DEPARTMENT OF THE ARMY PERMIT APPLICATION

APRIL 2020

COLLIER COUNTY
COMPREHENSIVE WATERSHED IMPROVEMENT PLAN
COLLIER COUNTY, FLORIDA

SUPPLEMENTAL INFORMATION
ATTACHMENT 1

PROJECT OVERVIEW

Supplemental Information Attachment 1 - CWIP Project Overview

Project Purpose and Need

The Collier County Watershed Improvement Project (CWIP) proposes restoration of hydrologic conditions in the natural area immediately east of Naples, FL between I-75 and US-41 by withdrawing water from the Golden Gate Canal and diverting it to the Picayune Strand State forest (**Figure 1**). The study area was once part of a much larger watershed extending well north of I-75. Development of the Golden Gate Estates subdivision and the associated network of canals, as well as the construction of I-75, cut off the northern third of the watershed. The runoff from that northern area was diverted into the Golden Gate Canal (GGC) and other stormwater ditches and drained to Naples Bay. The estuarine ecosystem within Naples Bay has been degraded by excessive freshwater inflows reducing salinities in the bay. The redirection of freshwater flows to the bay has dehydrated of the area south of I-75, with attendant changes in vegetation communities and other ecosystem behaviors due to the changed hydrologic conditions.

Collier County now proposes to return a portion of that diverted water to the project area. Due to other permitted water uses of the GGC flows, development within the study area for recreational and some residential/commercial uses, bordering urbanization, and the importance the habitat area for listed species, especially the Red-Cockaded Woodpecker, Florida Panther and Bonneted Bat, Collier County proposes hydrologic restoration to the extent practicable, rather than restoration of any estimated or simulated pre-development hydrologic condition. Intensive monitoring and an adaptive management using the monitoring data will allow the county to optimize the restoration over the long-term. Hydrologic restoration will not initially or in the long-term adversely affect the ecosystem, impinge on other water uses, or adversely affect developed properties bordering the study area.

To develop the restoration project safely and appropriately over time, the project is designed with proposed rehydration schedules and volumes that will focus effects in approximately 9,000 acres of the western Picayune Strand State Forest (PSSF) east of Naples FL (**Figure 2**: Core Rehydration Area and Flowway Extent). Outside that area the project may increase hydroperiod, wet season average water elevation and dry season groundwater elevations to a much lesser extent or not at all.

Over time, analysis of data from the project monitoring system (now collecting baseline data) and formal adaptive management efforts with agency stakeholders will optimize the restoration. Landscape boundaries of the hydration area that limit the scope of the rehydration efforts include the I-75 corridor to the north, and city of Naples development to the west. To the south, the 6Ls Agricultural Area creates a boundary to project effects. To the east, the SFWMD CERP (Comprehensive Everglades Restoration Program) Picayune Strand Forest Restoration Project (PSRP) creates a hydrologic condition that the CWIP accounts for in evaluation of project effects in order to avoid negative hydrologic impacts. In addition, protection of private properties within the project area also provides a restraint on hydrologic restoration. The total assessment area within those boundaries includes about 22,000 acres.

