

# Restoring the Historic Hydrologic Divide

## FSA Annual Conference

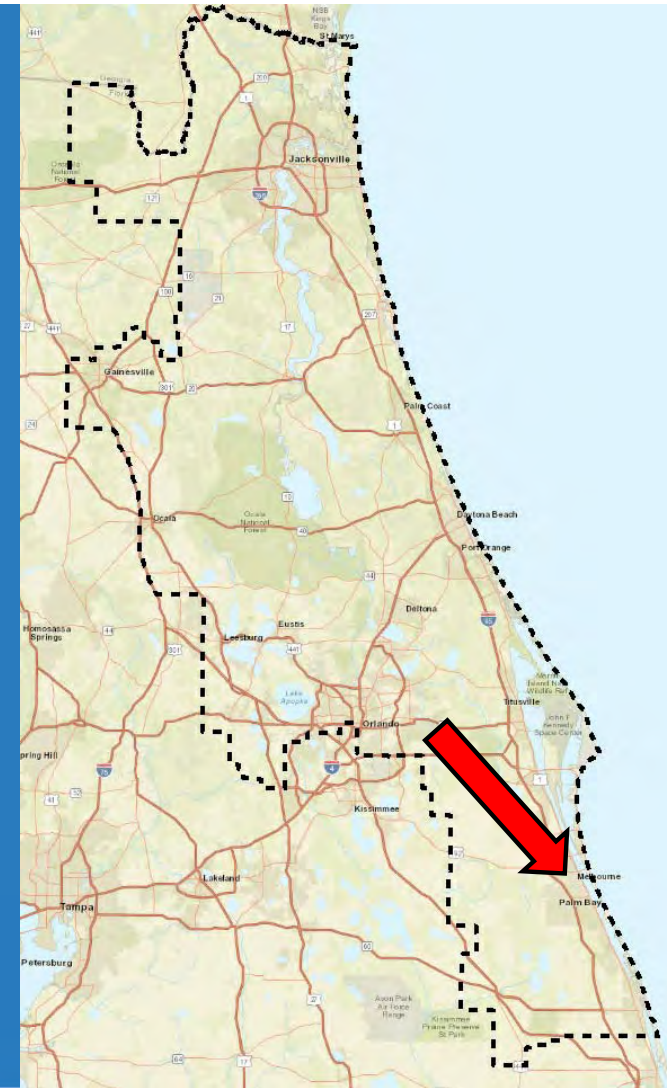
**July 17, 2020**

**Marc Van Heden, PE, Supervising Professional Engineer  
SJRWMD**

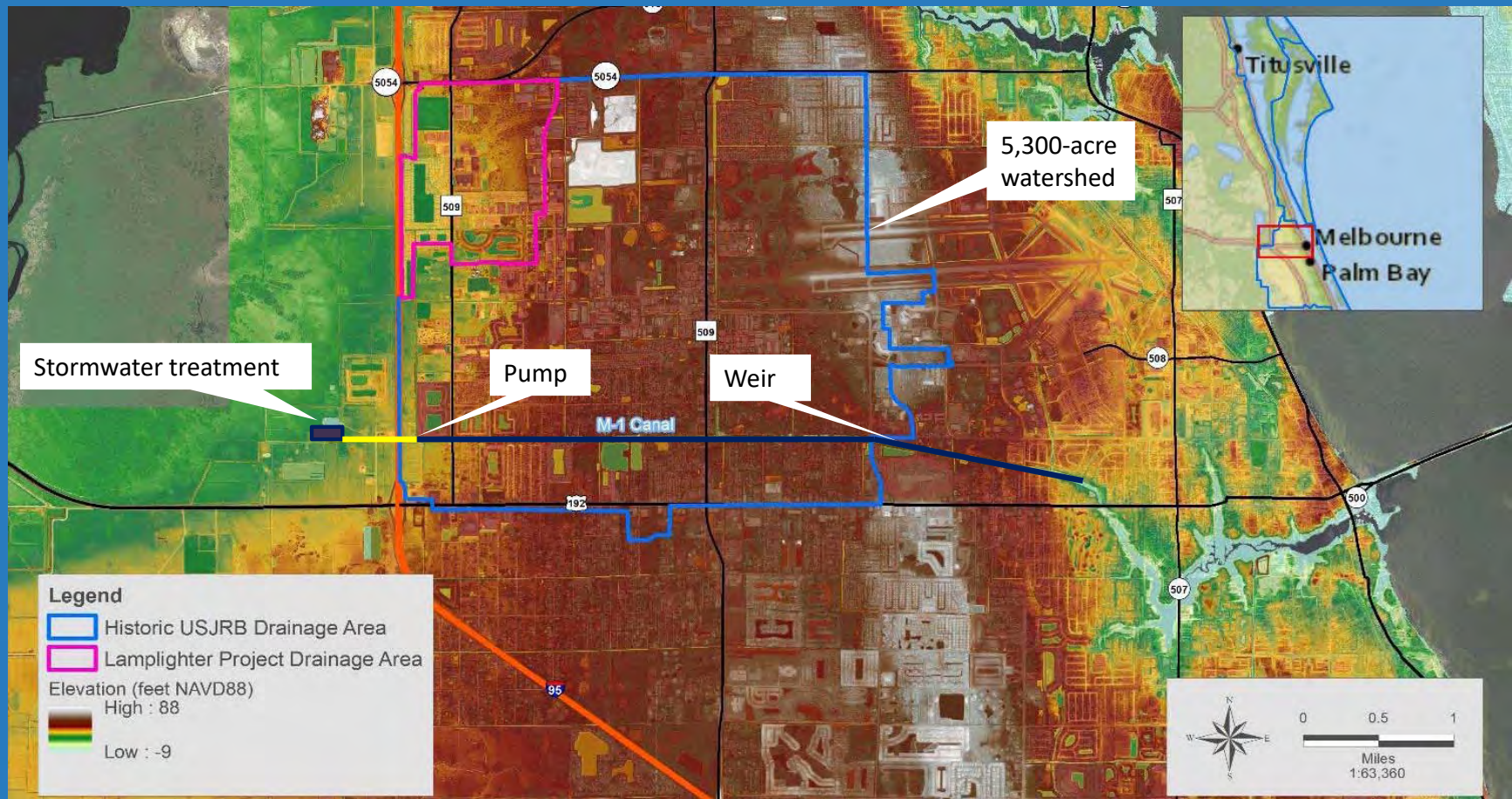
**Justin Gregory, PE, Senior Manager / Vice President  
Jones Edmunds & Associates**

