City of Miami Beach – Public Works Department

Stormwater Modeling and Master Plan Update

Public Outreach Meeting

September 28, 2023

AECOM

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Agenda

1. Project Purpose
2. Stormwater Master Plan Tasks
3. Neighborhood Improvement Projects
4. Proposed Stormwater Infrastructure Summary
5. Water Quality Approach
6. Critical Needs Projects
7. Questions

Project Purpose

Update the City's stormwater program:

- 50-year Planning Horizon
- Identify Critical Needs focused on the Next 10 Years
- Incorporate Recent Studies and Update Water Quality Approach
- Update the Citywide Stormwater Model
- Update Construction Cost Estimates
- Prioritize Phasing and Create Implementation Plan

Stormwater Master Plan Tasks

Schedule

- **Notice to Proceed (NTP):** October 2022
- **Completion:** October 2023 (12-month timeline)

Data Collection

Reviewed/processed CMB data:

- Stormwater geodatabase
- Miami Beach LiDAR survey
- Resident Complaints and PW Work Orders (Cityworks)
- Recent studies

Analysis

- Prioritization criteria for Critical Needs Projects
- Geospatial analysis of flooding complaints
- Public and stakeholder engagement strategy
- “Drainage toolbox” for Critical Needs Projects

Stormwater Modeling

- Updated the City’s Master Drainage Model
- Stormwater infrastructure planning for the City’s Neighborhood Improvement Projects

Stormwater Master Plan Tasks

We are here

Stormwater Modeling Technical Memorandum

- Detailed description of the methods used to develop the City's Master Drainage Model

Prioritized Capital Improvement Plan (CIP) Report

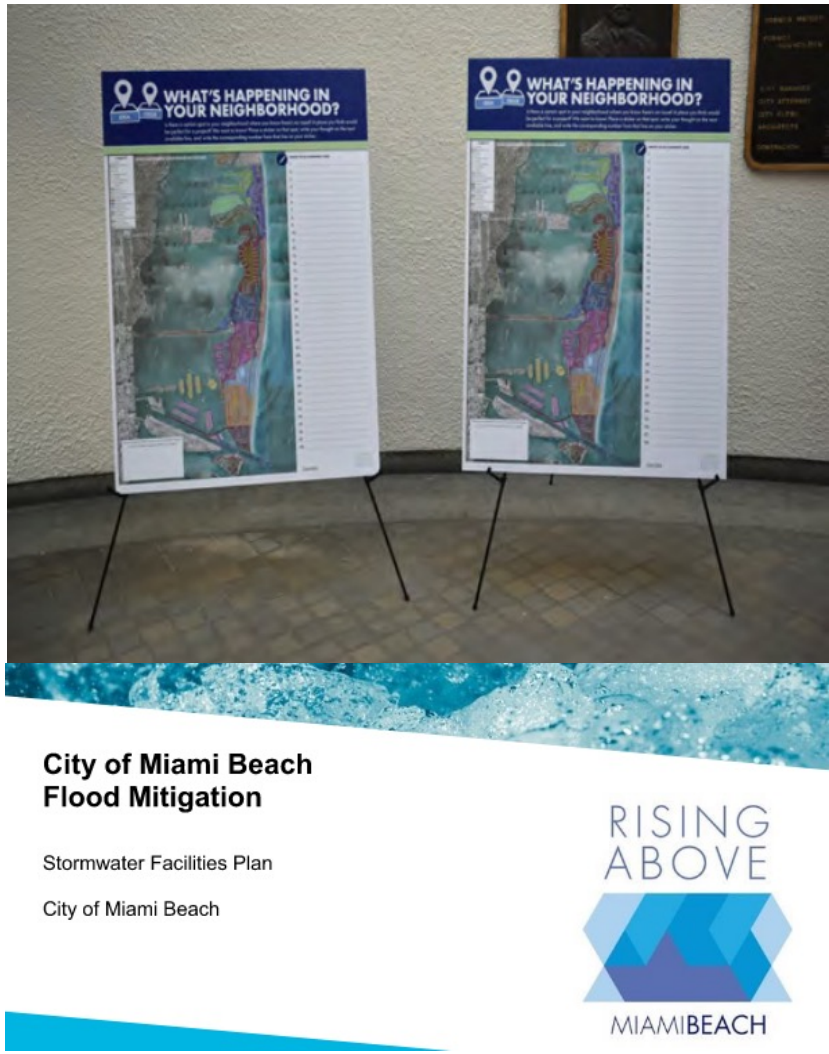
- Updated Construction Cost Estimates for the City's Neighborhood Improvement Projects
- Identified Critical Needs Projects to be implemented for the next 10 years (supplemental to Neighborhood Improvement Projects)

Public Outreach Meeting

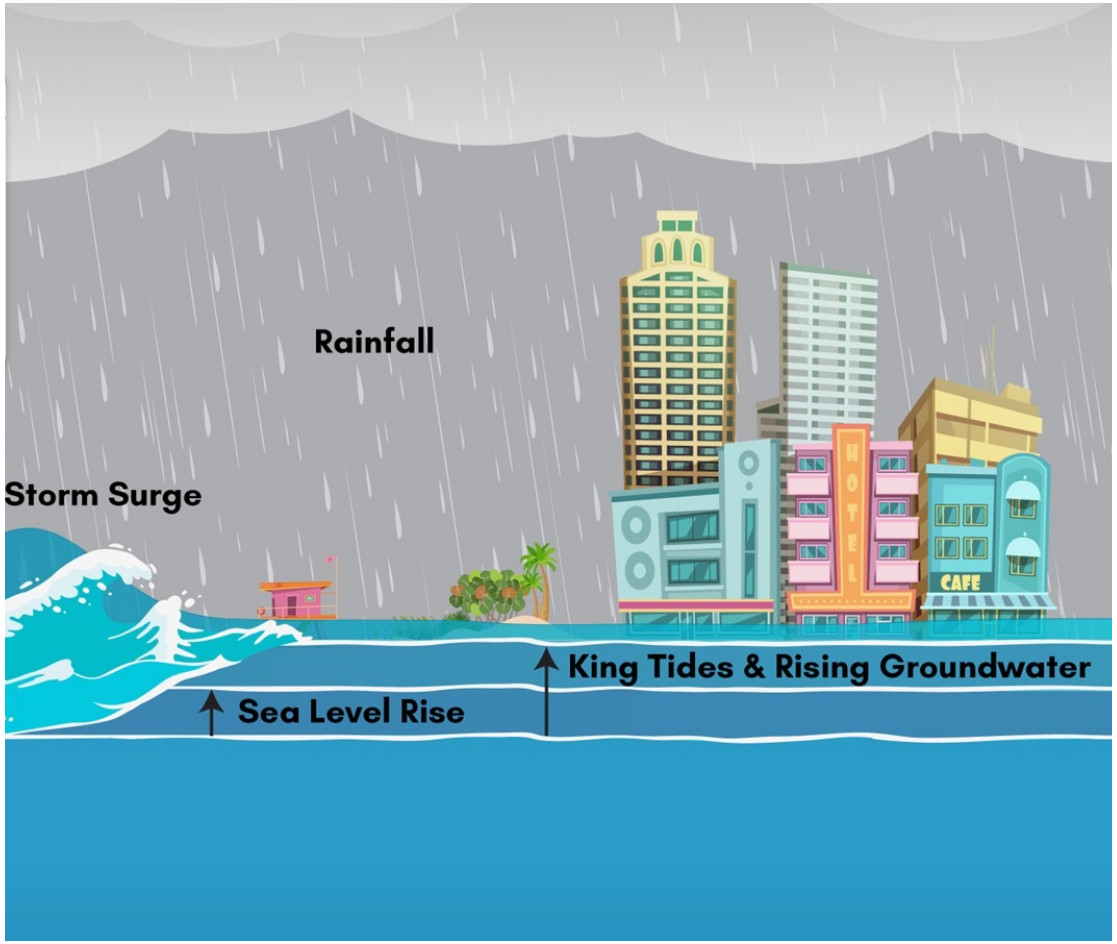
- Inform you about our progress and get your feedback

Previous 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 the Flood Mitigation Study
- Stormwater 20-Year Needs Analysis (HB 53)
- Sea Level Rise Vulnerability Assessment and Adaptation Plan (ongoing)



SLR Vulnerability Assessment



The Vulnerability Assessment identifies and analyzes the **impacts of compound flooding and sea level rise** on local communities

- Sea level rise scenarios for 2040 and 2070
- Helps secure eligibility for future FDEP Resilient Florida project funding

Transportation Networks and Evacuation Routes

Critical Infrastructure

Critical Community and Emergency Facilities

Natural, Cultural, and Historical Resources

Private Property Adaptation (PPA) Program

- **An innovative grant program for flood risk mitigation for Miami Beach private properties**
- **50/50 matching grant up to $20,000**
  - *Property owners reimbursed for half of program cost:*
    - *$2,500 for flood risk assessment*
    - *Up to $17,500 for design + construction*
- **Two Phases**
  - *Phase I: Assessments*
  - *Phase II: Design and Construction*
- **Applications reopen in 2024**
  - Visit MBRisingAbove.com/PPA for more information!

