Stormwater Resilience: Planning and Funding for Today and the Future

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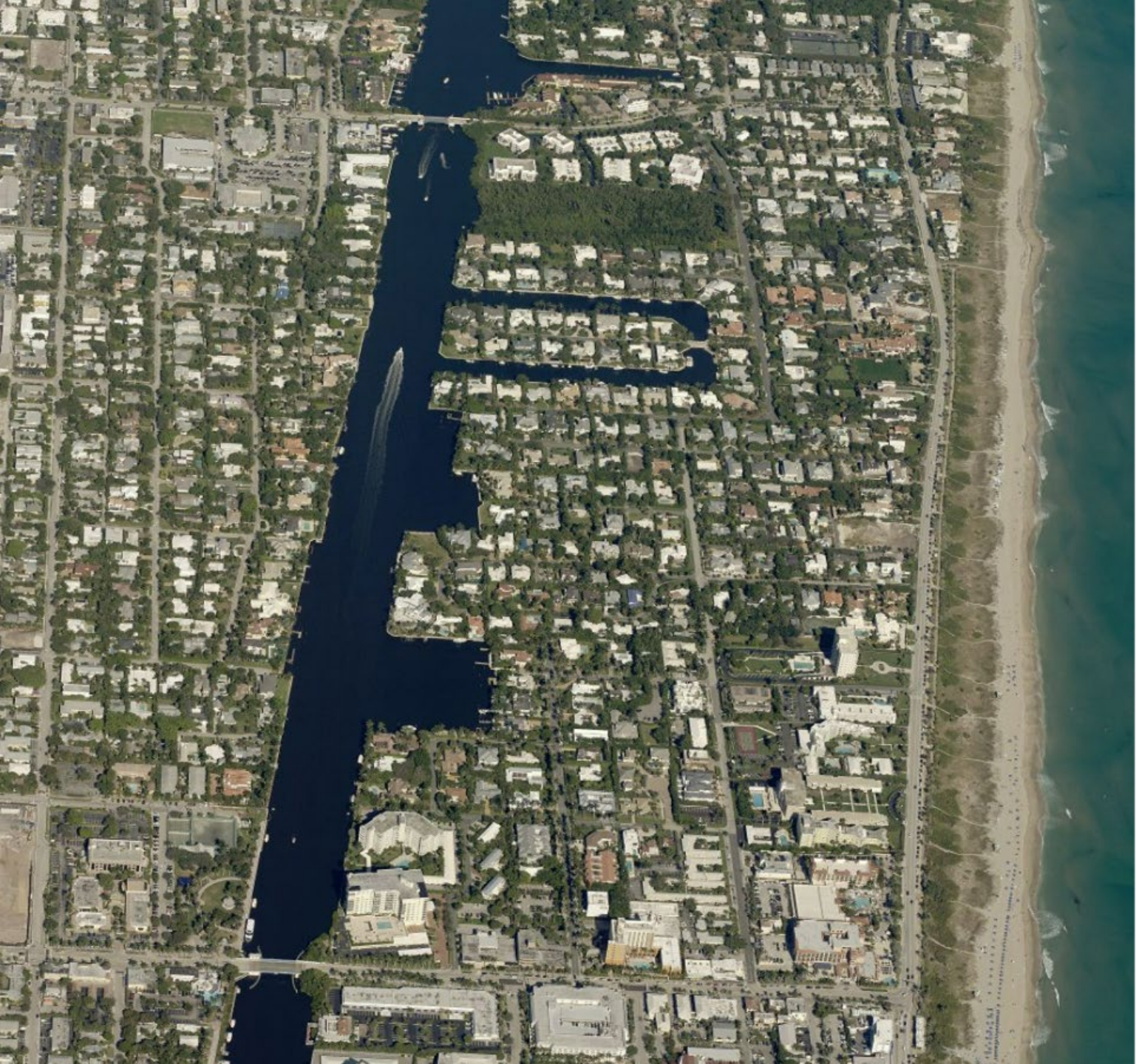
2025 FSA Winter Conference
December 3, 2025



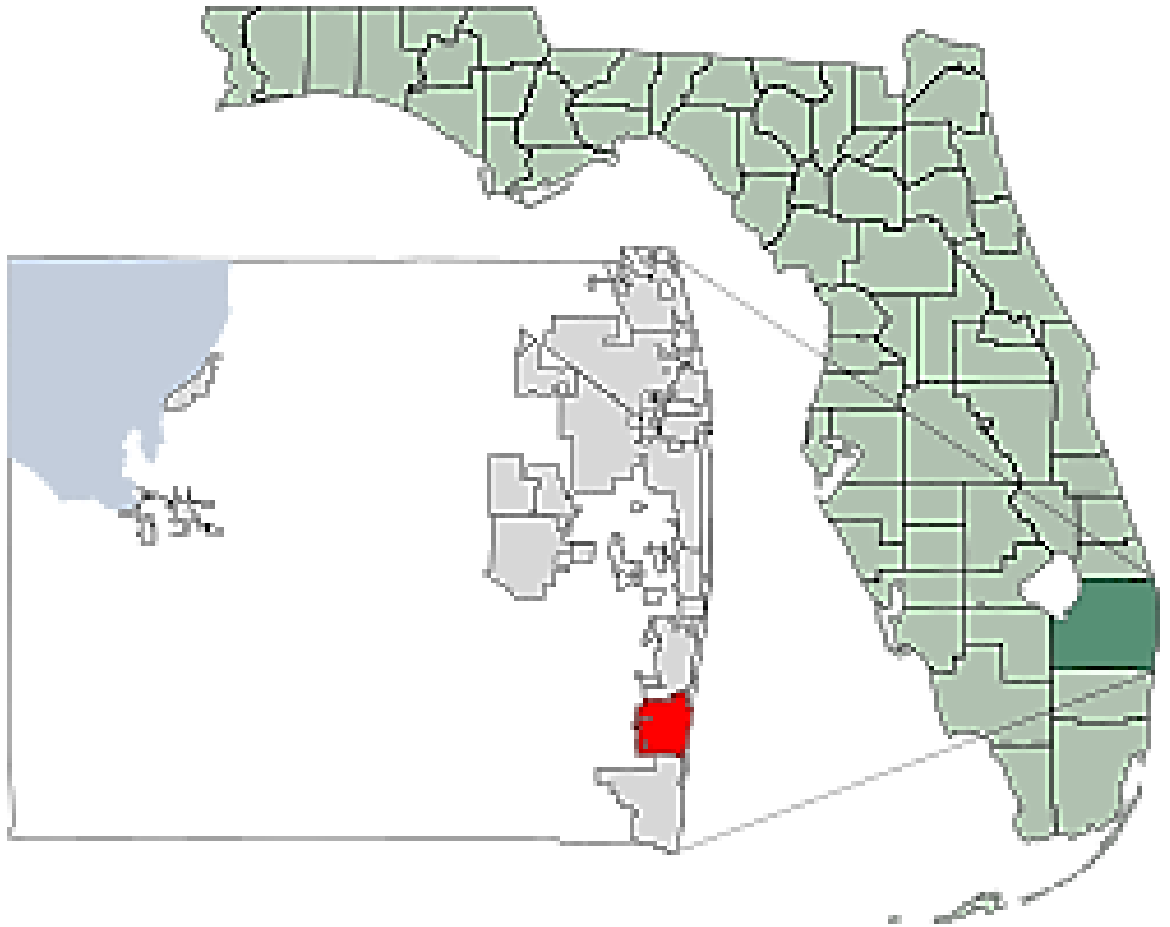
Overview

1. About Delray Beach
2. Stormwater Master Plan
3. Project Prioritization
4. Funding Needs
5. Rate Study & Restructuring
6. 2025 Rate Increase
7. Lessons Learned

DELRAY BEACH

- City in Palm Beach County
- 67,000 full-time residents
- Over 100,000 seasonal residents

- 16.5 total square miles
  - Water Bodies = 0.6 sq. mi. (4%)
  - Land = 15.9 sq. mi.
    - Impervious Area = 9.0 sq. mi. (55%)
    - Pervious Area = 8.1 sq. mi. (41%)



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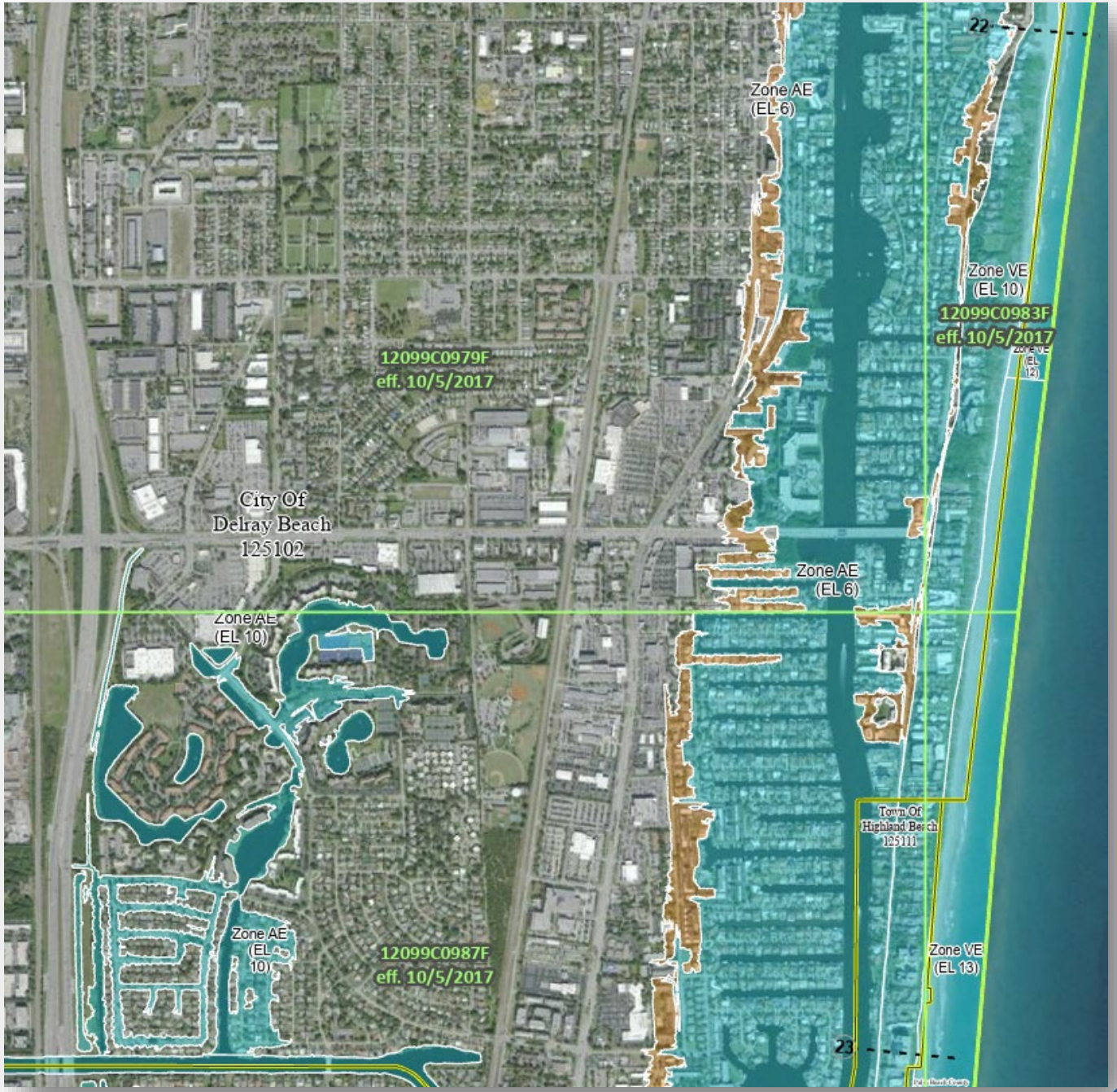
Stormwater Master Plan