# Background

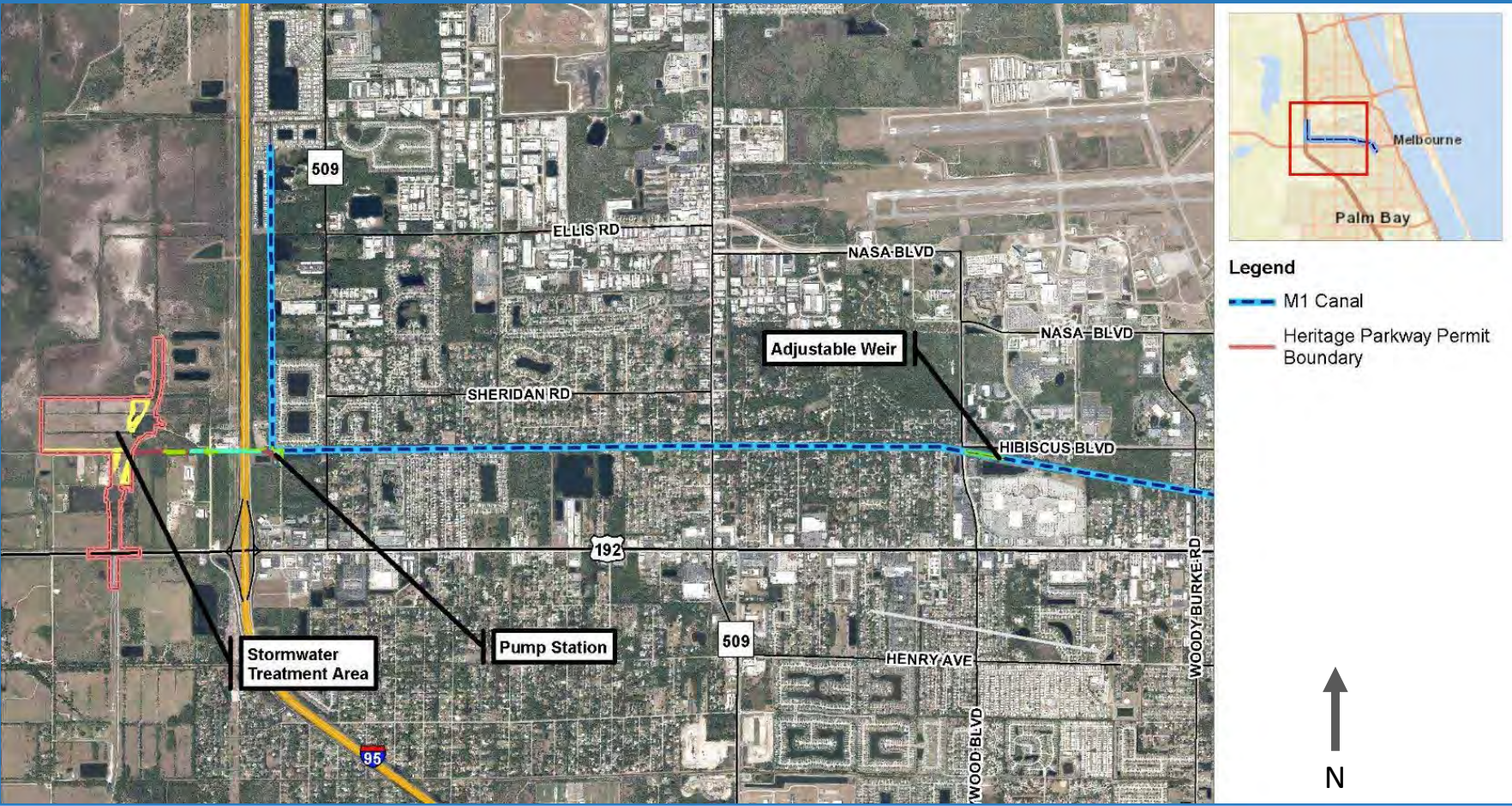
- Project identified in 2017 Lagoon-wide Feasibility Study to find projects that will benefit the Indian River Lagoon
- Located in Melbourne and West Melbourne
- Return 5,300 acres of diverted urban watershed back to the St. Johns River
- Reduces nutrient and sediment load to Indian River Lagoon. Treats stormwater before discharging to St. Johns River
- Crane Creek project is a top ranked project



# Watershed Map



# Project Overview – Weir/Pump/Treatment



# Details

- **Reduces untreated stormwater discharges to the Indian River Lagoon while restoring that that flow to St. Johns River by 7 MGD which is also used for downstream for water supply**
- **Nutrient reduction / Flow restoration**
  - Reduces TN to Lagoon by 24,000 lb./year
  - Reduces TP to Lagoon by 3,100 lb./year
- **Project cost approximately \$10.5M (includes design and land acquisition)**
  - Florida Department of Environmental Protection \$2,033,944
  - Brevard County \$2,450,000
- **Schedule:**
  - Final design is complete
  - Construction starts Winter 2020, Ends Winter 2022

