



Wekiva Watershed Management Plan

**Final Presentation to
Board of County
Commissioners
Presentation
June 13, 2023**

Presentation Outline

- Project History to Date
- Existing Conditions and Deficiency Summary
- Floodplain Summary
- Deficiency Areas Summary
- Proposed Improvement Projects Summary
with Ranking and Costs

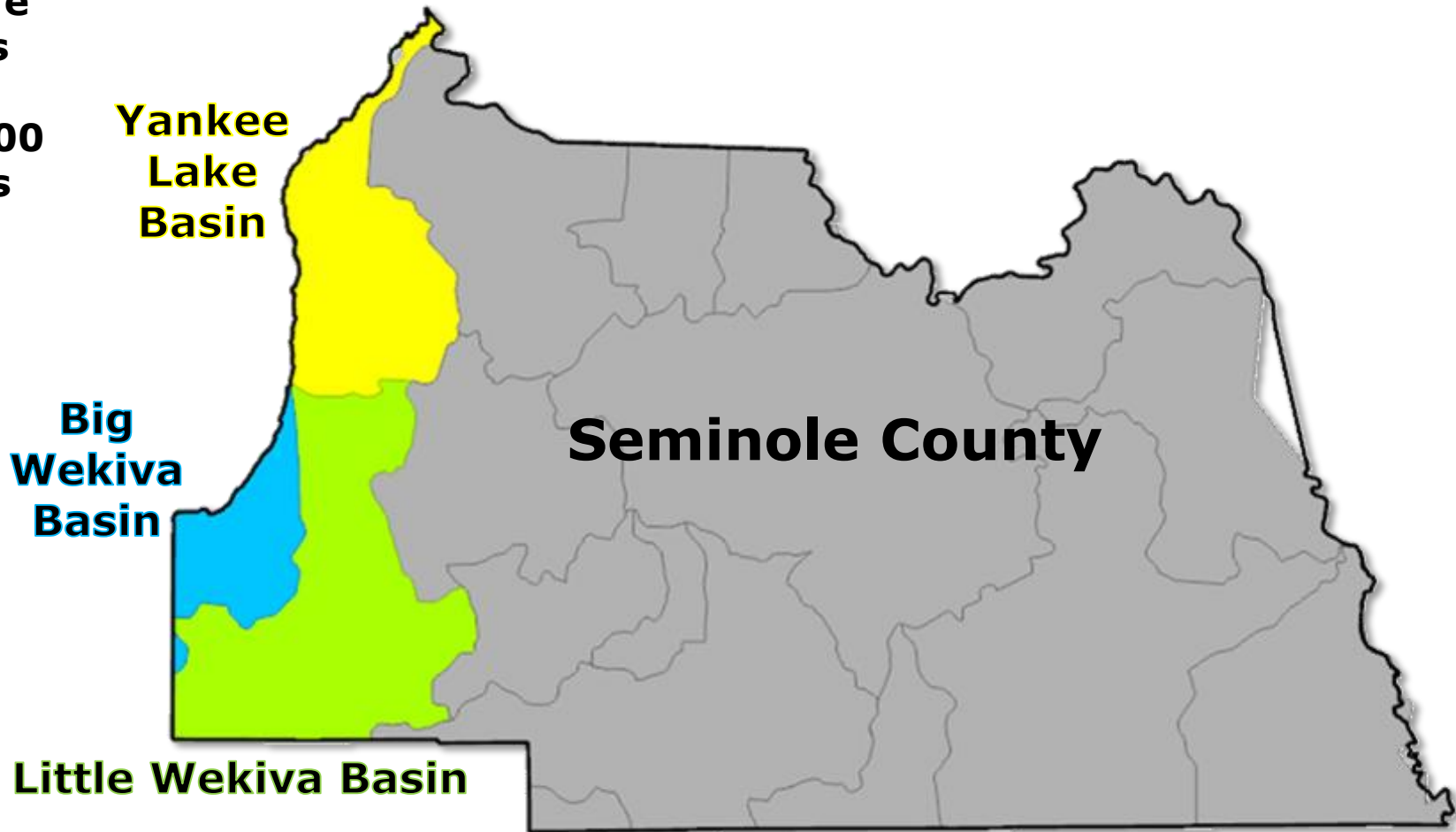
Project History

- Watershed Management Plan Phase Commenced January 2022
- Initial Public Meeting – May 3, 2022
- Initial BCC Workshop – February 14, 2023
 - *Project Background*
 - *Existing Conditions Flooding Level of Service Results*
 - *Water Quality Pollutant Loading Results*
 - *Initial Floodplain Delineation Results*
 - *Initial Deficiency Area Identification and Prioritization*
 - *Recommendations for Priority Areas to Address with Improvement Concepts*
- Final Public Meeting March 9, 2023
- Draft Final Reports Submitted May 2023
- **Final BCC Presentation June 2023**

Watershed Location

Total Area
~56.2
Square
Miles
or
~36,000
acres

WEKIVA WATERSHED



Scope of Work

- Project Initiation and Information
 - Data Compilation, Evaluation and Gap Analysis
 - Stakeholder Coordination
 - Existing Deficiency Identification
 - Field Reconnaissance, Investigation and Survey
- Existing Conditions Analysis
 - Existing Conditions Modelling
 - Infrastructure Level of Service Evaluation
 - Floodplain Delineation
 - Water Quality Assessment
- Alternative Analysis
 - Improvement Alternatives Analysis and Prioritization
 - Priority Project Concepts
- Draft, Draft-Final and Final Reports
- Public Meetings
- County Commission Workshop & Presentation



Existing Conditions Analysis

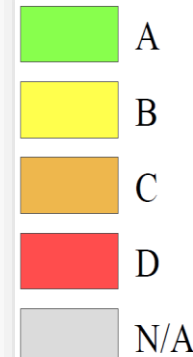
- Existing Conditions Model Assessment
 - Design Storms and Rainfall Depths
 - Hydrological Parameters (Surface Runoff Volumes)
 - Hydraulic Model Development (Conveyance and Storage)
 - Verification Storm to Calibrate Model – Irma & Ian
- Level of Service (LOS) Criteria Assignment and Evaluation
 - Develop Criteria Based on Infrastructure Type and Design Storm
 - Type – Storm Sewer / Culvert 10 Year Storm, Outfall Channel / Stormwater Pond 25 Year Storm
 - Road – Local 10 Year Storm, Collector 25 Year Storm, Evacuation 100 Year Storm
 - Habitable Structures – 100 Year Storm
- Floodplain Assessment
 - Evaluate Using Combination of 100 Year 24 and 96 Hour Storms
 - Assess Road and Structure Impacts
- Water Quality Assessment
 - Pollutant Load Hot Spot Analysis
 - Compare to Existing Surface and Ground Water Quality Data



