus F (North)	\$ 4,000,000	FY 2026	\$ 4,900,000	Ongoing
2	36	Nautilus B - Muss Park	\$ 4,300,000	FY 2026	\$ 5,300,000	Ongoing
3	33	La Gorce C - N Bay Rd 1	\$ 4,300,000	FY 2027	\$ 5,400,000	247
4	48	La Gorce A	\$ 3,000,000	FY 2027	\$ 3,800,000	243
5	33	La Gorce C - N Bay Rd 2	\$ 4,000,000	FY 2028	\$ 5,200,000	239
6	29	City Center A - Palm View	\$ 4,800,000	FY 2028	\$ 6,200,000	236
7	23	Flamingo/Lummus E - Lenox Ave	\$ 1,300,000	FY 2029	\$ 1,800,000	216
8	39	Nautilus F - Nautilus Dr	\$ 800,000	FY 2029	\$ 1,000,000	216
9	9	N Shore B & C - Dickens Ave	\$ 2,600,000	FY 2030	\$ 3,700,000	202
10	6	Flamingo/Lummus A - Jefferson Aven	\$ 1,900,000	FY 2030	\$ 2,600,000	200
11	21	North Shore A - Byron Ave	\$ 5,900,000	FY 2031	\$ 8,600,000	194
12	49	Nautilus D - N Bay Rd	\$ 3,500,000	FY 2031	\$ 5,100,000	192
13	5	Flamingo/Lummus C - Lenox Ave	\$ 3,100,000	FY 2032	\$ 4,600,000	187
14	22	Nautilus A - Royal Palm Ave	\$ 2,400,000	FY 2032	\$ 3,600,000	187
15	42	Lakeview A (North)	\$ 3,200,000	FY 2033	\$ 5,000,000	185
16	28	Nautilus G - N Bay Rd	\$ 3,400,000	FY 2033	\$ 5,300,000	175
17	25	Bayshore B (North)	\$ 4,200,000	FY 2034	\$ 6,700,000	170
18	31	Normandy Shores A - Shore Lane	\$ 1,200,000	FY 2034	\$ 1,900,000	170
19	34	Lower North Bay Rd A	\$ 1,800,000	FY 2035	\$ 3,000,000	167
20	36	La Gorce Island A	\$ 6,800,000	FY 2035	\$ 11,300,000	164
TOTAL			\$ 66,500,000		\$ 95,000,000	

Master Plan Proposed 10-Year Implementation Schedule



**The Master Plan recommends to continue implementing Neighborhood Improvement Projects at the same time as Critical Needs and WQ Projects.*



Questions?