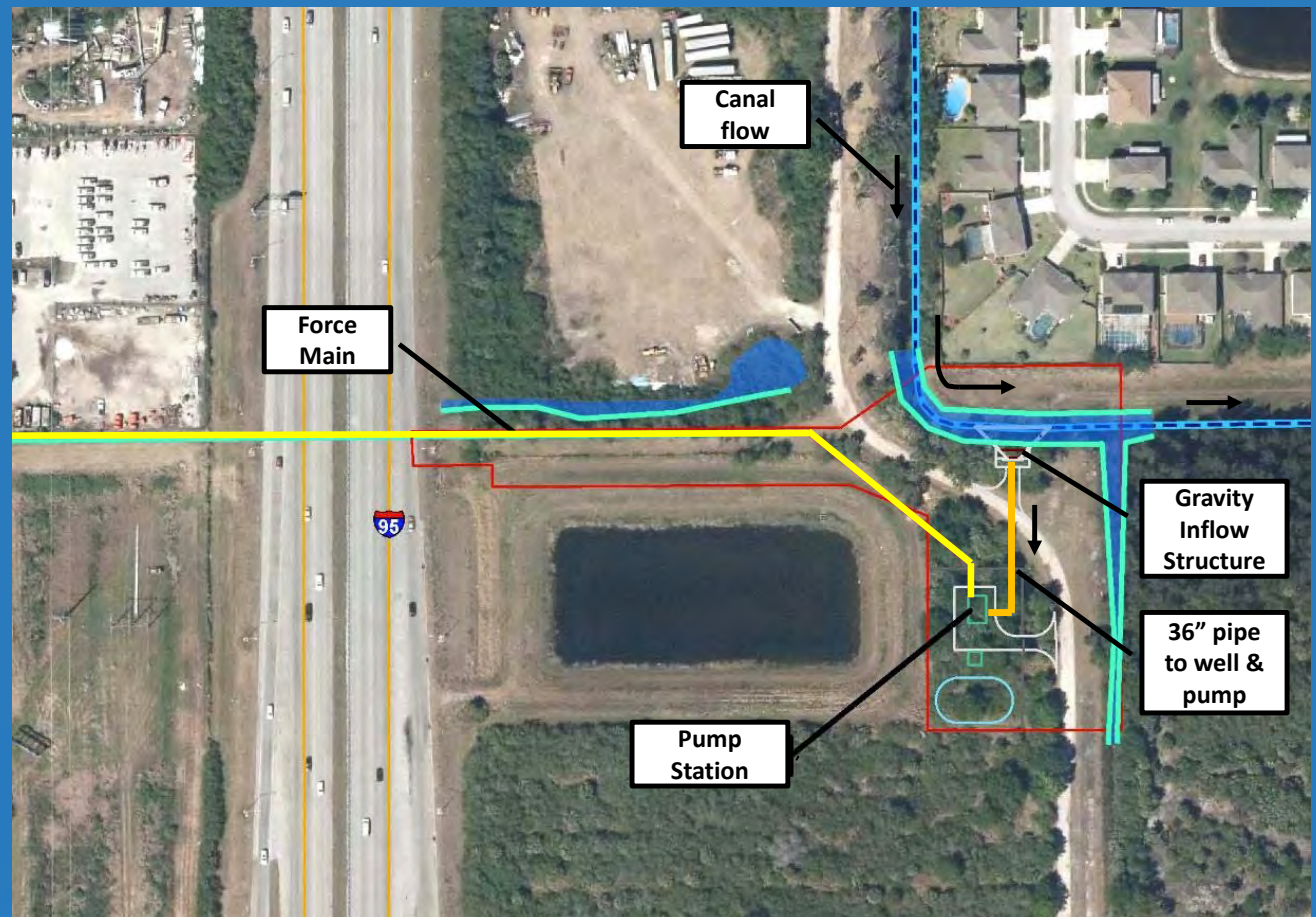
# Adjustable Weir

- Located at the natural drainage divide
- Pneumatic Crest Weir (AKA “Obermeyer weir”) Controlled by inflatable bladder
- Automated adjustable weir to control flow