LOS Assessment Results

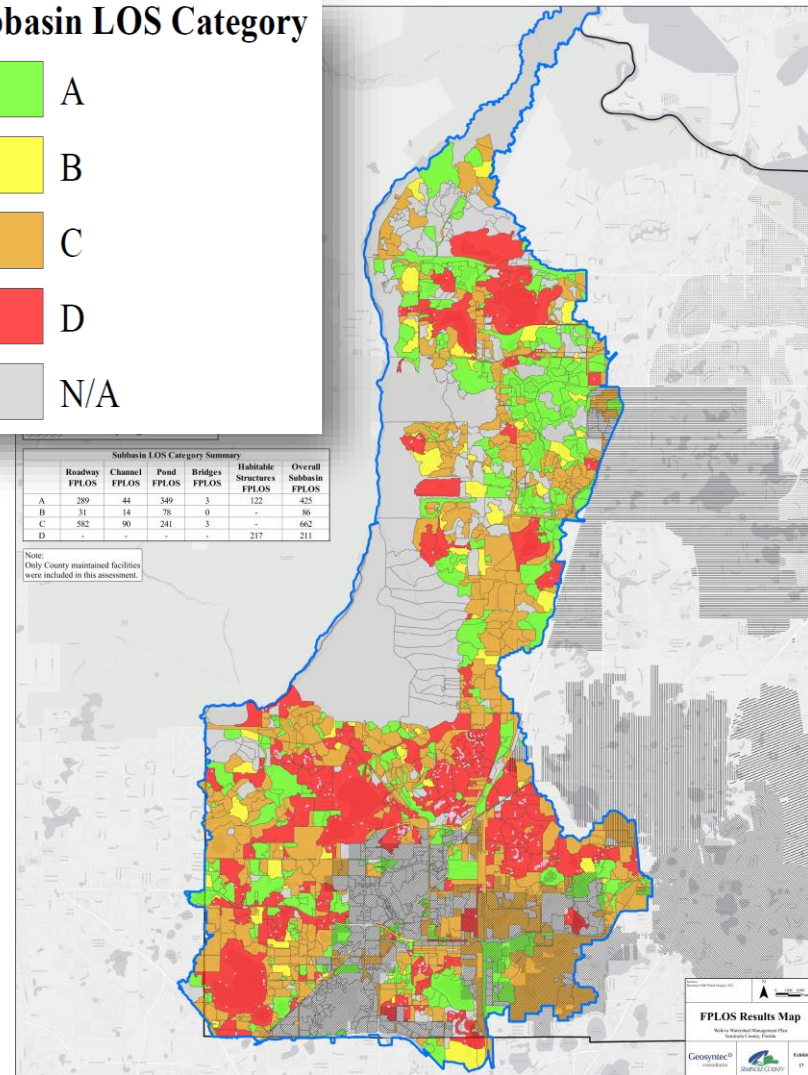
- Unincorporated Areas and County Maintained Roads
- Infrastructure
 - Roadways
 - Storm pipe systems
 - Local / Collector / Arterial
 - Evacuation Routes
 - Channels
 - Stormwater Ponds
 - Bridges
- LOS A, B, C, D Designations
 - Potential Structure Flooding = LOS D
 - LOS Grades of C & D Warrant Consideration for Improvements

Subbasin LOS Category



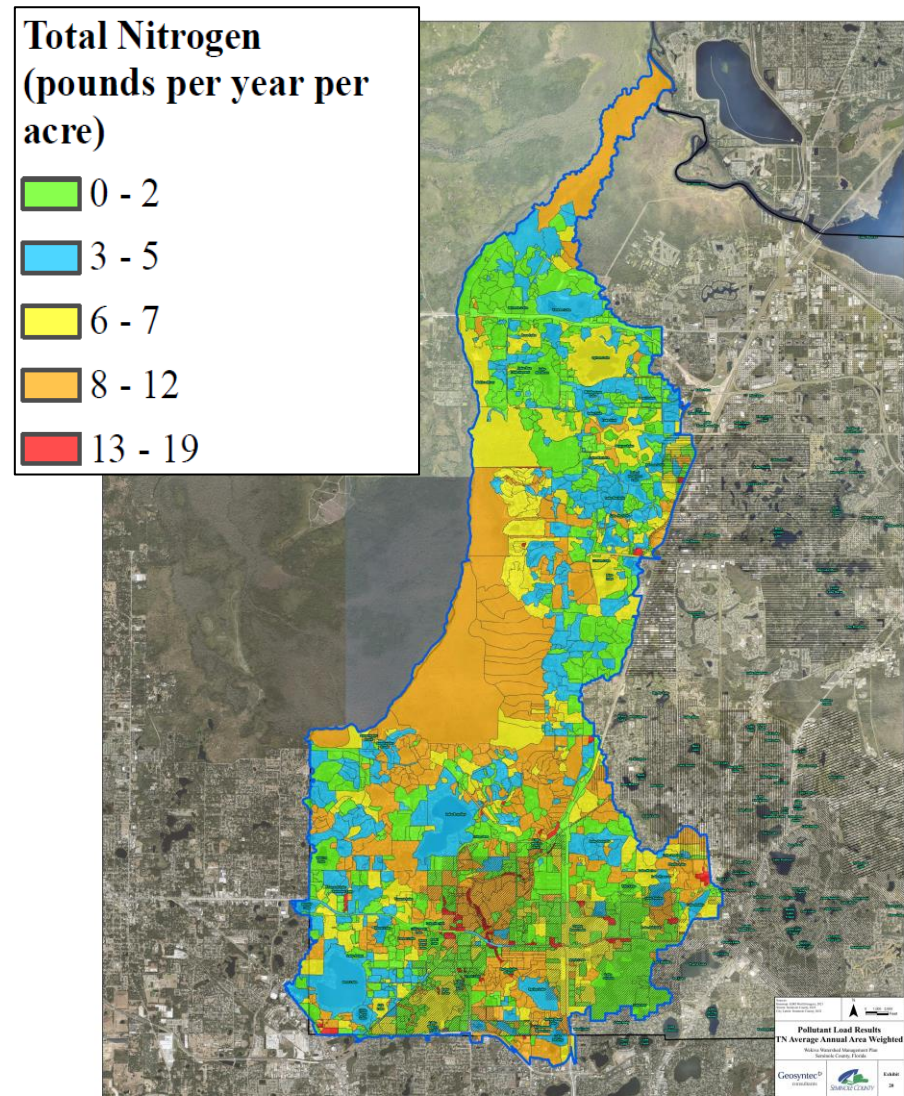
Subbasin LOS Category Summary					
	Roadway FPLOS	Channel FPLOS	Pond FPLOS	Bridges FPLOS	Habitable Structures FPLOS
A	289	44	349	3	122
B	31	14	78	0	-
C	582	90	241	3	-
D	-	-	-	-	217
					Overall Subbasin FPLOS
					425
					86
					662
					211

Note:
Only County maintained facilities
were included in this assessment.



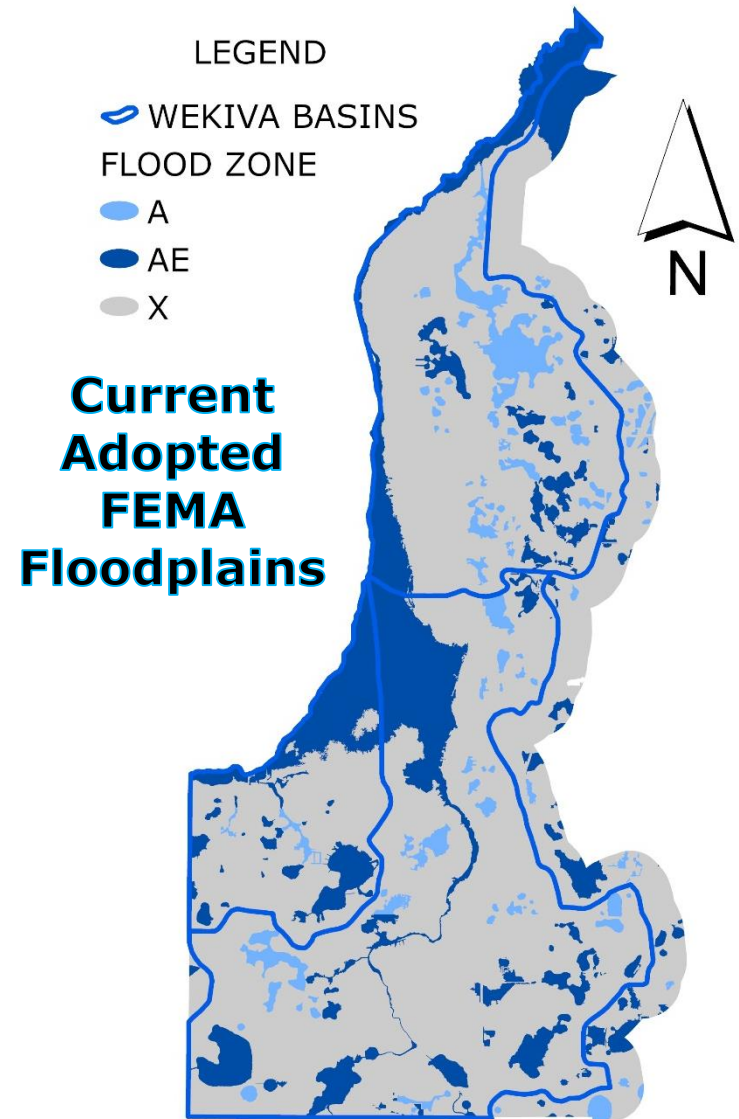
Pollutant Load Assessment Results

- Annual Loading Model
- Identify Hot Spots for Pollutants [Nutrients]
- Spatial Comparison to Impaired and Sensitive Waters
- Supports Identification of Target Locations for Improvement Projects



