



STORMWATER MASTER PLAN

PHASE 1 - Review and Report of Current Conditions

Thursday, July 25, 2024



Meet Our Presenters



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Presentation Agenda

- Introduction
- Office Research
- Field Research
- Public Engagement
- Existing Conditions H&H Model
- Prioritization of Issues/Areas
- Potential Funding Sources



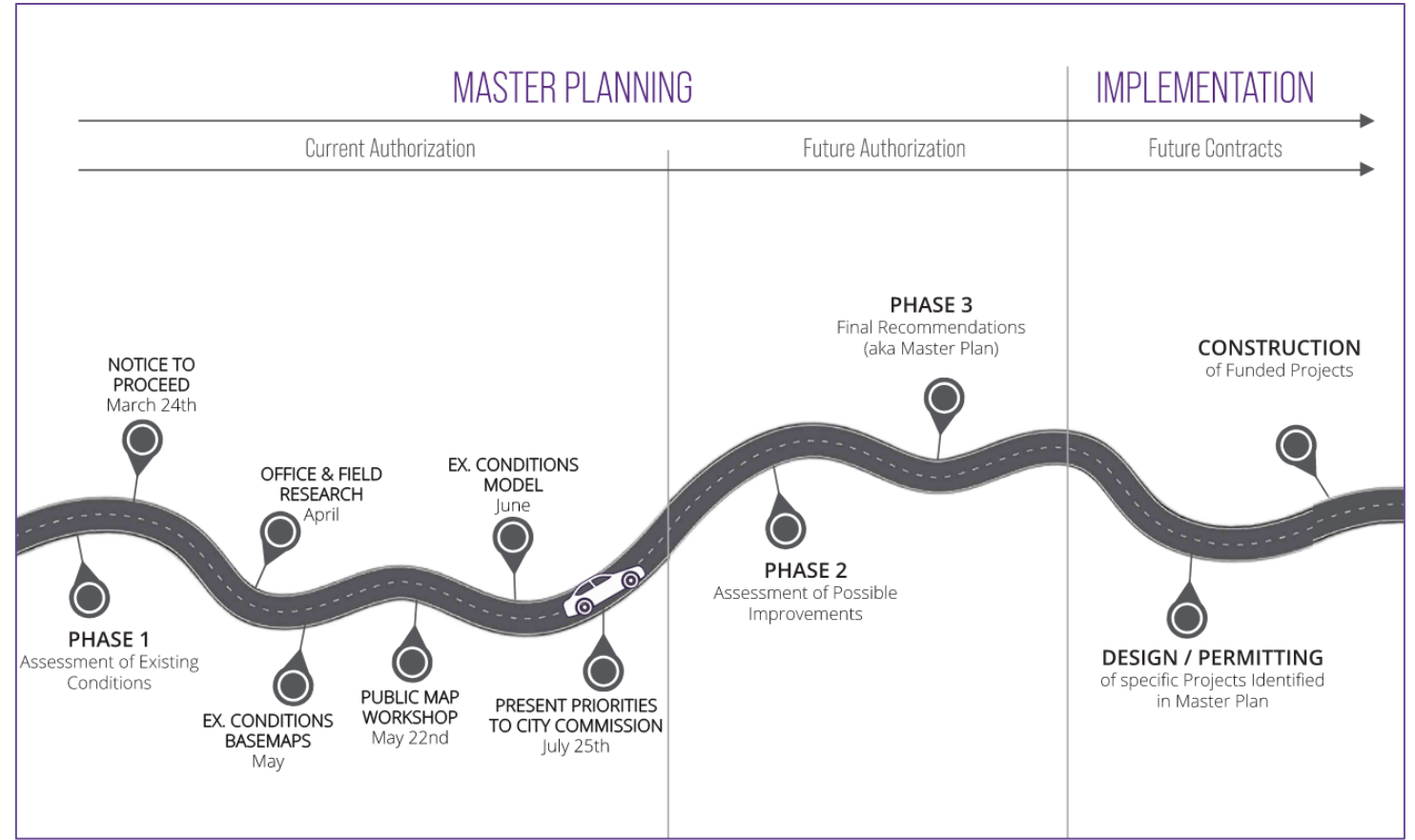
Introduction

Purpose

To identify and prioritize specific projects that help the City continue upgrading its stormwater infrastructure to stand the test of time and be adaptable.

Three phases:

- **Phase 1 – Review and Report of Current Conditions**
- Phase 2 – Assessment of Possible Improvements to Mitigate Flooding
- Phase 3 – Review, Revision, and Redevelopment of the City Stormwater Master Plan



scope – Phase 1



Office Research



Field Research



Public Engagement



Existing Condition H&H Model

GOALS— Phase 1

1. Define priority issues and areas for establishment of Phase 2 roadmap
2. Develop recommendations for minor enhancements
3. Identify opportunities for grant funding

Office Research

Summary Of Efforts



RESEARCH



COLLECTION



REVIEW

OF EXISTING DATA SOURCES

Prior projects

PROJECT	YEAR	IMPROVEMENTS
Custer's Palm Harbor Subdivision – Unit II	1993	Swales, berm, rock wall along ICW, pipe culvert under Palm Dr
Santa Maria Del Mar Church	1998	Wet pond, bleed down pipe to overflow weir
North Flagler Avenue Paving and Drainage Improvements	2000	New swales, inlets, pipes, connected to existing system
Cedar Island Subdivision	2001	New curb and gutter, into wet ponds
Mirror Lake Watershed Improvements	2009	New swales, trench drains, inlets
Palm Island Subdivision Stormwater Improvements	2010	Swale and driveway improvements, new dry pond
Venice Park Subdivision Stormwater Improvements	2010	Swale and driveway improvements, new outfalls into canals
CRA Utility Undergrounding, Streetscape & Stormwater Improvements	2010	New curb and gutter, inlets, exfiltration trenches
South Flagler Avenue (SR 100 to 7th ST. South) Stormwater Improvements	2010	New curb and gutter, swales, inlets, and connecting pipes

Prior projects continued...