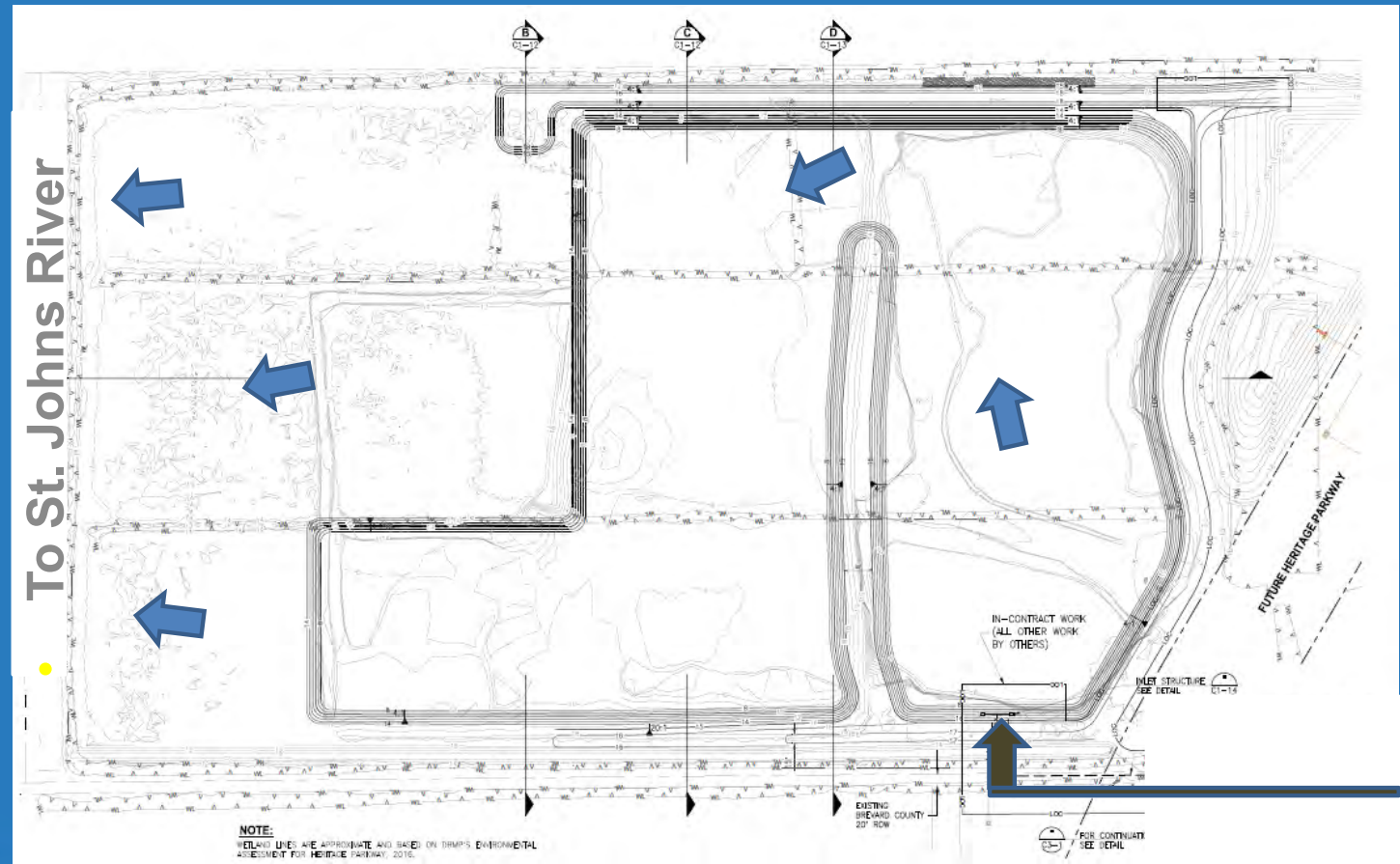
# Pump Station and Force Main

- Pump station in well similar to lift station
- Directional drill force main under I-95
- 24" force main pipe
- Coordinate with City for Sewer Line



# Stormwater Treatment Area

- Dual use of Floodplain Compensation Area
- Provides treatment
- Coordinated project with County in conjunction with Roadway







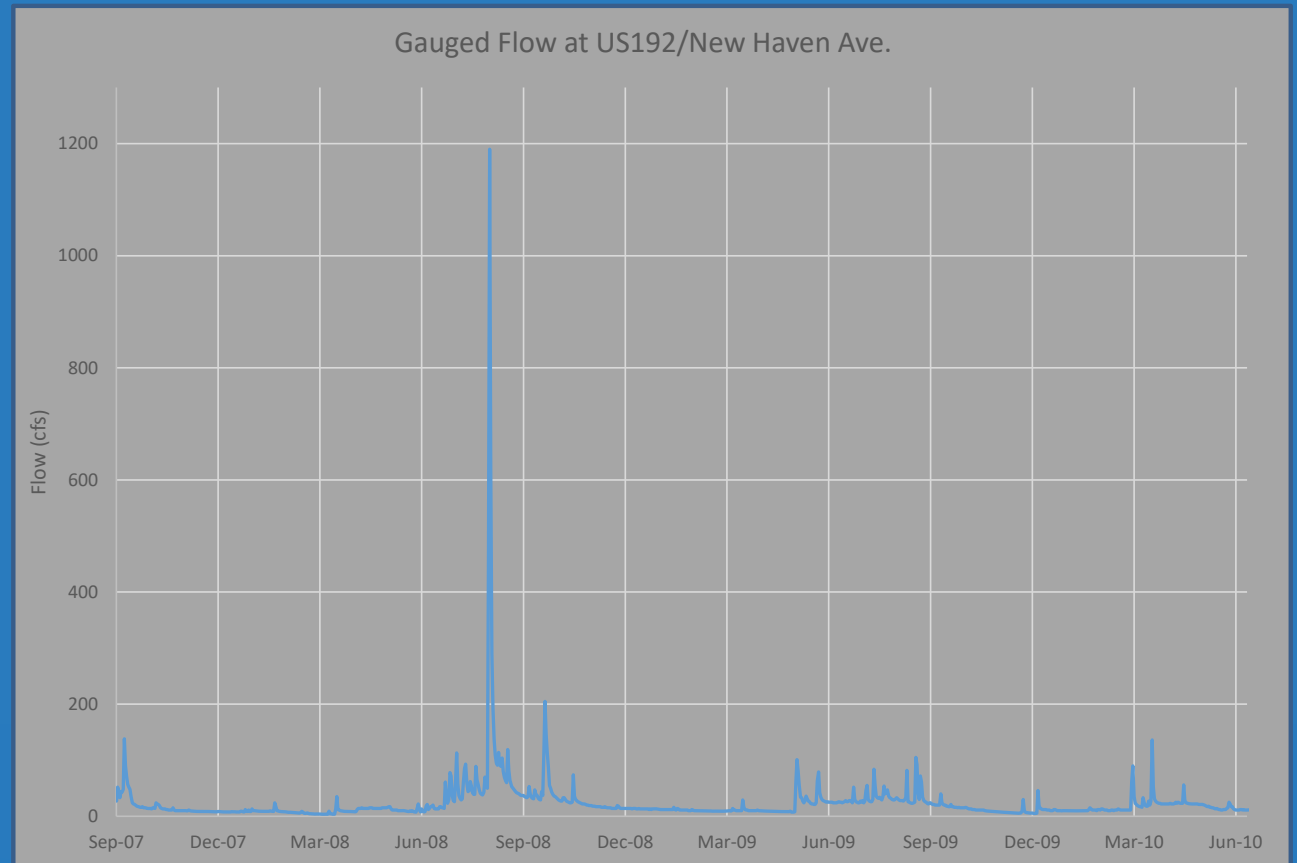
# Flooding Concerns

- High flood risk area
- M-1 Canal is the primary drainage feature
- Project could not adversely impact flooding