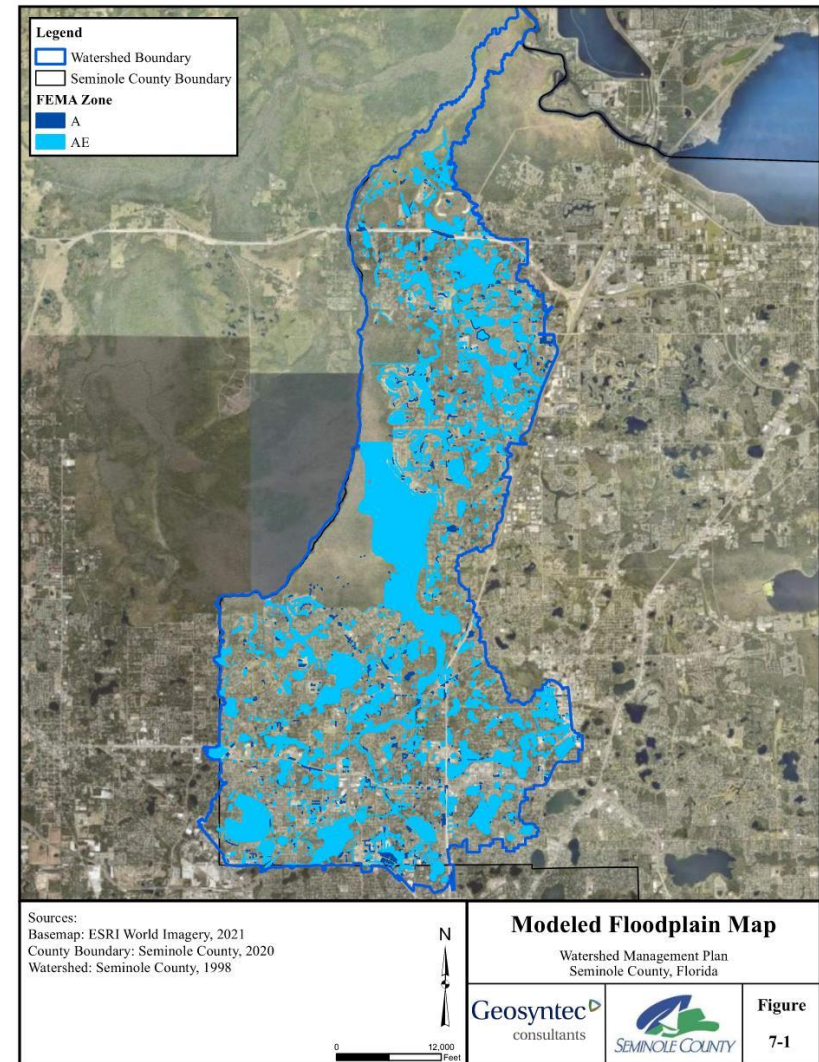
Watershed Characteristics - Floodplains

- FEMA Floodplains
- Used for Flood Insurance
- 2007 Most Recent Mapping
- Flood Hazard Zones
 - A = No Base Flood Elevation Determined*
 - AE = Base Flood Elevations Determined*
 - X = Areas Outside 1% Annual Chance (100 Year) Flood*
- Floodplains Currently Focused on main conveyances (Little Wekiva River, etc.), lakes and larger depressional areas
- Many Flood Prone Areas Not Currently Mapped



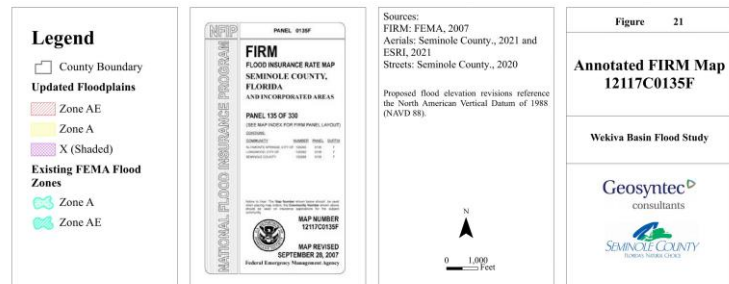
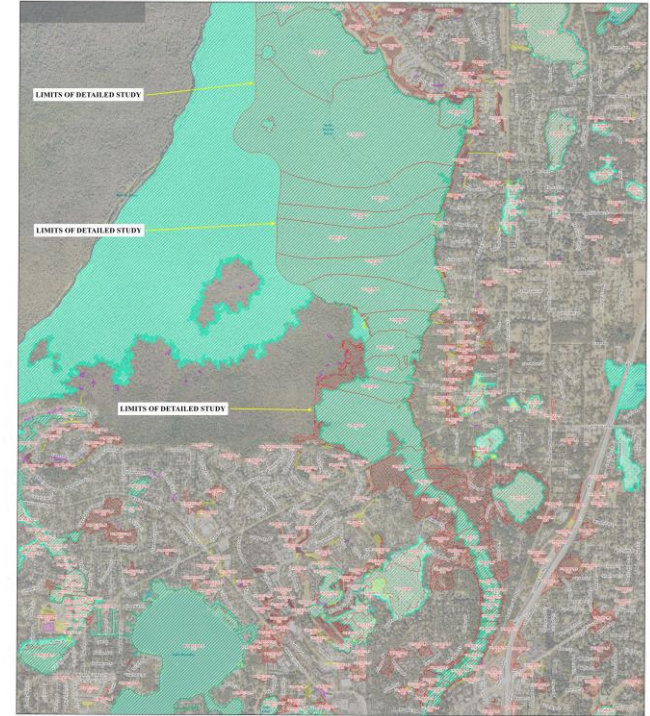
Floodplain Assessment Results

- Updated based on more recent and detailed data
 - Topography
 - Survey Data
 - Detailed Modeling
 - New Development
- Modeling Based on 100 Year / 96 Hour Storm Event Simulation
- Determined base flood elevations
- Floodplain Area Comparison
 - Modeled 8,311 acres
 - Existing FEMA = 6,561 areas
 - 26.7% Increase



FEMA Letter of Map Revision Package

- Package Containing Data Necessary to Submit to FEMA for Floodplain Map Revisions for Watershed
- Requires Sign-off from Cities where shared Floodplains
- BCC Approval to Move Forward with FEMA Submittal
- Requires Public Notice



Impact of New Floodplains

Floodplain Change Impact Statistic	Unincorp. Parcels*	Unincorp. Buildings**	City Parcels*	City Buildings**
Total in Watershed	29,863	26,453	14,625	7,912
Total Existing FEMA Floodplains	3,827	~928 ~915 residential ~13 commercial/other	1,175	~274 ~181 residential ~93 commercial/other
Total Proposed New Floodplains	6,618	~1,111 ~1063 residential ~48 commercial/other	2,687	~612 ~491 residential ~121 commercial/other
Added with New Floodplains	3,386	~784 ~742 residential ~42 commercial/other	1,743	~448 ~375 residential ~73 commercial/other
Removed from FEMA Floodplains	595	~601 ~595 residential ~6 commercial/other	231	~110 ~65 residential ~45 commercial/other