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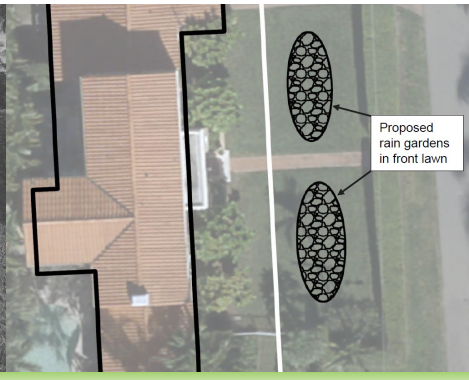
ABOVE



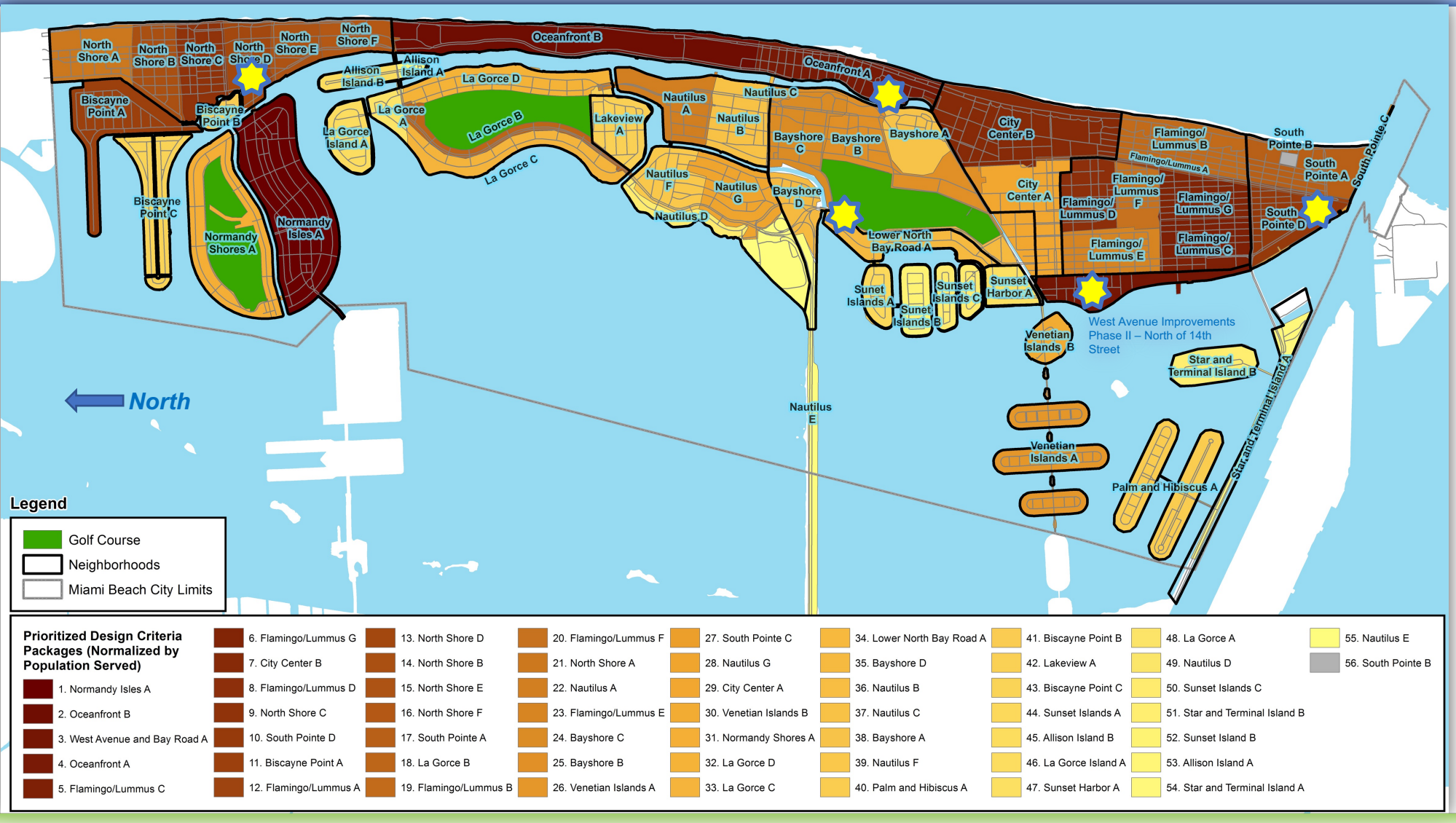
Neighborhood Improvement Projects (NIPs)

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 (including fire hydrants)
- Roadway improvements
- Aboveground components (sidewalks, street lighting, landscaping, etc.)

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

Current Level of Service

DESIGN STORM
10-year, 24-hour Storm

ROADWAY DESIGN LIFE/RESILIENCE
30 years

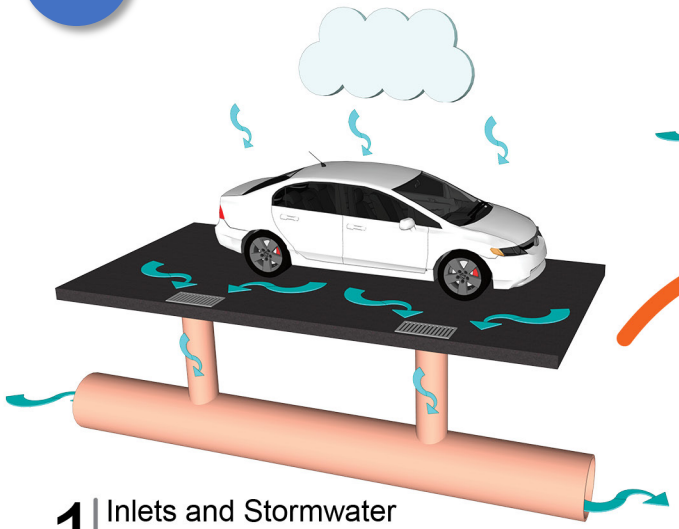
SEA LEVEL RISE PROJECTION
NOAA Intermediate High

Proposed Stormwater Infrastructure Summary

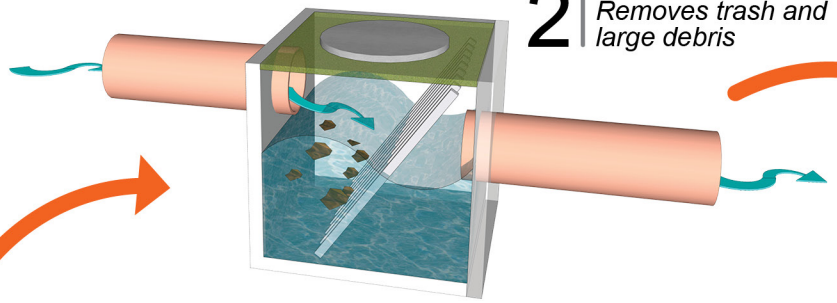
- 60 Stormwater Pump Stations
  - Including Best Management Practices (BMP) Water Quality Treatment Trains
- Approx. 104 miles of stormwater pipes and force mains
- 2023 Budgetary Estimate for the Proposed Neighborhood Improvement Projects: **$3.7 Billion**