History

- 1993 – City's first Stormwater Master Plan
- 2000 – Update #1 evaluated 11 known flooding locations
- 2019 – Update #2 evaluated 14 known flooding locations
- Present – Comprehensive Update



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Stormwater Master Plan

Purpose

- Study, analyze and provide recommendations and planning-level costs for operations and capital projects
- Meet the City's desired level of service (LOS) for stormwater management, plan for sea level rise and storm surge impacts

Regulatory Compliance

- Every 5 years, municipalities are required to provide a Stormwater Management Program to develop a needs analysis for the following 20 years
- Community Rating System requires an update every 5 years in order to lower homeowners' insurance

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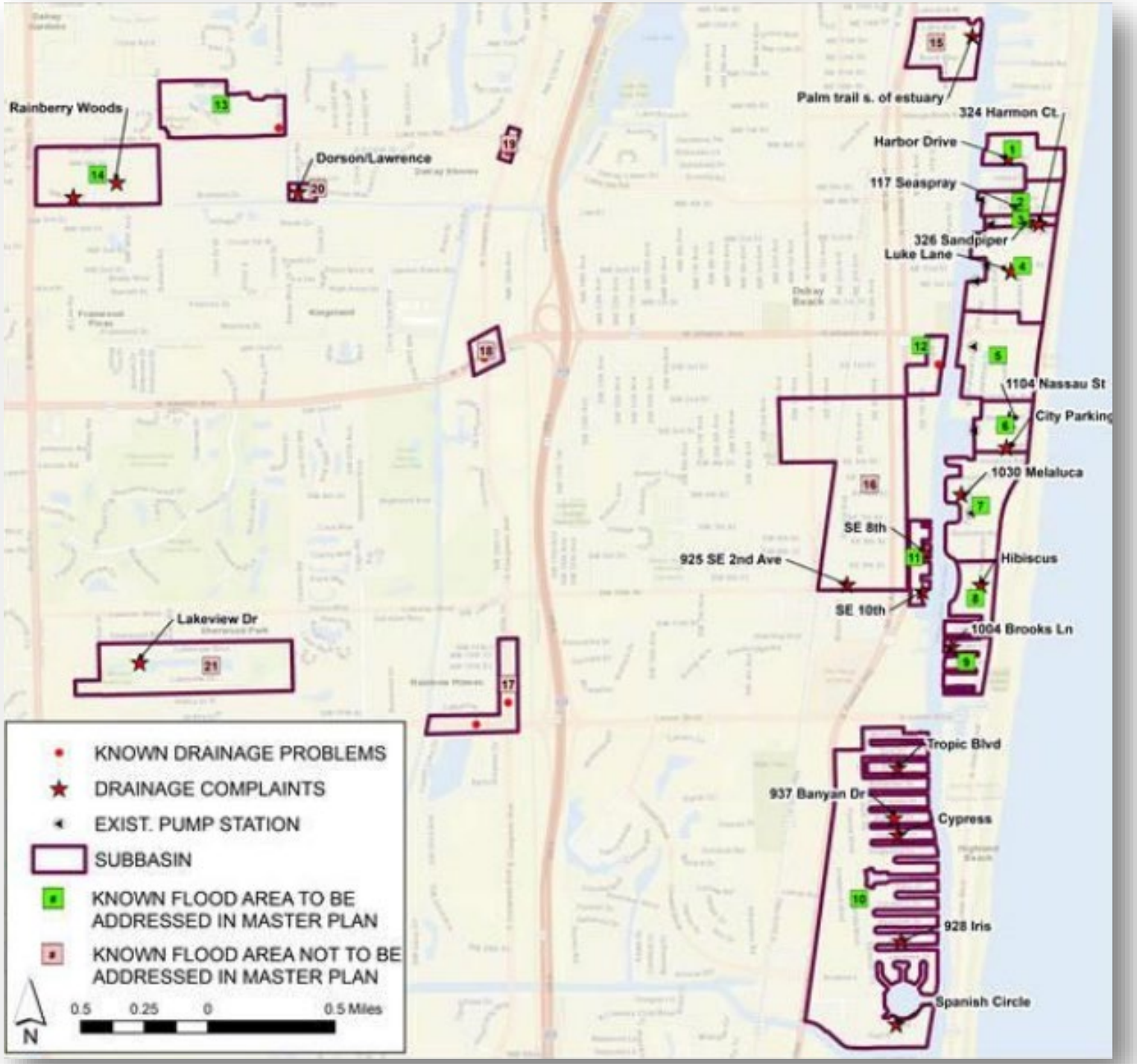
Stormwater Master Plan

2019 Problem Areas

- 14 known areas were selected to be part of the 2019 update

- Based on resident complains and City staff observations



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Stormwater Master Plan

Tasks

- Data Acquisition and Evaluation
  - City, County, SFWMD, LWDD, NOAA, FEMA
  - GIS files, LiDAR data, flooding reports, ordinances, as-builts, etc.
- Hydrologic & Hydraulic Modeling
  - Existing 1D/2D hydrologic/hydraulic models using ICPR4 Software
  - Uses rainfall, land use, drainage network data and spatial coverages for topography
- Existing Conditions Level of Service
  - Flood Protection Severity Score (FPSS)
- Projected Sea Level Rise Impacts
  -

Planning Horizon	Peak Tide Elevation*
Existing	2.5
30 Years	4.2
75 Years	7.4

*Elevations are in NAVD88

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Stormwater Master Plan

WaStop® inline check valve

Tasks

- Water Quality Assessment
  - SFWMD Environmental Resources Permits
  - Existing non-structural and structural BMPs
- Capital Improvement Projects
  - Incorporate raising seawalls, upgrading or adding pump stations, installing backflow preventers, exfiltration trenches, pollution control measures
- Stormwater Ordinance Review
  - Retaining runoff onsite, maximum lot coverage, minimum open space, BMPs, erosion control, pre vs. post runoff
- NPDES Review
  - Analysis of current procedures
- Incorporate City-Wide Public Seawall Vulnerability Assessment

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Project Prioritization

Flood Protection Severity Score (FPSS)

$$FPSS = \sum 4E_i * NS + \sum 2E_i * MCLRS$$

NS: Number of structures anticipated to flood by a 100-year, 3-day design storm event, which can include commercial, residential, and public buildings. All structures and/or buildings are considered equivalent, regardless of their size or value. **(WF = 4)**

MCLRS: Miles of collector and local residential streets anticipated to be impassable during 5-year, 1-day design storm event. All collector and local residential streets are considered impassable if the depth of flooding exceeds the crown of the road during the 5-year, 1-day design storm event. **(WF = 2)**

Note

To account for the varying size of each problem area, the FPSS was divided by the area of the problem area to normalize the FPSS.

The severity indicators are rated by an exceedance (E) value pursuant to the following severity score listed in the table below.

Depth of Flooding Above the FPLOS	E
Less than or equal to 6 inches	1
Greater than 6 inches and less than or equal to 12 inches	2
Greater than 12 inches	3

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Project Prioritization

Rank	Problem Area Name	Problem Area	Sub-Basin Area (Acres)	FPSS *	Weighted FPSS **
1	Seasage Drive	7	61.22	731.4	11.95
2	Beach Drive	2	22.84	105.7	4.63
3	Basin Drive	4	67.34	234.4	3.48
4	Rainberry Woods	14	71.02	190.3	2.68
5	Hibiscus Road	8	28.53	63.4	2.22
6	Bay Street	6	27.42	55.2	2.01
7	Waterway Lane	3	7.85	4.6	0.59
8	Atlantic Ave	5	64.79	33.7	0.52
9	Spanish Circle	10	281.49	144.6	0.51
10	Harbor Drive	1	26.22	9.2	0.35
11	Banwick Park	13	59.92	17.9	0.3
12	7th Avenue	11	14.65	1.6	0.11
13	Brooks Lane	9	19.54	1.4	0.07
14	Marine Way	12	15.28	0.8	0.05

2019 Problem Areas

- 1 through 9 (Barrier Island)
- 10 through 12 (West side of Intracoastal)
- 13 and 14 (West of I-95)

*FPSS = Flood Protection Severity Score

**Weighted FPSS = FPSS ÷ Sub-Basin Area

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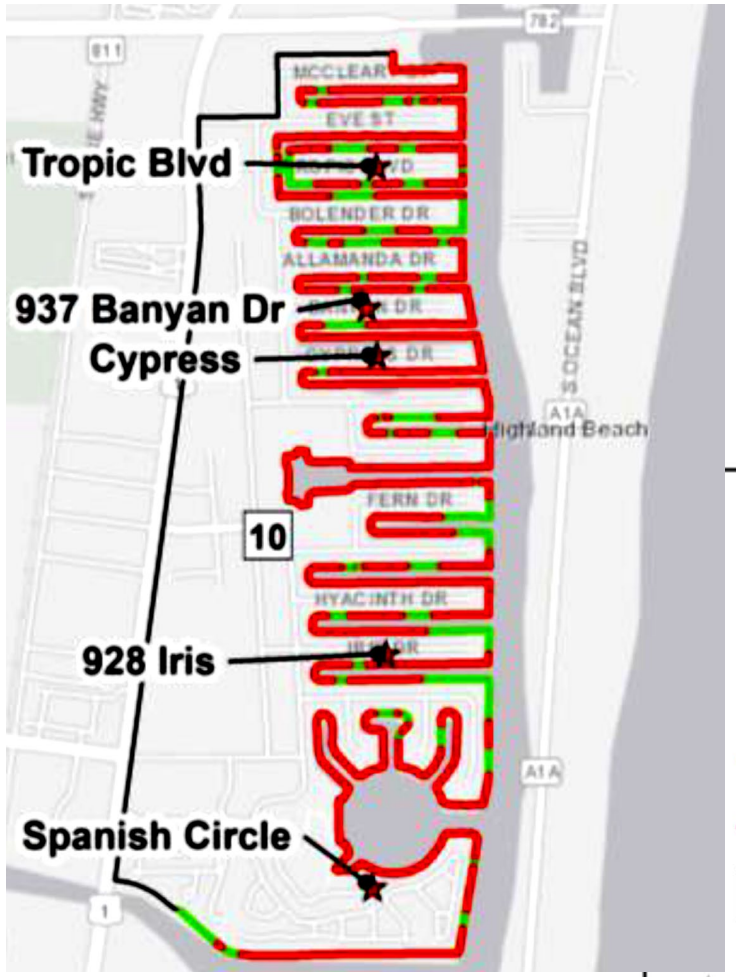
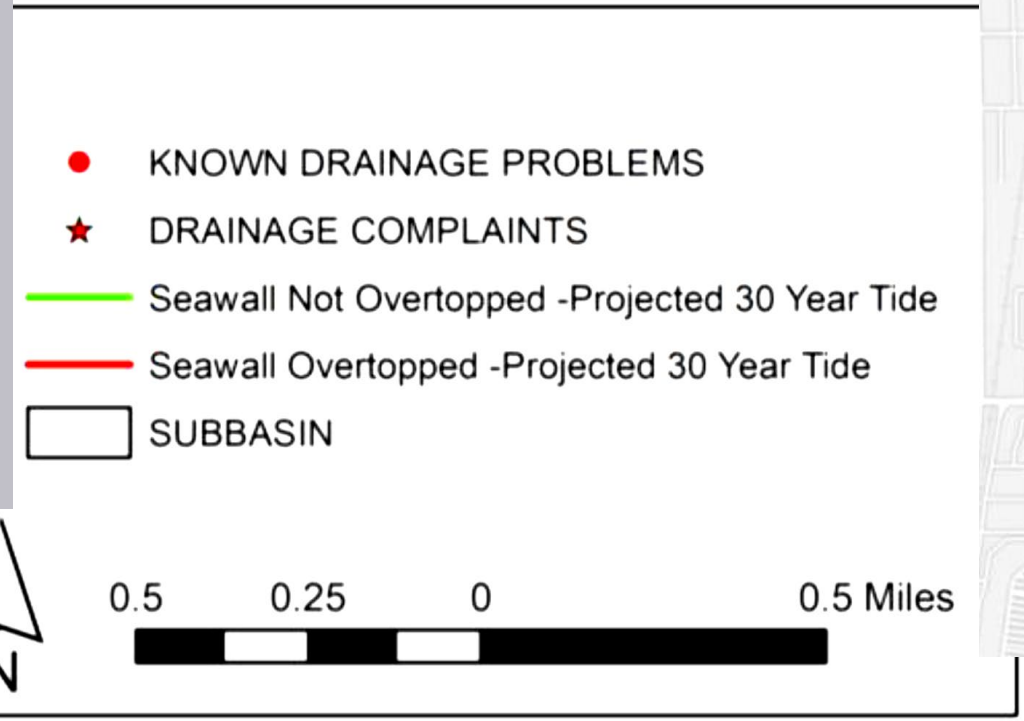
Project Prioritization