* Based on any portion of GIS parcel intersecting a floodplain

** Based on GIS building footprint extent intersecting floodplain, not confirmed by finished floor elevation

Project Ranking Prioritization Criteria

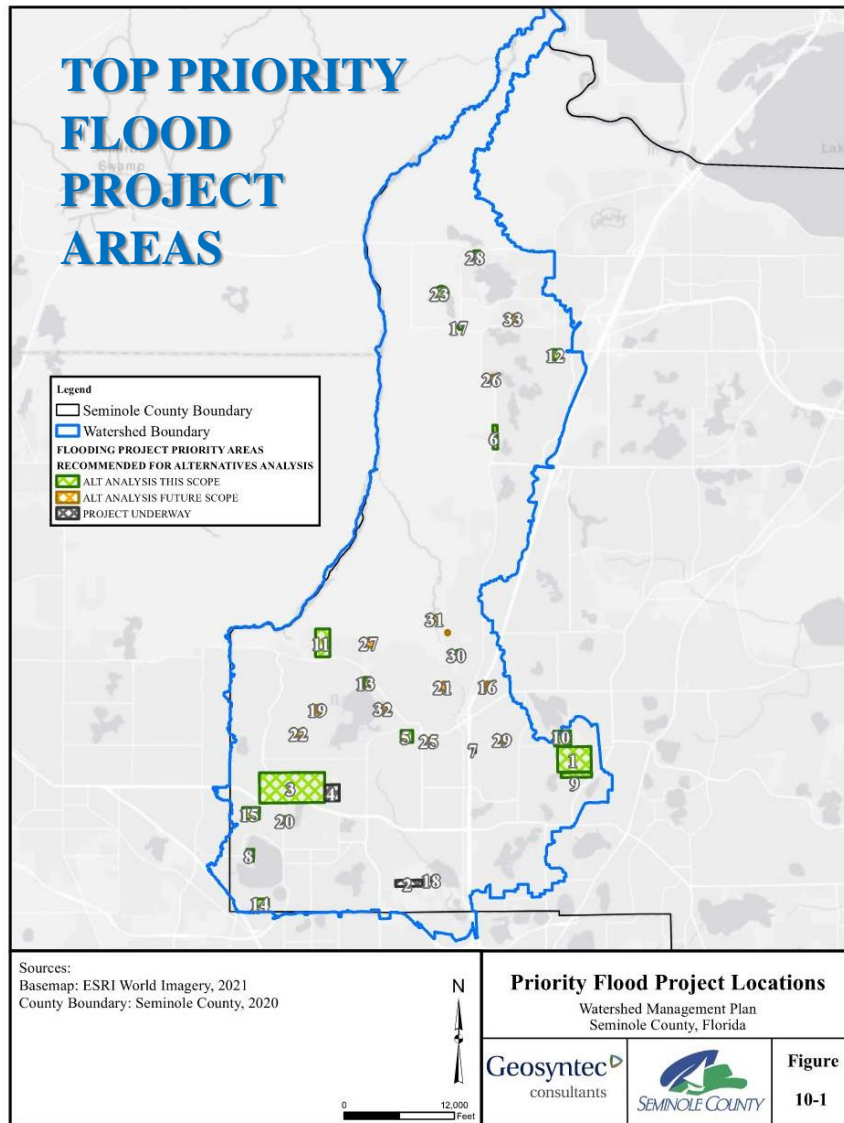
- Flooding Projects Ranked by:
 - *County Staff Input on Observed Problem Areas (incl. Irma & Ian)*
 - *Public Input on Observed Problem Areas*
 - *Flood Assessment Model Results*
 - LOS Grade from Hydrological & Hydraulic Modeling
 - Proximity to Delineated Floodplains
 - Apparent Structure Impacts from Modeling
 - *Documented Problem Areas*
 - 2018 County Stormwater Master Plan
 - Identified Complaint
 - Reported Storm Impact (Fay, Irma, Ian)
- Water Quality Project Ranked by:
 - *Proximity to Impaired Waters or Sensitive Water Resources*
 - *Results of Pollutant Load Assessment*
 - *Areas without Current Water Quality Treatment*
 - *2018 County Stormwater Master Plan*

Improvement Project Alternatives Analysis

- Improvement Alternatives Analysis
 - *Prepare Improvement Concepts*
 - Model Evaluation for Flood Reduction and Water Quality Improvements
 - *Prepare Cost-Benefit Projections*
 - *Implementation Feasibility Considerations*
 - Met with SJRWMD to Determine Permitting Requirements
 - Constructability
 - Easements / Right-of-Way
 - Maintenance Burden
 - Water Quality Benefit
 - Public Acceptance
 - *Support Future Next Steps*
 - Seek Grant Funding
 - Final Design Permitting



Final Ranked Flood Projects



CONSOLIDATED PROJECT NAME	FINAL PROJECT PRIORITY	# PROBLEMS IN CONSOLIDATED PROBLEM AREA
SANLANDO SPRINGS - NORTH STREET TO LAKE FLORIDA	1	14
HILLVIEW DRIVE	2	9
TRIBUTARY C - HUNT CLUB TO LAKE BRANTLEY	3	9
TRIBUTARY C - LAKE HARRIET ESTATES	4	9
MOBILE MANOR	5	6
MARKHAM WOODS RD NEAR TIMBERBROOK & BRIDGEWATER	6	5
OLIVER AVE, BAKER ST, ARTHUR ST - SANLANDO SPRINGS	7	4
CECELIA DRIVE AT BEAR LAKE	8	4
MAGNOLIA STREET 427 TO LAKE FLORIDA	9	4
ROLLING HILLS	10	4
RIVERBEND BOULEVARD AND SWEETWATER BOULEVARD AREA	11	4
BANANA LAKE ROAD	12	4
CUTLER ROAD	13	3
BEAR LAKE WOODS	14	3
BEL AIRE HILLS	15	3
LAKE OAKS BLVD	16	3
MARKHAM RD AT LAKE MARKHAM RD	17	2
SPRING VALLEY LOOP	18	2
AZALEA DRIVE	19	2
BEVERLY TERRACE	20	2
WOODSTEAD CIRCLE	21	2
COLYER DR	22	2
LAKE MARKHAM EVALUATION	23	1
DELK ROAD AND IBIS ROAD	24	1
OAK STREET	25	1
OAK KNOLL (PRIVATE PARCELS)	26	1
HORNBEAM DRIVE	27	1
LAKE SYLVAN EVALUATION	28	1
PRESSVIEW AVE	29	1
BILTMORE PT	30	1
MICHAEL DRIVE (PRIVATE PARCELS)	31	1
SHADOWBAY	32	1
SANDY LANE RV PARK	33	1

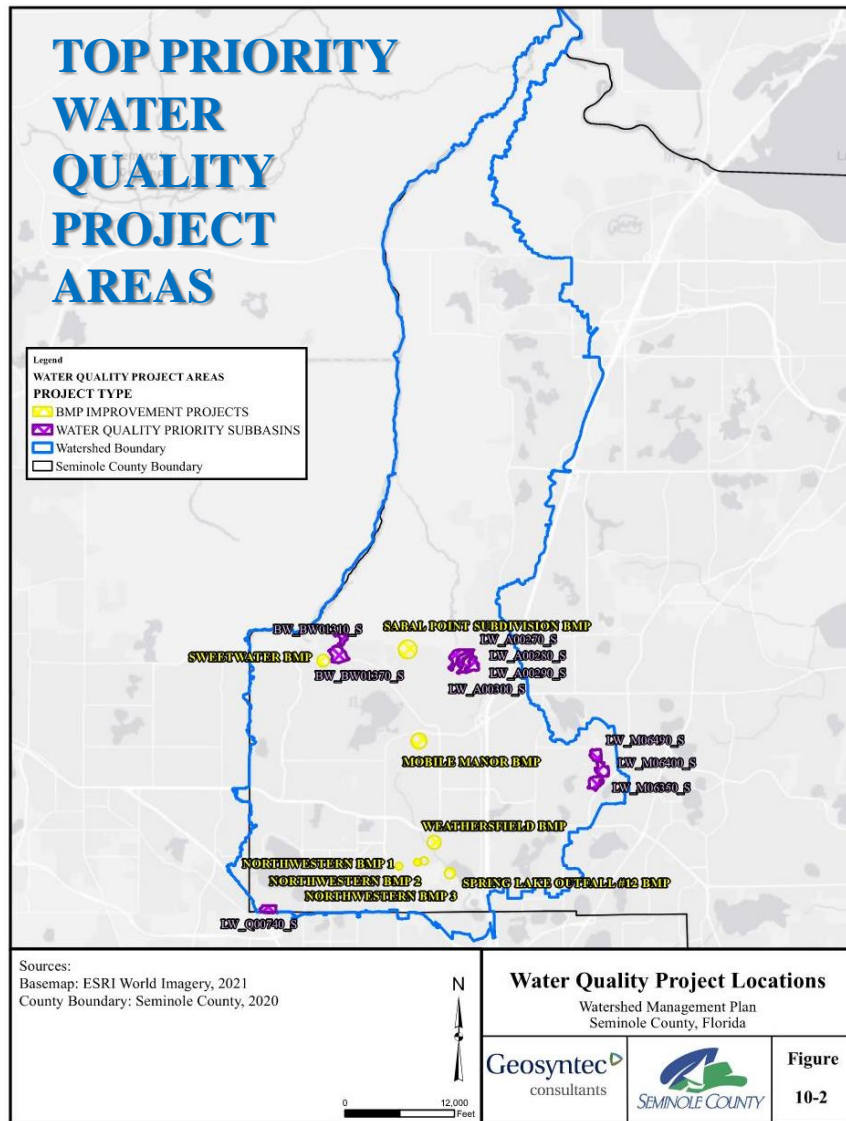
	DETAILED CONCEPT ANALYSIS - THIS SCOPE
	DETAILED CONCEPT ANALYSIS - FUTURE SCOPE
	SPECIAL EVALUATION PROJECT - THIS SCOPE
	SPECIAL DESIGN CONCEPT PROJECT - THIS SCOPE
	PROJECT CURRENTLY UNDERWAY BY COUNTY

