Collier County Comprehensive Watershed Improvements Plan Update

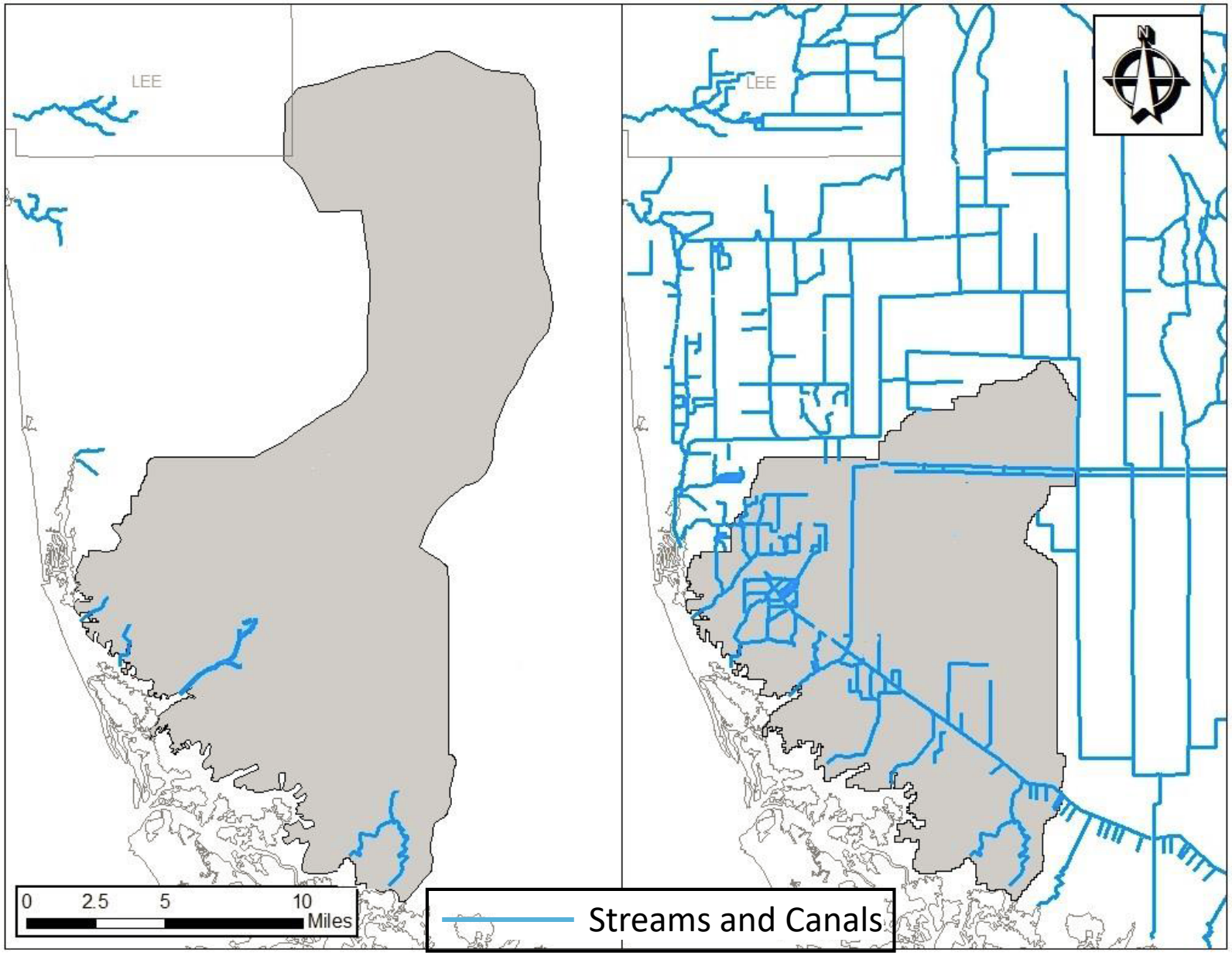
John Loper, P.E.
Taylor Engineering, Inc.

Collier County

Need for Project

Approximately 80 sq. miles of Rookery Bay Watershed diverted to Naples Bay

- Naples Bay receives too much fresh water via GGC
- Impacts to aquatic habitat (e.g., seagrass, oysters)