Projected Sea Level Rise Impacts



Note

100% of existing seawalls are overtopped at the 75-year planning horizon for Problem Areas 1 through 12



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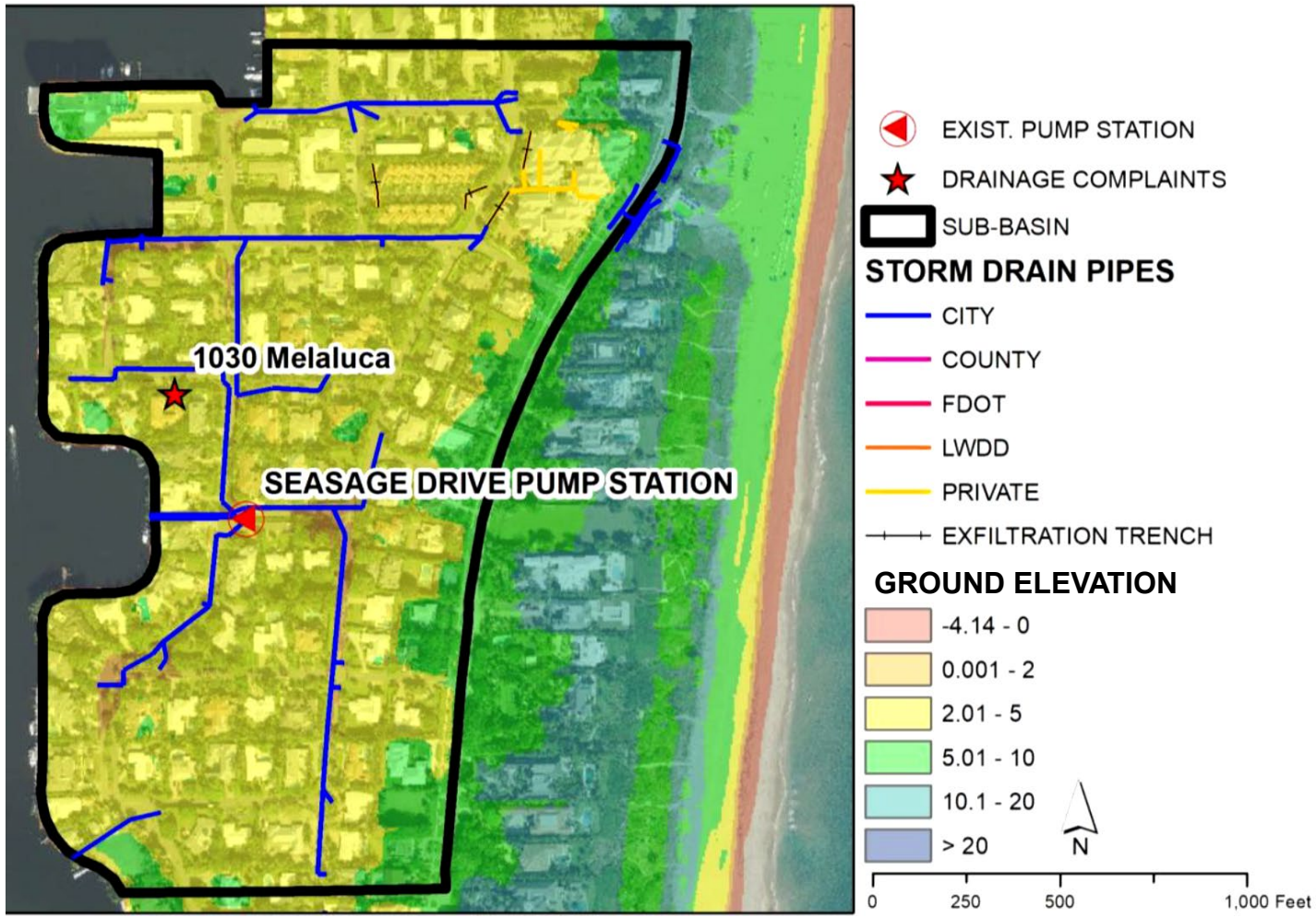
Project Prioritization

Project Ranked No. 1

- Problem Area 7 – Seasage Dr

- Necessary improvements include upgrade and replace existing pump station, new drainage pipe network, swale installation and road raising



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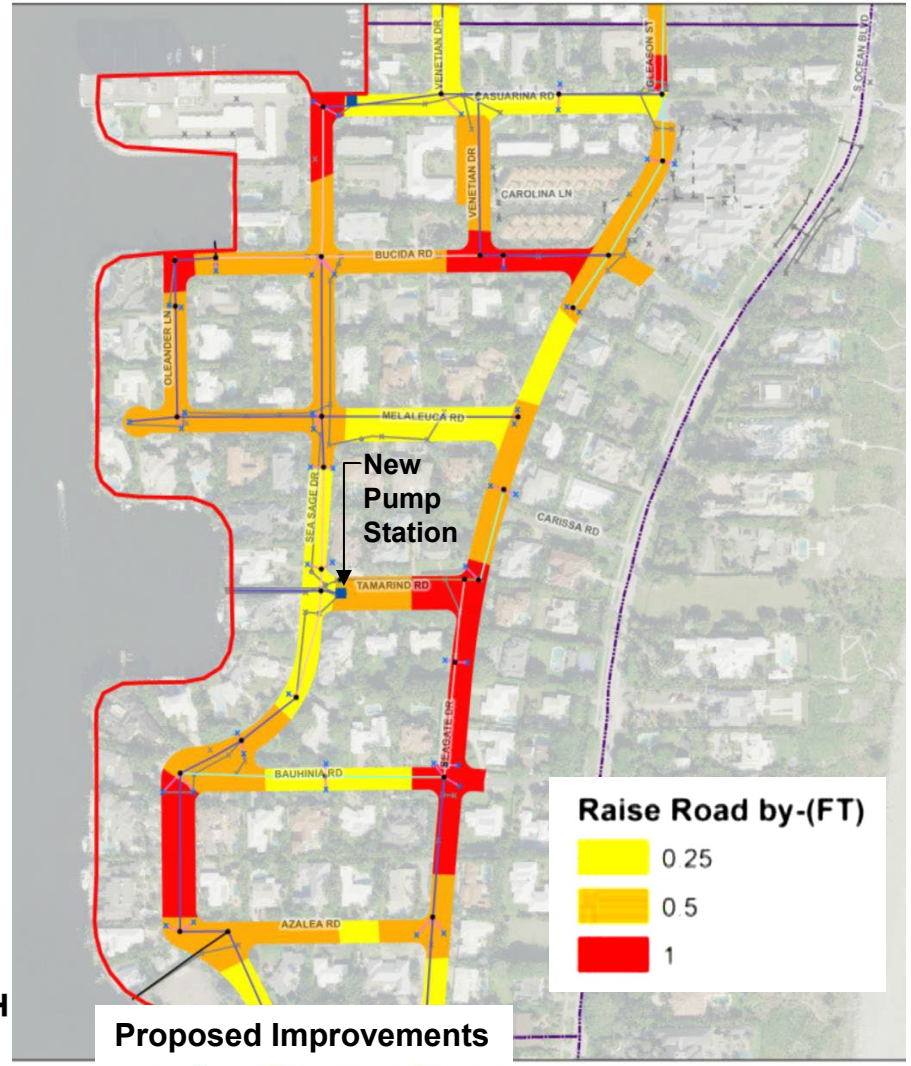
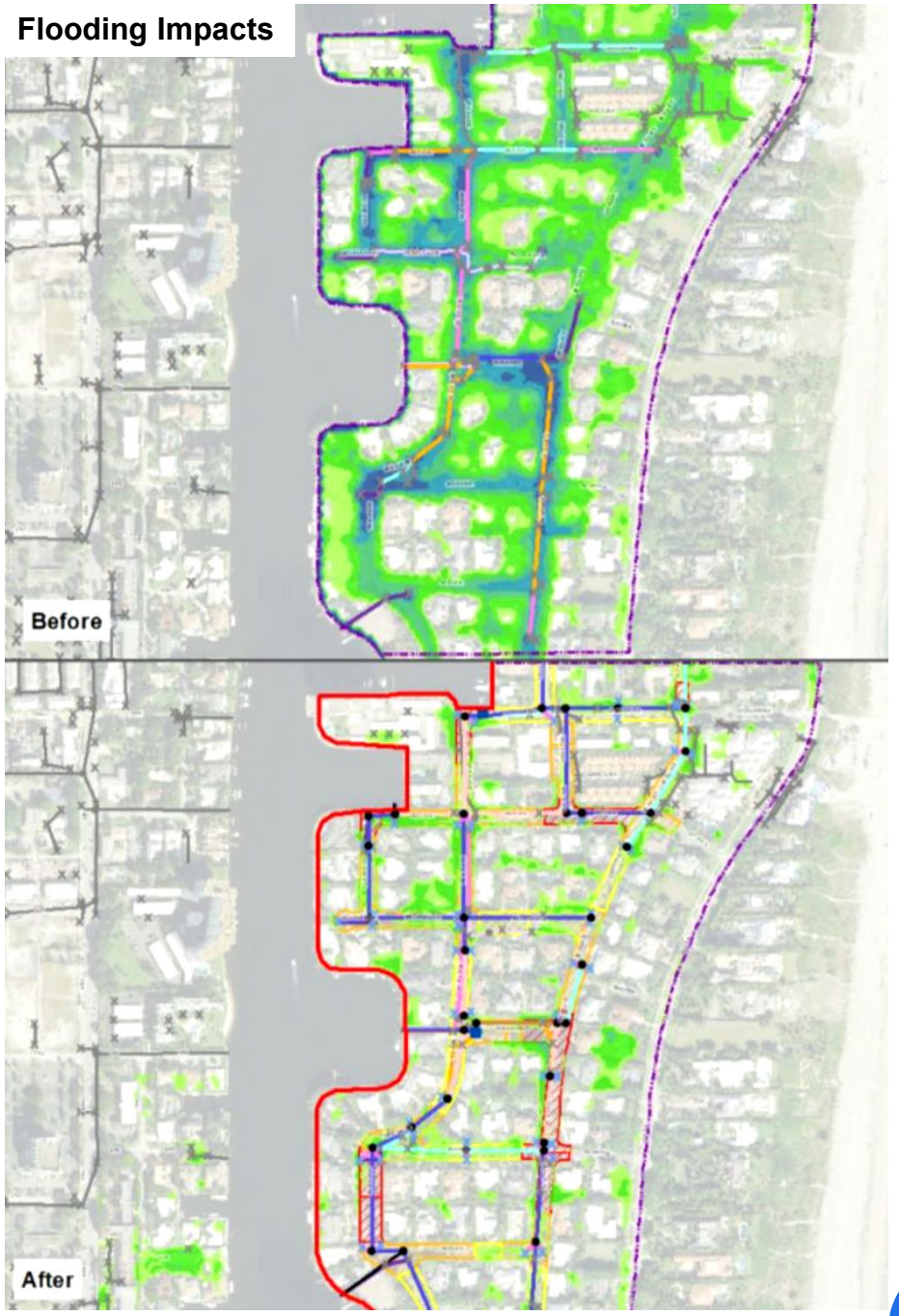
Project Prioritization