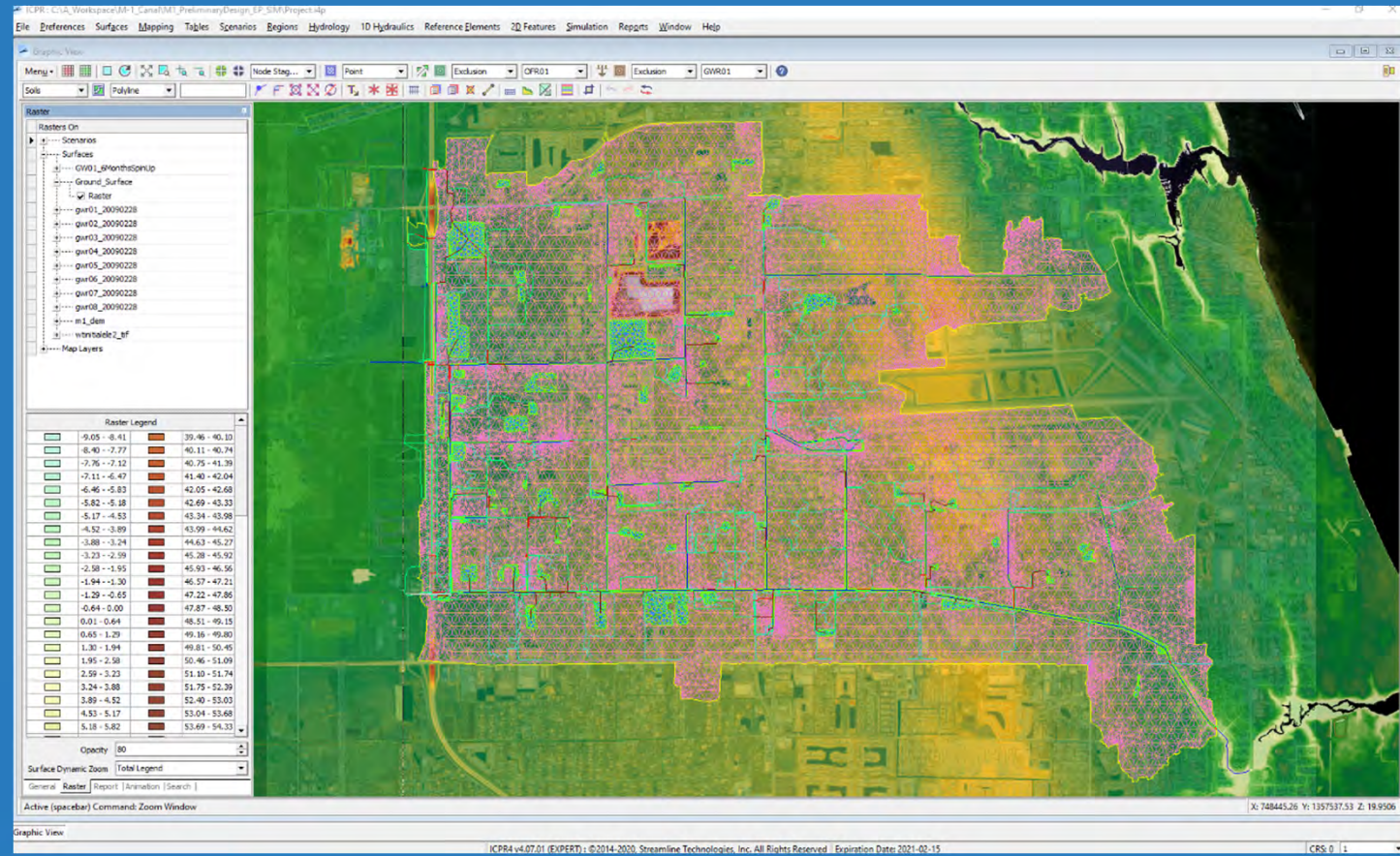
# Optimizing System

- Understand long-term functioning
- Optimize design
- Establish system controls
- Determine benefits