PROJECT	YEAR	IMPROVEMENTS
Palma Vista Subdivision Stormwater Improvements	2012	Swale and driveway improvements, new outfall to wetlands
S. Flagler Ave. (9th ST. to 13th ST. South) Stormwater Improvements	2015	New roadside inlets, pipes, trench drains
Ocean Palm Subdivision Stormwater Improvements	2017	New swales, new outfall to ICW, enhanced existing outfall
FY 2022/2023 Stormwater Modifications	2022	Swales replaced with pipe along S. Flagler

*Not guaranteed to be a comprehensive list of projects/improvements completed across the City.

Prior Studies

- STORMWATER MASTER PLAN, 2002
- STORMWATER MASTER PLAN UPDATE, 2009
- STORMWATER SYSTEMS EVALUATION AND RECOMMENDATION, 2020
- HOUSE BILL 53 STORMWATER NEEDS ANALYSIS, 2022
- REVIEW OF CUSTER'S PALM HARBOR, THE GARDENS, & PALM HARBOR SUBDIVISIONS, 2023

STORMWATER MASTER PLAN, 2002

PRIORITY	PRIORITIZED PROJECT	SCOPE
1	Mirror Lake Watershed	Construction of stormwater ponds and swales, raising elevation of portions of roadway, construction of berm along shoreline of ICW to eliminate surge
2	Venice Park Subdivision	Installation of swales and new dry ponds
3	Palm Island Subdivision	Raising portions of roadway, installation of swales and shallow ponds to discharge to existing pipes
4	South Flagler Avenue near the Fire Station	Connection of low areas of roadway to existing ponds with swales and pipes, raising roadway elevation
5	Ocean Palm Subdivision	Dredging and expansion of existing ponds in golf course, connection of each pond to ICW

STORMWATER MASTER PLAN Update, 2009

PRIORITY	PRIORITIZED PROJECT	SCOPE
1	Venice Park Subdivision	Not addressed after 2002 Plan. 1. <i>Construction of new swales, ponds, outfalls.</i> 2. Construction of curb and gutter with curb inlets and acquisition of 3 properties for new wet ponds
2	South Flagler Avenue Near Fire Station	Addressed in 2008 project, problems identified in 2002 not resolved. 1. Construction of new inlets and pipes, overbuilding roadway to raise profile. 2. <i>Those improvements in addition to new wet ponds.</i>
3	Joyce Street Area	1. <i>Construction of new swales, inlets connected to existing stormwater facilities</i> 2. Construction of new swale, inlet, pipe collection system connected to new dry pond
4	Palm Island Subdivision	Not addressed after 2002 plan. 1. <i>Construction of new swales, ponds, outfalls.</i> 2. Construction of curb and gutter with curb inlets and new wet ponds
5	South Flagler Avenue (South 9th Street to South 13th Street)	1. New swales and inlets, connected to larger inlets and outfalls, dredging of outfall slough 2. <i>Construction of new wet pond, discharged through control structure</i>
6	Palma Vista Subdivision	1. <i>Construction of new swales, inlets, outfalls along all roads</i> 2. Construction of curb and gutter with curb inlets and acquisition of properties for new wet ponds
7	Ocean Palm Subdivision	Not addressed after 2002 plan. 1. Construction of new pipes and swales, upsizing existing outfalls, construction of new outfall 2. <i>Those improvements in addition to new wet pond with enhanced outfall</i>

STORMWATER SYSTEMS EVALUATION AND RECOMMENDATIONS, 2020

RECOMMENDED PROJECT	SCOPE
Venice Park Subdivision	2002 and 2009 plans addressed in 2010. Found flow through storm structures to be blocked. Annual cleaning of trench drains, periodic mowing ponds, backflow prevention devices installed on all pipe outfalls to canals
South Flagler Avenue Near Fire Station	2002 and 2009 plans addressed 2010 – 2011. Found ICW backup creating standing water. Raise elevation of roadway to min. 3.5', implement other grading improvements
Joyce Street Area	2009 plan addressed. Found improvements functioning effectively. Annual maintenance of swales, inlets, pipes, master study to develop recommendations for Hillcrest Subdivision
Palm Island Subdivision	2002 and 2009 plans addressed in 2010. Found lack of maintenance of features, standing water in dry pond. Cleaning of trench drains, maintenance of swales, installing underdrain in pond
South Flagler Avenue (South 9th Street to South 13th Street)	2009 plan addressed in 2015. Found trench drains clogged, standing water in swales, full inlets. Annual maintenance trench drains and swales, routine control pond vegetation especially around control structure
Palma Vista Subdivision	2009 plan addressed in 2012. Found standing water in inlets. Cleaning trench drains, checking backflow prevention devices and observation of them to confirm effectiveness
Ocean Palm Subdivision	2002 and 2009 plans addressed in 2017. Found overgrown vegetation in ponds. Spraying vegetation in ponds, annual cleaning of pipes and inlets
Custer's Palm Harbor Subdivision	Citizen concerns addressed in regard to Veranda Bay. Minimal effect on Custer's Palm Harbor based on sufficient retention in new development.