Project Ranked No. 1

- Problem Area 7 – Seasage Dr
- Estimated Cost $80,000,000
- Must also consider cost effectiveness





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Funding Needs

Estimated Construction Costs

- Total = $378 million+
  (Problem Areas 1 to 11, 13 and 14)

- Problem Area 12 (Marine Way) excluded because the City is currently implementing a flood protection project

  Estimated Cost = $40,000,000
  Construction expected Summer 2026

Problem Area Name	Problem Area	Project Cost Estimate
Harbor Drive	1	$10,343,628.80
Beach Drive	2	$10,621,968.41
Waterway Lane	3	$19,400,414.09
Basin Drive	4	$42,085,705.66
Atlantic Avenue	5	$27,975,112.98
Bay Street	6	$21,087,575.32
Seasage Drive	7	$32,943,700.48
Hibiscus Road	8	$25,470,832.60
Brooks Lane	9	$15,902,001.70
Spanish Circle	10	$157,191,957.44
7th Avenue	11	$6,396,712.90
Banwick Park	13	$3,743,110.48
Rainberry Woods	14	$5,200,277.37
TOTAL		**$378,362,998.23**

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Funding Needs

Tax Roll Year	Stormwater Utility Revenue	Debt Payments	Operating Expenses	Capital Expenses
2021	$ 2,091,110	$ 0	$ 1,801,400	$ 575,900
2022	$ 2,077,725	$ 0	$ 2,144,000	$ 159,200
2023	$ 4,151,207	$ 562,200	$ 2,821,900	$ 787,100
FUTURE ESTIMATED				
2024	$ 5,346,900	$ 909,700	$ 3,177,900	$ 1,259,300
2025	$ 6,491,100	$ 1,562,300	$ 3,336,700	$ 4,592,100
2026	$ 7,874,700	$ 2,028,400	$ 3,469,400	$ 2,376,900

Notes:

1. Prior to the Stormwater Utility rate update in 2023, State Revolving Fund loans were needed to fund operating and capital needs.

2. Future Stormwater Utility Revenue assumes incremental rate increases over several years in order to generate revenue needed to fund operating and capital without State Revolving Fund loans.

Funding Needs

Potential Funding Sources

- City Stormwater Utility Revenue
- State Appropriations
- Resilient Florida Grant Program (FDEP)
- Water Quality Improvements Grant Program (FDEP)
- National Coastal Zone Enhancement Grant Program (NOAA)
- Clean Water State Revolving Fund (EPA)

Stormwater Rate Study

- Stormwater Master Plan identified extensive capital improvements to address
- Increasing O&M expenses
  - Expanding operational level of service
  - Accumulated impacts of inflation
  - Over $2M repair backlog
- Prior Stormwater Rate Structure
  - Was in effect from 2006 to May 2023
  - Need for updated Impervious Data
  - Review of cost recovery approach
- Current Stormwater Rate Structure
  - Commission approval May 2023
  - Rate increase approved August 2025

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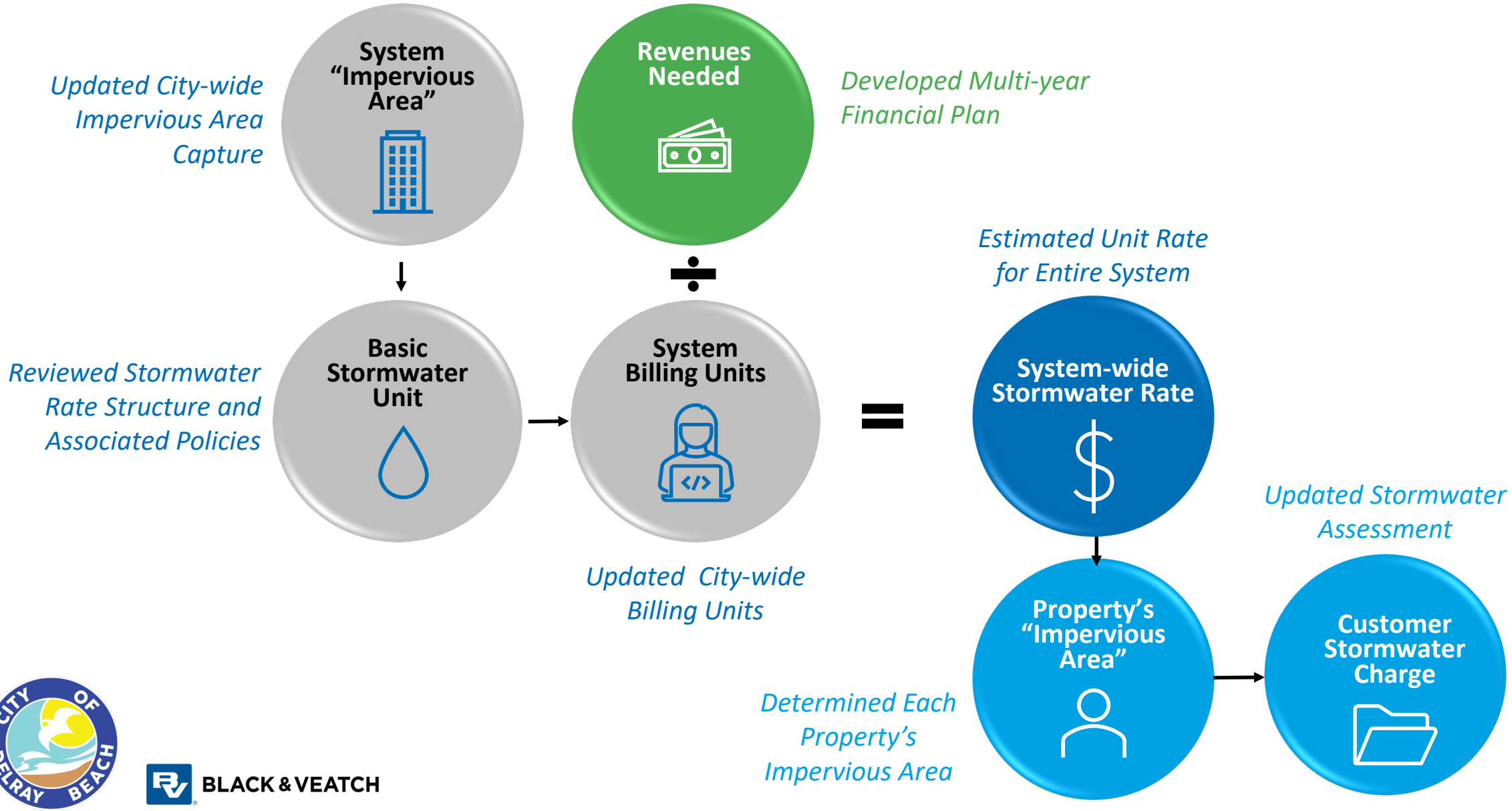
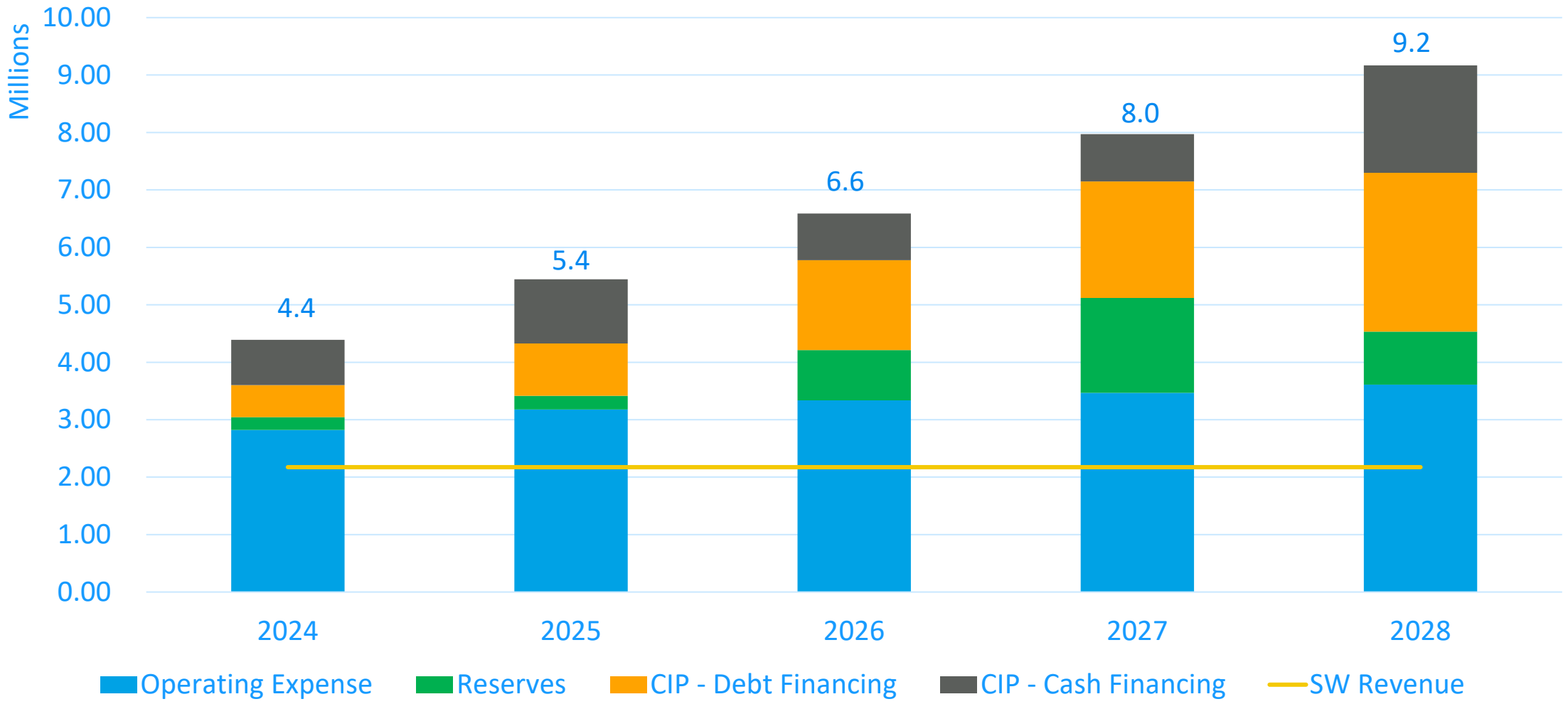
Study Approach