Project Description

Water will be diverted from the Golden Gate Canal through pumps located upstream of the GG-3 weir (**Figure 1**). Based on a GG-3 flow duration analysis and permitted water diversions from the canal, the project proposes to divert 100 CFS when the discharge through the structure exceeds 450 CFS (~55 days/year) and 50 CFS when the discharge is between 200 CFS and 450 CFS (~83 days/year). Diversions will occur most often during the wet season. However, sufficient water may also be available during the early dry season to allow for smaller (i.e. 50 CFS) diversions. The diverted water will flow southwards via a proposed ditch that discharges water directly into the I-75 north canal. An operable gate structure is proposed on the I-75 north canal to force water to move eastwards and hence restrict discharge into Henderson Creek. The water will continue to flow south into the I-75 south canal through existing culverts under I-75, where it will be pumped into a proposed flow-way located south of the canal, which will serve as an in-line water treatment facility providing sufficient settlement of solids to treat runoff from I-75. The spreader swale will have fixed weirs that both control water elevations within the entire flow-way system as well as release water into the Picayune Strand State Forest as sheet flow. Once released into the forest, the flow of water is driven by forest topography which slopes gradually from northeast to southwest. After infiltration and evapotranspiration losses, the remaining water will reach the southwest end of the forest where a collector ditch will receive the majority of the water near the eastern edge of Naples Reserve subdivision. The flow will be routed around the residential developments by means of proposed canals and will be discharged into the U.S. 41 north canal. A small portion of the forest water will continue to flow southwest as gravity sheet flow under Winding Cypress Drive and will also discharge into the U.S. 41 north canal. From here, the water will continue to flow south under Tamiami Trail (U.S. 41) through existing culverts into the U.S. 41 south canal. The water will then continue south and will be routed through the Fiddler's Creek residential developments using two existing canals, both of which discharge into a linear lake bordering the southern boundary of the Fiddler's Creek residential developments. The water will spill over the southern bank of the lake into wetlands fringing Rookery Bay as sheet flow. The sheet flow will continue to flow south and southwest towards Rookery Bay. A small fraction of the flow will make its way westwards towards Henderson Creek under existing S.R. 951 culverts. The reader is referred to **Supplemental Information Attachment 5 Hydrologic and Hydraulic Modeling** section 2.2.1.2 for details of the project drainage system and design details. The **Permit Drawings** detail all of the infrastructure components.

The project infrastructure will impact about 60 acres, including approximately 35 acres of wetlands and surface waters. Hydrologic enhancement of the freshwater wetlands within the core rehydration area and flowway extent resulting from the project will offset wetland impacts resulting from project construction.

On-site and Off-site Flooding Impacts

Flooding impacts of the proposed project to on-site and off-site canals and residential developments have been evaluated for 100-year and 25-year design storms. Simulated water levels in current and with-project conditions were compared for each design storm. Maximum water levels were compared with bank elevations of canals and/or lowest designed pavement elevations in residential developments. The project does not cause any adverse impacts on water levels in the major canals

included in the drainage system, such as I-75, Henderson and Tamiami canals. A separate report on water level impacts in the canals maintained by FDOT has been submitted to FDOT for their concurrence. Similarly, the project will not cause adverse impacts on water levels in residential developments included in or adjacent to the drainage system, such as Naples Reserve, Fiddler's Creek, SixL's Agricultural Area and Winding Cypress. The reader is referred to **Supplemental Information Attachment 5 Hydrologic and Hydraulic Modeling** Section 3 for details on the design storm analysis.

Picayune Strand State Forest Private Property Ownership

A total of 95 private parcels have been identified in the Picayune Strand State Forest that are located inside the project effects area. The county is working to acquire the property rights necessary to rehydrate these areas, in the form of flowage easements or equivalent legal instruments. As an inducement for private property owners within the primary and secondary flowway to execute a flowage easement, a Transfer of Development Right (TDR) bonus credit has been conceptually approved by the Board of County Commissioners, in addition to any TDR credits already available on these "sending lands". A TDR credit is a credit that represents the ability to add one unit of density in an area identified by the County as appropriate for higher density. Such an area is called a Receiving Area. Owners of property in Receiving Areas will, over a period of time, make plans to develop their properties at higher densities. In order to do so, they will need TDR credits. TDR credits can be bought and sold, and so their value fluctuates with the market. The County is in the process of drafting a formal amendment to their Growth Management Plan to accommodate the proposed TDR incentives.

Within the project effects area at least three properties will remain in private ownership. These properties will be protected by means of a berm, ditch and pump system designed to maintain current levels of flood protection on these properties (**Permit Drawings: Figure 10 Sanders Blvd Protection Feature**).

Project Operations

Pumped diversion rates were established through hydrologic and hydraulic modeling of water availability in the Golden Gate Canal, in combination with an analysis of downstream effects on hydrology, vegetation, and infrastructure (Refer to **Supplemental Information Attachment 5 Hydrologic and Hydraulic Modeling**). The proposed pumped diversion rates are 100 cfs whenever flows in the GGC (in the vicinity of GG3 control structure) exceed 450 cfs, and 50 cfs whenever the flow is between 200 cfs and 450 cfs.