*The Proposed Stormwater Infrastructure Board is available at our Neighborhood Improvement Projects Station

5 Water Quality Treatment Approach

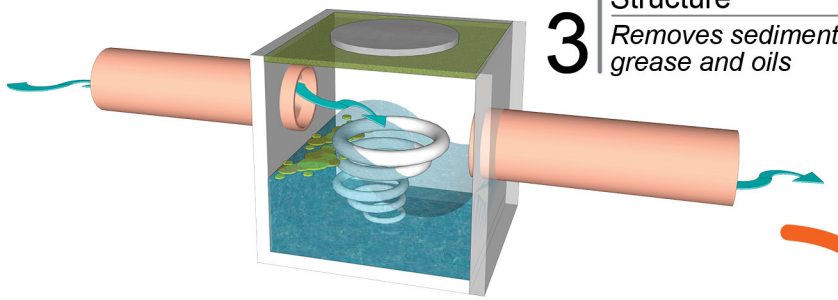


1 Inlets and Stormwater Collection System



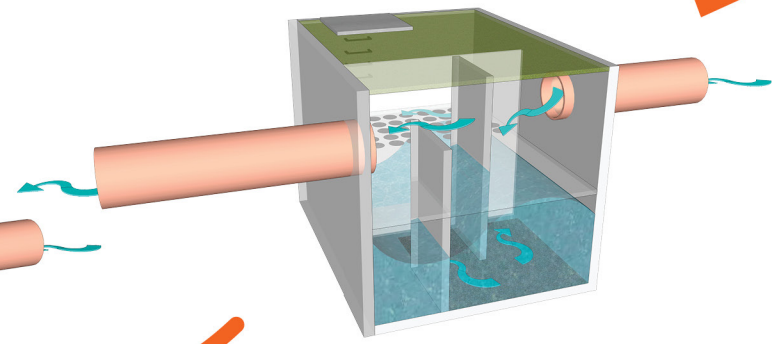
2 Bar Screen Trash Rack

Removes trash and large debris



3 Hydrodynamic Water Quality Treatment Structure

Removes sediments, grease and oils

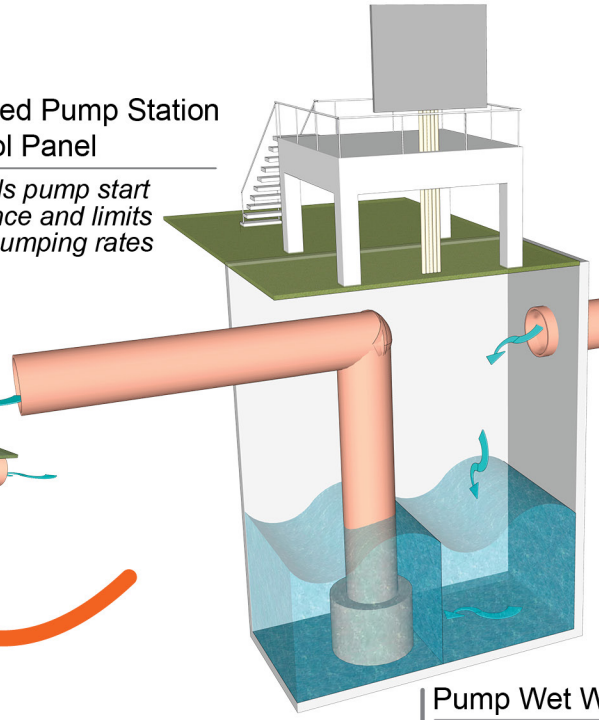


4 Membrane Filtration Water Quality Treatment Device

Removes dissolved nutrients - Total Phosphorus (TP) and Total Nitrogen (TN)

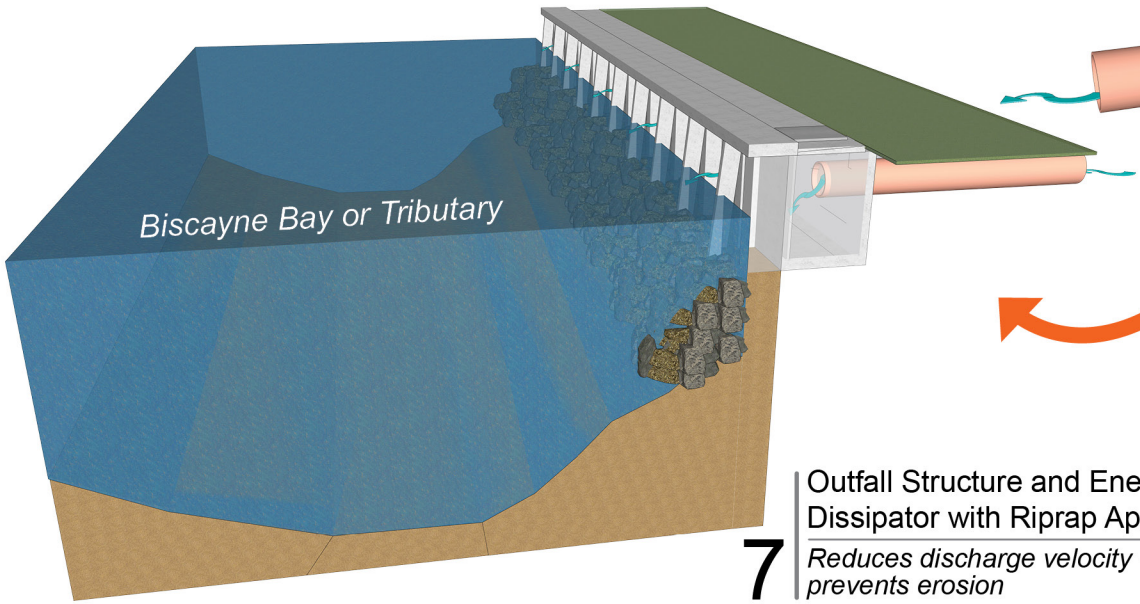
5 Elevated Pump Station Control Panel

Controls pump start sequence and limits initial pumping rates



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:

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

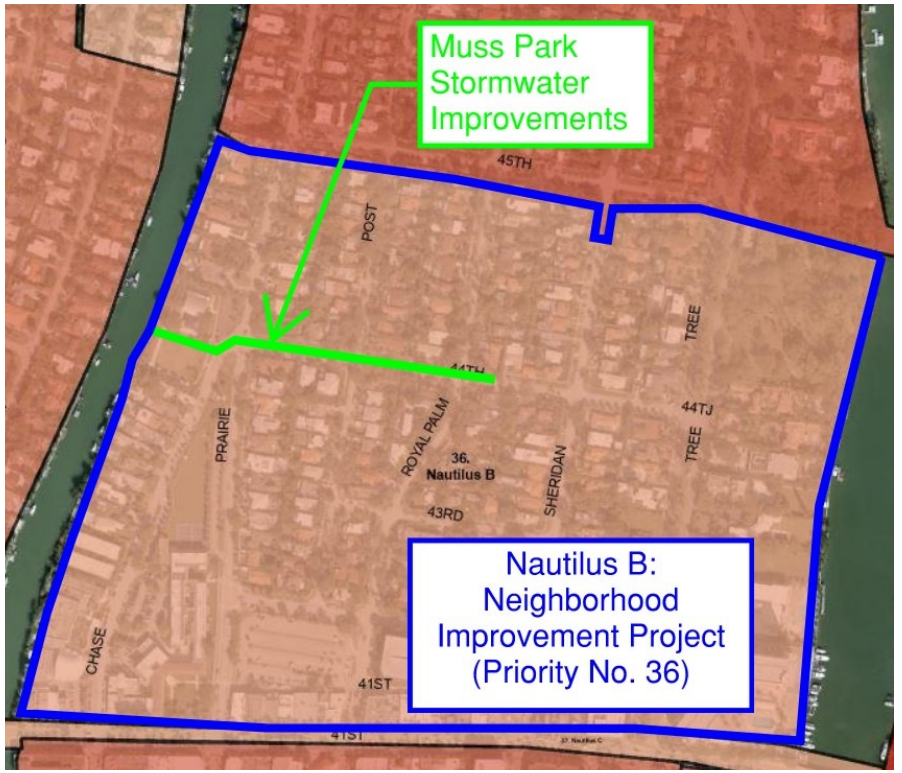
What is a Critical Needs Stormwater Project?