5-Year Financial Plan Results



Level of revenue was insufficient to meet projected O&M and Capital Needs

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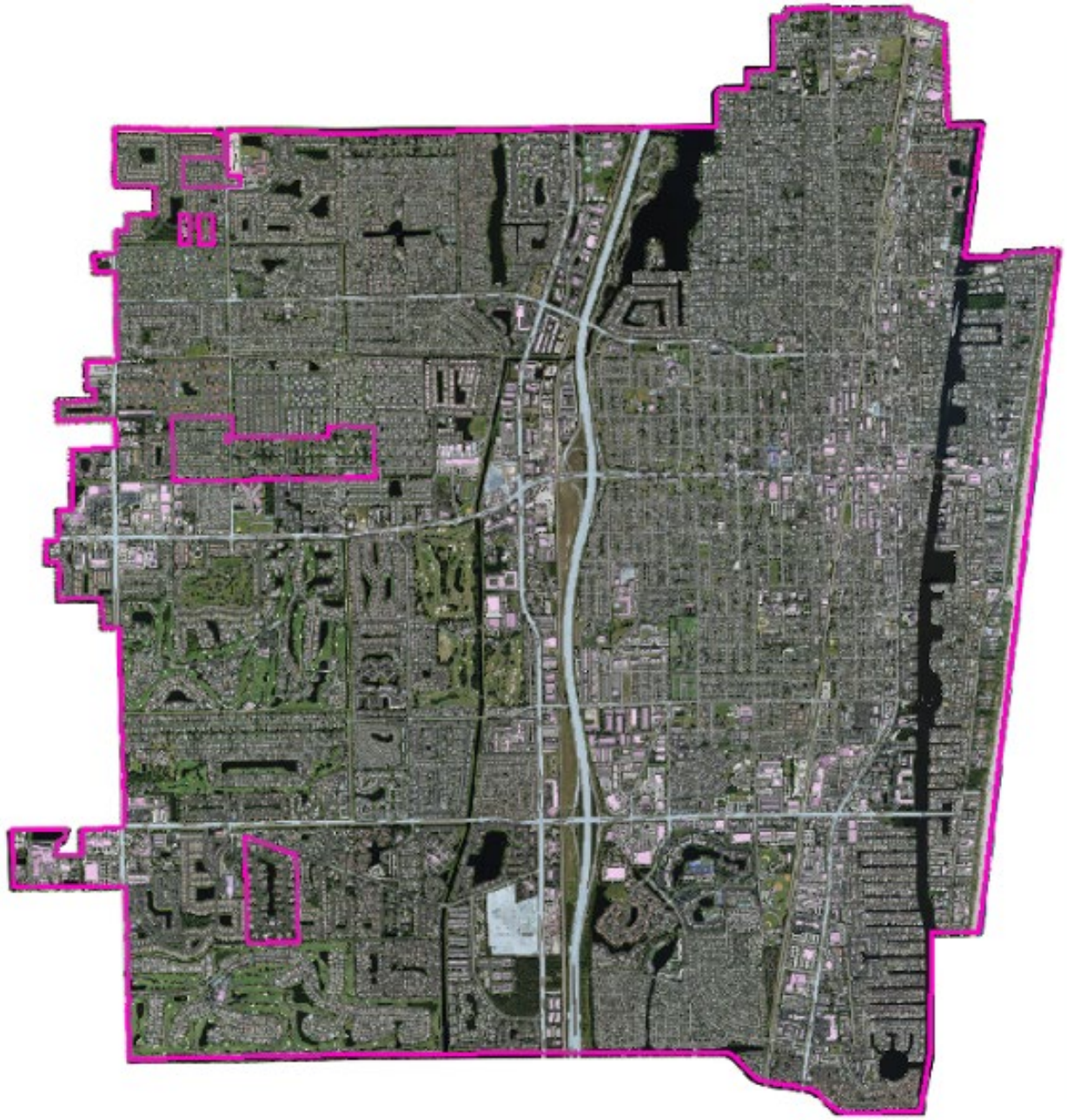
Completed City-Wide Impervious Area Capture

The update initiative enables:

- Complete refresh of stormwater billing data

- **Determination of updated ERU Square Footage**

- **Evaluation of an alternative rate structure**



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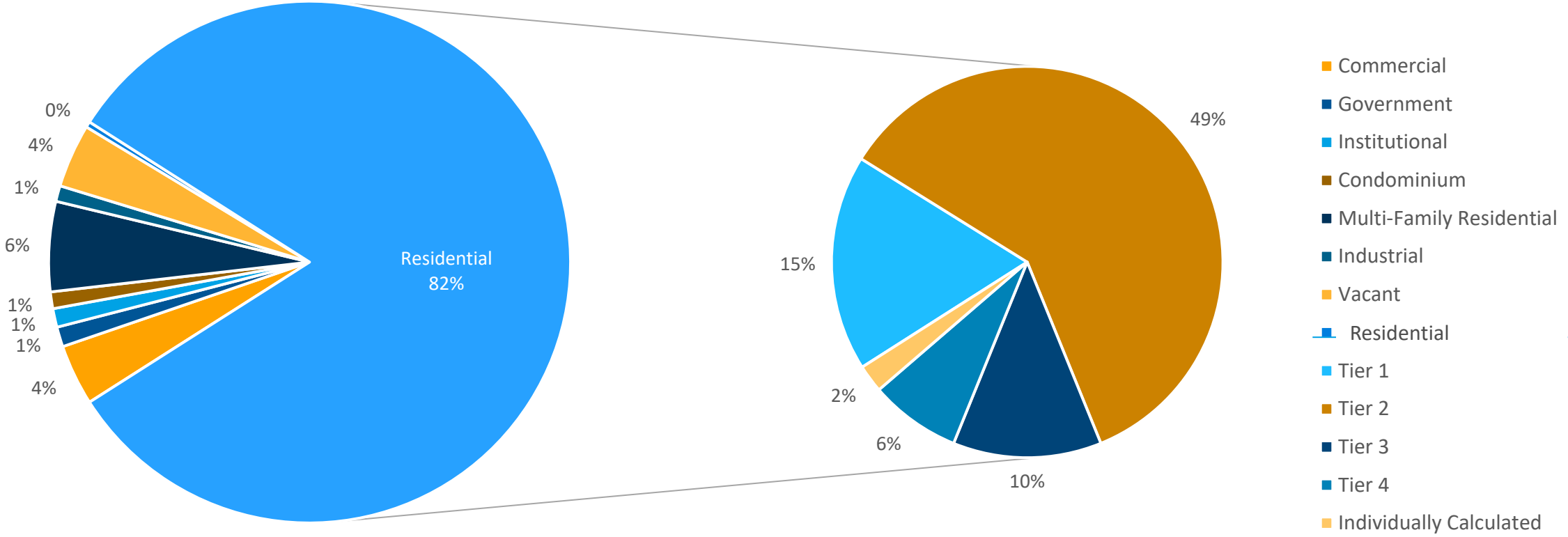
Findings

Distribution of Parcels by Customer Class



All Parcels

Residential Parcels

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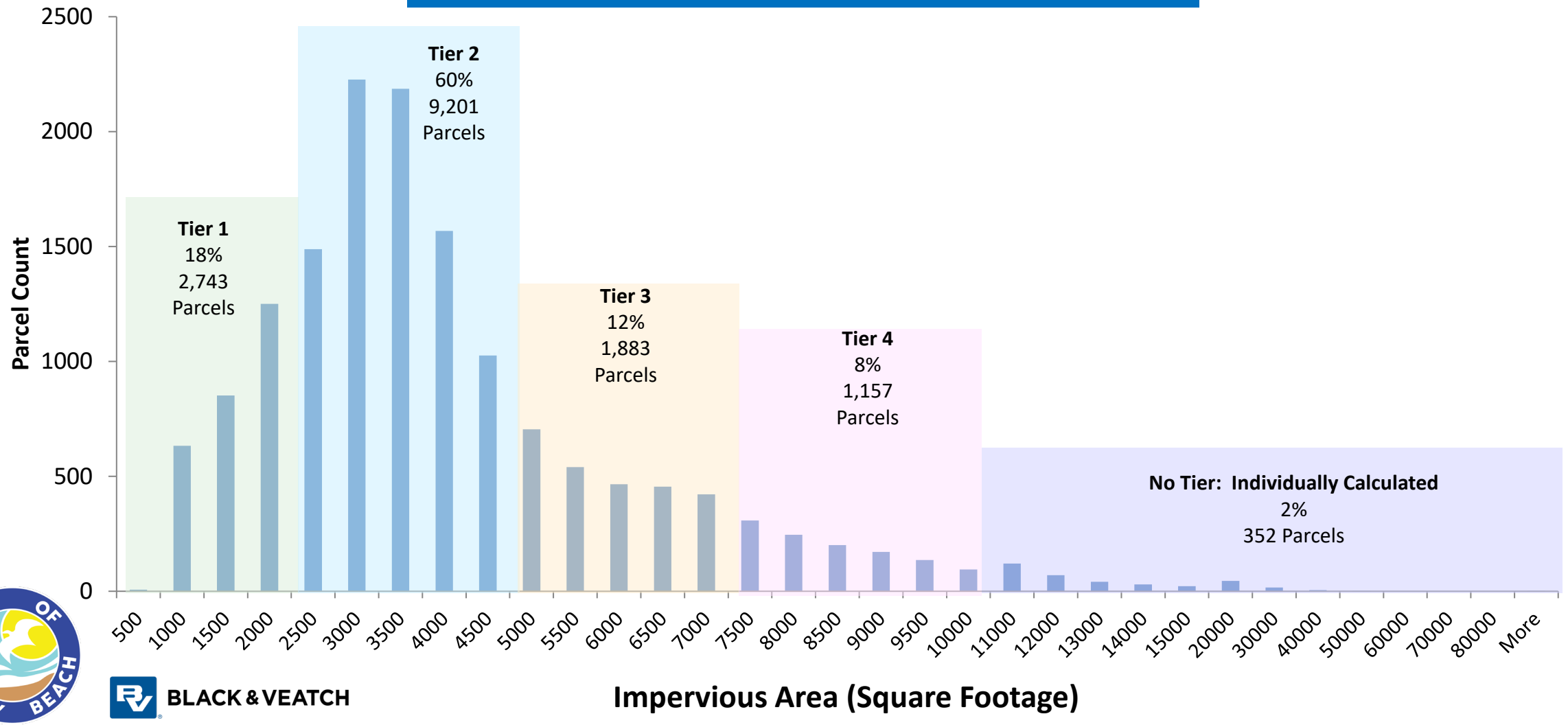
Findings