Recommended Priority Flood Projects

- Final Priority Projects for Alternatives Analysis and Concept Development
- Other Projects from Ranked List to be Conceptualized Under Future Efforts
- Note: Sanlando Springs Area, Rolling Hills Area, and Magnolia Street Area are Combined into One Consolidated Project Area Due to Proximity and Interconnectivity

PROJECT NAME
SANLANDO SPRINGS - NORTH STREET TO LAKE FLORIDA*
TRIBUTARY C - HUNT CLUB TO LAKE BRANTLEY
MOBILE MANOR*
MARKHAM WOODS RD NEAR TIMBERBROOK & BRIDGEWATER
CECELIA DRIVE AT BEAR LAKE*
MAGNOLIA STREET 427 TO LAKE FLORIDA*
ROLLING HILLS*
RIVERBEND BOULEVARD AND SWEETWATER BOULEVARD AREA
BANANA LAKE ROAD
CUTLER ROAD
BEAR LAKE WOODS*
BEL AIRE HILLS
MARKHAM RD AT LAKE MARKHAM RD
BILTMORE PT
* PROJECT ALSO INCORPORATES WATER QUALITY ELEMENTS

Recommended Priority Water Quality Projects



Water Quality Priority Project Recommendation Summary		
#	Water Quality Problem Area	Problem Source
1	SABAL POINT SUBDIVISION BMP	PROBLEM AREA ASSESSMENT
2	MOBILE MANOR BMP*	
3	NORTHWESTERN BMP 1	
4	NORTHWESTERN BMP 2	
5	NORTHWESTERN BMP 3	
6	WEATHERSFIELD BMP	
7	SPRING LAKE OUTFALL #12 BMP	
8	SWEETWATER BMP	
9	BEAR LAKE WOODS * BASIN LW_Q00740_S	POLLUTANT LOAD MODELING
10	SPRING LANDING BASINS LW_A00270_S, LW_A00280_S, LW_A00290_S, LW_A00300_S	
11	SANLANDO SPRINGS * BASINS LW_M06490_S, LW_M06400_S	
12	MAGNOLIA STREET* BASIN LW_M06350_S	
13	SWEETWATER BMP 1, 2, 3 BASINS BW_BW01310_S, BW_BW01370_S	
* ASSOCIATED WITH FLOODING PROJECT		

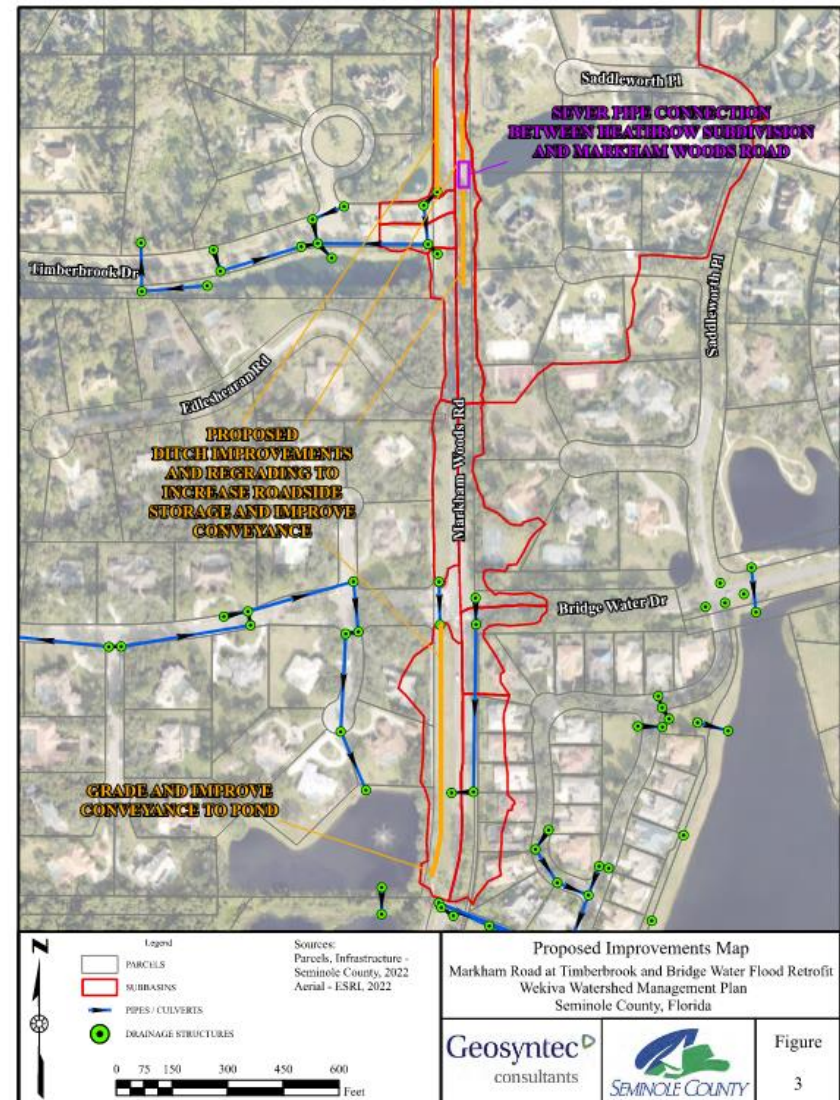
Recommended Priority Projects Costs

- Priority Projects Classified by Type and Consolidated by Area
 - *Construction Cost based on Preliminary Engineers Estimate of Probable Costs*
 - *Implementation Constraints Considered*
 - *SJRWMD Consulted*
 - *Right of Way / Easement Acquisition Accounted*
 - *Contingency Included*
 - *Each will Require Design and Permitting to Implement*
- Total of \$35+ million
 - *2023 Dollars*
 - *Includes Design, Permitting, CEI*
 - *Includes Land Cost Projection*
 - *Includes Contingency*
- Priority Projects will be Included in Countywide Stormwater Master Plan

Priority Project	Project Type	Estimated Total Cost
Sanlando Springs - Magnolia Street – Rolling Hills Area	Flooding and Water Quality	\$3,089,000 Phase 1
		\$3,077,000 Phase 2
		\$3,948,000 Phase 3
		\$6,298,000 Phase 4
		\$1,657,000 Phase 5
Bear Lake Woods	Flooding and Water Quality	\$1,873,000
Mobile Manor	Flooding and Water Quality	\$1,526,000
Cecelia Drive	Flooding and Water Quality	\$1,599,000
Tributary C – Hunt Club to Lake Brantley	Flooding	\$711,000
Markham Road at Timberbrook and Bridge Water	Flooding	\$263,000
Bel Aire Estates	Flooding	\$2,501,000
Cutler Road	Flooding	\$798,000
Riverbend Boulevard	Flooding	\$791,000
Banana Lake Road	Flooding	\$279,000
Biltmore Point	Flooding	\$271,000
Markham Road at Lake Markham	Flooding	\$1,920,000
Northwestern BMP 1	Water Quality	\$395,000
Northwestern BMP 2	Water Quality	\$395,000
Northwestern BMP 3	Water Quality	\$395,000
Spring Lake Outfall #12 BMP	Water Quality	\$484,000
Weathersfield BMP	Water Quality	\$540,000
Sabal Point BMP	Water Quality	\$481,000
Spring Landing BMP	Water Quality	\$644,000
Sweetwater BMP 1	Water Quality	\$472,000
Sweetwater BMP 2	Water Quality	\$371,000
Sweetwater BMP 3	Water Quality	\$788,000
TOTAL:		\$35,566,000