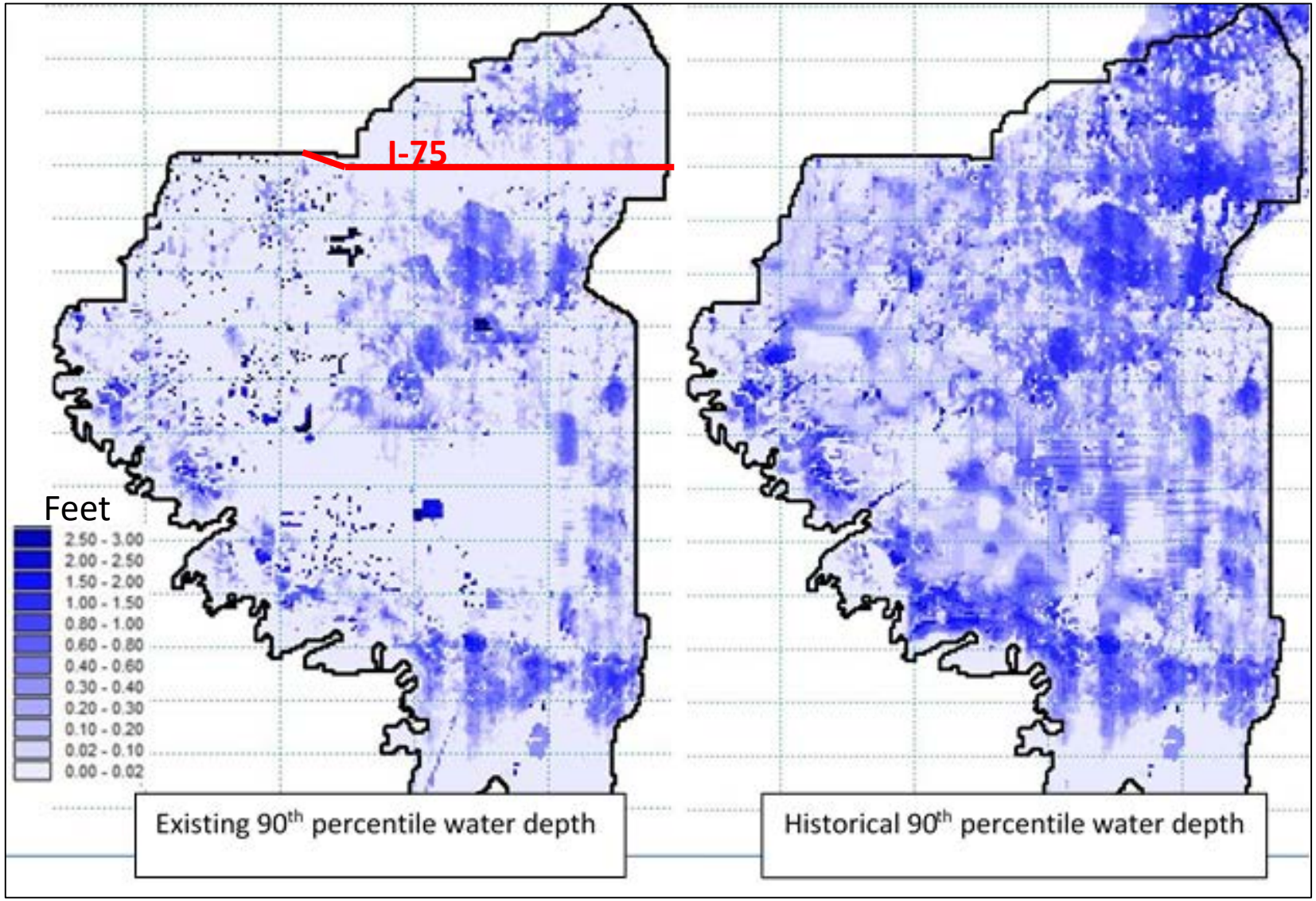
Historic Watershed Current Watershed

From Interflow Engineering Inc. and Taylor Engineering (2014)

Collier County

Need for Project

- Historically, the Belle Meade Flow-Way was much wetter than it is today
- Coastal areas in eastern portions of Rookery Bay have freshwater deficits

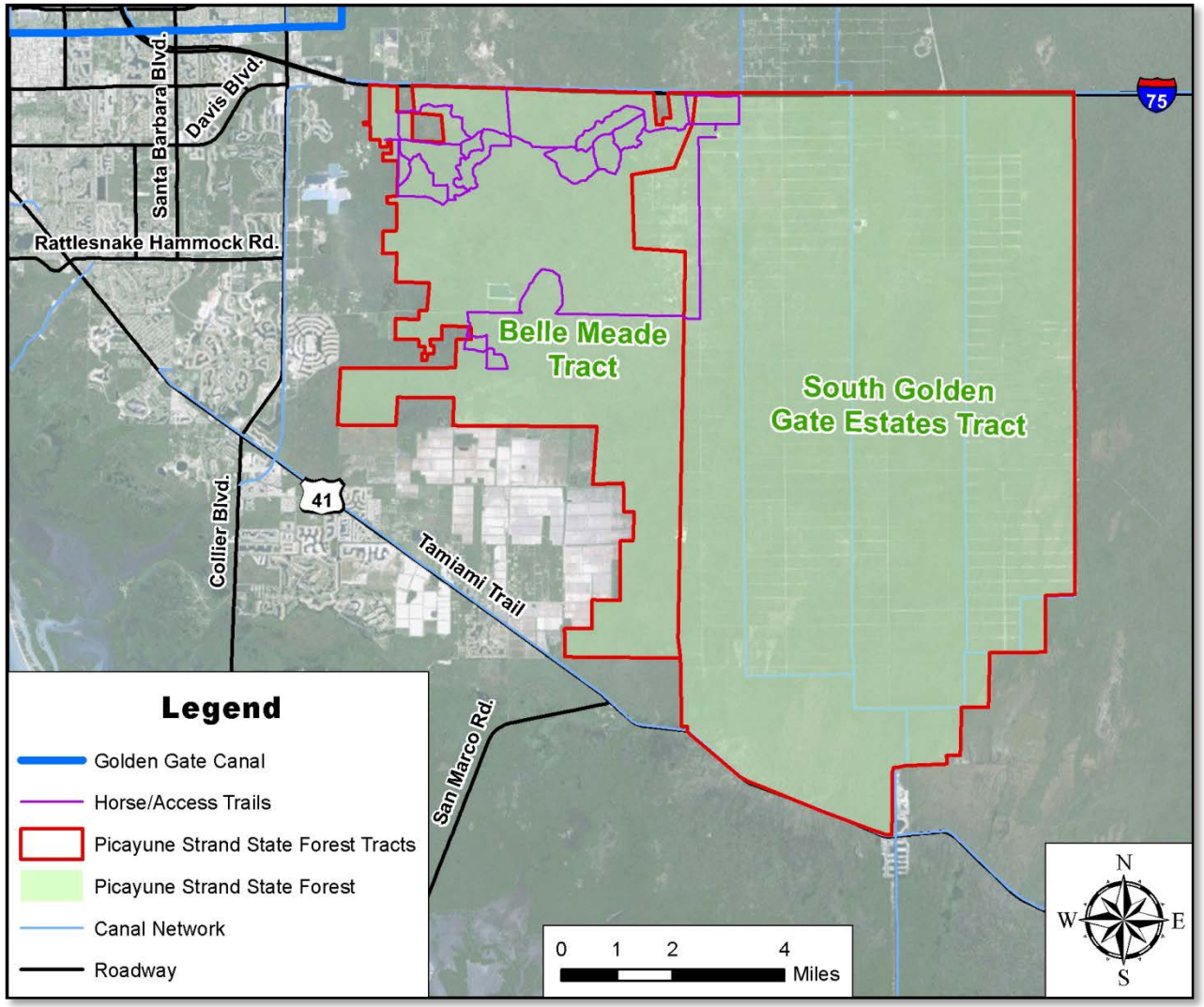


Ref: Henderson Creek Watershed Engineering Study, 2015 (FDEP/RBNERR)

Need for Project

Picayune Strand State Forest (PSSF)