House Bill 53 stormwater needs analysis, 2022

- *Goals:* Enhanced drainage, abatement of flooding, reduced vulnerability to flooding impacts, improvement of water quality
- No dedicated stormwater utility, projects funded within the City's Capital Budget.
- Most projects in the 2009 Master Plan complete, remaining projects to be bid 2022.
- No Asset Management system or GIS for stormwater infrastructure
- Various critical projects and maintenance lacking necessary funding
- Strategies for new funding sources: pursuit of grants, estimated to generate \$1M for FY22-23 to FY26-27.
- Funding gap >\$28M
- City implemented a Stormwater Fee \$9.50/ERU: 2021 Revenues approximately \$518k.

Review of Custer's Palm Harbor, the Gardens & Palm Harbor Subdivisions, 2023

RECOMMENDED PROJECT	SCOPE
Custer's Palm Harbor Subdivision	Restore the western berm of stormwater pond to design grades, restore pond and swales to design grades, add formal overflow structures ponds, clean and flush collection inlets and connecting pipes contributing to the ponds
Palm Harbor Subdivision	Construction of formal system of open swales to collect runoff and route it to the ICW, use of the City-owned Custer Park as site for new stormwater management facilities
The Gardens	Further evaluation of discharge into the northern wetlands

Field research

Summary Of Efforts

- FIELD WALKTHROUGHS
 - APRIL 12TH, 2024
 - CITY AND MCKIM & CREED PERSONNEL
 - OBSERVATION, DISCUSSION, DOCUMENTATION
- LIMITED SURVEY
 - REDUCING COSTS TO CITY
 - VERIFY SELECT EXISTING FEATURES



Summary Of findings

- Field research largely verified office research
- Various outfall configurations notably different than was understood from office research alone
- City personnel and resident feedback substantiated initial opinions regarding city challenges and effectiveness of past project solutions