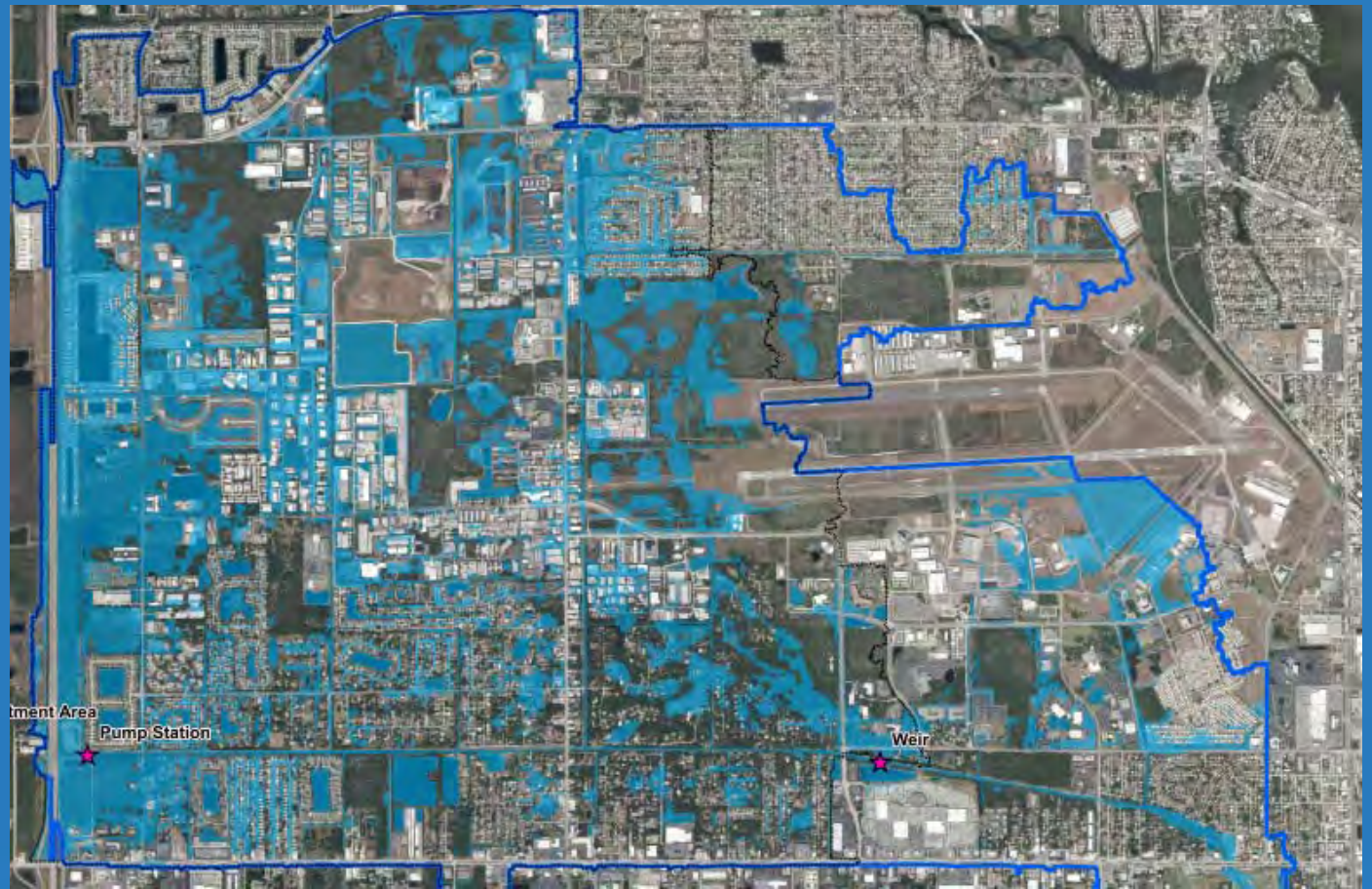
# Watershed Model

- Detail ICPR4 model
- Design storms
- Extended period continuous simulation



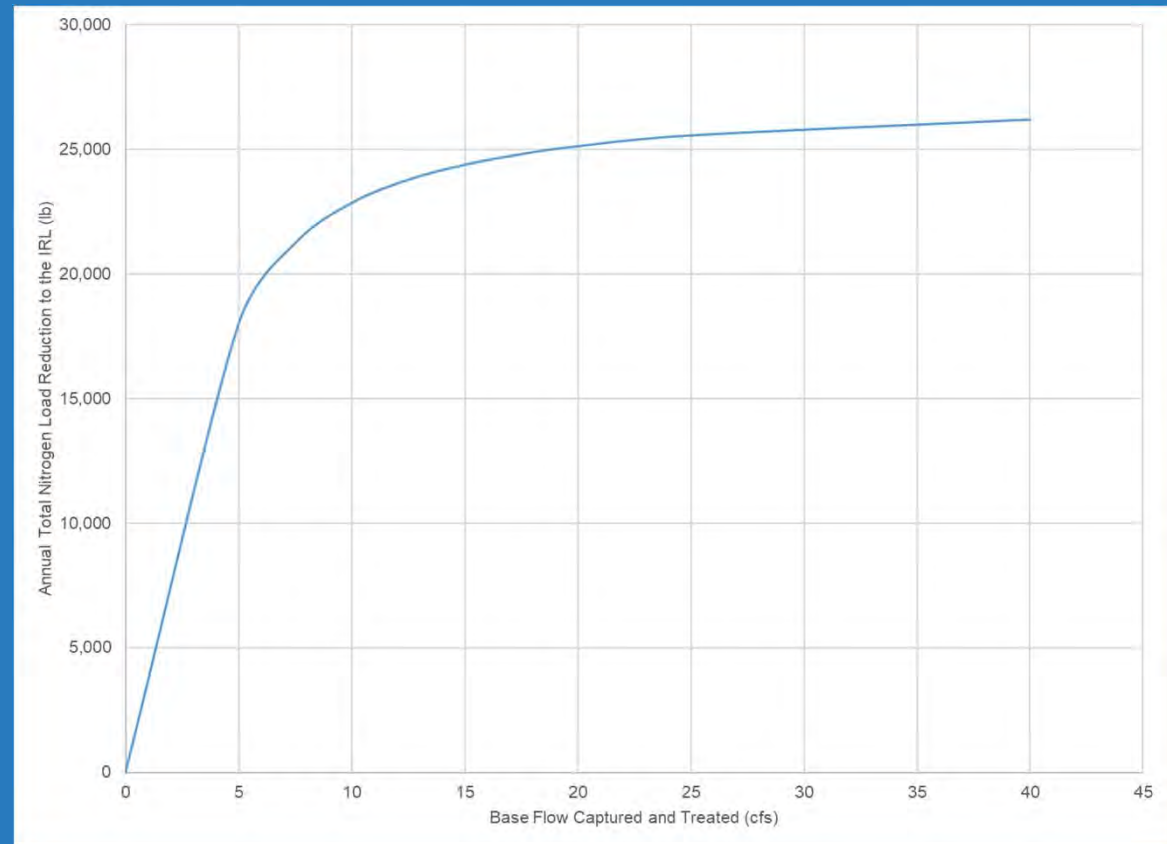
# Watershed Model

- 1-D Surface water model
  - 325 Nodes
  - Evaluated flood risk
- 2-D Groundwater model
  - Long term baseflow