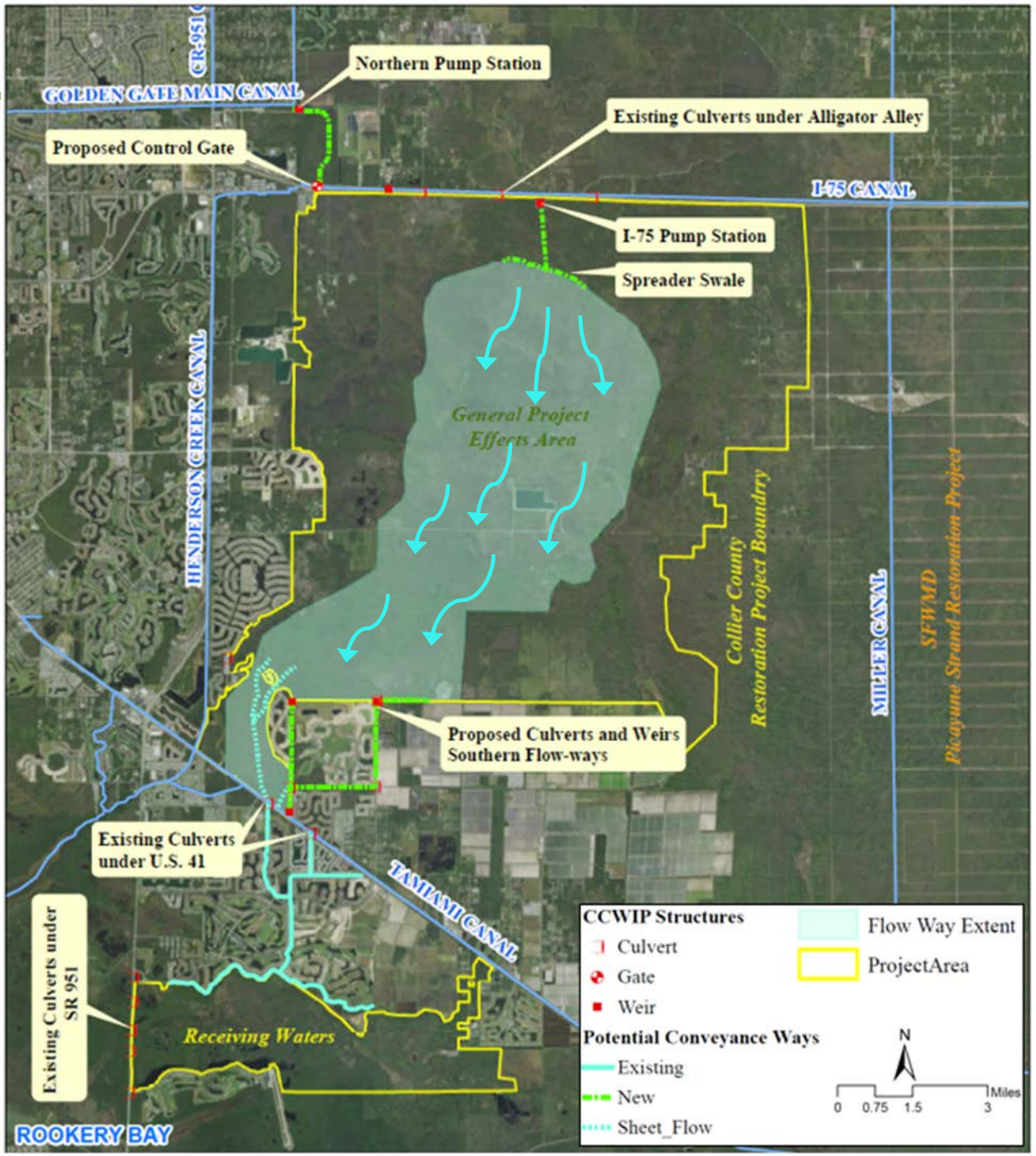
- The entire PSSF is about 73,000 acres
- First parcels were purchased in 1985 as part of the Conservation and Recreational Lands (CARL) program
- Hydrologic and Ecologic restoration for the PSSF was identified as part of the CERP
- Hydrologic restoration is one of the goals of the PSSF 10-year resource management plan