Pump operations will be tied to observations of headwater elevation (HW), tailwater elevation (TW), and gate position (GP) at the GG3 structure. The SFWMD has developed rating formulas that relate these three levels to discharge rates through the structure. When the combination of levels indicates that the discharge through GG3 exceeds 200 cfs, pumping from the GGC into the northern flowway will begin at a rate of 50 cfs. Because the pump station will be located upstream of GG3, the discharge through GG3 will be reduced by 50 cfs.

When the combination of levels indicates that discharges through the GG3 structure exceed 400 cfs (i.e., a total GGC flow of 450 cfs including the 50 cfs pumped diversion), the pumping rate will be increased by an additional 50 cfs, for a total pumped diversion of 100 cfs. When the discharge rate through

GG3 drops below 350 cfs, the pumping rate will fall back to 50 cfs. When the discharge through GG3 drops below 150 cfs, the pumps will be turned off.

Pumps will be shut off when any of the following occurs:

1. The 72-hour rainfall forecasts anywhere in the project area exceeds 5 inches of rainfall. Rainfall forecasts are published daily at: https://www.wpc.ncep.noaa.gov/qpf/day1-3.shtml and at https://www.sfwmd.gov/weather-radar/sfwmd-forecast. The 5-inch depth is approximately one-half of the 3-Day, 10-year rainfall per the SFWMD ERP Basis of Review.
2. High water levels in the CWIP effect area are observed that may result in negative impacts to infrastructure.
3. Flooding conditions are observed in any of the developed areas downstream of the I-75 pump station, including Sabal Palm Road (West of triple G Loop).

An operable underflow/sluice gate will be built in the I-75 North Canal just west of the junction between the North Belle Meade Flowway and the I-75 North Canal. The purpose of the gate is to keep pumped CWIP water from flowing westwards into the Henderson Creek Canal. The operable gate will be designed to close partially on days when CCWIP discharge is being pumped into I-75 North Canal and will ensure uninterrupted and unobstructed flows for the rest of the days when pumps are off. Approximately 30 minutes after the commencement of pumping into the northern flowway, the gate will be partially closed, to a level of approximately 0.6 feet above the sill elevation. When pumping stops, the gate will be fully opened (following a 30 minute lag) and will remain fully open until pumps are re-started.