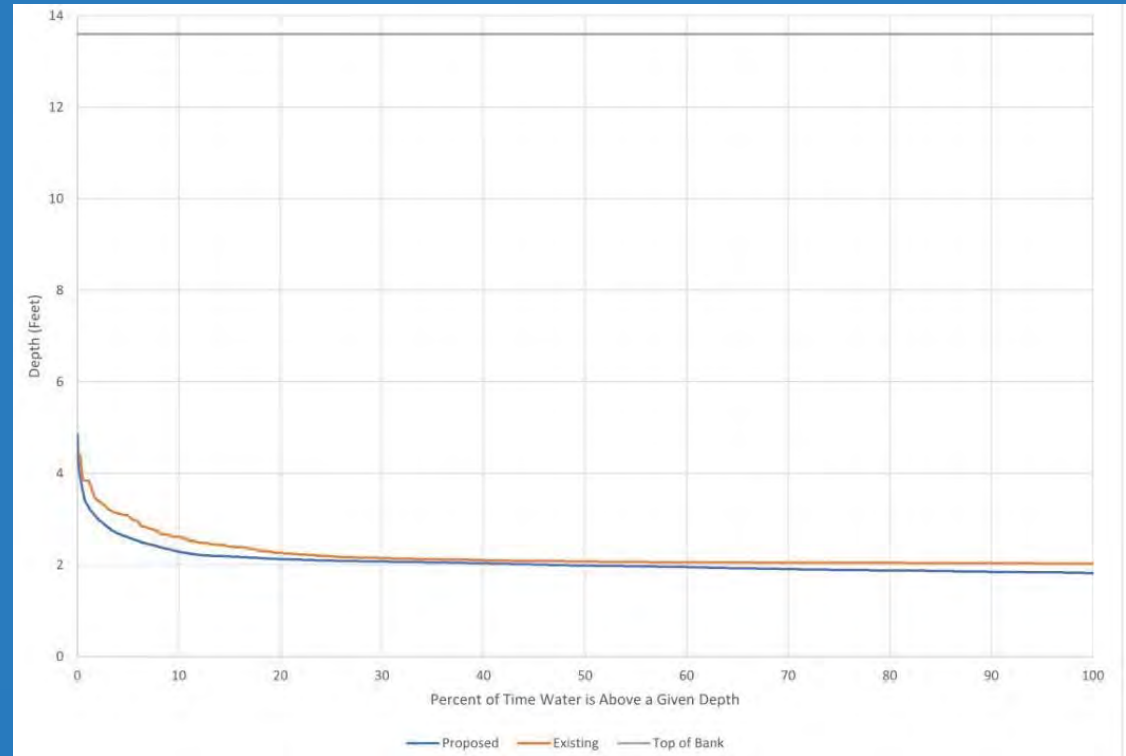
# Design Optimization

- Maximize load reduction
- Minimize pump capacity
- Minimize transmission main diameter
- No adverse flood impacts



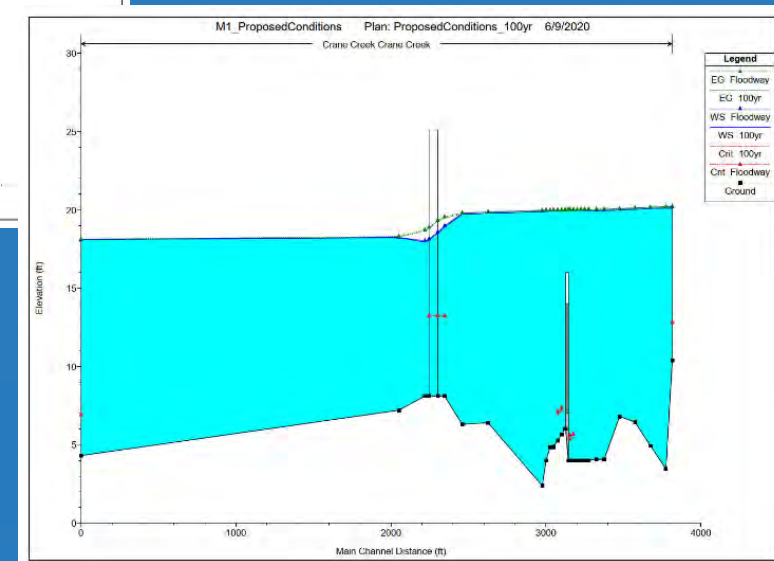
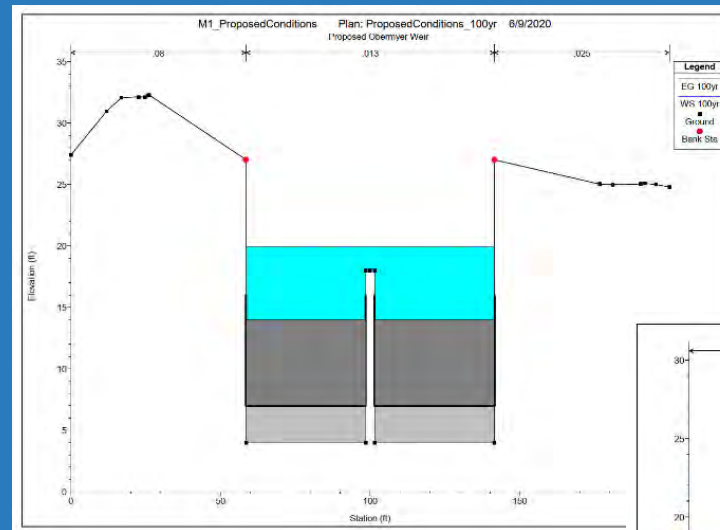
# Minimize Environmental Impacts

- Maintain hydroperiod
- Aquatic vegetation concerns
- Impacts to wildlife



# Permitting

- ERP
- M-1 Canal floodway
- No-Rise permit
- Assume gates are raised
- HEC-RAS model of weir





# Project Costs

- **Capital Costs (including land acquisition) ~ \$10.5 Million**
- **Annualized Costs**
  - **Capital ~ \$477,000/year**
  - **Replacement ~ \$174,000/year**
  - **O&M ~ \$83,000/year**
  - **Total ~\$734,000/year**



# Project Benefits

- **TN IRL Load Reduction**  
- 24,000 lb/year
- **TP IRL Load Reduction**  
- 3,100 lb/year
- **Flow Restored to SJR**  
– 7 MGD