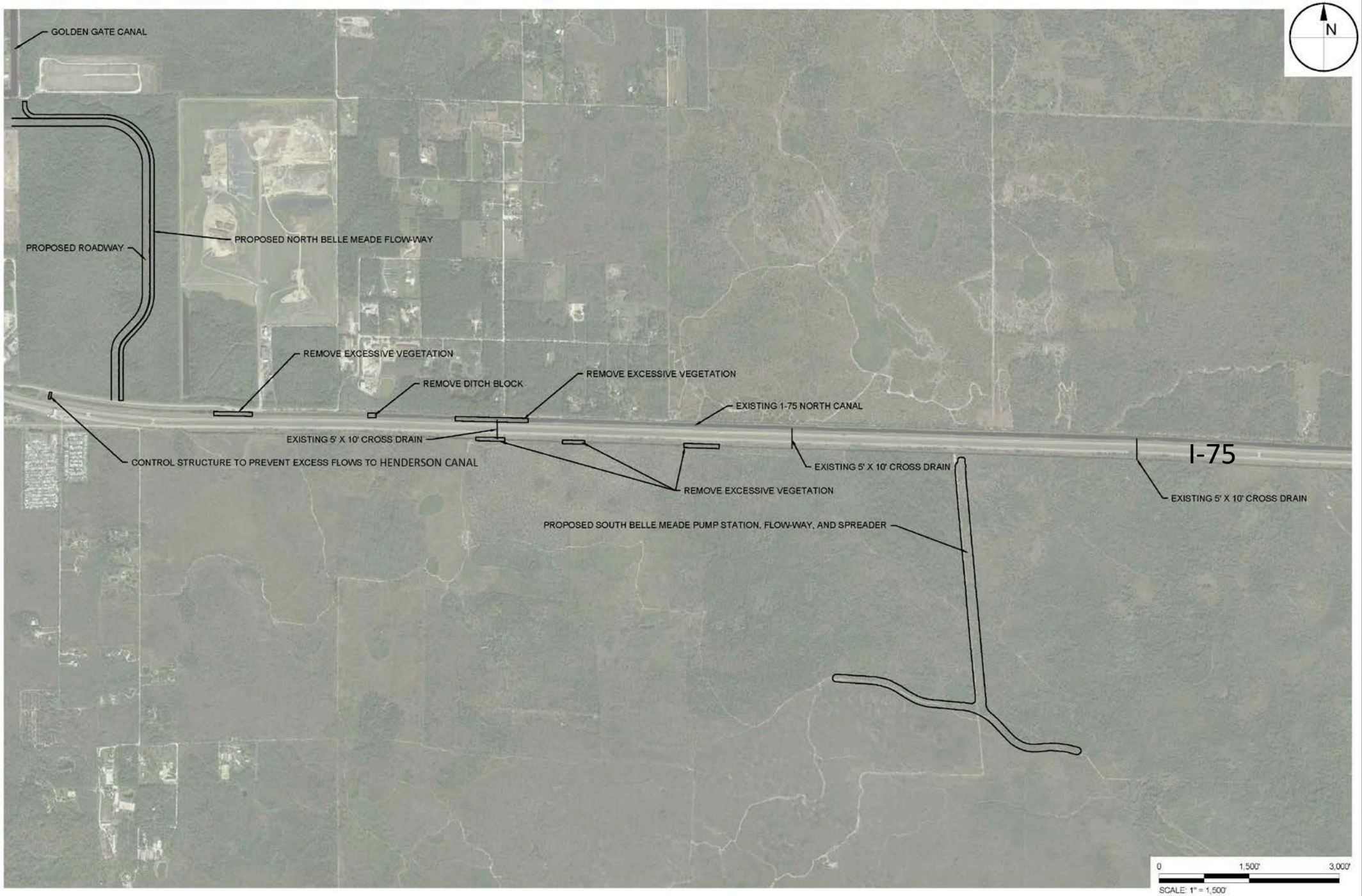


Collier County

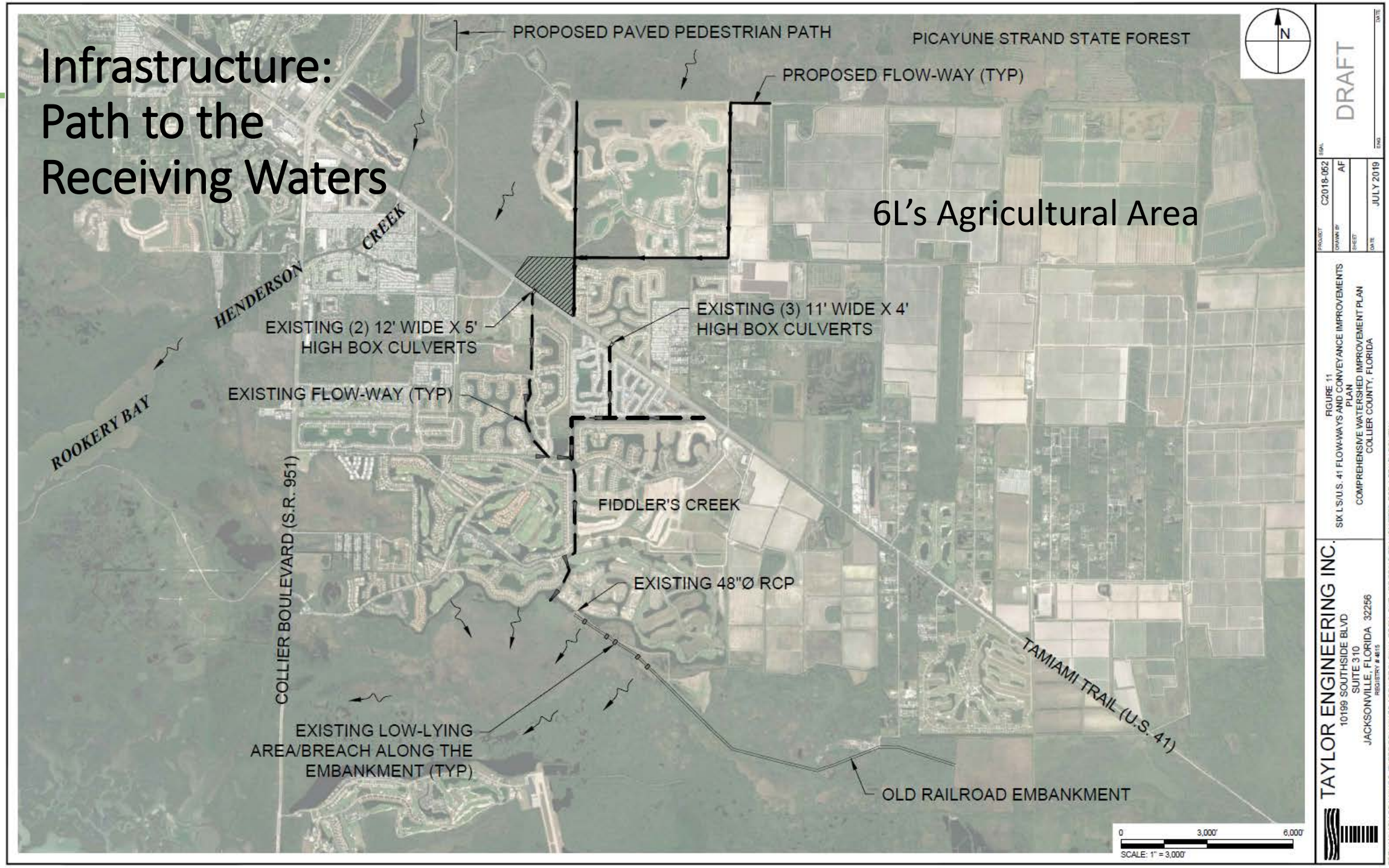
Proposed Project

- Divert up to 100 cubic feet per second (cfs) from Golden Gate Canal when excess water is available:
  - 2 pump stations,
  - I-75 canal improvements
  - 2 linear flow ways and 1 spreader
- Sheet flow through western PSSF (a.k.a. Belle Meade Flow-Way)
- Increases in evapotranspiration and groundwater recharge
- Flow accommodations around developments, 6Ls Agricultural Area, and into coastal fringes/eastern Rookery Bay