Public engagement

Summary Of Efforts



Online Project Hub

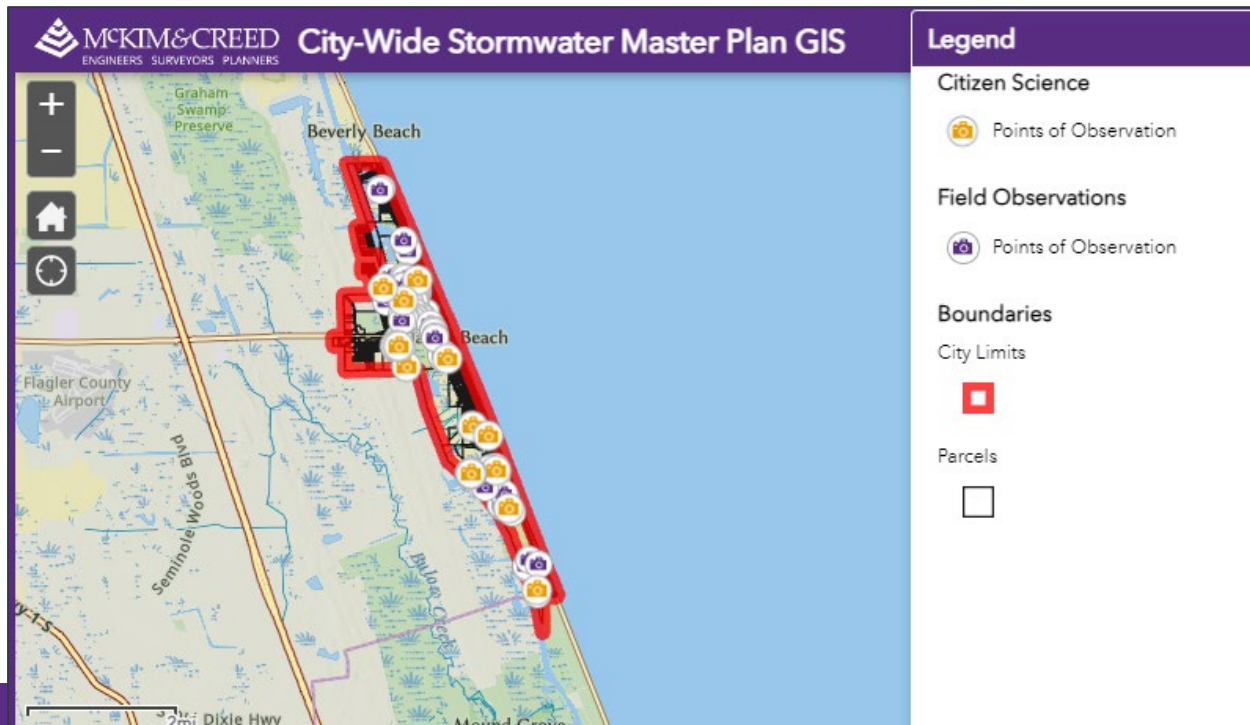


Map Workshop

Project Hub

Project Summary
Project Roadmap
Project Updates
GIS Map

Public Comment Form
Citizen Science Form
FAQ
Contact Info



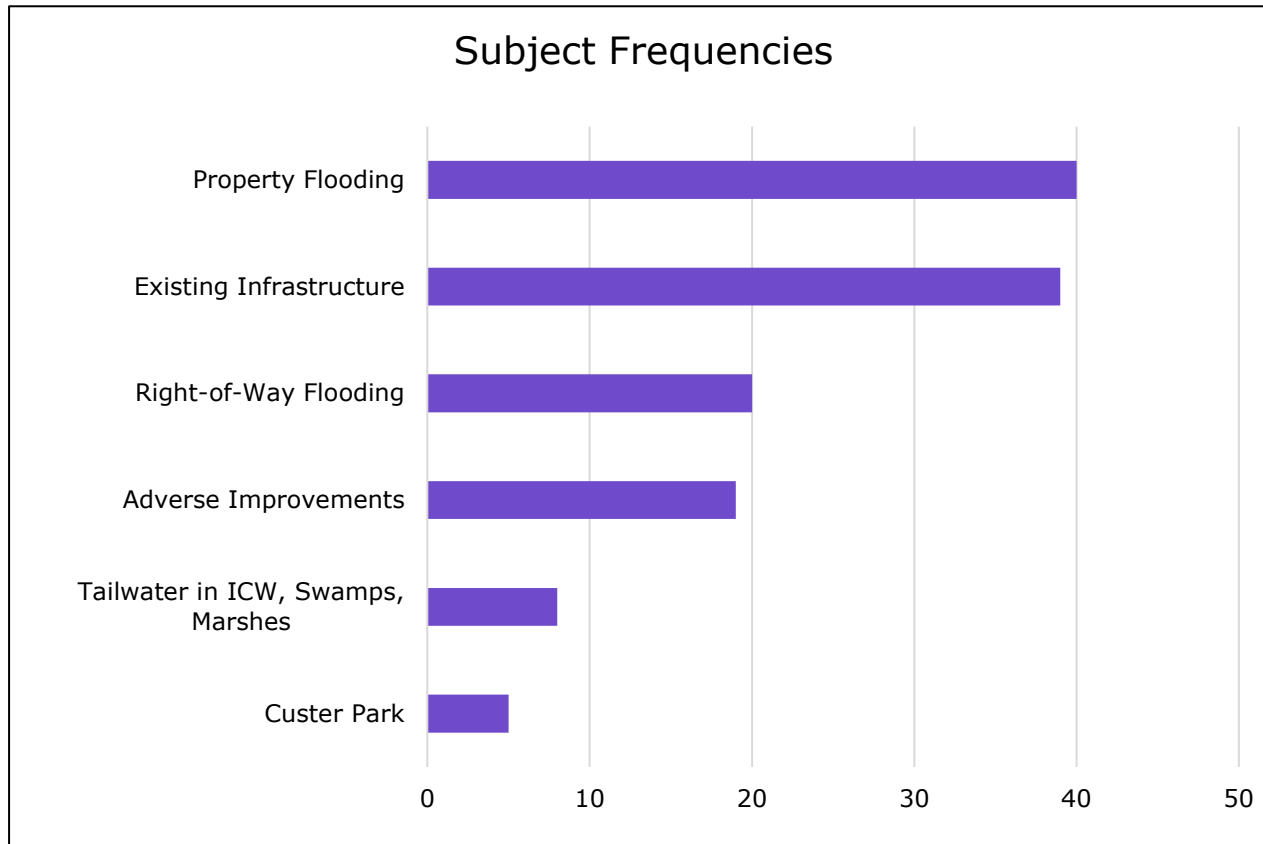
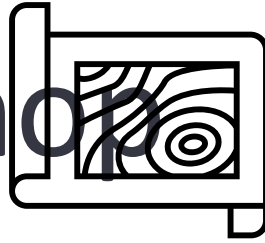
80+ Citizen Engagements

48
Public
Comments

33
Citizen
Science

<https://info.mckimcreed.com/flaglerbeach>

Map Workshop



FREQUENCY WITH WHICH COMMENTS ON PARTICULAR TOPICS WERE
RECEIVED FROM MAP WORKSHOP

- May 22nd, 2024
- Wickline Center
- Face-to-Face with residents
- Verifying preliminary model

Summary Of findings

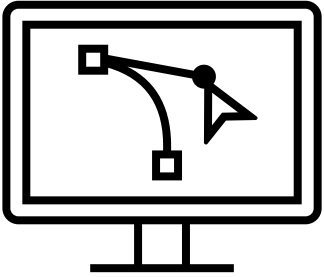
- City-wide interest and engagement
- Invaluable resident feedback
- Solidified research takeaways
- Deeper understanding of historical challenges and worsening of problem

Existing conditions H&H Model

Summary Of Efforts

- Creation of hydrologic and hydraulic (H&H) computer model to represent flood conditions during normal rainfall events
- 1.00' (NAVD) elevation of surface water in the ICW assumed based on tide gauges
- 2-YR through 100-YR, 24-hour storm models and resulting inundation mapping

Model Summary



software

- ICPR/StormWise
- Detailed representation of floodplains
- Highly utilized and respected in FL

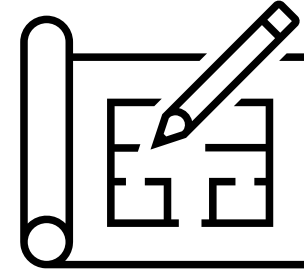
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Primary Components

