RESOLUTION NO. R-26-137

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA, RELATING TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION STATE REVOLVING FUND; ADOPTING THE FACILITIES PLAN FOR THE MANATEE COUNTY PIPELINE RESILIENCY PROJECT IN MANATEE COUNTY; AUTHORIZING SUBMITTAL OF THE FACILITIES PLAN TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION; PROVIDING FINDINGS; PROVIDING FOR IMPLEMENTATION; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, Manatee County (the "County") owns and operates a public water system that provides potable water service to retail and wholesale customers within Manatee County and surrounding municipalities; and

WHEREAS, the County's raw water supply system includes the East County Wellfield and transmission facilities that convey raw water from the wellfield to the Lake Manatee Water Treatment Plant; and

WHEREAS, the County is advancing the Pipeline Resiliency Project (the "Project") to improve the reliability and resiliency of the raw water transmission system between the East County Wellfield and the Lake Manatee Water Treatment Plant, including improvements to provide additional transmission capacity and redundancy; and

WHEREAS, Section 403.8532, Florida Statutes, establishes the Drinking Water State Revolving Loan Fund program administered by the Florida Department of Environmental Protection ("FDEP") to provide financial assistance for eligible public drinking water system projects; and

WHEREAS, Chapter 62-552, Florida Administrative Code, establishes requirements applicable to the Drinking Water State Revolving Fund Loan program, including requirements related to project planning, design, construction, procurement, and public participation; and

WHEREAS, the County was selected to receive $35,139,169 in Supplemental Appropriation for Hurricanes Helene and Milton ("SAHM") funding for the Project, consisting of approximately $17.57 million in principal forgiveness and approximately $17.57 million in zero-percent interest financing; and

WHEREAS, on March 3, 2026, the Board of County Commissioners of Manatee County, Florida (the "Board") adopted Resolution R-26-032 in furtherance of the County's application for and participation in the SAHM funding program for the Project, including authorization associated with the anticipated financial assistance; and

WHEREAS, Resolution R-26-032 contemplated that a subsequent loan agreement between FDEP and the County would be presented to the Board for approval; and

WHEREAS, a subsequent loan agreement has not yet been provided to the County by FDEP, and FDEP has advised that, generally, approval of planning, plans and specifications is required in connection with loan funding; and

WHEREAS, the County has prepared the East County Wellfield Pipeline Resiliency Project Facilities Plan (the "Facilities Plan") dated October 2026, attached hereto as **Exhibit 1,** as part of the planning requirements necessary to advance the Project through the SAHM and Drinking Water State Revolving Fund process; and

WHEREAS, the Facilities Plan documents the existing raw water supply and transmission system, evaluates alternatives for improving system reliability and resiliency, identifies a recommended planning alternative, evaluates anticipated environmental and financial impacts, and establishes a planning basis for subsequent design and implementation of the Project; and

WHEREAS, consistent with the public participation requirements applicable to the planning process, the County provided public notice, attached hereto as **Exhibit 2**, and conducted a public meeting at a County public library on September 15, 2026, to discuss the Project, the Facilities Plan, the alternatives evaluated, and the anticipated financial impacts and to provide an opportunity for public participation prior to adoption of the planning recommendations by the Board; and

WHEREAS, Rule 62-552.700, Florida Administrative Code, requires the planning process to address the need and justification for the project, alternatives, environmental and economic impacts and benefits, and public participation, including a public meeting, prior to the project sponsor's acceptance of the planning recommendations; and

WHEREAS, following completion of the required public participation process, formal adoption of the Facilities Plan by the Board constitutes the County's acceptance of the planning recommendations and is necessary for submittal to FDEP for review and approval as part of the applicable funding process; and

WHEREAS, following adoption of the Facilities Plan, the County anticipates submitting the adopted Facilities Plan to FDEP for review and approval, continuing development of the Project's plans and specifications, and subsequently presenting any FDEP loan agreement(s), or other documents related to the Project which require Board approval, to the Board for separate consideration; and

WHEREAS, adoption of the Facilities Plan does not constitute approval of any subsequent loan agreement(s), which agreement(s) will be presented to the Board separately if and when provided by FDEP for Board consideration and approval; and

WHEREAS, the Board finds that adoption and submittal of the Facilities Plan is in the public interest and further the County's efforts to improve the reliability and resiliency of its public water supply system and advance the Project toward eligibility for the SAHM funding the County has been selected to receive.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA:

SECTION 1. FINDINGS.

The foregoing recitals are true and correct and are incorporated into this Resolution by reference.

SECTION 2. ADOPTION OF FACILITIES PLAN.

The Board hereby adopts the Manatee County Pipeline Resiliency Project Facilities Plan attached hereto as Exhibit 1 and presented to the Board in connection with this Resolution.

SECTION 3. AUTHORIZATION TO SUBMIT FACILITIES PLAN.

The County Administrator, or designee, is authorized to submit the adopted Facilities Plan and related supporting documentation to FDEP and to provide such administrative, technical, and non-substantive supplemental information as may reasonably be required by FDEP for its review of the Facilities Plan.

SECTION 4. IMPLEMENTATION AND SUBSEQUENT PROJECT ACTIONS.

County staff is authorized to undertake administrative and technical activities reasonably necessary to advance FDEP review of the Facilities Plan and continue development of the Project consistent with existing County authority, approved budgets, procurement requirements, and applicable law.

Any loan agreement(s) or other documents or agreement(s) requiring approval by the Board shall be presented separately to the Board for consideration and approval.

Any loan agreement(s) between FDEP and County, or other documents related to the Project which require Board approval and/or separate Board authorization, are not approved by this Resolution and shall be presented to the Board as required for consideration and approval as necessary.

SECTION 5. RELATIONSHIP TO RESOLUTION R-26-032.

This Resolution supplements Resolution R-26-032 for purposes of adopting the Facilities Plan and advancing the planning requirements associated with the Project. Nothing in this Resolution shall be construed to supersede Resolution R-26-032.

SECTION 6. SEVERABILITY.

If any section, sentence, clause, or provision of this Resolution is held invalid or unconstitutional by a court of competent jurisdiction, such determination shall not affect the validity of the remaining portions of this Resolution, which remaining provision(s) shall continue in full force and effect, provided that the remaining provision(s) can be given legal effect absent the invalid portions.

SECTION 7. EFFECTIVE DATE.

This Resolution shall take effect immediately upon its adoption.

DULY ADOPTED with a quorum present and voting this 20th day of October, 2026.

MANATEE COUNTY FLORIDA

BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA

By: _____
Chairperson

ATTEST: ANGELINA COLONNESO
CLERK OF THE CIRCUIT COURT AND COMPTROLLER

By: _____
Deputy Clerk

EXHIBIT 1 TO RESOLUTION NO. R-26-137

East County Wellfield Pipeline Resiliency Project Facilities Plan

(71 pages)

ADOPTED IN OPEN SESSION 10/20/26 BY RESOLUTION R-26-137

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support



East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026

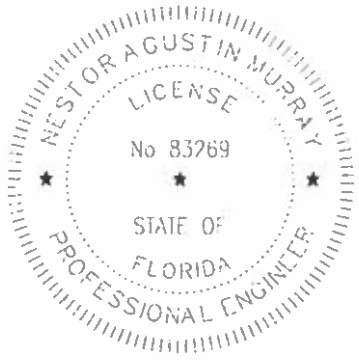
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MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support

East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026



This report has been digitally signed and sealed by Anthony Ryan Horvat on the date adjacent to the seal.

Signature must be verified on any electronic copies.

301 NORTH CATTLEMEN ROAD, SUITE 302 • SARASOTA, FLORIDA 34232 • P 941-371-9832

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Abbreviations

AAD	Annual Average Demand
AOI	Area of Interest
ASR	Aquifer Storage and Recovery
bls	Below Land Surface
CWA	Clean Water Act
DWSRF	Drinking Water State Revolving Fund
ECW	East County Wellfield
EDU	Equivalent Dwelling Unit
EPA	United States Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FLUCCS	Florida Land Use, Cover and Forms Classification System
FMSF	Florida Master Site File
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GW	Groundwater
HDD	Horizontal Directional Drilling
IAS	Intermediate Aquifer System
IMC	IMC-Manatee Wellfield
LOS	Level of Service
LMWTP	Lake Manatee Water Treatment Plant
M&O	Operations and Maintenance
mgd	Million Gallons per Day
MM	Maximum Month
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PMD	Peak Monthly Demand

Abbreviations (Continuation)

ROW	Right-of-Way
SAHM	Supplemental Appropriation for Hurricanes Helene and Milton
SAS	Surficial Aquifer System
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SR	State Road
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
UFA	Upper Floridan Aquifer
UPS	Uninterruptible Power Supply
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WCP	Water Well Construction Permit
WTP	Water Treatment Plant
WUP	Water Use Permit

SECTION 1 INTRODUCTION

This planning-level package has been developed to meet the planning requirements for the Supplemental Appropriation for Hurricanes Helene and/or Milton (SAHM) disaster relief funds award program through the Florida Department of Environmental Protection (FDEP). The SAHM funding provided a total of $35,139,169, of which $17,569,584 is provided as principal forgiveness. The project is described in the Intended Use Plan as shown below in **Figure 1-1**.

Impacts

The City's primary water treatment plant sustained direct damage when the metal roof over the filter tanks was torn off, compromising plant function and safety. At the same time, operations crews were dispatched to repair multiple water main breaks with limited system support and aging backup power equipment.

XX. Manatee County - DW41015 - $35,139,169

The proposed drinking water improvement projects by Manatee County are as follows:

1. Construction of two ground water production wells.
2. Installation of 20-inch raw water transmission main parallel to the current water transmission main.
3. Upgrading two degasifiers and internal hydraulic.
4. Installation of ground water treatment system electrical and ground water treatment system instrumentation/SCADA.

Impacts

During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage. Power outages were reported for Manatee County area during both Hurricanes Helene and Milton.

Figure 1-1 Manatee County SAHM Intended Use Plan Description

The Pipeline Resiliency Project is intended to improve the reliability and redundancy of Manatee County's raw water supply and transmission system between the East County Wellfield (ECW) and the Lake Manatee Water Treatment Plant (Lake Manatee WTP). This Facilities Plan documents the planning basis, evaluates feasible transmission alternatives, identifies a preferred planning alternative, and defines the technical, environmental, operational, and implementation considerations to be refined during future design.

1.1 Background and Hurricane Impacts

The American Relief Act was enacted by the US Environmental Protection Agency (EPA) on December 21, 2024, which provided disaster relief supplemental funding to a variety of State Revolving Fund (SRF) programs, with a focus on repairing and recovering from damages from Hurricanes Helene, Milton and

the Hawai'i wildfires. Manatee County (County), after submitting an RFI document for this program, was selected to receive funding. This report serves as the SAHM planning-level package and provides an analysis of the system needs, proposed alternative solutions, environmental review, as well as the selected alternative and implementation plans. Refer to **Appendix A** (Supplemental Appropriation for Hurricane Helene and Milton (SAHM) Request for Inclusion Supporting Documentation DWSRF Funds) for further explanations of how the project is deemed eligible for SAHM funding.

1.1.1 Location Description

Manatee County (County) owns and operates its potable water, wastewater, and reclaimed water system (System) that provides water, wastewater, and reclaimed water services to various retail and wholesale utility customers within County limits and surrounding municipalities (City of Palmetto, the Town of Longboat Key, and the three cities of Anna Maria Island: Holmes Beach, Bradenton Beach, and Anna Maria). The County also supplies water to meet some of the needs of Sarasota County and minimal amounts to the City of Bradenton. In the outlying areas of the County, households not served by any of these water systems rely upon private wells. The County's water service area is shown in **Figure 1-2.** The census tracks within the service area are as follows:

- 12081001913
- 12081001914
- 12081002010
- 12081002014
- 12081002020

The County owns and operates the Lake Manatee WTP, a facility with a combined nominal treatment capacity of 84 million gallons per day (mgd), to serve their potable water supply system. This facility uses both groundwater and surface water, which are treated in two separate treatment trains:

- A 54-mgd-capacity train for surface water from Lake Manatee.
- A 30-mgd-capacity train for groundwater from County wellfields.

The County is located within the Southwest Florida Water Management District (SWFWMD), one of five water management districts in Florida responsible for managing groundwater and surface water resources. The County's water use permit (WUP), issued by SWFWMD, allocates surface and groundwater quantities and environmental compliance monitoring requirements.

According to the 2024 Public Supply Annual Report, the County, on average, withdrew 50.1 mgd of water to meet their customer and wholesale water user demands. Of the 50.1 mgd, 34.0 mgd was supplied from surface water from Lake Manatee, and the remaining 16.1 mgd was supplied by groundwater.

Lake Manatee is the County's primary source of potable water. The County is permitted to withdraw an annual average of 34.9 mgd and a maximum monthly amount of 46.07 mgd from the reservoir. The County also has the capability to recover stored water through its aquifer storage and recovery system (ASR) at the WTP. The system consists of six ASR wells and is designed to provide up to 10 mgd for up to 180 days during emergency conditions or approximately 120 days for operational use.

The County is also permitted to withdraw an annual average of 19.086 mgd of groundwater from the East County Wellfield (ECW), a property comprising approximately 33 square miles in northern Manatee County. The ECW is comprised of approximately 24.8 miles of 30-inch and 36-inch transmission mains

that distribute raw water from seven production wells (ECW-1 through ECW-7) to Lake Manatee WTP. The wellfield is also supplemented by the three additional wells (Mosaic Wells1 through 3). Refer to **Figure 1-3** for existing relevant project infrastructure.

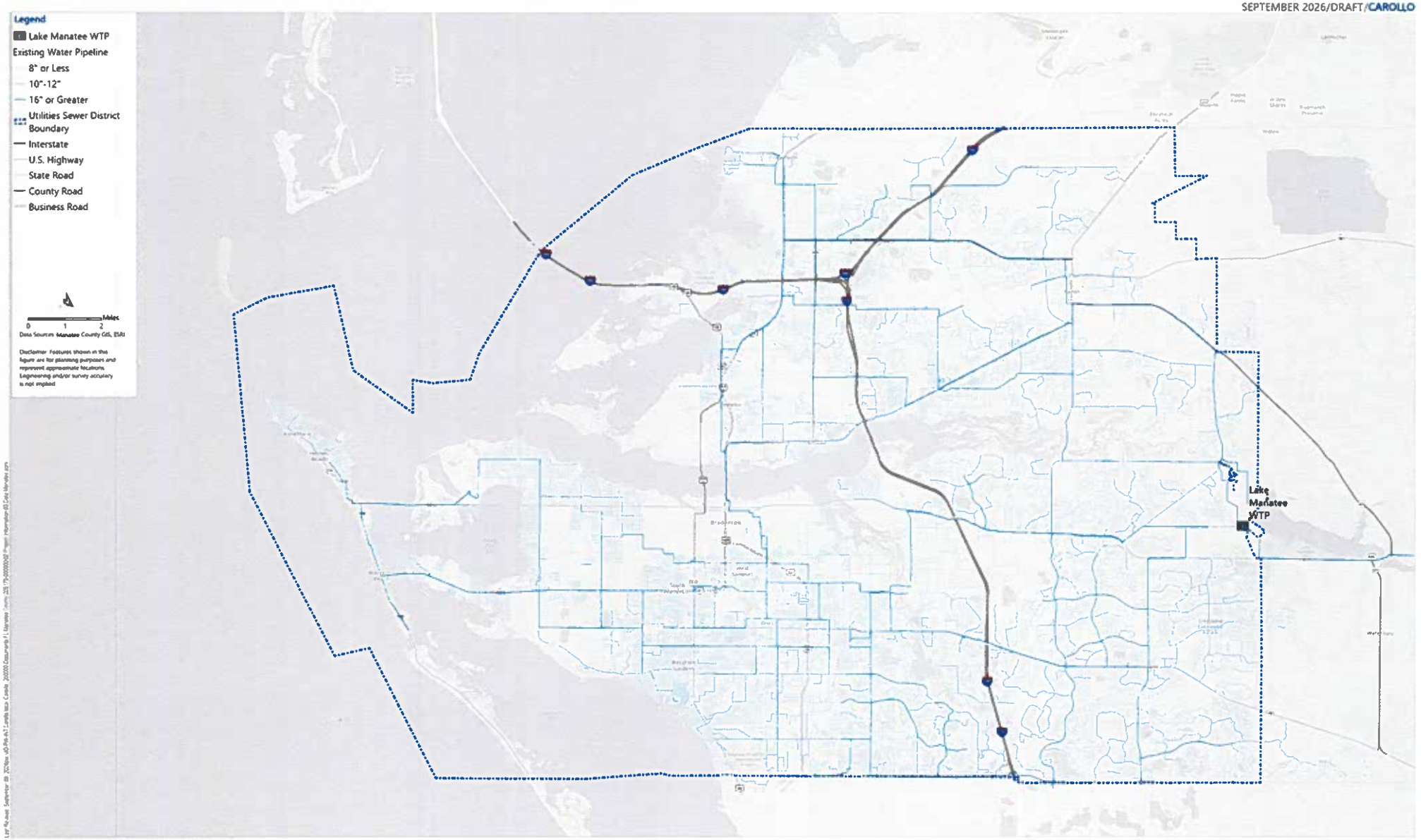


Figure 1-2 MANATEE COUNTY SERVICE AREA MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

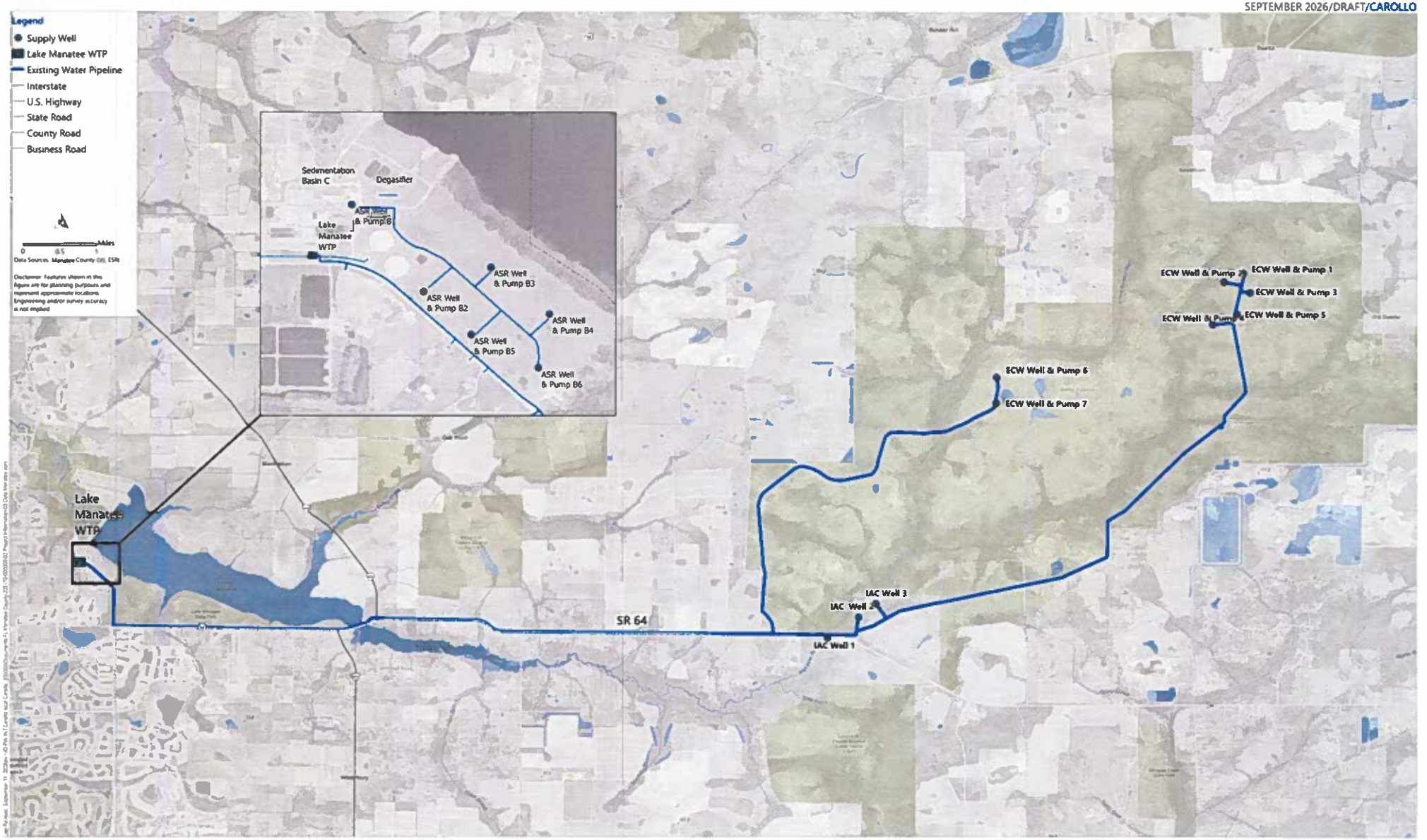


Figure 1-3 LAKE MANATEE WTP, EAST COUNTY WELLFIELD AND EXISTING PIPELINE ALIGNMENT MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

1.1.2 Hurricane Impacts

Hurricane Helene

Hurricane Helene made landfall on September 26th, 2024. Many stations experienced power outages during Hurricane Helene. There were multiple communication failures and instances where no data was collected throughout the Hurricane at three pump stations: Northwest Ground Storage Tank and Booster Pump Station (NWGS), Longboat Meter Station, and Cortez Booster Station. On the 26th, from 16:23 to 17:54, NWGS and Longboat Meter Station experienced power failure for their Uninterruptible Power Supplies (UPS). NWGS specifically experienced communications, power, and UPS failure from September 26th at 18:00 until November 2nd, 2024. At 18:20 on September 26th, the Longboat Meter Station also experienced communications, power, and UPS failure until November 2nd, 2024. Refer to Appendix A for pressure and flow data from the three pump stations between September 26th and 29th. At the Water Treatment Plant, the power was switched to generator power at 19:18 on the 26th and was restored to full power on the 28th.

The City of Bradenton's Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir experienced power outages due to Hurricane Helene and had to utilize generator backups during and after the storm. Manatee County stepped in to help the City of Bradenton augment their water supply since it compromised secondary drinking water parameter exceedances as a result of the storm. Specifically, 7 direct interconnects were made to support their water needs between the 27th and 28th and three water distribution locations were opened to support community water needs. The water treatment plant stabilized on the 29th, but chlorine levels were still high, so the distribution locations and direct interconnects continued till the 30th. Refer to Appendix A for the complete situation reports.

Hurricane Milton

Hurricane Milton made landfall shortly after Helene on October 9th, 2024. The Manatee County Water Treatment Plant power was switched to generator power at 18:15 on the 9th. The whole Manatee County distribution system felt the major effects of Hurricane Milton. Attached in Appendix A is a list of all the pipe breaks that were reported during and after the storm. There were 64 breaks of various pipe diameters and causes due to Milton's surge and debris between October 9th and October 12th. During Hurricane Milton, Bradenton's water plant was intentionally inactive, and water was on a bypass system with the goal to mitigate any impacts similarly to what the plant experienced in Helene. Yet, their plant still experienced water intrusion. Refer to Appendix A for the complete situation reports.

1.2 Project Scope and Objectives

Manatee County is applying for planning, design, and construction of their Pipeline Resiliency Project (Project). The Project will construct four groundwater (GW) production wells and place a 36-inch/42-inch raw water transmission main parallel to the current water transmission main. The well location and pipeline alignment will be determined in the planning and design phases but are anticipated to be near the current well field areas. The planning, design, and construction activities associated with the project are summarized (**Table 1-1**).

Table 1-1 Project Tasks Description

Task Name	Task Description
Planning	Project administration; Facilities Plan; route study; hydraulic assessment; environmental review; cost comparison; and supporting investigations.
Design	Survey, geotechnical investigation, subsurface utility engineering, environmental field verification, hydraulic and transient modeling, permitting, property coordination, and final design.
Construction	Construction of the selected transmission improvements and related wellfield, treatment, electrical, instrumentation, and SCADA components confirmed during design.

The selected Facilities Plan concept does not establish final design details. Final pipe diameters, materials, profiles, well equipment, treatment modifications, appurtenances, easements, and permitting requirements will be confirmed during design. The project objectives are to improve reliability and resiliency, provide adequate hydraulic performance, reduce environmental and permitting risk, support operational flexibility and emergency repair response, and preserve flexibility for future system needs.

1.2.1 Project Objectives

The main need and benefit of the Pipeline Resiliency Project is that it will create redundancy in Manatee County's raw water transmission system, providing increased resiliency in the event of a storm. During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage, further pointing to the need for system redundancy. This redundancy will beneficially support Manatee County's ability to provide water during major storm events and allow one pipe to remain operational if the other is damaged during a storm event, directing flows to the treatment plant and supporting future water security across the County.

To enhance system reliability and provide redundancy to the existing 30-inch and 36-inch transmission mains, three pipeline alternatives were developed and evaluated within the project corridor, as shown in **Figure 1-4**. Alternative 1 generally follows the existing transmission main corridor from the ECW to the Lake Manatee WTP. Alternative 2 originates at Wells and Pumps 1 through 5, extends to Wells and Pumps 6 and 7, and then follows the existing transmission main corridor to the Lake Manatee WTP. Alternative 3 consists of two segments: the first connects Wells and Pumps 1 through 5 to Wells and Pumps 6 and 7, while the second extends from the existing transmission main corridor along SR 64 to the Lake Manatee WTP.

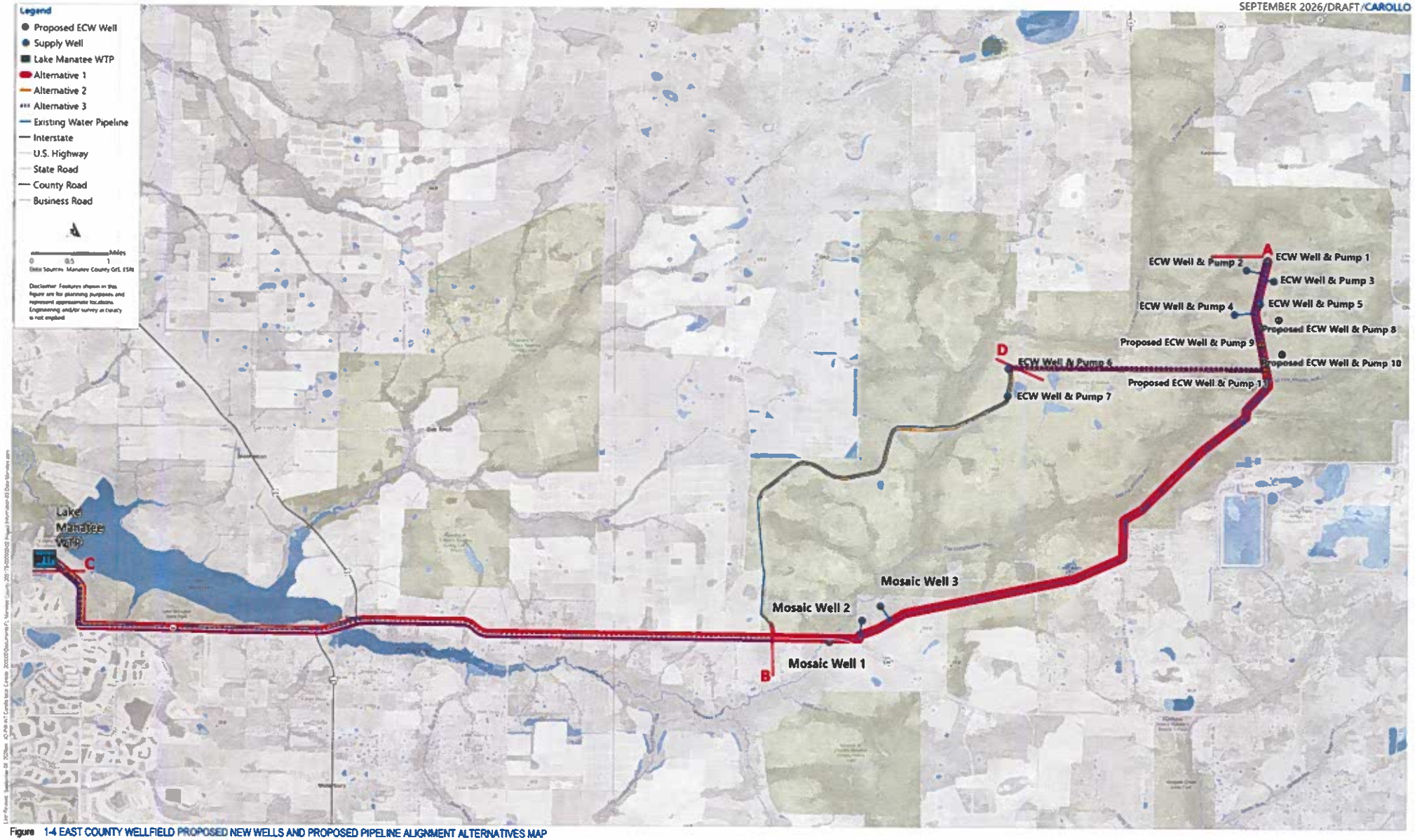


Figure 1-4 EAST COUNTY WELLFIELD PROPOSED NEW WELLS AND PROPOSED PIPELINE ALIGNMENT ALTERNATIVES MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 2 EXISTING AND FUTURE CONDITIONS

2.1 Description and Climate of Planning Area

The planning area is in eastern Manatee County, Florida, extending from the Lake Manatee WTP on SR 64 northeast toward the ECW and Duette Preserve. The predominantly rural corridor contains agricultural lands, natural habitats, conservation areas, road rights-of-way, utility corridors, wetlands, drainage features, and uplands within the Lake Manatee watershed. The draft planning-area population estimate for 2025 is approximately 468,200 residents, while the project corridor itself is less densely developed than western Manatee County.

The region has a humid subtropical climate with year-round warm temperatures and a pronounced summer wet season. The corridor generally ranges from approximately 30 to 90 feet above mean sea level. Topography transitions from relatively flat terrain near the WTP to gently rolling terrain toward Duette Preserve, with runoff conveyed toward Lake Manatee and associated tributaries.

2.1.1 Data Collection

A desktop evaluation was performed using public information, County utility records, GIS data, environmental datasets, right-of-way and parcel information, record drawings, roadway information, aerial imagery, and geotechnical information (**Table 2-1**). The data sources supported route development and comparison and will require field verification during detailed design. Refer to **Appendix B** for additional information regarding the GIS Data Collection.

Table 2-1 GIS Data Collection

Dataset	Representative Sources	Use in Planning
Aerial and parcels	Manatee County; statewide parcel data	Alignment development, access, and property screening
Environmental	USDA NRCS; USFWS; FWC; FDEP; FEMA; SWFWMD	Soils, wetlands, species, conservation lands, contamination, and floodplains
Transportation	FDOT and Manatee County	Roadway crossings, rights-of-way, traffic, and planned improvements
Utilities	Manatee County and available record drawings	Existing water, wastewater, reclaimed water, power, gas, fiber, drainage, and special crossings
Cultural resources	FDEP/FMSF and supporting environmental review	Known historical and cultural resources
Hydraulic and operational	County SCADA, pump curves, water-demand information	Model development, calibration, operating scenarios, and sizing

2.1.2 Soil Conditions and Hydrology

Soil Conditions

The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) mapping indicates that the project area is dominated by fine sands with varying hydrologic groups and drainage characteristics. Refer to **Figure 2-1**. Planning-level soil considerations include runoff potential, infiltration, poor drainage, dewatering, excavation, backfill, restoration, wetland indicators, and suitability for gopher tortoise burrowing habitat. Refer to **Table 2-2**. Soil mapping does not replace geotechnical investigation, wetland delineation, or wildlife surveys.

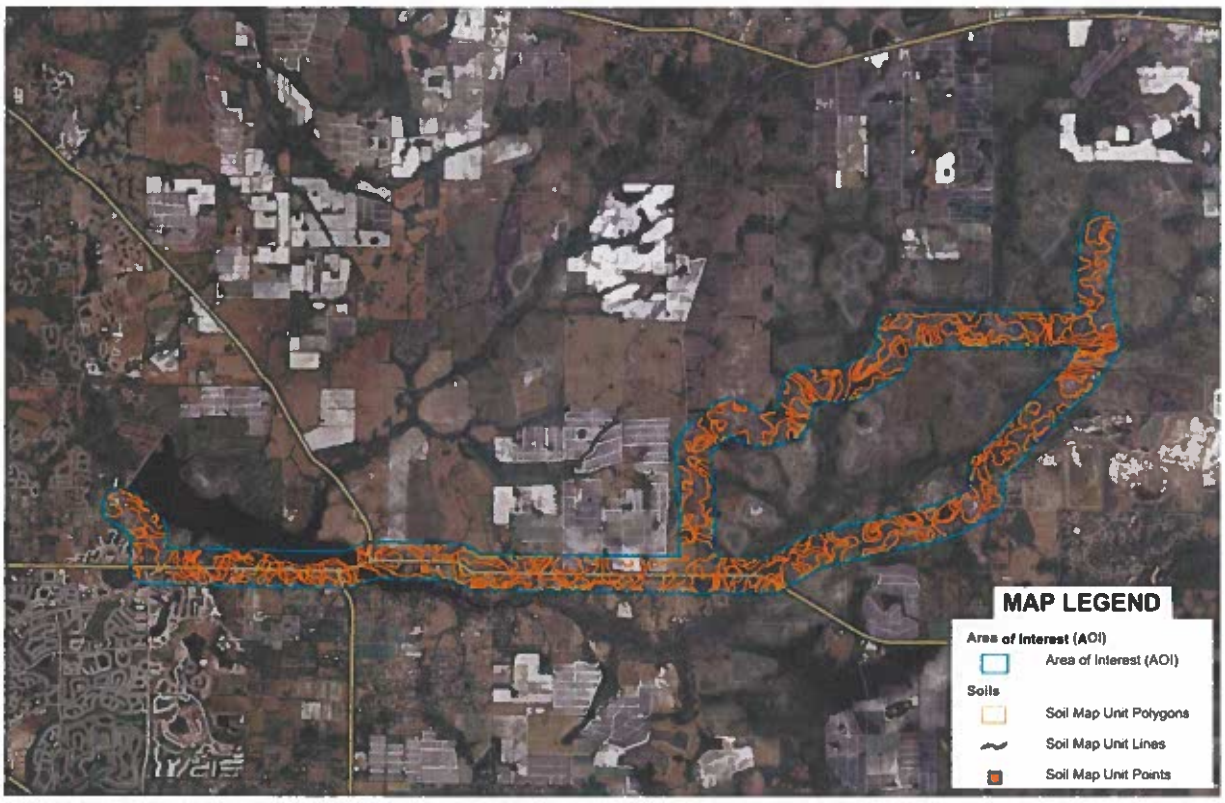


Figure 2-1 Pipeline Resiliency Project – Soil Map

Table 2-2 Predominant Soil Types and Hydrology within the Project Boundary

Soil Type	Approx. Composition	Hydrologic Group	Drainage Class
Waveland fine sand	29.34%	C/D	Poorly drained
Pomello fine sand	20.3%	A	Somewhat poorly drained
Duette fine sand	6.1%	A	Moderately well drained
Myakka-Myakka wet fine sands	5.7%	A/D	Poorly drained
Delray-Pomona complex	5.7%	A/D	Very poorly to poorly drained
St. Johns fine sand	5.7%	B/D	Poorly drained

Note: The project boundary also includes a significant portion of water (Lake Manatee) accounting for 2.3% of the Area of Interest (AOI). The table above lists the six most common soil types, excluding bodies of water.

For additional information regarding soil conditions, please refer to **Appendix C**.

Soil Hydric Rating and Gopher Tortoise Suitability

NRCS soil survey information was reviewed to characterize general soil conditions within the three alternatives. The mapped soil units were evaluated based on planning-level indication of areas that may be associated with wetland conditions and gopher tortoise gopher burrowing habitat. Refer to **Appendix D** for environmental analysis.

Alternatives 1 and 2 contain similar acreages of soils mapped as highly suited for gopher tortoise, while Alternative 3 contains a smaller total acreage but a higher proportional share of highly suited habitat for gopher tortoise because its overall corridor area is smaller. Alternative 3 has the lowest percentage of soils that would be expected to support wetland habitats.

2.1.3 Flood Plains

FEMA mapping identifies mapped flood-hazard areas within the project planning boundary. Floodplain exposure may affect design elevation, cover, erosion protection, access, permitting, construction methods, and emergency response. Final floodplain and floodway limits will be confirmed during detailed design using current mapping and survey data.

Additional maps of the parcels and floor areas can be found in **Appendix E**.

2.1.4 Environmentally Sensitive Areas or Features

Wetlands and Surface Waters

Project-specific desktop mapping was used to characterize potential freshwater emergent wetlands, freshwater forested/shrub wetlands, and other surface waters within the three alternative corridors. Refer to **Table 2-3**. The mapping provides a planning-level comparison and does not constitute a jurisdictional determination or field delineation.

Table 2-3 Desktop-Mapped Wetlands and Surface Waters within the Alternative Corridors

Resource Type	Impact Assumption	Alternative 1 (ac)	Alternative 2 (ac)	Alternative 3 (ac)
Freshwater emergent	Temporary	1.09	8.86	2.71
Freshwater forested/shrub	Permanent conversion	6.82	13.15	0.64
Other surface waters	Temporary	2.26	2.22	1.91
Total mapped area		10.17	24.23	5.26

Notes: Anticipated impact type assumes open-cut pipeline installation within the project area. Actual impacts will depend on the final pipeline alignment, construction footprint, construction methods, and field-verified wetland boundaries.

Alternative 2 has the greatest mapped wetland and surface-water impact and the greatest potential permanent forested/shrub wetland conversion. Alternative 1 has an intermediate mapped impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent conversion. Actual impacts will depend on final alignment, construction footprint, crossing methods, and field-verified boundaries.

Refer to Appendix D (Section 2.1.4) for environmental analysis.

Protected Wildlife Species

Desktop information was reviewed for federal and state protected species with potential to occur in or near the planning corridors. Potential considerations include Florida scrub-jay, gopher tortoise, eastern indigo snake, crested caracara, listed wading birds, Florida pine snake, Florida sandhill crane, southeastern American kestrel, tricolored bat, and other species identified in the supporting environmental material. Species inclusion in the desktop review does not establish presence. Final requirements will depend on field surveys and agency coordination.

Agricultural Lands

All alternatives intersect areas mapped as Farmland of Unique Importance, but much of the corridor is within existing rights-of-way or conservation land and is not actively farmed. No substantial difference among alternatives was identified from the available farmland mapping. Potential effects on active agricultural operations will depend on the final construction footprint and existing land use.

Cultural and Historic Resources

The Florida Master Site File (FMSF) review identified the Camphor Site Homestead, Bethany Baptist Cemetery, and Old Highway 39/Carlton Road within the planning area. The Camphor Site Homestead intersects all three alternatives within the SR 64 right-of-way. Old Highway 39/Carlton Road intersects Alternatives 1 and 3 within Duette Preserve. Bethany Baptist Cemetery is adjacent to the alternatives. The desktop review is not a Cultural Resource Assessment Survey and does not determine National Register eligibility or adverse effect. **Figure 2-2** below depicts the locations of the recorded resources relative to the three alternatives.

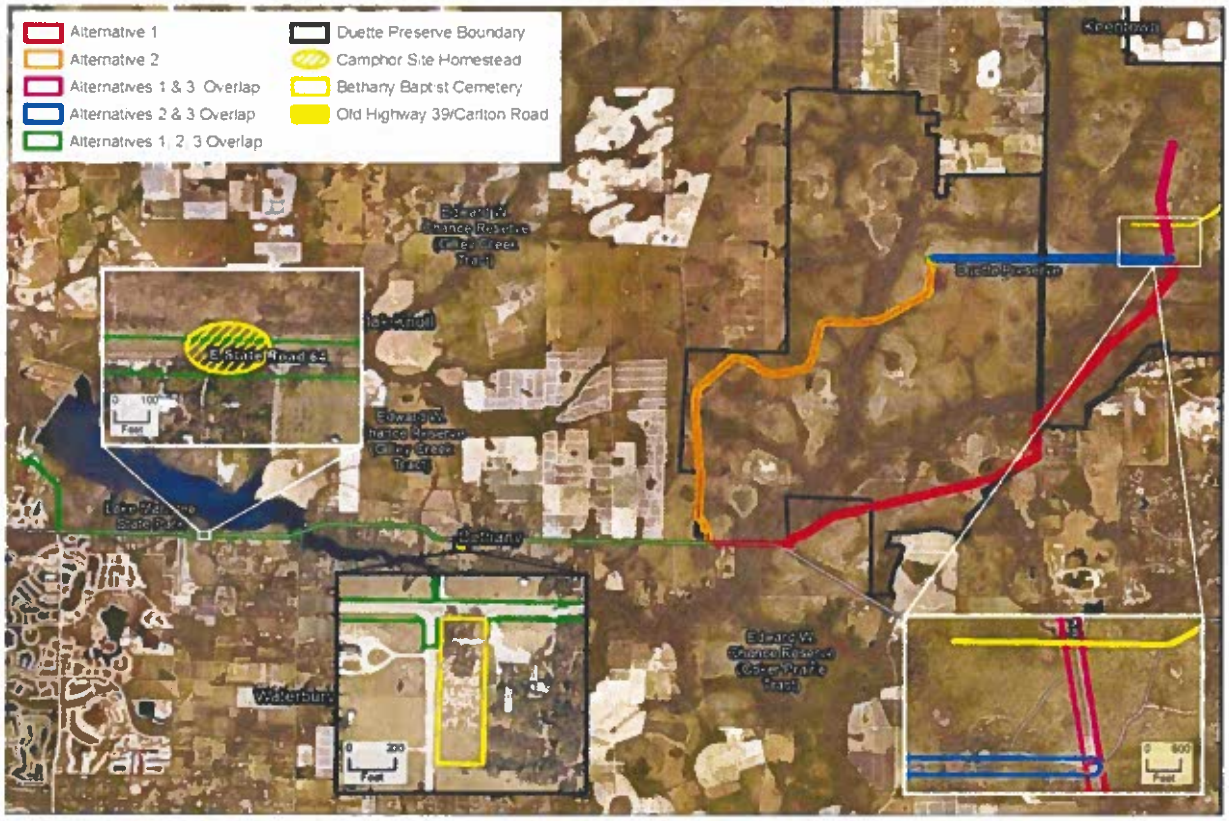


Figure 2-2 FMSF Mapped Resources

Contaminated Sites and Hazardous Materials

The desktop database review identified historical contamination records near the planning area, including a historical petroleum record at the WTP and a completed-cleanup oil-spill record near the Alternative 3 corridor. The available information did not identify a substantial differentiating constraint among the alternatives. Final design should update the database review and address unexpected conditions through construction specifications.

Environmental and Permitting Summary

The environmental evaluation is based primarily on desktop mapping and available records. It does not constitute a wetland jurisdictional determination, protected-species survey, cultural-resource assessment survey, geotechnical investigation, or final permitting determination. Final impacts, avoidance and minimization measures, mitigation requirements, construction feasibility, and permit conditions remain subject to field delineation, environmental surveys, agency coordination, final alignment, construction methods, and final design.

The final alignment will require additional evaluation near conservation lands, Duette Preserve, existing and proposed gopher-tortoise recipient areas, wetlands, surface waters, and cultural resources. The proposed connection between ECW Wells 1 through 5 and ECW Wells 6 and 7 may interact with known or proposed gopher-tortoise habitat or recipient areas. These conditions could affect alignment selection, access, construction sequence, long-term maintenance, permitting, and mitigation.

Alternative 3 has the lowest desktop-mapped wetland and surface-water acreage among the evaluated alternatives, but this comparison does not eliminate environmental or permitting risk. Actual impacts and requirements will be determined during design-phase field investigations and agency review.

2.1.5 Planning Basis and Demand Conditions

The planning basis for the Pipeline Resiliency Project was developed using the County's historical water use records, current and projected service area growth, and the water demand projections prepared as part of WA27 - Water Use Permit Modification. These demand conditions provide the basis for establishing the hydraulic and conveyance requirements for the proposed groundwater production wells and redundant raw water transmission main from the ECW and IMC-Manatee Wellfield to the Lake Manatee WTP.

The purpose of this project is not to expand finished water treatment capacity, but to improve the resiliency and redundancy of the County's raw water supply and transmission system. The proposed improvements will allow the County to maintain raw water conveyance to the Lake Manatee WTP during storm-related events, line breaks, maintenance activities, or other conditions where one segment of the existing transmission system may be unavailable.

Population projections

Future demand projections were developed based on County-provided growth forecasts for the Lake Manatee WTP service area. The County provided equivalent dwelling unit (EDU) projections for existing neighborhoods and future development areas through 2050. These EDUs were converted to population using 2.4 persons per household (pph), consistent with recent Census information for Manatee County and slightly more conservative than the 2.33 pph factor used in the SWFWMD projection methodology.

For planning purposes, the County's adopted potable water level of service (LOS) standard is currently 110 gallons per capita per day (gpcd); however, the County is in the process of revising this value to 100 gpcd. The 100 gpcd LOS value was used for the demand projections summarized in this section. In addition to the retail service area demand, 5.0 mgd was included to account for the County's existing wholesale contractual obligations, excluding Sarasota County. This includes 0.5 mgd for the City of Bradenton, 2.0 mgd for the City of Palmetto, and 2.5 mgd for the Town of Longboat Key.

Based on this approach, the projected service area population increases from approximately 534,200 in 2030 to approximately 649,895 in 2045. The corresponding annual average finished water demand increases from approximately 58.42 mgd in 2030 to approximately 70.00 mgd in 2045. **Table 2-4** summarizes the population-based finished water demand projection used for planning.

Table 2-4 Level of Service Finished Water Demand Projections

Year	Service Area Population	Annual Average Finished Water Demand (mgd)
2030	534,200	58.42
2035(1)	576,450	62.65
2040	618,700	66.87
2045(1)	649,895	70.00

(1) Values for 2035 and 2045 were interpolated.

Historical Water Usage

Historical water use was reviewed for the 2016 through 2025 period to characterize recent growth trends, seasonal demand conditions, and peaking factors. The County withdraws raw water from Lake Manatee, the ECW, and the IMC-Manatee Wellfield for treatment at the Lake Manatee WTP. Raw water withdrawals increased from approximately 39.8 mgd in 2016 to approximately 52.3 mgd in 2025 on an annual average basis. Over the same 10-year period, the average annual raw water withdrawal was approximately 45.8 mgd. Between 2019 and 2023, raw water withdrawals increased by an average of approximately 4.8 percent per year. **Table 2-5** summarizes raw water withdrawals from 2016 through 2025.

Table 2-4 Raw Water Withdrawals

Year	Average Daily		Maximum Month (mgd)	Maximum Day (mgd)
	Raw Withdrawal (mgd) (1)	Growth Change		
2016	39.8	--	43.7	51.0
2017	40.2	0.9%	47.5	54.1
2018	40.3	0.3%	44.7	54.2
2019	42.2	4.6%	45.9	52.9
2020	45.2	7.2%	49.5	56.1
2021	47.4	4.7%	53.7	55.1
2022	47.7	0.7%	51.8	57.5
2023	50.9	6.6%	53.6	61.5
2024	51.6	1.4%	58.6	62.7
2025	52.3	1.3%	56.2	60.7
Average	**45.8**	**3.1%**	**50.5**	**56.6**

Note: (1) Raw withdrawals include Lake Manatee, East County Wellfield, and IMC Manatee Wellfield.

Finished water demand followed a similar increasing trend. Annual average finished water demand increased from approximately 39.49 mgd in 2016 to approximately 49.50 mgd in 2025, with an average annual growth rate of approximately 3.8 percent over the 10-year period. Maximum month finished water demand increased from approximately 43.13 mgd in 2016 to approximately 53.30 mgd in 2025, while maximum day finished water demand increased from approximately 50.95 mgd in 2016 to approximately 59.56 mgd in 2025. **Table 2-5** presents the annual average, maximum month, and maximum day finished water demands for the past 10 years.

Table 2-5 10-Year Annual Average, Maximum Month, and Maximum Day Demands

Year	Annual Average Demand (mgd)	Annual Average Annual Growth	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2016	39.49	-	43.13	50.95
2017	39.93	1.1%	47.44	51.96
2018	39.55	-1.0%	43.09	49.14
2019	41.55	5.1%	44.70	57.20
2020	43.93	5.7%	48.16	53.00
2021	44.75	1.9%	51.83	56.18
2022	45.31	1.3%	48.93	54.83
2023	47.70	5.3%	52.45	58.34
2024	48.89	2.5%	55.55	61.42
2025	49.50	1.2%	53.30	59.56

The County provides finished water to retail customers in unincorporated Manatee County and wholesale customers including the City of Bradenton, City of Palmetto, Town of Longboat Key, and Sarasota County. Historical growth in finished water demand has been primarily driven by the unincorporated retail service area, while wholesale demands have remained relatively stable or declined due to contractual limitations and the phased reduction in supply to Sarasota County.

Historical peaking factors were also reviewed to support planning and facility sizing. Based on the historical analysis, the County's existing planning peaking factors remain appropriate: 1.2 for maximum month demand and 1.3 for maximum day demand. These factors were applied to the selected annual average demand projections to estimate future maximum month and maximum day conditions.

20-year water demand projections

Multiple methods were evaluated for projecting future finished water demand through 2045, including linear regression of historical demand, a County population and LOS-based projection, and the SWFWMD projection methodology. The selected planning projection is based on the County population and LOS approach because it reflects the County's projected service area growth and maintains consistency with the County's potable water LOS requirement.

The selected annual average finished water demand projection for 2045 is 70 mgd. Applying the County's planning peaking factors results in a 2045 maximum month demand of approximately 84 mgd and a maximum day demand of approximately 91 mgd. These values represent the 20-year demand condition for planning the proposed improvements. **Table2-6** summarizes the selected 20-year demand projection.

Table 2-6 Selected 20-year Finished Water Demand Projection

Year	Annual Average Demand (mgd)	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2030	58.42	70.10	75.95
2035	62.65	75.18	81.45
2040	66.87	80.24	86.93
2045	70.00	84.00	91.00

The 2045 demand condition is used as the long-term planning basis for evaluating raw-water supply and conveyance needs. The Lake Manatee WTP has a combined nominal raw-water treatment capacity of approximately 91 mgd across its surface-water and groundwater treatment trains. Actual production is constrained by source availability, authorized WUP withdrawal quantities, treatment-train limitations, operating conditions, and finished-water demand. The County is currently pursuing a WUP renewal or modification that may reflect updated demand projections, well-credit transfers, and retirement of third-party credits. Because the modification has not been finalized, proposed withdrawal quantities are planning assumptions and should not be represented as authorized quantities. Final design and phasing will be based on the WUP conditions in effect at the time of implementation.

2.1.6 Land Use and Development

Land Use and Habitat

SWFWMD FLUCCS mapping was used to characterize land use and habitat composition. Alternative 1 has a total mapped corridor area of approximately 411.77 acres, Alternative 2 approximately 430.10 acres, and Alternative 3 approximately 268.03 acres. Alternative 2 contains substantially more mapped shrub and brushland, while Alternative 1 contains more cropland/pastureland and tree plantations. Alternative 3 has the smallest overall mapped corridor area.

Refer to Appendix D for the detailed environmental analysis.

Future Capital Improvement Projects and Corridor Coordination

FDOT is developing improvements along SR 64 between Lorraine Road and Verna Bethany Road. The proposed pipeline's proximity to this corridor creates design and schedule coordination requirements involving utility placement, horizontal and vertical clearance, subsurface crossings, traffic control, permitting, and sequencing to avoid conflicts or unnecessary relocation. Coordination with FDOT should continue through design and construction.

The proposed roadway alignment corridor and study segments identified under the FDOT SR 64 Feasibility Study are conceptually illustrated in **Figure 2-3**.

Refer to **Appendix F** for Record Drawings pertaining to State Route 64.

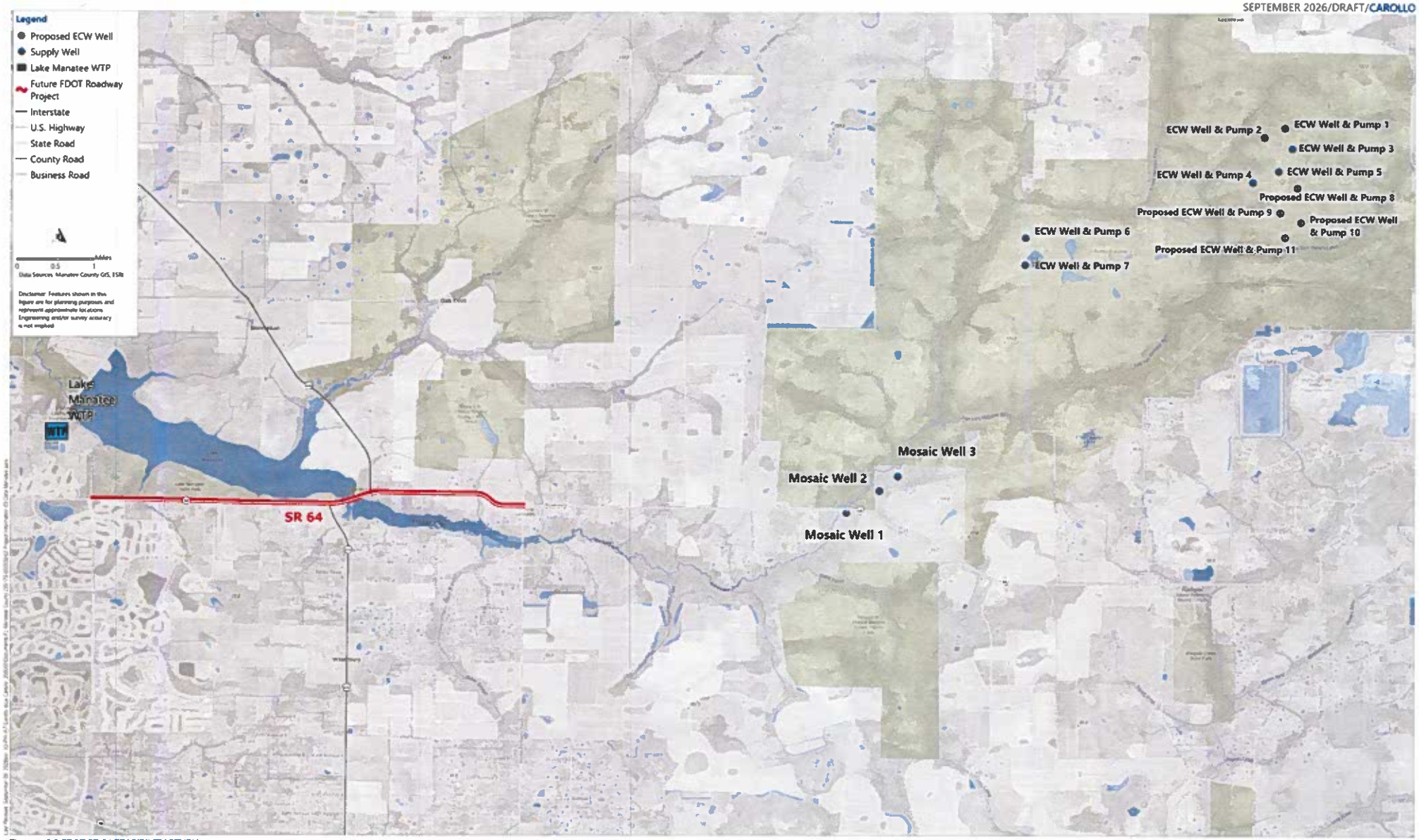


Figure 2-3 FDOT SR 64 FEASIBILITY STUDY
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

2.1.7 Hydrogeologic Setting and Description

The East County Wellfield (ECW) is located in eastern Manatee County, Florida, and is operated by Manatee County Utilities under WUP No. 13343. The wellfield consists of seven production wells (ECW-1 through ECW-7, SWFWMD District IDs 128 through 134) that withdraw groundwater from the Upper Floridan Aquifer (UFA). Five monitoring wells (District IDs 150 through 154) are used to monitor groundwater levels and water quality across the surficial aquifer system (SAS), the intermediate aquifer system (IAS), and the UFA. Site locations are shown in Appendix G – WSP Hydrogeological Evaluation.

The regional hydrostratigraphy beneath the ECW site consists of three principal hydrogeologic units:

- **Surficial Aquifer System (SAS):** An unconfined aquifer composed of unconsolidated sands and shell deposits, extending from land surface to approximately 25 feet below land surface (bls).
- **Intermediate Aquifer System (IAS):** A series of interbedded carbonate and clastic units that function as a semi-confining unit between the SAS and the UFA. Monitored by well ECW-IAMW-52 (monitored interval 145 to 250 ft bls).
- **Upper Floridan Aquifer (UFA):** The principal production aquifer, composed of Tertiary-age limestone and dolomite. Production wells are cased to approximately 500 to 580 feet bls with open-hole completions extending to approximately 1,200 to 1,250 feet bls.

2.1.8 Hydrogeologic Evaluation

The planning-level hydrogeologic evaluation reviewed pumpage, groundwater levels, rainfall, and water-quality information. The wellfield has been operated seasonally using well rotation. Available water-level records generally show seasonal response and recovery, with several identified anomalies requiring confirmation. Available TDS, chloride, and sulfate data remain below the cited secondary standards, and the evaluated record does not indicate progressive saltwater intrusion or water-quality degradation.

The evaluation identified anomalies within both the pumpage and groundwater level records. Two production wells each reported a monthly withdrawal substantially exceeding their typical operating range, resulting in corresponding spikes in total wellfield production. Additionally, two monitoring wells exhibited abrupt water level changes that are inconsistent with prevailing rainfall conditions and with measurements recorded at nearby wells. These anomalies are most likely attributable to data entry, reporting, or instrumentation errors. Accordingly, the evaluation recommends that the data be verified with Manatee County Utilities and the SWFWMD prior to final design.

Resolution of the identified data anomalies is not expected to affect the comparative evaluation of the transmission main alignment alternatives, provided that the verified data remain consistent with the underlying assumptions for available well yield, aquifer operating levels, and permitted withdrawal quantities.

2.2 Water Supply and Treatment

The County supplies the Lake Manatee WTP from Lake Manatee, the East County Wellfield, and the IMC-Manatee Wellfield. The Pipeline Resiliency Project focuses on raw-water reliability rather than expansion of finished-water treatment capacity. Planning-level modeling evaluates transmission configurations capable of supporting 26.2 mgd AAD and 31.5 mgd maximum-month wellfield production under normal and outage conditions.

The broader Pipeline Resiliency Project may include up to four additional groundwater production wells, WTP hydraulic modifications, degasifier or bypass improvements, electrical improvements, and instrumentation and SCADA improvements. Final inclusion and sequencing of these components will be evaluated and refined in subsequent design phase.

Figures 2-4 and **2-5** depict the future new additional wells and ASR bypass around degasifier, respectively.

2.3 Operations and Maintenance Considerations

Operations and maintenance considerations were evaluated from the perspective of operational flexibility and emergency repair response. Key factors include the ability to isolate pipeline segments, maintain raw-water conveyance when an existing or proposed segment is unavailable, access the pipeline and appurtenances for inspection or repair, restore service following an outage, and operate under varying well availability and demand conditions.

Alternatives that provide independent conveyance paths around existing segments offer greater operational flexibility during maintenance and emergencies. An alternative that remains dependent on an existing segment may require additional operational planning, temporary supply measures, expedited repair, or future improvements if that segment is unavailable. Final isolation-valve locations, maintenance access points, air-management facilities, blowoffs, tie-ins, and operating procedures will be established during design.

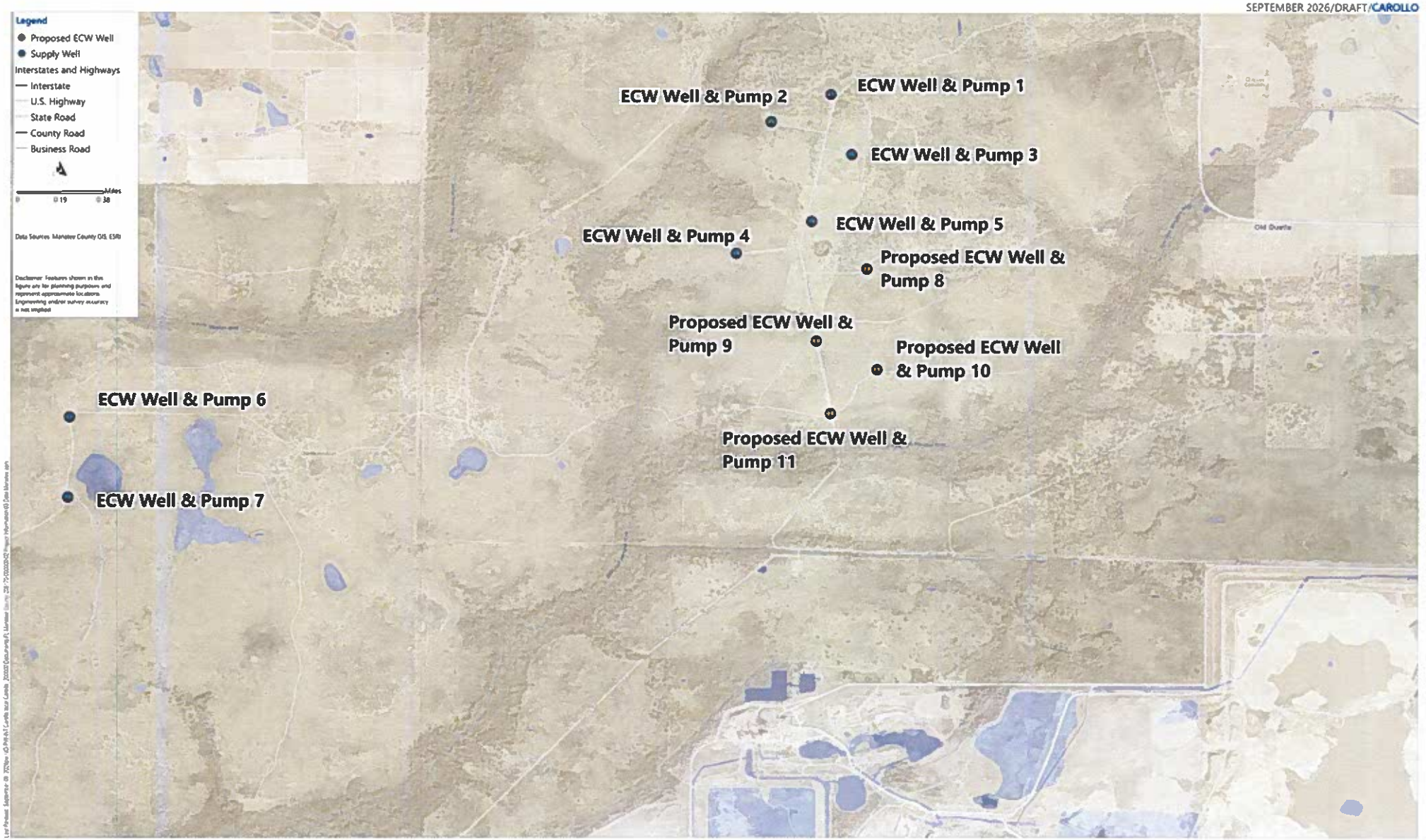


Figure 2-4 FUTURE NEW ADDITIONAL WELLS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

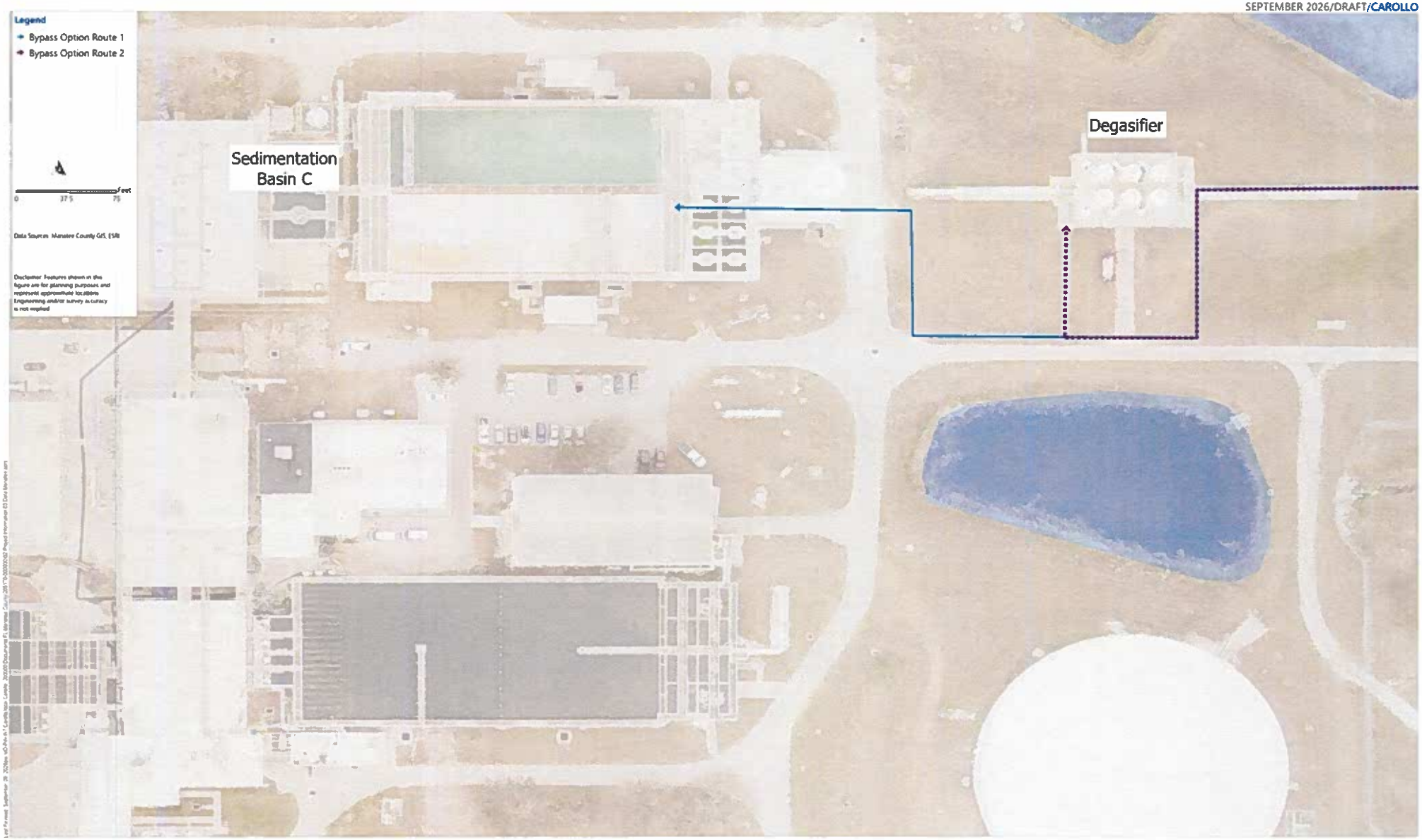


Figure 2-5 PROPOSED ASR BYPASS AROUND DEGASIFIER
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 3 DEVELOPMENT OF ALTERNATIVE ALIGNMENTS

3.1 FDEP Alternatives Analysis Requirements

The alternatives analysis evaluates feasible project concepts based on effectiveness, environmental and permitting considerations, hydraulic performance, constructability, operations and maintenance, future flexibility, and planning-level cost. Section 3 develops the alternatives and documents the primary technical findings. Section 4 synthesizes those findings through a weighted non-cost evaluation, a separate Class 5 cost comparison, and selection of the preferred planning alternative.

3.2 Overview of Alternative Alignments

3.2.1 Basis for Development

The need for the Pipeline Resiliency Project was identified based on the County's objective to enhance the reliability of its raw water supply and transmission infrastructure, particularly under extreme weather conditions such as hurricane events. The evaluation focuses on the development of redundancy within the existing system to maintain continuous conveyance of raw water during storm events or conditions that may compromise a portion of the network.

The purpose of this project is not to expand overall system capacity, but to improve resiliency by providing redundant transmission pathways between critical facilities. The proposed improvements will allow Manatee County to sustain raw water delivery during major storm events and maintain operation of at least one transmission main in the event the parallel system is damaged or taken out of service. The alternatives analysis presented in Sections 3 and 4 is limited to the identification and evaluation of three feasible transmission-main alignment alternatives. The broader Pipeline Resiliency Project may include associated wellfield, WTP, degasifier, electrical, instrumentation, and SCADA improvements, as described elsewhere in this Facilities Plan.

The alternatives were developed using the data summarized in Section 2. Route development considered existing raw-water infrastructure, utility corridors, road rights-of-way, environmental resources, conservation lands, wetlands and surface waters, cultural resources, property and access limitations, major roadway and water crossings, planned FDOT improvements, and the County's need for a redundant and operable transmission configuration. Because the planning area contains a limited number of practical conveyance corridors, the alternatives generally use or parallel existing corridors where feasible.

3.2.2 Corridor and Infrastructure Considerations

The alternatives must cross Lake Manatee and several associated waterways and drainage features. Portions of the B-C corridor parallel the existing raw-water main and PRECO overhead transmission facilities. Design will require coordination for workspace, utility separation, construction access, traffic, trenchless crossings, appurtenance access, and sequencing. Existing easements and access roads provide

advantages in some areas, while Duette Preserve and conservation restrictions create additional considerations in others.

3.2.3 Summary of Alternatives

During the route evaluation, multiple routes and alignments were explored to reduce roadway and environmental impacts. After review, three (3) alignment alternatives for the proposed transmission main were identified, delineated, and presented schematically in **Figure 3-1**. To facilitate the description of each alignment, four key reference locations were established along the corridor, as described in **Table 3-1.**

Table 3-1 Selected 20-year Finished Water Demand Projection

Alternative	Proposed Segments	Approx. Length	Planning Concept
1	A-B and B-C	97,000 ft	Continuous proposed conveyance route from the main ECW area to the WTP; existing D-B remains the connection for ECW Wells 6 and 7.
2	A-D, D-B, and B-C	104,700 ft	Most complete parallel conveyance path around the principal existing segments.
3	A-D and B-C	73,650 ft	Adds redundancy at the wellfield and between B and the WTP while retaining existing A-B as the intermediate link.

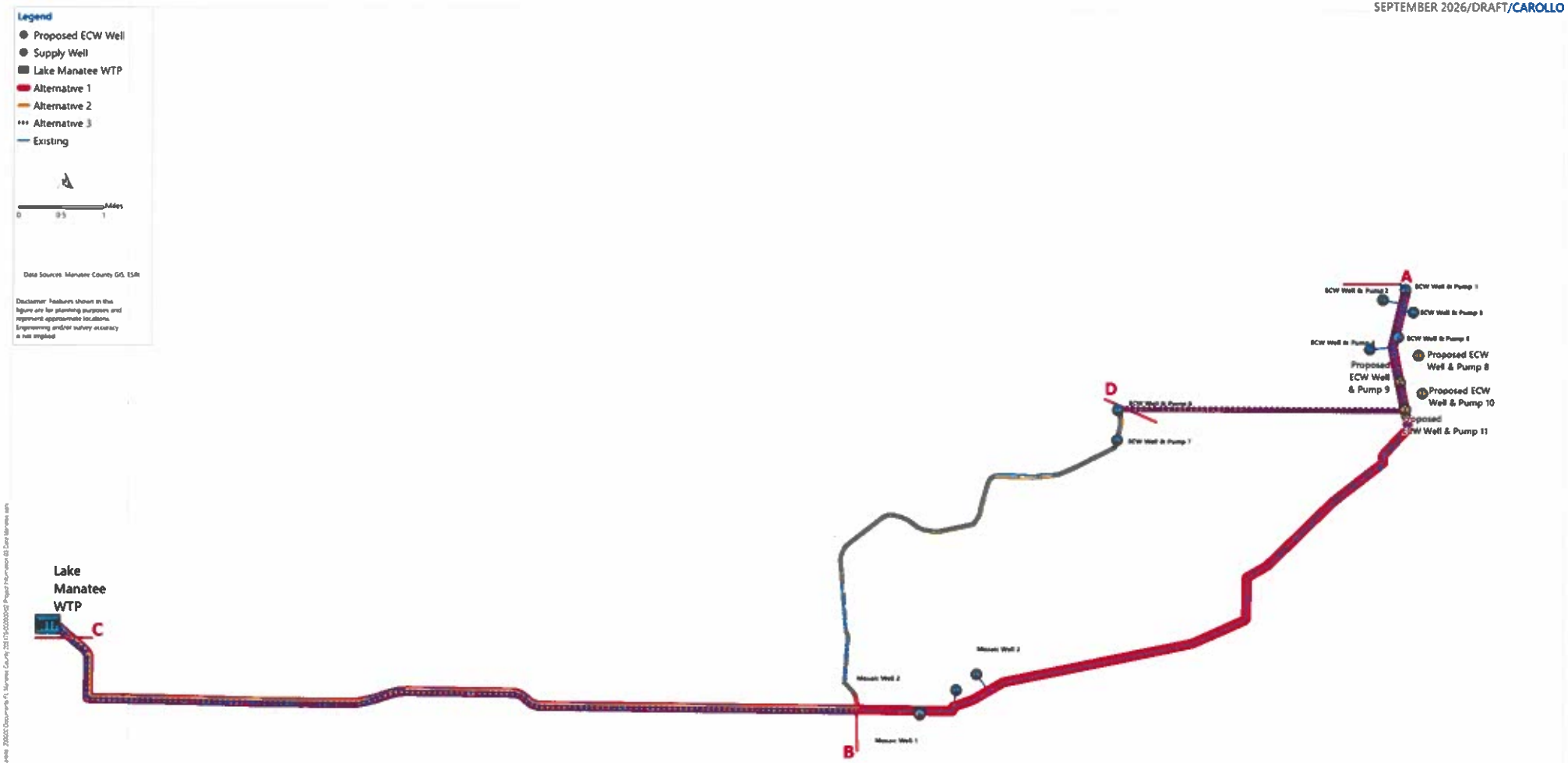


Figure 3-1 CONCEPTUAL DESIGN - PROPOSED ALIGNMENT ALTERNATIVES
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

Alternative 1

Alternative 1 follows the existing transmission corridor from Location A to Location B and continues west to Location C, as shown in **Figure 3-2**. The A-B segment is approximately 48,300 feet and the B-C segment approximately 48,700 feet. The route benefits from established utility access and known site conditions but requires construction along the full corridor and parallel to existing infrastructure.

Major considerations include workspace adjacent to the existing transmission main and PRECO facilities, the Lake Manatee crossing, other waterway crossings, access, construction sequencing, and protection of existing facilities. The Lake Manatee crossing is assumed to use HDD at the planning level. Four additional major waterway crossings require design-specific structural, hydraulic, environmental, and constructability evaluation.

Alternative 2

Alternative 2 includes A-D, D-B, and B-C segments. The route initially follows the existing corridor, then traverses a portion of Duette Preserve toward Location D, continues along the D-B corridor, and follows the common B-C route to the WTP. The total new pipeline length is approximately 104,700 feet. The alternative 2 alignment is shown in **Figure 3-3**.

Record drawings depicting the existing waterway crossings are included in **Appendix H** and provide additional information regarding the existing transmission main crossing configurations.

Alternative 3

Alternative 3 consists of a new A-D segment and a new B-C segment. The A-D segment is approximately 24,950 feet and connects the northern and southern portions of the wellfield. The B-C segment is approximately 48,700 feet and provides a parallel connection from the wellfield transmission system to the Lake Manatee WTP. The alternative retains the existing A-B segment as the intermediate conveyance link.

Alternative 3 has the least new pipeline length, lowest mapped wetland and surface-water impact, and lowest Class 5 pipeline cost. It remains dependent on the existing A-B segment, which is the controlling hydraulic limitation for an A-B outage. The selected planning configuration uses a 36-inch A-D segment and 42-inch B-C segment, subject to final design confirmation.

The alternative 3 alignment is shown in **Figure 3-4**.



Figure 3-2 PROPOSED ALIGNMENT ALTERNATIVE 1
MANATEE COUNTY
PIPELINE RESILIENCY STUDY



Figure 3-3 PROPOSED ALIGNMENT ALTERNATIVE 2
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

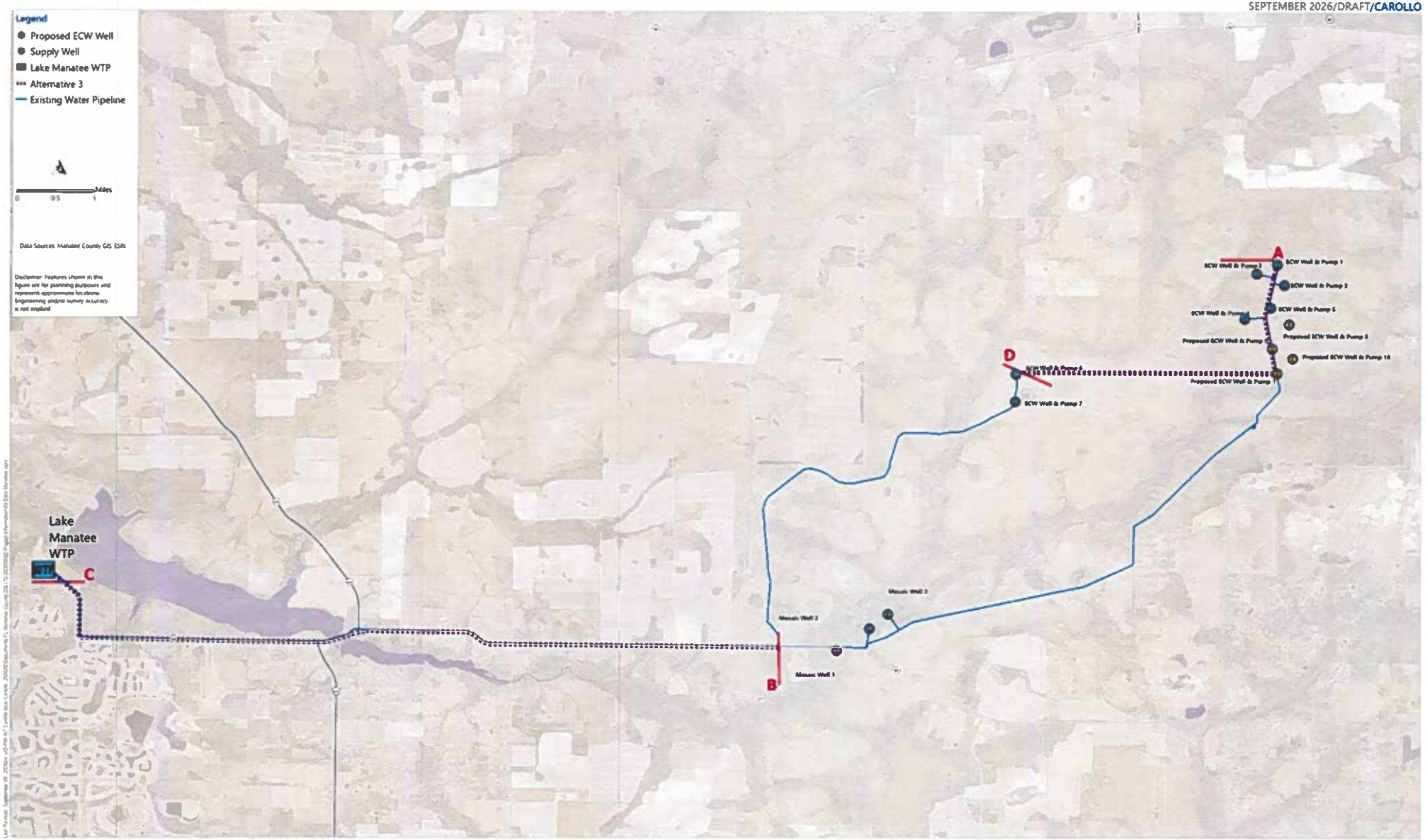


Figure 3-4 PROPOSED ALIGNMENT ALTERNATIVE 3
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

3.3 Hydrogeologic and Environmental Constraints

3.3.1 Hydrogeologic Constraints

The hydrogeologic evaluation does not directly differentiate the alignments but informs future well operation, pump selection, and WUP coordination. Environmental conditions provide significant differentiation. Alternative 2 has the greatest mapped wetland and surface-water impact and a unique conservation-easement constraint. Alternative 1 has intermediate mapped wetland impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent forested/shrub wetland conversion.

Refer to Appendix G for a full planning-level hydrogeologic evaluation prepared by WSP.

3.4 Hydraulic Modeling and System Capacity

Planning-level hydraulic modeling evaluated the capacity and resiliency of the existing ECW raw-water transmission system and three proposed alignments. The evaluation uses an AAD production requirement of 26.2 mgd and maximum-month production requirement of 31.5 mgd. Model assumptions include a Hazen-Williams C-factor of 130, available well pump curves, assumed aquifer levels, representative proposed future wells, Mosaic Well availability, a separate proposed-main WTP entry, and SCADA-informed operating conditions. These assumptions are suitable for comparative planning and require refinement during detailed design.

3.4.1 Hydraulic model basis and assumptions

The following assumptions were used for the planning-level calculations:

- A Hazen-Williams C-factor of 130 was used for the transmission mains.
- Existing wells were modeled using their respective factory pump curves.
- »Proposed future ECW Wells 8 through 11 were represented using available existing ECW pump-curve information until final future-well pump selections are established.
- ECW Wells 1 through 7 and the proposed future wells were assumed to pump from an aquifer water level of approximately -10 ft NGVD for the evaluated condition.
- Proposed ECW Wells 8-11 were assumed to pump from an aquifer water level of approximately -25 ft NGVD.
- Mosaic Well 3 was assumed to remain available for operation, while Mosaic Wells 1 and 2 were generally modeled out of service.
- Well operating combinations were varied by scenario so that the modeled pumps remained on their respective pump curves while determining the maximum conveyable system flow.
- The proposed raw water main was assumed to have a separate entry to the WTP degasifier rather than manifold into the existing transmission main immediately upstream of the degasifier.
- Historical SCADA flow and pressure data were used to inform model development. Field pressure logging was identified to verify ECW transmission-main pressures because some reported SCADA pressures appeared lower than expected.

These assumptions are appropriate for the current planning-level comparison of alternatives and are expected to be refined as field pressure data, final groundwater operating levels, future well pump selections, and WTP connection details are confirmed. Accordingly, the modeled capacities should be used to compare alternatives and identify controlling conditions rather than as final design capacities.

3.4.2 Hydraulic Criteria

Pipeline sizing was screened using conveyance capacity, velocity, and headloss. The preferred planning velocity range is approximately 3 to 5 ft/s. Lower velocities can increase deposition potential, while higher velocities increase friction loss, energy, wear, and surge potential. The analysis compares diameter combinations under normal operation and outages of the existing A-B, D-B, and B-C segments.

3.4.3 Hydraulic Performance

The hydraulic evaluation demonstrated that both pipeline alignment and pipeline diameter influence the ability of the system to meet the project resiliency objectives. Planning-level modeling was completed to evaluate multiple pipeline diameter combinations for each alternative under normal operating conditions and representative outage scenarios. The evaluation focused on the ability of each alternative to satisfy the 26.2 mgd AAD criterion and the 31.5 mgd PMM criterion while providing redundancy within the raw water transmission system (per WUP Modification). The evaluated alternatives differed not only in pipeline diameter but also in the degree of conveyance redundancy provided by the respective alignment configurations (**Table 3-2**).

Table 3-2 Summary of the Pipeline Segments for Each Alternative and the corresponding Planning-Level Resiliency

Alternative	Approx. Length	Diameter Findings	Planning-Level Result
1	Segment A-B: 48,300 ft Segment B-C: 48,700 ft	42/42 and 42/48 meet the 31.5 mgd MM criterion in all modeled cases.	Continuous conveyance route from ECW Pumps 1-7 to the WTP. The existing D-B branch remains the only connection for ECW Wells 6 and 7.
2	Segment A-D: 24,950 ft Segment D-B: 31,050 ft Segment B-C: 48,700 ft	42/36/48 and 42/42/42 meet or exceed 31.5 mgd in all modeled cases.	Most complete parallel conveyance path by extending the proposed system through the northern/eastern ECW branch and continuing to the WTP.
3	Segment A-D: 24,950 ft Segment B-C: 48,700 ft	Several combinations exceed 31.5 mgd under normal conditions, but none meet 26.2 mgd during A-B outage.	Adds redundancy at the northern/eastern ECW branch and between B and the WTP, while retaining the existing A-B segment as the intermediate conveyance link.

Alternative 1 provides a continuous parallel transmission route between the ECW and the LMWTP. The hydraulic results demonstrate that system capacity increases as proposed pipeline diameters increase, with the larger diameter combinations providing the highest conveyance capacity. Under the evaluated outage conditions, Alternative 1 maintained sufficient hydraulic performance to satisfy the 31.5 mgd MM criterion for the larger diameter configurations. Because the proposed alignment provides a continuous parallel conveyance route between Locations A, B, and C, the alternative provides a high degree of

redundancy and resiliency while maintaining hydraulic performance during the modeled outage scenarios (**Figure 3-5**).

Alternative 2 provides the greatest hydraulic redundancy of the alternatives evaluated because the proposed alignment creates an independent conveyance path around each principal existing transmission segment. The hydraulic results demonstrate that Alternative 2 consistently achieved the highest system capacities under both normal operating conditions and modeled outage scenarios. Multiple pipeline diameter combinations satisfied the 31.5 mgd MM criterion, demonstrating the resiliency benefits associated with providing redundancy throughout the ECW transmission system. Because Alternative 2 provides conveyance redundancy around the primary transmission corridors, it exhibited the strongest hydraulic performance and outage resiliency of the alternatives evaluated (**Figure 3-6**).

Alternative 3 provides redundancy between the northern and southern portions of the ECW and between the transmission system and the LMWTP. Under normal operating conditions, Alternative 3 demonstrated the ability to achieve the 31.5 mgd MM criterion for several evaluated diameter combinations. However, because Alternative 3 remains dependent on the existing A-B segment, the modeled A-B outage condition limits available conveyance capacity. As a result, none of the evaluated diameter combinations achieved the 26.2 mgd AAD criterion during the A-B outage scenario. Despite this limitation, Alternative 3 still provides redundancy improvements relative to the existing system and improves operational flexibility through the addition of the A-D and B-C transmission segments (**Figure 3-7**).

The hydraulic evaluation demonstrates that Alternative 2 provides the highest degree of system redundancy and outage resiliency by providing an independent conveyance path around each principal transmission segment. Alternative 1 provides strong hydraulic performance through a continuous parallel conveyance route between the ECW and the LMWTP. Alternative 3 improves redundancy within the ECW transmission system but remains dependent on the existing A-B segment during certain outage conditions. Final pipe diameters, operating criteria, and system configuration will be confirmed during future design using updated field data, refined hydraulic analyses, transient evaluation, and confirmed operating requirements.

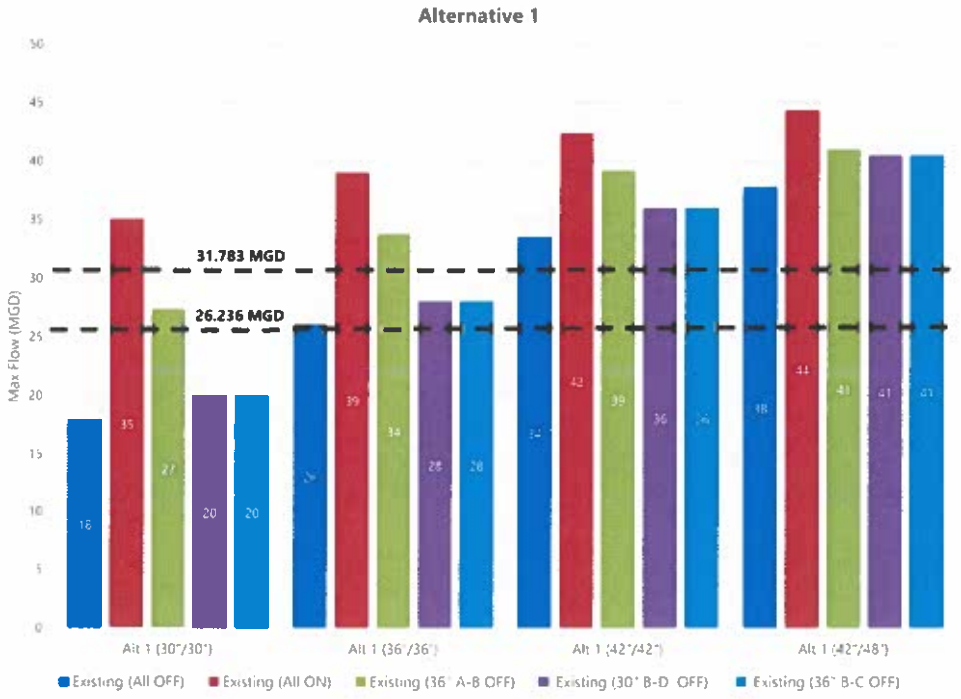


Figure 3-5 Hydraulic Results for Alternative 1

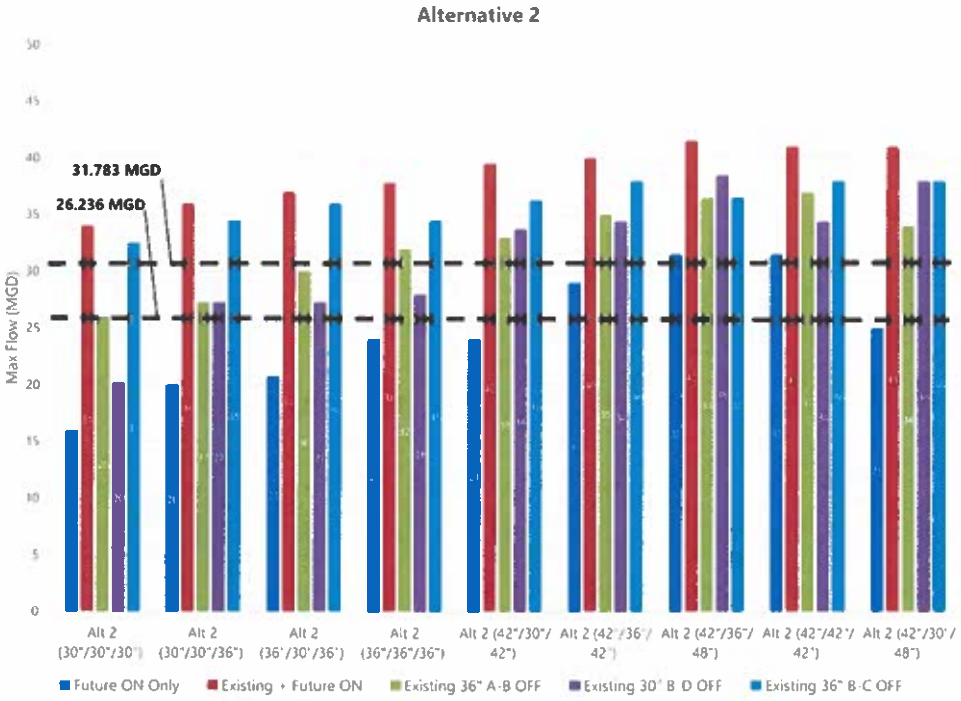


Figure 3-6 Hydraulic Results for Alternative 2

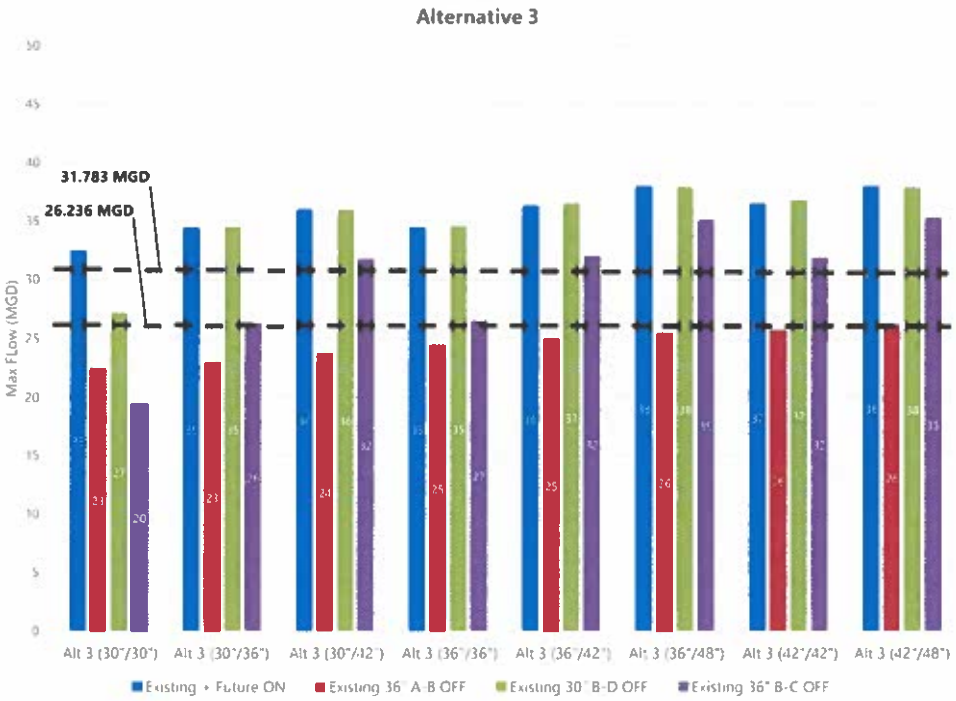


Figure 3-7 Hydraulic Results for Alternative 3

SECTION 4 ANALYSIS OF ALTERNATIVE ALIGNMENTS

4.1 Evaluation Methodology

The alternatives evaluation identifies the alternative that best balances the County's planning objectives rather than the alternative with the highest performance in a single category. The evaluation included a non-cost assessment, a planning-level cost evaluation, and a combined cost and non-cost evaluation to identify the recommended planning alternative. The non-cost assessment considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. Planning-level capital costs were evaluated separately and incorporated into the final combined evaluation to support selection of the preferred planning alternative.

4.2 Non-Cost Criteria Evaluation

Information developed in Sections 1 through 3 was synthesized using six non-cost criteria (**Table 4-1**). Cost was evaluated separately due to the nature of the Class 5 estimates which are intended to indicate relative cost rather than establish final construction cost.

Table 4-1 Non-Cost Evaluation Weighting Criteria

Criterion	Weight	Evaluation Basis
Reliability & Resiliency	25%	Hydraulic independence, service continuity, outage performance, and system recovery
Hydraulic Performance	25%	Capacity relative to AAD/MM criteria, velocity, headloss, and controlling outage
Environmental & Permitting	15%	Wetlands, surface waters, species, conservation lands, cultural resources, and permitting complexity
Constructability & Implementation Risk	15%	Length, access, crossings, utility coordination, workspace, property, and schedule risk
Operations & Maintenance	10%	Operational flexibility, isolation, emergency repair response, access, and restoration
Future Expandability & Flexibility	10%	Ability to support future wellfield conditions and design refinement
TOTAL	100%	

Each alternative was assigned an integer raw score from 1 to 10. A score of 10 represents the most favorable relative performance, 5 represents a condition that generally meets the planning objective but is not preferred, and 1 represents the least favorable relative performance. Raw scores are multiplied by the criterion weight to calculate weighted scores. Refer to **Table 4-2** for non-cost criteria weighted results for each alternative.

Table 4-2 Non-Cost Evaluation Weighting Criteria

Evaluation Criterion	Weight	Alt. 1 Raw	Alt. 1 Weighted	Alt. 2 Raw	Alt. 2 Weighted	Alt. 3 Raw	Alt. 3 Weighted
Reliability & Resiliency	25%	9	2.25	10	2.50	6	1.50
Hydraulic Performance	25%	9	2.25	10	2.50	6	1.50
Environmental & Permitting	15%	7	1.05	3	0.45	10	1.50
Constructability & Implementation Risk	15%	7	1.05	4	0.60	8	1.20
Operations & Maintenance	10%	8	0.80	9	0.90	6	0.60
Future Expandability & Flexibility	10%	8	0.80	9	0.90	7	0.70
TOTAL	100%	---	8.20	---	7.85	---	7.00

4.3 Cost Criteria Evaluation

Planning-level capital cost estimates were developed for each alternative using route-specific pipeline lengths, planning-level unit costs, alternative-specific allowances, and design and construction contingencies. The estimates use unit costs of $450 per linear foot for 36-inch ductile iron pipe and $625 per linear foot for 42-inch ductile iron pipe. Additional allowances were included, as applicable, for major waterway crossings, valves and appurtenances, tie-ins, utility coordination, access and restoration, environmental mitigation, engineering and design development, construction contingency, and construction management.

The estimates are intended for relative planning and budgeting comparison and do not represent final design-level construction costs. Detailed planning-level cost estimates for Alternatives 1, 2, and 3 are included in **Appendix I**, respectively. The resulting capital cost comparison was summarized in **Table 4-3**.

Table 4-3 Capital Cost Summary

Cost Component	Alternative 1	Alternative 2	Alternative 3
Bid-Based Pipeline Construction	$52,172,500	$55,637,500	$41,665,000
Alternative Specific Allowance	$7,000,000	$7,000,000	$6,500,000
Design and Construction Contingency	$16,520,000	$19,050,000	$12,880,000
Total Capital Cost	$75,692,500	$81,687,500	$61,045,000
Relative Capital Cost Rank	2	3	1

Alternative 3 has the lowest planning-level capital cost because it requires the least new pipeline length and retains the existing A-B segment as the intermediate conveyance link. Alternative 2 has the highest

planning-level capital cost due to its longer proposed pipeline alignment and higher environmental, access, and implementation allowances. Alternative 1 has an intermediate planning-level capital cost.

A 20-year net present value analysis was also completed to provide a consistent life-cycle cost comparison among the alternatives. The analysis considers initial capital cost, the present value of annual maintenance costs, and the present value of the remaining asset value at the end of the 20-year evaluation period. The NPV analysis uses a 3.0 percent discount rate and assumes a 75-year useful life for the transmission main facilities. At the end of the 20-year evaluation period, 55 years, or approximately 73.3 percent, of the assumed useful life remains.

Annual maintenance costs were estimated at $125,000 for Alternative 1, $175,000 for Alternative 2, and $75,000 for Alternative 3. The uniform-series present-worth factor, P/A, is 14.8775, and the single-payment present-worth factor, P/F, is 0.5537. Total net present cost was calculated as initial capital cost plus the present value of annual maintenance costs, less the present value of the residual asset value. The NPV results are summarized in **Table 4-4**.

Table 4-4 20-Year Net Present Value Summary

Economic Component	Alternative 1	Alternative 2	Alternative 3
Capital Cost	$75,692,500	$81,687,500	$61,045,000
Annual Maintenance	$125,000	$175,000	$75,000
Present Value of Maintenance	$1,859,684	$2,603,558	$1,115,811
Present Value of Residual Asset Value	($30,733,341)	($33,167,485)	($24,786,033)
Total Net Present Cost	$46,818,843	$51,123,573	$37,374,777
Relative NPV Rank	2	3	1

Alternative 3 has the lowest total net present cost and ranks first in the NPV comparison. The NPV ranking is consistent with the capital cost ranking and does not change the relative cost position of the alternatives.

The planning-level estimates should be refined during future design phases based on refinement to project specific requirements. Funding eligibility will be confirmed with FDEP.

4.4 Combined Cost and Non-Cost Evaluation

The alternatives evaluation included both a non-cost technical assessment and a planning-level cost comparison. The non-cost evaluation considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. A separate evaluation of planning-level capital cost was then completed to determine the overall planning value of each alternative. The combined evaluation results are summarized in **Table 4-5**.

Table 4-5 Combined Cost and Non-Cost Evaluation

Evaluation Component	Weight	Alternative 1	Alternative 2	Alternative 3
Non-Cost Evaluation Score	60%	8.2	7.85	7.00
Cost Score (Relative Planning-Level Cost Competitiveness)	40%	8.0	7.0	10.0
Non-Cost Weighted Score	--	4.92	4.71	4.20
Cost Weighted Score	--	3.20	2.80	4.00
Final Combined Score	100%	8.12	7.51	8.20
Overall Ranking	--	2	3	1

The combined cost and non-cost evaluation indicates that Alternative 3 achieved the highest overall score and ranked first among the evaluated alternatives. Alternative 1 ranked second, driven by its strong technical performance, while Alternative 2 ranked third due to higher planning-level costs and implementation challenges.

4.5 Key Alternative Strengths and Considerations

All three alternatives provide necessary improvements, but each has distinct strengths and planning considerations. The key strengths and planning considerations associated with each alternative were summarized in **Table 4-6**.

Table 4-6 Key Alternative Strengths and Considerations

Alternative	Key Strengths	Key Considerations
1	Strong hydraulic performance; continuous proposed A-B and B-C route; can satisfy the MM requirement in all modeled outage cases with sufficiently large segments.	Greater new pipeline length and cost than Alternative 3; intermediate mapped wetland impact; corridor and crossing complexity along the full route.
2	Strongest modeled hydraulic redundancy; parallel path around each principal existing segment; greatest operational flexibility during modeled outages.	Highest pipeline cost; greatest mapped wetland impact; conservation-easement and gopher tortoise recipient-site constraint; elevated permitting and implementation risk.
3	Lowest pipeline cost; least new pipeline length; lowest mapped wetland and surface-water impact; favorable implementation and planning flexibility.	Dependent on existing A-B; modeled A-B outage capacity below AAD; preliminary 36-inch A-D and 42-inch B-C diameters require final confirmation.

Alternative 1 and Alternative 2 provide stronger hydraulic outage performance. Alternative 3 provides the most favorable combination of pipeline cost, mapped environmental impact, reduced new pipeline length, and planning flexibility.

4.6 Recommended Planning Alternative

4.6.1 Evaluation Results

The non-cost evaluation indicated that Alternatives 1 and 2 provided greater hydraulic redundancy and outage resiliency than Alternative 3. Alternative 2 achieved the highest hydraulic evaluation score, while Alternative 1 achieved similar hydraulic performance with fewer environmental and implementation constraints. The evaluation also identified differences in environmental impacts, permitting complexity, constructability, and planning-level capital cost. Alternative 2 had the greatest estimated wetland impacts, the highest permitting complexity, and the highest planning-level capital and net present costs. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in both capital and net present cost than Alternative 3. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in cost than Alternative 3.

Alternative 3 had the lowest planning-level capital cost, the lowest 20-year net present cost, the shortest length of new transmission main, and the lowest mapped wetland and surface-water impacts. Alternative 3 also remains dependent on the existing A-B transmission segment, resulting in lower hydraulic redundancy than Alternatives 1 and 2. When cost and non-cost considerations were evaluated together, Alternative 3 achieved the highest combined evaluation score. Based on the combined evaluation results, Alternative 3 was selected as the preferred planning alternative for advancement into future design and implementation.

4.6.2 Basis for Selection

Based on combined consideration of technical performance, environmental findings, constructability and implementation, operations and maintenance, future flexibility, planning-level capital cost, 20-year net present cost, and County planning direction, Alternative 3 is recommended as the preferred planning alternative. (**Figure 4-1**).



Figure 4-1 PROPOSED SELECTED ALTERNATIVE 3 (36-INCH A-D AND 42-INCH B-C)
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

The recommendation transparently recognizes that Alternatives 1 and 2 provide stronger modeled outage performance, while Alternative 3 provides a favorable overall planning and budgeting approach.

For planning and budgeting, Alternative 3 consists of an approximately 24,950-foot, 36-inch A-D segment and an approximately 48,700-foot, 42-inch B-C segment. Final diameters and connection details will be confirmed during future design based on refined hydraulic analyses, updated design criteria, verified groundwater levels, confirmed well availability, WTP boundary conditions, transient analyses, constructability, permitting, and operational requirements.

Alternative 3 provides meaningful resiliency improvements but does not provide complete hydraulic independence from the existing transmission system. The proposed A-D segment provides an additional connection between the northern and southern portions of the ECW, and the proposed B-C segment provides a parallel transmission path to the WTP. However, the configuration continues to use the existing A-B and D-B segments.

The planning-level hydraulic analysis identifies the existing A-B segment as the controlling outage dependency. Under the modeled A-B outage condition, none of the evaluated Alternative 3 diameter combinations achieved the 26.236-mgd AAD criterion. Alternative 3 was nevertheless selected as the preferred planning alternative because its lower cost, shorter length, reduced mapped environmental impacts, and lower implementation risk produced the highest combined cost and non-cost evaluation score.

Selection of Alternative 3 represents a planning and budgeting decision rather than a conclusion that the alternative provides the same hydraulic independence as Alternatives 1 and 2. Future design shall establish the County's minimum acceptable service level for an A-B outage and evaluate well availability, available flow, WTP operation, isolation and maintenance requirements, emergency repair procedures, temporary supply measures, recovery actions, and potential future improvements. If the County's required outage performance cannot be achieved through operational measures, subsequent phases may include additional transmission improvements to reduce or eliminate the A-B dependency.

4.6.3 Potential Project Phasing

The planning-level cost estimates indicate that implementation of the selected alternative may require phased delivery to align project expenditures with available funding and future system needs. Potential project phasing strategies are summarized below.

- **Phase 1 – Core Resiliency Improvements**

Phase 1 would focus on the transmission infrastructure improvements that provide the greatest resiliency benefits and support increased raw water conveyance capacity between the ECW and the Lake Manatee WTP.

Potential Phase 1 improvements include:

- Construction of priority transmission main segments associated with the selected planning alternative.
- Improvements to transmission capacity between the Mosaic wells and the Lake Manatee WTP.
- Evaluation and potential construction of an interconnection between ECW Wells 1 through 5 and ECW Wells 6 and 7 within the ECW.

- **Phase 2 – Supply and Operational Improvements**

Phase 2 would focus on increasing raw water supply availability and improving operational flexibility within the existing treatment system.

Potential Phase 2 improvements include:

» Construction of two additional groundwater production wells.
» Construction of ASR bypass piping around the existing degasifiers.
» Construction of additional transmission infrastructure as warranted based on system demands, operational needs, and available funding.

- **Phase 3 – Long-Term Redundancy Improvements**

Phase 3 would focus on future water supply expansion and completion of additional system resiliency improvements.

Potential Phase 3 improvements include:

» Construction of two additional groundwater production wells.
» Completion of remaining transmission system redundancy improvements identified through future planning, design, and operational evaluations.

The final project phasing strategy will be refined during subsequent planning and design phases based on funding availability, regulatory requirements, operational priorities, hydraulic evaluation results, and future water demand projections.

SECTION 5 SELECTED ALTERNATIVE

Alternative 3 was selected for Facilities Plan development, planning, and budgeting. The selected concept includes the A-D wellfield connection and the B-C transmission segment to the Lake Manatee WTP. The preliminary configuration uses a 36-inch A-D segment and a 42-inch B-C segment. The selection establishes a planning basis and does not represent final design approval of materials, profiles, appurtenances, or connection details.

5.1 Description of the Proposed Project

The selected planning alternative includes approximately 24,950 feet of new 36-inch raw-water transmission main between Locations A and D and approximately 48,700 feet of new 42-inch raw-water transmission main between Locations B and C. The A-D segment connects the northern and southern portions of the East County Wellfield. The B-C segment provides a parallel connection between the wellfield transmission system and the Lake Manatee WTP. The selected concept operates with the existing A-B and D-B segments.

Planning-level components include tie-ins, isolation valves, air-release and vacuum-valve assemblies, blowoffs, access facilities, major roadway and water crossings, WTP connection modifications, and other appurtenances required for reliable operation. Final design will confirm the relationship between the selected transmission improvements and proposed wellfield, treatment, electrical, instrumentation, and SCADA improvements included in the broader project.

Refer to **Figure 5-1** for the selected Alternative 3 proposed tie-ins and major constraints. Refer to **Appendix H** for more detailed information on the major constraints and existing transmission main record drawings.

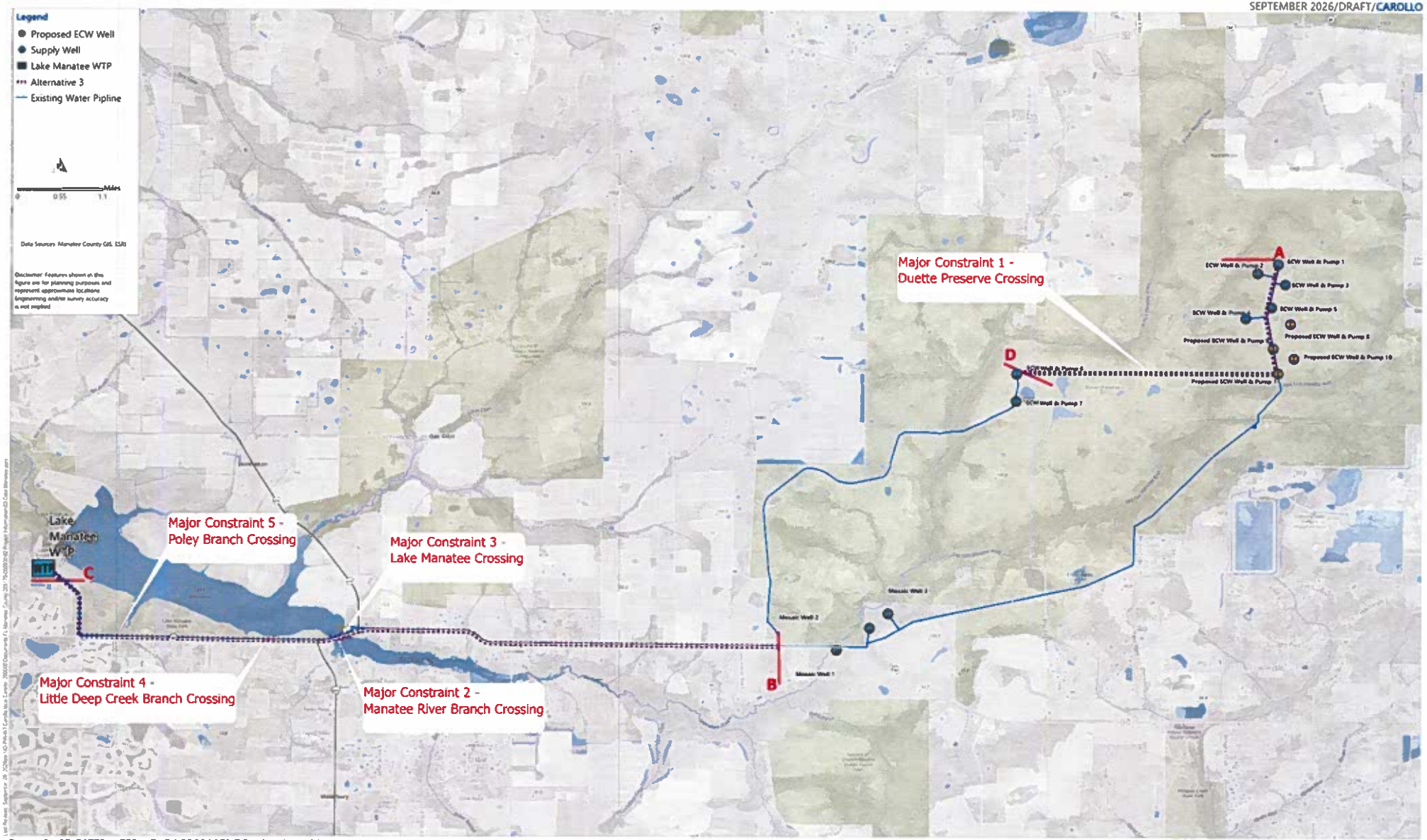


Figure 5-1 SELECTED ALTERNATIVE 3 PROPOSED TIE-INS AND MAJOR CONSTRAINTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

5.2 Project Implementation

Implementation will require coordinated survey, route refinement, geotechnical investigation, subsurface utility engineering, environmental field verification, property and easement coordination, permitting, hydraulic and transient modeling, design, procurement, construction, startup, and closeout. Coordination with FDOT and other agencies will be required where the project interfaces with planned roadway work, rights-of-way, regulated resources, and other infrastructure.

The project may be phased to align design, permitting, property acquisition, funding, procurement, and construction. Phasing should maintain County operations, reduce service disruption, and preserve the ability to advance critical wellfield and transmission improvements as information is refined.

5.2.1 Project Schedule

The preliminary funding implementation schedule presented in **Table 5-1** presents the current funding-program target dates. It identifies the milestones for Facilities Plan completion, funding coordination, field investigations, preliminary design, permitting, property acquisition, final design, procurement, construction, startup, and closeout. These dates are preliminary and have not yet been validated through a detailed critical-path method schedule. Achieving the dates depends on timely definition of the funded scope, selection of the project delivery approach, completion of field investigations, resolution of the WTP and degasifier interface, acquisition of necessary property rights, agency coordination, permit reviews, funding authorization, procurement, and construction.

The July 2027 date for design documents, permits, and site acquisition and the December 2031 project-completion date should therefore be treated as target milestones subject to schedule validation. Early schedule development shall identify controlling activities, responsible parties, dependencies, decision dates, float, and required escalation procedures.

Activities that should begin or be defined early because they may control the implementation schedule include confirmation of the SAHM-funded scope and project phasing; definition of the WTP and degasifier project boundary; confirmation of the delivery and procurement approach; survey, SUE, environmental field investigations, and geotechnical investigations; hydraulic criteria and required outage scenarios; property and easement acquisition; FDOT and conservation-land coordination; major-crossing feasibility; permitting coordination; final design; funding approval; procurement; construction; startup; and acceptance.

Table 5-1 Preliminary Funding Implementation Schedule

Schedule Categories	Month and Year
Submit the Planning or SSES documentation	Completed
Submit the design documents, obtain permits, and acquire sites (as necessary)	July 2027
Start activity (such as construction or non-structural best management practice)	January 2028
Complete activity (such as construction or non-structural best management practice)	December 2031

5.2.2 Project Cost and Funding Basis

The planning-level capital cost estimate for the Alternative 3 transmission improvements is $61,045,000. This estimate is based on approximately 24,950 linear feet of 36-inch transmission main along Segment A-D and approximately 48,700 linear feet of 42-inch transmission main along Segment B-C. The estimate includes the pipeline construction and the allowances, contingencies, engineering, and construction-management costs specifically identified in **Appendix I**.

The Alternative 3 estimate is a Class 5 planning-level estimate and is not the total cost of the broader Pipeline Resiliency Project. Unless expressly included in Appendix I, the estimate does not establish the final cost of additional production wells, well equipment, WTP hydraulic modifications, degasifier modifications or bypasses, electrical and SCADA improvements, property and easement acquisition, environmental mitigation, escalation to the midpoint of construction, or other improvements that may be added as the project scope is refined.

The current SAHM funding amount is $35,139,169, including $17,569,584 in principal forgiveness. Compared with the $61,045,000 planning-level estimate for the Alternative 3 transmission improvements, the presently identified funding is approximately $25.9 million less than the planning-level estimate. This comparison does not represent a final funding determination because project scope, eligible costs, phasing, and the total project estimate remain under development.

The County will coordinate with FDEP to confirm which project components and costs are eligible under the current SAHM funding package. Costs exceeding the available SAHM funding may require scope refinement, phased implementation, local funding, additional grant or loan funding, or a combination of funding sources. The Facilities Plan does not represent that funding eligibility or the source of the remaining funds has been finalized.

Cost estimates will be updated through final design as the scope, design criteria, crossing methods, property requirements, environmental mitigation, implementation schedule, and procurement approach are developed. The corresponding 20-year net present cost will be updated after the useful-life and residual-value assumptions are reconciled. These values are planning-level estimates for comparison, budgeting, and funding coordination. Funding eligibility and the relationship between the selected transmission alternative and broader SAHM-funded project components will be coordinated with FDEP and documented before issuance.

5.3 Future Design Confirmation

Items identified for confirmation are assigned to one of three resolution stages. Information needed to support the Facilities Plan conclusions, funding basis, public process, and regulatory submission will be resolved before final Facilities Plan issuance or expressly documented as a remaining planning limitation. County or agency determinations that occur after Facilities Plan submission, including funding eligibility, authorized WUP conditions, minimum acceptable outage service levels, property actions, and agency permit requirements, will be completed by the County with the applicable agency and consultant support before the related design, funding, or construction decision. Design details requiring survey, SUE, field investigation, geotechnical information, agency review, or progressive design development will be completed by the DCP/PDB team during project definition, permitting, or final design.

The project team will complete or expressly document the status of the hydrogeologic anomalies; reconcile alternative cost inclusions and exclusions; correct the net-present-value and residual-value basis; confirm the current funded scope and funding comparison; complete the public-meeting and appendix

references; and finish report-wide terminology, title, address, and clerical QA/QC. These items are not deferred to final design.

Following the Facilities Plan issuance, the County will lead decisions involving the funded scope, funding eligibility, minimum outage service level, emergency operating expectations, property acquisition, and project phasing, with FDEP, SWFWMD, FDOT, land managers, and other agencies providing determinations within their respective authorities. The DCP/PDB team will complete the final alignment, profiles, pipe materials and diameters, survey and SUE, geotechnical investigations, environmental fieldwork, permit applications, major-crossing methods, detailed hydraulic and transient analyses, WTP/degasifier interface, electrical and SCADA integration, construction sequencing, commissioning, and acceptance criteria.

Future design will confirm the alignment and preliminary diameters using updated survey, field investigations, utility and property data, environmental verification, agency coordination, hydraulic criteria, and operating data. The design process should confirm:

- Final A-D and B-C alignments, profiles, materials, and diameters.
- Updated demand, WUP, groundwater-level, well-availability, and WTP boundary conditions.
- Final isolation strategy, emergency operating procedures, maintenance access, and service restoration.
- Tie-ins, appurtenances, air management, blowoffs, and access facilities.
- Water and roadway crossing methods, geotechnical requirements, and construction staging.
- Property, easement, right-of-way, and agency-permit requirements.
- Environmental field surveys, avoidance and minimization, and mitigation.
- Updated cost estimates and schedule as design advances.

5.3.1 Hydraulic and Diameter Confirmation

The future hydraulic evaluation should refine model calibration and confirm performance under representative existing and future conditions. The analysis should evaluate normal operation, individual existing-main outages, future-well availability, operational sequencing, and recovery. Final diameters should be based on capacity, velocity, headloss, pressure, operational flexibility, energy, surge, and future-system requirements.

5.3.2 Surge and Air Management

A detailed transient and air-management evaluation should be completed during design development using the selected pipeline profile, final materials and diameters, confirmed pump conditions, WTP and degasifier boundary conditions, proposed valve locations, and operating sequences. The evaluation should address pump startup and shutdown, power failure, minimum and maximum pressures, column separation, check-valve behavior, air admission and release, individual-main outages, air accumulation at high points and HDD crossings, and the need for operating controls or dedicated surge mitigation.

Transient pressure, column separation, trapped air, and uncontrolled air release are key design risks for the proposed long, large-diameter transmission mains, major elevation changes, pump systems, and HDD crossings. Potential consequences include excessive positive or negative pressure, loss of pipeline

integrity, check-valve slam, pump or valve damage, air locking, reduced conveyance capacity, and difficulty restarting or recovering the system following an outage.

Design development shall include appropriate allowances for air-release and vacuum-valve assemblies, controlled valve operation, check-valve selection, surge-control facilities, instrumentation, emergency power and controls, and other mitigation identified by the transient analysis. Final locations and sizes will be established from the design-phase analysis and confirmed operating requirements.

5.4 Environmental and Regulatory Commitments

During design development, a permitting and approval matrix should be completed to identify the anticipated approval, reviewing agency, supporting information, critical-path dependency, resolution phase, responsible party, and next actions. Agency applicability and review durations should be confirmed through early coordination. In the early part of the design development, the DCP/PDB team should develop permit-supporting information and applications, and each reviewing agency will determine its final requirements and issue the applicable approval.

Environmental review for Alternative 3 should focus on field verification of wetlands and surface waters, protected-species surveys, cultural-resource coordination, conservation-land requirements, contaminated-site considerations, and applicable permits. Desktop evaluation indicates that Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential forested/shrub wetland conversion. Final impacts will depend on surveyed alignment, footprint, construction methods, and field-verified boundaries. The project should prioritize avoidance and minimization. Unavoidable impacts, mitigation, species-protection measures, cultural-resource requirements, and permit conditions will be established through design-phase surveys and agency coordination. Refer to **Figure 5-2** for the selected Alternative 3 environmental commitments.

Based on the preliminary alignment, environmental screening, and initial agency coordination, the anticipated permits are listed below. Additional permits may be required as the design progresses.

- Environmental Resource Permit (FDEP/SWFWMD)
- Section 404 / Section 10 Authorization (USACE)
- Clean Water Act Section 401 Water Quality Certification (FDEP/SWFWMD)
- Endangered Species Act Section 7 Consultation (USFWS)
- Gopher Tortoise Permit and Recipient Site / Conservation Easement Approval (FWC)
- Section 106 Coordination with the State Historic Preservation Officer (USACE/SHPO)
- Water Well Construction Permit (Manatee County Environmental Protection Division)
- Public Drinking Water System Construction Permit (FDEP)
- Generic Permit for the Discharge of Produced Groundwater from Dewatering (FDEP)
- Utility Permit (FDOT)
- NPDES Generic Permit for Stormwater Discharge from Construction Activities (FDEP)

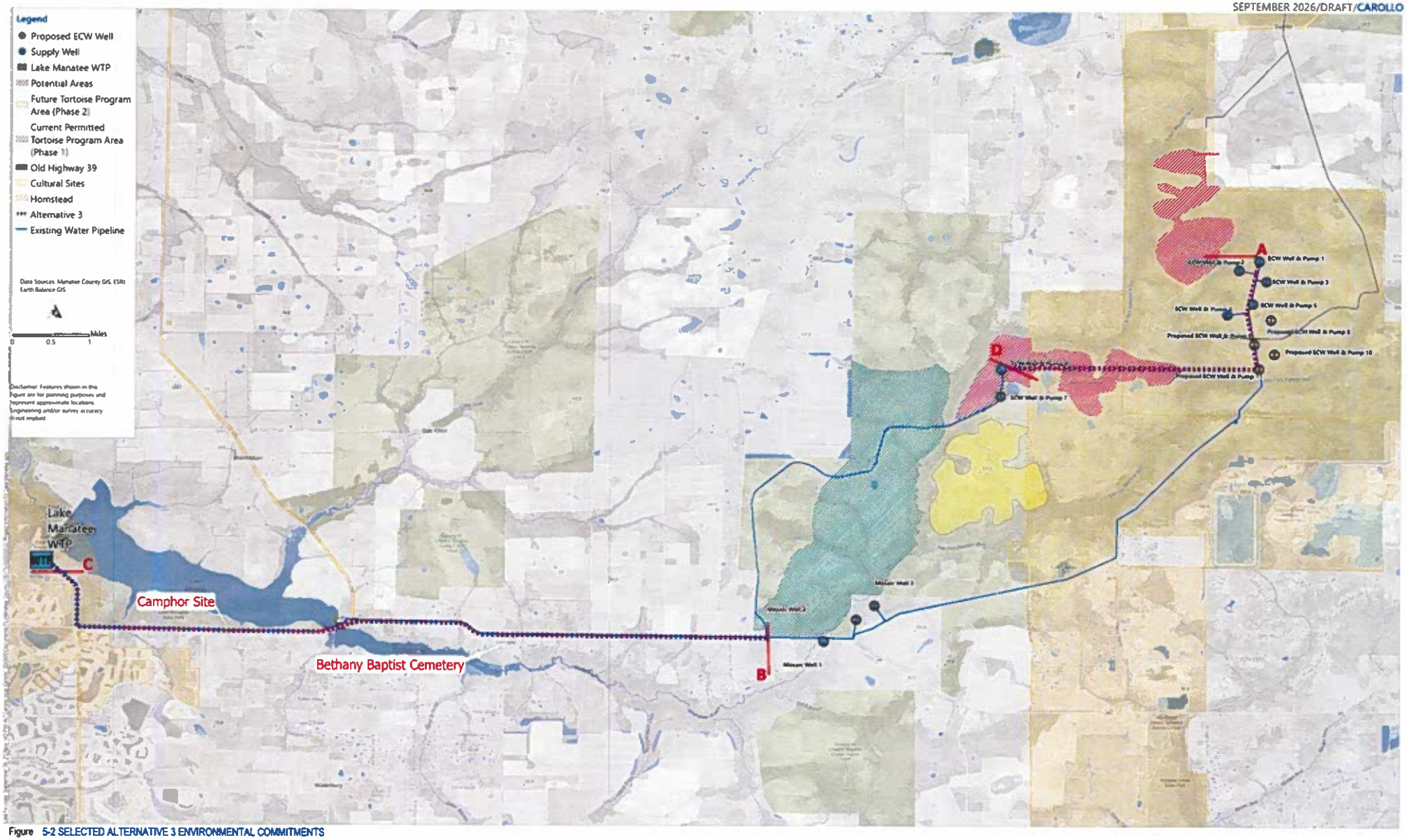


Figure 5-2 SELECTED ALTERNATIVE 3 ENVIRONMENTAL COMMITMENTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 6 COMPLIANCE

This section summarizes additional aspects of compliance requirements of the selected alternative, including public engagement and regulatory review. It is intended that the project will be executed in a timely manner while maintaining compliance with applicable federal, state and local requirements and the conditions of the SAHM award.

6.1 Public Engagement Meeting

Manatee County hosted a public engagement meeting on September 15, 2026, to present the proposed project and receive public comments. Refer to **Appendix J** for the public notice and **Appendix K** for the public notice meeting minutes.

The Facilities Plan and associated resolution will be presented to the Manatee County Board of County Commissioners for consideration and adoption. The approving resolution will be included in the final designated appendix following adoption.

6.2 Regulatory Agency Review

Implementation of the selected alternative will require review and approval by the applicable regulatory agencies. As part of the SAHM funding process, this Facility Plan will be submitted to FDEP for review to confirm the project's eligibility under the funding program requirements. Future phases of project development, such as design, may require additional agency coordination, permitting, and approvals associated with public water supply facilities, wells, construction, and any other applicable local, state and regulatory requirements.

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SUPPLEMENTAL APPROPRIATION FOR HURRICANE HELENE AND MILTON (SAHM) REQUEST FOR INCLUSION SUPPORTING DOCUMENTATION DWSRF FUNDS

APPENDIX B

GIS DATA COLLECTION TABLE

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NRCS SOIL REPORT FOR MANATEE COUNTY

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ENVIRONMENTAL EVALUATION REPORT

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FEMA FLOOD MAPS

APPENDIX F

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APPENDIX G

PLANNING-LEVEL HYDROLOGICAL EVALUATION REPORT

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MAJOR CROSSINGS AND TRANSMISSION MAIN RECORD DRAWINGS

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ALTERNATIVES 1-3 PLANNING-LEVEL CAPITAL COST ESTIMATES

APPENDIX J

PUBLIC NOTICE

APPENDIX K

PUBLIC NOTICE MEETING MINUTES

APPENDIX L

USEFUL LIFE CERTIFICATION

APPENDIX M

COST AND EFFECTIVENESS CERTIFICATION

APPENDIX N

BUISINESS PLAN (NOT INCLUDED)

EXHIBIT 2 TO RESOLUTION NO. R-26-137

Affidavit of Publishing and Public Notice

(2 pages)

MANATEE COUNTY GOVERNMENT

STATE OF FLORIDA

COUNTY OF MANATEE

Before the undersigned authority personally appeared **Quantana Acevedo,** who on oath says that she is a **County Employee of Manatee County Government, Manatee County, Florida**; that the attached copy of advertisement, being a public notice in the matters of **Public Notice of Special Meeting** for **Proposed Manatee County Pipeline Resilience Facility Plan,** in Manatee County Florida, was published on the publicly accessible website of Manatee County Government, Manatee County, Florida, of www.mymanatee.org on **September 1, 2026**.

Affiant further says that the website complies with all legal requirements for publication in Chapter 50, Florida Statutes.

By: Q Acevedo
Quantana Acevedo, Planning and Zoning Tech III

Sworn to and subscribed before me this 1st day of September, 2026, by Quantana Acevedo, who is personally known to me or who has produced (type of identification) as identification.

ABIGAIL RUTH-ELLEN BONDS
Notary Public-State of Florida
Commission # HH 815493
My Commission Expires
July 26, 2030

Abigail Bonds
(Signature of Notary Public)

Abigail Bonds
(Print Name of Notary Public)

Notary Public
(Title)

My Commission Expires: July 26, 2030

Commission Number: HH 815493

PUBLIC NOTICE

Notice is hereby given that the Board of County Commissioners of Manatee County, Florida, will hold a special meeting on September 15, 2026. The meeting is at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, for the purpose of considering the approval of the proposed Manatee County Pipeline Resiliency Facility Plan.

This hearing will include a discussion of the Facilities Plan and the financial impact on system users. The hearing is intended to afford the opportunity to individuals to be heard on the economic and social effects of the location, design, and environmental impact of the East County wellfield Pipeline Resiliency Project.

Responsible Entity:	Florida Department of Environmental Protection
Applicant:	Manatee County
Project Title(s):	Pipeline Resiliency Project

Location of Proposed Work: 17915 Water Line Service Road, Bradenton, FL 34212
GPS Coordinates: 27° 29' 16.7892" N82° 21' 41.4252" W

A portion of the funding for this project is anticipated to come from the Florida Department of Environmental Protection (FDEP) Supplemental Appropriations for Hurricanes Helene and Milton and Hawai'i Wildfires (SAHM) program. Financial impacts on utility users will be presented at the hearing. All interested persons are invited to attend and be heard.

COMMENTS: This will serve as both the initial and final public notice regarding the project funded by the FDEP SAHM program. Interested persons may submit comments, questions, or request documents and data relevant to this specific project by writing to Chad Butzow at Manatee County Utilities Administration, 3647 Cortez Road West, Bradenton, FL 34210, or by emailing chad.butzow@mymanatee.org. Comments should be sent in writing or by email with the subject line "FDEP SHAM Pipeline Resiliency Project Facility Plan" at the above address within 14 days of the date of this notice.

SPECIAL REQUIREMENTS: If you require special aid or services as addressed in the American Disabilities Act, please contact the County Clerk's Office at (904) 652-8521, no less than five (5) days prior to the above stated hearing date.

THIS NOTICE MAY BE REMOVED FROM PUBLIC VIEW ON THE 14TH DAY FROM ORIGINAL DATE OF POSTING.

NOTICE WAS POSTED ON THE 1ST DAY OF SEPTEMBER 2026

New Coversheet

Approved in Open Session 10/20/26
Manatee County
Board of County Commissioners

October 20, 2026 - Regular Meeting

Subject
Adoption of Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, Patrick Shea, Utilities Director, and Chad Butzow, Chief Utilities Engineer

Category
CONSENT AGENDA

Briefings
None

Contact and/or Presenter Information
Patrick Shea, Utilities Director, ext. 5389
Chad Butzow, Chief Utilities Engineer, x-5026

Action Requested
Adopt Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, and authorizing the appropriate County officials to take the actions necessary to support the associated Florida Department of Environmental Protection funding process.

Enabling/Regulating Authority
Florida Department of Environmental Protection State Revolving Fund requirements and applicable Florida Statutes/Administrative Code provisions

Applicable Advisory Board
N/A

Background Discussion
The East County Wellfield Pipeline Resiliency Project is intended to improve the reliability and resiliency of the County's raw water transmission system between the East County Wellfield and the Lake Manatee Water Treatment Plant. The project addresses the County's need for increased redundancy and long-term reliability of infrastructure that conveys raw groundwater from the wellfield to the water treatment plant.

The Facility Plan evaluates the existing raw water transmission system and identifies improvements intended to increase system resiliency. The recommended improvements include construction of a parallel raw water transmission pipeline and improvements associated with the degasification facilities serving the Lake Manatee Water Treatment Plant.

See attached agenda update memo 10.15.26, followed by revised Resiliency Plan document of 605 pages

The Pipeline Resiliency Facility Plan was prepared to support the County's participation in the Florida Department of Environmental Protection (FDEP) funding process. The project has been selected to receive approximately $35.14 million in ~~State Alternative Highly Managed~~ Supplemental Appropriation for Hurricanes Helene and Milton (SAHM) funding, consisting of approximately $17.57 million in grant funding (forgivable loan) and $17.57 million in loan funding (no interest).

A public hearing on the Facility Plan was conducted on September 15, 2026, at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, as part of the applicable Facility Plan and funding process.

FDEP requires approval/adoption of the Facility Plan before the associated project funding agreements can be issued. Consequently, formal Board adoption of the Facility Plan is a prerequisite to advancing the FDEP funding process.

The Facility Plan establishes the planning basis and recommended improvements for the Pipeline Resiliency Project. Subsequent design and implementation activities, including development of the Design Criteria Package and procurement/delivery of the improvements, will proceed separately in accordance with County requirements and future Board actions as applicable.

Adoption of Resolution R-26-137 will formally approve the Pipeline Resiliency Project Facilities Plan and allow the County to continue the FDEP funding process for the project.

Attorney Review
Formal Written Review (Opinion memo must be attached) DeCarlo

Instructions to Board Records
Please ensure that the Chairperson signs page ~~X~~ 4 of the Resolution.
Return executed Resolution to: Sue Dunn, Compliance Coordinator, Utilities Department ext. 5242 **Distributed 10/22/26, RT**

Cost and Funds Source Account Number and Name
Pipeline Resiliency – Project PJTP27007 Current project funding includes County utility funding and anticipated FDEP financial assistance. FDEP has selected the project to receive approximately $35,139,169 in SAHM financial assistance, consisting of: • $17,569,584 – Grant (forgivable loan) • $17,569,585 – Loan (0% interest)

Amount and Frequency of Recurring Costs
N/A. Approval of the Facility Plan does not itself authorize construction or create a new recurring operating expenditure.

October 20, 2026 - Regular Meeting

Subject
Updates to Agenda - October 15, 2026

Category
ANNOUNCEMENTS

Briefings
None

Contact and/or Presenter Information
Bobbi Roy, Agenda Division Supervisor, ext 6878

Action Requested
Updates incorporated appropriately

Enabling/Regulating Authority
N/A

Applicable Advisory Board
N/A

Background Discussion
Below are agenda updates (dated 10/15/26) for the meeting of October 20, 2026:

GENERIC PUBLIC COMMENTS
- This agenda item was updated with additional comments.

CONSENT AGENDA
Community and Veterans Services
Item 20, Approval and Execution of Modification of Mortgage between Manatee County and Blue CASL 41, LLC., Tracie Adams, Community and Veterans Services Department - District 4
- This agenda item was updated with a minor revision to the Cover Sheet deleting [PD1.1] from the Background Discussion (in strikethrough/underline format).

Financial Management
Item 25, Execution of Agreement No. 26-R090658TC for Street Sweeping Services for Property Management Department, Carmine DeMilio, Property Management Deputy Director, and Jeff Bare, Property Management Contracts Manager - Countywide
- This agenda item was updated with a public comment.

Natural Resources

Item 30, Approval of Tree Trust Fund Application for Robinson Preserve NEST; and Adoption of Budget Amendment Resolution B-27-012, Michael Elswick, Resource Management Division Manager - District 3

- This agenda item was updated with Budget Amendment Resolution B-27-012.

Property Management

Item 39, Execution of Conveyance and Construction Agreement between North River Village GEC, LLC and Manatee County, for property located at 6100 US 301 North, Ellenton, Florida 34222 - Peter Morrow, Property Acquisition Division Manager - District 1

- This agenda item was updated to revise the title of an attachment from Partially Executed Agreement w New Exhibit F to Partially Executed Conveyance and Construction Agreement (the agreement was not revised).

Item 63, Execution and Recording of Easement to Florida Power and Light (FPL) for property located at 3009 Lena Road Bradenton, Florida, 34211, Peter Morrow, Property Acquisition Division Manager - District 5

- This agenda item was added to the Agenda.

Utilities

Item 50, Adoption of Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, Patrick Shea, Utilities Director, and Chad Butzow, Chief Utilities Engineer

- This agenda item was updated with a revision to the Cover Sheet correcting the acronym for SAHM (in strikethrough/underline format).

REGULAR

Property Management

Item 57, Execution of Contract for Sale and Purchase from the Shelley N. Chilton Trust for Bunker Hill Preserve (Environmental Lands Candidate Property previously referred to as Taylor Grade Road Property); Adoption of Budget Amendment Resolution B-27-016; and Adoption of Budget Amendment Resolution B-27-017, Kara Koenig, Environmental Lands Program Manager - District 1

- This agenda item was updated with the revised Contract for Sale and Purchase.

Item 58, License Agreement with SEMA Construction, Inc., concerning a portion of County Property located in Cortez, Florida 34215, Peter Morrow, Property Acquisition Division Manager - District 3

- This agenda item was updated with public comments and finalized attachments (Location Map, SEMA Anticipated Uses and SEMA License Agreement).

REPORTS

Development Services

Item 64, Public Comment and Workflow Modernization, David Morehead, Business Services Support Manager

- This agenda item was added to the Agenda.

COMMISSIONER AGENDA ITEMSI

Items for Discussion

Item 61, County Administrator Contract

- This agenda item was updated with a public comment.

Attorney Review

Not Reviewed (No apparent legal issues)

Instructions to Board Records

N/A

Cost and Funds Source Account Number and Name

N/A

Amount and Frequency of Recurring Costs

N/A

October 20, 2026 - Regular Meeting

Subject
Adoption of Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, Patrick Shea, Utilities Director, and Chad Butzow, Chief Utilities Engineer

Category
CONSENT AGENDA

Briefings
None

Contact and/or Presenter Information
Patrick Shea, Utilities Director, ext. 5389
Chad Butzow, Chief Utilities Engineer, x-5026

Action Requested
Adopt Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, and authorizing the appropriate County officials to take the actions necessary to support the associated Florida Department of Environmental Protection funding process.

Enabling/Regulating Authority
Florida Department of Environmental Protection State Revolving Fund requirements and applicable Florida Statutes/Administrative Code provisions

Applicable Advisory Board
N/A

Background Discussion
The East County Wellfield Pipeline Resiliency Project is intended to improve the reliability and resiliency of the County's raw water transmission system between the East County Wellfield and the Lake Manatee Water Treatment Plant. The project addresses the County's need for increased redundancy and long-term reliability of infrastructure that conveys raw groundwater from the wellfield to the water treatment plant.

The Facility Plan evaluates the existing raw water transmission system and identifies improvements intended to increase system resiliency. The recommended improvements include construction of a parallel raw water transmission pipeline and improvements associated with the degasification facilities serving the Lake Manatee Water Treatment Plant.

REVISED/REPLACED

The Pipeline Resiliency Facility Plan was prepared to support the County's participation in the Florida Department of Environmental Protection (FDEP) funding process. The project has been selected to receive approximately $35.14 million in State Alternative Highly Managed (SAHM) funding, consisting of approximately $17.57 million in grant funding (forgivable loan) and $17.57 million in loan funding (no interest).

A public hearing on the Facility Plan was conducted on September 15, 2026, at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, as part of the applicable Facility Plan and funding process.

FDEP requires approval/adoption of the Facility Plan before the associated project funding agreements can be issued. Consequently, formal Board adoption of the Facility Plan is a prerequisite to advancing the FDEP funding process.

The Facility Plan establishes the planning basis and recommended improvements for the Pipeline Resiliency Project. Subsequent design and implementation activities, including development of the Design Criteria Package and procurement/delivery of the improvements, will proceed separately in accordance with County requirements and future Board actions as applicable.

Adoption of Resolution R-26-137 will formally approve the Pipeline Resiliency Project Facilities Plan and allow the County to continue the FDEP funding process for the project.

REVISED/REPLACED

Attorney Review
Formal Written Review (Opinion memo must be attached) DeCarlo

Instructions to Board Records
Please ensure that the Chairperson signs page X of the Resolution.
Return executed Resolution to: Sue Dunn, Compliance Coordinator, Utilities Department ext. 5242

Cost and Funds Source Account Number and Name
Pipeline Resiliency – Project PJTP27007 Current project funding includes County utility funding and anticipated FDEP financial assistance. FDEP has selected the project to receive approximately $35,139,169 in SAHM financial assistance, consisting of: • $17,569,584 – Grant (forgivable loan) • $17,569,585 – Loan (0% interest)

Amount and Frequency of Recurring Costs
N/A. Approval of the Facility Plan does not itself authorize construction or create a new recurring operating expenditure.

RESOLUTION NO. R-26-137

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA, RELATING TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION STATE REVOLVING FUND; ADOPTING THE FACILITIES PLAN FOR THE MANATEE COUNTY PIPELINE RESILIENCY PROJECT IN MANATEE COUNTY; AUTHORIZING SUBMITTAL OF THE FACILITIES PLAN TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION; PROVIDING FINDINGS; PROVIDING FOR IMPLEMENTATION; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, Manatee County (the "County") owns and operates a public water system that provides potable water service to retail and wholesale customers within Manatee County and surrounding municipalities; and

WHEREAS, the County's raw water supply system includes the East County Wellfield and transmission facilities that convey raw water from the wellfield to the Lake Manatee Water Treatment Plant; and

WHEREAS, the County is advancing the Pipeline Resiliency Project (the "Project") to improve the reliability and resiliency of the raw water transmission system between the East County Wellfield and the Lake Manatee Water Treatment Plant, including improvements to provide additional transmission capacity and redundancy; and

WHEREAS, Section 403.8532, Florida Statutes, establishes the Drinking Water State Revolving Loan Fund program administered by the Florida Department of Environmental Protection ("FDEP") to provide financial assistance for eligible public drinking water system projects; and

WHEREAS, Chapter 62-552, Florida Administrative Code, establishes requirements applicable to the Drinking Water State Revolving Fund Loan program, including requirements related to project planning, design, construction, procurement, and public participation; and

WHEREAS, the County was selected to receive $35,139,169 in Supplemental Appropriation for Hurricanes Helene and Milton ("SAHM") funding for the Project, consisting of approximately $17.57 million in principal forgiveness and approximately $17.57 million in zero-percent interest financing; and

WHEREAS, on March 3, 2026, the Board of County Commissioners of Manatee County, Florida (the "Board") adopted Resolution R-26-032 in furtherance of the County's application for and participation in the SAHM funding program for the Project, including authorization associated with the anticipated financial assistance; and

WHEREAS, Resolution R-26-032 contemplated that a subsequent loan agreement between FDEP and the County would be presented to the Board for approval; and

WHEREAS, a subsequent loan agreement has not yet been provided to the County by FDEP, and FDEP has advised that, generally, approval of planning, plans and specifications is required in connection with loan funding; and

WHEREAS, the County has prepared the East County Wellfield Pipeline Resiliency Project Facilities Plan (the "Facilities Plan") dated October 2026, attached hereto as **Exhibit 1,** as part of the planning requirements necessary to advance the Project through the SAHM and Drinking Water State Revolving Fund process; and

WHEREAS, the Facilities Plan documents the existing raw water supply and transmission system, evaluates alternatives for improving system reliability and resiliency, identifies a recommended planning alternative, evaluates anticipated environmental and financial impacts, and establishes a planning basis for subsequent design and implementation of the Project; and

WHEREAS, consistent with the public participation requirements applicable to the planning process, the County provided public notice, attached hereto as **Exhibit 2**, and conducted a public meeting at a County public library on September 15, 2026, to discuss the Project, the Facilities Plan, the alternatives evaluated, and the anticipated financial impacts and to provide an opportunity for public participation prior to adoption of the planning recommendations by the Board; and

WHEREAS, Rule 62-552.700, Florida Administrative Code, requires the planning process to address the need and justification for the project, alternatives, environmental and economic impacts and benefits, and public participation, including a public meeting, prior to the project sponsor's acceptance of the planning recommendations; and

WHEREAS, following completion of the required public participation process, formal adoption of the Facilities Plan by the Board constitutes the County's acceptance of the planning recommendations and is necessary for submittal to FDEP for review and approval as part of the applicable funding process; and

WHEREAS, following adoption of the Facilities Plan, the County anticipates submitting the adopted Facilities Plan to FDEP for review and approval, continuing development of the Project's plans and specifications, and subsequently presenting any FDEP loan agreement(s), or other documents related to the Project which require Board approval, to the Board for separate consideration; and

WHEREAS, adoption of the Facilities Plan does not constitute approval of any subsequent loan agreement(s), which agreement(s) will be presented to the Board separately if and when provided by FDEP for Board consideration and approval; and

WHEREAS, the Board finds that adoption and submittal of the Facilities Plan is in the public interest and further the County's efforts to improve the reliability and resiliency of its public water supply system and advance the Project toward eligibility for the SAHM funding the County has been selected to receive.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA:

SECTION 1. FINDINGS.

The foregoing recitals are true and correct and are incorporated into this Resolution by reference.

SECTION 2. ADOPTION OF FACILITIES PLAN.

The Board hereby adopts the Manatee County Pipeline Resiliency Project Facilities Plan attached hereto as Exhibit 1 and presented to the Board in connection with this Resolution.

SECTION 3. AUTHORIZATION TO SUBMIT FACILITIES PLAN.

The County Administrator, or designee, is authorized to submit the adopted Facilities Plan and related supporting documentation to FDEP and to provide such administrative, technical, and non-substantive supplemental information as may reasonably be required by FDEP for its review of the Facilities Plan.

SECTION 4. IMPLEMENTATION AND SUBSEQUENT PROJECT ACTIONS.

County staff is authorized to undertake administrative and technical activities reasonably necessary to advance FDEP review of the Facilities Plan and continue development of the Project consistent with existing County authority, approved budgets, procurement requirements, and applicable law.

Any loan agreement(s) or other documents or agreement(s) requiring approval by the Board shall be presented separately to the Board for consideration and approval.

Any loan agreement(s) between FDEP and County, or other documents related to the Project which require Board approval and/or separate Board authorization, are not approved by this Resolution and shall be presented to the Board as required for consideration and approval as necessary.

SECTION 5. RELATIONSHIP TO RESOLUTION R-26-032.

This Resolution supplements Resolution R-26-032 for purposes of adopting the Facilities Plan and advancing the planning requirements associated with the Project. Nothing in this Resolution shall be construed to supersede Resolution R-26-032.

SECTION 6. SEVERABILITY.

If any section, sentence, clause, or provision of this Resolution is held invalid or unconstitutional by a court of competent jurisdiction, such determination shall not affect the validity of the remaining portions of this Resolution, which remaining provision(s) shall continue in full force and effect, provided that the remaining provision(s) can be given legal effect absent the invalid portions.

SECTION 7. EFFECTIVE DATE.

This Resolution shall take effect immediately upon its adoption.

DULY ADOPTED with a quorum present and voting this ____ day of _____ _____, 20__.

BOARD OF COUNTY COMMISSIONERS
OF MANATEE COUNTY, FLORIDA

By: _____
Chairperson

ATTEST: ANGELINA COLONNESO
CLERK OF THE CIRCUIT COURT AND COMPTROLLER

By: _____
Deputy Clerk

EXHIBIT 1 TO RESOLUTION NO. R-26-137

East County Wellfield Pipeline Resiliency Project Facilities Plan

(71 pages)

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support



East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support

East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026



This report has been digitally signed and sealed by Anthony Ryan Horvat on the date adjacent to the seal.

Signature must be verified on any electronic copies.

301 NORTH CATTLEMEN ROAD, SUITE 302 ▪ SARASOTA, FLORIDA 34232 ▪ P 941-371-9832

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Abbreviations

AAD	Annual Average Demand
AOI	Area of Interest
ASR	Aquifer Storage and Recovery
bls	Below Land Surface
CWA	Clean Water Act
DWSRF	Drinking Water State Revolving Fund
ECW	East County Wellfield
EDU	Equivalent Dwelling Unit
EPA	United States Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FLUCCS	Florida Land Use, Cover and Forms Classification System
FMSF	Florida Master Site File
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GW	Groundwater
HDD	Horizontal Directional Drilling
IAS	Intermediate Aquifer System
IMC	IMC-Manatee Wellfield
LOS	Level of Service
LMWTP	Lake Manatee Water Treatment Plant
M&O	Operations and Maintenance
mgd	Million Gallons per Day
MM	Maximum Month
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PMD	Peak Monthly Demand

Abbreviations (Continuation)

ROW	Right-of-Way
SAHM	Supplemental Appropriation for Hurricanes Helene and Milton
SAS	Surficial Aquifer System
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SR	State Road
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
UFA	Upper Floridan Aquifer
UPS	Uninterruptible Power Supply
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WCP	Water Well Construction Permit
WTP	Water Treatment Plant
WUP	Water Use Permit

SECTION 1 INTRODUCTION

This planning-level package has been developed to meet the planning requirements for the Supplemental Appropriation for Hurricanes Helene and/or Milton (SAHM) disaster relief funds award program through the Florida Department of Environmental Protection (FDEP). The SAHM funding provided a total of $35,139,169, of which $17,569,584 is provided as principal forgiveness. The project is described in the Intended Use Plan as shown below in **Figure 1-1**.

Impacts

The City's primary water treatment plant sustained direct damage when the metal roof over the filter tanks was torn off, compromising plant function and safety. At the same time, operations crews were dispatched to repair multiple water main breaks with limited system support and aging backup power equipment.

XX. Manatee County - DW41015- $35,139,169

The proposed drinking water improvement projects by Manatee County are as follows:

1. Construction of two ground water production wells.
2. Installation of 20-inch raw water transmission main parallel to the current water transmission main.
3. Upgrading two degasifiers and internal hydraulic.
4. Installation of ground water treatment system electrical and ground water treatment system instrumentation/SCADA.

Impacts

During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage. Power outages were reported for Manatee County area during both Hurricanes Helene and Milton.

Figure 1-1 Manatee County SAHM Intended Use Plan Description

The Pipeline Resiliency Project is intended to improve the reliability and redundancy of Manatee County's raw water supply and transmission system between the East County Wellfield (ECW) and the Lake Manatee Water Treatment Plant (Lake Manatee WTP). This Facilities Plan documents the planning basis, evaluates feasible transmission alternatives, identifies a preferred planning alternative, and defines the technical, environmental, operational, and implementation considerations to be refined during future design.

1.1 Background and Hurricane Impacts

The American Relief Act was enacted by the US Environmental Protection Agency (EPA) on December 21, 2024, which provided disaster relief supplemental funding to a variety of State Revolving Fund (SRF) programs, with a focus on repairing and recovering from damages from Hurricanes Helene, Milton and

the Hawai'i wildfires. Manatee County (County), after submitting an RFI document for this program, was selected to receive funding. This report serves as the SAHM planning-level package and provides an analysis of the system needs, proposed alternative solutions, environmental review, as well as the selected alternative and implementation plans. Refer to **Appendix A** (Supplemental Appropriation for Hurricane Helene and Milton (SAHM) Request for Inclusion Supporting Documentation DWSRF Funds) for further explanations of how the project is deemed eligible for SAHM funding.

1.1.1 Location Description

Manatee County (County) owns and operates its potable water, wastewater, and reclaimed water system (System) that provides water, wastewater, and reclaimed water services to various retail and wholesale utility customers within County limits and surrounding municipalities (City of Palmetto, the Town of Longboat Key, and the three cities of Anna Maria Island: Holmes Beach, Bradenton Beach, and Anna Maria). The County also supplies water to meet some of the needs of Sarasota County and minimal amounts to the City of Bradenton. In the outlying areas of the County, households not served by any of these water systems rely upon private wells. The County's water service area is shown in **Figure 1-2.** The census tracks within the service area are as follows:

- 12081001913
- 12081001914
- 12081002010
- 12081002014
- 12081002020

The County owns and operates the Lake Manatee WTP, a facility with a combined nominal treatment capacity of 84 million gallons per day (mgd), to serve their potable water supply system. This facility uses both groundwater and surface water, which are treated in two separate treatment trains:

- A 54-mgd-capacity train for surface water from Lake Manatee.
- A 30-mgd-capacity train for groundwater from County wellfields.

The County is located within the Southwest Florida Water Management District (SWFWMD), one of five water management districts in Florida responsible for managing groundwater and surface water resources. The County's water use permit (WUP), issued by SWFWMD, allocates surface and groundwater quantities and environmental compliance monitoring requirements.

According to the 2024 Public Supply Annual Report, the County, on average, withdrew 50.1 mgd of water to meet their customer and wholesale water user demands. Of the 50.1 mgd, 34.0 mgd was supplied from surface water from Lake Manatee, and the remaining 16.1 mgd was supplied by groundwater.

Lake Manatee is the County's primary source of potable water. The County is permitted to withdraw an annual average of 34.9 mgd and a maximum monthly amount of 46.07 mgd from the reservoir. The County also has the capability to recover stored water through its aquifer storage and recovery system (ASR) at the WTP. The system consists of six ASR wells and is designed to provide up to 10 mgd for up to 180 days during emergency conditions or approximately 120 days for operational use.

The County is also permitted to withdraw an annual average of 19.086 mgd of groundwater from the East County Wellfield (ECW), a property comprising approximately 33 square miles in northern Manatee County. The ECW is comprised of approximately 24.8 miles of 30-inch and 36-inch transmission mains

that distribute raw water from seven production wells (ECW-1 through ECW-7) to Lake Manatee WTP. The wellfield is also supplemented by the three additional wells (Mosaic Wells1 through 3). Refer to **Figure 1-3** for existing relevant project infrastructure.

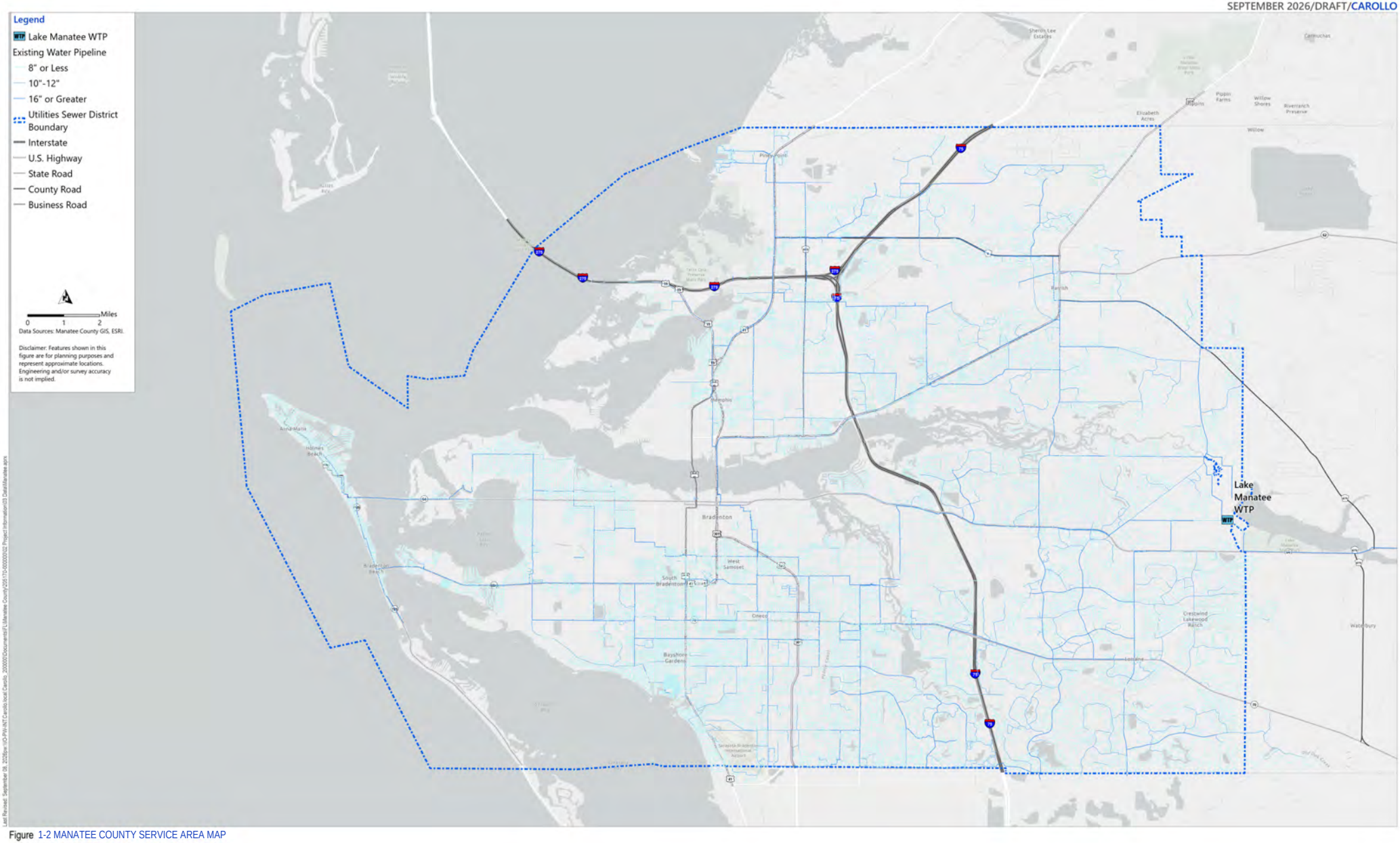


Figure 1-2 MANATEE COUNTY SERVICE AREA MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

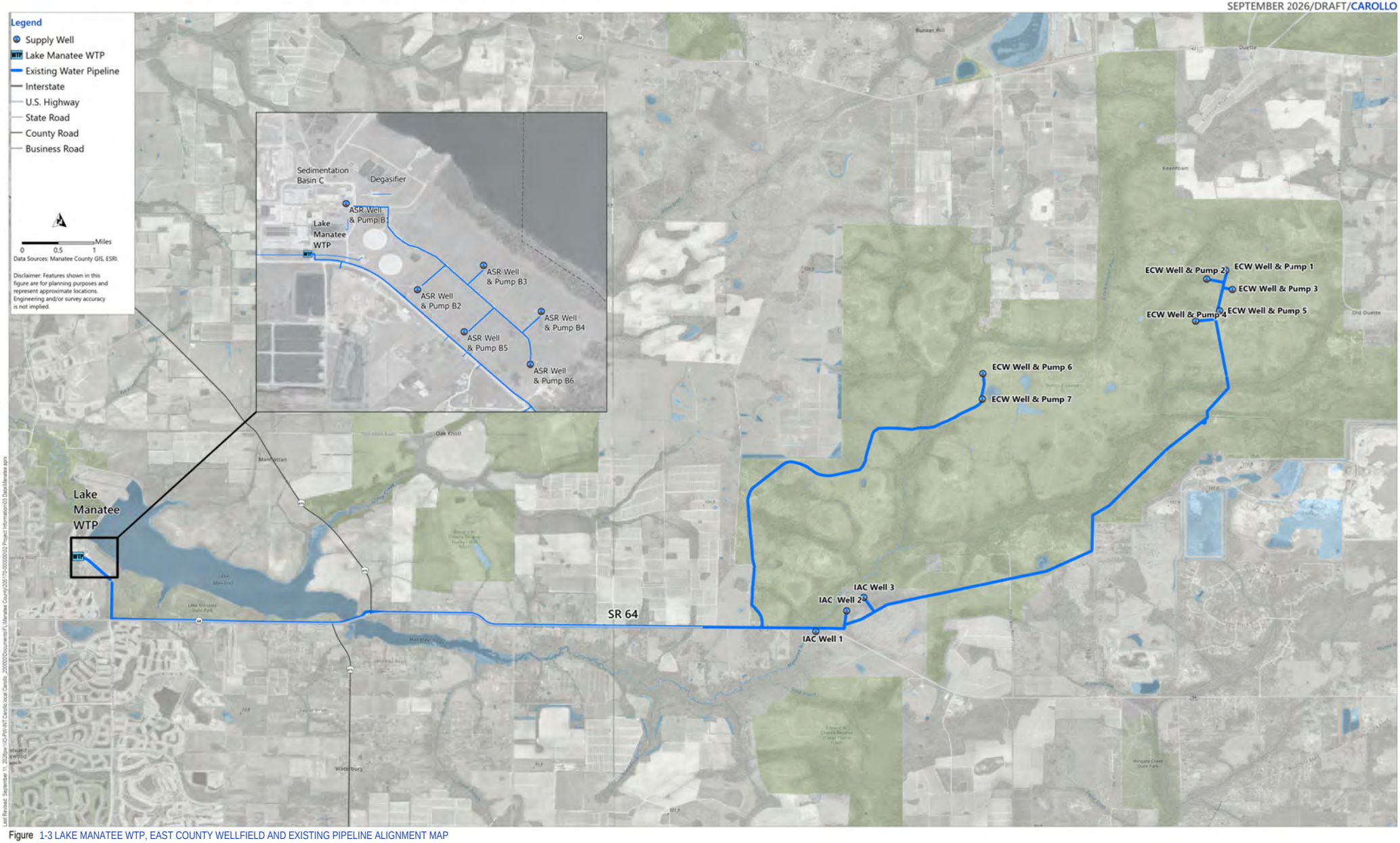


Figure 1-3 LAKE MANATEE WTP, EAST COUNTY WELLFIELD AND EXISTING PIPELINE ALIGNMENT MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

1.1.2 Hurricane Impacts

Hurricane Helene

Hurricane Helene made landfall on September 26th, 2024. Many stations experienced power outages during Hurricane Helene. There were multiple communication failures and instances where no data was collected throughout the Hurricane at three pump stations: Northwest Ground Storage Tank and Booster Pump Station (NWGS), Longboat Meter Station, and Cortez Booster Station. On the 26th, from 16:23 to 17:54, NWGS and Longboat Meter Station experienced power failure for their Uninterruptible Power Supplies (UPS). NWGS specifically experienced communications, power, and UPS failure from September 26th at 18:00 until November 2nd, 2024. At 18:20 on September 26th, the Longboat Meter Station also experienced communications, power, and UPS failure until November 2nd, 2024. Refer to Appendix A for pressure and flow data from the three pump stations between September 26th and 29th. At the Water Treatment Plant, the power was switched to generator power at 19:18 on the 26th and was restored to full power on the 28th.

The City of Bradenton's Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir experienced power outages due to Hurricane Helene and had to utilize generator backups during and after the storm. Manatee County stepped in to help the City of Bradenton augment their water supply since it compromised secondary drinking water parameter exceedances as a result of the storm. Specifically, 7 direct interconnects were made to support their water needs between the 27th and 28th and three water distribution locations were opened to support community water needs. The water treatment plant stabilized on the 29th, but chlorine levels were still high, so the distribution locations and direct interconnects continued till the 30th. Refer to Appendix A for the complete situation reports.