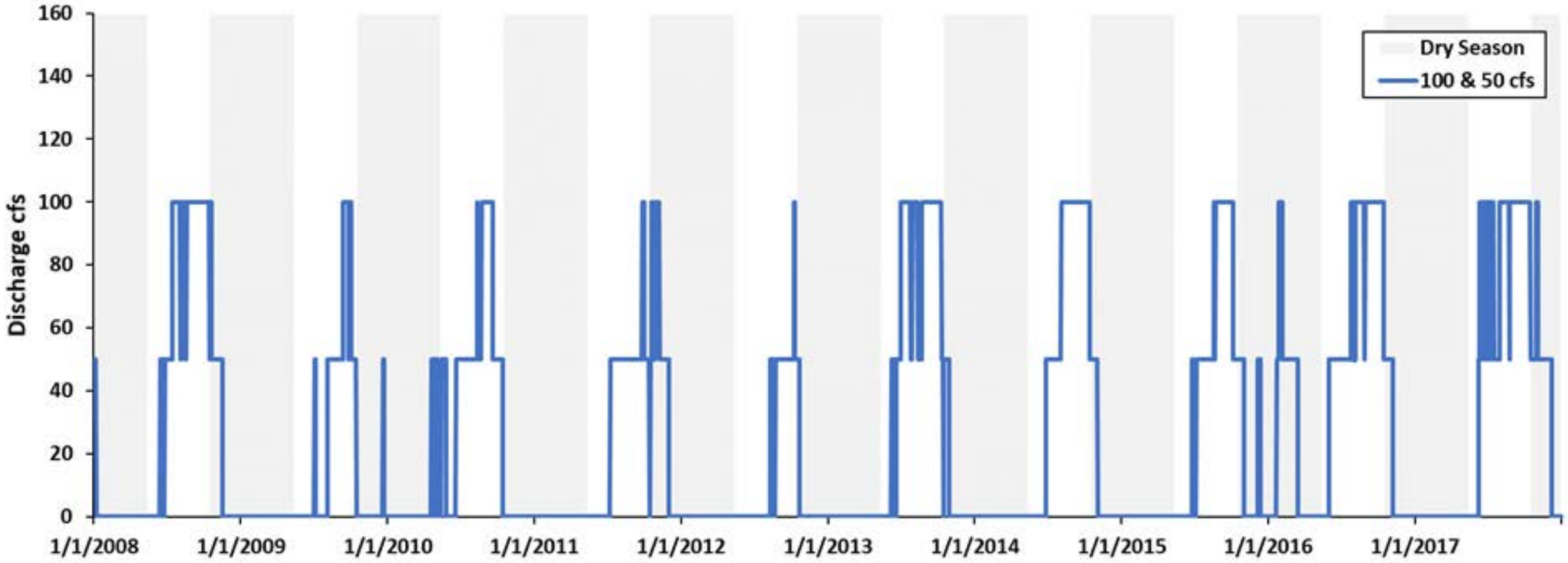

GOLDEN GATE CANAL
PROPOSED ROADWAY
PROPOSED NORTH BELLE MEADE FLOW-WAY
REMOVE EXCESSIVE VEGETATION
REMOVE DITCH BLOCK
REMOVE EXCESSIVE VEGETATION
EXISTING I-75 NORTH CANAL
EXISTING 5' X 10' CROSS DRAIN
CONTROL STRUCTURE TO PREVENT EXCESS FLOWS TO HENDERSON CANAL
EXISTING 5' X 10' CROSS DRAIN
REMOVE EXCESSIVE VEGETATION
I-75
EXISTING 5' X 10' CROSS DRAIN
PROPOSED SOUTH BELLE MEADE PUMP STATION, FLOW-WAY, AND SPREADER
N
0
1,500'
3,000'
SCALE: 1" = 1,500'
DRAFT
PROJECT C2018-052
DRAWN BY AF
SHEET 7 of 11
DATE NOV 2019
FIGURE 7
INTERSTATE 75 CANALS IMPROVEMENT PLAN
COMPREHENSIVE WATERSHED IMPROVEMENT PLAN
COLLIER COUNTY, FLORIDA
TAYLOR ENGINEERING INC.
10199 SOUTHSIDE BLVD
SUITE 310
JACKSONVILLE, FLORIDA 32256
REGISTRY # 4815
PRELIMINARY DRAWINGS THESE DRAWINGS ARE NOT IN FINAL FORM BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW

Infrastructure: Path to the Receiving Waters



Proposed Project – Pumping Protocol

- Divert 100 cubic feet per second (cfs) when flow at GG3 is 450 cfs or greater (55 days/yr)
- Divert 50 cfs when flow in GGC near GG3 is between 200 and 450 cfs (83 days/yr)
- Confirmed no impact to downstream permitted water users



Project Benefits

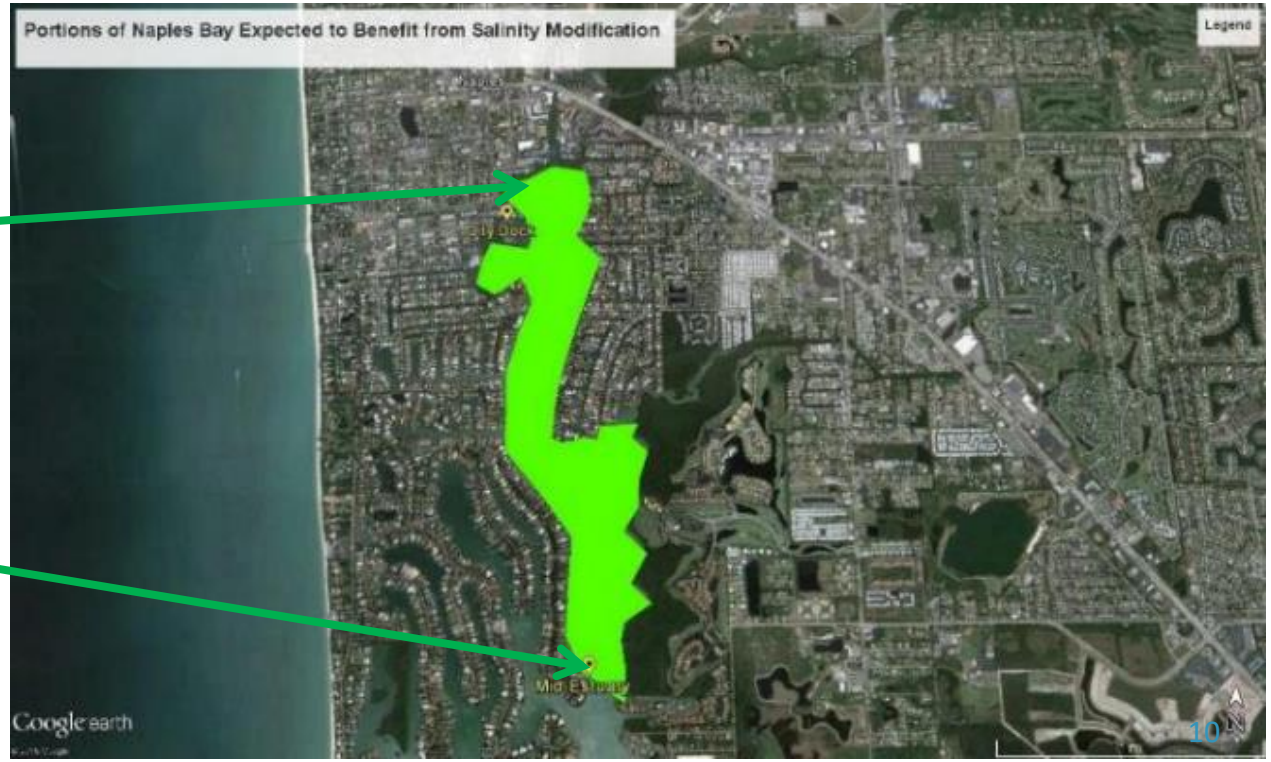
- **Naples Bay** (from Atkins, 2016)
  - Changes in salinity regimes create positive conditions for habitat development
  - Expected water quality benefits associated with nutrient load reductions
  - Turbidity reductions
- **Picayune Strand State Forest**
  - Increase water depth and duration to previously impacted wetlands, with minimal changes to vegetation
  - Benefit to almost 10,000 acres of mostly cypress and hydric (wet) flatwoods
  - Reduce potential for forest fires
- **Rookery Bay**
  - Restore freshwater inflows from forest to Rookery Bay
  - Will maintain water quality of current watershed