- Smaller project aimed at addressing nuisance flooding to provide both **beneficial** and **cost-effective** solutions within targeted areas.

- **Complimentary** and **adaptable** to the future Neighborhood Improvement Projects (not throw-away…)

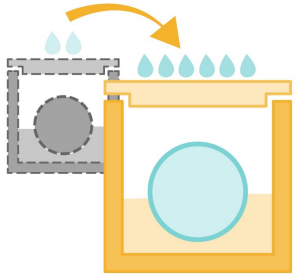
- Includes a variety of solutions available in the “Drainage Toolbox”.

For Example:

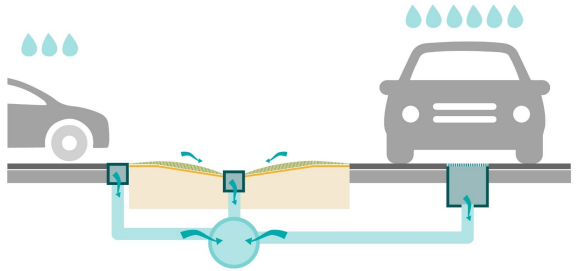


Drainage Toolbox for Critical Needs Projects

Regrading, Repaving, and Minor Road Raising

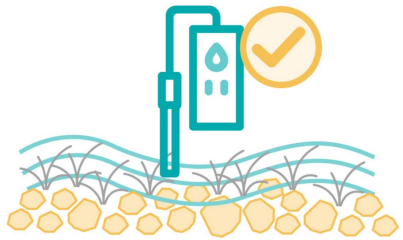


Upsizing Infrastructure

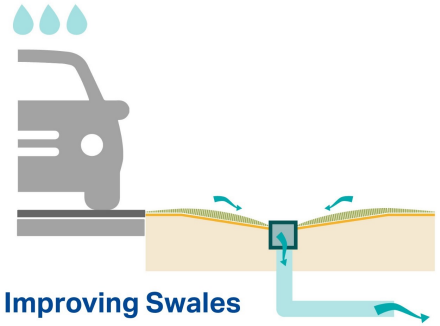


Connecting Drainage Areas

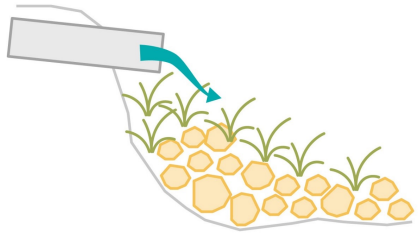
Adding Catch Basins



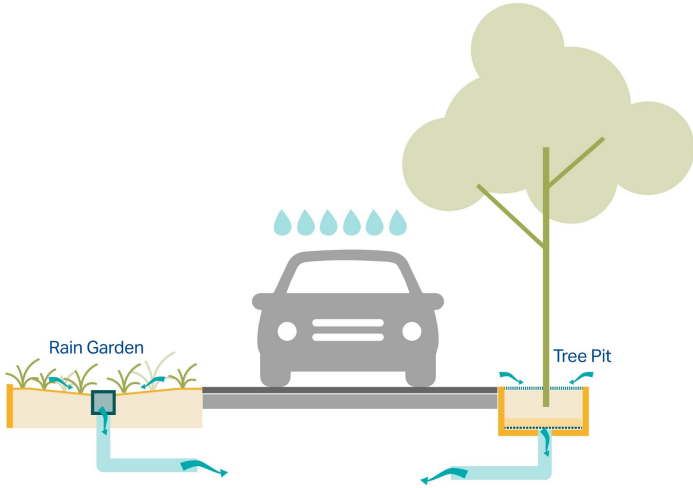
Water Quality Improvements



Improving Swales



Enhance Existing Outfalls



Implementing Blue-Green Infrastructure

How is a Critical Needs Project Envisioned?

Determine the prioritization strategy for the area by assessing the criteria in the **Critical Needs Projects Evaluation Matrix**.

Example Project:
La Gorce A

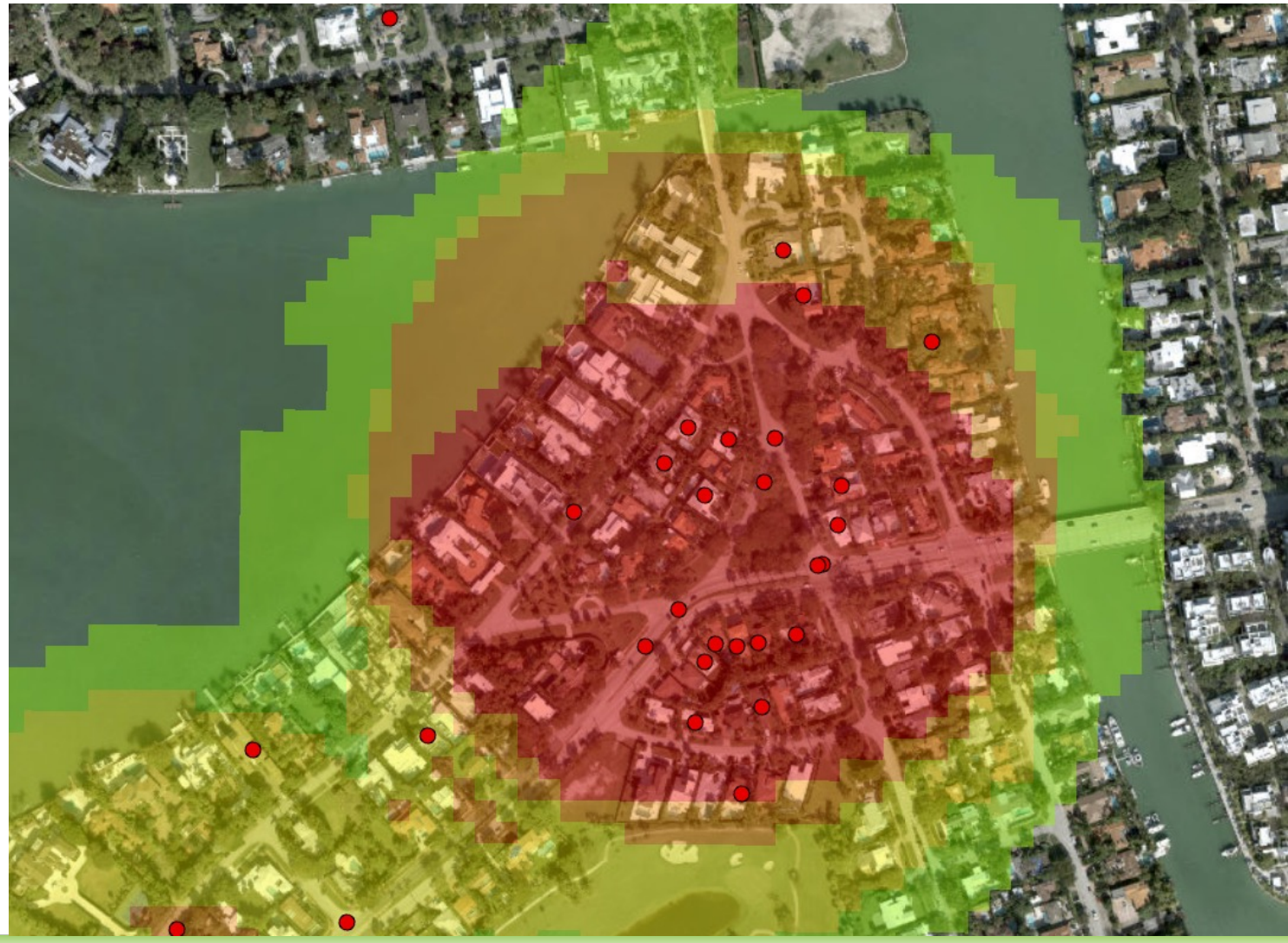
Criteria	Criteria Weighting
Flooding Complaints	7
Low Topography / Tidal Inundation	7
Temporary Pumps	7
Constructability	7
Neighborhood Improvement Project Ranking	6
No Improvement Projects in the Last 10 Years	6
Insufficient Drainage	4
Exfiltration Trenches	4
Drainage Wells	4
Historic District	3
Community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

How is a Critical Needs Project Envisioned?