Hurricane Milton

Hurricane Milton made landfall shortly after Helene on October 9th, 2024. The Manatee County Water Treatment Plant power was switched to generator power at 18:15 on the 9th. The whole Manatee County distribution system felt the major effects of Hurricane Milton. Attached in Appendix A is a list of all the pipe breaks that were reported during and after the storm. There were 64 breaks of various pipe diameters and causes due to Milton's surge and debris between October 9th and October 12th. During Hurricane Milton, Bradenton's water plant was intentionally inactive, and water was on a bypass system with the goal to mitigate any impacts similarly to what the plant experienced in Helene. Yet, their plant still experienced water intrusion. Refer to Appendix A for the complete situation reports.

1.2 Project Scope and Objectives

Manatee County is applying for planning, design, and construction of their Pipeline Resiliency Project (Project). The Project will construct four groundwater (GW) production wells and place a 36-inch/42-inch raw water transmission main parallel to the current water transmission main. The well location and pipeline alignment will be determined in the planning and design phases but are anticipated to be near the current well field areas. The planning, design, and construction activities associated with the project are summarized (**Table 1-1**).

Table 1-1 Project Tasks Description

Task Name	Task Description
Planning	Project administration; Facilities Plan; route study; hydraulic assessment; environmental review; cost comparison; and supporting investigations.
Design	Survey, geotechnical investigation, subsurface utility engineering, environmental field verification, hydraulic and transient modeling, permitting, property coordination, and final design.
Construction	Construction of the selected transmission improvements and related wellfield, treatment, electrical, instrumentation, and SCADA components confirmed during design.

The selected Facilities Plan concept does not establish final design details. Final pipe diameters, materials, profiles, well equipment, treatment modifications, appurtenances, easements, and permitting requirements will be confirmed during design. The project objectives are to improve reliability and resiliency, provide adequate hydraulic performance, reduce environmental and permitting risk, support operational flexibility and emergency repair response, and preserve flexibility for future system needs.

1.2.1 Project Objectives

The main need and benefit of the Pipeline Resiliency Project is that it will create redundancy in Manatee County's raw water transmission system, providing increased resiliency in the event of a storm. During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage, further pointing to the need for system redundancy. This redundancy will beneficially support Manatee County's ability to provide water during major storm events and allow one pipe to remain operational if the other is damaged during a storm event, directing flows to the treatment plant and supporting future water security across the County.

To enhance system reliability and provide redundancy to the existing 30-inch and 36-inch transmission mains, three pipeline alternatives were developed and evaluated within the project corridor, as shown in **Figure 1-4**. Alternative 1 generally follows the existing transmission main corridor from the ECW to the Lake Manatee WTP. Alternative 2 originates at Wells and Pumps 1 through 5, extends to Wells and Pumps 6 and 7, and then follows the existing transmission main corridor to the Lake Manatee WTP. Alternative 3 consists of two segments: the first connects Wells and Pumps 1 through 5 to Wells and Pumps 6 and 7, while the second extends from the existing transmission main corridor along SR 64 to the Lake Manatee WTP.

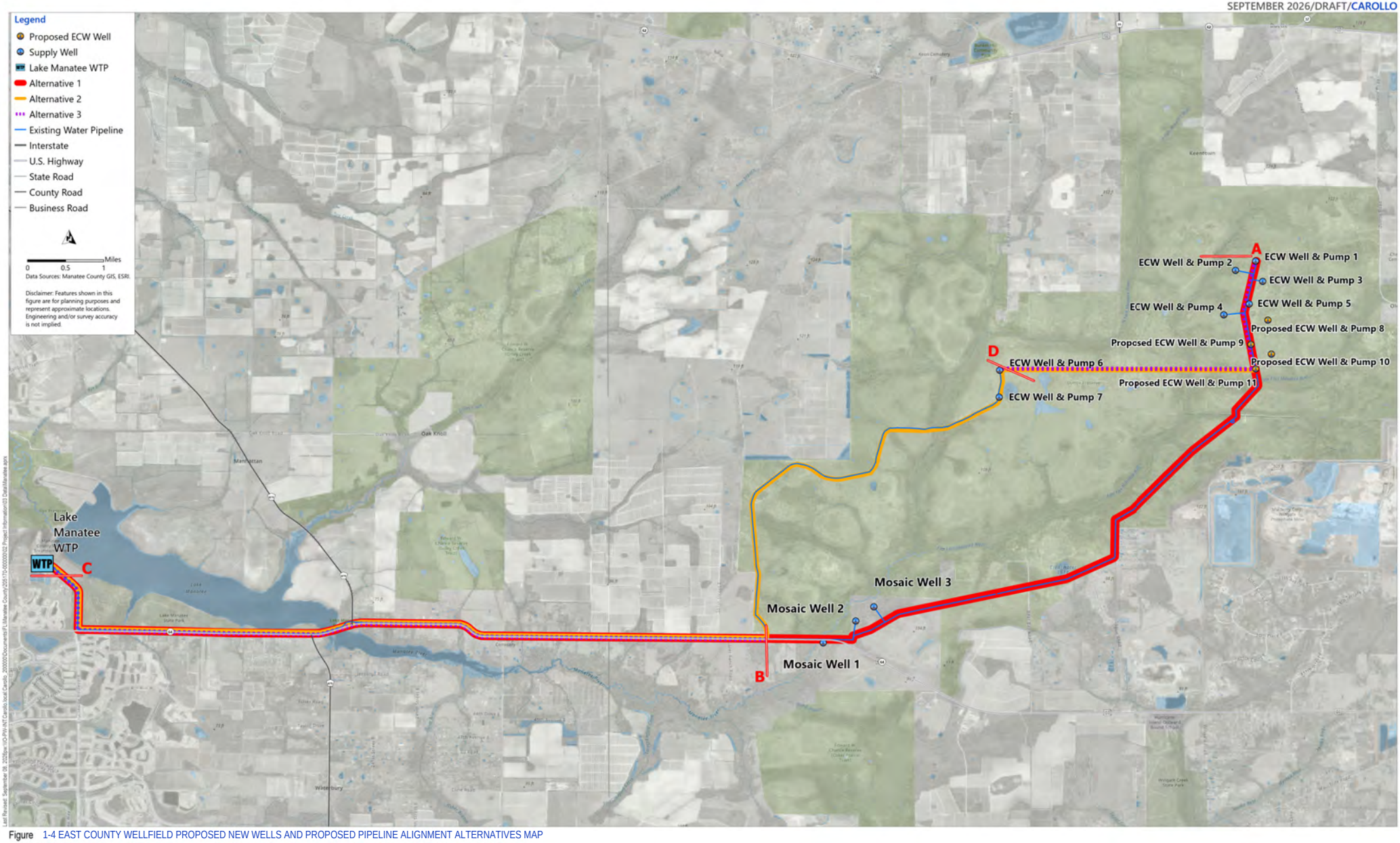


Figure 1-4 EAST COUNTY WELLFIELD PROPOSED NEW WELLS AND PROPOSED PIPELINE ALIGNMENT ALTERNATIVES MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 2 EXISTING AND FUTURE CONDITIONS

2.1 Description and Climate of Planning Area

The planning area is in eastern Manatee County, Florida, extending from the Lake Manatee WTP on SR 64 northeast toward the ECW and Duette Preserve. The predominantly rural corridor contains agricultural lands, natural habitats, conservation areas, road rights-of-way, utility corridors, wetlands, drainage features, and uplands within the Lake Manatee watershed. The draft planning-area population estimate for 2025 is approximately 468,200 residents, while the project corridor itself is less densely developed than western Manatee County.

The region has a humid subtropical climate with year-round warm temperatures and a pronounced summer wet season. The corridor generally ranges from approximately 30 to 90 feet above mean sea level. Topography transitions from relatively flat terrain near the WTP to gently rolling terrain toward Duette Preserve, with runoff conveyed toward Lake Manatee and associated tributaries.

2.1.1 Data Collection

A desktop evaluation was performed using public information, County utility records, GIS data, environmental datasets, right-of-way and parcel information, record drawings, roadway information, aerial imagery, and geotechnical information (**Table 2-1**). The data sources supported route development and comparison and will require field verification during detailed design. Refer to **Appendix B** for additional information regarding the GIS Data Collection.

Table 2-1 GIS Data Collection

Dataset	Representative Sources	Use in Planning
Aerial and parcels	Manatee County; statewide parcel data	Alignment development, access, and property screening
Environmental	USDA NRCS; USFWS; FWC; FDEP; FEMA; SWFWMD	Soils, wetlands, species, conservation lands, contamination, and floodplains
Transportation	FDOT and Manatee County	Roadway crossings, rights-of-way, traffic, and planned improvements
Utilities	Manatee County and available record drawings	Existing water, wastewater, reclaimed water, power, gas, fiber, drainage, and special crossings
Cultural resources	FDEP/FMSF and supporting environmental review	Known historical and cultural resources
Hydraulic and operational	County SCADA, pump curves, water-demand information	Model development, calibration, operating scenarios, and sizing

2.1.2 Soil Conditions and Hydrology

Soil Conditions

The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) mapping indicates that the project area is dominated by fine sands with varying hydrologic groups and drainage characteristics. Refer to **Figure 2-1**. Planning-level soil considerations include runoff potential, infiltration, poor drainage, dewatering, excavation, backfill, restoration, wetland indicators, and suitability for gopher tortoise burrowing habitat. Refer to **Table 2-2**. Soil mapping does not replace geotechnical investigation, wetland delineation, or wildlife surveys.

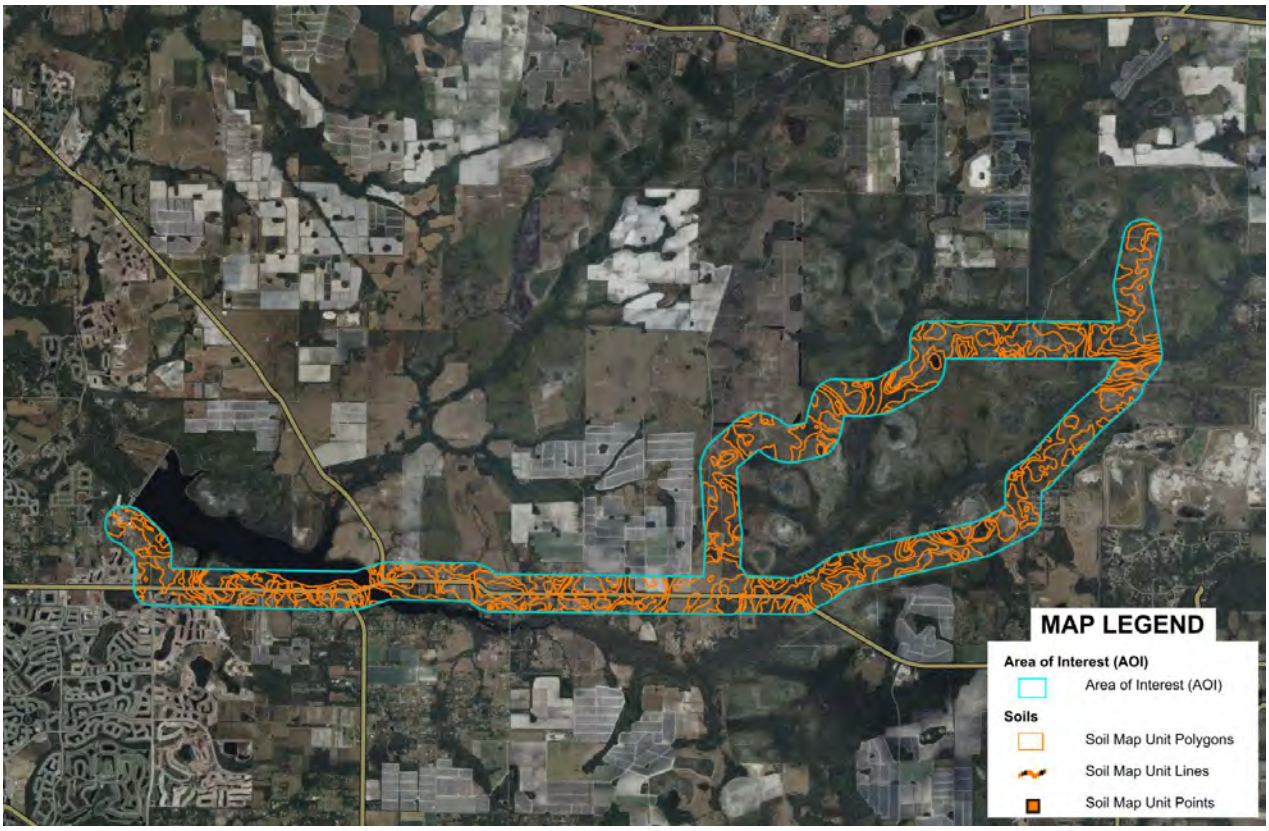


Figure 2-1 Pipeline Resiliency Project – Soil Map

Table 2-2 Predominant Soil Types and Hydrology within the Project Boundary

Soil Type	Approx. Composition	Hydrologic Group	Drainage Class
Waveland fine sand	29.34%	C/D	Poorly drained
Pomello fine sand	20.3%	A	Somewhat poorly drained
Duette fine sand	6.1%	A	Moderately well drained
Myakka-Myakka wet fine sands	5.7%	A/D	Poorly drained
Delray-Pomona complex	5.7%	A/D	Very poorly to poorly drained
St. Johns fine sand	5.7%	B/D	Poorly drained

Note: The project boundary also includes a significant portion of water (Lake Manatee) accounting for 2.3% of the Area of Interest (AOI). The table above lists the six most common soil types, excluding bodies of water.

For additional information regarding soil conditions, please refer to **Appendix C**.

Soil Hydric Rating and Gopher Tortoise Suitability

NRCS soil survey information was reviewed to characterize general soil conditions within the three alternatives. The mapped soil units were evaluated based on planning-level indication of areas that may be associated with wetland conditions and gopher tortoise gopher burrowing habitat. Refer to **Appendix D** for environmental analysis.

Alternatives 1 and 2 contain similar acreages of soils mapped as highly suited for gopher tortoise, while Alternative 3 contains a smaller total acreage but a higher proportional share of highly suited habitat for gopher tortoise because its overall corridor area is smaller. Alternative 3 has the lowest percentage of soils that would be expected to support wetland habitats.

2.1.3 Flood Plains

FEMA mapping identifies mapped flood-hazard areas within the project planning boundary. Floodplain exposure may affect design elevation, cover, erosion protection, access, permitting, construction methods, and emergency response. Final floodplain and floodway limits will be confirmed during detailed design using current mapping and survey data.

Additional maps of the parcels and floor areas can be found in **Appendix E**.

2.1.4 Environmentally Sensitive Areas or Features

Wetlands and Surface Waters

Project-specific desktop mapping was used to characterize potential freshwater emergent wetlands, freshwater forested/shrub wetlands, and other surface waters within the three alternative corridors. Refer to **Table 2-3**. The mapping provides a planning-level comparison and does not constitute a jurisdictional determination or field delineation.

Table 2-3 Desktop-Mapped Wetlands and Surface Waters within the Alternative Corridors

Resource Type	Impact Assumption	Alternative 1 (ac)	Alternative 2 (ac)	Alternative 3 (ac)
Freshwater emergent	Temporary	1.09	8.86	2.71
Freshwater forested/shrub	Permanent conversion	6.82	13.15	0.64
Other surface waters	Temporary	2.26	2.22	1.91
Total mapped area		10.17	24.23	5.26

Notes: Anticipated impact type assumes open-cut pipeline installation within the project area. Actual impacts will depend on the final pipeline alignment, construction footprint, construction methods, and field-verified wetland boundaries.

Alternative 2 has the greatest mapped wetland and surface-water impact and the greatest potential permanent forested/shrub wetland conversion. Alternative 1 has an intermediate mapped impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent conversion. Actual impacts will depend on final alignment, construction footprint, crossing methods, and field-verified boundaries.

Refer to Appendix D (Section 2.1.4) for environmental analysis.

Protected Wildlife Species

Desktop information was reviewed for federal and state protected species with potential to occur in or near the planning corridors. Potential considerations include Florida scrub-jay, gopher tortoise, eastern indigo snake, crested caracara, listed wading birds, Florida pine snake, Florida sandhill crane, southeastern American kestrel, tricolored bat, and other species identified in the supporting environmental material. Species inclusion in the desktop review does not establish presence. Final requirements will depend on field surveys and agency coordination.

Agricultural Lands

All alternatives intersect areas mapped as Farmland of Unique Importance, but much of the corridor is within existing rights-of-way or conservation land and is not actively farmed. No substantial difference among alternatives was identified from the available farmland mapping. Potential effects on active agricultural operations will depend on the final construction footprint and existing land use.

Cultural and Historic Resources

The Florida Master Site File (FMSF) review identified the Camphor Site Homestead, Bethany Baptist Cemetery, and Old Highway 39/Carlton Road within the planning area. The Camphor Site Homestead intersects all three alternatives within the SR 64 right-of-way. Old Highway 39/Carlton Road intersects Alternatives 1 and 3 within Duette Preserve. Bethany Baptist Cemetery is adjacent to the alternatives. The desktop review is not a Cultural Resource Assessment Survey and does not determine National Register eligibility or adverse effect. **Figure 2-2** below depicts the locations of the recorded resources relative to the three alternatives.

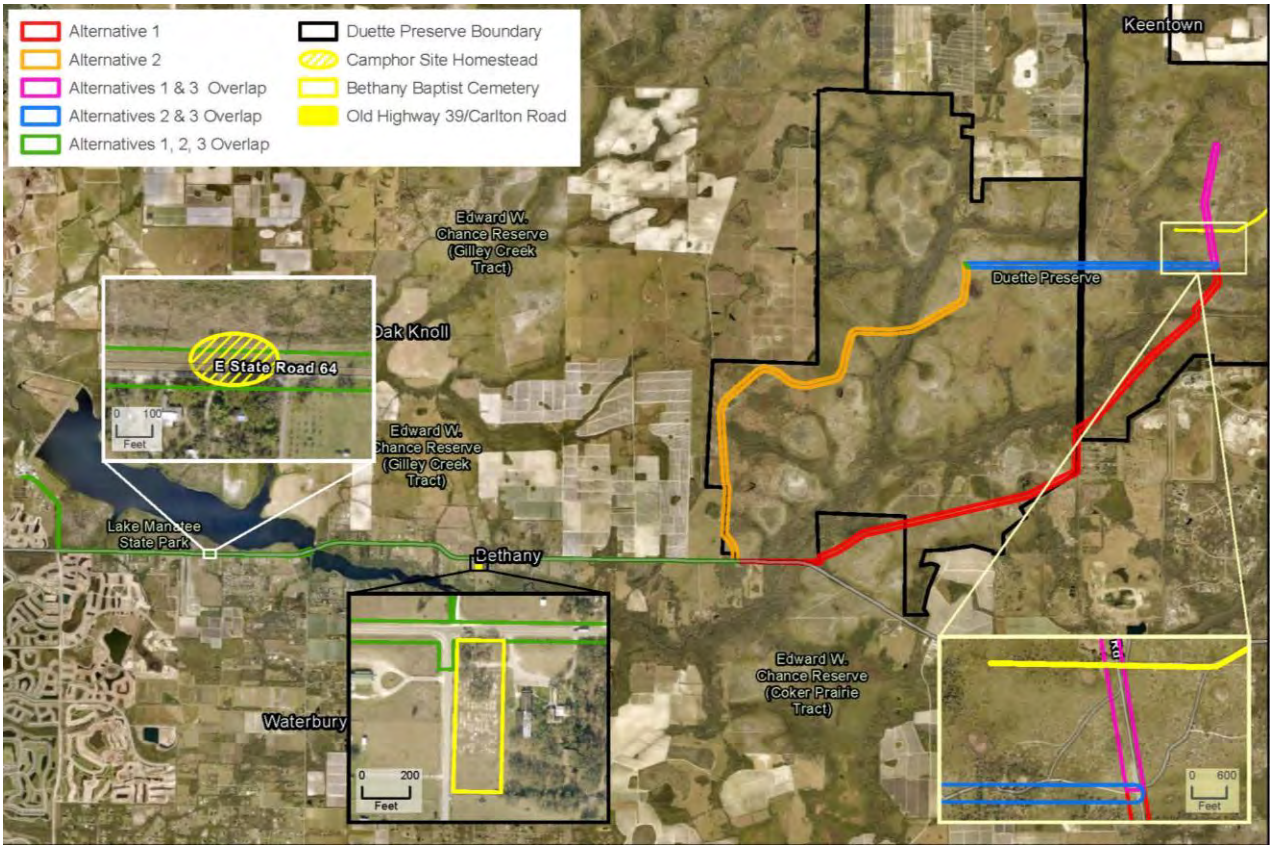


Figure 2-2 FMSF Mapped Resources

Contaminated Sites and Hazardous Materials

The desktop database review identified historical contamination records near the planning area, including a historical petroleum record at the WTP and a completed-cleanup oil-spill record near the Alternative 3 corridor. The available information did not identify a substantial differentiating constraint among the alternatives. Final design should update the database review and address unexpected conditions through construction specifications.

Environmental and Permitting Summary

The environmental evaluation is based primarily on desktop mapping and available records. It does not constitute a wetland jurisdictional determination, protected-species survey, cultural-resource assessment survey, geotechnical investigation, or final permitting determination. Final impacts, avoidance and minimization measures, mitigation requirements, construction feasibility, and permit conditions remain subject to field delineation, environmental surveys, agency coordination, final alignment, construction methods, and final design.

The final alignment will require additional evaluation near conservation lands, Duette Preserve, existing and proposed gopher-tortoise recipient areas, wetlands, surface waters, and cultural resources. The proposed connection between ECW Wells 1 through 5 and ECW Wells 6 and 7 may interact with known or proposed gopher-tortoise habitat or recipient areas. These conditions could affect alignment selection, access, construction sequence, long-term maintenance, permitting, and mitigation.

Alternative 3 has the lowest desktop-mapped wetland and surface-water acreage among the evaluated alternatives, but this comparison does not eliminate environmental or permitting risk. Actual impacts and requirements will be determined during design-phase field investigations and agency review.

2.1.5 Planning Basis and Demand Conditions

The planning basis for the Pipeline Resiliency Project was developed using the County's historical water use records, current and projected service area growth, and the water demand projections prepared as part of WA27 - Water Use Permit Modification. These demand conditions provide the basis for establishing the hydraulic and conveyance requirements for the proposed groundwater production wells and redundant raw water transmission main from the ECW and IMC-Manatee Wellfield to the Lake Manatee WTP.

The purpose of this project is not to expand finished water treatment capacity, but to improve the resiliency and redundancy of the County's raw water supply and transmission system. The proposed improvements will allow the County to maintain raw water conveyance to the Lake Manatee WTP during storm-related events, line breaks, maintenance activities, or other conditions where one segment of the existing transmission system may be unavailable.

Population projections

Future demand projections were developed based on County-provided growth forecasts for the Lake Manatee WTP service area. The County provided equivalent dwelling unit (EDU) projections for existing neighborhoods and future development areas through 2050. These EDUs were converted to population using 2.4 persons per household (pph), consistent with recent Census information for Manatee County and slightly more conservative than the 2.33 pph factor used in the SWFWMD projection methodology.

For planning purposes, the County's adopted potable water level of service (LOS) standard is currently 110 gallons per capita per day (gpcd); however, the County is in the process of revising this value to 100 gpcd. The 100 gpcd LOS value was used for the demand projections summarized in this section. In addition to the retail service area demand, 5.0 mgd was included to account for the County's existing wholesale contractual obligations, excluding Sarasota County. This includes 0.5 mgd for the City of Bradenton, 2.0 mgd for the City of Palmetto, and 2.5 mgd for the Town of Longboat Key.

Based on this approach, the projected service area population increases from approximately 534,200 in 2030 to approximately 649,895 in 2045. The corresponding annual average finished water demand increases from approximately 58.42 mgd in 2030 to approximately 70.00 mgd in 2045. **Table 2-4** summarizes the population-based finished water demand projection used for planning.

Table 2-4 Level of Service Finished Water Demand Projections

Year	Service Area Population	Annual Average Finished Water Demand (mgd)
2030	534,200	58.42
2035(1)	576,450	62.65
2040	618,700	66.87
2045(1)	649,895	70.00

(1) Values for 2035 and 2045 were interpolated.

Historical Water Usage

Historical water use was reviewed for the 2016 through 2025 period to characterize recent growth trends, seasonal demand conditions, and peaking factors. The County withdraws raw water from Lake Manatee, the ECW, and the IMC-Manatee Wellfield for treatment at the Lake Manatee WTP. Raw water withdrawals increased from approximately 39.8 mgd in 2016 to approximately 52.3 mgd in 2025 on an annual average basis. Over the same 10-year period, the average annual raw water withdrawal was approximately 45.8 mgd. Between 2019 and 2023, raw water withdrawals increased by an average of approximately 4.8 percent per year. **Table 2-5** summarizes raw water withdrawals from 2016 through 2025.

Table 2-4 Raw Water Withdrawals

Year	Average Daily		Maximum Month (mgd)	Maximum Day (mgd)
	Raw Withdrawal (mgd) (1)	Growth Change		
2016	39.8	--	43.7	51.0
2017	40.2	0.9%	47.5	54.1
2018	40.3	0.3%	44.7	54.2
2019	42.2	4.6%	45.9	52.9
2020	45.2	7.2%	49.5	56.1
2021	47.4	4.7%	53.7	55.1
2022	47.7	0.7%	51.8	57.5
2023	50.9	6.6%	53.6	61.5
2024	51.6	1.4%	58.6	62.7
2025	52.3	1.3%	56.2	60.7
Average	**45.8**	**3.1%**	**50.5**	**56.6**

Note: (1) Raw withdrawals include Lake Manatee, East County Wellfield, and IMC Manatee Wellfield.

Finished water demand followed a similar increasing trend. Annual average finished water demand increased from approximately 39.49 mgd in 2016 to approximately 49.50 mgd in 2025, with an average annual growth rate of approximately 3.8 percent over the 10-year period. Maximum month finished water demand increased from approximately 43.13 mgd in 2016 to approximately 53.30 mgd in 2025, while maximum day finished water demand increased from approximately 50.95 mgd in 2016 to approximately 59.56 mgd in 2025. **Table 2-5** presents the annual average, maximum month, and maximum day finished water demands for the past 10 years.

Table 2-5 10-Year Annual Average, Maximum Month, and Maximum Day Demands

Year	Annual Average Demand (mgd)	Annual Average Annual Growth	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2016	39.49	-	43.13	50.95
2017	39.93	1.1%	47.44	51.96
2018	39.55	-1.0%	43.09	49.14
2019	41.55	5.1%	44.70	57.20
2020	43.93	5.7%	48.16	53.00
2021	44.75	1.9%	51.83	56.18
2022	45.31	1.3%	48.93	54.83
2023	47.70	5.3%	52.45	58.34
2024	48.89	2.5%	55.55	61.42
2025	49.50	1.2%	53.30	59.56

The County provides finished water to retail customers in unincorporated Manatee County and wholesale customers including the City of Bradenton, City of Palmetto, Town of Longboat Key, and Sarasota County. Historical growth in finished water demand has been primarily driven by the unincorporated retail service area, while wholesale demands have remained relatively stable or declined due to contractual limitations and the phased reduction in supply to Sarasota County.

Historical peaking factors were also reviewed to support planning and facility sizing. Based on the historical analysis, the County's existing planning peaking factors remain appropriate: 1.2 for maximum month demand and 1.3 for maximum day demand. These factors were applied to the selected annual average demand projections to estimate future maximum month and maximum day conditions.

20-year water demand projections

Multiple methods were evaluated for projecting future finished water demand through 2045, including linear regression of historical demand, a County population and LOS-based projection, and the SWFWMD projection methodology. The selected planning projection is based on the County population and LOS approach because it reflects the County's projected service area growth and maintains consistency with the County's potable water LOS requirement.

The selected annual average finished water demand projection for 2045 is 70 mgd. Applying the County's planning peaking factors results in a 2045 maximum month demand of approximately 84 mgd and a maximum day demand of approximately 91 mgd. These values represent the 20-year demand condition for planning the proposed improvements. **Table2-6** summarizes the selected 20-year demand projection.

Table 2-6 Selected 20-year Finished Water Demand Projection

Year	Annual Average Demand (mgd)	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2030	58.42	70.10	75.95
2035	62.65	75.18	81.45
2040	66.87	80.24	86.93
2045	70.00	84.00	91.00

The 2045 demand condition is used as the long-term planning basis for evaluating raw-water supply and conveyance needs. The Lake Manatee WTP has a combined nominal raw-water treatment capacity of approximately 91 mgd across its surface-water and groundwater treatment trains. Actual production is constrained by source availability, authorized WUP withdrawal quantities, treatment-train limitations, operating conditions, and finished-water demand. The County is currently pursuing a WUP renewal or modification that may reflect updated demand projections, well-credit transfers, and retirement of third-party credits. Because the modification has not been finalized, proposed withdrawal quantities are planning assumptions and should not be represented as authorized quantities. Final design and phasing will be based on the WUP conditions in effect at the time of implementation.

2.1.6 Land Use and Development

Land Use and Habitat

SWFWMD FLUCCS mapping was used to characterize land use and habitat composition. Alternative 1 has a total mapped corridor area of approximately 411.77 acres, Alternative 2 approximately 430.10 acres, and Alternative 3 approximately 268.03 acres. Alternative 2 contains substantially more mapped shrub and brushland, while Alternative 1 contains more cropland/pastureland and tree plantations. Alternative 3 has the smallest overall mapped corridor area.

Refer to Appendix D for the detailed environmental analysis.

Future Capital Improvement Projects and Corridor Coordination

FDOT is developing improvements along SR 64 between Lorraine Road and Verna Bethany Road. The proposed pipeline's proximity to this corridor creates design and schedule coordination requirements involving utility placement, horizontal and vertical clearance, subsurface crossings, traffic control, permitting, and sequencing to avoid conflicts or unnecessary relocation. Coordination with FDOT should continue through design and construction.

The proposed roadway alignment corridor and study segments identified under the FDOT SR 64 Feasibility Study are conceptually illustrated in **Figure 2-3**.

Refer to **Appendix F** for Record Drawings pertaining to State Route 64.

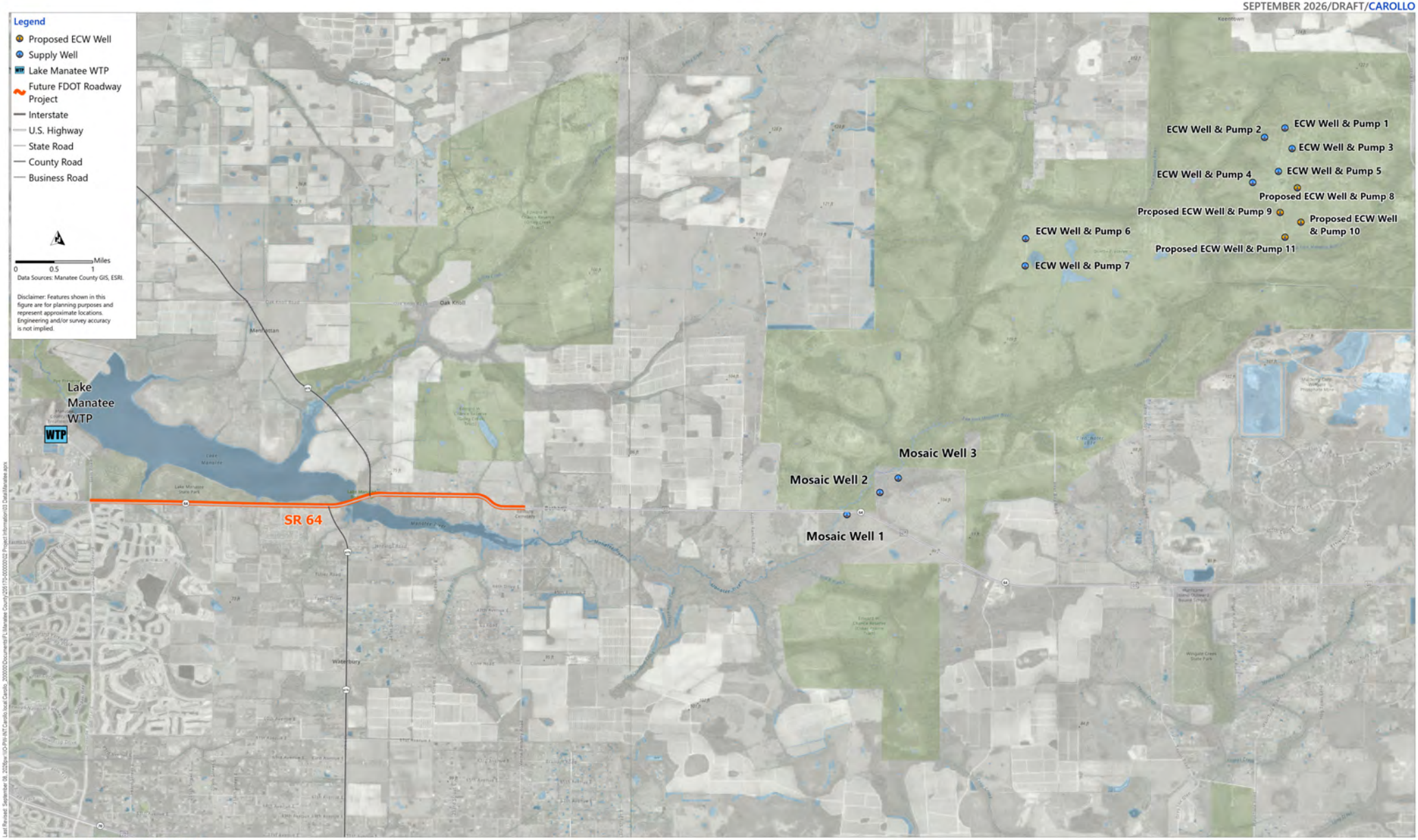


Figure 2-3 FDOT SR 64 FEASIBILITY STUDY
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

2.1.7 Hydrogeologic Setting and Description

The East County Wellfield (ECW) is located in eastern Manatee County, Florida, and is operated by Manatee County Utilities under WUP No. 13343. The wellfield consists of seven production wells (ECW-1 through ECW-7, SWFWMD District IDs 128 through 134) that withdraw groundwater from the Upper Floridan Aquifer (UFA). Five monitoring wells (District IDs 150 through 154) are used to monitor groundwater levels and water quality across the surficial aquifer system (SAS), the intermediate aquifer system (IAS), and the UFA. Site locations are shown in Appendix G – WSP Hydrogeological Evaluation.

The regional hydrostratigraphy beneath the ECW site consists of three principal hydrogeologic units:

- **Surficial Aquifer System (SAS):** An unconfined aquifer composed of unconsolidated sands and shell deposits, extending from land surface to approximately 25 feet below land surface (bls).
- **Intermediate Aquifer System (IAS):** A series of interbedded carbonate and clastic units that function as a semi-confining unit between the SAS and the UFA. Monitored by well ECW-IAMW-52 (monitored interval 145 to 250 ft bls).
- **Upper Floridan Aquifer (UFA):** The principal production aquifer, composed of Tertiary-age limestone and dolomite. Production wells are cased to approximately 500 to 580 feet bls with open-hole completions extending to approximately 1,200 to 1,250 feet bls.

2.1.8 Hydrogeologic Evaluation

The planning-level hydrogeologic evaluation reviewed pumpage, groundwater levels, rainfall, and water-quality information. The wellfield has been operated seasonally using well rotation. Available water-level records generally show seasonal response and recovery, with several identified anomalies requiring confirmation. Available TDS, chloride, and sulfate data remain below the cited secondary standards, and the evaluated record does not indicate progressive saltwater intrusion or water-quality degradation.

The evaluation identified anomalies within both the pumpage and groundwater level records. Two production wells each reported a monthly withdrawal substantially exceeding their typical operating range, resulting in corresponding spikes in total wellfield production. Additionally, two monitoring wells exhibited abrupt water level changes that are inconsistent with prevailing rainfall conditions and with measurements recorded at nearby wells. These anomalies are most likely attributable to data entry, reporting, or instrumentation errors. Accordingly, the evaluation recommends that the data be verified with Manatee County Utilities and the SWFWMD prior to final design.

Resolution of the identified data anomalies is not expected to affect the comparative evaluation of the transmission main alignment alternatives, provided that the verified data remain consistent with the underlying assumptions for available well yield, aquifer operating levels, and permitted withdrawal quantities.

2.2 Water Supply and Treatment

The County supplies the Lake Manatee WTP from Lake Manatee, the East County Wellfield, and the IMC-Manatee Wellfield. The Pipeline Resiliency Project focuses on raw-water reliability rather than expansion of finished-water treatment capacity. Planning-level modeling evaluates transmission configurations capable of supporting 26.2 mgd AAD and 31.5 mgd maximum-month wellfield production under normal and outage conditions.

The broader Pipeline Resiliency Project may include up to four additional groundwater production wells, WTP hydraulic modifications, degasifier or bypass improvements, electrical improvements, and instrumentation and SCADA improvements. Final inclusion and sequencing of these components will be evaluated and refined in subsequent design phase.

Figures 2-4 and **2-5** depict the future new additional wells and ASR bypass around degasifier, respectively.

2.3 Operations and Maintenance Considerations

Operations and maintenance considerations were evaluated from the perspective of operational flexibility and emergency repair response. Key factors include the ability to isolate pipeline segments, maintain raw-water conveyance when an existing or proposed segment is unavailable, access the pipeline and appurtenances for inspection or repair, restore service following an outage, and operate under varying well availability and demand conditions.

Alternatives that provide independent conveyance paths around existing segments offer greater operational flexibility during maintenance and emergencies. An alternative that remains dependent on an existing segment may require additional operational planning, temporary supply measures, expedited repair, or future improvements if that segment is unavailable. Final isolation-valve locations, maintenance access points, air-management facilities, blowoffs, tie-ins, and operating procedures will be established during design.

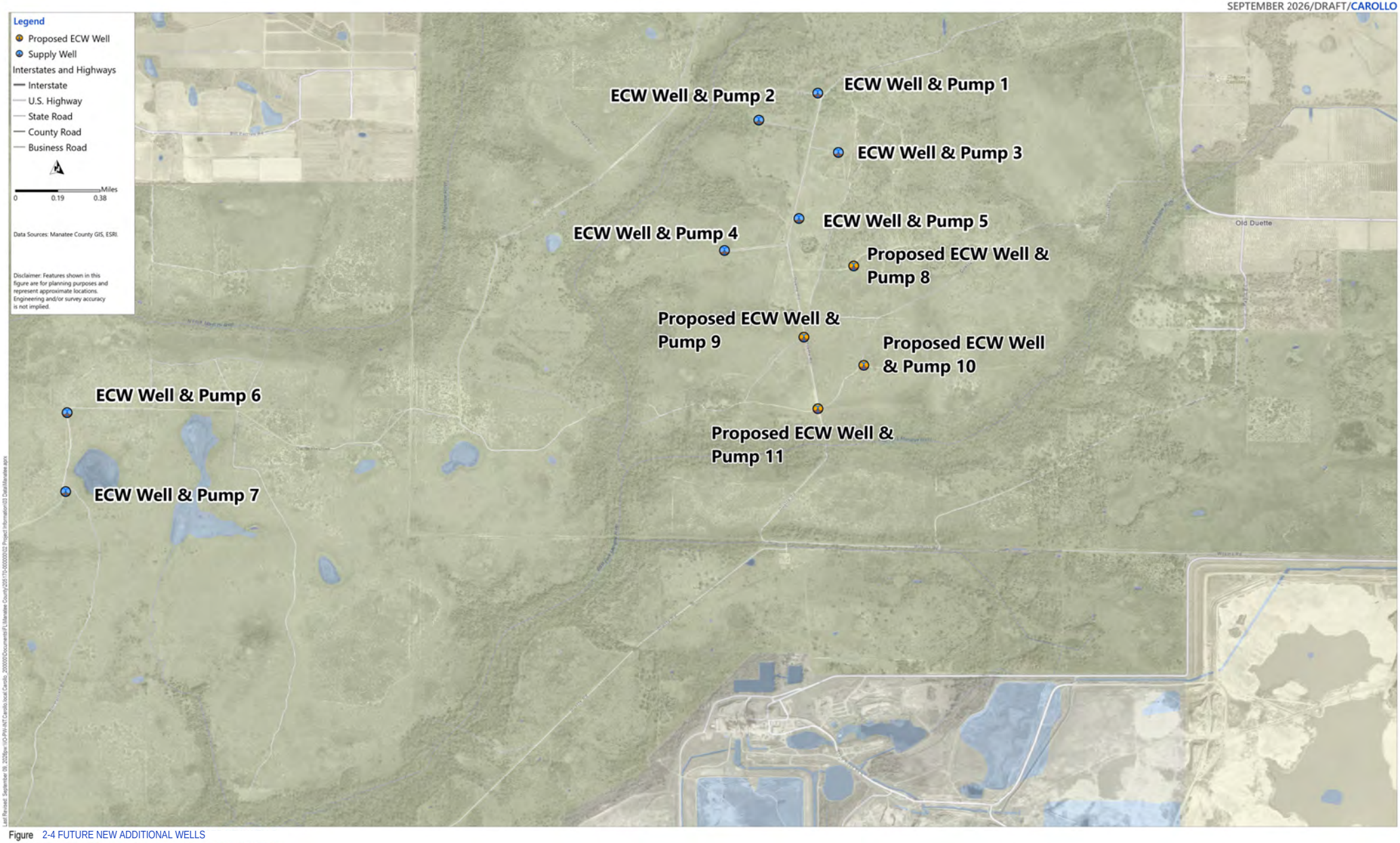


Figure 2-4 FUTURE NEW ADDITIONAL WELLS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

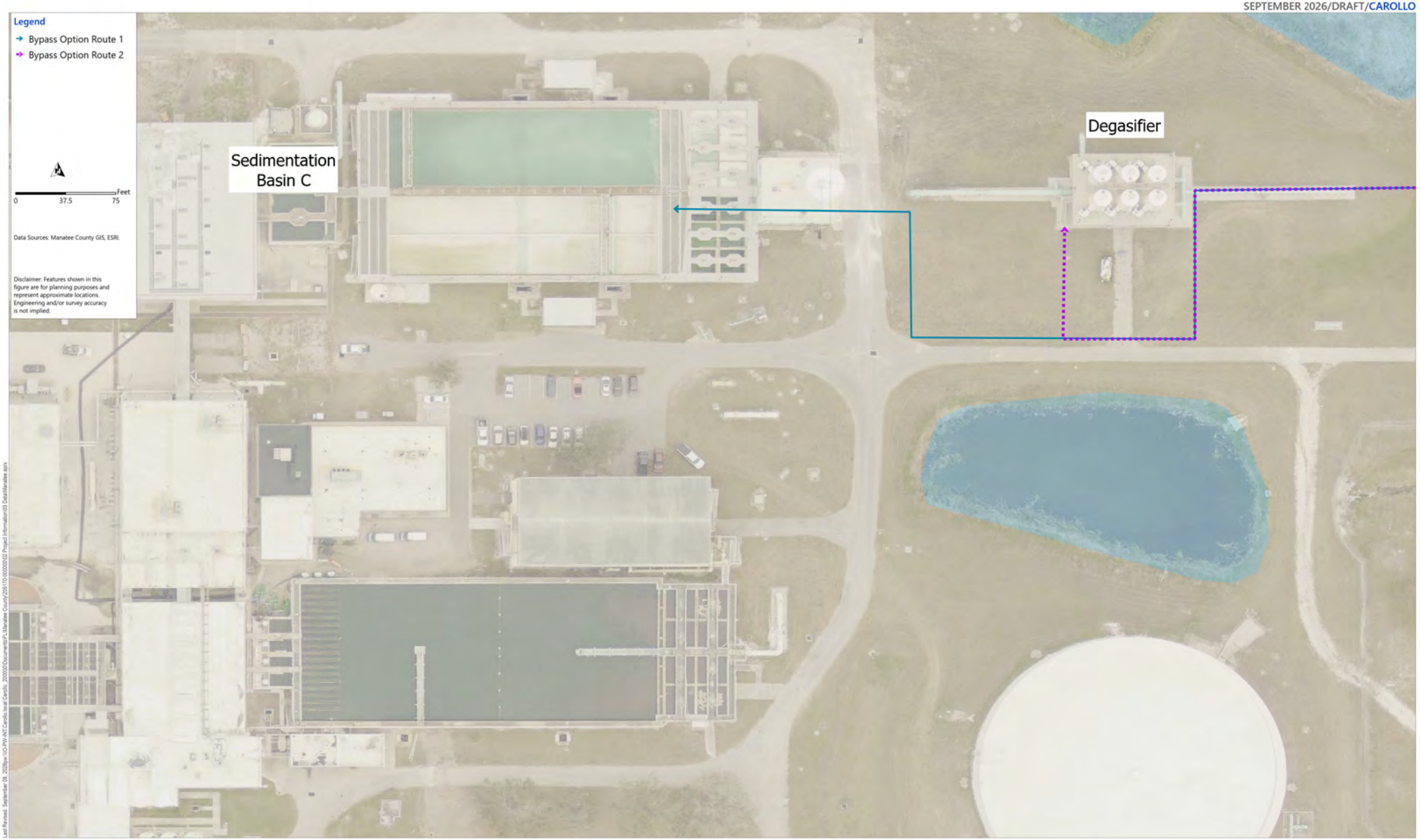


Figure 2-5 PROPOSED ASR BYPASS AROUND DEGASIFIER
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 3 DEVELOPMENT OF ALTERNATIVE ALIGNMENTS

3.1 FDEP Alternatives Analysis Requirements

The alternatives analysis evaluates feasible project concepts based on effectiveness, environmental and permitting considerations, hydraulic performance, constructability, operations and maintenance, future flexibility, and planning-level cost. Section 3 develops the alternatives and documents the primary technical findings. Section 4 synthesizes those findings through a weighted non-cost evaluation, a separate Class 5 cost comparison, and selection of the preferred planning alternative.

3.2 Overview of Alternative Alignments

3.2.1 Basis for Development

The need for the Pipeline Resiliency Project was identified based on the County's objective to enhance the reliability of its raw water supply and transmission infrastructure, particularly under extreme weather conditions such as hurricane events. The evaluation focuses on the development of redundancy within the existing system to maintain continuous conveyance of raw water during storm events or conditions that may compromise a portion of the network.

The purpose of this project is not to expand overall system capacity, but to improve resiliency by providing redundant transmission pathways between critical facilities. The proposed improvements will allow Manatee County to sustain raw water delivery during major storm events and maintain operation of at least one transmission main in the event the parallel system is damaged or taken out of service. The alternatives analysis presented in Sections 3 and 4 is limited to the identification and evaluation of three feasible transmission-main alignment alternatives. The broader Pipeline Resiliency Project may include associated wellfield, WTP, degasifier, electrical, instrumentation, and SCADA improvements, as described elsewhere in this Facilities Plan.

The alternatives were developed using the data summarized in Section 2. Route development considered existing raw-water infrastructure, utility corridors, road rights-of-way, environmental resources, conservation lands, wetlands and surface waters, cultural resources, property and access limitations, major roadway and water crossings, planned FDOT improvements, and the County's need for a redundant and operable transmission configuration. Because the planning area contains a limited number of practical conveyance corridors, the alternatives generally use or parallel existing corridors where feasible.

3.2.2 Corridor and Infrastructure Considerations

The alternatives must cross Lake Manatee and several associated waterways and drainage features. Portions of the B-C corridor parallel the existing raw-water main and PRECO overhead transmission facilities. Design will require coordination for workspace, utility separation, construction access, traffic, trenchless crossings, appurtenance access, and sequencing. Existing easements and access roads provide

advantages in some areas, while Duette Preserve and conservation restrictions create additional considerations in others.

3.2.3 Summary of Alternatives

During the route evaluation, multiple routes and alignments were explored to reduce roadway and environmental impacts. After review, three (3) alignment alternatives for the proposed transmission main were identified, delineated, and presented schematically in **Figure 3-1**. To facilitate the description of each alignment, four key reference locations were established along the corridor, as described in **Table 3-1.**

Table 3-1 Selected 20-year Finished Water Demand Projection

Alternative	Proposed Segments	Approx. Length	Planning Concept
1	A-B and B-C	97,000 ft	Continuous proposed conveyance route from the main ECW area to the WTP; existing D-B remains the connection for ECW Wells 6 and 7.
2	A-D, D-B, and B-C	104,700 ft	Most complete parallel conveyance path around the principal existing segments.
3	A-D and B-C	73,650 ft	Adds redundancy at the wellfield and between B and the WTP while retaining existing A-B as the intermediate link.

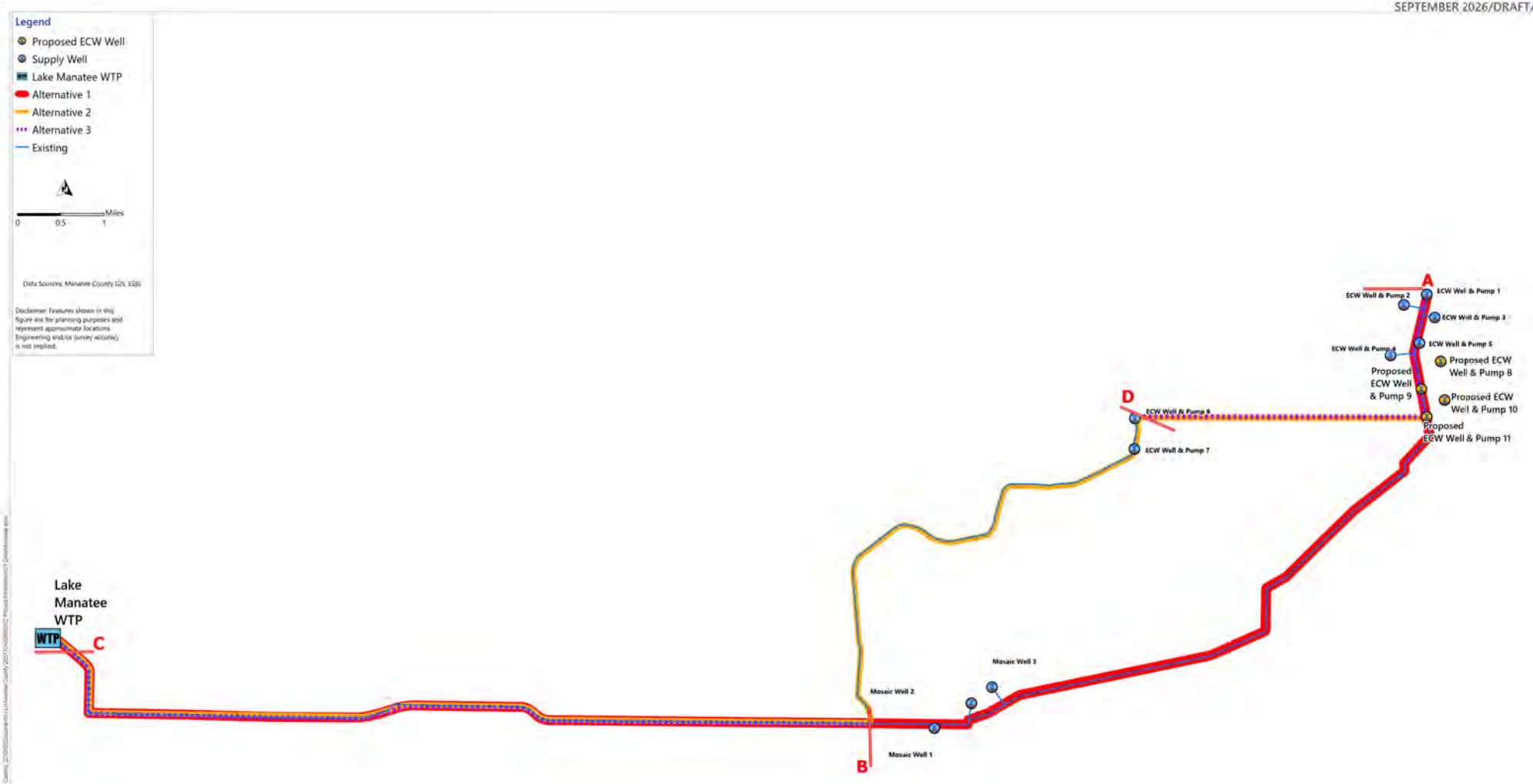


Figure 3-1 CONCEPTUAL DESIGN - PROPOSED ALIGNMENT ALTERNATIVES
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

Alternative 1

Alternative 1 follows the existing transmission corridor from Location A to Location B and continues west to Location C, as shown in **Figure 3-2**. The A-B segment is approximately 48,300 feet and the B-C segment approximately 48,700 feet. The route benefits from established utility access and known site conditions but requires construction along the full corridor and parallel to existing infrastructure.

Major considerations include workspace adjacent to the existing transmission main and PRECO facilities, the Lake Manatee crossing, other waterway crossings, access, construction sequencing, and protection of existing facilities. The Lake Manatee crossing is assumed to use HDD at the planning level. Four additional major waterway crossings require design-specific structural, hydraulic, environmental, and constructability evaluation.

Alternative 2

Alternative 2 includes A-D, D-B, and B-C segments. The route initially follows the existing corridor, then traverses a portion of Duette Preserve toward Location D, continues along the D-B corridor, and follows the common B-C route to the WTP. The total new pipeline length is approximately 104,700 feet. The alternative 2 alignment is shown in **Figure 3-3**.

Record drawings depicting the existing waterway crossings are included in **Appendix H** and provide additional information regarding the existing transmission main crossing configurations.

Alternative 3

Alternative 3 consists of a new A-D segment and a new B-C segment. The A-D segment is approximately 24,950 feet and connects the northern and southern portions of the wellfield. The B-C segment is approximately 48,700 feet and provides a parallel connection from the wellfield transmission system to the Lake Manatee WTP. The alternative retains the existing A-B segment as the intermediate conveyance link.

Alternative 3 has the least new pipeline length, lowest mapped wetland and surface-water impact, and lowest Class 5 pipeline cost. It remains dependent on the existing A-B segment, which is the controlling hydraulic limitation for an A-B outage. The selected planning configuration uses a 36-inch A-D segment and 42-inch B-C segment, subject to final design confirmation.

The alternative 3 alignment is shown in **Figure 3-4**.

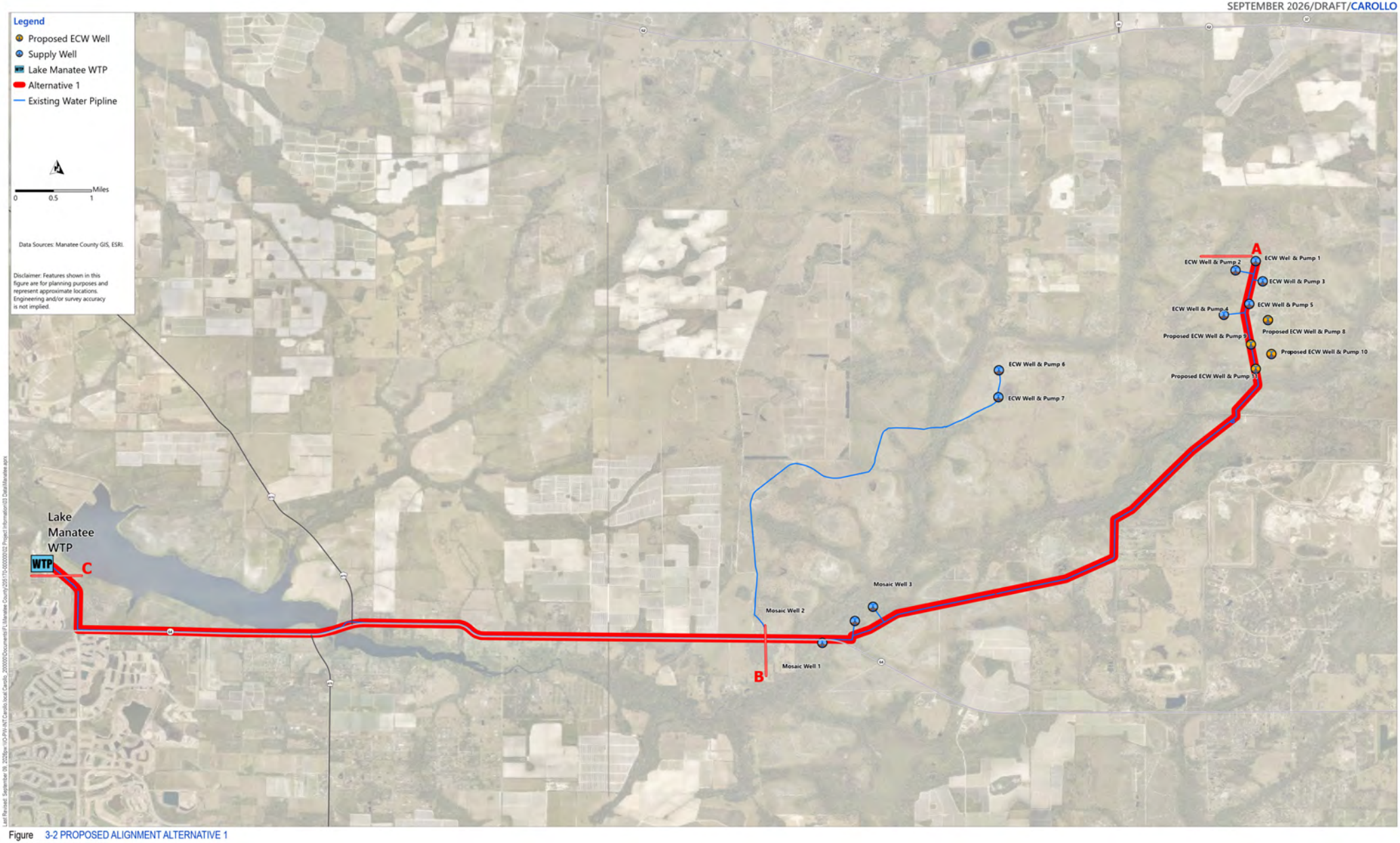


Figure 3-2 PROPOSED ALIGNMENT ALTERNATIVE 1
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

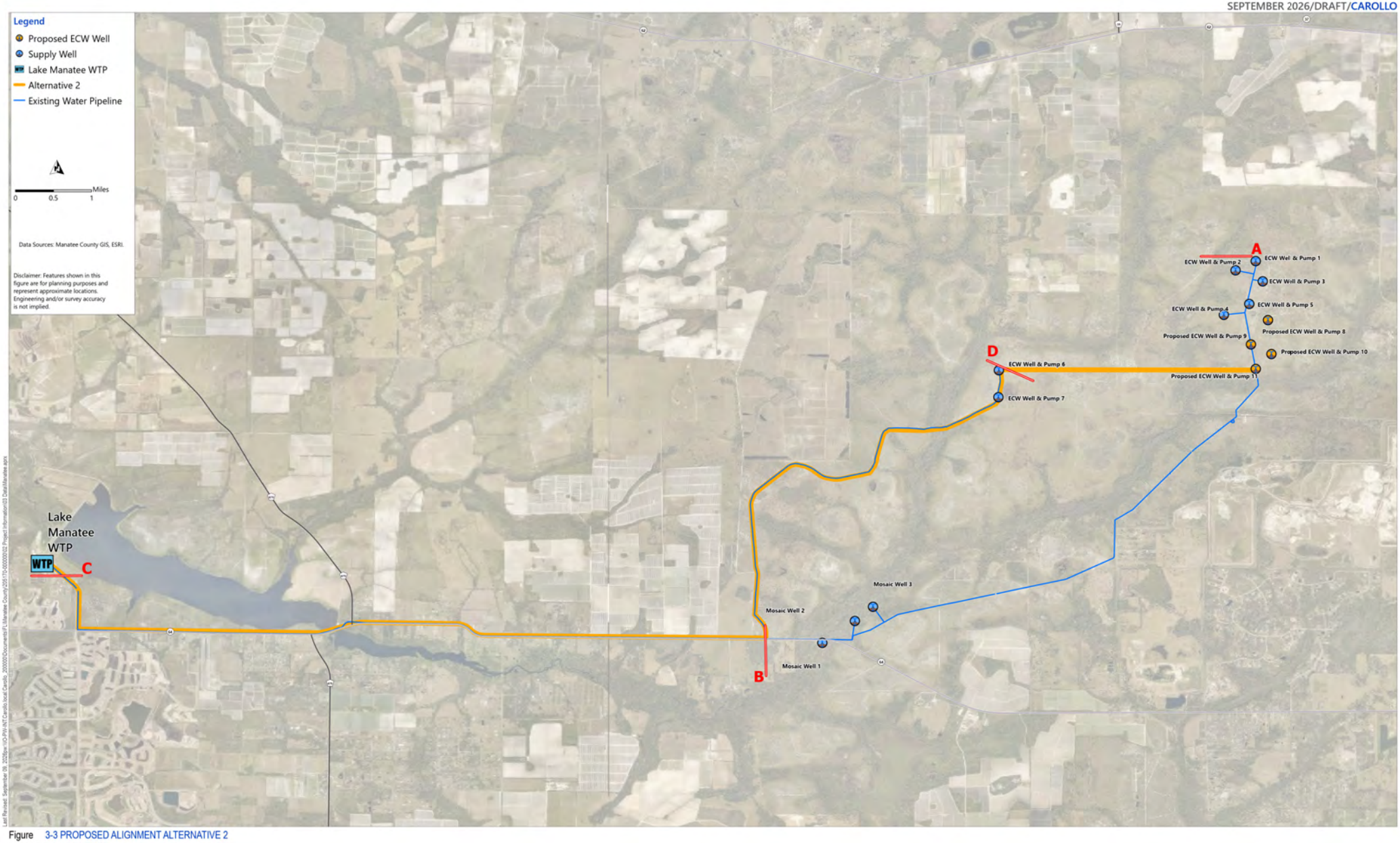


Figure 3-3 PROPOSED ALIGNMENT ALTERNATIVE 2
MANATEE COUNTY
PIPELINE RESILIENCY STUDY



Figure 3-4 PROPOSED ALIGNMENT ALTERNATIVE 3
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

3.3 Hydrogeologic and Environmental Constraints

3.3.1 Hydrogeologic Constraints

The hydrogeologic evaluation does not directly differentiate the alignments but informs future well operation, pump selection, and WUP coordination. Environmental conditions provide significant differentiation. Alternative 2 has the greatest mapped wetland and surface-water impact and a unique conservation-easement constraint. Alternative 1 has intermediate mapped wetland impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent forested/shrub wetland conversion.

Refer to Appendix G for a full planning-level hydrogeologic evaluation prepared by WSP.

3.4 Hydraulic Modeling and System Capacity

Planning-level hydraulic modeling evaluated the capacity and resiliency of the existing ECW raw-water transmission system and three proposed alignments. The evaluation uses an AAD production requirement of 26.2 mgd and maximum-month production requirement of 31.5 mgd. Model assumptions include a Hazen-Williams C-factor of 130, available well pump curves, assumed aquifer levels, representative proposed future wells, Mosaic Well availability, a separate proposed-main WTP entry, and SCADA-informed operating conditions. These assumptions are suitable for comparative planning and require refinement during detailed design.

3.4.1 Hydraulic model basis and assumptions

The following assumptions were used for the planning-level calculations:

- A Hazen-Williams C-factor of 130 was used for the transmission mains.
- Existing wells were modeled using their respective factory pump curves.
- »Proposed future ECW Wells 8 through 11 were represented using available existing ECW pump-curve information until final future-well pump selections are established.
- ECW Wells 1 through 7 and the proposed future wells were assumed to pump from an aquifer water level of approximately -10 ft NGVD for the evaluated condition.
- Proposed ECW Wells 8-11 were assumed to pump from an aquifer water level of approximately -25 ft NGVD.
- Mosaic Well 3 was assumed to remain available for operation, while Mosaic Wells 1 and 2 were generally modeled out of service.
- Well operating combinations were varied by scenario so that the modeled pumps remained on their respective pump curves while determining the maximum conveyable system flow.
- The proposed raw water main was assumed to have a separate entry to the WTP degasifier rather than manifold into the existing transmission main immediately upstream of the degasifier.
- Historical SCADA flow and pressure data were used to inform model development. Field pressure logging was identified to verify ECW transmission-main pressures because some reported SCADA pressures appeared lower than expected.

These assumptions are appropriate for the current planning-level comparison of alternatives and are expected to be refined as field pressure data, final groundwater operating levels, future well pump selections, and WTP connection details are confirmed. Accordingly, the modeled capacities should be used to compare alternatives and identify controlling conditions rather than as final design capacities.

3.4.2 Hydraulic Criteria

Pipeline sizing was screened using conveyance capacity, velocity, and headloss. The preferred planning velocity range is approximately 3 to 5 ft/s. Lower velocities can increase deposition potential, while higher velocities increase friction loss, energy, wear, and surge potential. The analysis compares diameter combinations under normal operation and outages of the existing A-B, D-B, and B-C segments.

3.4.3 Hydraulic Performance

The hydraulic evaluation demonstrated that both pipeline alignment and pipeline diameter influence the ability of the system to meet the project resiliency objectives. Planning-level modeling was completed to evaluate multiple pipeline diameter combinations for each alternative under normal operating conditions and representative outage scenarios. The evaluation focused on the ability of each alternative to satisfy the 26.2 mgd AAD criterion and the 31.5 mgd PMM criterion while providing redundancy within the raw water transmission system (per WUP Modification). The evaluated alternatives differed not only in pipeline diameter but also in the degree of conveyance redundancy provided by the respective alignment configurations (**Table 3-2**).

Table 3-2 Summary of the Pipeline Segments for Each Alternative and the corresponding Planning-Level Resiliency

Alternative	Approx. Length	Diameter Findings	Planning-Level Result
1	Segment A-B: 48,300 ft Segment B-C: 48,700 ft	42/42 and 42/48 meet the 31.5 mgd MM criterion in all modeled cases.	Continuous conveyance route from ECW Pumps 1-7 to the WTP. The existing D-B branch remains the only connection for ECW Wells 6 and 7.
2	Segment A-D: 24,950 ft Segment D-B: 31,050 ft Segment B-C: 48,700 ft	42/36/48 and 42/42/42 meet or exceed 31.5 mgd in all modeled cases.	Most complete parallel conveyance path by extending the proposed system through the northern/eastern ECW branch and continuing to the WTP.
3	Segment A-D: 24,950 ft Segment B-C: 48,700 ft	Several combinations exceed 31.5 mgd under normal conditions, but none meet 26.2 mgd during A-B outage.	Adds redundancy at the northern/eastern ECW branch and between B and the WTP, while retaining the existing A-B segment as the intermediate conveyance link.

Alternative 1 provides a continuous parallel transmission route between the ECW and the LMWTP. The hydraulic results demonstrate that system capacity increases as proposed pipeline diameters increase, with the larger diameter combinations providing the highest conveyance capacity. Under the evaluated outage conditions, Alternative 1 maintained sufficient hydraulic performance to satisfy the 31.5 mgd MM criterion for the larger diameter configurations. Because the proposed alignment provides a continuous parallel conveyance route between Locations A, B, and C, the alternative provides a high degree of

redundancy and resiliency while maintaining hydraulic performance during the modeled outage scenarios (**Figure 3-5**).

Alternative 2 provides the greatest hydraulic redundancy of the alternatives evaluated because the proposed alignment creates an independent conveyance path around each principal existing transmission segment. The hydraulic results demonstrate that Alternative 2 consistently achieved the highest system capacities under both normal operating conditions and modeled outage scenarios. Multiple pipeline diameter combinations satisfied the 31.5 mgd MM criterion, demonstrating the resiliency benefits associated with providing redundancy throughout the ECW transmission system. Because Alternative 2 provides conveyance redundancy around the primary transmission corridors, it exhibited the strongest hydraulic performance and outage resiliency of the alternatives evaluated (**Figure 3-6**).

Alternative 3 provides redundancy between the northern and southern portions of the ECW and between the transmission system and the LMWTP. Under normal operating conditions, Alternative 3 demonstrated the ability to achieve the 31.5 mgd MM criterion for several evaluated diameter combinations. However, because Alternative 3 remains dependent on the existing A-B segment, the modeled A-B outage condition limits available conveyance capacity. As a result, none of the evaluated diameter combinations achieved the 26.2 mgd AAD criterion during the A-B outage scenario. Despite this limitation, Alternative 3 still provides redundancy improvements relative to the existing system and improves operational flexibility through the addition of the A-D and B-C transmission segments (**Figure 3-7**).

The hydraulic evaluation demonstrates that Alternative 2 provides the highest degree of system redundancy and outage resiliency by providing an independent conveyance path around each principal transmission segment. Alternative 1 provides strong hydraulic performance through a continuous parallel conveyance route between the ECW and the LMWTP. Alternative 3 improves redundancy within the ECW transmission system but remains dependent on the existing A-B segment during certain outage conditions. Final pipe diameters, operating criteria, and system configuration will be confirmed during future design using updated field data, refined hydraulic analyses, transient evaluation, and confirmed operating requirements.

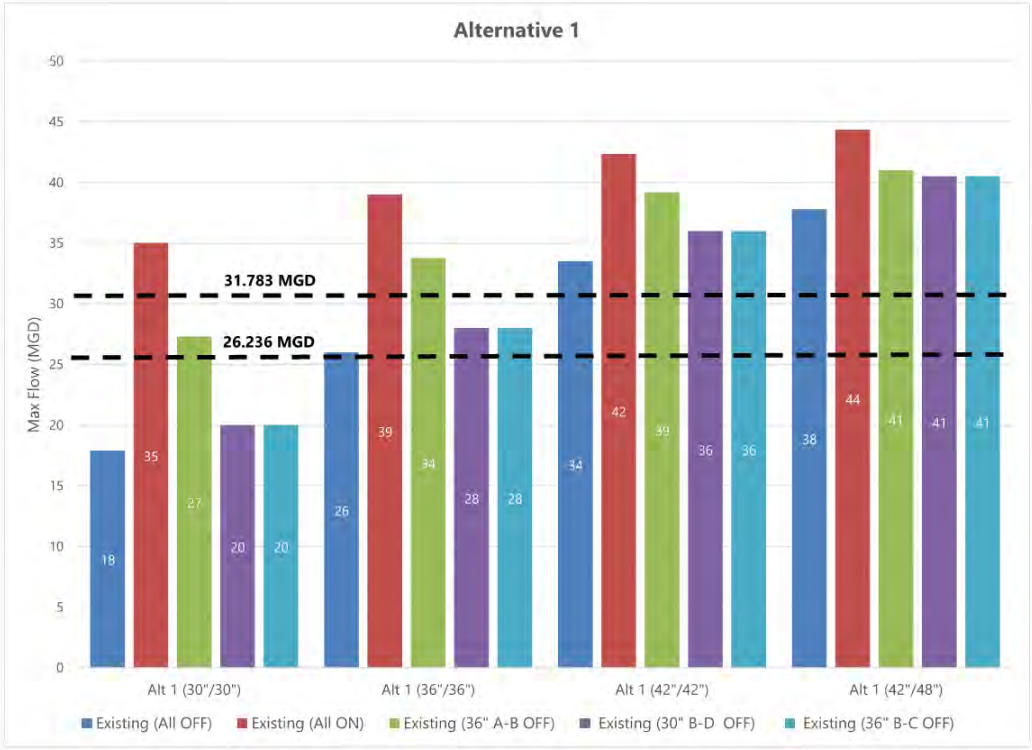


Figure 3-5 Hydraulic Results for Alternative 1

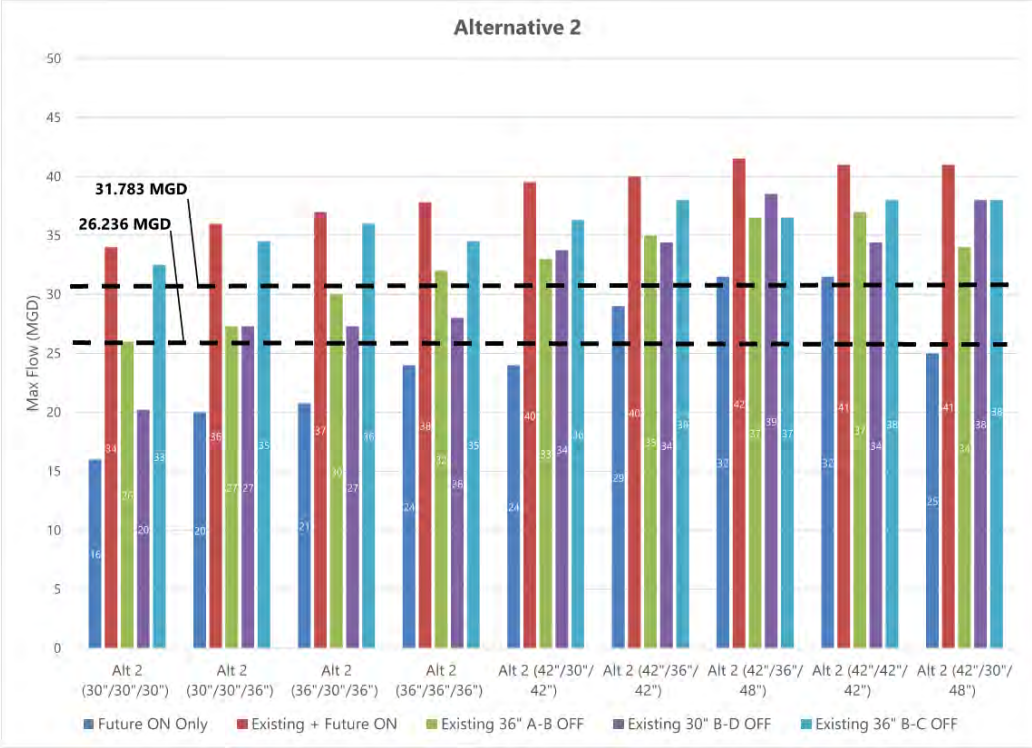


Figure 3-6 Hydraulic Results for Alternative 2

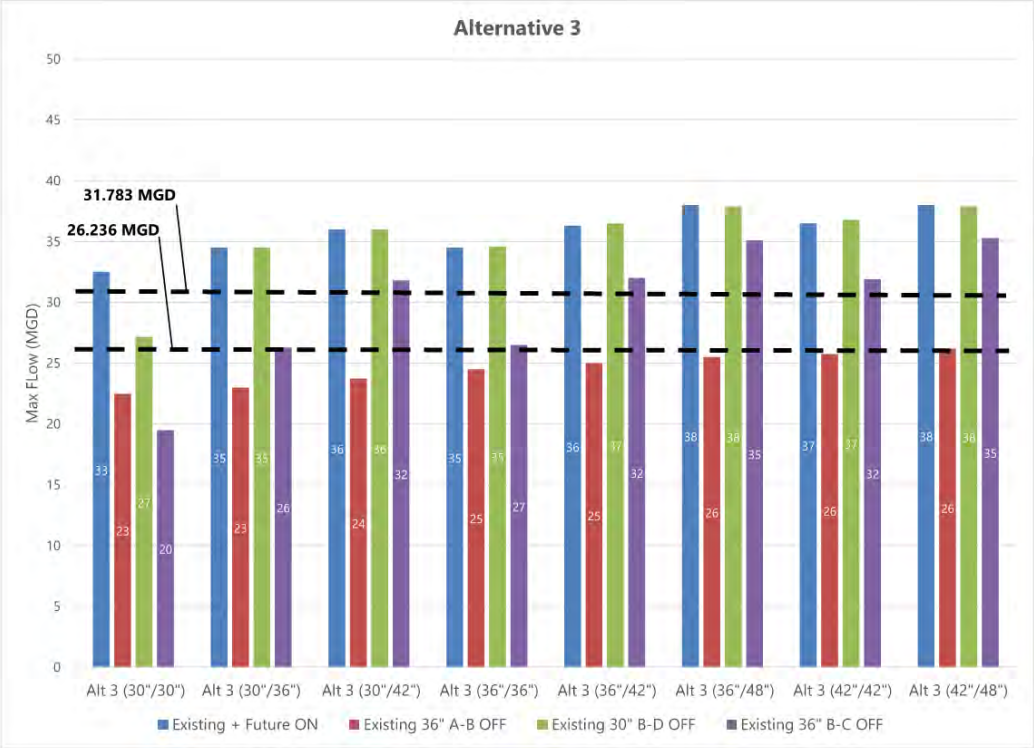


Figure 3-7 Hydraulic Results for Alternative 3

SECTION 4 ANALYSIS OF ALTERNATIVE ALIGNMENTS

4.1 Evaluation Methodology

The alternatives evaluation identifies the alternative that best balances the County's planning objectives rather than the alternative with the highest performance in a single category. The evaluation included a non-cost assessment, a planning-level cost evaluation, and a combined cost and non-cost evaluation to identify the recommended planning alternative. The non-cost assessment considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. Planning-level capital costs were evaluated separately and incorporated into the final combined evaluation to support selection of the preferred planning alternative.

4.2 Non-Cost Criteria Evaluation

Information developed in Sections 1 through 3 was synthesized using six non-cost criteria (**Table 4-1**). Cost was evaluated separately due to the nature of the Class 5 estimates which are intended to indicate relative cost rather than establish final construction cost.

Table 4-1 Non-Cost Evaluation Weighting Criteria

Criterion	Weight	Evaluation Basis
Reliability & Resiliency	25%	Hydraulic independence, service continuity, outage performance, and system recovery
Hydraulic Performance	25%	Capacity relative to AAD/MM criteria, velocity, headloss, and controlling outage
Environmental & Permitting	15%	Wetlands, surface waters, species, conservation lands, cultural resources, and permitting complexity
Constructability & Implementation Risk	15%	Length, access, crossings, utility coordination, workspace, property, and schedule risk
Operations & Maintenance	10%	Operational flexibility, isolation, emergency repair response, access, and restoration
Future Expandability & Flexibility	10%	Ability to support future wellfield conditions and design refinement
TOTAL	100%	

Each alternative was assigned an integer raw score from 1 to 10. A score of 10 represents the most favorable relative performance, 5 represents a condition that generally meets the planning objective but is not preferred, and 1 represents the least favorable relative performance. Raw scores are multiplied by the criterion weight to calculate weighted scores. Refer to **Table 4-2** for non-cost criteria weighted results for each alternative.

Table 4-2 Non-Cost Evaluation Weighting Criteria

Evaluation Criterion	Weight	Alt. 1 Raw	Alt. 1 Weighted	Alt. 2 Raw	Alt. 2 Weighted	Alt. 3 Raw	Alt. 3 Weighted
Reliability & Resiliency	25%	9	2.25	10	2.50	6	1.50
Hydraulic Performance	25%	9	2.25	10	2.50	6	1.50
Environmental & Permitting	15%	7	1.05	3	0.45	10	1.50
Constructability & Implementation Risk	15%	7	1.05	4	0.60	8	1.20
Operations & Maintenance	10%	8	0.80	9	0.90	6	0.60
Future Expandability & Flexibility	10%	8	0.80	9	0.90	7	0.70
TOTAL	100%	---	8.20	---	7.85	---	7.00

4.3 Cost Criteria Evaluation

Planning-level capital cost estimates were developed for each alternative using route-specific pipeline lengths, planning-level unit costs, alternative-specific allowances, and design and construction contingencies. The estimates use unit costs of $450 per linear foot for 36-inch ductile iron pipe and $625 per linear foot for 42-inch ductile iron pipe. Additional allowances were included, as applicable, for major waterway crossings, valves and appurtenances, tie-ins, utility coordination, access and restoration, environmental mitigation, engineering and design development, construction contingency, and construction management.

The estimates are intended for relative planning and budgeting comparison and do not represent final design-level construction costs. Detailed planning-level cost estimates for Alternatives 1, 2, and 3 are included in **Appendix I**, respectively. The resulting capital cost comparison was summarized in **Table 4-3**.

Table 4-3 Capital Cost Summary

Cost Component	Alternative 1	Alternative 2	Alternative 3
Bid-Based Pipeline Construction	$52,172,500	$55,637,500	$41,665,000
Alternative Specific Allowance	$7,000,000	$7,000,000	$6,500,000
Design and Construction Contingency	$16,520,000	$19,050,000	$12,880,000
Total Capital Cost	$75,692,500	$81,687,500	$61,045,000
Relative Capital Cost Rank	2	3	1

Alternative 3 has the lowest planning-level capital cost because it requires the least new pipeline length and retains the existing A-B segment as the intermediate conveyance link. Alternative 2 has the highest

planning-level capital cost due to its longer proposed pipeline alignment and higher environmental, access, and implementation allowances. Alternative 1 has an intermediate planning-level capital cost.

A 20-year net present value analysis was also completed to provide a consistent life-cycle cost comparison among the alternatives. The analysis considers initial capital cost, the present value of annual maintenance costs, and the present value of the remaining asset value at the end of the 20-year evaluation period. The NPV analysis uses a 3.0 percent discount rate and assumes a 75-year useful life for the transmission main facilities. At the end of the 20-year evaluation period, 55 years, or approximately 73.3 percent, of the assumed useful life remains.

Annual maintenance costs were estimated at $125,000 for Alternative 1, $175,000 for Alternative 2, and $75,000 for Alternative 3. The uniform-series present-worth factor, P/A, is 14.8775, and the single-payment present-worth factor, P/F, is 0.5537. Total net present cost was calculated as initial capital cost plus the present value of annual maintenance costs, less the present value of the residual asset value. The NPV results are summarized in **Table 4-4**.

Table 4-4 20-Year Net Present Value Summary

Economic Component	Alternative 1	Alternative 2	Alternative 3
Capital Cost	$75,692,500	$81,687,500	$61,045,000
Annual Maintenance	$125,000	$175,000	$75,000
Present Value of Maintenance	$1,859,684	$2,603,558	$1,115,811
Present Value of Residual Asset Value	($30,733,341)	($33,167,485)	($24,786,033)
Total Net Present Cost	$46,818,843	$51,123,573	$37,374,777
Relative NPV Rank	2	3	1

Alternative 3 has the lowest total net present cost and ranks first in the NPV comparison. The NPV ranking is consistent with the capital cost ranking and does not change the relative cost position of the alternatives.

The planning-level estimates should be refined during future design phases based on refinement to project specific requirements. Funding eligibility will be confirmed with FDEP.

4.4 Combined Cost and Non-Cost Evaluation

The alternatives evaluation included both a non-cost technical assessment and a planning-level cost comparison. The non-cost evaluation considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. A separate evaluation of planning-level capital cost was then completed to determine the overall planning value of each alternative. The combined evaluation results are summarized in **Table 4-5**.

Table 4-5 Combined Cost and Non-Cost Evaluation

Evaluation Component	Weight	Alternative 1	Alternative 2	Alternative 3
Non-Cost Evaluation Score	60%	8.2	7.85	7.00
Cost Score (Relative Planning-Level Cost Competitiveness)	40%	8.0	7.0	10.0
Non-Cost Weighted Score	--	4.92	4.71	4.20
Cost Weighted Score	--	3.20	2.80	4.00
Final Combined Score	100%	8.12	7.51	8.20
Overall Ranking	--	2	3	1

The combined cost and non-cost evaluation indicates that Alternative 3 achieved the highest overall score and ranked first among the evaluated alternatives. Alternative 1 ranked second, driven by its strong technical performance, while Alternative 2 ranked third due to higher planning-level costs and implementation challenges.

4.5 Key Alternative Strengths and Considerations

All three alternatives provide necessary improvements, but each has distinct strengths and planning considerations. The key strengths and planning considerations associated with each alternative were summarized in **Table 4-6**.

Table 4-6 Key Alternative Strengths and Considerations

Alternative	Key Strengths	Key Considerations
1	Strong hydraulic performance; continuous proposed A-B and B-C route; can satisfy the MM requirement in all modeled outage cases with sufficiently large segments.	Greater new pipeline length and cost than Alternative 3; intermediate mapped wetland impact; corridor and crossing complexity along the full route.
2	Strongest modeled hydraulic redundancy; parallel path around each principal existing segment; greatest operational flexibility during modeled outages.	Highest pipeline cost; greatest mapped wetland impact; conservation-easement and gopher tortoise recipient-site constraint; elevated permitting and implementation risk.
3	Lowest pipeline cost; least new pipeline length; lowest mapped wetland and surface-water impact; favorable implementation and planning flexibility.	Dependent on existing A-B; modeled A-B outage capacity below AAD; preliminary 36-inch A-D and 42-inch B-C diameters require final confirmation.

Alternative 1 and Alternative 2 provide stronger hydraulic outage performance. Alternative 3 provides the most favorable combination of pipeline cost, mapped environmental impact, reduced new pipeline length, and planning flexibility.

4.6 Recommended Planning Alternative

4.6.1 Evaluation Results

The non-cost evaluation indicated that Alternatives 1 and 2 provided greater hydraulic redundancy and outage resiliency than Alternative 3. Alternative 2 achieved the highest hydraulic evaluation score, while Alternative 1 achieved similar hydraulic performance with fewer environmental and implementation constraints. The evaluation also identified differences in environmental impacts, permitting complexity, constructability, and planning-level capital cost. Alternative 2 had the greatest estimated wetland impacts, the highest permitting complexity, and the highest planning-level capital and net present costs. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in both capital and net present cost than Alternative 3. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in cost than Alternative 3.

Alternative 3 had the lowest planning-level capital cost, the lowest 20-year net present cost, the shortest length of new transmission main, and the lowest mapped wetland and surface-water impacts. Alternative 3 also remains dependent on the existing A-B transmission segment, resulting in lower hydraulic redundancy than Alternatives 1 and 2. When cost and non-cost considerations were evaluated together, Alternative 3 achieved the highest combined evaluation score. Based on the combined evaluation results, Alternative 3 was selected as the preferred planning alternative for advancement into future design and implementation.

4.6.2 Basis for Selection

Based on combined consideration of technical performance, environmental findings, constructability and implementation, operations and maintenance, future flexibility, planning-level capital cost, 20-year net present cost, and County planning direction, Alternative 3 is recommended as the preferred planning alternative. (**Figure 4-1**).

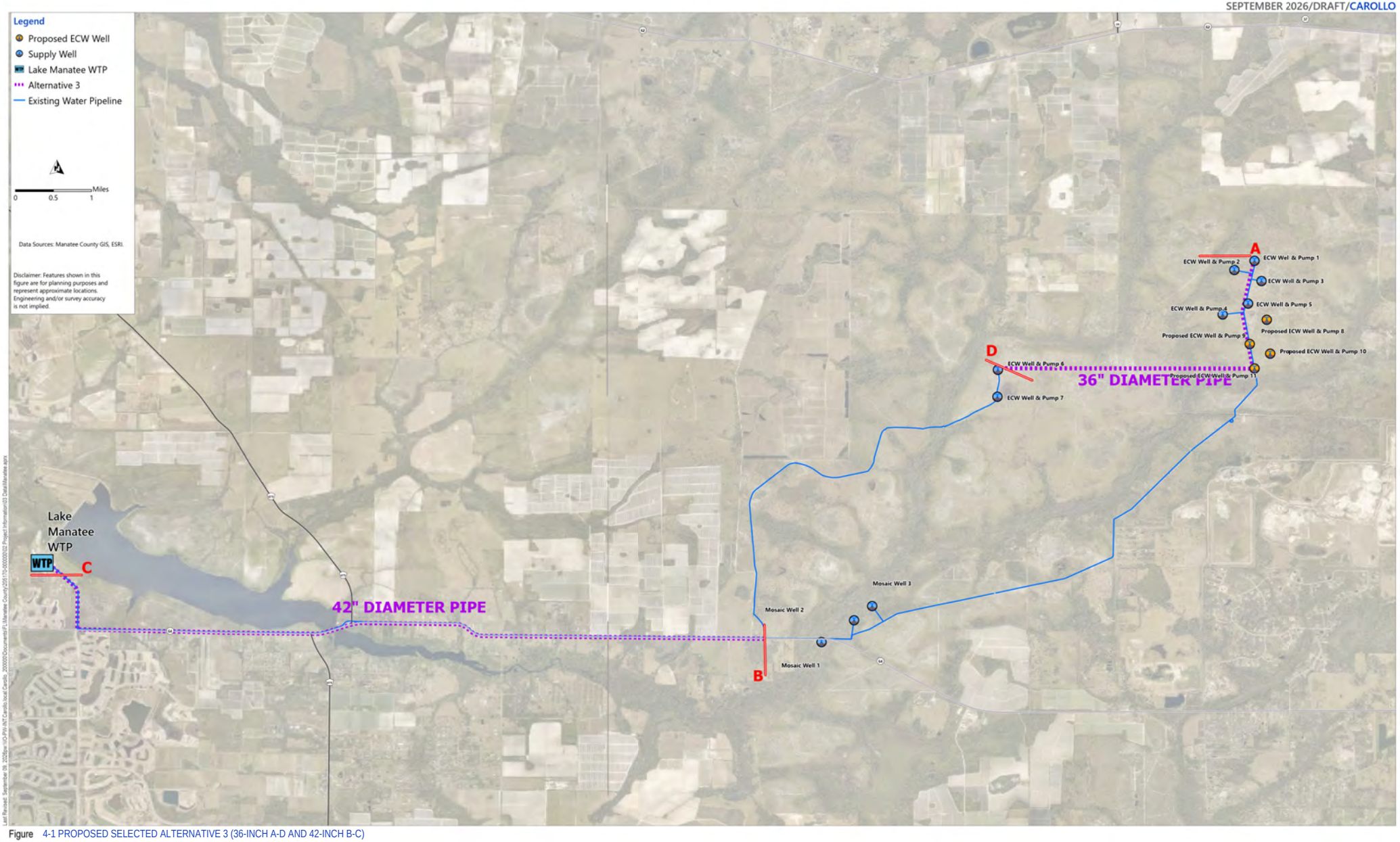


Figure 4-1 PROPOSED SELECTED ALTERNATIVE 3 (36-INCH A-D AND 42-INCH B-C)
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

The recommendation transparently recognizes that Alternatives 1 and 2 provide stronger modeled outage performance, while Alternative 3 provides a favorable overall planning and budgeting approach.

For planning and budgeting, Alternative 3 consists of an approximately 24,950-foot, 36-inch A-D segment and an approximately 48,700-foot, 42-inch B-C segment. Final diameters and connection details will be confirmed during future design based on refined hydraulic analyses, updated design criteria, verified groundwater levels, confirmed well availability, WTP boundary conditions, transient analyses, constructability, permitting, and operational requirements.

Alternative 3 provides meaningful resiliency improvements but does not provide complete hydraulic independence from the existing transmission system. The proposed A-D segment provides an additional connection between the northern and southern portions of the ECW, and the proposed B-C segment provides a parallel transmission path to the WTP. However, the configuration continues to use the existing A-B and D-B segments.

The planning-level hydraulic analysis identifies the existing A-B segment as the controlling outage dependency. Under the modeled A-B outage condition, none of the evaluated Alternative 3 diameter combinations achieved the 26.236-mgd AAD criterion. Alternative 3 was nevertheless selected as the preferred planning alternative because its lower cost, shorter length, reduced mapped environmental impacts, and lower implementation risk produced the highest combined cost and non-cost evaluation score.

Selection of Alternative 3 represents a planning and budgeting decision rather than a conclusion that the alternative provides the same hydraulic independence as Alternatives 1 and 2. Future design shall establish the County's minimum acceptable service level for an A-B outage and evaluate well availability, available flow, WTP operation, isolation and maintenance requirements, emergency repair procedures, temporary supply measures, recovery actions, and potential future improvements. If the County's required outage performance cannot be achieved through operational measures, subsequent phases may include additional transmission improvements to reduce or eliminate the A-B dependency.

4.6.3 Potential Project Phasing

The planning-level cost estimates indicate that implementation of the selected alternative may require phased delivery to align project expenditures with available funding and future system needs. Potential project phasing strategies are summarized below.

- **Phase 1 – Core Resiliency Improvements**

Phase 1 would focus on the transmission infrastructure improvements that provide the greatest resiliency benefits and support increased raw water conveyance capacity between the ECW and the Lake Manatee WTP.

Potential Phase 1 improvements include:

- Construction of priority transmission main segments associated with the selected planning alternative.
- Improvements to transmission capacity between the Mosaic wells and the Lake Manatee WTP.
- Evaluation and potential construction of an interconnection between ECW Wells 1 through 5 and ECW Wells 6 and 7 within the ECW.

- **Phase 2 – Supply and Operational Improvements**

Phase 2 would focus on increasing raw water supply availability and improving operational flexibility within the existing treatment system.

Potential Phase 2 improvements include:

- Construction of two additional groundwater production wells.
- Construction of ASR bypass piping around the existing degasifiers.
- Construction of additional transmission infrastructure as warranted based on system demands, operational needs, and available funding.

- **Phase 3 – Long-Term Redundancy Improvements**

Phase 3 would focus on future water supply expansion and completion of additional system resiliency improvements.

Potential Phase 3 improvements include:

- Construction of two additional groundwater production wells.
- Completion of remaining transmission system redundancy improvements identified through future planning, design, and operational evaluations.

The final project phasing strategy will be refined during subsequent planning and design phases based on funding availability, regulatory requirements, operational priorities, hydraulic evaluation results, and future water demand projections.

SECTION 5 SELECTED ALTERNATIVE

Alternative 3 was selected for Facilities Plan development, planning, and budgeting. The selected concept includes the A-D wellfield connection and the B-C transmission segment to the Lake Manatee WTP. The preliminary configuration uses a 36-inch A-D segment and a 42-inch B-C segment. The selection establishes a planning basis and does not represent final design approval of materials, profiles, appurtenances, or connection details.

5.1 Description of the Proposed Project

The selected planning alternative includes approximately 24,950 feet of new 36-inch raw-water transmission main between Locations A and D and approximately 48,700 feet of new 42-inch raw-water transmission main between Locations B and C. The A-D segment connects the northern and southern portions of the East County Wellfield. The B-C segment provides a parallel connection between the wellfield transmission system and the Lake Manatee WTP. The selected concept operates with the existing A-B and D-B segments.

Planning-level components include tie-ins, isolation valves, air-release and vacuum-valve assemblies, blowoffs, access facilities, major roadway and water crossings, WTP connection modifications, and other appurtenances required for reliable operation. Final design will confirm the relationship between the selected transmission improvements and proposed wellfield, treatment, electrical, instrumentation, and SCADA improvements included in the broader project.

Refer to **Figure 5-1** for the selected Alternative 3 proposed tie-ins and major constraints. Refer to **Appendix H** for more detailed information on the major constraints and existing transmission main record drawings.

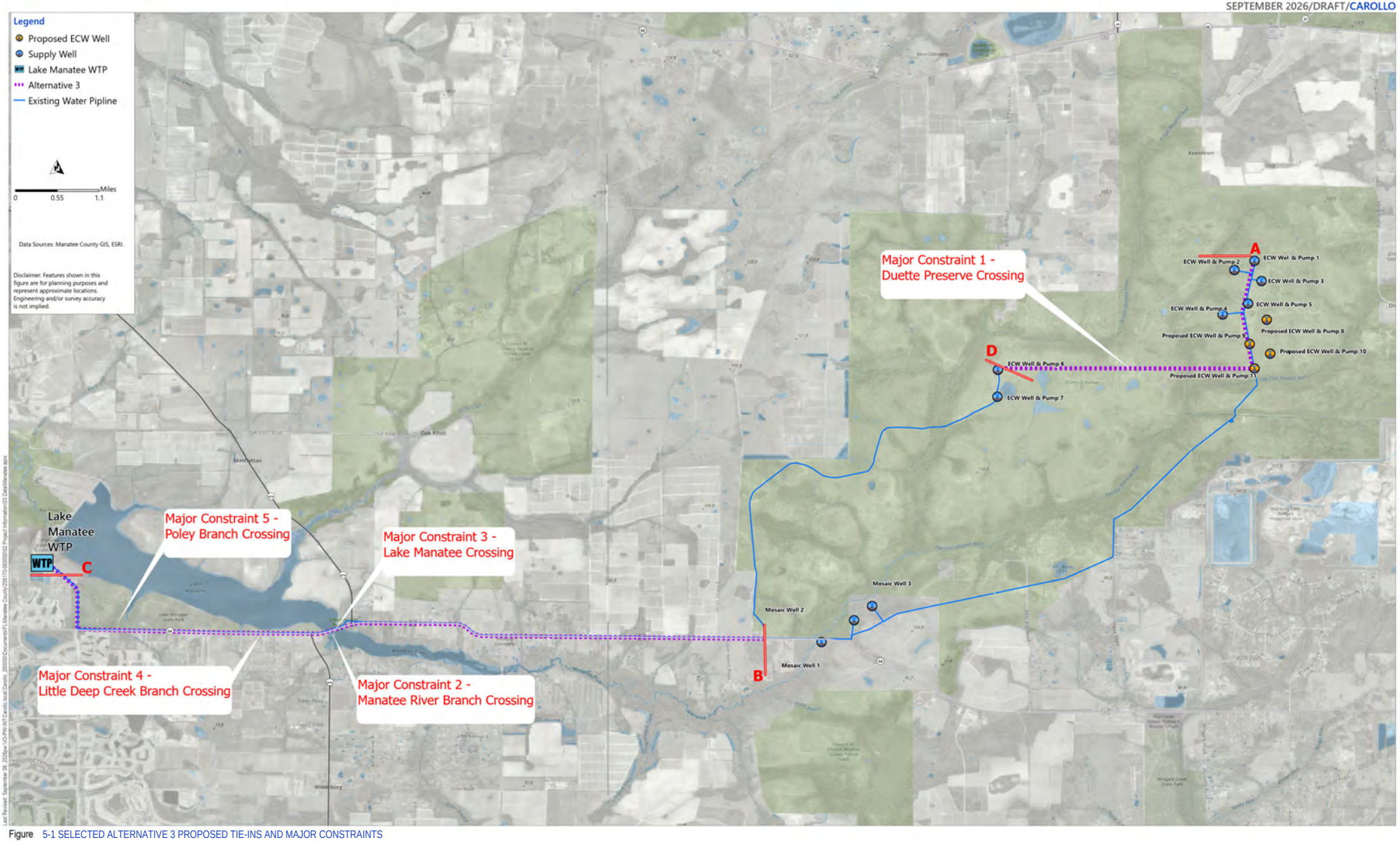


Figure 5-1 SELECTED ALTERNATIVE 3 PROPOSED TIE-INS AND MAJOR CONSTRAINTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

5.2 Project Implementation

Implementation will require coordinated survey, route refinement, geotechnical investigation, subsurface utility engineering, environmental field verification, property and easement coordination, permitting, hydraulic and transient modeling, design, procurement, construction, startup, and closeout. Coordination with FDOT and other agencies will be required where the project interfaces with planned roadway work, rights-of-way, regulated resources, and other infrastructure.

The project may be phased to align design, permitting, property acquisition, funding, procurement, and construction. Phasing should maintain County operations, reduce service disruption, and preserve the ability to advance critical wellfield and transmission improvements as information is refined.

5.2.1 Project Schedule

The preliminary funding implementation schedule presented in **Table 5-1** presents the current funding-program target dates. It identifies the milestones for Facilities Plan completion, funding coordination, field investigations, preliminary design, permitting, property acquisition, final design, procurement, construction, startup, and closeout. These dates are preliminary and have not yet been validated through a detailed critical-path method schedule. Achieving the dates depends on timely definition of the funded scope, selection of the project delivery approach, completion of field investigations, resolution of the WTP and degasifier interface, acquisition of necessary property rights, agency coordination, permit reviews, funding authorization, procurement, and construction.

The July 2027 date for design documents, permits, and site acquisition and the December 2031 project-completion date should therefore be treated as target milestones subject to schedule validation. Early schedule development shall identify controlling activities, responsible parties, dependencies, decision dates, float, and required escalation procedures.

Activities that should begin or be defined early because they may control the implementation schedule include confirmation of the SAHM-funded scope and project phasing; definition of the WTP and degasifier project boundary; confirmation of the delivery and procurement approach; survey, SUE, environmental field investigations, and geotechnical investigations; hydraulic criteria and required outage scenarios; property and easement acquisition; FDOT and conservation-land coordination; major-crossing feasibility; permitting coordination; final design; funding approval; procurement; construction; startup; and acceptance.

Table 5-1 Preliminary Funding Implementation Schedule

Schedule Categories	Month and Year
Submit the Planning or SSES documentation	Completed
Submit the design documents, obtain permits, and acquire sites (as necessary)	July 2027
Start activity (such as construction or non-structural best management practice)	January 2028
Complete activity (such as construction or non-structural best management practice)	December 2031

5.2.2 Project Cost and Funding Basis

The planning-level capital cost estimate for the Alternative 3 transmission improvements is $61,045,000. This estimate is based on approximately 24,950 linear feet of 36-inch transmission main along Segment A-D and approximately 48,700 linear feet of 42-inch transmission main along Segment B-C. The estimate includes the pipeline construction and the allowances, contingencies, engineering, and construction-management costs specifically identified in **Appendix I**.

The Alternative 3 estimate is a Class 5 planning-level estimate and is not the total cost of the broader Pipeline Resiliency Project. Unless expressly included in Appendix I, the estimate does not establish the final cost of additional production wells, well equipment, WTP hydraulic modifications, degasifier modifications or bypasses, electrical and SCADA improvements, property and easement acquisition, environmental mitigation, escalation to the midpoint of construction, or other improvements that may be added as the project scope is refined.

The current SAHM funding amount is $35,139,169, including $17,569,584 in principal forgiveness. Compared with the $61,045,000 planning-level estimate for the Alternative 3 transmission improvements, the presently identified funding is approximately $25.9 million less than the planning-level estimate. This comparison does not represent a final funding determination because project scope, eligible costs, phasing, and the total project estimate remain under development.

The County will coordinate with FDEP to confirm which project components and costs are eligible under the current SAHM funding package. Costs exceeding the available SAHM funding may require scope refinement, phased implementation, local funding, additional grant or loan funding, or a combination of funding sources. The Facilities Plan does not represent that funding eligibility or the source of the remaining funds has been finalized.

Cost estimates will be updated through final design as the scope, design criteria, crossing methods, property requirements, environmental mitigation, implementation schedule, and procurement approach are developed. The corresponding 20-year net present cost will be updated after the useful-life and residual-value assumptions are reconciled. These values are planning-level estimates for comparison, budgeting, and funding coordination. Funding eligibility and the relationship between the selected transmission alternative and broader SAHM-funded project components will be coordinated with FDEP and documented before issuance.

5.3 Future Design Confirmation

Items identified for confirmation are assigned to one of three resolution stages. Information needed to support the Facilities Plan conclusions, funding basis, public process, and regulatory submission will be resolved before final Facilities Plan issuance or expressly documented as a remaining planning limitation. County or agency determinations that occur after Facilities Plan submission, including funding eligibility, authorized WUP conditions, minimum acceptable outage service levels, property actions, and agency permit requirements, will be completed by the County with the applicable agency and consultant support before the related design, funding, or construction decision. Design details requiring survey, SUE, field investigation, geotechnical information, agency review, or progressive design development will be completed by the DCP/PDB team during project definition, permitting, or final design.

The project team will complete or expressly document the status of the hydrogeologic anomalies; reconcile alternative cost inclusions and exclusions; correct the net-present-value and residual-value basis; confirm the current funded scope and funding comparison; complete the public-meeting and appendix

references; and finish report-wide terminology, title, address, and clerical QA/QC. These items are not deferred to final design.

Following the Facilities Plan issuance, the County will lead decisions involving the funded scope, funding eligibility, minimum outage service level, emergency operating expectations, property acquisition, and project phasing, with FDEP, SWFWMD, FDOT, land managers, and other agencies providing determinations within their respective authorities. The DCP/PDB team will complete the final alignment, profiles, pipe materials and diameters, survey and SUE, geotechnical investigations, environmental fieldwork, permit applications, major-crossing methods, detailed hydraulic and transient analyses, WTP/degasifier interface, electrical and SCADA integration, construction sequencing, commissioning, and acceptance criteria.

Future design will confirm the alignment and preliminary diameters using updated survey, field investigations, utility and property data, environmental verification, agency coordination, hydraulic criteria, and operating data. The design process should confirm:

- Final A-D and B-C alignments, profiles, materials, and diameters.
- Updated demand, WUP, groundwater-level, well-availability, and WTP boundary conditions.
- Final isolation strategy, emergency operating procedures, maintenance access, and service restoration.
- Tie-ins, appurtenances, air management, blowoffs, and access facilities.
- Water and roadway crossing methods, geotechnical requirements, and construction staging.
- Property, easement, right-of-way, and agency-permit requirements.
- Environmental field surveys, avoidance and minimization, and mitigation.
- Updated cost estimates and schedule as design advances.

5.3.1 Hydraulic and Diameter Confirmation

The future hydraulic evaluation should refine model calibration and confirm performance under representative existing and future conditions. The analysis should evaluate normal operation, individual existing-main outages, future-well availability, operational sequencing, and recovery. Final diameters should be based on capacity, velocity, headloss, pressure, operational flexibility, energy, surge, and future-system requirements.

5.3.2 Surge and Air Management

A detailed transient and air-management evaluation should be completed during design development using the selected pipeline profile, final materials and diameters, confirmed pump conditions, WTP and degasifier boundary conditions, proposed valve locations, and operating sequences. The evaluation should address pump startup and shutdown, power failure, minimum and maximum pressures, column separation, check-valve behavior, air admission and release, individual-main outages, air accumulation at high points and HDD crossings, and the need for operating controls or dedicated surge mitigation.

Transient pressure, column separation, trapped air, and uncontrolled air release are key design risks for the proposed long, large-diameter transmission mains, major elevation changes, pump systems, and HDD crossings. Potential consequences include excessive positive or negative pressure, loss of pipeline

integrity, check-valve slam, pump or valve damage, air locking, reduced conveyance capacity, and difficulty restarting or recovering the system following an outage.

Design development shall include appropriate allowances for air-release and vacuum-valve assemblies, controlled valve operation, check-valve selection, surge-control facilities, instrumentation, emergency power and controls, and other mitigation identified by the transient analysis. Final locations and sizes will be established from the design-phase analysis and confirmed operating requirements.

5.4 Environmental and Regulatory Commitments

During design development, a permitting and approval matrix should be completed to identify the anticipated approval, reviewing agency, supporting information, critical-path dependency, resolution phase, responsible party, and next actions. Agency applicability and review durations should be confirmed through early coordination. In the early part of the design development, the DCP/PDB team should develop permit-supporting information and applications, and each reviewing agency will determine its final requirements and issue the applicable approval.

Environmental review for Alternative 3 should focus on field verification of wetlands and surface waters, protected-species surveys, cultural-resource coordination, conservation-land requirements, contaminated-site considerations, and applicable permits. Desktop evaluation indicates that Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential forested/shrub wetland conversion. Final impacts will depend on surveyed alignment, footprint, construction methods, and field-verified boundaries. The project should prioritize avoidance and minimization. Unavoidable impacts, mitigation, species-protection measures, cultural-resource requirements, and permit conditions will be established through design-phase surveys and agency coordination. Refer to **Figure 5-2** for the selected Alternative 3 environmental commitments.

Based on the preliminary alignment, environmental screening, and initial agency coordination, the anticipated permits are listed below. Additional permits may be required as the design progresses.

- Environmental Resource Permit (FDEP/SWFWMD)
- Section 404 / Section 10 Authorization (USACE)
- Clean Water Act Section 401 Water Quality Certification (FDEP/SWFWMD)
- Endangered Species Act Section 7 Consultation (USFWS)
- Gopher Tortoise Permit and Recipient Site / Conservation Easement Approval (FWC)
- Section 106 Coordination with the State Historic Preservation Officer (USACE/SHPO)
- Water Well Construction Permit (Manatee County Environmental Protection Division)
- Public Drinking Water System Construction Permit (FDEP)
- Generic Permit for the Discharge of Produced Groundwater from Dewatering (FDEP)
- Utility Permit (FDOT)
- NPDES Generic Permit for Stormwater Discharge from Construction Activities (FDEP)

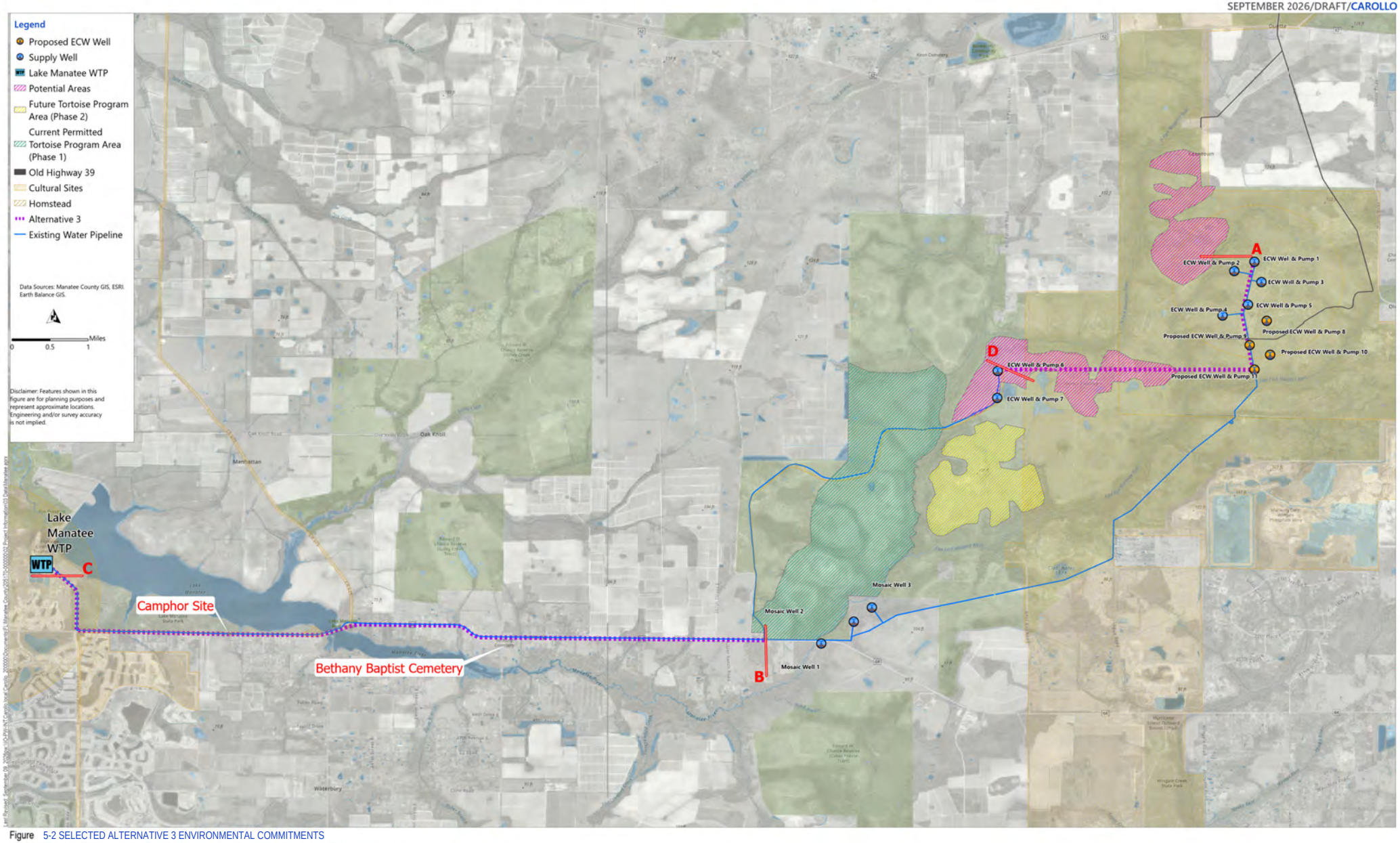


Figure 5-2 SELECTED ALTERNATIVE 3 ENVIRONMENTAL COMMITMENTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 6 COMPLIANCE

This section summarizes additional aspects of compliance requirements of the selected alternative, including public engagement and regulatory review. It is intended that the project will be executed in a timely manner while maintaining compliance with applicable federal, state and local requirements and the conditions of the SAHM award.

6.1 Public Engagement Meeting

Manatee County hosted a public engagement meeting on September 15, 2026, to present the proposed project and receive public comments. Refer to **Appendix J** for the public notice and **Appendix K** for the public notice meeting minutes.

The Facilities Plan and associated resolution will be presented to the Manatee County Board of County Commissioners for consideration and adoption. The approving resolution will be included in the final designated appendix following adoption.

6.2 Regulatory Agency Review

Implementation of the selected alternative will require review and approval by the applicable regulatory agencies. As part of the SAHM funding process, this Facility Plan will be submitted to FDEP for review to confirm the project's eligibility under the funding program requirements. Future phases of project development, such as design, may require additional agency coordination, permitting, and approvals associated with public water supply facilities, wells, construction, and any other applicable local, state and regulatory requirements.

APPENDIX A

SUPPLEMENTAL APPROPRIATION FOR HURRICANE HELENE AND MILTON (SAHM) REQUEST FOR INCLUSION SUPPORTING DOCUMENTATION DWSRF FUNDS

APPENDIX B

GIS DATA COLLECTION TABLE

APPENDIX C

NRCS SOIL REPORT FOR MANATEE COUNTY

APPENDIX D

ENVIRONMENTAL EVALUATION REPORT

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FEMA FLOOD MAPS

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PLANNING-LEVEL HYDROLOGICAL EVALUATION REPORT

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MAJOR CROSSINGS AND TRANSMISSION MAIN RECORD DRAWINGS

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ALTERNATIVES 1-3 PLANNING-LEVEL CAPITAL COST ESTIMATES

APPENDIX J

PUBLIC NOTICE

APPENDIX K

PUBLIC NOTICE MEETING MINUTES

APPENDIX L

USEFUL LIFE CERTIFICATION

APPENDIX M

COST AND EFFECTIVENESS CERTIFICATION

APPENDIX N

BUISINESS PLAN (NOT INCLUDED)

EXHIBIT 2 TO RESOLUTION NO. R-26-137

Affidavit of Publishing and Public Notice

(2 pages)

MANATEE COUNTY GOVERNMENT

STATE OF FLORIDA

COUNTY OF MANATEE

Before the undersigned authority personally appeared **Quantana Acevedo,** who on oath says that she is a **County Employee of Manatee County Government, Manatee County, Florida**; that the attached copy of advertisement, being a public notice in the matters of **Public Notice of Special Meeting** for **Proposed Manatee County Pipeline Resilience Facility Plan,** in Manatee County Florida, was published on the publicly accessible website of Manatee County Government, Manatee County, Florida, of www.mymanatee.org on **September 1, 2026**.

Affiant further says that the website complies with all legal requirements for publication in Chapter 50, Florida Statutes.

By: _____
Quantana Acevedo, Planning and Zoning Tech III

Sworn to and subscribed before me this 1st day of September, 2026, by Quantana Acevedo, who is personally known to me or who has produced (type of identification) as identification.

ABIGAIL RUTH-ELLEN BONDS
Notary Public-State of Florida
Commission # HH 815493
My Commission Expires
July 26, 2030

_____
(Signature of Notary Public)

Abigail Bonds
(Print Name of Notary Public)

Notary Public
(Title)

My Commission Expires: July 26, 2030

Commission Number: HH 815493

PUBLIC NOTICE

Notice is hereby given that the Board of County Commissioners of Manatee County, Florida, will hold a special meeting on September 15, 2026. The meeting is at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, for the purpose of considering the approval of the proposed Manatee County Pipeline Resiliency Facility Plan.

This hearing will include a discussion of the Facilities Plan and the financial impact on system users. The hearing is intended to afford the opportunity to individuals to be heard on the economic and social effects of the location, design, and environmental impact of the East County wellfield Pipeline Resiliency Project.

Responsible Entity: Florida Department of Environmental Protection
Applicant: Manatee County
Project Title(s): Pipeline Resiliency Project

Location of Proposed Work: 17915 Water Line Service Road, Bradenton, FL 34212
GPS Coordinates: 27° 29' 16.7892" N82° 21' 41.4252" W

A portion of the funding for this project is anticipated to come from the Florida Department of Environmental Protection (FDEP) Supplemental Appropriations for Hurricanes Helene and Milton and Hawai'i Wildfires (SAHM) program. Financial impacts on utility users will be presented at the hearing. All interested persons are invited to attend and be heard.

COMMENTS: This will serve as both the initial and final public notice regarding the project funded by the FDEP SAHM program. Interested persons may submit comments, questions, or request documents and data relevant to this specific project by writing to Chad Butzow at Manatee County Utilities Administration, 3647 Cortez Road West, Bradenton, FL 34210, or by emailing chad.butzow@mymanatee.org. Comments should be sent in writing or by email with the subject line "FDEP SHAM Pipeline Resiliency Project Facility Plan" at the above address within 14 days of the date of this notice.

SPECIAL REQUIREMENTS: If you require special aid or services as addressed in the American Disabilities Act, please contact the County Clerk's Office at (904) 652-8521, no less than five (5) days prior to the above stated hearing date.

THIS NOTICE MAY BE REMOVED FROM PUBLIC VIEW ON THE 14TH DAY FROM ORIGINAL DATE OF POSTING.

NOTICE WAS POSTED ON THE 1ST DAY OF SEPTEMBER 2026

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support



East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support

East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026



This report has been digitally signed and sealed by Anthony Ryan Horvat on the date adjacent to the seal.

Signature must be verified on any electronic copies.

301 NORTH CATTLEMEN ROAD, SUITE 302 ▪ SARASOTA, FLORIDA 34232 ▪ P 941-371-9832

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Abbreviations

AAD	Annual Average Demand
AOI	Area of Interest
ASR	Aquifer Storage and Recovery
bls	Below Land Surface
CWA	Clean Water Act
DWSRF	Drinking Water State Revolving Fund
ECW	East County Wellfield
EDU	Equivalent Dwelling Unit
EPA	United States Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FLUCCS	Florida Land Use, Cover and Forms Classification System
FMSF	Florida Master Site File
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GW	Groundwater
HDD	Horizontal Directional Drilling
IAS	Intermediate Aquifer System
IMC	IMC-Manatee Wellfield
LOS	Level of Service
LMWTP	Lake Manatee Water Treatment Plant
M&O	Operations and Maintenance
mgd	Million Gallons per Day
MM	Maximum Month
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PMD	Peak Monthly Demand

Abbreviations (Continuation)

ROW	Right-of-Way
SAHM	Supplemental Appropriation for Hurricanes Helene and Milton
SAS	Surficial Aquifer System
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SR	State Road
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
UFA	Upper Floridan Aquifer
UPS	Uninterruptible Power Supply
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WCP	Water Well Construction Permit
WTP	Water Treatment Plant
WUP	Water Use Permit

SECTION 1 INTRODUCTION

This planning-level package has been developed to meet the planning requirements for the Supplemental Appropriation for Hurricanes Helene and/or Milton (SAHM) disaster relief funds award program through the Florida Department of Environmental Protection (FDEP). The SAHM funding provided a total of $35,139,169, of which $17,569,584 is provided as principal forgiveness. The project is described in the Intended Use Plan as shown below in **Figure 1-1**.

Impacts

The City's primary water treatment plant sustained direct damage when the metal roof over the filter tanks was torn off, compromising plant function and safety. At the same time, operations crews were dispatched to repair multiple water main breaks with limited system support and aging backup power equipment.

XX. Manatee County - DW41015- $35,139,169

The proposed drinking water improvement projects by Manatee County are as follows:

1. Construction of two ground water production wells.
2. Installation of 20-inch raw water transmission main parallel to the current water transmission main.
3. Upgrading two degasifiers and internal hydraulic.
4. Installation of ground water treatment system electrical and ground water treatment system instrumentation/SCADA.

Impacts

During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage. Power outages were reported for Manatee County area during both Hurricanes Helene and Milton.

Figure 1-1 Manatee County SAHM Intended Use Plan Description

The Pipeline Resiliency Project is intended to improve the reliability and redundancy of Manatee County's raw water supply and transmission system between the East County Wellfield (ECW) and the Lake Manatee Water Treatment Plant (Lake Manatee WTP). This Facilities Plan documents the planning basis, evaluates feasible transmission alternatives, identifies a preferred planning alternative, and defines the technical, environmental, operational, and implementation considerations to be refined during future design.

1.1 Background and Hurricane Impacts

The American Relief Act was enacted by the US Environmental Protection Agency (EPA) on December 21, 2024, which provided disaster relief supplemental funding to a variety of State Revolving Fund (SRF) programs, with a focus on repairing and recovering from damages from Hurricanes Helene, Milton and

the Hawai'i wildfires. Manatee County (County), after submitting an RFI document for this program, was selected to receive funding. This report serves as the SAHM planning-level package and provides an analysis of the system needs, proposed alternative solutions, environmental review, as well as the selected alternative and implementation plans. Refer to **Appendix A** (Supplemental Appropriation for Hurricane Helene and Milton (SAHM) Request for Inclusion Supporting Documentation DWSRF Funds) for further explanations of how the project is deemed eligible for SAHM funding.

1.1.1 Location Description

Manatee County (County) owns and operates its potable water, wastewater, and reclaimed water system (System) that provides water, wastewater, and reclaimed water services to various retail and wholesale utility customers within County limits and surrounding municipalities (City of Palmetto, the Town of Longboat Key, and the three cities of Anna Maria Island: Holmes Beach, Bradenton Beach, and Anna Maria). The County also supplies water to meet some of the needs of Sarasota County and minimal amounts to the City of Bradenton. In the outlying areas of the County, households not served by any of these water systems rely upon private wells. The County's water service area is shown in **Figure 1-2.** The census tracks within the service area are as follows:

- 12081001913
- 12081001914
- 12081002010
- 12081002014
- 12081002020

The County owns and operates the Lake Manatee WTP, a facility with a combined nominal treatment capacity of 84 million gallons per day (mgd), to serve their potable water supply system. This facility uses both groundwater and surface water, which are treated in two separate treatment trains:

- A 54-mgd-capacity train for surface water from Lake Manatee.
- A 30-mgd-capacity train for groundwater from County wellfields.

The County is located within the Southwest Florida Water Management District (SWFWMD), one of five water management districts in Florida responsible for managing groundwater and surface water resources. The County's water use permit (WUP), issued by SWFWMD, allocates surface and groundwater quantities and environmental compliance monitoring requirements.

According to the 2024 Public Supply Annual Report, the County, on average, withdrew 50.1 mgd of water to meet their customer and wholesale water user demands. Of the 50.1 mgd, 34.0 mgd was supplied from surface water from Lake Manatee, and the remaining 16.1 mgd was supplied by groundwater.

Lake Manatee is the County's primary source of potable water. The County is permitted to withdraw an annual average of 34.9 mgd and a maximum monthly amount of 46.07 mgd from the reservoir. The County also has the capability to recover stored water through its aquifer storage and recovery system (ASR) at the WTP. The system consists of six ASR wells and is designed to provide up to 10 mgd for up to 180 days during emergency conditions or approximately 120 days for operational use.

The County is also permitted to withdraw an annual average of 19.086 mgd of groundwater from the East County Wellfield (ECW), a property comprising approximately 33 square miles in northern Manatee County. The ECW is comprised of approximately 24.8 miles of 30-inch and 36-inch transmission mains

that distribute raw water from seven production wells (ECW-1 through ECW-7) to Lake Manatee WTP. The wellfield is also supplemented by the three additional wells (Mosaic Wells1 through 3). Refer to **Figure 1-3** for existing relevant project infrastructure.

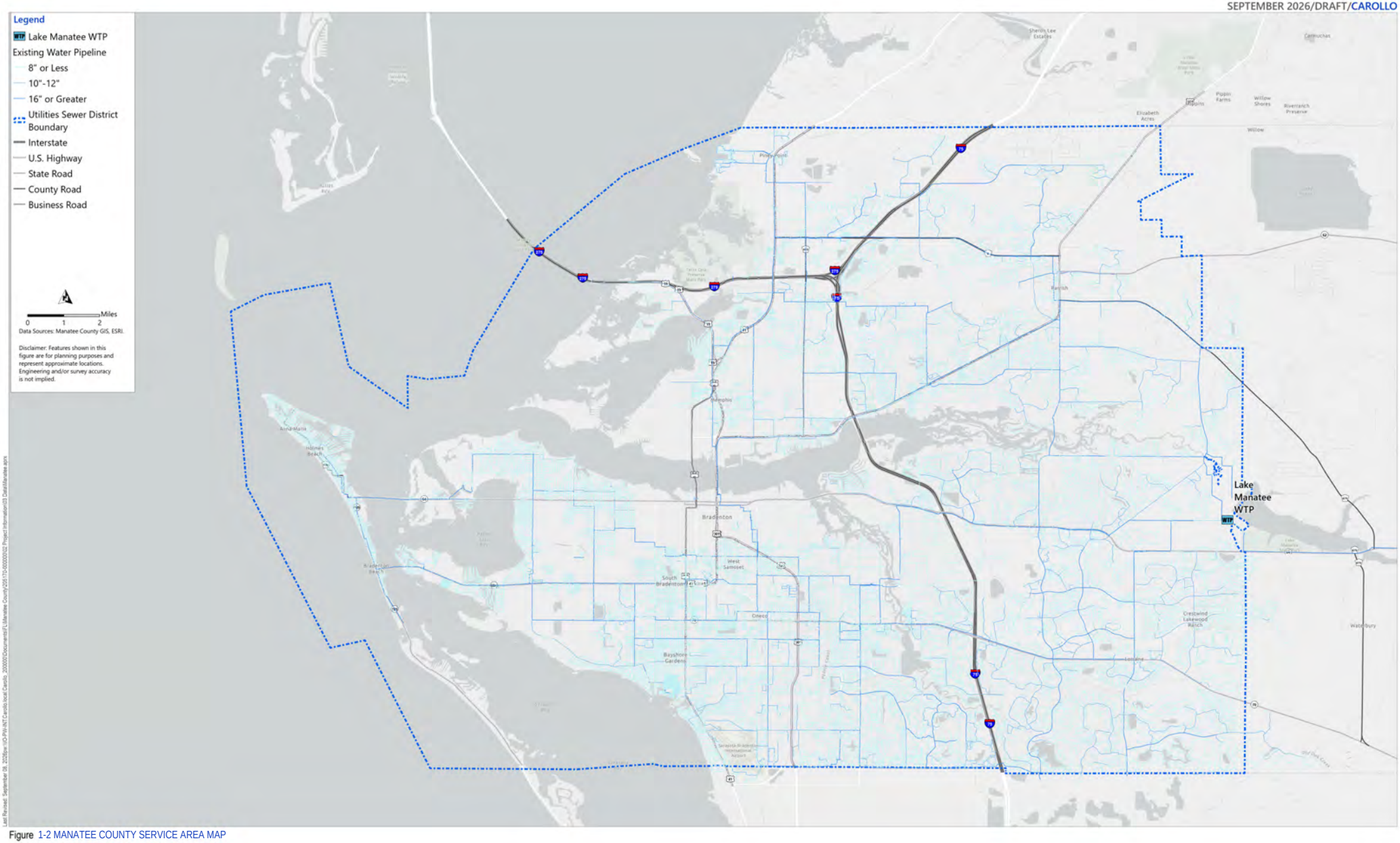


Figure 1-2 MANATEE COUNTY SERVICE AREA MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

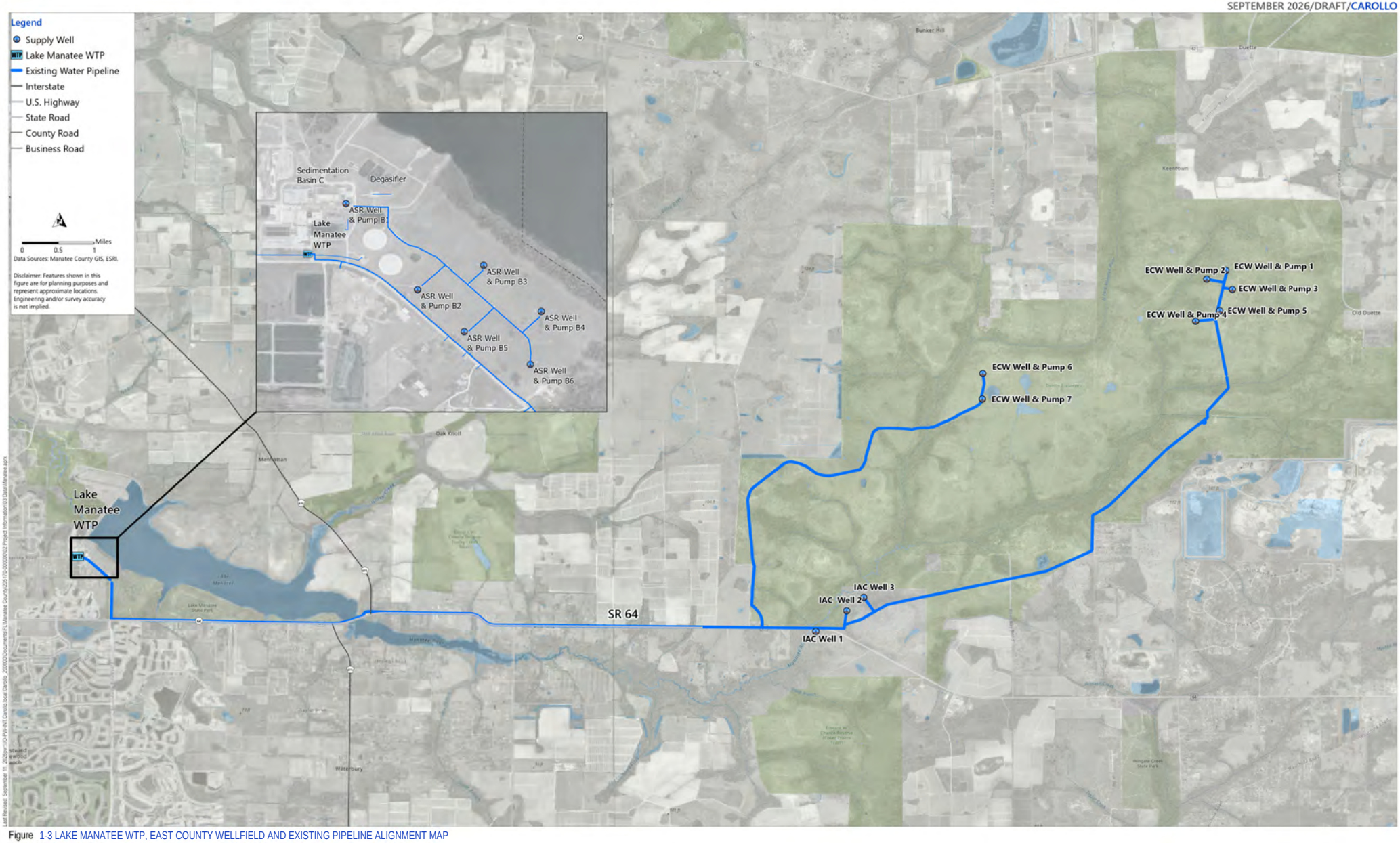


Figure 1-3 LAKE MANATEE WTP, EAST COUNTY WELLFIELD AND EXISTING PIPELINE ALIGNMENT MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

1.1.2 Hurricane Impacts

Hurricane Helene

Hurricane Helene made landfall on September 26th, 2024. Many stations experienced power outages during Hurricane Helene. There were multiple communication failures and instances where no data was collected throughout the Hurricane at three pump stations: Northwest Ground Storage Tank and Booster Pump Station (NWGS), Longboat Meter Station, and Cortez Booster Station. On the 26th, from 16:23 to 17:54, NWGS and Longboat Meter Station experienced power failure for their Uninterruptible Power Supplies (UPS). NWGS specifically experienced communications, power, and UPS failure from September 26th at 18:00 until November 2nd, 2024. At 18:20 on September 26th, the Longboat Meter Station also experienced communications, power, and UPS failure until November 2nd, 2024. Refer to Appendix A for pressure and flow data from the three pump stations between September 26th and 29th. At the Water Treatment Plant, the power was switched to generator power at 19:18 on the 26th and was restored to full power on the 28th.

The City of Bradenton's Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir experienced power outages due to Hurricane Helene and had to utilize generator backups during and after the storm. Manatee County stepped in to help the City of Bradenton augment their water supply since it compromised secondary drinking water parameter exceedances as a result of the storm. Specifically, 7 direct interconnects were made to support their water needs between the 27th and 28th and three water distribution locations were opened to support community water needs. The water treatment plant stabilized on the 29th, but chlorine levels were still high, so the distribution locations and direct interconnects continued till the 30th. Refer to Appendix A for the complete situation reports.

Hurricane Milton

Hurricane Milton made landfall shortly after Helene on October 9th, 2024. The Manatee County Water Treatment Plant power was switched to generator power at 18:15 on the 9th. The whole Manatee County distribution system felt the major effects of Hurricane Milton. Attached in Appendix A is a list of all the pipe breaks that were reported during and after the storm. There were 64 breaks of various pipe diameters and causes due to Milton's surge and debris between October 9th and October 12th. During Hurricane Milton, Bradenton's water plant was intentionally inactive, and water was on a bypass system with the goal to mitigate any impacts similarly to what the plant experienced in Helene. Yet, their plant still experienced water intrusion. Refer to Appendix A for the complete situation reports.

1.2 Project Scope and Objectives

Manatee County is applying for planning, design, and construction of their Pipeline Resiliency Project (Project). The Project will construct four groundwater (GW) production wells and place a 36-inch/42-inch raw water transmission main parallel to the current water transmission main. The well location and pipeline alignment will be determined in the planning and design phases but are anticipated to be near the current well field areas. The planning, design, and construction activities associated with the project are summarized (**Table 1-1**).

Table 1-1 Project Tasks Description

Task Name	Task Description
Planning	Project administration; Facilities Plan; route study; hydraulic assessment; environmental review; cost comparison; and supporting investigations.
Design	Survey, geotechnical investigation, subsurface utility engineering, environmental field verification, hydraulic and transient modeling, permitting, property coordination, and final design.
Construction	Construction of the selected transmission improvements and related wellfield, treatment, electrical, instrumentation, and SCADA components confirmed during design.

The selected Facilities Plan concept does not establish final design details. Final pipe diameters, materials, profiles, well equipment, treatment modifications, appurtenances, easements, and permitting requirements will be confirmed during design. The project objectives are to improve reliability and resiliency, provide adequate hydraulic performance, reduce environmental and permitting risk, support operational flexibility and emergency repair response, and preserve flexibility for future system needs.

1.2.1 Project Objectives

The main need and benefit of the Pipeline Resiliency Project is that it will create redundancy in Manatee County's raw water transmission system, providing increased resiliency in the event of a storm. During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage, further pointing to the need for system redundancy. This redundancy will beneficially support Manatee County's ability to provide water during major storm events and allow one pipe to remain operational if the other is damaged during a storm event, directing flows to the treatment plant and supporting future water security across the County.

To enhance system reliability and provide redundancy to the existing 30-inch and 36-inch transmission mains, three pipeline alternatives were developed and evaluated within the project corridor, as shown in **Figure 1-4**. Alternative 1 generally follows the existing transmission main corridor from the ECW to the Lake Manatee WTP. Alternative 2 originates at Wells and Pumps 1 through 5, extends to Wells and Pumps 6 and 7, and then follows the existing transmission main corridor to the Lake Manatee WTP. Alternative 3 consists of two segments: the first connects Wells and Pumps 1 through 5 to Wells and Pumps 6 and 7, while the second extends from the existing transmission main corridor along SR 64 to the Lake Manatee WTP.

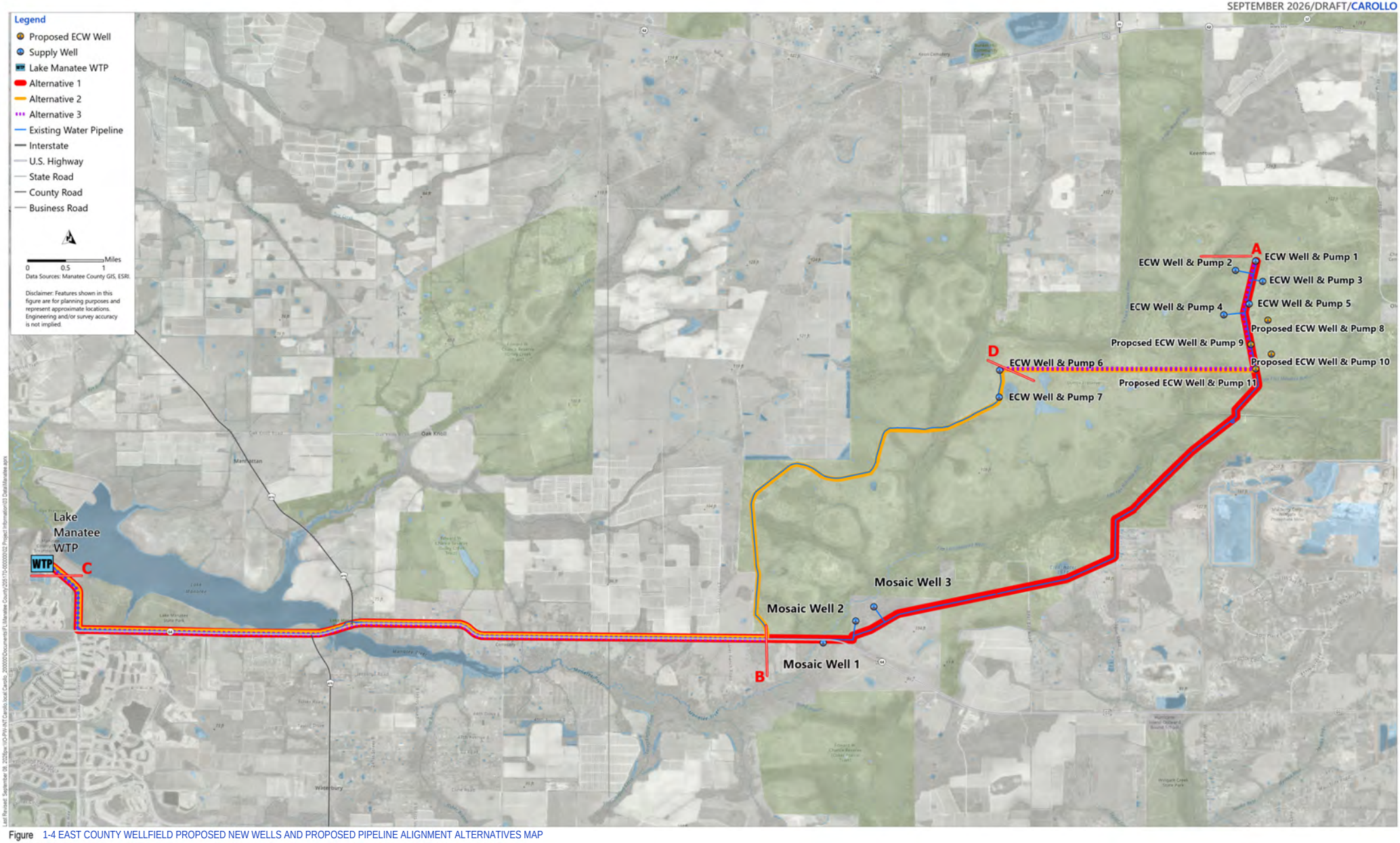


Figure 1-4 EAST COUNTY WELLFIELD PROPOSED NEW WELLS AND PROPOSED PIPELINE ALIGNMENT ALTERNATIVES MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 2 EXISTING AND FUTURE CONDITIONS

2.1 Description and Climate of Planning Area

The planning area is in eastern Manatee County, Florida, extending from the Lake Manatee WTP on SR 64 northeast toward the ECW and Duette Preserve. The predominantly rural corridor contains agricultural lands, natural habitats, conservation areas, road rights-of-way, utility corridors, wetlands, drainage features, and uplands within the Lake Manatee watershed. The draft planning-area population estimate for 2025 is approximately 468,200 residents, while the project corridor itself is less densely developed than western Manatee County.

The region has a humid subtropical climate with year-round warm temperatures and a pronounced summer wet season. The corridor generally ranges from approximately 30 to 90 feet above mean sea level. Topography transitions from relatively flat terrain near the WTP to gently rolling terrain toward Duette Preserve, with runoff conveyed toward Lake Manatee and associated tributaries.

2.1.1 Data Collection

A desktop evaluation was performed using public information, County utility records, GIS data, environmental datasets, right-of-way and parcel information, record drawings, roadway information, aerial imagery, and geotechnical information (**Table 2-1**). The data sources supported route development and comparison and will require field verification during detailed design. Refer to **Appendix B** for additional information regarding the GIS Data Collection.

Table 2-1 GIS Data Collection

Dataset	Representative Sources	Use in Planning
Aerial and parcels	Manatee County; statewide parcel data	Alignment development, access, and property screening
Environmental	USDA NRCS; USFWS; FWC; FDEP; FEMA; SWFWMD	Soils, wetlands, species, conservation lands, contamination, and floodplains
Transportation	FDOT and Manatee County	Roadway crossings, rights-of-way, traffic, and planned improvements
Utilities	Manatee County and available record drawings	Existing water, wastewater, reclaimed water, power, gas, fiber, drainage, and special crossings
Cultural resources	FDEP/FMSF and supporting environmental review	Known historical and cultural resources
Hydraulic and operational	County SCADA, pump curves, water-demand information	Model development, calibration, operating scenarios, and sizing

2.1.2 Soil Conditions and Hydrology

Soil Conditions

The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) mapping indicates that the project area is dominated by fine sands with varying hydrologic groups and drainage characteristics. Refer to **Figure 2-1**. Planning-level soil considerations include runoff potential, infiltration, poor drainage, dewatering, excavation, backfill, restoration, wetland indicators, and suitability for gopher tortoise burrowing habitat. Refer to **Table 2-2**. Soil mapping does not replace geotechnical investigation, wetland delineation, or wildlife surveys.

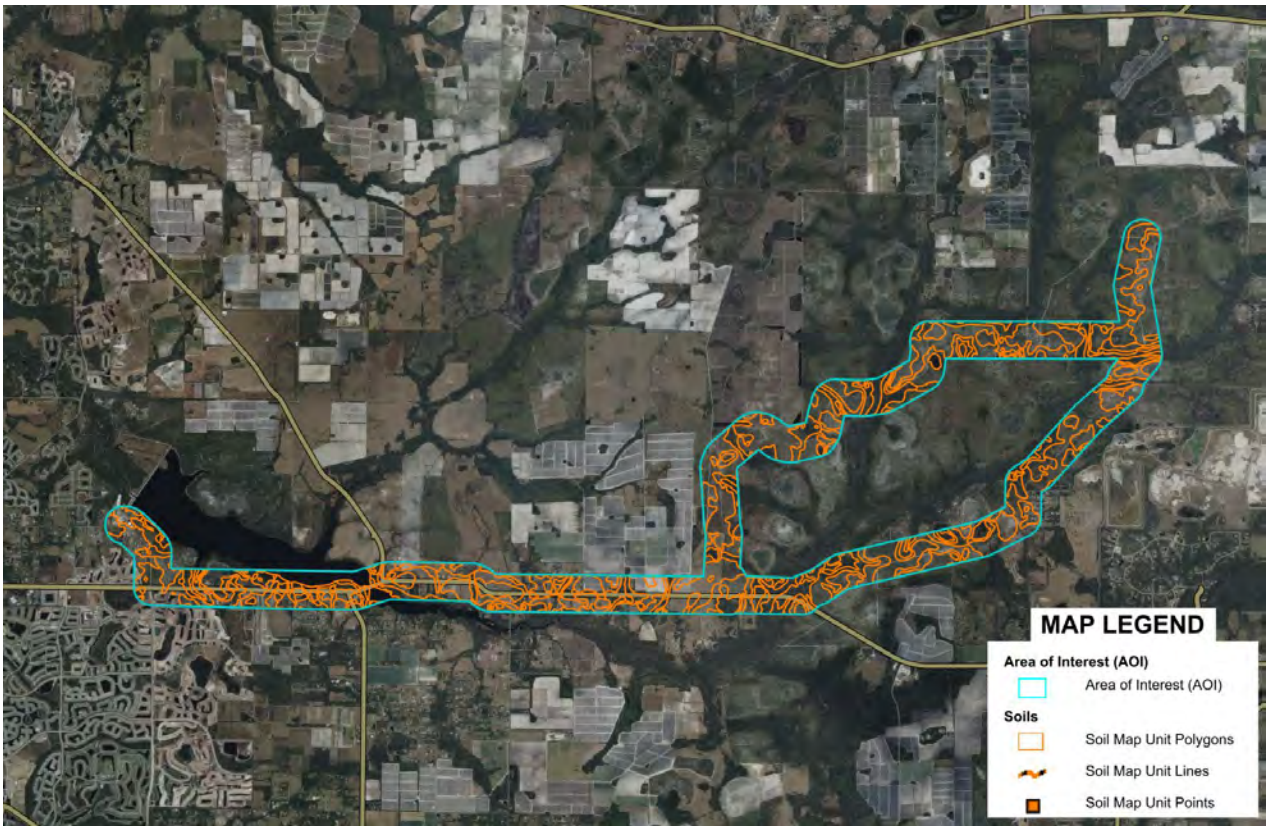


Figure 2-1 Pipeline Resiliency Project – Soil Map

Table 2-2 Predominant Soil Types and Hydrology within the Project Boundary

Soil Type	Approx. Composition	Hydrologic Group	Drainage Class
Waveland fine sand	29.34%	C/D	Poorly drained
Pomello fine sand	20.3%	A	Somewhat poorly drained
Duette fine sand	6.1%	A	Moderately well drained
Myakka-Myakka wet fine sands	5.7%	A/D	Poorly drained
Delray-Pomona complex	5.7%	A/D	Very poorly to poorly drained
St. Johns fine sand	5.7%	B/D	Poorly drained

Note: The project boundary also includes a significant portion of water (Lake Manatee) accounting for 2.3% of the Area of Interest (AOI). The table above lists the six most common soil types, excluding bodies of water.

For additional information regarding soil conditions, please refer to **Appendix C**.

Soil Hydric Rating and Gopher Tortoise Suitability

NRCS soil survey information was reviewed to characterize general soil conditions within the three alternatives. The mapped soil units were evaluated based on planning-level indication of areas that may be associated with wetland conditions and gopher tortoise gopher burrowing habitat. Refer to **Appendix D** for environmental analysis.

Alternatives 1 and 2 contain similar acreages of soils mapped as highly suited for gopher tortoise, while Alternative 3 contains a smaller total acreage but a higher proportional share of highly suited habitat for gopher tortoise because its overall corridor area is smaller. Alternative 3 has the lowest percentage of soils that would be expected to support wetland habitats.

2.1.3 Flood Plains

FEMA mapping identifies mapped flood-hazard areas within the project planning boundary. Floodplain exposure may affect design elevation, cover, erosion protection, access, permitting, construction methods, and emergency response. Final floodplain and floodway limits will be confirmed during detailed design using current mapping and survey data.

Additional maps of the parcels and floor areas can be found in **Appendix E**.

2.1.4 Environmentally Sensitive Areas or Features

Wetlands and Surface Waters

Project-specific desktop mapping was used to characterize potential freshwater emergent wetlands, freshwater forested/shrub wetlands, and other surface waters within the three alternative corridors. Refer to **Table 2-3**. The mapping provides a planning-level comparison and does not constitute a jurisdictional determination or field delineation.

Table 2-3 Desktop-Mapped Wetlands and Surface Waters within the Alternative Corridors

Resource Type	Impact Assumption	Alternative 1 (ac)	Alternative 2 (ac)	Alternative 3 (ac)
Freshwater emergent	Temporary	1.09	8.86	2.71
Freshwater forested/shrub	Permanent conversion	6.82	13.15	0.64
Other surface waters	Temporary	2.26	2.22	1.91
Total mapped area		10.17	24.23	5.26

Notes: Anticipated impact type assumes open-cut pipeline installation within the project area. Actual impacts will depend on the final pipeline alignment, construction footprint, construction methods, and field-verified wetland boundaries.

Alternative 2 has the greatest mapped wetland and surface-water impact and the greatest potential permanent forested/shrub wetland conversion. Alternative 1 has an intermediate mapped impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent conversion. Actual impacts will depend on final alignment, construction footprint, crossing methods, and field-verified boundaries.

Refer to Appendix D (Section 2.1.4) for environmental analysis.

Protected Wildlife Species

Desktop information was reviewed for federal and state protected species with potential to occur in or near the planning corridors. Potential considerations include Florida scrub-jay, gopher tortoise, eastern indigo snake, crested caracara, listed wading birds, Florida pine snake, Florida sandhill crane, southeastern American kestrel, tricolored bat, and other species identified in the supporting environmental material. Species inclusion in the desktop review does not establish presence. Final requirements will depend on field surveys and agency coordination.

Agricultural Lands

All alternatives intersect areas mapped as Farmland of Unique Importance, but much of the corridor is within existing rights-of-way or conservation land and is not actively farmed. No substantial difference among alternatives was identified from the available farmland mapping. Potential effects on active agricultural operations will depend on the final construction footprint and existing land use.

Cultural and Historic Resources

The Florida Master Site File (FMSF) review identified the Camphor Site Homestead, Bethany Baptist Cemetery, and Old Highway 39/Carlton Road within the planning area. The Camphor Site Homestead intersects all three alternatives within the SR 64 right-of-way. Old Highway 39/Carlton Road intersects Alternatives 1 and 3 within Duette Preserve. Bethany Baptist Cemetery is adjacent to the alternatives. The desktop review is not a Cultural Resource Assessment Survey and does not determine National Register eligibility or adverse effect. **Figure 2-2** below depicts the locations of the recorded resources relative to the three alternatives.

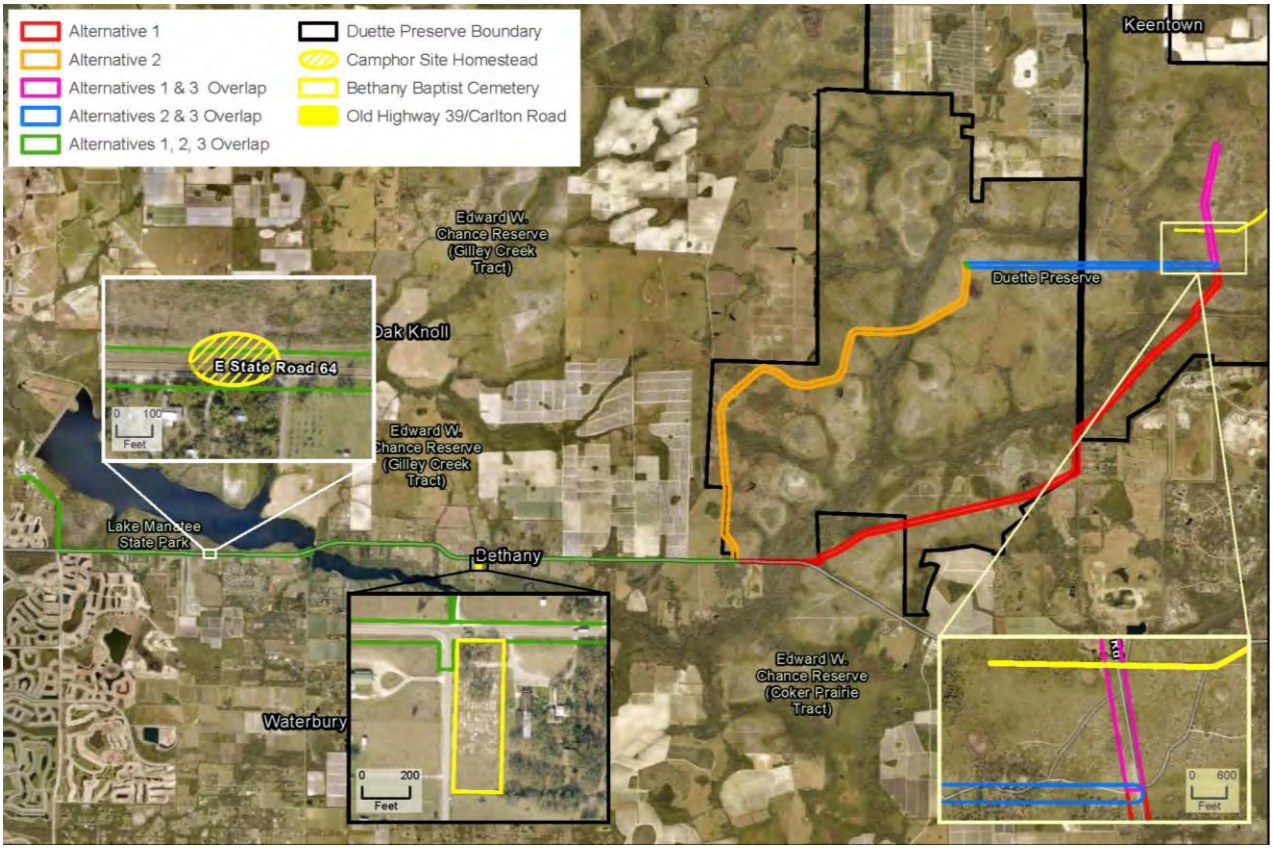


Figure 2-2 FMSF Mapped Resources

Contaminated Sites and Hazardous Materials

The desktop database review identified historical contamination records near the planning area, including a historical petroleum record at the WTP and a completed-cleanup oil-spill record near the Alternative 3 corridor. The available information did not identify a substantial differentiating constraint among the alternatives. Final design should update the database review and address unexpected conditions through construction specifications.

Environmental and Permitting Summary

The environmental evaluation is based primarily on desktop mapping and available records. It does not constitute a wetland jurisdictional determination, protected-species survey, cultural-resource assessment survey, geotechnical investigation, or final permitting determination. Final impacts, avoidance and minimization measures, mitigation requirements, construction feasibility, and permit conditions remain subject to field delineation, environmental surveys, agency coordination, final alignment, construction methods, and final design.

The final alignment will require additional evaluation near conservation lands, Duette Preserve, existing and proposed gopher-tortoise recipient areas, wetlands, surface waters, and cultural resources. The proposed connection between ECW Wells 1 through 5 and ECW Wells 6 and 7 may interact with known or proposed gopher-tortoise habitat or recipient areas. These conditions could affect alignment selection, access, construction sequence, long-term maintenance, permitting, and mitigation.

Alternative 3 has the lowest desktop-mapped wetland and surface-water acreage among the evaluated alternatives, but this comparison does not eliminate environmental or permitting risk. Actual impacts and requirements will be determined during design-phase field investigations and agency review.

2.1.5 Planning Basis and Demand Conditions

The planning basis for the Pipeline Resiliency Project was developed using the County's historical water use records, current and projected service area growth, and the water demand projections prepared as part of WA27 - Water Use Permit Modification. These demand conditions provide the basis for establishing the hydraulic and conveyance requirements for the proposed groundwater production wells and redundant raw water transmission main from the ECW and IMC-Manatee Wellfield to the Lake Manatee WTP.

The purpose of this project is not to expand finished water treatment capacity, but to improve the resiliency and redundancy of the County's raw water supply and transmission system. The proposed improvements will allow the County to maintain raw water conveyance to the Lake Manatee WTP during storm-related events, line breaks, maintenance activities, or other conditions where one segment of the existing transmission system may be unavailable.

Population projections

Future demand projections were developed based on County-provided growth forecasts for the Lake Manatee WTP service area. The County provided equivalent dwelling unit (EDU) projections for existing neighborhoods and future development areas through 2050. These EDUs were converted to population using 2.4 persons per household (pph), consistent with recent Census information for Manatee County and slightly more conservative than the 2.33 pph factor used in the SWFWMD projection methodology.

For planning purposes, the County's adopted potable water level of service (LOS) standard is currently 110 gallons per capita per day (gpcd); however, the County is in the process of revising this value to 100 gpcd. The 100 gpcd LOS value was used for the demand projections summarized in this section. In addition to the retail service area demand, 5.0 mgd was included to account for the County's existing wholesale contractual obligations, excluding Sarasota County. This includes 0.5 mgd for the City of Bradenton, 2.0 mgd for the City of Palmetto, and 2.5 mgd for the Town of Longboat Key.

Based on this approach, the projected service area population increases from approximately 534,200 in 2030 to approximately 649,895 in 2045. The corresponding annual average finished water demand increases from approximately 58.42 mgd in 2030 to approximately 70.00 mgd in 2045. **Table 2-4** summarizes the population-based finished water demand projection used for planning.

Table 2-4 Level of Service Finished Water Demand Projections

Year	Service Area Population	Annual Average Finished Water Demand (mgd)
2030	534,200	58.42
2035(1)	576,450	62.65
2040	618,700	66.87
2045(1)	649,895	70.00

(1) Values for 2035 and 2045 were interpolated.

Historical Water Usage

Historical water use was reviewed for the 2016 through 2025 period to characterize recent growth trends, seasonal demand conditions, and peaking factors. The County withdraws raw water from Lake Manatee, the ECW, and the IMC-Manatee Wellfield for treatment at the Lake Manatee WTP. Raw water withdrawals increased from approximately 39.8 mgd in 2016 to approximately 52.3 mgd in 2025 on an annual average basis. Over the same 10-year period, the average annual raw water withdrawal was approximately 45.8 mgd. Between 2019 and 2023, raw water withdrawals increased by an average of approximately 4.8 percent per year. **Table 2-5** summarizes raw water withdrawals from 2016 through 2025.

Table 2-4 Raw Water Withdrawals

Year	Average Daily		Maximum Month (mgd)	Maximum Day (mgd)
	Raw Withdrawal (mgd) (1)	Growth Change		
2016	39.8	--	43.7	51.0
2017	40.2	0.9%	47.5	54.1
2018	40.3	0.3%	44.7	54.2
2019	42.2	4.6%	45.9	52.9
2020	45.2	7.2%	49.5	56.1
2021	47.4	4.7%	53.7	55.1
2022	47.7	0.7%	51.8	57.5
2023	50.9	6.6%	53.6	61.5
2024	51.6	1.4%	58.6	62.7
2025	52.3	1.3%	56.2	60.7
Average	**45.8**	**3.1%**	**50.5**	**56.6**

Note: (1) Raw withdrawals include Lake Manatee, East County Wellfield, and IMC Manatee Wellfield.

Finished water demand followed a similar increasing trend. Annual average finished water demand increased from approximately 39.49 mgd in 2016 to approximately 49.50 mgd in 2025, with an average annual growth rate of approximately 3.8 percent over the 10-year period. Maximum month finished water demand increased from approximately 43.13 mgd in 2016 to approximately 53.30 mgd in 2025, while maximum day finished water demand increased from approximately 50.95 mgd in 2016 to approximately 59.56 mgd in 2025. **Table 2-5** presents the annual average, maximum month, and maximum day finished water demands for the past 10 years.

Table 2-5 10-Year Annual Average, Maximum Month, and Maximum Day Demands

Year	Annual Average Demand (mgd)	Annual Average Annual Growth	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2016	39.49	-	43.13	50.95
2017	39.93	1.1%	47.44	51.96
2018	39.55	-1.0%	43.09	49.14
2019	41.55	5.1%	44.70	57.20
2020	43.93	5.7%	48.16	53.00
2021	44.75	1.9%	51.83	56.18
2022	45.31	1.3%	48.93	54.83
2023	47.70	5.3%	52.45	58.34
2024	48.89	2.5%	55.55	61.42
2025	49.50	1.2%	53.30	59.56

The County provides finished water to retail customers in unincorporated Manatee County and wholesale customers including the City of Bradenton, City of Palmetto, Town of Longboat Key, and Sarasota County. Historical growth in finished water demand has been primarily driven by the unincorporated retail service area, while wholesale demands have remained relatively stable or declined due to contractual limitations and the phased reduction in supply to Sarasota County.

Historical peaking factors were also reviewed to support planning and facility sizing. Based on the historical analysis, the County's existing planning peaking factors remain appropriate: 1.2 for maximum month demand and 1.3 for maximum day demand. These factors were applied to the selected annual average demand projections to estimate future maximum month and maximum day conditions.

20-year water demand projections

Multiple methods were evaluated for projecting future finished water demand through 2045, including linear regression of historical demand, a County population and LOS-based projection, and the SWFWMD projection methodology. The selected planning projection is based on the County population and LOS approach because it reflects the County's projected service area growth and maintains consistency with the County's potable water LOS requirement.

The selected annual average finished water demand projection for 2045 is 70 mgd. Applying the County's planning peaking factors results in a 2045 maximum month demand of approximately 84 mgd and a maximum day demand of approximately 91 mgd. These values represent the 20-year demand condition for planning the proposed improvements. **Table2-6** summarizes the selected 20-year demand projection.

Table 2-6 Selected 20-year Finished Water Demand Projection

Year	Annual Average Demand (mgd)	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2030	58.42	70.10	75.95
2035	62.65	75.18	81.45
2040	66.87	80.24	86.93
2045	70.00	84.00	91.00

The 2045 demand condition is used as the long-term planning basis for evaluating raw-water supply and conveyance needs. The Lake Manatee WTP has a combined nominal raw-water treatment capacity of approximately 91 mgd across its surface-water and groundwater treatment trains. Actual production is constrained by source availability, authorized WUP withdrawal quantities, treatment-train limitations, operating conditions, and finished-water demand. The County is currently pursuing a WUP renewal or modification that may reflect updated demand projections, well-credit transfers, and retirement of third-party credits. Because the modification has not been finalized, proposed withdrawal quantities are planning assumptions and should not be represented as authorized quantities. Final design and phasing will be based on the WUP conditions in effect at the time of implementation.

2.1.6 Land Use and Development

Land Use and Habitat

SWFWMD FLUCCS mapping was used to characterize land use and habitat composition. Alternative 1 has a total mapped corridor area of approximately 411.77 acres, Alternative 2 approximately 430.10 acres, and Alternative 3 approximately 268.03 acres. Alternative 2 contains substantially more mapped shrub and brushland, while Alternative 1 contains more cropland/pastureland and tree plantations. Alternative 3 has the smallest overall mapped corridor area.

Refer to Appendix D for the detailed environmental analysis.

Future Capital Improvement Projects and Corridor Coordination

FDOT is developing improvements along SR 64 between Lorraine Road and Verna Bethany Road. The proposed pipeline's proximity to this corridor creates design and schedule coordination requirements involving utility placement, horizontal and vertical clearance, subsurface crossings, traffic control, permitting, and sequencing to avoid conflicts or unnecessary relocation. Coordination with FDOT should continue through design and construction.

The proposed roadway alignment corridor and study segments identified under the FDOT SR 64 Feasibility Study are conceptually illustrated in **Figure 2-3**.

Refer to **Appendix F** for Record Drawings pertaining to State Route 64.