Project Benefits

Naples Bay – area benefited is about 400 acres (from Atkins, 2016)

- Diverts ~6.3 Billion Gallons per year (~430,000 swimming pools). *More than double the volume in the Atkins 2016 plan estimate*
- Atkins, 2016 expectation of 20% increase in salinity and an average salinity difference of 2 ppt or higher *(should increase substantially)*
- Sets the stage for future sea grass and oyster bed increases

After diversions implemented, potential locations for "jump starting" restoration via seagrass transplanting and oyster reef deployment



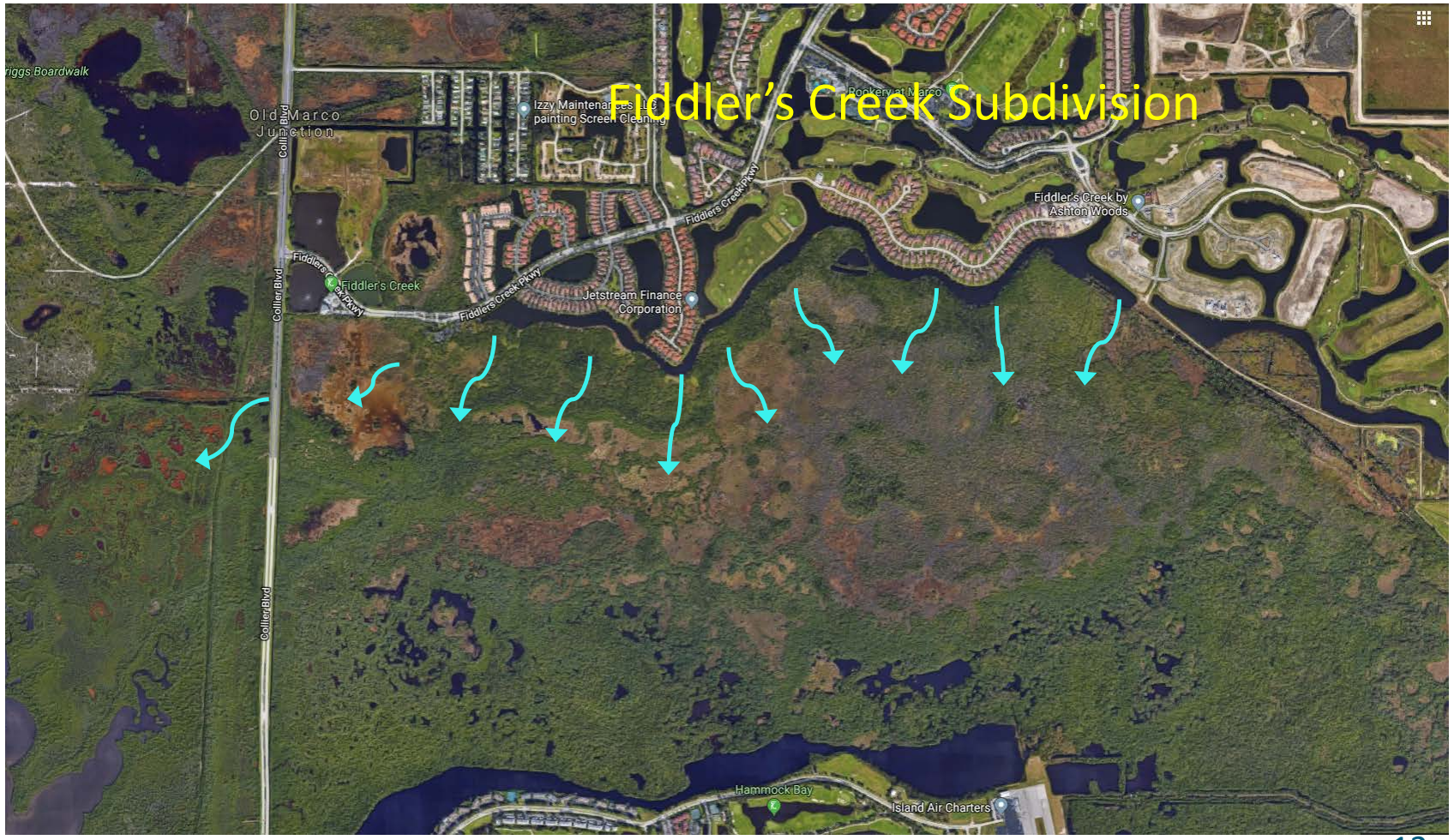
Benefits to Picayune Strand State Forest

- Increase water depth and duration to previously impacted wetlands, with minimal changes to flora and fauna
- Benefit to about 9,000 acres of mostly cypress and hydric flatwoods
- Reduce potential for forest fires