Residential Impervious Area

reflects a wide distribution



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Previous Rate Structure

- Base billing unit = Equivalent Residential Unit (ERU)
  - 1 ERU = 2,502 sf of impervious area
  - **ERU Rate = $63.96 /ERU** per Year
- **All residential customers assessed 1 ERU**
- Non-residential customers assessed ERUs based on property specific impervious area
- Stormwater **charge** discounts:
  - **25% for** properties within the Lake Worth Drainage District
  - **25% for properties for privately-maintained drainage systems**
- 100% **stormwater charge e**xemptions for some religious institutions

Existing Rate Structure and Needed Revenue Increase*:

FY 2024 Required ERU Rate = $129.24 /ERU per Year

* Required ERU Rate is determined by applying the required revenue increase to the Existing ERU Rate

Neighboring Communities Stormwater Charge Review:

- Do not offer similar discounts
- Majority do not have exemptions

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Alternative Rate Structure

Key aspects of proposed rate structure:

- Base billing Unit: Stormwater Unit (instead of ERU)
  - 1 SWU = **500 sf of impervious area**
- ***Tiered rate structure*** **for residential parcels** instead of a Uniform Charge
  - **Residential parcels over 10,000 sf of IA billed based upon their actual impervious area.**
- **Non-residential parcels billed using the property specific impervious area based SWUs**
  - **SWUs = Actual IA divided by 500 square feet of impervious area**
- **Elimination of stormwater discounts and phase-out exemptions**

Residential Tiered Rate Structure

Tier No.	Impervious Area Threshold (sf)	Median IA (sf)	Assigned SWUs
1	0 to 2,000	1,366	2.70
2	2,000 to 5,000	3,198	6.40
3	5,000 to 7,000	5,931	11.90
4	7,000 to 10,000	8,028	16.10

Assigned SWUs = Median IA divided by 500 square feet of impervious area

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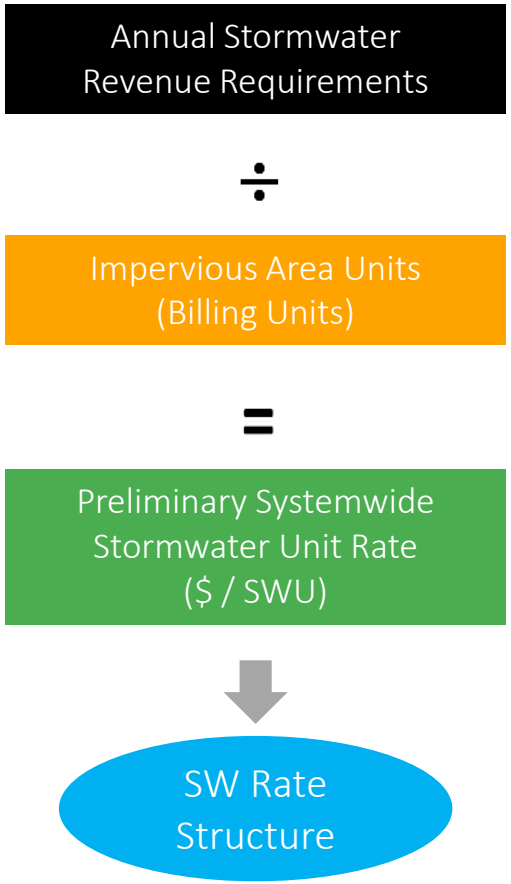
Determination of Unit Rates



	2024
How much money is needed? ($ million)	$4.42
What should the fee be based on? (SWUs)	328,722
What is the Stormwater Unit Rate? ($/SWU/Year)	13.44
How do we recover the costs from Customers?	

Note: Figures above are rounded

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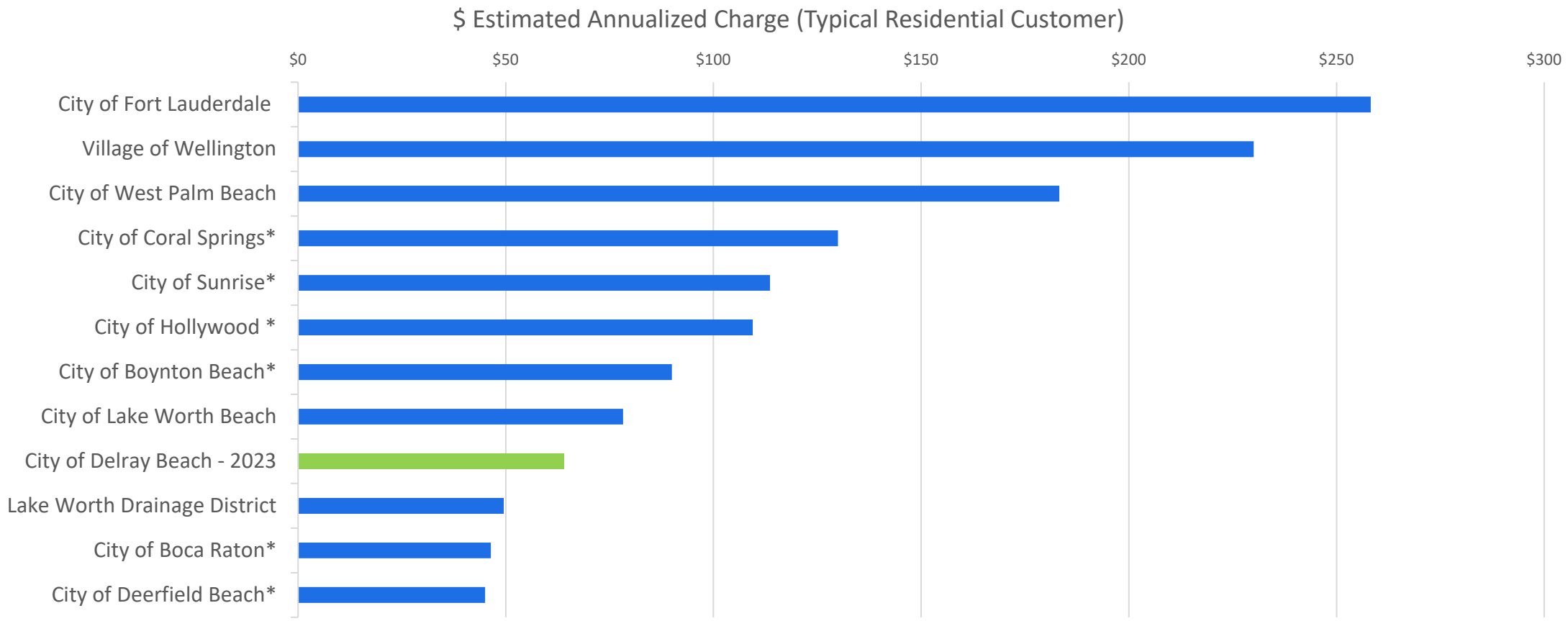
Neighboring Communities Comparison FY 2023



Notes:

* Communities that increased rates between FY 2022 and FY 2023

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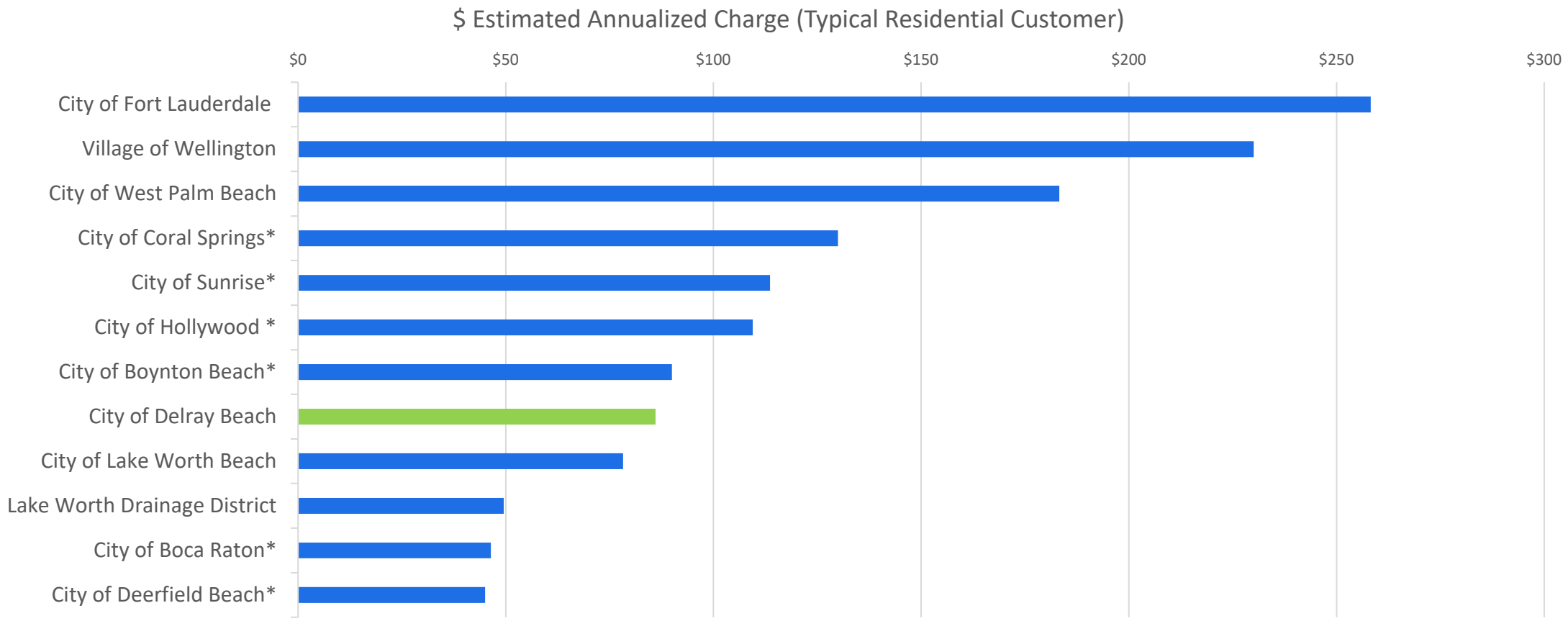
Neighboring Communities Comparison FY 2024



Notes:

* Communities that increased rates between FY 2022 and FY 2023

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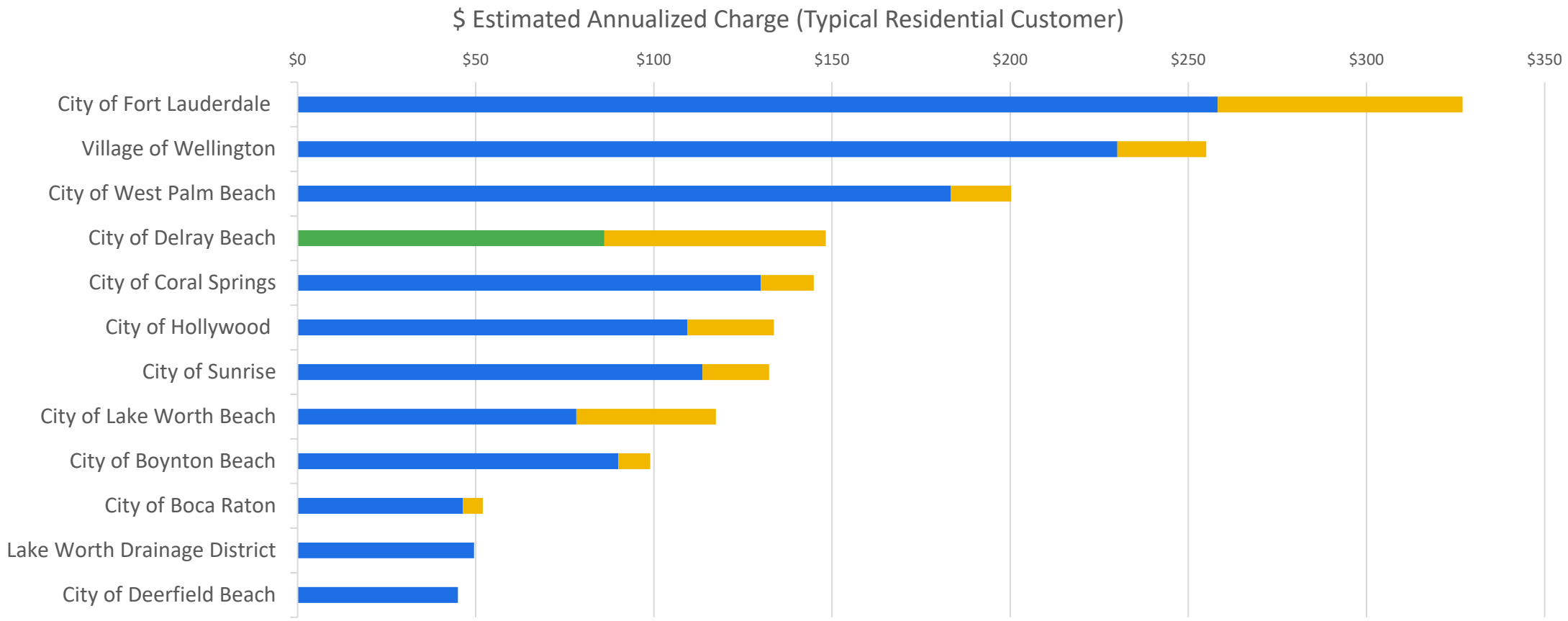
Neighboring Communities Comparison FY 2025



Notes:

* Communities that increased rates between FY 2023 and FY 2025

Benefits of Updated Stormwater Rate Structure

Reflect Current Program Needs

- Covers Operating Costs
- Provides Capacity for Capital Program Financing
- Provides Necessary Additional Resources Dedicated to Stormwater Management

Address City Stormwater Obligations & Customer Needs

- Supports Flooding Mitigation
- Enables Public Health & Safety
- Supports Neighborhood & Economic Enhancements

Defensible Policies

- Recognizes the Wide Range in Residential Impervious Area
- Establishes Reasonable Cost Recovery Approach
- Aligns with Neighboring Community charge assessment

Sustainable & Dedicated Funding

- Enables Revenue Stability
- Timely Investments in Capital Program
- Increases to Resource Capacity
- Effective Billing with Updated Billing Data

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2025 Rate Increase

- Approved Rates from May 2023 to August 2025
  - $1.12/month or $13.44/year per Stormwater Billing Unit (SWU)

- Approved Rates Effective August 2025
  - $1.93/month or $23.17/year per Stormwater Billing Unit (SWU)
  - Approximately 72% increase
  - Increased revenue by $2,957,529 (69%) from $4,292,821 (2024) to $7,250,350 (2025)

Residential Properties Tiered Rate Structure

Impact of proposed residential rate increase for parcels with less than 10,000 square feet of impervious area:

Previous SWU annual rate: $13.44/SWU

Approved SWU annual rate: $23.17/SWU

Residential Parcels > 10,000 sf of impervious area (3% of the Parcels):

- Individually calculated annual stormwater charge.
- 1 SWU per 500sqft x annual SWU rate.

Annual Charge Under Residential Tier Structure

Tier No.	Impervious Area Threshold (sf)	Parcels (%)	Current Annual Rate Fee Charge ($)	Proposed Annual Rate Fee Charge ($)	Increase in fee ($)/ Year
1	500 to 2,000	30.09%	36.29	62.53	26.24
2	2,000 to 5,000	49.20%	86.02	148.22	62.20
3	5,000 to 7,000	6.20%	159.94	275.60	115.66
4	7,000 to 10,000	3.84%	216.38	372.88	156.50

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Lessons Learned

- Exemption Requests
  - Parcels with Religious Land Use Code
  - Parcels with Agricultural Land Use Code
  - Palm Beach County Schools
  - Lake Worth Drainage District
  - South Florida Water Management District
  - Florida Department of Transportation
  - Federally Owned Parcels
- Maintaining Up-to-Date Impervious Area
- Incorrect Land Use Codes
- Residential Subdivisions with Common Area Parcels
- Condos/Timeshares with Common Area Parcels

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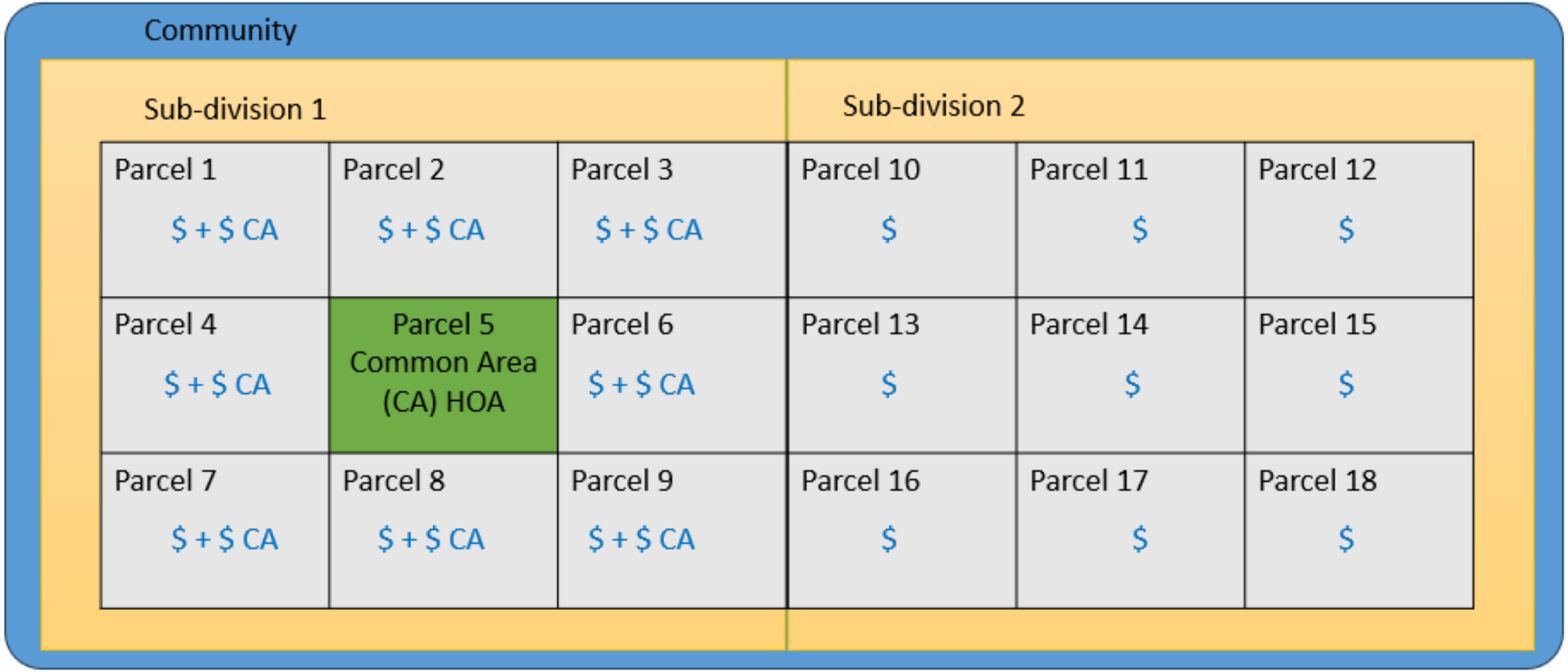
Residential Subdivisions with Common Area Parcels

The owner of residential property within a platted subdivision shall be responsible for the payment of the corresponding prorated portion of Common Elements included in the assessment of all the parcels within the platted subdivision.
(Assessment method in line with F.S. TITLE XIV Chapter 193.0235)

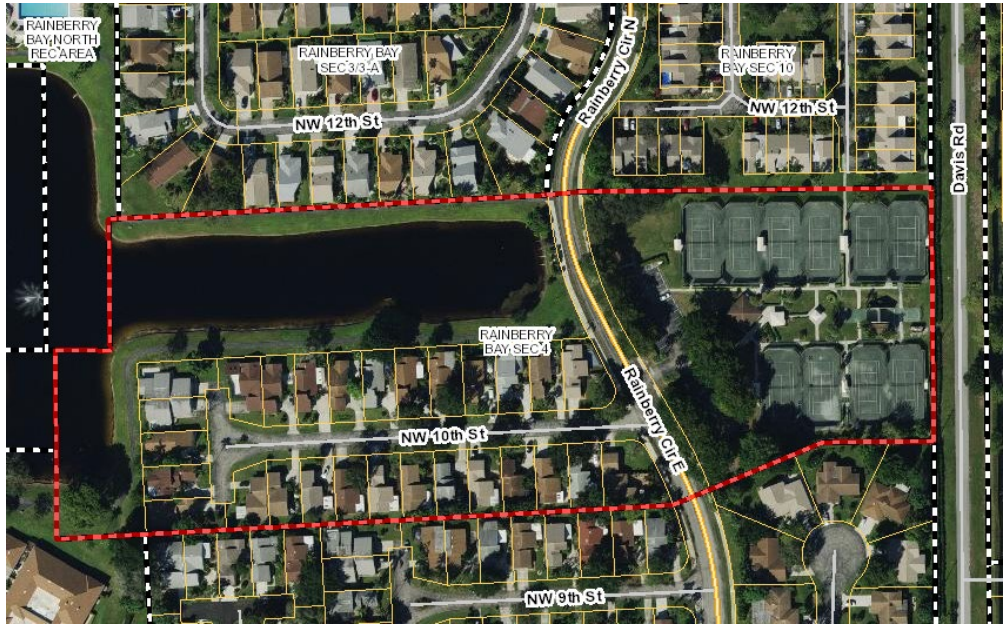
The total impervious area of the Common Elements within the respective platted subdivision shall be summed, divided by the impervious square footage of one SWU, and further divided by the number of individually owned parcels within the subdivision.