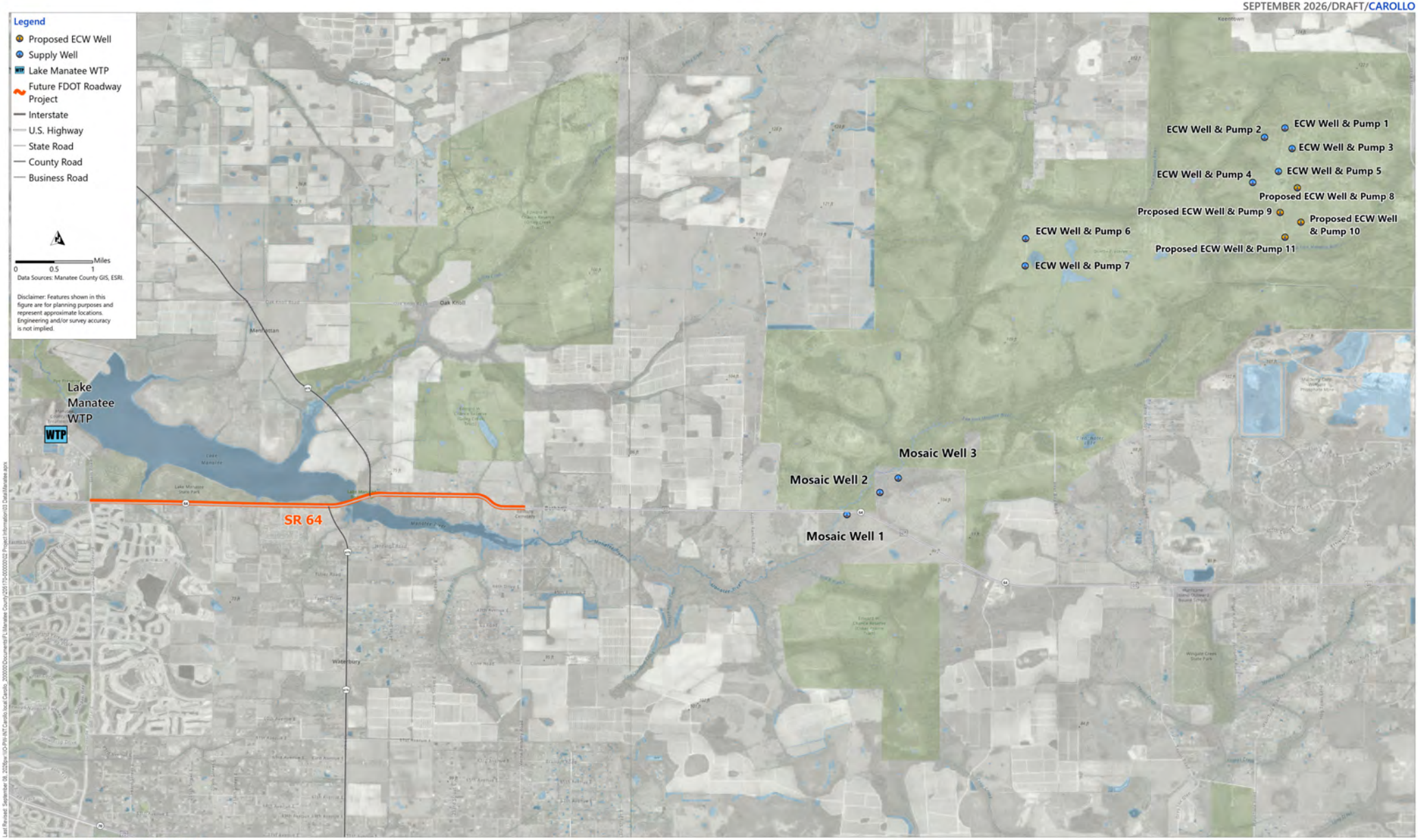


Figure 2-3 FDOT SR 64 FEASIBILITY STUDY
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

2.1.7 Hydrogeologic Setting and Description

The East County Wellfield (ECW) is located in eastern Manatee County, Florida, and is operated by Manatee County Utilities under WUP No. 13343. The wellfield consists of seven production wells (ECW-1 through ECW-7, SWFWMD District IDs 128 through 134) that withdraw groundwater from the Upper Floridan Aquifer (UFA). Five monitoring wells (District IDs 150 through 154) are used to monitor groundwater levels and water quality across the surficial aquifer system (SAS), the intermediate aquifer system (IAS), and the UFA. Site locations are shown in Appendix G – WSP Hydrogeological Evaluation.

The regional hydrostratigraphy beneath the ECW site consists of three principal hydrogeologic units:

- **Surficial Aquifer System (SAS):** An unconfined aquifer composed of unconsolidated sands and shell deposits, extending from land surface to approximately 25 feet below land surface (bls).
- **Intermediate Aquifer System (IAS):** A series of interbedded carbonate and clastic units that function as a semi-confining unit between the SAS and the UFA. Monitored by well ECW-IAMW-52 (monitored interval 145 to 250 ft bls).
- **Upper Floridan Aquifer (UFA):** The principal production aquifer, composed of Tertiary-age limestone and dolomite. Production wells are cased to approximately 500 to 580 feet bls with open-hole completions extending to approximately 1,200 to 1,250 feet bls.

2.1.8 Hydrogeologic Evaluation

The planning-level hydrogeologic evaluation reviewed pumpage, groundwater levels, rainfall, and water-quality information. The wellfield has been operated seasonally using well rotation. Available water-level records generally show seasonal response and recovery, with several identified anomalies requiring confirmation. Available TDS, chloride, and sulfate data remain below the cited secondary standards, and the evaluated record does not indicate progressive saltwater intrusion or water-quality degradation.

The evaluation identified anomalies within both the pumpage and groundwater level records. Two production wells each reported a monthly withdrawal substantially exceeding their typical operating range, resulting in corresponding spikes in total wellfield production. Additionally, two monitoring wells exhibited abrupt water level changes that are inconsistent with prevailing rainfall conditions and with measurements recorded at nearby wells. These anomalies are most likely attributable to data entry, reporting, or instrumentation errors. Accordingly, the evaluation recommends that the data be verified with Manatee County Utilities and the SWFWMD prior to final design.

Resolution of the identified data anomalies is not expected to affect the comparative evaluation of the transmission main alignment alternatives, provided that the verified data remain consistent with the underlying assumptions for available well yield, aquifer operating levels, and permitted withdrawal quantities.

2.2 Water Supply and Treatment

The County supplies the Lake Manatee WTP from Lake Manatee, the East County Wellfield, and the IMC-Manatee Wellfield. The Pipeline Resiliency Project focuses on raw-water reliability rather than expansion of finished-water treatment capacity. Planning-level modeling evaluates transmission configurations capable of supporting 26.2 mgd AAD and 31.5 mgd maximum-month wellfield production under normal and outage conditions.

The broader Pipeline Resiliency Project may include up to four additional groundwater production wells, WTP hydraulic modifications, degasifier or bypass improvements, electrical improvements, and instrumentation and SCADA improvements. Final inclusion and sequencing of these components will be evaluated and refined in subsequent design phase.

Figures 2-4 and **2-5** depict the future new additional wells and ASR bypass around degasifier, respectively.

2.3 Operations and Maintenance Considerations

Operations and maintenance considerations were evaluated from the perspective of operational flexibility and emergency repair response. Key factors include the ability to isolate pipeline segments, maintain raw-water conveyance when an existing or proposed segment is unavailable, access the pipeline and appurtenances for inspection or repair, restore service following an outage, and operate under varying well availability and demand conditions.

Alternatives that provide independent conveyance paths around existing segments offer greater operational flexibility during maintenance and emergencies. An alternative that remains dependent on an existing segment may require additional operational planning, temporary supply measures, expedited repair, or future improvements if that segment is unavailable. Final isolation-valve locations, maintenance access points, air-management facilities, blowoffs, tie-ins, and operating procedures will be established during design.

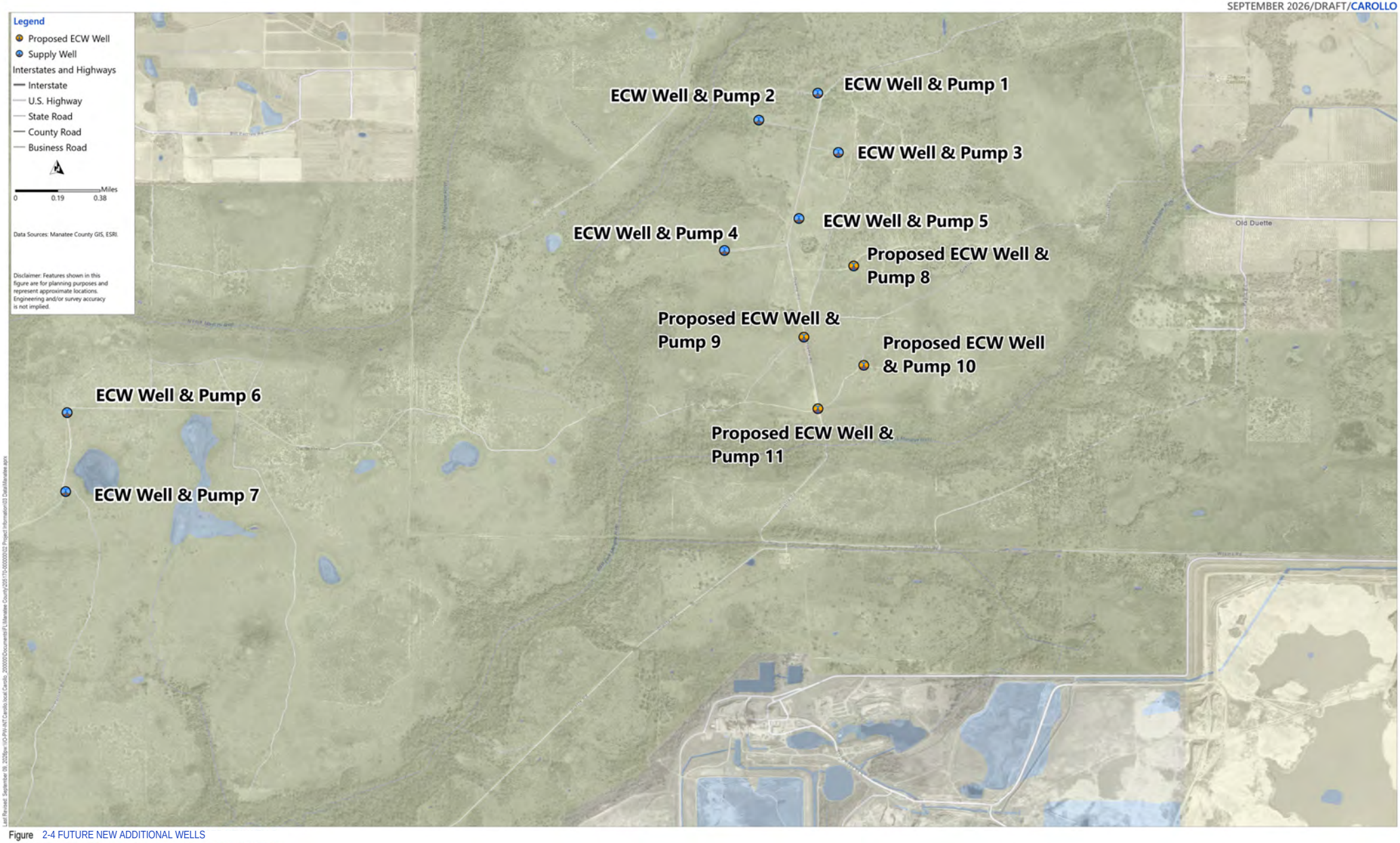


Figure 2-4 FUTURE NEW ADDITIONAL WELLS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

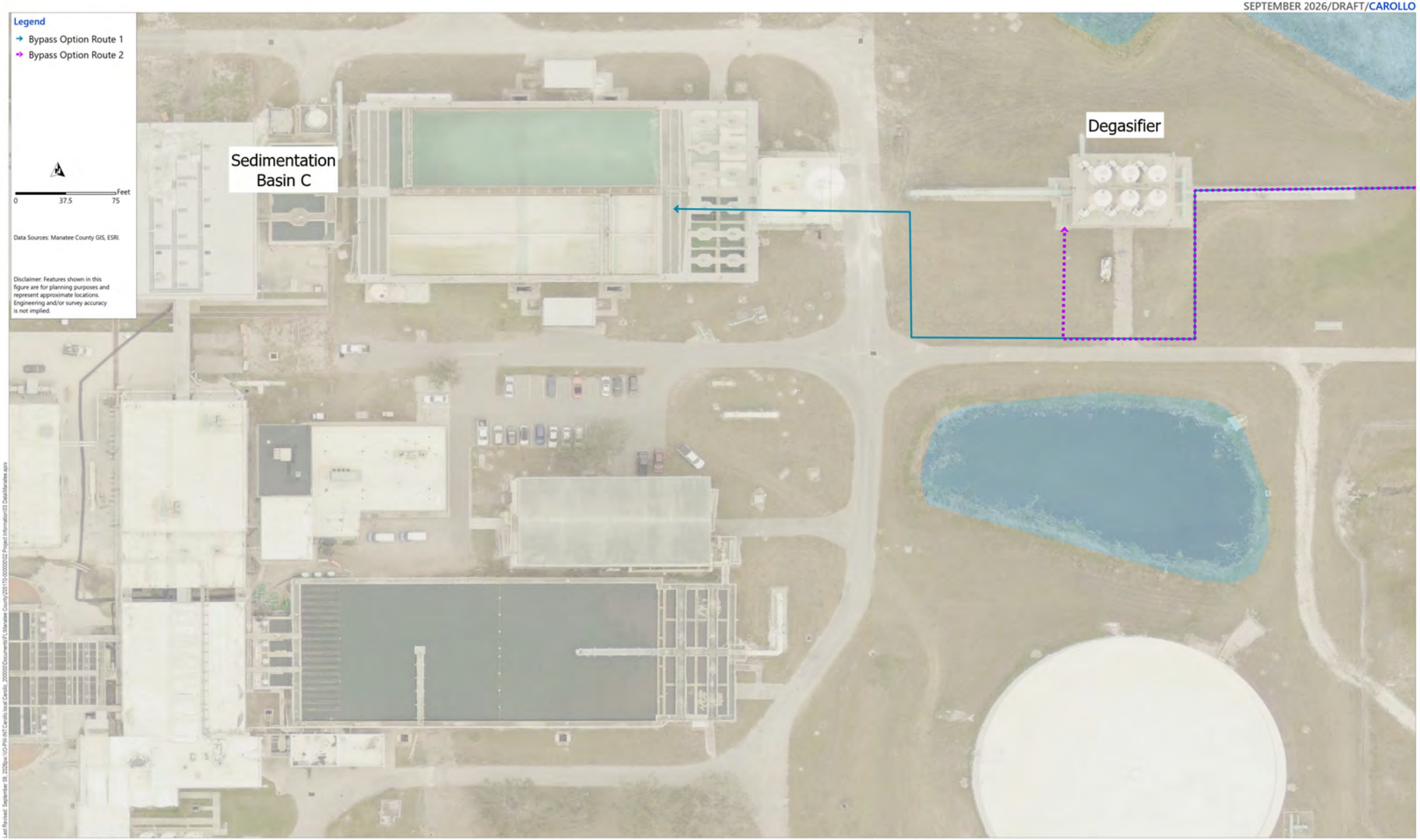


Figure 2-5 PROPOSED ASR BYPASS AROUND DEGASIFIER
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 3 DEVELOPMENT OF ALTERNATIVE ALIGNMENTS

3.1 FDEP Alternatives Analysis Requirements

The alternatives analysis evaluates feasible project concepts based on effectiveness, environmental and permitting considerations, hydraulic performance, constructability, operations and maintenance, future flexibility, and planning-level cost. Section 3 develops the alternatives and documents the primary technical findings. Section 4 synthesizes those findings through a weighted non-cost evaluation, a separate Class 5 cost comparison, and selection of the preferred planning alternative.

3.2 Overview of Alternative Alignments

3.2.1 Basis for Development

The need for the Pipeline Resiliency Project was identified based on the County's objective to enhance the reliability of its raw water supply and transmission infrastructure, particularly under extreme weather conditions such as hurricane events. The evaluation focuses on the development of redundancy within the existing system to maintain continuous conveyance of raw water during storm events or conditions that may compromise a portion of the network.

The purpose of this project is not to expand overall system capacity, but to improve resiliency by providing redundant transmission pathways between critical facilities. The proposed improvements will allow Manatee County to sustain raw water delivery during major storm events and maintain operation of at least one transmission main in the event the parallel system is damaged or taken out of service. The alternatives analysis presented in Sections 3 and 4 is limited to the identification and evaluation of three feasible transmission-main alignment alternatives. The broader Pipeline Resiliency Project may include associated wellfield, WTP, degasifier, electrical, instrumentation, and SCADA improvements, as described elsewhere in this Facilities Plan.

The alternatives were developed using the data summarized in Section 2. Route development considered existing raw-water infrastructure, utility corridors, road rights-of-way, environmental resources, conservation lands, wetlands and surface waters, cultural resources, property and access limitations, major roadway and water crossings, planned FDOT improvements, and the County's need for a redundant and operable transmission configuration. Because the planning area contains a limited number of practical conveyance corridors, the alternatives generally use or parallel existing corridors where feasible.

3.2.2 Corridor and Infrastructure Considerations

The alternatives must cross Lake Manatee and several associated waterways and drainage features. Portions of the B-C corridor parallel the existing raw-water main and PRECO overhead transmission facilities. Design will require coordination for workspace, utility separation, construction access, traffic, trenchless crossings, appurtenance access, and sequencing. Existing easements and access roads provide

advantages in some areas, while Duette Preserve and conservation restrictions create additional considerations in others.

3.2.3 Summary of Alternatives

During the route evaluation, multiple routes and alignments were explored to reduce roadway and environmental impacts. After review, three (3) alignment alternatives for the proposed transmission main were identified, delineated, and presented schematically in **Figure 3-1**. To facilitate the description of each alignment, four key reference locations were established along the corridor, as described in **Table 3-1.**

Table 3-1 Selected 20-year Finished Water Demand Projection

Alternative	Proposed Segments	Approx. Length	Planning Concept
1	A-B and B-C	97,000 ft	Continuous proposed conveyance route from the main ECW area to the WTP; existing D-B remains the connection for ECW Wells 6 and 7.
2	A-D, D-B, and B-C	104,700 ft	Most complete parallel conveyance path around the principal existing segments.
3	A-D and B-C	73,650 ft	Adds redundancy at the wellfield and between B and the WTP while retaining existing A-B as the intermediate link.

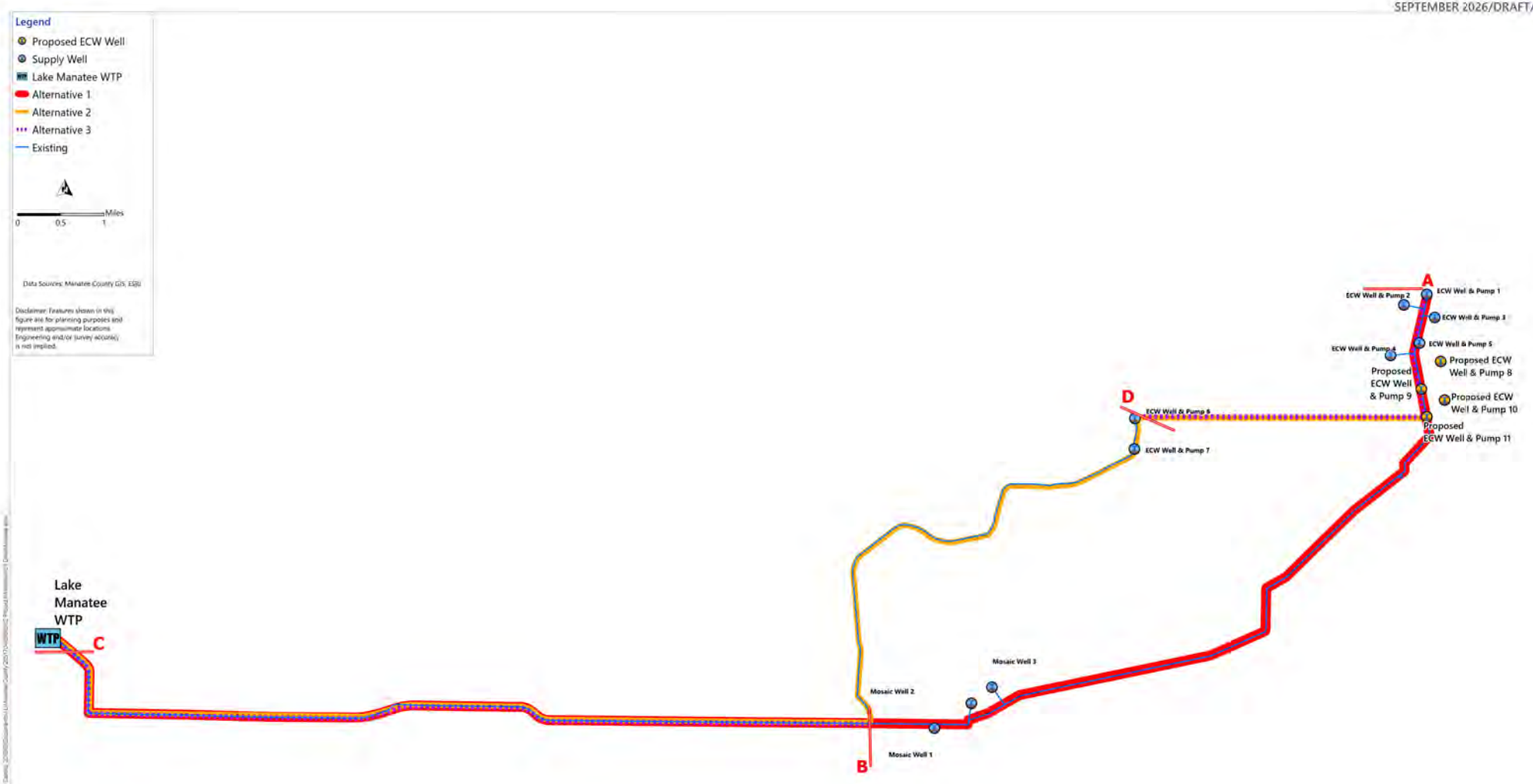


Figure 3-1 CONCEPTUAL DESIGN - PROPOSED ALIGNMENT ALTERNATIVES
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

Alternative 1

Alternative 1 follows the existing transmission corridor from Location A to Location B and continues west to Location C, as shown in **Figure 3-2**. The A-B segment is approximately 48,300 feet and the B-C segment approximately 48,700 feet. The route benefits from established utility access and known site conditions but requires construction along the full corridor and parallel to existing infrastructure.

Major considerations include workspace adjacent to the existing transmission main and PRECO facilities, the Lake Manatee crossing, other waterway crossings, access, construction sequencing, and protection of existing facilities. The Lake Manatee crossing is assumed to use HDD at the planning level. Four additional major waterway crossings require design-specific structural, hydraulic, environmental, and constructability evaluation.

Alternative 2

Alternative 2 includes A-D, D-B, and B-C segments. The route initially follows the existing corridor, then traverses a portion of Duette Preserve toward Location D, continues along the D-B corridor, and follows the common B-C route to the WTP. The total new pipeline length is approximately 104,700 feet. The alternative 2 alignment is shown in **Figure 3-3**.

Record drawings depicting the existing waterway crossings are included in **Appendix H** and provide additional information regarding the existing transmission main crossing configurations.

Alternative 3

Alternative 3 consists of a new A-D segment and a new B-C segment. The A-D segment is approximately 24,950 feet and connects the northern and southern portions of the wellfield. The B-C segment is approximately 48,700 feet and provides a parallel connection from the wellfield transmission system to the Lake Manatee WTP. The alternative retains the existing A-B segment as the intermediate conveyance link.

Alternative 3 has the least new pipeline length, lowest mapped wetland and surface-water impact, and lowest Class 5 pipeline cost. It remains dependent on the existing A-B segment, which is the controlling hydraulic limitation for an A-B outage. The selected planning configuration uses a 36-inch A-D segment and 42-inch B-C segment, subject to final design confirmation.

The alternative 3 alignment is shown in **Figure 3-4**.

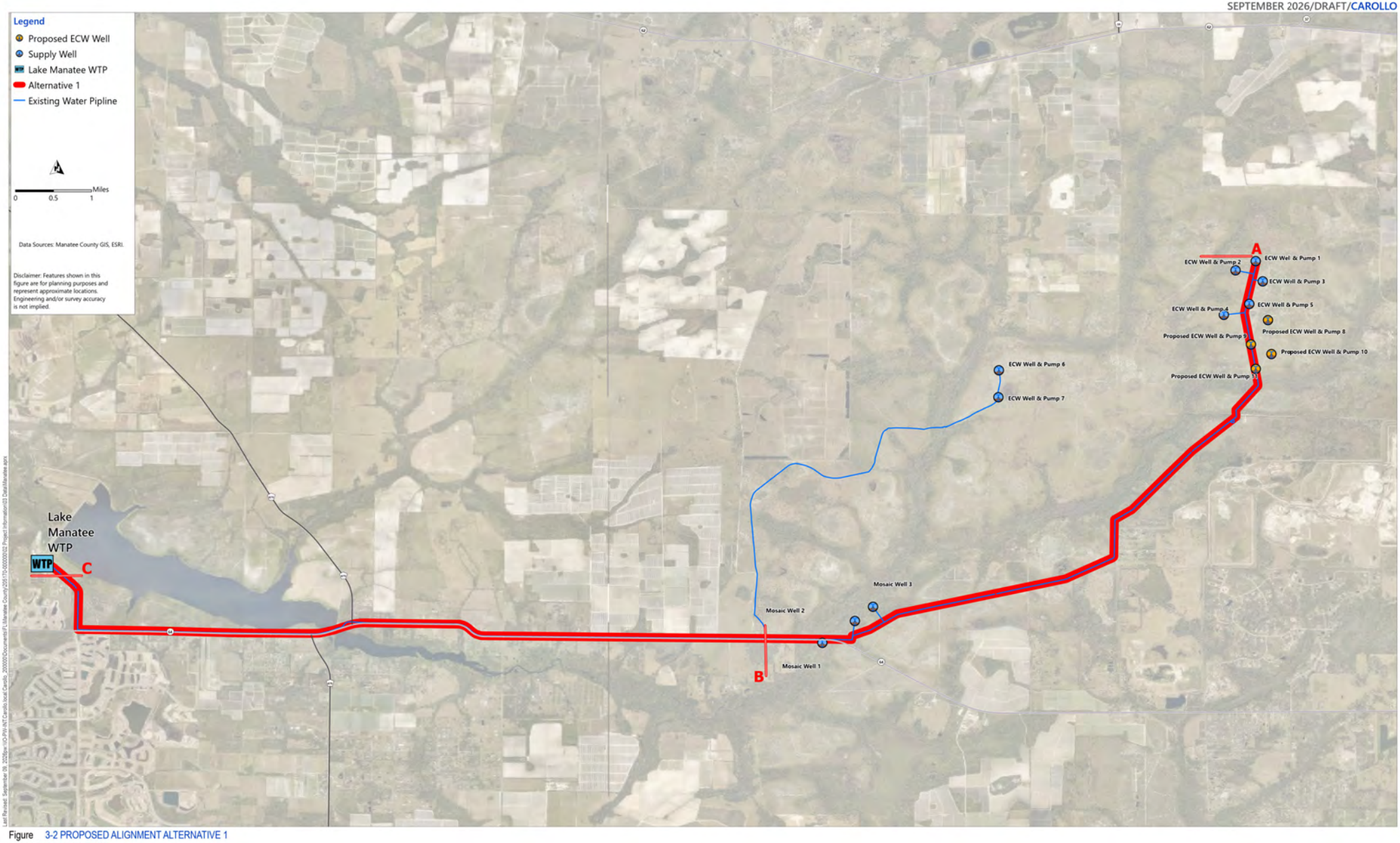


Figure 3-2 PROPOSED ALIGNMENT ALTERNATIVE 1
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

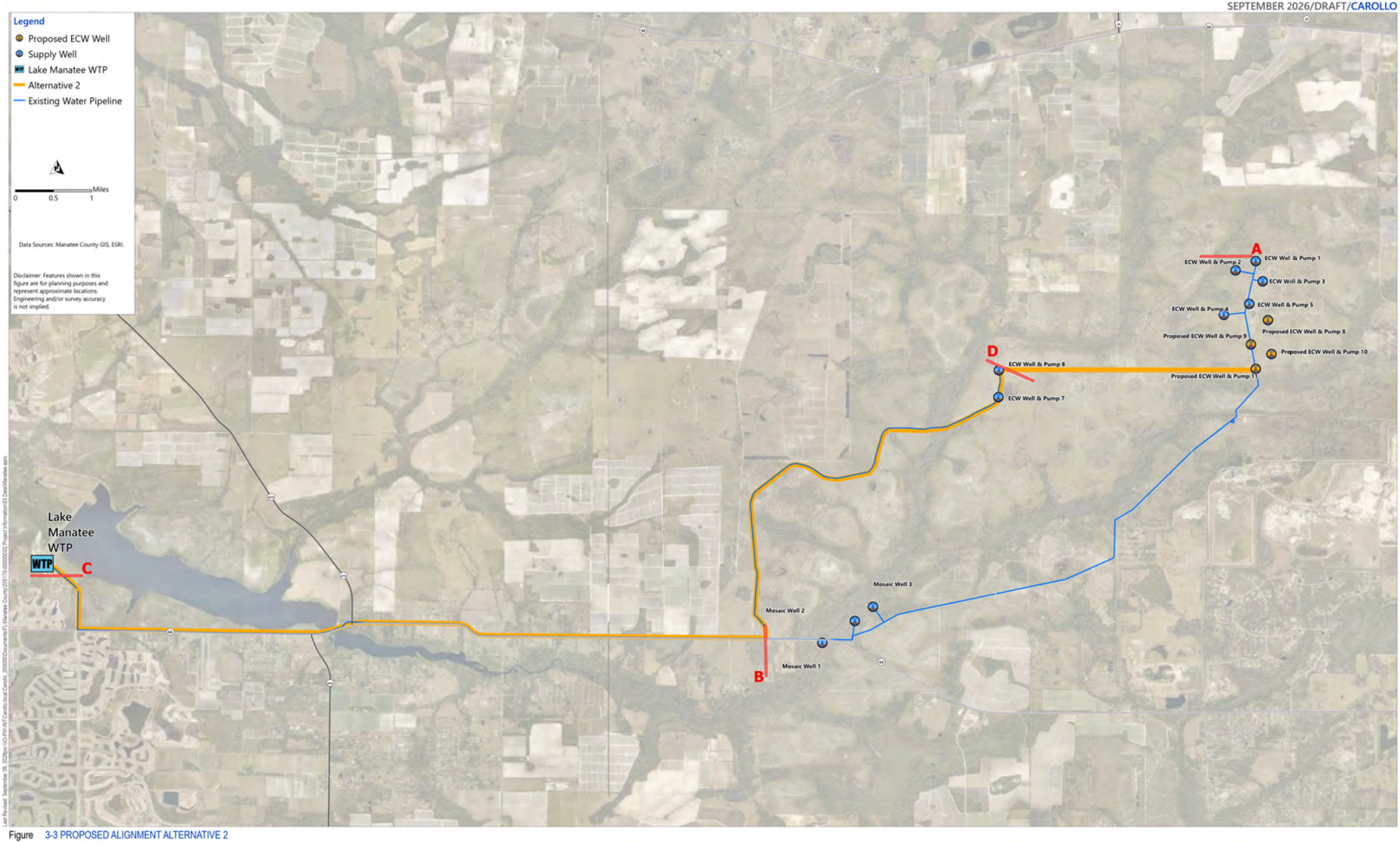


Figure 3-3 PROPOSED ALIGNMENT ALTERNATIVE 2
MANATEE COUNTY
PIPELINE RESILIENCY STUDY



Figure 3-4 PROPOSED ALIGNMENT ALTERNATIVE 3
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

3.3 Hydrogeologic and Environmental Constraints

3.3.1 Hydrogeologic Constraints

The hydrogeologic evaluation does not directly differentiate the alignments but informs future well operation, pump selection, and WUP coordination. Environmental conditions provide significant differentiation. Alternative 2 has the greatest mapped wetland and surface-water impact and a unique conservation-easement constraint. Alternative 1 has intermediate mapped wetland impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent forested/shrub wetland conversion.

Refer to Appendix G for a full planning-level hydrogeologic evaluation prepared by WSP.

3.4 Hydraulic Modeling and System Capacity

Planning-level hydraulic modeling evaluated the capacity and resiliency of the existing ECW raw-water transmission system and three proposed alignments. The evaluation uses an AAD production requirement of 26.2 mgd and maximum-month production requirement of 31.5 mgd. Model assumptions include a Hazen-Williams C-factor of 130, available well pump curves, assumed aquifer levels, representative proposed future wells, Mosaic Well availability, a separate proposed-main WTP entry, and SCADA-informed operating conditions. These assumptions are suitable for comparative planning and require refinement during detailed design.

3.4.1 Hydraulic model basis and assumptions

The following assumptions were used for the planning-level calculations:

- A Hazen-Williams C-factor of 130 was used for the transmission mains.
- Existing wells were modeled using their respective factory pump curves.
- »Proposed future ECW Wells 8 through 11 were represented using available existing ECW pump-curve information until final future-well pump selections are established.
- ECW Wells 1 through 7 and the proposed future wells were assumed to pump from an aquifer water level of approximately -10 ft NGVD for the evaluated condition.
- Proposed ECW Wells 8-11 were assumed to pump from an aquifer water level of approximately -25 ft NGVD.
- Mosaic Well 3 was assumed to remain available for operation, while Mosaic Wells 1 and 2 were generally modeled out of service.
- Well operating combinations were varied by scenario so that the modeled pumps remained on their respective pump curves while determining the maximum conveyable system flow.
- The proposed raw water main was assumed to have a separate entry to the WTP degasifier rather than manifold into the existing transmission main immediately upstream of the degasifier.
- Historical SCADA flow and pressure data were used to inform model development. Field pressure logging was identified to verify ECW transmission-main pressures because some reported SCADA pressures appeared lower than expected.

These assumptions are appropriate for the current planning-level comparison of alternatives and are expected to be refined as field pressure data, final groundwater operating levels, future well pump selections, and WTP connection details are confirmed. Accordingly, the modeled capacities should be used to compare alternatives and identify controlling conditions rather than as final design capacities.

3.4.2 Hydraulic Criteria

Pipeline sizing was screened using conveyance capacity, velocity, and headloss. The preferred planning velocity range is approximately 3 to 5 ft/s. Lower velocities can increase deposition potential, while higher velocities increase friction loss, energy, wear, and surge potential. The analysis compares diameter combinations under normal operation and outages of the existing A-B, D-B, and B-C segments.

3.4.3 Hydraulic Performance

The hydraulic evaluation demonstrated that both pipeline alignment and pipeline diameter influence the ability of the system to meet the project resiliency objectives. Planning-level modeling was completed to evaluate multiple pipeline diameter combinations for each alternative under normal operating conditions and representative outage scenarios. The evaluation focused on the ability of each alternative to satisfy the 26.2 mgd AAD criterion and the 31.5 mgd PMM criterion while providing redundancy within the raw water transmission system (per WUP Modification). The evaluated alternatives differed not only in pipeline diameter but also in the degree of conveyance redundancy provided by the respective alignment configurations (**Table 3-2**).

Table 3-2 Summary of the Pipeline Segments for Each Alternative and the corresponding Planning-Level Resiliency

Alternative	Approx. Length	Diameter Findings	Planning-Level Result
1	Segment A-B: 48,300 ft Segment B-C: 48,700 ft	42/42 and 42/48 meet the 31.5 mgd MM criterion in all modeled cases.	Continuous conveyance route from ECW Pumps 1-7 to the WTP. The existing D-B branch remains the only connection for ECW Wells 6 and 7.
2	Segment A-D: 24,950 ft Segment D-B: 31,050 ft Segment B-C: 48,700 ft	42/36/48 and 42/42/42 meet or exceed 31.5 mgd in all modeled cases.	Most complete parallel conveyance path by extending the proposed system through the northern/eastern ECW branch and continuing to the WTP.
3	Segment A-D: 24,950 ft Segment B-C: 48,700 ft	Several combinations exceed 31.5 mgd under normal conditions, but none meet 26.2 mgd during A-B outage.	Adds redundancy at the northern/eastern ECW branch and between B and the WTP, while retaining the existing A-B segment as the intermediate conveyance link.

Alternative 1 provides a continuous parallel transmission route between the ECW and the LMWTP. The hydraulic results demonstrate that system capacity increases as proposed pipeline diameters increase, with the larger diameter combinations providing the highest conveyance capacity. Under the evaluated outage conditions, Alternative 1 maintained sufficient hydraulic performance to satisfy the 31.5 mgd MM criterion for the larger diameter configurations. Because the proposed alignment provides a continuous parallel conveyance route between Locations A, B, and C, the alternative provides a high degree of

redundancy and resiliency while maintaining hydraulic performance during the modeled outage scenarios (**Figure 3-5**).

Alternative 2 provides the greatest hydraulic redundancy of the alternatives evaluated because the proposed alignment creates an independent conveyance path around each principal existing transmission segment. The hydraulic results demonstrate that Alternative 2 consistently achieved the highest system capacities under both normal operating conditions and modeled outage scenarios. Multiple pipeline diameter combinations satisfied the 31.5 mgd MM criterion, demonstrating the resiliency benefits associated with providing redundancy throughout the ECW transmission system. Because Alternative 2 provides conveyance redundancy around the primary transmission corridors, it exhibited the strongest hydraulic performance and outage resiliency of the alternatives evaluated (**Figure 3-6**).

Alternative 3 provides redundancy between the northern and southern portions of the ECW and between the transmission system and the LMWTP. Under normal operating conditions, Alternative 3 demonstrated the ability to achieve the 31.5 mgd MM criterion for several evaluated diameter combinations. However, because Alternative 3 remains dependent on the existing A-B segment, the modeled A-B outage condition limits available conveyance capacity. As a result, none of the evaluated diameter combinations achieved the 26.2 mgd AAD criterion during the A-B outage scenario. Despite this limitation, Alternative 3 still provides redundancy improvements relative to the existing system and improves operational flexibility through the addition of the A-D and B-C transmission segments (**Figure 3-7**).

The hydraulic evaluation demonstrates that Alternative 2 provides the highest degree of system redundancy and outage resiliency by providing an independent conveyance path around each principal transmission segment. Alternative 1 provides strong hydraulic performance through a continuous parallel conveyance route between the ECW and the LMWTP. Alternative 3 improves redundancy within the ECW transmission system but remains dependent on the existing A-B segment during certain outage conditions. Final pipe diameters, operating criteria, and system configuration will be confirmed during future design using updated field data, refined hydraulic analyses, transient evaluation, and confirmed operating requirements.

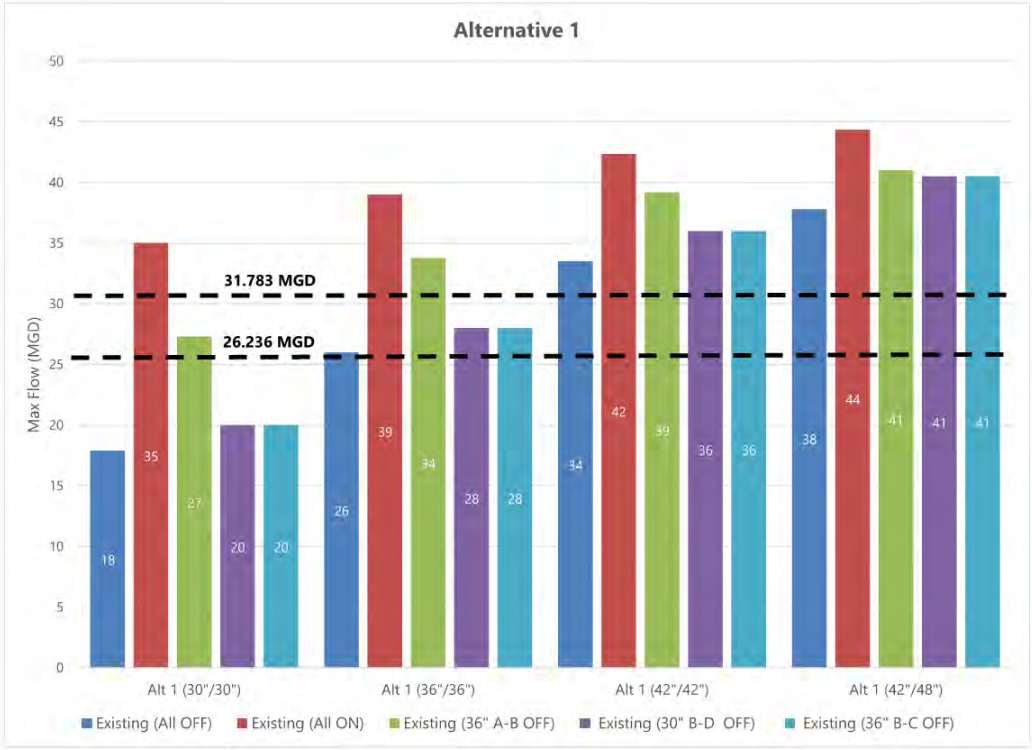


Figure 3-5 Hydraulic Results for Alternative 1

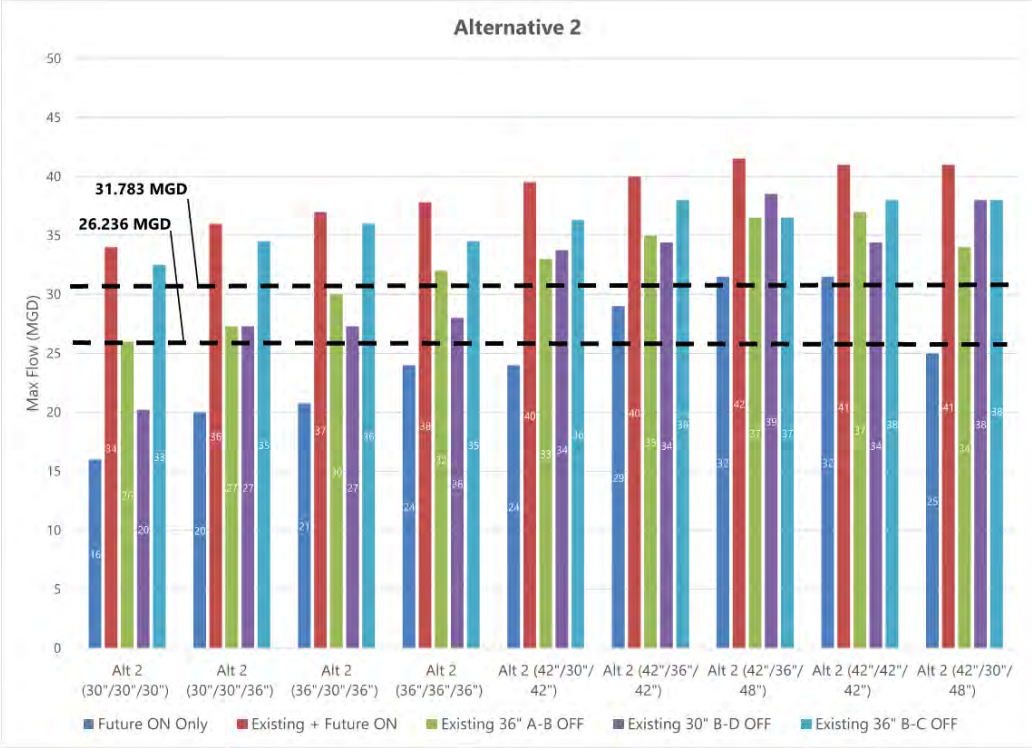


Figure 3-6 Hydraulic Results for Alternative 2

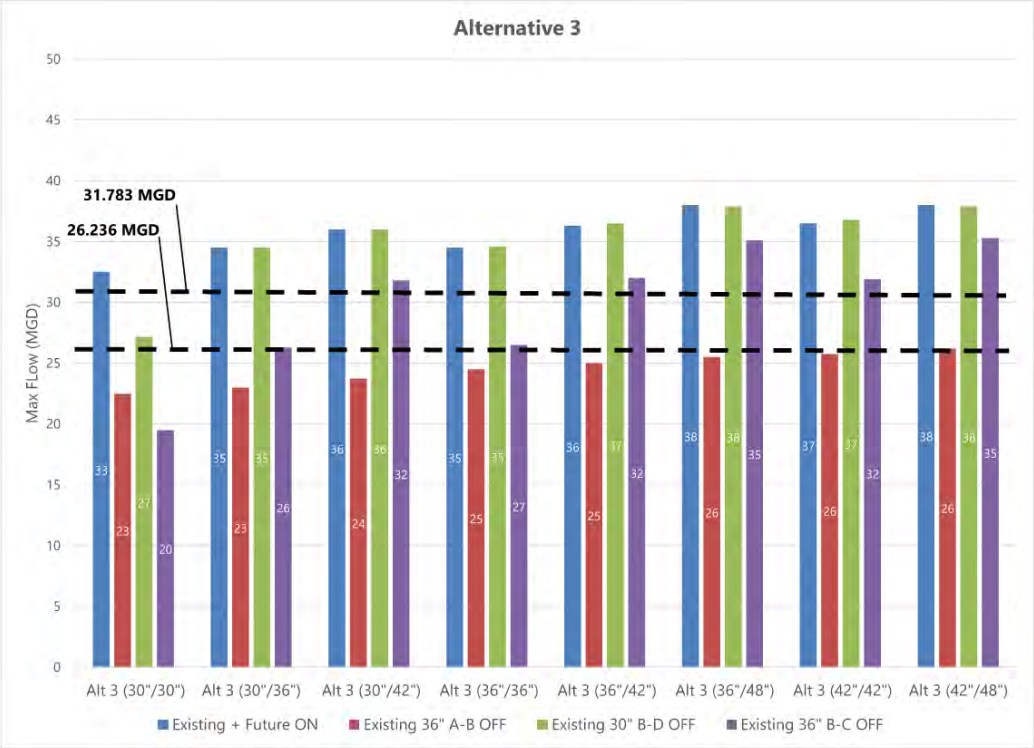


Figure 3-7 Hydraulic Results for Alternative 3

SECTION 4 ANALYSIS OF ALTERNATIVE ALIGNMENTS

4.1 Evaluation Methodology

The alternatives evaluation identifies the alternative that best balances the County's planning objectives rather than the alternative with the highest performance in a single category. The evaluation included a non-cost assessment, a planning-level cost evaluation, and a combined cost and non-cost evaluation to identify the recommended planning alternative. The non-cost assessment considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. Planning-level capital costs were evaluated separately and incorporated into the final combined evaluation to support selection of the preferred planning alternative.

4.2 Non-Cost Criteria Evaluation

Information developed in Sections 1 through 3 was synthesized using six non-cost criteria (**Table 4-1**). Cost was evaluated separately due to the nature of the Class 5 estimates which are intended to indicate relative cost rather than establish final construction cost.

Table 4-1 Non-Cost Evaluation Weighting Criteria

Criterion	Weight	Evaluation Basis
Reliability & Resiliency	25%	Hydraulic independence, service continuity, outage performance, and system recovery
Hydraulic Performance	25%	Capacity relative to AAD/MM criteria, velocity, headloss, and controlling outage
Environmental & Permitting	15%	Wetlands, surface waters, species, conservation lands, cultural resources, and permitting complexity
Constructability & Implementation Risk	15%	Length, access, crossings, utility coordination, workspace, property, and schedule risk
Operations & Maintenance	10%	Operational flexibility, isolation, emergency repair response, access, and restoration
Future Expandability & Flexibility	10%	Ability to support future wellfield conditions and design refinement
TOTAL	100%	

Each alternative was assigned an integer raw score from 1 to 10. A score of 10 represents the most favorable relative performance, 5 represents a condition that generally meets the planning objective but is not preferred, and 1 represents the least favorable relative performance. Raw scores are multiplied by the criterion weight to calculate weighted scores. Refer to **Table 4-2** for non-cost criteria weighted results for each alternative.

Table 4-2 Non-Cost Evaluation Weighting Criteria

Evaluation Criterion	Weight	Alt. 1 Raw	Alt. 1 Weighted	Alt. 2 Raw	Alt. 2 Weighted	Alt. 3 Raw	Alt. 3 Weighted
Reliability & Resiliency	25%	9	2.25	10	2.50	6	1.50
Hydraulic Performance	25%	9	2.25	10	2.50	6	1.50
Environmental & Permitting	15%	7	1.05	3	0.45	10	1.50
Constructability & Implementation Risk	15%	7	1.05	4	0.60	8	1.20
Operations & Maintenance	10%	8	0.80	9	0.90	6	0.60
Future Expandability & Flexibility	10%	8	0.80	9	0.90	7	0.70
TOTAL	100%	---	8.20	---	7.85	---	7.00

4.3 Cost Criteria Evaluation

Planning-level capital cost estimates were developed for each alternative using route-specific pipeline lengths, planning-level unit costs, alternative-specific allowances, and design and construction contingencies. The estimates use unit costs of $450 per linear foot for 36-inch ductile iron pipe and $625 per linear foot for 42-inch ductile iron pipe. Additional allowances were included, as applicable, for major waterway crossings, valves and appurtenances, tie-ins, utility coordination, access and restoration, environmental mitigation, engineering and design development, construction contingency, and construction management.

The estimates are intended for relative planning and budgeting comparison and do not represent final design-level construction costs. Detailed planning-level cost estimates for Alternatives 1, 2, and 3 are included in **Appendix I**, respectively. The resulting capital cost comparison was summarized in **Table 4-3**.

Table 4-3 Capital Cost Summary

Cost Component	Alternative 1	Alternative 2	Alternative 3
Bid-Based Pipeline Construction	$52,172,500	$55,637,500	$41,665,000
Alternative Specific Allowance	$7,000,000	$7,000,000	$6,500,000
Design and Construction Contingency	$16,520,000	$19,050,000	$12,880,000
Total Capital Cost	$75,692,500	$81,687,500	$61,045,000
Relative Capital Cost Rank	2	3	1

Alternative 3 has the lowest planning-level capital cost because it requires the least new pipeline length and retains the existing A-B segment as the intermediate conveyance link. Alternative 2 has the highest

planning-level capital cost due to its longer proposed pipeline alignment and higher environmental, access, and implementation allowances. Alternative 1 has an intermediate planning-level capital cost.

A 20-year net present value analysis was also completed to provide a consistent life-cycle cost comparison among the alternatives. The analysis considers initial capital cost, the present value of annual maintenance costs, and the present value of the remaining asset value at the end of the 20-year evaluation period. The NPV analysis uses a 3.0 percent discount rate and assumes a 75-year useful life for the transmission main facilities. At the end of the 20-year evaluation period, 55 years, or approximately 73.3 percent, of the assumed useful life remains.

Annual maintenance costs were estimated at $125,000 for Alternative 1, $175,000 for Alternative 2, and $75,000 for Alternative 3. The uniform-series present-worth factor, P/A, is 14.8775, and the single-payment present-worth factor, P/F, is 0.5537. Total net present cost was calculated as initial capital cost plus the present value of annual maintenance costs, less the present value of the residual asset value. The NPV results are summarized in **Table 4-4**.

Table 4-4 20-Year Net Present Value Summary

Economic Component	Alternative 1	Alternative 2	Alternative 3
Capital Cost	$75,692,500	$81,687,500	$61,045,000
Annual Maintenance	$125,000	$175,000	$75,000
Present Value of Maintenance	$1,859,684	$2,603,558	$1,115,811
Present Value of Residual Asset Value	($30,733,341)	($33,167,485)	($24,786,033)
Total Net Present Cost	$46,818,843	$51,123,573	$37,374,777
Relative NPV Rank	2	3	1

Alternative 3 has the lowest total net present cost and ranks first in the NPV comparison. The NPV ranking is consistent with the capital cost ranking and does not change the relative cost position of the alternatives.

The planning-level estimates should be refined during future design phases based on refinement to project specific requirements. Funding eligibility will be confirmed with FDEP.

4.4 Combined Cost and Non-Cost Evaluation

The alternatives evaluation included both a non-cost technical assessment and a planning-level cost comparison. The non-cost evaluation considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. A separate evaluation of planning-level capital cost was then completed to determine the overall planning value of each alternative. The combined evaluation results are summarized in **Table 4-5**.

Table 4-5 Combined Cost and Non-Cost Evaluation

Evaluation Component	Weight	Alternative 1	Alternative 2	Alternative 3
Non-Cost Evaluation Score	60%	8.2	7.85	7.00
Cost Score (Relative Planning-Level Cost Competitiveness)	40%	8.0	7.0	10.0
Non-Cost Weighted Score	--	4.92	4.71	4.20
Cost Weighted Score	--	3.20	2.80	4.00
Final Combined Score	100%	8.12	7.51	8.20
Overall Ranking	--	2	3	1

The combined cost and non-cost evaluation indicates that Alternative 3 achieved the highest overall score and ranked first among the evaluated alternatives. Alternative 1 ranked second, driven by its strong technical performance, while Alternative 2 ranked third due to higher planning-level costs and implementation challenges.

4.5 Key Alternative Strengths and Considerations

All three alternatives provide necessary improvements, but each has distinct strengths and planning considerations. The key strengths and planning considerations associated with each alternative were summarized in **Table 4-6**.

Table 4-6 Key Alternative Strengths and Considerations

Alternative	Key Strengths	Key Considerations
1	Strong hydraulic performance; continuous proposed A-B and B-C route; can satisfy the MM requirement in all modeled outage cases with sufficiently large segments.	Greater new pipeline length and cost than Alternative 3; intermediate mapped wetland impact; corridor and crossing complexity along the full route.
2	Strongest modeled hydraulic redundancy; parallel path around each principal existing segment; greatest operational flexibility during modeled outages.	Highest pipeline cost; greatest mapped wetland impact; conservation-easement and gopher tortoise recipient-site constraint; elevated permitting and implementation risk.
3	Lowest pipeline cost; least new pipeline length; lowest mapped wetland and surface-water impact; favorable implementation and planning flexibility.	Dependent on existing A-B; modeled A-B outage capacity below AAD; preliminary 36-inch A-D and 42-inch B-C diameters require final confirmation.

Alternative 1 and Alternative 2 provide stronger hydraulic outage performance. Alternative 3 provides the most favorable combination of pipeline cost, mapped environmental impact, reduced new pipeline length, and planning flexibility.

4.6 Recommended Planning Alternative

4.6.1 Evaluation Results

The non-cost evaluation indicated that Alternatives 1 and 2 provided greater hydraulic redundancy and outage resiliency than Alternative 3. Alternative 2 achieved the highest hydraulic evaluation score, while Alternative 1 achieved similar hydraulic performance with fewer environmental and implementation constraints. The evaluation also identified differences in environmental impacts, permitting complexity, constructability, and planning-level capital cost. Alternative 2 had the greatest estimated wetland impacts, the highest permitting complexity, and the highest planning-level capital and net present costs. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in both capital and net present cost than Alternative 3. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in cost than Alternative 3.

Alternative 3 had the lowest planning-level capital cost, the lowest 20-year net present cost, the shortest length of new transmission main, and the lowest mapped wetland and surface-water impacts. Alternative 3 also remains dependent on the existing A-B transmission segment, resulting in lower hydraulic redundancy than Alternatives 1 and 2. When cost and non-cost considerations were evaluated together, Alternative 3 achieved the highest combined evaluation score. Based on the combined evaluation results, Alternative 3 was selected as the preferred planning alternative for advancement into future design and implementation.

4.6.2 Basis for Selection

Based on combined consideration of technical performance, environmental findings, constructability and implementation, operations and maintenance, future flexibility, planning-level capital cost, 20-year net present cost, and County planning direction, Alternative 3 is recommended as the preferred planning alternative. (**Figure 4-1**).

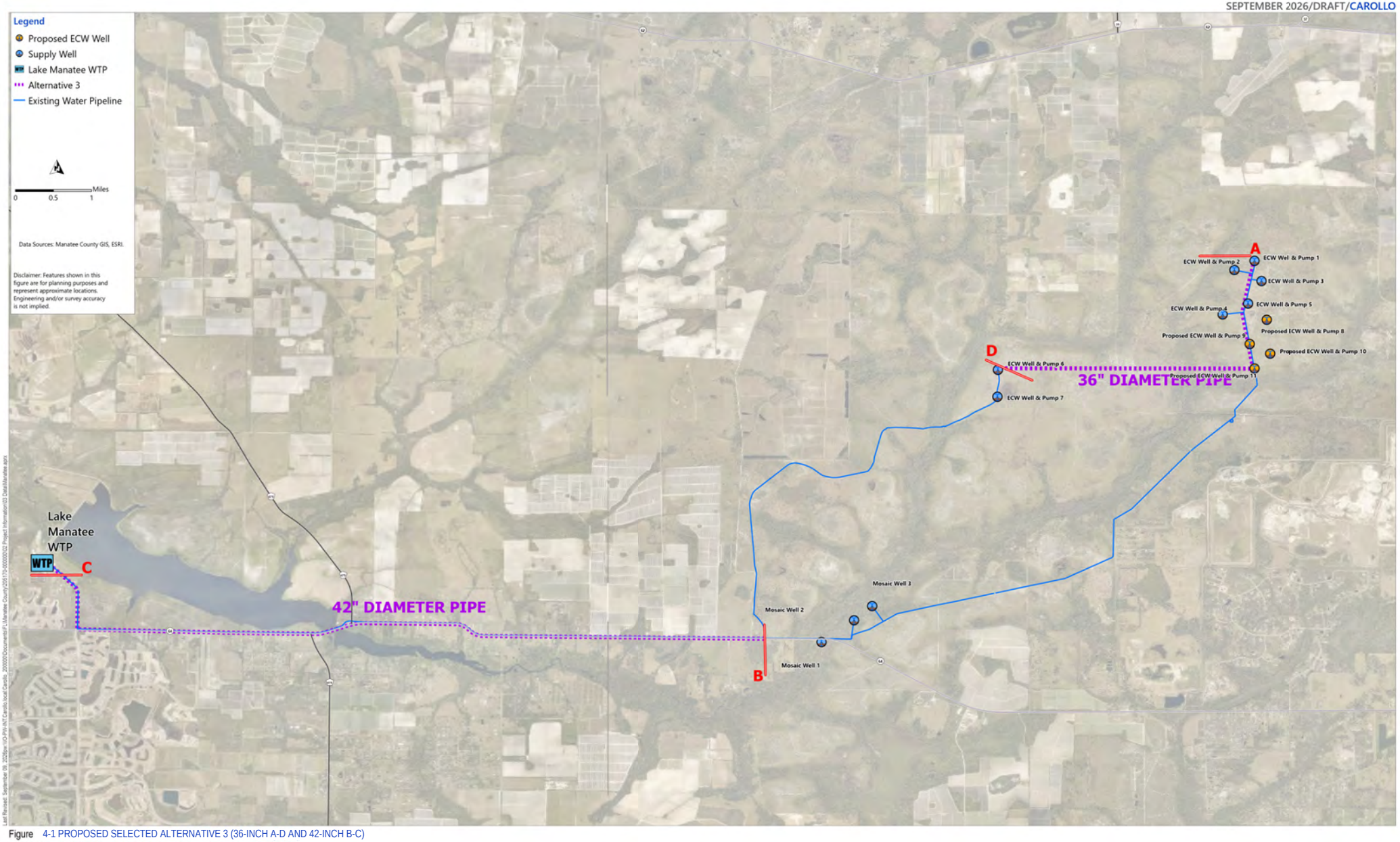


Figure 4-1 PROPOSED SELECTED ALTERNATIVE 3 (36-INCH A-D AND 42-INCH B-C)
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

The recommendation transparently recognizes that Alternatives 1 and 2 provide stronger modeled outage performance, while Alternative 3 provides a favorable overall planning and budgeting approach.

For planning and budgeting, Alternative 3 consists of an approximately 24,950-foot, 36-inch A-D segment and an approximately 48,700-foot, 42-inch B-C segment. Final diameters and connection details will be confirmed during future design based on refined hydraulic analyses, updated design criteria, verified groundwater levels, confirmed well availability, WTP boundary conditions, transient analyses, constructability, permitting, and operational requirements.

Alternative 3 provides meaningful resiliency improvements but does not provide complete hydraulic independence from the existing transmission system. The proposed A-D segment provides an additional connection between the northern and southern portions of the ECW, and the proposed B-C segment provides a parallel transmission path to the WTP. However, the configuration continues to use the existing A-B and D-B segments.

The planning-level hydraulic analysis identifies the existing A-B segment as the controlling outage dependency. Under the modeled A-B outage condition, none of the evaluated Alternative 3 diameter combinations achieved the 26.236-mgd AAD criterion. Alternative 3 was nevertheless selected as the preferred planning alternative because its lower cost, shorter length, reduced mapped environmental impacts, and lower implementation risk produced the highest combined cost and non-cost evaluation score.

Selection of Alternative 3 represents a planning and budgeting decision rather than a conclusion that the alternative provides the same hydraulic independence as Alternatives 1 and 2. Future design shall establish the County's minimum acceptable service level for an A-B outage and evaluate well availability, available flow, WTP operation, isolation and maintenance requirements, emergency repair procedures, temporary supply measures, recovery actions, and potential future improvements. If the County's required outage performance cannot be achieved through operational measures, subsequent phases may include additional transmission improvements to reduce or eliminate the A-B dependency.

4.6.3 Potential Project Phasing

The planning-level cost estimates indicate that implementation of the selected alternative may require phased delivery to align project expenditures with available funding and future system needs. Potential project phasing strategies are summarized below.

- **Phase 1 – Core Resiliency Improvements**

Phase 1 would focus on the transmission infrastructure improvements that provide the greatest resiliency benefits and support increased raw water conveyance capacity between the ECW and the Lake Manatee WTP.

Potential Phase 1 improvements include:

- Construction of priority transmission main segments associated with the selected planning alternative.
- Improvements to transmission capacity between the Mosaic wells and the Lake Manatee WTP.
- Evaluation and potential construction of an interconnection between ECW Wells 1 through 5 and ECW Wells 6 and 7 within the ECW.

- **Phase 2 – Supply and Operational Improvements**

Phase 2 would focus on increasing raw water supply availability and improving operational flexibility within the existing treatment system.

Potential Phase 2 improvements include:

- Construction of two additional groundwater production wells.
- Construction of ASR bypass piping around the existing degasifiers.
- Construction of additional transmission infrastructure as warranted based on system demands, operational needs, and available funding.

- **Phase 3 – Long-Term Redundancy Improvements**

Phase 3 would focus on future water supply expansion and completion of additional system resiliency improvements.

Potential Phase 3 improvements include:

- Construction of two additional groundwater production wells.
- Completion of remaining transmission system redundancy improvements identified through future planning, design, and operational evaluations.

The final project phasing strategy will be refined during subsequent planning and design phases based on funding availability, regulatory requirements, operational priorities, hydraulic evaluation results, and future water demand projections.

SECTION 5 SELECTED ALTERNATIVE

Alternative 3 was selected for Facilities Plan development, planning, and budgeting. The selected concept includes the A-D wellfield connection and the B-C transmission segment to the Lake Manatee WTP. The preliminary configuration uses a 36-inch A-D segment and a 42-inch B-C segment. The selection establishes a planning basis and does not represent final design approval of materials, profiles, appurtenances, or connection details.

5.1 Description of the Proposed Project

The selected planning alternative includes approximately 24,950 feet of new 36-inch raw-water transmission main between Locations A and D and approximately 48,700 feet of new 42-inch raw-water transmission main between Locations B and C. The A-D segment connects the northern and southern portions of the East County Wellfield. The B-C segment provides a parallel connection between the wellfield transmission system and the Lake Manatee WTP. The selected concept operates with the existing A-B and D-B segments.

Planning-level components include tie-ins, isolation valves, air-release and vacuum-valve assemblies, blowoffs, access facilities, major roadway and water crossings, WTP connection modifications, and other appurtenances required for reliable operation. Final design will confirm the relationship between the selected transmission improvements and proposed wellfield, treatment, electrical, instrumentation, and SCADA improvements included in the broader project.

Refer to **Figure 5-1** for the selected Alternative 3 proposed tie-ins and major constraints. Refer to **Appendix H** for more detailed information on the major constraints and existing transmission main record drawings.

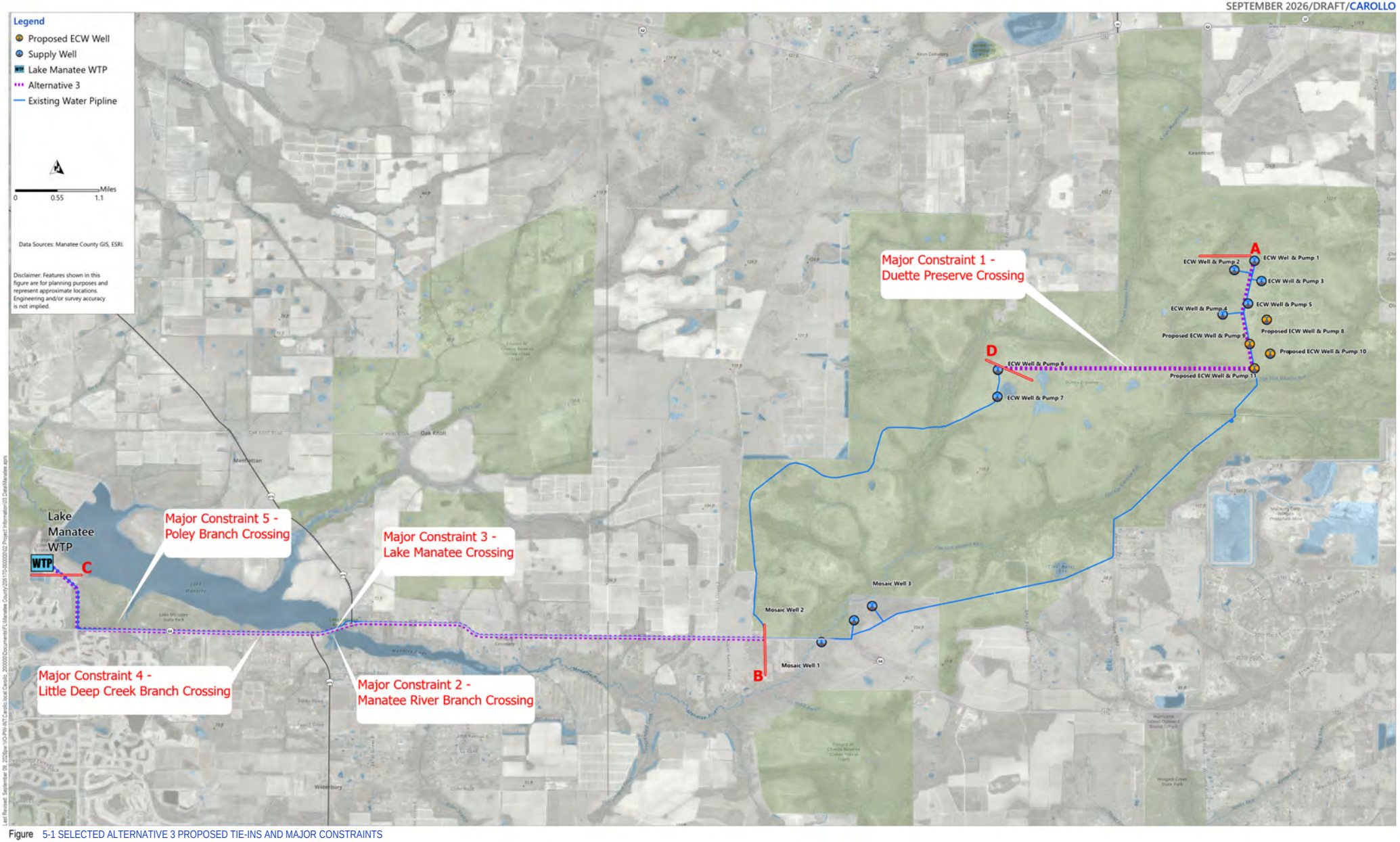


Figure 5-1 SELECTED ALTERNATIVE 3 PROPOSED TIE-INS AND MAJOR CONSTRAINTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

5.2 Project Implementation

Implementation will require coordinated survey, route refinement, geotechnical investigation, subsurface utility engineering, environmental field verification, property and easement coordination, permitting, hydraulic and transient modeling, design, procurement, construction, startup, and closeout. Coordination with FDOT and other agencies will be required where the project interfaces with planned roadway work, rights-of-way, regulated resources, and other infrastructure.

The project may be phased to align design, permitting, property acquisition, funding, procurement, and construction. Phasing should maintain County operations, reduce service disruption, and preserve the ability to advance critical wellfield and transmission improvements as information is refined.

5.2.1 Project Schedule

The preliminary funding implementation schedule presented in **Table 5-1** presents the current funding-program target dates. It identifies the milestones for Facilities Plan completion, funding coordination, field investigations, preliminary design, permitting, property acquisition, final design, procurement, construction, startup, and closeout. These dates are preliminary and have not yet been validated through a detailed critical-path method schedule. Achieving the dates depends on timely definition of the funded scope, selection of the project delivery approach, completion of field investigations, resolution of the WTP and degasifier interface, acquisition of necessary property rights, agency coordination, permit reviews, funding authorization, procurement, and construction.

The July 2027 date for design documents, permits, and site acquisition and the December 2031 project-completion date should therefore be treated as target milestones subject to schedule validation. Early schedule development shall identify controlling activities, responsible parties, dependencies, decision dates, float, and required escalation procedures.

Activities that should begin or be defined early because they may control the implementation schedule include confirmation of the SAHM-funded scope and project phasing; definition of the WTP and degasifier project boundary; confirmation of the delivery and procurement approach; survey, SUE, environmental field investigations, and geotechnical investigations; hydraulic criteria and required outage scenarios; property and easement acquisition; FDOT and conservation-land coordination; major-crossing feasibility; permitting coordination; final design; funding approval; procurement; construction; startup; and acceptance.

Table 5-1 Preliminary Funding Implementation Schedule

Schedule Categories	Month and Year
Submit the Planning or SSES documentation	Completed
Submit the design documents, obtain permits, and acquire sites (as necessary)	July 2027
Start activity (such as construction or non-structural best management practice)	January 2028
Complete activity (such as construction or non-structural best management practice)	December 2031

5.2.2 Project Cost and Funding Basis

The planning-level capital cost estimate for the Alternative 3 transmission improvements is $61,045,000. This estimate is based on approximately 24,950 linear feet of 36-inch transmission main along Segment A-D and approximately 48,700 linear feet of 42-inch transmission main along Segment B-C. The estimate includes the pipeline construction and the allowances, contingencies, engineering, and construction-management costs specifically identified in **Appendix I**.

The Alternative 3 estimate is a Class 5 planning-level estimate and is not the total cost of the broader Pipeline Resiliency Project. Unless expressly included in Appendix I, the estimate does not establish the final cost of additional production wells, well equipment, WTP hydraulic modifications, degasifier modifications or bypasses, electrical and SCADA improvements, property and easement acquisition, environmental mitigation, escalation to the midpoint of construction, or other improvements that may be added as the project scope is refined.

The current SAHM funding amount is $35,139,169, including $17,569,584 in principal forgiveness. Compared with the $61,045,000 planning-level estimate for the Alternative 3 transmission improvements, the presently identified funding is approximately $25.9 million less than the planning-level estimate. This comparison does not represent a final funding determination because project scope, eligible costs, phasing, and the total project estimate remain under development.

The County will coordinate with FDEP to confirm which project components and costs are eligible under the current SAHM funding package. Costs exceeding the available SAHM funding may require scope refinement, phased implementation, local funding, additional grant or loan funding, or a combination of funding sources. The Facilities Plan does not represent that funding eligibility or the source of the remaining funds has been finalized.

Cost estimates will be updated through final design as the scope, design criteria, crossing methods, property requirements, environmental mitigation, implementation schedule, and procurement approach are developed. The corresponding 20-year net present cost will be updated after the useful-life and residual-value assumptions are reconciled. These values are planning-level estimates for comparison, budgeting, and funding coordination. Funding eligibility and the relationship between the selected transmission alternative and broader SAHM-funded project components will be coordinated with FDEP and documented before issuance.

5.3 Future Design Confirmation

Items identified for confirmation are assigned to one of three resolution stages. Information needed to support the Facilities Plan conclusions, funding basis, public process, and regulatory submission will be resolved before final Facilities Plan issuance or expressly documented as a remaining planning limitation. County or agency determinations that occur after Facilities Plan submission, including funding eligibility, authorized WUP conditions, minimum acceptable outage service levels, property actions, and agency permit requirements, will be completed by the County with the applicable agency and consultant support before the related design, funding, or construction decision. Design details requiring survey, SUE, field investigation, geotechnical information, agency review, or progressive design development will be completed by the DCP/PDB team during project definition, permitting, or final design.

The project team will complete or expressly document the status of the hydrogeologic anomalies; reconcile alternative cost inclusions and exclusions; correct the net-present-value and residual-value basis; confirm the current funded scope and funding comparison; complete the public-meeting and appendix

references; and finish report-wide terminology, title, address, and clerical QA/QC. These items are not deferred to final design.

Following the Facilities Plan issuance, the County will lead decisions involving the funded scope, funding eligibility, minimum outage service level, emergency operating expectations, property acquisition, and project phasing, with FDEP, SWFWMD, FDOT, land managers, and other agencies providing determinations within their respective authorities. The DCP/PDB team will complete the final alignment, profiles, pipe materials and diameters, survey and SUE, geotechnical investigations, environmental fieldwork, permit applications, major-crossing methods, detailed hydraulic and transient analyses, WTP/degasifier interface, electrical and SCADA integration, construction sequencing, commissioning, and acceptance criteria.

Future design will confirm the alignment and preliminary diameters using updated survey, field investigations, utility and property data, environmental verification, agency coordination, hydraulic criteria, and operating data. The design process should confirm:

- Final A-D and B-C alignments, profiles, materials, and diameters.
- Updated demand, WUP, groundwater-level, well-availability, and WTP boundary conditions.
- Final isolation strategy, emergency operating procedures, maintenance access, and service restoration.
- Tie-ins, appurtenances, air management, blowoffs, and access facilities.
- Water and roadway crossing methods, geotechnical requirements, and construction staging.
- Property, easement, right-of-way, and agency-permit requirements.
- Environmental field surveys, avoidance and minimization, and mitigation.
- Updated cost estimates and schedule as design advances.

5.3.1 Hydraulic and Diameter Confirmation

The future hydraulic evaluation should refine model calibration and confirm performance under representative existing and future conditions. The analysis should evaluate normal operation, individual existing-main outages, future-well availability, operational sequencing, and recovery. Final diameters should be based on capacity, velocity, headloss, pressure, operational flexibility, energy, surge, and future-system requirements.

5.3.2 Surge and Air Management

A detailed transient and air-management evaluation should be completed during design development using the selected pipeline profile, final materials and diameters, confirmed pump conditions, WTP and degasifier boundary conditions, proposed valve locations, and operating sequences. The evaluation should address pump startup and shutdown, power failure, minimum and maximum pressures, column separation, check-valve behavior, air admission and release, individual-main outages, air accumulation at high points and HDD crossings, and the need for operating controls or dedicated surge mitigation.

Transient pressure, column separation, trapped air, and uncontrolled air release are key design risks for the proposed long, large-diameter transmission mains, major elevation changes, pump systems, and HDD crossings. Potential consequences include excessive positive or negative pressure, loss of pipeline

integrity, check-valve slam, pump or valve damage, air locking, reduced conveyance capacity, and difficulty restarting or recovering the system following an outage.

Design development shall include appropriate allowances for air-release and vacuum-valve assemblies, controlled valve operation, check-valve selection, surge-control facilities, instrumentation, emergency power and controls, and other mitigation identified by the transient analysis. Final locations and sizes will be established from the design-phase analysis and confirmed operating requirements.

5.4 Environmental and Regulatory Commitments

During design development, a permitting and approval matrix should be completed to identify the anticipated approval, reviewing agency, supporting information, critical-path dependency, resolution phase, responsible party, and next actions. Agency applicability and review durations should be confirmed through early coordination. In the early part of the design development, the DCP/PDB team should develop permit-supporting information and applications, and each reviewing agency will determine its final requirements and issue the applicable approval.

Environmental review for Alternative 3 should focus on field verification of wetlands and surface waters, protected-species surveys, cultural-resource coordination, conservation-land requirements, contaminated-site considerations, and applicable permits. Desktop evaluation indicates that Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential forested/shrub wetland conversion. Final impacts will depend on surveyed alignment, footprint, construction methods, and field-verified boundaries. The project should prioritize avoidance and minimization. Unavoidable impacts, mitigation, species-protection measures, cultural-resource requirements, and permit conditions will be established through design-phase surveys and agency coordination. Refer to **Figure 5-2** for the selected Alternative 3 environmental commitments.

Based on the preliminary alignment, environmental screening, and initial agency coordination, the anticipated permits are listed below. Additional permits may be required as the design progresses.

- Environmental Resource Permit (FDEP/SWFWMD)
- Section 404 / Section 10 Authorization (USACE)
- Clean Water Act Section 401 Water Quality Certification (FDEP/SWFWMD)
- Endangered Species Act Section 7 Consultation (USFWS)
- Gopher Tortoise Permit and Recipient Site / Conservation Easement Approval (FWC)
- Section 106 Coordination with the State Historic Preservation Officer (USACE/SHPO)
- Water Well Construction Permit (Manatee County Environmental Protection Division)
- Public Drinking Water System Construction Permit (FDEP)
- Generic Permit for the Discharge of Produced Groundwater from Dewatering (FDEP)
- Utility Permit (FDOT)
- NPDES Generic Permit for Stormwater Discharge from Construction Activities (FDEP)

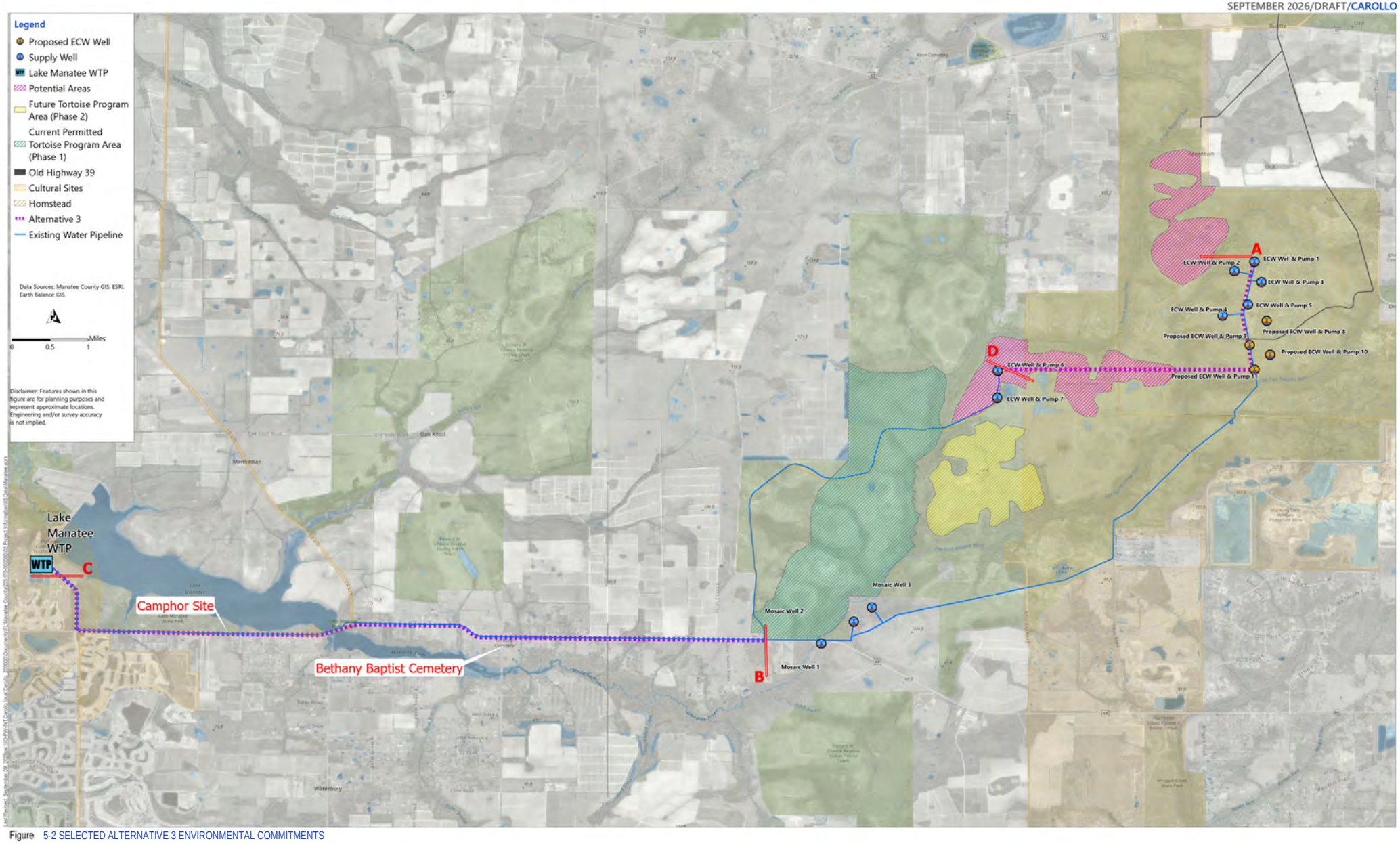


Figure 5-2 SELECTED ALTERNATIVE 3 ENVIRONMENTAL COMMITMENTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 6 COMPLIANCE

This section summarizes additional aspects of compliance requirements of the selected alternative, including public engagement and regulatory review. It is intended that the project will be executed in a timely manner while maintaining compliance with applicable federal, state and local requirements and the conditions of the SAHM award.

6.1 Public Engagement Meeting

Manatee County hosted a public engagement meeting on September 15, 2026, to present the proposed project and receive public comments. Refer to **Appendix J** for the public notice and **Appendix K** for the public notice meeting minutes.

The Facilities Plan and associated resolution will be presented to the Manatee County Board of County Commissioners for consideration and adoption. The approving resolution will be included in the final designated appendix following adoption.

6.2 Regulatory Agency Review

Implementation of the selected alternative will require review and approval by the applicable regulatory agencies. As part of the SAHM funding process, this Facility Plan will be submitted to FDEP for review to confirm the project's eligibility under the funding program requirements. Future phases of project development, such as design, may require additional agency coordination, permitting, and approvals associated with public water supply facilities, wells, construction, and any other applicable local, state and regulatory requirements.

APPENDIX A

SUPPLEMENTAL APPROPRIATION FOR HURRICANE HELENE AND MILTON (SAHM) REQUEST FOR INCLUSION SUPPORTING DOCUMENTATION DWSRF FUNDS

APPENDIX B

GIS DATA COLLECTION TABLE

APPENDIX C

NRCS SOIL REPORT FOR MANATEE COUNTY

APPENDIX D

ENVIRONMENTAL EVALUATION REPORT

APPENDIX E

FEMA FLOOD MAPS

APPENDIX F

FDOT SR 64 RECORD DRAWINGS

APPENDIX G

PLANNING-LEVEL HYDROLOGICAL EVALUATION REPORT

APPENDIX H

MAJOR CROSSINGS AND TRANSMISSION MAIN RECORD DRAWINGS

APPENDIX I

ALTERNATIVES 1-3 PLANNING-LEVEL CAPITAL COST ESTIMATES

APPENDIX J

PUBLIC NOTICE

APPENDIX K

PUBLIC NOTICE MEETING MINUTES

APPENDIX L

USEFUL LIFE CERTIFICATION

APPENDIX M

COST AND EFFECTIVENESS CERTIFICATION

APPENDIX N

BUISINESS PLAN (NOT INCLUDED)

MANATEE COUNTY GOVERNMENT

STATE OF FLORIDA

COUNTY OF MANATEE

Before the undersigned authority personally appeared **Quantana Acevedo,** who on oath says that she is a **County Employee of Manatee County Government, Manatee County, Florida**; that the attached copy of advertisement, being a public notice in the matters of **Public Notice of Special Meeting** for **Proposed Manatee County Pipeline Resilience Facility Plan,** in Manatee County Florida, was published on the publicly accessible website of Manatee County Government, Manatee County, Florida, of www.mymanatee.org on **September 1, 2026**.

Affiant further says that the website complies with all legal requirements for publication in Chapter 50, Florida Statutes.

By: _____
Quantana Acevedo, Planning and Zoning Tech III

Sworn to and subscribed before me this 1st day of September, 2026, by Quantana Acevedo, who is personally known to me or who has produced (type of identification) as identification.

ABIGAIL RUTH-ELLEN BONDS
Notary Public-State of Florida
Commission # HH 815493
My Commission Expires
July 26, 2030

_____
(Signature of Notary Public)

Abigail Bonds
(Print Name of Notary Public)

Notary Public
(Title)

My Commission Expires: July 26, 2030

Commission Number: HH 815493

PUBLIC NOTICE

Notice is hereby given that the Board of County Commissioners of Manatee County, Florida, will hold a special meeting on September 15, 2026. The meeting is at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, for the purpose of considering the approval of the proposed Manatee County Pipeline Resiliency Facility Plan.

This hearing will include a discussion of the Facilities Plan and the financial impact on system users. The hearing is intended to afford the opportunity to individuals to be heard on the economic and social effects of the location, design, and environmental impact of the East County wellfield Pipeline Resiliency Project.

Responsible Entity: Florida Department of Environmental Protection
Applicant: Manatee County
Project Title(s): Pipeline Resiliency Project

Location of Proposed Work: 17915 Water Line Service Road, Bradenton, FL 34212
GPS Coordinates: 27° 29' 16.7892" N82° 21' 41.4252" W

A portion of the funding for this project is anticipated to come from the Florida Department of Environmental Protection (FDEP) Supplemental Appropriations for Hurricanes Helene and Milton and Hawai'i Wildfires (SAHM) program. Financial impacts on utility users will be presented at the hearing. All interested persons are invited to attend and be heard.

COMMENTS: This will serve as both the initial and final public notice regarding the project funded by the FDEP SAHM program. Interested persons may submit comments, questions, or request documents and data relevant to this specific project by writing to Chad Butzow at Manatee County Utilities Administration, 3647 Cortez Road West, Bradenton, FL 34210, or by emailing chad.butzow@mymanatee.org. Comments should be sent in writing or by email with the subject line "FDEP SHAM Pipeline Resiliency Project Facility Plan" at the above address within 14 days of the date of this notice.

SPECIAL REQUIREMENTS: If you require special aid or services as addressed in the American Disabilities Act, please contact the County Clerk's Office at (904) 652-8521, no less than five (5) days prior to the above stated hearing date.

THIS NOTICE MAY BE REMOVED FROM PUBLIC VIEW ON THE 14TH DAY FROM ORIGINAL DATE OF POSTING.

NOTICE WAS POSTED ON THE 1ST DAY OF SEPTEMBER 2026

Manatee County Pipeline Resiliency Project Public Meeting

September 15, 2026

Lakewood Ranch Library

Name	Address	Preferred Contact Method (Phone or Email)
Sue Dunn	3647 Carter Rd. W. Bradenton	941-792-8811 x5342
Tina Saldana	3647 Cortez Rd W	941-525-0707
Brent Laudicina	2212 33rd Ave Dr West	941-792-8811 x8025
~~Pat Shea~~	4630 Sweet Retreat Run	320 492-0269
Kathleen Ballett	1501 Dam Road	941-290-8018
Nestor Murry		813-812-4391
Jim Rennebeg	7607 Addison Ave	763-258-4856
Kevin Doorman	4282 Garbett Terrace, NP 3475	941-536-6986

RESOLUTION R-26-032

A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA, RELATING TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION STATE REVOLVING FUND; AUTHORIZING IMPLEMENTATION OF A PIPELINE RESILIENCY PROJECT (THE "PROJECT") IN MANATEE COUNTY; APPROVING THE FORM OF AND AUTHORIZING THE EXECUTION AND DELIVERY OF THE LOAN APPLICATION RELATING TO THE PROJECT; AUTHORIZING A LOAN TO FINANCE A PORTION OF THE PROJECT; PLEDGING PUBLIC UTILITIES REVENUES OF THE COUNTY'S PUBLIC UTILITIES SYSTEM ON A SUBORDINATE BASIS TO REPAY THE LOAN; PROVIDING FOR OTHER MATTERS; PROVIDING FOR CONFLICT; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, Manatee County, Florida, a political subdivision of the State of Florida (the "County"), is the owner and operator of a combined public utility consisting of a water and wastewater system, a solid waste system and stormwater management system (collectively, the "System"); and

WHEREAS, pursuant to Chapter 63-1598, Laws of Florida, Acts of 1963, as amended and supplemented, Chapters 125, 197, and 403, Florida Statutes, Chapter 159, Part VII, Florida Statutes, certain ordinances enacted by Board of County Commissioners of Manatee County, Florida, as the governing body of the County (the "Board") and other applicable provisions of applicable law (collectively, the "Act") and Resolution No. R-91-21 adopted by the Board on January 15, 1991, as such resolution has been amended and supplemented from time to time (collectively, the "Bond Resolution"), the County has issued its "Senior Bonds," as defined below; and

WHEREAS, any capitalized term used in this Resolution and not otherwise defined shall have the meaning ascribed to such term in the Bond Resolution; and

WHEREAS, pursuant to the Bond Resolution, the County has issued and now has outstanding its Public Utilities Revenue Improvement and Refunding Bonds, Series 2025, Public Utilities Revenue Improvement and Refunding Bonds, Series 2023, its Public Utilities Revenue Improvement and Refunding Bonds, Series 2018, its Public Utilities Revenue Refunding Bonds, Series 2017, and its Public Utilities Revenue Refunding and Improvement Bonds, Series 2015 (collectively, the "Outstanding Senior Bonds") to finance and refinance additions, extensions and improvements to the System; and

WHEREAS, pursuant to the terms and provisions of the Bond Resolution, the County is authorized to issue additional bonds on parity with the Outstanding Senior Bonds (collectively, the "Senior Bonds"); and

WHEREAS, the Senior Bonds are payable from a pledge and first lien on the Net Revenues of the System; and

WHEREAS, pursuant to the Bond Resolution, the County is authorized to issue evidence of indebtedness payable from the Net Revenues of the System subordinate in all respects to the pledge of the Net Revenues securing the payment of any Senior Bonds ("Subordinate Debt"); and

WHEREAS, the State Revolving Fund Loan Program for Drinking Water Facilities designates Program No. DW 41015 ("Program"), as eligible for available funds; and

WHEREAS, the County desires to enter into a loan agreement with the State of Florida Department of Environmental Protection ("FDEP") in a form acceptable to the County for drinking water facilities; and

WHEREAS, the Board, acting upon the advice of the Director of the Manatee County Utilities Department and his agents hereby authorizes that such application be made for assistance in the principal amount of approximately $35,139,169.00 (the "Loan"), the form of such application herein referred to as the "Loan Application" is attached hereto as Exhibit A; and

WHEREAS, the Loan will be Subordinate Debt of the System payable from a pledge of the Net Revenues of the System subordinate in all respects to the pledge of Net Revenues securing existing and future Senior Bonds, senior lien refunding bonds or debt, and senior lien lease purchase agreements; and

WHEREAS, the terms of the Loan will be governed by the Loan Application and as further described below; and

WHEREAS, formal adoption of this Resolution authorizing the proposed financing of a portion of the Project with the proceeds of the Loan, including pledging Net Revenues to repay the Loan, is required for the County to participate in the Program.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MANATEE COUNTY, FLORIDA, THAT:

Section 1. The foregoing recitals are incorporated herein by reference and made a part hereof.

Section 2. The County formally approves and authorizes the Project for the implementation of planning and design activities for pipeline resiliency.

Section 3. The County Administrator, or his or her designee, is hereby designated as the authorized representative to provide the assurances and commitments that will be required by the Loan Application and/or in connection with the Program. The County Administrator, or his or her designee, is also authorized to represent the County in carrying out the County's responsibilities

under the Project including utilizing Utilities Department revenues to complete the Project and to repay the Loan received through the Program. The County Administrator is further authorized to delegate responsibility to appropriate County Staff to carry out technical, financial, and administrative activities associated with the Project.

Section 5. The Board hereby authorizes the execution and submittal of the Loan Application in substantially the form attached hereto as Exhibit A.

Section 6. The Board hereby approves the Loan subject to the following conditions:

(a) The principal amount of the Loan shall not exceed $35,139,169.00, with Principal Forgiveness of $17,569,584.50 and $17,569,584.50 as a 0% interest loan.

(b) The Loan will be amortized over a period of ten (10) years.

(c) The Loan will be secured by a pledge of the Net Revenues of the System subordinate in all respects to the pledge of Net Revenues securing existing and future Senior Bonds, senior lien refunding bonds or debt, and senior lien lease purchase agreements.

(d) In all other respects not contrary to the rights of the owners of the Senior Bonds, the terms and provisions of the Bond Resolution, including, but not limited to, a covenant to increase rates and charges of the System if ever deemed necessary to repay the Loan, continue and remain in full force and effect.

(e) The Board expects to approve a subsequent loan agreement, which the County has not yet received, by and between the County and the FDEP, provided the loan agreement is acceptable in all material respects to the County.

Section 7. The legal authority for borrowing money to construct this Project is Section 125.01, Florida Statutes.

Section 8. The County Attorney in his or her sole discretion is authorized, but not obligated, to issue a legal opinion addressing the availability of pledged revenues, the right to increase rates, and subordination of the pledge.

Section 9. This Resolution hereby supersedes all existing resolutions or portions thereof of the Board of County Commissioners which contains terms or provisions that are in direct conflict with and cannot be harmonized with the provisions of this Resolution.

Section 10. If any section, sentence, clause, or other portion of this Resolution is held invalid or unconstitutional by a court of competent jurisdiction, such invalidity or unconstitutionality shall not be construed as to render invalid or unconstitutional the remaining sections, sentences, clauses, or provisions of this Resolution.

Section 11. This Resolution shall take effect immediately upon its passage and adoption.

DULY ADOPTED with a quorum present and voting, on the 3rd day of March, 2026.

BOARD OF COUNTY COMMISSIONERS
OF MANATEE COUNTY, FLORIDA

By: _____
Chairperson

ATTEST: ANGELINA COLONNESO
CLERK OF THE CIRCUIT COURT AND COMPTROLLER

By: _____
Deputy Clerk

EXHIBIT A

Form of Loan Application

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE REVOLVING LOAN PROGRAM FOR DRINKING WATER FACILITIES

LOAN APPLICATION

Florida Department of Environmental Protection
State Revolving Fund Program
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000

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LOAN APPLICATION

(1) SUBMITTAL. Submit the application and attachments to the Department of Environmental Protection, MS 3505, State Revolving Fund Program, Marjorie Stoneman Douglas Building, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000. The application (and supporting documentation) may be submitted electronically to the Department's Project Manager.

(2) COMPLETING THE APPLICATION.

(a) This application consists of five parts: (I) ADMINISTRATIVE INFORMATION; (II) PROJECT INFORMATION; (III) FINANCIAL INFORMATION; (IV) AUTHORIZATION AND ASSURANCES; and (V) SUPPLEMENTARY INFORMATION.

(b) All information provided on this application must be printed. Monetary amounts may be rounded.

(c) Forms and attachments to be submitted are denoted with italic print.

(3) ASSISTANCE. Completing this application may require information that can be obtained from the Drinking Water State Revolving Fund Program staff. Please email SRF_Reporting@dep.state.fl.us for assistance in completing this application.

PART I - ADMINISTRATIVE INFORMATION

(1) PROJECT SPONSOR Manatee County

Federal Employer Identification Number 59-60000727

DUNS Number

(2) AUTHORIZED REPRESENTATIVE (person authorized to sign or attest loan documents).

Name Charlie Bishop Title County Administrator

Telephone 941-748-4501 Email charlie.bishop@mymanatee.org

Mailing Address 1112 Manatee Avenue West, Bradenton, FL 34205

(3) PRIMARY CONTACT (person to answer questions regarding this application).

Name Patrick Shea Title Director, Utilities Department

Telephone 941-792-8811 x5389 Email patrick.shea@mymanatee.org

Employer Manatee County Utilities Department

Mailing Address 3647 Cortez Road W. Bradenton, FL 34210

(4) ADDITIONAL CONTACTS. If more than one additional person is to receive copies of Department correspondence, attach the information (*Attachment #_____*).

Name Christopher Collins Title Deputy Director, Utilities Department

Telephone 941-792-8811 x5275 Email chris.collins@mymanatee.org

Employer Manatee County Utilities Department

Mailing Address 3647 Cortez Road W. Bradenton, FL 34210

(5) PROJECT NUMBER (listed on the Department's priority list). DW41015

(6) INTERIM FINANCING. A local government project sponsor that has interim financing may be subject to certain conditions regarding such financing.

Is the project currently being funded with interim financing? ☐ Yes ☒ No

PART II – PROJECT INFORMATION

If you are applying for a planning or design loan for a project that will involve construction, complete only Subpart A below. If you are applying for a loan to construct a project that is already planned and designed, complete only Subpart B below.

A. PLANNING OR DESIGN PROJECT

Information should be provided for each separate facility to be planned and designed as appropriate. For design/build projects (not eligible for design loans) or those where multiple facilities, segments, or phases are involved, please attach information for activities, schedule, and cost for each. (*Attachment #*1____)

(1) ACTIVITIES. Attach a brief description of the scope of planning and design activities to be financed by this loan. Include a list of any engineering services to be performed. (*Attachment #*1____) Are these activities the same as those scheduled on the *Request for Inclusion Form*? ■ Yes ☐ No. If "No", please explain. (*Attachment #*____)

(2) SCHEDULE.

(a) Provide proposed completion dates for the items. (Please call Department staff to discuss time frames needed to complete required tasks.)

Planning documentation	November 2026
Engineering design	July 2027
Certification of site availability	July 2027
Permitting	July 2027

(b) Do you anticipate that an interlocal agreement with another party will be necessary to implement the project? If "Yes", please explain. (*Attachment #*____) ☐ Yes ☒ No

(c) Is this a design/build project? ☐ Yes ☐ No

(3) COST. Is the cost information submitted for the planning or design loan priority list current? If "No", please explain and submit revised cost information using the appropriate page of the *Request for Inclusion Form*. (Attachment #____) Note that the disbursable amount will be limited to the priority list amount. ■ Yes ☐ No

PLANNING OR DESIGN APPLICANTS PROCEED TO PART III.

B. CONSTRUCTION PROJECT

(1) ACTIVITIES.

(a) Attach a brief description of construction activities to be financed by this loan. Include a list of the contracts (by title) corresponding to the plans and specifications accepted by the Department (*Attachment #*____).

Are these contracts the same as those scheduled on the *Request for Inclusion Form*? ☐ Yes ☐ No

If "No", please explain. (*Attachment #*____)

(b) Have any of the contracts been bid? ☐ Yes ☐ No

If "Yes", indicate which contracts have been bid. (*Attachment #*____)

(c) Was planning or design for this project financed in another SRF loan? ☐ Yes ☐ No

If "Yes", give the SRF loan number. _____

(d) Does this project involve an interlocal agreement with other local governments or other entities? ☐ Yes ☐ No

If "Yes", attach a copy of the interlocal agreement. (*Attachment #*____)

Is the interlocal agreement fully executed and enforceable? ☐ Yes ☐ No

If "No", please explain (*Attachment #_____*).

(2) SCHEDULE. (month and year)

(a) Anticipated notice to proceed for first construction contract. _____

(b) Anticipated completion of all construction contracts. _____

(3) COST. Is the cost information submitted for the priority list current? ☐ Yes ☐ No

If "No", please explain and submit revised cost information using the appropriate page of the *Request for Inclusion Form*. (*Attachment #_____*) Note that the disbursable amount will be limited to the priority list amount.

PART III - FINANCIAL INFORMATION

Estimates of the capitalized interest, interest rate, pledged revenue coverage, limitations on annual loan amounts for large projects, applicability and amount of repayment reserves, amount of the loan service fee and any other information may be obtained by contacting staff in the State Revolving Fund Management Section.

(1) PRINCIPAL. The requested amount of the loan which does not include capitalized interest is $35,139,169

Note that the disbursable amount will be limited to the priority list amount and must be consistent with the project information provided under **PART II** of this application. Also note that the capitalized interest is an inexact estimate, and it is subject to adjustment by the Department to reflect actual disbursement timing. The principal amount of the loan does not include the loan service fee.

(2) TERMS AND REPAYMENT.

(a) Loans for planning and design shall be amortized over 10 years. Construction loans to local government project sponsors are amortized over the lesser of useful life of the project or 20 years unless the project is to serve a small community qualifying as financially disadvantaged. Construction loans to financially disadvantaged small communities may be amortized over the lesser of useful life of the project or 30 years. Construction loans to non-governmental project sponsors are amortized over the lesser of the useful life of the project or 20 years. Interest charges and principal are paid semiannually.
What is the useful life of the project? 30 (years)
Over how many years would you like to amortize the loan? 10 (years)

(b) List all revenues that are to be pledged for repayment of this loan. Pleding net revenues of the Utilities System.

(c) Pledged revenue receipts or collections by the project sponsor must exceed the amount of the repayments due to the Department unless there are other collateral provisions. The excess revenue, or coverage, generally is 15% of each repayment.
What coverage is proposed for the loan? 15 % (coverage percentage)

(d) Is any other financial assistance being applied to this project? ☐ Yes ☒ No

If "Yes", please list. (*Attachment #_____*)

(3) ANNUAL FUNDING LIMIT. Large project funding (generally, loans in excess of $10 million) may be provided in increments pursuant to the initial loan agreement and subsequent amendments.

(4) INFORMATION ON LIENS.

(a) Describe, if applicable, all debt obligations having a prior or parity lien on the revenues pledged to repay this loan. (*Attachment #2____*) For example: City Name, Florida, Water and Sewer System Revenue Bonds, Series 1996, issued in the amount of $10,000,000, pursuant to Ordinance No. 93-104, as amended and supplemented by Ordinance No. 96-156.

(b) Using the Part V, *Schedule of Prior and Parity Liens*, provide debt service information, if applicable, on each prior and parity obligation.

(c) For the listed obligations, provide a copy of the ordinance(s), resolution(s), official statement(s), or pages thereof, setting forth the definitions, use of proceeds, debt service schedule, pledged revenues, rate covenants, provisions for issuing additional debt, provisions for bond insurance, and debt rating. (*Attachment #*3____).

(d) Describe any other notes and loans payable from the revenues pledged to repay this loan. (*Attachment #*_____).

(5) ACTUAL AND PROJECTED REVENUES.

(a) Complete the Part V, *Schedule of Actual Revenues and Debt Coverage* for the past two fiscal years.

(b) Complete the Part V, *Schedule of Projected Revenues and Debt Coverage*, demonstrating the availability of pledged revenues for loan repayment.

(6) AVAILABILITY OF PLEDGED REVENUES. All sources must be supported by a written legal opinion. (*Attachment #*4____) The opinion must address the following:

(a) Availability of the revenues to repay the loan.

(b) Right to increase rates at which revenues shall be collected to repay the loan.

(c) Subordination of the pledge if pledged revenues are subject to a prior or parity lien.

(7) LOAN SERVICE FEE. A loan service fee is assessed on each loan. The fee is not part of the loan. The fee along with interest thereon will be deducted from the first available repayments after the final amendment to the loan agreement.

PART IV – AUTHORIZATION AND ASSURANCES

(1) AUTHORIZATION. Provide an authorizing resolution of the Applicant's governing body or other evidence of authorization (*Attachment #*5____) for the following:

(a) Pledging revenues to repay the loan.

(b) Designation of the Authorized Representative(s) to file this application, provide assurances, execute the loan agreement, and represent the Applicant in carrying out responsibilities (including that of requesting loan disbursements) under the loan agreement.

(2) ASSURANCES. The Applicant agrees to comply with the laws, rules, regulations, policies and conditions relating to the loan for this project. Applicants should seek further information from the Drinking Water State Revolving Fund Program staff as to the applicability of the requirements if the necessity for the assurances is of concern. Specifically, the Applicant certifies that it has complied, as appropriate, and will comply with the following requirements, as appropriate, in undertaking the Project:

(a) Assurances for capitalization grant projects.

1. Complete all facilities for which funding has been provided.

2. The Applicant is advised, pursuant to 40 CFR 35 Section 35.3575, that a number of Federal law, executive orders, and government-wide policies can apply to your project or activity that is receiving Federal financial assistance. The Applicant agrees to read those provisions regarding the application of Federal cross-cutting authorities (cross-cutters) to determine their applicability to your specific project or activity.

(b) Assurances for other projects. Please note that Florida Statutes are available at http://www.leg.state.fl.us. They are also available at the following physical address: Florida Department of State Division of Library and Information Services R.A. Gray Building 500 South Bronough Street Tallahassee, Florida 32399-0250.

1. Chapter 161, Part I, F.S., "Beach and Shore Preservation Act" and Part III, "Coastal Zone Protection Act of 1985" which regulate coastal zone construction and all activities likely to affect the condition of the beaches or shore.

2. Chapter 163, Part II, F.S., the "Local Government Comprehensive Planning and Land Development Regulation Act" which requires units of local government to establish and implement comprehensive planning programs to control future development.

3. Chapter 186, F.S., State and Regional Planning, which requires conformance of projects with Regional Plans and the State Comprehensive Plan.

4. Chapter 253, F.S., "Emergency Archaeological Property Acquisition Act of 1988" which requires protection of archaeological properties of major statewide significance discovered during construction activities.

5. Chapter 258, Part III, F.S., which requires protection of components or potential components of the national wild and scenic rivers system.

6. Chapter 267, F.S., the "Florida Historical Resources Act" which requires identification, protection, and preservation of historic properties, archaeological and anthropological sites.

7. Chapter 287, Part I, F.S., which prohibits parties convicted of public entity crimes or discrimination from participating in State-assisted projects and which requires consideration of the utilization of Minority Business Enterprises in State-assisted projects.

8. Chapter 372, F.S., the Florida Endangered and Threatened Species Act which prohibits the killing or wounding of an endangered, threatened, or special concern species or intentionally destroying their eggs or nest.

9. Chapter 373, Part IV, F.S., Florida Water Resources Act of 1972, which requires that activities on surface waters or wetlands avoid adversely affecting: public health, safety, welfare, or property; conservation of fish and wildlife, including endangered or threatened species or their habitats; navigation or the flow of water; the fishing or recreational values or marine productivity; and significant historical and archaeological resources.

10. Chapter 380, Part I, F.S., Florida Environmental Land and Water Management Act of 1972 as it pertains to regulation of developments and implementation of land and water management policies.

11. Chapter 381, F.S., Public Health, as it pertains to regulation of onsite wastewater systems.

12. Chapter 403, Part I, F.S., Florida Air and Water Pollution Control which requires protection of all waters of the state.

13. Chapter 582, F.S., Soil and Water Conservation Act which requires conformance with Water Management District's regulations governing the use of land and water resources.

14. Governor's Executive Order 95-359, which requires State Clearinghouse review of project planning documentation and intergovernmental coordination.

(c) Assurances for all projects. The loan recipient certifies that it is not listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension."

I, the undersigned Authorized Representative of the Applicant, hereby certify that all information contained herein and in the attached is true, correct, and complete to the best of my knowledge and belief. I further certify that I have been duly authorized to file the application and to provide these assurances.

Signed this _____ Day of _____, 20 _____

Authorized Representative _____ _____

(signature) *(name typed or printed)*

Attachments

PART V – SUPPLEMENTARY INFORMATION

SCHEDULE OF PRIOR AND PARITY LIENS
(EXCLUDING SRF LOANS)

List annual debt service beginning two years before the anticipated loan agreement date and continue at least three additional fiscal years. Use additional pages as necessary.

Identify Each Obligation	**#1** Series 2015 Bonds	**#2** Series 2017 Bonds	**#3** Series 2018 Bonds
Coverage	115 %	115 %	115 %
Insured?	____ Yes X No	____ Yes X No	____ Yes X No

Fiscal Year	**Annual Debt Service (Principal Plus Interest)** #1	#2	#3	**Total Debt Service**	**Total Debt Service Incl. Coverage**
20 15	$ 1,745	$	$	$ 1,745	$
20 16	$ 3,951	$	$	$ 3,951	$
20 17	$ 7,111	$	$	$ 7,111	$
20 18	$ 7,105	$ 1,980	$	$ 9,085	$
20 19	$ 7,109	$ 2,611	$ 2,859	$ 12,579	$
20 20	$ 7,113	$ 2,611	$ 2,774	$ 12,498	$
20 21	$ 7,108	$ 5,256	$ 2,774	$ 15,138	$
20 22	$ 3,156	$ 5,249	$ 4,364	$ 12,769	$
20 23	$ 3,156	$ 5,241	$ 4,365	$ 12,758	$
20 24	$ 4,606	$ 5,241	$ 4,361	$ 14,208	$
20 25	$ 4,688	$ 5,128	$ 4,364	$ 14,180	$
20 26	$ 1,694	$ 5,129	$ 4,362	$ 11,185	$
20 27	$ 1,694	$ 5,127	$ 4,360	$ 11,181	$
20 28	$ 1,694	$ 5,132	$ 4,364	$ 11,190	$
20 29	$ 1,694	$ 5,133	$ 4,365	$ 11,192	$
20 30	$ 1,694	$ 5,135	$ 4,362	$ 11,191	$
20 31	$ 1,694	$ 5,128	$ 4,364	$ 11,184	$
20 32	$ 1,694	$ 5,131	$ 4,360	$ 11,185	$
20 33	$ 1,694	$ 5,129	$ 4,362	$ 11,185	$
20 34	$ 1,694	$ 5,132	$ 4,362	$ 11,188	$
20 35	$ 1,694	$ 5,127	$ 4,362	$ 11,183	$
20 36	$ 11,669	$	$ 4,363	$ 16,032	$
20 37	$ 11,670	$	$ 4,361	$ 16,031	$
20 38	$ 11,670	$	$ 4,361	$ 16,031	$
20 39	$ 11,668	$	$ 4,363	$ 16,031	$
20 40	$	$	$ 4,362	$ 4,362	$
20 41	$	$	$ 4,362	$ 4,362	$

PART V – SUPPLEMENTARY INFORMATION

SCHEDULE OF ACTUAL REVENUES AND DEBT COVERAGE

(Provide information for the two fiscal years preceding the anticipated date of the SRF loan agreement.)

		Year 2023	Year 2024
(a)	Operating Revenues (Source)		
	Charges for Services	178,513	197,067
	Miscellaneous	1,760	421
(b)	Interest Income	23,846	35,772
(c)	Other Income or Revenue (Identify)		
	Operating Grants/Contr		341
	Gain on Disposition Assets	62	15
(d)	Total Revenues	204,181	233,616
(e)	Operating Expenses (excluding interest on debt, depreciation, and other non-cash items)	136,344	147,763
(f)	Net Revenues [(f) = (d) – (e)]	67,837	85,853
(g)	Debt Service (including any required coverage)	19,631	22,845

(h) Attach audited annual financial report(s), or pages thereof, or other documentation necessary to support the above information. Include any notes or comments from the audit reports regarding compliance with covenants of debt obligations having a prior or parity lien on the revenues pledged for repayment of the SRF Loan. (*Attachment #* 6)

(i) Attach worksheets reconciling this page with the appropriate financial statements (for example, backing out depreciation and interest payments from operating expenses). (*Attachment #* 7)

(j) If the net revenues were not sufficient to satisfy the debt service and coverage requirement, please explain what corrective action was taken. (*Attachment #*_____)

PART V – SUPPLEMENTARY INFORMATION

SCHEDULE OF PROJECTED REVENUES AND DEBT COVERAGE

Begin with the fiscal year preceding first anticipated semiannual loan payment and continue for at least three additional years. Attach a separate page for previous State Revolving Fund loans.

		Year 2025	Year 2026	Year 2027	Year 2028	Year 2029
(a)	Operating Revenue	218,236	238,672	264,261	288,749	315,570
(b)	Interest Income	12,335	3,306	3,390	3,506	4,331
(c)	Other Income or Revenue (identify)					
	Contributions	86,655	291	291	291	291
	Miscellaneous/Grants	3,589	1,011	1,011	1,011	1,011
(d)	Total Revenues	320,815	243,280	268,953	293,557	321.203
(e)	Operating Expenses (excluding interest on debt, depreciation, and other non-cash items)	199,035	204,179	207,496	215,114	250,841
(f)	Net Revenues (f = d - e)	121,780	39,101	61,457	78,443	70,362
(g)	Revenue (including coverage) pledged to debt service, excluding SRF loans	33,514	33,671	33,852	34,045	34,250
(h)	Revenue (including coverage) pledged to outstanding SRF loans	-	-	-	-	-
(i)	Revenue Available for this SRF Loan [(i) = (f) – (g) – (h)]	88,266	5,430	27,605	44,398	36,112

(j) Identify the source of the above information and explain methods used to develop the projections (*Attachment #_____*). Include an explanation of any revenue and expense growth or other adjustments; for example, any rate increases, service growth, inflation adjustments, expense adjustments reflecting the cost of operating additional facilities, or other considerations.

(k) For construction loans, are the above projections consistent with the accepted financial feasibility information in the planning documents? ☐ Yes ☐ No

If "No", please explain. (*Attachment #_____*)

PART V – SUPPLEMENTARY INFORMATION

LIST OF ATTACHMENTS

LIST OF ATTACHMENTS. This application requires the submittal of *Attachments* to provide supplemental information. The application is not complete without the completed *List of Attachments*. Please list all attachments that you are including with this application form.

Attachment	Number
Official Project Scope	1
Debt obligations having prior or parity lien	2
Supporting documents for Debt obligations	3
Legal Opinion by County Attorney's Office	4
Board of County Commissioners' Authorizing Resolution	5
Fiscal Years 2023 and 2024 ACFR's/Financial Statements	6
ACFR Reconciling Work Paper	7

PART V – SUPPLEMENTARY INFORMATION

SCHEDULE OF PRIOR AND PARITY LIENS
(EXCLUDING SRF LOANS)

List annual debt service beginning two years before the anticipated loan agreement date and continue at least three additional fiscal years. Use additional pages as necessary.

Identify Each Obligation	**#4** Series 2023	**#5** Advanced Metering Infra Note, 2024	**#6** Series 2025
Coverage	115 %	115 %	115 %
Insured?	____ Yes X No	____ Yes X No	____ Yes X No

Fiscal Year	**Annual Debt Service (Principal Plus Interest) #1**	**#2**	**#3**	**Total Debt Service**	**Total Debt Service Incl. Coverage**
20 23	$ 3,023	$	$	$ 15,781	$ 18,148
20 24	$ 8,638	$	$	$ 22,846	$ 26,273
20 25	$ 11,788	$ 6,007	$	$ 31,975	$ 36,771
20 26	$ 11,790	$ 6,007	$ 2,848	$ 31,650	$ 36,397
20 27	$ 11,790	$ 6,007	$ 2,958	$ 31,936	$ 36,726
20 28	$ 11,791	$ 6,007	$ 3,077	$ 32,065	$ 36,875
20 29	$ 11,789	$ 6,007	$ 3,210	$ 32,198	$ 37,027
20 30	$ 11,792	$ 6,007	$ 3,337	$ 32,327	$ 37,176
20 31	$ 11,791	$ 6,007	$ 3,482	$ 32,464	$ 37,334
20 32	$ 11,790	$ 6,007	$ 3,624	$ 32,606	$ 37,470
20 33	$ 11,788	$ 6,007	$ 3,787	$ 32,767	$ 37,682
20 34	$ 11,790	$ 6,007	$ 3,939	$ 32,924	$ 37,863
20 35	$ 11,791	$ 6,007	$ 4,116	$ 33,097	$ 38,062
20 36	$ 11,789	$ 6,007	$	$ 33,828	$ 38,902
20 37	$ 11,789	$ 6,007	$	$ 33,827	$ 38,901
20 38	$ 11,791	$ 6,007	$	$ 33,827	$ 38,901
20 39	$ 11,789	$ 6,007	$	$ 38,827	$ 38,901
20 40	$ 11,787	$ 6,007	$	$ 22,156	$ 25,479
20 41	$ 11,790	$ 6,007	$	$ 22,159	$ 25,483
20 42	$ 11,791	$ 6,007	$	$ 17,798	$ 20,468
20 43	$ 11,789	$ 6,007	$	$ 17,796	$ 20,465
20 44	$ 11,790	$ 6,007	$	$ 17,797	$ 20,467
20 45	$ 11,792	$	$	$ 11,792	$ 13,561
20 46	$ 11,790	$	$	$ 11,790	$ 13,559
20 47	$ 11,791	$	$	$ 11,791	$ 13,560
20 48	$ 11,792	$	$	$ 11,792	$ 13,561
20 49	$ 11,789	$	$	$ 11,789	$ 13,557

From: Alicia Stull <alicia.stull@mymanatee.org>
Sent: Friday, October 9, 2026 3:00 PM
To: Chad Butzow <chad.butzow@mymanatee.org>
Cc: Bryan Parnell <bryan.parnell@mymanatee.org>; Patrick Shea <patrick.shea@mymanatee.org>; Bill Bowers <bill.bowers@mymanatee.org>; Sue Dunn <sue.dunn@mymanatee.org>; Pamela DAgostino <pamela.dagostino@mymanatee.org>; Christopher DeCarlo <christopher.decarlo@mymanatee.org>; Kate Welch <kate.welch@mymanatee.org>
Subject: Pipeline Resiliency Project; Facilities Plan; Legal Review of Draft Resolution R-26-137; RLS No. 25/26-0524

On behalf of Deputy County Attorney Christopher M. De Carlo:

Dear Chad:

In this Request for Legal Services (RLS), the Utilities Department asked the County Attorney's Office (CAO), to review and revise, on an expedited basis, for Board consideration, a draft resolution, and a facilities plan, in furtherance of obtaining funding from the Florida Department of Environmental Protection (FDEP) for a loan from the State Revolving Fund Loan Program for Drinking Water Facilities (Program) in connection with the implementation of the County's East County Wellfield Pipeline Resiliency Project (Project).

The following facts are relevant to my response:

1. The Board adopted Resolution R-26-032 on March 3, 2026, which authorized implementation of the Project, authorized execution and delivery of the Program's loan application, and contemplated a loan agreement between FDEP and the County. To date, a loan agreement has not been provided to the County by FDEP. FDEP recently advised the Utilities Department that a Board-approved Project plan is required prior to loan funding.

2. The Utilities Department engaged Carollo Engineers to prepare the East County Wellfield Pipeline Resiliency Project Facilities Plan (Facilities Plan) to fulfill FDEP's planning requirements, and FDEP requested that Utilities staff provide an accompanying resolution in connection with the submittal of the Facilities Plan to FDEP to advance the Project through the Program process.

3. As written, the draft resolution anticipates staff will need to subsequently present any FDEP-provided loan agreement(s), or other documents related to the Project requiring Board approval, to the Board for consideration and approval, in a form acceptable to the County.

4. Subsequent to the initial RLS submission, staff narrowed its request for the CAO to review only the legal sufficiency of the resolution. Thus, the CAO has not undertaken any legal review of the Facilities Plan.

I provide the following advice and comments in response to this RLS:

1. Attached is the draft resolution:

- Adopting the Facilities Plan and allowing for the County Administrator, or his or her designee, to submit the Facilities Plan and related supporting documentation to FDEP and to provide such administrative, technical, and non-substantive supplemental information as may reasonably be required by FDEP for its review of the Facilities Plan.

- Allowing County staff to undertake administrative and technical activities reasonably necessary to advance FDEP review of the Facilities Plan, and continue development of the Project consistent with existing County authority, approved budgets, procurement requirements, and applicable law.

- Directing staff to bring back any loan agreement(s), or other documents requiring approval by the Board, to the Board for consideration.

2. The Facilities Plan (without appendices, tables or figures), as discussed in an October 7, 2026, telephone conference with staff, is attached as Exhibit 1, and the Affidavit of Publishing with its corresponding public notice is attached as Exhibit 2 to the draft resolution. Staff should ensure the full and complete Facilities Plan with Appendix A through N, and its various tables and figures, is included as supporting documentation to the agenda item.

3. In furtherance of this RLS, our office consulted with the Clerk's Finance Department, the County's outside bond counsel, and the County's financial advisor, and discussed with the Department, the priority of the anticipated loan from FDEP in consideration of other Utilities System debt. Our office also consulted with FDEP's Program Administrator and newly assigned Project Manager as to FDEP's Program requirements, and shared applicable FDEP documentation with staff.

4. Assuming the draft resolution is adopted and the Facilities Plan is approved, and FDEP presents the County with a loan agreement for the Board's consideration, the County will need to comply with certain disclosure requirements regarding any existing and future senior bonds, senior lien refunding bonds or debt, and senior lien lease purchase agreements. This office previously advised of these disclosure requirements in response to RLS No. 25/26-0199 and the Department should promptly notify the CAO and the Clerk's Office when a loan agreement is received from FDEP.

Provided the Utilities Department adheres to the legal advice rendered in connection with this RLS, and the draft resolution is presented to the Board exactly in the form attached to this response, I have no objection from a legal standpoint to the attached

being presented to the Board for review and consideration. This completes my response to your RLS. Please contact me if you have any questions, or if I can be of further assistance.

Sincerely,

Alicia M. Stull, ACP, FRP
Advanced Certified Paralegal
Florida Registered Paralegal

Manatee County Government
Office of the County Attorney
Post Office Box 1000
Bradenton, Florida 34206-1000
Telephone: (941) 745-3750
Facsimile: (941) 749-3089
alicia.stull@mymanatee.org

Pam Stump – Senior Administrative Assistant
Manatee County Government
Utilities
3647 Cortez Road West
Bradenton, Fl 34210
941-792-8811 ext 5403
Mymanatee.org

Under Public Records Act, email communications sent to and from this address may be subject to public disclosure.
Please be advised that any correspondence may be retained as a public record and could be disclosed upon request.

October 20, 2026 - Regular Meeting

Subject
Updates to Agenda - October 19, 2026

Category
ANNOUNCEMENTS

Briefings
None

Contact and/or Presenter Information
Bobbi Roy, Agenda Division Supervisor, ext 6878

Action Requested
Updates incorporated appropriately

Enabling/Regulating Authority
N/A

Applicable Advisory Board
N/A

Background Discussion
Below are agenda updates (dated 10/19/26) for the meeting of October 20, 2026:

GENERIC PUBLIC COMMENTS
- This agenda was updated with additional comments.

CONSENT AGENDA
Natural Resources
Item 29, Approval of FY27 Tree Trust Fund Application for Hidden Harbor Park Native Tree Restoration; and Adoption of Budget Amendment Resolution B-27-008, Sherri Swanson, Ecological & Marine Resources Division Manager - Countywide
- This agenda item was updated to change the presenter from Sherri Swanson, Ecological & Marine Resources Division Manager, to Charlie Hunsicker, Natural Resources Director.

Property Management
Item 39, Execution of Conveyance and Construction Agreement between North River Village GEC, LLC and Manatee County, for property located at 6100 US 301 North, Ellenton, Florida 34222 - Peter Morrow, Property Acquisition Division Manager - District 1
- This agenda item was updated with the executed Anti-Human Trafficking Affidavit.

Utilities

Item 50, Adoption of Resolution R-26-137, approving the Pipeline Resiliency Project Facilities Plan, Patrick Shea, Utilities Director, and Chad Butzow, Chief Utilities Engineer

- This agenda item was updated to delete attachments Affidavit of Publishing FDEP SAHM Pipeline Resiliency Facility Plan and the Public Meeting Sign In Sheet and include revised Pipeline Resiliency Facilities Plan [attached to the resolution and as a separate attachment].

Item 51, Adoption of Resolution R-26-040, adopting the revised Cross Connection Control Manual, Patrick Shea, Utilities Director, and Olga Wolanin, Water Compliance Superintendent - Countywide

- This agenda was updated with public comments.

REGULAR

Property Management

Item 57, Execution of Contract for Sale and Purchase from the Shelley N. Chilton Trust for Bunker Hill Preserve (Environmental Lands Candidate Property previously referred to as Taylor Grade Road Property); Adoption of Budget Amendment Resolution B-27-016; and Adoption of Budget Amendment Resolution B-27-017, Kara Koenig, Environmental Lands Program Manager - District 1

- This agenda item was updated with the further revised Contract for Sale and Purchase correcting the signature date.

Item 58, License Agreement with SEMA Construction, Inc., concerning a portion of County Property located in Cortez, Florida 34215, Peter Morrow, Property Acquisition Division Manager - District 3

- This agenda was updated with additional public comments.

Item 59, Bishop Animal Shelter Update, Michelle Wehrle, Construction Services Division Manager - District 3

- This agenda was updated with public comments.

Community and Veterans Services

Item 60, Animal Services Advisory Board Recommendations – Reconsideration of Funding for Permanent Shade Structures (July 28, 2026 Agenda Item 19, Shade Component Only) and Preservation of the Lena Road Site for a Future Animal Services Use, Dena Sabou, Chair, Animal Services Advisory Board, and Johanna Beville, Program Analyst, Community and Veterans Services / Animal Services Advisory Board Staff Liaison – Countywide

- This agenda was updated with a public comment.

COMMISSIONER AGENDA ITEMS

Items for Discussion

Item 61, County Administrator Contract Discussion

- This agenda was updated with additional public comments.

Attorney Review

Not Reviewed (No apparent legal issues)

Instructions to Board Records
N/A

Cost and Funds Source Account Number and Name
N/A

Amount and Frequency of Recurring Costs
N/A

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support



East County Wellfield Pipeline Resiliency Project Facilities Plan

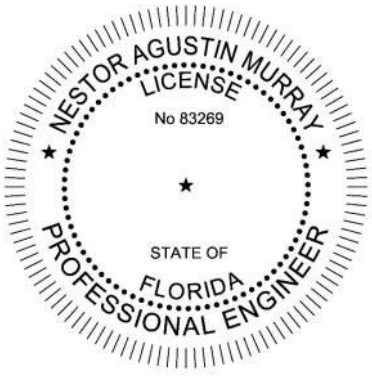
October 2026

MANATEE COUNTY UTILITIES

Pipeline Resiliency Project Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Funding Planning Support

East County Wellfield Pipeline Resiliency Project Facilities Plan

October 2026



This item has been digitally signed and sealed by Nestor Agustin Murray on the date adjacent to the seal. Signature must be verified on any electronic copies.

301 NORTH CATTLEMEN ROAD, SUITE 302 ▪ SARASOTA, FLORIDA 34232 ▪ P 941-371-9832

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Abbreviations

AAD	Annual Average Demand
AOI	Area of Interest
ASR	Aquifer Storage and Recovery
bls	Below Land Surface
County	Manatee County
CWA	Clean Water Act
DWSRF	Drinking Water State Revolving Fund
ECW	East County Wellfield
EDU	Equivalent Dwelling Unit
EPA	United States Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FLUCCS	Florida Land Use, Cover and Forms Classification System
FMSF	Florida Master Site File
ft/s	feet per second
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
gpcd	Gallons per Capita per Day
GW	Groundwater
HDD	Horizontal Directional Drilling
IAS	Intermediate Aquifer System
IMC	IMC-Manatee Wellfield
LOS	Level of Service
LMWTP	Lake Manatee Water Treatment Plant
M&O	Operations and Maintenance
mgd	Million Gallons per Day
MM	Maximum Month
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWGS	Northwest Ground Storage Tank and Booster Pump Station
PMD	Peak Monthly Demand
pph	persons per household
Project	Pipeline Resiliency Project
ROW	Right-of-Way

SAHM	Supplemental Appropriation for Hurricanes Helene and Milton
SAS	Surficial Aquifer System
SCADA	Supervisory Control and Data Acquisition
SHPO	State Historic Preservation Office
SR	State Road
SRF	State Revolving Fund
SWFWMD	Southwest Florida Water Management District
TDS	Total Dissolved Solids
UFA	Upper Floridan Aquifer
UPS	Uninterruptible Power Supply
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
WCP	Water Well Construction Permit
WTP	Water Treatment Plant
WUP	Water Use Permit

SECTION 1 INTRODUCTION

This planning-level package has been developed to meet the planning requirements for the Supplemental Appropriation for Hurricanes Helene and/or Milton (SAHM) disaster relief funds award program through the Florida Department of Environmental Protection (FDEP). The SAHM funding provided a total of $35,139,169, of which $17,569,584 is provided as principal forgiveness. The project is described in the Intended Use Plan as shown below in **Figure 1-1**.

Impacts

The City's primary water treatment plant sustained direct damage when the metal roof over the filter tanks was torn off, compromising plant function and safety. At the same time, operations crews were dispatched to repair multiple water main breaks with limited system support and aging backup power equipment.

XX. Manatee County - DW41015- $35,139,169

The proposed drinking water improvement projects by Manatee County are as follows:

1. Construction of two ground water production wells.
2. Installation of 20-inch raw water transmission main parallel to the current water transmission main.
3. Upgrading two degasifiers and internal hydraulic.
4. Installation of ground water treatment system electrical and ground water treatment system instrumentation/SCADA.

Impacts

During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage. Power outages were reported for Manatee County area during both Hurricanes Helene and Milton.

Figure 1-1 Manatee County SAHM Intended Use Plan Description

The Pipeline Resiliency Project is intended to improve the reliability and redundancy of Manatee County's raw water supply and transmission system between the East County Wellfield (ECW) and the Lake Manatee Water Treatment Plant (LMWTP). This Facilities Plan documents the planning basis, evaluates feasible transmission alternatives, identifies a preferred planning alternative, and defines the technical, environmental, operational, and implementation considerations to be refined during future design.

1.1 Background and Hurricane Impacts

The American Relief Act was enacted by the US Environmental Protection Agency (EPA) on December 21, 2024, which provided disaster relief supplemental funding to a variety of State Revolving Fund (SRF) programs, with a focus on repairing and recovering from damages from Hurricanes Helene, Milton and the Hawai'i wildfires. Manatee County (County), after submitting an RFI document for this program, was selected to receive funding. This report serves as the SAHM planning-level package and provides an analysis of the system needs, proposed alternative solutions, environmental review, as well as the selected alternative and implementation plans. Refer to **Appendix A** (Supplemental Appropriation for Hurricane Helene and Milton (SAHM) Request for Inclusion Supporting Documentation DWSRF Funds) for further explanations of how the project is deemed eligible for SAHM funding.

1.1.1 Location Description

The County owns and operates its potable water, wastewater, and reclaimed water system (System) that provides water, wastewater, and reclaimed water services to various retail and wholesale utility customers within County limits and surrounding municipalities (City of Palmetto, the Town of Longboat Key, and the three cities of Anna Maria Island: Holmes Beach, Bradenton Beach, and Anna Maria). The County also supplies water to meet some of the needs of Sarasota County and minimal amounts to the City of Bradenton. In the outlying areas of the County, households not served by any of these water systems rely upon private wells. The County's water service area is shown in **Figure 1-2.** The census tracks within the service area are as follows:

- 12081001913
- 12081001914
- 12081002010
- 12081002014
- 12081002020

The County owns and operates the Lake Manatee WTP, a facility with a combined nominal treatment capacity of 84 million gallons per day (mgd), to serve their potable water supply system. This facility uses both groundwater and surface water, which are treated in two separate treatment trains:

- A 54-mgd-capacity train for surface water from Lake Manatee.
- A 30-mgd-capacity train for groundwater from County wellfields.

The County is located within the Southwest Florida Water Management District (SWFWMD), one of five water management districts in Florida responsible for managing groundwater and surface water resources. The County's water use permit (WUP), issued by SWFWMD, allocates surface and groundwater quantities and environmental compliance monitoring requirements.

According to the 2024 Public Supply Annual Report, the County, on average, withdrew 50.1 mgd of water to meet their customer and wholesale water user demands. Of the 50.1 mgd, 34.0 mgd was supplied from surface water from Lake Manatee, and the remaining 16.1 mgd was supplied by groundwater.

Lake Manatee is the County's primary source of potable water. The County is permitted to withdraw an annual average of 34.9 mgd and a maximum monthly amount of 46.07 mgd from the reservoir. The County also has the capability to recover stored water through its aquifer storage and recovery system (ASR) at the WTP. The system consists of six ASR wells and is designed to provide up to 10 mgd for up to 180 days during emergency conditions or approximately 120 days for operational use.

The County is also permitted to withdraw an annual average of 19.086 mgd of groundwater from the ECW, a property comprising approximately 33 square miles in northern Manatee County. The ECW is comprised of approximately 24.8 miles of 30-inch and 36-inch transmission mains that distribute raw water from seven production wells (ECW-1 through ECW-7) to Lake Manatee WTP. The wellfield is also supplemented by the three additional wells (Mosaic Wells1 through 3). Refer to **Figure 1-3** for existing relevant project infrastructure.

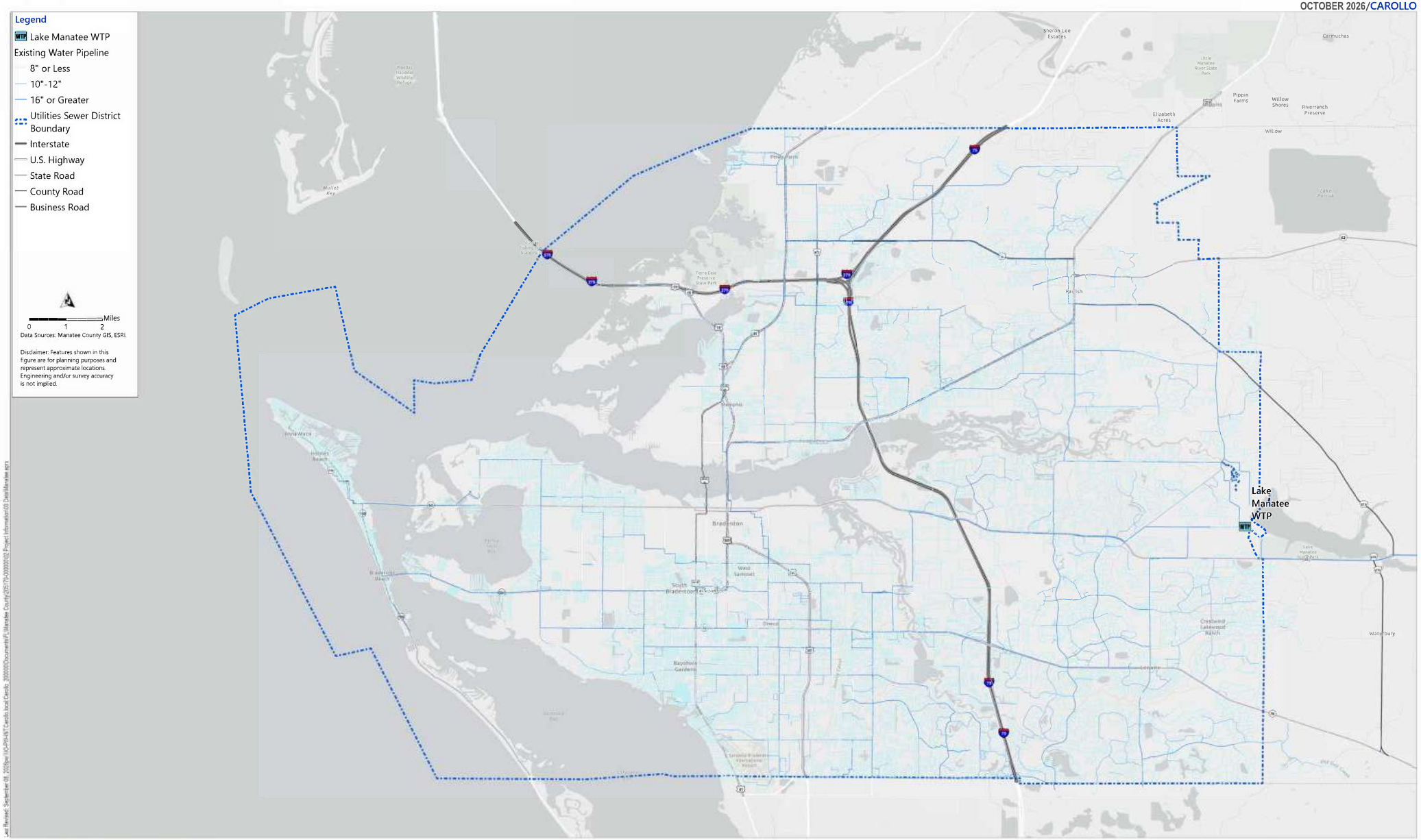


Figure 1-2 MANATEE COUNTY SERVICE AREA MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

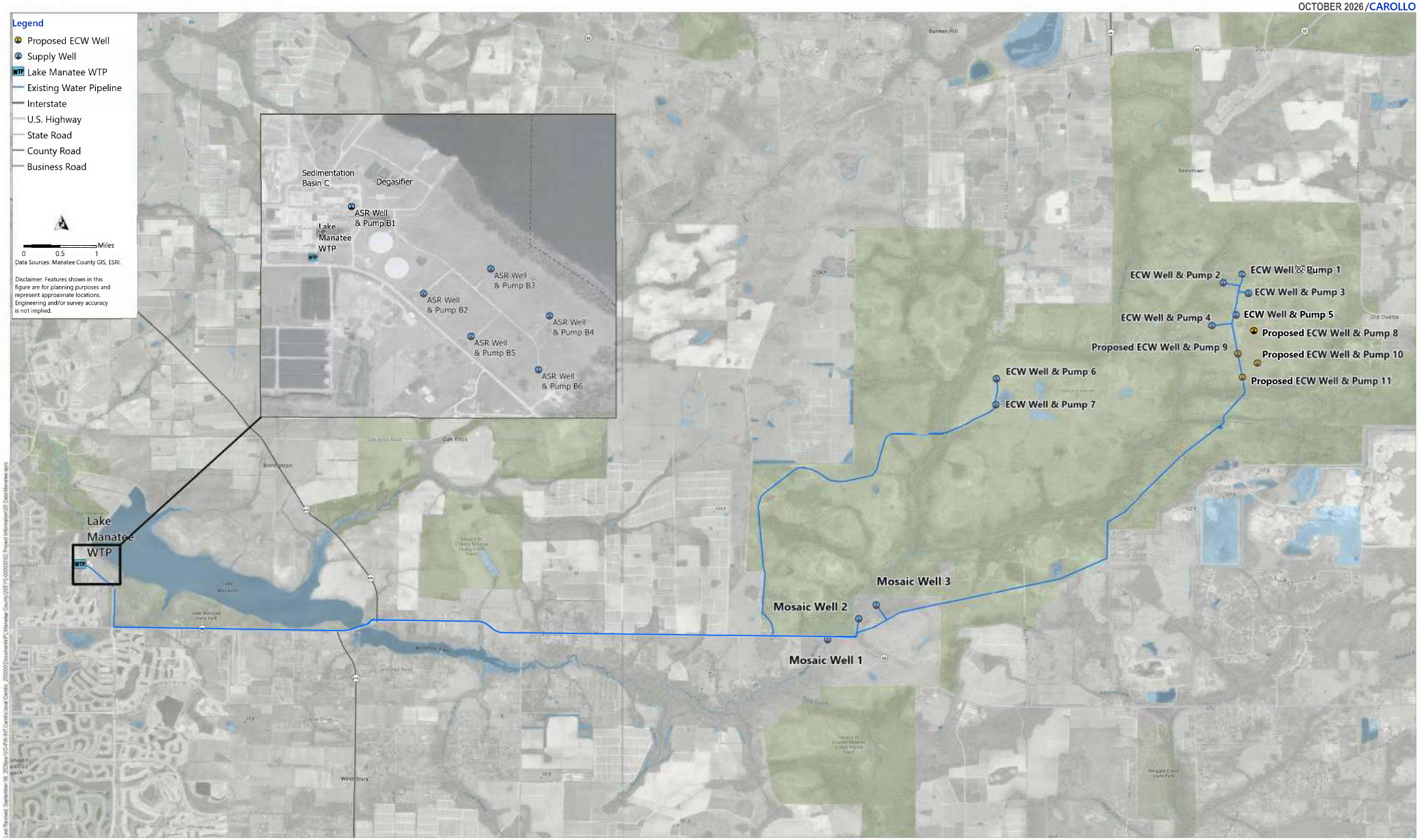


Figure 1-3 LAKE MANATEE WTP, EAST COUNTY WELLFIELD AND EXISTING PIPELINE ALIGNMENT MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

1.1.2 Hurricane Impacts

1.1.2.1 Hurricane Helene

Hurricane Helene made landfall on September 26th, 2024. Many stations experienced power outages during Hurricane Helene. There were multiple communication failures and instances where no data was collected throughout the Hurricane at three pump stations: Northwest Ground Storage Tank and Booster Pump Station (NWGS), Longboat Meter Station, and Cortez Booster Station. On the 26th, from 16:23 to 17:54, NWGS and Longboat Meter Station experienced power failure for their Uninterruptible Power Supplies (UPS). NWGS specifically experienced communications, power, and UPS failure from September 26th at 18:00 until November 2nd, 2024. At 18:20 on September 26th, the Longboat Meter Station also experienced communications, power, and UPS failure until November 2nd, 2024. Refer to **Appendix A** for pressure and flow data from the three pump stations between September 26th and 29th. At the Water Treatment Plant, the power was switched to generator power at 19:18 on the 26th and was restored to full power on the 28th.

The City of Bradenton's Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir experienced power outages due to Hurricane Helene and had to utilize generator backups during and after the storm. Manatee County stepped in to help the City of Bradenton augment their water supply since it compromised secondary drinking water parameter exceedances as a result of the storm. Specifically, 7 direct interconnects were made to support their water needs between the 27th and 28th and three water distribution locations were opened to support community water needs. The water treatment plant stabilized on the 29th, but chlorine levels were still high, so the distribution locations and direct interconnects continued till the 30th. Refer to **Appendix A** for the complete situation reports.

1.1.2.2 Hurricane Milton

Hurricane Milton made landfall shortly after Helene on October 9th, 2024. The Manatee County Water Treatment Plant power was switched to generator power at 18:15 on the 9th. The whole Manatee County distribution system felt the major effects of Hurricane Milton. Attached in Appendix A is a list of all the pipe breaks that were reported during and after the storm. There were 64 breaks of various pipe diameters and causes due to Milton's surge and debris between October 9th and October 12th. During Hurricane Milton, Bradenton's water plant was intentionally inactive, and water was on a bypass system with the goal to mitigate any impacts similarly to what the plant experienced in Helene. Yet, their plant still experienced water intrusion. Refer to **Appendix A** for the complete situation reports.

1.2 Project Scope and Objectives

Manatee County is applying for planning, design, and construction of their Pipeline Resiliency Project (Project). The Project will construct four groundwater (GW) production wells and place a 36-inch/42-inch raw water transmission main parallel to the current water transmission main. The well location and pipeline alignment will be determined in the planning and design phases but are anticipated to be near the current well field areas. The planning, design, and construction activities associated with the project are summarized (**Table 1-1**).

Table 1-1 Project Tasks Description

Task Name	Task Description
Planning	Project administration; Facilities Plan; route study; hydraulic assessment; environmental review; cost comparison; and supporting investigations.
Design	Survey, geotechnical investigation, subsurface utility engineering, environmental field verification, hydraulic and transient modeling, permitting, property coordination, and final design.
Construction	Construction of the selected transmission improvements and related wellfield, treatment, electrical, instrumentation, and SCADA components confirmed during design.

The selected Facilities Plan concept does not establish final design details. Final pipe diameters, materials, profiles, well equipment, treatment modifications, appurtenances, easements, and permitting requirements will be confirmed during design. The project objectives are to improve reliability and resiliency, provide adequate hydraulic performance, reduce environmental and permitting risk, support operational flexibility and emergency repair response, and preserve flexibility for future system needs.

1.2.1 Project Objectives

The main need and benefit of the Pipeline Resiliency Project is that it will create redundancy in Manatee County's raw water transmission system, providing increased resiliency in the event of a storm. During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage, further pointing to the need for system redundancy. This redundancy will beneficially support Manatee County's ability to provide water during major storm events and allow one pipe to remain operational if the other is damaged during a storm event, directing flows to the treatment plant and supporting future water security across the County.

To enhance system reliability and provide redundancy to the existing 30-inch and 36-inch transmission mains, three pipeline alternatives were developed and evaluated within the project corridor, as shown in **Figure 1-4**. Alternative 1 generally follows the existing transmission main corridor from the ECW to the Lake Manatee WTP. Alternative 2 originates at Wells and Pumps 1 through 5, extends to Wells and Pumps 6 and 7, and then follows the existing transmission main corridor to the Lake Manatee WTP. Alternative 3 consists of two segments: the first connects Wells and Pumps 1 through 5 to Wells and Pumps 6 and 7, while the second extends from the existing transmission main corridor along SR 64 to the Lake Manatee WTP.

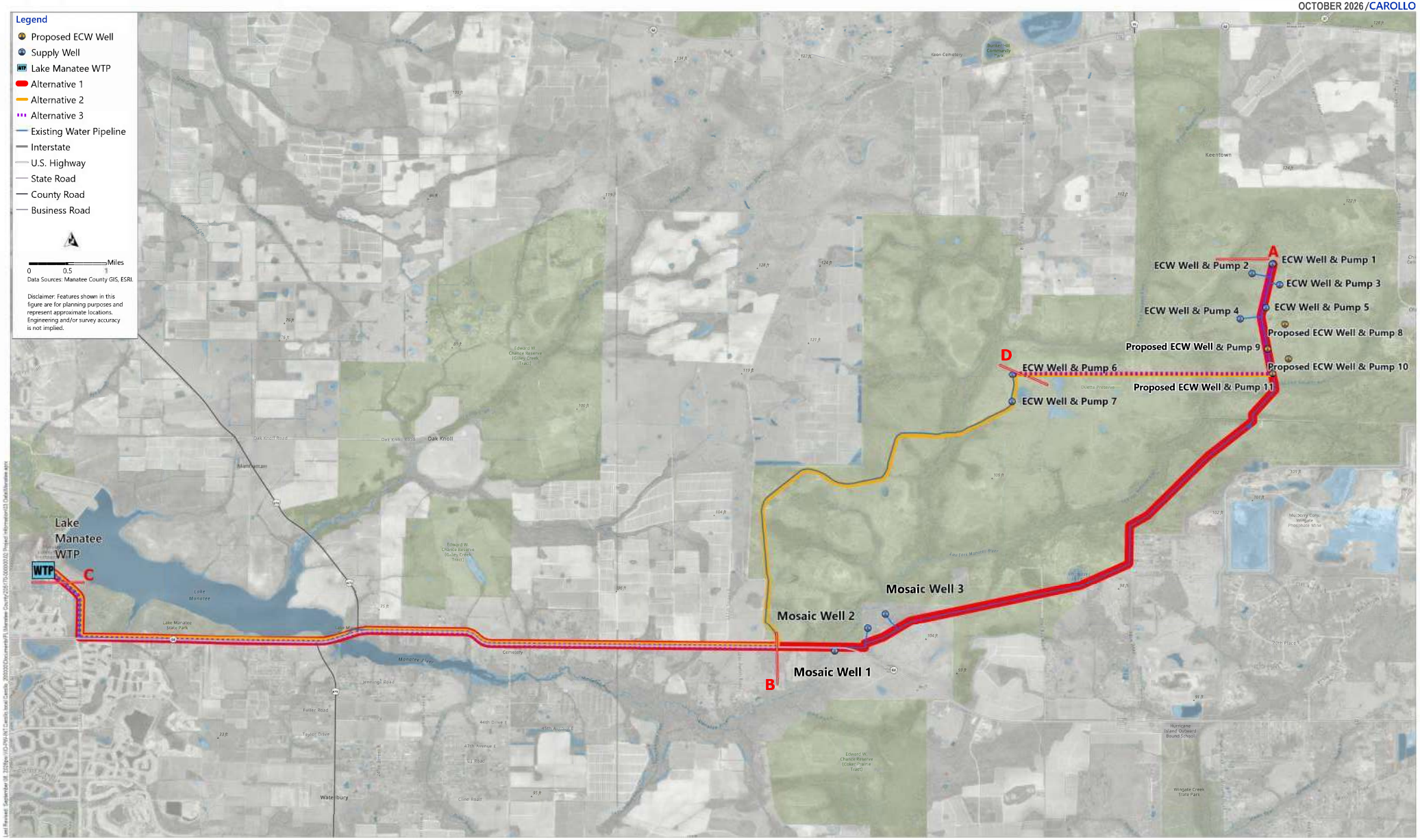


Figure 1-4 ECW PROPOSED NEW WELLS AND PIPELINE ALIGNMENT ALTERNATIVES
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 2 EXISTING AND FUTURE CONDITIONS

2.1 Description and Climate of Planning Area

The planning area is in eastern Manatee County, Florida, extending from the Lake Manatee WTP on SR 64 northeast toward the ECW and Duette Preserve. The predominantly rural corridor contains agricultural lands, natural habitats, conservation areas, road rights-of-way, utility corridors, wetlands, drainage features, and uplands within the Lake Manatee watershed. The draft planning-area population estimate for 2025 is approximately 468,200 residents, while the project corridor itself is less densely developed than western Manatee County.

The region has a humid subtropical climate with year-round warm temperatures and a pronounced summer wet season. The corridor generally ranges from approximately 30 to 90 feet above mean sea level. Topography transitions from relatively flat terrain near the WTP to gently rolling terrain toward Duette Preserve, with runoff conveyed toward Lake Manatee and associated tributaries.

2.1.1 Data Collection

A desktop evaluation was performed using public information, County utility records, GIS data, environmental datasets, right-of-way and parcel information, record drawings, roadway information, aerial imagery, and geotechnical information (**Table 2-1**). The data sources supported route development and comparison and will require field verification during detailed design. Refer to **Appendix B** for additional information regarding the GIS Data Collection.

Table 2-1 GIS Data Collection

Dataset	Representative Sources	Use in Planning
Aerial and parcels	Manatee County; statewide parcel data	Alignment development, access, and property screening
Environmental	USDA NRCS; USFWS; FWC; FDEP; FEMA; SWFWMD	Soils, wetlands, species, conservation lands, contamination, and floodplains
Transportation	FDOT and Manatee County	Roadway crossings, rights-of-way, traffic, and planned improvements
Utilities	Manatee County and available record drawings	Existing water, wastewater, reclaimed water, power, gas, fiber, drainage, and special crossings
Cultural resources	FDEP/FMSF and supporting environmental review	Known historical and cultural resources
Hydraulic and operational	County SCADA, pump curves, water-demand information	Model development, calibration, operating scenarios, and sizing

2.1.2 Soil Conditions and Hydrology

2.1.2.1 Soil Conditions

The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) mapping indicates that the project area is dominated by fine sands with varying hydrologic groups and drainage characteristics. Refer to **Figure 2-1**. Planning-level soil considerations include runoff potential, infiltration, poor drainage, dewatering, excavation, backfill, restoration, wetland indicators, and suitability for gopher tortoise burrowing habitat. Refer to **Table 2-2**. Soil mapping does not replace geotechnical investigation, wetland delineation, or wildlife surveys.

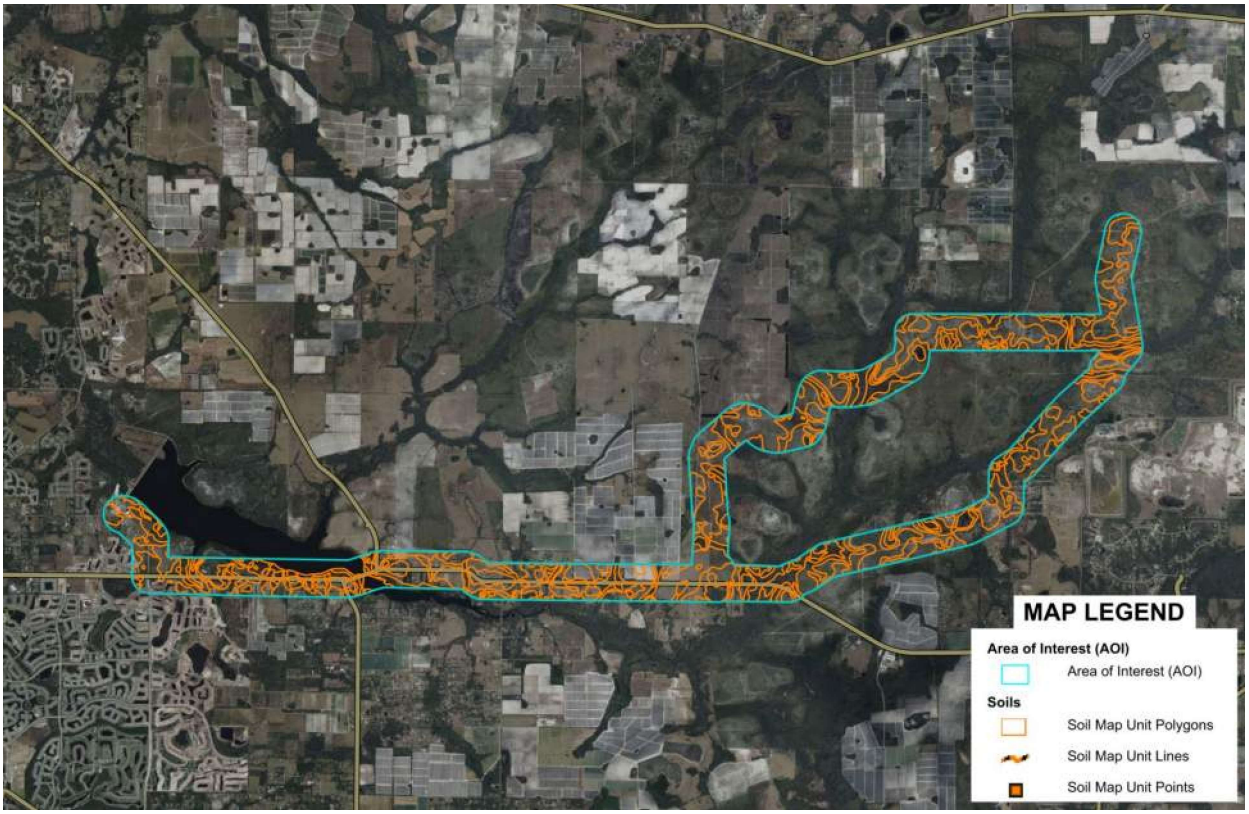


Figure 2-1 Pipeline Resiliency Project – Soil Map

Table 2-2 Predominant Soil Types and Hydrology within the Project Boundary

Soil Type	Approx. Composition	Hydrologic Group	Drainage Class
Waveland fine sand	29.34%	C/D	Poorly drained
Pomello fine sand	20.3%	A	Somewhat poorly drained
Duette fine sand	6.1%	A	Moderately well drained
Myakka-Myakka wet fine sands	5.7%	A/D	Poorly drained
Delray-Pomona complex	5.7%	A/D	Very poorly to poorly drained
St. Johns fine sand	5.7%	B/D	Poorly drained

Note: The project boundary also includes a significant portion of water (Lake Manatee) accounting for 2.3% of the Area of Interest (AOI). The table above lists the six most common soil types, excluding bodies of water.

For additional information regarding soil conditions, please refer to **Appendix C**.

2.1.2.2 Soil Hydric Rating and Gopher Tortoise Suitability

NRCS soil survey information was reviewed to characterize general soil conditions within the three alternatives. The mapped soil units were evaluated based on planning-level indication of areas that may be associated with wetland conditions and gopher tortoise gopher burrowing habitat. Refer to **Appendix D** for environmental analysis.

Alternatives 1 and 2 contain similar acreages of soils mapped as highly suited for gopher tortoise, while Alternative 3 contains a smaller total acreage but a higher proportional share of highly suited habitat for gopher tortoise because its overall corridor area is smaller. Alternative 3 has the lowest percentage of soils that would be expected to support wetland habitats.

2.1.3 Flood Plains

FEMA mapping identifies mapped flood-hazard areas within the project planning boundary. Floodplain exposure may affect design elevation, cover, erosion protection, access, permitting, construction methods, and emergency response. Final floodplain and floodway limits will be confirmed during detailed design using current mapping and survey data.

Additional maps of the parcels and floor areas can be found in **Appendix E**.

2.1.4 Environmentally Sensitive Areas or Features

2.1.4.1 Wetlands and Surface Waters

Project-specific desktop mapping was used to characterize potential freshwater emergent wetlands, freshwater forested/shrub wetlands, and other surface waters within the three alternative corridors. Refer to **Table 2-3**. The mapping provides a planning-level comparison and does not constitute a jurisdictional determination or field delineation.

Table 2-3 Desktop-Mapped Wetlands and Surface Waters within the Alternative Corridors

Resource Type	Impact Assumption	Alternative 1 (ac)	Alternative 2 (ac)	Alternative 3 (ac)
Freshwater emergent	Temporary	1.09	8.86	2.71
Freshwater forested/shrub	Permanent conversion	6.82	13.15	0.64

Resource Type	Impact Assumption	Alternative 1 (ac)	Alternative 2 (ac)	Alternative 3 (ac)
Other surface waters	Temporary	2.26	2.22	1.91
Total mapped area		10.17	24.23	5.26

Notes: Anticipated impact type assumes open-cut pipeline installation within the project area. Actual impacts will depend on the final pipeline alignment, construction footprint, construction methods, and field-verified wetland boundaries.

Alternative 2 has the greatest mapped wetland and surface-water impact and the greatest potential permanent forested/shrub wetland conversion. Alternative 1 has an intermediate mapped impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent conversion. Actual impacts will depend on final alignment, construction footprint, crossing methods, and field-verified boundaries.

Refer to **Appendix D** (Section 2.1.4) for environmental analysis.

2.1.4.2 Protected Wildlife Species

Desktop information was reviewed for federal and state protected species with potential to occur in or near the planning corridors. Potential considerations include Florida scrub-jay, gopher tortoise, eastern indigo snake, crested caracara, listed wading birds, Florida pine snake, Florida sandhill crane, southeastern American kestrel, tricolored bat, and other species identified in the supporting environmental material. Species inclusion in the desktop review does not establish presence. Final requirements will depend on field surveys and agency coordination.

2.1.4.3 Agricultural Lands

All alternatives intersect areas mapped as Farmland of Unique Importance, but much of the corridor is within existing rights-of-way or conservation land and is not actively farmed. No substantial difference among alternatives was identified from the available farmland mapping. Potential effects on active agricultural operations will depend on the final construction footprint and existing land use.

2.1.4.4 Cultural and Historic Resources

The Florida Master Site File (FMSF) review identified the Camphor Site Homestead, Bethany Baptist Cemetery, and Old Highway 39/Carlton Road within the planning area. The Camphor Site Homestead intersects all three alternatives within the SR 64 right-of-way. Old Highway 39/Carlton Road intersects Alternatives 1 and 3 within Duette Preserve. Bethany Baptist Cemetery is adjacent to the alternatives. The desktop review is not a Cultural Resource Assessment Survey and does not determine National Register eligibility or adverse effect. **Figure 2-2** below depicts the locations of the recorded resources relative to the three alternatives.

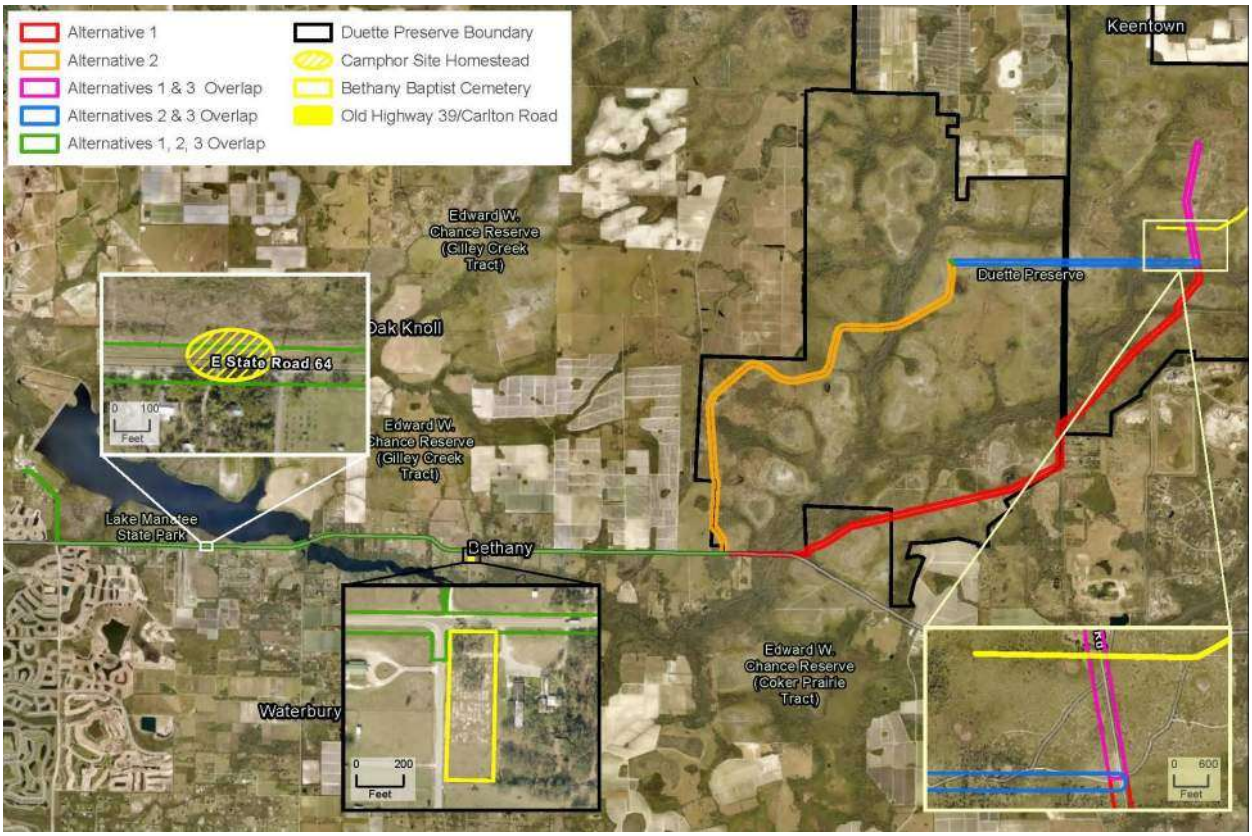


Figure 2-2 FMSF Mapped Resources

2.1.4.5 Contaminated Sites and Hazardous Materials

The desktop database review identified historical contamination records near the planning area, including a historical petroleum record at the WTP and a completed-cleanup oil-spill record near the Alternative 3 corridor. The available information did not identify a substantial differentiating constraint among the alternatives. Final design should update the database review and address unexpected conditions through construction specifications.

2.1.4.6 Environmental and Permitting Summary

The environmental evaluation is based primarily on desktop mapping and available records. It does not constitute a wetland jurisdictional determination, protected-species survey, cultural-resource assessment survey, geotechnical investigation, or final permitting determination. Final impacts, avoidance and minimization measures, mitigation requirements, construction feasibility, and permit conditions remain subject to field delineation, environmental surveys, agency coordination, final alignment, construction methods, and final design.