Project Benefits

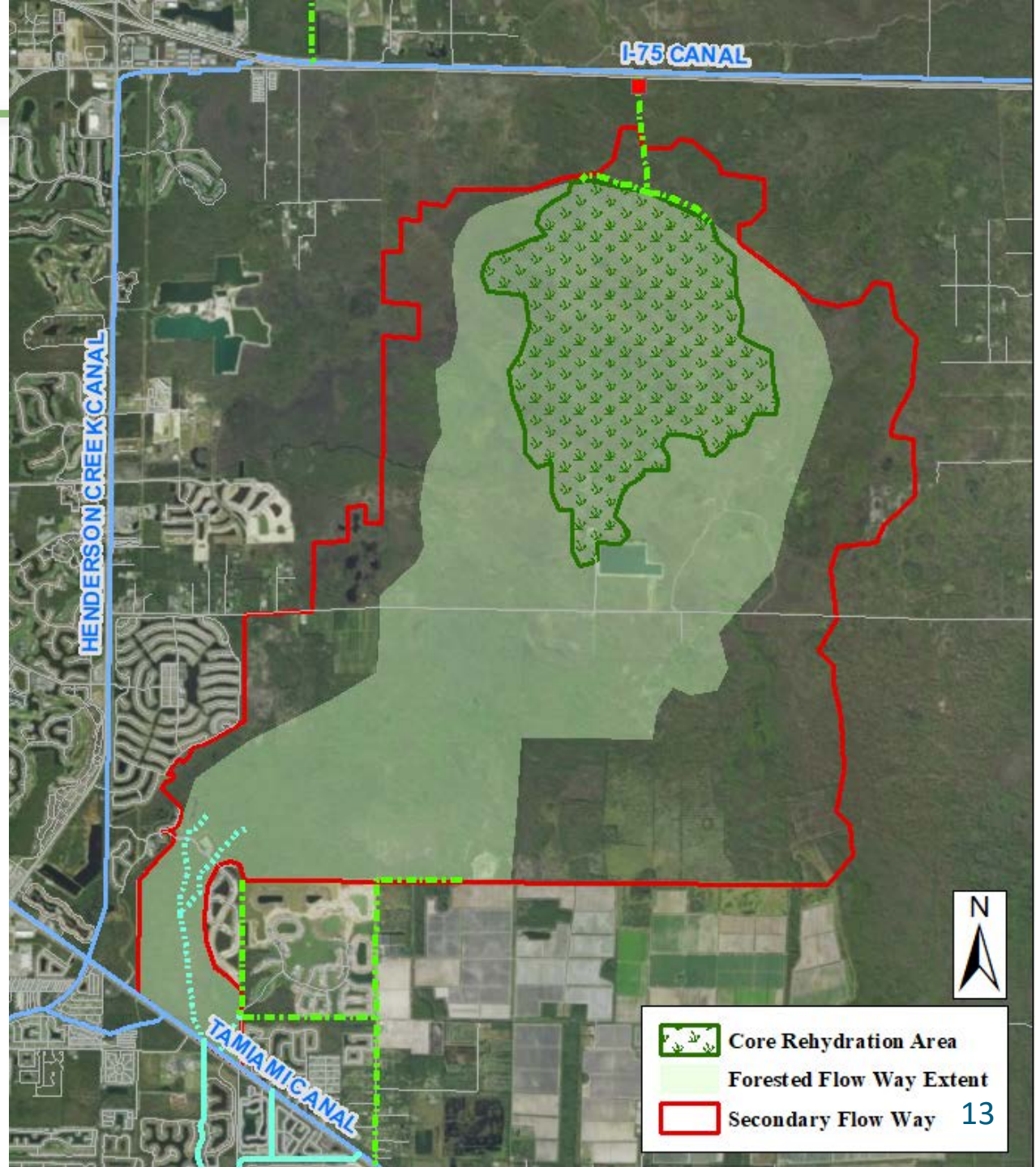
Benefits to Rookery Bay

- Restore freshwater inflows from forest to coastal wetlands fringing Rookery Bay
- 1,500 to 2,000 acres of coastal wetlands rehydrated
- Sufficient combination of water storage and sheet flow to maintain water quality of current watershed



Potential Changes

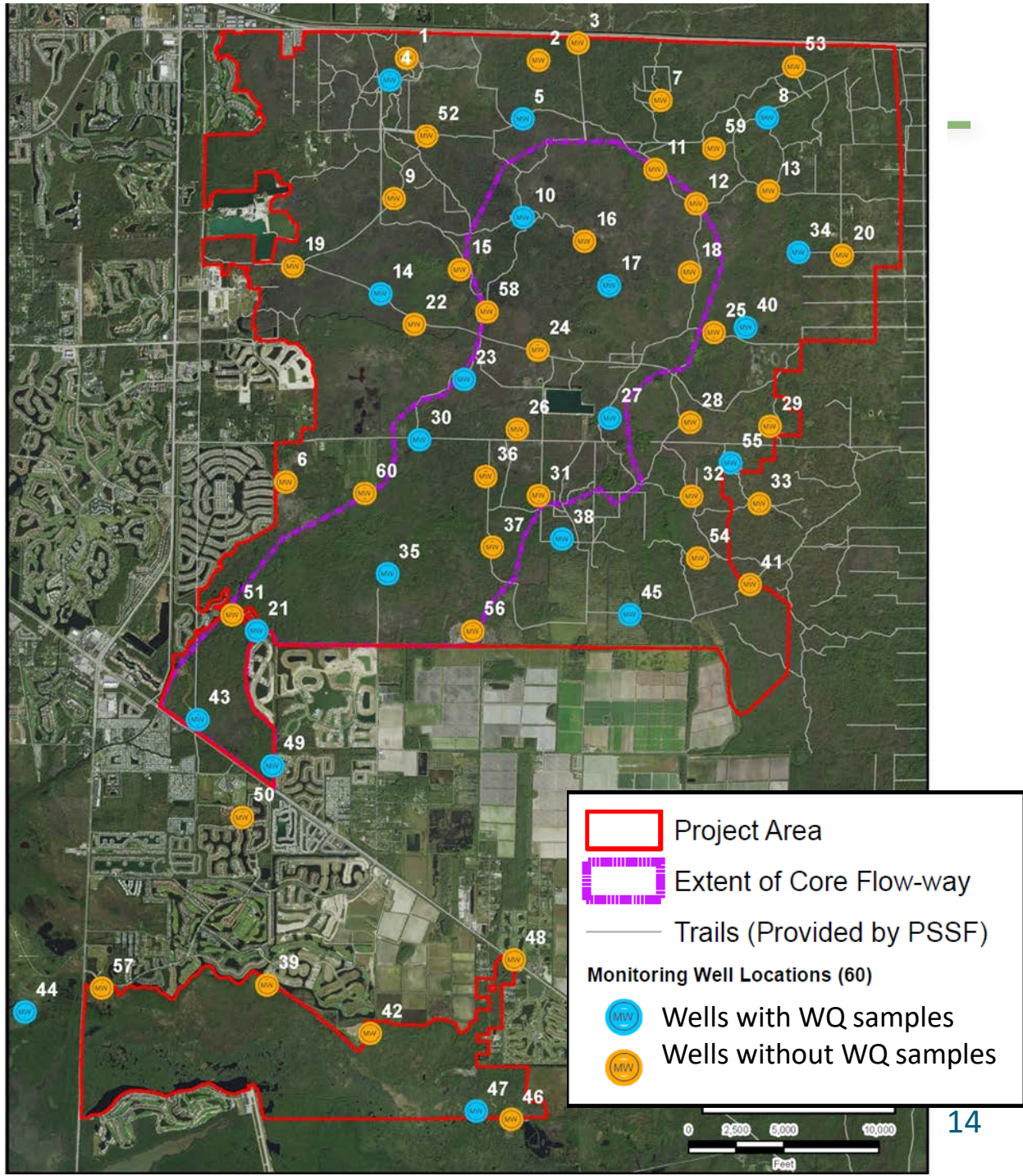
- Inside Core Rehydration Area:
  - 2-8 inches of additional water depth
  - Duration extended to ~6 mo./year
- Outside Core Rehydration Area but in Primary Flow-Way:
  - Less than 2 inches additional water depth
  - ~1-2 months per year increase in duration
- Outside Primary Flow-Way but inside secondary Flow-Way:
  - Less than 1 inch increase
  - Less than 1 month increase in duration