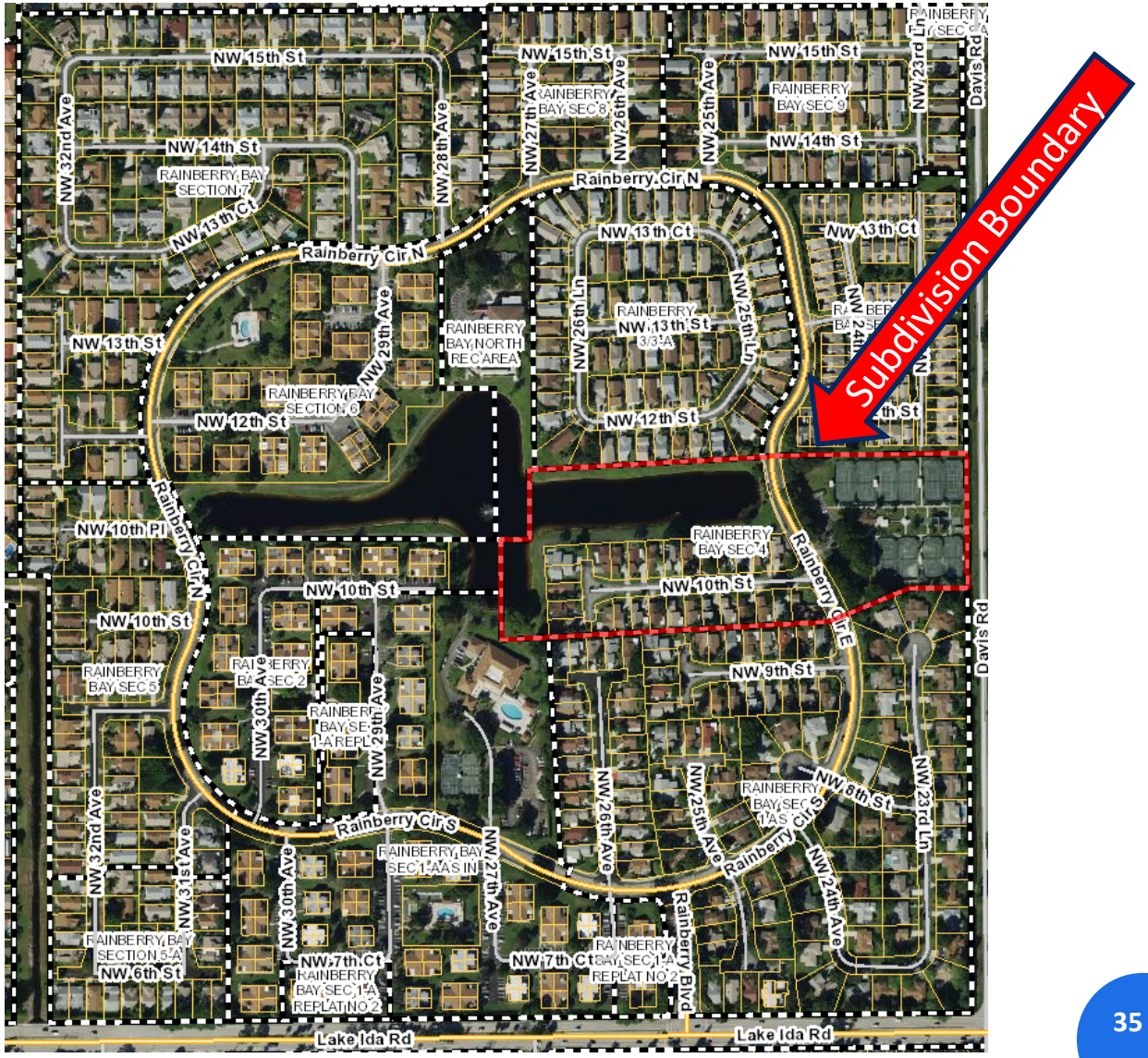
Residential Subdivisions with Common Area Parcels



Residential Subdivisions with Common Area Parcels
CASE: RAINBERRY COMMUNITY

Per Florida Statute only the parcels within the same subdivision where the common area is located will carry the prorated cost of the assessment of the common area.





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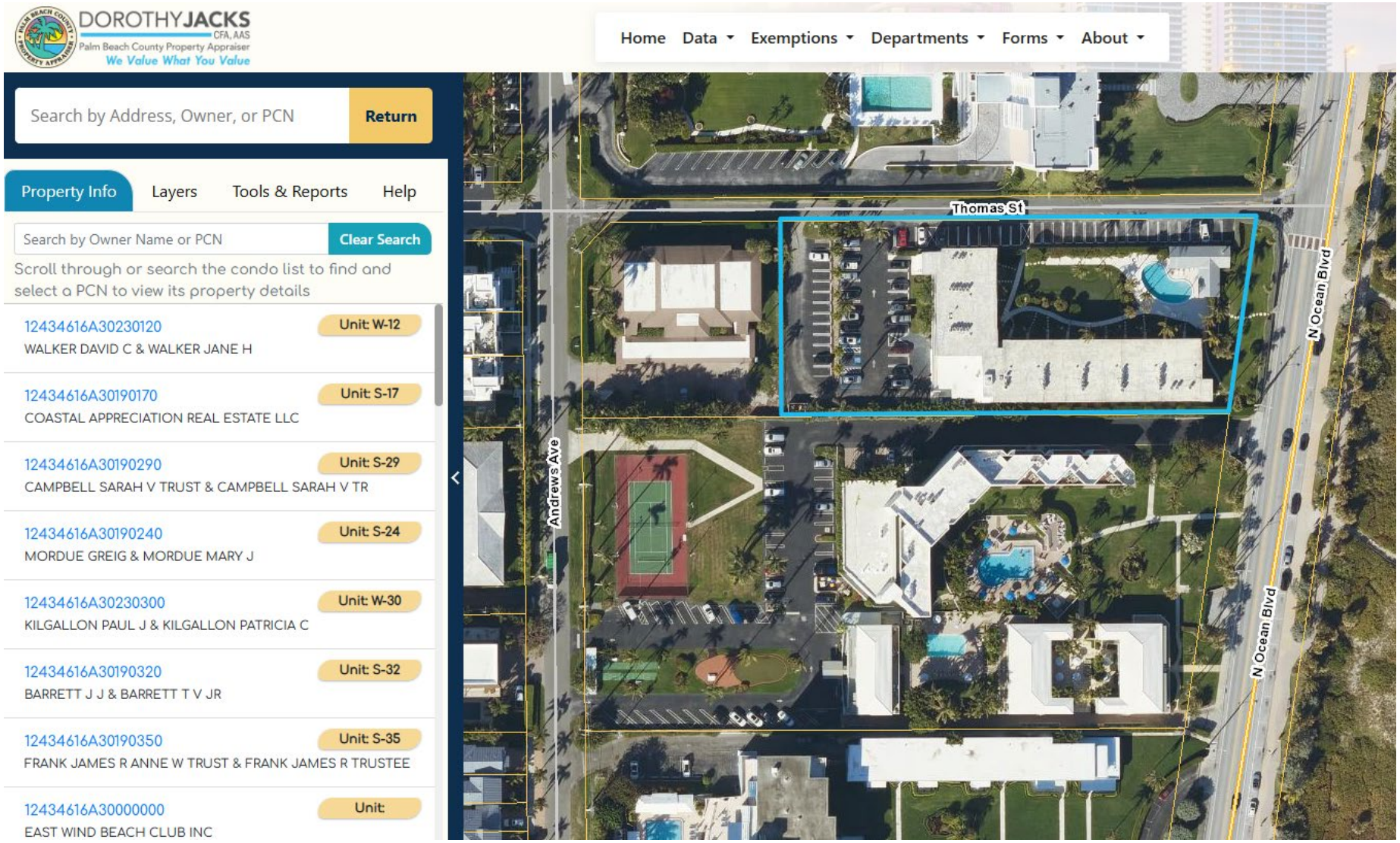
Condominiums with Common Area Parcels

- Individually Owned Condominium Units
- Building Footprint and common areas stormwater assessment is equally distributed among condo owners



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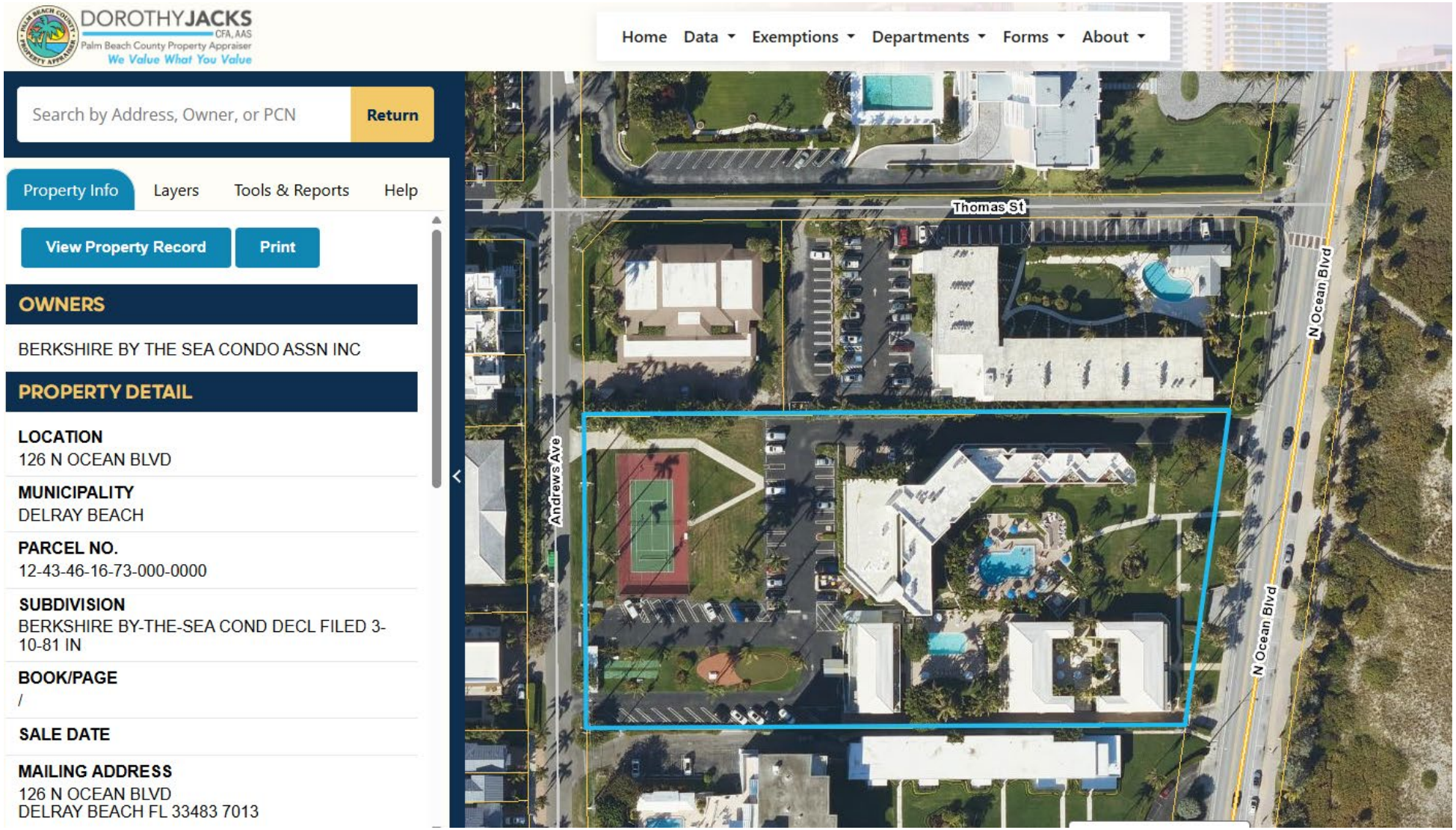
Timeshares with Common Area Parcels

- Parcel Owned by Association
- Time Share holders
- Association gets the bill for the stormwater assessment



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Thank you!

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