Step 1:

Assign a ranking to the **Flooding Complaints** criterium by choosing one of the following options: No Complaints (0), Low (1), Moderate (3), and High (5) Level of Complaints.

There is a **High Level (5)** of Flooding Complaints for this area.



How is a Critical Needs Project Envisioned?

Step 2:

Assign a ranking to the **Low Topography / Tidal Inundation** criterium by choosing one of the following options: No Tidal Flooding (0), Low (1), Moderate (3), and High (5) Level of Tidal Flooding.

There is a **High Level (5)** of Tidal Flooding for this area (associated with low topography).

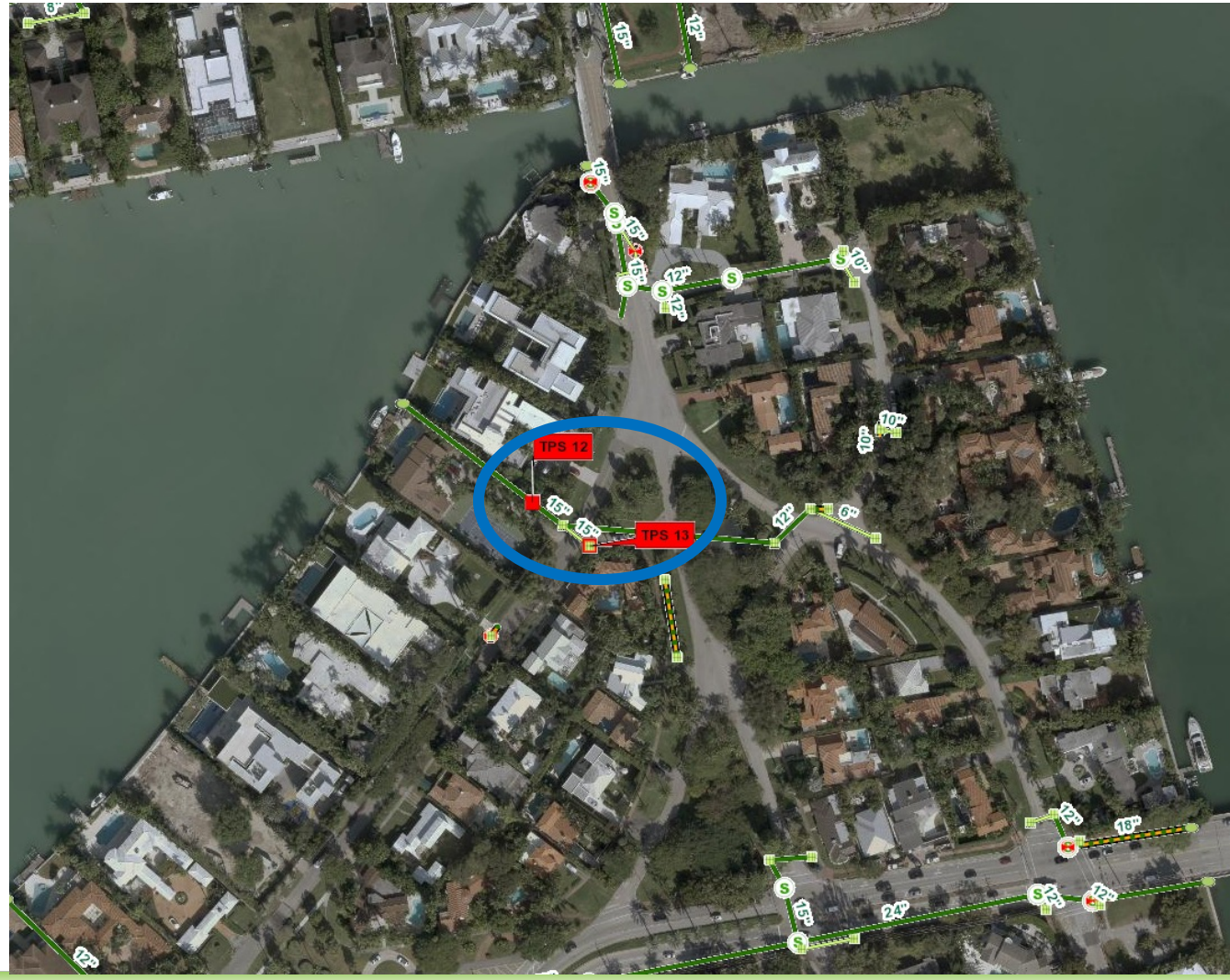
How is a Critical Needs Project Envisioned?

Step 3:

Assign a ranking to the **Temporary Pumps** criterium by choosing one of the following options:

- **0** = No Temporary Pumps Serving the Area
- **5** = Temporary Pumps Serving the Area

Since there are temporary pumps deployed in this area, this criterium is assigned a **ranking of 5**.

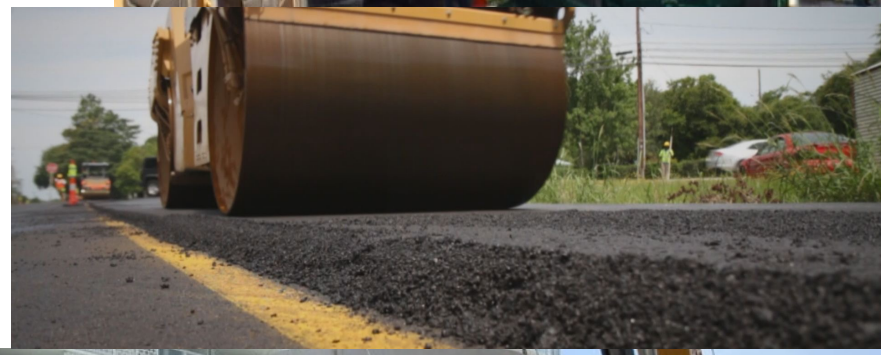


How is a Critical Needs Project Envisioned?

Step 4:

Assign a ranking to the **Constructability** criterium by choosing one of the following options: No Constructability (0), Low (1), Moderate (3), and High (5) Constructability.

Since the constructability for this project is high, this criterium is assigned a **ranking of 5**.



How is a Critical Needs Project Envisioned?

Step 5:

Assign a ranking to the **Neighborhood Improvement Project Ranking** criterium by choosing one of the following options:

- **0** = 1-10 ranking
- **3** = 11-30 ranking
- **5** = 31-56 ranking

Since the corresponding Neighborhood Improvement Project for this area is ranked 48 in priority, this criterium is assigned a **ranking of 5**.