The final alignment will require additional evaluation near conservation lands, Duette Preserve, existing and proposed gopher-tortoise recipient areas, wetlands, surface waters, and cultural resources. The proposed connection between ECW Wells 1 through 5 and ECW Wells 6 and 7 may interact with known or proposed gopher-tortoise habitat or recipient areas. These conditions could affect alignment selection, access, construction sequence, long-term maintenance, permitting, and mitigation.

Alternative 3 has the lowest desktop-mapped wetland and surface-water acreage among the evaluated alternatives, but this comparison does not eliminate environmental or permitting risk. Actual impacts and requirements will be determined during design-phase field investigations and agency review.

2.1.5 Planning Basis and Demand Conditions

The planning basis for the Pipeline Resiliency Project was developed using the County's historical water use records, current and projected service area growth, and the water demand projections prepared as part of WA27 - Water Use Permit Modification. These demand conditions provide the basis for establishing the hydraulic and conveyance requirements for the proposed groundwater production wells and redundant raw water transmission main from the ECW and IMC-Manatee Wellfield to the Lake Manatee WTP.

The purpose of this project is not to expand finished water treatment capacity, but to improve the resiliency and redundancy of the County's raw water supply and transmission system. The proposed improvements will allow the County to maintain raw water conveyance to the Lake Manatee WTP during storm-related events, line breaks, maintenance activities, or other conditions where one segment of the existing transmission system may be unavailable.

2.1.5.1 Population Projections

Future demand projections were developed based on County-provided growth forecasts for the Lake Manatee WTP service area. The County provided equivalent dwelling unit (EDU) projections for existing neighborhoods and future development areas through 2050. These EDUs were converted to population using 2.4 persons per household (pph), consistent with recent Census information for Manatee County and slightly more conservative than the 2.33 pph factor used in the SWFWMD projection methodology.

For planning purposes, the County's adopted potable water level of service (LOS) standard is currently 110 gallons per capita per day (gpcd); however, the County is in the process of revising this value to 100 gpcd. The 100 gpcd LOS value was used for the demand projections summarized in this section. In addition to the retail service area demand, 5.0 mgd was included to account for the County's existing wholesale contractual obligations, excluding Sarasota County. This includes 0.5 mgd for the City of Bradenton, 2.0 mgd for the City of Palmetto, and 2.5 mgd for the Town of Longboat Key.

Based on this approach, the projected service area population increases from approximately 534,200 in 2030 to approximately 649,895 in 2045. The corresponding annual average finished water demand increases from approximately 58.42 mgd in 2030 to approximately 70.00 mgd in 2045. **Table 2-4** summarizes the population-based finished water demand projection used for planning.

Table 2-4 Level of Service Finished Water Demand Projections

Year	Service Area Population	Annual Average Finished Water Demand (mgd)
2030	534,200	58.42
2035(1)	576,450	62.65
2040	618,700	66.87
2045(1)	649,895	70.00

Notes:
(1) Values for 2035 and 2045 were interpolated.

2.1.5.2 Historical Water Usage

Historical water use was reviewed for the 2016 through 2025 period to characterize recent growth trends, seasonal demand conditions, and peaking factors. The County withdraws raw water from Lake Manatee, the ECW, and the IMC-Manatee Wellfield for treatment at the Lake Manatee WTP. Raw water withdrawals increased from approximately 39.8 mgd in 2016 to approximately 52.3 mgd in 2025 on an annual average basis. Over the same 10-year period, the average annual raw water withdrawal was approximately 45.8 mgd. Between 2019 and 2023, raw water withdrawals increased by an average of approximately 4.8 percent per year. **Table 2-5** summarizes raw water withdrawals from 2016 through 2025.

Table 2-5 Raw Water Withdrawals

Year	Average Daily		Maximum Month (mgd)	Maximum Day (mgd)
	Raw Withdrawal (mgd) (1)	Growth Change		
2016	39.8	--	43.7	51.0
2017	40.2	0.9%	47.5	54.1
2018	40.3	0.3%	44.7	54.2
2019	42.2	4.6%	45.9	52.9
2020	45.2	7.2%	49.5	56.1
2021	47.4	4.7%	53.7	55.1
2022	47.7	0.7%	51.8	57.5
2023	50.9	6.6%	53.6	61.5
2024	51.6	1.4%	58.6	62.7
2025	52.3	1.3%	56.2	60.7
Average	**45.8**	**3.1%**	**50.5**	**56.6**

Note:
(1) Raw withdrawals include Lake Manatee, East County Wellfield, and IMC Manatee Wellfield.

Finished water demand followed a similar increasing trend. Annual average finished water demand increased from approximately 39.49 mgd in 2016 to approximately 49.50 mgd in 2025, with an average annual growth rate of approximately 3.8 percent over the 10-year period. Maximum month finished water demand increased from approximately 43.13 mgd in 2016 to approximately 53.30 mgd in 2025, while maximum day finished water demand increased from approximately 50.95 mgd in 2016 to approximately 59.56 mgd in 2025. **Table 2-6** presents the annual average, maximum month, and maximum day finished water demands for the past 10 years.

Table 2-6 10-Year Annual Average, Maximum Month, and Maximum Day Demands

Year	Annual Average Demand (mgd)	Annual Average Annual Growth	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2016	39.49	-	43.13	50.95
2017	39.93	1.1%	47.44	51.96
2018	39.55	-1.0%	43.09	49.14
2019	41.55	5.1%	44.70	57.20
2020	43.93	5.7%	48.16	53.00
2021	44.75	1.9%	51.83	56.18

Year	Annual Average Demand (mgd)	Annual Average Annual Growth	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2022	45.31	1.3%	48.93	54.83
2023	47.70	5.3%	52.45	58.34
2024	48.89	2.5%	55.55	61.42
2025	49.50	1.2%	53.30	59.56

The County provides finished water to retail customers in unincorporated Manatee County and wholesale customers including the City of Bradenton, City of Palmetto, Town of Longboat Key, and Sarasota County. Historical growth in finished water demand has been primarily driven by the unincorporated retail service area, while wholesale demands have remained relatively stable or declined due to contractual limitations and the phased reduction in supply to Sarasota County.

Historical peaking factors were also reviewed to support planning and facility sizing. Based on the historical analysis, the County's existing planning peaking factors remain appropriate: 1.2 for maximum month demand and 1.3 for maximum day demand. These factors were applied to the selected annual average demand projections to estimate future maximum month and maximum day conditions.

2.1.5.3 20-Year Water Demand Projections

Multiple methods were evaluated for projecting future finished water demand through 2045, including linear regression of historical demand, a County population and LOS-based projection, and the SWFWMD projection methodology. The selected planning projection is based on the County population and LOS approach because it reflects the County's projected service area growth and maintains consistency with the County's potable water LOS requirement.

The selected annual average finished water demand projection for 2045 is 70 mgd. Applying the County's planning peaking factors results in a 2045 maximum month demand of approximately 84 mgd and a maximum day demand of approximately 91 mgd. These values represent the 20-year demand condition for planning the proposed improvements. **Table 2-7** summarizes the selected 20-year demand projection.

Table 2-7 Selected 20-year Finished Water Demand Projection

Year	Annual Average Demand (mgd)	Maximum Month Demand (mgd)	Maximum Day Demand (mgd)
2030	58.42	70.10	75.95
2035	62.65	75.18	81.45
2040	66.87	80.24	86.93
2045	70.00	84.00	91.00

The 2045 demand condition is used as the long-term planning basis for evaluating raw-water supply and conveyance needs. The Lake Manatee WTP has a combined nominal raw-water treatment capacity of approximately 91 mgd across its surface-water and groundwater treatment trains. Actual production is constrained by source availability, authorized WUP withdrawal quantities, treatment-train limitations, operating conditions, and finished-water demand. The County is currently pursuing a WUP renewal or modification that may reflect updated demand projections, well-credit transfers, and retirement of third-party credits. Because the modification has not been finalized, proposed withdrawal quantities are planning assumptions and should not be represented as authorized quantities. Final design and phasing will be based on the WUP conditions in effect at the time of implementation.

2.1.6 Land Use and Development

2.1.6.1 Land Use and Habitat

SWFWMD FLUCCS mapping was used to characterize land use and habitat composition. Alternative 1 has a total mapped corridor area of approximately 411.77 acres, Alternative 2 approximately 430.10 acres, and Alternative 3 approximately 268.03 acres. Alternative 2 contains substantially more mapped shrub and brushland, while Alternative 1 contains more cropland/pastureland and tree plantations. Alternative 3 has the smallest overall mapped corridor area.

Refer to **Appendix D** for the detailed environmental analysis.

2.1.6.2 Future Capital Improvement Projects and Corridor Coordination

FDOT is developing improvements along SR 64 between Lorraine Road and Verna Bethany Road. The proposed pipeline's proximity to this corridor creates design and schedule coordination requirements involving utility placement, horizontal and vertical clearance, subsurface crossings, traffic control, permitting, and sequencing to avoid conflicts or unnecessary relocation. Coordination with FDOT should continue through design and construction.

The proposed roadway alignment corridor and study segments identified under the FDOT SR 64 Feasibility Study are conceptually illustrated in **Figure 2-3**.

Refer to **Appendix F** for Record Drawings pertaining to State Route 64.

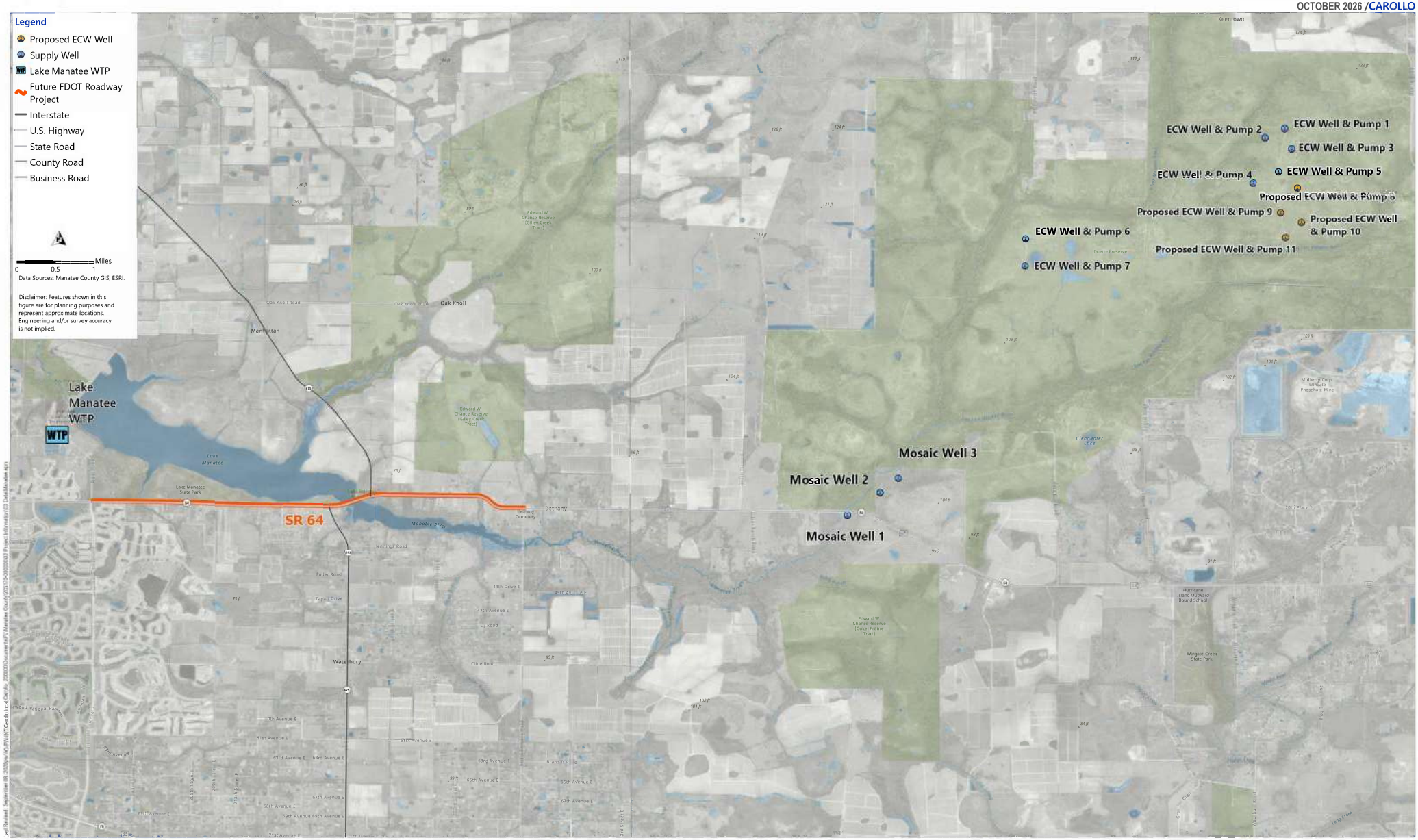


Figure 2-3 FDOT SR 64 FEASIBILITY STUDY

2.1.7 Hydrogeologic Setting and Description

The ECW is located in eastern Manatee County, Florida, and is operated by Manatee County Utilities under WUP No. 13343. The wellfield consists of seven production wells (ECW-1 through ECW-7, SWFWMD District IDs 128 through 134) that withdraw groundwater from the Upper Floridan Aquifer (UFA). Five monitoring wells (District IDs 150 through 154) are used to monitor groundwater levels and water quality across the surficial aquifer system (SAS), the intermediate aquifer system (IAS), and the UFA. Site locations are shown in **Appendix G** – WSP Hydrogeological Evaluation.

The regional hydrostratigraphy beneath the ECW site consists of three principal hydrogeologic units:

- **Surficial Aquifer System (SAS):** An unconfined aquifer composed of unconsolidated sands and shell deposits, extending from land surface to approximately 25 feet below land surface (bls).
- **Intermediate Aquifer System (IAS):** A series of interbedded carbonate and clastic units that function as a semi-confining unit between the SAS and the UFA. Monitored by well ECW-IAMW-52 (monitored interval 145 to 250 ft bls).
- **Upper Floridan Aquifer (UFA):** The principal production aquifer, composed of Tertiary-age limestone and dolomite. Production wells are cased to approximately 500 to 580 feet bls with open-hole completions extending to approximately 1,200 to 1,250 feet bls.

2.1.8 Hydrogeologic Evaluation

The planning-level hydrogeologic evaluation reviewed pumpage, groundwater levels, rainfall, and water-quality information. The wellfield has been operated seasonally using well rotation. Available water-level records generally show seasonal response and recovery, with several identified anomalies requiring confirmation. Available TDS, chloride, and sulfate data remain below the cited secondary standards, and the evaluated record does not indicate progressive saltwater intrusion or water-quality degradation.

The evaluation identified anomalies within both the pumpage and groundwater level records. Two production wells each reported a monthly withdrawal substantially exceeding their typical operating range, resulting in corresponding spikes in total wellfield production. Additionally, two monitoring wells exhibited abrupt water level changes that are inconsistent with prevailing rainfall conditions and with measurements recorded at nearby wells. These anomalies are most likely attributable to data entry, reporting, or instrumentation errors. Accordingly, the evaluation recommends that the data be verified with Manatee County Utilities and the SWFWMD prior to final design.

Resolution of the identified data anomalies is not expected to affect the comparative evaluation of the transmission main alignment alternatives, provided that the verified data remain consistent with the underlying assumptions for available well yield, aquifer operating levels, and permitted withdrawal quantities.

2.2 Water Supply and Treatment

The County supplies the Lake Manatee WTP from Lake Manatee, the East County Wellfield, and the IMC-Manatee Wellfield. The Pipeline Resiliency Project focuses on raw-water reliability rather than expansion of finished-water treatment capacity. Planning-level modeling evaluates transmission configurations capable of supporting 26.2 mgd AAD and 31.5 mgd maximum-month wellfield production under normal and outage conditions.

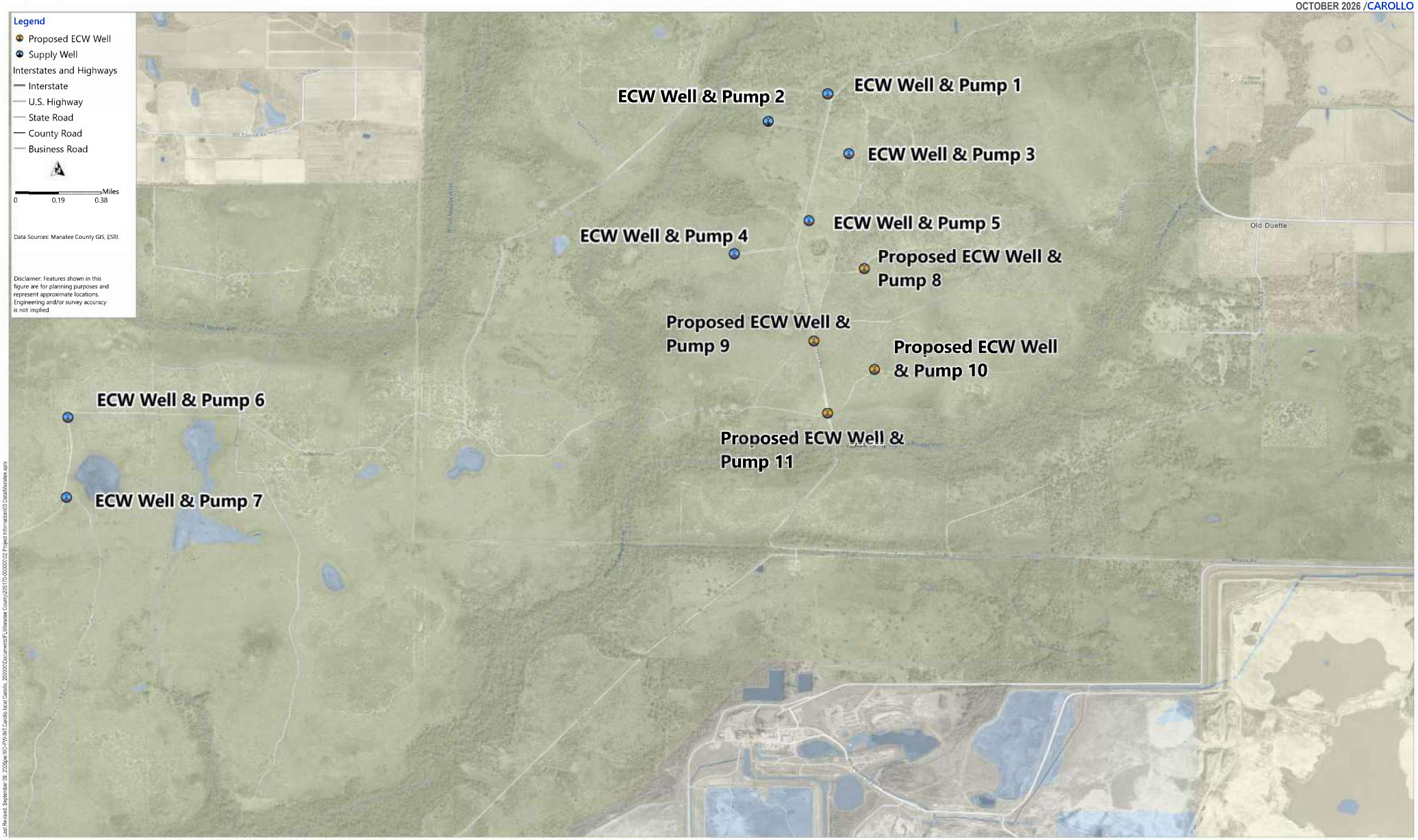
The broader Pipeline Resiliency Project may include up to four additional groundwater production wells, WTP hydraulic modifications, degasifier or bypass improvements, electrical improvements, and instrumentation and SCADA improvements. Final inclusion and sequencing of these components will be evaluated and refined in subsequent design phase.

Figures 2-4 and **2-5** depict the future new additional wells and ASR bypass around degasifier, respectively.

2.3 Operations and Maintenance Considerations

Operations and maintenance considerations were evaluated from the perspective of operational flexibility and emergency repair response. Key factors include the ability to isolate pipeline segments, maintain raw-water conveyance when an existing or proposed segment is unavailable, access the pipeline and appurtenances for inspection or repair, restore service following an outage, and operate under varying well availability and demand conditions.

Alternatives that provide independent conveyance paths around existing segments offer greater operational flexibility during maintenance and emergencies. An alternative that remains dependent on an existing segment may require additional operational planning, temporary supply measures, expedited repair, or future improvements if that segment is unavailable. Final isolation-valve locations, maintenance access points, air-management facilities, blowoffs, tie-ins, and operating procedures will be established during design.



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Figure 2-4 FUTURE NEW ADDITIONAL WELLS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

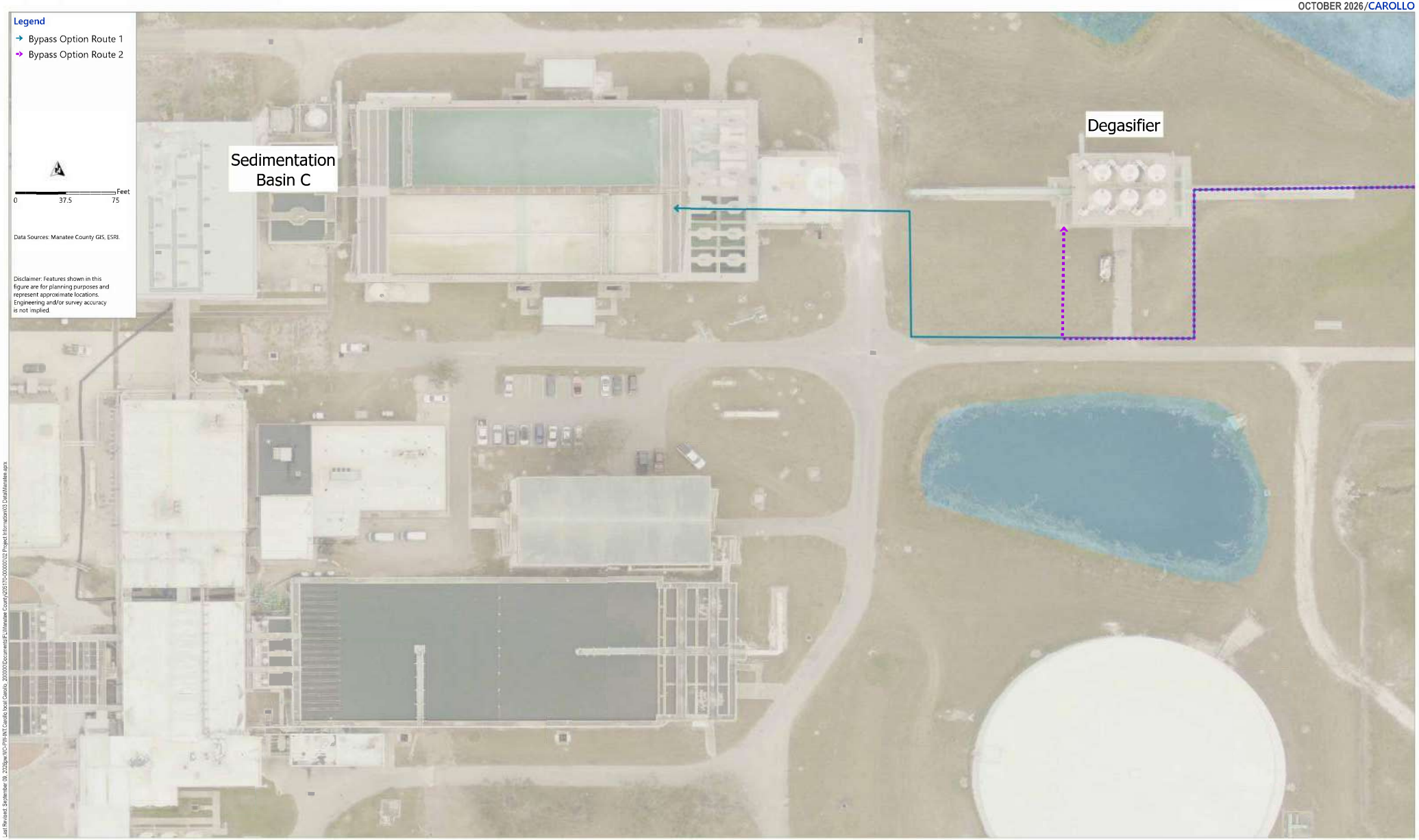


Figure 2-5 ASR BYPASS AROUND DEGASIFIER
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 3 DEVELOPMENT OF ALTERNATIVE ALIGNMENTS

3.1 FDEP Alternatives Analysis Requirements

The alternatives analysis evaluates feasible project concepts based on effectiveness, environmental and permitting considerations, hydraulic performance, constructability, operations and maintenance, future flexibility, and planning-level cost. Section 3 develops the alternatives and documents the primary technical findings. Section 4 synthesizes those findings through a weighted non-cost evaluation, a separate Class 5 cost comparison, and selection of the preferred planning alternative.

3.2 Overview of Alternative Alignments

3.2.1 Basis for Development

The need for the Pipeline Resiliency Project was identified based on the County's objective to enhance the reliability of its raw water supply and transmission infrastructure, particularly under extreme weather conditions such as hurricane events. The evaluation focuses on the development of redundancy within the existing system to maintain continuous conveyance of raw water during storm events or conditions that may compromise a portion of the network.

The purpose of this project is not to expand overall system capacity, but to improve resiliency by providing redundant transmission pathways between critical facilities. The proposed improvements will allow Manatee County to sustain raw water delivery during major storm events and maintain operation of at least one transmission main in the event the parallel system is damaged or taken out of service. The alternatives analysis presented in Sections 3 and 4 is limited to the identification and evaluation of three feasible transmission-main alignment alternatives. The broader Pipeline Resiliency Project may include associated wellfield, WTP, degasifier, electrical, instrumentation, and SCADA improvements, as described elsewhere in this Facilities Plan.

The alternatives were developed using the data summarized in Section 2. Route development considered existing raw-water infrastructure, utility corridors, road rights-of-way, environmental resources, conservation lands, wetlands and surface waters, cultural resources, property and access limitations, major roadway and water crossings, planned FDOT improvements, and the County's need for a redundant and operable transmission configuration. Because the planning area contains a limited number of practical conveyance corridors, the alternatives generally use or parallel existing corridors where feasible.

3.2.2 Corridor and Infrastructure Considerations

The alternatives must cross Lake Manatee and several associated waterways and drainage features. Portions of the B-C corridor parallel the existing raw-water main and PRECO overhead transmission facilities. Design will require coordination for workspace, utility separation, construction access, traffic, trenchless crossings, appurtenance access, and sequencing. Existing easements and access roads provide advantages in some areas, while Duette Preserve and conservation restrictions create additional considerations in others.

3.2.3 Summary of Alternatives

During the route evaluation, multiple routes and alignments were explored to reduce roadway and environmental impacts. After review, three (3) alignment alternatives for the proposed transmission main were identified, delineated, and presented schematically in **Figure 3-1**. To facilitate the description of each alignment, four key reference locations were established along the corridor, as described in **Table 3-1.**

Table 3-1 Selected 20-year Finished Water Demand Projection

Alternative	Proposed Segments	Approx. Length	Planning Concept
1	A-B and B-C	97,000 ft	Continuous proposed conveyance route from the main ECW area to the WTP; existing D-B remains the connection for ECW Wells 6 and 7.
2	A-D, D-B, and B-C	104,700 ft	Most complete parallel conveyance path around the principal existing segments.
3	A-D and B-C	73,650 ft	Adds redundancy at the wellfield and between B and the WTP while retaining existing A-B as the intermediate link.

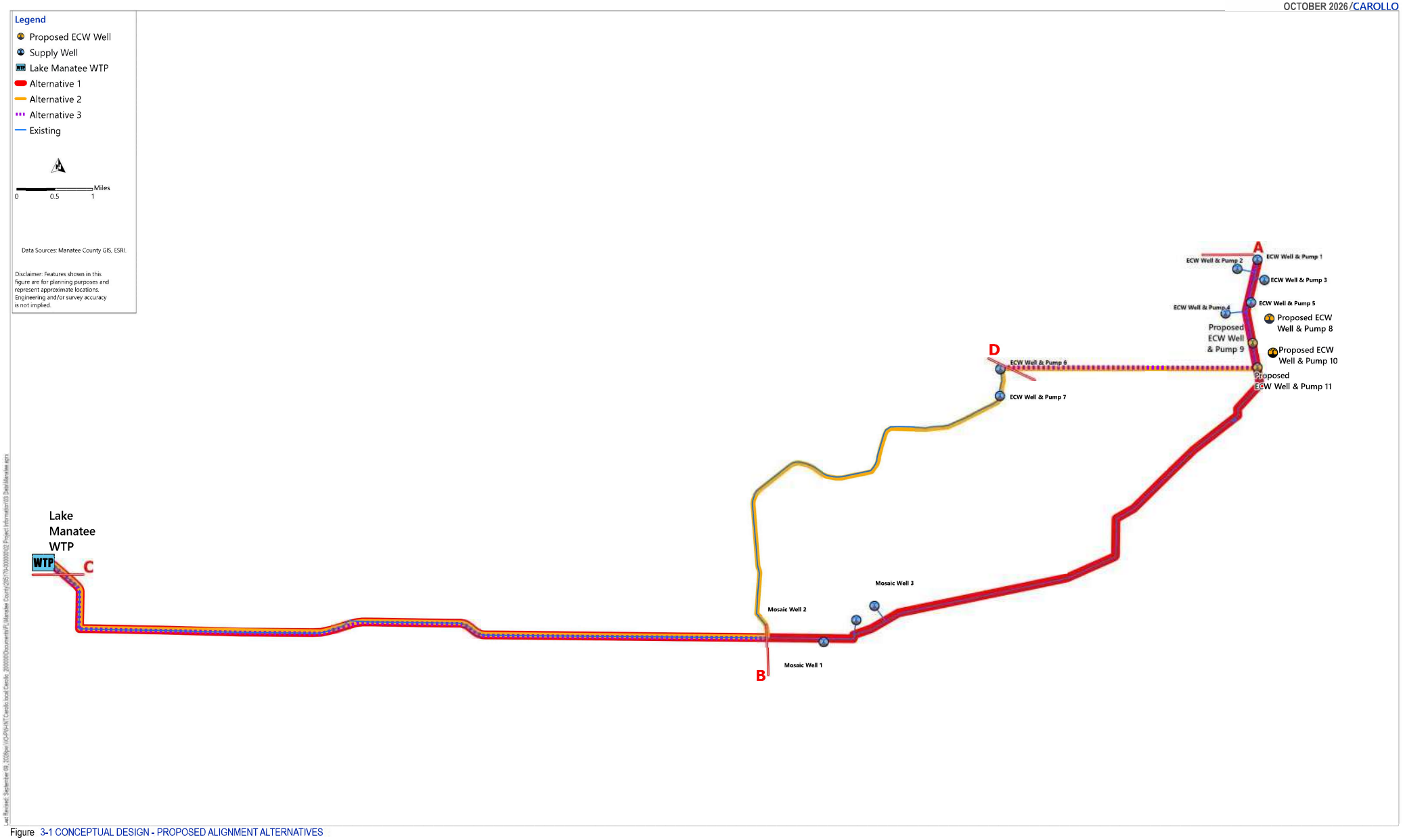


Figure 3-1 CONCEPTUAL DESIGN - PROPOSED ALIGNMENT ALTERNATIVES
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

3.2.3.1 Alternative 1

Alternative 1 follows the existing transmission corridor from Location A to Location B and continues west to Location C, as shown in **Figure 3-2**. The A-B segment is approximately 48,300 feet and the B-C segment approximately 48,700 feet. The route benefits from established utility access and known site conditions but requires construction along the full corridor and parallel to existing infrastructure.

Major considerations include workspace adjacent to the existing transmission main and PRECO facilities, the Lake Manatee crossing, other waterway crossings, access, construction sequencing, and protection of existing facilities. The Lake Manatee crossing is assumed to use HDD at the planning level. Four additional major waterway crossings require design-specific structural, hydraulic, environmental, and constructability evaluation.

3.2.3.2 Alternative 2

Alternative 2 includes A-D, D-B, and B-C segments. The route initially follows the existing corridor, then traverses a portion of Duette Preserve toward Location D, continues along the D-B corridor, and follows the common B-C route to the WTP. The total new pipeline length is approximately 104,700 feet. The alternative 2 alignment is shown in **Figure 3-3**.

Record drawings depicting the existing waterway crossings are included in **Appendix H** and provide additional information regarding the existing transmission main crossing configurations.

3.2.3.3 Alternative 3

Alternative 3 consists of a new A-D segment and a new B-C segment. The A-D segment is approximately 24,950 feet and connects the northern and southern portions of the wellfield. The B-C segment is approximately 48,700 feet and provides a parallel connection from the wellfield transmission system to the Lake Manatee WTP. The alternative retains the existing A-B segment as the intermediate conveyance link.

Alternative 3 has the least new pipeline length, lowest mapped wetland and surface-water impact, and lowest Class 5 pipeline cost. It remains dependent on the existing A-B segment, which is the controlling hydraulic limitation for an A-B outage. The selected planning configuration uses a 36-inch A-D segment and 42-inch B-C segment, subject to final design confirmation.

The alternative 3 alignment is shown in **Figure 3-4**.

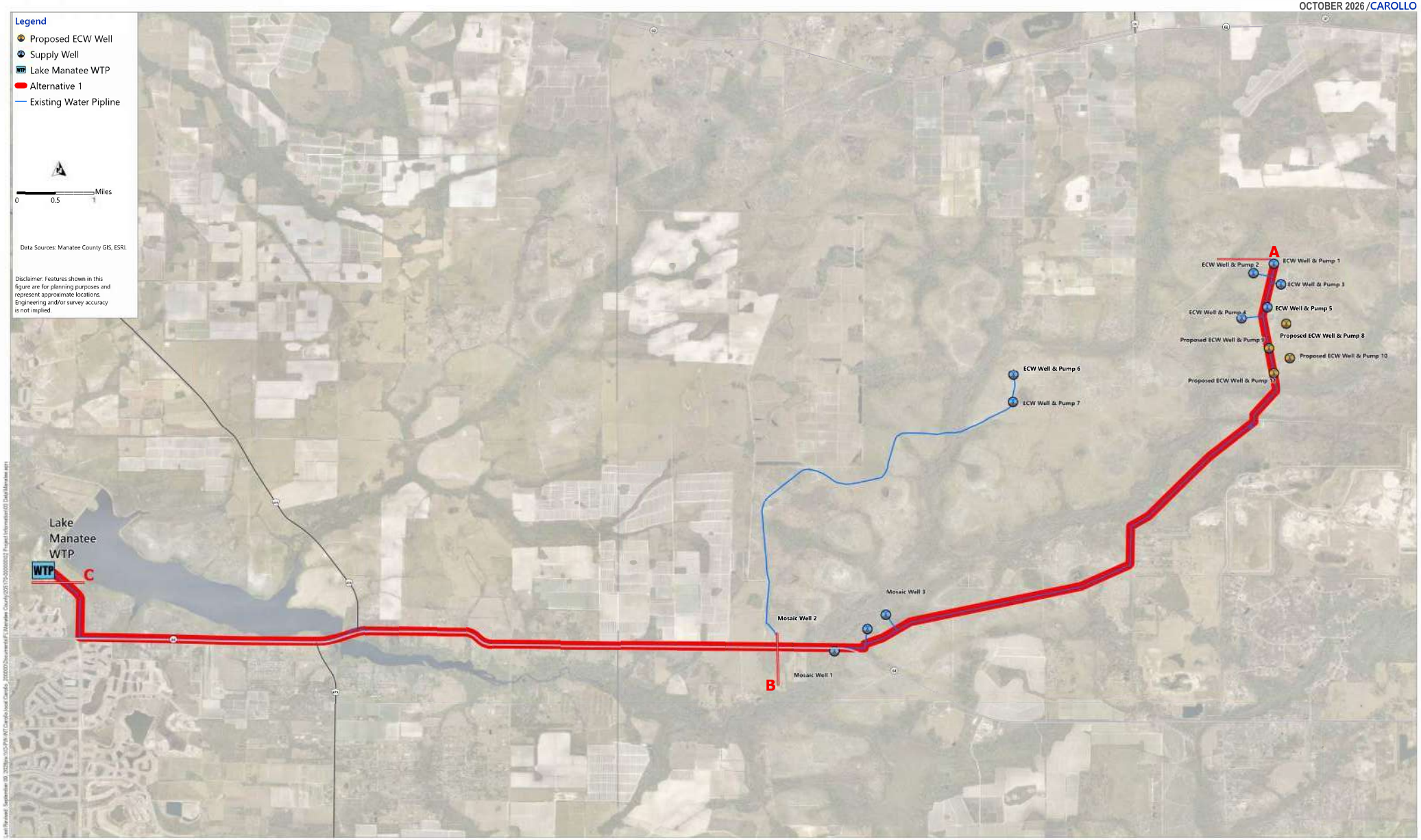


Figure 3-2 PROPOSED ALIGNMENT ALTERNATIVE 1
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

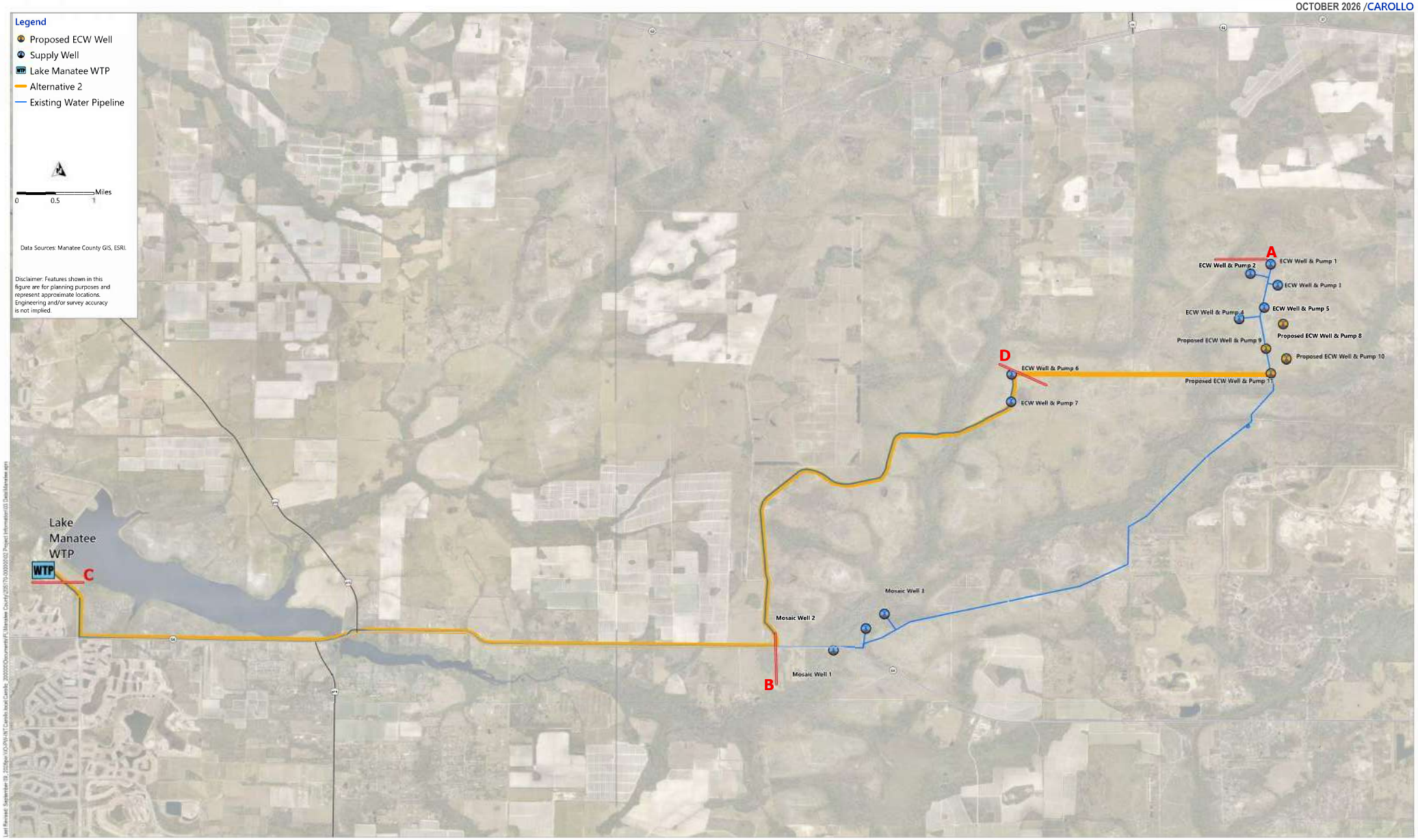


Figure 3-3 PROPOSED ALIGNMENT ALTERNATIVE 2
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

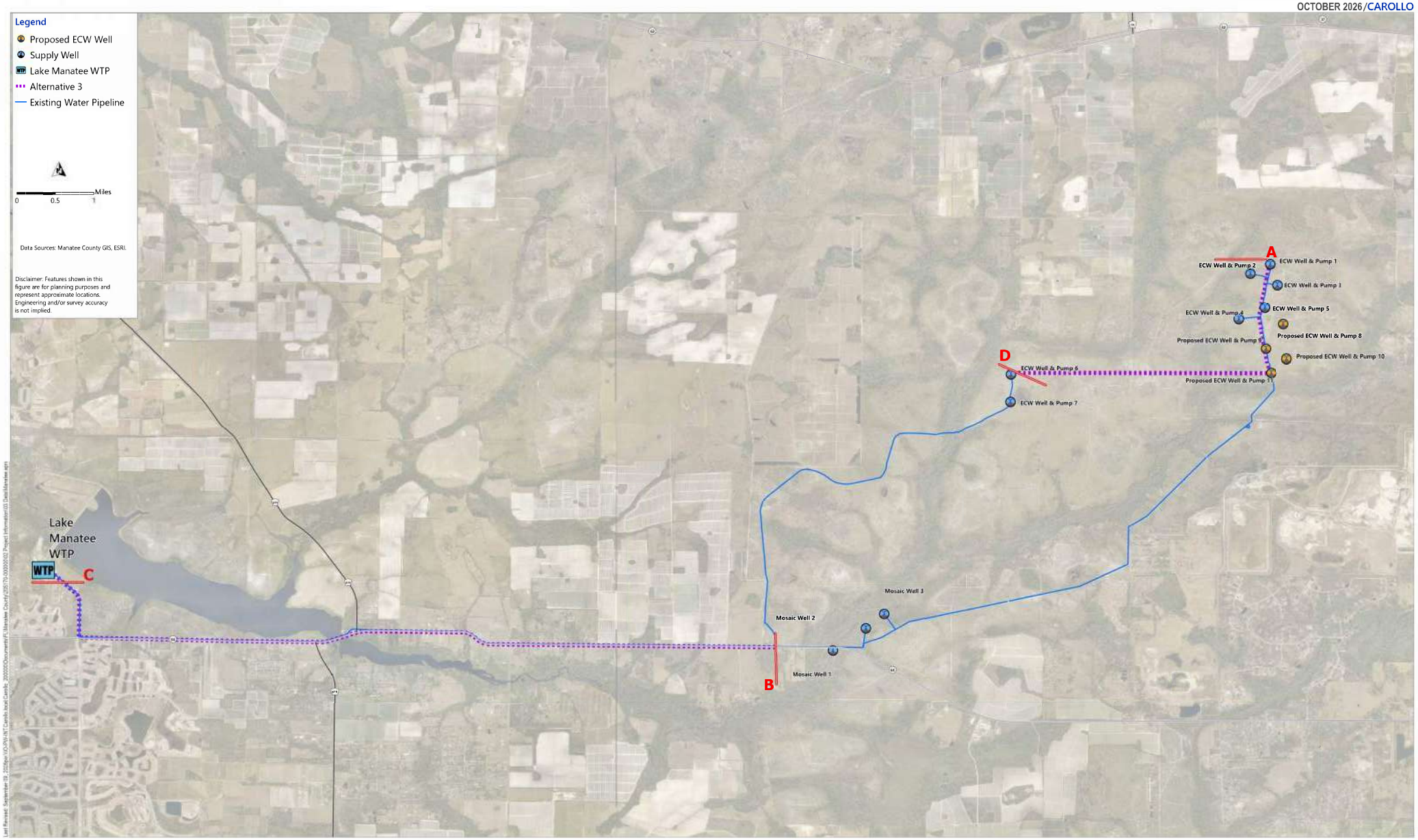


Figure 3-4 PROPOSED ALIGNMENT ALTERNATIVE 3
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

3.3 Hydrogeologic and Environmental Constraints

3.3.1 Hydrogeologic Constraints

The hydrogeologic evaluation does not directly differentiate the alignments but informs future well operation, pump selection, and WUP coordination. Environmental conditions provide significant differentiation. Alternative 2 has the greatest mapped wetland and surface-water impact and a unique conservation-easement constraint. Alternative 1 has intermediate mapped wetland impact. Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential permanent forested/shrub wetland conversion.

Refer to **Appendix G** for a full planning-level hydrogeologic evaluation prepared by WSP.

3.4 Hydraulic Modeling and System Capacity

Planning-level hydraulic modeling evaluated the capacity and resiliency of the existing ECW raw-water transmission system and three proposed alignments. The evaluation uses an AAD production requirement of 26.2 mgd and maximum-month production requirement of 31.5 mgd. Model assumptions include a Hazen-Williams C-factor of 130, available well pump curves, assumed aquifer levels, representative proposed future wells, Mosaic Well availability, a separate proposed-main WTP entry, and SCADA-informed operating conditions. These assumptions are suitable for comparative planning and require refinement during detailed design.

3.4.1 Hydraulic model basis and assumptions

The following assumptions were used for the planning-level calculations:

- A Hazen-Williams C-factor of 130 was used for the transmission mains.
- Existing wells were modeled using their respective factory pump curves.
- Proposed future ECW Wells 8 through 11 were represented using available existing ECW pump-curve information until final future-well pump selections are established.
- ECW Wells 1 through 7 and the proposed future wells were assumed to pump from an aquifer water level of approximately -10 ft NGVD for the evaluated condition.
- Proposed ECW Wells 8-11 were assumed to pump from an aquifer water level of approximately -25 ft NGVD.
- Mosaic Well 3 was assumed to remain available for operation, while Mosaic Wells 1 and 2 were generally modeled out of service.
- Well operating combinations were varied by scenario so that the modeled pumps remained on their respective pump curves while determining the maximum conveyable system flow.
- The proposed raw water main was assumed to have a separate entry to the WTP degasifier rather than manifold into the existing transmission main immediately upstream of the degasifier.
- Historical SCADA flow and pressure data were used to inform model development. Field pressure logging was identified to verify ECW transmission-main pressures because some reported SCADA pressures appeared lower than expected.

These assumptions are appropriate for the current planning-level comparison of alternatives and are expected to be refined as field pressure data, final groundwater operating levels, future well pump selections, and WTP connection details are confirmed. Accordingly, the modeled capacities should be used to compare alternatives and identify controlling conditions rather than as final design capacities.

3.4.2 Hydraulic Criteria

Pipeline sizing was screened using conveyance capacity, velocity, and headloss. The preferred planning velocity range is approximately 3 to 5 feet per second (ft/s). Lower velocities can increase deposition potential, while higher velocities increase friction loss, energy, wear, and surge potential. The analysis compares diameter combinations under normal operation and outages of the existing A-B, D-B, and B-C segments.

3.4.3 Hydraulic Performance

The hydraulic evaluation demonstrated that both pipeline alignment and pipeline diameter influence the ability of the system to meet the project resiliency objectives. Planning-level modeling was completed to evaluate multiple pipeline diameter combinations for each alternative under normal operating conditions and representative outage scenarios. The evaluation focused on the ability of each alternative to satisfy the 26.2 mgd AAD criterion and the 31.5 mgd PMM criterion while providing redundancy within the raw water transmission system (per WUP Modification). The evaluated alternatives differed not only in pipeline diameter but also in the degree of conveyance redundancy provided by the respective alignment configurations (**Table 3-2**).

Table 3-2 Summary of the Pipeline Segments for Each Alternative and the corresponding Planning-Level Resiliency

Alternative	Approx. Length	Diameter Findings	Planning-Level Result
1	Segment A-B: 48,300 ft Segment B-C: 48,700 ft	42/42 and 42/48 meet the 31.5 mgd MM criterion in all modeled cases.	Continuous conveyance route from ECW Pumps 1-7 to the WTP. The existing D-B branch remains the only connection for ECW Wells 6 and 7.
2	Segment A-D: 24,950 ft Segment D-B: 31,050 ft Segment B-C: 48,700 ft	42/36/48 and 42/42/42 meet or exceed 31.5 mgd in all modeled cases.	Most complete parallel conveyance path by extending the proposed system through the northern/eastern ECW branch and continuing to the WTP.
3	Segment A-D: 24,950 ft Segment B-C: 48,700 ft	Several combinations exceed 31.5 mgd under normal conditions, but none meet 26.2 mgd during A-B outage.	Adds redundancy at the northern/eastern ECW branch and between B and the WTP, while retaining the existing A-B segment as the intermediate conveyance link.

Alternative 1 provides a continuous parallel transmission route between the ECW and the LMWTP. The hydraulic results demonstrate that system capacity increases as proposed pipeline diameters increase, with the larger diameter combinations providing the highest conveyance capacity. Under the evaluated outage conditions, Alternative 1 maintained sufficient hydraulic performance to satisfy the 31.5 mgd MM criterion for the larger diameter configurations. Because the proposed alignment provides a continuous parallel conveyance route between Locations A, B, and C, the alternative provides a high degree of redundancy and resiliency while maintaining hydraulic performance during the modeled outage scenarios (**Figure 3-5**).

Alternative 2 provides the greatest hydraulic redundancy of the alternatives evaluated because the proposed alignment creates an independent conveyance path around each principal existing transmission segment. The hydraulic results demonstrate that Alternative 2 consistently achieved the highest system capacities under both normal operating conditions and modeled outage scenarios. Multiple pipeline diameter combinations satisfied the 31.5 mgd MM criterion, demonstrating the resiliency benefits associated with providing redundancy throughout the ECW transmission system. Because Alternative 2 provides conveyance redundancy around the primary transmission corridors, it exhibited the strongest hydraulic performance and outage resiliency of the alternatives evaluated (**Figure 3-6**).

Alternative 3 provides redundancy between the northern and southern portions of the ECW and between the transmission system and the LMWTP. Under normal operating conditions, Alternative 3 demonstrated the ability to achieve the 31.5 mgd MM criterion for several evaluated diameter combinations. However, because Alternative 3 remains dependent on the existing A-B segment, the modeled A-B outage condition limits available conveyance capacity. As a result, none of the evaluated diameter combinations achieved the 26.2 mgd AAD criterion during the A-B outage scenario. Despite this limitation, Alternative 3 still provides redundancy improvements relative to the existing system and improves operational flexibility through the addition of the A-D and B-C transmission segments (**Figure 3-7**).

The hydraulic evaluation demonstrates that Alternative 2 provides the highest degree of system redundancy and outage resiliency by providing an independent conveyance path around each principal transmission segment. Alternative 1 provides strong hydraulic performance through a continuous parallel conveyance route between the ECW and the LMWTP. Alternative 3 improves redundancy within the ECW transmission system but remains dependent on the existing A-B segment during certain outage conditions. Final pipe diameters, operating criteria, and system configuration will be confirmed during future design using updated field data, refined hydraulic analyses, transient evaluation, and confirmed operating requirements.

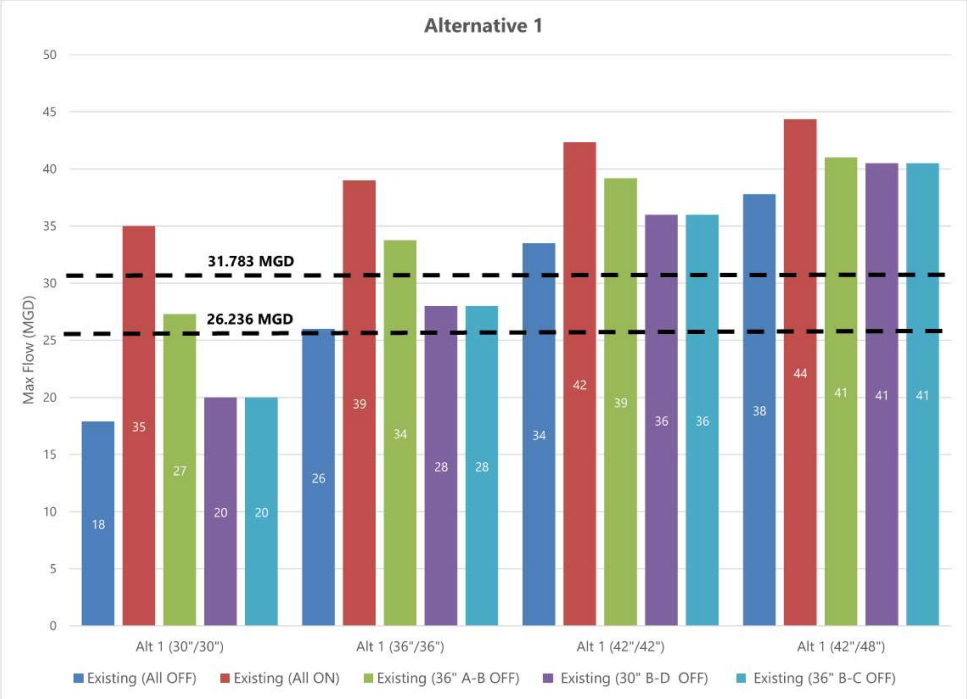


Figure 3-5 Hydraulic Results for Alternative 1

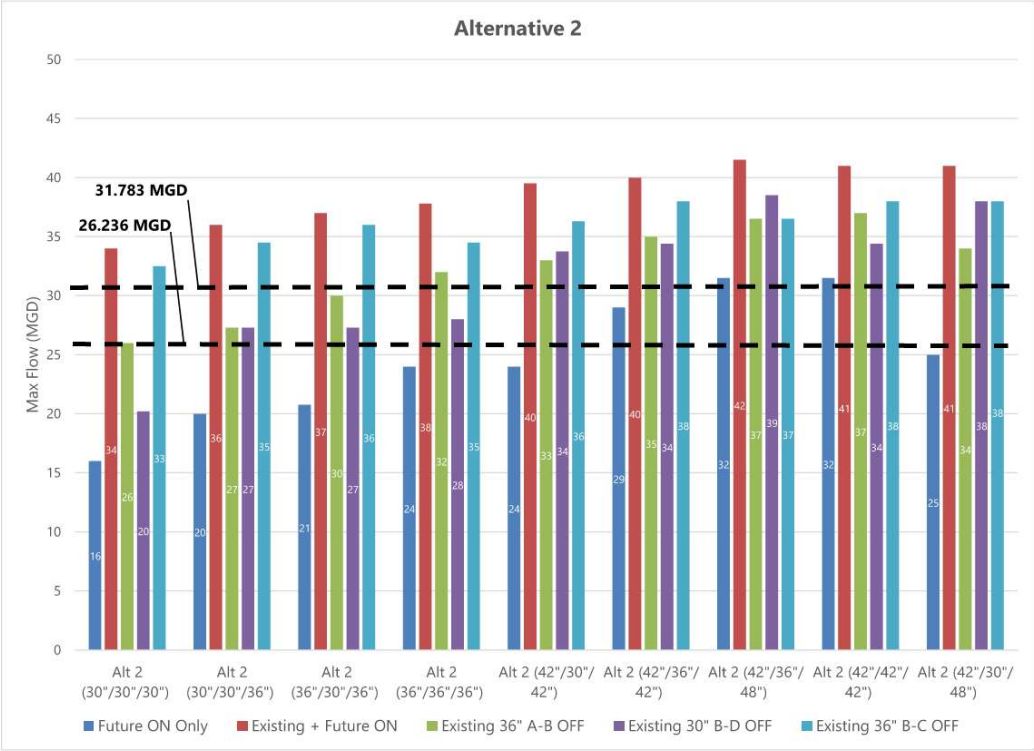


Figure 3-6 Hydraulic Results for Alternative 2

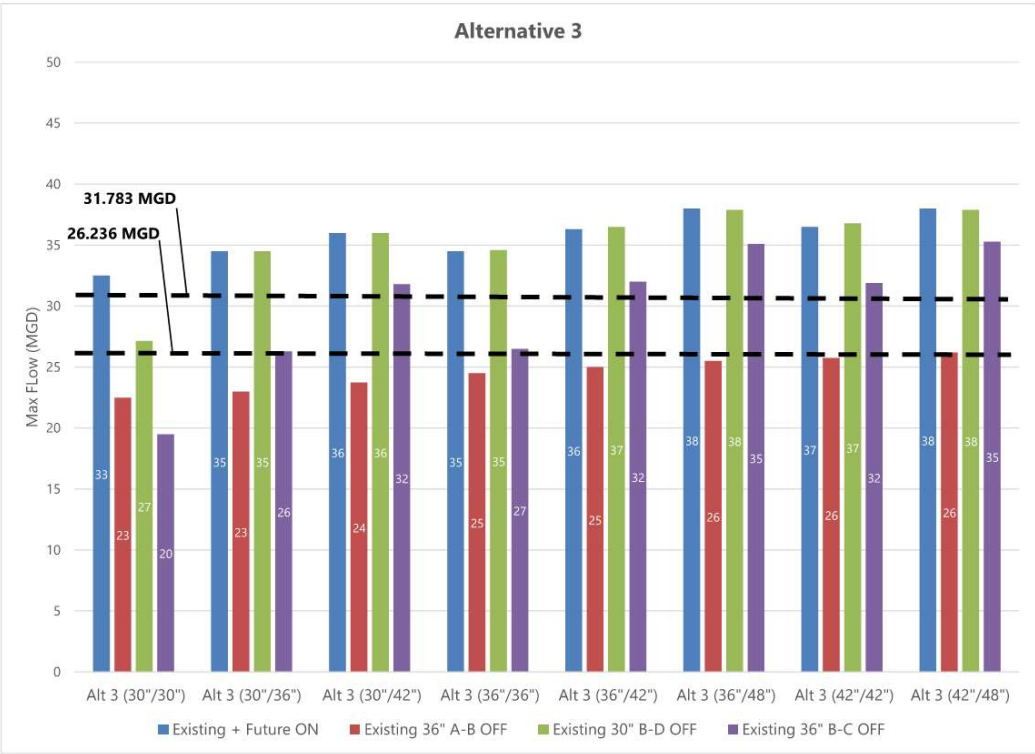


Figure 3-7 Hydraulic Results for Alternative 3

SECTION 4 ANALYSIS OF ALTERNATIVE ALIGNMENTS

4.1 Evaluation Methodology

The alternatives evaluation identifies the alternative that best balances the County's planning objectives rather than the alternative with the highest performance in a single category. The evaluation included a non-cost assessment, a planning-level cost evaluation, and a combined cost and non-cost evaluation to identify the recommended planning alternative. The non-cost assessment considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. Planning-level capital costs were evaluated separately and incorporated into the final combined evaluation to support selection of the preferred planning alternative.

4.2 Non-Cost Criteria Evaluation

Information developed in Sections 1 through 3 was synthesized using six non-cost criteria (**Table 4-1**). Cost was evaluated separately due to the nature of the Class 5 estimates which are intended to indicate relative cost rather than establish final construction cost.

Table 4-1 Non-Cost Evaluation Weighting Criteria

Criterion	Weight	Evaluation Basis
Reliability & Resiliency	25%	Hydraulic independence, service continuity, outage performance, and system recovery
Hydraulic Performance	25%	Capacity relative to AAD/MM criteria, velocity, headloss, and controlling outage
Environmental & Permitting	15%	Wetlands, surface waters, species, conservation lands, cultural resources, and permitting complexity
Constructability & Implementation Risk	15%	Length, access, crossings, utility coordination, workspace, property, and schedule risk
Operations & Maintenance	10%	Operational flexibility, isolation, emergency repair response, access, and restoration
Future Expandability & Flexibility	10%	Ability to support future wellfield conditions and design refinement
TOTAL	100%	

Each alternative was assigned an integer raw score from 1 to 10. A score of 10 represents the most favorable relative performance, 5 represents a condition that generally meets the planning objective but is not preferred, and 1 represents the least favorable relative performance. Raw scores are multiplied by the criterion weight to calculate weighted scores. Refer to **Table 4-2** for non-cost criteria weighted results for each alternative.

Table 4-2 Non-Cost Evaluation Weighting Criteria

Evaluation Criterion	Weight	Alt. 1 Raw	Alt. 1 Weighted	Alt. 2 Raw	Alt. 2 Weighted	Alt. 3 Raw	Alt. 3 Weighted
Reliability & Resiliency	25%	9	2.25	10	2.50	6	1.50
Hydraulic Performance	25%	9	2.25	10	2.50	6	1.50
Environmental & Permitting	15%	7	1.05	3	0.45	10	1.50
Constructability & Implementation Risk	15%	7	1.05	4	0.60	8	1.20
Operations & Maintenance	10%	8	0.80	9	0.90	6	0.60
Future Expandability & Flexibility	10%	8	0.80	9	0.90	7	0.70
TOTAL	100%	---	8.20	---	7.85	---	7.00

4.3 Cost Criteria Evaluation

Planning-level capital cost estimates were developed for each alternative using route-specific pipeline lengths, planning-level unit costs, alternative-specific allowances, and design and construction contingencies. The estimates use unit costs of $450 per linear foot for 36-inch ductile iron pipe and $625 per linear foot for 42-inch ductile iron pipe. Additional allowances were included, as applicable, for major waterway crossings, valves and appurtenances, tie-ins, utility coordination, access and restoration, environmental mitigation, engineering and design development, construction contingency, and construction management.

The estimates are intended for relative planning and budgeting comparison and do not represent final design-level construction costs. Detailed planning-level cost estimates for Alternatives 1, 2, and 3 are included in **Appendix I**, respectively. The resulting capital cost comparison was summarized in **Table 4-3**.

Table 4-3 Capital Cost Summary

Cost Component	Alternative 1	Alternative 2	Alternative 3
Bid-Based Pipeline Construction	$52,172,500	$55,637,500	$41,665,000
Alternative Specific Allowance	$7,000,000	$7,000,000	$6,500,000
Design and Construction Contingency	$16,520,000	$19,050,000	$12,880,000
Total Capital Cost	$75,692,500	$81,687,500	$61,045,000
Relative Capital Cost Rank	2	3	1

Alternative 3 has the lowest planning-level capital cost because it requires the least new pipeline length and retains the existing A-B segment as the intermediate conveyance link. Alternative 2 has the highest planning-level capital cost due to its longer proposed pipeline alignment and higher environmental, access, and implementation allowances. Alternative 1 has an intermediate planning-level capital cost.

A 20-year net present value analysis was also completed to provide a consistent life-cycle cost comparison among the alternatives. The analysis considers initial capital cost, the present value of annual maintenance costs, and the present value of the remaining asset value at the end of the 20-year evaluation period. The NPV analysis uses a 3.0 percent discount rate and assumes a 75-year useful life for the transmission main facilities. At the end of the 20-year evaluation period, 55 years, or approximately 73.3 percent, of the assumed useful life remains.

Annual maintenance costs were estimated at $125,000 for Alternative 1, $175,000 for Alternative 2, and $75,000 for Alternative 3. The uniform-series present-worth factor, P/A, is 14.8775, and the single-payment present-worth factor, P/F, is 0.5537. Total net present cost was calculated as initial capital cost plus the present value of annual maintenance costs, less the present value of the residual asset value. The NPV results are summarized in **Table 4-4**.

Table 4-4 20-Year Net Present Value Summary

Economic Component	Alternative 1	Alternative 2	Alternative 3
Capital Cost	$75,692,500	$81,687,500	$61,045,000
Annual Maintenance	$125,000	$175,000	$75,000
Present Value of Maintenance	$1,859,684	$2,603,558	$1,115,811
Present Value of Residual Asset Value	($30,733,341)	($33,167,485)	($24,786,033)
Total Net Present Cost	$46,818,843	$51,123,573	$37,374,777
Relative NPV Rank	2	3	1

Alternative 3 has the lowest total net present cost and ranks first in the NPV comparison. The NPV ranking is consistent with the capital cost ranking and does not change the relative cost position of the alternatives.

The planning-level estimates should be refined during future design phases based on refinement to project specific requirements. Funding eligibility will be confirmed with FDEP.

4.4 Combined Cost and Non-Cost Evaluation

The alternatives evaluation included both a non-cost technical assessment and a planning-level cost comparison. The non-cost evaluation considered reliability and resiliency, hydraulic performance, environmental and permitting considerations, constructability and implementation risk, operations and maintenance, and future expandability and flexibility. A separate evaluation of planning-level capital cost was then completed to determine the overall planning value of each alternative. The combined evaluation results are summarized in **Table 4-5**.

Table 4-5 Combined Cost and Non-Cost Evaluation

Evaluation Component	Weight	Alternative 1	Alternative 2	Alternative 3
Non-Cost Evaluation Score	60%	8.2	7.85	7.00
Cost Score (Relative Planning-Level Cost Competitiveness)	40%	8.0	7.0	10.0
Non-Cost Weighted Score	--	4.92	4.71	4.20
Cost Weighted Score	--	3.20	2.80	4.00
Final Combined Score	100%	8.12	7.51	8.20
Overall Ranking	--	2	3	1

The combined cost and non-cost evaluation indicates that Alternative 3 achieved the highest overall score and ranked first among the evaluated alternatives. Alternative 1 ranked second, driven by its strong technical performance, while Alternative 2 ranked third due to higher planning-level costs and implementation challenges.

4.5 Key Alternative Strengths and Considerations

All three alternatives provide necessary improvements, but each has distinct strengths and planning considerations. The key strengths and planning considerations associated with each alternative were summarized in **Table 4-6**.

Table 4-6 Key Alternative Strengths and Considerations

Alternative	Key Strengths	Key Considerations
1	Strong hydraulic performance; continuous proposed A-B and B-C route; can satisfy the MM requirement in all modeled outage cases with sufficiently large segments.	Greater new pipeline length and cost than Alternative 3; intermediate mapped wetland impact; corridor and crossing complexity along the full route.
2	Strongest modeled hydraulic redundancy; parallel path around each principal existing segment; greatest operational flexibility during modeled outages.	Highest pipeline cost; greatest mapped wetland impact; conservation-easement and gopher tortoise recipient-site constraint; elevated permitting and implementation risk.
3	Lowest pipeline cost; least new pipeline length; lowest mapped wetland and surface-water impact; favorable implementation and planning flexibility.	Dependent on existing A-B; modeled A-B outage capacity below AAD; preliminary 36-inch A-D and 42-inch B-C diameters require final confirmation.

Alternative 1 and Alternative 2 provide stronger hydraulic outage performance. Alternative 3 provides the most favorable combination of pipeline cost, mapped environmental impact, reduced new pipeline length, and planning flexibility.

4.6 Recommended Planning Alternative

4.6.1 Evaluation Results

The non-cost evaluation indicated that Alternatives 1 and 2 provided greater hydraulic redundancy and outage resiliency than Alternative 3. Alternative 2 achieved the highest hydraulic evaluation score, while Alternative 1 achieved similar hydraulic performance with fewer environmental and implementation constraints. The evaluation also identified differences in environmental impacts, permitting complexity, constructability, and planning-level capital cost. Alternative 2 had the greatest estimated wetland impacts, the highest permitting complexity, and the highest planning-level capital and net present costs. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in both capital and net present cost than Alternative 3. Alternative 1 had lower environmental and implementation impacts than Alternative 2 but remained higher in cost than Alternative 3.

Alternative 3 had the lowest planning-level capital cost, the lowest 20-year net present cost, the shortest length of new transmission main, and the lowest mapped wetland and surface-water impacts. Alternative 3 also remains dependent on the existing A-B transmission segment, resulting in lower hydraulic redundancy than Alternatives 1 and 2. When cost and non-cost considerations were evaluated together, Alternative 3 achieved the highest combined evaluation score. Based on the combined evaluation results, Alternative 3 was selected as the preferred planning alternative for advancement into future design and implementation.

4.6.2 Basis for Selection

Based on combined consideration of technical performance, environmental findings, constructability and implementation, operations and maintenance, future flexibility, planning-level capital cost, 20-year net present cost, and County planning direction, Alternative 3 is recommended as the preferred planning alternative. (**Figure 4-1**).

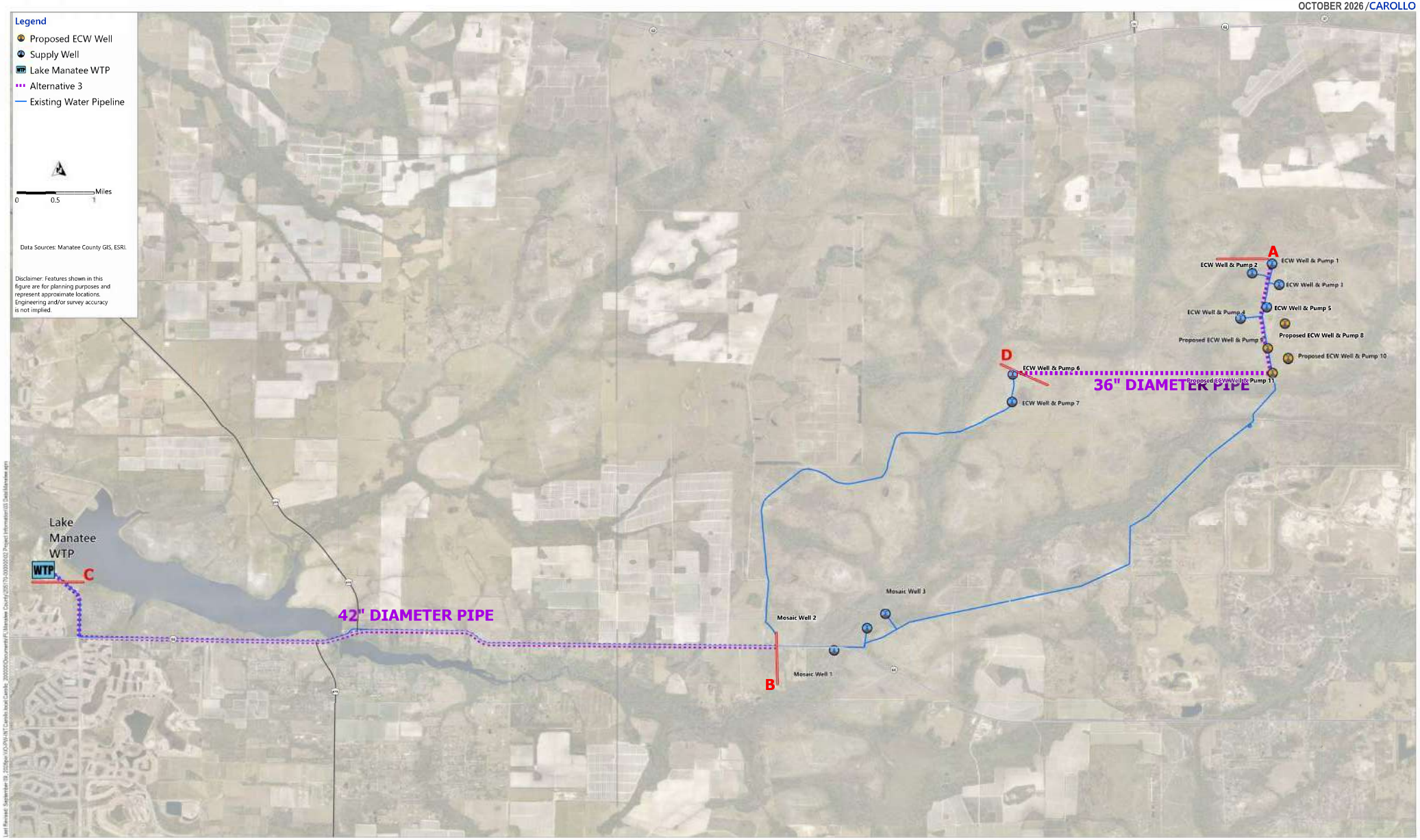


Figure 4-1 PROPOSED SELECTED PLANNING ALTERNATIVE 3 (36-INCH A-D AND 42-INCH B-C)
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

The recommendation transparently recognizes that Alternatives 1 and 2 provide stronger modeled outage performance, while Alternative 3 provides a favorable overall planning and budgeting approach.

For planning and budgeting, Alternative 3 consists of an approximately 24,950-foot, 36-inch A-D segment and an approximately 48,700-foot, 42-inch B-C segment. Final diameters and connection details will be confirmed during future design based on refined hydraulic analyses, updated design criteria, verified groundwater levels, confirmed well availability, WTP boundary conditions, transient analyses, constructability, permitting, and operational requirements.

Alternative 3 provides meaningful resiliency improvements but does not provide complete hydraulic independence from the existing transmission system. The proposed A-D segment provides an additional connection between the northern and southern portions of the ECW, and the proposed B-C segment provides a parallel transmission path to the WTP. However, the configuration continues to use the existing A-B and D-B segments.

The planning-level hydraulic analysis identifies the existing A-B segment as the controlling outage dependency. Under the modeled A-B outage condition, none of the evaluated Alternative 3 diameter combinations achieved the 26.236-mgd AAD criterion. Alternative 3 was nevertheless selected as the preferred planning alternative because its lower cost, shorter length, reduced mapped environmental impacts, and lower implementation risk produced the highest combined cost and non-cost evaluation score.

Selection of Alternative 3 represents a planning and budgeting decision rather than a conclusion that the alternative provides the same hydraulic independence as Alternatives 1 and 2. Future design shall establish the County's minimum acceptable service level for an A-B outage and evaluate well availability, available flow, WTP operation, isolation and maintenance requirements, emergency repair procedures, temporary supply measures, recovery actions, and potential future improvements. If the County's required outage performance cannot be achieved through operational measures, subsequent phases may include additional transmission improvements to reduce or eliminate the A-B dependency.

4.6.3 Potential Project Phasing

The planning-level cost estimates indicate that implementation of the selected alternative may require phased delivery to align project expenditures with available funding and future system needs. Potential project phasing strategies are summarized below.

- **Phase 1 – Core Resiliency Improvements**

Phase 1 would focus on the transmission infrastructure improvements that provide the greatest resiliency benefits and support increased raw water conveyance capacity between the ECW and the Lake Manatee WTP.

Potential Phase 1 improvements include:

- Construction of priority transmission main segments associated with the selected planning alternative.
- Improvements to transmission capacity between the Mosaic wells and the Lake Manatee WTP.
- Evaluation and potential construction of an interconnection between ECW Wells 1 through 5 and ECW Wells 6 and 7 within the ECW.

- **Phase 2 – Supply and Operational Improvements**

Phase 2 would focus on increasing raw water supply availability and improving operational flexibility within the existing treatment system.

Potential Phase 2 improvements include:

- Construction of two additional groundwater production wells.
- Construction of ASR bypass piping around the existing degasifiers.
- Construction of additional transmission infrastructure as warranted based on system demands, operational needs, and available funding.

- **Phase 3 – Long-Term Redundancy Improvements**

Phase 3 would focus on future water supply expansion and completion of additional system resiliency improvements.

Potential Phase 3 improvements include:

- Construction of two additional groundwater production wells.
- Completion of remaining transmission system redundancy improvements identified through future planning, design, and operational evaluations.

The final project phasing strategy will be refined during subsequent planning and design phases based on funding availability, regulatory requirements, operational priorities, hydraulic evaluation results, and future water demand projections.

SECTION 5 SELECTED ALTERNATIVE

Alternative 3 was selected for Facilities Plan development, planning, and budgeting. The selected concept includes the A-D wellfield connection and the B-C transmission segment to the Lake Manatee WTP. The preliminary configuration uses a 36-inch A-D segment and a 42-inch B-C segment. The selection establishes a planning basis and does not represent final design approval of materials, profiles, appurtenances, or connection details.

5.1 Description of the Proposed Project

The selected planning alternative includes approximately 24,950 feet of new 36-inch raw-water transmission main between Locations A and D and approximately 48,700 feet of new 42-inch raw-water transmission main between Locations B and C. The A-D segment connects the northern and southern portions of the East County Wellfield. The B-C segment provides a parallel connection between the wellfield transmission system and the Lake Manatee WTP. The selected concept operates with the existing A-B and D-B segments.

Planning-level components include tie-ins, isolation valves, air-release and vacuum-valve assemblies, blowoffs, access facilities, major roadway and water crossings, WTP connection modifications, and other appurtenances required for reliable operation. Final design will confirm the relationship between the selected transmission improvements and proposed wellfield, treatment, electrical, instrumentation, and SCADA improvements included in the broader project.

Refer to **Figure 5-1** for the selected Alternative 3 proposed tie-ins and major constraints. Refer to **Appendix H** for more detailed information on the major constraints and existing transmission main record drawings.

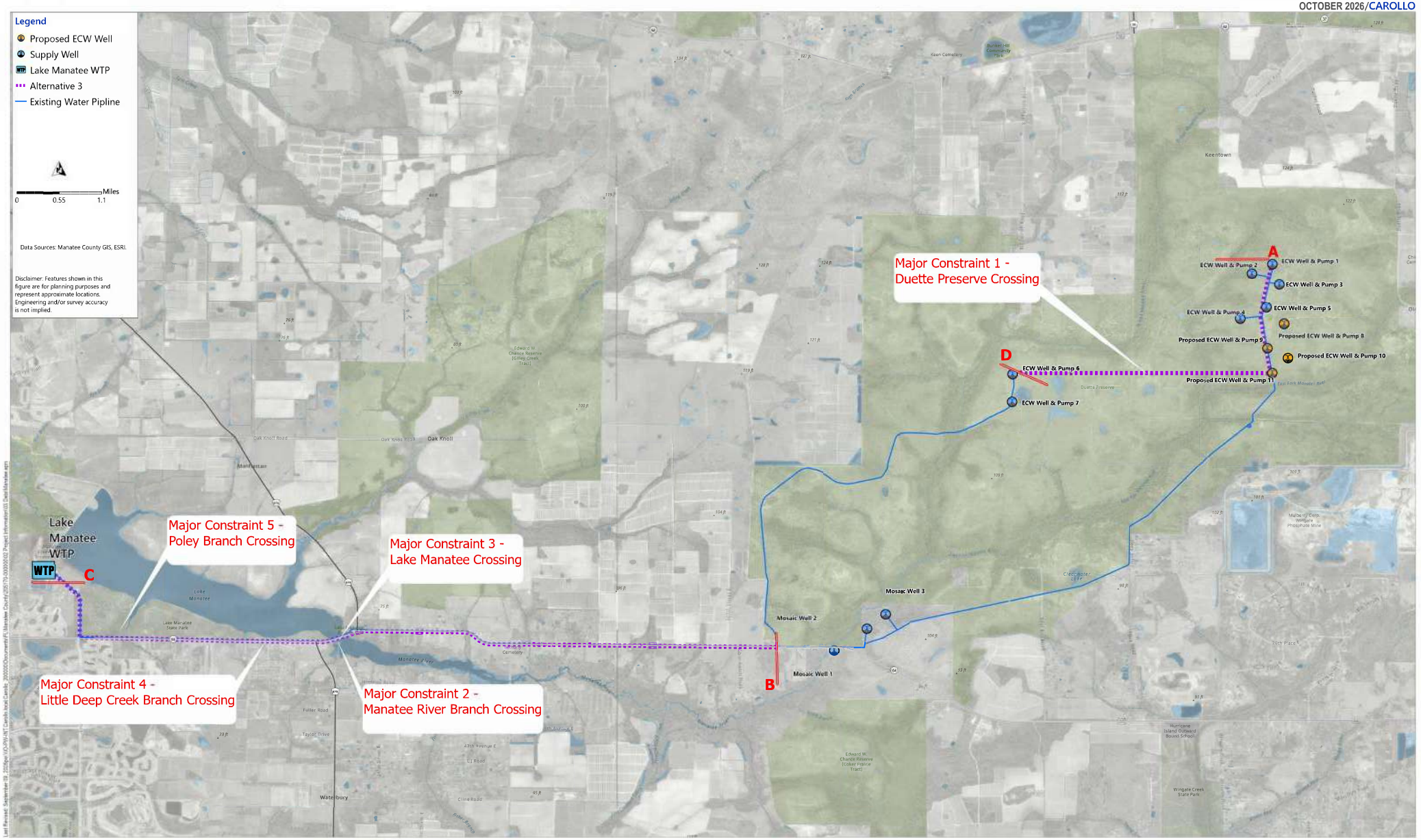


Figure 5-1 SELECTED PLANNING ALTERNATIVE 3 - PROPOSED TIE-INS AND MAJOR CONSTRAINTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

5.2 Project Implementation

Implementation will require coordinated survey, route refinement, geotechnical investigation, subsurface utility engineering, environmental field verification, property and easement coordination, permitting, hydraulic and transient modeling, design, procurement, construction, startup, and closeout. Coordination with FDOT and other agencies will be required where the project interfaces with planned roadway work, rights-of-way, regulated resources, and other infrastructure.

The project may be phased to align design, permitting, property acquisition, funding, procurement, and construction. Phasing should maintain County operations, reduce service disruption, and preserve the ability to advance critical wellfield and transmission improvements as information is refined.

5.2.1 Project Schedule

The preliminary funding implementation schedule presented in **Table 5-1** presents the current funding-program target dates. It identifies the milestones for Facilities Plan completion, funding coordination, field investigations, preliminary design, permitting, property acquisition, final design, procurement, construction, startup, and closeout. These dates are preliminary and have not yet been validated through a detailed critical-path method schedule. Achieving the dates depends on timely definition of the funded scope, selection of the project delivery approach, completion of field investigations, resolution of the WTP and degasifier interface, acquisition of necessary property rights, agency coordination, permit reviews, funding authorization, procurement, and construction.

The July 2027 date for design documents, permits, and site acquisition and the December 2031 project-completion date should therefore be treated as target milestones subject to schedule validation. Early schedule development shall identify controlling activities, responsible parties, dependencies, decision dates, float, and required escalation procedures.

Activities that should begin or be defined early because they may control the implementation schedule include confirmation of the SAHM-funded scope and project phasing; definition of the WTP and degasifier project boundary; confirmation of the delivery and procurement approach; survey, SUE, environmental field investigations, and geotechnical investigations; hydraulic criteria and required outage scenarios; property and easement acquisition; FDOT and conservation-land coordination; major-crossing feasibility; permitting coordination; final design; funding approval; procurement; construction; startup; and acceptance.

Table 5-1 Preliminary Funding Implementation Schedule

Schedule Categories	Month and Year
Submit the Planning or SSES documentation	Completed
Submit the design documents, obtain permits, and acquire sites (as necessary)	July 2027
Start activity (such as construction or non-structural best management practice)	January 2028
Complete activity (such as construction or non-structural best management practice)	December 2031

5.2.2 Project Cost and Funding Basis

The planning-level capital cost estimate for the Alternative 3 transmission improvements is $61,045,000. This estimate is based on approximately 24,950 linear feet of 36-inch transmission main along Segment A-D and approximately 48,700 linear feet of 42-inch transmission main along Segment B-C. The estimate includes the pipeline construction and the allowances, contingencies, engineering, and construction-management costs specifically identified in **Appendix I**.

The Alternative 3 estimate is a Class 5 planning-level estimate and is not the total cost of the broader Pipeline Resiliency Project. Unless expressly included in Appendix I, the estimate does not establish the final cost of additional production wells, well equipment, WTP hydraulic modifications, degasifier modifications or bypasses, electrical and SCADA improvements, property and easement acquisition, environmental mitigation, escalation to the midpoint of construction, or other improvements that may be added as the project scope is refined.

The current SAHM funding amount is $35,139,169, including $17,569,584 in principal forgiveness. Compared with the $61,045,000 planning-level estimate for the Alternative 3 transmission improvements, the presently identified funding is approximately $25.9 million less than the planning-level estimate. This comparison does not represent a final funding determination because project scope, eligible costs, phasing, and the total project estimate remain under development.

The County will coordinate with FDEP to confirm which project components and costs are eligible under the current SAHM funding package. Costs exceeding the available SAHM funding may require scope refinement, phased implementation, local funding, additional grant or loan funding, or a combination of funding sources. The Facilities Plan does not represent that funding eligibility or the source of the remaining funds has been finalized.

Cost estimates will be updated through final design as the scope, design criteria, crossing methods, property requirements, environmental mitigation, implementation schedule, and procurement approach are developed. The corresponding 20-year net present cost will be updated after the useful-life and residual-value assumptions are reconciled. These values are planning-level estimates for comparison, budgeting, and funding coordination. Funding eligibility and the relationship between the selected transmission alternative and broader SAHM-funded project components will be coordinated with FDEP and documented before issuance.

5.3 Future Design Confirmation

Items identified for confirmation are assigned to one of three resolution stages. Information needed to support the Facilities Plan conclusions, funding basis, public process, and regulatory submission will be resolved before final Facilities Plan issuance or expressly documented as a remaining planning limitation. County or agency determinations that occur after Facilities Plan submission, including funding eligibility, authorized WUP conditions, minimum acceptable outage service levels, property actions, and agency permit requirements, will be completed by the County with the applicable agency and consultant support before the related design, funding, or construction decision. Design details requiring survey, SUE, field investigation, geotechnical information, agency review, or progressive design development will be completed by the DCP/PDB team during project definition, permitting, or final design.

The project team will complete or expressly document the status of the hydrogeologic anomalies; reconcile alternative cost inclusions and exclusions; correct the net-present-value and residual-value basis; confirm the current funded scope and funding comparison; complete the public-meeting and appendix references; and finish report-wide terminology, title, address, and clerical QA/QC. These items are not deferred to final design.

Following the Facilities Plan issuance, the County will lead decisions involving the funded scope, funding eligibility, minimum outage service level, emergency operating expectations, property acquisition, and project phasing, with FDEP, SWFWMD, FDOT, land managers, and other agencies providing determinations within their respective authorities. The DCP/PDB team will complete the final alignment, profiles, pipe materials and diameters, survey and SUE, geotechnical investigations, environmental fieldwork, permit applications, major-crossing methods, detailed hydraulic and transient analyses, WTP/degasifier interface, electrical and SCADA integration, construction sequencing, commissioning, and acceptance criteria.

Future design will confirm the alignment and preliminary diameters using updated survey, field investigations, utility and property data, environmental verification, agency coordination, hydraulic criteria, and operating data. The design process should confirm:

- Final A-D and B-C alignments, profiles, materials, and diameters.
- Updated demand, WUP, groundwater-level, well-availability, and WTP boundary conditions.
- Final isolation strategy, emergency operating procedures, maintenance access, and service restoration.
- Tie-ins, appurtenances, air management, blowoffs, and access facilities.
- Water and roadway crossing methods, geotechnical requirements, and construction staging.
- Property, easement, right-of-way, and agency-permit requirements.
- Environmental field surveys, avoidance and minimization, and mitigation.
- Updated cost estimates and schedule as design advances.

5.3.1 Hydraulic and Diameter Confirmation

The future hydraulic evaluation should refine model calibration and confirm performance under representative existing and future conditions. The analysis should evaluate normal operation, individual existing-main outages, future-well availability, operational sequencing, and recovery. Final diameters should be based on capacity, velocity, headloss, pressure, operational flexibility, energy, surge, and future-system requirements.

5.3.2 Surge and Air Management

A detailed transient and air-management evaluation should be completed during design development using the selected pipeline profile, final materials and diameters, confirmed pump conditions, WTP and degasifier boundary conditions, proposed valve locations, and operating sequences. The evaluation should address pump startup and shutdown, power failure, minimum and maximum pressures, column separation, check-valve behavior, air admission and release, individual-main outages, air accumulation at high points and HDD crossings, and the need for operating controls or dedicated surge mitigation.

Transient pressure, column separation, trapped air, and uncontrolled air release are key design risks for the proposed long, large-diameter transmission mains, major elevation changes, pump systems, and HDD crossings. Potential consequences include excessive positive or negative pressure, loss of pipeline integrity, check-valve slam, pump or valve damage, air locking, reduced conveyance capacity, and difficulty restarting or recovering the system following an outage.

Design development shall include appropriate allowances for air-release and vacuum-valve assemblies, controlled valve operation, check-valve selection, surge-control facilities, instrumentation, emergency power and controls, and other mitigation identified by the transient analysis. Final locations and sizes will be established from the design-phase analysis and confirmed operating requirements.

5.4 Environmental and Regulatory Commitments

During design development, a permitting and approval matrix should be completed to identify the anticipated approval, reviewing agency, supporting information, critical-path dependency, resolution phase, responsible party, and next actions. Agency applicability and review durations should be confirmed through early coordination. In the early part of the design development, the DCP/PDB team should develop permit-supporting information and applications, and each reviewing agency will determine its final requirements and issue the applicable approval.

Environmental review for Alternative 3 should focus on field verification of wetlands and surface waters, protected-species surveys, cultural-resource coordination, conservation-land requirements, contaminated-site considerations, and applicable permits. Desktop evaluation indicates that Alternative 3 has the lowest mapped wetland and surface-water acreage and substantially less potential forested/shrub wetland conversion. Final impacts will depend on surveyed alignment, footprint, construction methods, and field-verified boundaries. The project should prioritize avoidance and minimization. Unavoidable impacts, mitigation, species-protection measures, cultural-resource requirements, and permit conditions will be established through design-phase surveys and agency coordination. Refer to **Figure 5-2** for the selected Alternative 3 environmental commitments.

Based on the preliminary alignment, environmental screening, and initial agency coordination, the anticipated permits are listed below. Additional permits may be required as the design progresses.

- Environmental Resource Permit (FDEP/SWFWMD)
- Section 404 / Section 10 Authorization (USACE)
- Clean Water Act Section 401 Water Quality Certification (FDEP/SWFWMD)
- Endangered Species Act Section 7 Consultation (USFWS)
- Gopher Tortoise Permit and Recipient Site / Conservation Easement Approval (FWC)
- Section 106 Coordination with the State Historic Preservation Officer (USACE/SHPO)
- Water Well Construction Permit (Manatee County Environmental Protection Division)
- Public Drinking Water System Construction Permit (FDEP)
- Generic Permit for the Discharge of Produced Groundwater from Dewatering (FDEP)
- Utility Permit (FDOT)
- NPDES Generic Permit for Stormwater Discharge from Construction Activities (FDEP)
- SELECTED ALTERNATIVE 3 ENVIRONMENTAL COMMITMENTS

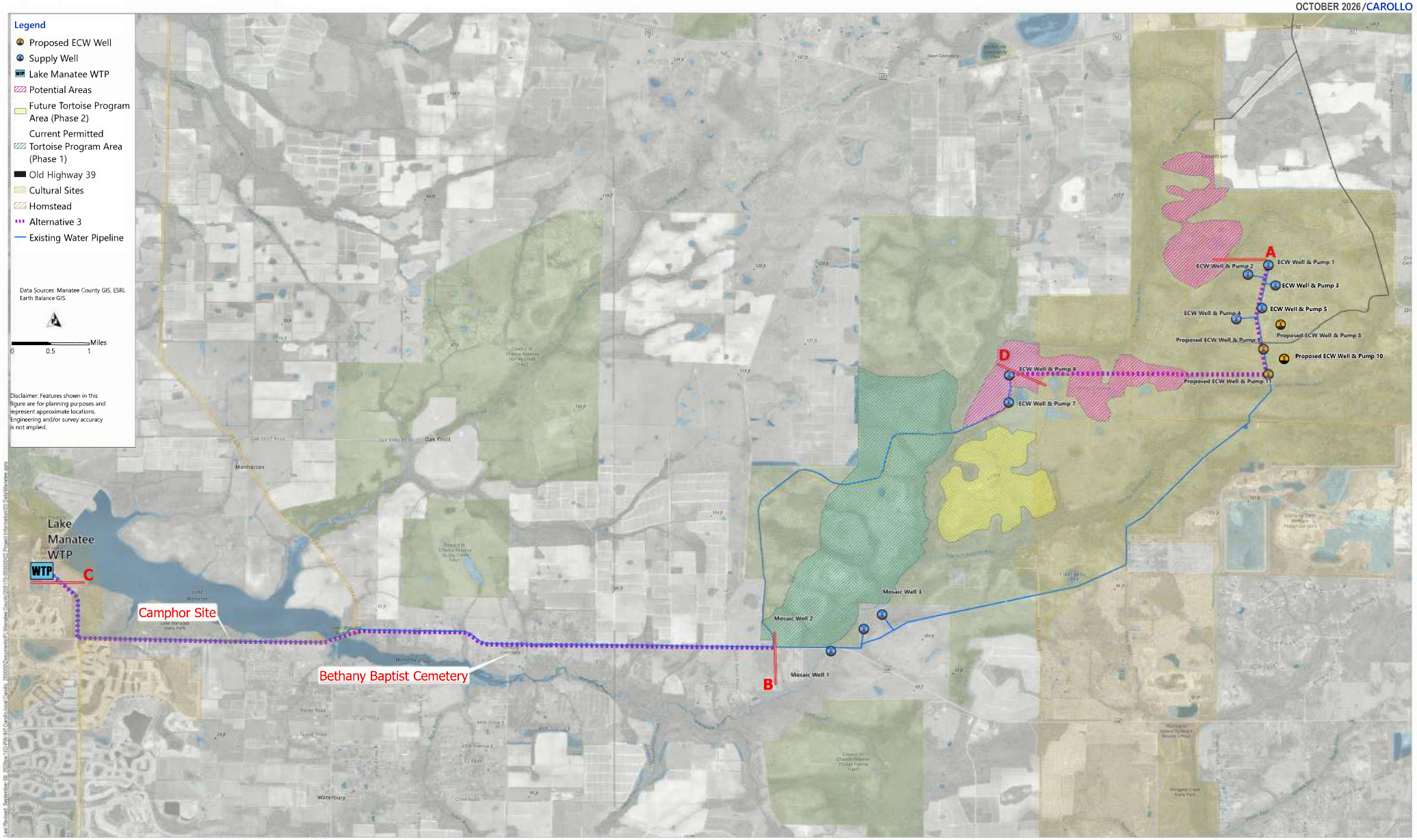


Figure 5-2 SELECTED ALTERNATIVE 3 ENVIRONMENTAL COMMITMENTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

SECTION 6 COMPLIANCE

This section summarizes additional aspects of compliance requirements of the selected alternative, including public engagement and regulatory review. It is intended that the project will be executed in a timely manner while maintaining compliance with applicable federal, state and local requirements and the conditions of the SAHM award.

6.1 Public Engagement Meeting

Manatee County hosted a public engagement meeting on September 15, 2026, to present the proposed project and receive public comments. Refer to **Appendix J** for the public notice and **Appendix K** for the public notice meeting minutes.

The Facilities Plan and associated resolution will be presented to the Manatee County Board of County Commissioners for consideration and adoption. The approving resolution will be included in the final designated appendix following adoption.

6.2 Regulatory Agency Review

Implementation of the selected alternative will require review and approval by the applicable regulatory agencies. As part of the SAHM funding process, this Facility Plan will be submitted to FDEP for review to confirm the project's eligibility under the funding program requirements. Future phases of project development, such as design, may require additional agency coordination, permitting, and approvals associated with public water supply facilities, wells, construction, and any other applicable local, state and regulatory requirements.

APPENDIX A

SUPPLEMENTAL APPROPRIATION FOR HURRICANE HELENE AND MILTON (SAHM) REQUEST FOR INCLUSION SUPPORTING DOCUMENTATION DWSRF FUNDS

Florida Department of Environmental Protection

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

Drinking Water State Revolving Fund Program
Douglas Building, 3900 Commonwealth Blvd, Tallahassee, Florida 32399-3000

The information in this Request for Inclusion (RFI) application is used to determine project eligibility and priority scoring. The priority score is used to rank projects for placement on the State Revolving Fund (SRF) priority list. Only projects placed on the fundable portion of the priority list receive consideration for a loan. Please note that costs incurred before the adoption of the project on the fundable or waiting portion of the priority list are not eligible for reimbursement.

1. Applicant's Name and Address.

Project Sponsor: Manatee County Contact Person: Jim Renneberg Title: Chief Utilities Engineer

3647 Cortez Rd W
(street address)

Bradenton (city) Manatee (county) 34210 (zip code)

(941) 792-8811 (telephone) (ext.) jim.renneberg@mymanatee.org (e-mail)

Contact Person Address (if different): _____
(street address) (city) (state) (zip code)

2. Name and Address of Applicant's Consultant (if any).

Firm: Carollo Engineers, Inc. Contact Person: Laura Baumburger Title: Senior Client Services Manager

301 N Cattlemen Rd #302
(street address)

Sarasota (city) 34232 (zip code)

+1 (941) 893-6476 (telephone) (ext.) LBaumberger@carollo.com (e-mail)

3. Type of Loan Requested in this Application. (select only one loan category and project type)

Planning Loan ☑	Design Loan ☑	Planning and Design Loan ☐	Construction Loan ☑

Project Type: Design/Bid/Build ☑ Design/Build (D/B) ☐ Construction Manager at Risk (CMR) ☐

Note: Procurement of professional services must meet the requirements of the Consultants' Competitive Negotiation Act, Section 287.055, F.S.

Eligibility for a Loan. In order to be considered for a priority listing, the following conditions must be met:

- The respondent to this solicitation must qualify as a "project sponsor" as defined in subsection 62-552.200(27), F.A.C.
- The minimum construction loan amount is $75,000.
- The project sponsor must agree to submit biddable plans and specifications within 1-year after execution of the loan agreement to qualify for a combined planning and design loan.
- The project is part of a public water system as defined in subsection 62-552.200(28), F.A.C., and may include drinking water supply, storage, transmission, treatment, disinfection, distribution, residuals management, and appurtenant facilities.

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

4. Median Household Income, Population and Principal Forgiveness Percentage (PF%). (complete a. through e. below)

a. Median household income (MHI): $79,524 (current U.S. Census data or verifiable estimates)

b. State median household income (SMHI): $71,711 (current U.S. Census data)

c. Population (P) served 149,000 = number of service connections 372,500 times 2.5 persons per connection to include proposed connections.

d. Is the project sponsor applying for a planning and/or design loan with principal forgiveness? Yes ☑ No ☐. If yes, then PF is 50%. *Only a sponsor that qualifies as a financially disadvantaged small community is eligible for a planning/ design loan with PF.*

e. Is the project sponsor applying for a construction loan with principal forgiveness? Yes ☑ No ☐. If yes, then PF% is calculated using the formula: *PF% = 1760/9 – 160 x (MHI/SMHI) – 7/4500 x P.*

Calculate PF% for a construction loan using the above formula: 50% *(minimum 20% and maximum 90%).*
If the sponsor is connecting a financially disadvantaged small community as defined below, a maximum 50% PF is available.

Please note that the calculated PF% is an estimate and the actual percentage will be determined by the Department. The amount of loan available with principal forgiveness for a project is dependent upon the amount of funds allocated for the fiscal year.

Eligibility for a loan with principal forgiveness. In order to be considered for a loan with principal forgiveness, the following conditions must be met:

- The project sponsor must qualify as a financially disadvantaged small community public water system as defined in Rule 62-552.200, F.A.C., unless the sponsor is specifically exempted from this requirement.
- The median household income (MHI) of the sponsor's service area must be less than the state median household income (SMHI) as reported from the current U.S. Census data or from verifiable estimates, unless the sponsor is specifically exempted from this requirement.
- The population (P) of the sponsor's service area must be less than 10,000 (to include the population from the project's proposed future connections), unless the sponsor is specifically exempted from this requirement.
- The project sponsor is allowed only one open loan with principal forgiveness. A loan is deemed open until the final disbursement of the project has been paid by the department.
- A project sponsor is eligible for a construction loan with principal forgiveness (maximum 50%) if connecting a community with less than 250 residential wells; an existing public water system with less than 250 service connections; or a separate, non-interconnected public water system owned by the sponsor. The project area must qualify as a financially disadvantaged small community.
- A financially disadvantaged community with a population of 10,000 or more is eligible for a construction loan with 20% principal forgiveness if dollars are available after funding all eligible financially disadvantaged small communities.
- A project sponsor that is a for-profit entity is not eligible for principal forgiveness.
- A construction project for a financially disadvantaged small community that uses a Construction Manager at Risk delivery method is ineligible for principal forgiveness.

5. Interest Rate Percentage.

The interest rate for a loan with the Department is determined using the following formula:

% of MR = 40 x (MHI/SMHI) + 15 % of MR = Percentage of Market Rate.

Calculate and enter the % of MR below:

% of MR for a loan: 0 (35% ≤ % of MR ≤ 75%)

Please note that the calculated % of MR is an estimate and the actual interest rate will be determined by the Department. The interest rate for a loan shall not be less than 0.2 percent.

6. Base Priority Score. Each project shall receive a base priority score (BPS) dependent on the weighted average of its components. The BPS shall be determined using the below formula where CPS means the component priority score and CCC means component construction cost.

$$BPS = [CPS_1 \times CCC_1 + \ldots + CPS_n \times CCC_n]/\text{Total Construction Cost}$$

Select each component and component score in Table 1 below that apply to the project, enter the estimated construction costs, and calculate the base priority score.

- Component priority scores that are based on contaminant levels must be justified by sample analytical data (see exception in notes at bottom of Table 1). The date of sample collection must be less than 24-months from the submittal date of the Request for Inclusion.
- The project sponsor must provide documentation demonstrating that contaminant levels (e.g. disinfection byproducts) cannot be reduced by adjusting system operations, if applicable.

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

- A compliance-1 category component score of 400 points, if selected in Table 1, must be supported by documentation demonstrating the need for the project; otherwise, a component score of 300 points shall be assigned.

Table 1

Project Component (*select all components that apply*)	**Component Priority Score**	**Component Construction Cost**
Acute Public Health Risk ☐ **1a.** E-Coli or Fecal Coliform Exceed MCL (62-550.310(5), F.A.C.) ☐ **1b.** Nitrate, Nitrite, or Total Nitrogen Exceed MCL (62-550.310(1), F.A.C., Table 1) ☐ **1c.** Lead or Copper Exceed Action Level (62-550.800, F.A.C) ☐ **1d.** Surface Water Filtration/Disinfection Noncompliance (62-550.817(2), F.A.C.)	800 points ☐	
Potential Acute Public Health Risk ☐ **2a.** Nitrate, Nitrite, or Total Nitrogen 50% of MCL (62-550.310(1), F.A.C., Table 1) ☐ **2b.** Microbiologicals Exceed MCL (62-550.310(5), F.A.C.) ☐ **2c.** Surface Water Enhanced Filtration/Disinfection Noncompliance (62-550.817(3), F.A.C.) ☐ **2d.** State Health Certification of Acute Health Risk, Unregulated Microbiological Contaminant ☐ **2e.** Violation of Disinfection Requirements (62-555.320(12), F.A.C.)	700 points ☐	_____
Chronic Public Health Risk ☐ **3a.** Inorganic/Organic Contaminant Exceed MCL (62-550.310(1) & (4), F.A.C., Tables 1,4,5) ☐ **3b.** Disinfection Byproducts Exceed MCL (62-550.310(3), F.A.C., Table 3) ☐ **3c.** Radionuclides Exceed MCL (62-550.310(6), F.A.C)	600 points ☐	
Potential Chronic Public Health Risk ☐ **4a.** Inorganic/Organic Contaminant 50% of MCL (62-550.310(1) & (4), F.A.C., Tables 1,4,5) ☐ **4b.** Disinfection Byproducts 80% of MCL (62-550.310(3), F.A.C., Table 3) ☐ **4c.** State Health Certification of Chronic Health Risk, Unregulated Chemical Contaminant	500 points ☐	_____
Compliance-1 Projects ***(documentation must be attached or default to Compliance-2 score)*** ☑ **5a.** Infrastructure upgrades to facilities undersized, exceed useful life, or with equipment failures ☐ **5b.** Insufficient water supply source, treatment capacity, or storage ☐ **5c.** Water distribution system pressure less than 20 psi ☐ **5d.** Eliminate dead ends and provide adequate looping in a distribution system ☐ **5e.** Replace distribution mains to correct continual leaks, pipe breaks, and water outages ☐ **5f.** New water system or extension of existing system to replace contaminated or low yield wells ☐ **5g.** Lack of significant safety measures (e.g. chemical containment) ☐ **5h.** Secondary Contaminant MCL Exceedance (62-550.320, F.A.C.) ☐ **5i.** Drinking water supply project as defined in 403.8532(9)(a), F.S.	400 points ☑	$69,300,000
Compliance-2 Projects ☐ **6a.** Treatment, Storage, Power, and Distribution Requirements (62-555.320, F.A.C) ☐ **6b.** Minimum Required Number of Wells (62-555.315(2), F.A.C) ☐ **6c.** Well Set-back and Construction Requirements (62-555.312 and 62-555.315, F.A.C) ☐ **6d.** Cross-Connection Control Requirements (62-555.360, F.A.C) ☐ **6e.** Physical Security Project Documented in a Vulnerability Analysis ☐ **6f.** Consolidation or regionalization of public water systems ☐ **6g.** Water or Energy Conservation Project	300 points ☐	_____
☐ **7. All Other Projects** ***(including land or public water system acquisition projects)***	100 points ☐	

Note: Item 2d. and 4c. of Table 1 requires a State Health Officer to complete the form "Certification of a Public Health Risk". If 50% or more of wells meet contaminant levels from Table 1 above, then select the appropriate health risk category in Table 1. Flooded wells and wells under the direct influence of surface water are considered an unregulated microbiological potential acute public health risk and require documentation of occurrence in lieu of sampling data.

7. **Affordability Score.** The extent of affordability existing in a small community to be served by the project shall be reflected in the priority score. Points shall be awarded based upon two affordability criteria: median household income (MHI) and population (P) served. These points are to be added to the base priority score. Calculate the affordability score using the following formulas:

Affordability Score = (MHI Score + Population Score)

MHI Score = 100 x (1.00 – MHI/SMHI), zero ≤ MHI score ≤ 75, rounded to nearest whole number

Population Score = 50.0 - (P/200), population score ≥ zero, rounded to nearest whole number

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

8. **Water Conservation Score.** A project sponsor with a qualifying water conservation project is eligible to receive an additional 100 points added to their base priority score if the sponsor provides a water conservation plan in accordance with EPA's Water Conservation Plan Guidelines document number EPA-832-D-98-001, August 6, 1998.

9. **Total Priority Score.** Total priority score equals the base priority score plus the affordability score. (complete a. through d. below)

   a. Base priority score: 400 points.
   b. Affordability score: _____ points (> zero).
   c. Water Conservation score: 0 points.
   d. Total priority score: 400 points (sum of items a. and c.)

10. **Estimated Project Cost.** (complete a. through i. below)
(enter $0 if activity is not applicable)

Project Activity	*Cost*
a. Planning.	$2,625,000
b. Design (not applicable if a D/B project).	$6,300,000
c. Eligible land (necessary land divided by total land times purchase price).	
d. Constr., equip., material, demo. & related procurement (include design if D/B project).	$52,500,000
e. Construction contingency (10% of 'd', only applicable for Design/Bid/Build projects).	$5,250,000
f. Technical services during construction and after bid opening.	$2,625,000
g. Asset management plan per 62-552.700(7), F.A.C.	
h. *Total project costs* (sum of a. through g.).	
i. *Loan amount requested* by the sponsor in this RFI (assume no principal forgiveness).	$69,300,000

List all funding sources (including grants for this project): Utility Rates

11. **Project Schedule.** (complete a. through d. below)

Project Activity	*(M/D/YY)*
a. Submit planning documents.	1/31/26
b. Submit design/bid documents or RFQ/RFP for CMR & D/B projects.	7/31/27
c. Start construction.	1/31/28
d. Complete construction.	7/31/29

12. **Project Information.** Provide the following information, if applicable.
(select all items below that are attached to this RFI)

- ☑ Project description, location with lat/long (degrees), water system PWS ID, and project need *(this is a required attachment)*.
- ☑ Map of city and county limits, existing and proposed service area, and project area *(this is a required attachment)*.
- ☐ Lab data, lab data with operational records, or substantiated documentation in lieu of lab data for public health risk projects.
- ☐ Certification of a Public Health Risk form completed by a State Health Officer.
- ☑ Supporting documentation for projects identified under the Compliance-1 project categories from Table 1 above.
- ☐ Project schedule showing plans and specs completion within 1-year of the execution date of a planning/design loan.
- ☐ Supporting documentation if MHI not taken from current U.S. Census data.
- ☐ Water Conservation Plan in accordance with EPA guidelines.

13. Certification by an Authorized Representative. I certify that this form and attachments have been completed by me or at my direction and that the information presented herein is, to the best of my knowledge, accurate and true.

Patrick Shea (signature) | 6/30/2025 (date) | patrick.shea@mymanatee.org (e-mail)

Patrick Shea (print name) | Utilities Director (print title)

Email the completed RFI form with attachments to SRFRFI@FloridaDEP.gov *or mail to the Florida Department of Environmental Protection, State Revolving Fund Program,* 3900 Commonwealth Blvd, Tallahassee, Florida 32399-3000.



Supplemental Appropriation for Hurricanes Helene and Milton (SAHM) Request for Inclusion Supporting Documentation DWSRF Funds

June 2025

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BACKGROUND

Location Description

Manatee County (County) owns and operates its potable water, wastewater, and reclaimed water system (System) that provides water, wastewater, and reclaimed water services to various retail and wholesale utility customers within County limits and surrounding municipalities. The Bureau of Economic and Business Research (BEBR) at the University of Florida estimated the total population of Manatee County to be 455,356 in 2024. The County also provides stormwater and solid waste services within County limits, which are not considered in this report.

The County owns and operates the Lake Manatee Water Treatment Plant (WTP), a facility permitted for a maximum daily treatment capacity of 84 million gallons per day (mgd), to serve their potable water supply system. This facility uses both groundwater and surface water, which are treated in two separate treatment trains:

- A 54-mgd-capacity train for surface water from Lake Manatee.
- A 30-mgd-capacity train for groundwater from County wellfields.

The County is located within the Southwest Florida Water Management District (SWFWMD), one of five water management districts in Florida responsible for managing groundwater and surface water resources. The County's water use permit (WUP), issued by SWFWMD, allocates surface and groundwater quantities and environmental compliance monitoring requirements.

According to the 2024 Public Supply Annual Report, the County, on average, withdrew 50.1 mgd of water to meet their customer and wholesale water user demands. Of the 50.1 mgd, 34.0 mgd was supplied from surface water from Lake Manatee and the remaining 16.1 mgd was supplied by groundwater.

Lake Manatee is the County's primary source of potable water. The County is permitted to withdraw an annual average of 34.9 mgd and a maximum monthly amount of 46.07 mgd from the reservoir. The County also has the capability to withdraw groundwater via its aquifer storage and recovery (ASR) system located at the Lake Manatee WTP. This system consists of six ASR wells and is designed to provide 10 mgd of water for 180 days during an emergency.

The County is also permitted to withdraw an annual average of 19.086 mgd of groundwater from the East County Wellfield (ECW), a property comprising approximately 33 square miles in northern Manatee County. The ECW is comprised of approximately 24.8 miles of transmission mains that distribute raw water from seven production wells to the Lake Manatee WTP.

Maps

Manatee County is the sole supplier of potable water to the unincorporated areas within County limits, the City of Palmetto, the Town of Longboat Key, and the three cities of Anna Maria Island: Holmes Beach,

Bradenton Beach, and Anna Maria. The County also supplies water to meet some of the needs of Sarasota County and minimal amounts to the City of Bradenton. In the outlying areas of the County, households not served by any of these water systems rely upon private wells. The County's water service area is shown in Figure 1.

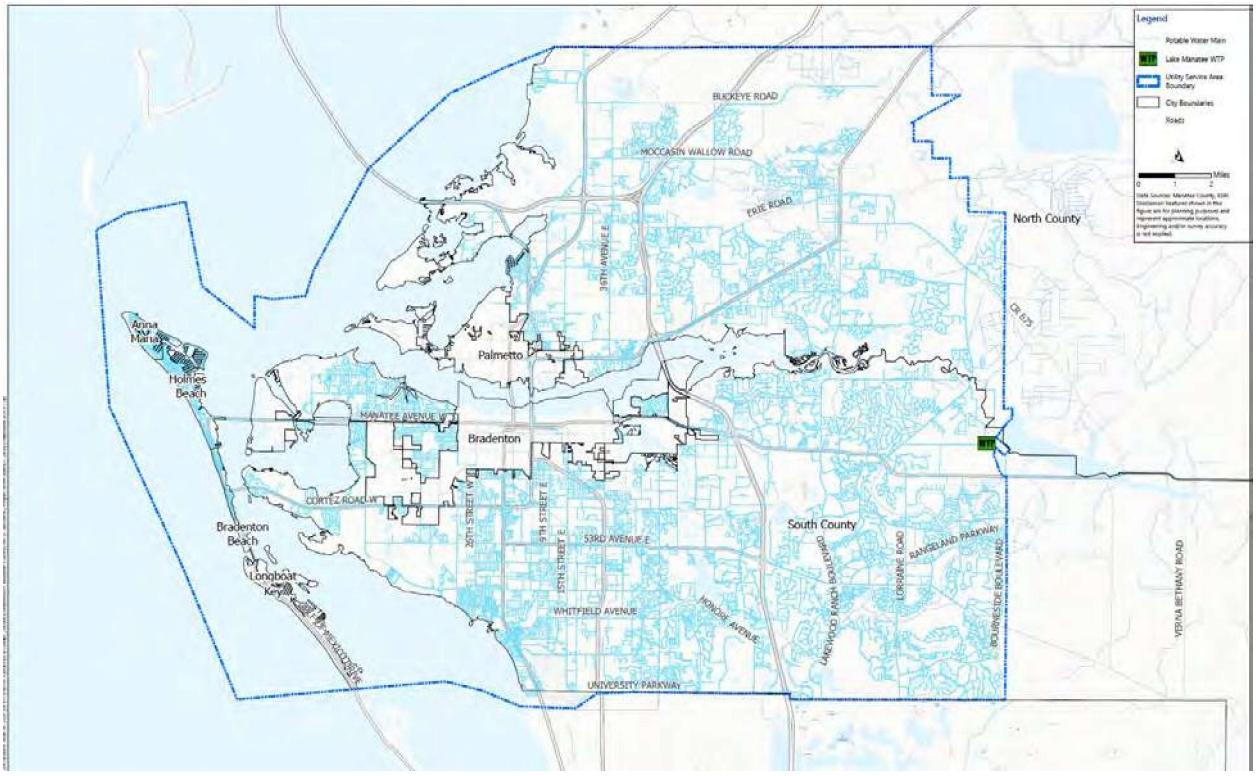


Figure 1 Manatee County Potable Water Service Area

PIPELINE RESILIENCY PROJECT INFORMATION

Public Water System/Facility ID Number

6411132

Project Location

17915 Water Line Srv Rd

Bradenton, FL 34212

27° 29' 16.7892'' N82° 21' 41.4252'' W

Project Description

Manatee County is applying for planning, design, and construction of their Pipeline Resiliency Project (Project). The Project will construct two groundwater (GW) production wells and place a 20-inch raw water transmission main, parallel to the current water transmission main. The well location and pipeline alignment will be determined in the planning and design phases but are anticipated to be near the current well field areas. The planning, design, and construction tasks are broken down as follows:

Task Name	Task Description
Planning	Monitoring project progress, scope, schedule, budget, reporting, and meetings. Creation of facilities plan, route study, and hydraulic assessment, which will include geotechnical, surveying, etc.
Design	Design of the project. Securing all necessary permits and environmental compliance to meet all regulatory requirements. This includes coordinating with local, state, and federal agencies, preparing documentation, and addressing any environmental impact concerns.
Construction	Construction of GW production wells (2 assumed), installation of 20-inch raw water transmission main, upgrading degasifiers (2 assumed), internal hydraulic modifications (from degasifiers' outlet to Basin C rapid mix), installation of GW treatment system electrical and GW treatment system instrumentation/SCADA.

Manatee County's East County Wellfield is an existing water source permitted under the County's consolidated WUP No. 20013343.005, with an authorized annual average demand (AAD) withdrawal of 18.386 mgd and a peak monthly demand (PMD) withdrawal of 20.736 mgd. Within this allocation, the wellfield includes a conjunctive use capacity of 4.75 mgd derived from reallocated Floridan aquifer quantities.

These 4.75 mgd in new Floridan quantities are eligible for withdrawal at the East County Wellfield to provide operational flexibility but do not increase the total current permit allocation. This flexibility is contingent on the continued delivery of at least 4.0 mgd of reclaimed water to Schroeder-Manatee Ranch. If reclaimed deliveries fall below this threshold, the allowable Floridan withdrawals at East County are reduced to 2.4 mgd for conjunctive use purposes. Should future demand projections indicate the need for additional supply, the County may apply for a permit modification to convert all or part of the 4.75 mgd flexibility into an increase in the total permit allocation.

In its 2025 Projected Water Demands and Sources of Supply report submitted in January 2025, the County indicated the potential to obtain an additional 4.0 mgd from the East County Wellfield by 2033. This anticipated capacity could potentially be realized either through submitting a WUP modification application for increased use of the conjunctive capacity or by expanding the wellfield's infrastructure to support higher withdrawal volumes. The approval of this modification is critical to this Pipeline Resiliency Project and will be a critical piece of the planning and implementation process.

Overall Project Need and Benefits

The main need and benefit of the Pipeline Resiliency Project is that it will create redundancy in Manatee County's raw water transmission system providing increased resiliency in the event of a storm. During Hurricanes Helene and Milton, there were multiple line breaks and other distribution system impacts, which caused system leakage, further pointing to the need for system redundancy (see Appendix B). This redundancy will beneficially support Manatee County's ability to provide water during major storm events and allow one pipe to remain operational if the other is damaged during a storm event, directing flows to the treatment plant and supporting future water security across the County.

Project location Map

The figure below shows the general project location. The project's pipeline is expected to run parallel to the current 30-36 inch diameter pipe, in the same overall alignment. The current assumption is that the pipeline will start around the ECW well sites 1-5 (pending further planning and approval of a WUP modification), and travel west to the water treatment plant (WTP) structures, for a total length of approximately 18 miles.

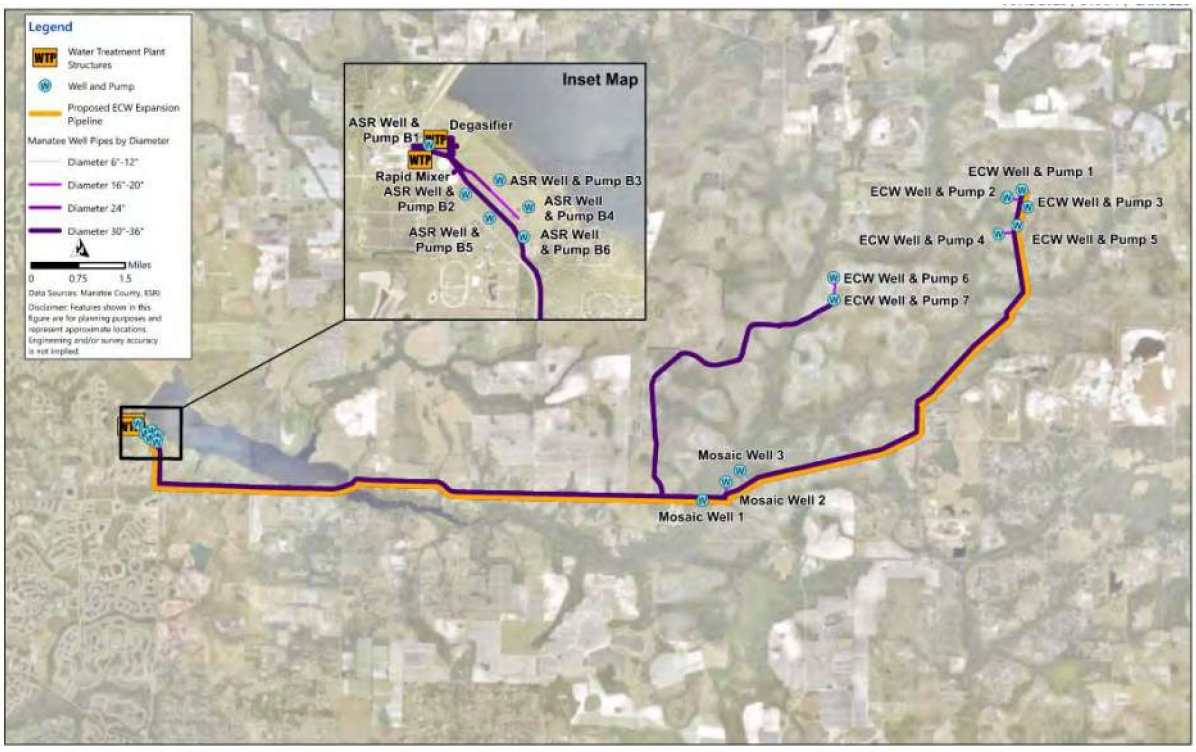


Figure 2 East County Wellfield and Pipeline Alignment Map with Proposed ECW Expansion Pipeline

Project Estimated Costs

Cost Categories	Estimated Costs
Planning	$2,625,000
Design (not applicable if a D/B project)	$6,300,000
Eligible Land (necessary land divided by total land times purchase price)	
Construction, equipment, material, demolition and related procurement (including design if D/B project)	$52,500,000
Construction Contingency (10% of 'd', only applicable for Design/Bid/Build projects)	$5,250,000
Technical Services during Construction and after bid opening	$2,625,000
Asset management plan per 62-552.700(7), F.A.C.	
Sum of Items	**$69,300,000**

Project Schedule

Schedule Categories	Month and Year
Submit the Planning or SSES documentation	January 2026
Submit the design documents, obtain permits, and acquire sites (as necessary)	July 2027
Start activity (such as construction or non-structural best management practice)	January 2028
Complete activity (such as construction or non-structural best management practice)	December 2029

Project Priority Scoring Support

Expected Priority Point Category	Priority Points	Component Construction Cost	Support
Compliance-1 Projects *(documentation must be attached or default to Compliance-2 score)* **5a.** Infrastructure upgrades to facilities undersized, exceed useful life, or with equipment failures **5b.** Insufficient water supply source, treatment capacity, or storage	400	$69,300,000	Stations for the current raw water system experienced power failure during Hurricane Helene (see Appendix A). Project will create redundancy in raw water transmission system to support the County's water needs during storm events and ensure that

5c. Water distribution system pressure less than 20 psi **5d.** Eliminate dead ends and provide adequate looping in a distribution system **5e.** Replace distribution mains to correct continual leaks, pipe breaks, and water outages **5f.** New water system or extension of existing system to replace contaminated or low yield wells **5g.** Lack of significant safety measures (e.g. chemical containment) **5h.** Secondary Contaminant MCL Exceedance (62-550.320, F.A.C.) **5i.** Drinking water supply project as defined in 403.8532(9)(a), F.S.			if one pipe is harmed during a storm event, the other could remain operational. Appendix C includes a list of breaks experienced throughout the system during Hurricane Milton.

Explanation of how the Project is Eligible for SAHM Funding

As detailed in Attachment 3 of the United States Environmental Protection Agency (USEPA) memorandum titled "*Appropriation for Hurricanes Helene and Milton and the Hawai'i Wildfires,*" the following eligibility criteria directly apply to the Pipeline Resiliency Project under the Drinking Water SRF category:

- Projects that prevent interruption of water distribution system operation in the event of a flood or natural disaster, including but not limited to:
  - Installation/construction of redundant distribution system components and equipment.
- Projects that maintain the operation of a drinking water treatment plant, intake or well in the event of a flood or natural disaster, including but not limited to:
  - Installation/construction of redundant distribution system components and equipment.

This project supports both eligibility criteria since the new pipeline and wells will support the County's need for redundancy and resiliency in their raw water transmission system. In the event of a major storm, the second pipeline will provide additional security to the water supply system, so that the County can provide water to all communities in its service area. In this manner, the project meets the SAHM eligibility criteria.

PROOF OF IMPACTS TO SYSTEM

Hurricane Helene

Hurricane Helene made landfall on September 26th, 2024. Many stations experienced power outages during Hurricane Helene. There were multiple communication failures and instances where no data was collected throughout the Hurricane at three pump stations: Northwest Ground Storage Tank and Booster Pump Sation (NWGS), Longboat Meter Station, and Cortez Booster Station. On the 26th, from 16:23 to 17:54, NWGS and Longboat Meter Station experienced power fail for their Uninterruptible Power Supplies (UPS). NWGS specifically experienced communications, power, and UPS failure from September 26th at 18:00 until November 2nd 2024. At 18:20 on September 26th, the Longboat Meter Station also experienced communications, power, and UPS failure until November 2nd 2024. See Appendix A for pressure and flow data from the three pump stations between September 26th and 29th. At the Water Treatment Plant, the power was switched to generator power at 19:18 on the 26th and was restored to full power on the 28th.

The City of Bradenton's Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir experienced power outages due to Hurricane Helene and had to utilize generator backups during and after the storm. Manatee County stepped in to help the City of Bradenton augment their water supply since it compromised secondary drinking water parameter exceedances as a result of the storm. Specifically, 7 direct interconnects were made to support their water needs between the 27th and 28th and three water distribution locations were opened to support community water needs. The water treatment plant stabilized on the 29th, but chlorine levels were still high, so the distribution locations and direct interconnects continued till the 30th. See Appendix B for the complete situation reports.

Hurricane Milton

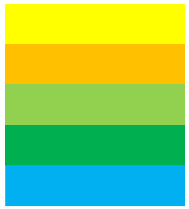
Hurricane Milton made landfall shortly after Helene on October 9th, 2024. The Manatee County Water Treatment Plant power was switched to generator power at 18:15 on the 9th. The whole Manatee County distribution system felt the major effects of Hurricane Milton. Attached in Appendix C is a list of all the pipe breaks that were reported during and after the storm. There were 64 breaks of various calibers and causes due to Milton's surge and debris between October 9th and October 12th. During Hurricane Milton, Bradenton's water plant was intentionally inactive, and water was on a bypass system with the goal to mitigate any sever impacts similarly to what the plant experienced in Helene. Yet, their plant still experienced water intrusion. See Appendix B for the complete situation reports.

APPENDIX A

HURRICANE HELENE PRESSURE AND FLOW DATA

Hurricane Helene Pressure and Flow Data
9/24/2024 00:00 to 9/29/24 23:59

Legend:



Power fail, on UPS
Station valved out
Comms, power, and UPS fail
Comms failure
No data

	NWGS		Longboat Meter Station		Cortez Booster	
	No generator		No generator		Manual generator, manual transfer switch	
Time	NWGS PSI	NWGS Flow	Longboat PSI	Longboat Flow	Cortez PSI	Cortez Flow
9/26/2024 0:00	82.125	(null)	79.106	0.016	80.425	1.173
9/26/2024 0:01		(null)	79.419		80.394	1.203
9/26/2024 0:02	83.944	(null)	80.625		82.069	1.276
9/26/2024 0:03	83.869	(null)	80.813		82.225	1.229
9/26/2024 0:04	84.506	(null)	81.1		82.256	1.255
9/26/2024 0:05	83.738	(null)	80.512		82.15	1.245
9/26/2024 0:06	83.756	(null)	80.525		82.006	1.274
9/26/2024 0:07		(null)			81.6	1.288
9/26/2024 0:08	83.719	(null)	80.762		81.906	1.278
9/26/2024 0:09	83.531	(null)	80.4		81.113	1.324
9/26/2024 0:10	82.425	(null)	79.544		80.256	1.431
9/26/2024 0:11	81.169	(null)	78.787		80.456	1.445
9/26/2024 0:12	81.637	(null)	79		80.431	1.438
9/26/2024 0:13	81.581	(null)	78.725		80.219	1.442
9/26/2024 0:14	80.887	(null)	79.019		79.756	1.487
9/26/2024 0:15	80.831	(null)	78.275		79.75	1.526
9/26/2024 0:16	80.981	(null)	78.037			
9/26/2024 0:17	80.213	(null)	78.088		78.769	1.567
9/26/2024 0:18	80.794	(null)	78.438		79.787	1.527
9/26/2024 0:19	80.006	(null)	77.45		79.381	1.556

9/26/2024 0:20		(null)			78.881	1.601
9/26/2024 0:21	80.137	(null)	77.613		79.469	1.656
9/26/2024 0:22	80.119	(null)	81.488		84.844	2.128
9/26/2024 0:23	85.537	(null)	83.331		85.463	2.03
9/26/2024 0:24	85.238	(null)	83.869		86.438	2.018
9/26/2024 0:25	85.5	(null)	84.894		86.681	
9/26/2024 0:26	85.256	(null)	84.806		86.856	2.01
9/26/2024 0:27	85.781	(null)	85.156	0.015	85.556	1.958
9/26/2024 0:28	84.863	(null)	82.863		81.356	1.748
9/26/2024 0:29	79.144	(null)	78.175	0.016		
9/26/2024 0:30	77.606	(null)	77.088	0.016	78.7	1.949
9/26/2024 0:31	78.394	(null)	77.006	0.016	78.75	1.961
9/26/2024 0:32	78.094	(null)	76.75	0.017	78.744	1.932
9/26/2024 0:33	77.025	(null)	76.012	0.016	77.813	1.953
9/26/2024 0:34	77.456	(null)	76.738		77.869	1.998
9/26/2024 0:35	77.625	(null)	76.75		78.381	1.976
9/26/2024 0:36	77.381	(null)	76.756	0.016	78.338	1.986
9/26/2024 0:37	78.338	(null)	77.306	0.016	78.912	1.959
9/26/2024 0:38	78.563	(null)	77.338	0.015	79.181	1.954
9/26/2024 0:39	78.15	(null)	76.95	0.016	79.056	1.948
9/26/2024 0:40	78.544	(null)	77.131	0.016	78.881	1.954
9/26/2024 0:41	78.787	(null)	77.619	0.016	78.994	1.973
9/26/2024 0:42	78.488	(null)	77.725	0.016	79.338	1.96
9/26/2024 0:43	79.613	(null)	78.575	0.016	79.956	2.024
9/26/2024 0:44	80.006	(null)	79.075		80.494	2.001
9/26/2024 0:45	79.969	(null)	78.863		80.675	1.982
9/26/2024 0:46	78.881	(null)	78.281		80.213	1.998
9/26/2024 0:47	78.731	(null)	77.575		79.781	2.036
9/26/2024 0:48	78.581	(null)	77.619	0.016	79.169	2.086
9/26/2024 0:49	77.681	(null)	76.656	0.016	79.094	2.062
9/26/2024 0:50	77.925	(null)	76.919		78.856	2.098
9/26/2024 0:51	77.381	(null)	76.894	0.016	78.713	2.096
9/26/2024 0:52	77.475	(null)	77.131	0.015	78.406	2.103

9/26/2024 0:53	82.406	(null)	83.488	0.016	81.556	2.216
9/26/2024 0:54	87.45	(null)	86.281	0.015	87.025	2.115
9/26/2024 0:55	87.975	(null)	87.006	0.016	88.95	2.04
9/26/2024 0:56	88.35	(null)	87.325		88.975	2.065
9/26/2024 0:57	87.994	(null)			89.106	2.084
9/26/2024 0:58		(null)	87.012	0.016	87.431	2.044
9/26/2024 0:59	86.719	(null)	84.425	0.016	82.85	1.843
9/26/2024 1:00	80.756	(null)	79.406		80.35	1.992
9/26/2024 1:01	79.669	(null)	77.831		78.35	2.014
9/26/2024 1:02	78.15	(null)	76.925	0.017	77.475	2.003
9/26/2024 1:03	77.044	(null)	75.319	0.016	76.594	2.06
9/26/2024 1:04	75.713	(null)	74.5		76.506	2.075
9/26/2024 1:05	75.506	(null)	73.838		74.981	2.129
9/26/2024 1:06	73.819	(null)	73.094		74.9	2.162
9/26/2024 1:07	74.644	(null)	73.419		75.144	2.153
9/26/2024 1:08	73.856	(null)	73.063	0.016	75.119	2.165
9/26/2024 1:09	74.475	(null)	73.444		75.387	2.154
9/26/2024 1:10	74.119	(null)	72.938	0.016	75.006	2.183
9/26/2024 1:11	74.287	(null)	73.219		76.019	2.228
9/26/2024 1:12	74.963	(null)	74.488		77.919	2.332
9/26/2024 1:13	76.575	(null)	76.188		78.425	2.324
9/26/2024 1:14	76.706	(null)	76.531		78.95	2.311
9/26/2024 1:15	77.55	(null)	76.906		79.369	2.312
9/26/2024 1:16	77.85	(null)	77.106		79.287	2.302
9/26/2024 1:17	78.113	(null)	77.65		79.631	2.296
9/26/2024 1:18	77.794	(null)	77.363	0.017		
9/26/2024 1:19	77.512	(null)	77.481	0.015	79.088	2.275
9/26/2024 1:20	77.569	(null)	77.287	0.04	79.306	2.312
9/26/2024 1:21	77.063	(null)	76.831	0.016	78.85	2.348
9/26/2024 1:22		(null)	76.531		78.912	2.359
9/26/2024 1:23	77.588	(null)	77.162		79.213	2.341
9/26/2024 1:24	78.206	(null)	77.331		79.537	2.342
9/26/2024 1:25	77.231	(null)	76.931		79.106	

9/26/2024 1:26	77.831	(null)	76.825		79.181	2.341
9/26/2024 1:27	77.438	(null)	77		78.975	2.344
9/26/2024 1:28	77.137	(null)	76.756		79.05	2.351
9/26/2024 1:29	77.269	(null)	76.006		78.912	2.366
9/26/2024 1:30	76.762	(null)	76.475		78.669	2.376
9/26/2024 1:31	76.406	(null)	75.894	0.016	78.037	2.384
9/26/2024 1:32	76.425	(null)	75.944	0.016	78.338	2.395
9/26/2024 1:33	76.463	(null)	76.075		78.294	2.396
9/26/2024 1:34	77.044	(null)	76.606		78.588	2.371
9/26/2024 1:35	77.512	(null)	76.944		79.056	2.359
9/26/2024 1:36	77.625	(null)	76.725		79.125	2.359
9/26/2024 1:37	77.662	(null)	76.794	0.017	78.956	2.34
9/26/2024 1:38	77.7	(null)	77.475		78.938	2.331
9/26/2024 1:39	86.512	(null)	83.981	0.016	86.719	2.787
9/26/2024 1:40	89.287	(null)			90.338	2.618
9/26/2024 1:41	89.363	(null)	87.9		91.344	2.506
9/26/2024 1:42		(null)	88.475		92.375	2.485
9/26/2024 1:43	91.688	(null)	90.625		93.45	2.448
9/26/2024 1:44		(null)	91.344	0.017	93.537	2.428
9/26/2024 1:45	92.006	(null)	91.656	0.016	94.113	2.45
9/26/2024 1:46	91.537	(null)	91.556		93.794	2.464
9/26/2024 1:47	91.519	(null)	91.431	0.015	93.35	2.461
9/26/2024 1:48	90.694	(null)	90.256	0.016	92.331	2.459
9/26/2024 1:49	90.281	(null)	89.944		92.45	2.459
9/26/2024 1:50	89.794	(null)	89.887	0.016	91.662	2.447
9/26/2024 1:51	89.512	(null)	89.175	0.016	91.95	2.444
9/26/2024 1:52	90.188	(null)	89.475		91.956	2.438
9/26/2024 1:53	89.813	(null)	89.488		91.481	2.459
9/26/2024 1:54	89.213	(null)	89.344			
9/26/2024 1:55	89.419	(null)	88.881		91.488	2.486
9/26/2024 1:56	88.912	(null)	82.975		91.113	2.473
9/26/2024 1:57	85.162	(null)	84.556	0.019	88.144	2.393
9/26/2024 1:58	83.794	(null)	84.075	0.016	86.231	2.362

9/26/2024 1:59	83.175	(null)	82.588	0.016	85.506	2.442
9/26/2024 2:00	81.844	(null)	81.512		84.213	2.465
9/26/2024 2:01	79.275	(null)	79.625		82.863	2.53
9/26/2024 2:02	77.887	(null)	78.069	0.015	81.175	2.624
9/26/2024 2:03	76.238	(null)	76.594	0.016	79.731	2.664
9/26/2024 2:04	75.319	(null)	76.356		78.469	2.679
9/26/2024 2:05	74.156	(null)	75.081		77.725	2.714
9/26/2024 2:06	72.563	(null)	74.075	0.018	76.713	2.759
9/26/2024 2:07	72.6	(null)	73.488	0.017	76.412	2.795
9/26/2024 2:08	72.3	(null)	73.106	0.016	76.106	2.8
9/26/2024 2:09	72.037	(null)	73.3	0.017	75.912	2.786
9/26/2024 2:10	71.456	(null)	72.775	0.016	75.431	2.776
9/26/2024 2:11	71.569	(null)	72.931	0.017	75.619	2.803
9/26/2024 2:12	71.325	(null)	72.269	0.016	75.381	2.819
9/26/2024 2:13	70.725	(null)	72.494		74.813	2.839
9/26/2024 2:14	71.512	(null)	72.137	0.017	75.05	2.925
9/26/2024 2:15	71.269	(null)	72.225	0.016	75.144	2.913
9/26/2024 2:16	70.5	(null)	71.694	0.017	74.869	2.921
9/26/2024 2:17	71.137	(null)	72.7	0.016	74.831	2.963
9/26/2024 2:18		(null)			75.669	2.957
9/26/2024 2:19	72.206	(null)	73.963		77.794	3.022
9/26/2024 2:20	73.5	(null)	74.95		78.356	2.988
9/26/2024 2:21	74.363	(null)	75.875	0.016	78.875	2.975
9/26/2024 2:22	74.738	(null)	75.975	0.016	78.906	2.975
9/26/2024 2:23	74.588	(null)	76.094		78.569	2.972
9/26/2024 2:24	74.55	(null)	75.313		78.469	2.994
9/26/2024 2:25		(null)	75.713	0.016	78.144	2.974
9/26/2024 2:26	74.081	(null)	75.875		78.762	2.965
9/26/2024 2:27	74.269	(null)	76.106	0.015	78.731	2.963
9/26/2024 2:28	74.4	(null)	75.838	0.014	78.569	2.983
9/26/2024 2:29	74.194	(null)	75.769	0.016		
9/26/2024 2:30	73.669	(null)	74.975	0.016	78.069	2.977
9/26/2024 2:31	74.119	(null)	75.35	0.015	78.344	2.981

9/26/2024 2:32	73.369	(null)	75.131	0.042	78.431	2.973
9/26/2024 2:33	73.481	(null)	75.162	0.016	77.963	3.007
9/26/2024 2:34	74.044	(null)	75.387		78.331	2.991
9/26/2024 2:35	74.119	(null)	75.3	0.016	78.35	2.984
9/26/2024 2:36	73.65	(null)	74.981	0.015	78.125	2.969
9/26/2024 2:37	73.369	(null)	75.175		77.75	2.98
9/26/2024 2:38	74.119	(null)	75.731	0.017	78.162	2.978
9/26/2024 2:39	73.406	(null)	74.994	0.015	77.9	2.97
9/26/2024 2:40	73.744	(null)	75.25	0.016	77.844	2.98
9/26/2024 2:41	74.55	(null)	75.963	0.016	78.181	2.967
9/26/2024 2:42	74.306	(null)	75.494	0.016	78.519	2.926
9/26/2024 2:43	73.613	(null)	75.35	0.015	78.031	2.92
9/26/2024 2:44	73.706	(null)	74.975	0.016	77.963	2.953
9/26/2024 2:45	73.95	(null)	75.719		77.806	2.947
9/26/2024 2:46	74.963	(null)	76.162	0.015	78.506	2.93
9/26/2024 2:47	74.512	(null)	75.806	0.016	79	2.9
9/26/2024 2:48	73.95	(null)	75.188	0.016	78.331	2.925
9/26/2024 2:49	74.419	(null)	75.319	0.016	78.488	2.912
9/26/2024 2:50	75.675	(null)	77.056	0.016	79.238	2.9
9/26/2024 2:51	75.994	(null)			79.531	2.859
9/26/2024 2:52	74.963	(null)	75.294		78.606	2.737
9/26/2024 2:53		(null)			76.113	2.712
9/26/2024 2:54	72.281	(null)	73.25		74.95	2.773
9/26/2024 2:55	70.537	(null)	71.844		74.569	2.83
9/26/2024 2:56	71.063	(null)	72.375	0.017	74.581	2.832
9/26/2024 2:57	70.988	(null)	72.675	0.016	74.925	2.849
9/26/2024 2:58	70.744	(null)	72.5	0.018	74.931	2.971
9/26/2024 2:59	69.975	(null)	71.8	0.016	75.137	3.02
9/26/2024 3:00	70.012	(null)	72.419			
9/26/2024 3:01	69.787	(null)	72.294		74.9	3.064
9/26/2024 3:02	69.394	(null)	71.619		74.8	3.1
9/26/2024 3:03	69.356	(null)	72.469		75.175	3.146
9/26/2024 3:04	68.588	(null)	71.963	0.017	75	3.182

9/26/2024 3:05		(null)	71.588	0.016	75.137	3.254
9/26/2024 3:06	68.269	(null)	74.4		74.594	3.187
9/26/2024 3:07	67.725	(null)	73.125		74.369	3.281
9/26/2024 3:08	67.819	(null)	71.131	0.016	75	3.245
9/26/2024 3:09	68.344	(null)	71.412	0.016	75.356	3.38
9/26/2024 3:10	67.069	(null)	71.725		74.775	3.397
9/26/2024 3:11	67.5	(null)	71.544		75	3.446
9/26/2024 3:12	66.637	(null)	71.113		74.669	3.468
9/26/2024 3:13	67.369	(null)	71.838		75.244	3.523
9/26/2024 3:14	67.2	(null)	70.919		75.225	3.497
9/26/2024 3:15	67.537	(null)	71.825		75.194	3.476
9/26/2024 3:16	67.387	(null)	71.694		74.956	3.441
9/26/2024 3:17	67.425	(null)	71.406		74.925	3.441
9/26/2024 3:18	68.081	(null)	71.556		75.4	3.424
9/26/2024 3:19	68.363	(null)	71.531	0.017	75.281	3.381
9/26/2024 3:20	67.444	(null)	71.075	0.016	74.938	3.35
9/26/2024 3:21	68.1	(null)			74.775	3.38
9/26/2024 3:22		(null)	71.912		74.806	3.36
9/26/2024 3:23	67.35	(null)	71.319	0.015	75.206	3.396
9/26/2024 3:24	68.269	(null)	72.031	0.016	75.025	3.325
9/26/2024 3:25	68.344	(null)	72.306		75.113	3.27
9/26/2024 3:26	68.194	(null)		0.016	75.519	3.311
9/26/2024 3:27	68.7	(null)	71.306		76.219	3.308
9/26/2024 3:28	69.544	(null)	73.262		76.856	3.328
9/26/2024 3:29	70.556	(null)	74.3		75.35	3.147
9/26/2024 3:30	69	(null)	71.662			
9/26/2024 3:31	68.419	(null)	71.65		75.162	3.219
9/26/2024 3:32	68.137	(null)	71.706	0.016	74.681	3.277
9/26/2024 3:33	68.381	(null)	72.075		75.356	3.32
9/26/2024 3:34	68.156	(null)	71.387	0.016	75.225	3.324
9/26/2024 3:35	67.575	(null)	71.481		75	3.378
9/26/2024 3:36	67.144	(null)	71.025		74.988	3.423
9/26/2024 3:37	67.106	(null)	71.356		74.994	3.489

9/26/2024 3:38	67.256	(null)	71.825		75.125	3.475
9/26/2024 3:39	67.313	(null)	71.569		75.281	3.468
9/26/2024 3:40	67.238	(null)	70.969		75.231	3.456
9/26/2024 3:41	66.694	(null)	71.881	0.016	74.931	3.506
9/26/2024 3:42	67.519	(null)	71.644	0.016	75.375	3.52
9/26/2024 3:43	66.694	(null)	71.438		75.025	3.461
9/26/2024 3:44	66.563	(null)	71.512		74.975	3.479
9/26/2024 3:45	66.281	(null)	71.356		74.75	3.509
9/26/2024 3:46	66.619	(null)	71.156		74.831	3.509
9/26/2024 3:47		(null)	71.019		75.006	3.515
9/26/2024 3:48	66.694	(null)	71.725	0.016	75.119	3.55
9/26/2024 3:49	66.863	(null)	71.456		74.819	3.509
9/26/2024 3:50	66.975	(null)			75.244	3.513
9/26/2024 3:51	67.031	(null)	71.556	0.016	75.356	3.496
9/26/2024 3:52	66.994	(null)	71.831		75.256	3.479
9/26/2024 3:53		(null)	71.625		75.006	3.501
9/26/2024 3:54	67.2	(null)	71.787		75.125	3.469
9/26/2024 3:55	67.481	(null)	71.45		74.569	3.427
9/26/2024 3:56	66.825	(null)	71.838		74.713	3.465
9/26/2024 3:57	66.656	(null)	71.931	0.015	74.569	3.467
9/26/2024 3:58		(null)	71.887	0.016	75.075	3.496
9/26/2024 3:59	66.994	(null)	71.456		74.869	3.522
9/26/2024 4:00	66.656	(null)	70.719		74.931	3.674
9/26/2024 4:01	65.287	(null)	70.775		74.406	3.739
9/26/2024 4:02	64.8	(null)	71.525	0.016	75.363	3.762
9/26/2024 4:03	65.156	(null)	70.575	0.016	74.894	3.834
9/26/2024 4:04	77.7	49.56	71.025	0.016	75.681	3.433
9/26/2024 4:05	75.019	687.645	72.1	0.016	74.544	3.133
9/26/2024 4:06	73.744	816.708	72.45			
9/26/2024 4:07	74.194	809.48	72.269	0.015	75.313	3.163
9/26/2024 4:08	73.838	803.285	72.012		75	3.169
9/26/2024 4:09	74.25	817.74	72.2		75.15	3.174
9/26/2024 4:10	74.231	807.415	71.994		75	3.098

9/26/2024 4:11	74.025		72.006		74.95	3.108
9/26/2024 4:12	73.838	797.09	72.169		74.619	3.042
9/26/2024 4:13	73.762	819.805	71.65		74.906	3.108
9/26/2024 4:14	73.894	809.48	72.3		75.244	3.11
9/26/2024 4:15	74.287	798.122	72.425		75.425	3.125
9/26/2024 4:16	73.95		72.2	0.016	75.369	3.093
9/26/2024 4:17	74.156	787.797	72.669	0.015	75.381	3.096
9/26/2024 4:18	73.95	797.09	73.219		74.831	3.043
9/26/2024 4:19	74.025	793.992	71.956		74.956	2.97
9/26/2024 4:20	73.838	787.797	72.225		75	2.987
9/26/2024 4:21	74.194	781.602	71.869		74.894	2.954
9/26/2024 4:22	74.25	788.83	72.125	0.016	75.031	2.93
9/26/2024 4:23	74.419	781.602	72.356	0.015	74.906	2.935
9/26/2024 4:24	74.044	770.245			74.994	2.933
9/26/2024 4:25			72.569		74.912	2.92
9/26/2024 4:26	74.306	765.083	72.225		75.256	2.897
9/26/2024 4:27	74.831	744.432	72.75		75.325	2.901
9/26/2024 4:28	74.363	754.758	72.95		75.338	2.907
9/26/2024 4:29	74.738	740.302	72.969		75.588	2.868
9/26/2024 4:30	74.925	722.75	73.137	0.016	75.863	2.873
9/26/2024 4:31	75.019	718.62	73.294	0.015	75.519	2.871
9/26/2024 4:32	74.569	719.653	73.194		75.762	2.872
9/26/2024 4:33	74.85	714.49	72.794		75.256	2.845
9/26/2024 4:34	74.7	723.782	72.569		75.262	2.876
9/26/2024 4:35	74.438	747.53	73.006		75.5	2.856
9/26/2024 4:36	74.475	731.01	72.069	0.016	75.137	2.882
9/26/2024 4:37	74.512	738.237	72.563		75.3	2.865
9/26/2024 4:38	74.7	733.075	72.781	0.015	75.231	2.849
9/26/2024 4:39		745.465	72.45	0.015	74.581	2.842
9/26/2024 4:40	74.475	764.05	72.381		75.363	2.883
9/26/2024 4:41	74.456	737.205	72.488		75.056	2.846
9/26/2024 4:42	74.494	733.075	72.731		75.306	2.833
9/26/2024 4:43	74.775	737.205	72.619		75.35	2.866

9/26/2024 4:44	74.606	732.042	72.688		75.488	2.85
9/26/2024 4:45	74.981	726.88	72.95	0.016	75.475	2.869
9/26/2024 4:46	74.325	746.497	72.131	0.015	75.15	2.884
9/26/2024 4:47	74.4	757.855	72.675			
9/26/2024 4:48	74.231	769.213	72.431	0.015	74.544	2.893
9/26/2024 4:49	74.194	758.888	72.813		74.975	2.929
9/26/2024 4:50	74.044	751.66	73	0.022	75.113	2.888
9/26/2024 4:51	74.306	745.465	72.706	0.015	74.994	2.885
9/26/2024 4:52	74.269	764.05	72.194		75.05	2.893
9/26/2024 4:53	74.044	758.888	72	0.016	74.9	2.884
9/26/2024 4:54	74.344	752.693	72.681	0.015	75.15	2.894
9/26/2024 4:55	74.1	753.725	72.331		74.919	2.884
9/26/2024 4:56	74.438	745.465	72.106			2.843
9/26/2024 4:57	74.081	767.148	72.556		74.838	2.854
9/26/2024 4:58	74.4	773.343	72.056		74.75	2.879
9/26/2024 4:59	74.006	774.375	72.031		74.875	2.928
9/26/2024 5:00	73.969	777.472	72.656		74.906	2.944
9/26/2024 5:01					74.95	2.997
9/26/2024 5:02	73.856	801.22	71.344	0.015	74.919	3.142
9/26/2024 5:03	73.331	827.032	71.469	0.015	74.863	3.206
9/26/2024 5:04		818.773	72.262	0.016	74.994	3.278
9/26/2024 5:05	72.956	845.617	71.844		74.963	3.324
9/26/2024 5:06	73.031	843.552	71.2	0.015	74.819	3.32
9/26/2024 5:07	73.05	841.487	71.469	0.014	75.275	3.353
9/26/2024 5:08	72.881	852.845	71.625	0.015	74.55	3.374
9/26/2024 5:09	72.956	854.91	71.963	0.015	74.725	3.404
9/26/2024 5:10	72.675	867.3	71.675	0.016	75.094	3.424
9/26/2024 5:11	72.713	853.878	71.594		74.869	3.425
9/26/2024 5:12	72.994	865.235	71.769	0.015	75.031	3.423
9/26/2024 5:13	72.769	848.715	71.662	0.015		
9/26/2024 5:14	72.994	845.617	71.575	0.016	75.425	3.434
9/26/2024 5:15	72.806	858.008	71.694		74.65	3.364
9/26/2024 5:16	72.956	862.138	71.269		74.806	3.417

9/26/2024 5:17	72.806	853.878	71.838	0.015	75	3.437
9/26/2024 5:18	72.75	849.747	71.594		74.881	3.385
9/26/2024 5:19	72.787	863.17	71.412		74.9	3.385
9/26/2024 5:20	73.012	856.975	72		74.662	3.389
9/26/2024 5:21	73.088	843.552	71.775		75	3.354
9/26/2024 5:22	72.863	835.292		0.016	74.719	3.286
9/26/2024 5:23	73.537	831.162	71.894	0.015	75.238	3.292
9/26/2024 5:24	72.9	824.968	72.063	0.015	75.313	3.262
9/26/2024 5:25	72.919	828.065	71.875	0.015	75.075	3.238
9/26/2024 5:26	73.219	803.285	72.194	0.009	75.144	3.19
9/26/2024 5:27	73.35	800.188	72.25	0.016	74.55	3.155
9/26/2024 5:28	73.481	805.35	72.05	0.015	74.725	3.137
9/26/2024 5:29	73.537	793.992	71.906		74.8	3.154
9/26/2024 5:30					75.225	3.301
9/26/2024 5:31	72.694	875.56	71.381	0.015	75.25	3.22
9/26/2024 5:32			70.994	0.015	92.956	1.465
9/26/2024 5:33	60.188	1419.688	44.556	0.018	97.231	1.271
9/26/2024 5:34	57.356	1510.547	38.987	0.016	73.781	1.09
9/26/2024 5:35	55.35	1549.782	38.563		73.819	1.072
9/26/2024 5:36	55.369	1561.14	38.506	0.015	73.694	1.092
9/26/2024 5:37	65.719	1686.073	37.987	0.016		
9/26/2024 5:38	66.225	1772.802	41.169	0.023	73.65	1.047
9/26/2024 5:39	67.706	1775.9	41.6	0.016	72.738	1.025
9/26/2024 5:40	68.025	1763.51	42.069	0.016	73.781	1.041
9/26/2024 5:41	67.012	1760.412	42.631		77.056	1.075
9/26/2024 5:42	68.044	1751.12	43.081	0.015	79.338	1.11
9/26/2024 5:43	67.762	1753.185	42.838	0.016	79	1.097
9/26/2024 5:44	67.744	1743.892	42.862	0.016	78.325	1.081
9/26/2024 5:45	66.113	1795.517	41.313	0.021	78.106	1.083
9/26/2024 5:46	65.606	1812.037	40.969	0.022	78.113	1.098
9/26/2024 5:47	65.494	1805.843	41.131	0.016	78.75	1.107
9/26/2024 5:48	64.819	1806.875	40.9		78.363	1.123
9/26/2024 5:49	65.512	1798.615	41.256	0.034	78.25	1.128

9/26/2024 5:50	65.494	1812.037	41.362	0.019	78.019	1.12
9/26/2024 5:51	65.681	1803.777	41.287	0.016	77.088	1.04
9/26/2024 5:52	65.325	1806.875	40.956		72.794	1.005
9/26/2024 5:53	64.781	1814.103	40.963	0.017	72.281	1.027
9/26/2024 5:54	68.475	1746.99	43.919	0.016	72.825	0.984
9/26/2024 5:55	67.313	1733.568	44.638	0.016	72.838	0.99
9/26/2024 5:56	69	1717.047	45.056	0.015	73.306	1.006
9/26/2024 5:57	68.213	1729.438	44.794	0.016	73.1	1.045
9/26/2024 5:58	68.625		45.063	0.015	72.9	1.022
9/26/2024 5:59	68.738	1727.373	44.219	0.025	73.688	1.034
9/26/2024 6:00	68.494	1723.243	44.456	0.016	73.338	1.054
9/26/2024 6:01	67.65	1740.795	43.938		72.713	1.072
9/26/2024 6:02	67.912	1746.99	43.269	0.017	73.019	1.022
9/26/2024 6:03	67.406	1757.315	42.544	0.017	72.181	1.036
9/26/2024 6:04	68.269	1737.698	43.013	0.017	70.794	0.99
9/26/2024 6:05	69.131	1711.885	44.237	0.016	72.431	1.011
9/26/2024 6:06	69.113	1717.047	43.456	0.017	71.044	0.994
9/26/2024 6:07	68.719	1722.21	43.325	0.016	71.787	1.016
9/26/2024 6:08	68.85	1696.397	44.331	0.036	71.762	1.004
9/26/2024 6:09	69.694	1704.657	44.206	0.016	71.512	1.02
9/26/2024 6:10	68.944	1699.495	44.081		72.125	1.013
9/26/2024 6:11	69.75				70.806	1.014
9/26/2024 6:12			44.769		72.281	1.007
9/26/2024 6:13	69.431	1684.007	45.081	0.028	62.7	0.9
9/26/2024 6:14	69.656	1707.755	43.744	0.016	64.975	0.909
9/26/2024 6:15	69.244	1694.333	44.162	0.016	64.869	0.909
9/26/2024 6:16	70.481	1677.813	48.9	0.015	91.069	1.533
9/26/2024 6:17	70.162	1679.877	48.138	0.018	88.963	1.148
9/26/2024 6:18	70.613	1664.39	48.081	0.016	87.106	1.161
9/26/2024 6:19			47.956	0.015	76.844	1.039
9/26/2024 6:20	70.519	1685.04	47.65	0.016	75.456	1.026
9/26/2024 6:21	70.256	1663.358	48.194	0.016	75.762	1.002
9/26/2024 6:22	71.456	1643.74	49.331	0.007	75.881	0.983

9/26/2024 6:23	72.338	1641.675	50.019	0.016	75.906	0.97
9/26/2024 6:24	72.131	1629.285	50.362	0.02	75.644	0.995
9/26/2024 6:25	72.113	1622.057	50.769	0.017		
9/26/2024 6:26	72.338	1633.415	51.169	0.019	75.794	0.969
9/26/2024 6:27	73.069	1621.025	51.563	0.009	76.094	0.945
9/26/2024 6:28	73.519	1603.473	52.319	0.016	76.044	0.95
9/26/2024 6:29	73.088	1604.505	52.069	0.017	76.162	0.938
9/26/2024 6:30	72.825	1596.245	52.281		76.188	0.936
9/26/2024 6:31	73.969	1580.757	53.731	0.016	76.231	0.935
9/26/2024 6:32	75.619	1541.522	54.319	0.028	76.269	0.9
9/26/2024 6:33	76.162	1491.963	55.825	0.021	76.425	0.845
9/26/2024 6:34	77.063	1462.02	56.85	0.018	76.569	0.822
9/26/2024 6:35	76.762	1469.248	56.819	0.016	76.525	0.832
9/26/2024 6:36	77.175	1471.313	56.581	0.016	76.55	0.866
9/26/2024 6:37	76.613	1475.443	56.388	0.027	76.556	0.771
9/26/2024 6:38	76.725	1477.507	55.919	0.015	76.575	0.807
9/26/2024 6:39	76.762	1474.41	56.056	0.018	76.588	0.819
9/26/2024 6:40	77.119	1480.605	56.388	0.047	76.512	0.788
9/26/2024 6:41	77.194	1465.118	57.338	0.016	76.519	0.798
9/26/2024 6:42		1444.468	57.537	0.015	76.444	0.88
9/26/2024 6:43	77.231	1458.922	57.588	0.014	76.412	0.883
9/26/2024 6:44	77.7	1445.5	57.594	0.015	76.369	0.851
9/26/2024 6:45	77.588	1434.142	58.25	0.025	76.45	0.836
9/26/2024 6:46	77.963	1423.818	58.525	0.039	76.5	0.841
9/26/2024 6:47	77.831	1410.395	59.1	0.015	76.525	0.826
9/26/2024 6:48	78.525	1421.752	59.075	0.016	76.4	0.785
9/26/2024 6:49	78.262	1412.46	59.119	0.032	76.356	0.825
9/26/2024 6:50	78.319	1402.135	59.662	0.015	76.581	0.758
9/26/2024 6:51	79.219	1394.907	60.1	0.016	76.537	0.711
9/26/2024 6:52	78.525	1398.005	60.481		76.619	0.685
9/26/2024 6:53	79.144	1369.095	61.256	0.015	76.637	0.676
9/26/2024 6:54	79.856	1367.03	61.813	0.016	76.656	0.632
9/26/2024 6:55	79.762	1338.12	62.55		76.806	0.429

9/26/2024 6:56	80.063	1340.185			76.825	0.368
9/26/2024 6:57			62.862	0.017	76.881	0.471
9/26/2024 6:58	80.887	1319.535	63.594	0.016	76.963	0.382
9/26/2024 6:59	81.169	1300.95	64.231		77.006	0.302
9/26/2024 7:00	81	1308.177	64.381	0.017	76.944	0.361
9/26/2024 7:01	81.394	1287.527	65.069	0.029	77.075	0.203
9/26/2024 7:02	81.994	1277.203	65.131	0.016	77.137	0.222
9/26/2024 7:03	82.275	1275.137	65.619		77.119	0.196
9/26/2024 7:04	82.2	1271.007	65.475	0.015	77.019	0.228
9/26/2024 7:05	82.106	1279.267	65.25	0.016	77.044	0.184
9/26/2024 7:06	81.863	1274.105	65.6	0.017		
9/26/2024 7:07		1277.203	65.519	0.016	77.137	0.214
9/26/2024 7:08	81.975	1279.267	65.688	0.016	77.075	0.194
9/26/2024 7:09	82.219	1274.105	65.438			0.206
9/26/2024 7:10	81.731	1280.3	64.713	0.016	77.088	0.231
9/26/2024 7:11	82.05	1285.463	65.044	0.016	77.012	0.224
9/26/2024 7:12	81.731	1278.235	65.213	0.016	76.938	0.305
9/26/2024 7:13	81.844	1279.267	65.588	0.016	77.019	0.347
9/26/2024 7:14	82.35	1263.78	65.988	0.016	77.05	0.228
9/26/2024 7:15	82.5	1255.52	66.506	0.016	77.188	0.119
9/26/2024 7:16	82.969	1237.968	67.325	0.015	77.162	0.11
9/26/2024 7:17	82.706	1222.48	67.194	0.016	77.231	0.102
9/26/2024 7:18	82.838	1235.902	67.588		77.313	0.07
9/26/2024 7:19	82.95	1236.935	67		77.181	0.089
9/26/2024 7:20	83.063	1233.838	67.55	0.016	77.287	0.123
9/26/2024 7:21	83.644	1217.318	68.206		77.162	0.099
9/26/2024 7:22	83.606	1220.415	68.1	0.017	77.306	0.136
9/26/2024 7:23	77.738	1142.978	68.994	0.021	77.281	0.109
9/26/2024 7:24	78.375	1049.02	65.4	0.016	76.887	0.235
9/26/2024 7:25					76.938	0.286
9/26/2024 7:26	78.206	1046.955	65.206	0.02	77.012	0.215
9/26/2024 7:27	77.794	1066.573	65.488	0.019	77.05	0.175
9/26/2024 7:28	78.675	1047.988	66.419	0.016	77.15	0.146