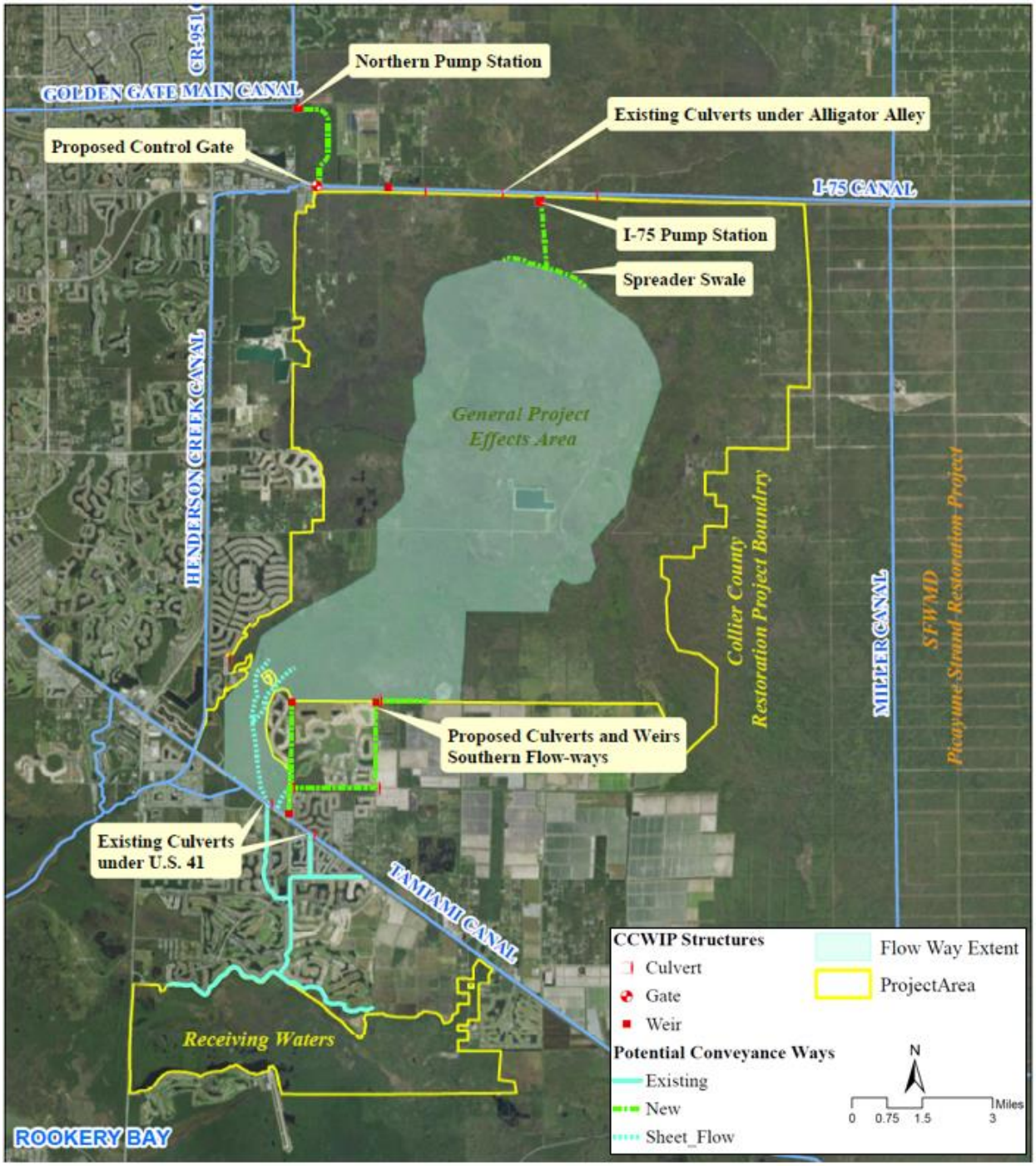

Figure 1. CWIP Restoration Project Overview

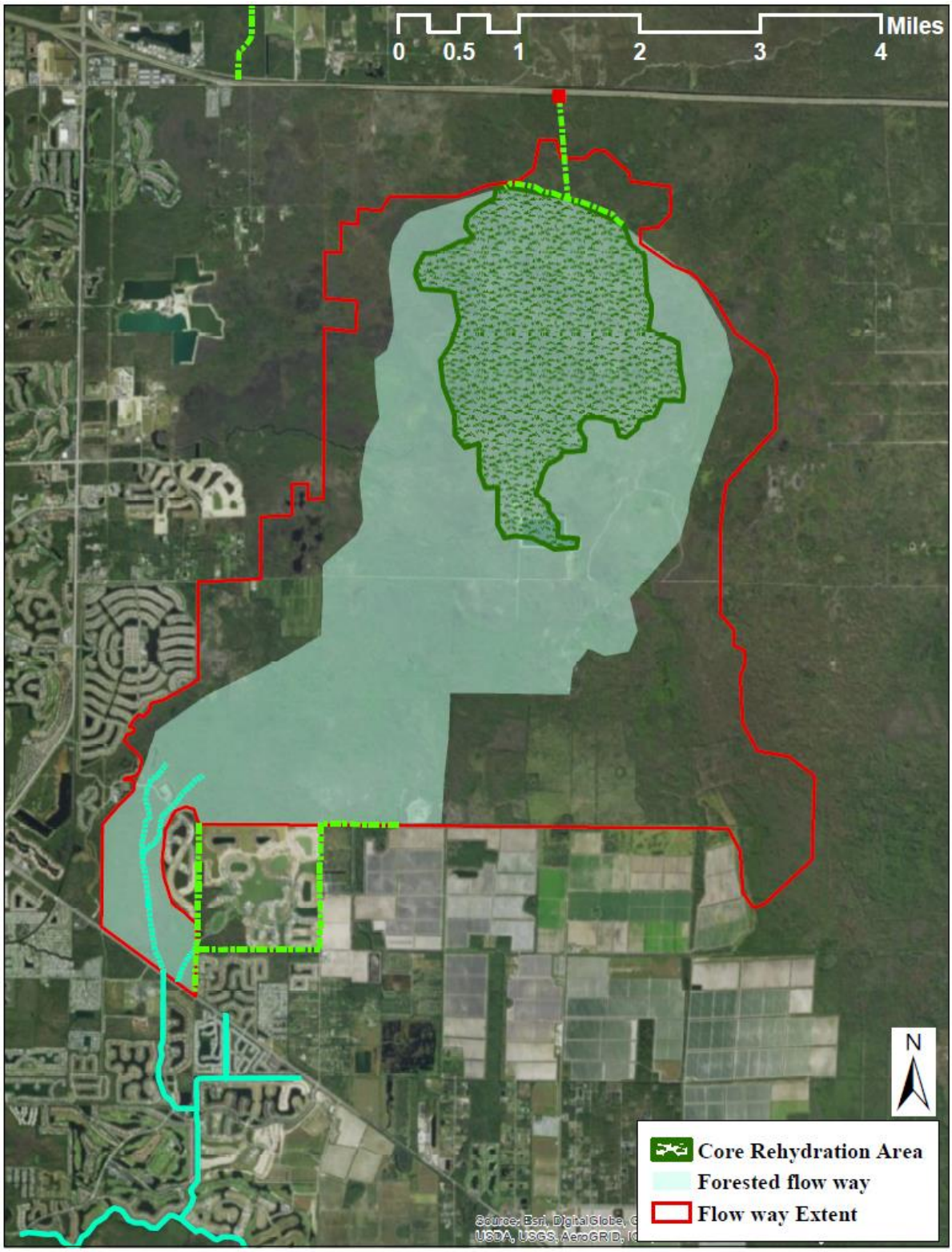

Figure 2. CWIP General Project Effects Area, about 9,000 acres.

Monitoring Plan

Collier County has defined a monitoring plan, installed a monitoring system (Figure 3), and is currently collecting background information from that system.

The basic monitoring system is described in **Supplemental Information Attachment 10** and shown in **Figure 3**. Sixty shallow wells (**Figure 3**) were installed to a target depth of approximately four (4) feet below grade surface or until refusal occurred. Hobo MX2001 water level loggers were installed to record water depths at four (4) hour intervals and is downloaded quarterly. Water quality data is collected during each download event at 20 of the wells (**Figure 3**)**.** At each well location, beginning with well installation in the late spring and summer of 2019, transect and plot vegetation data, along with site photographs are recorded annually. The vegetation sampling plan includes groundcover, mid-story, and canopy species measurements to allow understanding of both short-term and long-term vegetation community responses and allow consideration of conditions important to key plant and animal species. The pre-construction data collection period will provide the baseline information that will allow validation of the hydrologic simulation model and if appropriate modification of the model parameters to best simulate the existing conditions. During project operation, the collected data will support validation of the model (with modifications if appropriate) and allow adaptive management to provide the long-term best project execution of the project.

While the hydrologic response is rapid, the vegetation response will occur over a period of years. The baseline and operation period annual data will be compared for change beginning after a full year of operation and collection of the first annual operating period vegetation data.