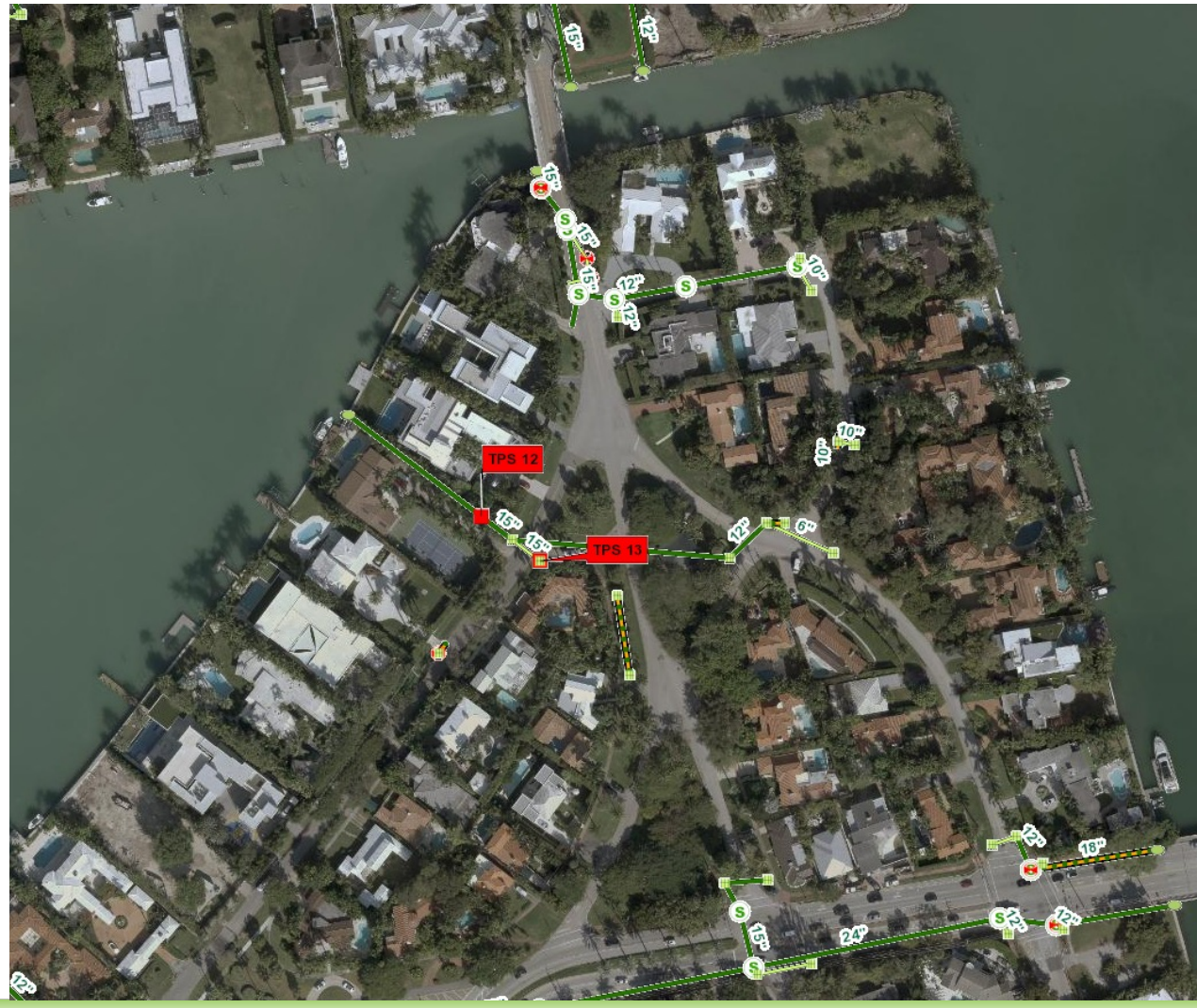
How is a Critical Needs Project Envisioned?

Step 6:

Assign a ranking to the **No Improvement Projects in the Last 10 Years** criterium by choosing one of the following options:

- **0** = Area was Improved in the Last 10 Years
- **1** = Area was Improved in the Last 15 Years
- **3** = Area was Improved in the Last 20 Years
- **5** = Area was Last Improved More Than 20 Years Ago

Since this area was improved in the last 15 years, this criterium is assigned a **ranking of 1**.



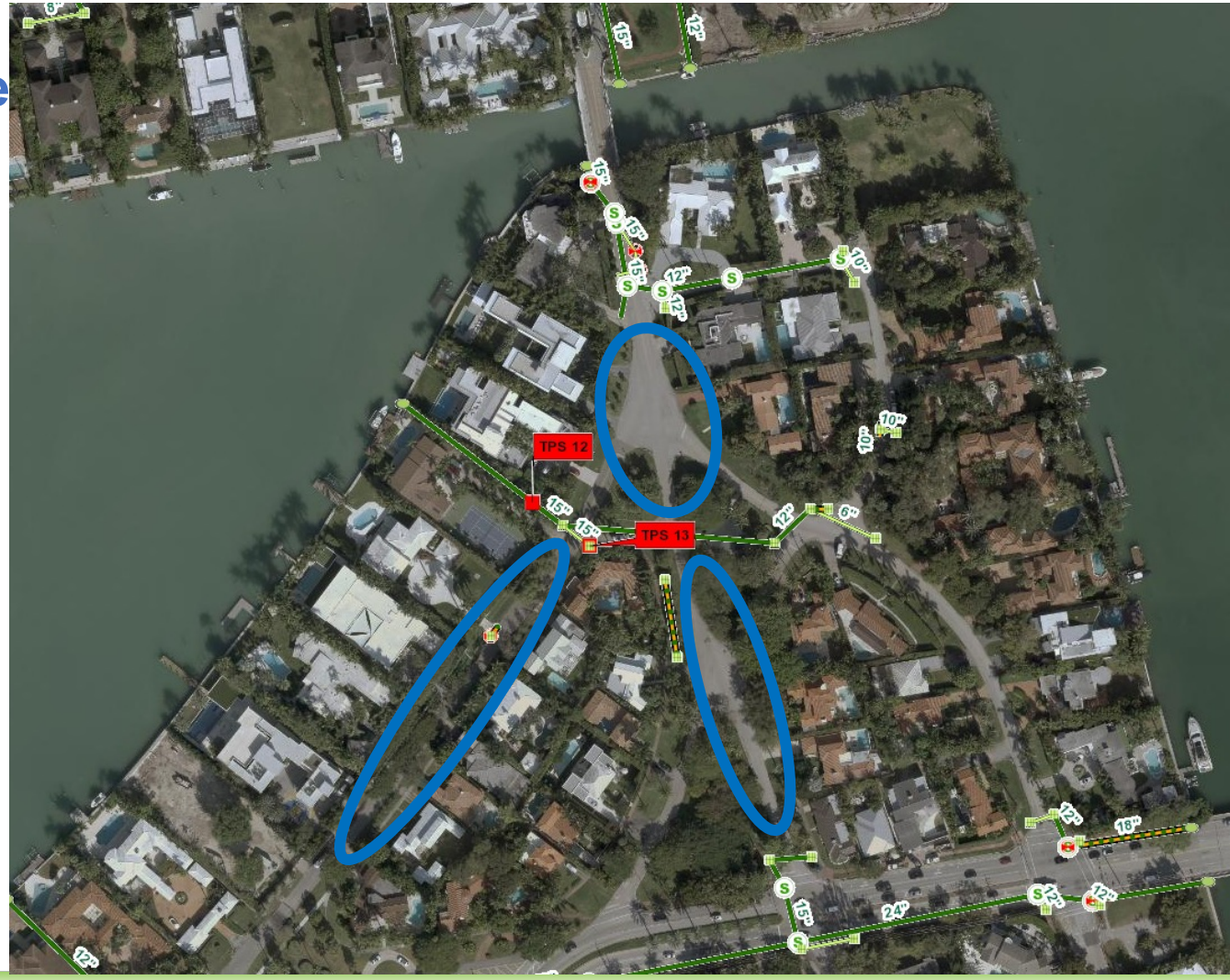
How is a Critical Needs Project Envisioned?

Step 7:

Assign a ranking to the **Insufficient Drainage** criterium by choosing one of the following options:

- **0** = Area has Adequate Drainage Infrastructure
- **1** = Area has Minor Drainage Issues
- **3** = Area has Deficient/Undersized Drainage Infrastructure
- **5** = Areas has Sections with No Drainage Infrastructure

Since the area has section with no drainage infrastructure, this criterium is assigned a **ranking of 5**.



How is a Critical Needs Project Envisioned?

Step 8:

Assign a ranking to the **Exfiltration Trenches** criterium by choosing one of the following options:

- **0** = No Exfiltration Trenches in the Area
- **1** = Exfiltration Trenches within 0.50 miles of the Area
- **3** = Exfiltration Trenches in the Close Vicinity of the Area
- **5** = Exfiltration Trenches in the Area

Since there are exfiltration trenches in this area, this criterium is assigned a **ranking of 5**.

How is a Critical Needs Project Envisioned?

Step 9:

Assign a ranking to the **Drainage Wells** criterium by choosing one of the following options:

- **0** = No Drainage Wells in the Area
- **1** = Drainage Wells within 0.50 miles of the Area
- **3** = Drainage Wells in the Close Vicinity of the Area
- **5** = Drainage Wells in the Area

Since there are drainage wells within 0.50 miles of this area, this criterium is assigned a **ranking of 1**.

How is a Critical Needs Project Envisioned?