Example Flood Control Project

- Markham Road at Timberbrook and Bridge Water
- Road and Sidewalk Flooding During Extreme Storm Events
- Flooding Persists after Storms
- Proposed Project
 - *Restore Roadside Drainage Grading and storage*
 - *Improve Conveyance to Outfalls*



Example Water Quality Project

- Older Development with No Water Quality treatment
- Discharges Directly into Little Wekiva River
- Proposed Project
 - *Retrofit Existing Outfall Pipe System*
 - *Install Baffle Box with Filter Media for Treating Nutrients*

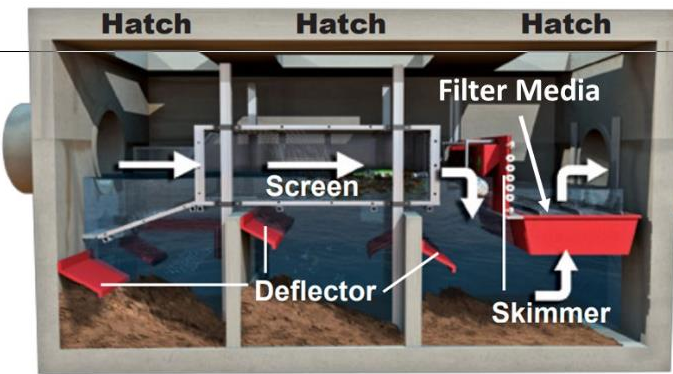
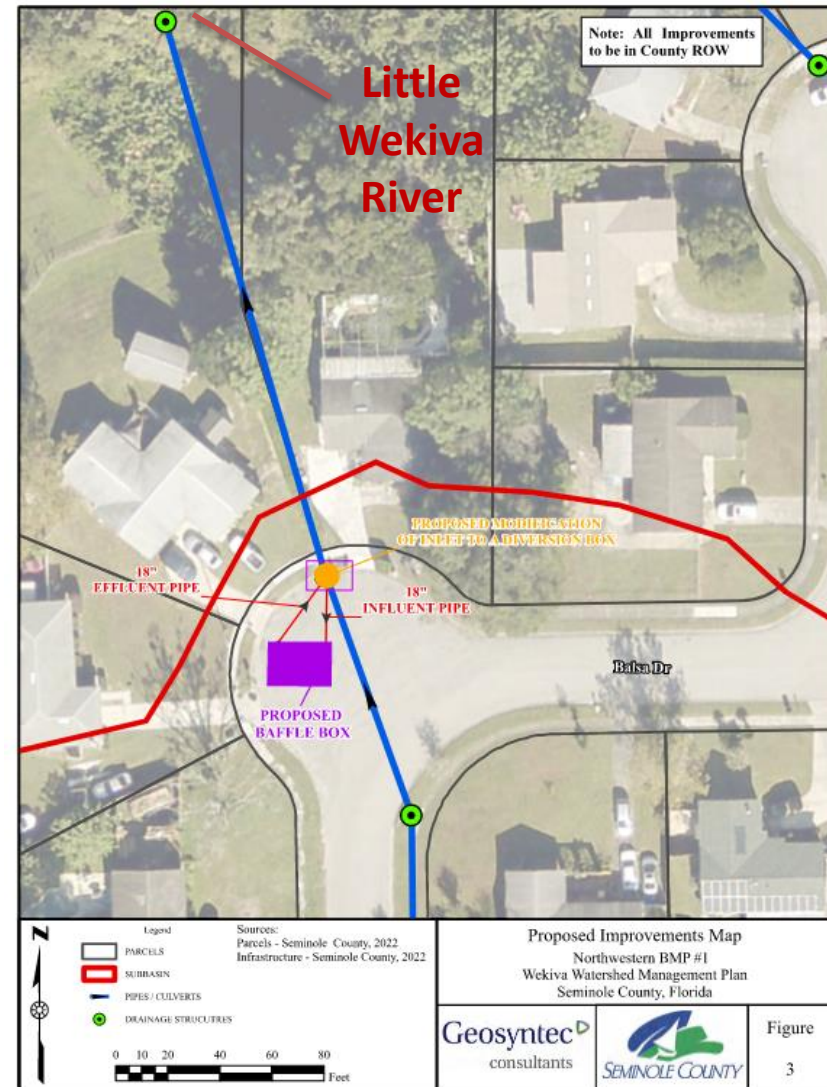
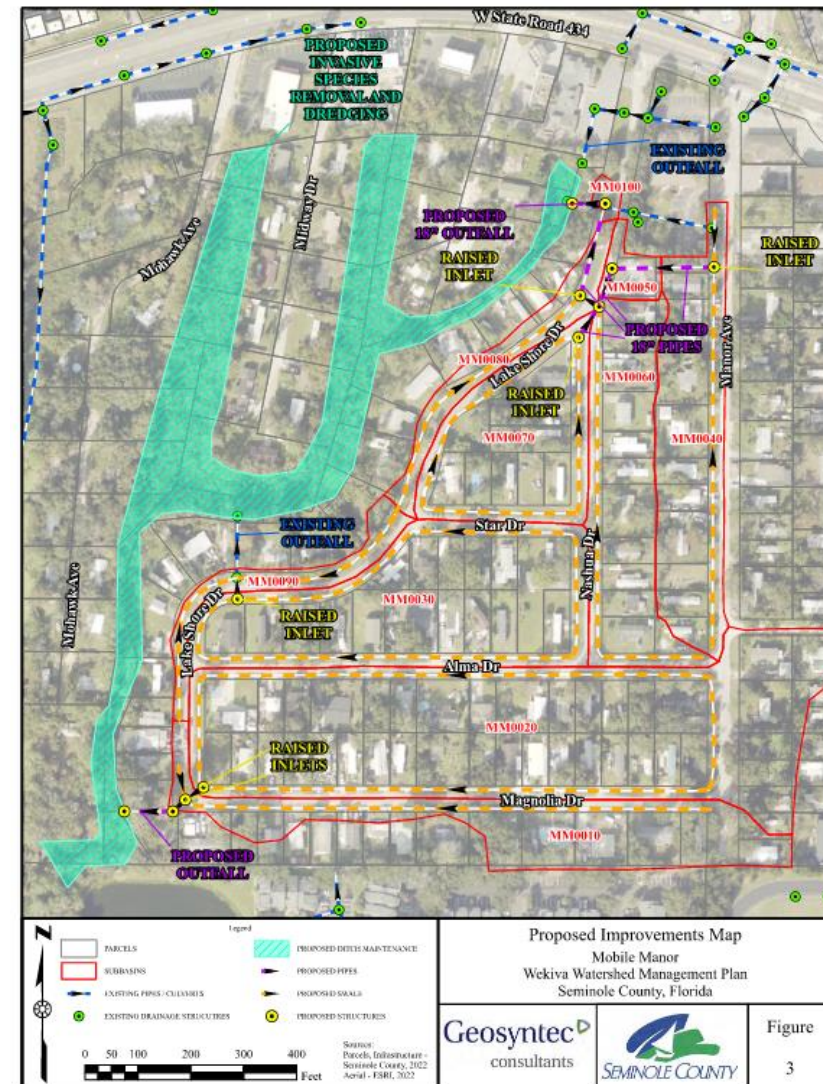


Photo 5: NSBB with Upflow Media Filter Concept (image from Oldecastle Infrastructure)