9/26/2024 7:29	78.431	1024.24	66.556	0.017	77.206	0.092
9/26/2024 7:30	79.219	1012.883	67.281	0.016	77.287	0.07
9/26/2024 7:31	79.406	998.427	67.731	0.016	77.144	0.097
9/26/2024 7:32	79.35	1005.655	67.213	0.041		
9/26/2024 7:33	79.669	995.33	68.044	0.017	77.275	0.066
9/26/2024 7:34	79.537	992.232	67.919	0.016	77.338	0.075
9/26/2024 7:35	79.912	978.81	68.431	0.016	77.262	0.063
9/26/2024 7:36	79.894	975.713	68.787	0.015	77.181	0.062
9/26/2024 7:37	80.156	965.388	69.056	0.016	77.188	0.06
9/26/2024 7:38	79.781	964.355	69.5		77.381	0.055
9/26/2024 7:39	80.081	959.193	69.256	0.022	77.256	0.051
9/26/2024 7:40	80.381	935.445	69.619	0.016	77.338	0.054
9/26/2024 7:41	80.625	942.672	69.813	0.017	77.331	0.062
9/26/2024 7:42	80.681	946.802	69.475	0.015	77.306	0.052
9/26/2024 7:43	80.456	960.225	66.681	0.042	77.313	0.049
9/26/2024 7:44	79.181	1004.622	67.925	0.017	71.069	0.026
9/26/2024 7:45	79.631	997.395	68.231	0.016	71.144	0.025
9/26/2024 7:46	79.519	1002.557	67.8	0.045	70.738	0.022
9/26/2024 7:47	79.762	999.46	68.019	0.018	70.762	0.023
9/26/2024 7:48	79.8	1002.557	68.05	0.017	70.081	0.02
9/26/2024 7:49	79.575	1006.688	68.006	0.016	70.738	0.022
9/26/2024 7:50		991.2	67.662		70.131	0.019
9/26/2024 7:51	80.1	980.875	68.725	0.018	69.925	0.02
9/26/2024 7:52	80.512	964.355	69.1	0.016	70.556	0.016
9/26/2024 7:53	80.175	988.102	68.656		70.5	0.017
9/26/2024 7:54	80.306	975.713	68.887	0.017	70.412	0.018
9/26/2024 7:55	80.512		68.988	0.016	70.037	0.016
9/26/2024 7:56	80.456	960.225	68.606		71.156	0.019
9/26/2024 7:57	80.363	975.713	69.8	0.023	70.206	0.014
9/26/2024 7:58	81.075	945.77			71.356	0.016
9/26/2024 7:59			70.056	0.017	71.744	0.02
9/26/2024 8:00	80.906	943.705	69.488	0.016	71.137	0.024
9/26/2024 8:01	80.4	971.583	69.406	0.017	70.881	0.021

9/26/2024 8:02	80.194	966.42	69.262	0.016	71.412	0.018
9/26/2024 8:03	80.906	946.802	69.963		70.944	0.018
9/26/2024 8:04	80.569	952.997	69.494		71.044	0.016
9/26/2024 8:05	80.7	943.705	69.7	0.016	71.3	0.016
9/26/2024 8:06	80.662	954.03	69.8		71.213	
9/26/2024 8:07	80.456	951.965	70.025	0.016	70.725	0.012
9/26/2024 8:08		944.737	70.056	0.015	70.863	0.014
9/26/2024 8:09	80.7	949.9	69.844	0.017	71.181	0.014
9/26/2024 8:10	80.887	939.575	70.338	0.016	71.431	0.013
9/26/2024 8:11	81.3	918.925	70.688		71.425	0.013
9/26/2024 8:12	81.188	931.315	70.394		71.525	
9/26/2024 8:13	81		70.363		71.481	0.012
9/26/2024 8:14	81.131		70.662			
9/26/2024 8:15	81.037	932.347	71.094		71.113	0.01
9/26/2024 8:16	81.619	900.34	71.075		72.006	0.008
9/26/2024 8:17	81.281	920.99	70.975	0.017	71.6	0.01
9/26/2024 8:18	81.15		70.762	0.016	71.525	0.009
9/26/2024 8:19	81.525	941.64	70.581	0.016	71.762	
9/26/2024 8:20	80.813	952.997	70.106	0.017	70.981	0.011
9/26/2024 8:21	80.606	936.477	70.063	0.016	71.194	
9/26/2024 8:22	80.85	939.575	70.469	0.016	71.3	0.014
9/26/2024 8:23	81.188	930.282	69.906	0.016	70.756	0.009
9/26/2024 8:24	80.981	922.023	70.431	0.031	71.275	0.011
9/26/2024 8:25	81.225	907.568	70.438	0.016	71.05	0.008
9/26/2024 8:26	81.262	910.665	70.556	0.056	71.537	0.009
9/26/2024 8:27	81.094	928.218	69.887	0.019	71.287	0.01
9/26/2024 8:28	81.15	927.185	70.537	0.016	71.081	0.009
9/26/2024 8:29	81.431	938.542	69.975	0.039	70.881	0.01
9/26/2024 8:30	81.262	928.218	70.544	0.016	71.125	0.009
9/26/2024 8:31	81.656	916.86	70.762	0.015	71.319	0.008
9/26/2024 8:32	81.412		70.4	0.037	70.588	0.008
9/26/2024 8:33	81.6	936.477	70.35	0.02	70.881	0.009
9/26/2024 8:34	81.037		70.631	0.043	70.6	0.007

9/26/2024 8:35	80.887	961.258	70.544	0.015	69.925	0.01
9/26/2024 8:36	80.456	975.713	70.269	0.019	69.625	0.016
9/26/2024 8:37	80.944	956.095	69.787	0.016	70.344	0.012
9/26/2024 8:38	81.244	940.607	69.912	0.018	70.137	0.01
9/26/2024 8:39	80.831	957.128	68.594	0.02	69.863	
9/26/2024 8:40	80.887	965.388	69.169	0.016	69.681	0.01
9/26/2024 8:41	81.262	963.323	69.525	0.026	70.269	0.01
9/26/2024 8:42	81.113	958.16	69.931	0.017	70.412	0.009
9/26/2024 8:43	81.375	943.705	69.944	0.016	70.406	0.008
9/26/2024 8:44	81.506	933.38	70.494	0.028	70.519	0.007
9/26/2024 8:45	81.544	918.925				
9/26/2024 8:46			70.563	0.016	69.994	0.007
9/26/2024 8:47	81.675	938.542	69.994	0.016	69.919	0.007
9/26/2024 8:48	81.319	946.802	69.869	0.016	70.431	0.008
9/26/2024 8:49	81.731	929.25	70.519	0.016	70.613	0.007
9/26/2024 8:50	81.244	932.347	71.137	0.036	69.881	0.007
9/26/2024 8:51	81.619	933.38	70.669	0.017	69.875	0.006
9/26/2024 8:52	81.225	936.477	70.544	0.019	69.838	
9/26/2024 8:53	81.806	920.99	70.988	0.016	70.137	0.006
9/26/2024 8:54	81.262	944.737	70.213	0.023	70.113	0.005
9/26/2024 8:55	81.694	919.958	70.731	0.016	69.588	0.006
9/26/2024 8:56	81.544	931.315	71.531	0.035	70.569	
9/26/2024 8:57	81.938	919.958	71.794	0.021	70.575	0.005
9/26/2024 8:58	81.825	901.372	71.35	0.017		
9/26/2024 8:59	81.75	919.958	71.037	0.022	69.738	
9/26/2024 9:00	81.844	906.535	71.281	0.018	69.994	
9/26/2024 9:01	82.106	894.145	71.838	0.017	70.406	
9/26/2024 9:02	81.994	899.307	71.856		69.631	0.006
9/26/2024 9:03	82.275	895.177	71.613	0.015	69.838	0.006
9/26/2024 9:04	82.106	896.21	72.419	0.016	70.45	0.007
9/26/2024 9:05	82.294	870.398	72.363	0.017	70.931	0.006
9/26/2024 9:06	82.35	869.365	72.338	0.017	70.762	0.006
9/26/2024 9:07	82.181	880.722	72.331	0.017	70.262	

9/26/2024 9:08	82.481	887.95	72.175	0.019	69.9	0.006
9/26/2024 9:09		881.755	72.656		69.713	
9/26/2024 9:10	82.181	892.08	72.144	0.018	69.575	0.005
9/26/2024 9:11	82.05	899.307	72.256	0.016	69.431	0.006
9/26/2024 9:12	74.681	862.138	71.738		68.956	0.005
9/26/2024 9:13	75.619	715.523	67.05	0.017	67.625	0.007
9/26/2024 9:14	75.694	729.977	67.425	0.016	67.981	0.01
9/26/2024 9:15	75.525	708.295	68.725	0.02	69.406	0.014
9/26/2024 9:16	76.238	697.97			69.338	0.021
9/26/2024 9:17			68.238	0.02	69.775	0.019
9/26/2024 9:18	76.481	669.06	68.344	0.016	69.794	0.018
9/26/2024 9:19	76.2	668.028	69.056	0.018	69.475	0.015
9/26/2024 9:20	76.35	661.833	68.469	0.016	69.494	0.018
9/26/2024 9:21	76.219	679.385	68.169	0.019	69.806	0.017
9/26/2024 9:22	75.806	680.417	68.525	0.053	69.769	0.015
9/26/2024 9:23	76.05	670.093	68.65	0.016	70.188	
9/26/2024 9:24	76.594	652.54	69.113	0.016	70.162	0.014
9/26/2024 9:25	75.994	663.898	68.6		69.4	
9/26/2024 9:26	76.181	668.028	68.825	0.018	69.588	
9/26/2024 9:27	76.294	676.287	68.65	0.016	69.531	0.012
9/26/2024 9:28	75.956	675.255	69.019	0.016	69.588	
9/26/2024 9:29	76.275	679.385	68.744	0.016		
9/26/2024 9:30	76.106	687.645	68.081	0.015	69.625	0.011
9/26/2024 9:31	76.181	691.775	68.144	0.016	69.494	0.014
9/26/2024 9:32	76.406	663.898	68.594		69.988	0.013
9/26/2024 9:33	76.331	675.255	68.4		68.762	0.008
9/26/2024 9:34	75.938	705.198	60.463	0.199	68.644	0.012
9/26/2024 9:35	71.325	999.46	54.731	1.231	67.575	0.05
9/26/2024 9:36	68.794	1095.483	53.769	1.198	66.806	0.07
9/26/2024 9:37	69.262	1071.735	55.281	1.11	66.931	0.11
9/26/2024 9:38	70.2	1053.15	56.425	1.039	67.894	0.053
9/26/2024 9:39	70.425	1029.402	57.675	0.991	67.363	0.049
9/26/2024 9:40	71.137	1013.915	58.369	0.953	67.694	0.046

9/26/2024 9:41	71.456	996.362	59.219	0.921	67.431	0.043
9/26/2024 9:42	71.869	964.355			67.525	0.038
9/26/2024 9:43			60.35	0.892	68.063	0.04
9/26/2024 9:44	72.375	952.997	60.6	0.875	67.588	0.042
9/26/2024 9:45	72.394	959.193	60.831	0.849	66.637	0.037
9/26/2024 9:46	71.963	961.258	60.487	0.831	67.85	0.038
9/26/2024 9:47	72.3	962.29	60.638	0.823		
9/26/2024 9:48	72.244	966.42	60.975	0.827	66.375	0.037
9/26/2024 9:49	73.05	934.412	61.456	0.843	66.856	0.038
9/26/2024 9:50	72.713	949.9	61.188	0.835	67.2	0.037
9/26/2024 9:51	72.787	937.51	60.681	0.843	67.394	0.037
9/26/2024 9:52	72.338	935.445	60.706	0.856	66.731	0.035
9/26/2024 9:53	72.75	950.932	61.1	0.835	67.431	0.04
9/26/2024 9:54	72.019	960.225	60.588	0.826	66.569	0.038
9/26/2024 9:55	72	970.55	60.156	0.811	66.694	0.039
9/26/2024 9:56	71.644	975.713			66.4	0.036
9/26/2024 9:57			60.05	0.792	66.469	0.035
9/26/2024 9:58	72.169	960.225	61.063		66.338	
9/26/2024 9:59	72.488	952.997	60.813	0.793	66.206	0.038
9/26/2024 10:00	72.15	973.648	60.013	0.8	66.281	0.044
9/26/2024 10:01	72.656	959.193	60.713	0.823		
9/26/2024 10:02	72.356		60.475	0.784	66.594	0.04
9/26/2024 10:03	72.15	971.583	60.063	0.807	66.613	0.037
9/26/2024 10:04		990.167	59.825	0.8	66.394	0.035
9/26/2024 10:05	72.225	970.55	60.444	0.817	66.5	0.039
9/26/2024 10:06	71.944	959.193	60.894	0.8	67.125	0.038
9/26/2024 10:07	72.281	965.388	60.513	0.816	66.769	0.04
9/26/2024 10:08	72.769	966.42	60.581	0.817	66.338	0.038
9/26/2024 10:09	72.375	954.03	60.394	0.7	66.287	0.037
9/26/2024 10:10	72	961.258	60.362	0.816	66.531	0.04
9/26/2024 10:11	72.863	956.095	60.987	0.812	66.65	0.038
9/26/2024 10:12	76.2	1003.59	60.675	0.793	66.131	0.036
9/26/2024 10:13					67.012	0.038

9/26/2024 10:14	75.919	1063.475	62.456	0.794	66.7	0.035
9/26/2024 10:15	76.369		62.537	0.842	66.912	0.034
9/26/2024 10:16	75.656	1069.67	62.231	0.897	67.113	0.042
9/26/2024 10:17	76.744	1044.89	63.6	0.892	72.031	0.049
9/26/2024 10:18	76.275	1015.98	63.487	0.904	72.119	0.058
9/26/2024 10:19	75.619	1073.8	62.263	1.032	72	0.068
9/26/2024 10:20	76.219	1053.15	63.688	0.896	72.194	0.058
9/26/2024 10:21	75.469	1075.865	61.544	1.028	72.044	0.055
9/26/2024 10:22	75.956	1072.767			72.131	0.059
9/26/2024 10:23			63.444	0.878	72.119	0.062
9/26/2024 10:24	76.8	1029.402	62.088	1.066	72.031	0.084
9/26/2024 10:25	75.806	1068.637	63.3	0.956	72.037	0.091
9/26/2024 10:26	76.219	1034.565	62.7	1.034	72.125	0.057
9/26/2024 10:27	76.144	1049.02	63.819	0.967	72.175	0.063
9/26/2024 10:28	76.744	1029.402	62.813	0.988	72.106	0.068
9/26/2024 10:29	75.525	1065.54	62.506	1.015		
9/26/2024 10:30	76.894	1036.63	63.806	0.945	72.131	0.082
9/26/2024 10:31	76.463	1045.922	62.325	1.065	72.113	0.072
9/26/2024 10:32	76.181	1067.605	62.844	0.922	72.006	0.065
9/26/2024 10:33	77.025	1018.045	64	0.942	72.131	0.053
9/26/2024 10:34	76.631	1030.435			72.175	0.05
9/26/2024 10:35			63.35	0.98	72	0.06
9/26/2024 10:36	76.275	1049.02	62.906	1.014	72.063	0.074
9/26/2024 10:37	76.162	1066.573	62.612	1.02	71.912	0.091
9/26/2024 10:38	76.088	1059.345	62.606	1.001		
9/26/2024 10:39	76.406	1046.955	62.981	0.99	72.044	0.092
9/26/2024 10:40	77.025	1044.89	63.781	0.946	72.15	0.052
9/26/2024 10:41	77.194	1030.435	64.012	0.942	72.075	0.101
9/26/2024 10:42	76.856	1024.24	63.862	0.912	71.969	0.106
9/26/2024 10:43	76.519	1041.792	62.544	1.059	72.081	0.063
9/26/2024 10:44	76.369	1061.41	63.019	1.003	71.956	0.131
9/26/2024 10:45	76.875	1028.37	64.15	0.934	71.756	0.169
9/26/2024 10:46	77.156	1022.175	63.006	1.008	71.981	0.098

9/26/2024 10:47	76.162	1055.215	63.3	1.046	72.125	0.069
9/26/2024 10:48	76.669	1037.662			72	0.072
9/26/2024 10:49			64.012	0.929	72.031	0.065
9/26/2024 10:50	77.25	1009.785	63.888	1.005	72.169	0.049
9/26/2024 10:51	76.762	1036.63	62.95	1.051	71.969	0.095
9/26/2024 10:52	76.594	1059.345	63.287	1.011	72.075	0.087
9/26/2024 10:53	76.781	1018.045	64.006	0.937		
9/26/2024 10:54	77.438	1012.883	64.25	0.957	72.194	0.069
9/26/2024 10:55	77.006	1030.435	63.675	1.004	71.969	0.098
9/26/2024 10:56	76.331	1054.182	62.331	0.953	72.044	0.065
9/26/2024 10:57	76.294	1059.345	62.763	1.002	71.863	0.074
9/26/2024 10:58	76.894	1042.825	63.388	0.991	71.925	0.099
9/26/2024 10:59	77.063	1022.175	63.931	0.959	72.144	0.049
9/26/2024 11:00					72.094	0.072
9/26/2024 11:01	77.006	1020.11	63.744	0.969	72.05	0.091
9/26/2024 11:02	73.95	1028.37	63.131	1.035	71.938	0.082
9/26/2024 11:03	74.175	980.875	61.319	1.014		
9/26/2024 11:04	73.95	979.843	61.469	0.914	71.881	0.093
9/26/2024 11:05	74.063	987.07	62.125	0.954	71.875	0.159
9/26/2024 11:06	74.475	957.128	62.7	0.89	72.006	0.056
9/26/2024 11:07	75.375	923.055	63.55	0.816	72.1	0.078
9/26/2024 11:08	75.506	929.25	62.737	0.967	72.019	0.063
9/26/2024 11:09	74.363	966.42	62.156	1.008	71.925	0.069
9/26/2024 11:10	74.794	950.932	62.612	0.966	71.944	0.095
9/26/2024 11:11	74.925	949.9	63.188	0.913	71.894	0.079
9/26/2024 11:12	74.981	924.088	63.7	0.874	71.869	0.094
9/26/2024 11:13	73.931	1003.59	62	0.857	71.844	0.108
9/26/2024 11:14	73.744	1010.818			71.938	0.08
9/26/2024 11:15			61.669	0.934	71.9	0.085
9/26/2024 11:16	73.856	1020.11	61.894	0.892	71.738	0.137
9/26/2024 11:17	73.8	1015.98	62.044	0.883	71.981	0.111
9/26/2024 11:18	73.537	1036.63	61.625	0.914	71.919	0.091
9/26/2024 11:19	73.387	1023.208	61.975	0.86		

9/26/2024 11:20	76.012	1057.28	62.25	0.854	71.831	0.099
9/26/2024 11:21	75.9	1071.735	63.912	0.92	72.031	0.09
9/26/2024 11:22	76.313	1057.28	63.775	0.87	72.181	0.063
9/26/2024 11:23	76.406	1067.605	63.956	0.861	72.025	0.063
9/26/2024 11:24	76.125	1063.475	63.85	0.959	72.075	0.074
9/26/2024 11:25	75.656	1083.093	62.938	0.983	72.144	0.049
9/26/2024 11:26	75.769	1079.995	62.394	1.05	72.044	0.071
9/26/2024 11:27					72.031	0.049
9/26/2024 11:28	75.469	1093.417	63.612	0.889	72.156	0.055
9/26/2024 11:29	76.406	1070.703	64.063	0.83		
9/26/2024 11:30	76.012	1069.67	63.031	1.057	72.075	0.052
9/26/2024 11:31	75.769	1086.19	63.625	0.978	72.119	0.067
9/26/2024 11:32	76.894	1062.443	63.8	0.942	72.188	0.044
9/26/2024 11:33	76.838	1053.15			72.075	0.046
9/26/2024 11:34			63.475	1.012	72.1	0.057
9/26/2024 11:35		1064.507	62.713	1	71.963	0.073
9/26/2024 11:36	76.275	1081.027	63.631	1.025		
9/26/2024 11:37	76.725	1066.573	63.975	0.887	72.213	0.056
9/26/2024 11:38	75.956	1074.833	62.944	1.055	72.113	0.052
9/26/2024 11:39	76.088	1062.443	64.188	0.948	72.081	0.044
9/26/2024 11:40	76.65	1066.573	63.912	0.966	72.219	0.084
9/26/2024 11:41	75.694	1094.45	62.65	1.056	72.169	0.048
9/26/2024 11:42	75.806		63.425	0.965	72.05	0.055
9/26/2024 11:43	76.387	1062.443			72.088	0.058
9/26/2024 11:44			63.956	0.917	72.006	0.049
9/26/2024 11:45	76.463	1070.703	63.331	0.926	72.075	0.046
9/26/2024 11:46	75.863	1093.417	63.05	0.839	72.069	0.058
9/26/2024 11:47	76.088	1089.287	63.081	0.989		
9/26/2024 11:48	76.144	1082.06	63.481	1	72.056	0.063
9/26/2024 11:49	76.275	1076.897	63.856	0.933	72.113	0.045
9/26/2024 11:50	76.425	1063.475	63.912	0.936	72.094	0.101
9/26/2024 11:51	76.838		63.744	0.865	72.044	0.082
9/26/2024 11:52	76.35	1062.443	63.85	0.967	72.019	0.064

9/26/2024 11:53	76.856	1051.085	64.156	0.9	72.025	0.061
9/26/2024 11:54	76.65	1064.507	63.969	0.904	72.113	0.126
9/26/2024 11:55	76.613	1062.443	64.162	0.955	72.2	0.056
9/26/2024 11:56		1057.28	64.394	0.824	72.025	0.043
9/26/2024 11:57					72.075	0.045
9/26/2024 11:58	76.931	1054.182	64.213	0.97	72.056	0.058
9/26/2024 11:59	77.137	1049.02	64.488	0.926	72.006	0.064
9/26/2024 12:00	76.744	1056.248	63.813	0.946	71.881	0.083
9/26/2024 12:01	75.881	1088.255	62.575	1.042		
9/26/2024 12:02	76.256	1091.353	62.919	1.036	71.906	0.066
9/26/2024 12:03	76.481	1078.963	63.625	0.996	71.981	0.084
9/26/2024 12:04	76.875	1060.377	64.338	0.938	72.025	0.057
9/26/2024 12:05	77.044	1053.15	64.356	0.966	72.188	0.042
9/26/2024 12:06	76.969	1060.377	63.294	1.009	72.1	0.058
9/26/2024 12:07	76.856	1065.54	64.444	0.957	72	0.066
9/26/2024 12:08	77.456	1041.792	63.194	1.034	72.056	0.052
9/26/2024 12:09	76.519	1071.735	63.7	1.029	72.025	0.058
9/26/2024 12:10					72.106	0.048
9/26/2024 12:11	77.7	1022.175	64.281	0.966	72.131	0.043
9/26/2024 12:12	77.344	1050.052	64.125	1.006	72.006	0.058
9/26/2024 12:13	76.425	1067.605	63.169	0.952	72.025	0.056
9/26/2024 12:14	76.988	1060.377	63.325	1.03		
9/26/2024 12:15	76.725	1066.573	63.463	0.978	72.012	0.054
9/26/2024 12:16	76.988	1047.988	64.369	0.941	72.05	0.042
9/26/2024 12:17	77.25	1049.02	64.225	0.736	72.081	0.049
9/26/2024 12:18	77.063	1060.377	63.813	1.009	71.931	0.066
9/26/2024 12:19	76.444	1072.767	63.581	1.046	71.981	0.045
9/26/2024 12:20	77.081	1075.865	64.287	0.962	72.125	0.047
9/26/2024 12:21	77.25	1047.988	64.144	0.961	72.256	0.04
9/26/2024 12:22					72.106	0.046
9/26/2024 12:23	76.463	1070.703	63.531	0.971	72.056	0.048
9/26/2024 12:24	77.137	1065.54	64.331	0.786	72.05	0.053
9/26/2024 12:25	76.575	1060.377	63.181	0.914		

9/26/2024 12:26	76.181	1081.027	63.375	0.945	72.162	0.044
9/26/2024 12:27	76.594	1079.995	64	0.912	72.081	0.049
9/26/2024 12:28	77.175	1062.443	64.037	0.794	72.025	0.052
9/26/2024 12:29	76.481	1083.093	62.8	0.915	71.988	0.095
9/26/2024 12:30	76.35	1079.995	63.644	1.004	72.094	0.096
9/26/2024 12:31	76.856	1063.475	63.944	0.97	72.056	0.048
9/26/2024 12:32	76.575	1070.703	63.987	0.953	72.081	0.07
9/26/2024 12:33	77.044	1067.605			71.95	0.071
9/26/2024 12:34			63.925	0.984	71.9	0.069
9/26/2024 12:35	76.706	1075.865	63.313	0.98	72.338	0.081
9/26/2024 12:36	76.012	1099.613	62.669	0.97	71.925	0.101
9/26/2024 12:37	76.144	1090.32	62.981	0.965	71.819	0.097
9/26/2024 12:38	75.769	1113.035	62.362	0.952	71.781	0.068
9/26/2024 12:39	76.256	1076.897	63.025	0.944		
9/26/2024 12:40	76.05	1095.483	63.275	0.929	71.731	0.094
9/26/2024 12:41	76.35	1089.287	63.756	0.794	71.9	0.055
9/26/2024 12:42	76.181	1075.865	63.875	0.856	71.869	0.11
9/26/2024 12:43	76.725	1071.735	64.113	0.933	71.994	0.045
9/26/2024 12:44	76.387	1089.287	63.662	0.935	71.844	0.06
9/26/2024 12:45	75.881	1095.483	62.65	0.966	71.769	0.066
9/26/2024 12:46	76.2	1103.743			71.9	0.067
9/26/2024 12:47			62.475	0.984	71.825	0.056
9/26/2024 12:48	75.637	1114.068	62.425	0.947	71.794	0.086
9/26/2024 12:49	76.463	1088.255	63.838	0.864	71.919	0.087
9/26/2024 12:50	76.819	1064.507	64.075	0.935		
9/26/2024 12:51	76.631	1079.995	63.019	0.945	72.031	0.05
9/26/2024 12:52	76.256	1099.613	62.763	0.999	71.856	0.052
9/26/2024 12:53	76.406	1083.093	63.844	0.91	71.906	0.058
9/26/2024 12:54	76.744	1079.995	63.831	0.916	71.95	0.045
9/26/2024 12:55	76.519	1082.06	62.506	0.999	71.875	0.067
9/26/2024 12:56	76.275	1086.19	63.581	0.883	71.85	0.065
9/26/2024 12:57	77.025	1062.443	63.737	0.93	71.994	0.039
9/26/2024 12:58	76.275	1087.223	62.531	0.947	71.806	0.049

9/26/2024 12:59	76.35	1100.645	63.031	0.949	71.8	0.056
9/26/2024 13:00	76.162	1084.125	63.862	0.744	71.85	0.049
9/26/2024 13:01	76.5	1082.06			71.856	0.046
9/26/2024 13:02			63.35	0.951	71.894	0.046
9/26/2024 13:03	75.806	1102.71	62.456	0.972	71.85	0.047
9/26/2024 13:04	75.713	1115.1	63.281	0.888		
9/26/2024 13:05	76.313	1082.06	63.106	0.94	71.9	0.051
9/26/2024 13:06	76.031	1095.483	62.481	0.97	71.819	0.048
9/26/2024 13:07	75.956	1110.97	62.475	0.968	71.75	0.09
9/26/2024 13:08	76.256	1095.483	62.125	0.92	71.844	0.046
9/26/2024 13:09	76.125	1079.995	63.1	0.857	71.731	0.06
9/26/2024 13:10	76.613	1088.255	62.975	0.923	71.856	0.056
9/26/2024 13:11	76.125	1094.45	62.9	0.942	71.762	0.047
9/26/2024 13:12	76.856	1082.06	63.656	0.791	71.706	0.091
9/26/2024 13:13	77.156	1077.93	63.55	0.856	71.719	0.056
9/26/2024 13:14	76.181	1084.125	63.469	0.952	71.769	0.058
9/26/2024 13:15					71.794	0.058
9/26/2024 13:16	76.669	1079.995	63.031	0.928	71.863	0.052
9/26/2024 13:17	76.875	1090.32	63.412	0.856		
9/26/2024 13:18	76.331	1077.93	63.063	0.849	71.85	0.067
9/26/2024 13:19	75.938	1103.743	62.019	1.009	71.794	0.045
9/26/2024 13:20	76.294	1107.873	63.069	0.904	71.806	0.048
9/26/2024 13:21	76.931	1084.125	63.463	0.867	71.825	0.045
9/26/2024 13:22	76.519	1088.255	62.331	0.968	71.8	0.05
9/26/2024 13:23	75.75	1102.71	62.706	0.999	71.756	0.115
9/26/2024 13:24	76.387	1100.645	63.313	0.895	71.713	0.093
9/26/2024 13:25	76.406	1096.515			71.819	0.065
9/26/2024 13:26			62.956	0.904	73.475	0.434
9/26/2024 13:27	76.575	1091.353	62.831	0.868	73.106	0.049
9/26/2024 13:28	76.688		63.638	0.936	74.969	0.22
9/26/2024 13:29	78.6	1032.5	64.344	0.822	75	0.084
9/26/2024 13:30	78.037	1033.532	64.556	0.945		
9/26/2024 13:31	77.887		63.944	1.036	75.669	0.158

9/26/2024 13:32	77.363	1058.313	64.063	1.015	75.269	0.12
9/26/2024 13:33	77.963	1041.792	64.494	1.002	75.381	0.166
9/26/2024 13:34	78.206	1030.435	64.119	0.915	75.525	0.11
9/26/2024 13:35					75.394	0.073
9/26/2024 13:36	77.644	1045.922	63.669	1.025	75.381	0.059
9/26/2024 13:37	78.019	1033.532	64.938	0.956		
9/26/2024 13:38	78.375	1009.785	64.256	0.971	75.731	0.049
9/26/2024 13:39	77.887	1029.402	63.775	1.075	75.469	0.052
9/26/2024 13:40	77.456	1050.052	64.525	0.94	74.75	0.048
9/26/2024 13:41	78.431	1005.655	65.956	0.766	75.825	0.049
9/26/2024 13:42	79.088	974.68	66.556	0.649	75.919	0.042
9/26/2024 13:43	75.113	934.412	66.931	0.888	75.544	0.044
9/26/2024 13:44					75.45	0.049
9/26/2024 13:45	75.713	890.015	65.975	0.732	76.05	0.051
9/26/2024 13:46	75.431	867.3	65.375	0.707	74.9	0.049
9/26/2024 13:47	75.15	885.885	65.262	0.376		
9/26/2024 13:48	75.188	888.982	64.906	0.659	75.819	0.053
9/26/2024 13:49	75.338	880.722	65.019	0.722	76.319	0.056
9/26/2024 13:50	75.375	873.495	65.688	0.64	75.988	0.057
9/26/2024 13:51	75.656	865.235	65.856	0.613	76.525	0.052
9/26/2024 13:52	75.806	864.203	66.169	0.561	75.544	0.049
9/26/2024 13:53					75.869	0.049
9/26/2024 13:54	75.45	868.333	65.744	0.702	76	0.052
9/26/2024 13:55	75.919	864.203	66.075	0.67	76.119	0.047
9/26/2024 13:56	75.825	851.813	66.044	0.685	75.669	0.049
9/26/2024 13:57	75.45	875.56	66.081	0.511		
9/26/2024 13:58	75.713	871.43	65.556	0.636	76.381	0.047
9/26/2024 13:59	73.594	995.33	65.275	0.432	75.819	0.042
9/26/2024 14:00	76.031	945.77	64.081	0.392	75.412	0.055
9/26/2024 14:01	75.45	955.063	65.525	0.48	76.387	
9/26/2024 14:02	75.956	952.997	65.194	0.655	76.262	0.049
9/26/2024 14:03	74.756	967.453	64.994	0.595	76.1	0.055
9/26/2024 14:04	75.037	977.778	64.306	0.63	76.244	0.055

9/26/2024 14:05	75.206	993.265	64.3	0.654	75.694	0.05
9/26/2024 14:06	74.794	1001.525	63.75	0.683	76.2	0.053
9/26/2024 14:07					75.881	0.053
9/26/2024 14:08	74.831	1003.59	63.594	0.729	75.844	0.054
9/26/2024 14:09	74.625	977.778	63.969	0.767	76.231	0.051
9/26/2024 14:10	75.225	970.55	64.5	0.646	77.269	0.056
9/26/2024 14:11	75.694	951.965	65.031	0.545	76.363	0.052
9/26/2024 14:12	75.488	962.29	65.081	0.749		
9/26/2024 14:13	75.244	965.388	65.094	0.438	75.738	
9/26/2024 14:14	75.769	946.802	65.75	0.418	76.781	0.053
9/26/2024 14:15	76.631	897.242	66.194	0.492	77.175	0.053
9/26/2024 14:16	76.744		66.344	0.55	76.969	0.052
9/26/2024 14:17	77.175	882.787	66.456	0.526	76.606	0.051
9/26/2024 14:18					76.688	0.054
9/26/2024 14:19	77.081	884.852	66.306	0.608	77.225	0.056
9/26/2024 14:20	76.688	886.917	66.506	0.669	77.05	0.049
9/26/2024 14:21	76.781	881.755	66.394	0.584	77.075	0.052
9/26/2024 14:22	76.894	899.307	66.05	0.701	76.887	0.053
9/26/2024 14:23	77.231	894.145	66.287	0.655		
9/26/2024 14:24	76.594	903.438	65.719	0.728	77.119	0.055
9/26/2024 14:25	76.688	891.047	65.944	0.645	76.238	0.052
9/26/2024 14:26	76.106	909.633	65.575	0.646	75.863	0.05
9/26/2024 14:27	76.537	927.185	65.262	0.753	74.794	0.046
9/26/2024 14:28	76.05	924.088	65.356	0.805	74.656	0.044
9/26/2024 14:29	76.387	905.503	65.006	0.595	75.05	0.048
9/26/2024 14:30	76.331	908.6	64.881	0.637	74.85	0.049
9/26/2024 14:31					74.625	0.049
9/26/2024 14:32	76.481		64.75	0.615	74.938	0.054
9/26/2024 14:33	75.825	941.64	63.225	0.773	74.5	0.052
9/26/2024 14:34	75.619	943.705	63.306	0.602		
9/26/2024 14:35	75.3	964.355	62.656	0.939	74.887	0.056
9/26/2024 14:36	75.244	958.16	62.838	0.891	74.544	0.057
9/26/2024 14:37	75.319	966.42	63.287	0.91	75.506	0.056

9/26/2024 14:38	75.338	958.16	63.344	0.821	75.944	0.059
9/26/2024 14:39	75.431	956.095	63.362	0.634	76.144	0.056
9/26/2024 14:40	75.525	945.77	63.931	0.824	76.363	0.059
9/26/2024 14:41	75.619	943.705	63.981	0.612	76.6	0.062
9/26/2024 14:42	75.919	938.542	64.281	0.764	76.35	0.061
9/26/2024 14:43					76.412	0.059
9/26/2024 14:44	75.994		64.256	0.844	76.106	0.054
9/26/2024 14:45	75.806	925.12	64.175	0.808	76.231	0.052
9/26/2024 14:46	76.631	908.6	64.731	0.727	76.319	
9/26/2024 14:47	76.181	924.088	64.556	0.783	77.056	0.057
9/26/2024 14:48	76.125	922.023	64.131	0.822		
9/26/2024 14:49	73.65	890.015	64.694	0.781	76.606	0.059
9/26/2024 14:50	73.856	837.357	63.45	0.504	76.025	0.054
9/26/2024 14:51	73.781	846.65	62.631	0.791	75.694	0.055
9/26/2024 14:52	73.463	867.3	62.644	0.795	75.644	0.059
9/26/2024 14:53	73.294	881.755	61.981	0.728	76.156	0.06
9/26/2024 14:54	72.994	884.852	62.294	0.797	76.35	0.059
9/26/2024 14:55					76.275	
9/26/2024 14:56	73.313	860.073	62.669	0.778	76.144	0.062
9/26/2024 14:57	73.162	886.917	62.219	0.807	75.444	0.059
9/26/2024 14:58	72.938	891.047	61.938	0.651	76.325	0.065
9/26/2024 14:59	72.975	897.242	61.675	0.806		
9/26/2024 15:00	72.994	895.177	61.481	0.715	76.175	0.061
9/26/2024 15:01	72.637	914.795	61.15	0.653	75.756	0.059
9/26/2024 15:02	72.694	901.372	61.556	0.797	77.15	0.065
9/26/2024 15:03	73.144	897.242	61.969	0.887	76.5	0.062
9/26/2024 15:04	72.787	898.275	62.025	0.753	76.412	0.062
9/26/2024 15:05	72.863	902.405	61.481	0.761	76.694	0.065
9/26/2024 15:06	72.731	898.275	61.237	0.746	77.35	0.066
9/26/2024 15:07	72.938	896.21			77.512	0.063
9/26/2024 15:08			61.688	0.804	77.012	0.068
9/26/2024 15:09	72.619	903.438	61.4	0.894	77.456	0.067
9/26/2024 15:10	72.863	899.307	61.444	0.81	76.619	0.063

9/26/2024 15:11	72.506	895.177	61.138	0.702	76.194	0.066
9/26/2024 15:12	72.769	896.21	61.388	0.618		
9/26/2024 15:13	72.825	897.242	61.619	0.712	76.875	0.102
9/26/2024 15:14	72.769	892.08	61.388	0.585	77.3	0.065
9/26/2024 15:15	72.806	887.95	61.681	0.811	77.713	0.063
9/26/2024 15:16	72.881	902.405	61.713	0.568	77.275	0.062
9/26/2024 15:17	72.956	892.08	62.188	0.584	78.131	0.069
9/26/2024 15:18	72.881	895.177	61.925	0.52	77.887	0.064
9/26/2024 15:19	73.2	873.495	62.362	0.591	78.181	0.069
9/26/2024 15:20	73.519	863.17	62.344	0.772	78.488	0.066
9/26/2024 15:21					78.706	0.065
9/26/2024 15:22	73.294	861.105	62.444	0.702	78.387	0.064
9/26/2024 15:23	73.35	854.91	62.581	0.405	77.794	0.065
9/26/2024 15:24	73.162	872.463	62.319	0.77		
9/26/2024 15:25	72.844	888.982	62.037	0.754	78.537	0.069
9/26/2024 15:26	73.144	883.82	62.713	0.838	78.4	0.065
9/26/2024 15:27	73.012	868.333	62.681	0.582	78.669	0.067
9/26/2024 15:28	72.919	885.885	62.181	0.776	76.762	0.056
9/26/2024 15:29	72.863	903.438	61.631	0.778	71.825	0.047
9/26/2024 15:30	72.844	893.112	61.456	0.804	72.081	0.052
9/26/2024 15:31	72.619	902.405	61.181	0.74	72.05	0.05
9/26/2024 15:32	72.787	885.885	61.65	0.567	74.531	0.059
9/26/2024 15:33	72.9	876.593	61.681	0.741	74.238	0.057
9/26/2024 15:34					74.512	0.054
9/26/2024 15:35	73.181	871.43	61.919	0.602	74.912	0.058
9/26/2024 15:36	73.144	884.852	62.069	0.762		
9/26/2024 15:37	72.863	891.047	61.944	0.598	73.969	0.065
9/26/2024 15:38		878.657	62.006	0.596	74.894	0.06
9/26/2024 15:39	73.012	875.56	62.313	0.583	75.213	0.06
9/26/2024 15:40	72.656	898.275	61.819	0.475	75.181	0.058
9/26/2024 15:41	72.394	905.503	61.481	0.659	75.569	0.061
9/26/2024 15:42	72.45	893.112	61.506	0.619	75.619	0.057
9/26/2024 15:43	72.338	914.795	61.119	0.587	74.981	0.06

9/26/2024 15:44					75.088	0.063
9/26/2024 15:45	72.619	905.503	61.112	0.354	74.381	0.066
9/26/2024 15:46	65.869	(null)	46.375	0.128	74.769	0.536
9/26/2024 15:47	69.431	1032.5	58.544	0.246	75.419	0.069
9/26/2024 15:48	73.556	963.323	58.05	0.827		
9/26/2024 15:49	72.75	1044.89	60.469	0.73	74.637	0.099
9/26/2024 15:50	73.65	994.297	62.181	0.813	75.231	0.059
9/26/2024 15:51	74.081	963.323	62.362	0.77	73.775	0.055
9/26/2024 15:52	74.738	949.9	63.425	0.831	74.662	0.053
9/26/2024 15:53	75.206	933.38	63.444	0.647	75.262	0.054
9/26/2024 15:54		939.575	63.95	0.556	74.219	0.052
9/26/2024 15:55	75.188	923.055	63.969	0.504	75.075	0.057
9/26/2024 15:56					74.787	0.054
9/26/2024 15:57	75.15	927.185	63.975	0.697	75.488	0.055
9/26/2024 15:58	74.7	946.802	64.037	0.664	75.206	0.056
9/26/2024 15:59	75.3	931.315	64.044	0.769	72.625	0.045
9/26/2024 16:00	74.381	952.997	62.994	0.822	75.219	0.059
9/26/2024 16:01	74.588	945.77	63.894	0.613	75.113	0.056
9/26/2024 16:02	75.525	929.25	63.481	0.539	73.725	0.05
9/26/2024 16:03	75.056	943.705	63.656	0.685		
9/26/2024 16:04	75.244	926.153	63.987	0.802	74.619	0.053
9/26/2024 16:05	75.188	940.607	63.731	0.843	74.262	0.051
9/26/2024 16:06	74.887	951.965	63.619	0.766	74.363	0.056
9/26/2024 16:07	74.55	945.77	63.6	0.836	73.956	0.051
9/26/2024 16:08	74.7	938.542	63.056	0.592	72.619	0.047
9/26/2024 16:09	74.606	945.77	63.081	0.596	71.6	0.049
9/26/2024 16:10	74.306	950.932	62.806	0.591	72.5	0.049
9/26/2024 16:11	74.944	938.542			73.1	0.049
9/26/2024 16:12	75.169	926.153	63.463	0.778	73.794	0.049
9/26/2024 16:13	74.981	923.055			74.619	0.052
9/26/2024 16:14	75.056	922.023	63.662	0.849	74.244	0.051
9/26/2024 16:15					73.512	0.045
9/26/2024 16:16	74.756	948.867	63.425	0.859	74.4	0.06

9/26/2024 16:17	74.569	950.932	63.219	0.863	74.037	0.056
9/26/2024 16:18	74.813	932.347	63.338	0.865	74.044	0.055
9/26/2024 16:19	74.494	951.965	63.006	0.88	74.206	0.052
9/26/2024 16:20	74.719	937.51	63.55	0.871	72.919	0.049
9/26/2024 16:21	74.869	947.835	63.5	0.844	73.325	0.049
9/26/2024 16:22		940.607	63.463	0.852		
9/26/2024 16:23	40.556	0	62.475	0.768	72.306	0.047
9/26/2024 16:24	43.444	0	41.888	0.018		0.81
9/26/2024 16:25	46.65	0	39.744	0.126	72.55	0.848
9/26/2024 16:26	37.5	0			72.688	0.893
9/26/2024 16:27	35.963	0	33.931	0.107	71.719	0.955
9/26/2024 16:28	36.862	0	32.825	0.028		
9/26/2024 16:29	38.156	0	34.263	0.104	72.238	0.945
9/26/2024 16:30	38.756	0	34.706	0.077	72.969	0.94
9/26/2024 16:31	38.119	0	37.813	0.021		0.921
9/26/2024 16:32		0			73.738	0.945
9/26/2024 16:33	39.375	0	35.7	0.061	73.463	0.922
9/26/2024 16:34	39.881	0	35.144	0.026		
9/26/2024 16:35	39.263	0	34.669	0.121	73.037	0.955
9/26/2024 16:36	38.494	0			72.963	0.933
9/26/2024 16:37	38.438	0	35.119	0.028	72.756	0.953
9/26/2024 16:38	37.987	0	33.681	0.024	72.988	0.94
9/26/2024 16:39	37.912	0	32.706	0.049	73.131	0.941
9/26/2024 16:40	38.606	0	34.169		73.069	0.946
9/26/2024 16:41	38.081	0	33.794	0.019	72.762	0.972
9/26/2024 16:42	37.331	0	32.75	0.038	72.425	0.949
9/26/2024 16:43	35.4	0	31.875	0.031		
9/26/2024 16:44	35.531	0	31.788	0.019	72.419	0.965
9/26/2024 16:45	35.119	0	31.462	0.112	72.994	0.985
9/26/2024 16:46	34.631	0	31.175	0.025	72.787	0.986
9/26/2024 16:47	34.856	0	31.019	0.016	73.069	0.988
9/26/2024 16:48	34.744	0		0.018	72.662	0.991
9/26/2024 16:49	34.725	0	31.063	0.023	73.106	1.029

9/26/2024 16:50	35.1	0	31.181	0.019	73.925	0.973
9/26/2024 16:51	35.119	0	31.3	0.036	73.656	0.982
9/26/2024 16:52	35.269	0	31.531	0.019	74.131	1.004
9/26/2024 16:53	35.25	0	31.331	0.027		0.967
9/26/2024 16:54		0			73.594	0.968
9/26/2024 16:55	35.063	0	31.544	0.021	74.369	0.978
9/26/2024 16:56	35.438	0	31.575	0.021		
9/26/2024 16:57	35.362	0		0.019	73.806	0.971
9/26/2024 16:58	35.175	0	31.487	0.088	73.85	0.98
9/26/2024 16:59	35.1	0	31.4	0.058	73.925	0.979
9/26/2024 17:00	35.269	0	31.669	0.022	73.975	0.987
9/26/2024 17:01		0			73.738	0.991
9/26/2024 17:02	35.325	0	31.581	0.024	74.231	0.966
9/26/2024 17:03	35.025	0	31.169	0.048	73.425	0.965
9/26/2024 17:04	35.081	0	30.95	0.018	73	0.991
9/26/2024 17:05	34.65	0	31.025	0.019	73.213	0.985
9/26/2024 17:06	34.688	0	30.95	0.015	72.912	0.985
9/26/2024 17:07	34.612	0	30.981	0.02	73.275	0.983
9/26/2024 17:08	34.294	0	30.681	0.018		
9/26/2024 17:09	34.519	0	30.956	0.03	72.681	0.985
9/26/2024 17:10	35.044	0	31.294	0.02	73.194	0.989
9/26/2024 17:11	34.931	0	31.337	0.038	72.488	
9/26/2024 17:12	35.325	0	31.775	0.019	77.275	1.093
9/26/2024 17:13	35.531	0	31.819	0.042	82.637	1.103
9/26/2024 17:14	35.362	0	31.625	0.021	80.137	1.035
9/26/2024 17:15	34.744	0	31.219	0.029	77.869	1.022
9/26/2024 17:16	34.425	0	30.919	0.033	79.106	1.029
9/26/2024 17:17		0			77.863	1.041
9/26/2024 17:18	33.9	0	30.375	0.026	77.975	1.074
9/26/2024 17:19	34.237	0	30.712	0.04	78.75	1.047
9/26/2024 17:20	34.369	0	30.669	0.017	78.069	1.009
9/26/2024 17:21	34.65	0	30.981	0.061		
9/26/2024 17:22	34.256	0	30.756	0.04	77.787	1.02

9/26/2024 17:23	33.806	0	30.256	0.019	78.594	1.027
9/26/2024 17:24	33.731	0	30.956	0.043	77.588	1.016
9/26/2024 17:25	35.813	0	32.469	0.087	77.625	1.027
9/26/2024 17:26	36.938	0	33.706	0.028	77.844	0.996
9/26/2024 17:27	37.031	0			77.181	1.013
9/26/2024 17:28		0	33.606	0.024	78.319	1.029
9/26/2024 17:29	37.5	0	33.862	0.037	77.494	1.005
9/26/2024 17:30	37.069	0	33.856	0.036		
9/26/2024 17:31	37.237	0	33.744	0.031	78.225	1.021
9/26/2024 17:32	37.688	0	33.819	0.038	77.775	1.014
9/26/2024 17:33	37.537	0	34.069	0.016	77.35	0.996
9/26/2024 17:34	37.106	0	33.906	0.017	77.556	1
9/26/2024 17:35	37.444	0	33.644	0.03	78.075	1.013
9/26/2024 17:36	37.313	0	33.781	0.038	76.963	1.084
9/26/2024 17:37	37.781	0	33.844	0.066	78.5	1.024
9/26/2024 17:38	37.688	0	33.781	0.02	78.144	0.994
9/26/2024 17:39		0			77.631	1.017
9/26/2024 17:40	37.669	0	33.944	0.022	77.369	1.03
9/26/2024 17:41	37.875	0	34.175	0.05	77.5	1.003
9/26/2024 17:42	38.1	0	34.037	0.023	78.206	1.022
9/26/2024 17:43	37.594	0	33.944	0.04		
9/26/2024 17:44	37.519	0	33.931	0.014	77.512	1.015
9/26/2024 17:45	36.956	0	33.369	0.018	77.906	0.977
9/26/2024 17:46	37.05	0	33.456	0.032	78.137	1.011
9/26/2024 17:47	36.825	0	33.338	0.018	76.9	0.983
9/26/2024 17:48	36.731	0	33.056	0.051	77.869	1.023
9/26/2024 17:49	36.675	0	33.331	0.061	77.063	1.001
9/26/2024 17:50	37.125	0	33.456	0.02	77.081	1
9/26/2024 17:51	36.506	0			77.213	1.03
9/26/2024 17:52		0	32.731	0.018	76.887	1.017
9/26/2024 17:53	36.281	0	32.725	0.017	76.269	0.992
9/26/2024 17:54	36.3	0	32.681	0.058	76.344	1.009
9/26/2024 17:55	60.919	0	40.356	0.043		

9/26/2024 17:56	68.419	0	53	0.952	72.637	0.803
9/26/2024 17:57	68.063	0	54.15	1.204	74.225	0.501
9/26/2024 17:58	68.006	0	55.206	1.155	73.544	0.443
9/26/2024 17:59	68.213	0	55.65	1.075	73.637	0.328
9/26/2024 18:00					72.875	0.293
9/26/2024 18:01			55.669	0.977		
9/26/2024 18:02					65.869	0.055
9/26/2024 18:03			53.737	0.841	71.525	0.08
9/26/2024 18:04			56.075	0.876		
9/26/2024 18:05			52.825	1.045	70.731	0.067
9/26/2024 18:06					70.619	0.12
9/26/2024 18:07			51.569	1.164		
9/26/2024 18:08			51.694	1.163	70.512	0.167
9/26/2024 18:09			51.05	1.179	70.056	0.176
9/26/2024 18:10			50.55	1.172	69.606	0.202
9/26/2024 18:11			50.2	1.02	69.463	0.188
9/26/2024 18:12			50.025	1.173	69.175	0.288
9/26/2024 18:13			49.45	1.177	69.088	0.279
9/26/2024 18:14			49.394	1.163	69.944	0.48
9/26/2024 18:15			49.169	1.161	69.213	0.339
9/26/2024 18:16			48.406	1.126	69.262	0.391
9/26/2024 18:17					68.681	0.344
9/26/2024 18:18			47.906	1.254	69.069	0.368
9/26/2024 18:19			47.438	1.236	68.262	0.325
9/26/2024 18:20					68.563	0.403
9/26/2024 18:22					65.994	0.168
9/26/2024 18:23					70.025	0.736
9/26/2024 18:24					70.713	0.815
9/26/2024 18:25					70.588	0.711
9/26/2024 18:26					70.756	0.675
9/26/2024 18:27					71.35	0.694
9/26/2024 18:28					71.162	0.657
9/26/2024 18:29					71.225	0.708

9/26/2024 18:30					71.037	0.793
9/26/2024 18:31					70.475	0.786
9/26/2024 18:32					70.131	0.747
9/26/2024 18:33					70.806	0.813
9/26/2024 18:34					71.325	0.827
9/26/2024 18:35					70.731	0.693
9/26/2024 18:36					70.781	0.672
9/26/2024 18:37					71.681	0.679
9/26/2024 18:38					71.381	0.696
9/26/2024 18:39					71.3	0.627
9/26/2024 18:40					71.688	0.741
9/26/2024 18:41					71.156	0.71
9/26/2024 18:42					70.85	0.631
9/26/2024 18:43					71.756	0.802
9/26/2024 18:44					71.494	0.732
9/26/2024 18:45					70.887	0.707
9/26/2024 18:46					71.544	0.763
9/26/2024 18:47					71.906	0.816
9/26/2024 18:48					71.381	0.794
9/26/2024 18:49					71.387	0.802
9/26/2024 18:50					70.887	0.801
9/26/2024 18:51					70.931	0.703
9/26/2024 18:52					71.531	0.839
9/26/2024 18:53					71.363	0.836
9/26/2024 18:54					71.156	0.852
9/26/2024 18:55					71.619	0.818
9/26/2024 18:56					70.787	0.82
9/26/2024 18:57					71.081	0.821
9/26/2024 18:58					70.313	0.825
9/26/2024 18:59					70.919	0.822
9/26/2024 19:00					70.981	0.809
9/26/2024 19:01					70.563	0.832
9/26/2024 19:02					70.575	0.828

9/26/2024 19:03					64.306	0.068
9/26/2024 19:04					60.075	0.574
9/26/2024 19:05					64.206	0.79
9/26/2024 19:06					65.106	0.721
9/26/2024 19:07					65.063	0.761
9/26/2024 19:08						0.828
9/26/2024 19:09					64.35	0.707
9/26/2024 19:10					64.681	0.834
9/26/2024 19:11					64.35	0.77
9/26/2024 19:12					64.956	0.675
9/26/2024 19:13					65.231	0.644
9/26/2024 19:14					64.637	0.543
9/26/2024 19:15					64.675	0.539
9/26/2024 19:16					65.169	0.563
9/26/2024 19:17					64.887	0.613
9/26/2024 19:18					64.844	0.66
9/26/2024 19:19					64.794	0.515
9/26/2024 19:20					68.7	0.82
9/26/2024 19:21					69.063	0.783
9/26/2024 19:22					69.081	0.791
9/26/2024 19:23					69.125	0.7
9/26/2024 19:24					68.075	0.585
9/26/2024 19:25					68.162	0.783
9/26/2024 19:26					68.225	0.728
9/26/2024 19:27					68.375	0.675
9/26/2024 19:28					68.844	0.756
9/26/2024 19:29					68.419	0.731
9/27/2024 8:13					59.144	1.331
9/27/2024 8:15					59.494	1.29
9/27/2024 8:17					71.537	1.313
9/27/2024 8:18					58.994	1.279
9/27/2024 8:20					59.037	1.277
9/27/2024 8:21					59.319	1.242

9/27/2024 8:22					59.225	1.26
9/27/2024 8:23					59.331	1.253
9/27/2024 8:24					59.056	1.252
9/27/2024 8:25					59.131	1.226
9/27/2024 8:26					58.844	1.253
9/27/2024 8:27					59.131	1.243
9/27/2024 8:28					59.213	1.26
9/27/2024 8:29						1.267
9/27/2024 8:30					58.794	1.267
9/27/2024 8:31					58.894	1.257
9/27/2024 8:32					59.287	1.259
9/27/2024 8:33					58.706	1.25
9/27/2024 8:34					59.056	1.257
9/27/2024 8:35					58.75	1.252
9/27/2024 8:36					58.769	1.266
9/27/2024 8:37					58.612	1.255
9/27/2024 8:38					58.631	1.279
9/27/2024 8:39					59.019	1.292
9/27/2024 8:40					58.412	1.28
9/27/2024 8:41					58.494	1.266
9/27/2024 8:42					58.912	1.285
9/27/2024 8:43					58.694	1.255
9/27/2024 8:44					58.6	1.26
9/27/2024 8:45					58.775	1.288
9/27/2024 8:46					58.594	1.281
9/27/2024 8:47					58.75	1.258
9/27/2024 8:48					58.306	1.268
9/27/2024 8:49					58.75	1.261
9/27/2024 8:50					59.013	1.242
9/27/2024 8:51					58.469	1.257
9/27/2024 8:52					58.463	1.237
9/27/2024 8:53					58.494	1.229
9/27/2024 8:54					58.588	1.206

9/27/2024 8:56					58.619	1.229
9/27/2024 8:58					58.819	1.245
9/27/2024 9:00					58.294	1.264
9/27/2024 9:01					58.188	1.293
9/27/2024 9:02					59.056	1.231
9/27/2024 9:03					58.1	1.245
9/27/2024 9:04					58.263	1.271
9/27/2024 9:05					57.944	1.277
9/27/2024 9:06					58.444	1.242
9/27/2024 9:07					58.469	1.265
9/27/2024 9:08					57.994	1.252
9/27/2024 9:09					58.112	1.26
9/27/2024 9:10					58.025	1.253
9/27/2024 9:11					58.281	1.242
9/27/2024 9:12					58.963	1.231
9/27/2024 9:13					58.125	1.251
9/27/2024 9:14					57.794	1.26
9/27/2024 9:15					58.106	1.263
9/27/2024 9:16					57.75	1.242
9/27/2024 9:17					57.375	1.227
9/27/2024 9:18					53.237	1.182
9/27/2024 9:19					51.65	1.151
9/27/2024 9:20					53.362	1.201
9/27/2024 9:21					55.25	1.22
9/27/2024 9:22					56.25	1.225
9/27/2024 9:23					57.419	1.254
9/27/2024 9:24					58.15	1.242
9/27/2024 9:25					57.325	1.273
9/27/2024 9:26					57.431	1.244
9/27/2024 9:27					57.869	1.239
9/27/2024 9:28					58.463	1.24
9/27/2024 9:29					58.175	1.251
9/27/2024 9:30					58.088	1.148

9/27/2024 9:31					58.037	1.144
9/27/2024 9:32					58.131	1.151
9/27/2024 9:33					58.431	1.151
9/27/2024 9:34					57.969	1.197
9/27/2024 9:35					58.188	1.197
9/27/2024 9:36					58.094	1.17
9/27/2024 9:37					58.831	1.167
9/27/2024 9:38					58.744	1.145
9/27/2024 9:39					58.025	1.167
9/27/2024 9:40					58.638	1.151
9/27/2024 9:41					58.519	1.155
9/27/2024 9:42					58.644	1.128
9/27/2024 9:43					58.588	1.111
9/27/2024 9:44					58.394	1.133
9/27/2024 9:45					58.631	1.113
9/27/2024 9:46					58.519	1.118
9/27/2024 9:47					58.556	1.127
9/27/2024 9:48					58.544	1.126
9/27/2024 9:49					58.35	1.131
9/27/2024 9:50					58.194	1.123
9/27/2024 9:51					58.625	1.114
9/27/2024 9:52					58.325	1.116
9/27/2024 9:53					58.731	1.111
9/27/2024 9:54					58.719	1.086
9/27/2024 9:55					58.625	1.08
9/27/2024 9:56					58.725	1.099
9/27/2024 9:57					58.731	1.108
9/27/2024 9:58					58.438	1.113
9/27/2024 9:59					58.744	1.095
9/27/2024 10:00					58.438	1.102
9/27/2024 10:01					58.65	1.11
9/27/2024 10:02					59.019	1.084
9/27/2024 10:03					58.575	1.1

9/27/2024 10:04					58.269	1.079
9/27/2024 10:05					58.344	1.097
9/27/2024 10:06					58.419	1.111
9/27/2024 10:07					57.963	1.103
9/27/2024 10:08					58.188	1.11
9/27/2024 10:09					58.431	1.099
9/27/2024 10:10					58.2	1.13
9/27/2024 10:11					58.188	1.11
9/27/2024 10:12					58.256	1.126
9/27/2024 10:13					58.081	1.128
9/27/2024 10:14					58.631	1.127
9/27/2024 10:15					58.438	1.072
9/27/2024 10:16					58.631	1.096
9/27/2024 10:17					58.481	1.09
9/27/2024 10:18					58.287	1.077
9/27/2024 10:19					58.6	1.102
9/27/2024 10:20					58.513	1.097
9/27/2024 10:21					58.25	1.116
9/27/2024 10:22					58.287	1.092
9/27/2024 10:23					57.975	1.111
9/27/2024 10:24					58.706	1.106
9/27/2024 10:25					58.162	1.094
9/27/2024 10:26					58.419	1.117
9/27/2024 10:27					58.169	1.114
9/27/2024 10:28						1.122
9/27/2024 10:29					58.181	1.107
9/27/2024 10:30					58.619	1.108
9/27/2024 10:31					58.444	1.096
9/27/2024 10:32					58.956	1.075
9/27/2024 10:33					58.694	1.057
9/27/2024 10:34					58.963	1.069
9/27/2024 10:35					58.775	1.055
9/27/2024 10:36					58.575	1.069

9/27/2024 10:37					58.556	1.067
9/27/2024 10:38					58.313	1.098
9/27/2024 10:39					58.319	1.09
9/27/2024 10:40					58.412	1.103
9/27/2024 10:41					58.369	1.111
9/27/2024 10:42					57.875	1.115
9/27/2024 10:43					58.325	1.13
9/27/2024 10:44					58.244	1.115
9/27/2024 10:45					58.063	1.124
9/27/2024 10:46					58.431	1.12
9/27/2024 10:47					58.537	1.131
9/27/2024 10:48					58.65	1.114
9/27/2024 10:49					58.175	1.13
9/27/2024 10:50					58.369	1.123
9/27/2024 10:51					58.6	1.154
9/27/2024 10:52					58.119	1.127
9/27/2024 10:53					57.975	1.142
9/27/2024 10:54					58.537	1.129
9/27/2024 10:55					58.169	1.113
9/27/2024 10:56					58.669	1.117
9/27/2024 10:57					58.506	1.118
9/27/2024 10:58					58.813	1.096
9/27/2024 10:59					58.206	1.103
9/27/2024 11:00					58.487	1.131
9/27/2024 11:01					57.963	1.105
9/27/2024 11:02					58.287	1.129
9/27/2024 11:03					58.35	1.126
9/27/2024 11:04					57.65	1.13
9/27/2024 11:05					58.556	1.138
9/27/2024 11:06					58.075	1.13
9/27/2024 11:07					57.456	1.131
9/27/2024 11:08					58.144	1.102
9/27/2024 11:09					58.419	1.135

9/27/2024 11:10					57.513	1.134
9/27/2024 11:11					58.438	1.112
9/27/2024 11:12					58.1	1.122
9/27/2024 11:13					57.944	1.154
9/27/2024 11:14					57.688	1.144
9/27/2024 11:15					57.781	1.115
9/27/2024 11:16					58.031	1.112
9/27/2024 11:17					57.813	1.145
9/27/2024 11:18						1.129
9/27/2024 11:19					57.956	1.139
9/27/2024 11:20					57.194	1.195
9/27/2024 11:21					57.269	1.208
9/27/2024 11:22					57.431	1.174
9/27/2024 11:23					57.188	1.197
9/27/2024 11:24					57.987	1.187
9/27/2024 11:25					57.362	1.187
9/27/2024 11:26					57.888	1.154
9/27/2024 11:27					57.344	1.166
9/27/2024 11:28					57.219	1.172
9/27/2024 11:29					57.813	1.194
9/27/2024 11:30					58.081	1.154
9/27/2024 11:31					58.006	1.113
9/27/2024 11:32					57.612	1.101
9/27/2024 11:33					57.219	1.108
9/27/2024 11:34					58.269	1.102
9/27/2024 11:35					57.487	1.138
9/27/2024 11:36					57.825	1.157
9/27/2024 11:37					57.588	1.137
9/27/2024 11:38					57.5	1.151
9/27/2024 11:39					57.513	1.153
9/27/2024 11:40					57.219	1.176
9/27/2024 11:41					57.119	1.18
9/27/2024 11:42					59.231	1.248

9/27/2024 11:43					59.706	1.201
9/27/2024 11:44					64.213	1.245
9/27/2024 11:46					63.987	1.269
9/27/2024 11:48					64.488	1.209
9/27/2024 11:50					64.356	1.221
9/27/2024 11:51					64.325	1.228
9/27/2024 11:52					64.4	1.207
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9/27/2024 11:54					61.481	1.19
9/27/2024 11:55						1.189
9/27/2024 11:56					61.575	1.169
9/27/2024 11:57					61.544	1.175
9/27/2024 11:58					61.513	1.18
9/27/2024 11:59					61.369	1.195
9/27/2024 12:00					61.463	1.183
9/27/2024 12:01					61.5	1.178
9/27/2024 12:02					61.275	1.193
9/27/2024 12:03					61.444	1.178
9/27/2024 12:04					61.506	1.169
9/27/2024 12:05					61.237	1.193
9/27/2024 12:06					61.319	
9/27/2024 12:07					61.3	1.196
9/27/2024 12:08					61.138	1.215
9/27/2024 12:09					60.994	1.234
9/27/2024 12:10					61.15	1.207
9/27/2024 12:11					61.188	1.194
9/27/2024 12:12					60.919	1.261
9/27/2024 12:13					60.881	1.25
9/27/2024 12:14					60.956	1.236
9/27/2024 12:15					60.994	1.23
9/27/2024 12:16					60.987	1.233
9/27/2024 12:17					61.1	1.204
9/27/2024 12:18					61.138	1.197

9/27/2024 12:19					61.144	
9/27/2024 12:20					60.994	1.218
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9/27/2024 12:22						1.225
9/27/2024 12:23					60.975	1.22
9/27/2024 12:24					61.081	1.204
9/27/2024 12:25					61.125	1.193
9/27/2024 12:26					60.987	1.221
9/27/2024 12:27					61.088	1.21
9/27/2024 12:28					61.037	1.221
9/27/2024 12:29						1.207
9/27/2024 12:30					61.069	
9/27/2024 12:31					61.106	1.204
9/27/2024 12:32					60.994	1.216
9/27/2024 12:33					61.181	1.194
9/27/2024 12:34					61.069	1.202
9/27/2024 12:35					60.912	1.232
9/27/2024 12:36					60.987	1.203
9/27/2024 12:37					61.05	1.207
9/27/2024 12:38					61.013	1.2
9/27/2024 12:39					60.938	1.219
9/27/2024 12:40					60.888	1.239
9/27/2024 12:41					60.869	1.222
9/27/2024 12:42					60.994	1.202
9/27/2024 12:43					61	1.193
9/27/2024 12:44					61.063	1.2
9/27/2024 12:45					61.088	1.186
9/27/2024 12:46					61.131	1.18
9/27/2024 12:47					61.056	1.194
9/27/2024 12:48						1.19
9/27/2024 12:49					61.112	1.169
9/27/2024 12:50					60.919	1.201
9/27/2024 12:51					60.825	1.222

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9/27/2024 12:54						1.178
9/27/2024 12:56					61.044	1.176
9/27/2024 12:57					60.931	1.2
9/27/2024 12:58					61.056	1.173
9/27/2024 12:59					61.075	1.173
9/27/2024 13:00					61.162	1.164
9/27/2024 13:01					61.188	1.147
9/27/2024 13:02					61.219	1.142
9/27/2024 13:03					61.225	1.149
9/27/2024 13:04					61.162	1.141
9/27/2024 13:05					61.106	1.165
9/27/2024 13:06					61.081	1.173
9/27/2024 13:07					60.963	1.184
9/27/2024 13:08					60.644	1.222
9/27/2024 13:09					60.825	1.203
9/27/2024 13:10					61.019	1.172
9/27/2024 13:11					60.963	1.186
9/27/2024 13:12					61.044	1.158
9/27/2024 13:13					61.019	1.182
9/27/2024 13:14					60.85	1.196
9/27/2024 13:15					60.919	1.18
9/27/2024 13:16					60.944	1.173
9/27/2024 13:17					60.813	1.182
9/27/2024 13:18					60.737	1.188
9/27/2024 13:19					60.844	1.179
9/27/2024 13:20					60.756	1.188
9/27/2024 13:21					60.95	1.159
9/27/2024 13:22					60.8	1.178
9/27/2024 13:23					60.994	1.152
9/27/2024 13:24					60.938	1.162
9/27/2024 13:25					60.862	1.164

9/27/2024 13:26					60.987	1.147
9/27/2024 13:27					60.938	1.156
9/27/2024 13:28					60.844	1.171
9/27/2024 13:29					60.769	1.183
9/27/2024 13:30					60.888	1.158
9/27/2024 13:31					60.806	1.169
9/27/2024 13:33					60.794	1.169
9/27/2024 13:34					60.594	1.2
9/27/2024 13:35					60.856	1.154
9/27/2024 13:36					60.806	1.165
9/27/2024 13:37					60.931	1.153
9/27/2024 13:38					60.8	1.158
9/27/2024 13:39					60.819	1.153
9/27/2024 13:40					60.713	1.176
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9/27/2024 13:42					60.656	1.179
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9/27/2024 13:46					60.656	1.179
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9/27/2024 13:53					56.906	1.175
9/27/2024 13:54					57.519	1.142
9/27/2024 13:55					56.856	1.148
9/27/2024 13:56					56.644	1.151
9/27/2024 13:57					56.869	1.105
9/27/2024 13:58					56.813	1.128
9/27/2024 13:59					56.625	1.123

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9/27/2024 14:05					56.519	1.139
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9/27/2024 14:07					56.2	1.143
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9/27/2024 14:09					55.719	1.13
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9/27/2024 14:17					56.563	1.121
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9/27/2024 14:22					56.675	1.088
9/27/2024 14:23					55.912	1.054
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9/27/2024 14:26					56.25	1.057
9/27/2024 14:27					55.906	1.092
9/27/2024 14:28						1.098
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9/27/2024 14:30					56.063	1.071
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9/27/2024 14:32					55.844	1.098

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9/27/2024 14:34					55.5	1.086
9/27/2024 14:35					55.044	1.164
9/27/2024 14:36					55.531	1.148
9/27/2024 14:37					55.7	1.118
9/27/2024 14:38					55.888	1.124
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9/27/2024 15:04					54.056	1.012
9/27/2024 15:05					53.869	1.043

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9/27/2024 15:09					53.2	1.023
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9/27/2024 15:15					53.431	1.054
9/27/2024 15:16					52.769	1.022
9/27/2024 15:17					42.225	0.96
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9/27/2024 15:19					43.2	0.899
9/27/2024 15:20					43.5	0.905
9/27/2024 15:21					43.275	0.925
9/27/2024 15:22					43.481	0.937
9/27/2024 15:23					43.281	0.925
9/27/2024 15:24					43.319	0.932
9/27/2024 15:26					43.406	0.92
9/27/2024 15:27					43.669	0.898
9/27/2024 15:28					43.612	0.871
9/27/2024 15:29					43.769	0.919
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9/27/2024 15:31					43.556	0.875
9/27/2024 15:32					43.213	0.896
9/27/2024 15:33					43.063	0.886
9/27/2024 15:34					43.456	0.881
9/27/2024 15:35					43.594	0.886
9/27/2024 15:36					43.406	0.858
9/27/2024 15:37					43.131	0.855
9/27/2024 15:38					43.1	0.862
9/27/2024 15:39					43.263	0.906

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9/27/2024 15:42					44.506	0.885
9/27/2024 15:43					44.406	0.906
9/27/2024 15:44					44.875	0.903
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9/27/2024 15:46					45.606	0.91
9/27/2024 15:47					45.338	0.906
9/27/2024 15:48					45.694	0.919
9/27/2024 15:49					45.294	0.935
9/27/2024 15:50					45.438	0.924
9/27/2024 15:51					44.963	0.913
9/27/2024 15:52					44.831	0.898
9/27/2024 15:53					45.606	0.928
9/27/2024 15:54					45.088	0.92
9/27/2024 15:55					45.175	0.947
9/27/2024 15:56					45.481	0.921
9/27/2024 15:57					44.763	0.942
9/27/2024 15:58					44.362	0.952
9/27/2024 15:59					44.519	0.945
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9/27/2024 16:01					44.9	0.908
9/27/2024 16:02					44.769	0.962
9/27/2024 16:03					44.75	0.943
9/27/2024 16:04					44.081	0.93
9/27/2024 16:05					44.487	0.959
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9/27/2024 16:11					44.275	0.914
9/27/2024 16:12					43.644	0.922

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9/27/2024 16:17					43.275	0.906
9/27/2024 16:18					43.131	0.9
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9/27/2024 16:30					42.794	0.896
9/27/2024 16:31					43.15	0.89
9/27/2024 16:32					43.362	0.881
9/27/2024 16:33					42.681	0.857
9/27/2024 16:34					43.494	0.885
9/27/2024 16:35					43.55	0.881
9/27/2024 16:36					43.775	0.852
9/27/2024 16:37					43.2	0.854
9/27/2024 16:38					44.081	0.86
9/27/2024 16:39					43.919	0.863
9/27/2024 16:40					44.275	0.84
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9/27/2024 16:43					43.869	0.849
9/27/2024 16:44					43.912	0.833
9/27/2024 16:45					44.013	0.824
9/27/2024 16:46					43.987	0.816

9/27/2024 16:47					43.638	0.839
9/27/2024 16:48					44.063	0.825
9/27/2024 16:49					43.956	0.828
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9/27/2024 16:51					43.956	0.846
9/27/2024 16:52					43.95	0.836
9/27/2024 16:53					43.775	0.855
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9/27/2024 16:55					43.594	0.848
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9/27/2024 17:03					43.5	0.857
9/27/2024 17:04					43.419	0.853
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9/27/2024 17:14					43.894	0.856
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9/27/2024 17:19					43.206	0.845
9/27/2024 17:21					43.263	0.901
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9/27/2024 17:27					44.619	0.847
9/27/2024 17:28					44.356	0.844
9/27/2024 17:29					44.775	0.839
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9/27/2024 17:32					44.588	0.861
9/27/2024 17:33					44.713	0.865
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9/27/2024 17:35					44.838	0.862
9/27/2024 17:36					44.362	0.872
9/27/2024 17:37					44.475	0.872
9/27/2024 17:38					45.244	0.735
9/27/2024 17:39					44.875	0.827
9/27/2024 17:40					50.188	0.886
9/27/2024 17:41					54.144	1.068
9/27/2024 17:42					62.6	1.053
9/27/2024 17:43					64.231	1.124
9/27/2024 17:45					64.569	1.073
9/27/2024 17:47					64.581	1.074
9/27/2024 17:48					64.563	1.076
9/27/2024 17:50					64.569	1.078
9/27/2024 17:51					64.75	1.052
9/27/2024 17:52					64.588	1.067
9/27/2024 17:53					64.619	1.059
9/27/2024 17:54					64.694	1.059
9/27/2024 17:55					64.606	1.068
9/27/2024 17:56					64.675	1.059
9/27/2024 17:57					64.575	1.078
9/27/2024 17:58					64.488	1.089
9/27/2024 17:59					64.537	1.069
9/27/2024 18:00					64.494	1.071

9/27/2024 18:01					64.512	1.069
9/27/2024 18:02					64.581	1.048
9/27/2024 18:03					64.506	1.06
9/27/2024 18:04					64.519	1.054
9/27/2024 18:05					64.419	1.074
9/27/2024 18:06					64.344	1.086
9/27/2024 18:07					64.05	1.126
9/27/2024 18:08					64.231	1.103
9/27/2024 18:09					64.325	1.084
9/27/2024 18:10					64.475	1.066
9/27/2024 18:11					64.4	1.071
9/27/2024 18:12					64.406	1.062
9/27/2024 18:13					64.306	1.083
9/27/2024 18:14					64.325	1.078
9/27/2024 18:15					64.244	1.093
9/27/2024 18:16					64.287	1.082
9/27/2024 18:17					64.375	1.078
9/27/2024 18:18						1.071
9/27/2024 18:19					64.131	1.106
9/27/2024 18:20					64.019	1.116
9/27/2024 18:21					64.012	1.117
9/27/2024 18:22					64.156	1.102
9/27/2024 18:23					64.238	1.079
9/27/2024 18:24					64.094	1.104
9/27/2024 18:25					64.019	1.118
9/27/2024 18:26					63.95	1.115
9/27/2024 18:27					64.15	1.092
9/27/2024 18:28					64.113	1.094
9/27/2024 18:29					63.987	1.109
9/27/2024 18:30					63.963	1.115
9/27/2024 18:31					63.862	1.135
9/27/2024 18:32					63.838	1.128
9/27/2024 18:33					64.075	1.095

9/27/2024 18:34					64.15	1.082
9/27/2024 18:36					64.119	1.092
9/27/2024 18:37					64.031	1.099
9/27/2024 18:38					64.188	1.076
9/27/2024 18:39					64.15	1.078
9/27/2024 18:40					64.1	1.082
9/27/2024 18:41					64.238	1.067
9/27/2024 18:42					64.225	1.06
9/27/2024 18:43					64.238	1.057
9/27/2024 18:44					64.219	1.062
9/27/2024 18:45					64.231	1.066
9/27/2024 18:46					64.219	1.059
9/27/2024 18:47					64.194	1.067
9/27/2024 18:48					64.075	1.082
9/27/2024 18:49					63.906	1.108
9/27/2024 18:50					63.975	1.088
9/27/2024 18:51					63.912	1.095
9/27/2024 18:53						1.091
9/27/2024 18:54					63.938	1.102
9/27/2024 18:55					66.6	1.182
9/27/2024 18:57					67.081	1.106
9/27/2024 18:59					67.219	1.082
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9/27/2024 19:02					67.088	1.09
9/27/2024 19:03					66.863	1.13
9/27/2024 19:04					66.912	1.118
9/27/2024 19:05					67.131	1.096
9/27/2024 19:06					67.075	1.091
9/27/2024 19:07					67.225	1.074
9/27/2024 19:08					67.075	1.097
9/27/2024 19:09						1.085
9/27/2024 19:10					67.181	1.082
9/27/2024 19:11					67.225	1.069

9/27/2024 19:12					67.275	1.06
9/27/2024 19:13					67.181	1.074
9/27/2024 19:14					67.194	1.069
9/27/2024 19:15					67.2	1.085
9/27/2024 19:16					66.95	1.107
9/27/2024 19:17					66.819	1.134
9/27/2024 19:18					66.756	1.141
9/27/2024 19:19					66.725	1.153
9/27/2024 19:20					66.6	1.157
9/27/2024 19:21					66.725	1.141
9/27/2024 19:22					66.825	1.131
9/27/2024 19:23					66.944	1.097
9/27/2024 19:24					67.031	1.088
9/27/2024 19:25					67.2	1.075
9/27/2024 19:26					67.194	1.057
9/27/2024 19:27					67.069	1.082
9/27/2024 19:28					67.05	1.099
9/27/2024 19:29					67.131	1.071
9/27/2024 19:30					66.919	1.099
9/27/2024 19:31					66.938	1.096
9/27/2024 19:32					66.819	1.114
9/27/2024 19:33					66.912	1.104
9/27/2024 19:34					66.856	1.109
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9/27/2024 19:36					66.912	1.098
9/27/2024 19:37					66.931	1.089
9/27/2024 19:38						1.099
9/27/2024 19:39					67.006	1.092
9/27/2024 19:40					66.856	1.102
9/27/2024 19:42					66.794	1.109
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9/27/2024 19:45					66.838	1.093

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9/27/2024 19:50					66.912	1.075
9/27/2024 19:51					66.75	1.092
9/27/2024 19:52					66.875	1.081
9/27/2024 19:53					66.794	1.095
9/27/2024 19:54					66.863	1.089
9/27/2024 19:55					66.887	1.08
9/27/2024 19:56					66.844	1.077
9/27/2024 19:57					66.856	1.074
9/27/2024 19:58					66.787	1.088
9/27/2024 19:59					66.8	1.087
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9/27/2024 20:01					66.825	1.085
9/27/2024 20:02					66.856	1.071
9/27/2024 20:03					66.869	1.075
9/27/2024 20:04					66.806	1.082
9/27/2024 20:05					66.863	1.069
9/27/2024 20:06					66.844	1.065
9/27/2024 20:07					66.544	1.115
9/27/2024 20:08					66.488	1.123
9/27/2024 20:09					66.769	1.082
9/27/2024 20:10					66.794	1.09
9/27/2024 20:11					66.887	1.072
9/27/2024 20:12					66.769	1.076
9/27/2024 20:13					66.869	1.063
9/27/2024 20:14					66.875	1.075
9/27/2024 20:15					66.856	1.066
9/27/2024 20:16					66.756	1.071
9/27/2024 20:17					66.762	1.09
9/27/2024 20:18						1.078

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9/27/2024 20:20					66.7	1.087
9/27/2024 20:21					66.9	1.082
9/27/2024 20:22					66.581	1.083
9/27/2024 20:23					66.669	1.078
9/27/2024 20:24					66.7	1.076
9/27/2024 20:25						1.074
9/27/2024 20:26					66.656	1.061
9/27/2024 20:27					51.919	1.123
9/27/2024 20:28					82.688	1.067
9/27/2024 20:29					73.613	1.124
9/27/2024 20:30					72.85	1.184
9/27/2024 20:31					73.925	1.162
9/27/2024 20:32					73.563	1.139
9/27/2024 20:33					74.05	1.152
9/27/2024 20:34					74.113	1.135
9/27/2024 20:35					73.938	1.109
9/27/2024 20:36					74.512	1.114
9/27/2024 20:37					74.275	1.117
9/27/2024 20:38					74.162	1.116
9/27/2024 20:39					73.738	1.145
9/27/2024 20:40					74.181	1.151
9/27/2024 20:41					72.931	1.169
9/27/2024 20:42					74.075	1.162
9/27/2024 20:43					73.775	1.168
9/27/2024 20:44					74.325	1.152
9/27/2024 20:45					74.519	1.141
9/27/2024 20:46					74.619	1.137
9/27/2024 20:47					74.563	1.137
9/27/2024 20:48					74.45	1.123
9/27/2024 20:49					74.644	1.141
9/27/2024 20:50					74.244	1.129
9/27/2024 20:51					74.875	1.149

9/27/2024 20:52					75.056	1.13
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9/27/2024 20:54					74.387	1.164
9/27/2024 20:55					74.181	1.196
9/27/2024 20:56					74.512	1.183
9/27/2024 20:57					74.319	1.178
9/27/2024 20:58					75.113	1.175
9/27/2024 20:59					74.869	1.169
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9/27/2024 21:02					74.669	1.152
9/27/2024 21:03					74.569	1.166
9/27/2024 21:04					74.269	1.165
9/27/2024 21:05					74.175	1.172
9/27/2024 21:06					74.356	1.167
9/27/2024 21:07					74.481	1.156
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9/27/2024 21:09					74.319	1.176
9/27/2024 21:10					74.6	1.17
9/27/2024 21:12					74.938	1.163
9/27/2024 21:13					75.213	1.174
9/27/2024 21:14					74.938	1.176
9/27/2024 21:15					75.313	1.168
9/27/2024 21:16					74.625	1.165
9/27/2024 21:17					74.713	1.158
9/27/2024 21:18					74.431	1.165
9/27/2024 21:19					74.194	1.195
9/27/2024 21:20					74.05	1.206
9/27/2024 21:21					74.188	1.148
9/27/2024 21:22					74.9	1.166
9/27/2024 21:23					74.438	1.155
9/27/2024 21:24					74.775	1.152
9/27/2024 21:25					75.25	1.169

9/27/2024 21:26					74.8	1.176
9/27/2024 21:27					74.963	1.158
9/27/2024 21:28					74.131	1.187
9/27/2024 21:29					74.825	1.193
9/27/2024 21:30					74.912	1.19
9/27/2024 21:31					75.363	1.187
9/27/2024 21:32					75.406	1.188
9/27/2024 21:33					74.994	1.168
9/27/2024 21:34					75.213	1.195
9/27/2024 21:35					75.25	1.191
9/27/2024 21:36					75.137	1.185
9/27/2024 21:37					75.131	1.183
9/27/2024 21:38					74.444	1.183
9/27/2024 21:39					75.019	1.188
9/27/2024 21:40					75.425	1.178
9/27/2024 21:41					75.194	1.192
9/27/2024 21:42					75.563	1.185
9/27/2024 21:43					75.675	1.203
9/27/2024 21:44					75.506	1.21
9/27/2024 21:45					75.55	1.188
9/27/2024 21:46					75.844	1.169
9/27/2024 21:47					75.606	1.167
9/27/2024 21:48					75.688	1.198
9/27/2024 21:49					75.575	1.201
9/27/2024 21:50					75.188	1.207
9/27/2024 21:51					73.988	1.179
9/27/2024 21:52					75.375	1.208
9/27/2024 21:53					75.456	1.204
9/27/2024 21:54					75.894	1.206
9/27/2024 21:55					75.925	1.198
9/27/2024 21:56					75.894	1.187
9/27/2024 21:57					76.012	1.199
9/27/2024 21:58					76.294	1.199

9/27/2024 21:59					76.369	1.206
9/27/2024 22:00					75.844	1.184
9/27/2024 22:01					76.137	1.179
9/27/2024 22:02					75.65	1.181
9/27/2024 22:03					75.925	1.2
9/27/2024 22:04					76.081	1.188
9/27/2024 22:05					75.319	1.19
9/27/2024 22:06					76.144	1.184
9/27/2024 22:07					75.225	1.2
9/27/2024 22:08					74.762	1.202
9/27/2024 22:09					75.137	1.191
9/27/2024 22:10					75.319	1.17
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9/27/2024 22:13					75.231	1.186
9/27/2024 22:14					75.137	1.197
9/27/2024 22:15					75.162	1.177
9/27/2024 22:16					75.844	1.169
9/27/2024 22:17					75.931	1.171
9/27/2024 22:18					75.519	1.168
9/27/2024 22:19					75.613	1.178
9/27/2024 22:20					75.887	1.161
9/27/2024 22:21					75.969	1.171
9/27/2024 22:22					76.094	1.164
9/27/2024 22:23					76.194	1.174
9/27/2024 22:24					76.037	1.183
9/27/2024 22:25					76.319	1.181
9/27/2024 22:26					76.3	1.178
9/27/2024 22:27					75.894	1.159
9/27/2024 22:28					76.425	1.17
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9/27/2024 22:30					76.244	1.179
9/27/2024 22:31					75.838	1.214

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9/27/2024 22:33					76.25	1.171
9/27/2024 22:34					75.988	1.182
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9/27/2024 22:38					76.119	1.169
9/27/2024 22:39					76.613	1.159
9/27/2024 22:40					76.9	1.173
9/27/2024 22:41					76.95	1.174
9/27/2024 22:42					77.156	1.163
9/27/2024 22:43					77.225	1.175
9/27/2024 22:44					76.156	1.179
9/27/2024 22:45					76.463	1.173
9/27/2024 22:46					75.719	1.162
9/27/2024 22:47					75.094	1.148
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9/27/2024 22:59					76.537	1.16
9/27/2024 23:00					77.275	1.183
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9/27/2024 23:03					77.325	1.176
9/27/2024 23:04					76.988	1.179
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9/27/2024 23:14					80.344	1.195
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9/27/2024 23:16					80.619	1.194
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9/27/2024 23:21					85.175	1.218
9/27/2024 23:22					84.088	1.222
9/27/2024 23:23					84.475	1.223
9/27/2024 23:24					84.963	1.221
9/27/2024 23:25					85.031	1.211
9/27/2024 23:26					86.363	1.256
9/27/2024 23:27					88.294	1.245
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9/27/2024 23:30					72.412	1.082
9/27/2024 23:32					65.706	1.074
9/27/2024 23:34					65.631	1.077
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9/27/2024 23:47					66.488	1.096
9/27/2024 23:48					66.575	1.083
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9/27/2024 23:59					67.75	1.104
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9/28/2024 0:03					65.162	1.106
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9/28/2024 0:13					64.775	1.113
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9/28/2024 0:16					37.338	4.802
9/28/2024 0:17					35.394	4.462
9/28/2024 0:19					35.838	4.336

9/28/2024 0:21					36.019	4.305
9/28/2024 0:23					38.213	4.528
9/28/2024 0:25					40.881	4.785
9/28/2024 0:26					55.019	6.42
9/28/2024 0:27					58.169	6.623
9/28/2024 0:28					59.406	6.604
9/28/2024 0:29					60.763	6.763
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9/28/2024 5:57					45.525	5.613
9/28/2024 5:58					45.594	5.619
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9/28/2024 7:51					66.063	4.787
9/28/2024 7:52					66.094	4.774
9/28/2024 7:53					65.7	4.785
9/28/2024 7:54					65.506	4.782

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9/28/2024 7:56					65.675	4.791
9/28/2024 7:57					65.762	4.788
9/28/2024 7:58					65.394	4.783
9/28/2024 7:59					65.581	4.785
9/28/2024 8:00					65.938	4.785
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9/28/2024 8:07					65.519	4.777
9/28/2024 8:08					65.35	4.777
9/28/2024 8:09					65.631	4.783
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9/28/2024 8:14					65.412	4.76
9/28/2024 8:15					65.244	4.782
9/28/2024 8:16					65.281	4.778
9/28/2024 8:17					64.925	4.775
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9/28/2024 8:23					65.606	4.762
9/28/2024 8:24					64.7	4.761
9/28/2024 8:25					65.5	4.766
9/28/2024 8:26					65.719	4.746
9/28/2024 8:27					65.556	4.755

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9/28/2024 8:33					63.713	4.908
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9/28/2024 8:38					65.206	4.767
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9/28/2024 8:40					65.463	4.77
9/28/2024 8:41					65.363	4.75
9/28/2024 8:42					65.594	4.76
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9/28/2024 8:45					65.794	4.746
9/28/2024 8:46					65.613	4.76
9/28/2024 8:47					65.412	4.763
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9/28/2024 8:49					65.287	4.751
9/28/2024 8:50					65.613	4.756
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9/28/2024 8:59					65.787	4.749
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9/28/2024 9:09					66.162	4.72
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9/28/2024 9:16					66.537	4.729
9/28/2024 9:17					66.675	4.721
9/28/2024 9:18					66.375	4.726
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9/28/2024 9:23					66.206	4.715
9/28/2024 9:24						4.725
9/28/2024 9:25					66.531	4.714
9/28/2024 9:26					66.444	4.714
9/28/2024 9:27					66.563	4.713
9/28/2024 9:28					66.244	4.725
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9/28/2024 9:31					66.981	4.683
9/28/2024 9:32					66.912	4.695
9/28/2024 9:33					66.394	4.72

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9/28/2024 9:46					66.887	4.698
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9/28/2024 9:48					67.156	4.686
9/28/2024 9:49					66.95	4.682
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9/28/2024 9:51					67.331	4.685
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9/28/2024 9:58					67.056	4.7
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9/28/2024 10:06					67.431	4.673

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9/28/2024 10:10					67.787	4.659
9/28/2024 10:11					67.3	4.659
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9/28/2024 10:13					67.681	4.671
9/28/2024 10:14					66.65	4.612
9/28/2024 10:15					66.556	4.637
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9/28/2024 10:18					67.575	4.691
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9/28/2024 10:20					68.856	4.636
9/28/2024 10:21					69.331	4.628
9/28/2024 10:22					69.844	4.612
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9/28/2024 10:24					70.081	4.599
9/28/2024 10:26					69.781	4.595
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9/28/2024 10:31					70.569	4.591
9/28/2024 10:32					70.938	4.565
9/28/2024 10:33					71.019	4.574
9/28/2024 10:34					71.294	4.568
9/28/2024 10:35					70.963	4.57
9/28/2024 10:36					71.519	4.561
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9/28/2024 10:38					71.775	4.555
9/28/2024 10:39					71.681	4.573
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9/28/2024 10:45					72.55	4.535
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9/28/2024 10:52					72.831	4.528
9/28/2024 10:53					73.069	4.524
9/28/2024 10:54					73.506	4.508
9/28/2024 10:55					72.325	4.528
9/28/2024 10:56					73.194	4.522
9/28/2024 10:57					72.975	4.518
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9/28/2024 10:59					73.25	4.522
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9/28/2024 11:10					70.744	4.422
9/28/2024 11:11					70.75	4.413
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9/28/2024 11:25					69.881	4.442
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9/28/2024 11:29					70.194	4.435
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9/28/2024 11:57					72.494	4.376
9/28/2024 11:58					72.644	4.394
9/28/2024 11:59					72.3	4.381
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9/28/2024 12:07					72.081	4.387
9/28/2024 12:08					72.331	4.382
9/28/2024 12:09					72.662	4.358
9/28/2024 12:10					72.25	4.389
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9/28/2024 12:23					73.569	4.362
9/28/2024 12:24					72.9	4.282
9/28/2024 12:26					71.537	4.284
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9/28/2024 13:15					59.606	4.963
9/28/2024 13:16					60.4	4.95
9/28/2024 13:17					60.581	4.935
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9/28/2024 13:19					60.269	4.943
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9/28/2024 13:23					60.494	4.93
9/28/2024 13:24					61.263	4.921
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9/28/2024 13:27					62.7	5.343
9/28/2024 13:30					63.612	5.016
9/28/2024 13:32					63.806	4.997
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9/28/2024 13:35					63.919	4.904
9/28/2024 13:36					63.756	5.002
9/28/2024 13:37					63.669	5.03
9/28/2024 13:38					63.8	4.996
9/28/2024 13:39					67.725	5.256
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9/28/2024 13:42					70.856	5.211
9/28/2024 13:44					70.794	5.217
9/28/2024 13:45					71.137	5.143

9/28/2024 13:47					70.988	5.173
9/28/2024 13:48					71.075	5.144
9/28/2024 13:49					70.938	5.186
9/28/2024 13:50					70.887	5.203
9/28/2024 13:51					70.869	5.2
9/28/2024 13:52					71.019	5.157
9/28/2024 13:53					71.025	5.166
9/28/2024 13:54					71.137	5.151
9/28/2024 13:55						5.148
9/28/2024 13:56					71.069	5.154
9/28/2024 13:57					71.194	5.132
9/28/2024 13:58					71.231	5.133
9/28/2024 13:59					71.275	5.1
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9/28/2024 14:02					71.169	5.103
9/28/2024 14:03					71.231	5.115
9/28/2024 14:04					71.269	5.112
9/28/2024 14:05					71.2	5.125
9/28/2024 14:06					71.375	5.078
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9/28/2024 14:08					71.088	5.152
9/28/2024 14:09					71.356	5.095
9/28/2024 14:10					71.225	5.112
9/28/2024 14:11					71.137	5.145
9/28/2024 14:12					71.1	5.147
9/28/2024 14:13					70.969	5.18
9/28/2024 14:14					69.894	5.048
9/28/2024 14:16					69.719	5.043
9/28/2024 14:17					69.831	5.051
9/28/2024 14:18					69.887	5.034
9/28/2024 14:19					69.713	5.075
9/28/2024 14:20					69.738	5.071

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9/28/2024 14:24					69.931	5.033
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9/28/2024 14:26					69.769	5.061
9/28/2024 14:27					69.731	5.082
9/28/2024 14:28					69.713	5.081
9/28/2024 14:29					69.875	5.025
9/28/2024 14:30					69.894	5.014
9/28/2024 14:31					69.675	5.097
9/28/2024 14:32					69.694	5.088
9/28/2024 14:33					69.85	5.044
9/28/2024 14:34					69.813	5.043
9/28/2024 14:35					69.744	5.044
9/28/2024 14:36					69.762	5.052
9/28/2024 14:37					69.963	5.002
9/28/2024 14:38					69.806	5.057
9/28/2024 14:39					69.994	4.985
9/28/2024 14:40					70.094	4.95
9/28/2024 14:41					69.912	4.995
9/28/2024 14:42					69.831	5.029
9/28/2024 14:43					69.925	4.998
9/28/2024 14:44						4.988
9/28/2024 14:45					69.956	4.988
9/28/2024 14:46					70.012	4.985
9/28/2024 14:47					70.05	4.978
9/28/2024 14:48					69.938	5
9/28/2024 14:49					69.931	4.986
9/28/2024 14:50					70.069	4.95
9/28/2024 14:51					69.919	4.973
9/28/2024 14:52					68.613	4.879
9/28/2024 14:53					68.563	4.886

9/28/2024 14:54					68.544	4.88
9/28/2024 14:55					67.238	4.779
9/28/2024 14:56						4.792
9/28/2024 14:57					68.494	4.835
9/28/2024 14:58					69.694	4.817
9/28/2024 14:59					69.375	4.827
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9/28/2024 15:02					68.425	4.82
9/28/2024 15:03					67.887	4.842
9/28/2024 15:04					68.15	4.832
9/28/2024 15:05					67.863	4.828
9/28/2024 15:06					67.781	4.824
9/28/2024 15:07					67.606	4.812
9/28/2024 15:08					67.613	4.819
9/28/2024 15:09					68.488	4.815
9/28/2024 15:10					69.344	4.825
9/28/2024 15:11					69.012	4.832
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9/28/2024 15:13					69.094	4.816
9/28/2024 15:14					69.194	
9/28/2024 15:15					69.425	4.824
9/28/2024 15:16					69.331	4.822
9/28/2024 15:17					69.688	4.805
9/28/2024 15:18					70.169	4.806
9/28/2024 15:19					69.313	4.817
9/28/2024 15:20					69.762	4.816
9/28/2024 15:21					71.063	4.802
9/28/2024 15:22					70.988	4.771
9/28/2024 15:23					70.444	4.737
9/28/2024 15:24					70.813	4.819
9/28/2024 15:25					69.844	4.824
9/28/2024 15:26					69.506	4.813

9/28/2024 15:27					69.85	4.818
9/28/2024 15:28						4.816
9/28/2024 15:29					69.488	4.834
9/28/2024 15:30					69.95	4.804
9/28/2024 15:31					70.381	4.805
9/28/2024 15:32					70.15	4.785
9/28/2024 15:33					69.931	4.799
9/28/2024 15:34					70.325	4.789
9/28/2024 15:35					70.256	4.799
9/28/2024 15:36					70.425	4.798
9/28/2024 15:37					70.181	4.816
9/28/2024 15:38					69.588	4.802
9/28/2024 15:39					70.219	4.788
9/28/2024 15:40					70.844	4.78
9/28/2024 15:41					70.325	4.799
9/28/2024 15:42					70.588	4.787
9/28/2024 15:43					70.444	4.802
9/28/2024 15:44					70.225	4.782
9/28/2024 15:45					71.1	4.772
9/28/2024 15:46					70.988	4.781
9/28/2024 15:47					71.137	4.769
9/28/2024 15:48					70.863	4.785
9/28/2024 15:49					71.556	4.756
9/28/2024 15:50					71.225	4.767
9/28/2024 15:51					70.694	4.781
9/28/2024 15:52					70.569	4.768
9/28/2024 15:53					69.569	4.818
9/28/2024 15:54					70.131	4.805
9/28/2024 15:55					70.106	4.803
9/28/2024 15:56					70.031	4.815
9/28/2024 15:57					69.781	4.81
9/28/2024 15:58					69.688	4.811
9/28/2024 15:59					68.744	4.833

9/28/2024 16:00					68.594	4.837
9/28/2024 16:01					69.037	4.83
9/28/2024 16:02					69.706	4.807
9/28/2024 16:03					70.056	4.796
9/28/2024 16:04					69.675	4.806
9/28/2024 16:05					70.406	4.802
9/28/2024 16:06					70.669	4.788
9/28/2024 16:07					70.469	4.767
9/28/2024 16:08					70.669	4.791
9/28/2024 16:09					70.637	4.783
9/28/2024 16:10					70.344	4.794
9/28/2024 16:11					70.35	4.788
9/28/2024 16:12					70.556	4.798
9/28/2024 16:13					70.631	4.775
9/28/2024 16:14					71.106	4.769
9/28/2024 16:15					71.45	4.755
9/28/2024 16:16					70.769	4.781
9/28/2024 16:17					70.744	4.776
9/28/2024 16:18					71.012	
9/28/2024 16:19					70.438	4.789
9/28/2024 16:20					70.25	4.8
9/28/2024 16:21					70.369	4.794
9/28/2024 16:22					70.706	4.783
9/28/2024 16:23					70.537	4.789
9/28/2024 16:24					70.575	4.776
9/28/2024 16:25					71.037	4.769
9/28/2024 16:26					71.194	4.77
9/28/2024 16:27					71.444	4.754
9/28/2024 16:28					71.394	4.76
9/28/2024 16:29					70.613	4.775
9/28/2024 16:30					70.9	4.773
9/28/2024 16:31					70.981	4.776
9/28/2024 16:32					71.706	4.753

9/28/2024 16:33					71.031	4.773
9/28/2024 16:34					71.419	4.758
9/28/2024 16:35					71.906	4.744
9/28/2024 16:36					71.45	4.752
9/28/2024 16:37					71.306	4.761
9/28/2024 16:38					71.144	4.755
9/28/2024 16:39					71.813	4.749
9/28/2024 16:40					71.306	4.755
9/28/2024 16:41					71.537	4.753
9/28/2024 16:42					71.519	4.77
9/28/2024 16:43					71.363	4.753
9/28/2024 16:44					70.588	4.784
9/28/2024 16:45					70.681	4.771
9/28/2024 16:46					70.494	4.779
9/28/2024 16:47					70.894	4.783
9/28/2024 16:48					71.075	4.771
9/28/2024 16:49					71.425	4.771
9/28/2024 16:50					71.512	4.765
9/28/2024 16:51					71.506	4.758
9/28/2024 16:52					71.262	4.772
9/28/2024 16:53					71.894	4.736
9/28/2024 16:55					83.569	4.388
9/28/2024 16:56					87.581	4.249
9/28/2024 16:57					87.588	4.232
9/28/2024 16:58					87.869	4.253
9/28/2024 16:59					88.35	4.224
9/28/2024 17:00					88.506	4.223
9/28/2024 17:01					88.975	4.21
9/28/2024 17:02					86.831	4.263
9/28/2024 17:03					83.925	3.99
9/28/2024 17:04					75.481	3.55
9/28/2024 17:05					66.906	3.471
9/28/2024 17:06					66.169	3.605

9/28/2024 17:07					67.938	3.671
9/28/2024 17:08					69.075	3.656
9/28/2024 17:10					69.581	3.625
9/28/2024 17:12					69.469	3.629
9/28/2024 17:13					69.313	3.651
9/28/2024 17:15					68.738	3.662
9/28/2024 17:16					68.844	3.661
9/28/2024 17:17					68.925	3.652
9/28/2024 17:18					68.619	3.661
9/28/2024 17:19					68.563	3.675
9/28/2024 17:20					68.744	3.647
9/28/2024 17:21					71.05	3.702
9/28/2024 17:22					71.044	3.696
9/28/2024 17:23					71.506	3.695
9/28/2024 17:24					71.675	3.689
9/28/2024 17:25					71.025	3.697
9/28/2024 17:26					71.25	3.68
9/28/2024 17:27					70.938	3.695
9/28/2024 17:28					71.125	3.702
9/28/2024 17:29					71.894	3.671
9/28/2024 17:30					71.919	3.677
9/28/2024 17:31					72.175	3.678
9/28/2024 17:32					71.45	3.687
9/28/2024 17:33					71.975	3.669
9/28/2024 17:34					71.95	3.685
9/28/2024 17:35					71.738	3.68
9/28/2024 17:36					72.431	3.655
9/28/2024 17:37					72.637	3.646
9/28/2024 17:38					72.131	3.663
9/28/2024 17:39					71.725	3.682
9/28/2024 17:40					71.613	3.681
9/28/2024 17:41					71.669	3.685
9/28/2024 17:42					72.169	3.67

9/28/2024 17:43					72.331	3.672
9/28/2024 17:44					72.119	3.664
9/28/2024 17:45					71.938	3.573
9/28/2024 17:46					71.162	3.622
9/28/2024 17:47					70.831	3.607
9/28/2024 17:48					70.512	3.632
9/28/2024 17:49					70.644	3.618
9/28/2024 17:50					71.106	3.637
9/28/2024 17:51					72.762	3.682
9/28/2024 17:52					72.2	3.656
9/28/2024 17:53					71.769	3.675
9/28/2024 17:54					71.956	3.661
9/28/2024 17:55					72.519	3.651
9/28/2024 17:56					72.15	3.654
9/28/2024 17:57					71.85	3.673
9/28/2024 17:58					72.075	3.661
9/28/2024 17:59					72.287	3.676
9/28/2024 18:00					72.05	3.65
9/28/2024 18:01					71.662	3.672
9/28/2024 18:02					71.794	3.681
9/28/2024 18:03					71.512	3.682
9/28/2024 18:04					72.031	3.675
9/28/2024 18:05					72.244	3.671
9/28/2024 18:06					72.219	3.661
9/28/2024 18:07					72.631	3.646
9/28/2024 18:08					72.1	3.67
9/28/2024 18:09					72.525	3.661
9/28/2024 18:10					73.556	3.618
9/28/2024 18:11					73.387	3.629
9/28/2024 18:12					73.6	3.619
9/28/2024 18:13					74.025	3.616
9/28/2024 18:14					73.981	3.611
9/28/2024 18:15					73.731	3.601

9/28/2024 18:16					73.656	3.605
9/28/2024 18:17					73.819	3.616
9/28/2024 18:18					74.05	3.604
9/28/2024 18:19					73.944	3.596
9/28/2024 18:20					74.131	3.579
9/28/2024 18:21					74.275	3.585
9/28/2024 18:22					74.219	3.589
9/28/2024 18:23					73.037	3.512
9/28/2024 18:24					72.375	3.547
9/28/2024 18:25					73.031	3.521
9/28/2024 18:26					73.406	3.508
9/28/2024 18:27					72.844	3.506
9/28/2024 18:28					73.481	3.524
9/28/2024 18:29					74.044	3.486
9/28/2024 18:30					73.925	3.49
9/28/2024 18:31					74.162	3.473
9/28/2024 18:32					73.656	3.49
9/28/2024 18:33					73.6	3.494
9/28/2024 18:34					73.575	
9/28/2024 18:35					73.45	3.506
9/28/2024 18:36					73.581	3.484
9/28/2024 18:37					74.069	3.497
9/28/2024 18:38					73.831	3.493
9/28/2024 18:39					72.863	3.42
9/28/2024 18:41					72.387	3.431
9/28/2024 18:43					72.8	3.415
9/28/2024 18:45					73.313	3.381
9/28/2024 18:46					73.744	3.377
9/28/2024 18:48					73.825	3.373
9/28/2024 18:49					74.394	3.359
9/28/2024 18:50					74.9	3.34
9/28/2024 18:51					74.55	3.343
9/28/2024 18:52					75.063	

9/28/2024 18:53					75.119	3.333
9/28/2024 18:54					74.488	3.345
9/28/2024 18:55					74.519	3.381
9/28/2024 18:56					74.725	3.354
9/28/2024 18:57					74.45	3.327
9/28/2024 18:58					74.787	3.352
9/28/2024 19:00					75.063	3.336
9/28/2024 19:02					74.613	3.355
9/28/2024 19:03					75.063	3.352
9/28/2024 19:04					74.881	3.354
9/28/2024 19:05					75.156	3.334
9/28/2024 19:06					75.137	3.342
9/28/2024 19:08						3.337
9/28/2024 19:10					75.238	3.328
9/28/2024 19:12					73.869	3.171
9/28/2024 19:13					71.519	3.177
9/28/2024 19:14					70.569	3.151
9/28/2024 19:16					70.55	3.161
9/28/2024 19:17					70.156	3.174
9/28/2024 19:19					69.881	3.168
9/28/2024 19:21					71.619	3.22
9/28/2024 19:22					71.681	3.218
9/28/2024 19:23					71.419	3.146
9/28/2024 19:24					68.162	2.923
9/28/2024 19:26					68.45	3.008
9/28/2024 19:28					68.431	3.005
9/28/2024 19:30					67.938	3.03
9/28/2024 19:31					67.356	3.045
9/28/2024 19:33					67.444	3.042
9/28/2024 19:34					67.762	3.025
9/28/2024 19:35					67.9	3.02
9/28/2024 19:36					68.106	
9/28/2024 19:37					68.287	3.009

9/28/2024 19:38					68.306	2.989
9/28/2024 19:39					68.206	3.008
9/28/2024 19:40					68.594	3.005
9/28/2024 19:41					68.9	2.985
9/28/2024 19:42					68.381	2.994
9/28/2024 19:43					68.162	3.013
9/28/2024 19:44					68.625	2.979
9/28/2024 19:46					68.95	2.966
9/28/2024 19:47					69.275	2.949
9/28/2024 19:48					69.606	2.938
9/28/2024 19:49					69.262	2.957
9/28/2024 19:50					69.644	2.954
9/28/2024 19:51					69.262	2.954
9/28/2024 19:52					69.4	2.96
9/28/2024 19:53					69.331	2.954
9/28/2024 19:54					69.794	2.942
9/28/2024 19:55					70.075	2.922
9/28/2024 19:56					70.375	2.908
9/28/2024 19:57					70.313	2.915
9/28/2024 19:58					70.144	2.937
9/28/2024 19:59					69.694	2.926
9/28/2024 20:00					69.619	
9/28/2024 20:01					69.7	2.949
9/28/2024 20:02					69.675	2.923
9/28/2024 20:03					69.55	2.944
9/28/2024 20:04					69.575	2.928
9/28/2024 20:05					69.144	2.93
9/28/2024 20:06					69.675	2.916
9/28/2024 20:07					69.144	2.935
9/28/2024 20:08					69.275	2.933
9/28/2024 20:09					69.219	2.946
9/28/2024 20:10					69.338	2.947
9/28/2024 20:11					69.394	2.948

9/28/2024 20:12					69.556	2.946
9/28/2024 20:13					69.606	2.935
9/28/2024 20:14					69.512	2.93
9/28/2024 20:15					70.387	2.937
9/28/2024 20:16					70.325	2.922
9/28/2024 20:17					70.119	2.948
9/28/2024 20:18					70.188	2.946
9/28/2024 20:19					70.269	2.933
9/28/2024 20:20					70.137	2.95
9/28/2024 20:21					70.456	2.93
9/28/2024 20:23					69.063	3.006
9/28/2024 20:25					69.463	2.979
9/28/2024 20:26					70.088	2.975
9/28/2024 20:27					70.188	2.951
9/28/2024 20:28					69.881	2.956
9/28/2024 20:29					70.006	2.952
9/28/2024 20:30					69.762	2.957
9/28/2024 20:31					69.85	2.968
9/28/2024 20:32					69.988	2.952
9/28/2024 20:33					70.125	2.952
9/28/2024 20:34					70.231	2.953
9/28/2024 20:35					70.081	2.966
9/28/2024 20:36					70.213	2.953
9/28/2024 20:38					70.694	2.93
9/28/2024 20:39					70.894	2.95
9/28/2024 20:40					70.65	2.942
9/28/2024 20:41					70.775	2.944
9/28/2024 20:42					70.563	2.941
9/28/2024 20:44					70.525	2.958
9/28/2024 20:45					70.631	2.946
9/28/2024 20:46					71	2.931
9/28/2024 20:47					70.756	2.937
9/28/2024 20:48					70.744	2.965

9/28/2024 20:49					71.156	2.954
9/28/2024 20:50					71.25	2.933
9/28/2024 20:51					71.106	2.939
9/28/2024 20:52					70.813	2.962
9/28/2024 20:53					70.8	2.969
9/28/2024 20:54					70.706	2.968
9/28/2024 20:55					70.094	2.974
9/28/2024 20:56					70.05	2.992
9/28/2024 20:57					70.556	2.98
9/28/2024 20:58					71.1	2.946
9/28/2024 20:59					71.306	2.957
9/28/2024 21:00					71.45	2.929
9/28/2024 21:01					71.287	2.941
9/28/2024 21:02					70.644	2.975
9/28/2024 21:03					70.313	2.99
9/28/2024 21:04					69.881	3.01
9/28/2024 21:05					69.894	3.021
9/28/2024 21:06					70.206	3
9/28/2024 21:07					70.194	3.002
9/28/2024 21:08					70.731	2.981
9/28/2024 21:09					70.662	2.985
9/28/2024 21:10					70.488	2.998
9/28/2024 21:11					70.606	
9/28/2024 21:12					70.431	3
9/28/2024 21:13					70.331	3
9/28/2024 21:14					70.119	3.015
9/28/2024 21:15					69.6	2.94
9/28/2024 21:16					68.756	2.953
9/28/2024 21:17					69	2.963
9/28/2024 21:18					68.787	2.968
9/28/2024 21:19					68.894	2.98
9/28/2024 21:20					69.137	2.96
9/28/2024 21:21					68.931	2.968

9/28/2024 21:22					69.05	2.95
9/28/2024 21:23					69.119	2.948
9/28/2024 21:24					69.169	2.95
9/28/2024 21:25					68.8	2.968
9/28/2024 21:26					68.375	2.977
9/28/2024 21:27					68.225	2.986
9/28/2024 21:28					68.369	3.006
9/28/2024 21:29					68.488	3.002
9/28/2024 21:30					68.531	3.009
9/28/2024 21:31					68.644	2.984
9/28/2024 21:32					68.669	2.987
9/28/2024 21:33					68.963	
9/28/2024 21:34					69.2	2.964
9/28/2024 21:36					68.887	2.976
9/28/2024 21:37					69.056	2.952
9/28/2024 21:38					68.975	2.975
9/28/2024 21:39					68.819	2.973
9/28/2024 21:40					68.95	
9/28/2024 21:41					68.931	2.987
9/28/2024 21:42					68.856	2.969
9/28/2024 21:43					68.969	2.984
9/28/2024 21:44					68.694	2.995
9/28/2024 21:45					68.488	2.991
9/28/2024 21:46					68.631	2.988
9/28/2024 21:47					69.081	2.979
9/28/2024 21:48						2.982
9/28/2024 21:49					69.244	2.975
9/28/2024 21:50					69.512	2.964
9/28/2024 21:51					69.431	2.972
9/28/2024 21:52					69.269	2.967
9/28/2024 21:53					69.275	2.968
9/28/2024 21:54					69.188	2.965
9/28/2024 21:55					69.075	2.975

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9/28/2024 21:57					69.431	2.965
9/28/2024 21:58					69.512	2.97
9/28/2024 21:59					69.713	2.975
9/28/2024 22:00					69.363	2.97
9/28/2024 22:01					69.044	2.977
9/28/2024 22:02					69.419	2.97
9/28/2024 22:03					69.106	2.983
9/28/2024 22:04					69.037	2.992
9/28/2024 22:05					69.144	2.985
9/28/2024 22:06					69.081	2.984
9/28/2024 22:07					68.7	3.011
9/28/2024 22:08					68.912	2.995
9/28/2024 22:09					69.181	2.998
9/28/2024 22:10					69.075	2.987
9/28/2024 22:11						3.002
9/28/2024 22:12					69.019	3.007
9/28/2024 22:13					69.531	2.987
9/28/2024 22:14					69.519	2.978
9/28/2024 22:15					69.375	2.974
9/28/2024 22:16					69.169	2.978
9/28/2024 22:17					69.606	2.98
9/28/2024 22:18					69.806	2.988
9/28/2024 22:19					69.644	2.977
9/28/2024 22:20					69.188	3.001
9/28/2024 22:21					69.438	2.982
9/28/2024 22:22					69.519	2.961
9/28/2024 22:23					69.719	2.982
9/28/2024 22:24					69.65	2.978
9/28/2024 22:25					69.675	2.973
9/28/2024 22:26					70.2	2.974
9/28/2024 22:27					69.762	2.981
9/28/2024 22:28					69.637	2.98

9/28/2024 22:29					69.781	2.985
9/28/2024 22:30					69.725	2.977
9/28/2024 22:31					70.094	2.979
9/28/2024 22:32					69.844	2.971
9/28/2024 22:33					70.119	2.962
9/28/2024 22:34					70.519	2.94
9/28/2024 22:35					70.225	2.952
9/28/2024 22:36					70.769	2.955
9/28/2024 22:37					71.081	2.923
9/28/2024 22:38					71.675	2.894
9/28/2024 22:39					71.531	2.906
9/28/2024 22:40					71.488	2.912
9/28/2024 22:41					71.394	2.89
9/28/2024 22:42					71.037	2.884
9/28/2024 22:44					71.244	2.905
9/28/2024 22:45					71.031	2.908
9/28/2024 22:46					71.238	2.906
9/28/2024 22:47					71.269	2.904
9/28/2024 22:48					71.144	2.897
9/28/2024 22:50					71.25	2.903
9/28/2024 22:51					71.262	2.899
9/28/2024 22:52					71.213	2.907
9/28/2024 22:53					71.081	2.913
9/28/2024 22:54					71.419	2.896
9/28/2024 22:55					70.819	2.916
9/28/2024 22:56					70.85	2.917
9/28/2024 22:57					71.125	2.914
9/28/2024 22:58					71.456	2.893
9/28/2024 22:59					71.706	2.896
9/28/2024 23:00					71.244	2.912
9/28/2024 23:01					71.512	2.895
9/28/2024 23:02					71.331	2.902
9/28/2024 23:03					71.806	2.897

9/28/2024 23:04					71.319	2.906
9/28/2024 23:05					71.887	2.894
9/28/2024 23:06					71.787	2.891
9/28/2024 23:07					71.881	2.883
9/28/2024 23:08					71.581	2.886
9/28/2024 23:09					71.825	2.874
9/28/2024 23:10					71.944	2.884
9/28/2024 23:11					71.856	2.882
9/28/2024 23:12					71.775	2.9
9/28/2024 23:13					72.075	2.882
9/28/2024 23:14					71.569	2.902
9/28/2024 23:15					71.787	2.899
9/28/2024 23:16					72.381	2.873
9/28/2024 23:17					72.269	2.861
9/28/2024 23:18					72.156	2.874
9/28/2024 23:19					71.006	2.922
9/28/2024 23:20					70.912	2.934
9/28/2024 23:21					70.813	2.942
9/28/2024 23:22					71.012	2.932
9/28/2024 23:23					70.994	2.938
9/28/2024 23:24					70.894	2.95
9/28/2024 23:25					70.906	2.945
9/28/2024 23:26					71.375	2.938
9/28/2024 23:27					71.244	2.926
9/28/2024 23:28					71.037	2.944
9/28/2024 23:29					71.031	2.941
9/28/2024 23:31					71.075	2.932
9/28/2024 23:32					71.094	2.948
9/28/2024 23:33					71.512	2.938
9/28/2024 23:34					71.519	2.932
9/28/2024 23:35					71.613	2.92
9/28/2024 23:36					70.713	2.881
9/28/2024 23:37					70.606	2.898

9/28/2024 23:38					70.713	2.895
9/28/2024 23:39					71.069	2.874
9/28/2024 23:40					70.963	2.895
9/28/2024 23:41					71.006	2.886
9/28/2024 23:42					71.238	2.873
9/28/2024 23:43					70.75	2.891
9/28/2024 23:44					70.819	2.896
9/28/2024 23:45					76.325	3.126
9/28/2024 23:46					78.219	3.006
9/28/2024 23:47					74.544	2.845
9/28/2024 23:48					73.869	2.896
9/28/2024 23:49						2.901
9/28/2024 23:50					74.463	2.901
9/28/2024 23:51					73.794	2.854
9/28/2024 23:52					73.294	2.874
9/28/2024 23:53					73.1	2.877
9/28/2024 23:54					73.15	2.878
9/28/2024 23:55					72.969	2.892
9/28/2024 23:56					73.338	2.874
9/28/2024 23:57					73.313	2.883
9/28/2024 23:58					73.363	2.874
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9/29/2024 0:09					72.044	2.822
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9/29/2024 0:14					72.006	2.824
9/29/2024 0:15					71.531	2.833
9/29/2024 0:16					72.063	2.815
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9/29/2024 0:18					71.575	2.839
9/29/2024 0:19					71.819	2.842
9/29/2024 0:20					71.681	2.84
9/29/2024 0:21					71.656	2.846
9/29/2024 0:22					71.706	2.849
9/29/2024 0:23					71.113	2.848
9/29/2024 0:24					71.394	2.845
9/29/2024 0:25						2.848
9/29/2024 0:26					70.944	2.848
9/29/2024 0:27					71.1	2.861
9/29/2024 0:28					70.575	2.884
9/29/2024 0:29					70.675	2.891
9/29/2024 0:30					70.581	2.889
9/29/2024 0:31					70.85	2.898
9/29/2024 0:32					70.7	2.901
9/29/2024 0:33					70.8	2.89
9/29/2024 0:34					70.775	2.888
9/29/2024 0:35					71.05	2.87
9/29/2024 0:36					71.025	2.888
9/29/2024 0:37					71.275	2.87
9/29/2024 0:38					71.019	2.877
9/29/2024 0:39					70.75	2.871
9/29/2024 0:40					70.544	2.891
9/29/2024 0:41					70.775	2.879
9/29/2024 0:42					71.144	2.868
9/29/2024 0:43					71.238	2.876

9/29/2024 0:44					71.525	2.843
9/29/2024 0:45					71.012	2.854
9/29/2024 0:46					70.75	2.864
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9/29/2024 0:48					71.006	2.852
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9/29/2024 0:51					70.669	2.852
9/29/2024 0:52					70.944	2.845
9/29/2024 0:53					70.8	2.862
9/29/2024 0:54					71.363	2.869
9/29/2024 0:55					71.287	2.862
9/29/2024 0:56					70.844	2.886
9/29/2024 0:57					71.269	2.884
9/29/2024 0:58					71.137	2.886
9/29/2024 0:59					70.85	2.887
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9/29/2024 1:04					69.275	2.939
9/29/2024 1:05					68.844	2.958
9/29/2024 1:06					68.956	2.95
9/29/2024 1:07					68.988	2.937
9/29/2024 1:08					69.106	2.944
9/29/2024 1:09					69.387	
9/29/2024 1:10					69.35	2.943
9/29/2024 1:11					69.637	2.941
9/29/2024 1:12					70.469	2.995
9/29/2024 1:13					70.556	2.994
9/29/2024 1:14					70.95	2.98
9/29/2024 1:15					71.169	2.982
9/29/2024 1:16					71.075	2.984
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9/29/2024 1:36					71.731	3.037
9/29/2024 1:37					71.613	3.049
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9/29/2024 1:39					71.988	3.025
9/29/2024 1:40					72.012	3.017
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9/29/2024 1:44					71.681	3.045
9/29/2024 1:45					71.887	3.038
9/29/2024 1:46					71.588	3.046
9/29/2024 1:48					71.988	3.039
9/29/2024 1:49					71.569	3.048
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9/29/2024 1:52					71.063	3.082

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9/29/2024 2:02					70.037	3.123
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9/29/2024 2:08					67.956	3.189
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9/29/2024 2:10					68.25	3.194
9/29/2024 2:11					68.037	3.193
9/29/2024 2:12					68.3	3.194
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9/29/2024 2:14					70.3	3.291
9/29/2024 2:15					70.825	3.283
9/29/2024 2:16					70.963	3.285
9/29/2024 2:17					70.469	3.314
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9/29/2024 2:22					71.637	3.319
9/29/2024 2:23					71.912	3.314
9/29/2024 2:24					71.662	3.324
9/29/2024 2:25					71.794	3.314

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9/29/2024 2:29					72.063	3.31
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9/29/2024 2:31					71.656	3.325
9/29/2024 2:32					71.481	3.323
9/29/2024 2:33					71.819	3.311
9/29/2024 2:34					71.813	3.293
9/29/2024 2:35					71.944	3.306
9/29/2024 2:36					71.838	3.311
9/29/2024 2:37					71.731	3.312
9/29/2024 2:38					71.956	3.315
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9/29/2024 2:53					71.519	3.329
9/29/2024 2:54					71.775	3.32
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9/29/2024 2:58					71.963	3.316

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9/29/2024 3:29					71.9	3.322
9/29/2024 3:30					72.331	3.289
9/29/2024 3:31					72.431	3.283

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9/29/2024 3:42					70.688	3.352
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9/29/2024 4:49					71.656	3.559
9/29/2024 4:50					71.994	3.55
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9/29/2024 4:53					71.85	3.545
9/29/2024 4:54					71.825	3.537
9/29/2024 4:55					71.4	3.568
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9/29/2024 4:57					71.85	3.561
9/29/2024 4:58					71.637	3.545
9/29/2024 4:59					71.031	3.569
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9/29/2024 5:03					69.375	3.616
9/29/2024 5:04					69.275	3.625
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9/29/2024 5:06					68.213	3.649
9/29/2024 5:07					68.338	3.652
9/29/2024 5:08					68.744	3.648
9/29/2024 5:09					71.313	3.765
9/29/2024 5:10					71.7	3.763

9/29/2024 5:11					71.269	3.771
9/29/2024 5:12					71.225	3.773
9/29/2024 5:13					71.15	3.758
9/29/2024 5:14					71.238	3.78
9/29/2024 5:15					71.375	3.778
9/29/2024 5:16					71.125	3.77
9/29/2024 5:17					71.294	3.768
9/29/2024 5:18					71.575	3.762
9/29/2024 5:19					71.775	3.752
9/29/2024 5:21					72.375	3.73
9/29/2024 5:22					72.381	3.737
9/29/2024 5:23					72.419	3.744
9/29/2024 5:24					72.469	3.737
9/29/2024 5:25					73.181	3.717
9/29/2024 5:26					73.7	3.681
9/29/2024 5:27					73.887	3.689
9/29/2024 5:28					73.825	3.684
9/29/2024 5:29					73.706	3.681
9/29/2024 5:30					73.525	3.695
9/29/2024 5:31					73.531	3.701
9/29/2024 5:32					73.656	3.682
9/29/2024 5:33					73.756	
9/29/2024 5:34					73.919	
9/29/2024 5:35					73.875	3.681
9/29/2024 5:36					73.944	3.663
9/29/2024 5:37					73.981	3.668
9/29/2024 5:38					74.287	3.656
9/29/2024 5:39					74.225	3.663
9/29/2024 5:40					74.512	3.667
9/29/2024 5:41					75.231	3.639
9/29/2024 5:42					75.894	3.616
9/29/2024 5:43					75.806	3.625
9/29/2024 5:44					75.856	3.62

9/29/2024 5:45					75.506	3.591
9/29/2024 5:46					76.081	3.598
9/29/2024 5:47					76.1	3.593
9/29/2024 5:48					76.325	3.578
9/29/2024 5:49					76.463	3.578
9/29/2024 5:50					76.381	3.576
9/29/2024 5:51					76.556	3.573
9/29/2024 5:52					76.719	3.566
9/29/2024 5:53					76.338	3.565
9/29/2024 5:54					76.394	3.531
9/29/2024 5:55					75.575	3.561
9/29/2024 5:56					75.119	3.561
9/29/2024 5:57					75.1	3.581
9/29/2024 5:58					75.238	3.579
9/29/2024 5:59					75.225	3.567
9/29/2024 6:00					75.05	3.582
9/29/2024 6:01					74	3.598
9/29/2024 6:02					72.731	3.643
9/29/2024 6:03					72.512	3.657
9/29/2024 6:04					71.781	3.672
9/29/2024 6:05					71.537	3.688
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9/29/2024 6:07					71.613	3.728
9/29/2024 6:08					71.7	3.714
9/29/2024 6:09					71.656	3.713
9/29/2024 6:10					72.181	3.71
9/29/2024 6:11					72.406	3.693
9/29/2024 6:12					72.344	3.69
9/29/2024 6:13					72.494	3.702
9/29/2024 6:14					72.537	3.687
9/29/2024 6:15					72.713	3.671
9/29/2024 6:16					73.056	3.67
9/29/2024 6:17					72.781	3.677

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9/29/2024 6:19					72.681	3.68
9/29/2024 6:20					72.925	3.679
9/29/2024 6:21					73.225	3.66
9/29/2024 6:22					74.369	3.622
9/29/2024 6:23					74.606	3.6
9/29/2024 6:24					74.363	3.595
9/29/2024 6:25					74.506	3.59
9/29/2024 6:26					74.606	3.574
9/29/2024 6:27					75.294	3.553
9/29/2024 6:28					76.006	3.539
9/29/2024 6:29					76.3	3.538
9/29/2024 6:30					76.056	3.542
9/29/2024 6:31					75.912	3.546
9/29/2024 6:32					75.919	3.519
9/29/2024 6:33					77.481	3.492
9/29/2024 6:34					77.769	3.464
9/29/2024 6:35					77.981	3.468
9/29/2024 6:36					78.463	3.453
9/29/2024 6:37					78.956	3.438
9/29/2024 6:38					79.325	3.43
9/29/2024 6:39					79.387	3.422
9/29/2024 6:40					79.25	3.44
9/29/2024 6:41					79.537	3.432
9/29/2024 6:42					79.4	3.433
9/29/2024 6:43					78.956	3.442
9/29/2024 6:44					77.969	3.38
9/29/2024 6:45					77.787	3.379
9/29/2024 6:46					78.269	3.372
9/29/2024 6:47					78.294	3.359
9/29/2024 6:48					78	3.368
9/29/2024 6:49					77.969	3.368
9/29/2024 6:50					78.463	3.359

9/29/2024 6:51					78.056	3.342
9/29/2024 6:52					78.225	3.336
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9/29/2024 6:54					78.3	3.341
9/29/2024 6:55					78.006	3.359
9/29/2024 6:56					78.175	3.344
9/29/2024 6:57					78.394	3.321
9/29/2024 6:58					78.575	3.331
9/29/2024 6:59					78.613	3.326
9/29/2024 7:00					78.387	3.346
9/29/2024 7:01					76.275	3.239
9/29/2024 7:02					75.488	3.27
9/29/2024 7:03					74.831	3.285
9/29/2024 7:04					74.931	3.273
9/29/2024 7:05					74.838	3.276
9/29/2024 7:06					74.988	3.282
9/29/2024 7:07						3.267
9/29/2024 7:08					75.338	3.262
9/29/2024 7:09					75.25	3.258
9/29/2024 7:10					75.375	3.264
9/29/2024 7:11					75.606	3.251
9/29/2024 7:12					75.325	3.254
9/29/2024 7:13					75.113	3.255
9/29/2024 7:14					75.275	3.263
9/29/2024 7:15					75.081	3.255
9/29/2024 7:16					75.069	3.27
9/29/2024 7:17					75.162	3.248
9/29/2024 7:18					74.675	3.255
9/29/2024 7:19					75.181	3.257
9/29/2024 7:20					75.175	3.247
9/29/2024 7:21					74.988	3.253
9/29/2024 7:22					75.419	3.253
9/29/2024 7:23					75.2	3.261

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9/29/2024 7:25					74.938	3.252
9/29/2024 7:26					75.012	3.24
9/29/2024 7:27					74.713	3.278
9/29/2024 7:28					74.95	3.266
9/29/2024 7:29					75.5	3.261
9/29/2024 7:30					76.088	3.244
9/29/2024 7:31					76.7	3.215
9/29/2024 7:32					76.35	3.235
9/29/2024 7:33					76.719	3.217
9/29/2024 7:34					76.275	3.212
9/29/2024 7:35					76.019	3.224
9/29/2024 7:36					76.606	3.212
9/29/2024 7:37					76.719	3.224
9/29/2024 7:38					76.581	3.214
9/29/2024 7:39					75.944	3.216
9/29/2024 7:40					75.919	3.239
9/29/2024 7:41					76.137	3.244
9/29/2024 7:42					75.869	3.244
9/29/2024 7:43					75.613	3.237
9/29/2024 7:44					75.381	3.241
9/29/2024 7:45					75.844	3.235
9/29/2024 7:46					76.575	3.198
9/29/2024 7:47					76.069	3.223
9/29/2024 7:48					75.869	3.228
9/29/2024 7:49					75.669	3.242
9/29/2024 7:50					75.531	3.237
9/29/2024 7:51					75.681	3.223
9/29/2024 7:52					76.2	3.208
9/29/2024 7:53					76.287	3.203
9/29/2024 7:54					75.938	3.227
9/29/2024 7:55					75.5	3.229
9/29/2024 7:56					75.775	3.209

9/29/2024 7:57					75.831	3.231
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9/29/2024 7:59					76.156	3.205
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9/29/2024 8:09					75.35	3.201
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9/29/2024 8:11					75.756	3.205
9/29/2024 8:12					75.912	3.214
9/29/2024 8:13					75.656	3.219
9/29/2024 8:14					75.169	3.231
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9/29/2024 8:19					76.15	3.18
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9/29/2024 8:21					75.556	3.109
9/29/2024 8:23					75.35	3.091
9/29/2024 8:25					74.819	3.098
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9/29/2024 8:28					74.906	3.09
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9/29/2024 8:31					75.844	3.044
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9/29/2024 8:33					76.769	3.019

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9/29/2024 8:35					76.887	3.007
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9/29/2024 8:37					76.225	3.016
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9/29/2024 8:39					76.744	3.024
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9/29/2024 8:42					76.294	3.046
9/29/2024 8:43					76.494	3.048
9/29/2024 8:44					76.963	3.013
9/29/2024 8:45					76.7	3.025
9/29/2024 8:46					76.506	
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9/29/2024 8:49					75.887	3.045
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9/29/2024 8:53					74.475	3.09
9/29/2024 8:54					73.869	3.113
9/29/2024 8:55					73.75	3.12
9/29/2024 8:56					73.7	3.115
9/29/2024 8:57					74.419	3.09
9/29/2024 8:58					75.063	3.068
9/29/2024 8:59					75.056	3.081
9/29/2024 9:00					75.2	3.046
9/29/2024 9:01					75.963	3.017
9/29/2024 9:02					75.887	3.014
9/29/2024 9:03					75.775	3.012
9/29/2024 9:04					76.575	3.003
9/29/2024 9:05					77.031	2.97
9/29/2024 9:06					76.4	2.978

9/29/2024 9:07					76.319	2.978
9/29/2024 9:08					76.225	2.991
9/29/2024 9:09					76.294	2.985
9/29/2024 9:10					75.5	3.009
9/29/2024 9:11					75.95	2.975
9/29/2024 9:12					76.125	2.987
9/29/2024 9:13					75.95	2.993
9/29/2024 9:14					75.556	2.997
9/29/2024 9:15					75.475	2.971
9/29/2024 9:16					75.125	3
9/29/2024 9:17					75.381	3.011
9/29/2024 9:18					75.669	2.971
9/29/2024 9:19					75.225	3.006
9/29/2024 9:20					74.769	3.015
9/29/2024 9:21					75.169	2.996
9/29/2024 9:22					75.144	2.982
9/29/2024 9:23					75.463	2.987
9/29/2024 9:24					74.7	3.01
9/29/2024 9:25					75.231	2.973
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9/29/2024 9:27					74.756	2.988
9/29/2024 9:28					74.631	2.997
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9/29/2024 9:30					74.144	3.012
9/29/2024 9:31					73.944	3.045
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9/29/2024 9:34					74.125	3.063
9/29/2024 9:35					74.406	3.01
9/29/2024 9:36					74.55	3.029
9/29/2024 9:37					73.9	3.045
9/29/2024 9:38					74.025	3.059
9/29/2024 9:39					74.894	3.251

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9/29/2024 9:53					71.95	4.315
9/29/2024 9:55					71.894	4.324
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9/29/2024 10:02					72.363	4.296
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9/29/2024 10:05					72.85	4.284
9/29/2024 10:06					72.775	4.291
9/29/2024 10:07					72.725	4.281
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9/29/2024 10:12					73.306	4.284
9/29/2024 10:13					73.325	4.277
9/29/2024 10:14					72.787	4.279
9/29/2024 10:15					73.044	4.302
9/29/2024 10:16					72.713	4.303
9/29/2024 10:17					72.456	4.312

9/29/2024 10:18					72.394	4.294
9/29/2024 10:19					72.375	4.313
9/29/2024 10:20					71.756	4.321
9/29/2024 10:21					71.506	4.312
9/29/2024 10:22					72.025	4.318
9/29/2024 10:23					71.544	4.326
9/29/2024 10:24					71.488	4.319
9/29/2024 10:25					71.412	4.334
9/29/2024 10:26					71.4	4.332
9/29/2024 10:27					71.806	4.33
9/29/2024 10:28					72.719	4.3
9/29/2024 10:29					72.994	4.279
9/29/2024 10:30					72.569	4.284
9/29/2024 10:31					72.394	4.299
9/29/2024 10:32					72.756	4.289
9/29/2024 10:33					73.137	4.275
9/29/2024 10:34					73.056	4.27
9/29/2024 10:35					72.719	4.286
9/29/2024 10:36					72.063	4.298
9/29/2024 10:37					72.119	4.307
9/29/2024 10:38					72.3	4.294
9/29/2024 10:39					71.856	4.315
9/29/2024 10:40					70.975	4.332
9/29/2024 10:41					71.681	4.317
9/29/2024 10:42					72.069	4.306
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9/29/2024 10:50					71.406	4.328
9/29/2024 10:52					72.213	4.298

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9/29/2024 10:58					70.438	4.34
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9/29/2024 11:03					70.856	4.347
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9/29/2024 11:09					73.131	4.254
9/29/2024 11:10					72.681	4.268
9/29/2024 11:11					73.175	4.264
9/29/2024 11:12					73.681	4.244
9/29/2024 11:13					73.269	4.258
9/29/2024 11:14					72.412	4.277
9/29/2024 11:15					72.537	4.271
9/29/2024 11:16					72.906	4.265
9/29/2024 11:17					73.25	4.263
9/29/2024 11:18					72.725	4.277
9/29/2024 11:19					72.438	4.279
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9/29/2024 11:21					74.113	4.244
9/29/2024 11:22					74.031	4.236
9/29/2024 11:23					73.456	4.253
9/29/2024 11:24					73.662	4.244
9/29/2024 11:25					74.731	4.215
9/29/2024 11:26					74.569	4.232
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9/29/2024 11:34					68.481	4.052
9/29/2024 11:36					68.556	4.002
9/29/2024 11:38					68.469	4.022

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9/29/2024 11:42					68.394	4.069
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9/29/2024 12:03					76.556	4.378
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9/29/2024 12:05					74.856	4.693
9/29/2024 12:06					74.2	4.806
9/29/2024 12:07					74.606	4.767
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9/29/2024 12:13					74.137	4.813
9/29/2024 12:14					75.5	4.603
9/29/2024 12:15					76.019	4.516
9/29/2024 12:16					76.15	4.504
9/29/2024 12:17					75.537	4.602

9/29/2024 12:18					75.719	4.58
9/29/2024 12:19					75.569	4.596
9/29/2024 12:20					75.225	4.634
9/29/2024 12:21					75.338	4.526
9/29/2024 12:22					75.369	4.508
9/29/2024 12:23					75.331	4.512
9/29/2024 12:24					75.275	4.514
9/29/2024 12:25					75.55	4.47
9/29/2024 12:26					75.556	4.459
9/29/2024 12:27						4.442
9/29/2024 12:28					75.675	4.422
9/29/2024 12:29					75.613	4.434
9/29/2024 12:30					75.488	4.477
9/29/2024 12:31					75.369	4.492
9/29/2024 12:32					75.319	4.491
9/29/2024 12:33					75.631	4.439
9/29/2024 12:34					75.606	4.456
9/29/2024 12:35					75.781	4.431
9/29/2024 12:36					75.694	4.416
9/29/2024 12:37					75.95	4.378
9/29/2024 12:38					76.144	4.335
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9/29/2024 12:40					75.944	4.389
9/29/2024 12:41					76.088	4.345
9/29/2024 12:42					75.738	4.434
9/29/2024 12:43					75.731	4.445
9/29/2024 12:44					75.662	4.451
9/29/2024 12:45					75.994	4.37
9/29/2024 12:46					75.925	4.39
9/29/2024 12:47					75.656	4.404
9/29/2024 12:48					75.875	4.392
9/29/2024 12:49					75.963	4.372
9/29/2024 12:50					76.05	4.361

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9/29/2024 12:53					76.094	4.363
9/29/2024 12:54					75.931	4.41
9/29/2024 12:55					75.65	4.453
9/29/2024 12:56					75.644	4.433
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9/29/2024 12:58					75.825	4.399
9/29/2024 12:59					75.725	4.448
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9/29/2024 13:12					75.613	4.344
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9/29/2024 13:14					75.706	4.318
9/29/2024 13:15					75.625	4.326
9/29/2024 13:16					75.887	4.276
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9/29/2024 13:22					75.8	4.299
9/29/2024 13:23					75.875	4.301

9/29/2024 13:24					75.606	4.337
9/29/2024 13:25					75.563	4.343
9/29/2024 13:26					75.637	4.339
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9/29/2024 13:28					75.119	4.455
9/29/2024 13:29					75.444	4.38
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9/29/2024 13:32					74.9	4.384
9/29/2024 13:33					74.794	4.393
9/29/2024 13:34					74.65	4.409
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9/29/2024 13:36					75.019	4.346
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9/29/2024 13:38					74.556	4.443
9/29/2024 13:39					74.331	4.448
9/29/2024 13:40					74.4	4.425
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9/29/2024 13:42					74.519	4.436
9/29/2024 13:43					74.438	4.435
9/29/2024 13:44					74.619	4.414
9/29/2024 13:45					74.887	4.377
9/29/2024 13:46					75.069	4.331
9/29/2024 13:47					75.225	4.312
9/29/2024 13:48					75.006	4.351
9/29/2024 13:49					74.919	4.32
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9/29/2024 13:52					75.225	4.26
9/29/2024 13:53					74.906	4.3
9/29/2024 13:54					74.938	4.326
9/29/2024 13:55						4.312
9/29/2024 13:56					75.069	4.274

9/29/2024 13:57					75.35	4.232
9/29/2024 13:58					75.306	4.202
9/29/2024 13:59					75.662	4.147
9/29/2024 14:00					75.744	4.148
9/29/2024 14:01					69.181	3.577
9/29/2024 14:02					71.512	4.128
9/29/2024 14:04					73.512	4.068
9/29/2024 14:06					73.625	4.06
9/29/2024 14:08					74.012	4.035
9/29/2024 14:10					73.206	4.044
9/29/2024 14:12					74.269	4.086
9/29/2024 14:13					74.6	4.117
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9/29/2024 14:16					75.181	4.087
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9/29/2024 14:18					74.325	4.122
9/29/2024 14:19					74.794	4.109
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9/29/2024 14:21					73.406	4.148
9/29/2024 14:22					73.512	4.177
9/29/2024 14:23					73.806	4.193
9/29/2024 14:24					74.25	4.16
9/29/2024 14:27					74.444	4.14
9/29/2024 14:29					75.131	4.156
9/29/2024 14:31					74.856	4.158
9/29/2024 14:33					74.756	4.14
9/29/2024 14:34					75.019	4.137
9/29/2024 14:35					75.306	4.121
9/29/2024 14:38					75.219	4.122
9/29/2024 14:40					74.181	4.153
9/29/2024 14:42					74.794	4.136
9/29/2024 14:44					74.512	4.128

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9/29/2024 14:47					73.656	4.149
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9/29/2024 14:49					74.319	4.134
9/29/2024 14:50					74.069	4.144
9/29/2024 14:51					74.056	4.144
9/29/2024 14:52					73.869	4.149
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9/29/2024 14:54					73.569	4.138
9/29/2024 14:55					73.5	4.151
9/29/2024 14:56					72.363	4.198
9/29/2024 14:57					72.081	4.2
9/29/2024 14:58					72.131	4.206
9/29/2024 14:59					74.619	4.37
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9/29/2024 15:03					75.744	4.318
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9/29/2024 15:06					76.669	4.295
9/29/2024 15:07					77.063	4.273
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9/29/2024 15:10					76.613	4.309
9/29/2024 15:11					76.206	4.309
9/29/2024 15:12					75.95	4.306
9/29/2024 15:13					75.994	4.321
9/29/2024 15:14					76.512	4.312
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9/29/2024 15:16					76.85	4.294
9/29/2024 15:17					76.175	4.314

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9/29/2024 15:25					76.438	4.487
9/29/2024 15:26					76.2	4.479
9/29/2024 15:27					77.488	4.451
9/29/2024 15:28					76.563	4.476
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9/29/2024 15:31					70.719	4.686
9/29/2024 15:32					73.463	4.556
9/29/2024 15:33					73.319	4.546
9/29/2024 15:34					74.006	4.544
9/29/2024 15:35					68.856	4.749
9/29/2024 15:36					65.269	4.784
9/29/2024 15:37					65.806	4.787
9/29/2024 15:38					66.369	4.76
9/29/2024 15:39					65.9	4.767
9/29/2024 15:40					66.456	4.761
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9/29/2024 15:42					66.325	4.76
9/29/2024 15:43					66.206	4.777
9/29/2024 15:44					66.006	4.766
9/29/2024 15:45					65.431	4.785
9/29/2024 15:46					66.338	4.756
9/29/2024 15:47					66.512	4.756
9/29/2024 15:48					66.325	4.767
9/29/2024 15:49					66.925	4.896
9/29/2024 15:50					68.181	5.059

9/29/2024 15:52					70.519	5.049
9/29/2024 15:54					70.725	5.045
9/29/2024 15:56					73.419	4.993
9/29/2024 15:58					70.731	5.048
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9/29/2024 16:03					74.756	5.12
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9/29/2024 16:08					75.469	5.092
9/29/2024 16:09					76.1	5.092
9/29/2024 16:10					76.537	5.074
9/29/2024 16:11					74.963	5.098
9/29/2024 16:12					72.356	5.206
9/29/2024 16:13					76.069	5.048
9/29/2024 16:14					73.606	5.137
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9/29/2024 16:17					75.975	5.082
9/29/2024 16:18					76.606	5.063
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9/29/2024 16:21					75.869	5.07
9/29/2024 16:22					75.156	5.083
9/29/2024 16:23					75.581	5.099
9/29/2024 16:24					75.65	5.096
9/29/2024 16:25					74.8	5.101
9/29/2024 16:26					75.969	5.095
9/29/2024 16:27					75.244	5.089
9/29/2024 16:28					75.775	5.088
9/29/2024 16:29					73.569	5.152
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9/29/2024 16:31					73.344	5.162
9/29/2024 16:32					73.887	5.135

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9/29/2024 16:34					75.725	5.091
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9/29/2024 16:36					77.262	5.054
9/29/2024 16:37					74.419	5.129
9/29/2024 16:38					75.656	5.093
9/29/2024 16:39					75.088	5.128
9/29/2024 16:40					75.825	5.069
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9/29/2024 16:48					73.713	5.135
9/29/2024 16:49					73.8	5.149
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9/29/2024 16:56					75.125	5.106
9/29/2024 16:57					74.575	5.103
9/29/2024 16:58					73.787	5.127
9/29/2024 16:59					76.175	5.053
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9/29/2024 17:02					78.769	5
9/29/2024 17:03					78.463	5.002
9/29/2024 17:04					78.431	4.991
9/29/2024 17:05					76.669	4.869

9/29/2024 17:07					76.762	4.889
9/29/2024 17:09					75.981	4.889
9/29/2024 17:10					77.156	4.881
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9/29/2024 17:16					77.575	4.858
9/29/2024 17:17					74.875	4.924
9/29/2024 17:18					74.031	4.963
9/29/2024 17:19					73.262	4.986
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9/29/2024 17:22					77.631	4.859
9/29/2024 17:23					77.925	4.844
9/29/2024 17:24					77.912	4.858
9/29/2024 17:25					78.387	4.835
9/29/2024 17:26					78.844	4.809
9/29/2024 17:27					79.844	4.783
9/29/2024 17:28					80.581	4.771
9/29/2024 17:29					79.781	4.652
9/29/2024 17:30					78.356	4.644
9/29/2024 17:32					75.744	4.526
9/29/2024 17:34					76.537	4.511
9/29/2024 17:35					76.981	4.5
9/29/2024 17:36					76.719	4.495
9/29/2024 17:38					76.775	4.506
9/29/2024 17:39					76.875	4.494
9/29/2024 17:40					77.081	4.499
9/29/2024 17:41					75.156	4.525
9/29/2024 17:42					76.512	4.522
9/29/2024 17:43					75.963	
9/29/2024 17:44					70.037	4.766

9/29/2024 17:45					67.425	4.774
9/29/2024 17:46					68.063	4.756
9/29/2024 17:47					67.175	4.799
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9/29/2024 17:51					66.881	5.041
9/29/2024 17:53					70.537	4.92
9/29/2024 17:54					71.394	4.893
9/29/2024 17:56					72.281	4.867
9/29/2024 17:57					71.775	4.885
9/29/2024 17:58					72.094	4.879
9/29/2024 17:59					71.613	4.894
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9/29/2024 18:04						4.849
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9/29/2024 18:07					71.869	4.904
9/29/2024 18:08					71.856	4.89
9/29/2024 18:09					72.344	4.866
9/29/2024 18:10					71.912	4.88
9/29/2024 18:11					71.744	4.903
9/29/2024 18:12					72.65	5.06
9/29/2024 18:13					73.744	5.028
9/29/2024 18:14					75.506	5.095
9/29/2024 18:15					74.537	5.102
9/29/2024 18:16					73.912	5.132
9/29/2024 18:17					73.975	5.135
9/29/2024 18:18					73.556	5.133
9/29/2024 18:19					73.169	5.157
9/29/2024 18:20					73.125	5.152

9/29/2024 18:21					73.319	5.146
9/29/2024 18:22						5.151
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9/29/2024 18:25					73.938	5.105
9/29/2024 18:26					73.512	5.137
9/29/2024 18:27					73.594	
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9/29/2024 18:29					73.25	5.139
9/29/2024 18:30					73.619	5.138
9/29/2024 18:31					73.269	5.133
9/29/2024 18:32					73.506	5.125
9/29/2024 18:33					73.956	5.121
9/29/2024 18:34					73.738	5.109
9/29/2024 18:35					73.969	5.103
9/29/2024 18:36					73.744	5.095
9/29/2024 18:37					73.156	5.08
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9/29/2024 18:39					82.488	4.872
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9/29/2024 18:41					80.181	4.761
9/29/2024 18:42					78.35	4.625
9/29/2024 18:43					75.394	4.696
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9/29/2024 18:46					72.419	5.108
9/29/2024 18:47					71.969	5.248
9/29/2024 18:48					72.506	5.196
9/29/2024 18:49					72.425	5.212
9/29/2024 18:50					72.356	5.21
9/29/2024 18:51					72.344	5.225
9/29/2024 18:52					72.431	5.185
9/29/2024 18:53					72.463	5.18

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9/29/2024 18:57					72.338	5.206
9/29/2024 18:58					72.275	5.248
9/29/2024 18:59					72.113	5.261
9/29/2024 19:00					72.719	5.18
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9/29/2024 19:04					72.863	5.187
9/29/2024 19:05					72.662	5.223
9/29/2024 19:06					72.806	5.208
9/29/2024 19:07					72.738	5.204
9/29/2024 19:08					72.656	5.207
9/29/2024 19:09					72.731	5.19
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9/29/2024 19:11					72.669	5.191
9/29/2024 19:12					72.787	
9/29/2024 19:13					72.819	5.175
9/29/2024 19:14					72.912	5.141
9/29/2024 19:15					72.787	5.169
9/29/2024 19:16					72.706	5.192
9/29/2024 19:17					72.806	5.202
9/29/2024 19:18					73.219	4.976
9/29/2024 19:19					73.194	4.965
9/29/2024 19:20					72.975	5.083
9/29/2024 19:21					72.856	5.152
9/29/2024 19:22					72.944	5.127
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9/29/2024 19:24					79.994	4.692
9/29/2024 19:25					82.619	4.648
9/29/2024 19:26					82.525	4.656

9/29/2024 19:27					81.856	4.671
9/29/2024 19:28					81.631	4.663
9/29/2024 19:29					81.394	4.679
9/29/2024 19:30					80.319	4.589
9/29/2024 19:31					79.069	4.625
9/29/2024 19:32					78.925	4.619
9/29/2024 19:33					79.656	4.616
9/29/2024 19:34					79.569	4.615
9/29/2024 19:35					79.519	4.628
9/29/2024 19:36					79.656	4.602
9/29/2024 19:37					78.756	4.637
9/29/2024 19:38					79.213	4.615
9/29/2024 19:39					79.731	4.606
9/29/2024 19:40					76.019	4.39
9/29/2024 19:41					74.738	4.426
9/29/2024 19:42					76.175	4.41
9/29/2024 19:43					75.85	
9/29/2024 19:44					75.662	4.414
9/29/2024 19:45					75.55	4.422
9/29/2024 19:46					76.656	4.411
9/29/2024 19:47					76.706	4.395
9/29/2024 19:48					77.031	4.396
9/29/2024 19:49					76.825	4.391
9/29/2024 19:50					76.431	4.41
9/29/2024 19:51					72.069	4.914
9/29/2024 19:52					72.588	4.802
9/29/2024 19:53					72.344	4.879
9/29/2024 19:54					72.287	4.89
9/29/2024 19:55					72.438	4.854
9/29/2024 19:56					72.356	4.847
9/29/2024 19:57					72.55	4.803
9/29/2024 19:58					73.144	4.55
9/29/2024 19:59					77.6	4.355

9/29/2024 20:00					77.075	4.378
9/29/2024 20:01					77.375	4.377
9/29/2024 20:02					77.275	4.38
9/29/2024 20:03					77.269	4.386
9/29/2024 20:04					77.15	4.374
9/29/2024 20:05					76.631	4.401
9/29/2024 20:06					76.7	4.401
9/29/2024 20:07					76.537	4.397
9/29/2024 20:08					76.656	4.4
9/29/2024 20:09					75.963	4.408
9/29/2024 20:10					76.181	4.409
9/29/2024 20:11					75.756	4.426
9/29/2024 20:12					75.963	4.421
9/29/2024 20:13					76.35	4.401
9/29/2024 20:14					76.662	4.403
9/29/2024 20:15					76.531	4.405
9/29/2024 20:16					76.863	4.404
9/29/2024 20:17					76.15	4.402
9/29/2024 20:18					76.244	4.39
9/29/2024 20:19					76.956	4.407
9/29/2024 20:20					76.662	4.392
9/29/2024 20:21					76.775	4.405
9/29/2024 20:22					76.719	4.401
9/29/2024 20:23					76.95	4.388
9/29/2024 20:24					76.6	4.4
9/29/2024 20:25					76.619	4.406
9/29/2024 20:26					77.681	4.368
9/29/2024 20:27					77.65	4.371
9/29/2024 20:28					77.544	4.384
9/29/2024 20:29					77.875	4.378
9/29/2024 20:30					78.206	4.355
9/29/2024 20:31					77.738	4.375
9/29/2024 20:32					77.963	4.379

9/29/2024 20:33					77.269	4.384
9/29/2024 20:34					77.825	4.383
9/29/2024 20:35					77.975	4.384
9/29/2024 20:36					77.556	4.381
9/29/2024 20:37					77.831	4.376
9/29/2024 20:38					78.119	4.371
9/29/2024 20:39					78.219	4.381
9/29/2024 20:40					78.106	4.361
9/29/2024 20:41					78.012	4.376
9/29/2024 20:42					78.156	4.383
9/29/2024 20:43					77.544	4.399
9/29/2024 20:44					77.662	4.366
9/29/2024 20:45					78.15	4.368
9/29/2024 20:46					77.794	4.384
9/29/2024 20:47					77.838	4.381
9/29/2024 20:48					77.912	4.382
9/29/2024 20:49					77.988	4.376
9/29/2024 20:50					77.981	4.381
9/29/2024 20:51					78.175	4.394
9/29/2024 20:52					77.944	4.385
9/29/2024 20:53					78.1	4.379
9/29/2024 20:54					78.094	4.392
9/29/2024 20:55					78.425	4.385
9/29/2024 20:56					78.588	4.384
9/29/2024 20:57					78.713	4.363
9/29/2024 20:58					76.863	4.233
9/29/2024 20:59					76.475	4.263
9/29/2024 21:00					76.481	4.267
9/29/2024 21:01					76.494	4.273
9/29/2024 21:02					76.106	4.265
9/29/2024 21:04					76.412	4.268
9/29/2024 21:05					76.4	4.266
9/29/2024 21:07					76.069	4.273

9/29/2024 21:08					76.738	4.262
9/29/2024 21:09					76.681	4.254
9/29/2024 21:10					76.506	4.27
9/29/2024 21:11					76.475	4.272
9/29/2024 21:12					76.644	4.256
9/29/2024 21:13					76.813	4.262
9/29/2024 21:14					76.481	4.266
9/29/2024 21:15					76.713	4.272
9/29/2024 21:16					76.613	4.272
9/29/2024 21:17					77.056	4.267
9/29/2024 21:18					77.319	4.272
9/29/2024 21:19					77.175	4.26
9/29/2024 21:20					77.2	4.271
9/29/2024 21:21					77.069	4.261
9/29/2024 21:23					77.025	4.28
9/29/2024 21:25					77.15	4.271
9/29/2024 21:26					75.744	4.187
9/29/2024 21:27					75.262	4.186
9/29/2024 21:28					75.844	4.199
9/29/2024 21:30					75.713	4.182
9/29/2024 21:31					76.194	4.183
9/29/2024 21:32					75.912	4.186
9/29/2024 21:33					76.144	4.21
9/29/2024 21:34					76.306	4.191
9/29/2024 21:35					76.394	4.18
9/29/2024 21:36					76.137	4.177
9/29/2024 21:37					76.438	4.173
9/29/2024 21:38					76.494	4.184
9/29/2024 21:39					77.031	4.169
9/29/2024 21:40					76.85	4.175
9/29/2024 21:41					77.219	4.172
9/29/2024 21:42					76.706	4.185
9/29/2024 21:43					77.181	4.187

9/29/2024 21:44					76.881	4.192
9/29/2024 21:45					76.794	4.19
9/29/2024 21:46					76.887	4.183
9/29/2024 21:47					76.906	4.182
9/29/2024 21:48					77.35	4.194
9/29/2024 21:49					77.15	4.173
9/29/2024 21:50					77.331	4.182
9/29/2024 21:51					77.588	4.169
9/29/2024 21:52					77.569	4.17
9/29/2024 21:53					77.688	4.171
9/29/2024 21:54					77.656	4.18
9/29/2024 21:55					77.869	4.189
9/29/2024 21:56					77.706	4.187
9/29/2024 21:57					77.45	4.172
9/29/2024 21:58					78.219	4.161
9/29/2024 21:59					78.306	4.168
9/29/2024 22:00					77.775	4.186
9/29/2024 22:01					78.081	4.177
9/29/2024 22:02					78.5	4.173
9/29/2024 22:03					78.175	4.172
9/29/2024 22:04					77.912	4.174
9/29/2024 22:05					77.519	4.192
9/29/2024 22:06					78.119	4.193
9/29/2024 22:07					78.031	4.172
9/29/2024 22:08					78.056	4.195
9/29/2024 22:09					78.125	4.206
9/29/2024 22:10					77.694	4.212
9/29/2024 22:11					77.613	4.217
9/29/2024 22:12					77.775	4.206
9/29/2024 22:13					77.994	4.207
9/29/2024 22:14					78.325	4.184
9/29/2024 22:15					78.506	4.172
9/29/2024 22:16					78.006	4.188

9/29/2024 22:17					78.044	
9/29/2024 22:18					78.512	4.193
9/29/2024 22:19					78.325	4.194
9/29/2024 22:20					78.544	4.194
9/29/2024 22:21					78.331	4.199
9/29/2024 22:22					78.575	4.199
9/29/2024 22:23					78.594	4.174
9/29/2024 22:24					78.688	4.186
9/29/2024 22:25					78.975	4.176
9/29/2024 22:26					79.5	4.166
9/29/2024 22:27					79.569	4.174
9/29/2024 22:28					79.238	4.162
9/29/2024 22:29					79.319	4.18
9/29/2024 22:30					79.188	4.173
9/29/2024 22:31					79.45	4.172
9/29/2024 22:32					78.819	4.206
9/29/2024 22:33					79.094	4.189
9/29/2024 22:34					79.363	4.192
9/29/2024 22:35					79.331	4.189
9/29/2024 22:36					79.644	4.187
9/29/2024 22:37					79.569	4.186
9/29/2024 22:38					79.738	4.204
9/29/2024 22:39					79.831	4.192
9/29/2024 22:40					79.9	4.193
9/29/2024 22:41					79.969	4.17
9/29/2024 22:42					79.906	4.176
9/29/2024 22:43					80.206	4.191
9/29/2024 22:44					80.194	4.18
9/29/2024 22:45					80.331	4.169
9/29/2024 22:46					80.313	4.182
9/29/2024 22:47					80.338	4.182
9/29/2024 22:48					80.656	4.172
9/29/2024 22:49					80.594	4.167

9/29/2024 22:50					80.431	4.158
9/29/2024 22:51					80.262	4.17
9/29/2024 22:53					80.656	4.169
9/29/2024 22:54					80.525	4.181
9/29/2024 22:55					80.65	4.163
9/29/2024 22:56					80.756	4.155
9/29/2024 22:57					81.094	4.165
9/29/2024 22:58					80.981	4.162
9/29/2024 22:59					78.494	4.01
9/29/2024 23:00					78.294	4.022
9/29/2024 23:01						4.006
9/29/2024 23:02					78.1	4.02
9/29/2024 23:03					78.719	4.005
9/29/2024 23:04					78.706	4.012
9/29/2024 23:05					79.213	3.994
9/29/2024 23:06					79.269	4.002
9/29/2024 23:07					76.463	3.853
9/29/2024 23:08					76.344	3.863
9/29/2024 23:09					76.4	
9/29/2024 23:10					76.175	3.842
9/29/2024 23:11					76.656	3.853
9/29/2024 23:12					76.325	3.87
9/29/2024 23:13					76.5	3.871
9/29/2024 23:14					76.575	3.894
9/29/2024 23:15					76.681	3.871
9/29/2024 23:16					76.738	3.866
9/29/2024 23:17					76.863	3.873
9/29/2024 23:18					76.619	3.849
9/29/2024 23:19					76.563	3.857
9/29/2024 23:20					76.469	3.861
9/29/2024 23:22					76.412	3.878
9/29/2024 23:23					76.456	3.877
9/29/2024 23:24					76.1	3.884

9/29/2024 23:25					76.05	3.876
9/29/2024 23:26					76.5	3.875
9/29/2024 23:27					75.887	3.863
9/29/2024 23:28					76.069	3.868
9/29/2024 23:29					76.431	3.852
9/29/2024 23:30					76.644	3.857
9/29/2024 23:32					76.338	3.861
9/29/2024 23:33					76.4	3.849
9/29/2024 23:34					76.469	3.872
9/29/2024 23:35					76.869	3.852
9/29/2024 23:36					76.975	3.863
9/29/2024 23:38					77.075	3.848
9/29/2024 23:39					77	3.84
9/29/2024 23:40					77.012	3.849
9/29/2024 23:41					76.6	3.857
9/29/2024 23:42					76.912	3.849
9/29/2024 23:43					76.787	3.846
9/29/2024 23:45					77	3.851
9/29/2024 23:46					77.069	3.861
9/29/2024 23:47					76.894	3.85
9/29/2024 23:48					76.931	3.847
9/29/2024 23:49					77.063	3.839
9/29/2024 23:50					77.313	3.833
9/29/2024 23:51					77.025	3.845
9/29/2024 23:52					76.731	3.857
9/29/2024 23:53					77.031	3.854
9/29/2024 23:54					76.887	3.859
9/29/2024 23:55					76.875	3.857
9/29/2024 23:56					76.644	3.871
9/29/2024 23:57					77.069	3.855
9/29/2024 23:58					77	3.849
9/29/2024 23:59					76.894	3.855
9/29/2024 23:59					76.719	3.849

APPENDIX B

HURRICANES HELENE AND MILTON SITUATION REPORTS

SITUATION REPORT #5 – HURRICANE HELENE

September 27, 2024 at 9:00AM

Jodie Fiske, Director
Manatee County Public Safety Department
2101 47th Terrace E, Bradenton, FL 34203

Updates occurring since the last report will be listed in red.