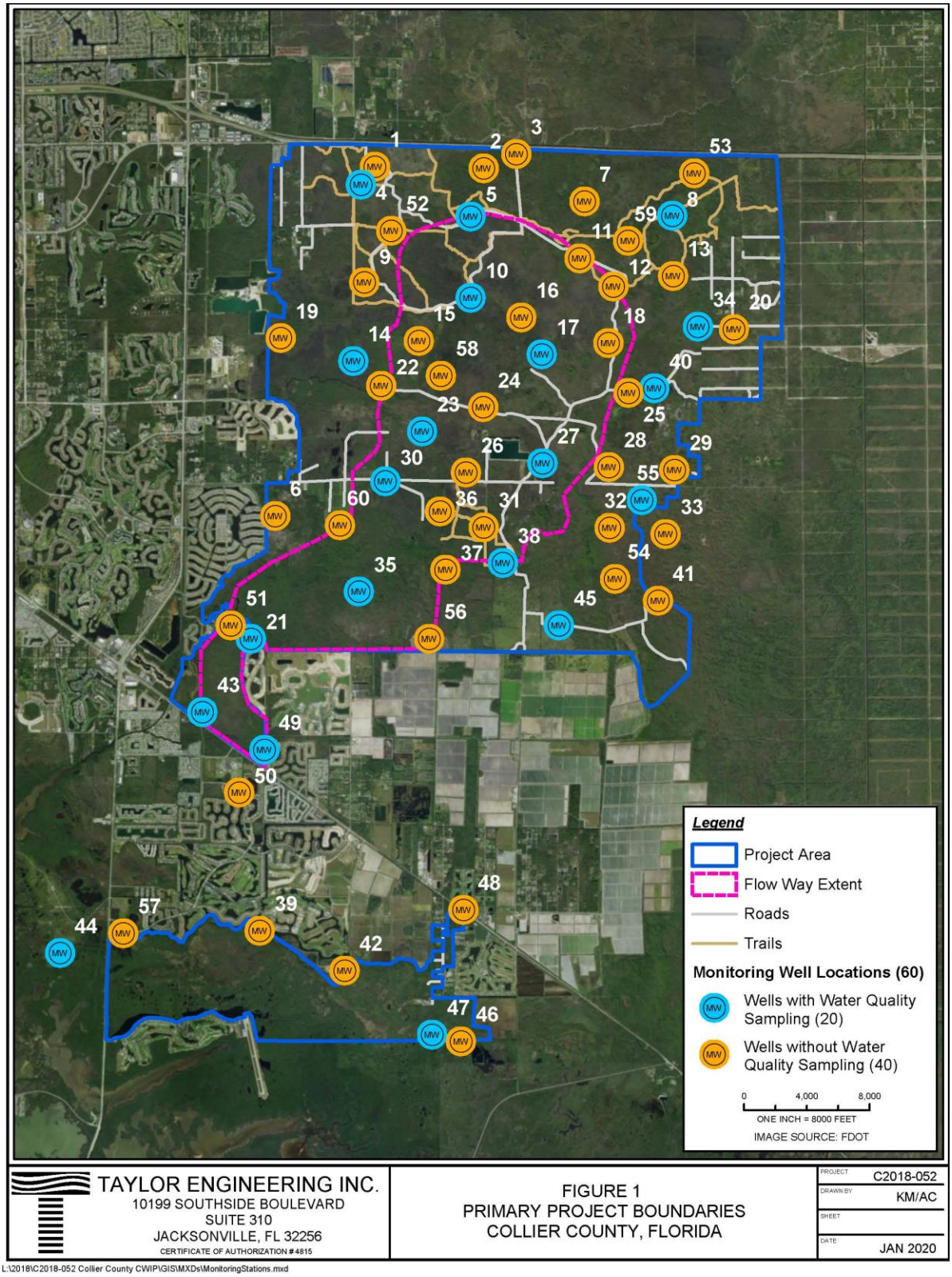

Figure 3. CWIP Hydrologic, Water Quality, and Vegetation Monitoring Stations (Stations with Water quality monitoring are in blue)

Adaptive Management Plan

Introduction

The CWIP project has the goals of enhancing hydrologic conditions in the PSSF project area and decreasing freshwater flows to Naples Bay, without creating significant environmental impacts. The operational plan for withdrawing water from Golden Gate Canal and discharging it into the PSSF provides the basis to achieve the project goals. However, the operational plans are based on model results; once the project begins operating and data from the monitoring system are collected and analyzed, those plans can be adjusted to refine the operations to better meet the goals. This approach is the heart of the adaptive management plan for the CWIP.

For the CWIP, adaptive management intends to improve project operations to better meet project goals: to improve habitats in general (Picayune Strand State Forest, Naples Bay, and Rookery Bay wetlands) and habitat for listed and managed species, to protect and enhance human activity (e.g., recreation in the state forest), and to protect existing infrastructure. While led by Collier County, other project stakeholders, with key roles in conceiving, developing, and implementing the project have a significant role in the adaptive management process. Those stakeholders include at least the following: Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, Florida Forestry Service, Rookery Bay National Estuarine Research Reserve, South Florida Water Management District, US Fish and Wildlife Service, and United States Army Corps of Engineers, and the citizens of the state of Florida.