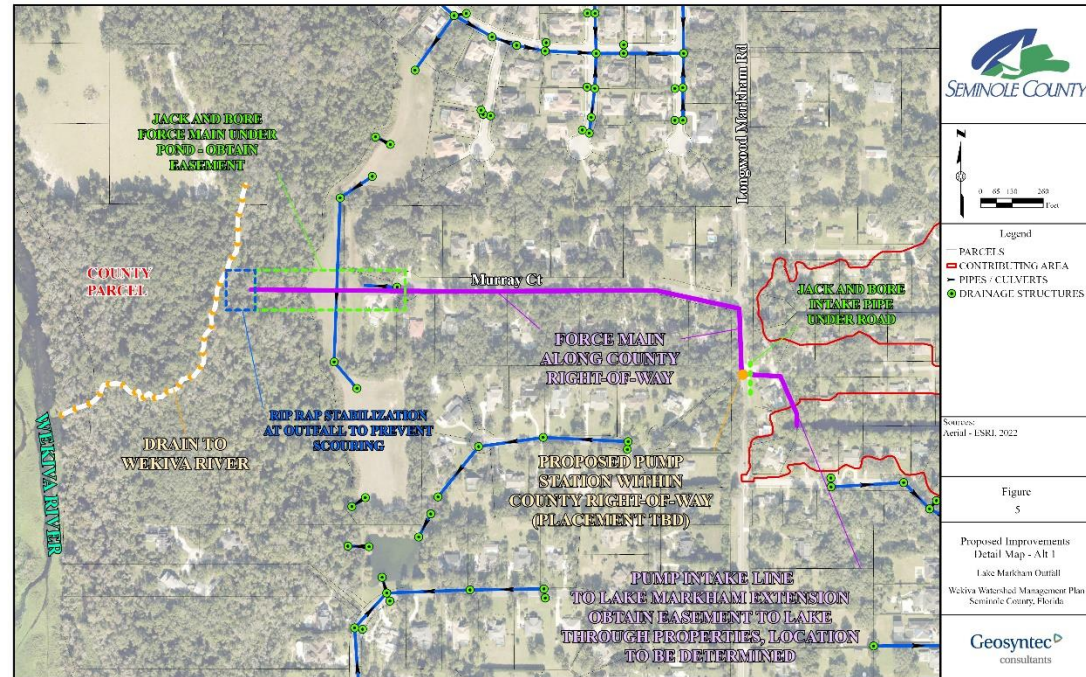
Example Flood & Water Quality Project

- Older Development Inconsistent and Mismatched Drainage, Limited Outfalls
- No Designed Water Quality Treatment
- Proposed Project
 - *Re-establish Swales to Attenuate Flooding and Treat Runoff*
 - *Install Additional Outfalls Through Obtained Easements*



Lake Markham Alternative

- Feasibility for Providing Engineered Positive Outfall
 - Gravity Pipe Outfall not Feasible
 - Pumped Outfall Feasible
 - Outfall to Wekiva River (Closer) or Yankee Lake
 - 122 Private Properties to Benefit
- Design Constraints
 - Right of Way / Easements from Private Property
 - Utility Impacts
- Permitting Considerations
 - Downstream Flooding
 - Water Quality Impacts
 - Lake Conservation Easements

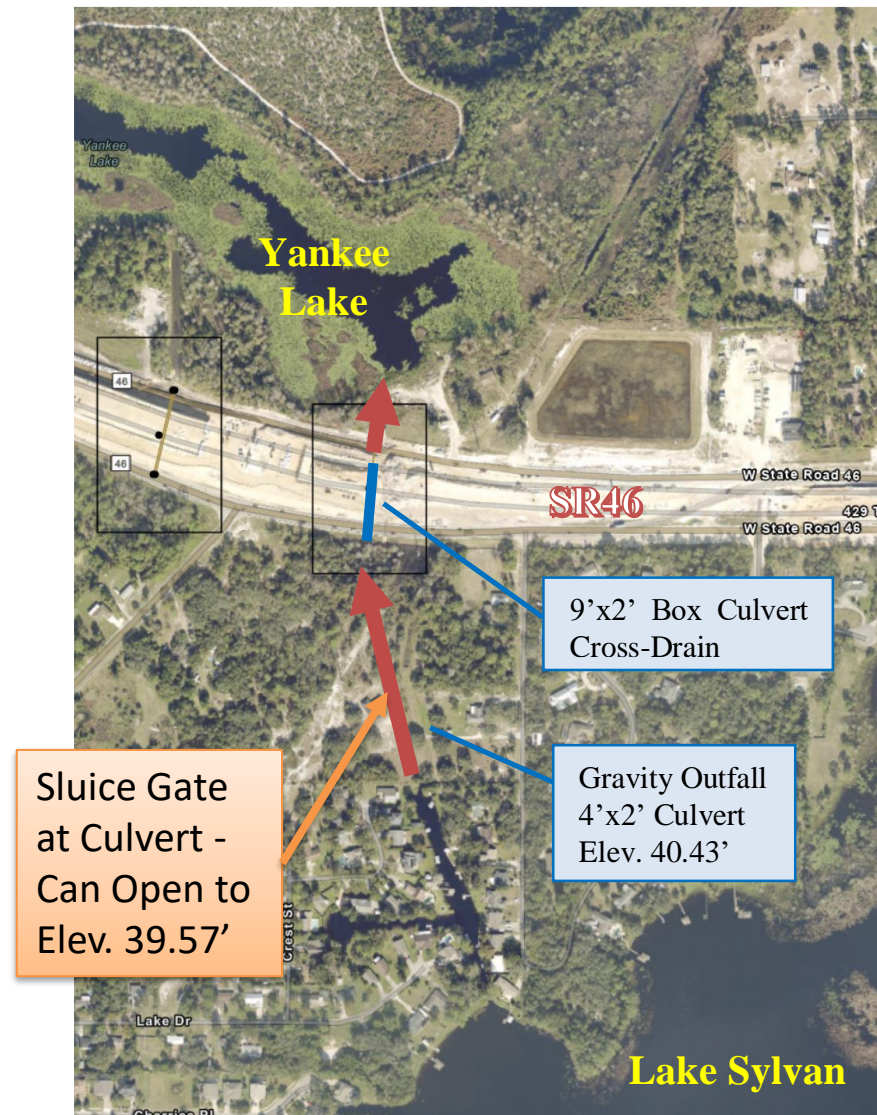


Proposed Pump Station Solution to Address Impacts

- ~62.5 cfs pump station pumping to Wekiva River to provide flood protection for design storms
- Eliminates flood impacts for up to the 10 year design storm
- 1' peak stage reduction for 100 Year / 96 Hour design storm, full recovery of stages within 3 days
- Leverage pump station to maintain a consistent maximum lake control level of ~42.5'
- \$14.8+ Million Estimated for Implementation (design, permitting, construction)
- Consider Project Costs versus Benefit to Number of Properties versus Frequency of Need