Step 10:

Assign a ranking to the **Historic District** criterium by choosing one of the following options:

- **0** = Area is more than 0.5 miles away from a Historic District
- **1** = Area is within 0.5 miles of a Historic District
- **3** = Area is in the close vicinity of a Historic District
- **5** = Area is in a Historic District

Since this area is more than 0.5 miles away from a Historic District, this criterium is assigned a **ranking of 1**.

How is a Critical Needs Project Envisioned?

Step 11:

Assign a ranking to the **Community and Emergency Facilities** criterium by choosing one of the following options:

- **0** = Area is more than 0.5 miles away from a Community or Emergency Facility
- **1** = Area is within 0.5 miles of Community or Emergency Facility
- **3** = Area is in the Close Vicinity of a Community or Emergency Facility
- **5** = A Community or Emergency Facility is within the Area

Since there is a community park within the area, this criterium is assigned a **ranking of 5**.

Examples of Community Facilities: City administrative buildings, schools, libraries, affordable housing areas, community centers, and community parks.

Examples of Emergency Facilities: Public safety facilities, such as fire stations, law enforcement, and hospitals.

How is a Critical Needs Project Envisioned?

Step 12:
Assign a ranking to the **No Permitting Complexity** criterium by choosing one of the following options: High Permitting Complexity (0), Moderate (1), Low (3), and No Permitting Complexity (5).

Since the permitting complexity for this area is moderate, this criterium is assigned a **ranking of 1**.

How is a Critical Needs Project Envisioned?

Step 13:

Assign a ranking to the **No Connection to Outfalls** criterium by choosing one of the following options:

- **0** = Multiple Interconnected Outfalls in the Area
- **1** = At Least One Connected Outfall in the Area
- **3** = One Disconnected Outfall in the Area
- **5** = No Outfalls in the Area

Since there is at least one connected outfall in the area, this criterium is assigned a **ranking of 1**.

How is a Critical Needs Project Envisioned?

Step 14:

Assign a ranking to the **10-Year Design Storm Flooding** criterium by choosing one of the following options: No Flooding, (0), Low (1), Moderate (3), and High (5) Level of Flooding.

There is a **High Level (5)** of Flooding caused by the 10-Year Design Storm for this area.

How is a Critical Needs Project Envisioned?

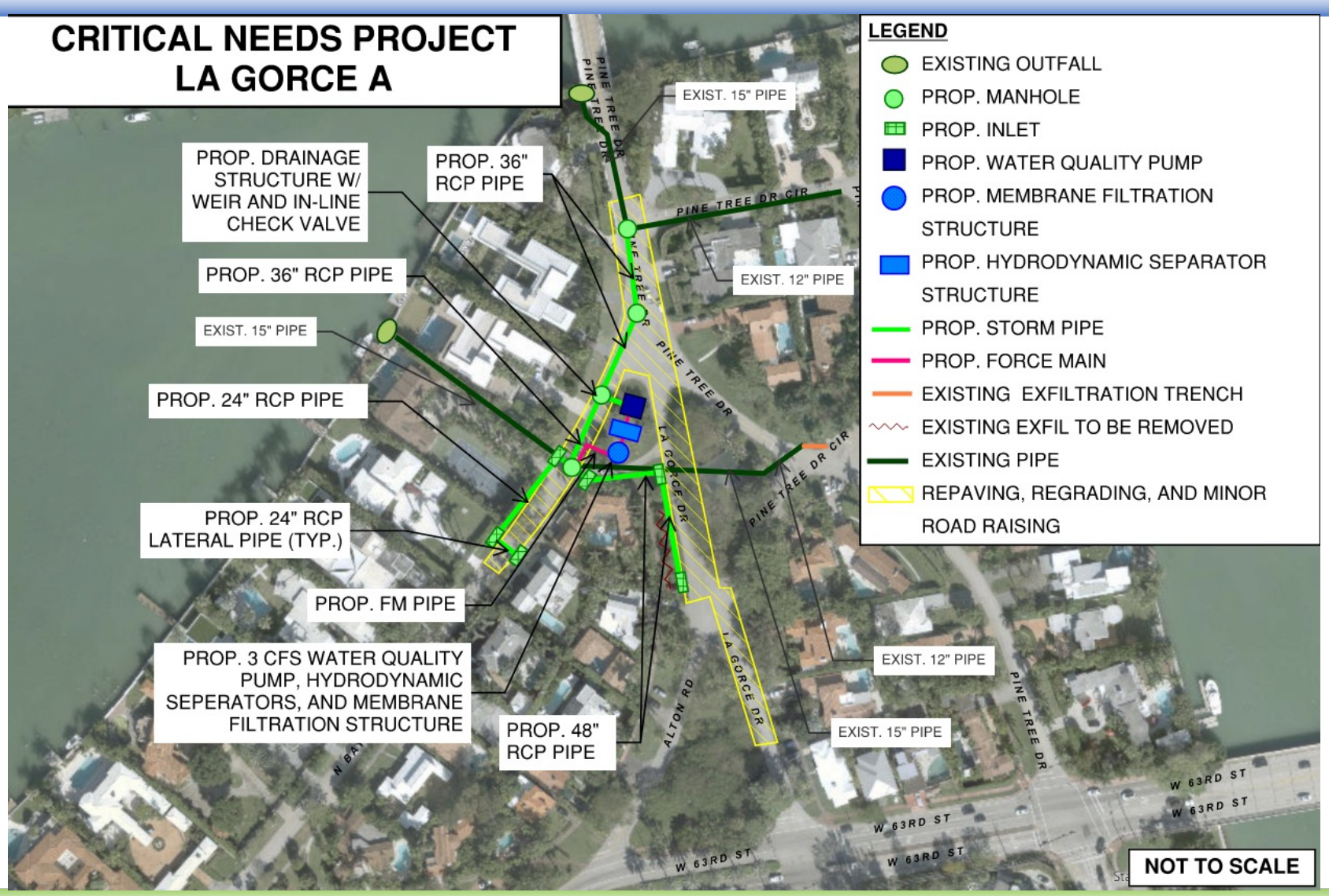
Step 14: Score the Critical Needs Project based on the criteria rankings.

Criteria	Criteria Weighting	Rank	Score
Flooding Complaints	7	5	35
Low Topography / Tidal Inundation	7	5	35
Temporary Pumps	7	5	35
Constructability	7	5	35
Neighborhood Improvement Project Ranking	6	5	30
No Improvement Projects in the Last 10 Years	6	1	6
Insufficient Drainage	4	5	20
Exfiltration Trenches	4	5	20
Drainage Wells	4	1	4
Historic District	3	0	0
Community and Emergency Facilities	3	5	15
No Permitting Complexity	3	1	3
No Connection to Outfalls	1	0	0
10-Year Design Storm Flooding	1	5	5
TOTAL SCORE			**243**

How is a Critical Needs Project Envisioned?

Step 15:
Design and Construct the Critical Needs Project.

Budgetary Estimate:
$3.4 Million



Prioritization Strategy for Critical Needs Projects

Areas of Known Concerns (Flooding Complaints)