- Surface Elevations
 - LiDAR
- Land Use
 - SJRWMD
- Soils
 - NRCS
- Aerial Photography
 - FDOT

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Dimensional Modeling

- 1D Modeling
 - Simplified, less detail
- 2D Modeling
 - Complex, detailed
- Our model primarily 2D with certain 1D elements

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Boundary Conditions

- Fixed water elevation of ICW
- NOAA tide gauges
- Based on “rainy day” flooding

Summary Of Results

- Creation of what is intended to be “living” model
 - Basis of future recommendations
 - To be refined and updated as process advances
 - Future verification of impacts from development
- Various means of data representation
 - Maps, reports, etc.
- Select snapshots of maps follow as examples

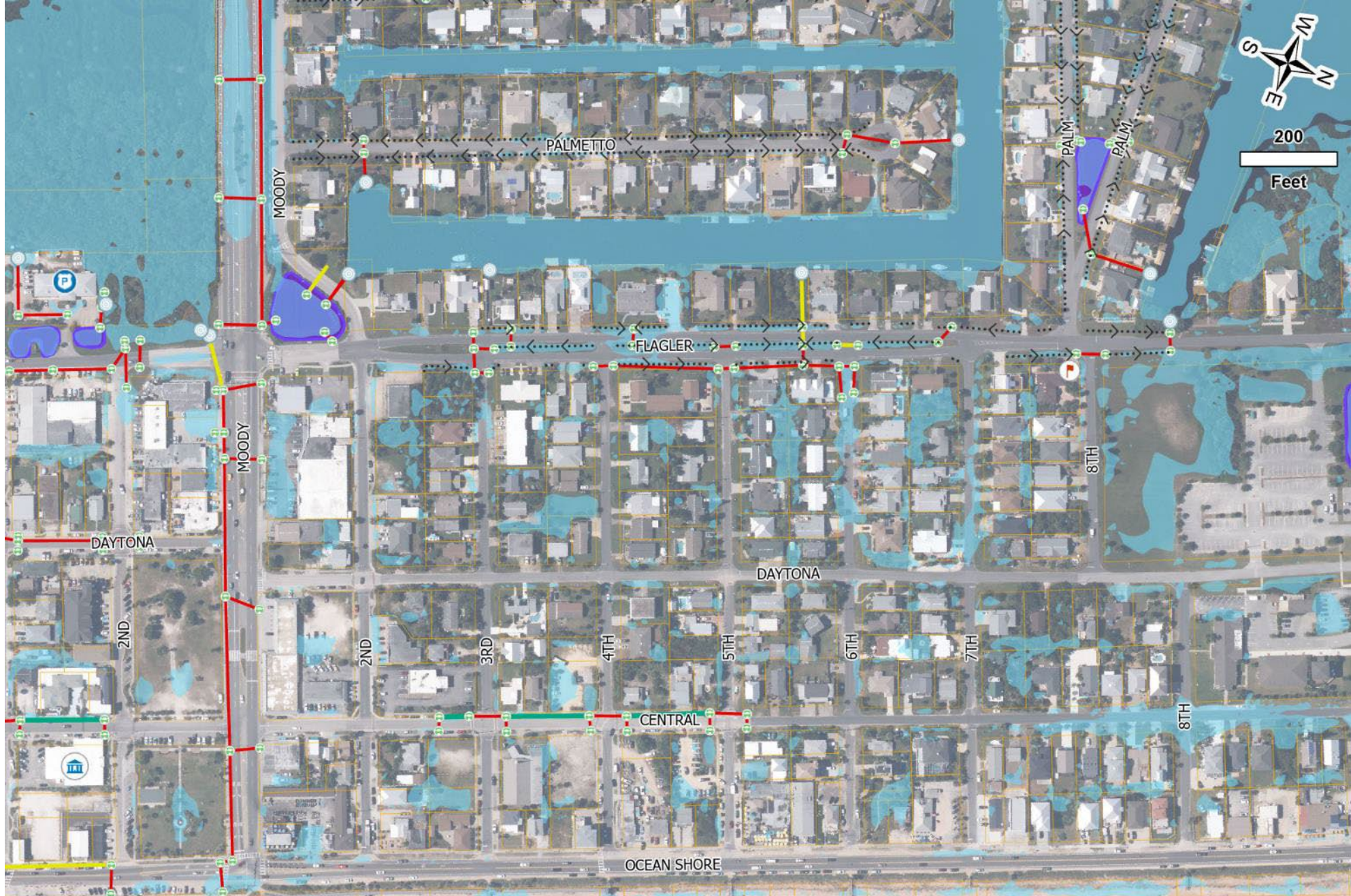
SOUTH 26TH TO SOUTH 28TH



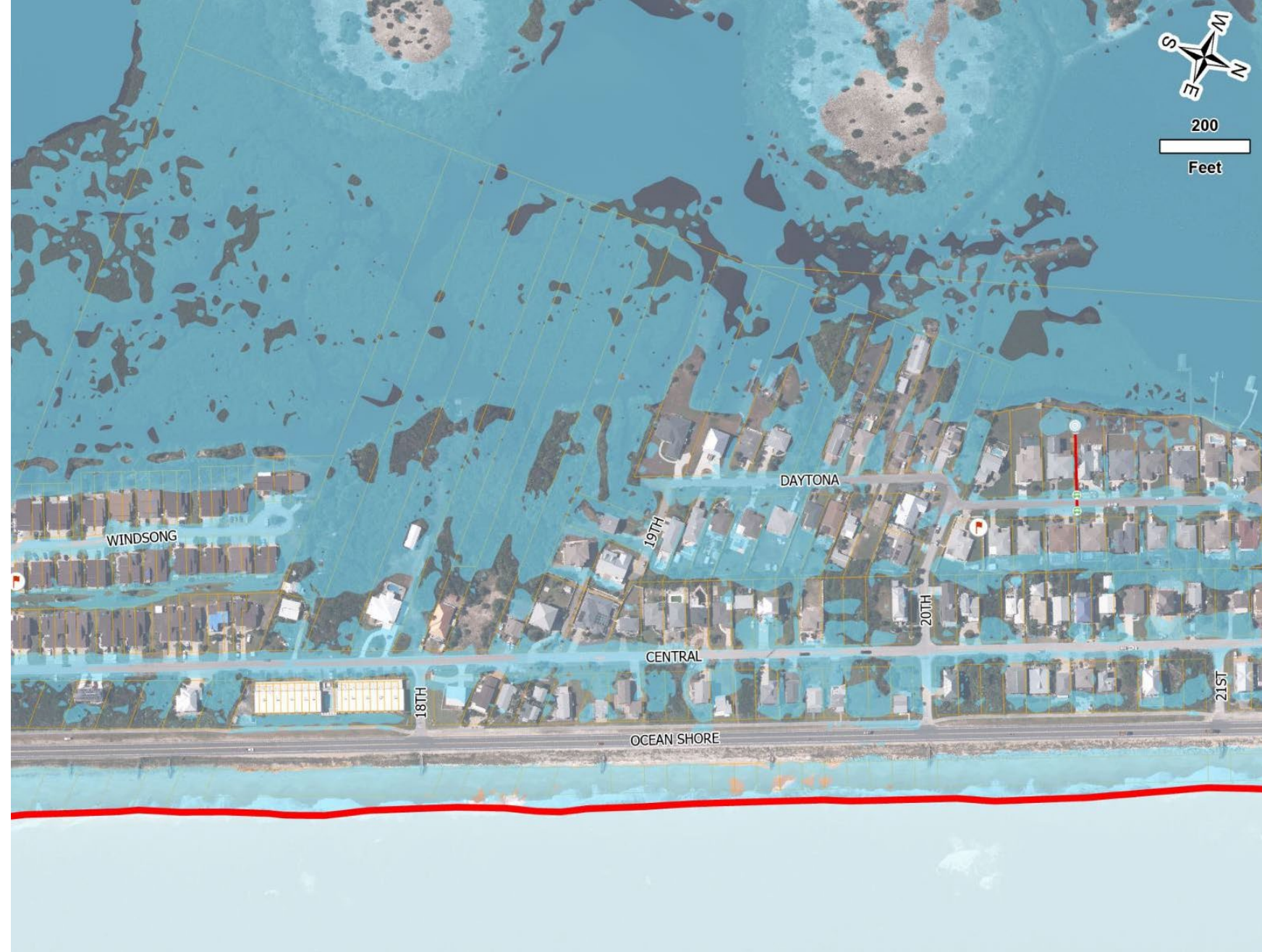
SOUTH 3RD TO SOUTH 12TH



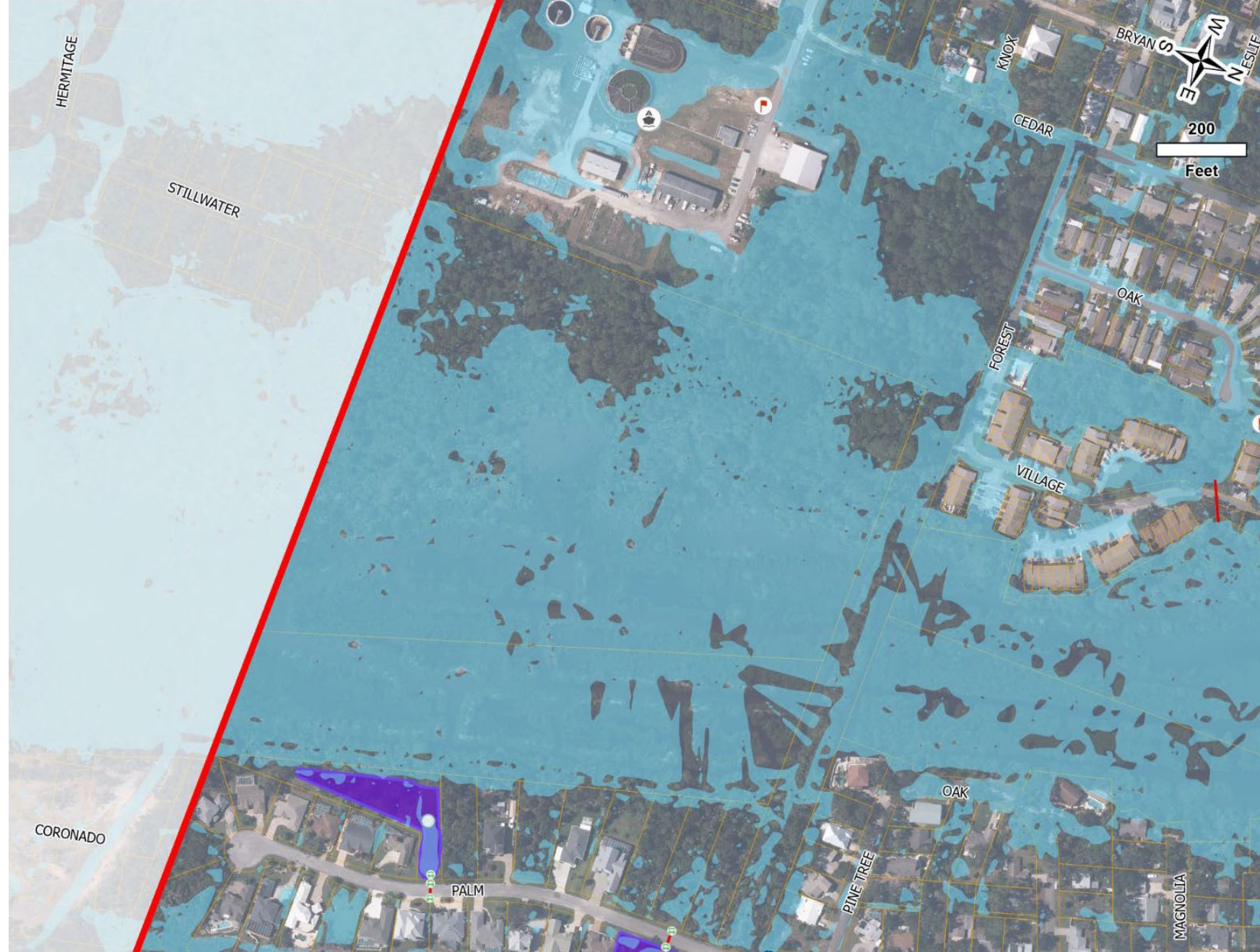
MOODY TO NORTH 8TH



North Dayton a north central



WEST OF CUSTER 'S PALM HARBOR



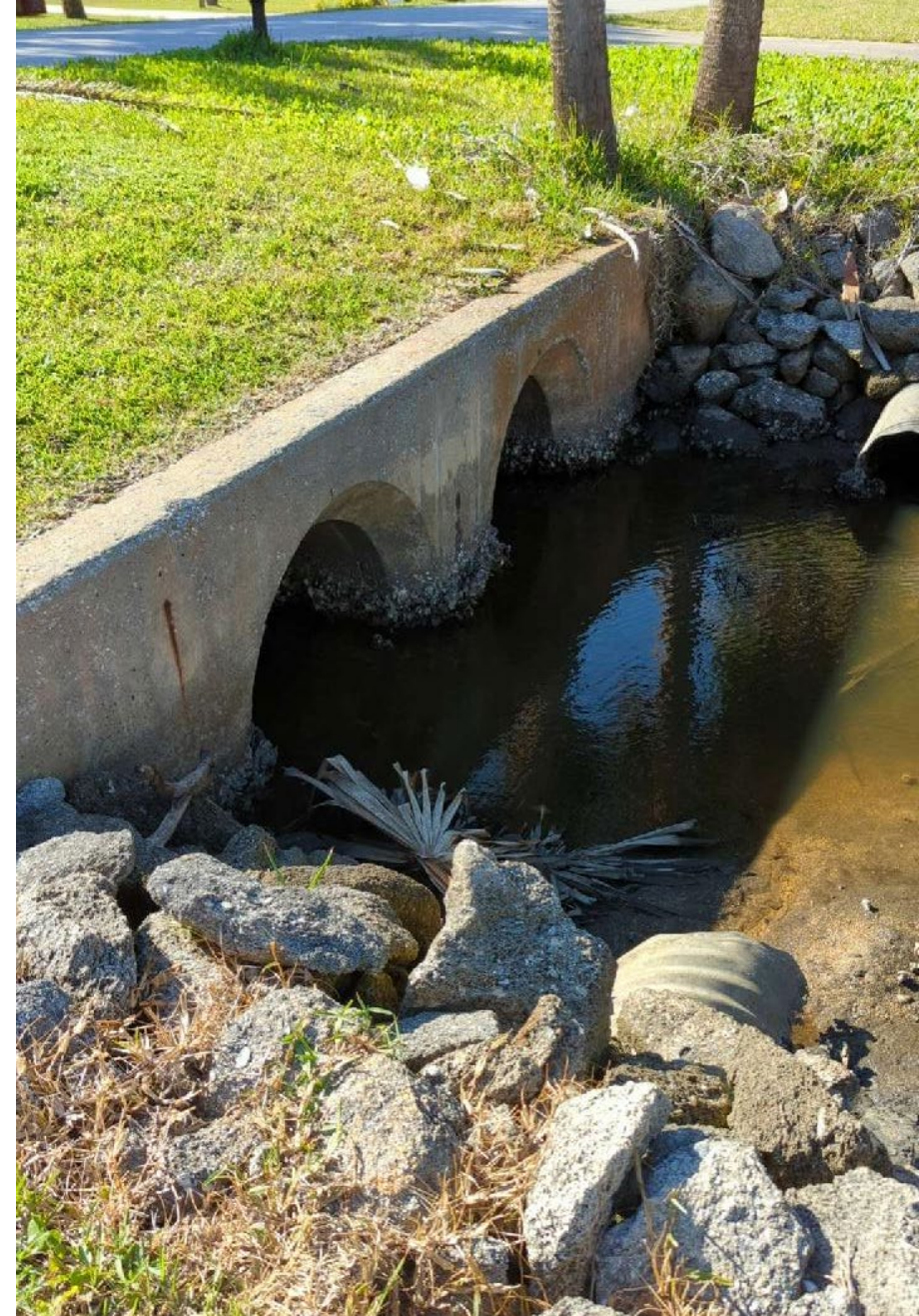
CUSTER'S PALM, PALM HARBOR, FLORIDA CUSTER PARK