Collier County

Monitoring Stations

- 60 Monitoring Locations
  - 60 Groundwater and Surface Water Monitoring Wells
  - 60 Vegetation Transects
  - 30 Water Quality Sampling Stations
- Effectively tracks project performance
- Provides database for effective adaptive management



Operations and Adaptive Management

- Pumps off during flood events
- Gated control structure to control flows to Henderson Creek when pumps are on. Gates fully open when pumps are off.
- Monitoring results (hydrology and vegetation) will be reviewed periodically post-construction
  - Adjustments to pump operations can be made in response to observed changes in hydrology, vegetation, and/or flood protection

Potential Changes

No Adverse Impacts to FDOT Roadways

- I-75
- U.S. 41

Re: Collier County Watershed Improvement Project

Dear Mr. McAlpin:

I have reviewed the conceptual plan for the Collier County Watershed Improvement Project prepared by Taylor Engineering, Inc., December 2019. The Florida Department of Transportation (FDOT) does not believe the proposed conceptual plan will create an adverse impact upon FDOT's systems. The project will be required to submit for review via a Drainage Connection Permit to obtain final approval.

If you have any questions regarding this correspondence, please feel free to contact me at:

Brent Setchell, P.E.
District Drainage Design Engineer
Florida Department of Transportation
801 N. Broadway Avenue
Bartow, Florida 33830
863-519-2557
Brent.Setchell@dot.state.fl.us

Sincerely,

Brent Setchell

Digitally signed by:
Brent Setchell
Date: 2020.01.31
15:10:40 -05'00'

Collier County

Potential Changes

No Adverse Impacts to Subdivisions

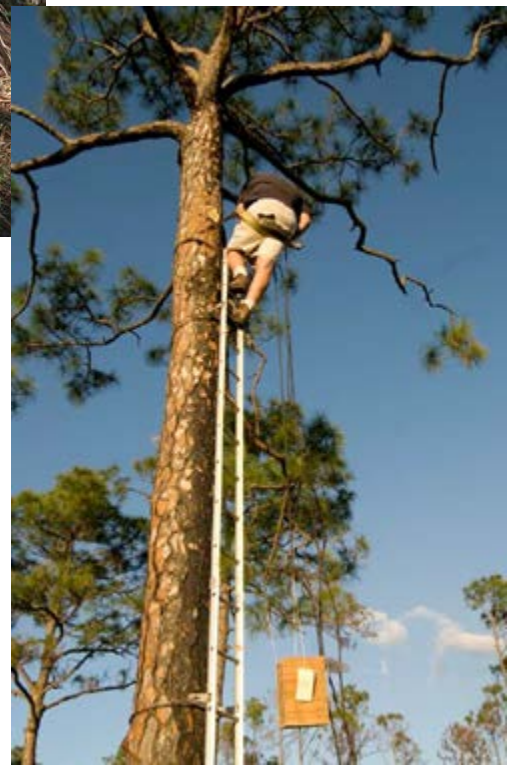
Including, but not limited to:

- Winding Cypress
- Verona Walk
- Naples Reserve
- Reflection Lakes
- Greenway Road
- Fiddler's Creek

Collier County

Activities Underway and Planned

- Multi-Year Monitoring and Mapping
  - Groundwater elevations
  - Water quality
  - Vegetation
- Agency Coordination
  - FDEP, SFWMD, FFS, FFWCC
  - USACE, USFWS
- Modeling and Analysis (Completed)
  - Surface Water / Groundwater with MIKE SHE / MIKE-11
  - Water Quality
- Preliminary Design – (Completed)
- Permitting Underway – Conceptual ERP Submitted



Agency Coordination

- Extensive Coordination with SFWMD Regulatory, PSRP, and BCB Staff
  - 9/07/18: SFWMD Regulatory – Introduction to project
  - 10/09/18: SFWMD Big Cypress Basin and PSRP Staff – Introduction to project
  - 11/14/18: SFWMD BCB – Introduce BCB staff to project and discuss water availability in Golden Gate Canal
  - 3/13/19: USACE-IMC Modeling Team – Sharing of H&H modeling results and discussion of approach to modeling combined effects of CWIP and PSRP
  - 10/15/19: SFWMD Big Cypress Basin – Project update focusing on hydrologic and hydraulic modeling completed for the CWIP
  - 12/16/19: SFWMD Regulatory – Pre-application meeting; content of application

Conclusions of Analyses to Date

- Project meets objectives of restoring hydrology within the Belle Meade Flow-Way
- Coordination with landowners, FDOT, Florida Forest Service, FFWCC, USFWS to focus and complete necessary designs, permissions, and analyses.
- Combined PSRP and CWIP changes along eastern project boundary do not significantly alter hydrologic conditions in the project area
- Monitoring program is tracking system hydrology, vegetation, water quality
- Avoids/minimizes adverse impacts to infrastructure, listed and managed species habitats
- Monitoring and operational flexibility allow for adaptive management

THANK YOU
Questions?