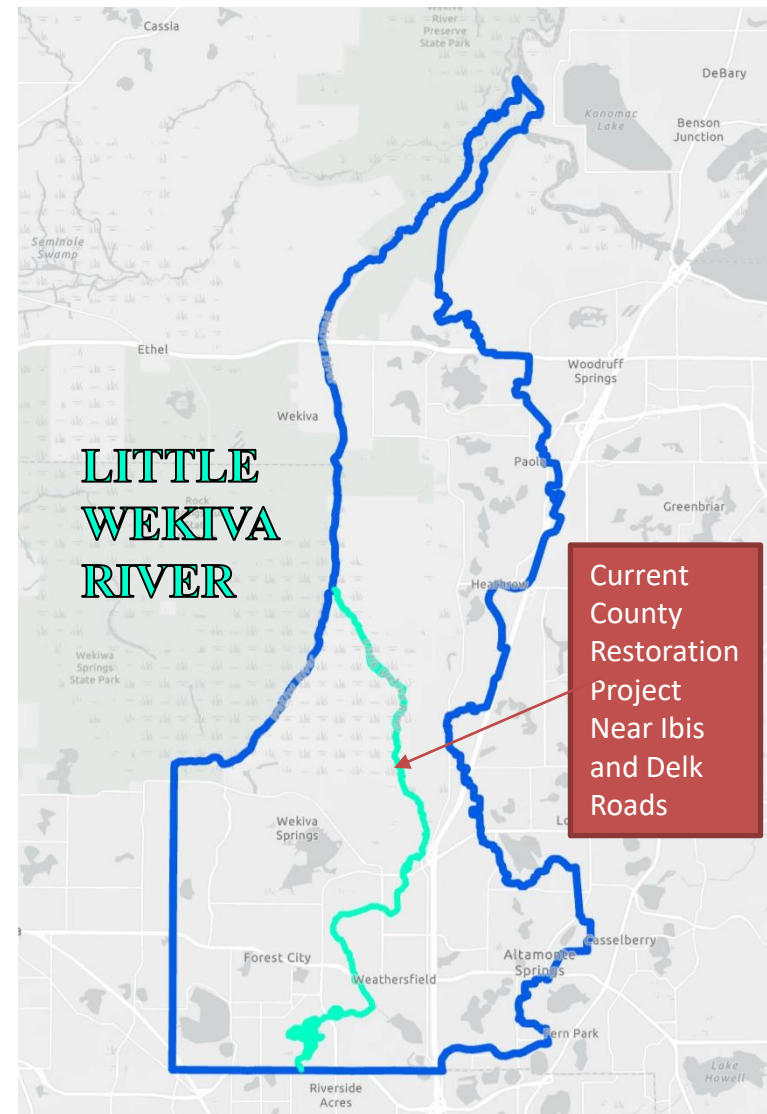
Lake Sylvan Alternative

- Need for Active Operation Schedule for Outfall Structure
 - *Sluice Gate Controls Discharge through Outfall Culvert*
 - *Existing Normal Elevation 40.43'*
 - *Emergency Authorization Level 39.57'*
- Propose Operating Schedule that has normal operation at the lower limit of range
- County Controls the Operation
- Permitting Considerations
 - *Downstream Impacts*
 - *Water Quality*
 - *Conservation Areas*

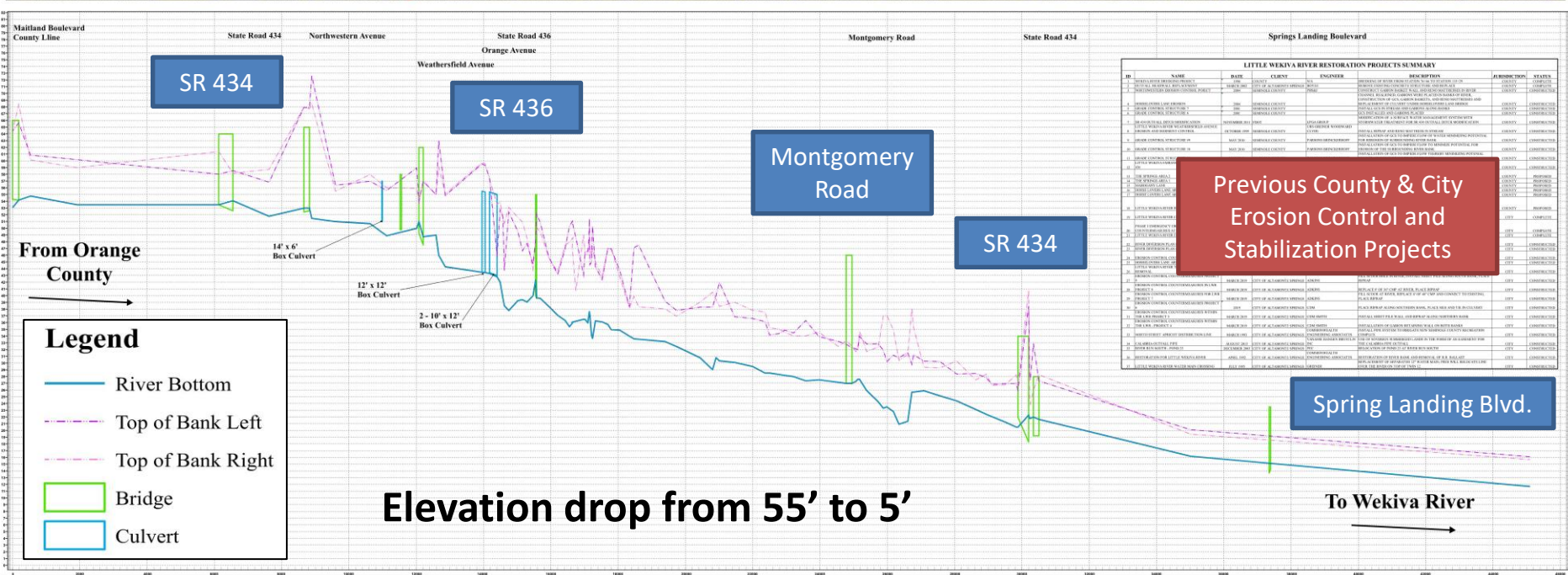
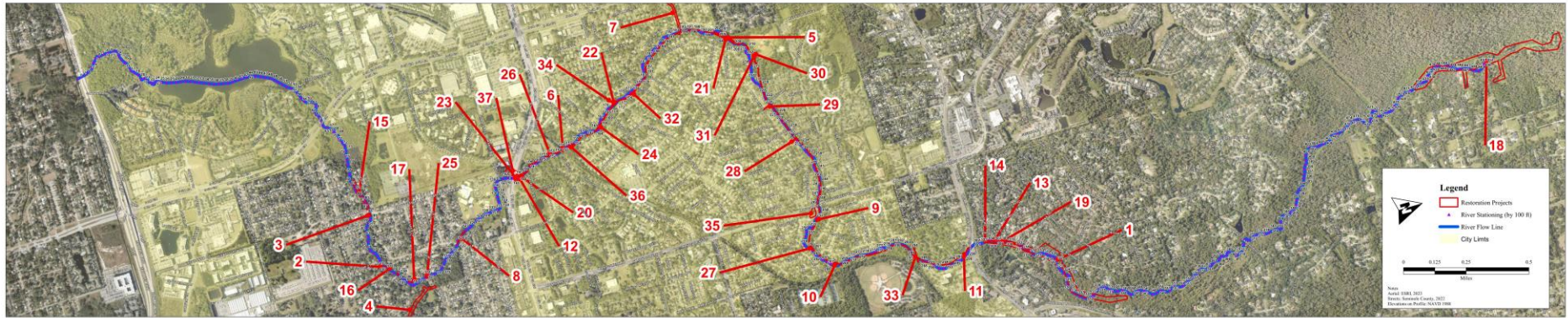


Little Wekiva River Evaluation

- Primary Drainage Feature in Southern Part of Watershed to the Wekiva River
- Flashy River Segments with High Velocities During Extreme Storms
- History of Erosion and Sedimentation and Water Quality Concerns
- Large Contributing Area from Orange County
- Numerous Previous Erosion and Sedimentation Control Projects Implemented by the County and Others
- Current County Restoration Project Near Ibis and Delk Roads



Little Wekiva River Projects



Wekiva Watershed Management Plan
Seminole County, Florida

Little Wekiva River Plan and Profile with Project Locations

Exhibit 26

Geosyntec
consultants

Project Schedule

Study Task	2022												2023									
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J			
Inventory and Problem Identification																						
Engineering Drainage Assessment																						
Water Quality Assessment																						
Initial Public Meeting																						
Draft Existing Conditions Report																						
Improvement Project Area Prioritization																						
County Comissioner Workshop																						
Improvement Alternative Analysis																						
Final Public Meeting																						
Final Reports																						
Final Commissioner Presentation																						
Final Reports - Project Closeout																						

Requested Board Action

- Accept Watershed Study
- Direction on whether or not to move forward with FEMA Letter of Map Revision

Acknowledgments & Contacts

Seminole County Staff

Jean Jreij, PE – Public Works Director

Shannon Wetzel – Project Manager – Watershed Management Division Manager

Kim Ornberg, PE – Director Environmental Services

Tony Nelson, PE, CFM – Public Works – Deputy Public Works Director

Dino Lucarelli, PE – Chief Design Engineer - Public Works

Jeff Sloman, PE – Professional Engineer - Public Works

Owen Reagan, PE – Professional Engineer - Public Works – Roads / Stormwater

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Mark Ellard, PE, CFM – Project Manager

Geosyntec Consultants

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