Event Name:	*Hurricane Helene*
Date:	*09/27/2024*
EOC Activation Level:	*Level 1 – Full Activation*
Current Operational Period	*8:00AM to 8:00PM*
Public Safety Contact:	*Jodie Fiske - jodie.fiske@mymanatee.org*
Emergency Management Contact:	*Matthew Myers – matthew.myers@mymanatee.org*
Media Information – Manatee County:	*James Nicholson – james.nicholson@mymanatee.org*
WebEOC Incident Name:	*2024 Helene*

Incident Overview

Helene has reduced to a Tropical Storm with maximum sustained winds near 70mph. The storm is currently located 40 miles E of Macon, Georgia and 100 miles from Atlanta, Georgia. All Hurricane and Tropical Storm warnings have been discontinued along the Florida east coast. The storm is moving N at 30 mph. The Storm Surge Warning for the Florida coast has been discontinued west of Indian Pass and south of Bonita Beach. 20% Chance of rain today with heat indices of 104°. Saturday will see an increased rain chance with normal summer thunderstorm patterns and heat indices of 107°. **Teams need to diligently hydrate and monitor for signs of heat stroke.**

Essential Elements of Information – Government Actions	
Fatalities:	*0*
Injuries:	*0*
Current Max Wind Speed	*70 mph*
Current Pressure	*968 mb*
EOC Mission Requests:	*23 Manatee County / 1,523 total statewide missions, as of 9/27 @ 0800*
Local State of Emergency:	*In Effect*
Sandbag Stations Open:	*Self-service & pre-filled sandbag locations are fully stocked and open: 66th St W Fleet Building; Bennett Park; Blackstone Park; Buffalo Creek Park; Daiken Dairy; 1505 Dam Rd (Quattlebaum House); Greenbrook Park; Kingfish Boat Ramp; Lakewood Ranch Park; Myakka Community Center; Palmetto Youth Center; Rubonia Community Center; Rye Preserve; 39th St E Stormwater Facility. See https://www.mymanatee.org/sandbags for more information.*
Evacuation Orders:	*LEVEL A, Mobile & Manufactured Homes. LEVEL B recommended*
Curfew:	*None in Effect*
Beach Closures:	*All Closed*
School Closures:	*Closed through Friday (9/27)*
Road Closures:	*44 Current Road Closures- see Extreme Weather Dashboard for locations*
County Government Closures:	*Closed Thursday (9/26/24) & Friday (9/27/24)*
Shelters Open:	*3 – Nolan Middle (special needs), Buffalo Creek Middle & Lee Middle*

COVID Testing Site:	*Closed*

Actions and/or Incident Updates by Emergency Support Function, Partner, and Workgroup

ESF-1 Transportation and Public Works

- Pump operations continue at Lake Brendan. Pump Operations will cease when Heavy rainfall approaches.
- Monitoring/calibrating automated rain and stream gauges stations – CONTINUOUSLY ONGOING.
- Peak Tide/Storm Surge Level Reported as of 0745 09/26/24 - *All tide levels reflected in North American Vertical Datum (NAVD):*
    - Aztec Cove: 2.71 feet
    - Bowlees Creek at Magellan Drive: 3.32 feet
    - Braden River at 44th AVE E: 2.27 feet
    - Coquina Beach: 3.30 feet
    - Gap Creek at 45th ST E: 2.32
    - Key Royale Drive Bridge: 2.98
    - Manatee River at Fort Hamer Park: 2.36
    - McMullen Creek at Bayshore Road: 2.90
    - Palma Sola Drain at 75th ST W: 2.87
    - Wares Creek at 12th AVE W: 2.91
- FIT (First in Team) staged
- MCAT Transport to Shelters:
    - Special Needs: 22
    - General Population: 9
    - Enroute to Salvation Army or Turning Points, weather permitting
- Traffic onto the island at Cortez and Manatee Ave is being shut down. Barriers are being placed to block traffic from going onto the island but traffic will still be able to come off of the island. Deputies will be stationed at 8600 block of Manatee Ave and 1200 block of Cortez Rd.
- Transports to shelters as of 0700 9/27/24: 131 general population, 25 special needs, 44 transient
- Manatee Avenue and Cortez Rd closed; Public works is placing barricades and concrete barriers.
- 4 traffic signals are inoperable with others having comms disruption needing physical checks.
- Island authorities and DOT endorsed isolating the island
- Gulf Drive is reported to have significant damage.
- FIT teams out checking roads
    - Teams 3-7 are have completed 60-70% of routes
    - Team 1 is pushing to the island
    - Team 2 was diverted to the island and is working south to north

ESF-2 Communication/311 Call Center

- 24hr call center fully staffed & operational.
- Received close to 3,000 calls since activation.
- Tree fell onto Mobile Home, No injuries
- Q-alert created for donations.
- 311 is Overstaffed- departments should not send more staff unless HR sends the request.
- 911 inundated overnight with over 1,100 emergency calls

- P-25 radio systems area ll up and have plenty of fuel

ESF-3 Utilities

- Southwest Water reclamation plant is on generator as of 2:25 PM 9/26. Fuel level is adequate at this time
- At 1:40 PM 9/26 today, a power surge occurred at Piney Point, prompting Chemical Injection Partners (CIP) personnel to bring the treatment plant offline as a precautionary measure to ensure the safety of the plant, our team, and the surrounding environment. Our team has confirmed the security and integrity of all plant systems, including the grounds, equipment, tanks, pumps, filters, and lines. For safety and operational integrity, the plant will remain offline until further notice. However, we anticipate having the plant back online and fully operational by 9:00 AM tomorrow, September 27, pending power stabilization and system checks.
- Potable Water Treatment Plant on generator power as of 1918.
- Lake Manatee is currently at 37.03 ft with an inflow of 872.35 cfs and no outflow. Due to insufficient anticipated rainfall the lake level remains approx. 1 foot lower that then normal water level elevation for this time of the year.
- Out of 737 total lift stations, 662 are in full operation, 29 are on generator power, and 75 remain offline.
- Utilities staff are assisting FIT teams to assess damages.
- Our debris hauler, Ashbritt is enroute and will be commencing debris assessments.
- We are currently assisting the City of Bradenton to augment their water supply that was compromised due to the storm surge that affected their system, 4 Interconnects have been completed and we are continuing to evaluate the remaining systems.
- ESF 8 has verified that Blake Hospital currently has adequate water pressure, and we will continue to monitor this further.
- Anna Maria, Holmes Beach, Longboat Key and Bradenton Beaches water supply remains suspended until first in teams have completed their damage assessments and we can assess our water and wastewater systems.
- Northwest & Cortez booster stations were offline but are now on generator power.
- Trash collection is resuming today.
- Previous requested equipment from the state is currently in the process of being filled.

ESF-4/9/10 Fire, Search and Rescue, and Hazmat

- Alpha 4 relocated from WMFR Station 3 to WMFR station 1 at 23:20.
- Roof off of mobile home at 1014 52nd Ave W. No Injuries, FPL enroute to handle power line down in debris.
- City of Bradenton Fire Station 1 is on generator power as of 14:40 hrs.
  Fuel level is adequate.
- East Manatee Fire Rescue Station 12 is back on normal power.
- Roof off of mobile home 6620 Massachusetts St Trailer Estates
  Power line down in Debris.
- City of Bradenton Fire Station 2 is on generator power as of 16:20.
  Fuel level is adequate.
- City of Bradenton PSOC and Fire Station 3 are on generator power as of 17:30.
  Fuel level is adequate.
  Rescue Boat #526 enroute to WMFR Station One to provide support rescue missions to Island // City of Bradenton sending high water vehicle to WMFR Station Two, (19:04).

- Potable Water Treatment Plant on generator power as of 19:18.
- Road flooding Canada Blvd Trailer Estates, (19:56).
- Structure Fire at 2400 block of 77th Ave E, Myakka, FL. Fire in the garage, under control with units on scene, (20:30).
- WMFR requested additional high water vehicle to their station 2. EMFR U657 will be relocating to WMFR 2, (21:53).
- Road Flooded: El Con Pkwy flooded at 43rd St. W., (22:15) .

ESF-5 Information and Situational Awareness

- Potential Storm Surge maps posted on WebEOC from Advisory 06 (19:08)

ESF-6 Mass Care and Sheltering

- Shelters are fully staffed.
- Shelter @ Lee: If more general population received, might require more staff.
- Working on clearing those who can leave the shelters with help from transit.

ESF-7 Procurement and Resource Support

- P-card limits have been elevated
- Vendors list supplied to Utilities and Natural Resources.

ESF-8 Public Health and Medical Support

- Hospitals
  - Actively engaged in communicating with all facilities. Open lines of communication being maintained.
  - Blake was on generator power put has been restored.
  - All hospitals are open and recieving patients.
  - Ensuring hospitals and medical facilities have adequate water supply.
  - Department of Health assessing need for addition staffing at shelters.

- Congregate Care Facilities (ALFs / Group Homes)
  - Aspire of Bradenton actively evacuating. States that they have 83 patients – states ALL are wheelchair-bound. They are working with their transportation vendor to move patients to Aspire at West Palm Beach. Had requested assistance from ESF-8 to transport all of their patients to West Palm Beach – they were encouraged to utilize their existing vendors to meet this need.
    - Called ESF-8 again to update that all but 20 residents have been evacuated. Asked if ESF-8 would reconsider assistance for transporting residents to West Palm Beach. Encouraged to continue to utilize existing vendor to meet this need.
  - Magnolia on the Avenue has evacuated to Tampa.
- Aeromedical Transport
  - BayFlight 2 & 3 aircraft are sheltered until further notice.
  - All Aeromed Aircraft (The County Air Medical Transport Provider) will be grounded at 1800 9/25 - until further notice.
- Salvation Army will remain open.
  - Beds will be free Wednesday (9/25) and Thursday (9/26)
- Turning Points closed tomorrow, 9/26/2024, with plans to reopen on Friday, 9/27/2024.
- Homeless Shelter Transportation is currently active.

- EMS is monitoring the Winds- Currently at the Airport winds are sustained above 55 MPH - EMS Response in this area is being suspended until winds decrease and responding on case by case basis as needed. Any calls for service will be placed into a que and responded once wind speed decreases.
- Westside Base EMS station without power.
- Blake Hospital on generator power due to power surges. Has enough fuel to power hospital for 4.4 days.
- Causeway is now closed in both directions. Any access or response will require a high-water rescue vehicle. As such, any EMS response will require that WMFR bring patient to rendezvous with EMS
- EMS can transport to MMH as of 7:09AM.

ESF-11 Food & Water

- No update @ 9/26

ESF-12 Energy

- Nolan Generator: ON for precautionary measures
- Jail Generator: ON for precautionary measures
- Bishop Generator: ON for precautionary measures
- Myakka Portable Generator: (RTG ready to go) & on standby
- Power Outages:
    - FPL: 40,590
    - PRECO: 383
- No power in Robinson Preserve

ESF-13 Military Support

- No update @ 9/27

ESF-14 Public Information

- Messaging 9/27 is focused on post-storm safety, recovery & donations

ESF-15 Volunteer and Donations Management

- No update @ 9/26

ESF-16 Law Enforcement

- Transportation notified of concerns for malfunctioning traffic lights
- Palmetto PD Phone lines were down but have been restored
- Downed Tree blocking intersection at Summerfield Pkwy (east bound lane) just east of Blackberry Ln intersection.
- All MSO Patrol have relocated to the mainland due to flooding/water influx; Address is 701 63rd St W, (West Manatee District Administration)
- Per MSO Major - Traffic signal at 301 and Victory RD has broken loose from the top wire and hanging upside down from the bottom wire.
- Traffic onto the island at Cortez and Manatee Ave is being shut down. Barriers are being placed to block traffic from going onto the island, but traffic will still be able to come off of the island.
- Deputies will be stationed at 8600 block of Manatee Ave and 1200 block of Cortez Rd.

- CSX RR crossing arm broken near base and on the ground, but not full severed. Crossing arm is NOT blocking any lanes of travel, sidewalks, or the actual RR tracks. Crossing arm is situated on the shoulder of the eastbound lanes of 10th St W (SR 43) Palmetto, (19:17).
- ** The Green Bridge is being closed in both directions due to flooding on the Palmetto side. **
    - Direct contact is being made with Bradenton to request them to block northbound traffic.
    - Palmetto Public Works is barricading southbound traffic across the bridge.
    - Riverside Drive in Palmetto is also closed due to flooding.
- Jet Mobile Home Park and Pegal Point Mobile Home Park in Palmetto are both severely flooded. Any emergency calls for service would need to be responded to in a high-water vehicle.
- Ramada Inn Wyndham at 7150 N Tamiami Trl, Sarasota, FL 34243 is evacuating their first floor guests due to flooding. Dispatch is requesting resources. Will call back if additional resources needed, (21:23).
- Flooding: 10th St W in Palmetto from 20th Ave west towards Snead Island is impassable without a high-water vehicle. As are side streets between 10th St W and the Manatee River, West of 20th Ave W., (21:58).
- Per MSO Deputies - Rubonia appears to be good, there is no noticeable structural damage. There is debris in the road and downed signs. (07:28)

ESF-17 Animal Services

- Have received good response to request for foster homes
- Cat Town evacuated.
- Overnight staff at Palmetto.
- At approximately 4pm Animal Welfare field operations were suspended until further notice.

ESF-18 Business & Industry

- No update @ 9/27

ESF-19 Energy

- No fuel deliveries Thursday, preliminary deliveries scheduled for Friday
- De-energized communities include Anna Maria Island, portions of Rubonia, Cortez Fishing Village, Snead Island, portions of Palmetto

ESF-20 Cyber

- No update @ 9/27

IT/Radio

- No update @ 9/27

Beach and Water Safety

- *Report to 911 center of a derelict sailboat striking the Cortez Rd Bridge. USCG in the area not finding anything, no damage to bridge noted by USCG; Beach Patrol and engine 121 responded and were cancelled en route per MSO as the person in the water was able to get back on the boat.*
- Beach and water rescue team 3 assisting west manatee with evacuations at paradise bay with 2 jon boats, 1 tiller, and 1 pick up truck, 4 personnel. (19:33). Returning to GT Bray, (19:56).
- Beach and water rescue Team 1 staging at West Manatee St. 2 with 1 pickup truck, 1 jet ski, and 4 personnel, (19:37). Returning to GT Bray, (19:55).
- Downed Power Line: 7300 block of 7th Ave NW, Box 930, 1943 Original Call, (21:17).

- Beach & Water Rescue supplying a truck to transport evacuees from WMFR to Lee middle school, (21:18).
    - 6-7 people to transport, multiple trips, (21:46).
- Rescue: Beach and water rescue Teams 1 and 3 returning to Paradise Bay to assist in evacuations, (21:23). 4 John Boast Responding, (21:40).
    - John Boats being walked from near the Fire Station due to undrivable roads, (21:23).
- Rescue: Bayshore Dr., Terra Ceia, Possible Water Rescue, (21:37).
- Active Fire: 1200 block of 51st St, Structure Fire, (21:56).
- Fire Alarm: 500 block of 56th St., Holmes Beach, Fire, (22:03). Hallway Smoke detected, (22:04).
- Water Rescue, EMFR M686 moving to NRFD St. 2, (22:37).
- 1100 block of Palma Sola Blvd., Abandoned vehicle on road in high water with flashers, Unknown if any victims, (23:43).
- Evacuations and Water Rescues as of 0700 9/27/24: Over b

Human Needs

- Calls to special needs list went out Wednesday
- As of 16:00 Thursday, MCAT Transport: 10 Nolan; 3 Special Needs
- Going door to door for needs assessments and for aging clients
- Nolan (special needs) – 98 Staff, 48 Evacuated, 7 pets
- Lee – 39 Staff, 136 Evacuated, 21 pets
- Buffalo Creek – 20 Staff, 61 Evacuated, 3 pets

Property Management

- Over 150 pallets of pre-made sandbags have been delivered
- Debris removal teams are staged.
- All parks are secure and closed.
- County facilities closed Thursday and Friday.
- All Sandbag locations are stocked.
- Pre-made sandbags dropped off at Centre Lake, Trailer Estates, and Shadybrook
- Sandbags have been deployed to all downtown campus facilities
- Staff has documented all park facilities, buildings and amenities.
- EMS and Water Rescue are staged at GT Bray.
- Stormwater staff completed cleaning and clearing all canals and ditches.
- Deploying staff for door-to-door needs.
- When able we will assess Bray for potential partial reopening to the public tomorrow.
- When able we will assess fields park by park to understand when league play can resume.
- Manatee Ave and both causeways are covered in rock and sand
- Cell service very spotty.
    - Will request communication assistance from the state.
- South of Cortez gulf drive under 3’ of water/sand
- Robinson, Emmerson, and Botanical Park 1’ under water
- Trails clearing is projected to last 3 days.

Finances

- Reach out if needing help with FROCs

Drone

- Pilots completed documenting the JC, Admin and Historical Courthouse
- Data compilation and moving to create maps to include clips and video.
- Vendor engaged for post-storm assessment of barrier island.
- Coordinating with vendors to document the flooded areas.

Damage Assessment

- 28 teams deployed
- Building Inspectors assessing special needs shelter population homes to see if they can return

State of Florida – Division of Emergency Management

- No update @ 9/26

SeaPort Manatee

- All up and running ground operations
- No fuel interruptions

Clerk of Courts

- Closed Wednesday and Thursday

Court Administration

- Closed Wednesday and Thursday

Supervisor of Elections

- Closed Thursday and Friday

City of Bradenton

- City of Bradenton Water Reclamation Plant located at 1810 1st Street West and 17th Avenue West has lost FPL power. Operating on generator backups. FPL has been notified of critical infrastructure power loss. FPL has advised wind conditions are being evaluated to determine field crew response. The event is being handled by COB Public Works.
- City of Bradenton report - fallen Wastewater Treatment Plant back on regular FPL service. Water Distribution Plant at SR 70 & Natalie Way/Evers Reservoir on emergency backup power.
- Multiple roadways closed due to flooding/storm surge.
- Public Safety: BFD on multiple calls - experiencing high call volume for fallen energized power lines, high-water rescue, and emergency medical assistance. BFD is operational.
- BPD is operational but restricting response to high-priority calls.
- Public Works: Lift Stations 33, 35, 16, 42, and 37 are down.
- County assisting with water supply- working with ESF-3
- FIT teams are currently assessing damage, flooding, and signalization issues
- No wastewater bypass

City of Palmetto

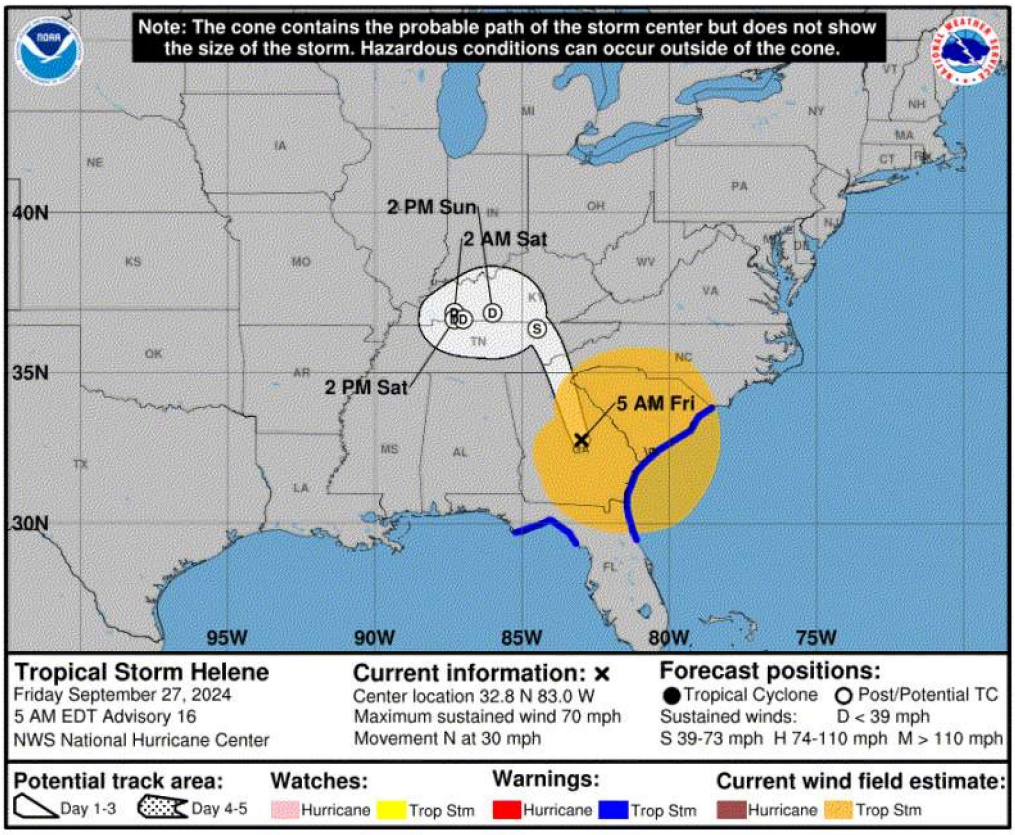
- Damage assessment ongoing- all roadways are passable

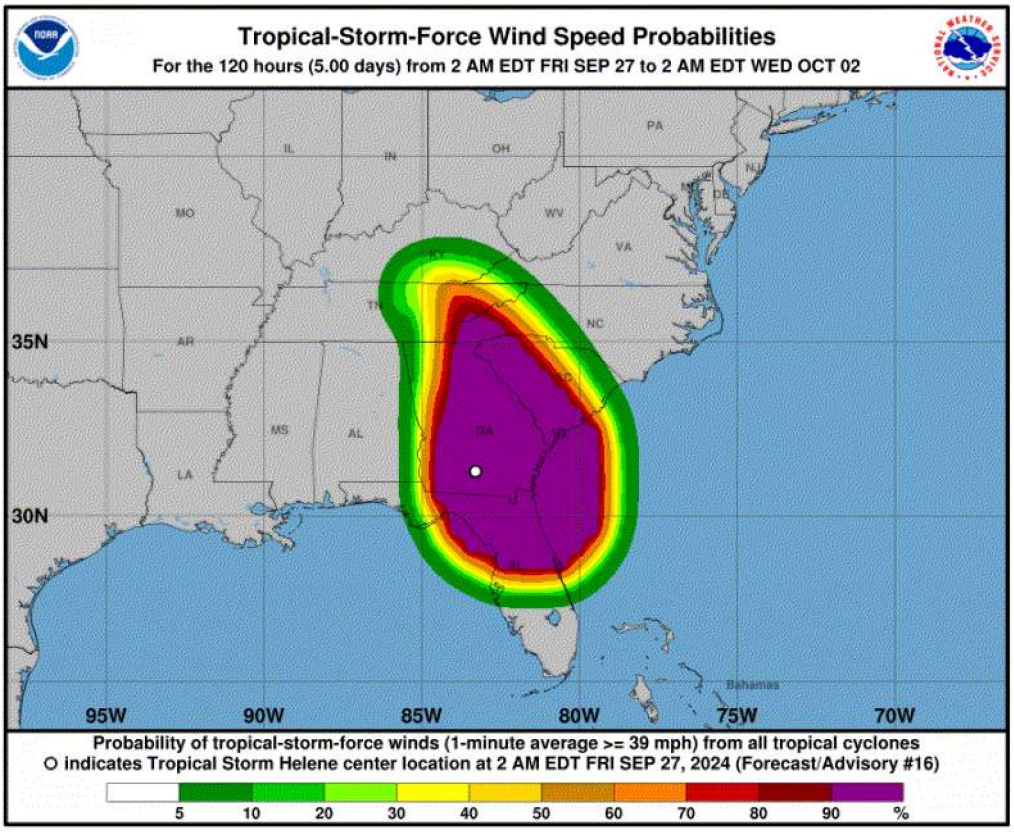
Town of Longboat Key

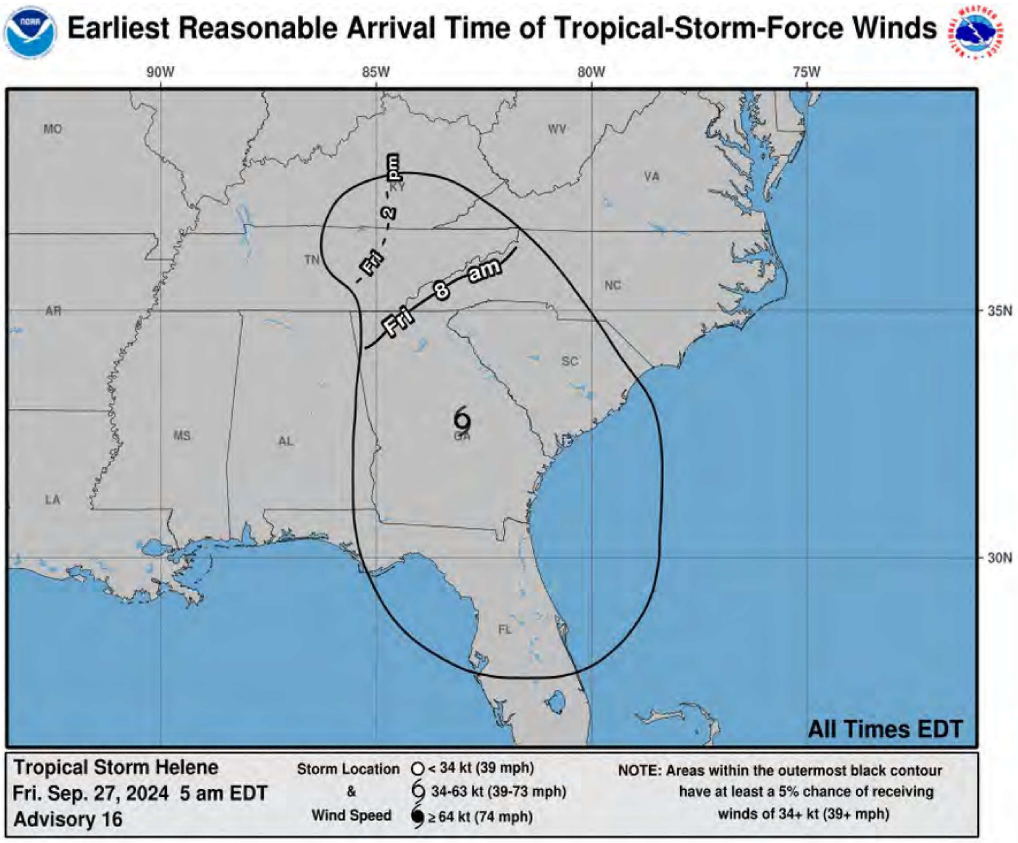
- Severe impact on north end of island
- Some structures collapsed
- USAR team arriving soon with National Guard assisting
- No access from St. Armands and cannot access from Gulf Drive due to sand on roadway (County FIT teams 1&2 on the way with front end loaders

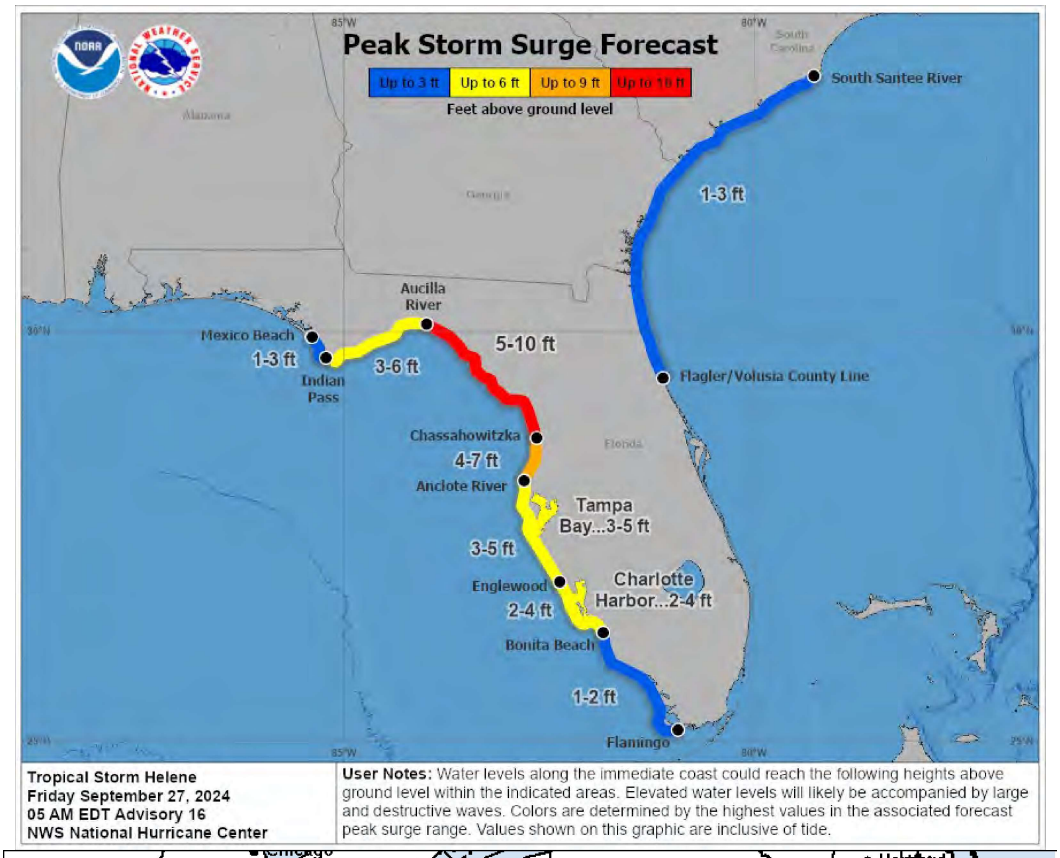
Workgroup	*Status Update*
Childcare	
Feeding	
Homeless	
Recovery	

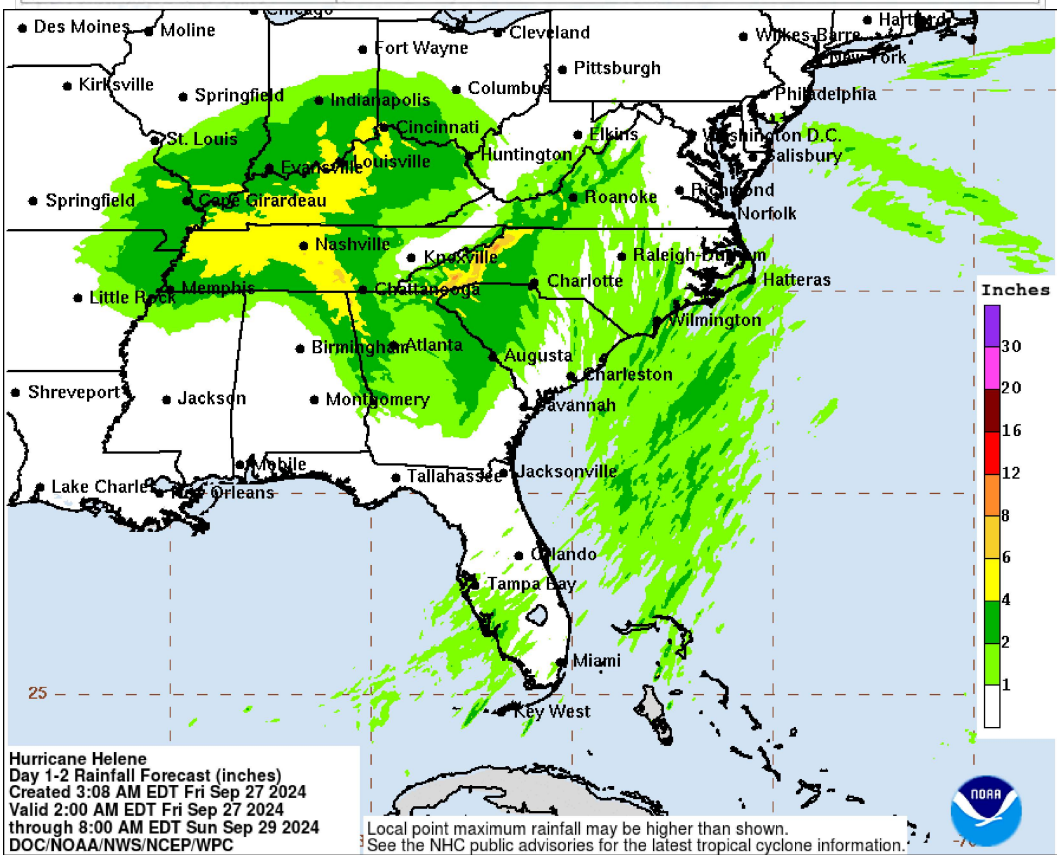
Incident Data and Maps

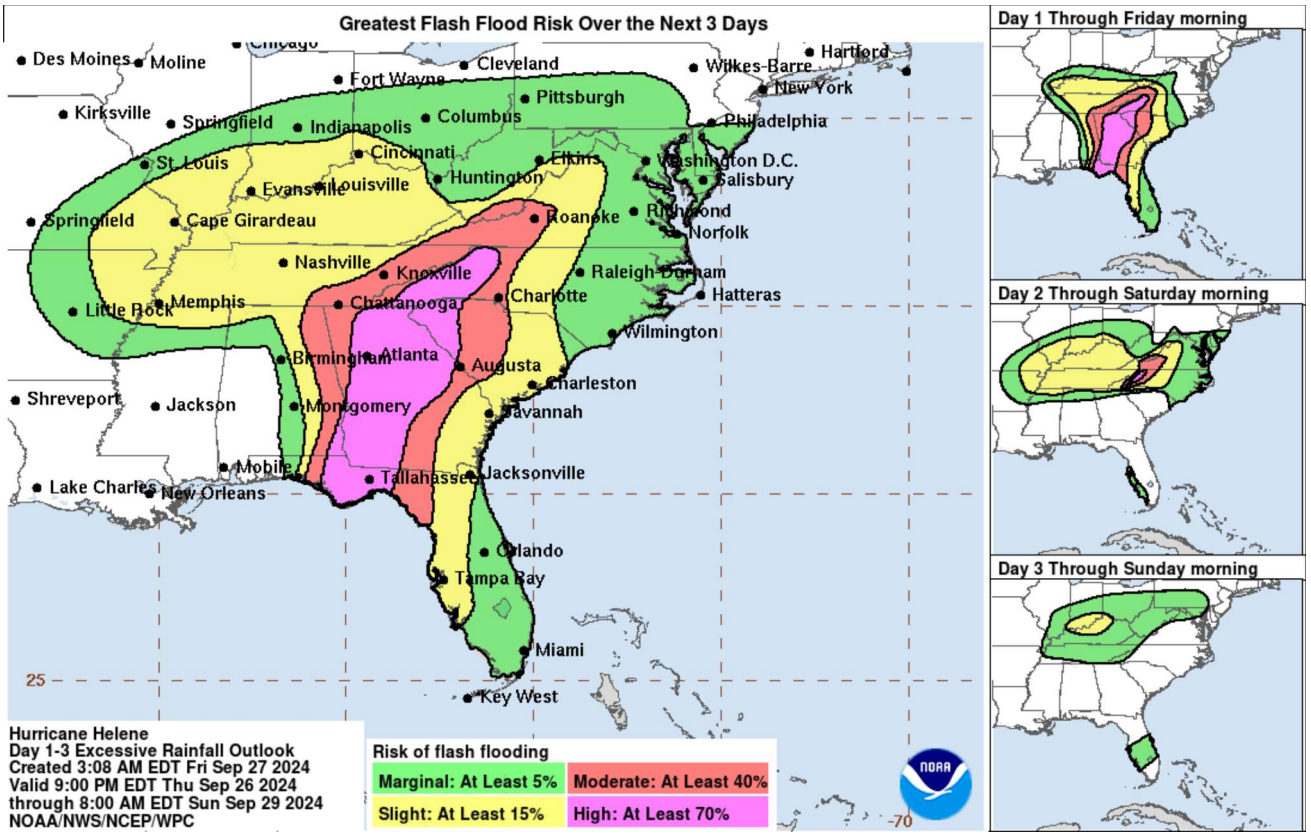



Tropical-Storm-Force Wind Speed Probabilities
For the 120 hours (5.00 days) from 2 AM EDT FRI SEP 27 to 2 AM EDT WED OCT 02
35N
30N
95W
90W
85W
80W
75W
70W
Bahamas
Probability of tropical-storm-force winds (1-minute average >= 39 mph) from all tropical cyclones
O indicates Tropical Storm Helene center location at 2 AM EDT FRI SEP 27, 2024 (Forecast/Advisory #16)
5
10
20
30
40
50
60
70
80
90
%


Earliest Reasonable Arrival Time of Tropical-Storm-Force Winds
90W
85W
80W
75W
35N
30N
Fri - 2 pm
Fri 8 am
All Times EDT
Tropical Storm Helene
Fri. Sep. 27, 2024 5 am EDT
Advisory 16
Storm Location
&
Wind Speed
< 34 kt (39 mph)
34-63 kt (39-73 mph)
≥ 64 kt (74 mph)
NOTE: Areas within the outermost black contour have at least a 5% chance of receiving winds of 34+ kt (39+ mph)


Peak Storm Surge Forecast
Up to 3 ft
Up to 6 ft
Up to 9 ft
Up to 15 ft
Feet above ground level
South Santee River
1-3 ft
Aucilla River
Mexico Beach
1-3 ft
Indian Pass
3-6 ft
5-10 ft
Flagler/Volusia County Line
Chassahowitzka
4-7 ft
Anclote River
Tampa Bay...3-5 ft
3-5 ft
Englewood
2-4 ft
Charlotte Harbor...2-4 ft
Bonita Beach
1-2 ft
Flamingo
Tropical Storm Helene
Friday September 27, 2024
05 AM EDT Advisory 16
NWS National Hurricane Center
User Notes: Water levels along the immediate coast could reach the following heights above ground level within the indicated areas. Elevated water levels will likely be accompanied by large and destructive waves. Colors are determined by the highest values in the associated forecast peak surge range. Values shown on this graphic are inclusive of tide.


Des Moines
Moline
Fort Wayne
Cleveland
Pittsburgh
Wilkes-Barre
Kirksville
Springfield
Indianapolis
Columbus
Philadelphia
St. Louis
Cincinnati
Elkins
Washington D.C.
Salisbury
Evansville
Louisville
Huntington
Springfield
Cape Girardeau
Roanoke
Norfolk
Nashville
Knoxville
Raleigh-Durham
Memphis
Chattanooga
Charlotte
Hatteras
Little Rock
Wilmington
Birmingham
Atlanta
Augusta
Charleston
Shreveport
Jackson
Montgomery
Savannah
Mobile
Tallahassee
Jacksonville
Lake Charles
New Orleans
Orlando
Tampa Bay
Miami
Key West
25
Inches
30
20
16
12
8
6
4
2
1
Hurricane Helene
Day 1-2 Rainfall Forecast (inches)
Created 3:08 AM EDT Fri Sep 27 2024
Valid 2:00 AM EDT Fri Sep 27 2024
through 8:00 AM EDT Sun Sep 29 2024
DOC/NOAA/NWS/NCEP/WPC
Local point maximum rainfall may be higher than shown.
See the NHC public advisories for the latest tropical cyclone information.



Current EOC and County Objectives

Continue to monitor situation and report any unmet needs.

Note for Department Directors

Note for All County Leadership and Partner Organizations

Resources and Links

Public Messaging and Information

Contact Information

Public Safety Center/Emergency Operations Center | 941-749-3500
FDOH Manatee Hotline | 941-242-6649
FDOH COVID-19 Call Center | 1-866-779-6121
Media Inquiries – Manatee County Government | 941-745-3771
Media Inquiries – FDOH | 305-924-6839
Donations Hotline | 941-744-3939
WebEOC Login | https://eoc.mymanatee.org/eoc/default.aspx

UPCOMING EVENTS AND DEADLINES

Please send any incident-related updates, unmet needs, or other information relevant to this document to loretta.merrill@mymanatee.org for inclusion in the next iteration of this report. Situation reports will be disseminated at 8:00AM and 8:00PM until leadership determines the need no longer exists.

SITUATION REPORT #8 – HURRICANE HELENE

September 28, 2024 at 4:00PM

Jodie Fiske, Director
Manatee County Public Safety Department
2101 47th Terrace E, Bradenton, FL 34203

Updates occurring since the last report will be listed in red.

Event Name:	*Hurricane Helene*
Date:	*09/28/2024*
EOC Activation Level:	*Level 1 – Full Activation*
Current Operational Period	*8:00AM to 8:00PM*
Public Safety Contact:	*Jodie Fiske - jodie.fiske@mymanatee.org*
Emergency Management Contact:	*Matthew Myers – matthew.myers@mymanatee.org*
Media Information – Manatee County:	*James Nicholson – james.nicholson@mymanatee.org*
WebEOC Incident Name:	*2024 Helene*

Incident Overview

Helene continues to slowly spin down today into tomorrow across the Tennessee Valley. With the heavy rain lessening, advisories on this system have ended.

Essential Elements of Information – Government Actions	
Fatalities:	*0*
Injuries:	*0*
Current Max Wind Speed	*15 mph*
Current Pressure	*998 mb*
EOC Mission Requests:	*29 Manatee County / 2,093 total statewide missions, as of 9/28 @ 0830*
Local State of Emergency:	*In Effect*
Sandbag Stations Open:	*Self-service & pre-filled sandbag locations are fully stocked and open: 66th St W Fleet Building; Bennett Park; Blackstone Park; Buffalo Creek Park; Daiken Dairy; 1505 Dam Rd (Quattlebaum House); Greenbrook Park; Kingfish Boat Ramp; Lakewood Ranch Park; Myakka Community Center; Palmetto Youth Center; Rubonia Community Center; Rye Preserve; 39th St E Stormwater Facility. See https://www.mymanatee.org/sandbags for more information.*
Evacuation Orders:	*None in Effect*
Curfew:	*Anna Maria Island, Bradenton Beach, and Holmes Beach dusk to dawn curfew*
Beach Closures:	*All Closed*
School Closures:	*Opening Monday (9/30)*
Road Closures:	*9 Current Road Closures- see Extreme Weather Dashboard for locations*
County Government Closures:	*Opening Monday (9/30)*
Shelters Open:	*First Baptist Church Life Center in Bradenton (pet friendly)*
COVID Testing Site:	*Closed*

Actions and/or Incident Updates by Emergency Support Function, Partner, and Workgroup

ESF-1 Transportation and Public Works

- Gulf Drive is reported to have significant damage.
- Transit will be running a modified Fix Route service; Route 3, 6 will be modified and no Beach Trolley. All other Fixed Routes will be operational. (9/28)
- Paratransit will continue to provide dialysis appointments. (9/28)
- No trolley services
- MCAT shuttle running from Manatee Ave W/75th St W to take island evacuees to the shelter.
- Except for 13 signals on generator, all other traffic signals are now in operation.
- We have one team working on signal repairs till sundown today (9/28), then both teams will be back in first thing Sunday morning to continue recovery of signs and signals. The goal is to have all signal repair items done by Monday close of business and sign repairs by middle or end of next week. The only exception are the signals and devices on the island. Once we gain access, we will be able to better assess repair needs.
- Cortez Rd bridge to Anna Maria Island remains closed. Manatee Avenue has check points set up to restrict island access.

ESF-2 Communication/311 Call Center

- 24hr call center fully staffed & operational.
- Q-alert created for donations.
- 911 inundated overnight with over 1,100 emergency calls as of the morning of 9/27
- P-25 radio systems area full up and have plenty of fuel
- 311 received 1912 calls on 9/27

ESF-3 Utilities

- Trash collection has resumed.
- We are currently working on restoring power to lift stations that have been operating on generator power.
- Out of 18 Master lift stations 16 are in full operation, 1 is on generator power and 1 is currently offline.
- Lake Manatee is currently at 37.57 ft with an inflow of 316cfs and no outflow.
- Out of 737 total lift stations, 632 are in full operation, 49 are on generator/bypass power, and 54 remain offline.
- Today's plan is to fully restore all lift stations on the island.
- Two Easternly most interconnects with the City of Bradenton are planned to be turned off sometime this morning. Utilities Water Treatment Plant Staff is working with the City of Bradenton's Water Treatment Plant staff to coordinate efforts involving the water supply. Our system continues to operate normally.
- Debris haulers will be continuing their debris removal assessments.
- Currently waiting on fulfillment of our TCU request
- Southwest Water reclamation plant is back on FPL power.
- Piney Point is back on-line.
- Potable Water Treatment Plant is back on FPL power.
- Interconnect repairs on "G" have been completed.

- Water service has been restored to Anna Maria Island, Homes Beach, Bradenton Beach and Longboat key.
- Boil Water Advisory for residents of Anna Maria Island for drinking water only.

ESF-4/9/10 Fire, Search and Rescue, and Hazmat

- City of Bradenton Fire Station 1 is on generator power as of 14:40 hrs.
  Fuel level is adequate.
- City of Bradenton Fire Station 2 is on generator power as of 16:20.
  Fuel level is adequate.
- City of Bradenton PSOC and Fire Station 3 are on generator power as of 17:30. Fuel level is adequate.
- Potable Water Treatment Plant on generator power as of 19:18.

ESF-5 Information and Situational Awareness

- Potential Storm Surge maps posted on WebEOC from Advisory 06 (19:08)
- As of 1330, AuxComm has 8 of 19 CERTs reporting. Only one reports to have activated. No CERT has reported any unmet needs through the AuxComm desk.

ESF-6 Mass Care and Sheltering

- First Baptist Church Life Center open and is pet friendly (downtown Bradenton) manned by Red Cross
- Buffalo Creek shelter closed as of 10:15a
- Nolan (Special Needs) now closed
- Continuing to transport those in need to the church shelter

ESF-7 Procurement and Resource Support

- P-card limits have been elevated
- Vendors list supplied to Utilities and Natural Resources.
- Assisting providing sanitation facilities to Holmes Beach
- Emergency drone services and generators have been ordered
- Taking in requests for portable generators for utilities

ESF-8 Public Health and Medical Support

- Hospitals
  - Actively engaged in communicating with all facilities. Open lines of communication being maintained.
  - All hospitals are open and receiving patients.
  - Ensuring hospitals and medical facilities have adequate water supply.
- Congregate Care Facilities (ALFs / Group Homes) are in the process of being checked for safe return of residents
- Aeromedical Transport
  - BayFlight 2 & 3 aircraft are sheltered until further notice.
  - All Aeromed Aircraft (The County Air Medical Transport Provider) will be grounded at 1800 9/25 - until further notice.
  - Aeromed 1 is back and service and available for aeromedical transport.
- Salvation Army will remain open.
- All hospitals have returned to normal operations

- EMS has returned to servicing the island
- Alpha 4 has been relocated back to their station on Anna Maria Island. Station is operating on generator power. Portable toilets and handwashing stations to be delivered within the next 4 hours.
- Alpha 11 has been relocated near the intersection of Manatee Avenue and Gulf Drive.
- Both units are available to respond to incidents on AMI so long as road conditions permit.

ESF-11 Food & Water

- No update @ 9/26

ESF-12 Energy

- Myakka Portable Generator: (RTG ready to go) & on standby
- Power Outages:
    - FPL: 18,000 (8%)
    - PRECO: 1
- No power in Robinson Preserve

ESF-13 Military Support

- Three Points of Distribution (POD) sites have been set up at Bennett, Blackstone, and GT Bray Parks. Each has Meals Ready to Eat (MRE), water and tarps. Open daily 8am to 8pm until further notice.

ESF-14 Public Information

- No update 9/28

ESF-15 Volunteer and Donations Management

- No update 9/28

ESF-16 Law Enforcement

- Traffic onto the island at Cortez and Manatee Ave is being shut down. Barriers are being placed to block traffic from going onto the island, but traffic will still be able to come off of the island.
- Deputies will be stationed at 8600 block of Manatee Ave and 1200 block of Cortez Rd.
- CSX RR crossing arm broken near base and on the ground, but not full severed. Crossing arm is NOT blocking any lanes of travel, sidewalks, or the actual RR tracks. Crossing arm is situated on the shoulder of the eastbound lanes of 10th St W (SR 43) Palmetto, (19:17).
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- Flooding: 10th St W in Palmetto from 20th Ave west towards Snead Island is impassable without a high-water vehicle. As are side streets between 10th St W and the Manatee River, West of 20th Ave W., (21:58).
- Per MSO Deputies - Rubonia appears to be good, there is no noticeable structural damage. There is debris in the road and downed signs. (07:28)
- 4 Man MSO Patrol teams will be stationed at two traffic lights:
    - I75 and 301 (north Side)
    - Ellenton Gillette and 301
- All others will be unmanned at this time

- AMI MSO Deputies have relocated to the firehouse at 67th St West and Manatee Ave
- All MSO Patrol have relocated to the mainland due to flooding/water influx
- Per MSO Major - Traffic signal at 301 and Victory RD has broken loose from the top wire and hanging upside down from the bottom wire.

ESF-17 Animal Services

- Have received good response to request for foster homes
- Cat Town evacuated.
- Overnight staff at Palmetto.
- At approximately 4pm Animal Welfare field operations were suspended until further notice.
- Adopt-A-Palooza will still be held on 9/28 as scheduled.

ESF-18 Business & Industry

- No update 9/28

ESF-19 Energy

- De-energized communities include Anna Maria Island, portions of Rubonia, Cortez Fishing Village, Snead Island, portions of Palmetto
- Currently filling all fueling requests

ESF-20 Cyber

- No update 9/28

IT/Radio

- The following network sites are down, likely due to power issues:
    - Marine Rescue
    - MSO D5
    - Island Library
    - EMS 04

Beach and Water Safety

- Evacuations and Water Rescues as of 0700 9/27/24 = 13
- Evacuations and Water Rescues from 15:12 to 23:59 9/27/24 = 11
- Evacuations and Water Rescues as of 07:00 9/28/24 = 14

Human Needs

- Calls to special needs list went out Wednesday
- Nolan (special needs), Lee and Buffalo Creek are closed.
- Going door to door for needs assessments and for aging clients
- First Baptist Church is open, pets allowed, manned by Red Cross
- Continuing to field calls from 311 for shelters and Damage Assessment

Property Management

- Over 150 pallets of pre-made sandbags have been delivered
- Debris removal teams are staged.
- All parks are secure and closed.

- All Sandbag locations are stocked.
- Pre-made sandbags dropped off at Centre Lake, Trailer Estates, and Shadybrook
- Sandbags have been deployed to all downtown campus facilities
- Staff has documented all park facilities, buildings and amenities.
- EMS and Water Rescue are staged at GT Bray.
- Stormwater staff completed cleaning and clearing all canals and ditches.
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- When able we will assess Bray for potential partial reopening to the public tomorrow.
- When able we will assess fields park by park to understand when league play can resume.
- Manatee Ave and both causeways are covered in rock and sand
- Cell service very spotty.
    - Will request communication assistance from the state.
- South of Cortez gulf drive under 3' of water/sand
- Robinson, Emmerson, and Botanical Park 1' under water
- Trails clearing is projected to last 3 days.
- Moving generator from Bishop to island library
- GT Bray Park is operating on a regular schedule.
- Crews continue to assess damages and prepare for Monday's opening.
- The portable genset moved to the Island Library.

Finances

- Reach out if needing help with FROCs

Drone

- Pilots completed documenting the JC, Admin and Historical Courthouse
- Data compilation and moving to create maps to include clips and video.
- Vendor engaged for post-storm assessment of barrier island.
- Coordinating with vendors to document the flooded areas.
- Waiting on either a mission request or a vendor to gather geo data
- Saturday, Fix Wing will cover 182 square miles on the west side of the county. Will share it with IT to have it displayed on the maps and GEO located.
- High-resolution drone flight for mapping disaster areas starts today.
- High-volume data storage coordination for GIS analysis started.

Damage Assessment

- 28 teams deployed
- Damage assessment teams are reporting that due to low/no cell phone service, they're unable to utilize Crisis Track. Requesting mobile cell tower(s) be deployed if possible.
- Special Needs home assessments have been completed
- 50 inspectors working in the field
- 540 Destroyed homes
- 50% complete

State of Florida – Division of Emergency Management

- No update @ 9/28

SeaPort Manatee

- All up and running ground operations
- No fuel interruptions
- Still in Port Condition Zulu
- Post storm damage assessment conducted by staff as well as USCG
- Waiting on Army Corps assessment to open the port for vessel operations

SRQ

- No damage, open and operating

Clerk of Courts

- No update 9/28

Court Administration

- No update 9/28

Supervisor of Elections

- Could be an asset for addresses for homeowners
- Coordinate with providing mailers for elections

City of Bradenton

- Multiple roadways closed due to flooding/storm surge.
- Public Works: Lift Stations 33, 35, 16, 42, and 37 are down.
    - Currently LS22 is on generator power, and LS12 is in bypass
- No wastewater bypass
- Focusing on Public Works type recovery phase missions
    - Road Closures
    - ROW and Yard Depressions
    - Assessing damage to parks, PWU facilities, and City infrastructure
- Potable after advisory per DEP but water is safe to drink
- Demobilized Public Safety, will resume normal operations on Monday
- Currently City of Bradenton has exceedances of secondary drinking water parameter. Water is safe to drink. Tier 1 notifications sent out. Continuously testing, waiting on exceedances to drop.
- Seven interconnection with the County systems were implemented.
    - Tower 5 was losing pressure and A & B connections were closed morning of 9/28
    - F, G, H, J, and E are still connected
- City of Bradenton urging residents to conserve water over the next 24-48 hours to recover from the storm surge.
- City of Bradenton opened three locations for water distribution 9/28 and 9/29 from 12pm to 7pm
    - Former location of Wakeland Elementary – 1812 27th St E
    - 1000-1200 block of 3rd Ave W (enter from 10th to 3rd Ave)
    - G.T. Bray – 5502 33rd Ave W (59th St W Ave)
- No wastewater bypass of 9/28/24
- The Public Safety Operations Center was demobilized 9/27

- Solid Wast collection resumed 9/27

City of Palmetto

- Damage assessment ongoing- all roadways are passable

Town of Longboat Key

- Severe impact on north end of island
- Some structures collapsed
- USAR team arriving soon with National Guard assisting
- No access from St. Armands and cannot access from Gulf Drive due to sand on roadway (County FIT teams 1&2 on the way with front end loaders
- South bridge is still closed with Law Enforcement providing security
- Working with Manatee County for the water situation.
- As of 10:30A, town remains closed
- Dealing with a significant water supply and pressure situation, this will delay re-entry
- Power has been restored to most of the island
- Those that did not evacuate may leave the island; re-entry will not be allowed until the town re-opens
- There is no access to Longboat key from Anna Maria Island

City of Bradenton Beach

- There is 3-6 feet of sand on the roadways. Gulf drive is decimated.
- DOT is estimating 1 week to 10 days for a temporary road to be placed
- Secondary roads are inundated with sand and still need to be assessed.
- There are no sand dunes
- Downstairs in the Police Department, City Hall, and Public Works took on water.
- There are houses in the middle of the road and will need to be removed.
- Cell tower has not been restored and service is limited.
- No entry for any vehicle traffic until further notice
- Planning to bus residents, business owners, and insurance adjusters to allow for assessment

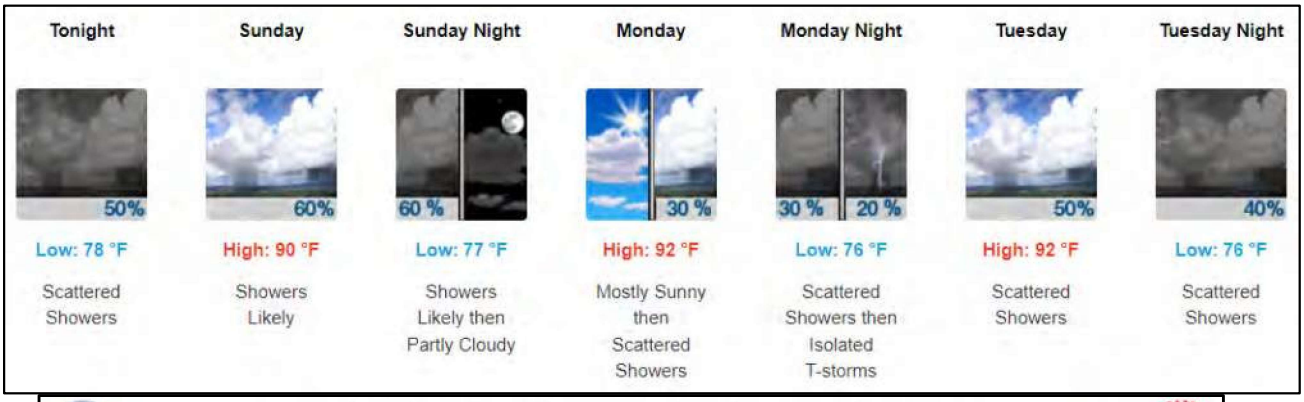
City of Holmes Beach

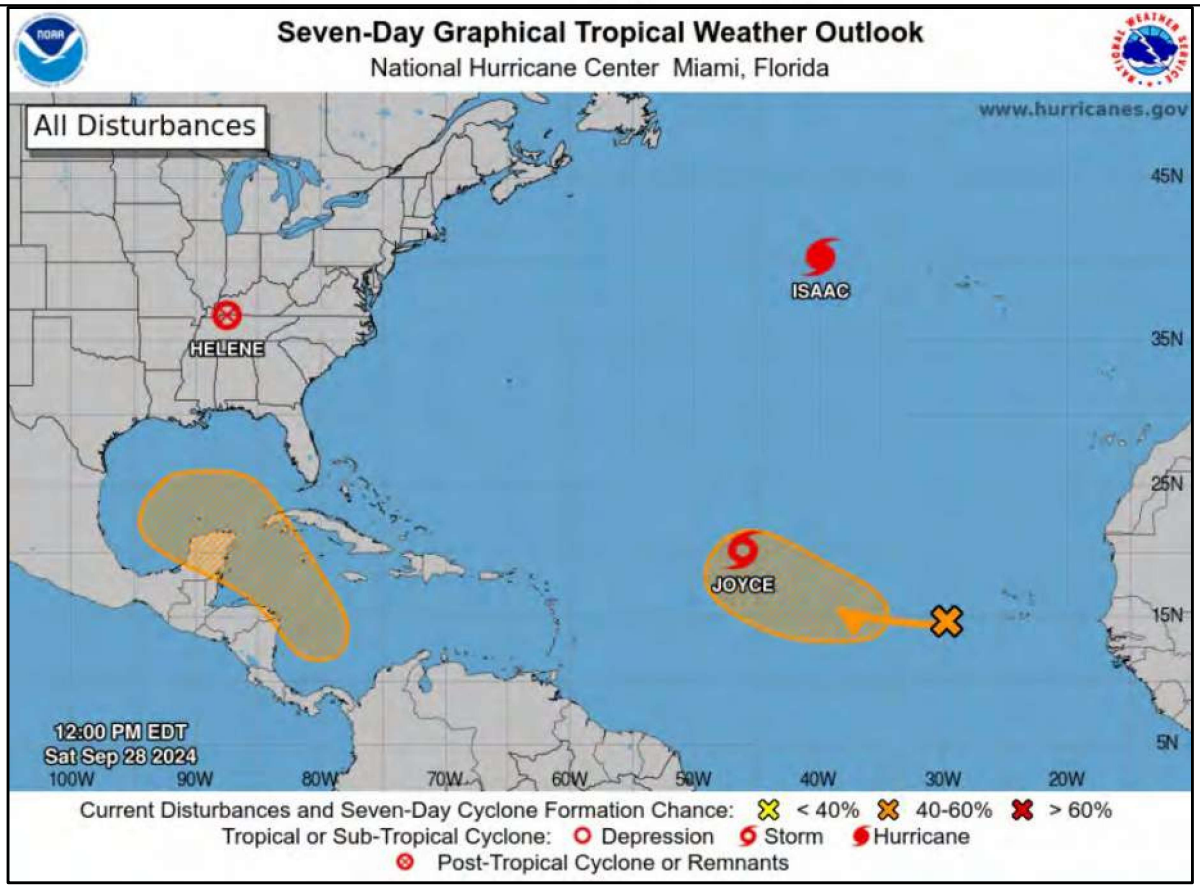
- Public Works is continuing to clear roadways.
- Will be barricaded on the south end as Lido has opened up their roadway.
- Working with Manatee County on water situation
- Will allow business owners and homeowner with entry tags to access to assess and mitigate damage starting at 10am.
- No power
- You can only access the Island by Manatee Ave, There will be barricades at the city line of Holmes Beach/Bradenton Beach so no one can enter Bradenton Beach
- Will handout flyers with instructions on where to place trash and debris.
- Essential workers will be allowed onto the island at 3p today
- No one will be allowed onto the island after 7pm, the checkpoint will re-open at 7am

Workgroup	***Status Update***
Childcare	

Feeding	
Homeless	
Recovery	

Incident Data and Maps





Current EOC and County Objectives

Continue to monitor situation and report any unmet needs.

Note for Department Directors

Note for All County Leadership and Partner Organizations

Resources and Links

Public Messaging and Information

Contact Information

Public Safety Center/Emergency Operations Center | 941-749-3500
FDOH Manatee Hotline | 941-242-6649
FDOH COVID-19 Call Center | 1-866-779-6121
Media Inquiries – Manatee County Government | 941-745-3771
Media Inquiries – FDOH | 305-924-6839
Donations Hotline | 941-744-3939
WebEOC Login | https://eoc.mymanatee.org/eoc/default.aspx

UPCOMING EVENTS AND DEADLINES

Please send any incident-related updates, unmet needs, or other information relevant to this document to loretta.merrill@mymanatee.org for inclusion in the next iteration of this report. Situation reports will be disseminated at 8:00AM and 8:00PM until leadership determines the need no longer exists.

SITUATION REPORT #9 – HURRICANE HELENE

September 29, 2024 at 4:00PM

Jodie Fiske, Director
Manatee County Public Safety Department
2101 47th Terrace E, Bradenton, FL 34203

Updates occurring since the last report will be listed in red.

Event Name:	*Hurricane Helene*
Date:	*09/29/2024*
EOC Activation Level:	*Level 1 – Full Activation (Modified)*
Current Operational Period	*8:00AM to 5:00PM*
Public Safety Contact:	*Jodie Fiske - jodie.fiske@mymanatee.org*
Emergency Management Contact:	*Matthew Myers – matthew.myers@mymanatee.org*
Media Information – Manatee County:	*James Nicholson – james.nicholson@mymanatee.org*
WebEOC Incident Name:	*2024 Helene*

Incident Overview

Early through mid week, weak high pressure is expected to build and hold over the area with frontal features remaining just N of FL with generally light NE-E flow favoring afternoon/evening sea breeze showers and a few storms mainly over interior areas as temps remain at or above seasonal normal.

Late week into next weekend abundant moisture remains in place as guidance suggests a tropical feature may move into the Gulf of Mexico and the 7-Day TWO from NHC continues to show a 50% chance of development somewhere around the western Caribbean Sea by mid-week and possibly in the Gulf by late week and into next weekend. We will continue to monitor the situation closely over the coming days.

Essential Elements of Information – Government Actions	
Fatalities:	*0*
Injuries:	*0*
Current Max Wind Speed	*N/A*
Current Pressure	*N/A*
EOC Mission Requests:	*39 Manatee County / 2,698 total statewide missions, as of 9/29 @ 1530*
Local State of Emergency:	*In Effect*
Sandbag Stations Open:	*Self-service & pre-filled sandbag locations are fully stocked and open: 66th St W Fleet Building; Bennett Park; Blackstone Park; Buffalo Creek Park; Daiken Dairy; 1505 Dam Rd (Quattlebaum House); Greenbrook Park; Kingfish Boat Ramp; Lakewood Ranch Park; Myakka Community Center; Palmetto Youth Center; Rubonia Community Center; Rye Preserve; 39th St E Stormwater Facility. See https://www.mymanatee.org/sandbags for more information.*
Evacuation Orders:	*None in Effect*
Curfew:	*Anna Maria Island, Bradenton Beach, and Holmes Beach, Longboat Key dusk to dawn curfew*

Beach Closures:	*All Closed*
School Closures:	*Opening Monday (9/30) except for AMI Elementary (will divert to Stewert Elementary)*
Road Closures:	*6 Current Road Closures- see Extreme Weather Dashboard for locations*
County Government Closures:	*Opening Monday (9/30)*
Shelters Open:	*First Baptist Church Life Center in Bradenton (pet friendly)*
COVID Testing Site:	*Closed*

Actions and/or Incident Updates by Emergency Support Function, Partner, and Workgroup

ESF-1 Transportation and Public Works

- Gulf Drive is reported to have significant damage.
- Transit will be running a modified Fix Route service; Route 3, 6 will be modified and no Beach Trolley. All other Fixed Routes will be operational. (9/28)
- No trolley services
- The goal is to have all signal repair items done by Monday close of business and sign repairs by middle or end of next week. The only exception are the signals and devices on the island. Once we gain access, we will be able to better assess repair needs.
- All signals are operational with 1 being on generator power
- Field operations crews have been pulled off the island at the request of FDOT
- Needed additional cleanup equipment is enroute
- MCAT: Transportation route between AMI Publix and Bradenton First Baptist Church Life Center continues today. Please provide transportation to shelter as requested through WebEOC mission request.
- Stormwater Operations: Performing canal inspections, canal debris removal, flush operations, and retrieving pumps from pond locations.
- Highway Operations: Will remove tree on 9th Ave Dr & 25th St E, Palmetto once I receive confirmation that power lines are clear. 311 should utilize the after-hours call center to route routine after hour-response items.
- Holmes Beach and Anna Maria have removed their checkpoints, so everyone is able to get onto the islands now. Due to this we are not moving any resources onto the islands until we get the green light from them with a location that will not impede the flow of traffic.
- Dwindling list of road closures
    - Cortez bridge is still closed

ESF-2 Communication/311 Call Center

- Q-alert created for donations.
- P-25 radio systems area full up and have plenty of fuel
- 911 call center back to normal operations 9/28
- Total of 6,336 calls taken
- 311 has demobilized overnight staff

ESF-3 Utilities

- Trash collection has resumed.
- Debris haulers will be continuing their debris removal assessments.

- Currently waiting on fulfillment of our TCU request
- Water service has been restored to Anna Maria Island, Homes Beach, Bradenton Beach and Longboat key.
- Boil Water Advisory for residents of Anna Maria Island for drinking water only.
- Water Distribution team is going door to door to evaluate any damages
- Sandbags have been depleted. A state mission request will be put in for more sandbags due to possible storm next week.
- Lake Manatee is currently at 37.84 ft with an inflow of 363cfs and no outflow.
- With the exception of 3 non-essential public restrooms that have been posted as out of service, as of 10:30 PM last night all Island lift stations are under normal power, generator power or bypass pump.
- The precautionary boil water advisory cannot be lifted until we have fully completed the assessment and repairs to the water system to ensure that it completely safe. Utilities staff are working diligently to complete this assessment and make necessary repairs. At this time, it is not possible to give a definitive date. The public will be updated via the county's social media accounts And an Everbridge announcement will be sent to residence within the specific affected area.
- As of 9/29 1600, all 755 lift stations throughout the county are conveying wastewater with the exception of 4 stations that serve closed restrooms and concession stands. There are no active sanitary sewer overflows at this time. There are currently twenty-two stations on generator power and two stations on a diesel-powered pump.
- Interconnect update:
    - Distribution crews are continuing to go block by block identifying water leaks, and water infrastructure. A full complement will start first thing in the morning to continue this task. They will also work on developing a map, which will show areas that have been inspected and identified as potential issues.
    - Utility staff did reconnect the City of Longboat Key this afternoon. The County was contacted by Blake Hospital about high salinity in their water. Utility staff reached out to the City of Bradenton and are working on ensuring that Blake hospital will be receiving Manatee County water rather than from City of Bradenton water.
- Debris Update:
    - In response to receiving the FEMA Cat-A declaration, Storm debris collection operations will commence beginning Monday morning.
    - In efforts to better assist residents in the aftermath of Hurricane Helene, at this time, the landfill will be waiving tipping fees for those self-hauling separated yard/household debris as part of this emergency activation.

ESF-4/9/10 Fire, Search and Rescue, and Hazmat

- City of Bradenton Fire Station 1 is on generator power as of 14:40 hrs.
  Fuel level is adequate.
- City of Bradenton Fire Station 2 is on generator power as of 16:20.
  Fuel level is adequate.
- City of Bradenton PSOC and Fire Station 3 are on generator power as of 17:30. Fuel level is adequate.
- City of Bradenton Potable Water Treatment Plant on generator power as of 19:18.

- Back to normal operations

ESF-5 Information and Situational Awareness

- Continuing to process GIS mapping requests through WebEOC

ESF-6 Mass Care and Sheltering

- First Baptist Church Life Center open and is pet friendly (downtown Bradenton) manned by Red Cross
- Buffalo Creek shelter closed as of 10:15a
- Nolan (Special Needs) now closed
- Continuing to transport those in need to the church shelter

ESF-7 Procurement and Resource Support

- P-card limits have been elevated
- Vendors list supplied to Utilities and Natural Resources.
- Assisting providing sanitation facilities to Holmes Beach
- Emergency drone services and generators have been ordered
- Taking in requests for portable generators for utilities

ESF-8 Public Health and Medical Support

- All hospitals have returned to normal operations

ESF-11 Food & Water

- No update @ 9/29

ESF-12 Energy

- Power Outages:
  - FPL: 4,389 outages
  - PRECO: 1 outage
- Power has been restored to the island.

ESF-13 Military Support

- Three Points of Distribution (POD) sites have been set up at Bennett, Blackstone, and GT Bray Parks. Each has Meals Ready to Eat (MRE), water and tarps. Open daily 8am to 8pm until further notice.
- GT Bray will serve as a cooling station with showers available, the POD is currently collocated with City of Bradenton however we will not resupply the POD at GT Brey.
- Blackstone Park will remain a National Guard POD.
- Tom Bennet POD being relocated to Kingfish Boat Ramp

ESF-14 Public Information

- Coordination messaging with that of island municipalities as well as pushing out recovery safety messages.
- Sending messaging regarding PODS, Damage Assessment, Volunteering, and recovery resources.

ESF-15 Volunteer and Donations Management

- Currently devising plan to coordinate volunteers and donations

ESF-16 Law Enforcement

- Traffic onto the island at Cortez and Manatee Ave is being shut down. Barriers are being placed to block traffic from going onto the island, but traffic will still be able to come off of the island.
- EOC support team at Bradenton Beach Police Department
- Regional coordinator suggested a mission request for FDLE to assist with preventing unlicensed contractors on the island. Emergency Management staff working on submitting.

ESF-17 Animal Services

- Adopt-a-palooza and reunification event 9/28 went well with 31 adoptions.

ESF-18 Business & Industry

- 46 business have completed the needs assessment survey
- Resource list will be sent to businesses
- Bridge loans opened today and the Chamber of Commerce will be sending out communications on this resource.

ESF-19 Energy

- Generator for Beach Patrol installed.
- Fueling Anna Maria Island generator twice daily

ESF-20 Cyber

- No update 9/29

IT/Radio

- The following network sites are down, likely due to power issues:
    - Marine Rescue
    - MSO D5
    - Island Library
    - EMS 04
- Order placed for 20 I-Pads for community human needs assessment teams
- 3 COWs (Cell on Wheels) requested for the island; City of Bradenton Beach said they no longer need one because the Verizon towner is up and running on generator power.
- Continuing to provide general assistance to GIS, Health, and Transportation
- Power and communications have been restored to MSO DS and Island Library

Beach and Water Safety

- Evacuations and Water Rescues as of 0700 9/27/24 = 13
- Evacuations and Water Rescues from 15:12 to 23:59 9/27/24 = 11
- Evacuations and Water Rescues as of 07:00 9/28/24 = 14
- Evacuations and Water Rescues as of 07:00 9/28/24 = 14
- Evacuations and Water Rescues as of 13:00 9/29/24 = 12
- Serving as USAR going door to door on the island to check for any needs; anticipated completion 9/29

Human Needs

- Going door to door for needs assessments (50-person team)
- First Baptist Church is open, pets allowed, manned by Red Cross
- Continuing to field calls from 311 for shelters and Damage Assessment
- Over 1500 contacts made in the community
- Rubonia will have a modified comfort station at 72nd St E and Bayshore. The community center route is too cluttered with debris to use that site now. The location will have cleaning supplies, multiple groups have already set up a feeding schedule for that location as well and we will provide water and MRE's from the POD sites that will also be dropped off.
- FEMA Disaster Assistance Teams are mobilizing and should be on the ground in the next 24-48 hours
- The Disaster Recovery Center will be at the Lakewood Ranch library and will be collocated with the Debby DRC.
    - staffing a senior services table at the Debby DRC and there are no wireless access points on the second floor.
    - Staff en route for scoping and response.
- Holmes Beach residents just wanting to know if the house is livable or not as they are in need of all resources.
- Rubonia second canvas is priority on 9/30
- Staff will be based out of the Admin building starting 9/30

Temporary Housing

- Currently 12 evacuees housed at the Red Cross shelter.

Property Management

- GT Bray Park is operating on a regular schedule.
- Crews continue to assess damages and prepare for Monday's opening.
- The portable genset moved to the Island Library.
- Park crews have been pulled from cleaning up island properties at the request of FDOT.
- Preserves opening Sunday with select trails closed
- Parks staff will continue to cut up and removed downed trees in the parks.
- Parks staff assisting mission sites.
- 1 – 20-yard rolloffs were dropped at each location (Tom Bennett and Blackstone parks). Brays is in the overflow parking because can get it close to POD site. Ordered 2 more for GT Bray.
- All preserves open today with limited access to coastal trails as clean up continues.
- Army Corps disaster response teams will visit the Island on Monday afternoon to confirm expected eligibility for 100% funded federal beach replacement. FEMA beach teams for Coquina Beach expected week of October 7th
- Parks and Natural Resources will coordinate return of beach sand over-wash to the beach from a stockpile process managed by Public Works.
- Barricades were installed at entrance to Bradenton Beach

Finances

- Reach out if needing help with FROCs

- When providing P-card documentation, be as specific as possible providing information on the what the items purchased will be used for.
- Retained Hagerty for consulting assistance with FEMA reimbursements

Human Resources

- County is shifting to Tier 2 on Sunday. This requires prior approvals to work and continued FROC documentation
- Email will be going out to assess employee needs.
- Per County Administrator, Department Directors MUST support staffing of community outreach teams. If any staff is available for this team let HR leads know.
- Any departments with air card equipped I-Pads need to contact HR so they can be used for community outreach

Drone

- Vendor engaged for post-storm assessment of barrier island.
- Continuing high altitude mapping and coordinating data dump and analysis.

Damage Assessment

- Damage Assessment has been completed on Anna Maria Island
- Only 1 subzone of the county is left for damage assessment to complete
- Assisted City of Bradenton Beach 9/28 and will assist City of Anna Maria 9/29
- Working with island officials to post condemned buildings
- Will assist with power need checks

State of Florida – Division of Emergency Management

- No update @ 9/29

SeaPort Manatee

- All up and running ground operations
- No fuel interruptions
- Post storm damage assessment conducted by staff as well as USCG
- Port Condition 4 – normal operations with some minor modifications
    - Any vessels requiring piloting are limited to daylight operations du to 28' draft in the channel

SRQ

- No damage, open and operating

Clerk of Courts

- Will be open 9/30

Court Administration

- No update 9/29

Supervisor of Elections

- Could be an asset for addresses for homeowners
- Coordinate with providing mailers for elections

City of Bradenton

- Multiple roadways closed due to flooding/storm surge.
- Public Works: Lift Stations 33, 35, 16, 42, and 37 are down.
    - Currently LS22 is on generator power, and LS12 is in bypass
- No wastewater bypass
- Focusing on Public Works type recovery phase missions
    - Road Closures
    - ROW and Yard Depressions
    - Assessing damage to parks, PWU facilities, and City infrastructure
- Potable after advisory per DEP but water is safe to drink
- Demobilized Public Safety, will resume normal operations on Monday
- Currently City of Bradenton has exceedances of secondary drinking water parameter. Water is safe to drink. Tier 1 notifications sent out. Continuously testing, waiting on exceedances to drop.
- Seven interconnection with the County systems were implemented.
    - Tower 5 was losing pressure and A & B connections were closed morning of 9/28
    - F, G, H, J, and E are still connected
- City of Bradenton urging residents to conserve water over the next 24-48 hours to recover from the storm surge.
- City of Bradenton opened three locations for water distribution 9/28 and 9/29 from 12pm to 7pm
    - Former location of Wakeland Elementary – 1812 27th St E
    - 1000-1200 block of 3rd Ave W (enter from 10th to 3rd Ave)
    - G.T. Bray – 5502 33rd Ave W (59th St W Ave)
- No wastewater bypass of 9/28/24
- The Public Safety Operations Center was demobilized 9/27
- Solid Waste collection resumed 9/27
- In recovery mode with full municipal services commencing 9/30
- Structures in East Bradenton from Manatee Memorial Hospital to the Braden River along the river to about 2nd Ave have substantial water damage. About 400-500 homes were inundated with water
- Debris removal commenced with 6 large boom trucks & large roll-off dumpsters.
- Water Treatment plant has been stabilized but chlorine levels are still high so water distribution will continue.
- Public Safety agencies are serving in support roles.
- Planning to increase communications to citizens
- Water reclamation facility is having intermittent issues
- Blake Hospital is experiencing salinity issues with their water (high chloride) which effects dialysis services. Will continue to work the Manatee County to ensure adequate water service.

City of Palmetto

- Damage assessment ongoing- all roadways are passable

Town of Longboat Key

- Severe impact on north end of island
- Some structures collapsed
- USAR team arriving soon with National Guard assisting
- No access from St. Armands and cannot access from Gulf Drive due to sand on roadway (County FIT teams 1&2 on the way with front end loaders
- South bridge is still closed with Law Enforcement providing security
- Working with Manatee County for the water situation.
- As of 10:30A, town remains closed
- Dealing with a significant water supply and pressure situation, this will delay re-entry
- Power has been restored to most of the island
- Those that did not evacuate may leave the island; re-entry will not be allowed until the town re-opens
- There is no access to Longboat key from Anna Maria Island
- Severe gas leaks on the north end of the island are preventing re-entry by citizens
- Successfully used a Microsoft Teams call to communicate with over 1,000 community members at once.
- Open to all with a curfew 6am to 7pm
- Continuing damage assessment
- Power not completely restored, but making profress

City of Bradenton Beach

- There is 3-6 feet of sand on the roadways. Gulf drive is decimated.
- DOT is estimating 1 week to 10 days for a temporary road to be placed
- Secondary roads are inundated with sand and still need to be assessed.
- There are no sand dunes
- Downstairs in the Police Department, City Hall, and Public Works took on water.
- There are houses in the middle of the road and will need to be removed.
- No entry for any vehicle traffic until further notice
- Effective Monday, 9/30/2024 - Chief Cosby has issued new access guidelines:
    - Curfew: 7 AM - 7 PM
    - No traffic on Gulf Drive
    - Foot access across Cortez Bridge for:
    - Property/business owners with proof
    - Condo/property managers
    - Insurance adjusters
    - Access is for damage assessment only, no cleanup allowed. Stay tuned for updates.

City of Holmes Beach

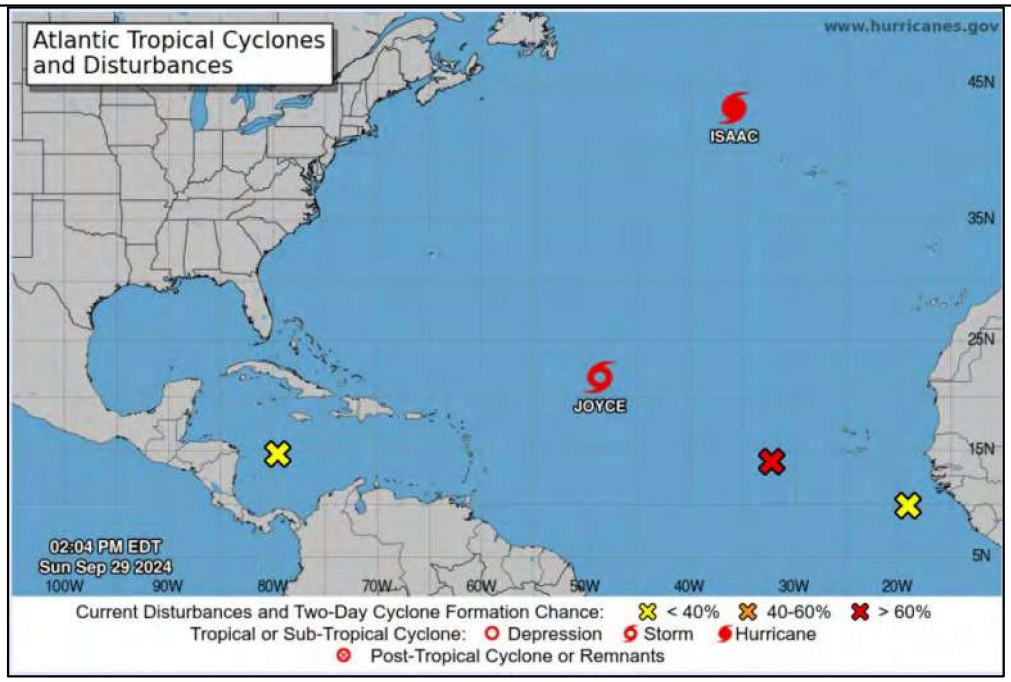
- Public Works is continuing to clear roadways.
- Will be barricaded on the south end as Lido has opened up their roadway.
- Working with Manatee County on water situation
- No power
- You can only access the Island by Manatee Ave; there will be barricades at the city line of Holmes Beach/Bradenton Beach so no one can enter Bradenton Beach

- Will handout flyers with instructions on where to place trash and debris.
- No one will be allowed onto the island after 7pm, the checkpoint will re-open at 7am
- Access to island reopened to all
- Will need County Code Enforcement assistance until City of Bradenton Beach roads can be opened. DOT predicts 5 days.
- Request being submitted for additional law enforcement

Workgroup	*Status Update*
Childcare	
Feeding	
Homeless	
Recovery	

Incident Data and Maps





Current EOC and County Objectives

Continue to monitor situation and report any unmet needs.

Note for Department Directors

Note for All County Leadership and Partner Organizations

Resources and Links

Public Messaging and Information

Contact Information
Public Safety Center/Emergency Operations Center | 941-749-3500
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Donations Hotline | 941-744-3939
WebEOC Login | https://eoc.mymanatee.org/eoc/default.aspx

UPCOMING EVENTS AND DEADLINES

Please send any incident-related updates, unmet needs, or other information relevant to this document to esf5planning@mymanatee.org for inclusion in the next iteration of this report. Situation reports will be disseminated at 4:00PM until leadership determines the need no longer exists.

SITUATION REPORT #6 – Hurricane Milton

October 10, 2024 at 9:00am

Jodie Fiske, Director
Manatee County Public Safety Department
2101 47th Terrace E, Bradenton, FL 34203

Updates occurring since the last report will be listed in red.

Event Name:	*Hurricane Milton*
Date:	*10/10/2024*
EOC Activation Level:	*Level 1 Full Activation*
Current Operational Period	*8:00PM to 8:00AM*
Public Safety Contact:	*Jodie Fiske - jodie.fiske@mymanatee.org*
Emergency Management Contact:	*Matthew Myers – matthew.myers@mymanatee.org*
Media Information – Manatee County:	*James Nicholson – james.nicholson@mymanatee.org*
WebEOC Incident Name:	*2024 Milton*

Incident Overview

Milton moved quickly across central Florida overnight, producing significant flooding and damaging winds near its path. The center of the hurricane is now exiting the state near Cape Canaveral, and the worst conditions have shifted to east-central and northeastern Florida. All Hurricane and Tropical Storm Warnings have been discontinued for the west coast of Florida. The Storm Surge Warning has been discontinued from Anclote River to Middle of Longboat Key, including Tampa Bay.

Essential Elements of Information – Government Actions	
Fatalities:	*0*
Injuries:	*0*
Current Max Wind Speed	*85 mph*
Current Pressure	*976 mb*
EOC Mission Requests:	*Manatee County 122; Statewide 2580; missions, as of 10/10 @ 0800*
Local State of Emergency:	*In Effect*
Sandbag Stations Open:	*All sandbag locations are open as of this time, though are depleted from community preparation for Milton. Please see https://www.mymanatee.org/sandbags for more detailed information on each location*
Evacuation Orders:	*Levels A, B, C, and all Mobile/Manufactured Homes, and RVs*
Curfew:	*None in Effect*
Beach Closures:	*All still closed due to Hurricane Helene*
School Closures:	*Closed through Friday 10/11*
Road Closures:	*Numerous; see Road Closure board for detailed information. https://extreme-weather-dashboard-manateegis.hub.arcgis.com/pages/9dfa8bd9c9474126aede5d57d7539a28*
County Government Closures:	*Closed through Friday 10/11*
Shelters Open:	*16 General Population, 1 Special Needs: (Nolan); please see https://www.mymanatee.org/shelters for detailed information*

ESF-1 Transportation and Public Works

- Fleet Missions entered thru WEBEOC.
- Public Works – No routine calls currently, all staff are on standby
- Maintenance crews are working on storm prep
- Small generators are ready for traffic lights
- Fleet updates:
    - Fleet availability is at 93% - Wednesday morning all equipment awaiting repairs will be reviewed, if its not a safety sensitive item, it will be placed back in service
      • We continue to support needs with additional on call technicians
      • The workshops are working limited staff on Saturday for essential needs and repairs
    - Working with equipment rental providers for light tower rentals for landfill
      • Working with service provider to add additional technician labor at the landfill for equipment repairs
      • Continue to remind all departments, if they need rental equipment, to put in a request.
    - Rental equipment pool is very thin with all the storms and projects working thru the state
    - POC: Matt Case Office: 7417 Cell: 941-290-8446
- Have approximately 70 generators ready to go
- MCAT:
    - Total 293 evacuees transported to shelter
- Highway Operations:
    - Road Closures & Info:
    - Manatee Ave and Cortez Road Barriers have been placed overnight. Emergency Vehicle access
- Pumps:
    - All pumps have been retrieved.
    - All FIT Teams have been briefed and in place this morning
- Road Closure: *Emergency Access Only* Cortez Road (Bridge) to Anna Maria Island Closure at 127th ST W
- Road Closure: *Emergency Access Only* Manatee Avenue (Causeway/Bridge) to Anna Maria Island Closure at west end of Perico Island
- 293 shelter transports and will continue until unsafe
- Road Closures: Clay Gully Rd, Wauchula Rd @ Long Creek, Gulf Dr from Manatee Ave to Cortez Rd, Golf Course Road Bridge @ Gamble Creek Bridge, Jim Davis Rd @ Gamble Creek Bridge, Verna Bethany Rd @ Lake Manatee Bridge
- No sand or sandbags at Lena Rd Landfill nor GT Bray Park
- Monitoring traffic signals: 13 on flash, 11 with either no power or comms, 70 intermittent.
- First in teams (FIT) in place.
- First In Teams were deployed around 0600 to begin assessing roadway conditions.

ESF-2 Communication/311 Call Center

- Emergency Comms ramping up for expected increase in calls

- 75 Radios went to 5 cities
- Generators are topped off
- Continuing radio efforts – sending radios to Holmes Beach
- Fortifying doors for water intrusion at Myakka & Main locations
- 911 still running normal operations on 22 consoles
- Fire and EMS units working tiered Regional dispatch operations as of 1400 hrs.
- EMS has stopped responding to all calls due to weather.
- All fire departments, with the exception of BFD, are still running fire calls and have been told to advise when they shut down entirely.
- **ALL FIRE DEPARTMENTS HAVE STOPPED RESPONDING TO CALLS. 10/9/2024 18:27
- Tiered regional dispatch enacted
- 311 has taken 1,851 calls on 10/9; 8,598 total since Monday

ESF-3 Utilities

- Utilities installed the surge protection plates on the master LS on the island (#5). Staff is mobilizing this morning to install sandbags at the two masters that had flooding during the last storm (12A and 1M).
- Tiger Dam has been installed at the Northwest Booster Pump Station.
- All 755 lift stations are conveying wastewater with the exception of three lift stations that only serve restrooms or concessions stands that are closed. There are currently 2 stations on generator power. Additionally, there are no active sanitary sewer overflows (SSO) at this time.
- Garbage and recycling will not be picked up Tuesday or Wednesday
- 10/8 10:00 – Water shut off to the island
- 10/8 20:00 – Lift stations on island are out of service
- 66th St Utilities evacuated to 24th St warehouse
- Plan to have the sewer turned off at 8pm. In communication with Sarasota County, they communicated are taking a similar action at the same time.
- We have decommissioned all satellite lift stations on the island serving Anna Maria, Holmes Beach, Bradenton Beach and Longboat Key and have pulled any sensitive electronic equipment from the sites. The Master station is still online and will be turned off once the power has been turned off to the island.
- With the Southwest Wastewater Treatment Facility located in evacuation zone C, an evacuation plan is in place when we need to remove staff prior the tropical force winds.
- Fuel level and conditions are set for all Wastewater and the Water treatment plant.
- Lake Manatee is currently at 36.3 ft with an inflow of 3588 cfs and outflow of 3432 cfs. As rain increases, there is a potential to increase discharges above 3,500 cfs. Water and sewer were turned off on the Island on Tuesday and Master Lift Station #5 on the Island was decommissioned today at 7am.
- Southwest facility will run on a generator, and the process will be continuously monitored through remote SCADA. The Department of Environmental Protection (DEP) has been notified.
- Between 7pm and midnight, there were 4 cars dropping off debris at the landfill. Due to the low volume, the landfill stopped all operations at midnight.
- As of 12:15 PM. Southwest Wastewater facility switched to emergency generator power. All equipment is online, and all valves are positioned for the plant abandonment. The staff left the plant at approximately 12:45. ESF-3 notified that staff arrived at shelter facility (GT-Bray).

- 12:15pm ESF3 was notified that the North Wastewater Reclamation Facility lost power and switched to generator power and will remain on generator through the storm
- 6:28pm 10/9 ESF3 was notified that the Southeast WWRF switched to generator power and will remain on generator through the storm. 10/10 as of 0755 SW Reclamation Facility is back on power and running.
- 6:15pm 10/9 ESF3 was notified that the Water Treatment Plant has switched to generator power and will remain on generator through the storm.
- Debris haulers scheduled to begin 10/11 at 07:00

ESF-4/9/10 Fire, Search and Rescue, and Hazmat

- Staging high water vehicles
- Housing some of MSO boats and vehicles at the Myakka location.
- Disposal site designated for SMALL Lithium-Ion batteries: Southern Manatee Fire Rescue will accept small (scooters etc.) sized lithium batteries at their station 2 located at 1911 30th Ave E.
- Pre-determined large Helicopter landing zones
- Disposal site designated for SMALL Lithium-Ion batteries. Memo from Southern Manatee Fire Rescue states they will accept small (scooters etc.) sized lithium batteries at their station 2 located at 1911 30th Ave E.
- East Manatee Fire reporting flooding on Singletary Rd, River Rd, Crane Park, and Clay Gully Rd at Terra Nova. Still passable for emergency vehicles at this time.
- All volunteers must go thru ESF-15, All requested agencies must go thru 4/9/10
- All self-deployed agencies are not Authorized/approved
- City of Bradenton water main break. City crews actively working to make repairs.
- East Manatee Fire is relocating a tanker to EMFR station 2 to standby for BFD until the water main is repaired.
- East Manatee Fire is reporting that Tanker 654 is out of service and will not be back online anytime soon.
- East Manatee Fire has evacuated their old station 11 and their station 12 (the old Myakka stations). They have relocated to the new station 11 in service at 10215 Wauchula Rd. Manatee County EMS Medic 71 and Alpha 14 have also relocated to the new facility.
- Per Holmes Beach PD and West Manatee Fire - The Island will officially be vacated at 10:30am
- West Manatee Fire will be withdrawing from the island at 0900 this morning. Their units are moving to WMFR station 1.
- 10/9 0926 West Manatee Fire is reporting hazardous unsafe conditions for residents and emergency responders at multiple addresses on Anna Maria Island. Request has been made following emergency procedures to secure power to those areas.
- 10/09 1003 We have been notified by FPL rep Kevin Milford that they will be re-energizing the areas of Anna Maria Island immediately. FPL was advised that ESF 4,9,10 could not confirm whether responders were operating in the area and requested they delay until confirmation could be obtained. FPL denied that request and re-energized the area.
- 10/09 1025 West Manatee Fire is no longer responding to calls on the Island due to hazardous conditions. They are requesting tiered dispatch for all island calls and that those calls will be assigned to C102 so that they can be stacked by WMFR regional dispatch center.
- West Manatee station 2 units are withdrawing to BFD station 3. All WMFR calls are now the be tiered and assigned to C102, their regional dispatch center will handle from there.
- BFD station #2 personnel are relocating to BFD station #1.

- CHFR is on scene at a working fire @ IMG 4400 El Conquistador Parkway.
- Due to wind conditions EMS is shutting down response to the area's of SMFR, CHFR and WMFR.
- EMS is shutting down response to all Medical Call, All Fire Districts are currently still running fire related calls.
- BFD Station 1 is on generator power as of 18:05.
- EMFR: All stations and admin are on generator 10/09 20:59
- CHFR stations 1 and 2 on generator.
- 4 Westminster residents that refused to evacuate:
- NRFD 3 and 4 evacuated and in place at shelter locations
- Cedar Hammock Fire has evacuated their station 3 and station 4 18:57:40
- SMFR: Amin, stations 1 & 5 on generator
- Duette Fire Rescue on generator power 19:10:23.
- Parrish Fire: stations 1 & 2 on generator
- 10/9 23:06 – City of Bradenton PSOC is offline: lost power and has lost their generator. Request is for replacement or repair of generator at earliest possible time.
- 10/10 03:44 – NRFD all stations are on generator power
- 10/10 0515 – Myakka fuel depot is without power and out of service.

ESF-5 Information and Situational Awareness

- GIS requests- placed detailed requests in WebEOC including how the deliverables will be used

ESF-6 Mass Care and Sheltering

- Manatee Memorial – Tiger Dam
- Check to see if Blake will need Tiger Dam
- These locations are open for National Guard housing:
    - Buffalo Creek
    - Lakewood Ranch Highschool Gymnasium
- Will be opening general population shelters opening – due to the perceived risks they will all accept pets.
    - Miller Elementary
    - Mills Elementary
    - Myakka Elementary
    - Nolan (Special Needs)
    - McNeal Elementary
    - Harvey Elementary
    - Gullett Elementary
    - Sugg Middle
    - Mona Jain Middle
    - Prine Elementary
    - Lee Middle, Freedom Elementary, Willis Elementary Williams Elementary, Witt Elementary, and Daughtry Elementary will open Wednesday 10:00am
- National Guard housed at Buffalo Creek
- Shelters have been placed on LOCKDOWN status but will take evacuees when conditions allow as of 17:18:43.
- 11,592 shelter guests

ESF-7 Procurement and Resource Support

- No update

ESF-8 Public Health and Medical Support

- Coordinating with Department of Health for shelter needs
- All Aeromed aircraft are beginning their sheltering processes and will be unavailable for aeromedical evacuation no later than 2PM today. Aeromed is hopeful that their aircraft will return to service sometime on Thursday.
- Medical call down for A/B - 1,000 calls for special needs, in contact with transportation.
- Zone A/B/C call downs are complete
- Manatee Memorial Hospital is on full diversion until further notice.
- Manatee Memorial Hospital is transferring patients, but not evacuating.
- Relocating EMS assets for continuation of operations
- Continuing to work with facilities in evacuation zones A through C
- We have secured permission to use Bradenton Motorsports Park and The Freedom Factory Racetrack located at 21000 SR 64 E. for any staging needs.
- Blake Medical Center transferring 64 patients. Strike teams requested.
- Against advisement, Manatee River Assisted Living Facility is not evacuating from Evacuation Zone B.
- Helping to facilitate the transport of bed-bound patients to the Special Needs Shelter (SpNS).
- Freestanding ED closed at 7:00 PM today (10/8/2024).
- DMAT requested for post storm
- Ambulance Strike teams requested for post storm.
- 63 patients transferred out of Manatee Memorial Hospital. 13 total strike teams used
- Contract nurses have been called in to assist with special needs shelters
- EMS is no longer responding to incidents on Anna Maria Island due to hazardous conditions.
- Turning Points closed Wednesday and Thursday with projected reopening Friday 10am
- Assisted Great American Home ALF with evacuation of 77 residents via strike teams to Tampa. 0300 10/9/2024
- EMS holding ALL CALLS until further notice due to hazardous conditions as of 18:11:16.
- 10/09 18:12 – Law Enforcement, have shut down response operations until further notice
- 10/9 22:18 - Lakewood Ranch Medical Center is currently on generator power. No significant structural damage identified at this time. No needs at this time. Plenty of fuel on hand.
- 10/9 22:22 – Blake Medical Center reports that facility is on Generator Power
    - Generator A-1 Emergency Power (Facility) – 90%, 8,600g diesel, 88.8g per hour burn rate. 104.6 hours total fuel time, 4.03 days.
    - Generator A-2 Emergency Power (Facility) – 90%, 8,600g diesel, 88.8g per hour burn rate. 104.6 hours total fuel time, 4.03 days.
    - Generator B-1 Emergency Power (East Tower and ER) – 98% 2,400g diesel, 21.5g per hour burn rate. 110.8 hours total fuel time, 4.6 days.
- All Children's Hospital is on FULL DIVERSION including Trauma Until further notice. 10/10 0356

ESF-11 Food & Water

- No update

ESF-12 Energy

- PRECO – 25,273 outages

- FPL – 33,320 outages
- Nolan and Myakka generators ready to go (both require manual start and transfer).
- Nolan, Generator ready to go; to manual start and manual transfer.
- Mayaka Generator ready to go to manual start and manual transfer.
- Bishop AS, in place and needs to be connected if needed (45 min)
- Both FPL and PRECO have liaisons in the EOC
- Some generators may be in flooded areas, plans are being made to mitigate

ESF-13 Military Support

- No update

ESF-14 Public Information

- Aggressively messaging shelter in place

ESF-15 Volunteer and Donations Management

- Currently receiving volunteer and donations thru 311, adding information into WEBEOC

ESF-16 Law Enforcement

- Skyway Bridge is CLOSED
- Patrols were suspended overnight but have resumed as of 1am, 10/10
- Palmetto Police has lost internet. Also, Palmetto City Hall has lost power which has knocked offline City Cameras which effect the Police Department 19:53:52.
- Palmetto City Hall now has generator power, but internet is still down 20:27:11.

ESF-17 Animal Services

- Cat town has been evacuated to Ft Lauderdale to be adopted out.
- All remaining animals are at Bishop, still pushing for fosters, 38 cats, 55 dogs, 1 Rabbit
- Shelter staff will be working 24 hrs at Bishop and in pet-friendly shelters
- Coordinating with Tampa Bay area rescues for post storm response
- 10 staff at Bishop with Vet on site for animal care during/after the storm
- Agriculture – Transportation fees are waived, can transport to GA, AL, MS, NC
- Hotline setup with Department of Agriculture for post storm
- Post storm resources lined up with nationwide assets
- As of 10/9 13:47 Manatee County Animal Welfare has suspended field operations
- 10/10 02:09 Reporting flooding water damage at Admin building

ESF-18 Business & Industry

- No update

ESF-19 Fuel

- Continuing topping of fuel for island generators and pumping operations
- Below is the list of tanks we will be filling today.
  Beach:
  -Jacksonville Fire & Rescue (ULSD)
  -Marine rescue gas fuel cube
  -IMT trailer (GAS)

PUMPS:
-NW Bradenton 9th Ave and Catalina
-57th Ave & 15 St E
-Whitfield & Lockwood Ridge
-Riomar (Prospect) two pumps
-Magellan two pumps

- POC: Karen Simpson Office: 7524 Cell: 941-720-2104

- Nolan Generator started at noon. 5' 5" = 4788 gallons.
- Filled Cortez radio tower-200 gallons
- Generators deployed to Myakka PW and Bishop Animal shelter
- Coordinated with Palmdale and Sunoco on fuel site deliveries.
- Jacksonville Fire & Rescue requesting fuel top off tomorrow a.m.
- As of 10/8 1900: 11 days of gas, 23 days of diesel.
- Nolan fuel delivery occurred this morning. Second delivery will later today.

Human Needs

- Contacted newly registered special needs registrants and those coming in through 311
- Finished call down at the Lakewood Ranch Library, staff will be working remote or at the ECO continuing to make calls, made around 2000 calls

IT/Radio

- Reminders going out for remote access, and if new personnel need access.
- 25 radios distributed to Property Management (Event 7)
- City of Bradenton will be on Interop 4
- Continuing programming efforts
- Hardening Myakka location
- P-25 system is 100% operational
- More than 30 network sites down

AuxComm

- Polling assets for their prep/evac plans
- AuxComm will be manned at the EOC thru the duration of the storm.

Beach and Water Safety

- ½ staff on standby at GT Bray, ½ staff on standby at North River Station 2
- Beach and water safety are shut down due to dangerous conditions (10/09 2130)

State of Florida – Division of Emergency Management

- No updates

Human Resources

- Will be sending out memo for pay procedures
- 534 employees who live in A, B, and C evacuation zones were contacted to assess their needs
- Request sent to employees for staffing at 9 shelters, 72 shifts per day Tuesday thru Friday

Finances

- Will be sending out information on how to code for Helene & Milton

Property Management

- Leagues are now closed down
- Relocating all vehicles in A/B/C zones to X zone such as Lakewood Ranch Library
- Ready to go

Damage Assessment

- On standby

Port Manatee

- Coast Guard relayed the port condition is level Zulu
- Shut down regular operations, will remain with skeleton crew until post storm.
- All trucks are 100%
- Fuel: 40% regular fuel (3-5 days), 31% premium (3 days), 50% diesel (4 days)
- Completed moving containers for storm prep

Drone

- Charged and on Standby
- Pilots have been briefed
- Scheduled missions for future flights
- Coordinating with pilots to capture post storm needs.

Sarasota Bradenton Airport

- Closed Tuesday at 1600 and planning to reopen at the earliest Friday 0600
- Losing part of a concourse roof

City of Bradenton

- Still a large amount of debris on the roadways
- Tiger Dams are set up for the Wastewater Station and Lift Station 14
- Taking measures to protect stormwater facilities and infrastructure
- PSOC is at Limited Level 1 Activation, 20 personnel, 2 FIT, and state personnel, with provisions for extended operations.
- Planning post-storm response
- Incident Command will be on radio channel Interop 4
- Mission request in for additional post storm Law Enforcement
- 60 foot low-boy tractor trailer was top centered across the Palma Sola Causeway completely blocking traffic at 7:30 a.m. The tractor trailer is located approximately 300 yards west of the Palma Sola Causeway bridge. It appeared that a driver and additional transport staff were attempting to figure out how to get the trailer off top center. The only east/west passage through the area is approximately a 20-foot area in the dirt parking lot on the north side of the road.
- Will redeploy 2 hygiene stations post storm
- DRC @ 15th Street E with community assistance.
- PD and FD sheltering in place
- Water plant is intentionally inactive; water on bypass

City of Palmetto

- No updates

City of Anna Maria

- FDOT left Monday and will not return until post-storm
- Law enforcement on duty and ready, will stay until weather starts pickup, then will leave the island

City of Bradenton Beach

- Approximately 98% of residents have evacuated
- Law enforcement on duty and ready, will stay until weather starts pickup, then will leave the island

City of Holmes Beach

- Have 27 Law Enforcement Officers arriving post-storm from Panama City
- Law enforcement on duty and ready, will stay until weather starts pickup, then will leave the island

Town of Longboat Key

- Law enforcement on duty and ready, will stay until weather starts pickup, then will leave the island

Clerk of Courts

- Closed through Friday 10/11

Court Administration

- Closed through Friday 10/11

Tax Collector

- No update

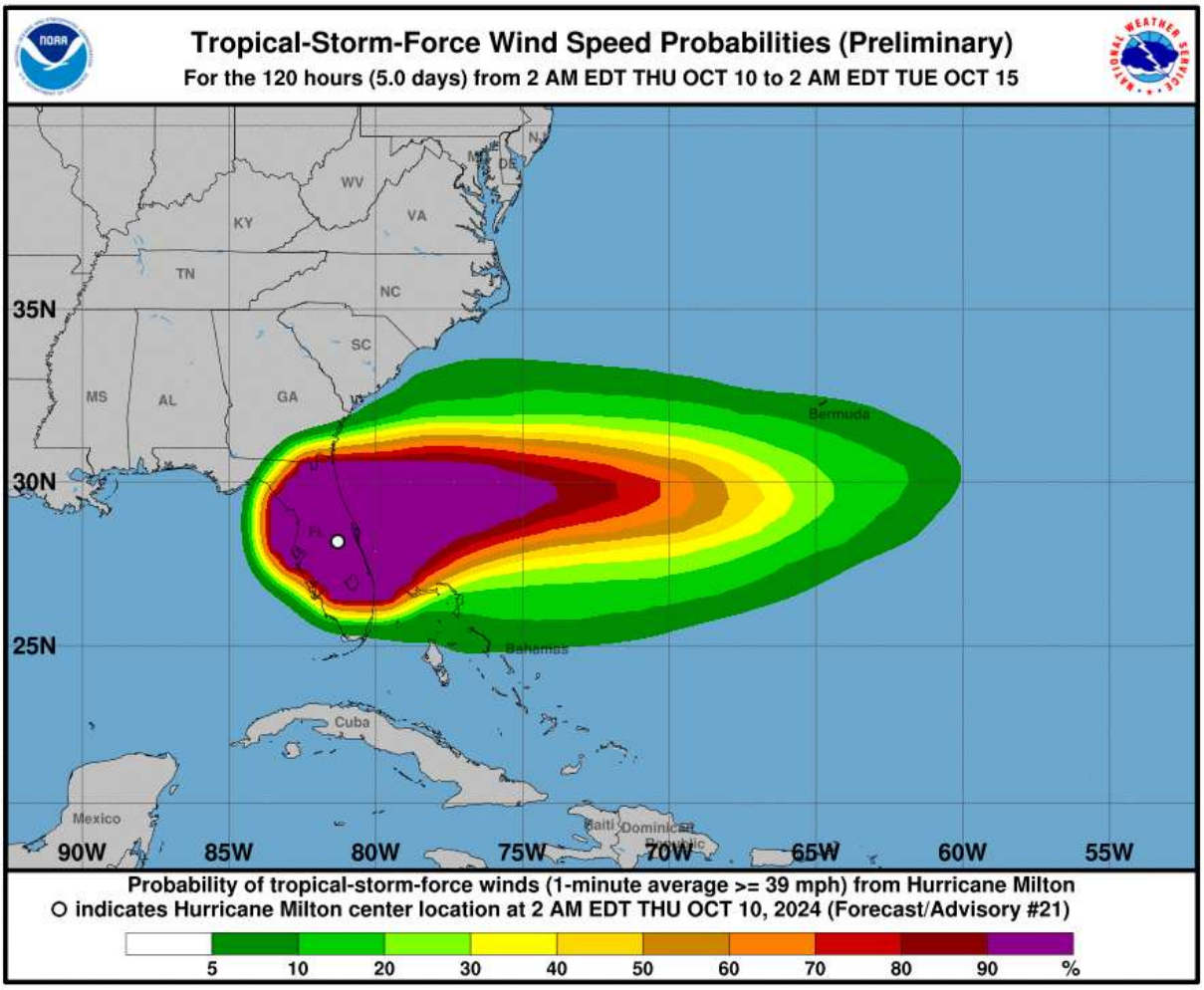
Property Appraiser's Office

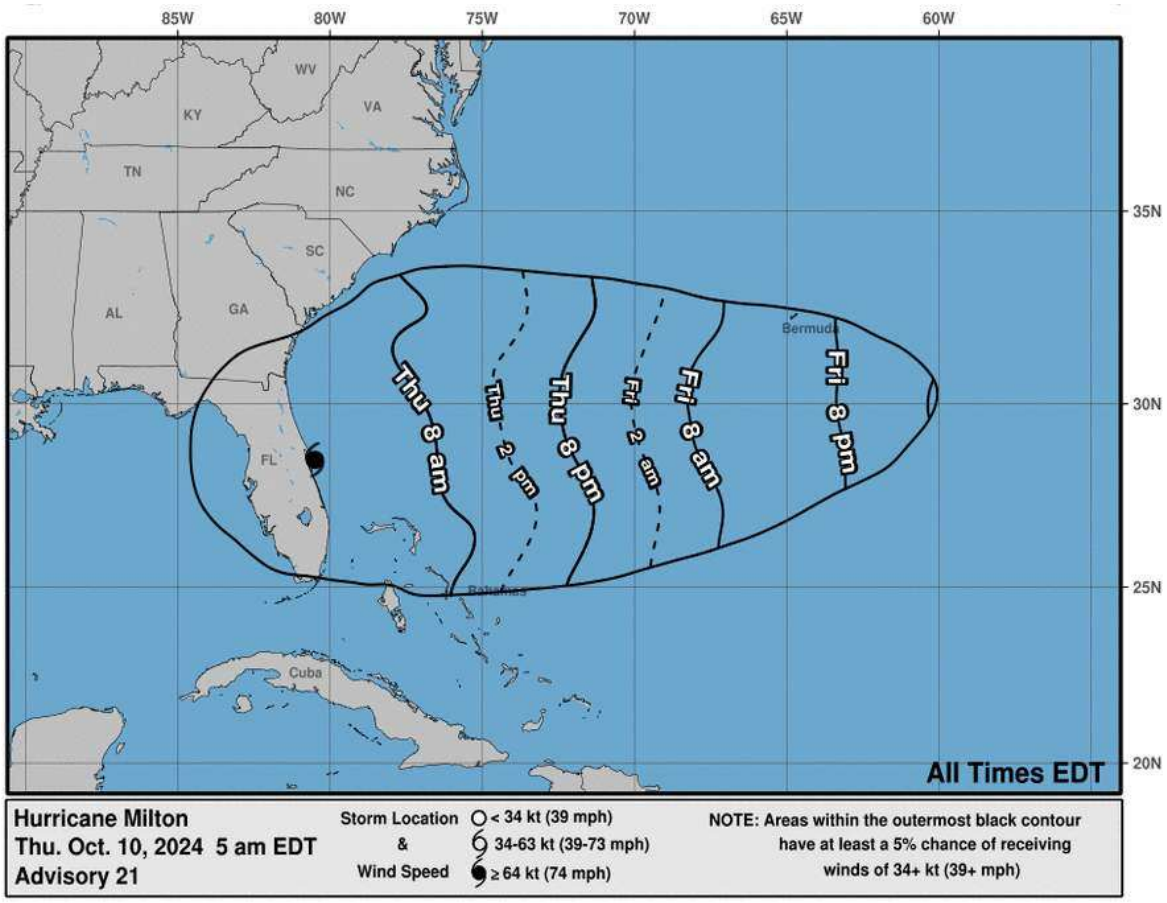
- No update

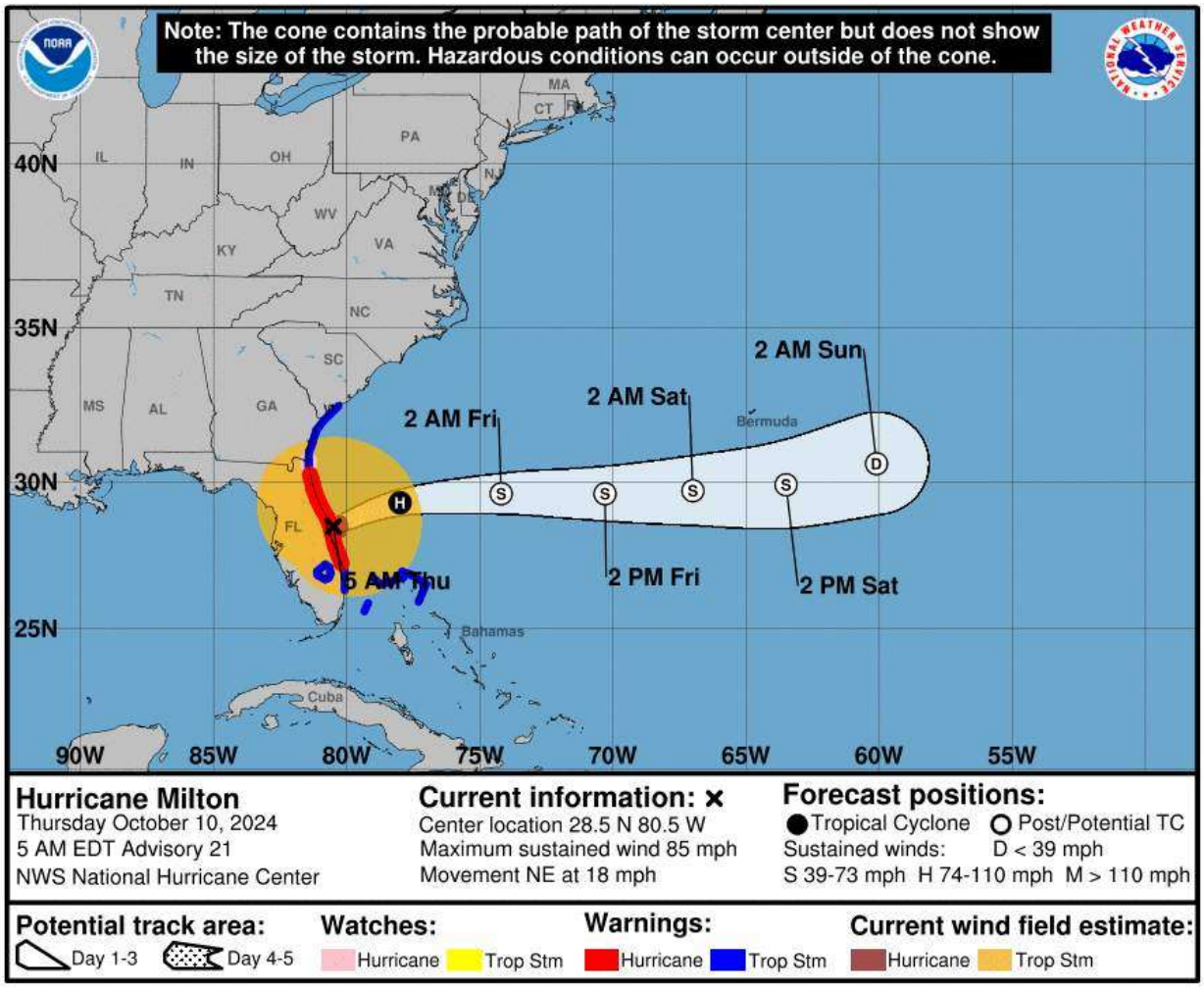
Supervisor of Elections

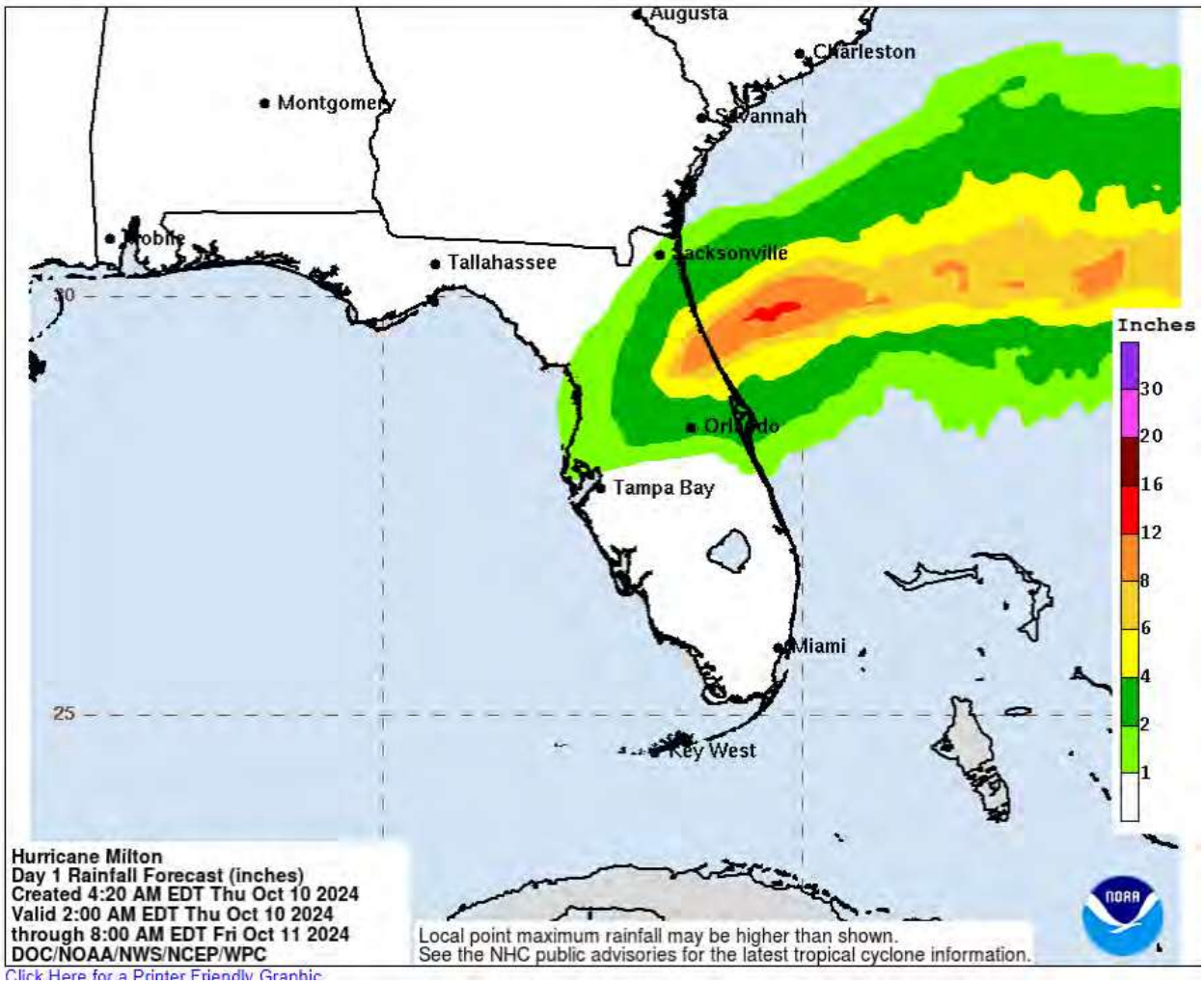
- Closed Wednesday and Thursday
- Meeting with Postmasters General to discuss post storm mail deliveries

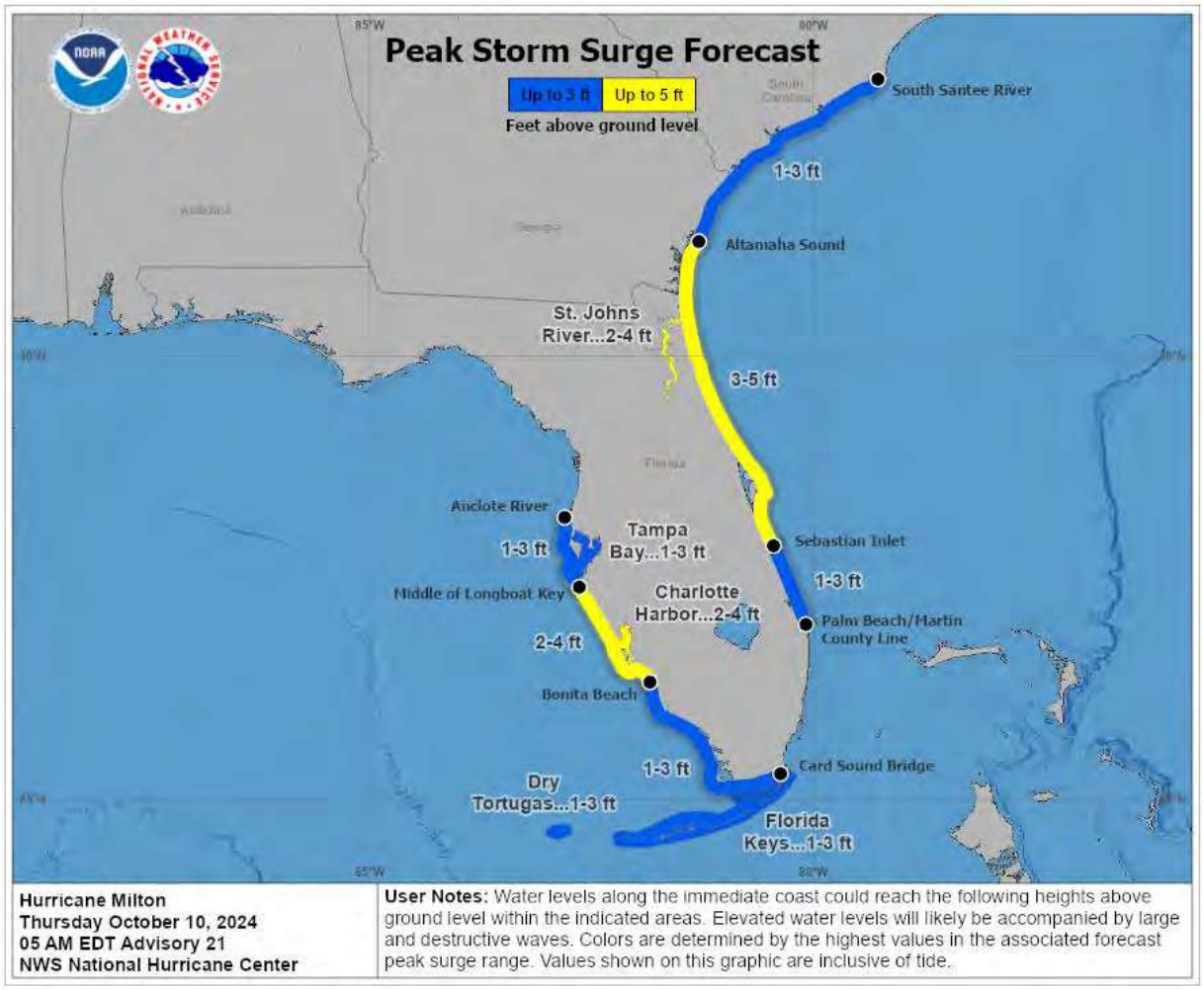
Incident Data and Maps


Tropical-Storm-Force Wind Speed Probabilities (Preliminary)
For the 120 hours (5.0 days) from 2 AM EDT THU OCT 10 to 2 AM EDT TUE OCT 15
WV
VA
KY
TN
NC
SC
MS
AL
GA
35N
30N
25N
Bermuda
Bahamas
Cuba
Mexico
Haiti
90W
85W
80W
75W
70W
65W
60W
55W
Probability of tropical-storm-force winds (1-minute average >= 39 mph) from Hurricane Milton
indicates Hurricane Milton center location at 2 AM EDT THU OCT 10, 2024 (Forecast/Advisory #21)
5
10
20
30
40
50
60
70
80
90
%


85W
80W
75W
70W
65W
60W
35N
30N
25N
20N
WV
KY
VA
TN
NC
SC
AL
GA
FL
Bermuda
Cuba
Thu 8 am
Thu 2 pm
Thu 8 pm
Fri 2 am
Fri 8 am
Fri 8 pm
All Times EDT
Hurricane Milton
Thu. Oct. 10, 2024 5 am EDT
Advisory 21
Storm Location & Wind Speed
< 34 kt (39 mph)
34-63 kt (39-73 mph)
≥ 64 kt (74 mph)
NOTE: Areas within the outermost black contour have at least a 5% chance of receiving winds of 34+ kt (39+ mph)


Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.
40N
35N
30N
25N
90W
85W
80W
75W
70W
65W
60W
55W
MA
CT
RI
PA
NJ
MD
DE
IL
IN
OH
WV
VA
KY
TN
NC
SC
MS
AL
GA
FL
Bermuda
Bahamas
Cuba
2 AM Fri
2 AM Sat
2 AM Sun
2 PM Fri
2 PM Sat
5 AM Thu
Hurricane Milton
Thursday October 10, 2024
5 AM EDT Advisory 21
NWS National Hurricane Center
Current information:
Center location 28.5 N 80.5 W
Maximum sustained wind 85 mph
Movement NE at 18 mph
Forecast positions:
Tropical Cyclone
Post/Potential TC
Sustained winds:
D < 39 mph
S 39-73 mph H 74-110 mph M > 110 mph
Potential track area:
Day 1-3
Day 4-5
Watches:
Hurricane
Trop Stm
Warnings:
Hurricane
Trop Stm
Current wind field estimate:
Hurricane
Trop Stm


Augusta
Charleston
Montgomery
Savannah
Mobile
Tallahassee
Jacksonville
30
Orlando
Tampa Bay
Miami
25
Key West
Inches
30
20
16
12
8
6
4
2
1
Hurricane Milton
Day 1 Rainfall Forecast (inches)
Created 4:20 AM EDT Thu Oct 10 2024
Valid 2:00 AM EDT Thu Oct 10 2024
through 8:00 AM EDT Fri Oct 11 2024
DOC/NOAA/NWS/NCEP/WPC
Local point maximum rainfall may be higher than shown.
See the NHC public advisories for the latest tropical cyclone information.
NOAA
Click Here for a Printer Friendly Graphic



Current EOC and County Objectives

Continue to monitor situation and report any unmet needs.

Note for Department Directors

Note for All County Leadership and Partner Organizations

Resources and Links

Public Messaging and Information

Contact Information

Public Safety Center/Emergency Operations Center | 941-749-3500
FDOH Manatee Hotline | 941-242-6649
FDOH COVID-19 Call Center | 1-866-779-6121
Media Inquiries – Manatee County Government | 941-745-3771
Media Inquiries – FDOH | 305-924-6839
Donations Hotline | 941-744-3939
WebEOC Login | https://eoc.mymanatee.org/eoc/default.aspx

UPCOMING EVENTS AND DEADLINES

Please send any incident-related updates, unmet needs, or other information relevant to this document to ESF5Planning@mymanatee.org for inclusion in the next iteration of this report. Situation reports will be disseminated at 9:00AM and 4:00PM until leadership determines the need no longer exists.

SITUATION REPORT #8 – Hurricane Milton

October 11, 2024 at 4:00pm

Jodie Fiske, Director
Manatee County Public Safety Department
2101 47th Terrace E, Bradenton, FL 34203

Updates occurring since the last report will be listed in red.

Event Name:	*Hurricane Milton*
Date:	*10/11/2024*
EOC Activation Level:	*Level 1 Modified Activation*
Current Operational Period	*8:00AM to 5:00PM*
Public Safety Contact:	*Jodie Fiske - jodie.fiske@mymanatee.org*
Emergency Management Contact:	*Matthew Myers – matthew.myers@mymanatee.org*
Media Information – Manatee County:	*James Nicholson – james.nicholson@mymanatee.org*
WebEOC Incident Name:	*2024 Milton*

Incident Overview

We are focusing on Response & Recovery following the departure of Hurricane Milton. The EOC is at Modified Level 1 Activation

Essential Elements of Information – Government Actions	
Fatalities:	*0*
Injuries:	*0*
Current Max Wind Speed	*N/A*
Current Pressure	*N/A*
EOC Mission Requests:	*Manatee County 206; Statewide 3180; missions, as of 10/11 @ 1500*
Local State of Emergency:	*In Effect*
Sandbag Stations Open:	*All sandbag locations are open as of this time, though are depleted from community preparation for Milton. Please see https://www.mymanatee.org/sandbags for more detailed information on each location*
Evacuation Orders:	*None in Effect*
Curfew:	*None in Effect*
Beach Closures:	*All still closed due to Hurricane Helene*
School Closures:	*Closed through Friday 10/11*
Road Closures:	*Numerous; see Road Closure board for detailed information. https://extreme-weather-dashboard-manateegis.hub.arcgis.com/pages/9dfa8bd9c9474126aede5d57d7539a28*
County Government Closures:	*Closed through Friday 10/11*
Shelters Open:	*0 General Population, 1 Special Needs: (Nolan); 88 total please see https://www.mymanatee.org/shelters for detailed information*

Actions and/or Incident Updates by Emergency Support Function, Partner, and Workgroup

ESF-1 Transportation and Public Works

- Highway Operations:

    - Road Closures & Info:
    - Manatee Ave and Cortez Road Barriers have been placed overnight. Emergency Vehicle access
- Road Closure: *Emergency Access Only* Cortez Road (Bridge) to Anna Maria Island Closure at 127th ST W
- Road Closure: *Emergency Access Only* Manatee Avenue (Causeway/Bridge) to Anna Maria Island Closure at west end of Perico Island
- Road Closures: Clay Gully Rd, Wauchula Rd @ Long Creek, Gulf Dr from Manatee Ave to Cortez Rd, Golf Course Road Bridge @ Gamble Creek Bridge, Jim Davis Rd @ Gamble Creek Bridge, Verna Bethany Rd @ Lake Manatee Bridge
- MCAT:
  Providing service for the following routes, all on an hour frequency-Rt 99 to/from airport only, Route 6, 3 east/west bound, route 1 and route 12. We will also be providing dialysis trips only for paratransit and continued assistance for evacuees.
- Highway Operations:
  Road Closures:
  Golf Course Road Bridge – water over road
  Jim Davis bridge closed - water over road
  CR 675 water in EB lane
  Verna Bethany rd over manatee River - closed - precautionary
- Pumps:
  Pumps being deployed to Seaport Manatee to dewater containment area.
- Traffic Operations: PHOTO MAP BELOW
  As of 15:00
  29 Signals on generator.
  18 Signals on Flash
  170 Signals Power or Communication Error

ESF-2 Communication/311 Call Center

- 75 Radios went to 5 cities
- Central Park CERT reports Traffic Signal down on 44th Ave East at BD Gullet Elementary. Entrance to the community is blocked.
- FL-TERT contacted ESF-2 and is arranging a team of 12 telecommunicators from Collier County and Miami-Dade Fire Rescue for ECC, will update when enroute.
- 70% of radio sites on generator
- Taken over 12,300 calls since Tuesday 10/8

ESF-3 Utilities

- Tiger Dam has been installed at the Northwest Booster Pump Station.
- 66th St Utilities evacuated to 24th St warehouse
- Lake Manatee is currently at 39.30 ft with an inflow of 2,950 cfs and outflow of 2,096 cfs.
- Sink hole on west bound lane at 60th Ave W & Hopkins Dr N
- The Water Treatment Plant and the North and Southeast Water Reclamation Facilities are on generator power.
- The Southwest Water Reclamation Facility just got power restored.

- The East County Wellfield is back up on power to supplement potable water supply.
- Water restored to the Island and a boil water notice is in effect.
- There are currently 461 lift stations out of service.
- Solid waste Collections have resumed today and tomorrow.
- The Landfill will be open 8 am to 5 pm today and tomorrow. The landfill will be closed Sunday and reopen 6 am to midnight Monday.
- Debris Contractor is currently completing the push effort to clear roads.
- A shout out to Fuel services for the continued help to keep our critical infrastructure on generator's fueled and the FP&L/The State for helping get an order to fuel up our all of our Treatment Plants.
- We have a few unmet needs in WebEOC but nothing additional at this time.

ESF-4/9/10 Fire, Search and Rescue, and Hazmat

- Housing some of MSO boats and vehicles at the Myakka location.
- Disposal site designated for SMALL Lithium-Ion batteries: Southern Manatee Fire Rescue will accept small (scooters etc.) sized lithium batteries at their station 2 located at 1911 30th Ave E.
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- City of Bradenton water main break. City crews actively working to make repairs.
- East Manatee Fire is relocating a tanker to EMFR station 2 to standby for BFD until the water main is repaired.
- East Manatee Fire is reporting that Tanker 654 is out of service and will not be back online anytime soon.
- East Manatee Fire has evacuated their old station 11 and their station 12 (the old Myakka stations). They have relocated to the new station 11 in service at 10215 Wauchula Rd. Manatee County EMS Medic 71 and Alpha 14 have also relocated to the new facility.
- BFD station #2 personnel are relocating to BFD station #1.
- BFD Station 1 is on generator power as of 18:05.
- EMFR: All stations and admin are on generator 10/09 20:59
- CHFR stations 1 and 2 on generator.
- 4 Westminster residents that refused to evacuate:
- NRFD 3 and 4 evacuated and in place at shelter locations
- Cedar Hammock Fire has evacuated their station 3 and station 4 18:57:40
- SMFR: Amin, stations 1 & 5 on generator
- Duette Fire Rescue on generator power 19:10:23.
- Parrish Fire: stations 1 & 2 on generator
- 10/9 23:06 – City of Bradenton PSOC is offline: lost power and has lost their generator. Request is for replacement or repair of generator at earliest possible time.
- 10/10 03:44 – NRFD all stations are on generator power
- 10/10 0515 – Myakka fuel depot is without power and out of service.
- Railroad gate arms down on the tracks at 9th Ave W crossing
- State USAR teams in county for damage assessment and documentation; no rescues needed.

- Compiling fuel needs- almost all stations are on generator
- North River Fire has a need for marine fuel for their fire boat FB516. East Manatee Fire is going to fill that request with on hand resources from their station 5.
- City of Bradenton Fire station 2 continues to be on generator power and they estimate at the current burn rate that they have 2 days of generator power remaining. A mission request for propane refuel has been submitted.
- Bradenton Fire Department is working with mutual aid partners to move up tankers to assist with covering the city in case of a water system pressure reduction.

ESF-5 Information and Situational Awareness

- GIS requests- placed detailed requests in WebEOC including how the deliverables will be used

ESF-6 Mass Care and Sheltering

- Only the Special Needs shelter is left open: Nolan Middle
- Per FHP : I-275 North bound lanes - It is only open to one lane due to tree debris at 7.5 Mile Marker; FHP Chainsaw crews will be clearing the debris and update will come once clear
- The County is coordinating placing 8 POD's (Point of Distribution) across the county.

ESF-7 Procurement and Resource Support

- No update

ESF-8 Public Health and Medical Support

- Manatee Memorial Hospital is on full diversion until further notice.
- Relocating EMS assets for continuation of operations
- We have secured permission to use Bradenton Motorsports Park and The Freedom Factory Racetrack located at 21000 SR 64 E. for any staging needs.
- Against advisement, Manatee River Assisted Living Facility is not evacuating from Evacuation Zone B.
- Contract nurses have been called in to assist with special needs shelters
- 10/9 22:18 - Lakewood Ranch Medical Center is currently on generator power. No significant structural damage identified at this time. No needs at this time. Plenty of fuel on hand.
- 10/9 22:22 – Blake Medical Center reports that facility is on Generator Power
    - Generator A-1 Emergency Power (Facility) – 90%, 8,600g diesel, 88.8g per hour burn rate. 104.6 hours total fuel time, 4.03 days.
    - Generator A-2 Emergency Power (Facility) – 90%, 8,600g diesel, 88.8g per hour burn rate. 104.6 hours total fuel time, 4.03 days.
    - Generator B-1 Emergency Power (East Tower and ER) – 98% 2,400g diesel, 21.5g per hour burn rate. 110.8 hours total fuel time, 4.6 days.
- All Children's Hospital is on FULL DIVERSION including Trauma Until further notice. 10/10 0356
- All held calls have been addressed
- Checking on facilities and encouraging them to have inspections prior to re-occupying
- Actively working on the discharge of patients from the shelter.

ESF-11 Food & Water

- No update

ESF-12 Energy

- PRECO – 143,800 outages (60%)
- FPL – 15,631 outages (30%)
- Nolan and Myakka generators ready to go (both require manual start and transfer).
- Nolan, Generator ready to go; to manual start and manual transfer.
- Mayaka Generator ready to go to manual start and manual transfer.
- Some generators may be in flooded areas, plans are being made to mitigate
- Magnolia Ave and South Bay Blvd (Anna Maria) Powerlines are across the roadway

ESF-13 Military Support

- No update

ESF-14 Public Information

- No update

ESF-15 Volunteer and Donations Management

- Currently receiving volunteer and donations thru 311, adding information into WEBEOC

ESF-16 Law Enforcement

- Palmetto Police has lost internet. Also, Palmetto City Hall has lost power which has knocked offline City Cameras which effect the Police Department 19:53:52.
- Palmetto City Hall now has generator power, but internet is still down 20:27:11.
- PER FHP : I-275 North bound lanes - It is only open to one lane due to tree debris at 7.5 Mile Marker
- Working with multiple state agencies, manning major intersections with down traffic signals, manning extra patrols in the mobile home parks
- Since 2100 on 10/9/24, The Palmetto Police Department has been on generator power only.
- We have an officer on scene monitoring but this is a county intersection. Requesting that one-two units from MSO be enroute to monitor and control traffic.

ESF-17 Animal Services

- All remaining animals are at Bishop, still pushing for fosters, 38 cats, 55 dogs, 1 Rabbit
- Shelter staff will be working 24 hrs at Bishop and in pet-friendly shelters
- 10 staff at Bishop with Vet on site for animal care during/after the storm
- Agriculture – Transportation fees are waived, can transport to GA, AL, MS, NC
- Hotline setup with Department of Agriculture for post storm
- 10/10 02:09 Reporting flooding water damage at Admin building
- Bishop shelter is at capacity and has their generator up and running
- Planning an emergency adoption event
- Palmetto Shelter will need significant clean-up before it will be usable

ESF-18 Business & Industry

- No update

ESF-19 Fuel

- Continuing topping of fuel for island generators and pumping operations
- Nolan Generator started at noon. 5' 5" = 4788 gallons.
- Filled Cortez radio tower-200 gallons
- Generators deployed to Myakka PW and Bishop Animal shelter
- As of 10/8 1900: 11 days of gas, 23 days of diesel.
- State missions in for fuel for numerous Fire Department generators
- Completing fuel mission request with assistance through FDEM.

Human Needs

- Calling aging services clients to assess needs

Temporary Housing

- Red cross is looking at 2 possible longer-term shelter locations

IT/Radio

- 25 radios distributed to Property Management (Event 7)
- City of Bradenton will be on Interop 4
- P-25 system is 100% operational

AuxComm

- AuxComm has been demobilized

Beach and Water Safety

- ½ staff on standby at GT Bray, ½ staff on standby at North River Station 2

State of Florida – Division of Emergency Management

- No updates

Human Resources

- Request sent to employees for staffing at 9 shelters, 72 shifts per day Tuesday thru Friday

Finances

- Will be sending out information on how to code for Helene & Milton

Property Management

- Staff cleaning up parks
- Staff is still assessing damage

Damage Assessment

- Deploying for special needs assessment
- Beginning windshield assessments 10/12 0800
- 74% done with Special Needs assessments

Port Manatee

- No electrical power; FPL notified to prioritize
- No fuel coming out of the port

- Working on repairing generator

Drone

- Charged and on Standby
- Scheduled missions for future flights
- 3 teams assessing mobile home parks
- High & Low altitude flights are in progress

Sarasota Bradenton Airport

- Closed Tuesday at 1600 and planning to reopen at the earliest Friday 0600
- Losing part of a concourse roof
- Airfield is operational

City of Bradenton

- Still a large amount of debris on the roadways
- Tiger Dams are set up for the Wastewater Station and Lift Station 14
- Incident Command will be on radio channel Interop 4
- Will redeploy 2 hygiene stations post storm
- DRC @ 15th Street E with community assistance.
- Water plant is intentionally inactive; water on bypass
- In power restoration mode at the PSOC, awaiting a permanent generator
- River District sustained minor to moderate flooding with similar damage as Helene
- Significant water outage
- Infrastructure including lift stations being evaluated
- Water plant had minor intrusion and is still on bypass

City of Palmetto

- Significant impacts, working through all issues
- Since 2100 on 10/9/24, The Palmetto Police Department has been on generator power only.

City of Anna Maria

- Assessing damage
- There was significant damage and many power lines down

City of Bradenton Beach

- Approximately 98% of residents have evacuated
- Law enforcement on duty and ready, will stay until weather starts pickup, then will leave the island
- No flooding, Milton was a wind event, many power lines down, and compromised roofs

City of Holmes Beach

- Have 27 Law Enforcement Officers arriving post-storm from Panama City

Town of Longboat Key

- No updates

Clerk of Courts

- Closed through Friday 10/11
- Sustained possible roof damage, awaiting full assessment

Court Administration

- Closed through Friday 10/11

Tax Collector

- No update

Property Appraiser's Office

- No update

Supervisor of Elections

- Meeting with Postmasters General to discuss post storm mail deliveries

Incident Data and Maps



Tonight	Saturday	Saturday Night	Sunday	Sunday Night
				
Low: 69 °F	High: 85 °F	Low: 70 °F	High: 86 °F	Low: 71 °F
Partly Cloudy and Breezy then Partly Cloudy	Sunny	Partly Cloudy	Mostly Sunny then Slight Chance T-storms	Slight Chance T-storms then Partly Cloudy

Current EOC and County Objectives

Continue to monitor situation and report any unmet needs.

Note for Department Directors

Note for All County Leadership and Partner Organizations

Resources and Links

Public Messaging and Information

Contact Information

Public Safety Center/Emergency Operations Center | 941-749-3500
FDOH Manatee Hotline | 941-242-6649
FDOH COVID-19 Call Center | 1-866-779-6121
Media Inquiries – Manatee County Government | 941-745-3771
Media Inquiries – FDOH | 305-924-6839
Donations Hotline | 941-744-3939
WebEOC Login | https://eoc.mymanatee.org/eoc/default.aspx

UPCOMING EVENTS AND DEADLINES

Please send any incident-related updates, unmet needs, or other information relevant to this document to ESF5Planning@mymanatee.org for inclusion in the next iteration of this report. Situation reports will be disseminated at 9:00AM and 4:00PM until leadership determines the need no longer exists.

APPENDIX C

MILTON LINE BREAK WORK ORDER REPORT

Date & Time Reported	Address	Issue Reported
10/9/24 9:06 PM	701 Moorings Way, Bradenton 34212	Palm tree fell on to water main / pipe / meter in front of home. Customer turned off water at meter and he said it is bubbling before meter before
10/10/24 3:48 AM	4700 Block of 15th St E	Fire Hydrant spraying water
10/10/24 3:52 AM	2416 13th Ave W, Bradenton 34205	Main water line broken and water is spraying everywhere
10/10/24 7:54 AM	6751 2nd Ave Cir W, Bradenton 34209	caller states oak tree fell on backflow and has water flowing everywhere. unsure if has damaged meter or damaged on county side. started yesterday afternoon.
10/10/24 7:39 AM	7661 Ridge Lake Cir, Bradenton, FL 34203	Filtration system on side of house got knocked off from Milton, water will not shut off and flooding the neighborhood
10/10/24 8:46 AM	2628 32nd Avenue East	Broken water pipe at 2628 32nd Avenue East, Bradenton, FL.
10/10/24 9:12 AM	194 Poinciana Drive Ellenton, 34222	Caller says there is water gushing from a line that was hit at their neighbors house. They are unable to shut their water off and it is beginning to flood her yard. the neighbors roof is blocking the break. Colony Cove

10/10/24 8:33 AM	Carlton Arms, back side 39th St E (caller does not live at Carlton Arms)	caller states there is water gushing from carlton arms apartments building on the back side 39th St E, Bradenton, caller unsure of what building number it is coming from
10/10/24 9:42 AM	7505 52nd Terr E Bradenton FL	Water main burst
10/10/24 10:09 AM	302 Braden Ave	Water main burst. Infomation provided by MSO dispatch from field.
10/10/24 10:13 AM	142 51st St Cir E	Water line is broke from a tree and water is flowing
10/10/24 10:46 AM	1804 51st St W Bradenton, FL 34209	tree fell on backflow preventer and water gushing out. Tried to turn it off but won't so must be coming out of the pipe. It is starting to flood property and close to lift station there
10/10/24 11:11 AM	3307 7th Street Cir W, Palmetto, FL 34221	Tree limb fell onto backflow & water is flooding the roadway. Requesting assistance with getting water off
10/10/24 11:11 AM	147 Americans Cup BLVD, Bradenton 34208	Caller reports that there is a large pipe break in her yard. Water to her house is nor working and the "fountain" in her yard is flooding her street.
10/10/24 11:33 AM	428 59th St NW Bradenton	Water break onto 5th Street from their yard
10/10/2024	147 babbling brook run bradenton ,fl 34212 in River Strand	no water service to home and water is bubling up out of ground by backflow and is not the valve

10/10/24 12:20 PM	7611 17th Ave, Bradenton	Water main break at sidewalk
10/10/24 12:20 PM	2808 60th Ave W, Bradenton	Tree fell and pulled water pipe out of ground, flooding property
10/10/24 11:53 AM	319 Braden Ave	FD is reporting water main break at 319 Braden Ave
10/10/24 12:59 PM	152 Adair Avenue, Sarasota	Tree fell broke pipes under the roadway.
10/10/24 1:04 PM	1710 2nd Ave W, Plametto	Carissa called to report that she has a burst pipe against her home and they cant get to the valve to turn it off
10/10/24 1:14 PM	10606 Klee Ave Bradenton FL 34212	Water is line/meter maine broke and water is running down the street, these are elderly ladies out of water
10/10/24 1:34pm	607 14th St E Palmetto FL, 34221	Tree limbs busted pipe at the neighbors house
10/10/24 1:31 PM	6115 Misty Oak Street Sarasota Fl 34243	Tree came down on resident Neighbour water meter. (UTILITIES)
10/10/2024 1:40pm	4019 Osprey Harbour Loop Cortez, FL 34215	Water line break in front of house
10/10/24 1:49 PM	2808 60th Ave W, Bradenton	tree fell and pulled water pipe out of ground and is flooding property ****cancel - resident called back to 311 and stated that someone fixed it and req to cancel - cancelled WEBEOC ****

10/10/24 1:18 PM	6510 Dakoata St. Bradenton 34207	caller states water pipe is broken, water currently gushing, states it is behind home, states it was not a personal line. stated there are pieces of roofing near pipe
10/10/24 2:12pm	431 49th St W Palmetto, FL 34221	Water flooding the yard from a broken water main..
10/10/24 2:07 PM	700 Jacaranda Rd in Anna Maria	water main break @ 700 Jacaranda Rd in Anna Maria
10/10/24 8:12AM	303 Hillcrest Dr Bradenton	water flowing out of toilets - flowing fast and needs assistance
10/10/2024 2:37	11228 Little River Way Parrish FL, 34219	Steady flow of water coming out of water meter box
10/10/24 2:25 PM	360 & 364 hernando ave, sarasota 34243	360 / 364 hernando ave, sarasota 34243. caller states no water in neighborhood currently. no active leaks in neighborhood that they can see
10/10/24 2:35 PM	6103 Riverview Blvd Bradenton	David Tudor called to report that he has a busted water line next or under his home. He says it is urgent.
10/10/24 2:48PM	316 Hernando Ave Sarsota	customer states that they are not getting water at their home and the surrounding houses are having the same issue. - came in through QAlert
10/10/24 3:28 PM	9011 63rd Ave Dr. East, Bradenton	Busted water line in front of home water running out / tree fell on line

10/10/2024 3:52PM	2628 32nd Ave e Bradenton	Tree ripped out water pipe in front of this location - water leaking everywhere.
10/10/24 2:45 PM	3911 US 301 N Ellenton	behind Popi's in Ellenton main pipe behind building burst / water flowing into neighborhood in the south
10/10/24 3:49 PM	3915 38th Ave E Palmetto	Tree limb fell on water pipe & broke it, causing water to flow onto property. Caller believes that homeowner was able to turn off water to stop flooding, but is unsure
10/10/24 4:17 PM	6201 US 41 N UP	COUNTRY LAKES VILLAGE-- OFFICE ROADS FLOODING POSS WATER MAINBREAK
10/10/24 4:19 PM	6045 Lilli Way, Bradenton, FL 34207	Has no water and would like to know when would be back on.
10/10/24 5:38 AM	5944 Riverview Blvd	Tree fell on Backflow and needs BF turned off.
10/10/24 4:53PM	620 64th St Ct E Palmetto FL 34221	backflow valve have been expelling water all day
10/10/24 11:15PM	8737 28th St Cir E Parrish	Water pipe burst or broken and water seeping out of asphault on the road in front corner of house
10/11/24 7:24AM	8250 Enclave Way Sarasota	outside by the curb gushing water out of the drainage gate, to the left of the home in front
10/11/24 8:12AM	7122 58th Ter e Palmetto	water coming out of sidewalk and road
10/11/24 8:27AM	5102 19th Ave W Bradenton	water main pipe burst yesterday 10/10 and is much worse today and caller stated no water to home and unable to stop water gushing from the pipe near the backflow.

10/11/24 9:27AM	928 Winter Garden Dr Sarasota	Water spewing from underground and flooding yard and the street
10/11/2024 10:53	9220 67th Ave e	Water main break reported by Patrolling code enforcement
10/11/2024 9:53AM	4903 Mangrove Point Rd Bradenton	Tree fell over and broke water line, water washing out the side of the house under the foundation
10/11/24 1:09PM	4412 100th St W Bradenton	Tree fell and broke water pipe, water flooding out. Home owner turned off the water at the main water valve at the road way. Unsure if this will affect other homes.
10/11/24 4:41PM	4418 124th Street Ct W, Cortez Village	Water meter leaking.
10/11/24 6:44PM	310 whitfield Ave / Manatee st	Water main break flooding intersection
10/11/24 6:53 PM	Approx 4424 18th St E Palmetto	Employee Shannon Cox came in to report a water leak in the industrial park on 18th St E @Aer-Flo on the North side of the property next to the fire hydrant.
10/11/24 7:29 PM	724 Twin Rivers Trl Parrish	Caller reports that the pipes in their yards and sidewalks are flooding multiple yards.
10/12/24 9:16AM	1658 16th Ave E Palmetto	Potable ARV blown off here - needs repair asap
10/12/24 8:52 AM	1207 32nd St Ct E Bradenton	Customer has water all over the lawn, thinks it might be a meter leaking. Tried to shut the water off but theres still water leaking all over.

10/12/24 9:29AM	7207 Willow St Sarasota	No water at home - BF was shut off -- was sent to on call meter tech Rick Sarson
10/12/24 9:33AM	289 Petrel Trl Bradenton	House is flooding from people using the water and needs someone out there asap.
10/12/24 9:37AM	627 Foxworth ln Holmes Beach	Water main break, neighbor calling in due to resident not being home.
10/12/24 10:20AM	109 39th St Ct NW Bradenton	Broken Water main
10/12/24 10:29AM	16003 33rd Ct E	Meter broken and county needs to repair
10/12/24 10:32AM	120 39th ST Ct NW Bradenton	Water pipe- clear water flowing and pooling on the road and spraying up from the pressure, this was just repaired a week ago and they have not paved over it yet.
10/12/24 11:22AM	501 Horseshoe Loop Rd Terra Ceia	Water right next to road, clear clean water, going down the driveway.
10/12/24 1:55 PM	7807 2nd Ave W Bradenton FL	Thinks there's a leak at her meter box.

APPENDIX B

GIS DATA COLLECTION TABLE

GIS Data Collection

Dataset	Source	Categories
Aerial	Manatee County	Overall Aerial*
Environmental	USDA NRCS	Contaminated Soils
		Groundwater*
		Soil Conditions/Materials*
	US Fish and Wildlife Service	National Wetland Inventory*
	FEMA	FEMA Flood Maps*
	FDEP	Petroleum Contamination Monitoring Zones
		Groundwater Contamination Area
		Florida Superfind Waste Cleanup Sites
		Drycleaning Solvent Program Cleanup Sites
		Florida State Funded Cleanup Sites
		ERIC Waste Cleanup Zone
Endangered Species	Manatee County - Natural Resources	Gopher Tortoise Site Permitted Areas*
	Florida Department of Wildlife and Conservation	Scrub-Jay Nest*
	National Audubon Society	Audubon Eagles Nest
	Florida Natural Areas Inventory (FNAI)	Florida Natural Areas Inventory
	Florida Fish and Wildlife Conservation Commission	FWC Wildlife Occurrence Data
	Bat Conservation and Management	Florida bonneted bat survey data
Facilities	Manatee County	County Facilities*
		Right-of-way*
		Public Utility Easements
		Parks
		School
		Daycare
		Health Medical

		Hospitals
		Lake*
Parcels	Florida Geographic Information Office	Florida Statewide Parcels*
Transportation	FDOT	State Roads*
	Manatee County	County Roads*
		Major Roads
		Bus Routes
		Railroads
		Evacuation Routes
		Trails
Utilities	Manatee County	Stormwater*
		Water Main*
		Sanitary Sewer*
		Reclaimed Water*
		Electrical*
		Gas
		Fiber Optic*
		Underground Injection Control Class I Wells
		Underground Injection Control Class V ASR Wells
		Underground Injection Control Class V ASR Non-Wells
		Special Crossings
Natural, Cultural, and Historical Resources	FDEP	Historical and Cultural Assets*
		Conservation Lands*
		Wetlands*
		Shorelines
		Surface Waters*

Contains data and information that are important to the project and may impact the project area.