Short Term and Long-Term Adaptive Management Plan

Collier County has divided the adaptive management process into short-term and long-term actions. Using the monitoring data, Collier County will alter short-term and long-term operational plans to enhance the project performance. The current plans, based on hydrologic simulations, identify pump activation and pumping rates based on GGC flow rates. The plans also call for shutting down the pumps when high rainfall is forecast or high-water levels in the CWIP effect area are observed that may result in negative impacts to infrastructure (see Operational Plans summary above and **Supplemental Information Attachment 10**). The monitoring data will allow evaluation of the performance the project using the GGC flow values and allow the county to identify changes to those plans to maintain or enhance target hydrologic conditions without impacting development (roads, houses, private property, etc.). It may be possible to assess the effects of short-term operations as soon as one full quarter of data collection after the operational events occur. This will mainly involve storm-associated shutdown values; longer term datasets (at least a year period) will be necessary to begin to assess overall project performance and identify any long-term pumping changes.

The current plans will be provisionally revised as the environmental data that reflect the results of the operational plans are analyzed. Some decisions may be made quickly, for instance if the storm-related pump shutdown is assessed to have been planned to occur too close to the expected event. Longer-term, as annual operational data become available, Collier County will be able to assess and adjust the seasonal operations.

As soon as sufficient data are available to assess the effects of short-term events (e.g. hurricanes or droughts) Collier County will assess whether the operational plan was appropriate and effective. As

necessary, the county will identify necessary changes in the operation plans for better project performance and inform the project stakeholders of any recommended changes. As necessary, the county will hold workshops to present the data and change recommendations.

Once the project begins operating, Collier County will hold an annual Adaptive management Plan Review with key stakeholders to present analysis of project performance and obtain consensus for significant changes to the operational plans. The county will release an annual project report and hold annual technical workshops to present the prior year project performance, compare of predicted and actual project performance, and obtain consensus on desirable changes to the operational plan.

Red-Cockaded Woodpecker Habitat Adaptive Management Plan Component

The Red-Cockaded Woodpecker (RCW) population in the project area is a very important natural resource to which the project cannot cause adverse impacts. Benefits to the population by improving the habitat of that species is not a project goal but would certainly be appreciated by the county and all the project stakeholders. Beneficial vegetation changes would probably not be measurable for a number of years. However, hydrologic data can provide evidence of impact avoidance on an annual basis. Therefore, annual evaluation of hydroperiod and water elevations at monitoring locations already identified in the Red Cockaded Woodpecker analyses presented in **Supplemental Information Attachment 7,** Appendix 4, will provide a basis for assessment of project performance and allow development of recommendations to ensure continued avoidance of impacts to RCW. Changes to the monitoring plans based on the monitoring RCW area hydrologic monitoring results will be considered annually. The expert RCW stakeholders (Florida Forestry Service, Florida Fish and Wildlife Conservation Commission, and the US Fish and Wildlife Service) will form a subgroup focused on project performance considering the RCW. The analysis results may also support the goals and objectives of the agencies responsible for RCW recovery.

Adaptive Management Plan Summary

The Collier County CWIP Adaptive Management Plan includes the following components

- Intensive hydrologic, water quality, and vegetation community data collection and analysis.
- Ongoing review and analysis as needed to assess the performance of key short-term operational and identify immediately necessary plan changes.
- Annual assessment of project performance compared to predicted performance, project objectives, and project goals.
- Based on short-term and long-term performance, adjustment of the operation plans to provide best possible project performance.
- Ongoing informal and annual formal coordination with key stakeholders to maintain their understanding of the project performance and consensus for necessary and beneficial changes to project operations.
- The annual project performance evaluation will include a separate evaluation focus on the Red Cockaded Woodpecker habitat hydrology, based on the baseline RCW habitat hydrology assessment provided as part of the project permit package. A stakeholder expert group will work with Collier County on this evaluation and any recommendations for changes to better ensure RCW habitat impact avoidance.