Topography

Evaluation of Existing Drainage Infrastructure

Evaluation of Inundation Maps

Proximity to Ongoing Projects

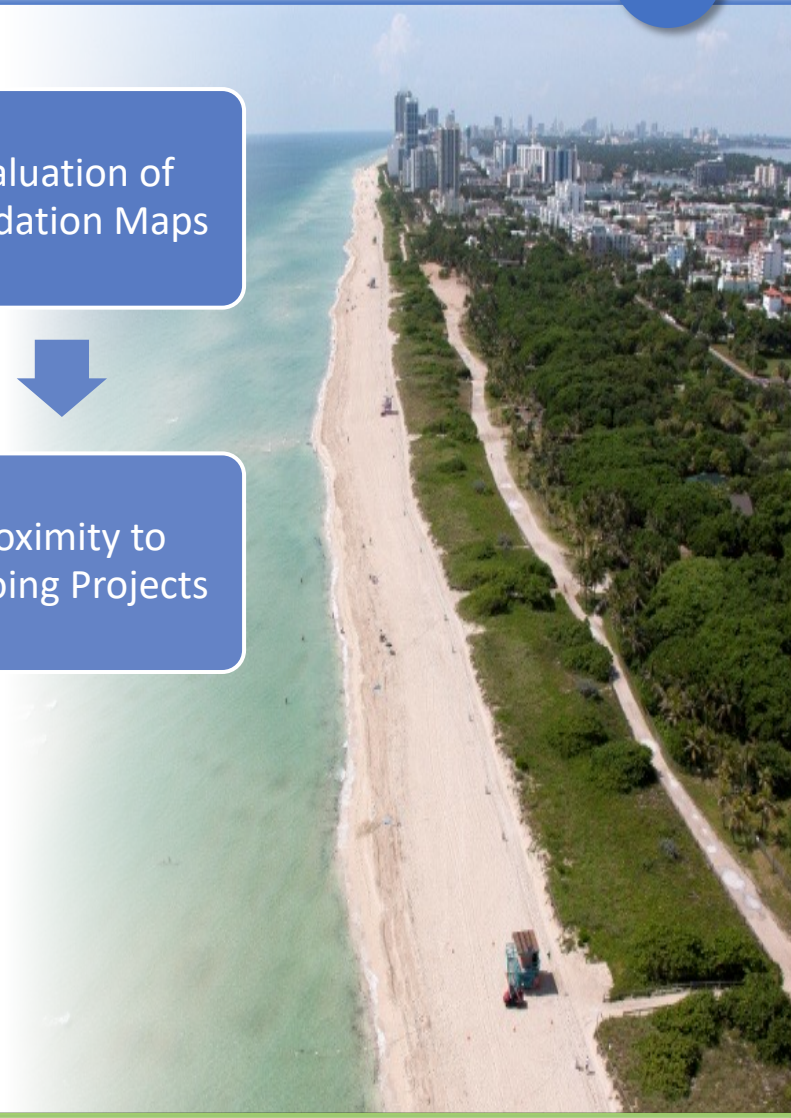
Evaluation of Historic Districts

Geographic Phasing

Funding Availability

Previous Improvement Projects (Last 10 Years)

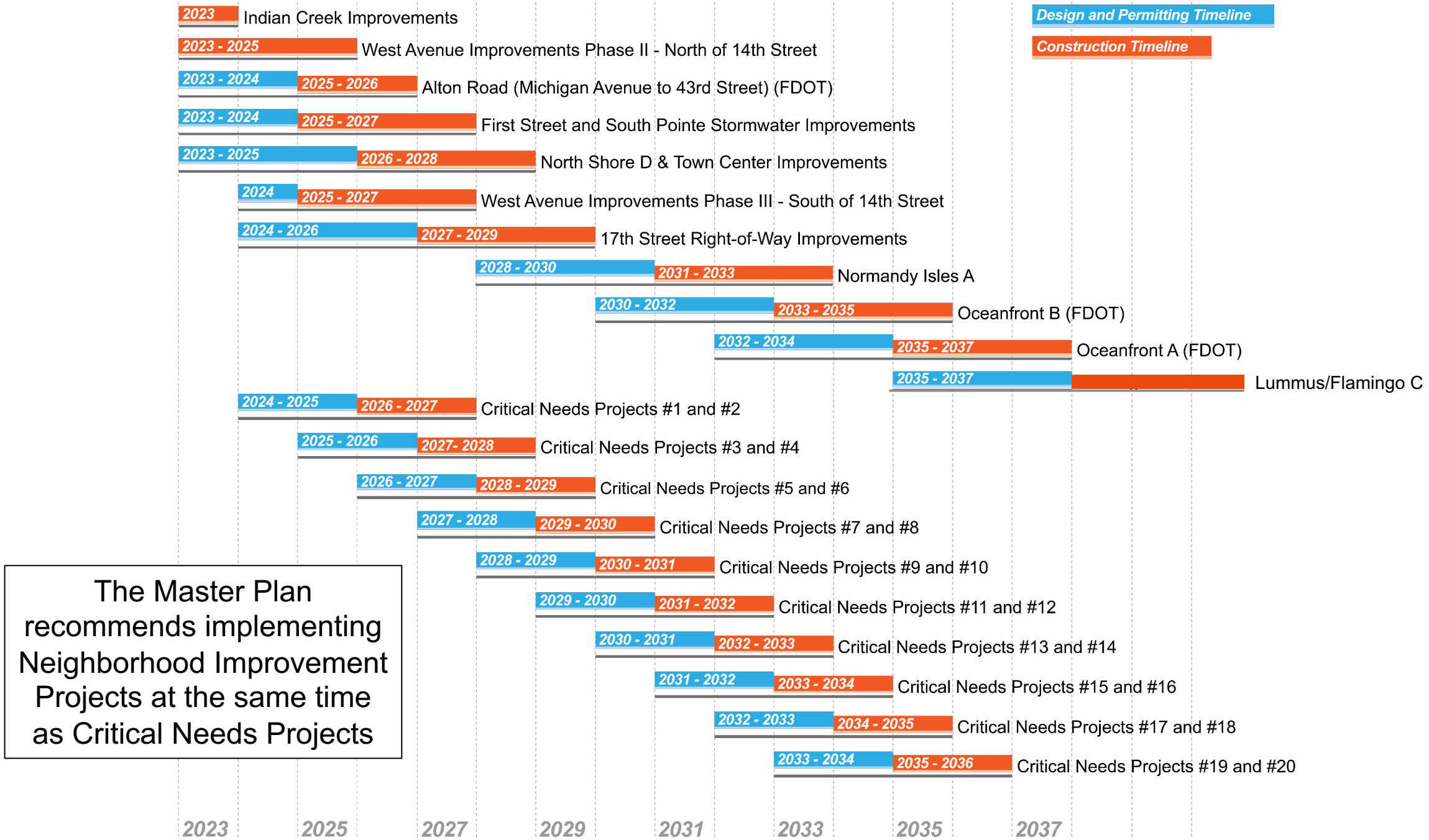
Cost/Benefit Analysis



Recommended Critical Needs Projects

Critical Needs Rank	Neighborhood Improvement Project Rank	Critical Needs Project Name		Budgetary Estimate	Critical Needs Score
1	39	Nautilus F (North)	$	2,607,000.00	Ongoing
2	36	Nautilus B - Muss Park	$	4,389,000.00	254
3	33	La Gorce C - N Bay Rd 1	$	3,941,000.00	247
4	48	La Gorce A	$	3,356,000.00	243
5	33	La Gorce C - N Bay Rd 2	$	3,753,000.00	239
6	29	City Center A - Palm View	$	3,702,000.00	236
7	23	Flamingo/Lummus E - Lenox Ave	$	1,154,000.00	216
8	39	Nautilus F - Nautilus Dr	$	800,000.00	216
9	9	N Shore B & C - Dickens Ave	$	2,723,000.00	202
10	6	Flamingo/Lummus A - 6th St	$	1,732,000.00	200
11	21	North Shore A - Byron Ave	$	5,642,000.00	194
12	49	Nautilus D - N Bay Rd	$	3,934,000.00	192
13	5	Flamingo/Lummus C (North)	$	3,076,000.00	187
14	22	Nautilus A - Royal Palm Ave	$	2,520,000.00	187
15	42	Lakeview A (North)	$	3,383,000.00	185
16	28	Nautilus G - N Bay Rd	$	3,477,000.00	175
17	25	Bayshore B (North)	$	4,171,000.00	170
18	31	Normandy Shores A - Shore Lane	$	1,146,000.00	170
19	34	Lower North Bay Rd A	$	2,229,000.00	167
20	36	La Gorce Island A	$	7,127,000.00	164
		TOTAL	**$**	**64,862,000.00**	

Conceptual Schedule



The Master Plan recommends implementing Neighborhood Improvement Projects at the same time as Critical Needs Projects

Please contact Outreach@MiamiBeachFL.gov

Thank You!

Tonight's Stations

1. **Neighborhood Improvement Projects Station**
   - Neighborhood Improvement Projects Map
   - Proposed Stormwater Infrastructure Map
2. **Critical Needs Projects and Drainage Toolbox Station**
   - Critical Needs Projects Maps
   - Drainage Toolbox for Critical Needs Projects
3. **Water Quality Approach and Vulnerability Assessment Station**
   - Water Quality Approach (Treatment Train) Exhibit
   - Sea Level Rise Vulnerability Assessment Exhibit
   - "How the City Floods" Exhibit