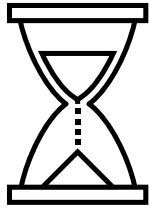
Prioritization of issues/areas

INTENT

- Build on prior efforts to resolve stormwater management issues
- Chart a new course
- Provide achievable steps forward
- Start breaking a large problem down, making it more manageable
- Identity minor enhancements to provide benefit without extended efforts
- These are NOT the final recommendations of the overall master plan.

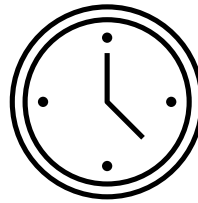


Action Groups



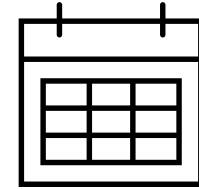
Near-Term

- Relatively easy, quick
- To slow trend of worsening issues
- To shift trend to positive results
- Necessary for effective overall effort



Shorter-Term

- Readily achievable
- May require longer time for design, permitting, funding



Longer-Term

- Require longer time to develop and implement
- Require coordination with outside parties

Near-Term Initiatives

INITIATIVE	SCOPE
Confirm Primary Objectives for Phase 2 Master Plan Project Prioritization	Robust analysis/modeling/cost estimating, define City's primary objectives
Development Code Enforcement	City-wide effort to enforce existing Land Development Regulations, esp. in Mirror Lake Watershed and for construction sites near environmentally sensitive areas
Development Code Review and Enhancement	Form a TAC to review current regulations, consider recommendations for enhancements, create cooperation among stakeholder groups
Implement No-Rise Certification Requirements	Require certification showing net zero floodplain impact for all construction on lots in 100-yr flood zones
Routine Flush and Clean of Existing Systems	Establish formal routine for flushing/cleaning existing systems

Near-Term Initiatives

INITIATIVE	SCOPE
Maintenance Clearing of Obstructions from Existing Outfalls	Clearing blocked outfall points, implementing routine maintenance
Install Backflow Prevention Devices on All Piped Outfalls	Confirm and complete installation of backflow prevention devices to piped outfalls
Retrofit Traversable Slots on Existing Collection Inlets in Roadside Swales	Install traversable slots to promote runoff flow within swales and reduce issues due to clogging
Implement Restrictions on Private Improvements within Rights-of-Way	Restrict private improvements within the right-of-way
Inventory City-owned Parcels, Public vs. Private systems, and Platted/Recorded Easements	Identify City-owned properties, create an inventory of all existing easements available to the City
Revisit Stormwater Fee	Revisit basis of Stormwater Fee amount of approximately \$9.50 per ERU to ensure it is generating enough revenue

Shorter-Term

INITIATIVE	SCOPE
North Daytona Avenue Outfall Improvements	Earthwork behind 2005 and 2007 N. Daytona to correct path from outfall to adjacent wetland
Palm Island Subdivision Pond Underdrain	Install new underdrain in dry pond for more effective recovery
Custer's Palm Harbor Acquisition and Restoration	Budget funds to restore existing stormwater system
Stormwater Asset Management Plan	Develop plan for infrastructure, beginning with a GIS-based inventory with tracking of condition assessments, maintenance scheduling/reporting, and budgeting needs

Longer-Term

INITIATIVE	SCOPE
Solicit Interest for the Sale of Undeveloped and/or Repetitive Loss Properties	Acquire parcels to be considered for future stormwater management
S. Flagler Ave. (South 9th St.to 13th St.)	Enhance existing stormwater ponds, potentially construct new pond, reprofile roadway to improve grade, measures along rear of properties to protect from tidal surge
Palm Harbor Subdivision Collection System and Custer Park Bulkhead	Seek an easement in subdivision rear and route new collection system into wetlands, install a berm/bulkhead along the waterfront of Custer Park

Potential Funding Sources

Potential Funding

- RESILIENT FLORIDA PROGRAM – GRANT
- HAZARD MITIGATION GRANT PROGRAM (HMGP)



FACTORS KEY TO SUCCESS:

- Defined project scope, GOALS, cost-benefit ratio
- Detailed application packages
- Justification of request's alignment with grant objectives
- Demonstrated collaboration with stakeholders



LOOKING AHEAD –

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CHALLENGE		STRATEGY
Lack of elevation relief for conveyance and lack of and space available for significant facilities, primarily the lower, western areas	>	Hybrid approaches to drainage. Collect/attenuate closer to the source, treat closer to the outfall
Swales, a prominent stormwater in feature in the City, are difficult to maintain and lose effectiveness over time	>	Improving and introducing a combination of open swales and pipe systems
Shallow groundwater reduces infiltration capacity, impacting water quality	>	Treatment of runoff from existing areas with new ponds where practical, and alternate options such as water quality units and baffle boxes
High tailwater reducing runoff disposal efficiency and impacting existing infrastructure	>	Innovative approaches that correct everyday drainage and flooding and lay groundwork for future efforts addressing extreme conditions

Thank you for the opportunity.

Questions