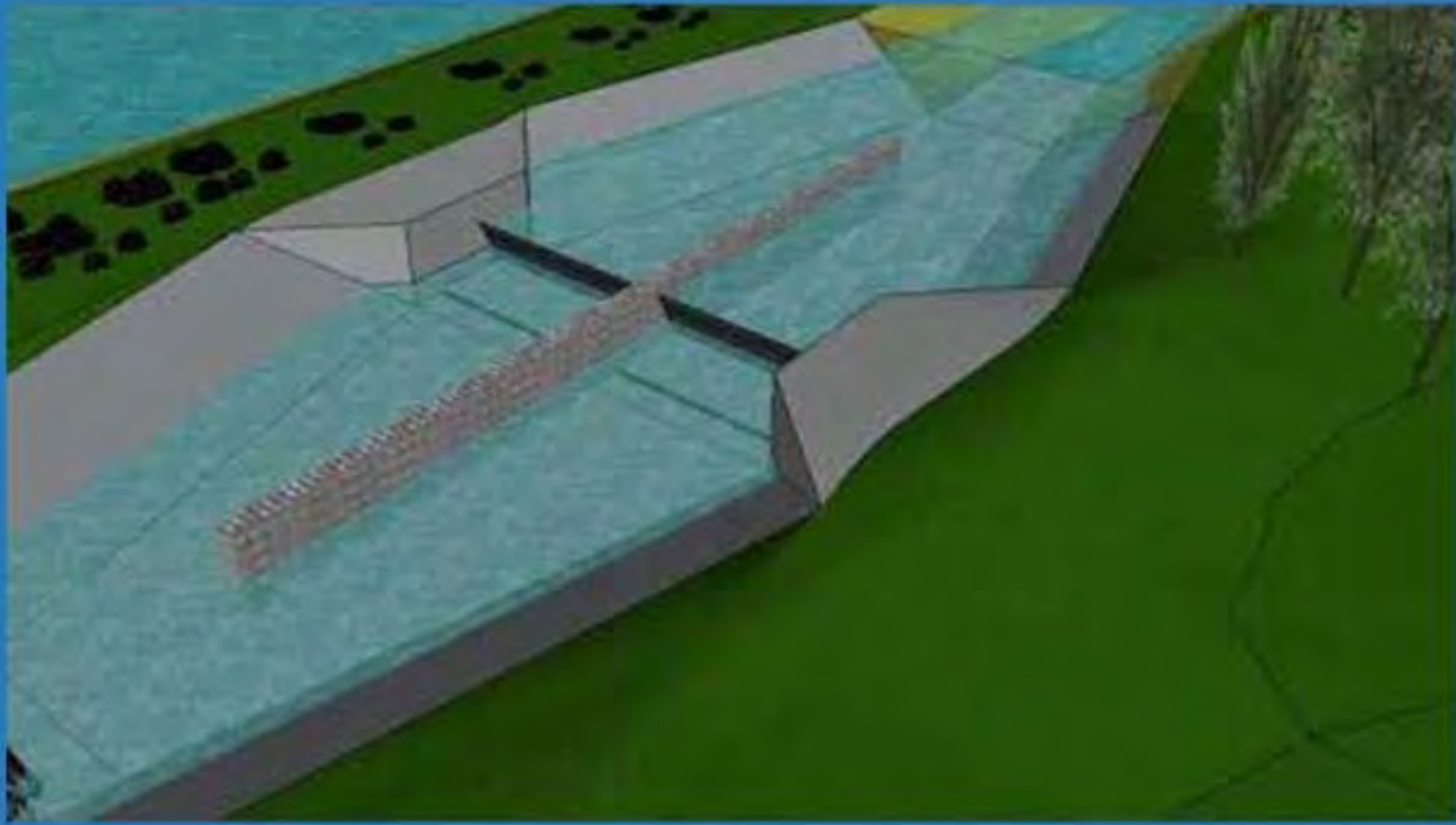
# Project Cost-Benefit

- TN IRL Load Reduction - \$31 /lb/year
- TP IRL Load Reduction - \$236 /lb/year
- Flow Restored to SJR – \$0.29 /kgal/year

Save Our Indian River Lagoon Project Plan 2020 Update, June 2020

Table ES-1: Summary of Project Types, Costs, and Nutrient Reductions in the 2020 Update of the Save Our Indian River Lagoon Project Plan (2016 dollars without inflation)

Project Category	Project Type	Estimated Total Project Cost	Nitrogen Reductions (lbs/yr)	Average Cost per Pound per Year of TN	Phosphorus Reductions (lbs/yr)	Average Cost per Pound per Year of TP
Reduce	Public Education	\$1,125,000	30,423	\$37	2,013	\$559
Reduce	WWTF Upgrades for Reclaimed Water	\$24,711,400	72,033	\$343	13,760	\$1,796
Reduce	Sewer Lateral Rehabilitation	\$1,580,000	6,196	\$255	188	\$8,404
Reduce	Rapid Infiltration Basin/Sprayfield Upgrades	\$6,660,414	49,136	\$136	5,139	\$1,296
Reduce	Septic System Removal by Sewer Extension	\$110,572,597	94,298	\$1,173	To be determined	To be determined
Reduce	Septic System Removal by Sewer Connection	\$11,280,000	21,446	\$487	To be determined	To be determined
Reduce	Septic System Upgrades	\$29,351,854	38,108	\$770	To be determined	To be determined
Reduce	Stormwater Projects	\$48,107,860	277,534	\$173	37,554	\$1,281
Remove	Muck Removal	\$108,229,911	207,990	\$520	17,815	\$6,075
Remove	Treatment of Muck Interstitial Water	\$46,945,641	481,059	\$98	28,361	\$1,655
Restore	Oyster Bars	\$9,887,876	24,921	\$397	784	\$12,612
Restore	Planted Shorelines	\$92,135	384	\$240	131	\$703
Respond	Projects Monitoring	\$10,000,000	-	-	-	-
Respond	Contingency	\$20,427,234	-	-	-	-
<b>Total</b>	<b>Total</b>	<b>\$428,971,922</b>	<b>1,303,528</b>	<b>\$329 (average)</b>	<b>105,745</b>	<b>\$4,057 (average)</b>



Questions?