APPENDIX C

NRCS SOIL REPORT FOR MANATEE COUNTY

United States Department of Agriculture

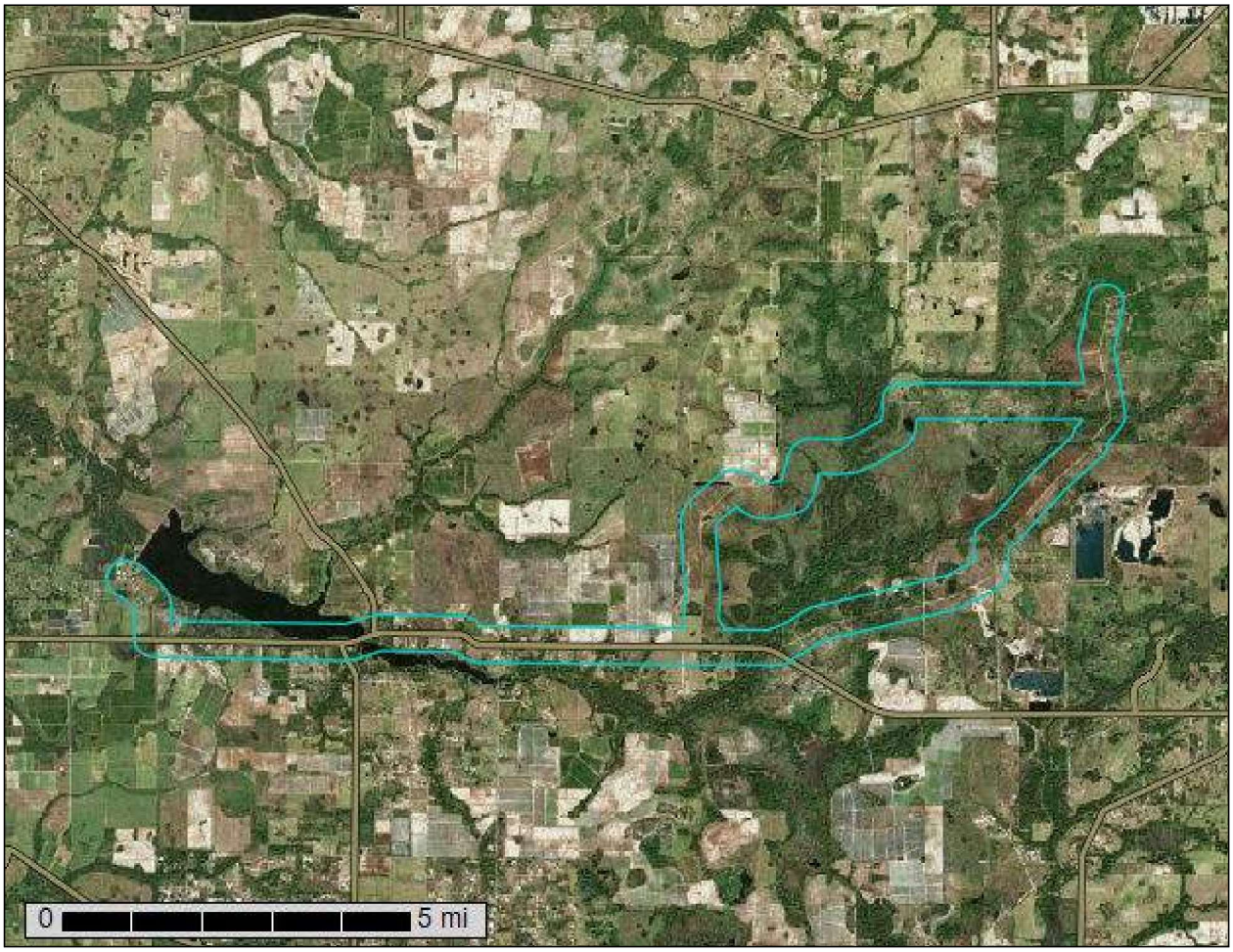
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Manatee County, Florida

Project Boundary



August 25, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

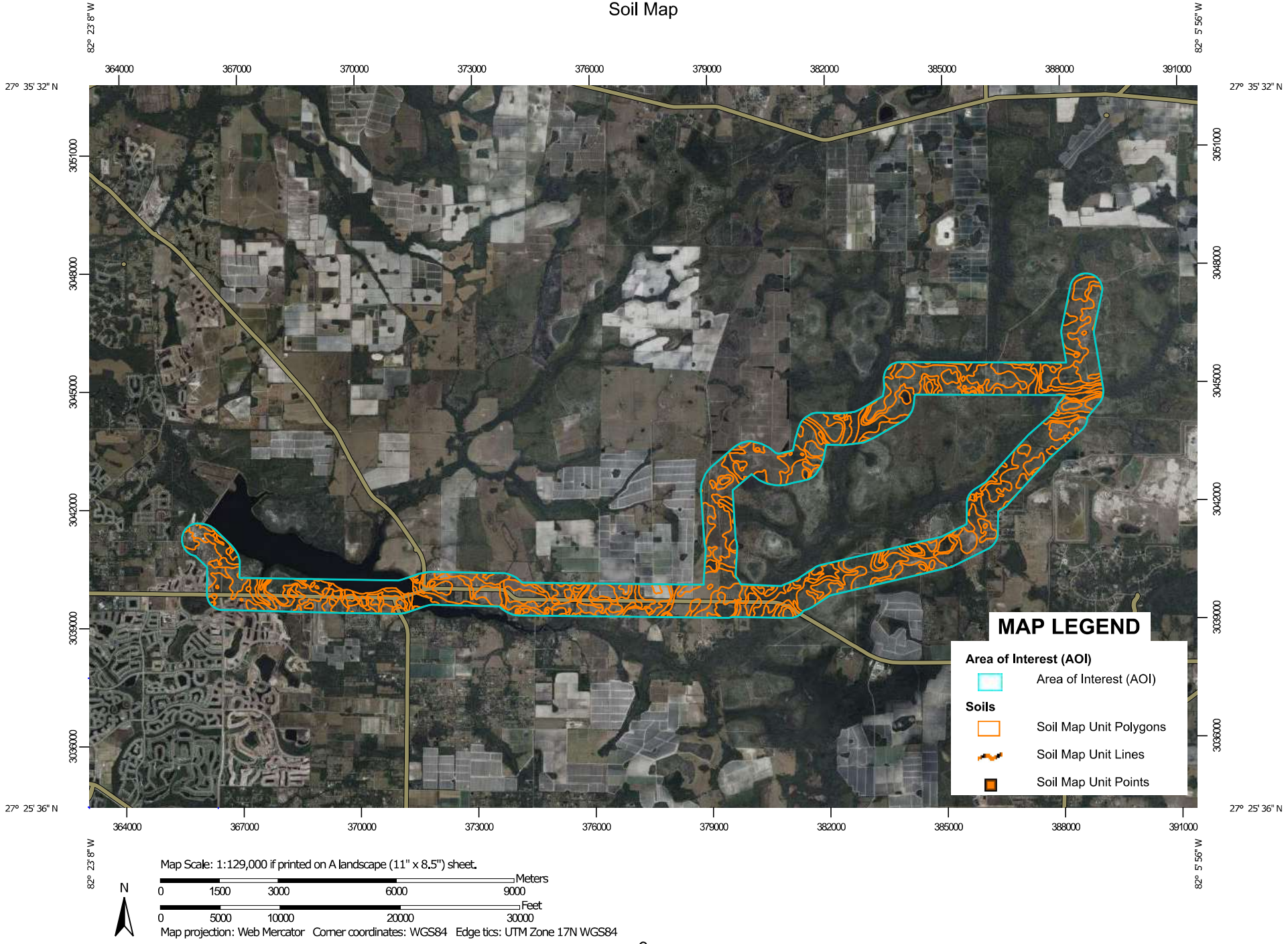
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


82° 23' 8" W
82° 5' 56" W
27° 35' 32" N
27° 25' 36" N
364000
367000
370000
373000
376000
379000
382000
385000
388000
391000
3051000
3048000
3045000
3042000
3039000
3036000
MAP LEGEND
Area of Interest (AOI)
Area of Interest (AOI)
Soils
Soil Map Unit Polygons
Soil Map Unit Lines
Soil Map Unit Points
Map Scale: 1:129,000 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 1500 3000 6000 9000
Feet
0 5000 10000 20000 30000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Manatee County, Florida
Survey Area Data: Version 22, Aug 28, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 25, 2025—Feb 23, 2025

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Adamsville variant fine sand	0.0	0.0%
3	Braden fine sand	56.9	0.7%
7	Canova, Anclote, and Okeelanta soils	107.8	1.2%
11	Cassia fine sand, 0 to 2 percent slopes	441.6	5.1%
12	Cassia fine sand, moderately well drained	29.3	0.3%
16	Delray complex	5.6	0.1%
18	Delray-Pomona complex	497.8	5.7%
19	Duette fine sand, 0 to 5 percent slopes	525.0	6.1%
24	Felda-Wabasso association, frequently flooded	242.1	2.8%
26	Floridana-Immokalee-Okeelanta association	122.7	1.4%
30	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	492.7	5.7%
31	Myakka fine sand, 2 to 5 percent slopes	348.8	4.0%
35	Ona fine sand, orstein substratum	30.1	0.3%
36	Orlando fine sand, moderately wet, 0 to 2 percent slopes	34.8	0.4%
37	Orsino fine sand, 0 to 5 percent slopes	9.1	0.1%
38	Palmetto sand	34.1	0.4%
42	Pomello fine sand, 0 to 2 percent slopes	1,761.5	20.3%
43	St. Johns fine sand, 2 to 5 percent slopes	497.3	5.7%
45	Tavares fine sand, 0 to 5 percent slopes	224.8	2.6%
52	Waveland fine sand	2,552.4	29.4%
54	Zolfo fine sand, 0 to 2 percent slopes	411.9	4.7%
55	Zolfo fine sand, 2 to 5 percent slopes	45.5	0.5%
99	Water	203.2	2.3%
Totals for Area of Interest		**8,675.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Manatee County, Florida

1—Adamsville variant fine sand

Map Unit Setting

National map unit symbol: 1hg7m
Landscape: Coastal plains
Elevation: 20 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Adamsville variant and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adamsville Variant

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 8 inches: fine sand
C - 8 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Myakka, non-hydric
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Ona, non-hydric
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Orlando
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA003FL - Dry Yellow Sands Pine Woodland
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

St. johns, non-hydric
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Seeps on marine terraces
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R155XY110FL - Wet Sandy Cutthroat Seeps and Flatwoods
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

3—Braden fine sand

Map Unit Setting

National map unit symbol: 1hg8b
Landscape: Coastal plains
Elevation: 0 to 110 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Braden and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Braden

Setting

Landscape: Coastal plains
Landform: Stream terraces on flood plains on marine terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy alluvium

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 28 inches: fine sand
Bt - 28 to 40 inches: fine sandy loam
Cg - 40 to 70 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Ecological site: F155XY160FL - Sandy over Loamy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy over loamy soils on rises and knolls of mesic uplands (G155XB231FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on rises and knolls of mesic uplands (G155XB231FL)
Hydric soil rating: No

7—Canova, Anclote, and Okeelanta soils

Map Unit Setting

National map unit symbol: 1hg9b
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Canova and similar soils: 40 percent
Anclote and similar soils: 25 percent
Okeelanta and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canova

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy marine deposits

Typical profile

Oa - 0 to 8 inches: muck
A - 8 to 24 inches: fine sand
B/C - 24 to 68 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Anclote

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 16 inches: fine sand
Cg2 - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Okeelanta

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 20 inches: muck
C - 20 to 54 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Minor Components

Chobee

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Manatee

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

11—Cassia fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzx6
Landscape: Coastal plains
Elevation: 0 to 110 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Cassia and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassia

Setting

Landscape: Coastal plains

Landform: Knolls on flatwoods on marine terraces, Rises on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 26 inches: fine sand
Bh - 26 to 42 inches: fine sand
C - 42 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Myakka

Percent of map unit: 7 percent
Landscape: Coastal plains
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomello

Percent of map unit: 6 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces

Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Satellite

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Rises on marine terraces, Flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Ridges on marine terraces, Knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

12—Cassia fine sand, moderately well drained

Map Unit Setting

National map unit symbol: 1hg7q
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassia, moderately well drained, and similar soils: 90 percent

Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassia, Moderately Well Drained

Setting

Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 29 inches: fine sand
Bh - 29 to 41 inches: fine sand
C - 41 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Pomello

Percent of map unit: 10 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands

Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

16—Delray complex

Map Unit Setting

National map unit symbol: 1hg7v
Landscape: Coastal plains
Elevation: 10 to 60 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Delray and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delray

Setting

Landscape: Coastal plains
Landform: Drainageways on marine terraces, Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave, linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 15 inches: fine sand
E - 15 to 55 inches: fine sand
Btg - 55 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Ona, non-hydric
Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Floridana, depressional
Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Felda, hydric
Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Slough (R155XY011FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Anclote
Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Dip

Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Gator

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

18—Delray-Pomona complex

Map Unit Setting

National map unit symbol: 1hg7x
Landscape: Coastal plains
Elevation: 10 to 120 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Delray and similar soils: 50 percent
Pomona, non-hydric, and similar soils: 20 percent
Pomona, hydric, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delray

Setting

Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 15 inches: fine sand
E - 15 to 55 inches: fine sand
Btg - 55 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Description of Pomona, Hydric

Setting

Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 36 inches: fine sand
E' - 36 to 51 inches: fine sand
Btg - 51 to 60 inches: fine sandy loam
Cg - 60 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)

Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Description of Pomona, Non-hydric

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 22 inches: fine sand
Bh - 22 to 36 inches: fine sand
E' - 36 to 51 inches: fine sand
Btg - 51 to 60 inches: fine sandy loam
Cg - 60 to 80 inches: loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Minor Components

Myakka, hydric
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Palmetto
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Waveland, non-hydric
Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Wauchula, non-hydric
Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)

Hydric soil rating: No

19—Duette fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1hg7y
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Duette and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duette

Setting

Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 58 inches: fine sand
Bh - 58 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Cassia

Percent of map unit: 8 percent
Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Pomello

Percent of map unit: 7 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

24—Felda-Wabasso association, frequently flooded

Map Unit Setting

National map unit symbol: 1hg84
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days

Farmland classification: Not prime farmland

Map Unit Composition

Felda and similar soils: 60 percent
Wabasso, hydric, and similar soils: 15 percent
Wabasso, non-hydric, and similar soils: 10 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Felda

Setting

Landscape: Coastal plains
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 24 inches: fine sand
Btg - 24 to 64 inches: sandy clay loam
BCg - 64 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: R155XY040FL - Sandy over Loamy Freshwater Floodplain Marshes and Swamps
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Description of Wabasso, Hydric

Setting

Landscape: Coastal plains
Landform: Flood plains on marine terraces

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 21 inches: fine sand
Bh - 21 to 31 inches: fine sand
Bw - 31 to 37 inches: fine sand
Bt - 37 to 65 inches: sandy loam
Cg - 65 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: R155XY030FL - Sandy Freshwater Floodplain Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Description of Wabasso, Non-hydric

Setting

Landscape: Coastal plains
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: fine sand
E - 7 to 21 inches: fine sand
Bh - 21 to 31 inches: fine sand
Bw - 31 to 37 inches: fine sand
Bt - 37 to 65 inches: sandy loam
Cg - 65 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: R155XY030FL - Sandy Freshwater Floodplain Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: No

Minor Components

Bradenton

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY140FL - Loamy and Clayey Flats and Hammocks
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Loamy and clayey soils on flats of hydric or mesic lowlands (G155XB341FL)
Hydric soil rating: Yes

Anclote

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Chobee

Percent of map unit: 4 percent
Landscape: Coastal plains

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Floridana, depressional

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

26—Floridana-Immokalee-Okeelanta association

Map Unit Setting

National map unit symbol: 1hg86
Landscape: Coastal plains
Elevation: 0 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Floridana, depressional, and similar soils: 35 percent
Immokalee and similar soils: 30 percent
Okeelanta and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Floridana, Depressional

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces

Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 19 inches: fine sand
E - 19 to 36 inches: fine sand
Btg - 36 to 63 inches: sandy clay loam
Cg - 63 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C/D
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy over loamy soils on stream terraces, flood plains, or in depressions (G155XB245FL)
Hydric soil rating: Yes

Description of Immokalee

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 10 inches: fine sand
E - 10 to 34 inches: fine sand
Bh - 34 to 43 inches: fine sand
C - 43 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: B/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL), Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Description of Okeelanta

Setting

Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 20 inches: muck
C - 20 to 54 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D

Ecological site: R155XY100FL - Organic Freshwater Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Minor Components

Anclote
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Chobee
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

Delray
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Myakka, non-hydric
Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex

Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Pomona, non-hydric

Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Manatee

Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY090FL - Loamy and Clayey Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Loamy and clayey soils on stream terraces, flood plains, or in depressions (G155XB345FL)
Hydric soil rating: Yes

30—Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2twt7
Landscape: Coastal plains
Elevation: 0 to 160 feet
Mean annual precipitation: 38 to 68 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 310 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Myakka and similar soils: 70 percent
Myakka, wet, and similar soils: 15 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand
C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Myakka, Wet

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 20 inches: fine sand
Bh - 20 to 36 inches: fine sand

C - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 3 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Eaugallie

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Placid

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Drainageways on marine terraces, Depressions on marine terraces

Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

31—Myakka fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1hg8d
Landscape: Coastal plains
Elevation: 0 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Myakka, non-hydric, and similar soils: 70 percent
Myakka, hydric, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka, Non-hydric

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 12 inches: fine sand
Bh - 12 to 33 inches: fine sand
E' - 33 to 61 inches: fine sand
B'h - 61 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Myakka, Hydric

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 12 inches: fine sand
Bh - 12 to 33 inches: fine sand
E' - 33 to 61 inches: fine sand
B'h - 61 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Pomona, non-hydric
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Ona, non-hydric
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

St. johns, non-hydric
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Seeps on marine terraces
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Wauchula, non-hydric
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

35—Ona fine sand, orstein substratum

Map Unit Setting

National map unit symbol: 1hg8j
Landscape: Coastal plains
Elevation: 20 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ona, non-hydric, and similar soils: 70 percent
Ona, hydric, and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ona, Non-hydric

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
Bh - 5 to 16 inches: fine sand
E - 16 to 52 inches: fine sand
B'h1 - 52 to 68 inches: fine sand
B'h2 - 68 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Ona, Hydric

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
Bh - 5 to 16 inches: fine sand
E - 16 to 52 inches: fine sand
B'h1 - 52 to 68 inches: fine sand
B'h2 - 68 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

St. johns, non-hydric

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Seeps on marine terraces
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R155XY110FL - Wet Sandy Cutthroat Seeps and Flatwoods
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka, non-hydric

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Wauchula, non-hydric

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY130FL - Sandy over Loamy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: No

Waveland, non-hydric

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

36—Orlando fine sand, moderately wet, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1hg8k
Landscape: Coastal plains
Elevation: 20 to 120 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Orlando and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orlando

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over fluviomarine deposits

Typical profile

A - 0 to 12 inches: fine sand
C - 12 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Tavares
Percent of map unit: 10 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

37—Orsino fine sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 2x9dn
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 43 to 63 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 335 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Orsino and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orsino

Setting
Landscape: Coastal plains
Landform: Ridges on marine terraces, Knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits and/or eolian deposits

Typical profile
A - 0 to 2 inches: fine sand
E - 2 to 23 inches: fine sand
Bw and Bh/E - 23 to 43 inches: fine sand

Bw - 43 to 62 inches: fine sand
C - 62 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Paola

Percent of map unit: 6 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R155XY230FL - Sandy Scrub on Ridges, Knolls, and Dunes of Xeric Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Cassia

Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)

Hydric soil rating: No

Daytona

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Tavares

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Hills on marine terraces, Flats on marine terraces, Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Basinger

Percent of map unit: 1 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 1 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

38—Palmetto sand

Map Unit Setting

National map unit symbol: 1hg8m
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Palmetto and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Palmetto

Setting

Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 8 inches: sand
E - 8 to 25 inches: sand
Bh - 25 to 45 inches: sand
Btg - 45 to 64 inches: sandy clay loam
BCg - 64 to 68 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: A/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Delray
Percent of map unit: 10 percent
Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Slough (R155XY011FL), Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

42—Pomello fine sand, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 2tzw1
Landscape: Coastal plains
Elevation: 0 to 110 feet
Mean annual precipitation: 42 to 60 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition
Pomello and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 42 inches: fine sand
Bh - 42 to 54 inches: fine sand
B/C - 54 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Duette

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks

Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Jonathan

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Ridges on marine terraces, Knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Tavares

Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces, Hills on marine terraces, Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

43—St. Johns fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1hg8t
Landscape: Coastal plains
Elevation: 30 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

St. johns, non-hydric, and similar soils: 45 percent
St. johns, hydric, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Johns, Non-hydric

Setting

Landscape: Coastal plains
Landform: Seeps on marine terraces
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 13 inches: fine sand
E - 13 to 28 inches: fine sand
Bh - 28 to 60 inches: fine sand
E' - 60 to 68 inches: fine sand
B'h - 68 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of St. Johns, Hydric

Setting

Landscape: Coastal plains
Landform: Seeps on marine terraces
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 13 inches: fine sand
E - 13 to 28 inches: fine sand
Bh - 28 to 60 inches: fine sand

E' - 60 to 68 inches: fine sand
B'h - 68 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Felda

Percent of map unit: 8 percent
Landscape: Coastal plains
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R155XY080FL - Sandy over Loamy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Wetland Hardwood Hammock (R155XY012FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

Myakka, non-hydric

Percent of map unit: 7 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

45—Tavares fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sw00
Landscape: Coastal plains
Elevation: 0 to 130 feet
Mean annual precipitation: 42 to 63 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Tavares and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces, Hills on marine terraces, Flats on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: A
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Minor Components

Cassia
Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Pomello
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Astatula
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces, Hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY230FL - Sandy Scrub on Ridges, Knolls, and Dunes of Xeric Uplands
Other vegetative classification: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Apopka
Percent of map unit: 3 percent

Landscape: Coastal plains
Landform: Ridges on marine terraces, Hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises and knolls of mesic uplands (G155XB131FL), Upland Hardwood Hammock (R155XY008FL)
Hydric soil rating: No

52—Waveland fine sand

Map Unit Setting

National map unit symbol: 1hg94
Landscape: Coastal plains
Elevation: 20 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Waveland, non-hydric, and similar soils: 60 percent
Waveland, hydric, and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waveland, Non-hydric

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 32 inches: sand
Bh1 - 32 to 40 inches: sand
Bh2 - 40 to 51 inches: sand
C - 51 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 30 to 50 inches to ortstein
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Waveland, Hydric

Setting

Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 32 inches: sand
Bh1 - 32 to 40 inches: sand
Bh2 - 40 to 51 inches: sand
C - 51 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 31 to 50 inches to ortstein
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very low (about 0.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Pomona, non-hydric

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Ona, non-hydric

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Myakka, non-hydric

Percent of map unit: 5 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

54—Zolfo fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tzw7
Landscape: Coastal plains
Elevation: 0 to 200 feet
Mean annual precipitation: 45 to 58 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Zolfo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zolfo

Setting

Landscape: Coastal plains
Landform: Flatwoods on marine terraces, Rises on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 59 inches: fine sand
Bh - 59 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Tavares
Percent of map unit: 6 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces, Rises on marine terraces, Knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope, interfluve, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Myakka
Percent of map unit: 4 percent
Landscape: Coastal plains
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Malabar
Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: R155XY070FL - Sandy Freshwater Isolated Marshes and Swamps
Other vegetative classification: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Millhopper
Percent of map unit: 2 percent
Landscape: Coastal plains
Landform: Flatwoods on marine terraces, Rises on marine terraces

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, talf, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F154XA004FL - Moist Sandy Pine-Hardwood Woodlands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

55—Zolfo fine sand, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1hg97
Landscape: Coastal plains
Elevation: 10 to 140 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Zolfo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zolfo

Setting

Landscape: Coastal plains
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 65 inches: fine sand
Bh - 65 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Minor Components

Tavares

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

Orsino

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Knolls on marine terraces, Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL), Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Pomello

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Flats on marine terraces, Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Cassia

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F155XY150FL - Sandy Flatwoods and Hammocks on Rises and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Duette

Percent of map unit: 3 percent
Landscape: Coastal plains
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises, knolls, and ridges of mesic uplands (G155XB121FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

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APPENDIX D

ENVIRONMENTAL EVALUATION REPORT

Manatee County Pipeline Resiliency Project
Environmental Alternatives Analysis

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1.0 INTRODUCTION

Manatee County is completing the Pipeline Resiliency Project to increase potable water supply capacity and improve the reliability and resiliency of the County's raw water transmission system. The project will provide a second transmission pipeline between the East County Wellfield and the Lake Manatee Water Treatment Plant and add water production wells at the East County Wellfield. The additional pipeline will increase the County's ability to convey raw water from the expanded wellfield while also providing redundancy for the existing transmission pipeline.

As part of the Pipeline Resiliency Project, EarthBalance evaluated the environmental resources associated with three proposed pipeline alternatives, identified as Alternatives 1, 2, and 3, as shown on **Figure 1** below. The purpose of this evaluation is to document and compare potential environmental impacts associated with each Alternative for incorporation into the overall alternatives analysis being conducted by the project team.



Figure 1. Pipeline Route Alternatives. Source: Carollo

The environmental assessment was based primarily on a desktop review of available environmental information, including the Southwest Florida Water Management District's (SWFWMD) Florida Land Use, Cover and Forms Classification System (FLUCCS) mapping[1], USDA NRCS Soil Survey Geographic Database (SSURGO) soil data for Manatee County, Florida[2], the U.S.

[1] Southwest Florida Water Management District (SWFWMD). 2023. *2023 Land Use Land Cover Geographic Information System Dataset*. Southwest Florida Water Management District, Brooksville, Florida. Accessed August 2026.

[2] Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Web Soil Survey*. Available online through the USDA Natural Resources Conservation Service. Accessed August 2026.

Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI)[3], FWS's IPaC[4], cultural resource information, aerial imagery, and other available environmental data. Previously completed project-specific surveys and environmental information prepared by others were also reviewed where available.

The evaluation focuses on environmental resources that may affect the relative impacts or permitting considerations associated with the proposed alternatives, including wetlands and surface waters, protected wildlife species and habitat, soils, agricultural lands, cultural resources, and other environmental constraints.

The mapped environmental resources and acreages presented in this report are intended for planning-level comparison. No field investigations were conducted as part of this assessment to verify mapped land cover, soil conditions, wetland boundaries, or protected species habitat unless otherwise noted. Final environmental impacts will depend on field verification, final engineering design, construction methods, and the location and extent of temporary and permanent work areas.

This report is limited to documenting the environmental considerations associated with the three alternatives. The findings will be incorporated with engineering, constructability, cost, hydraulic, and other analyses being prepared separately by the project team as part of the overall alternatives evaluation.

2.0 LAND USE AND HABITAT

Land use and habitat within each alternative were characterized using SWFWMD land use/land cover mapping classified according to the Florida Land Use, Cover and Forms Classification System (FLUCCS). The FLUCCS data provides a consistent, regional-scale dataset for comparing the general land use and habitat composition of the three alternatives. FLUCCS land use and land cover within the three alternative corridors are depicted in **Appendix A**.

Although the FLUCCS dataset includes wetland and surface water classifications, those classifications were not used to quantify potential wetlands and surface waters for this analysis. Project-specific desktop wetland mapping was used for that purpose, as discussed in Section 4.0.

[3] U.S. Fish and Wildlife Service. 2026. *National Wetlands Inventory*. U.S. Fish and Wildlife Service. DOI: 10.7944/usfws.nwi.202605

[4] U.S. Fish and Wildlife Service. 2026. *Information for Planning and Consultation (IPaC)*. U.S. Department of the Interior, Fish and Wildlife Service. Accessed August 2026.

Table 1. SWFWMD FLUCCS Land Use and Land Cover within the Alternative Corridors

FLUCCS Code	FLUCCS Description	Area (Acres)		
		Alt. 1	Alt. 2	Alt. 3
1100	Residential, Low Density (<2 Dwelling Units/Ac)	31.94	32.83	31.94
1200	Residential, Medium Density (2-5 Dwelling Units/Ac)	0.96	0.96	0.96
1700	Institutional	1.15	1.15	1.15
1800	Recreational	1.13	1.13	1.13
1900	Open Land	0.77	0.77	0.77
2100	Cropland and Pastureland	68.11	23.17	16.03
2400	Nurseries And Vineyards	2.20	2.20	2.20
2600	Other Open Lands (Rural)	38.94	7.30	32.67
3100	Herbaceous (Dry Prairie)	0.00	0.43	0.00
3200	Shrub And Brushland	138.04	306.67	138.88
3300	Mixed Rangeland	3.37	8.46	0.00
4100	Upland Coniferous Forests	23.83	13.76	13.94
4200	Upland Hardwood Forests	0.12	2.60	2.60
4300	Upland Hardwood Forests	12.75	9.30	7.70
4400	Tree Plantations	56.02	1.03	8.10
5300	Reservoirs	1.32	0.94	0.94
6100	Wetland Hardwood Forests	6.07	8.11	2.38
6300	Wetland Forested Mixed	0.02	0.02	0.02
6400	Vegetated Non-Forested Wetlands	20.63	5.73	3.08
7400	Disturbed Land	1.96	0.00	0.00
8200	Communications	0.26	0.26	0.26
8300	Utilities	2.18	3.28	3.28
Total:		**411.77**	**430.10**	**268.03**

Shrub and Brushland is the dominant mapped land cover for all three alternatives, particularly Alternative 2, where it comprises approximately 307 acres. Alternative 1 contains substantially more mapped Cropland and Pastureland and Tree Plantations than the other alternatives, while Alternative 3 has the smallest overall corridor area and contains a greater proportion of Other Open Lands – Rural. These differences generally reflect the existing land use and habitat conditions traversed by each corridor.

3.0 SOILS

NRCS soil survey information was reviewed to characterize general soil conditions within the three alternatives. The mapped soil units were evaluated based on both hydric rating and gopher tortoise habitat suitability. NRCS-mapped soils are depicted in **Appendix B**. Hydric soil ratings provide a planning-level indication of areas that may be associated with wetland conditions. Gopher tortoise suitability ratings provide a relative indication of the suitability of mapped soil

types for gopher tortoise burrowing habitat. These ratings are based on mapped soil characteristics and should not be interpreted as confirmation of wetland boundaries, gopher tortoise occupancy, or the presence or absence of burrows.

Alternatives 1 and 2 contain similar acreages of soils considered Highly Suited soils for gopher tortoise, with approximately 182.41 acres in Alternative 1 and 182.52 acres in Alternative 2. Alternative 3 contains approximately 162.82 acres of Highly Suited soils. However, because Alternative 3 has a substantially smaller overall project area, Highly Suited soils comprise a greater proportion of Alternative 3 than either Alternative 1 or 2.

With approximately 61% mapped as nonhydric or predominantly nonhydric and only 1.23% mapped as hydric or predominantly hydric, Alternative 3 has the lowest percentage of soils that would be expected to support wetland habitats. Alternatively, Alternative 2 contains the highest percentage of soil that would be expected to support wetland habitats with approximately 42% mapped as nonhydric or predominantly nonhydric and 1.43% mapped as hydric or predominantly hydric.

Table 2. Summary of Soil Hydric Ratings and Gopher Tortoise Suitability

Soil Consideration		Area (ac)		
		Alt. 1	Alt. 2	Alt. 3
Hydric Rating	Nonhydric	166.23	166.34	146.64
	Predominantly Nonhydric	16.25	16.25	16.25
	Partially Hydric	224.05	241.43	101.89
	Predominantly Hydric	3.69	1.74	1.74
	Hydric	1.56	4.43	1.56
Gopher Tortoise Suitability	Highly Suited	182.41	182.52	162.82
	Less Suited	186.49	210.56	91.71
	Unsuitable	42.81	37.04	13.48
	Not Rated	0.07	0.07	0.07

4.0 WETLANDS AND SURFACE WATERS

Potential wetlands and other surface waters within the three alternative corridors were evaluated using project-specific desktop mapping developed through review of available aerial imagery and other environmental information. Approximate wetland and surface water boundaries were mapped within each alternative corridor and classified as freshwater emergent wetlands, freshwater forested/shrub wetlands, or other surface waters. The resulting acreages are summarized in Table 3 and depicted in **Appendix C.**

The project-specific desktop wetland mapping differs from the wetland classifications contained in the SWFWMD FLUCCS dataset discussed in Section 2.0. The FLUCCS dataset was used to characterize the general land use and habitat composition of each alternative, whereas the wetland mapping presented in this section was developed specifically for this project at a finer review scale. Accordingly, the wetland and surface water boundaries and acreages presented in this section are not expected to correspond directly with the FLUCCS wetland classifications.

Table 3. Desktop-Mapped Wetlands and Surface Waters within the Alternative Corridors

Wetland or Surface Water Type	Anticipated Impact Type *	Area (Acres)		
		Alt. 1	Alt. 2	Alt. 3
Freshwater Emergent	Temporary	1.09	8.86	2.71
Freshwater Forested/ Shrub	Permanent	6.82	13.15	0.64
Other Surface Waters	Temporary	2.26	2.22	1.91

**Anticipated impact type assumes open-cut pipeline installation within the project area. Actual impacts will depend on the final pipeline alignment, construction footprint, construction methods, and field-verified wetland boundaries.*

Impacts to freshwater emergent wetlands and other surface waters are anticipated to be temporary. Following pipeline installation, temporarily disturbed areas would be restored to preconstruction grades and conditions, allowing herbaceous wetland vegetation and surface water functions to be reestablished. Provided these systems are successfully restored to their preconstruction condition, these temporary impacts are not anticipated to result in a permanent loss of wetland or surface water acreage.

In contrast, impacts to freshwater forested/shrub wetlands are anticipated to result in permanent wetland conversion where woody vegetation will not be allowed to reestablish above the pipeline. Following construction, these areas would be restored as herbaceous wetlands rather than returned to forested or shrub wetland communities. Although the affected area would remain wetland, the conversion from a forested or shrub-dominated wetland to an herbaceous wetland would represent a permanent change in wetland community type and associated functions.

Accordingly, the acreage of freshwater forested/shrub wetlands provides an important indicator of potential permanent wetland impacts, while freshwater emergent wetlands and other surface waters primarily represent potential temporary construction impacts. All wetland and surface water impacts would remain subject to avoidance and minimization requirements. Compensatory mitigation is anticipated to be associated with unavoidable permanent wetland impacts, while temporary impacts that are successfully restored to preconstruction conditions would generally not require compensatory mitigation.

Based on desktop wetland mapping, Alternative 2 has the greatest potential wetland and surface water impact, including approximately 13.15 acres of forested/shrub wetlands potentially subject to permanent conversion. Alternative 1 contains approximately 6.82 acres of potentially affected forested/shrub wetlands, while Alternative 3 contains only approximately 0.64 acre. Alternative 3 therefore has substantially less potential for permanent wetland conversion than either Alternative 1 or Alternative 2.

5.0 PROTECTED WILDLIFE SPECIES

Available federal and state protected species information was reviewed to identify protected wildlife species with the potential to occur within or adjacent to the proposed pipeline alternatives. The review included the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) resource list, available USFWS and Florida Fish and Wildlife

Conservation Commission (FWC) GIS data, FLUCCS land cover mapping, aerial imagery, and previously completed project-specific surveys. The desktop protected-species review identified the wildlife species listed in **Table 4** for consideration within the project area.

The inclusion of a species in the desktop review does not indicate that the species is present within a proposed pipeline corridor. Potential effects were evaluated at a planning level based on the geographic location of the project, mapped habitat conditions, available species information, and previously completed surveys. No new protected wildlife surveys were conducted as part of this alternatives evaluation.

Table 4. Protected Wildlife Species Evaluated for the Pipeline Alternatives

Common Name	Scientific Name	Federal Status	State Status	Project Consideration
Audubon's crested caracara	*Caracara plancus audubonii*	T	T	Potential open/pasture habitat
Eastern black rail	*Laterallus jamaicensis jamaicensis*	T	—	Potential wetland habitat
Eastern indigo snake	*Drymarchon couperi*	T	T	Potential upland habitat
Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E	E	Limited suitable habitat anticipated
Florida burrowing owl	*Athene cunicularia floridana*	—	T	Potential open upland habitat
Florida panther	*Puma concolor coryi*	E	E	Outside Panther Focus Areas
Florida pine snake	*Pituophis melanoleucus mugitus*	—	T	Potential sandy upland habitat
Florida sandhill crane	*Antigone canadensis pratensis*	—	T	Potential open/wetland habitat
Florida scrub-jay	*Aphelocoma coerulescens*	T	T	Previously surveyed; nests/buffers present
Gopher tortoise	*Gopherus polyphemus*	T	T	Potential habitat; permitted recipient site
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	T	No suitable habitat anticipated
Little blue heron	*Egretta caerulea*	—	T	Potential wetland/foraging habitat
Roseate spoonbill	*Platalea ajaja*	—	T	Potential wetland/foraging habitat
Rufa red knot	*Calidris canutus rufa*	T	—	No suitable coastal habitat anticipated
Southeastern American kestrel	*Falco sparverius paulus*	—	T	Potential open upland habitat
Tricolored bat	*Perimyotis subflavus*	Proposed E	—	Potential forested habitat
Tricolored heron	*Egretta tricolor*	—	T	Potential wetland/foraging habitat
West Indian manatee	*Trichechus manatus*	T	T	No suitable aquatic habitat anticipated unless pipeline crosses navigable waters

5.1 Florida Scrub-Jay (*Aphelocoma coerulescens*)

The 2025 Florida scrub-jay survey identified nests and associated nest buffers within the vicinity of the three proposed alternatives. The locations of surveyed nests and associated buffers relative to the alternative corridors are depicted in **Appendix D**. Based on the available mapping, all three alternatives are anticipated to affect one or more identified Florida scrub-jay nests or associated nest buffers.

Because each alternative is anticipated to affect an identified nest or buffer, Florida scrub-jay occurrence is considered a common environmental consideration among the alternatives for purposes of this planning-level comparison. Additional agency coordination and/or survey work may be required as the project advances.

5.2 Gopher Tortoise (*Gopherus polyphemus*)

All three alternatives contain mapped upland habitat that likely supports gopher tortoise. Soil mapping identifies areas within each alternative as highly suited for gopher tortoise based on soil characteristics, as discussed in Section 3.0. These soil suitability ratings are intended as a planning-level indicator and do not establish the presence or absence of gopher tortoise burrows.

A significant distinction associated with Alternative 2 is its crossing of the FWC-approved gopher tortoise recipient site within Duette Preserve. The recipient site is subject to a conservation easement that prohibits installation of a pipeline above or below ground within the recipient site. Therefore, prior approval from FWC would be required and the conservation easement may need to be amended before construction of Alternative 2, if it is the selected route. Alternatives 1 and 3 do not cross the mapped permitted gopher tortoise recipient site.

5.3 Audubon's Crested Caracara (*Caracara plancus audubonii*)

The Audubon's crested caracara is federally listed as threatened in Florida. The species occurs primarily in open habitats and is associated with improved pasture, dry prairie, grasslands, shrub and brushland, freshwater marshes, and other open landscapes.

All three alternatives contain mapped land cover that may provide potential crested caracara habitat, including Cropland and Pastureland, Shrub and Brushland, Other Open Lands – Rural, and other open upland communities. Alternative 1 contains the greatest acreage of mapped Cropland and Pastureland, while Alternative 2 contains substantially more Shrub and Brushland than Alternatives 1 or 3.

No crested caracara surveys were conducted as part of this assessment, and no conclusions regarding nesting or occupancy within the alternatives are made based on the desktop review. Species-specific surveys and/or coordination with USFWS may be required depending on the final alignment and the presence of suitable habitat.

5.4 Eastern Indigo Snake (*Drymarchon couperi*)

The eastern indigo snake is federally listed as threatened and occurs in a variety of upland habitats in Florida, including pine flatwoods, scrub, sandhill, and other uplands. Gopher tortoise burrows can provide important shelter for the species.

All three alternatives contain upland habitat that may provide potential eastern indigo snake habitat. The occurrence of soils and habitat potentially suitable for gopher tortoise further indicates that habitat conditions potentially relevant to eastern indigo snake occur within portions of each alternative.

No eastern indigo snake surveys were conducted as part of this assessment. The USFWS standard protection measures should be utilized to minimize potential impacts to eastern indigo snakes during land-disturbing activities.

5.5 Other Wildlife Species

The remaining wildlife species identified during the desktop review were considered but are not discussed individually because the currently available information does not indicate a project-specific constraint warranting a separate alternatives analysis.

The eastern black rail is federally listed as threatened and is associated primarily with dense herbaceous emergent wetlands. Potential impacts to freshwater emergent wetlands associated with this project are anticipated to be temporary, with affected areas restored following construction. If suitable eastern black rail habitat is identified within the selected alignment, additional agency coordination and species-specific avoidance, minimization, or conservation measures may be required. However, mitigation for wetland impacts would likely satisfy impacts to this species as well.

The Florida panther was also identified for consideration during the protected-species review. However, none of the three proposed alternatives are located within the USFWS Florida Panther Focus Areas, including the mapped Primary, Secondary, or Dispersal Zones. The project area is located substantially north of these mapped panther conservation zones and regular use of the project area is considered very unlikely.

The Everglade snail kite is closely associated with suitable freshwater wetland systems, while Gulf sturgeon and West Indian manatee are dependent on aquatic habitats. The rufa red knot is primarily associated with coastal and shoreline habitats. These species are not expected to represent significant differentiating constraints among the three alternatives.

The Florida burrowing owl, Florida pine snake, Florida sandhill crane, southeastern American kestrel, little blue heron, tricolored heron, and roseate spoonbill may utilize upland, wetland, or open habitats that occur within portions of the project area. Potential effects to these species will depend on actual habitat conditions and the final construction footprint.

6.0 AGRICULTURAL LANDS

Portions of all three alternative corridors are mapped as Farmland of Unique Importance. Because the available farmland classification data are based on soil characteristics and do not necessarily reflect current agricultural use, mapped farmland classifications were evaluated qualitatively rather than used to calculate potential acreage impacts. Mapped Farmland of Unique Importance within the alternative corridors is depicted on **Appendix E**.

Review of current aerial imagery and land use conditions indicates that much of the proposed pipeline corridors would be located within existing road rights-of-way (ROW). Although portions of these ROWs are mapped as Farmland of Unique Importance, these areas have already been converted from agricultural use and are not currently being used for agricultural production. Similarly, portions of the alternatives extending through Duette Preserve are mapped as Farmland of Unique Importance; however, these lands are managed for conservation purposes and are not currently in agricultural production.

Accordingly, the presence of mapped Farmland of Unique Importance does not necessarily represent an impact to actively farmed agricultural land. While all three alternatives intersect areas with this farmland classification, no substantial difference among the alternatives was identified based on the available farmland mapping. Potential effects to active agricultural operations, if any, would depend on the final construction footprint and existing land use, however, based on the existing land uses reviewed, impacts to active agricultural operations are not anticipated.

7.0 CULTURAL AND HISTORIC RESOURCES

The Florida Master Site File (FMSF) identified three previously recorded cultural resources within the project review area: the Camphor Site Homestead, Bethany Baptist Cemetery, and Old Highway 39/Carlton Road.

The Camphor Site Homestead is located along SR 64 east of the drag racing strip. Bethany Baptist Cemetery is located southeast of the intersection of Verna Bethany Road and SR 64 E. Old Highway 39/Carlton Road is located within Duette Preserve. Figure 2 below depicts the locations of the recorded resources relative to the three alternatives.

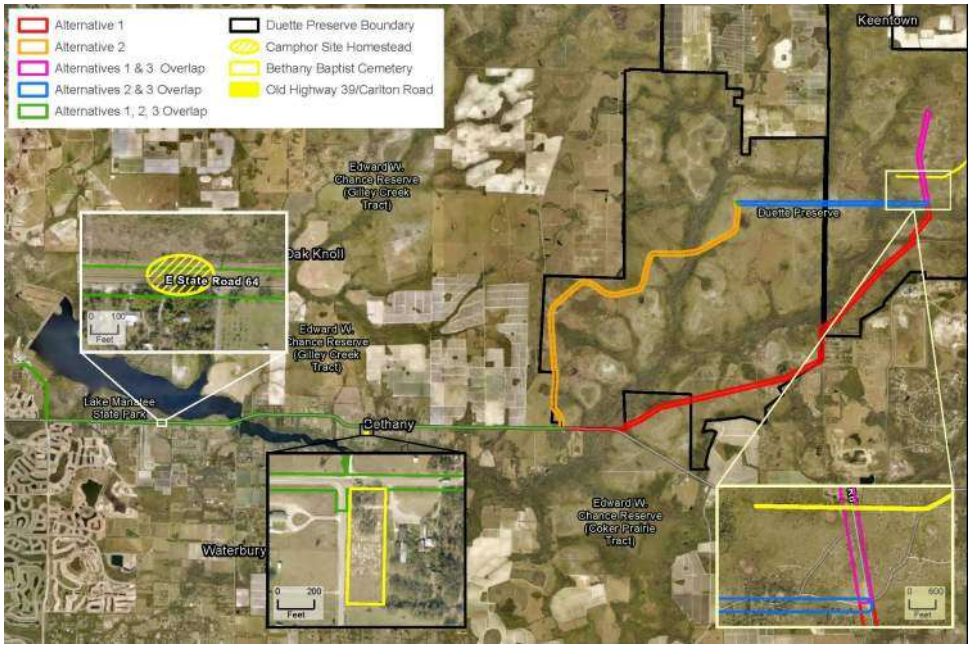


Figure 2. FMSF Mapped Resources

As shown on Figure 2, the mapped Camphor Site Homestead intersects all three proposed alternatives within the existing State Road 64 right-of-way. Old Highway 39/Carlton Road intersects Alternatives 1 and 3 within Duette Preserve. Bethany Baptist Cemetery does not intersect any of the proposed routes but is adjacent to all three.

The presence of a resource in the FMSF indicates that it has been previously recorded but does not, by itself, establish its eligibility for listing in the National Register of Historic Places or determine whether the proposed project would adversely affect the resource. The FMSF review is intended as a planning-level screening of known cultural resources and does not constitute a Cultural Resource Assessment Survey (CRAS). Previously unrecorded archaeological or historic resources may occur within the proposed pipeline corridors.

8.0 CONTAMINATED SITES AND HAZARDOUS MATERIALS

Available environmental databases and GIS resources were reviewed for known contaminated sites and hazardous materials concerns within and adjacent to the three alternatives. Resources reviewed included Florida Department of Environmental Protection (FDEP) Contamination Locator Map[5], the FDEP Brownfields GeoViewer[6], FDEP Groundwater Contamination Areas[7], and FDEP Petroleum Contamination Monitoring Areas[8].

The database review identified two potential sources of contamination near the proposed pipeline alternatives. The first was a potential petroleum discharge at the Manatee County Water Treatment Plant in 1996 that did not require cleanup. Therefore, the historical discharge is unlikely to affect any of the three alternatives. The second was an oil spill associated with Hollar & Greene Trucking Company along Verna Bethany Road near the Alternative 3 route. The spill occurred in 1999 and is listed as having completed cleanup; therefore, the historical spill is unlikely to affect the proposed route.

9.0 SUMMARY OF ENVIRONMENTAL CONSIDERATIONS

The three pipeline alternatives were evaluated for land use and habitat, soils, wetlands and surface waters, protected wildlife species, agricultural lands, cultural and historic resources, and known contaminated sites. Each alternative presents environmental constraints; however, the type and relative magnitude of those constraints differ among the alternatives.

Wetlands and surface waters represent one of the primary differences among the alternatives. Alternative 2 contains the greatest acreage of potential wetlands and surface waters (24.23

[5] Florida Department of Environmental Protection (FDEP). *Contamination Locator Map (CLM).* Division of Waste Management, Tallahassee, Florida. Accessed August 2026.
[6] Florida Department of Environmental Protection (FDEP). *DEP Brownfields GeoViewer.* Waste Cleanup Program, Tallahassee, Florida. Accessed August 2026.
[7] Florida Department of Environmental Protection (FDEP). *Groundwater Contamination Areas.* FDEP Geographic Information Systems (GIS), Tallahassee, Florida. Accessed August 2026.
[8] Florida Department of Environmental Protection (FDEP). *Petroleum Contamination Monitoring Areas.* FDEP Geographic Information Systems (GIS), Tallahassee, Florida. Accessed August 2026.

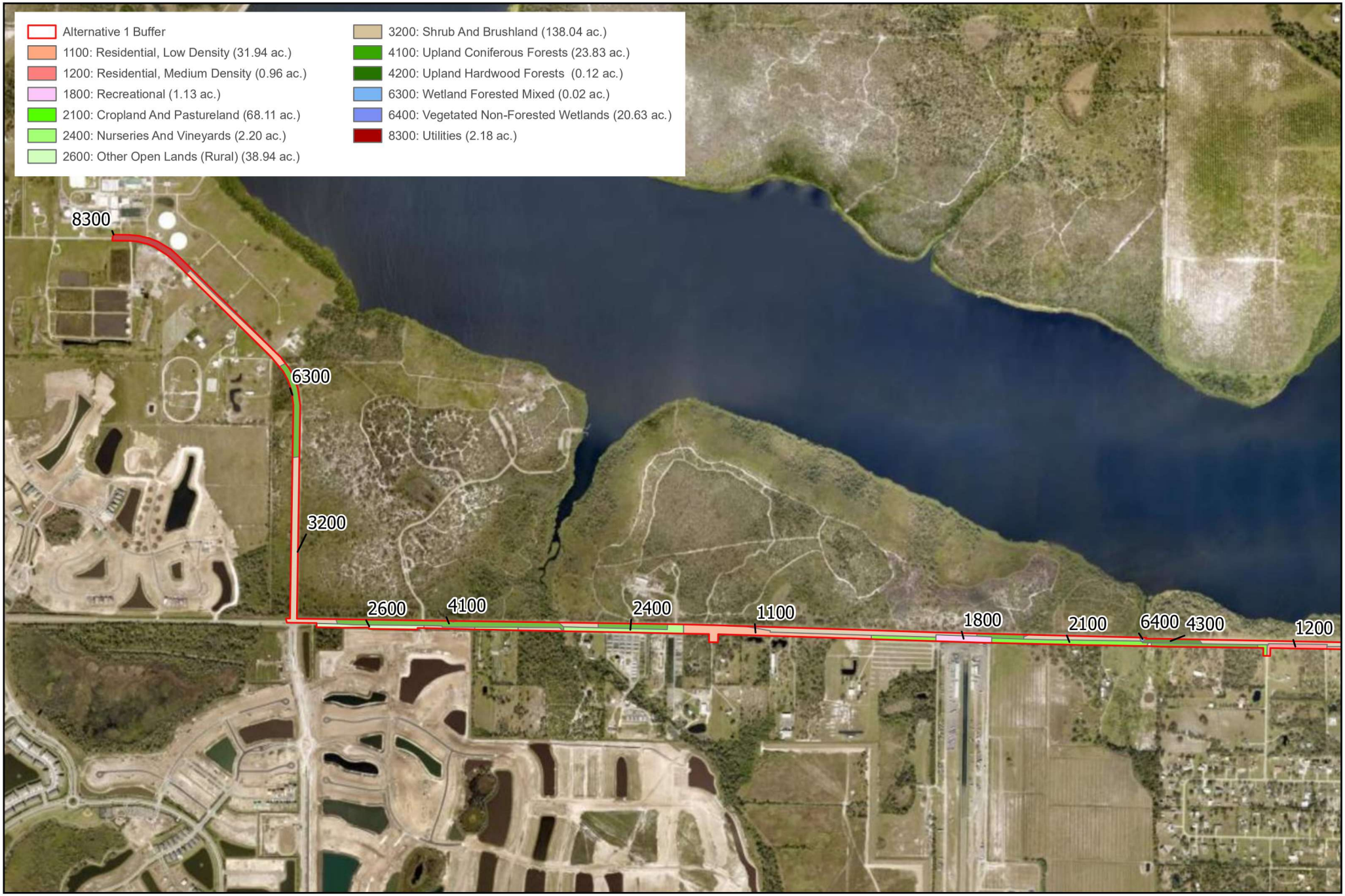
acres), including 13.15 acres of forested/shrub wetlands potentially subject to permanent conversion. Alternative 1 contains 10.17 acres of mapped wetlands and surface waters, including 6.82 acres of forested/shrub wetlands, while Alternative 3 contains the least at 5.26 acres, including only 0.64 acre of forested/shrub wetlands.

Alternative 2 also presents a unique protected wildlife and conservation constraint because it crosses the FWC-approved gopher tortoise recipient site within Duette Preserve. The recipient site is protected by a conservation easement that restricts pipeline installation, and the proposed crossing would require additional coordination and potentially modification of the easement. A comparable constraint was not identified for Alternatives 1 or 3.

Other environmental considerations provide less distinction among the alternatives. All three alternatives are anticipated to affect one or more identified Florida scrub-jay nests or associated buffers, contain potentially suitable gopher tortoise habitat, and intersect areas mapped as Farmland of Unique Importance. The contaminated-site review did not identify a substantial constraint associated with any alternative.

Overall, Alternative 2 has the greatest potential wetland impacts and is constrained by the Duette Preserve gopher tortoise recipient site conservation easement. Alternative 1 has an intermediate level of potential wetland impact, while Alternative 3 has the lowest mapped wetland and surface water acreage and substantially less potential permanent wetland conversion. These findings are intended to inform the overall alternatives analysis and should be considered with the engineering, cost, constructability, hydraulic, and other evaluations being conducted separately by the project team.

Appendix A. Land Use and Land Cover Maps



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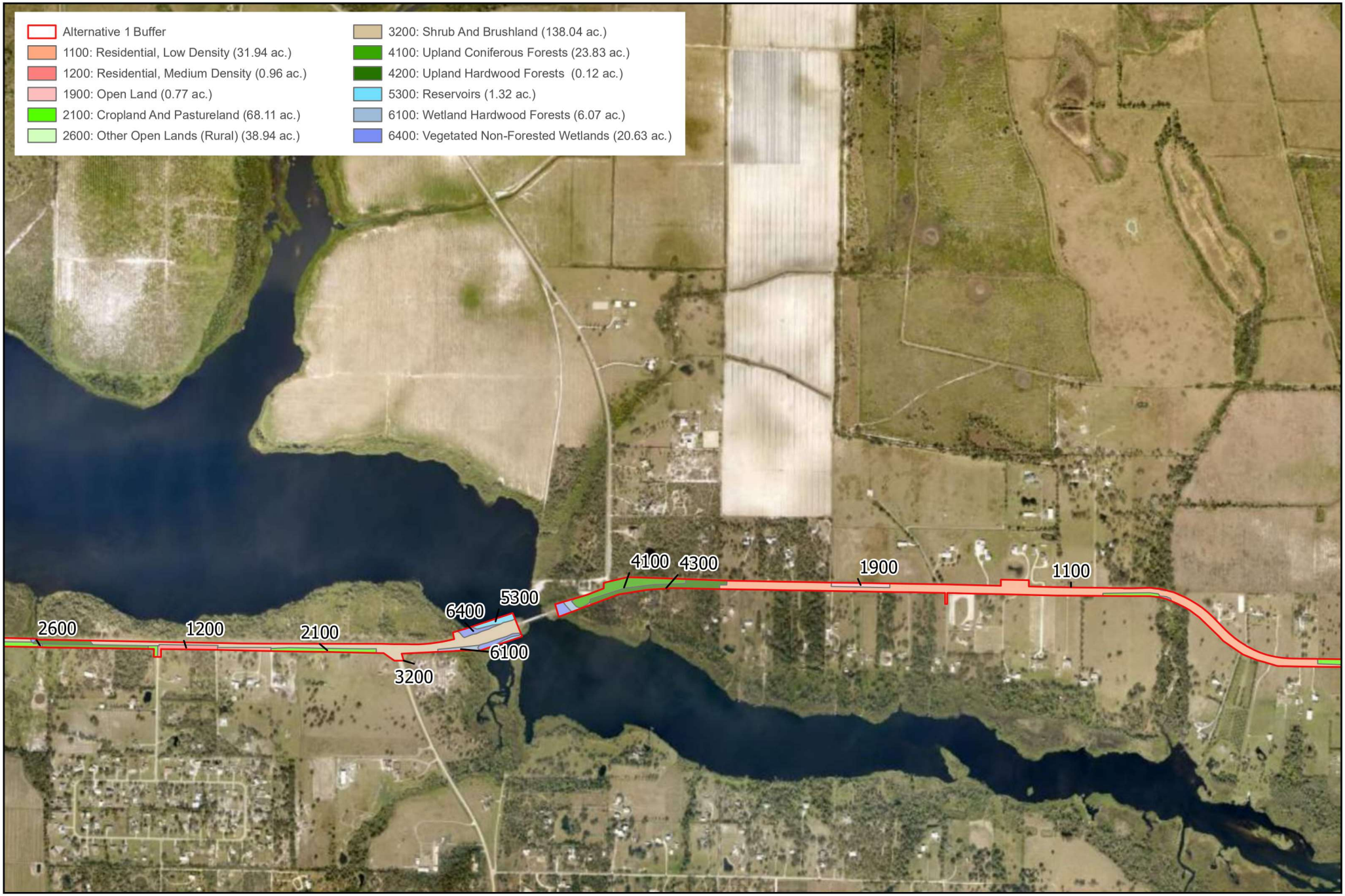
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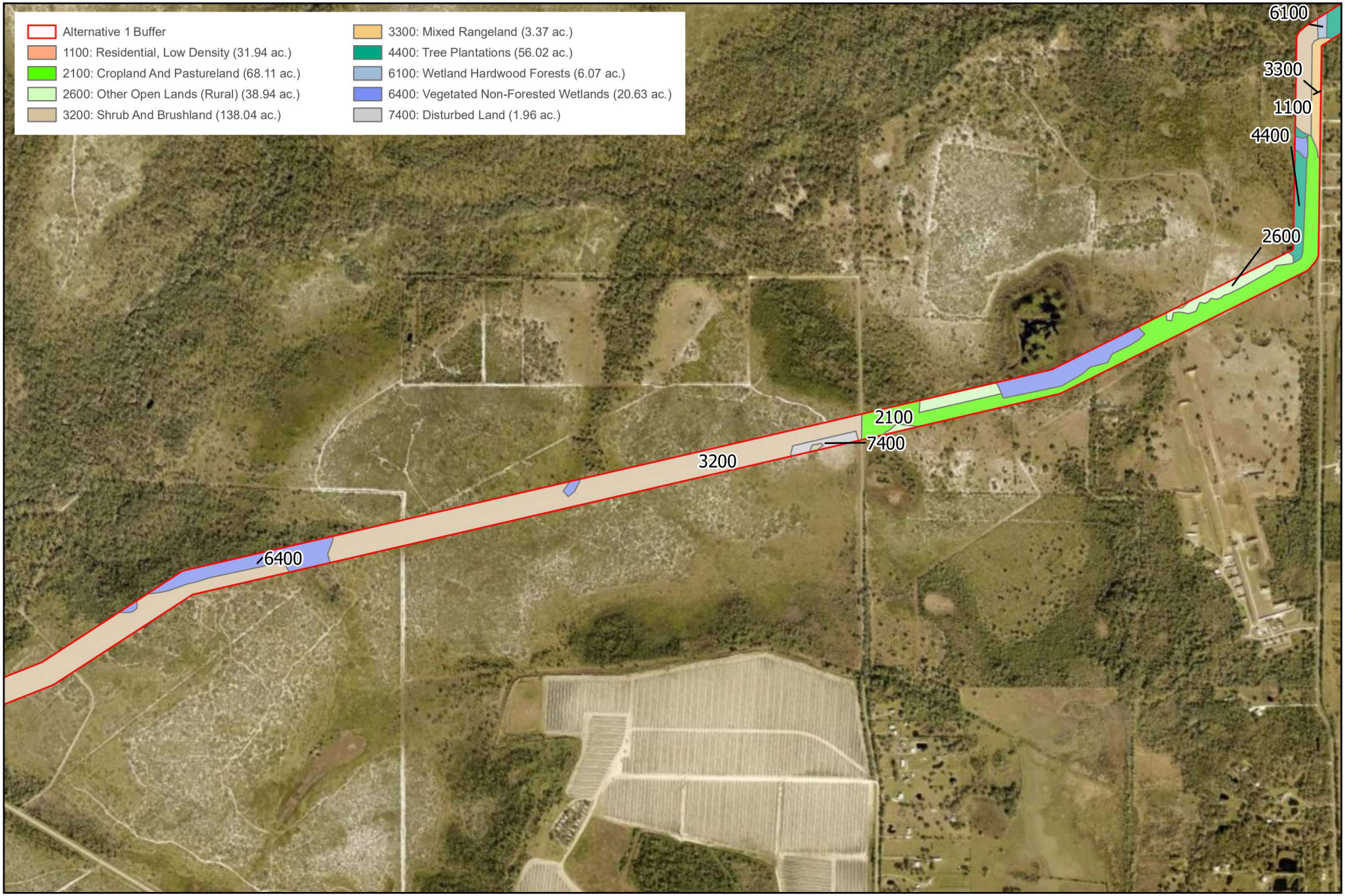
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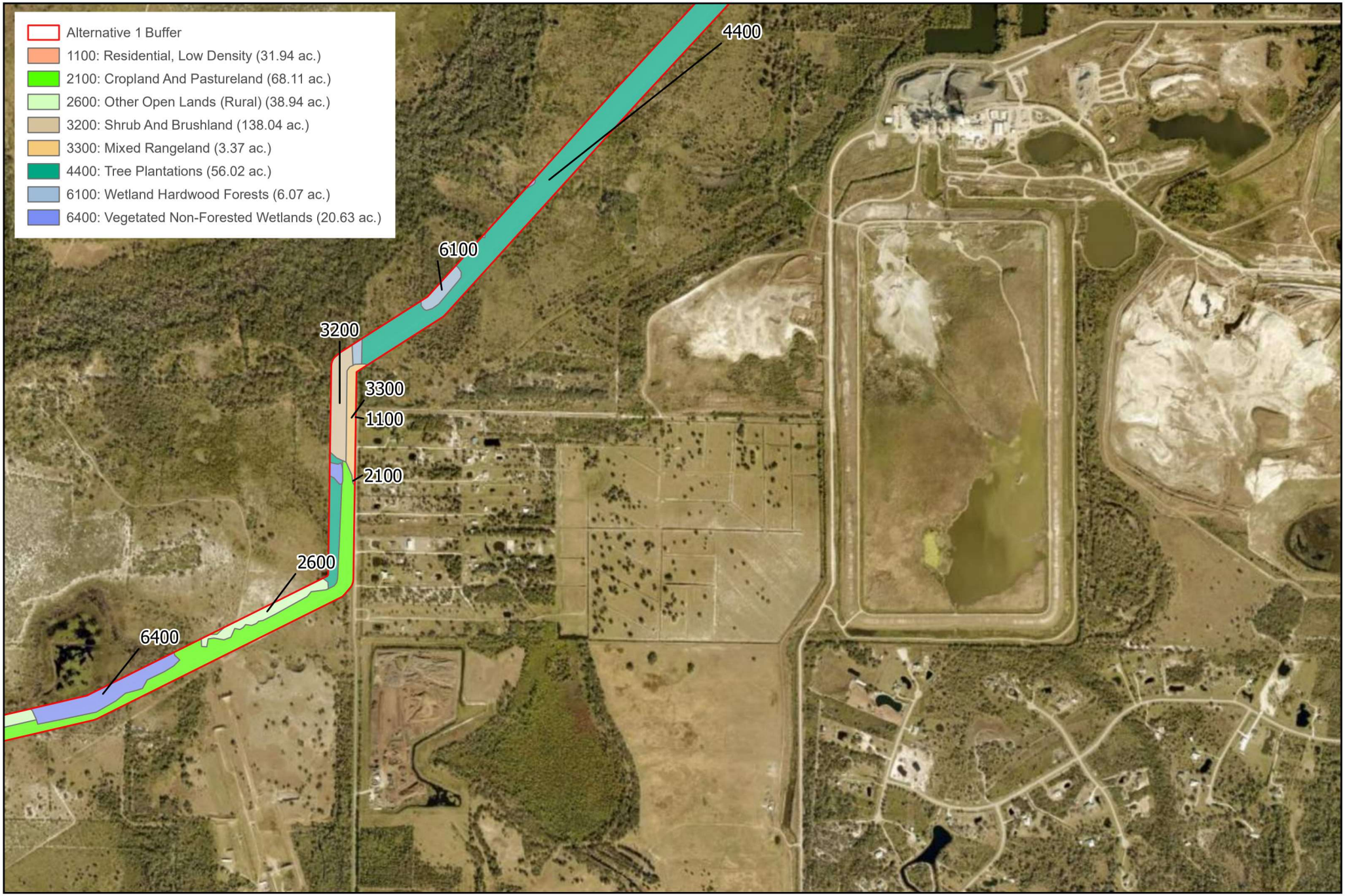
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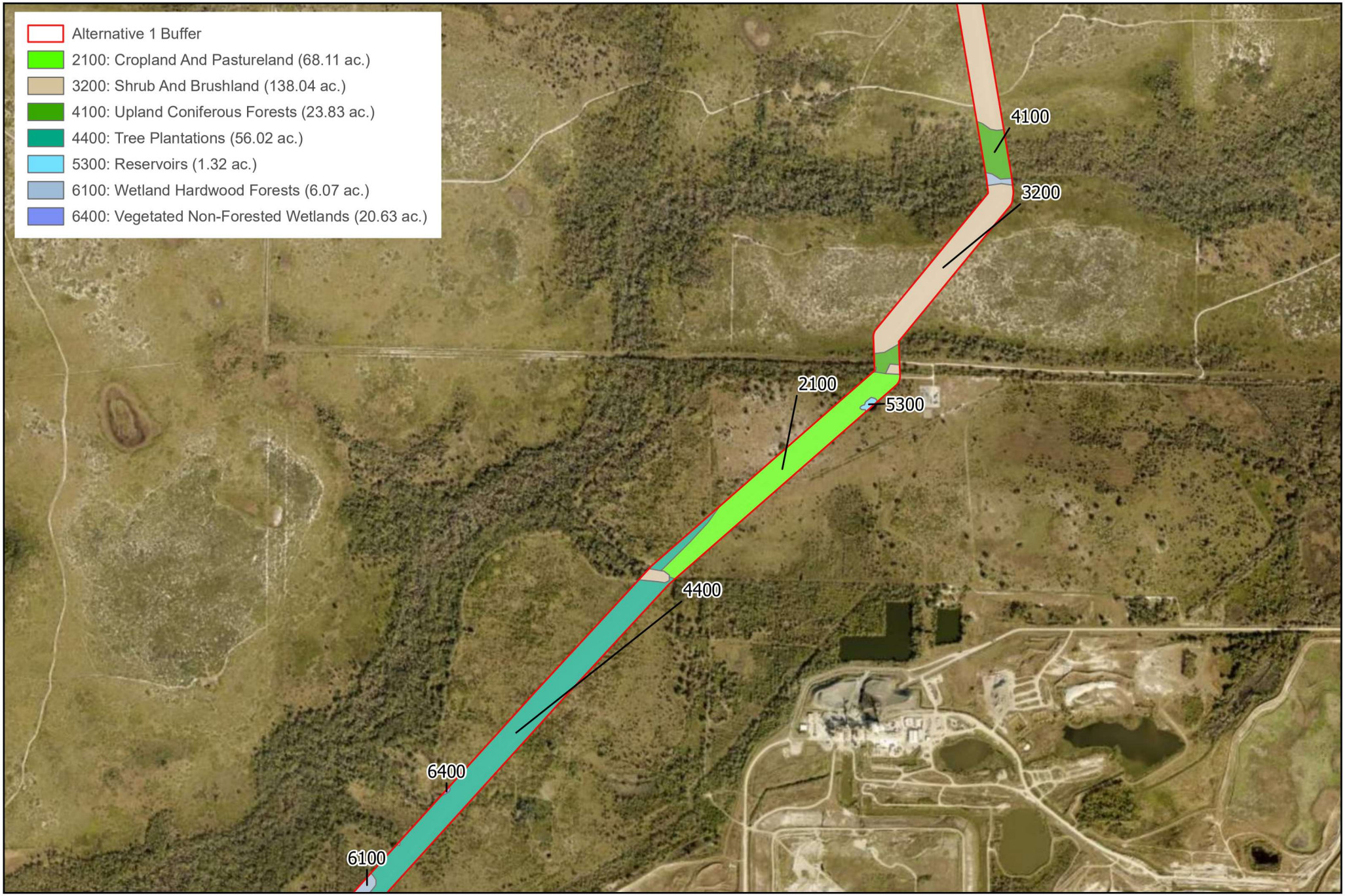
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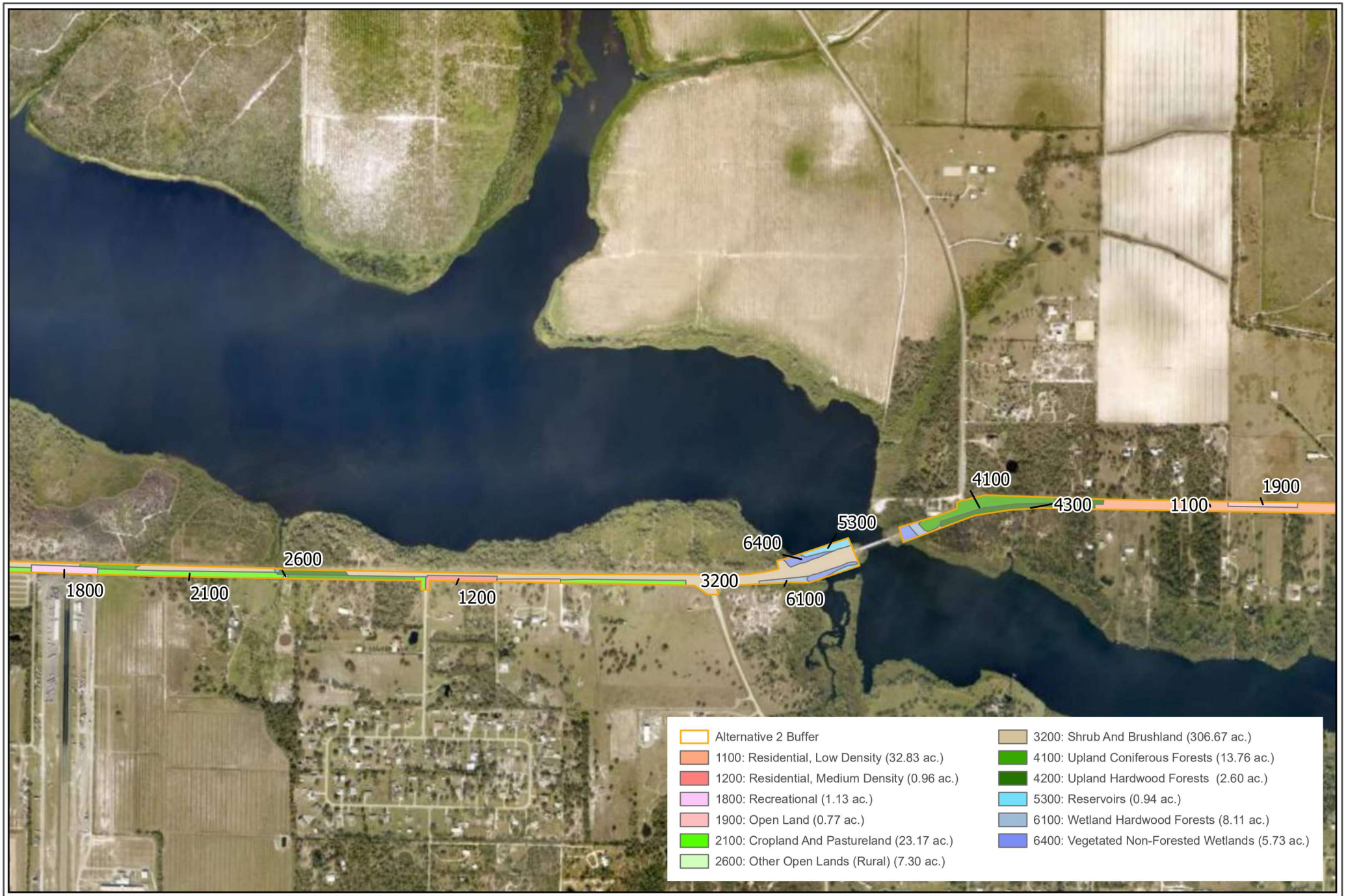
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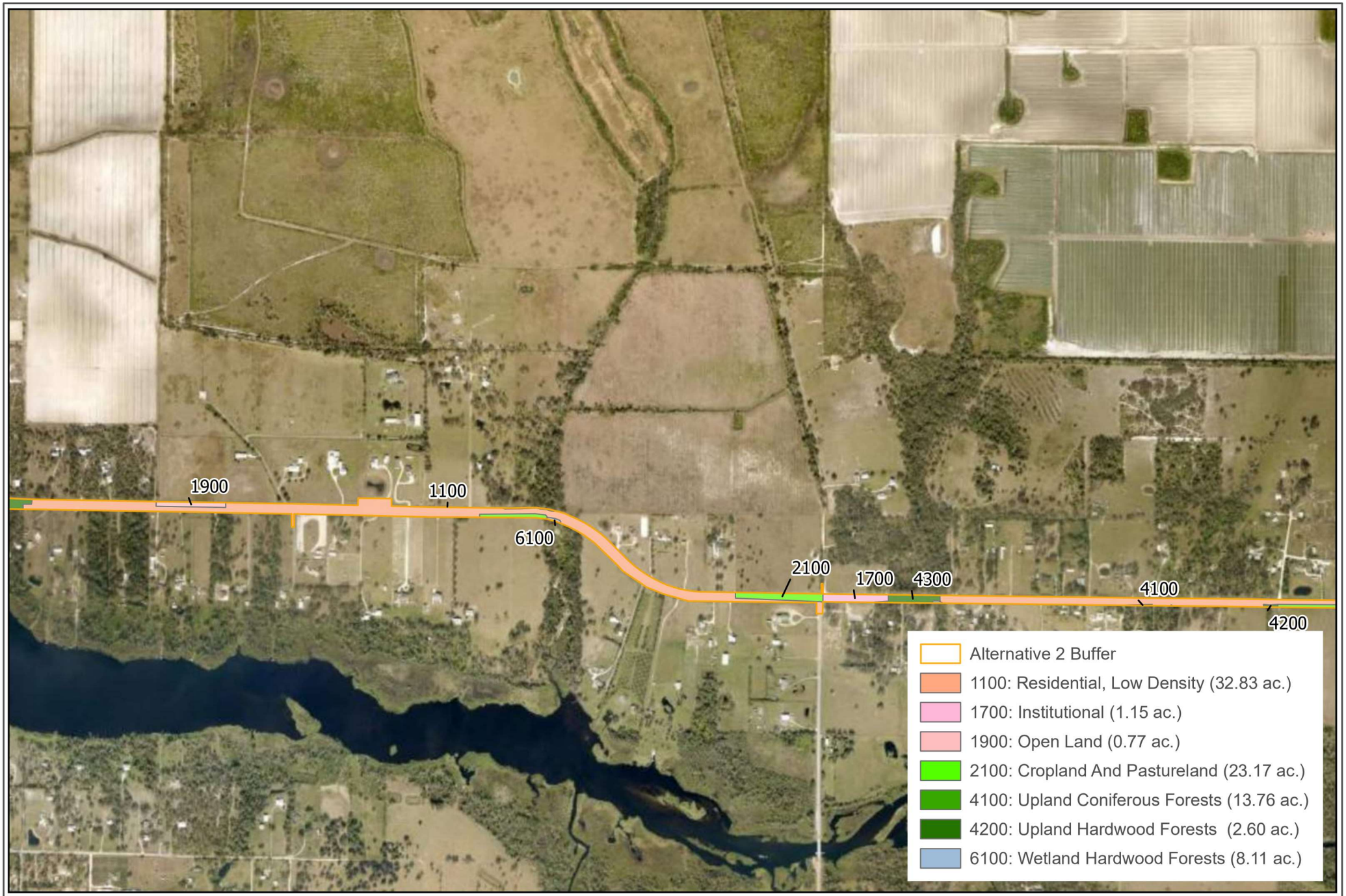
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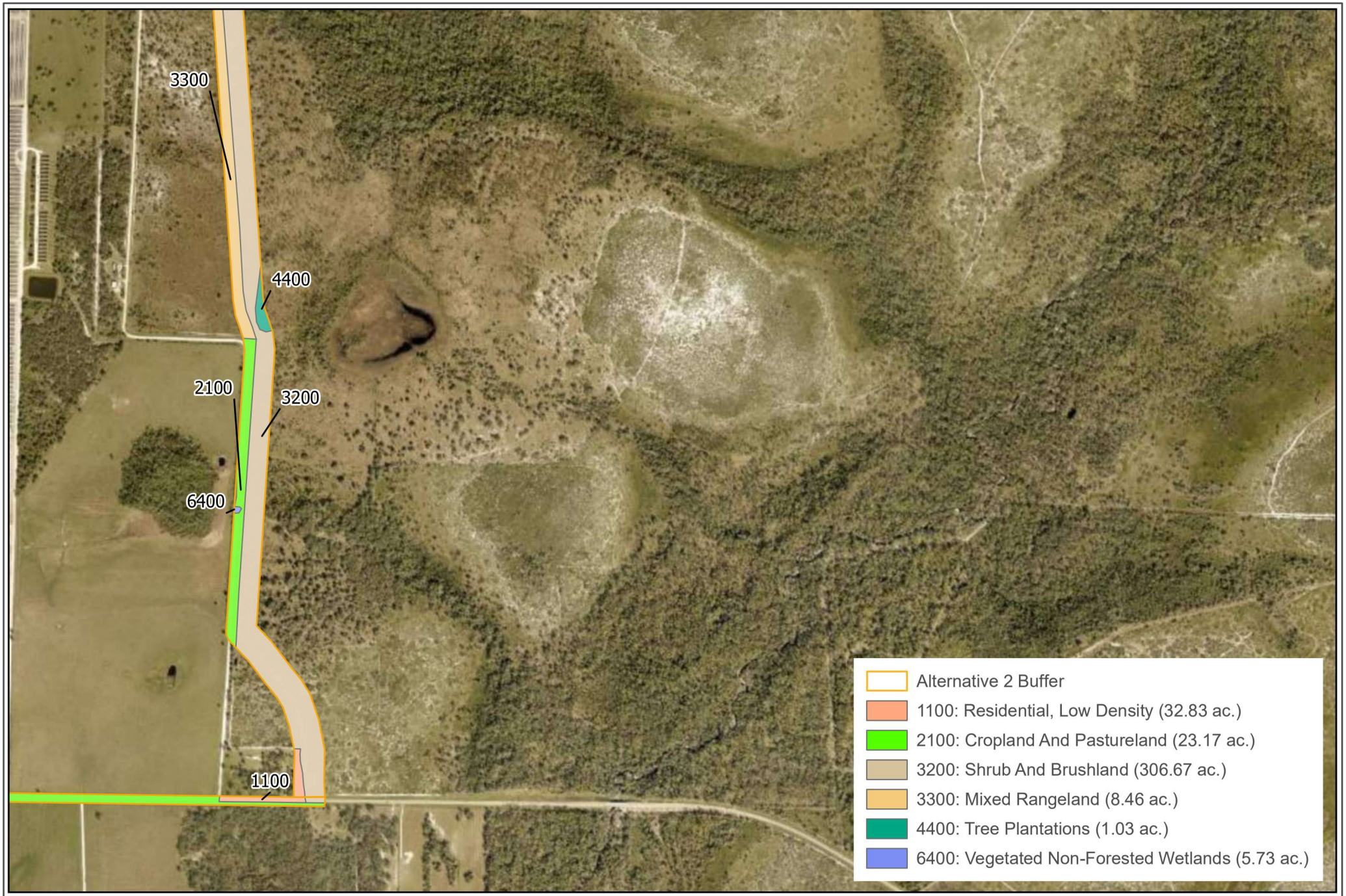
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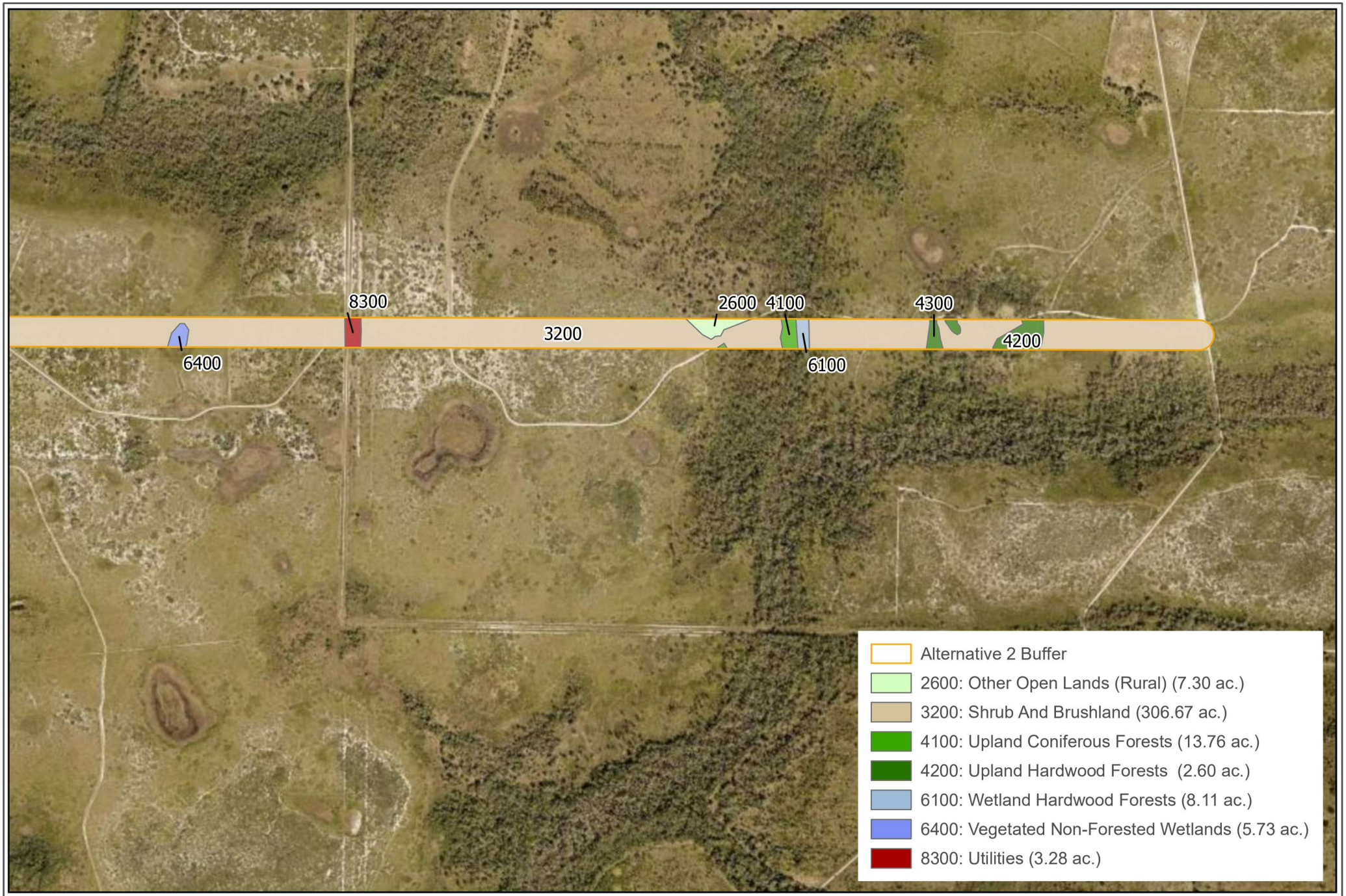
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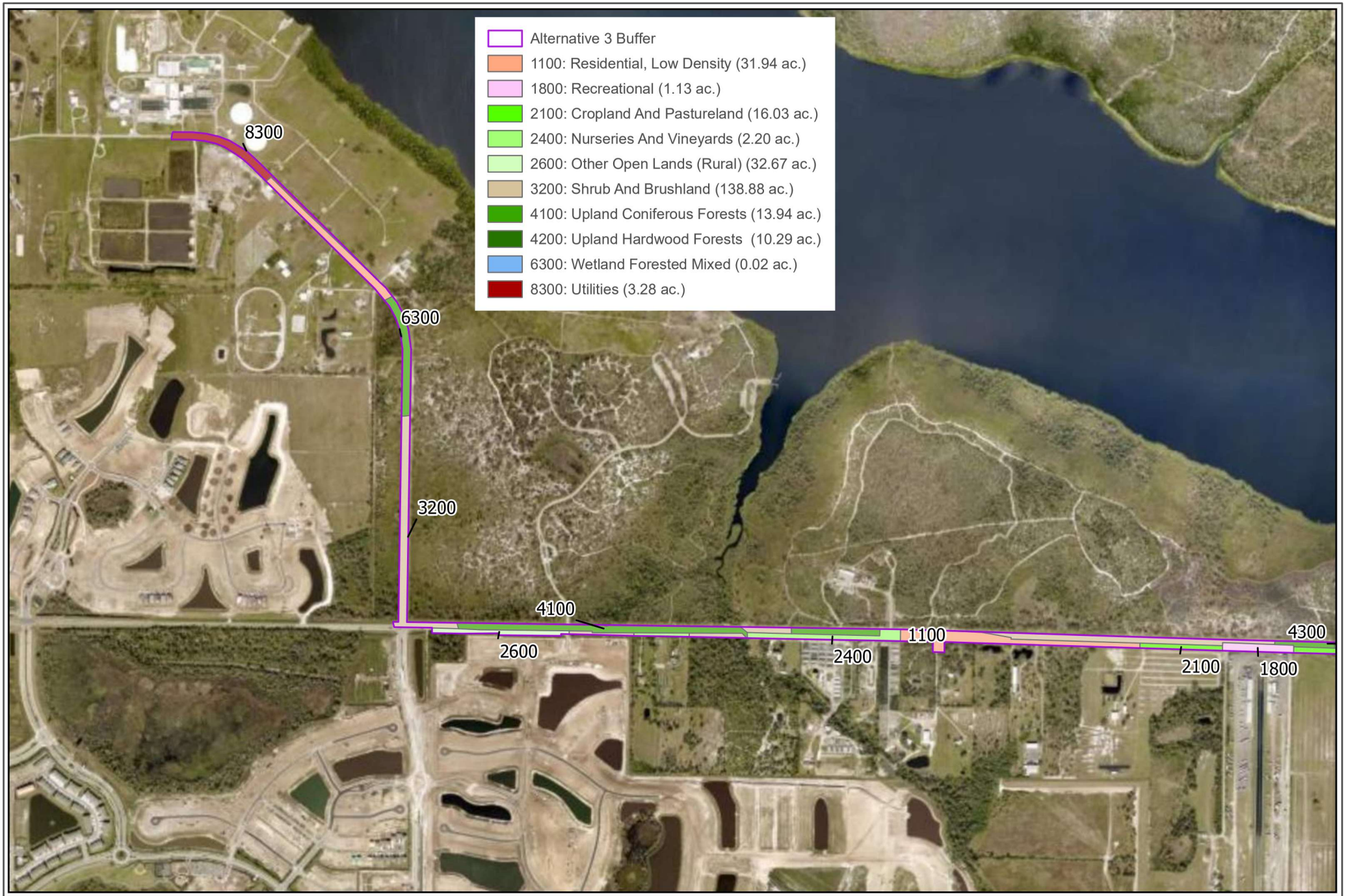
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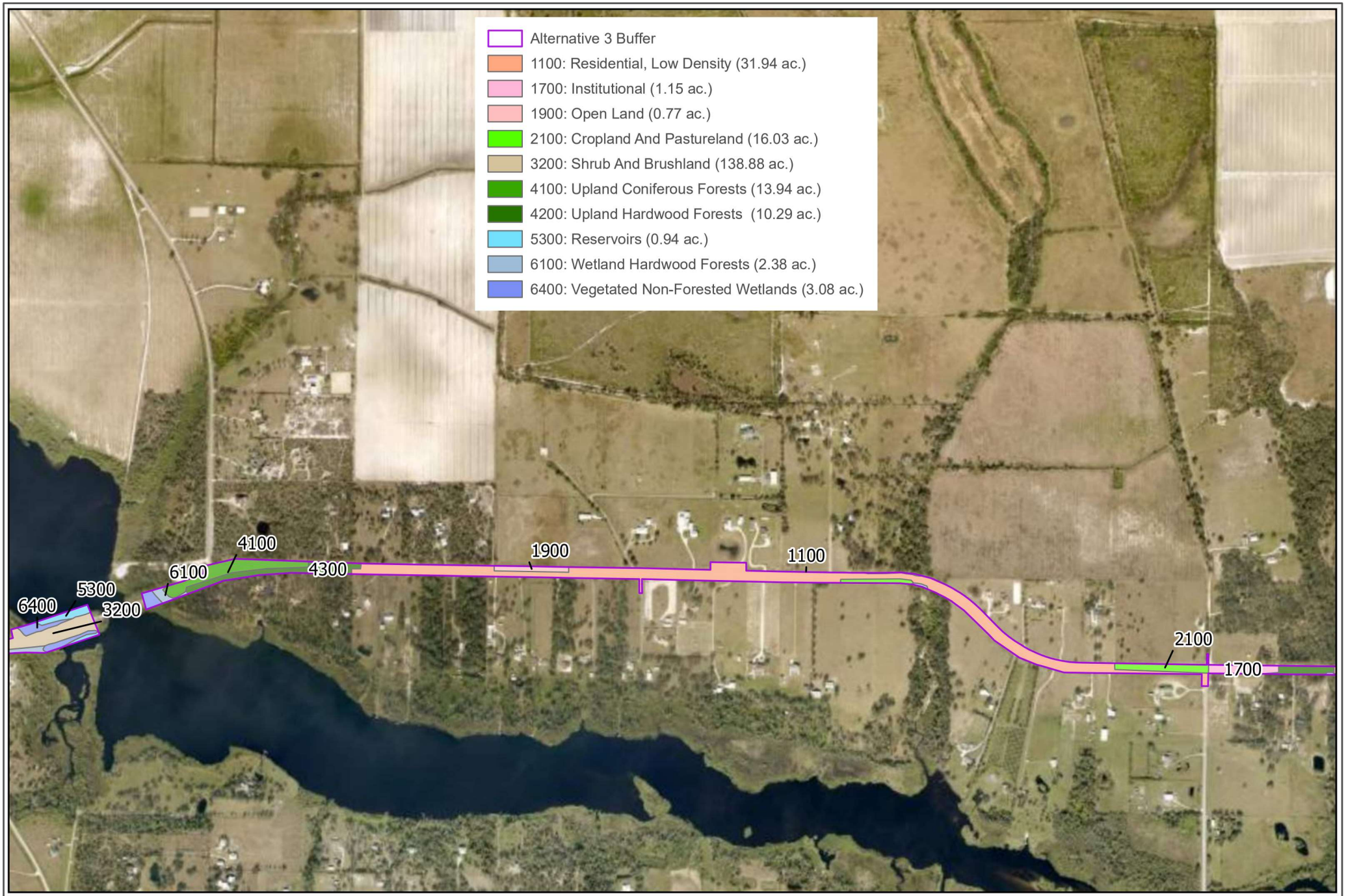
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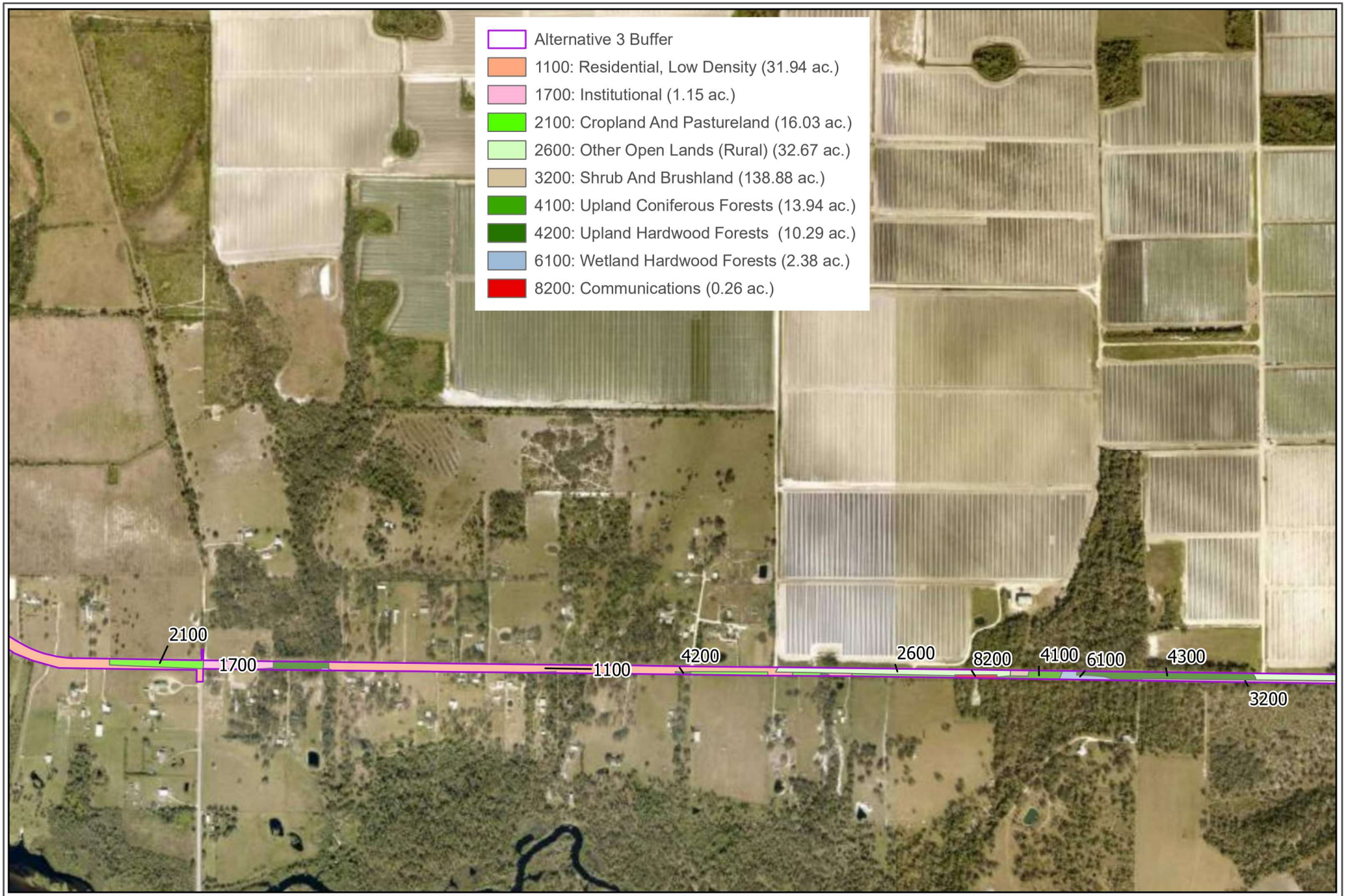
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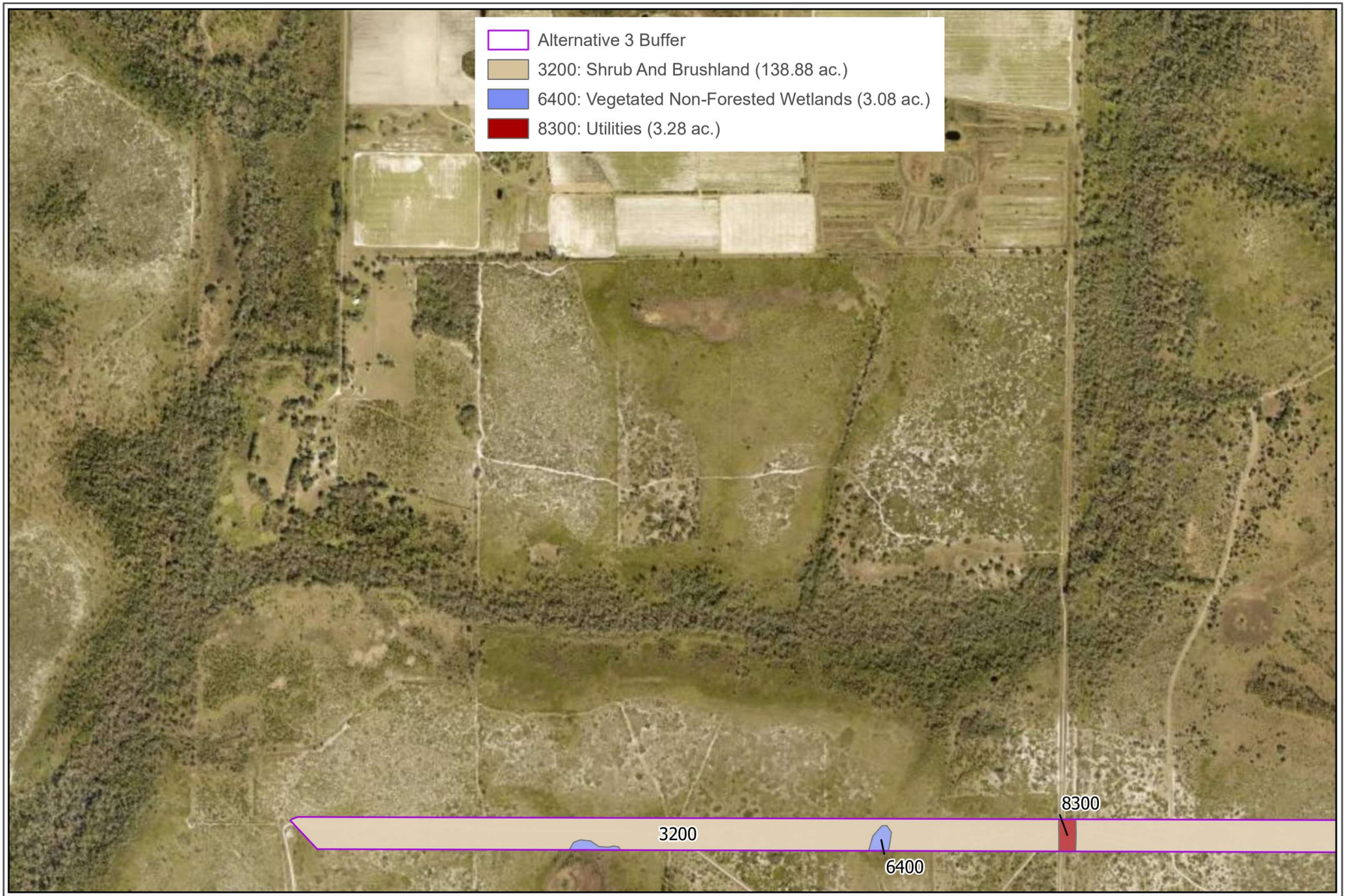
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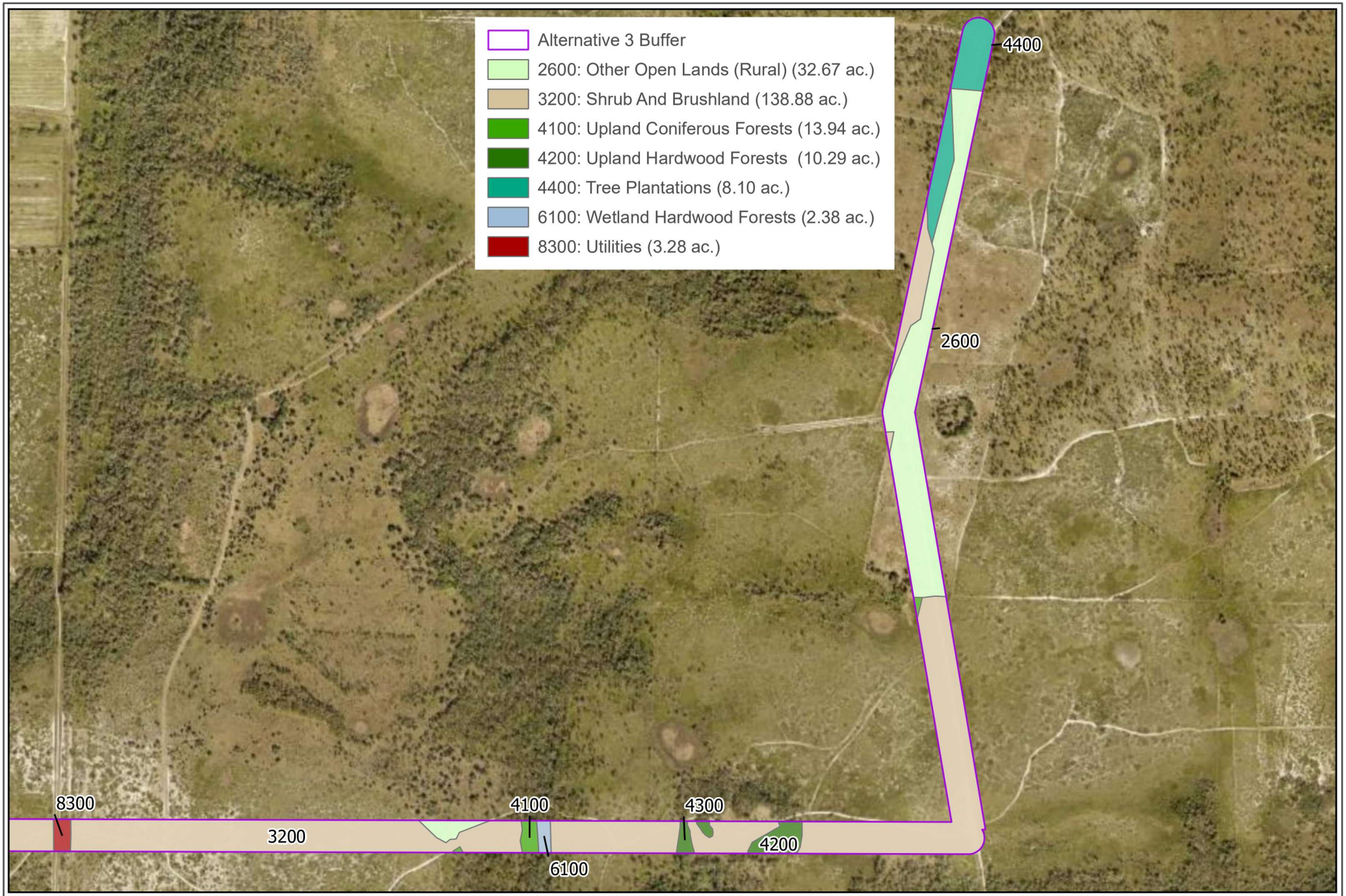
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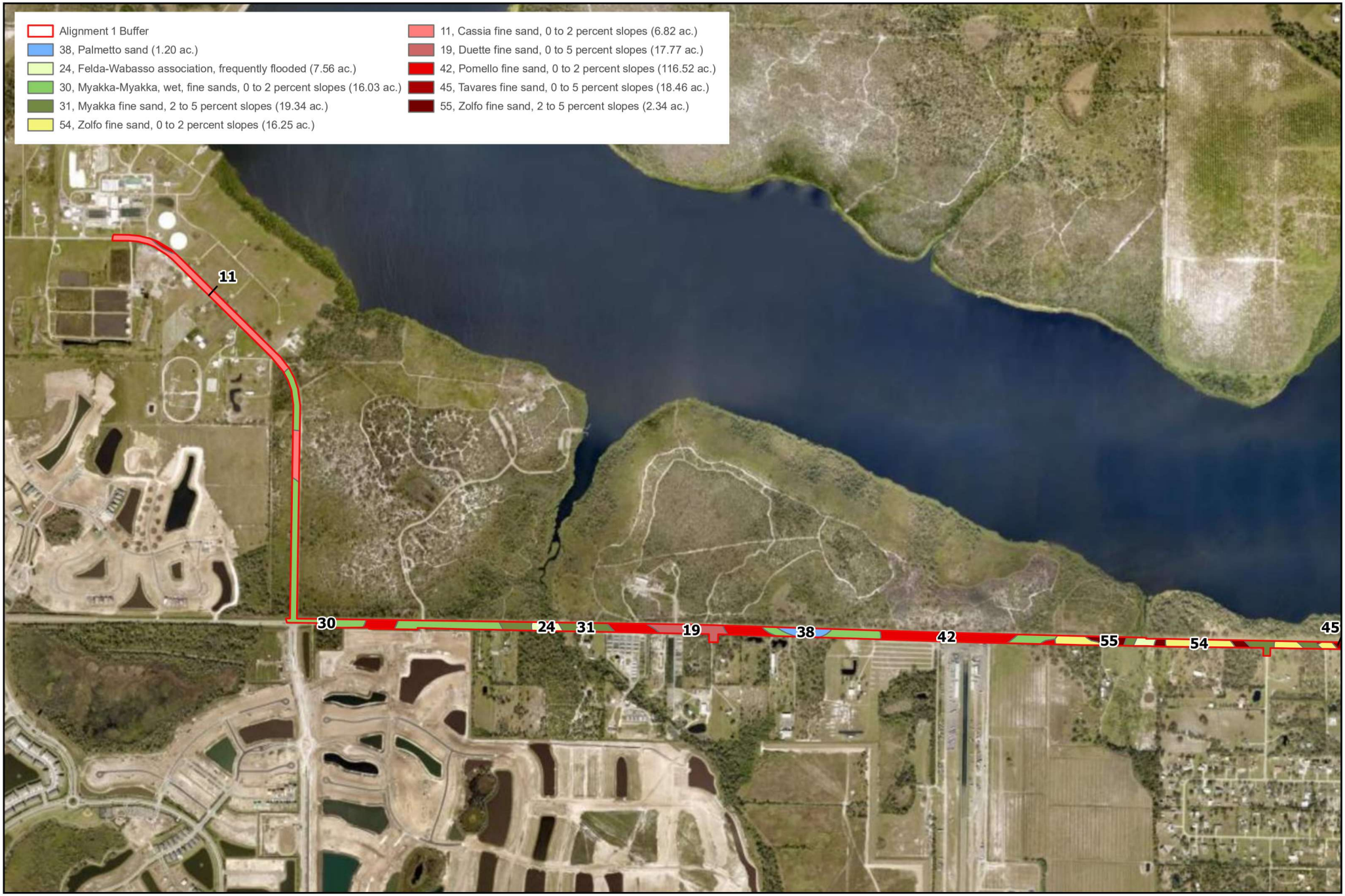
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Appendix B. Soils Maps

Map Unit Symbol	Map Unit Name	Hydric Rating	Gopher Tortoise Suitability	Area (ac)		
				Alt. 1	Alt. 2	Alt. 3
11	Cassia fine sand, 0 to 2 percent slopes	Nonhydric	Highly suited	6.82	47.00	28.83
12	Cassia fine sand, moderately well drained	Nonhydric	Highly suited	0.78	0.78	0.78
18	Delray-Pomona complex	Partially Hydric	Unsuitable	30.00	21.69	5.40
19	Duette fine sand, 0 to 5 percent slopes	Nonhydric	Highly suited	17.77	6.34	3.62
24	Felda-Wabasso association, frequently flooded	Partially Hydric	Unsuitable	7.56	9.18	4.78
26	Floridana-Immokalee-Okeelanta association	Predominantly Hydric	Unsuitable	3.69	1.74	1.74
3	Braden fine sand	Nonhydric	Highly suited	3.47	2.08	2.08
30	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	Partially Hydric	Less suited	16.03	14.05	14.05
31	Myakka fine sand, 2 to 5 percent slopes	Partially Hydric	Less suited	19.34	4.59	4.59
35	Ona fine sand, orstein substratum	Partially Hydric	Less suited	0.75	2.68	2.68
38	Palmetto sand	Hydric	Unsuitable	1.20	4.07	1.20
42	Pomello fine sand, 0 to 2 percent slopes	Nonhydric	Highly suited	116.52	89.27	90.46
43	St. Johns fine sand, 2 to 5 percent slopes	Partially Hydric	Less suited	12.98	22.84	8.24
45	Tavares fine sand, 0 to 5 percent slopes	Nonhydric	Highly suited	18.46	18.46	18.46
52	Waveland fine sand	Partially Hydric	Less suited	137.39	166.40	62.15
54	Zolfo fine sand, 0 to 2 percent slopes	Predominantly Nonhydric	Highly suited	16.25	16.25	16.25
55	Zolfo fine sand, 2 to 5 percent slopes	Nonhydric	Highly suited	2.34	2.34	2.34
7	Canova, Anclote, and Okeelanta soils	Hydric	Unsuitable	0.36	0.36	0.36
99	Water	Nonhydric	Not rated	0.07	0.07	0.07
			Total:	411.78	430.19	268.08



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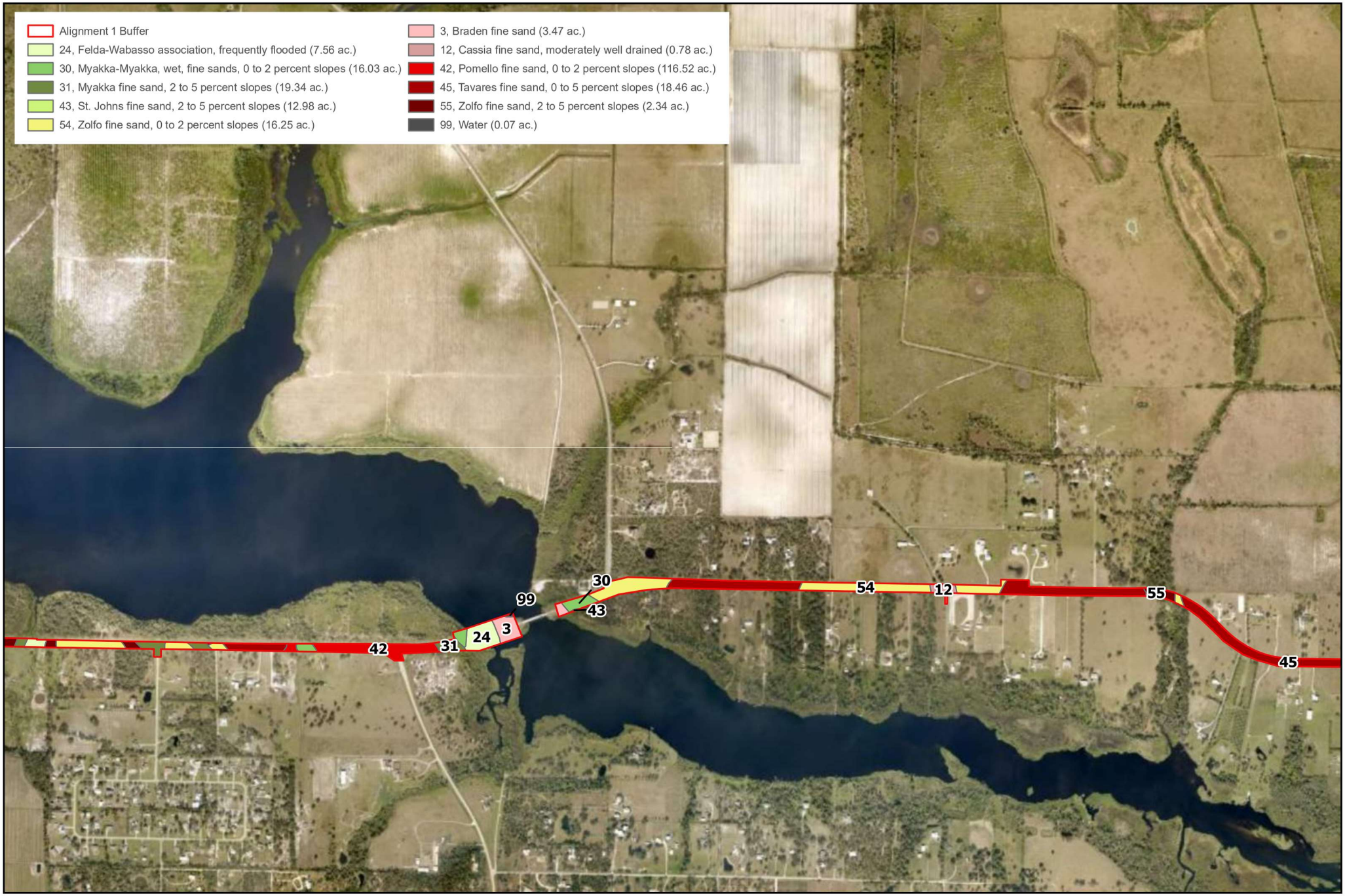
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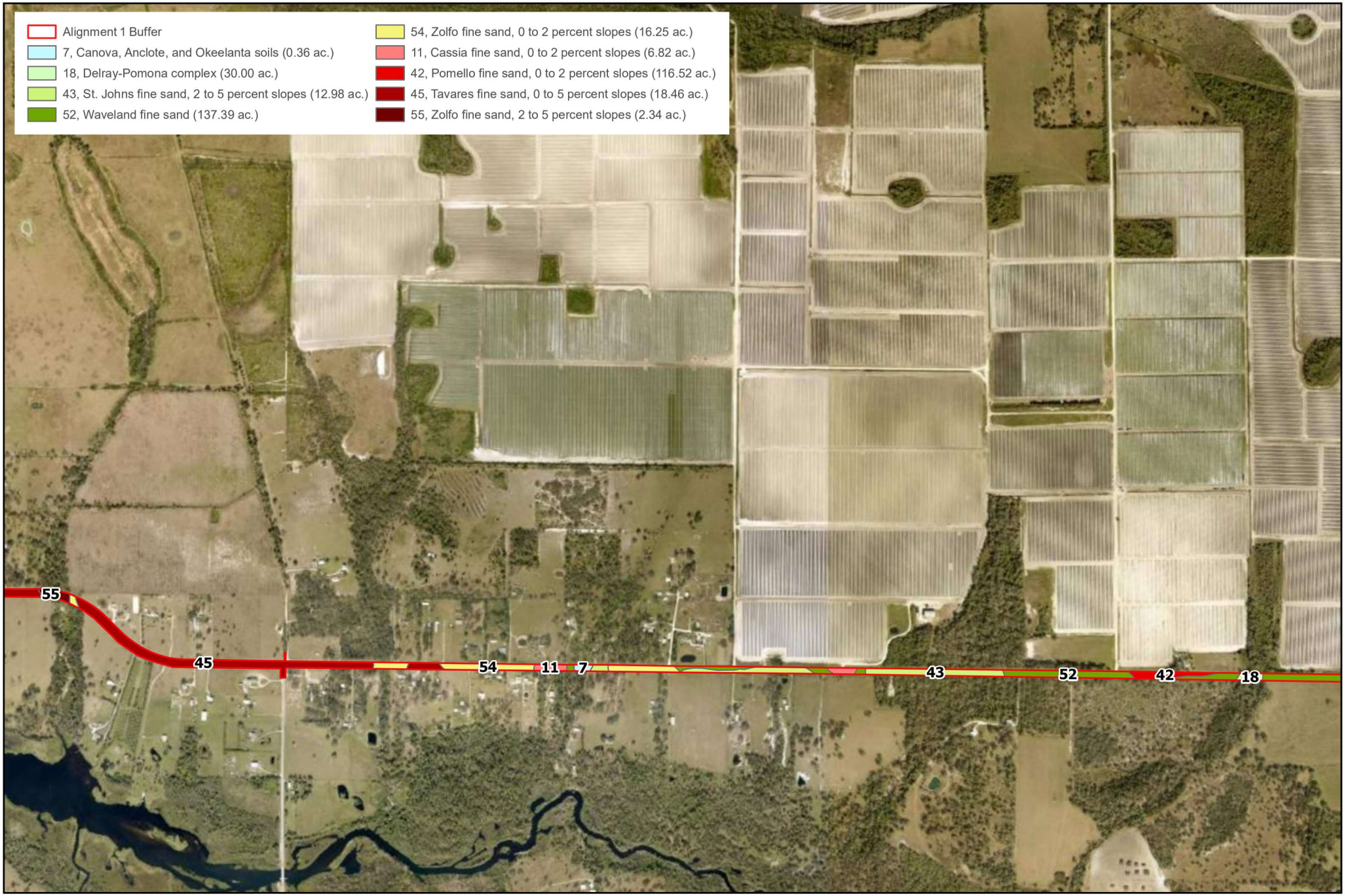
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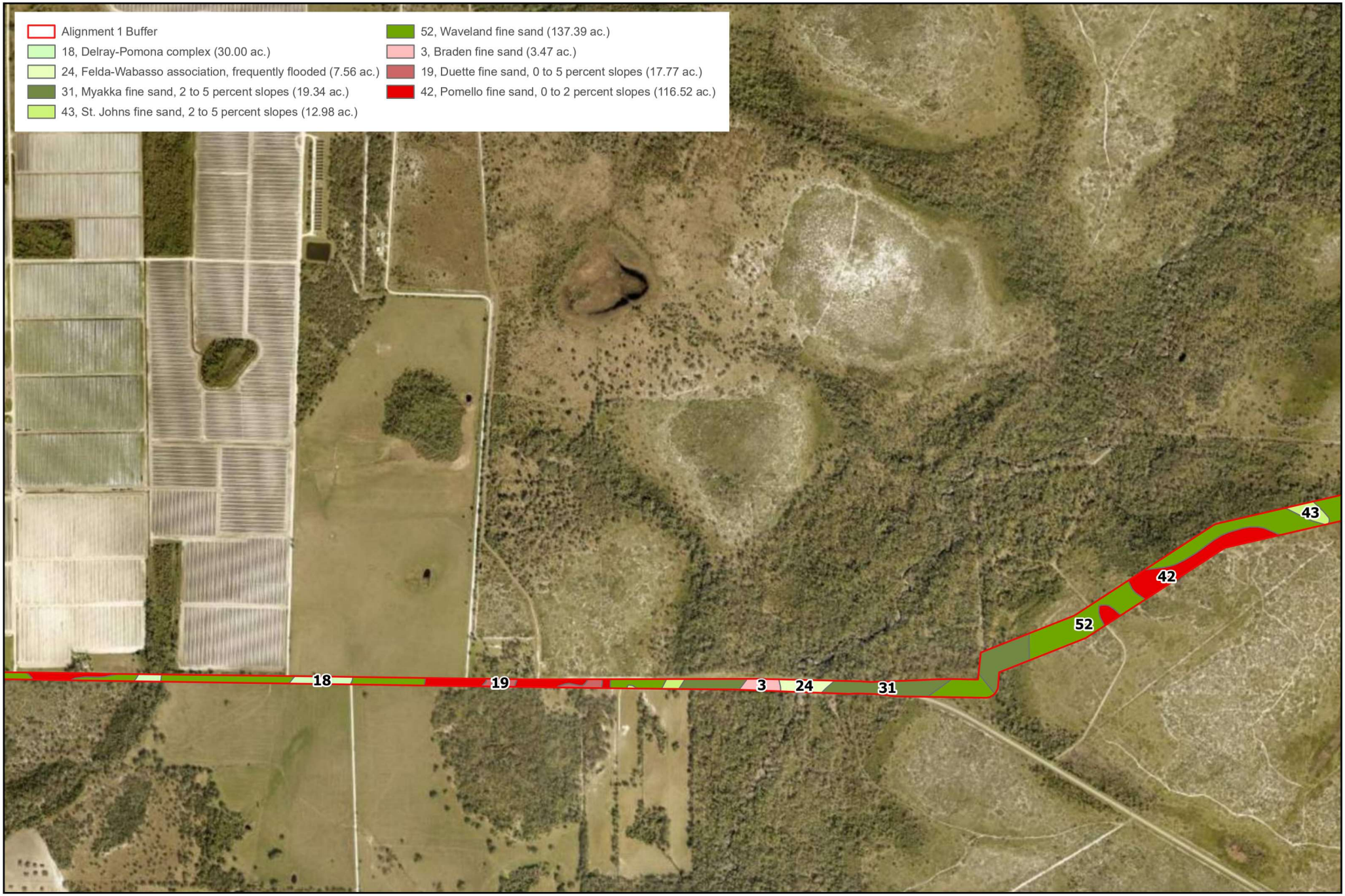
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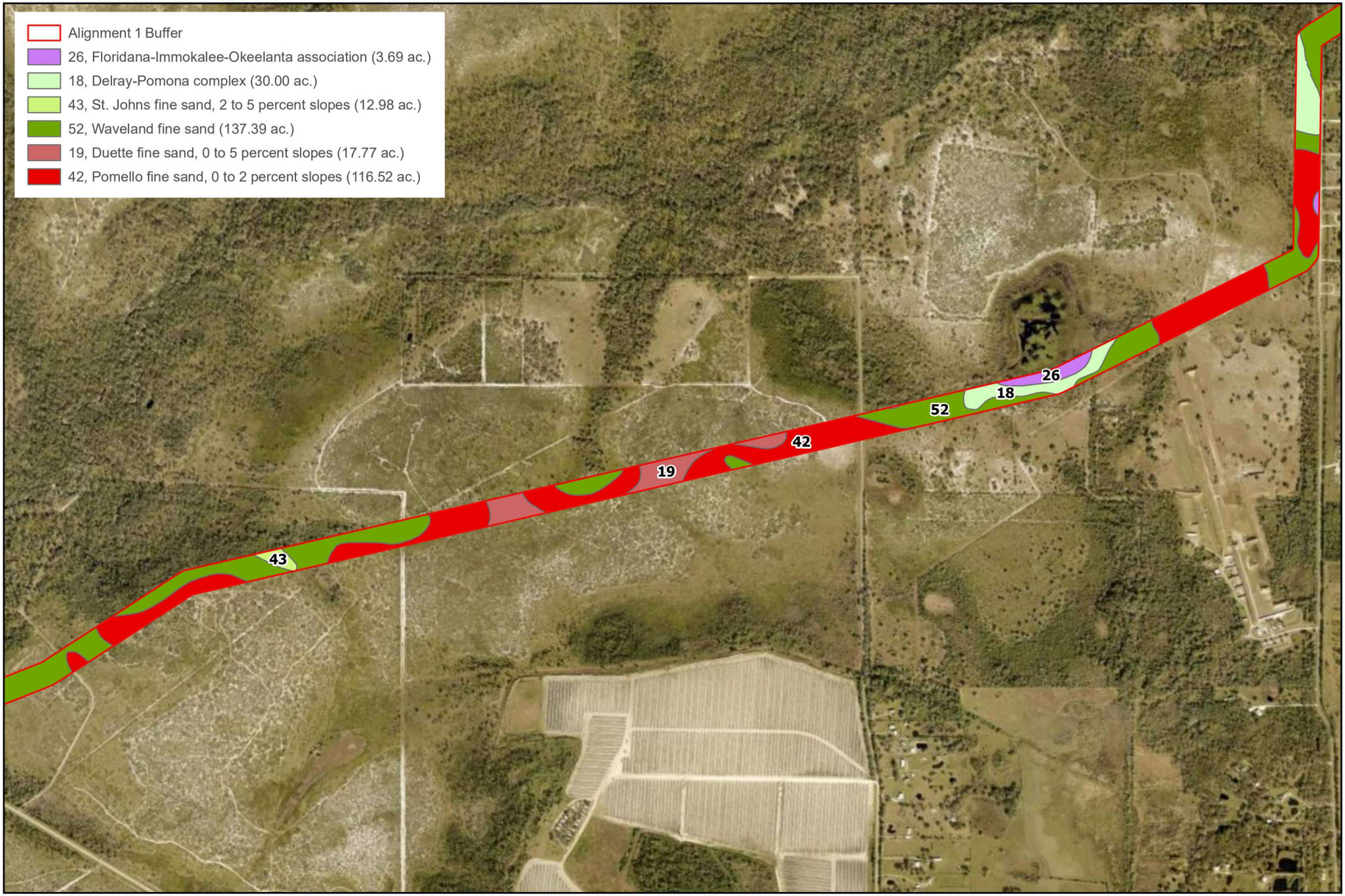
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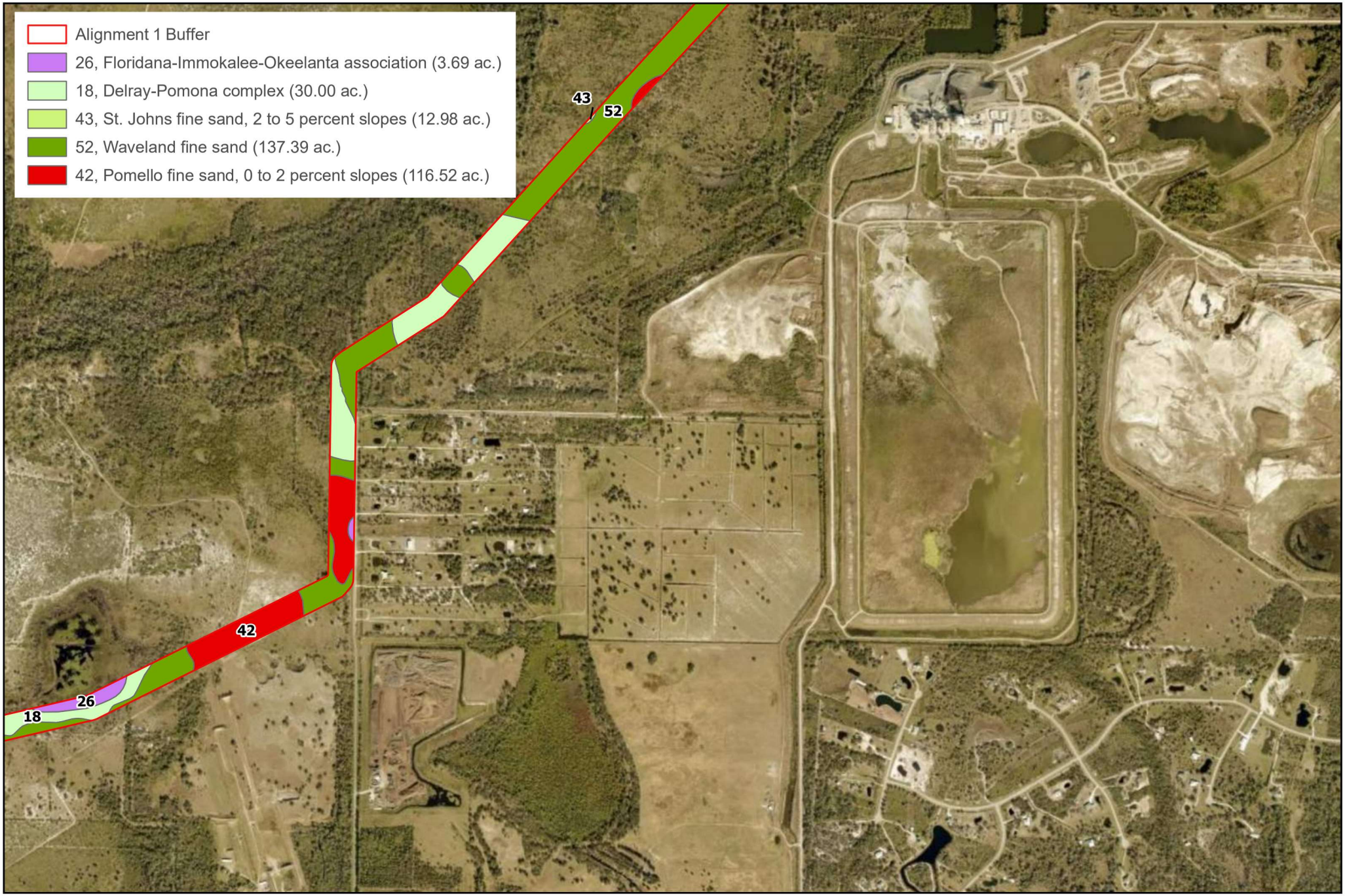
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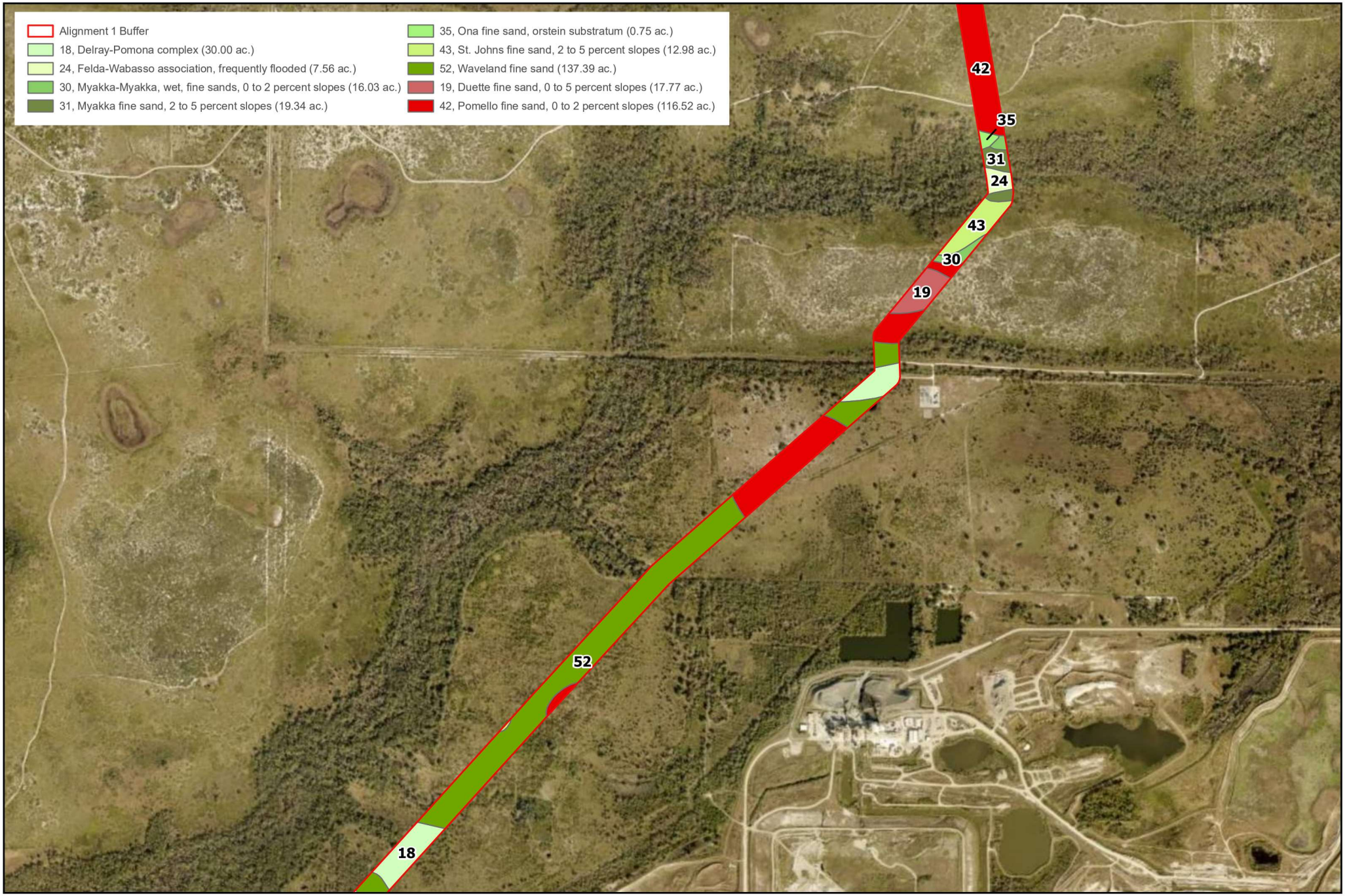
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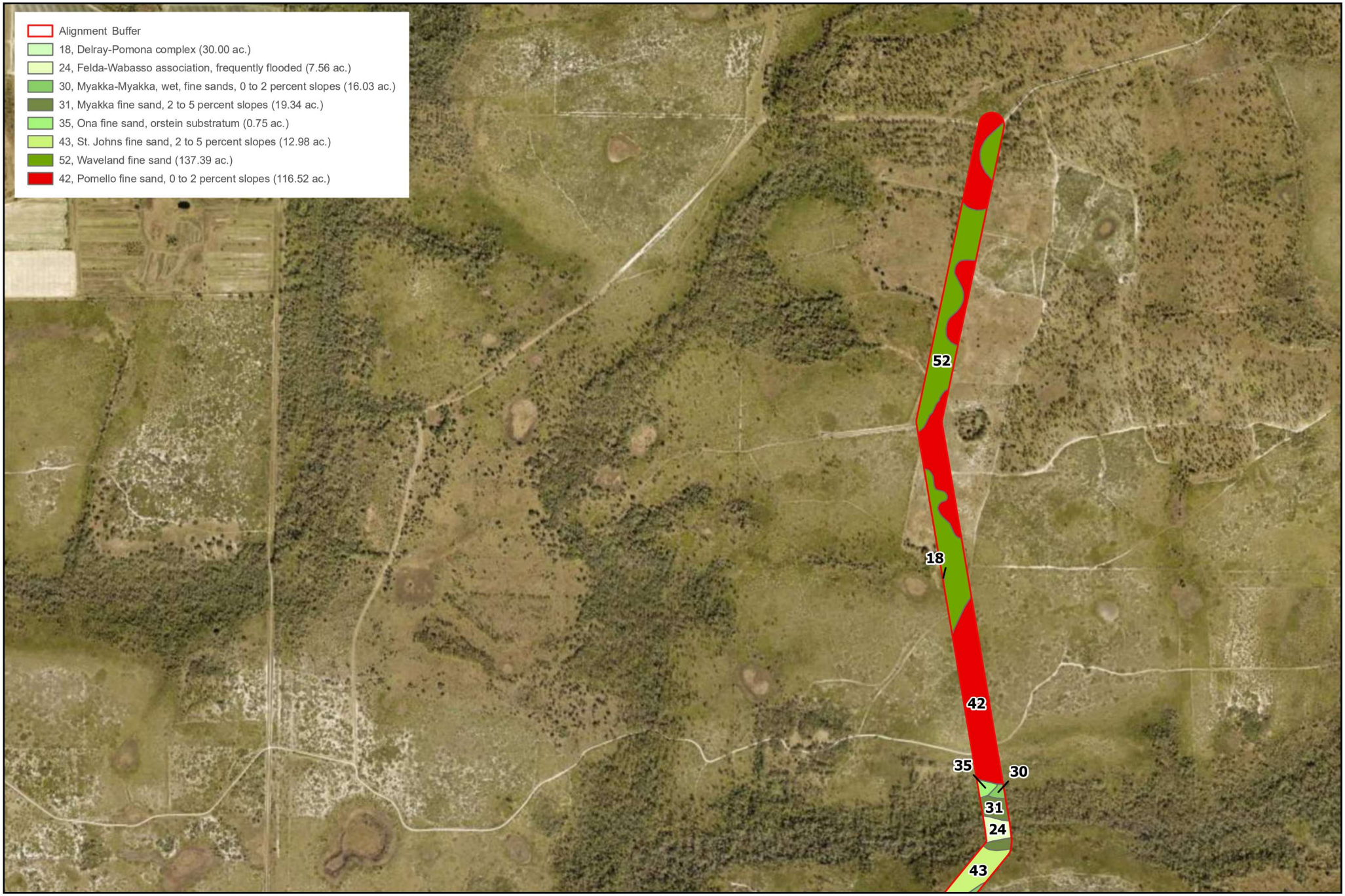
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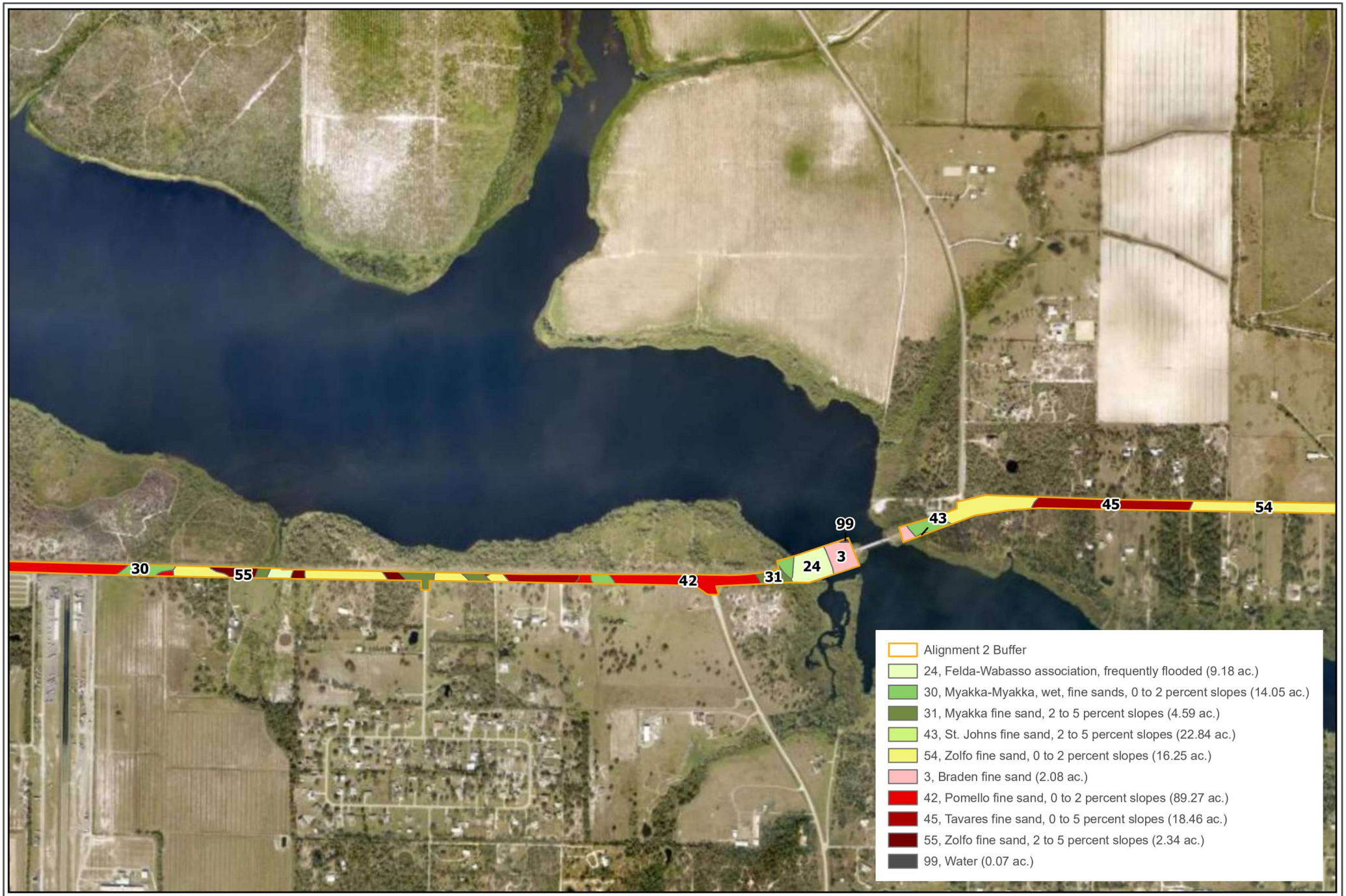
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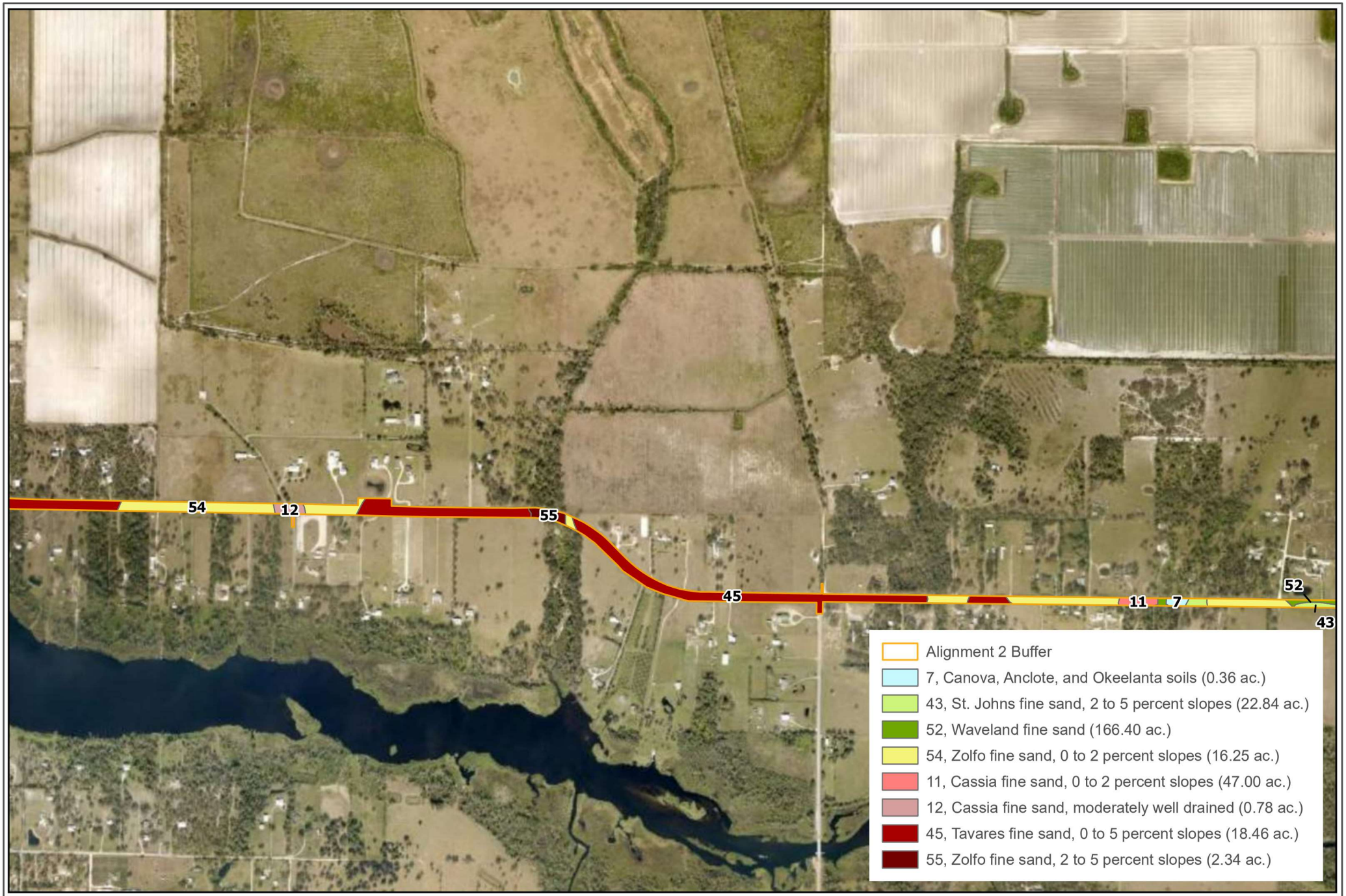
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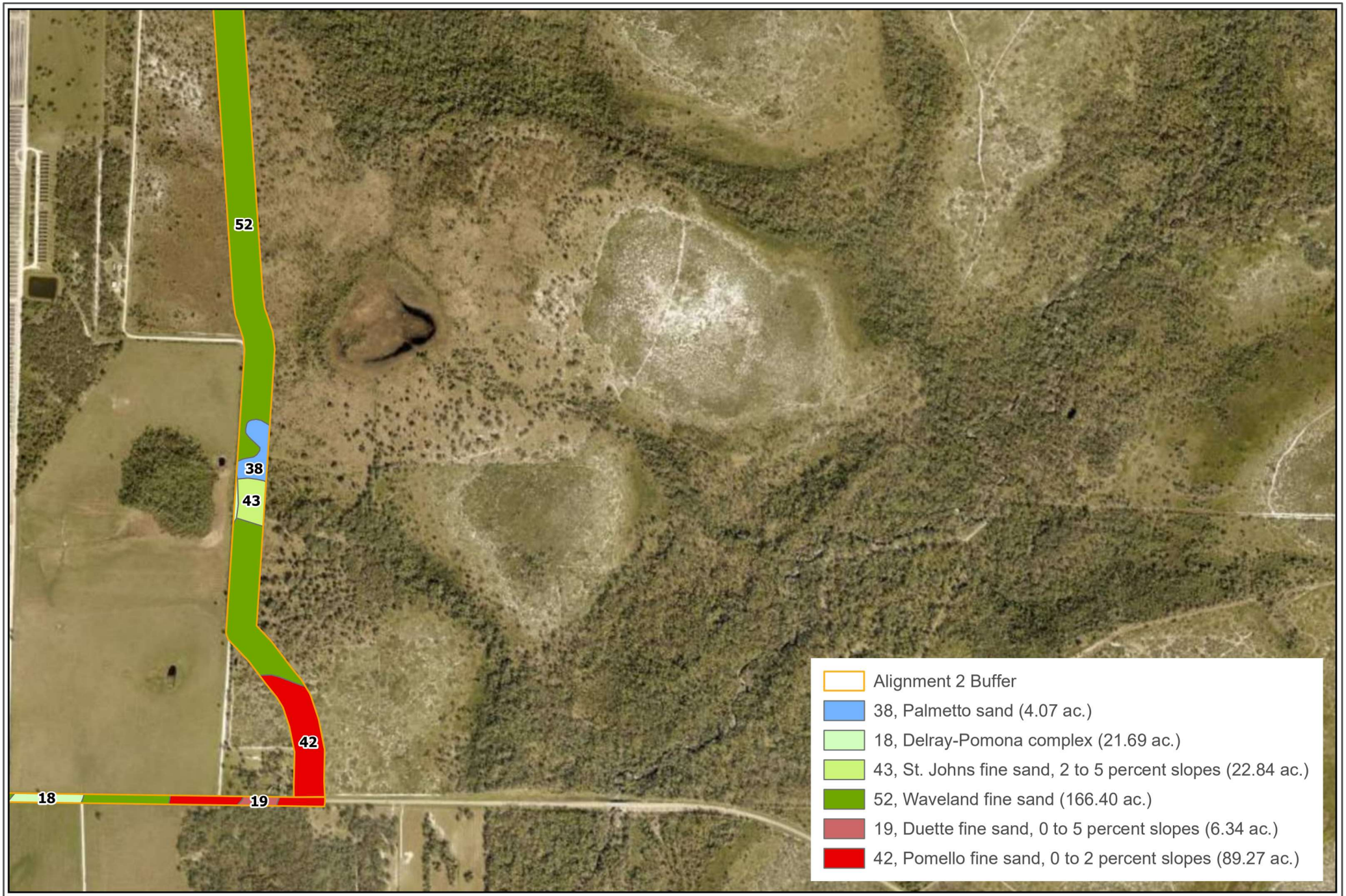
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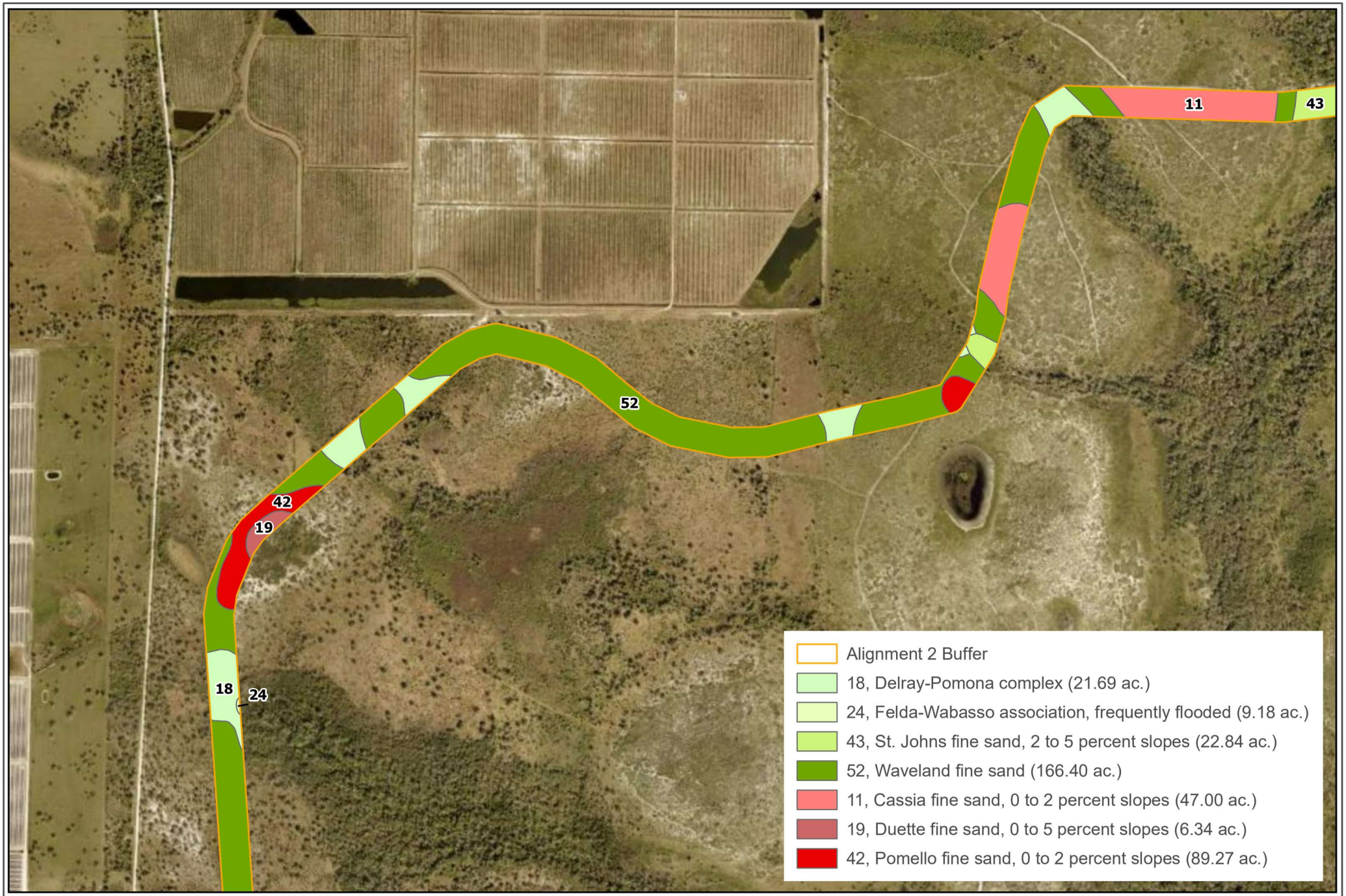
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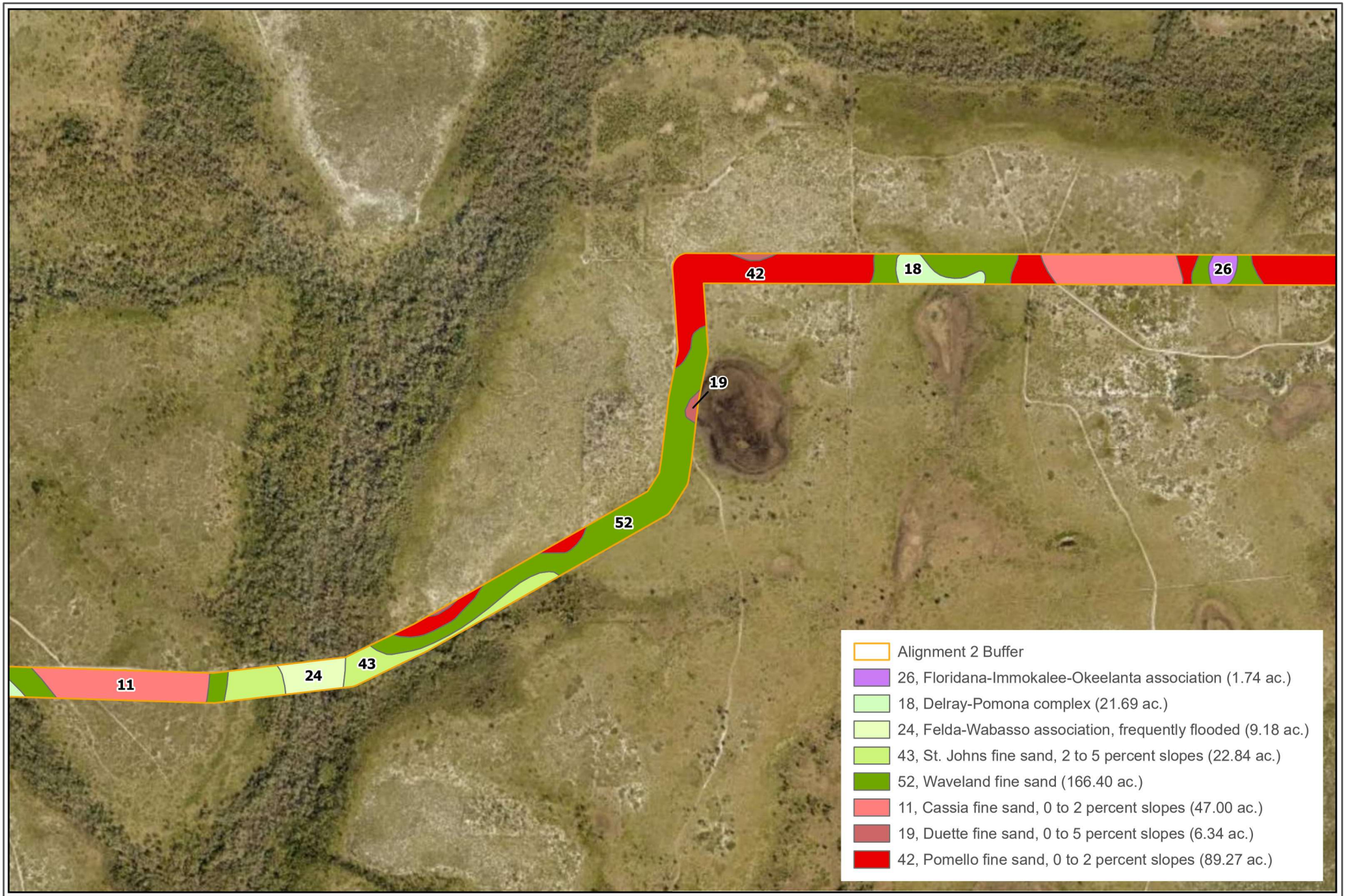
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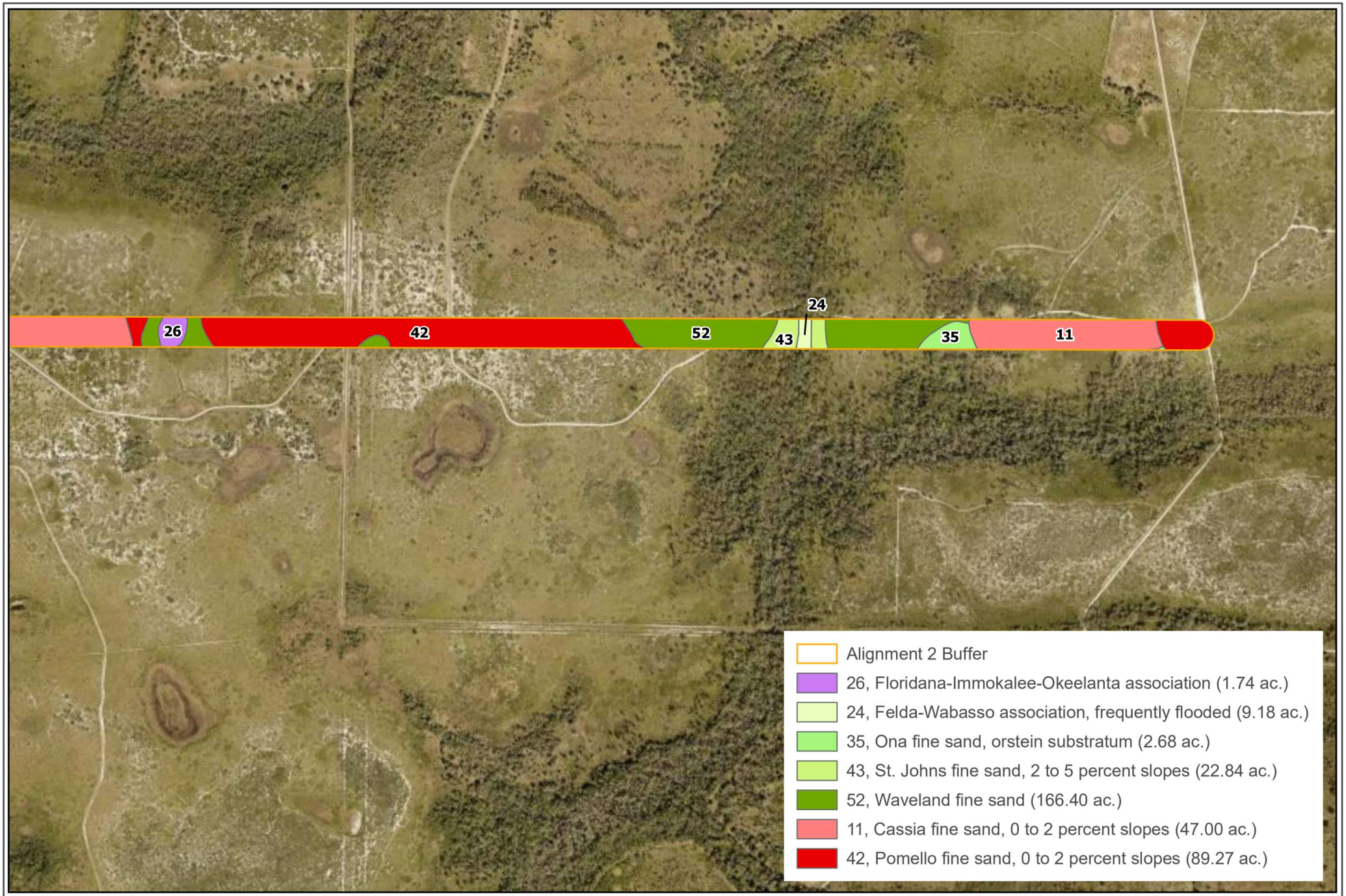
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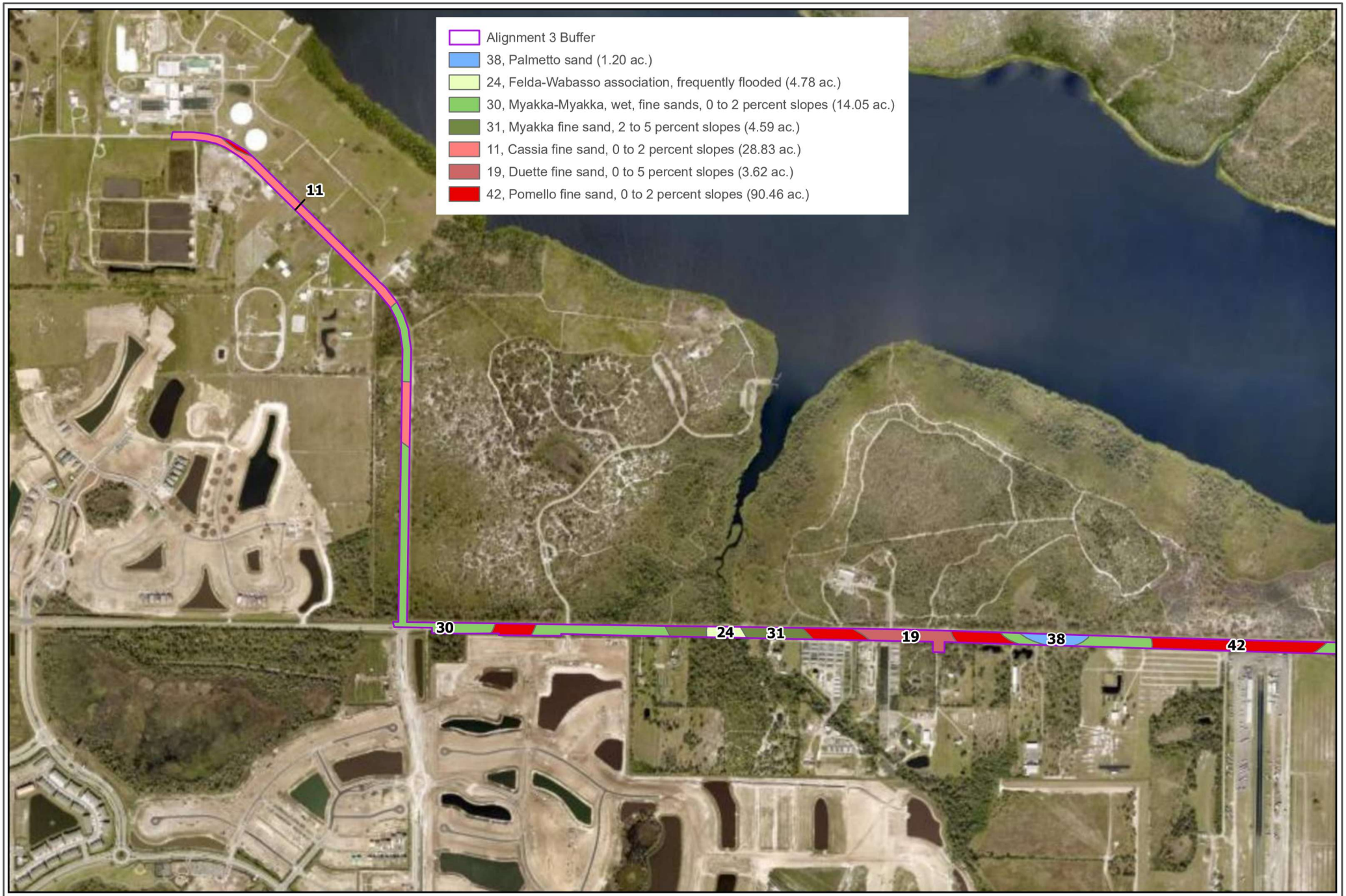
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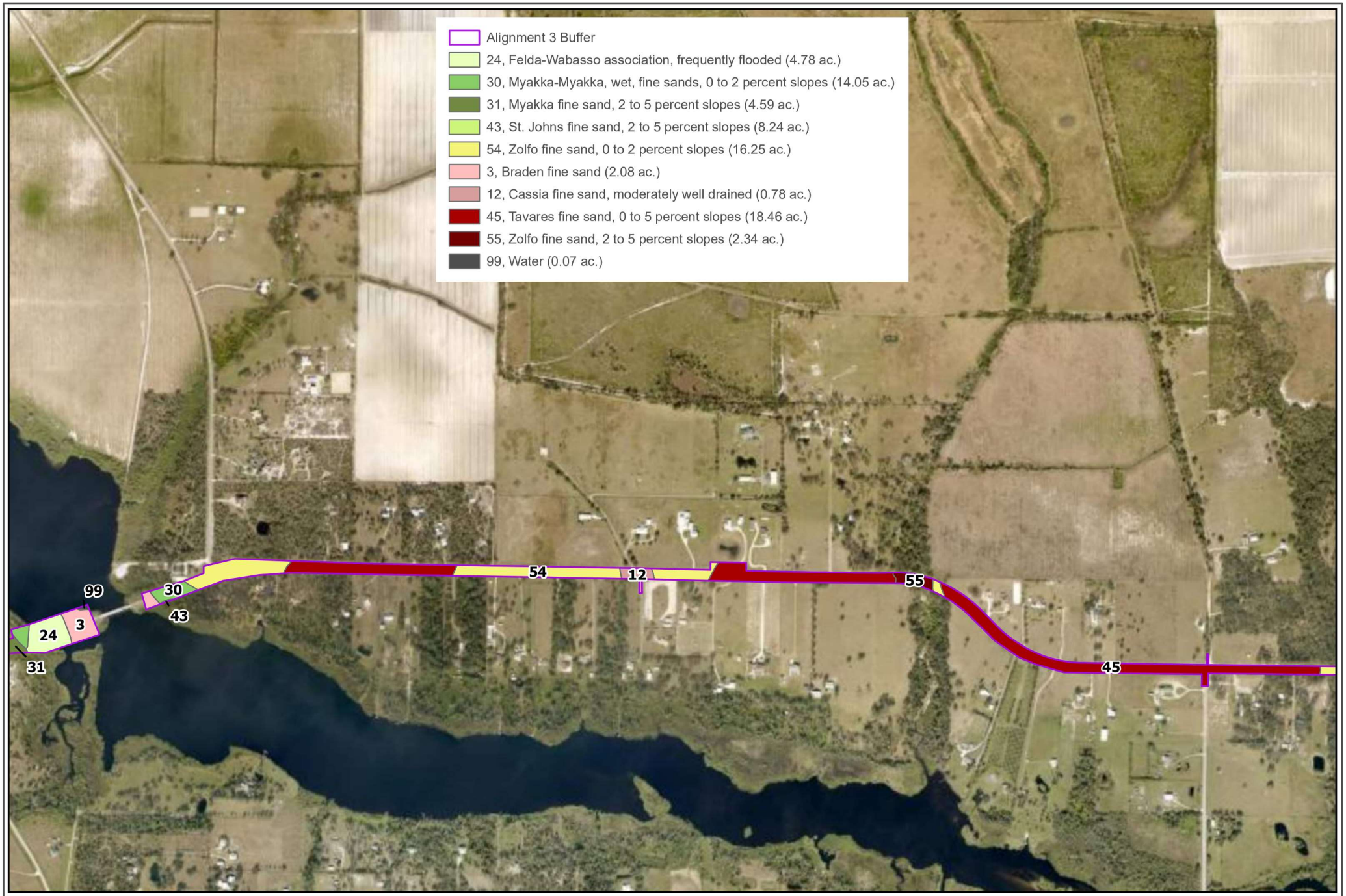
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MANATEE COUNTY PIPELINE RESILIENCY
ALTERNATIVE ALIGNMENT 3
HYDRIC SOILS MAP

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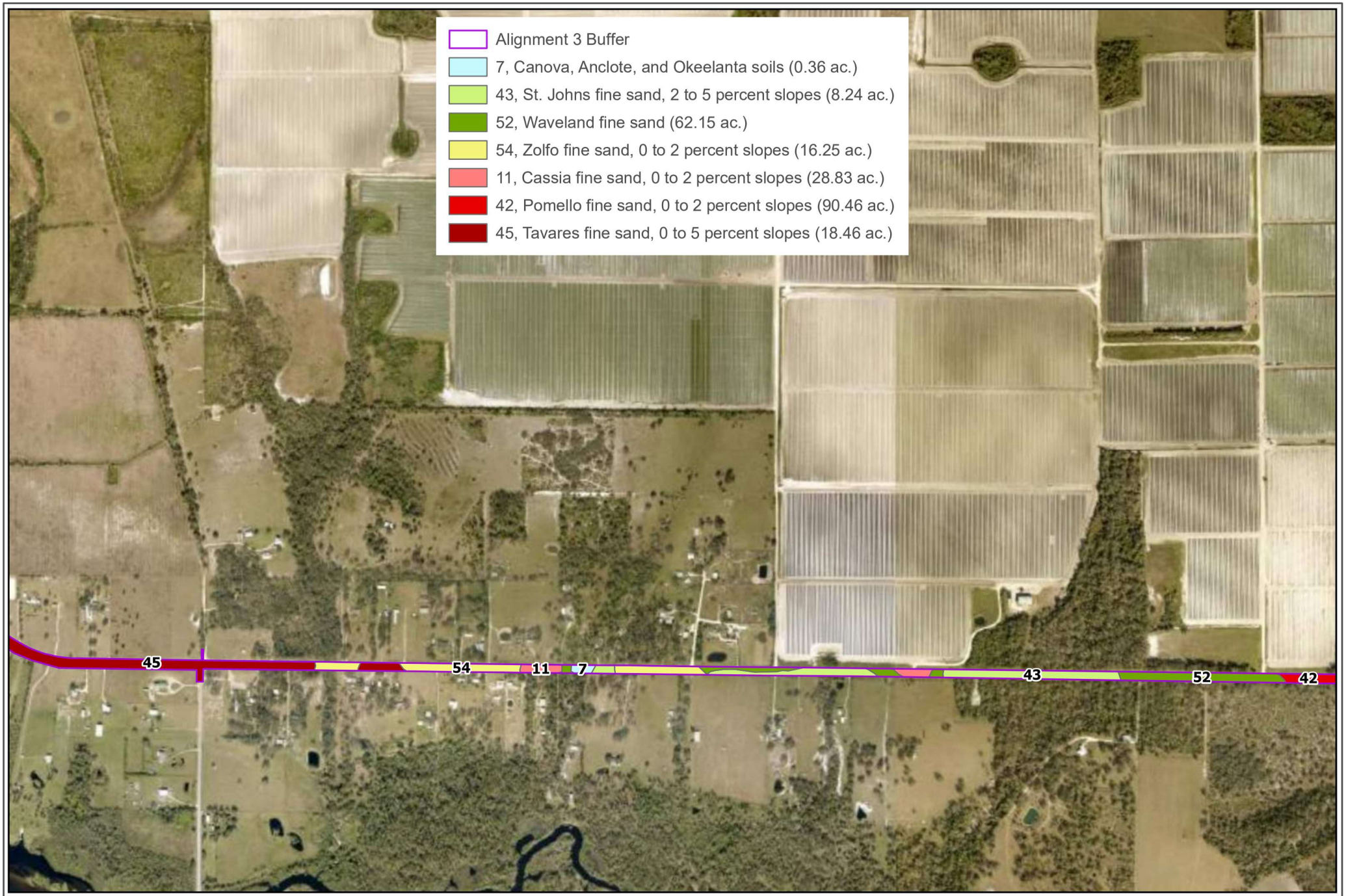
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Page 3 of 7

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Page 5 of 7

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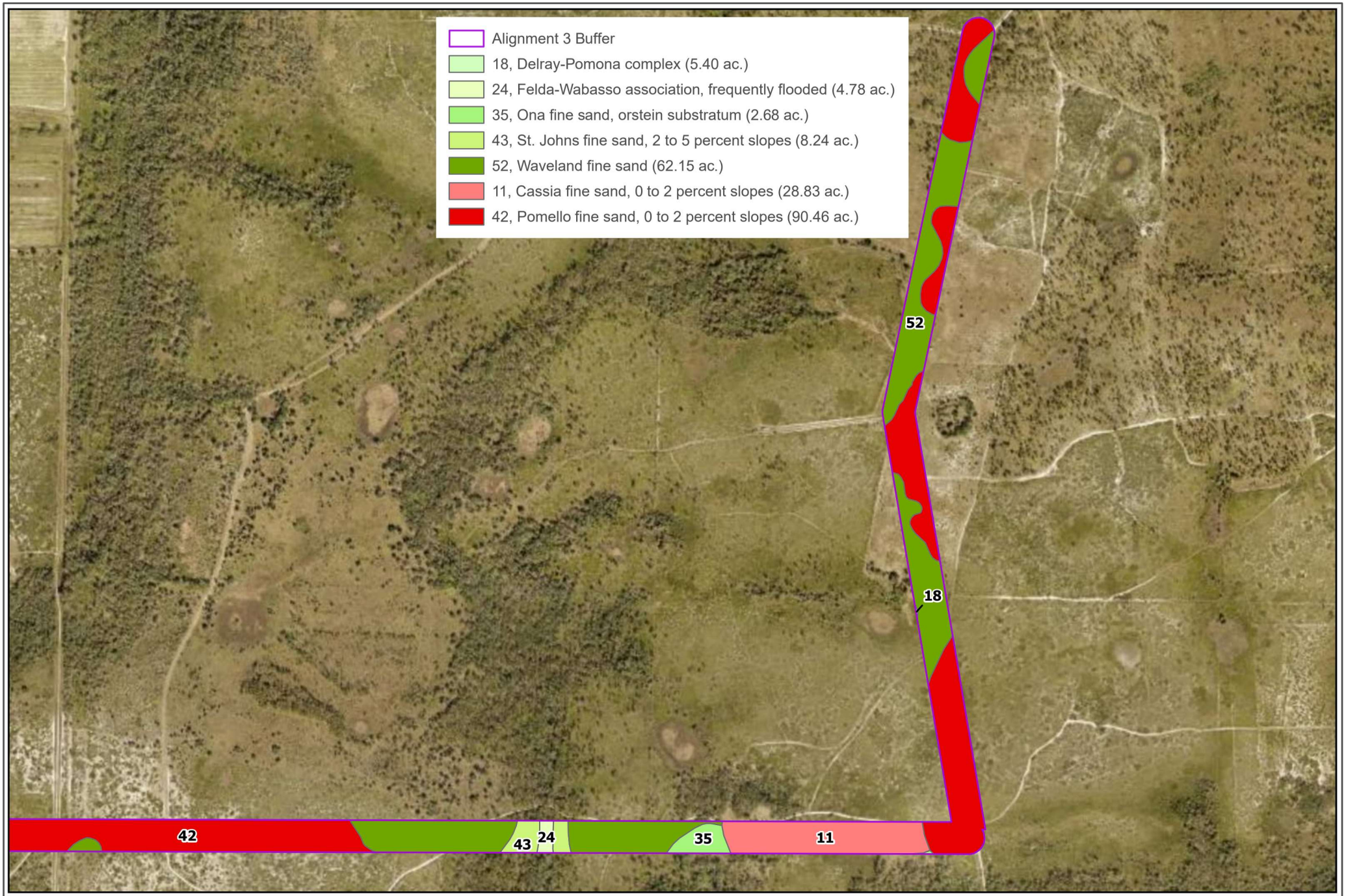
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MANATEE COUNTY PIPELINE RESILIENCY
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Page 6 of 7

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Appendix C. Wetland and Surface Water Maps



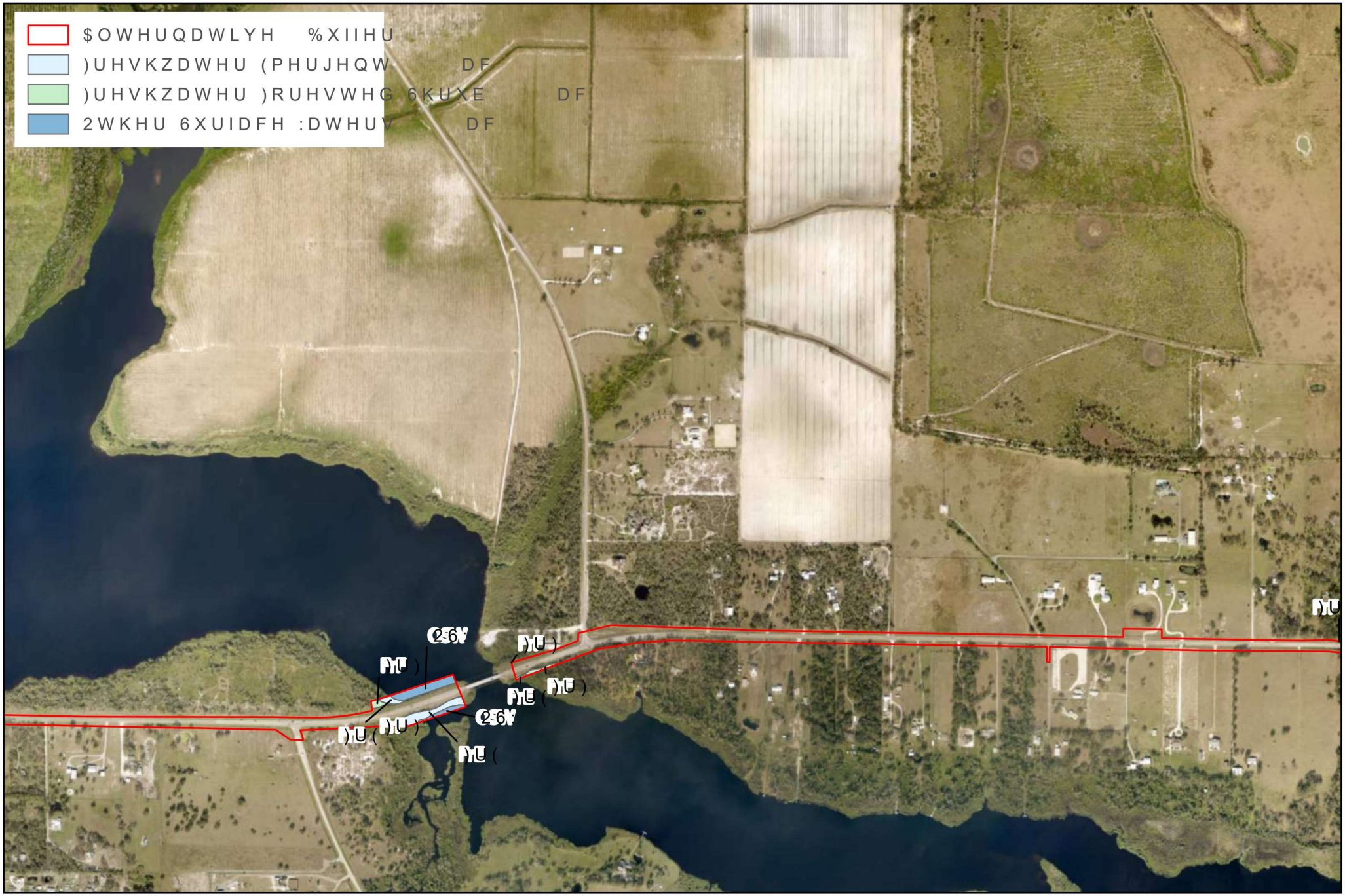
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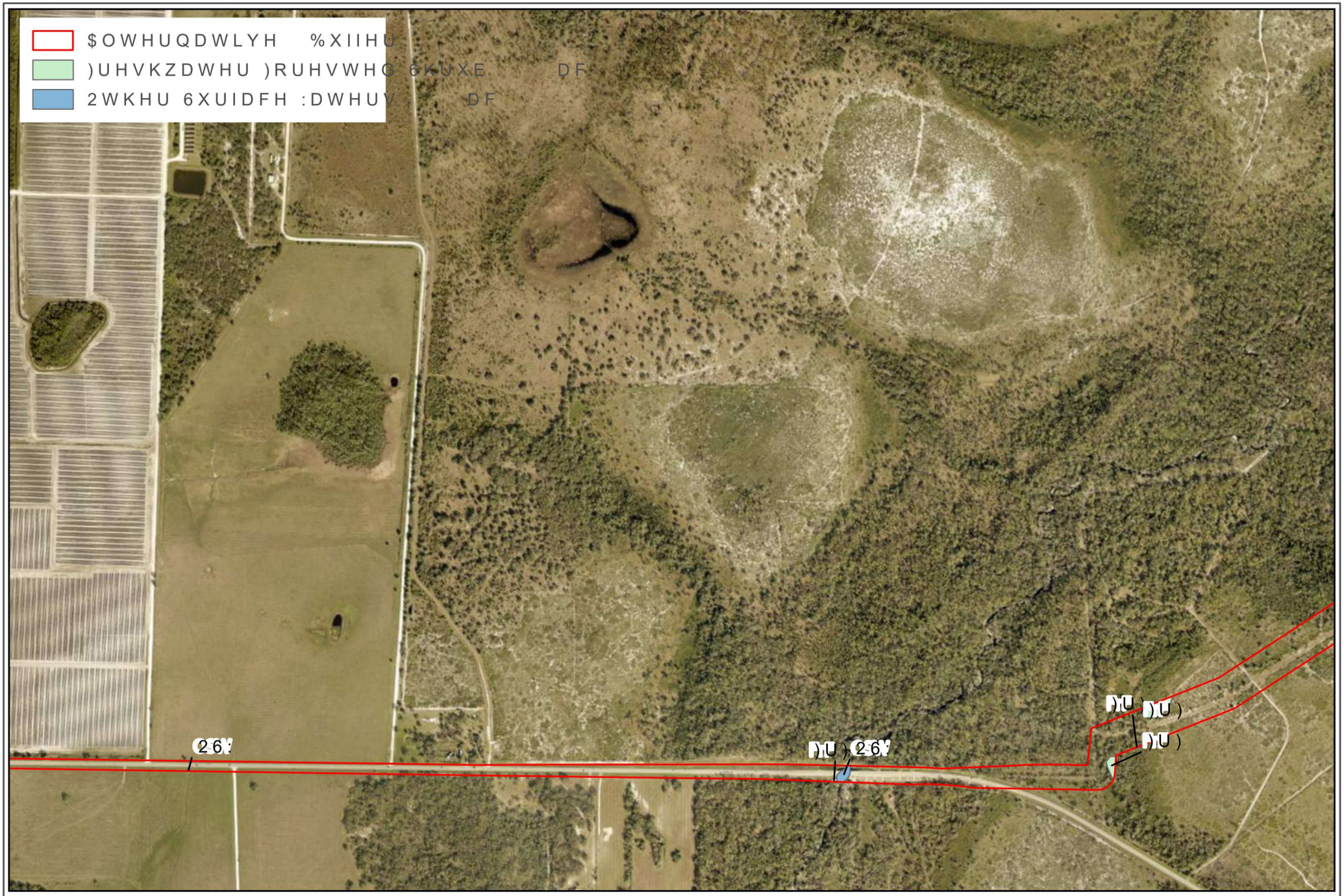
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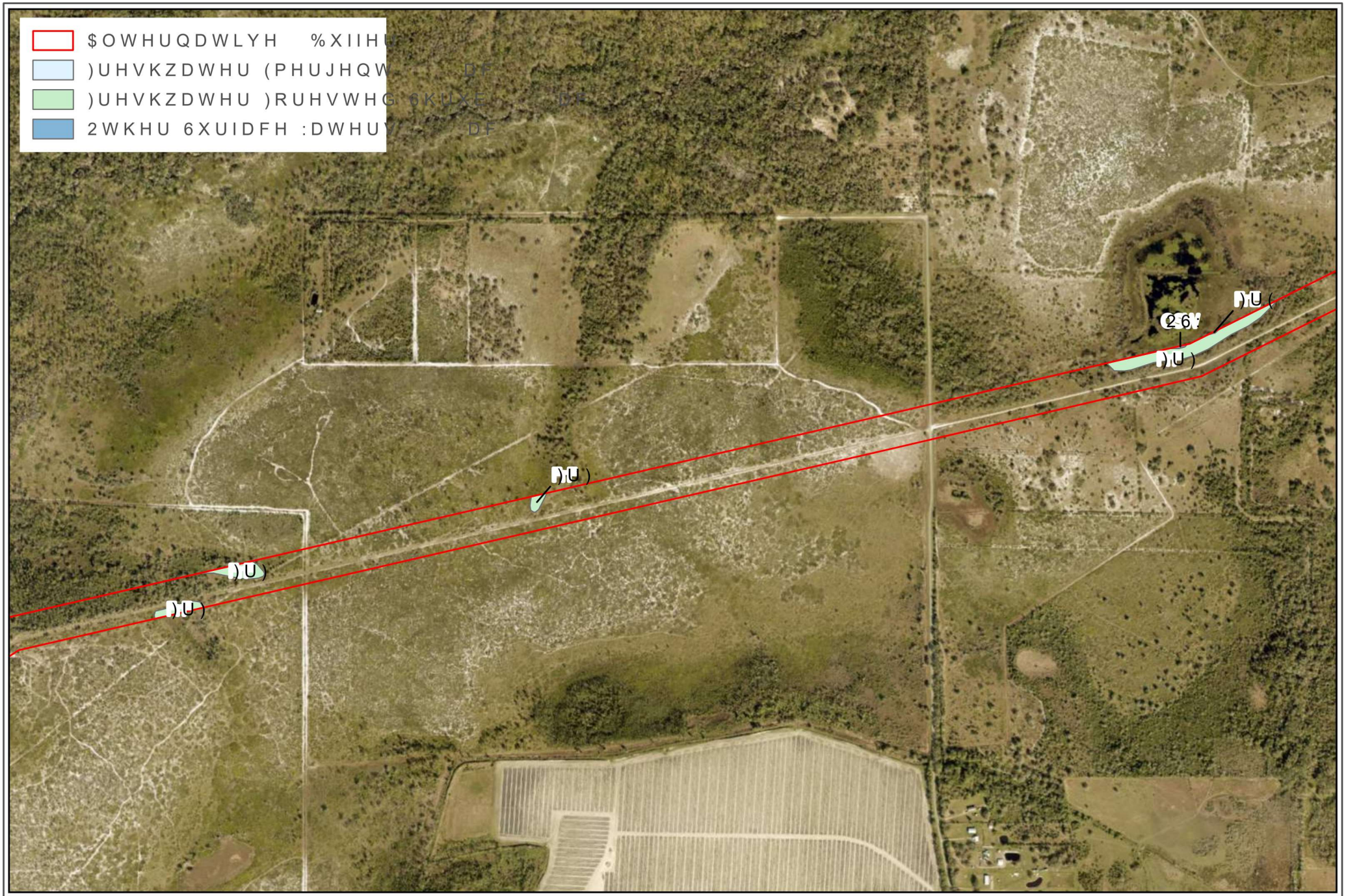
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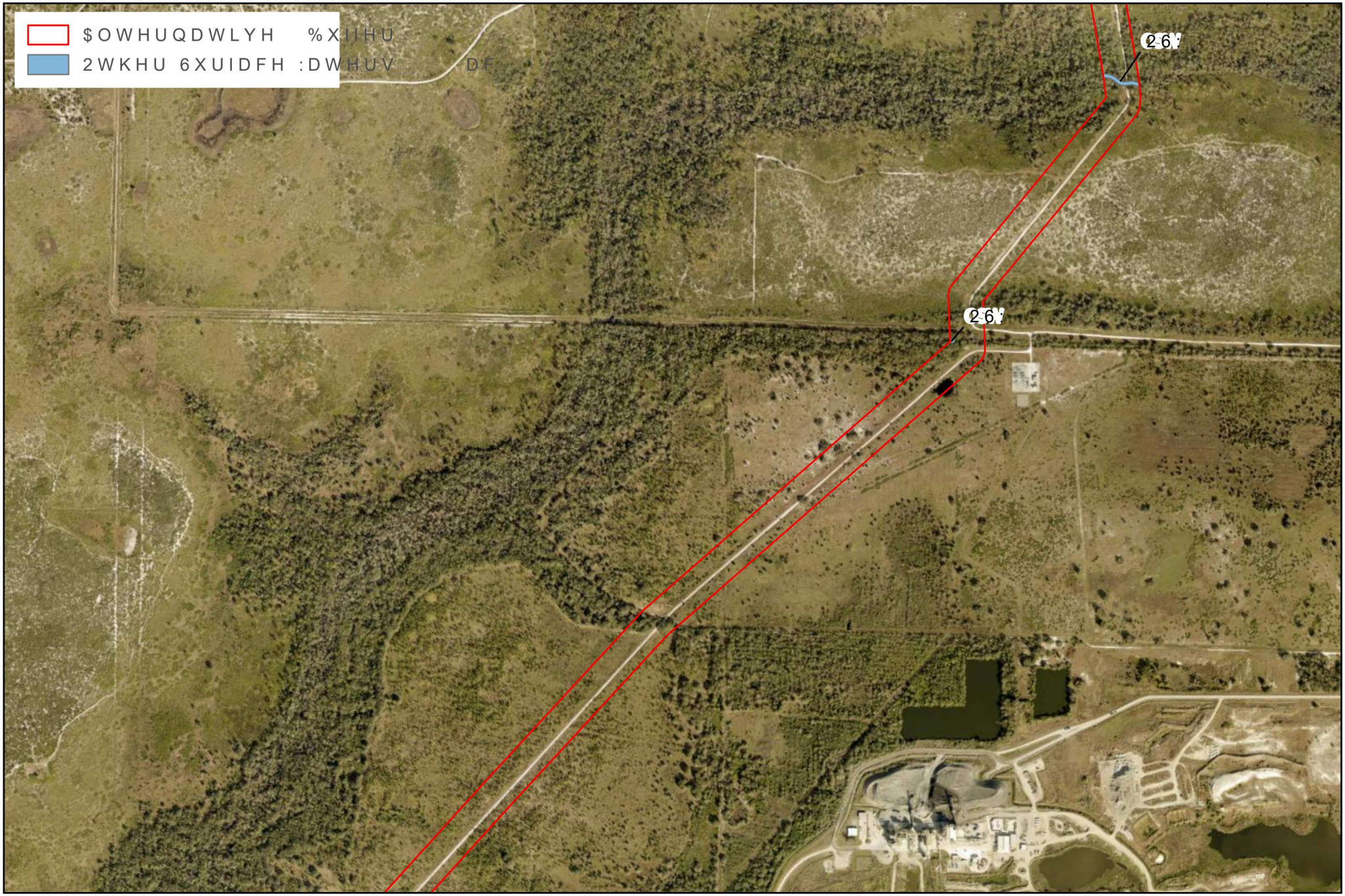
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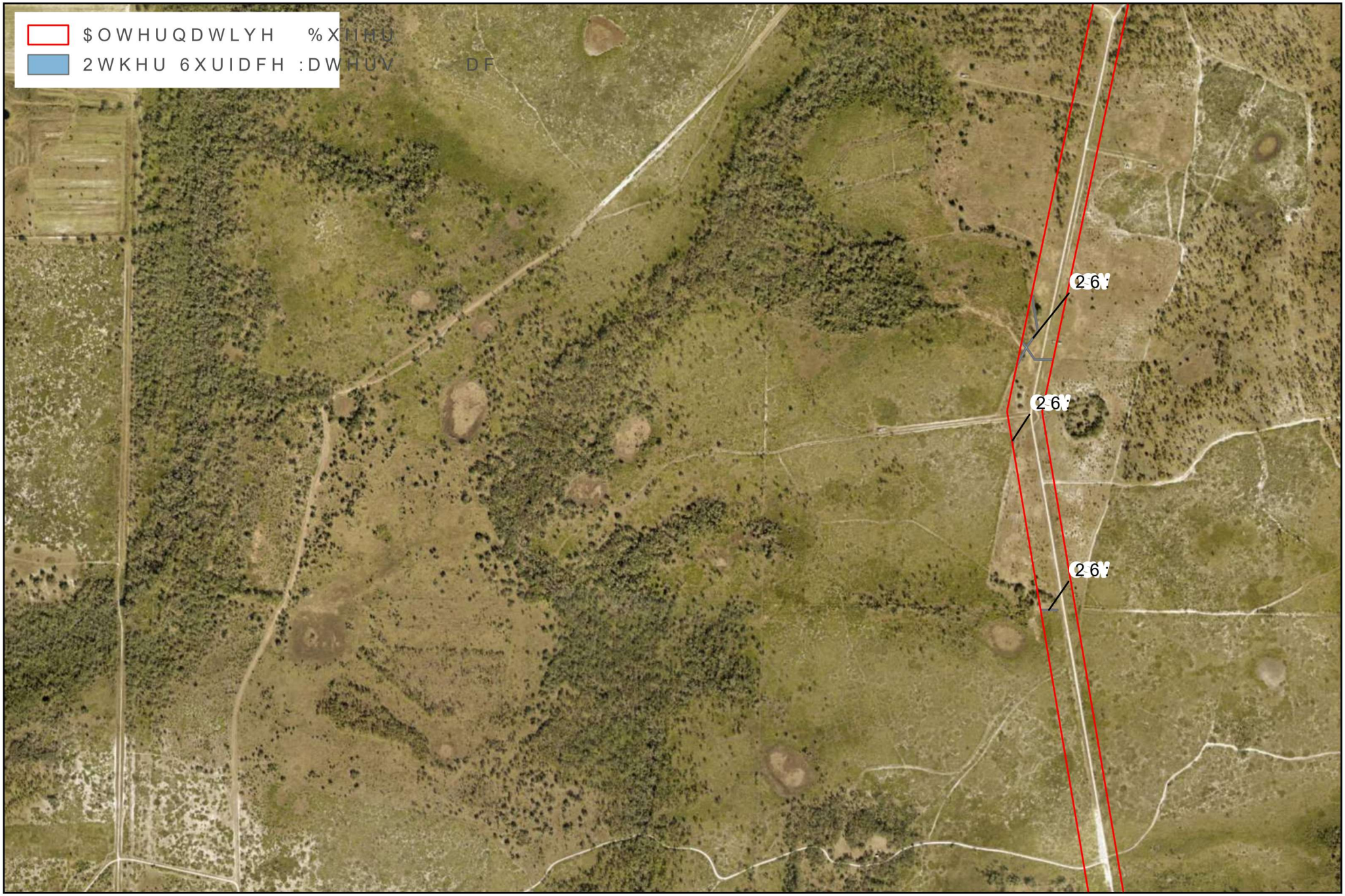
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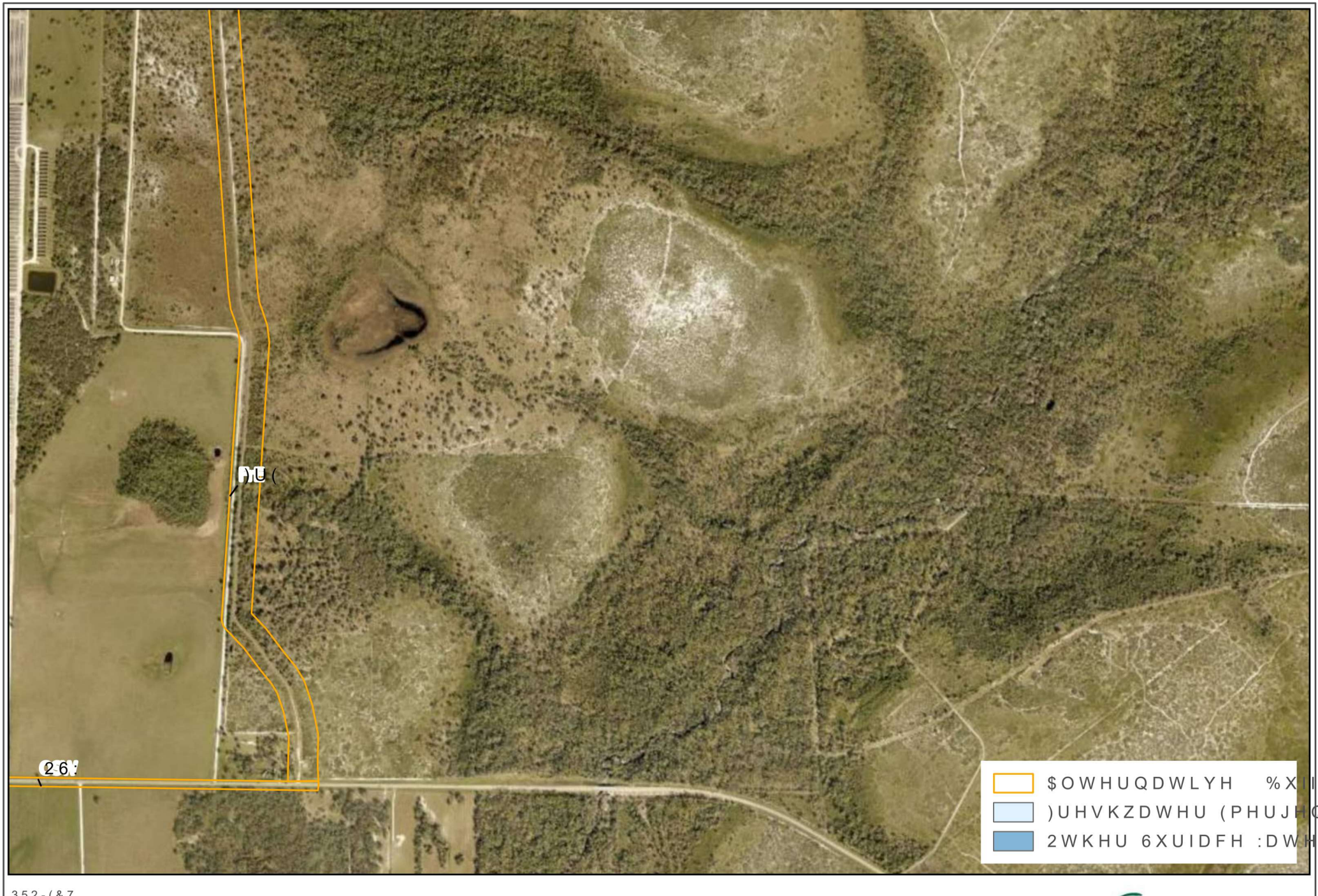
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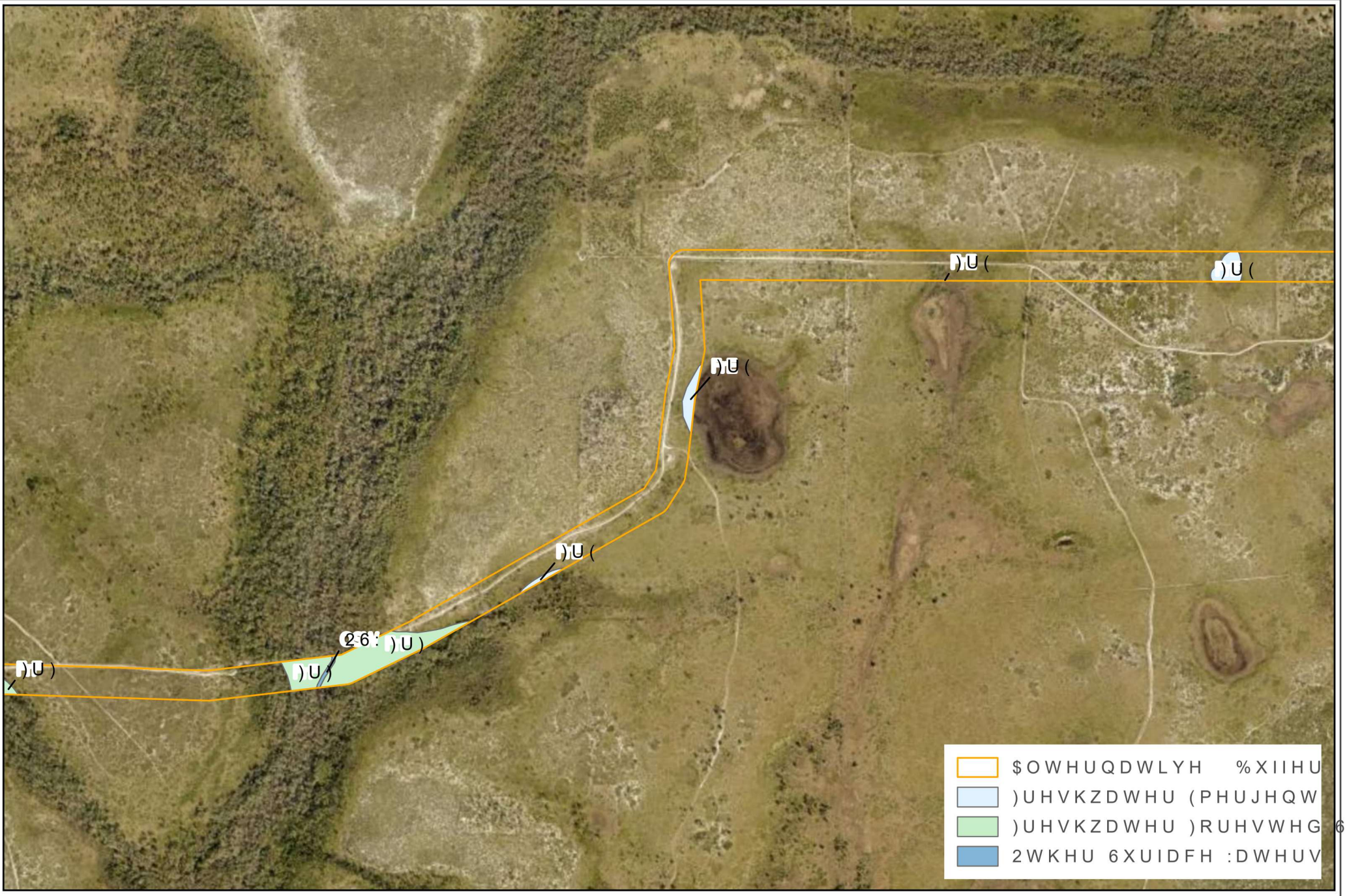
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1RUWK 3RUW 1RFDWHH 3DUULV

â7 "'Œ‡…–•7•Z^7•8Z^XX[a8 ƒ•ƒ–‡‡ '8 ‹'‡Ž‹•‡ ‡•‹Ž‹‡•…›7 7 ƒ•ƒ–‡‡ '8 ‹'‡Ž‹•‡ ‡•‹Ž‹‡•…›8Z^XX[a8ZXZ^X]ZZ7



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9(56,21 $0
0$3 0DQDWHH&RB3LSHOLQH5HVLOLHQF\B
6FDOH
1$' +$51 6WDWH3ODQH)ORULGD :HVW),:)HHW
$(5,$/ %$6(0$3 (VUL %LQJ 0DS 6HUYLFHV
0(7$'$7$ 8SRQ 5HTXHVW
$33 $UF*,6 3UR
*,6 (DUWK%DODQFH

0$1$7((&2817< 3,3(/,1(5(6,/,(1&<
$/7(51$7,9($/,*10(17
:(7/$1'6 0$3
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EarthBalance
ZZZ HDUWKEDODQF
&RUSRUDWH 2IILFH
&RPPHUFH 3DUNZD
1RUWK 3RUW)/
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1$' +$51 6WDWH3ODQH)ORULGD :HVW),:)HHW
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EarthBalance
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1RUWK 3RUW 1RFDWHH 3DUUL

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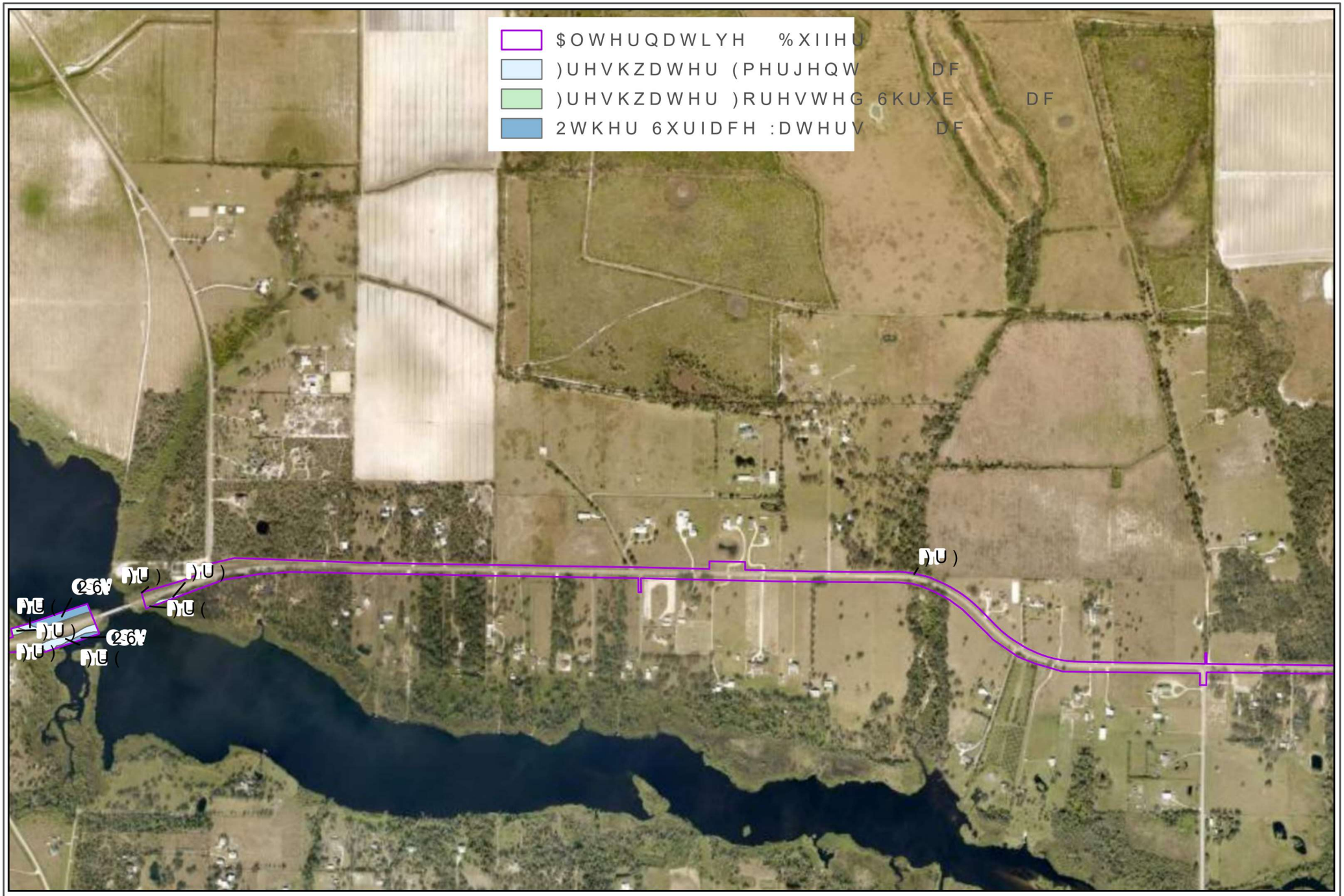
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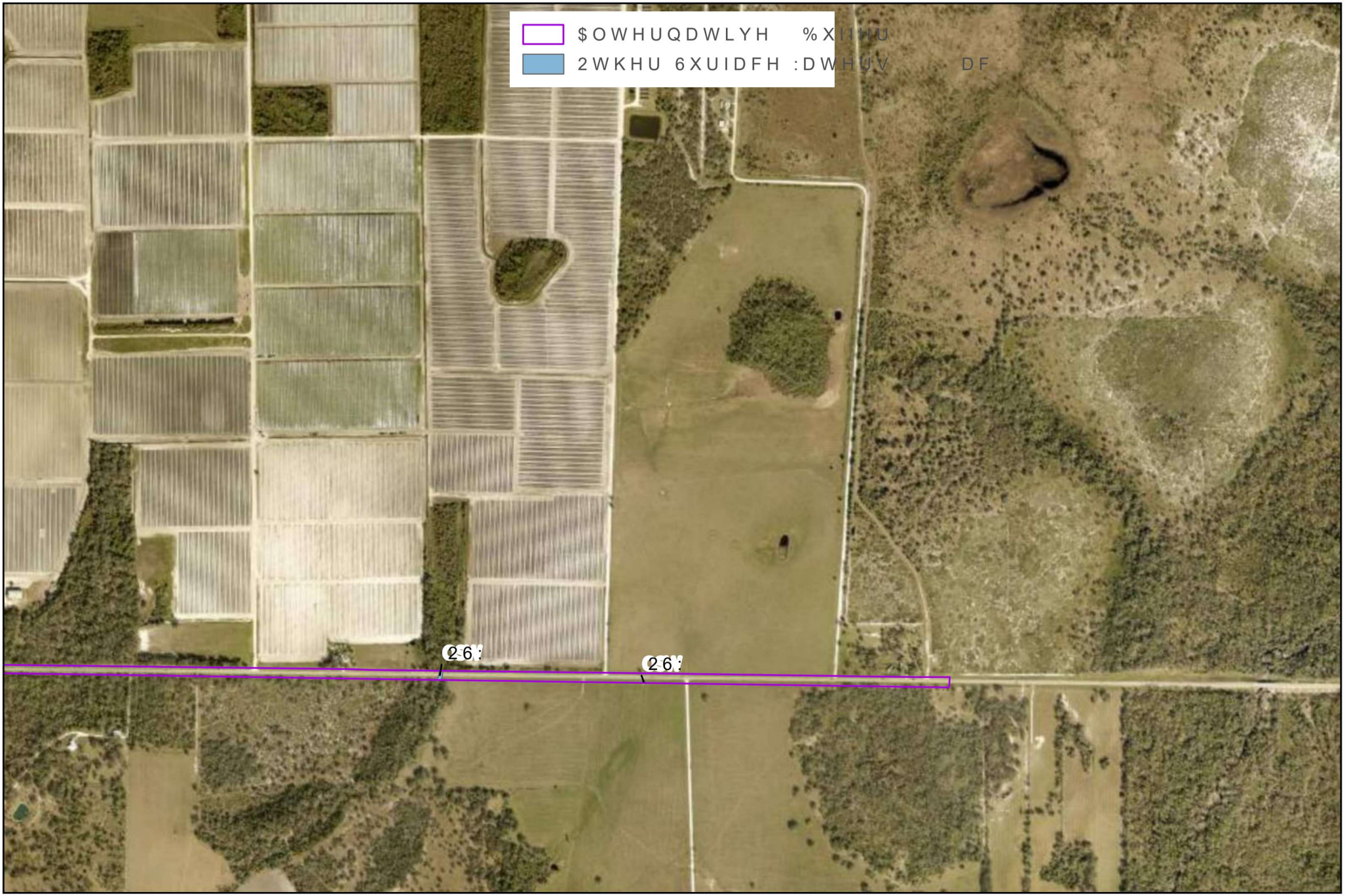
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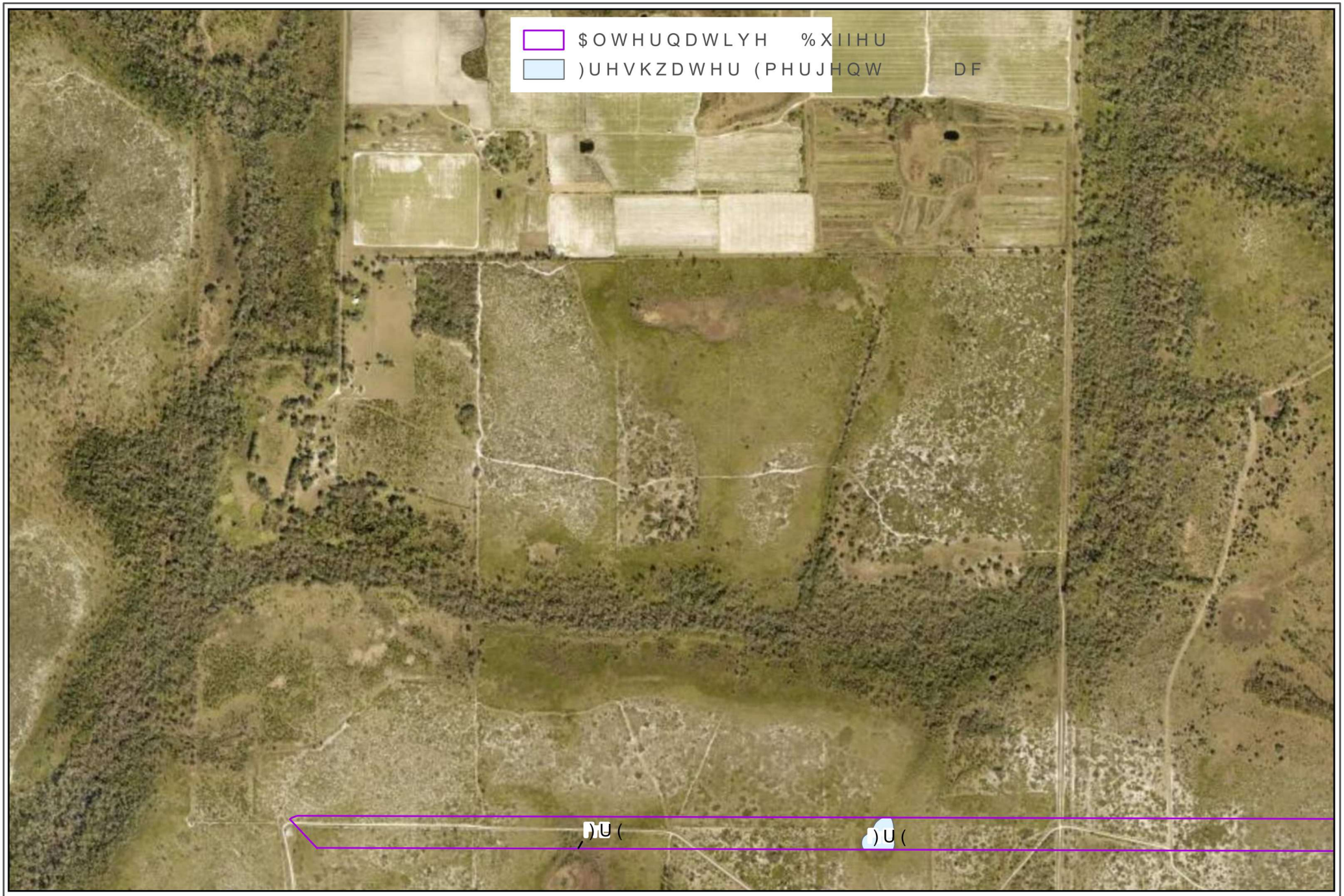
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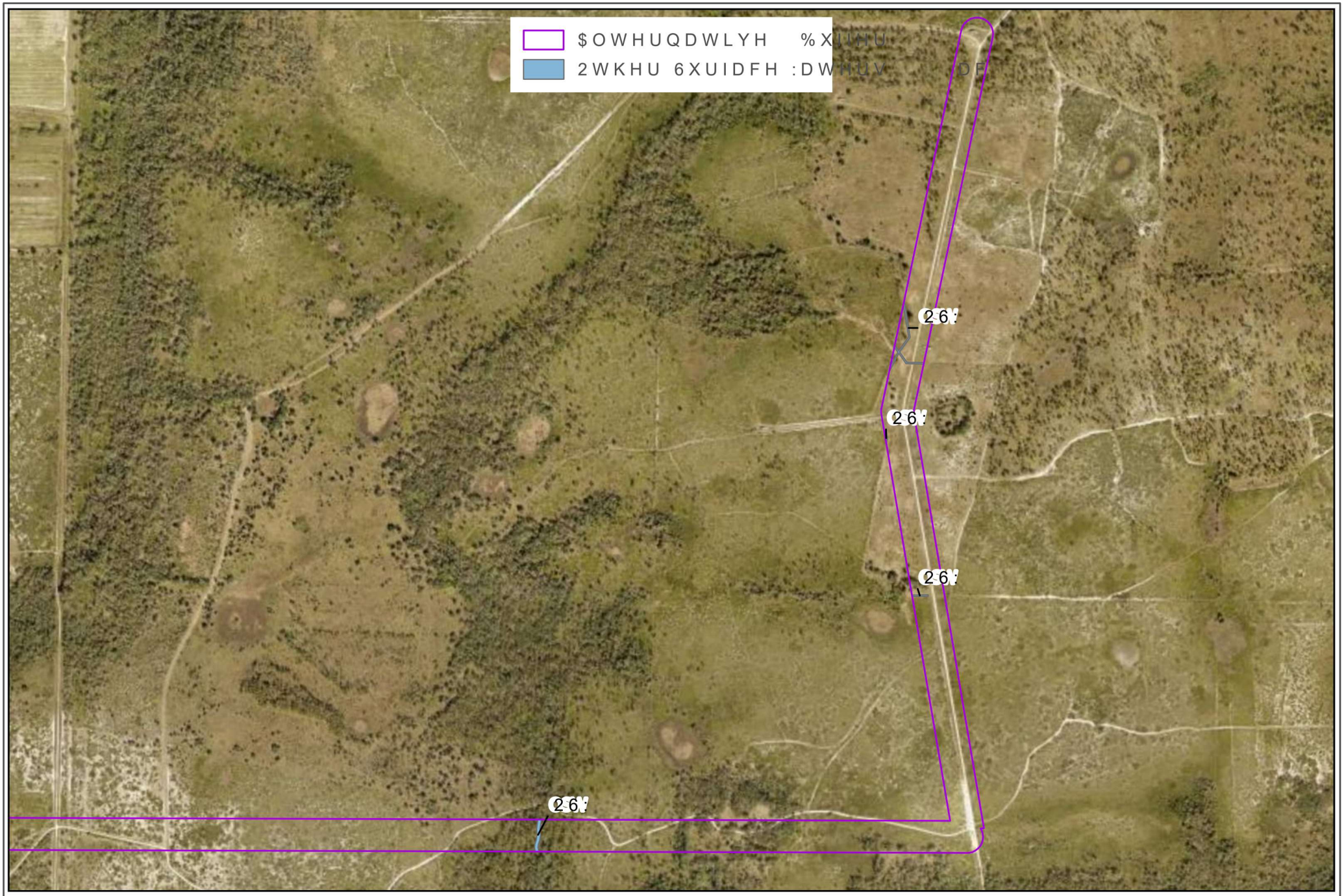
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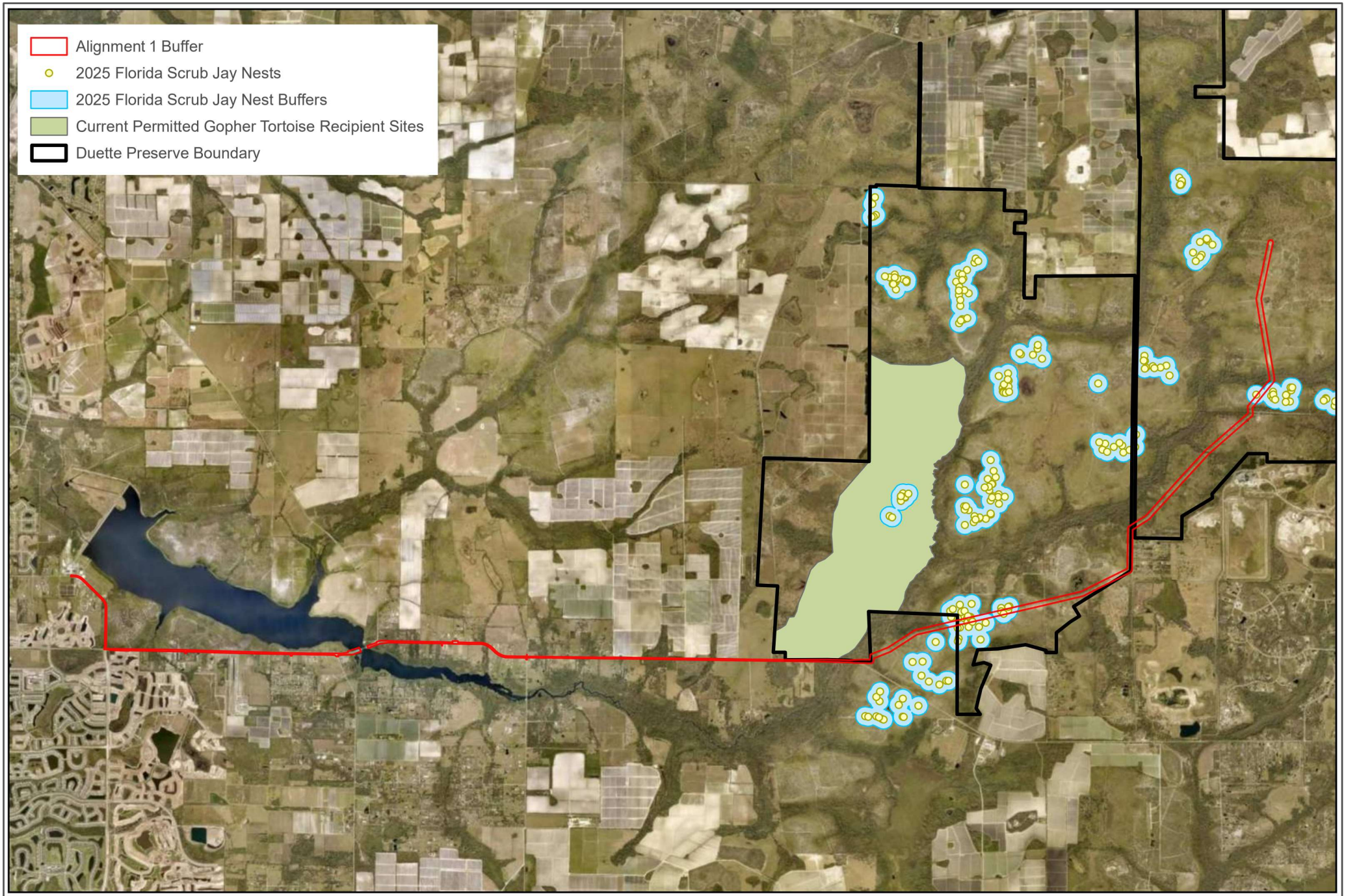
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Appendix D. Protected Wildlife Species Maps



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AERIAL/BASEMAP: Esri/Bing Map Services
METADATA: Upon Request
APP: ArcGIS Pro
GIS: 2024 EarthBalance® /EmmaEverett

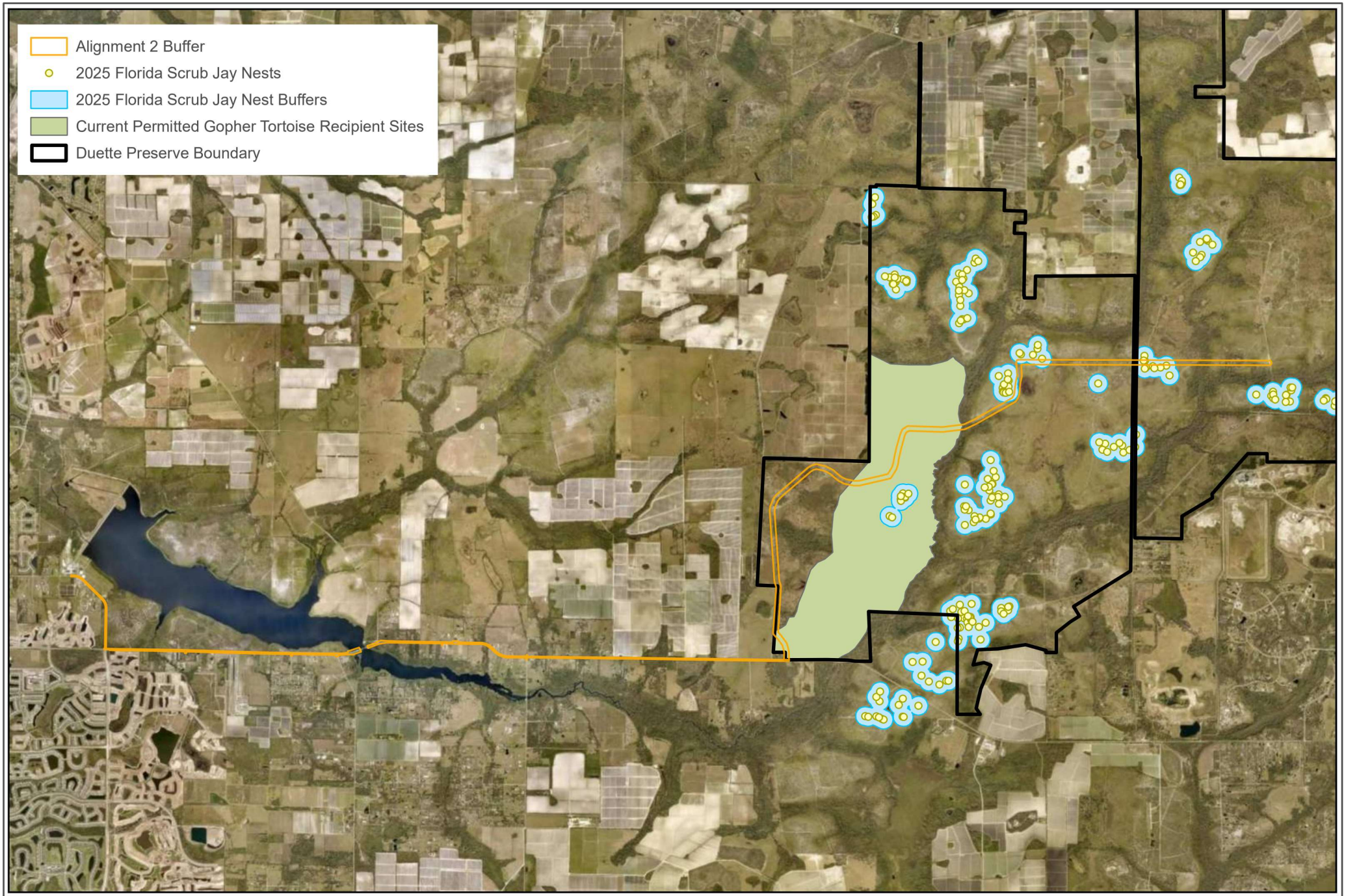
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MANATEE COUNTY PIPELINE RESILIENCY
ALTERNATIVE ALIGNMENT 1
THREATENED SPECIES MAP

0 1
Miles

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North Port, FL 34289
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North Port-Nocatee-Parrish-St.Cloud-Ft.Myers

M:\Projects\m26\m_260039_ManateeCo_PipelineResiliency\PRO\ManateeCo_PipelineResiliency_260039_20260522\



PROJECT: #260039
VERSION: 8/20/2026 3:36 PM
MAP: ManateeCo_PipelineResiliency_260039_20260522
Scale: 1:93,506
NAD 1983 HARN StatePlane Florida West FIPS 0902 Feet
AERIAL/BASEMAP: Esri/Bing Map Services
METADATA: Upon Request
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GIS: 2024 EarthBalance® /EmmaEverett

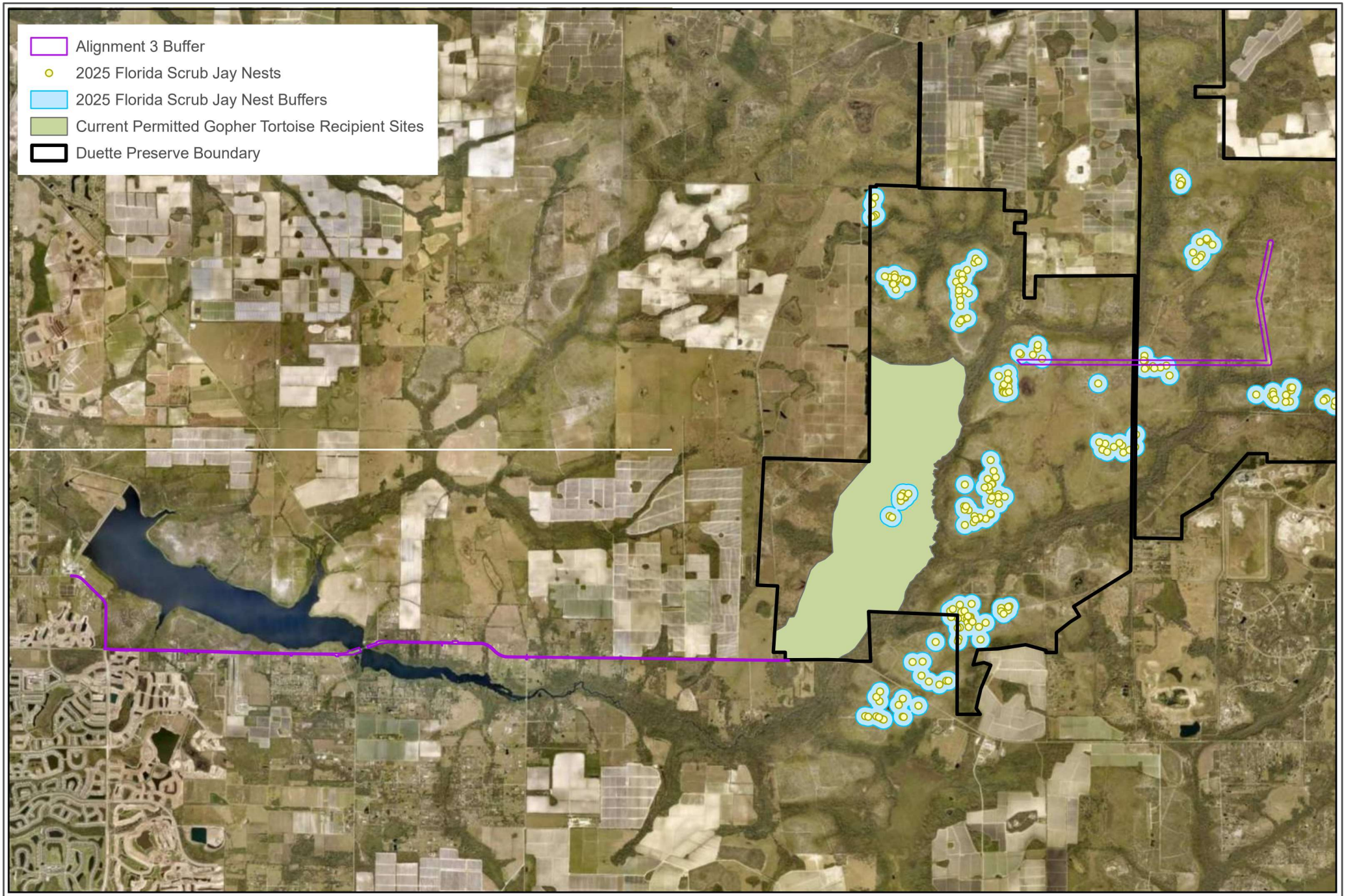
N

MANATEE COUNTY PIPELINE RESILIENCY
ALTERNATIVE ALIGNMENT 2
THREATENED SPECIES MAP

0 1
Miles

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North Port-Nocatee-Parrish-St.Cloud-Ft.Myers

M:\Projects\m26\m_260039_ManateeCo_PipelineResiliency\PRO\ManateeCo_PipelineResiliency_260039_20260522\



PROJECT: #260039
VERSION: 8/20/2026 3:36 PM
MAP: ManateeCo_PipelineResiliency_260039_20260522
Scale: 1:93,506
NAD 1983 HARN StatePlane Florida West FIPS 0902 Feet
AERIAL/BASEMAP: Esri/Bing Map Services
METADATA: Upon Request
APP: ArcGIS Pro
GIS: 2024 EarthBalance® /EmmaEverett

N

MANATEE COUNTY PIPELINE RESILIENCY
ALTERNATIVE ALIGNMENT 3
THREATENED SPECIES MAP

0 1
Miles

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Appendix E. Agricultural Resources Maps


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)DUPODQG RI 8QLTX
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0(7$'$7$ 8SRQ 5HTXHVW
$33 $UF*,6 3UR
*,6 (DUWK%DDDD



352-(&7 ˇ ˝
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&RUSRUDWH 2IILFH
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1RUWK 3RUW 1RFDWHH 3DUULV

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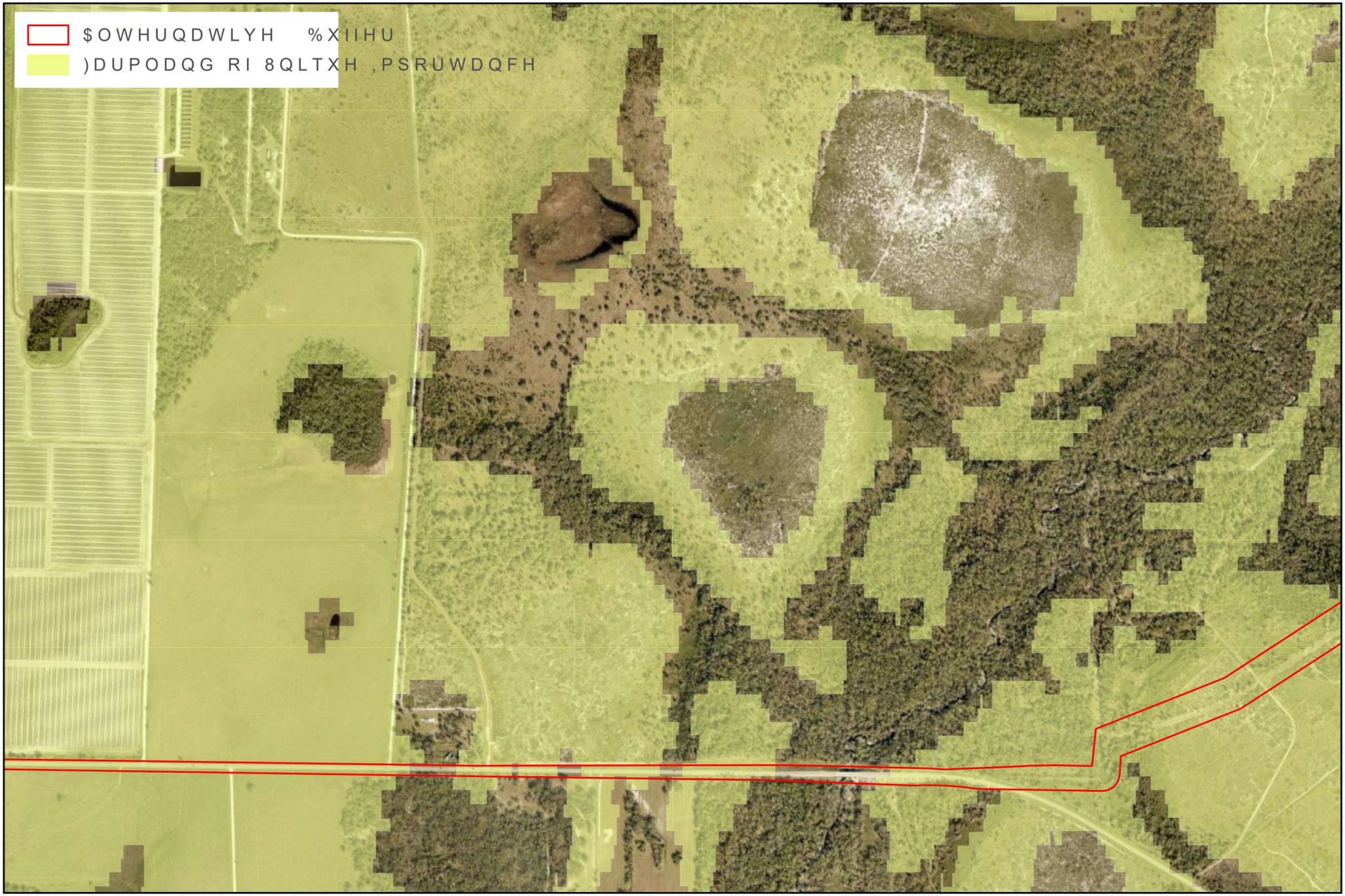


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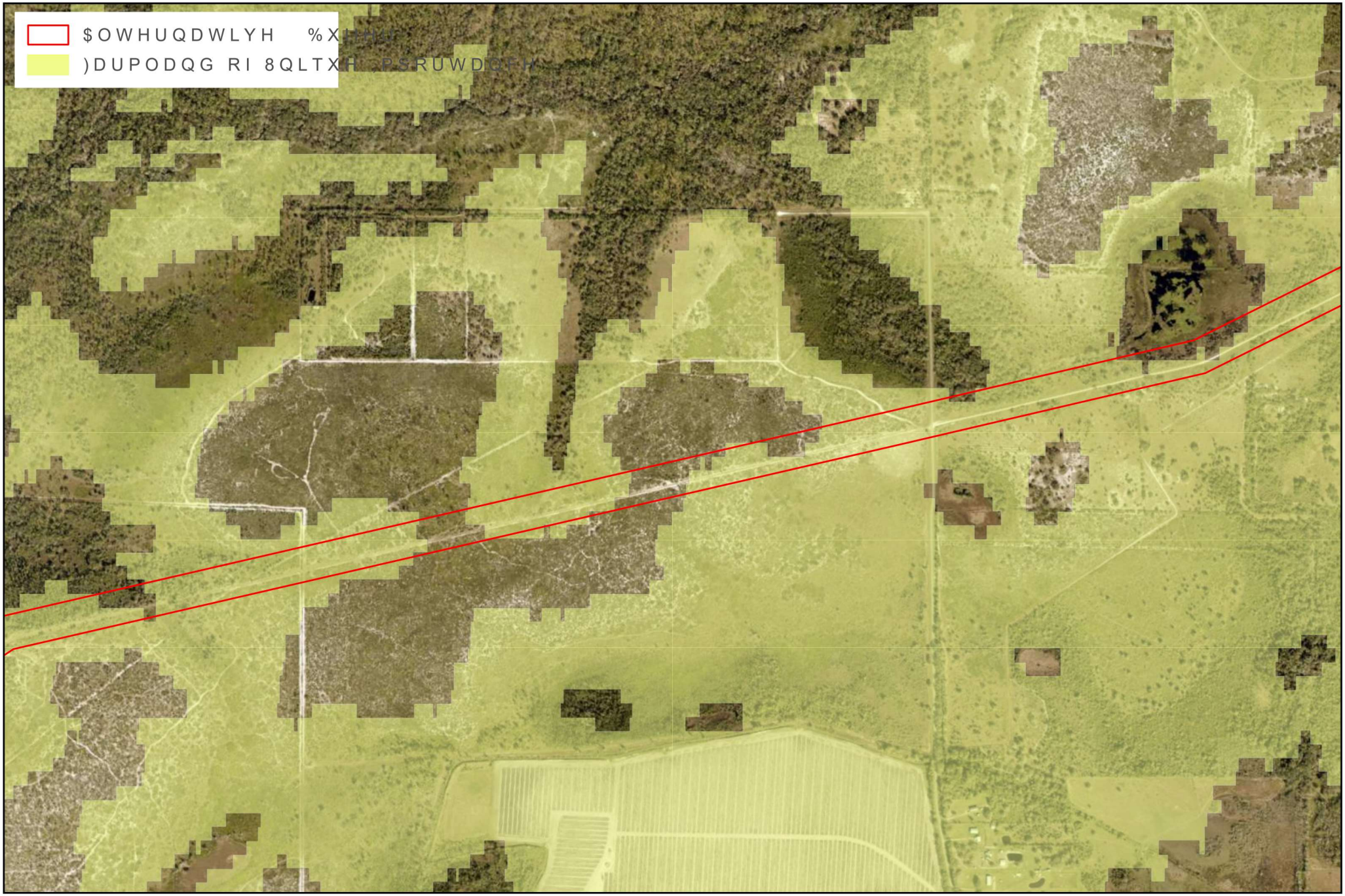
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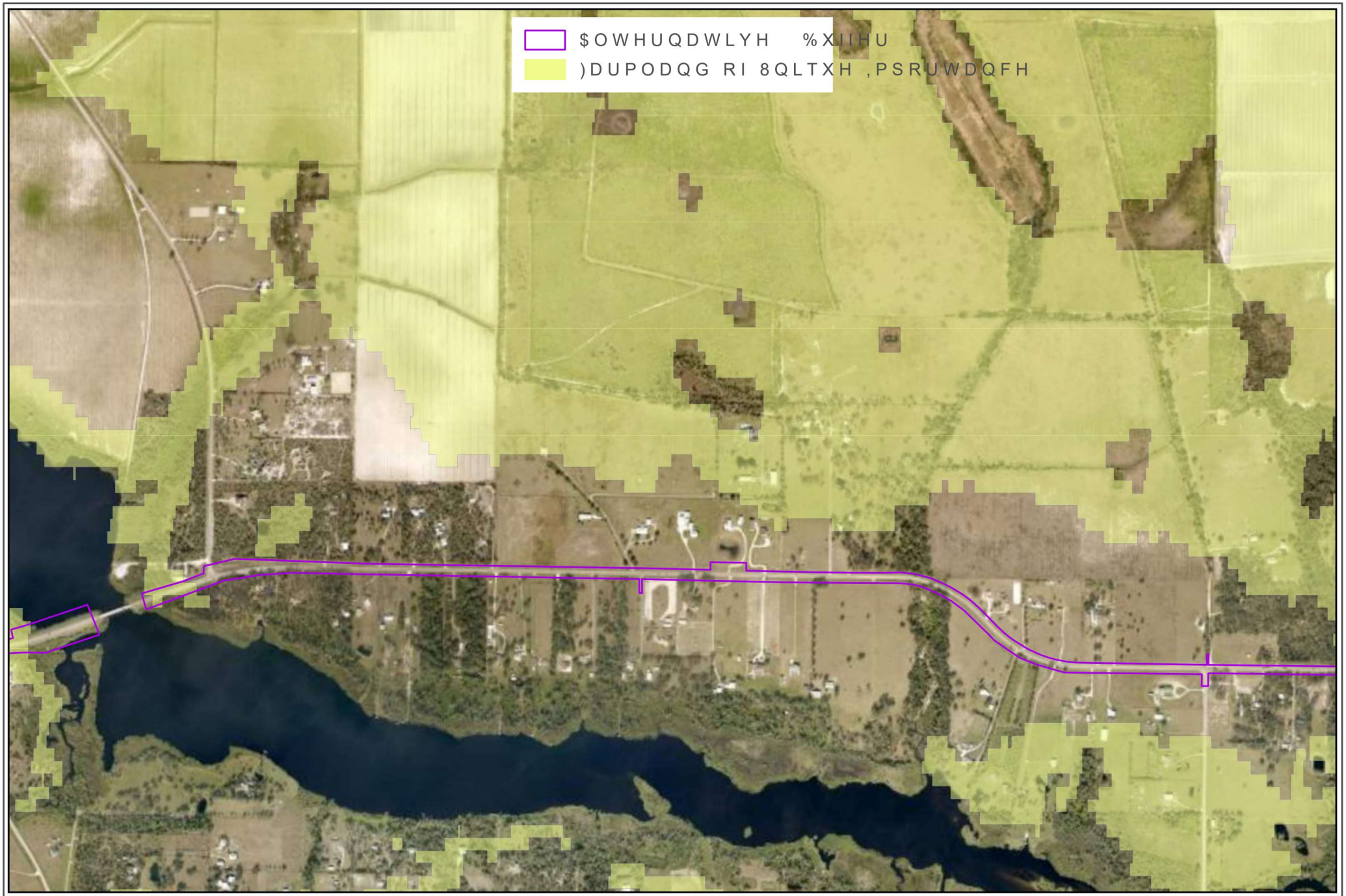


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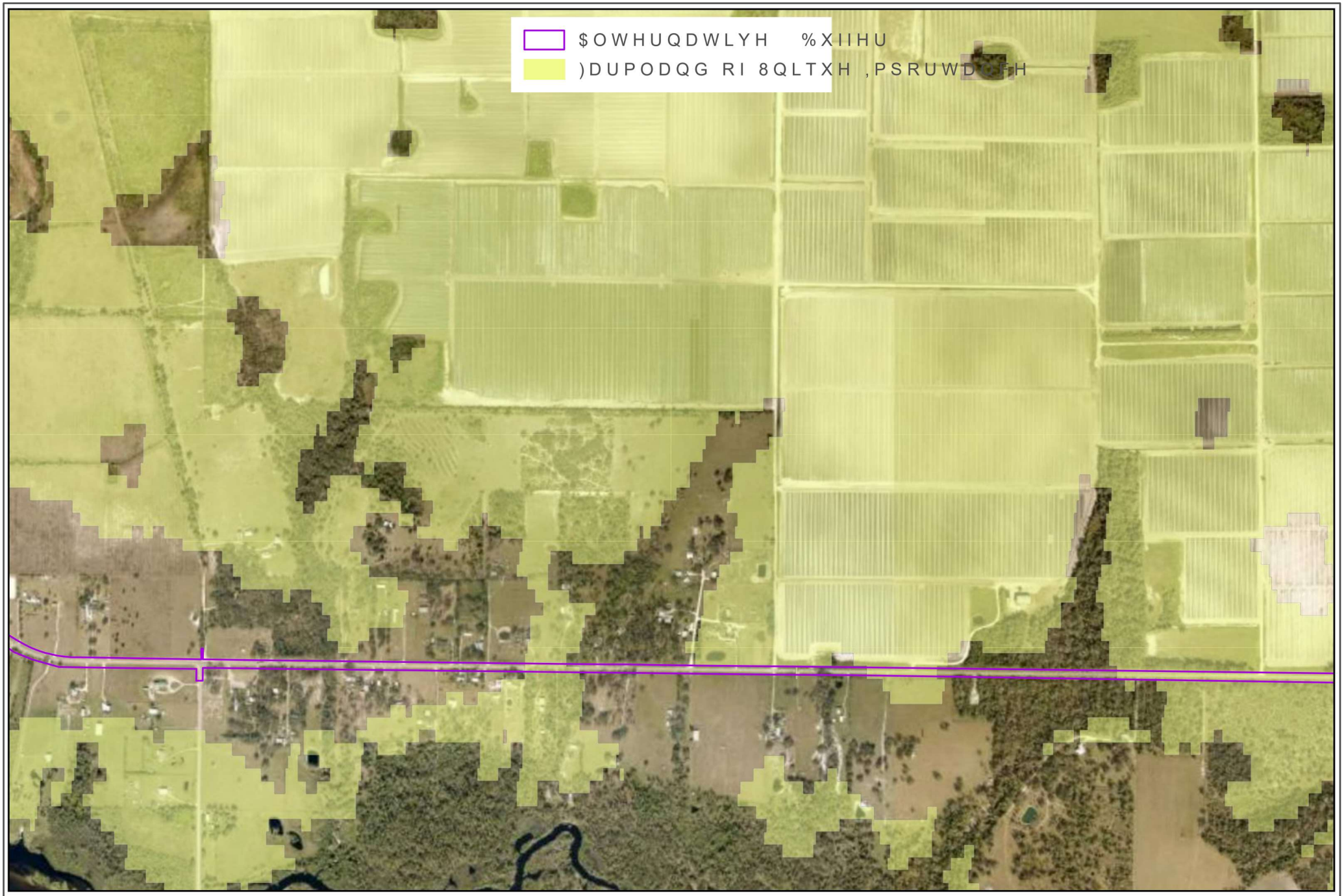
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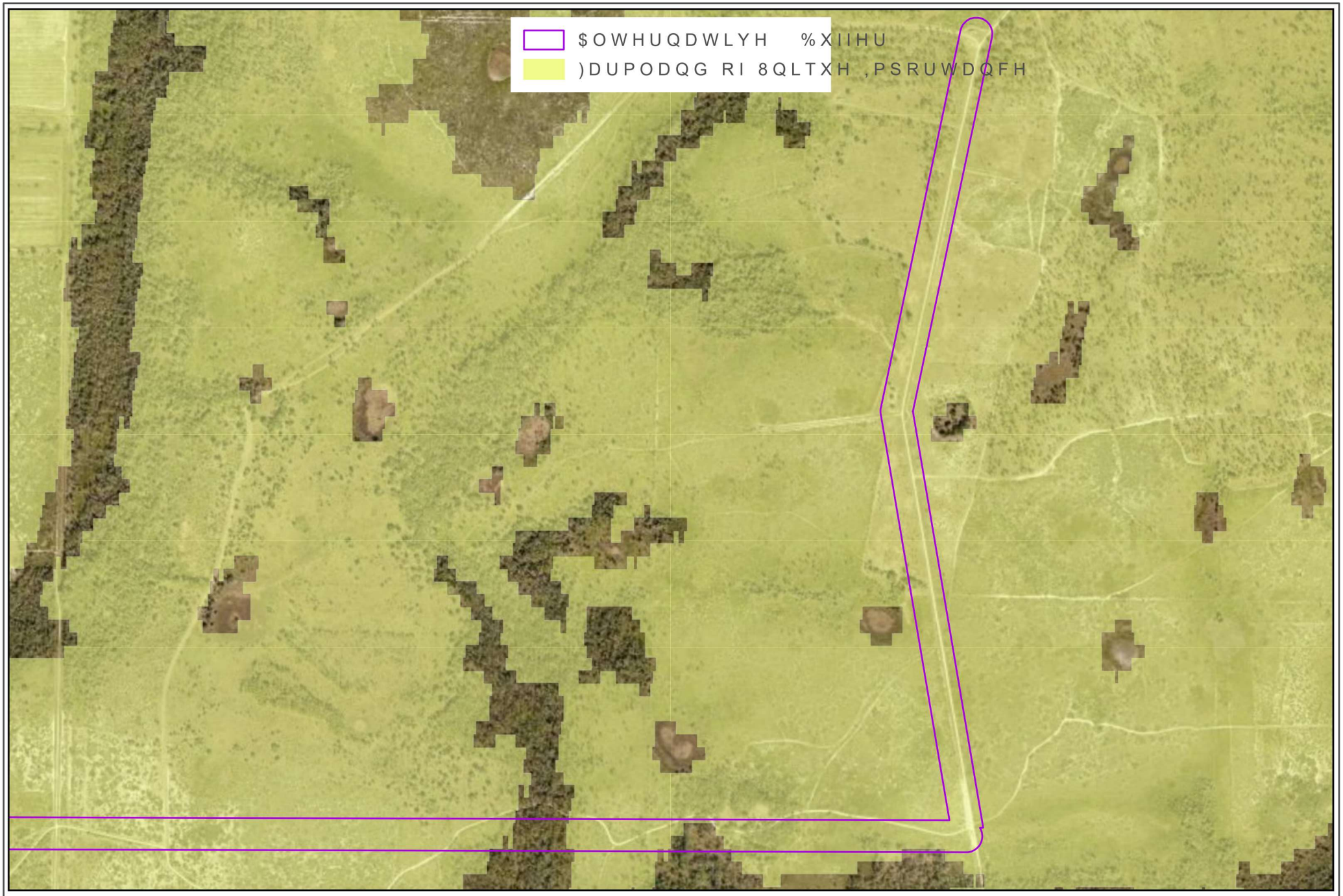
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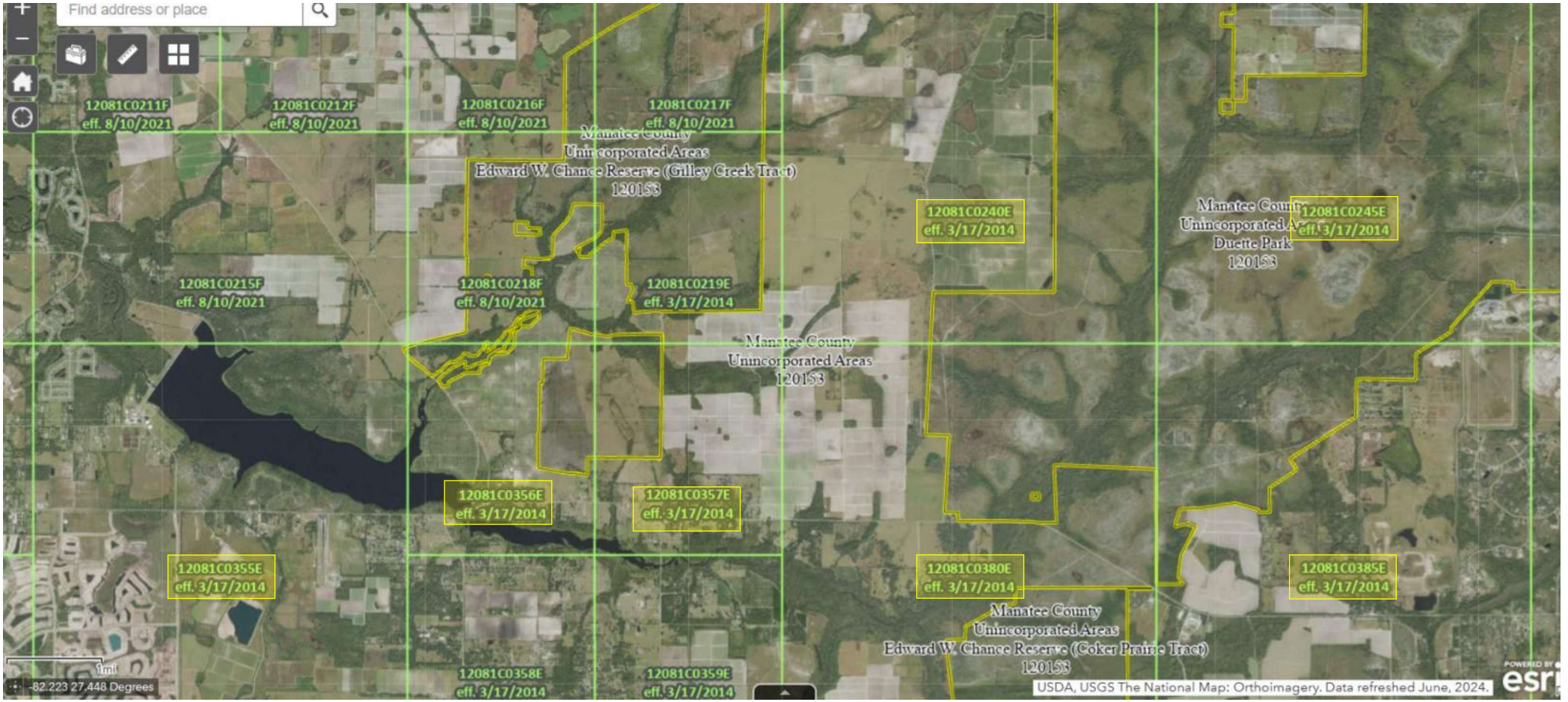
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APPENDIX E

FEMA FLOOD MAPS


Find address or place
12081C0211F
eff. 8/10/2021
12081C0212F
eff. 8/10/2021
12081C0216F
eff. 8/10/2021
12081C0217F
eff. 8/10/2021
Manatee County
Unincorporated Areas
Edward W. Chance Reserve (Gilley Creek Tract)
120153
12081C0240E
eff. 3/17/2014
Manatee County
Unincorporated Areas
Duette Park
120153
12081C0245E
eff. 3/17/2014
12081C0215F
eff. 8/10/2021
12081C0218F
eff. 8/10/2021
12081C0219E
eff. 3/17/2014
Manatee County
Unincorporated Areas
120153
12081C0356E
eff. 3/17/2014
12081C0357E
eff. 3/17/2014
12081C0355E
eff. 3/17/2014
12081C0380E
eff. 3/17/2014
12081C0385E
eff. 3/17/2014
Manatee County
Unincorporated Areas
Edward W. Chance Reserve (Coker Prairie Tract)
120153
12081C0358E
eff. 3/17/2014
12081C0359E
eff. 3/17/2014
1 mi
-82.223 27.448 Degrees
USDA, USGS The National Map: Orthoimagery. Data refreshed June, 2024.
esri

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

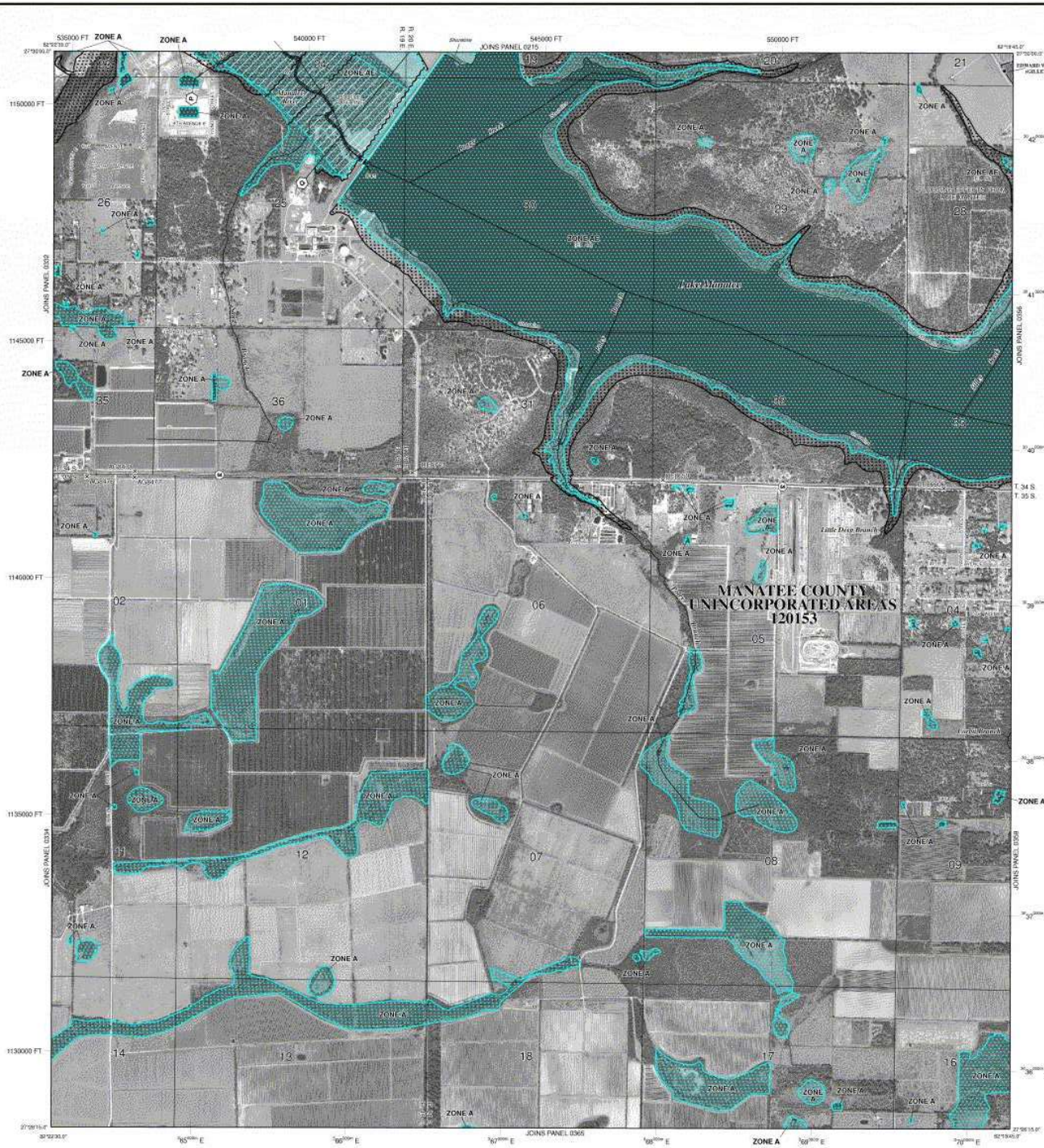
Base map orthophotography was obtained from Southwest Florida Water Management District (SWFWMD) from one-foot resolution digital orthoimagery flown in 2006 and 2008. Vector base map data was provided by Manatee County and SWFWMD. Vector information was compiled in 2003 – 2009 by Manatee County GIS department.

This map may reflect more detailed or up to date stream channel configurations than those shown on the previous FIRM. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations and improved topographic data. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the **FEMA Map Service Center** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the **FEMA Map Service Center** website or by calling the FEMA Map Information eXchange.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4479000 N — 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 6000000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, west zone (FIPSZONE 0902), Transverse Mercator
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 17, 2014
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0355E

FIRM
FLOOD INSURANCE RATE MAP
MANATEE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 355 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0355	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12081C0355E
EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

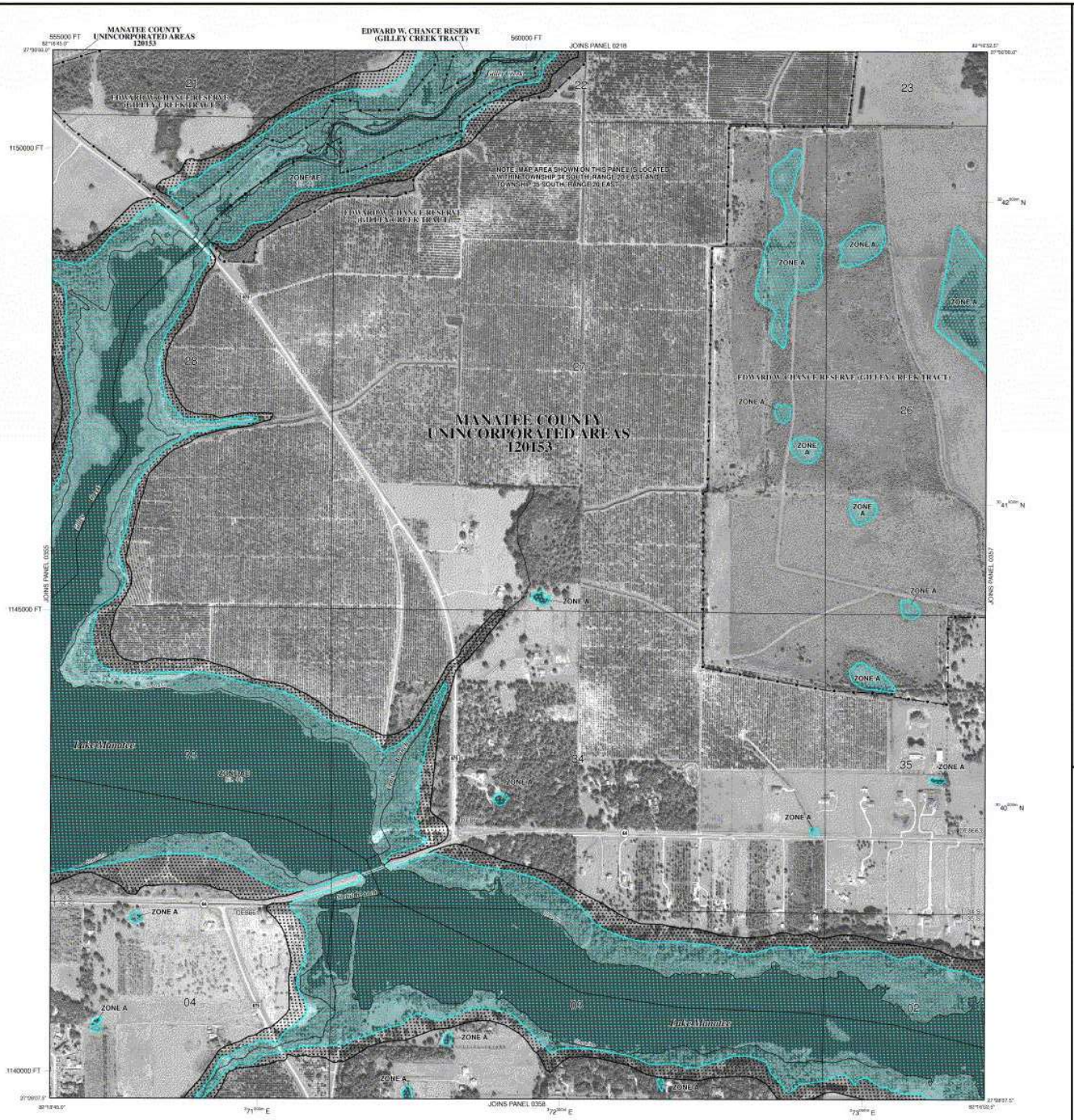
Base map orthophotography was obtained from Southwest Florida Water Management District (SWFWMD) from one-foot resolution digital orthoimagery flown in 2008 and 2009. Vector base map data was provided by Manatee County and SWFWMD. Vector information was compiled in 2003 – 2009 by Manatee County GIS department.

This map may reflect more detailed or up to date stream channel configurations than those shown on the previous FIRM. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations and improved topographic data. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the **FEMA Map Service Center** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the **FEMA Map Service Center** website or by calling the FEMA Map Information eXchange.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.
ZONE AE — Base Flood Elevations determined.
ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- (A) — (A) — Cross section line
- (23) — (23) — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4376000mN — 1000-meter Universal Transverse Mercator grid ticks; zone 17
- 6000000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, west zone (FIPSZONE 0902), Transverse Mercator
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 17, 2014
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
200 0 500 1000 FEET
100 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0356E

FIRM
FLOOD INSURANCE RATE MAP
MANATEE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 356 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0356	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12081C0356E
EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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SSMC-3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map orthophotography was obtained from Southwest Florida Water Management District (SWFWMD) from one-foot resolution digital orthoimagery flown in 2008 and 2009. Vector base map data was provided by Manatee County and SWFWMD. Vector information was compiled in 2003 – 2009 by Manatee County GIS department.

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base flood elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line

23 — 23 — Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 17

6000000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, west zone (FIPSZONE 0902), Transverse Mercator

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 17, 2014
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 500'

200 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0357E

FIRM

FLOOD INSURANCE RATE MAP

MANATEE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 357 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0357	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12081C0357E

EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

NOTES TO USERS

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The **projection** used in the preparation of this map was Florida State Plane west zone (FIPSZONE 0902). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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SSMC-3, #9202
1315 East-West Highway
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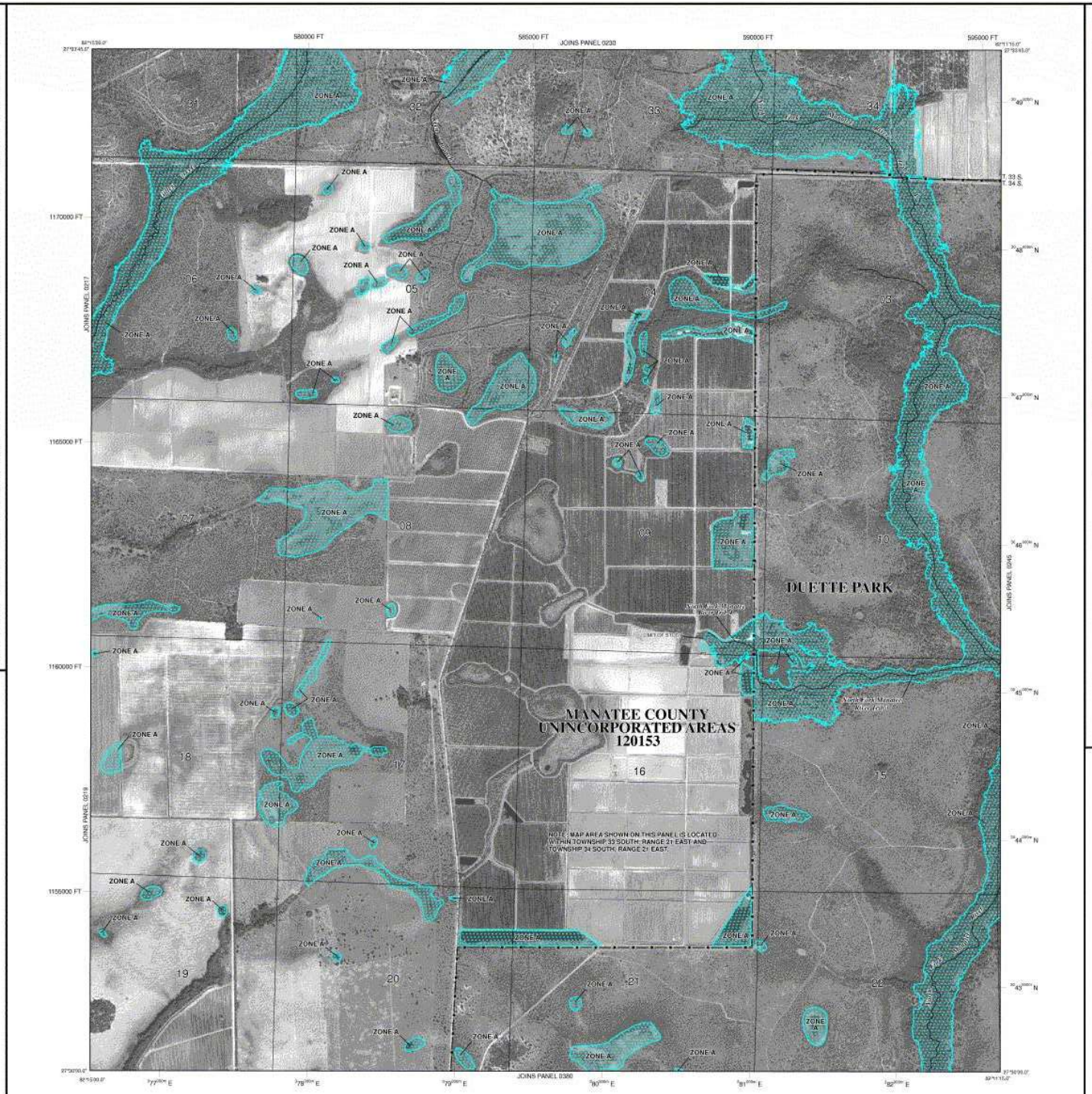
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LEGEND

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ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
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6000000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, west zone (FIPSZONE 0902), Transverse Mercator
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 17, 2014
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0240E

FIRM
FLOOD INSURANCE RATE MAP
MANATEE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 240 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0240	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12081C0240E
EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

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National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

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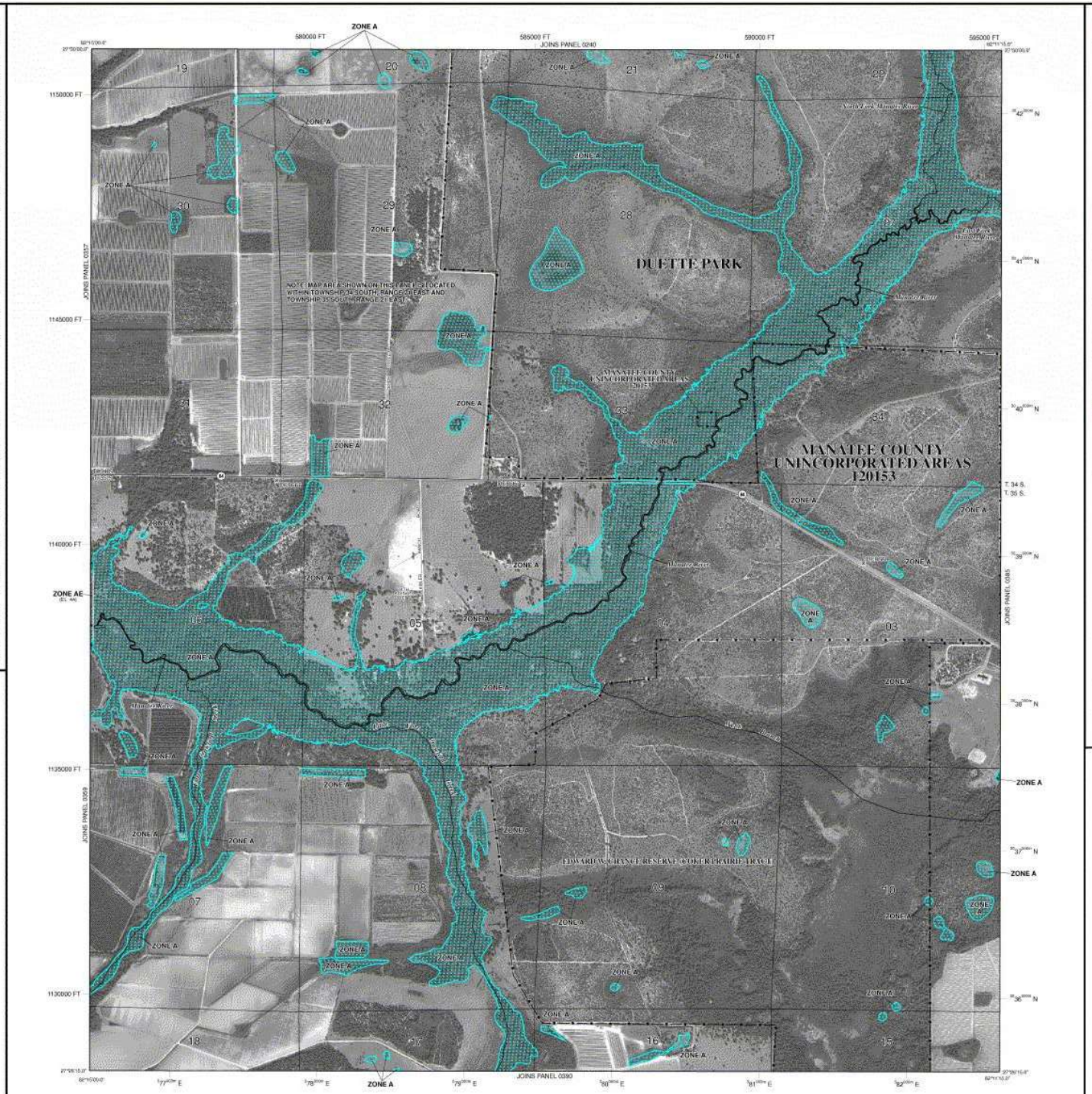
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ZONE A
580000 FT
585000 FT
590000 FT
595000 FT
JOINS PANEL 0240
DUETTE PARK
MANATEE COUNTY
UNINCORPORATED AREAS
120153
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 34 SOUTH, RANGE 19 EAST AND TOWNSHIP 35 SOUTH, RANGE 21 EAST.
JOINS PANEL 0237
JOINS PANEL 0365
JOINS PANEL 0369
JOINS PANEL 0390
1150000 FT
1145000 FT
1140000 FT
1135000 FT
1130000 FT
ZONE AE
(EL 44)
T. 34 S.
T. 35 S.
EDWARD W. CHANCE RESERVE (TOKER PRAIRIE TRACT)
Manatee River
Braden River
Upper Braden River
Lake Manatee
Lake Manatee Reservoir
Upper Lake Manatee
Lake Manatee Dam
Upper Lake Manatee Dam
Lake Manatee Spillway
Upper Lake Manatee Spillway
Lake Manatee Spillway Road
Upper Lake Manatee Spillway Road
Upper Lake Manatee Road
Lake Manatee Road
Upper Lake Manatee Road
Lake Manatee Dam Road
Upper Lake Manatee Dam Road
Upper Lake Manatee Road
Upper Lake Manatee Spillway Road
Upper Lake Manatee Spillway
Upper Lake Manatee Dam
Upper Lake Manatee Reservoir
Upper Lake Manatee Reservoir
Upper Lake Manatee Reservoir

NOTES TO USERS

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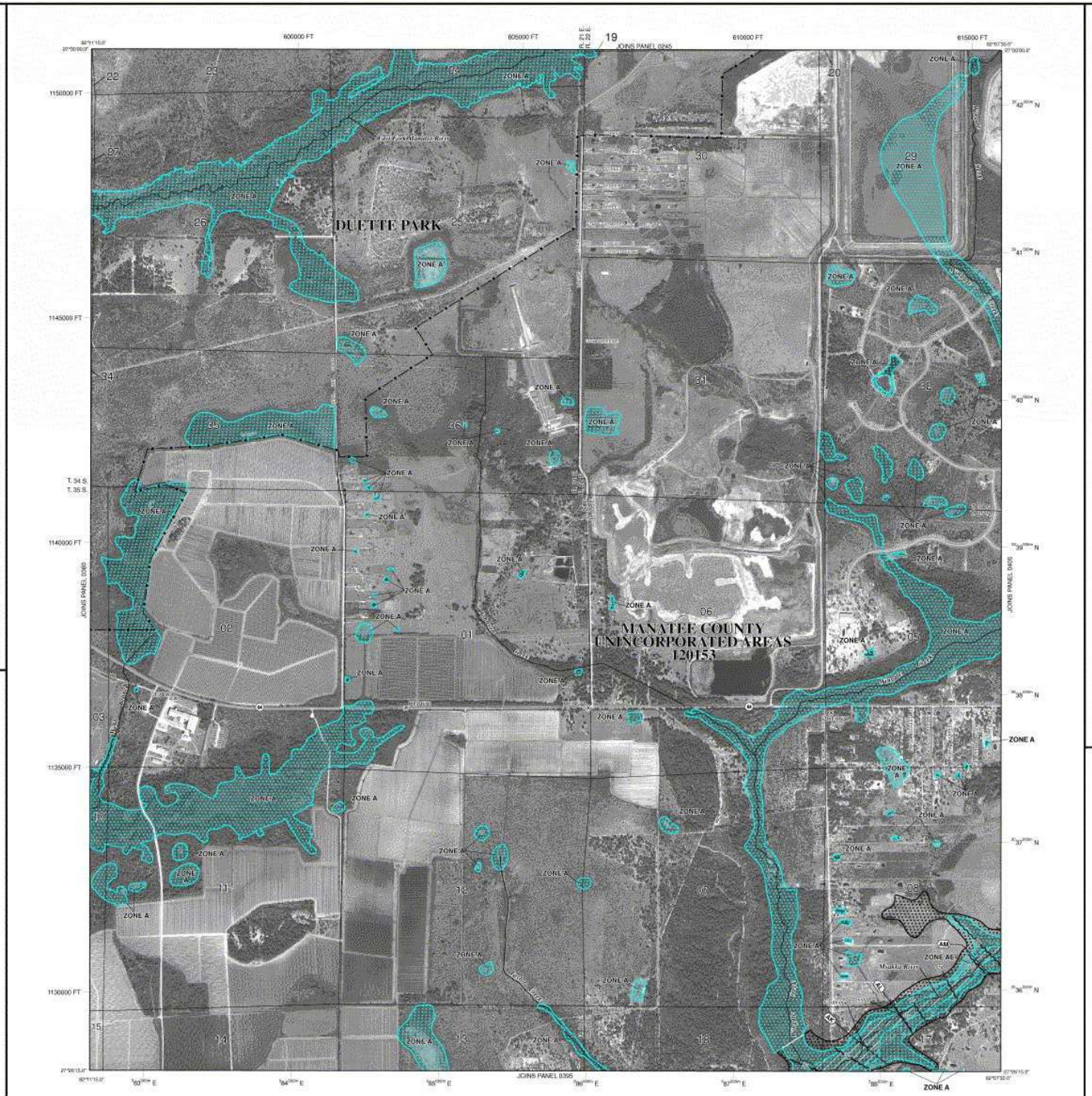
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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4,329,000 N — 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 6000000 FT — 5000-foot grid ticks: Florida State Plane coordinate system, west zone (FIPSZONE 0902), Transverse Mercator
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
March 17, 2014
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0385E

FIRM
FLOOD INSURANCE RATE MAP
MANATEE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 385 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0385	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12081C0385E
EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

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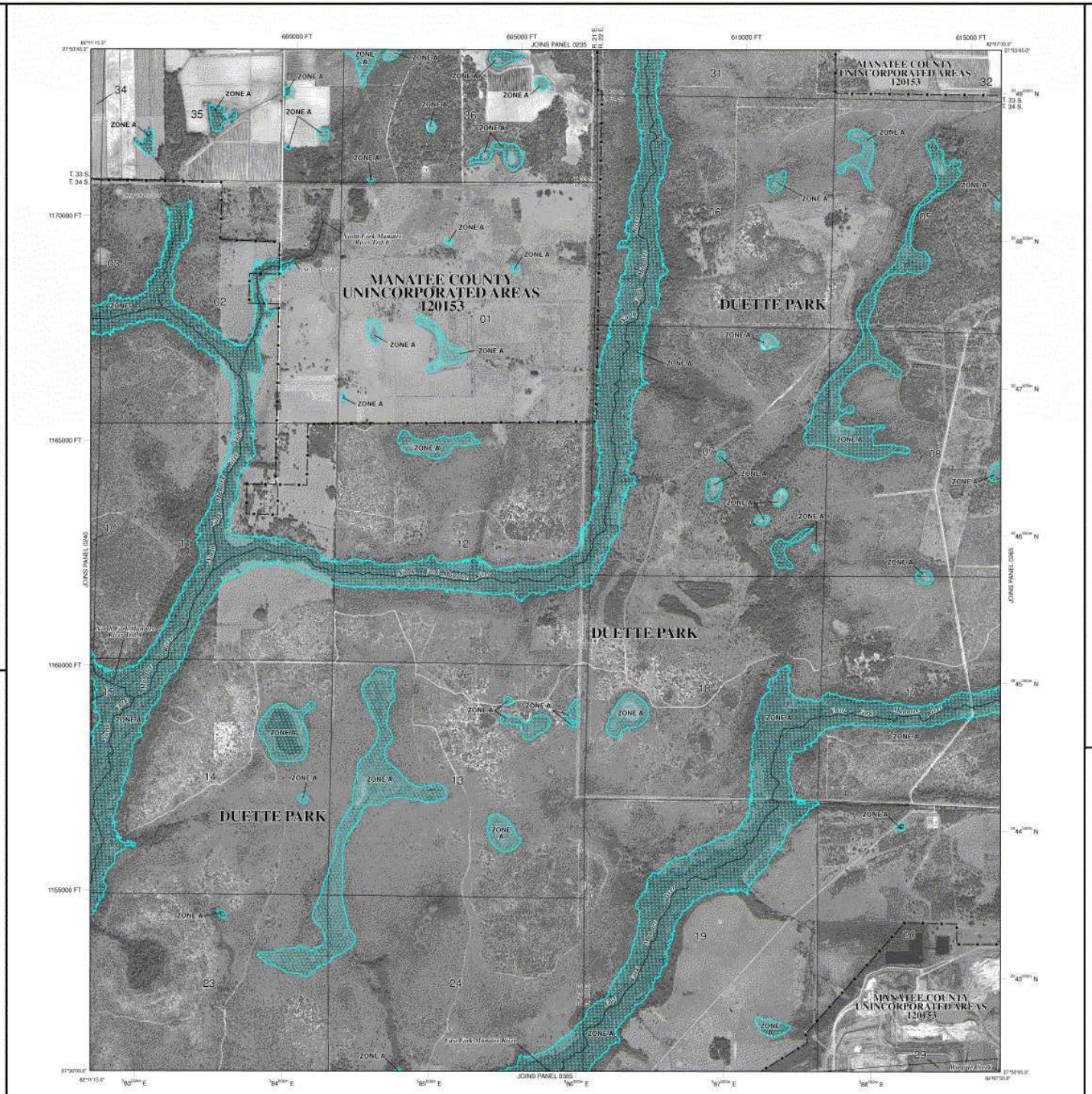
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March 17, 2014
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500 0 1000 2000 FEET
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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0245E

FIRM

FLOOD INSURANCE RATE MAP

MANATEE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 245 OF 575
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MANATEE COUNTY	120153	0245	E

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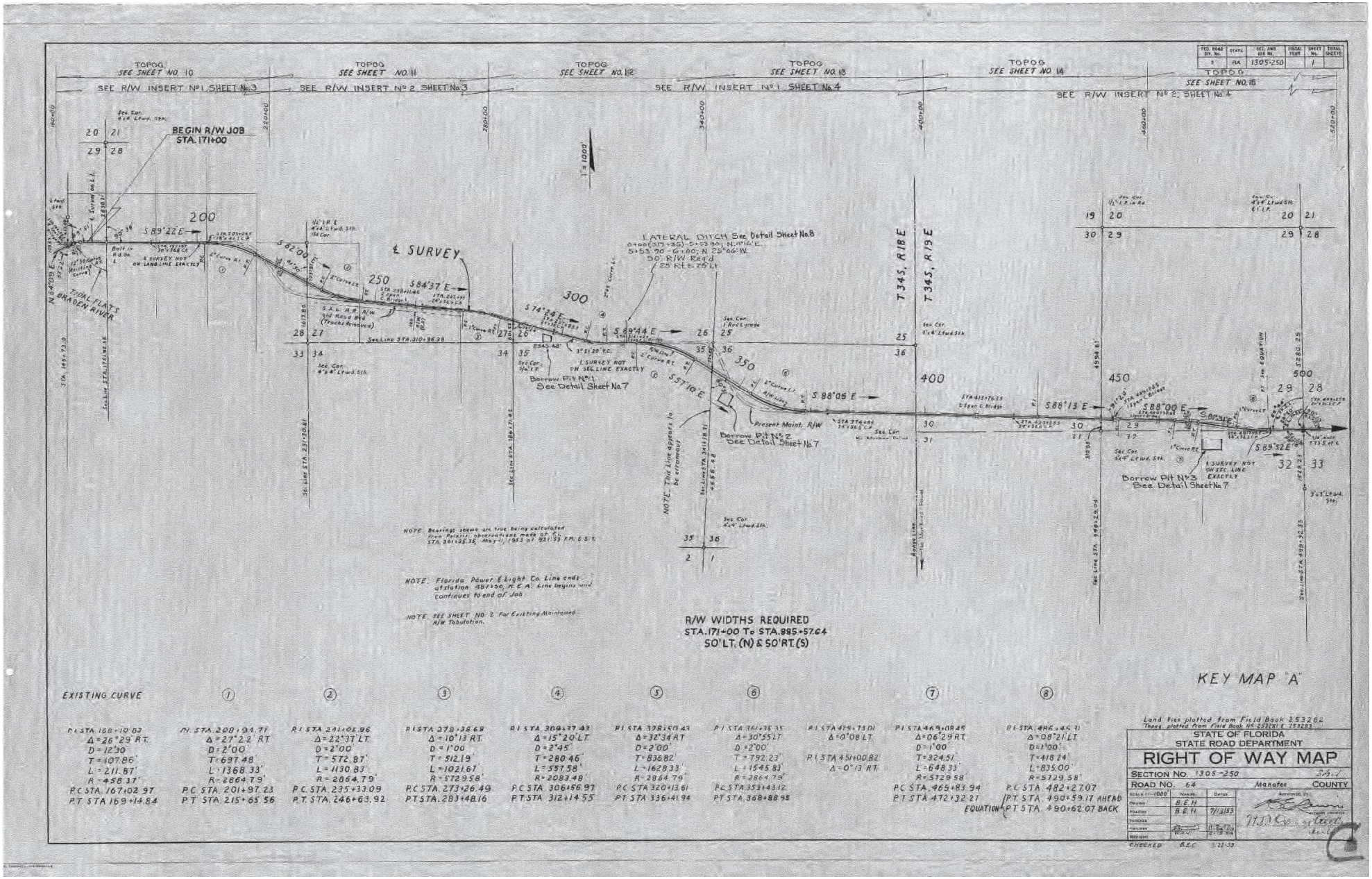
MAP NUMBER
12081C0245E

EFFECTIVE DATE
MARCH 17, 2014

Federal Emergency Management Agency

APPENDIX F

FDOT SR 64 RECORD DRAWINGS



EXISTING CURVE	(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)
P.I STA 168+10.83	P.I. STA. 208+94.71	P.I STA 241+05.96	P.I STA 278+38.68	P.I STA 309+27.43	P.I STA 328+50.42	P.I STA 361+35.35	P.I STA 429+73.01	P.I STA 469+08.48	P.I STA. 496+45.21
Δ = 26°29' RT.	Δ = 27°22' RT	Δ = 22°37' LT.	Δ = 10°13' RT.	Δ = 15°20' LT.	Δ = 32°34' RT	Δ = 30°55' LT	Δ = 0°08' LT.	Δ = 06°29' RT.	Δ = 08°21' LT.
D = 12°30'	D = 2°00'	D = 2°00'	D = 1°00'	D = 2°45'	D = 2°00'	D = 2°00'	P.I STA 451+00.82	D = 1°00'	D = 1°00'
T = 107.86'	T = 697.48'	T = 572.87'	T = 512.19'	T = 280.46'	T = 836.82'	T = 792.23'	Δ = 0°13 RT.	T = 324.51'	T = 418.24'
L = 211.87'	L = 1368.33'	L = 1130.83'	L = 1021.67'	L = 557.58'	L = 1628.33'	L = 1545.83'		L = 648.33'	L = 835.00'
R = 458.37'	R = 2864.79'	R = 2864.79'	R = 5729.58'	R = 2083.48'	R = 2864.79'	R = 2864.79'		R = 5729.58'	R = 5729.58'
P.C. STA. 167+02.97	P.C. STA. 201+97.23	P.C. STA. 235+33.09	P.C. STA. 273+26.49	P.C. STA. 306+56.97	P.C. STA 320+13.61	P.C. STA 353+43.12		P.C. STA. 465+83.94	P.C. STA. 482+27.07
P.T. STA 169+14.84	P.T. STA. 215+65.56	P.T. STA. 246+63.92	P.T. STA. 283+48.16	P.T. STA. 312+14.55	P.T. STA 336+41.94	P.T. STA. 368+88.98		P.T. STA. 472+32.27	P.T. STA. 490+59.17 AHEAD
								EQUATION	P.T. STA. 490+62.07 BACK

Land ties plotted from Field Book 253262
Trees plotted from Field Book Nº 253261 & 253283

STATE OF FLORIDA
STATE ROAD DEPARTMENT

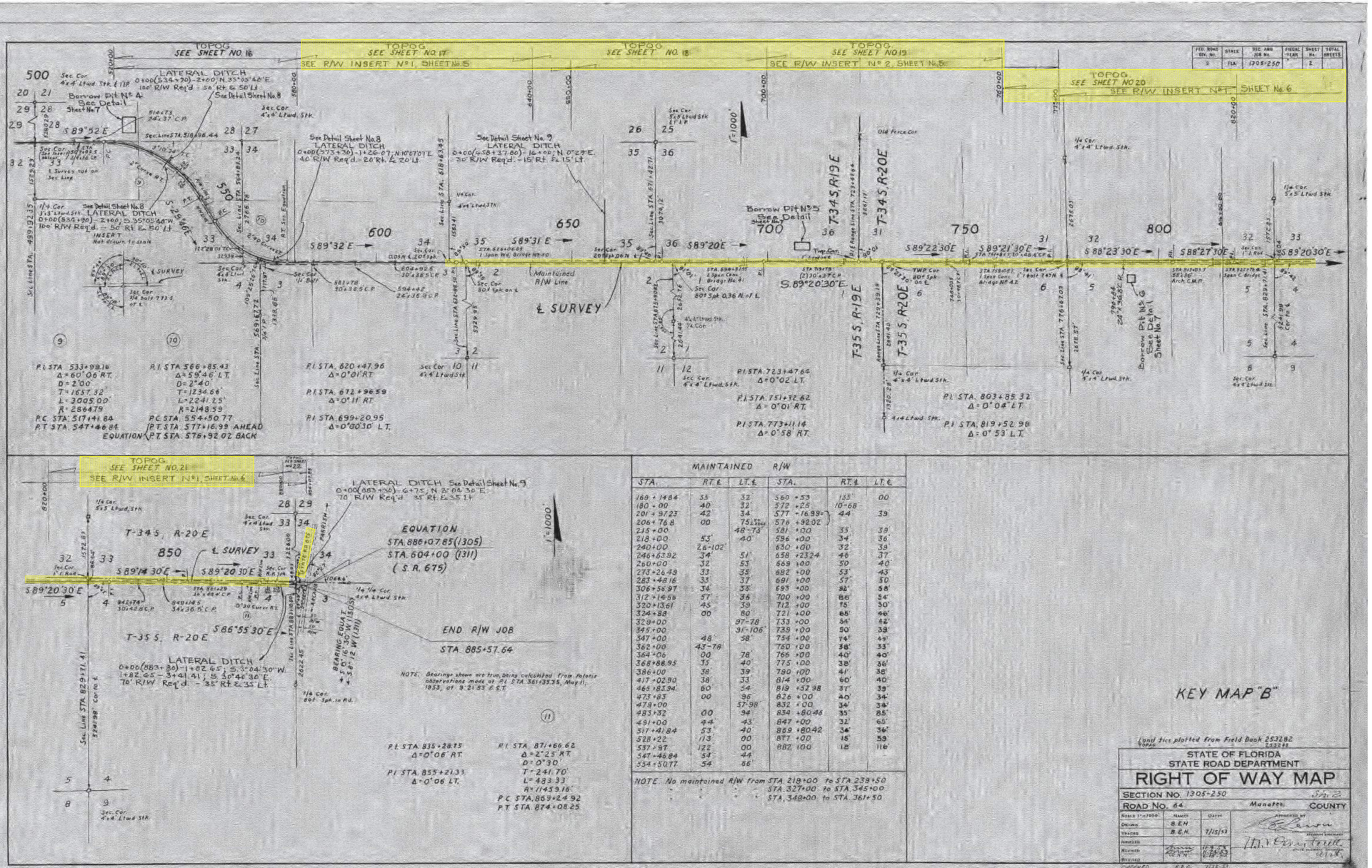
RIGHT OF WAY MAP

FED. ROAD DIV. No.	STATE	SEC. AND JOB No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
9	FLA	1305-250		1	

SECTION No. 1305-250 Sh. 1
ROAD No. 64 Manatee COUNTY

	NAME	DATE
DRAWN	B.E.H	
TRACED	B.E.H	7/1/53
CHECKED	B.E.C	7-22-53

APPROVED BY: [signature] STATE ROAD ENGINEER
[signature] CHIEF ENGINEER



MAINTAINED R/W

STA.	RT. ℄	LT. ℄	STA.	RT. ℄	LT. ℄
169+14.84	55	32	560+53	135	00
180+00	40	32	572+25	10'-68	
201+97.23	42	34	577+16.99)	44	39
206+76.8	00	75' Varies	578+92.02)		
215+00		48'-73'	581+00	35	39
218+00	53'	40'	586+00	34	36'
240+00	26-102'		630+00	32	39
246+63.92	34'	51'	658+23.24	46	37'
260+00	32	53	669+00	50	40'
273+26.49	33	35	682+00	53'	43
283+48.16	33	37'	691+00	57'	50
306+56.97	34	53	693+00	82'	58'
312+14.58	57'	36	700+00	86	54'
320+13.61	45	59	713+00	75'	30'
324+88	00	80	721+00	65	46'
328+00		97'-78	733+00	56'	42'
345+00		31'-106'	739+00	50	38'
347+00	48'	58'	754+00	74'	49'
362+00	45'-76'		760+00	58'	33'
364+06	00	78'	766+00	40'	40'
368+88.95	33	40	775+00	38'	36'
386+00	38'	39	780+00	41'	38'
417+02.90	38	33	814+00	60'	40'
465+83.94	60'	54	819+52.98	37'	39'
473+83	00	96'	826+00	40'	34'
478+00		57'-98'	832+00	34'	38'
483+32	00	94'	834+80.46	35'	85'
491+00	44'	43'	847+00	32'	65'
517+41.84	53'	40'	869+80.42	34'	36'
528+22	113'	00	877+00	15'	59'
537+97	122'	00	882+00	18'	116'
547+46.84	54'	44'			
554+50.77	54'	66'			

NOTE. No maintained R/W from STA. 218+00 to STA. 239+50
" " " " STA. 327+00 to STA. 345+00
" " " " STA. 348+00 to STA. 361+50

Land ties plotted from Field Book 253282 253283

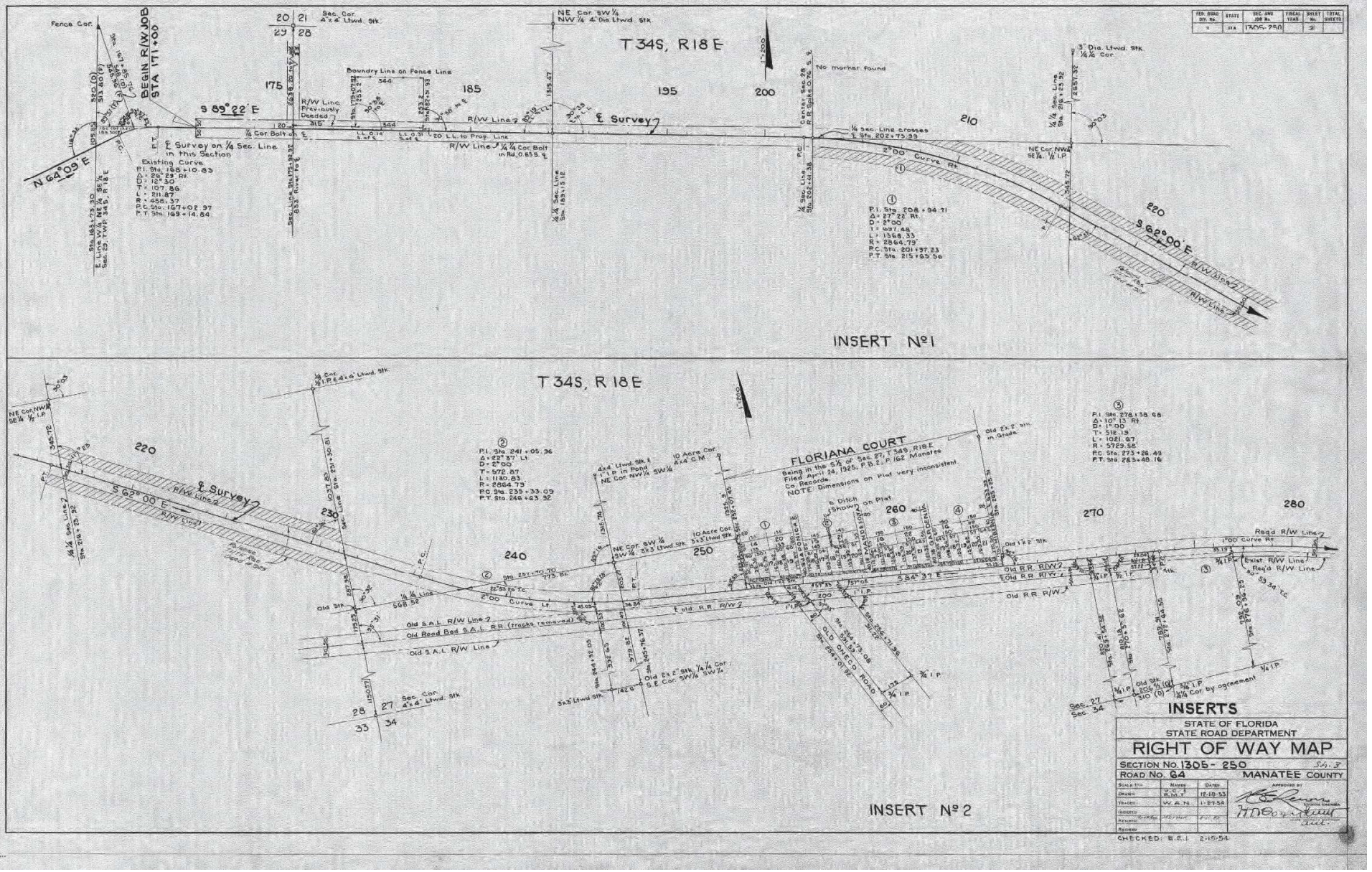
STATE OF FLORIDA
STATE ROAD DEPARTMENT

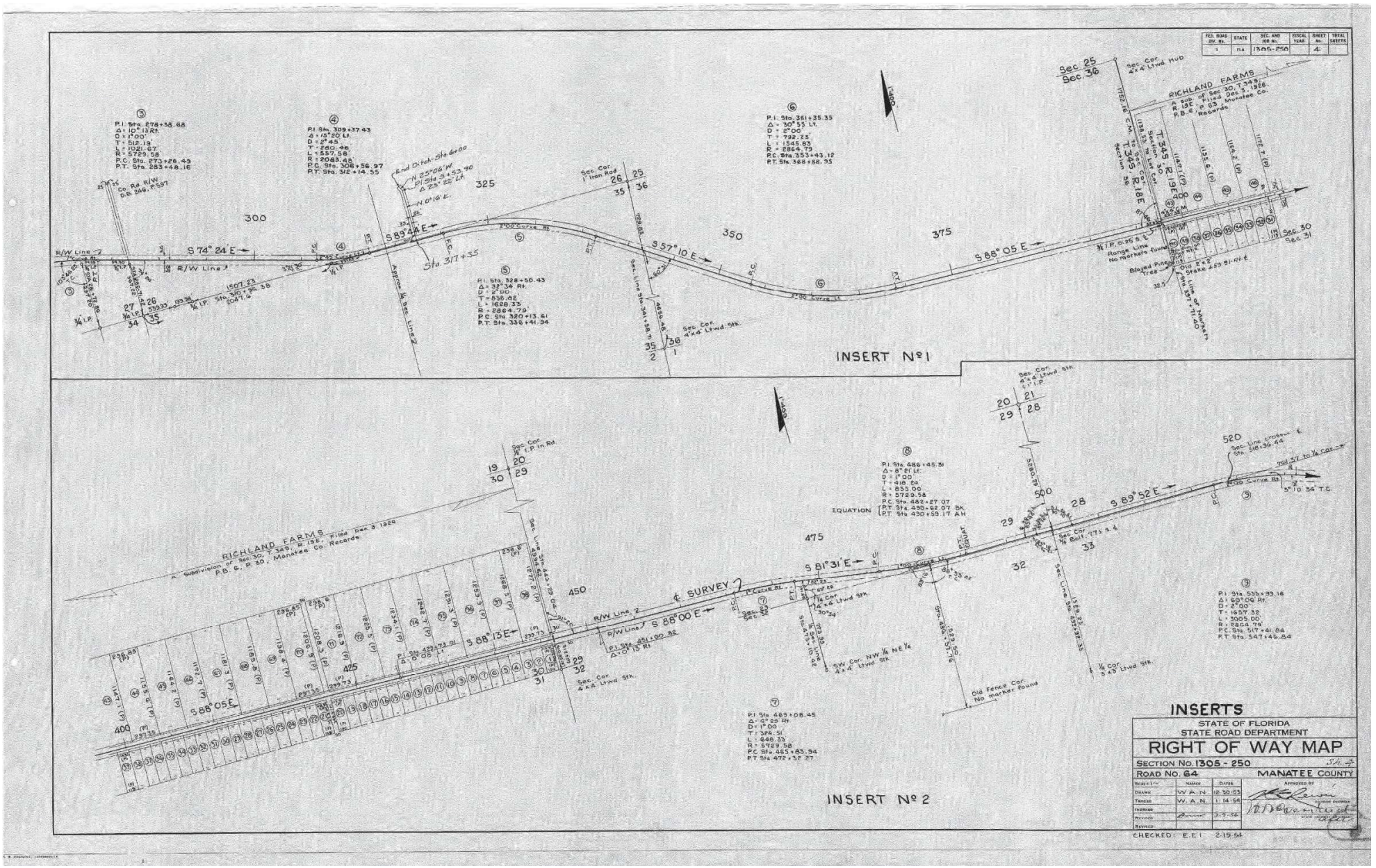
RIGHT OF WAY MAP

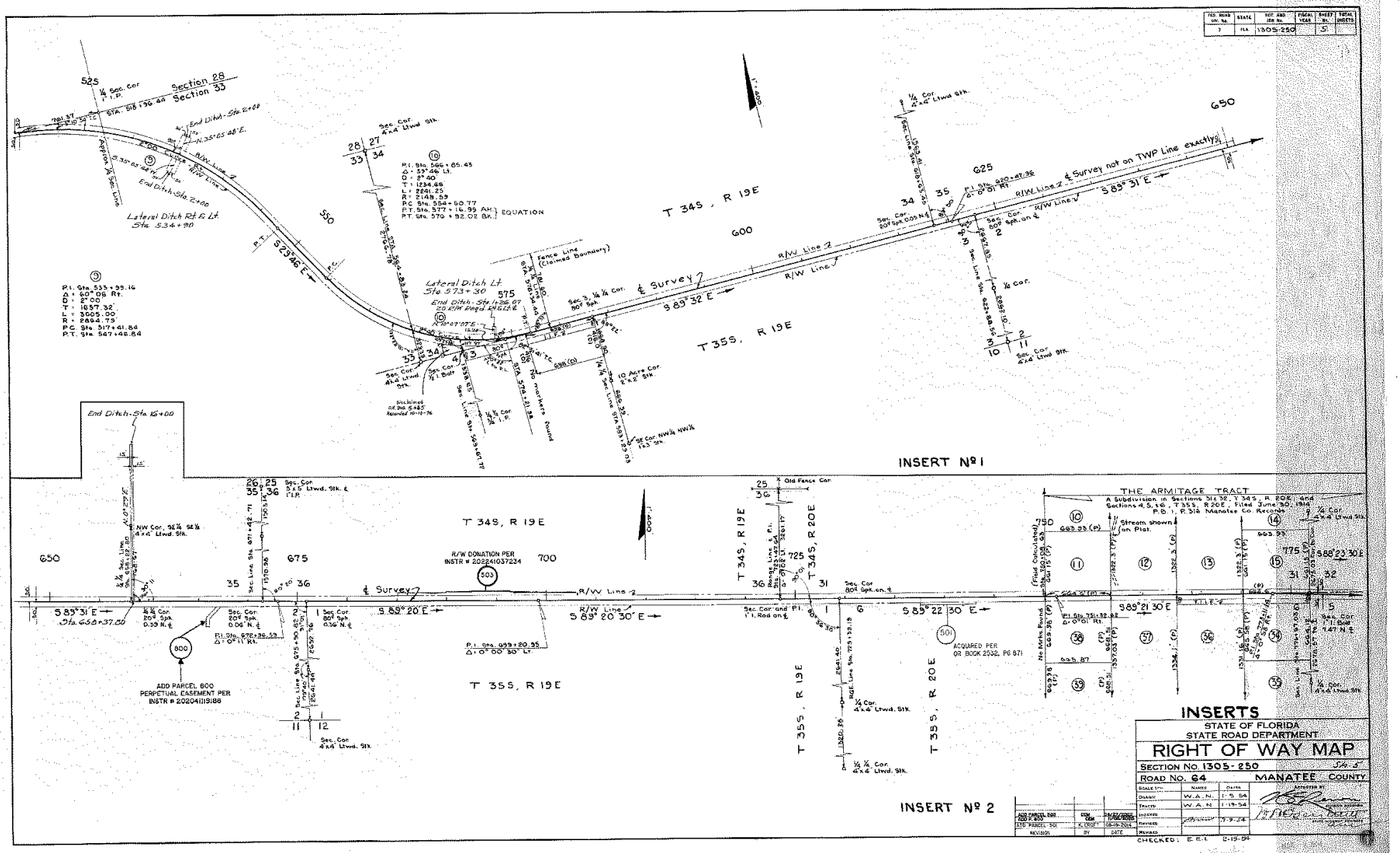
SECTION No. 1305-230 Sht. 2
ROAD No. 64 Manatee COUNTY

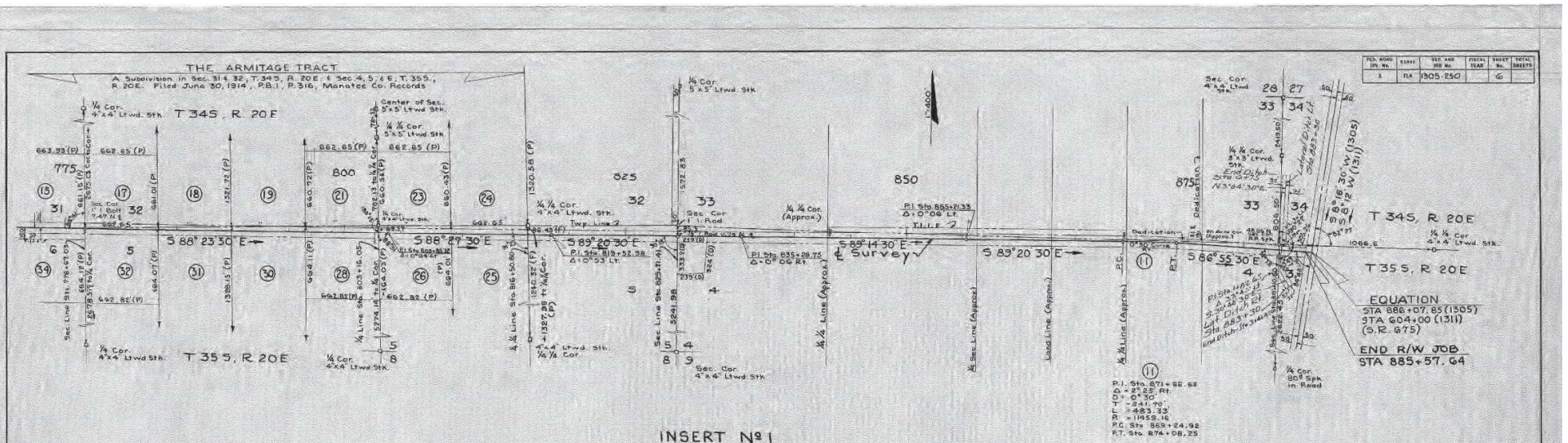
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SCALE 1"=1000'		
ORIGINAL	B.E.H.	
TRACED	B.E.H.	7/15/53
REVISED		
REVISED		
REVISED		
CHECKED	R.E.C.	7-22-53

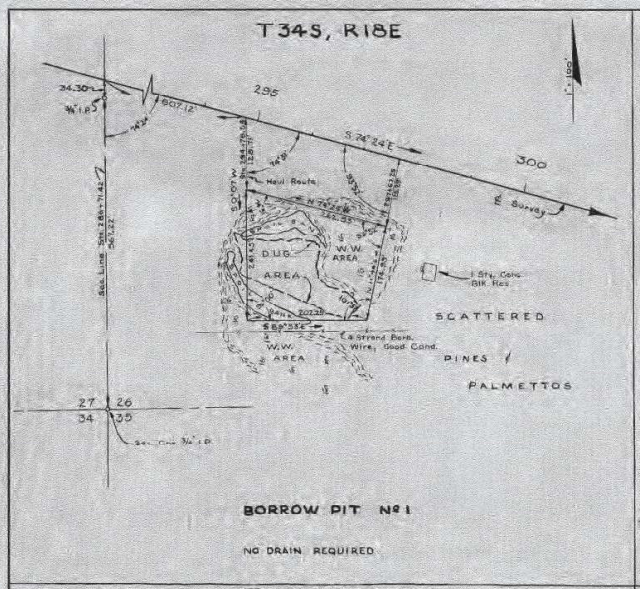
APPROVED BY
Chief Engr.
DIVISION ENGINEER
DIST. ENGINEER
STATE PLANNING ENGINEER
STATE ROAD ENGINEER

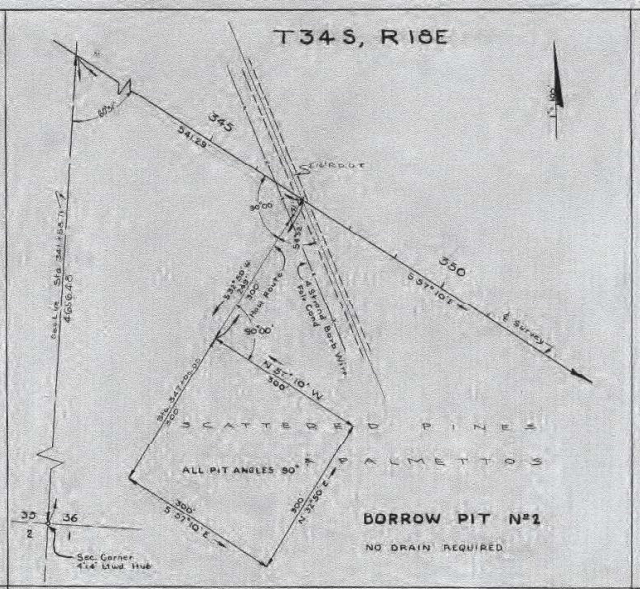

T 34S, R 18 E
INSERT Nº 1
INSERT Nº 2
FLORIANA COURT
Being in the S½ of Sec. 27, T 34S, R 18 E
Filed April 24, 1925, P.B. 2, P. 162 Manatee
Co. Records
NOTE: Dimensions on Plat very inconsistent
Old R.R. R/W
Old S.A.L. R/W Line
Old Road Bed S.A.L. RR (tracks removed)
Old S.A.L. R/W Line
Old ONECO ROAD
Old Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
NE Cor. SW¼ NW¼ 4" Dia. Ltwd. Stk.
3" Dia. Ltwd. Stk. ¼¼ Cor.
No marker found
Fence Cor.
BEGIN R/W JOB STA 171+00
S 89° 22' E
N 64° 09' E
Boundry Line on Fence Line
R/W Line Previously Deeded
¼ Cor. Bolt on ℄
℄ Survey on ¼ Sec. Line in this Section
℄ Survey
R/W Line
¼ ¼ Cor. Bolt in Rd. 0.65 S. ℄
¼ Sec. Line crosses ℄ Sta. 202+75.39
NE Cor. NW¼ SE¼ I.P.
Existing Curve
P.I. Sta. 185+10.83
Δ = 26° 29' Rt.
D = 12° 30'
T = 107.86
L = 211.87
R = 458.37
P.C. Sta. 167+02.97
P.T. Sta. 169+14.84
① P.I. Sta. 208+94.71
Δ = 27° 22' Rt.
D = 2° 00'
T = 697.48
L = 1368.33
R = 2864.79
P.C. Sta. 201+97.23
P.T. Sta. 215+65.56
② P.I. Sta. 241+05.36
Δ = 22° 37' Lt.
D = 2° 00'
T = 572.87
L = 1180.83
R = 2864.79
P.C. Sta. 235+33.09
P.T. Sta. 246+43.92
③ P.I. Sta. 278+58.98
Δ = 10° 13' Rt.
D = 1° 00'
T = 512.15
L = 1021.87
R = 5729.58'
P.C. Sta. 273+28.43
P.T. Sta. 283+48.16
2° 00' Curve Rt.
2° 00' Curve Lt.
1° 00' Curve Rt.
Req'd R/W Line
Exist. R/W Line
Old 8"x 8" Stk. ¼¼ Cor. S.E. Cor. SW¼ SW¼
Old 8"x 8" Stk. in Grade
10 Acre Cor. 3"x 3" Ltwd. Stk.
NE Cor. SW¼ SW¼ 3"x 3" Ltwd. Stk.
¼ Cor. ¾" I.P. & 4"x 4" Ltwd. Stk.
4"x 4" Ltwd. Stk. & 1" I.P. in Pond NE Cor. NW¼ SW¼
¾" I.P.
½" I.P.
Old Stk. 505.5' (R) 510' (D) ¾" I.P. ¼¼ Cor. by agreement
Sec. 27 Sec. 34
Sec. 28 Sec. 33 Sec. 34
¼ ¼ Sec. Line Sta. 216+25.22
¼ Sec. Line Sta. 172+39.32 8.53 River to E
¼ Sec. Line Sta. 183+15.12
¼ Sec. Line Sta. 202+41.38
¼ Sec. Line Sta. 0+16+23.92
¼ Sec. Line Sta. 273+28.43
E. Line W¼ NE¼ SE¼ Sec. 29, TWP. 34 S., R 18 E
NE Cor. NW¼ SE¼ ½ I.P.
Old 5"x 5" Stk. in Grade
Old R.R. R/W
Old Stk.
Old Stk. 505.5' (R) 510' (D) ¾" I.P. ¼¼ Cor. by agreement
Old 8"x 8" Stk. ¼¼ Cor. S.E. Cor. SW¼ SW¼
Old 5"x 5" Ltwd. Stk.
Sec. 27 Sec. 34
Sec. 28 Sec. 33 Sec. 34
Old R.R. R/W
Old S.A.L. R/W Line
Old Road Bed S.A.L. RR (tracks removed)
Old ONECO ROAD
Old Stk.
Old 8"x 8" Stk. ¼¼ Cor. S.E. Cor. SW¼ SW¼
Old 5"x 5" Ltwd. Stk.
Sec. 27 Sec. 34
Sec. 28 Sec. 33 Sec. 34
¼ ¼ Sec. Line Sta. 216+25.22
¼ Sec. Line Sta. 172+39.32 8.53 River to E
¼ Sec. Line Sta. 183+15.12
¼ Sec. Line Sta. 202+41.38
¼ Sec. Line Sta. 0+16+23.92
¼ Sec. Line Sta. 273+28.43
E. Line W¼ NE¼ SE¼ Sec. 29, TWP. 34 S., R 18 E
NE Cor. NW¼ SE¼ ½ I.P.
Old 5"x 5" Stk. in Grade
Old R.R. R/W
Old Stk.
Old Stk. 505.5' (R) 510' (D) ¾" I.P. ¼¼ Cor. by agreement

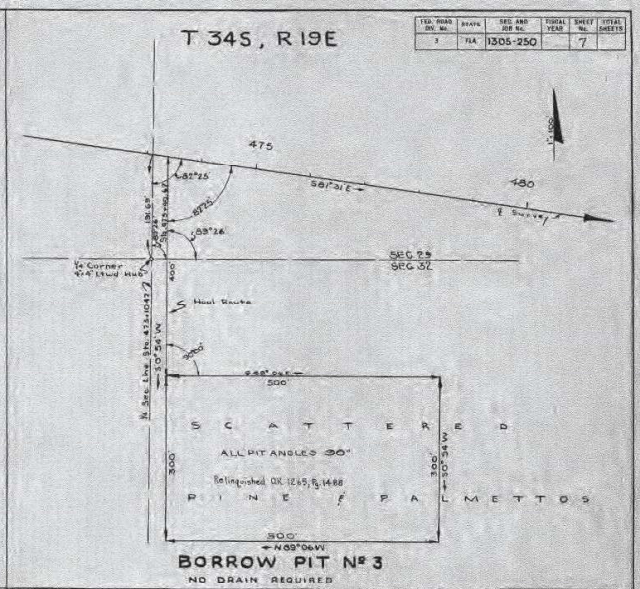

INSERT Nº1
INSERT Nº2
RICHLAND FARMS
A Subdivision of Sec 30, T 34S, R 19E, Filed Dec. 9, 1926
P.B. 6, P. 30, Manatee Co. Records
S 74° 24' E
S 89° 44' E
S 57° 10' E
S 88° 05' E
S 81° 31' E
S 88° 00' E
S 88° 13' E
S 89° 52' E
℄ SURVEY
R/W Line
Sec Cor 4"x4" Ltwd Stk
Sec Cor 4"x4" Ltwd Mnd
Old Fence Cor No marker found
Range Line No marker found
Blazed Pine Tree
Sec 25
Sec 36
Sec 30
Sec 31
EQUATION
INSERTS
STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP
SECTION NO. 1305 - 250
ROAD NO. 64
MANATEE COUNTY
DRAWN W.A.N. 12-30-53
TRACED W.A.N. 1-14-54
CHECKED E.E.I. 2-19-54

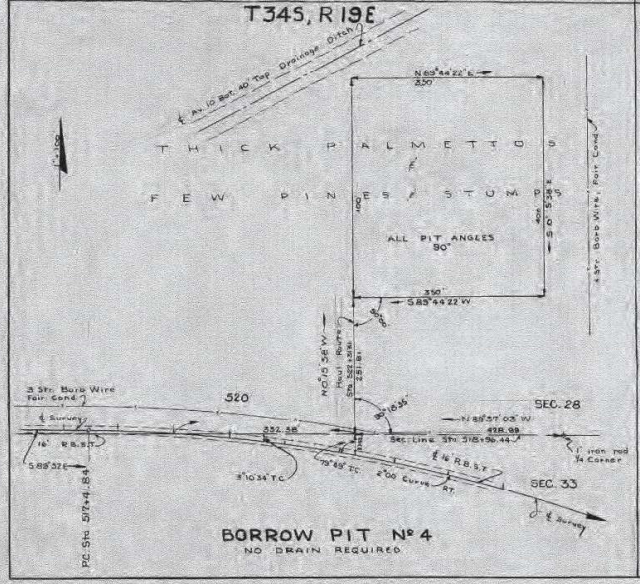

INSERT Nº 1
INSERT Nº 2
Section 28
Section 33
T 34S , R 19E
T 35S , R 19E
T 34S, R 20E
T 35S, R 20E
Lateral Ditch Lt Sta 573+30
Lateral Ditch Rt & Lt Sta 534+90
End Ditch-Sta 2+00
End Ditch-Sta 16+00
R/W Line 2
R/W Line 1
℄ Survey ?
S 89° 31' E
S 89° 32' E
S 89° 20' E
S 89° 20 30" E
S 89° 22 30" E
S 89° 21 30" E
S 88° 23 30" E
S 29° 46' E
N 35° 05 48" E
N 01° 29' E
R/W DONATION PER INSTR # 202241037234
ADD PARCEL 800 PERPETUAL EASEMENT PER INSTR # 202041019188
ACQUIRED PER OR BOOK 2532, PG 871
THE ARMITAGE TRACT
A Subdivision in Sections 32, T 34S, R 20E, and Sections 4, 5, 9 & 8, T 35S, R 20E, Filed June 30, 1914 P.B. 1, P. 51A Manatee Co. Records
Stream shown on Plat.
Fence Line (Claimed Boundary)
No markers found
Backlined OR Bk 5485 Recorded 10-14-76
Old Fence Cor.
10 Acre Cor. 4"x4" Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 1/4 Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 80# Spk. on ℄
Sec. Cor. 5"x5" Ltwd. Stk. & I.P.
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 80# Spk. on ℄
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.

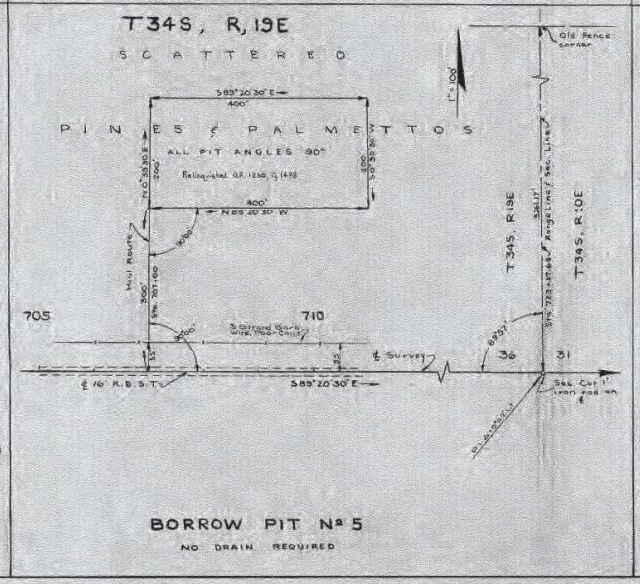

THE ARMITAGE TRACT
A Subdivision in Sec. 31 & 32, T. 34 S., R. 20 E. & Sec. 4, 5, & 6 E., T. 35 S., R. 20 E. Filed June 30, 1914, P.B. 1, P. 316, Manatee Co. Records
T 34 S., R. 20 E.
T 35 S., R. 20 E.
S 88° 23 30" E
S 88° 29 30" E
S 89° 20 30" E
S 89° 14 30" E
S 89° 20 30" E
S 86° 55 30" E
Survey
Center of Sec. 5"x5" Ltwd. Stk.
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 1/4 Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 5"x5" Ltwd. Stk.
1/4 1/4 Cor. 5"x5" Ltwd. Stk.
1/4 1/4 Cor. 4"x4" Ltwd. Stk. Twp. Line
Sec. Cor. 1" I. Rod
1/4 1/4 Cor. (Approx.)
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 80' Spk in Road
Pl Sta 855+21.33 Δ 1° 06 Lt.
Pl Sta 819+52.38 Δ 1° 53 Lt.
Pl Sta 835+28.75 Δ 0° 06 Rt.
Pl Sta 803+16.05
Pl Sta 846+50.80
Pl Sta 822.71 Ahead
Pl Sta 885+21.33 Δ 1° 06 Lt.
T.L.I.F. 2
Dedication
Approx. Dedication
Sec. Line
1/4 1/4 Line
Long Line (Approx.)
1/4 Sec. Line (Approx.)
P.C.
P.T.
EQUATION
STA 886+07.85 (1305)
STA 604+00 (1311)
(5.12.675)
END R/W JOB
STA 885+57.64
T 34 S., R. 20 E.
T 35 S., R. 20 E.
1/4 1/4 Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 1/4 Cor.
Sec. Cor. 4"x4" Ltwd. Stk.
Sec. Cor. 1" I. Rod 0.49' N. & 0.49' W.
Sec. Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 4"x4" Ltwd. Stk.
1/4 Cor. 80' Spk in Road
End Ditch S 79° 01' E N 3° 04' 30" E.
End Ditch S 83° 30' E
Ahead Pl Sta 885+21.33
Sta 883+30
Pl Sta 885+21.33 Δ 1° 06 Lt.
Lot Ditch
End Ditch

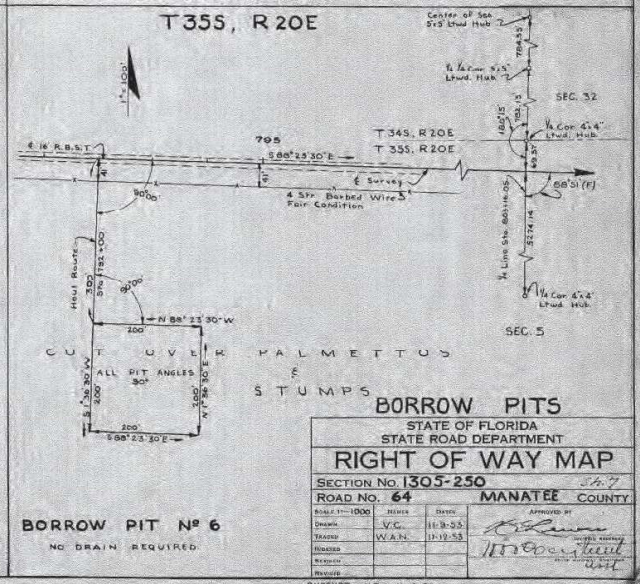












FED. ROAD DIV. No.	STATE	SEC. AND JOB No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
3	FLA.	1305-250		7	

BORROW PITS

STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

SECTION No. 1305-250

ROAD No. 64 MANATEE COUNTY

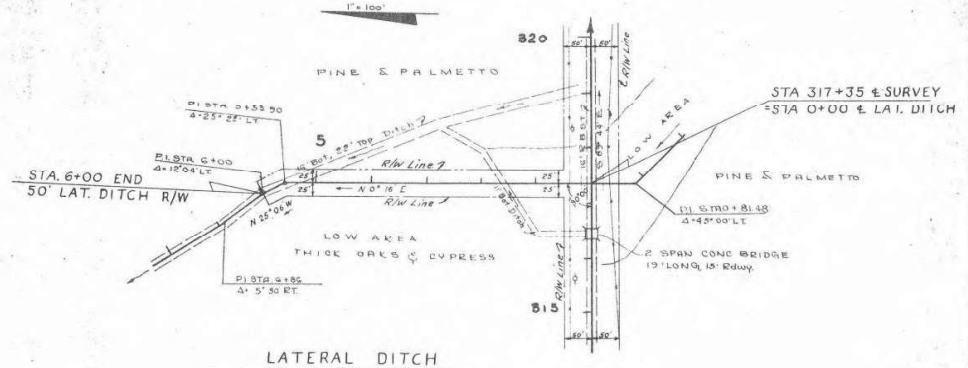
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SCALE 1"=1000'		
DRAWN	V.C.	11-8-55
TRACED	W.A.N.	11-12-55
HORIZED		
REVISED		
REVISED		

APPROVED BY

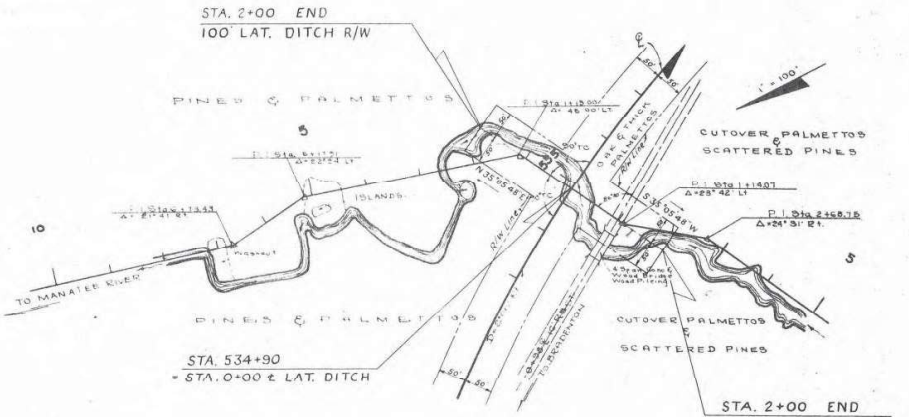
CHIEF ENGINEER

CHECKED V.C. 11-12-55

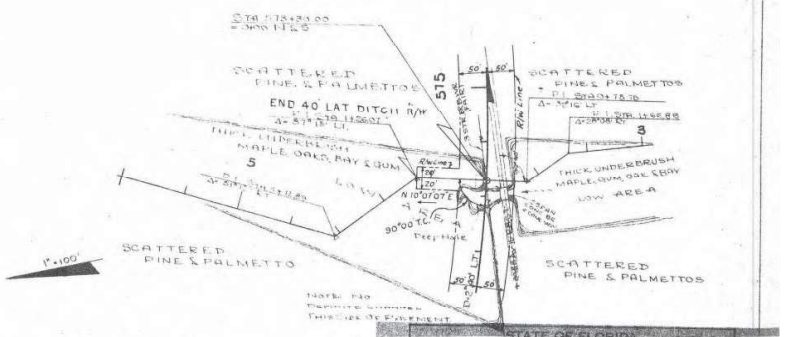
FED. ROAD DIVN. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	FLA.	1305-250		8	



LATERAL DITCH
LT. ℄ STA. 317+35



LATERAL DITCH
LT ℄ RT ℄ STA. 534+90



LATERAL DITCH
LT. ℄ STA. 573+30

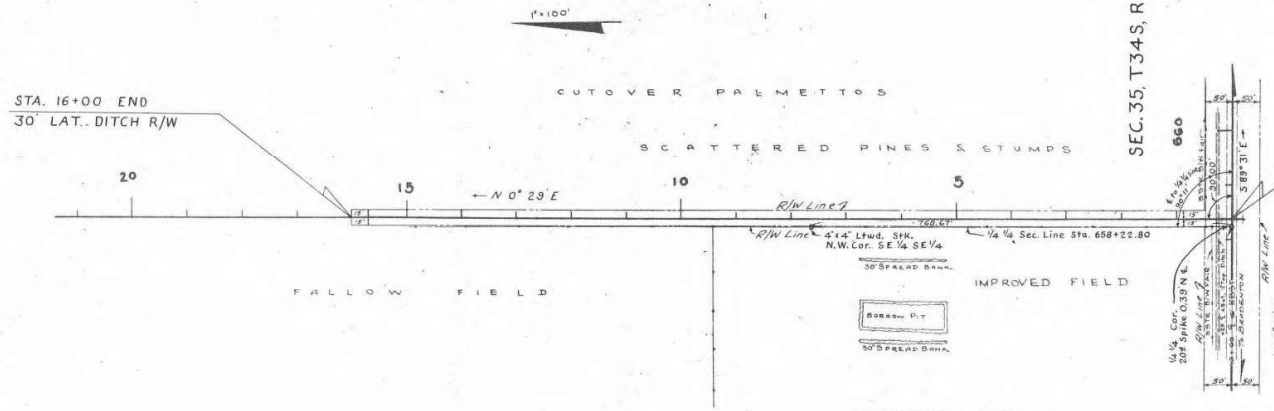
STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP

SECTION NO. 1305-250 Sh. 8

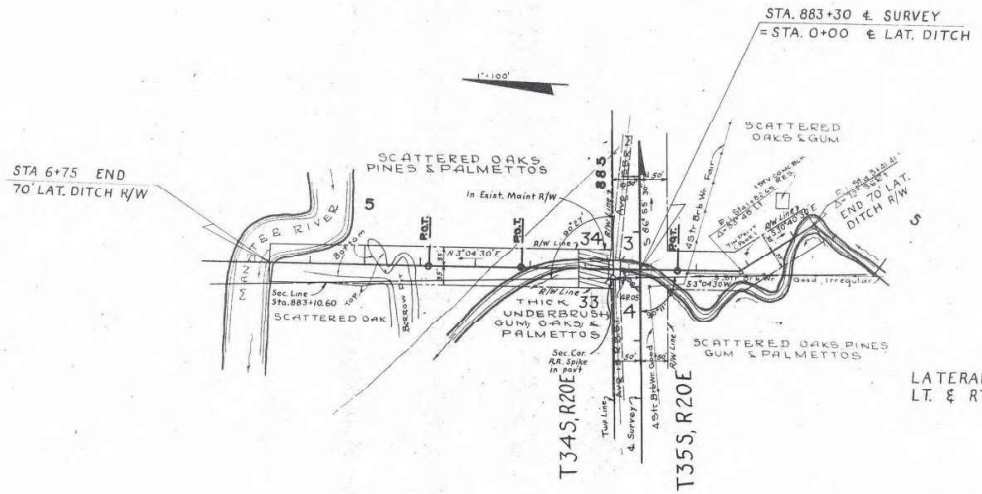
ROAD NO. 64 MANATEE COUNTY

	NAMES	DATES	APPROVED
DRAWN	B.E.H.	10/27/53	
TRACED	B.E.H.	10/27/53	
TABULATED			
CHECKED			
RECHECKED			

FED. ROAD DIVN. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	FLA.	1305-2.50		9	



LATERAL DITCH
LT. ℄ STA. 658+37.80



LATERAL DITCH
LT. & RT. STA. 883+30

STATE OF FLORIDA
STATE ROAD DEPARTMENT

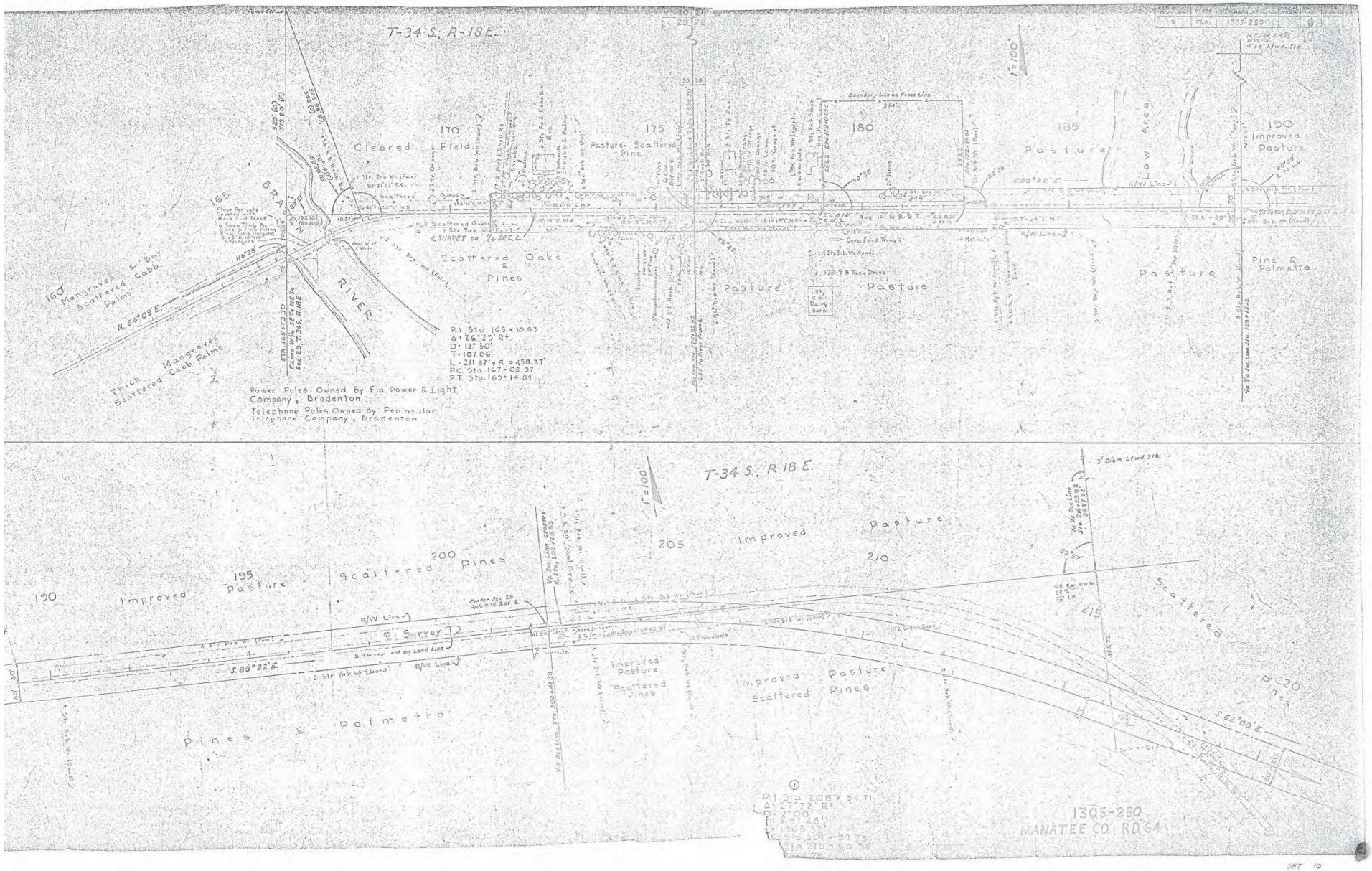
RIGHT OF WAY MAP

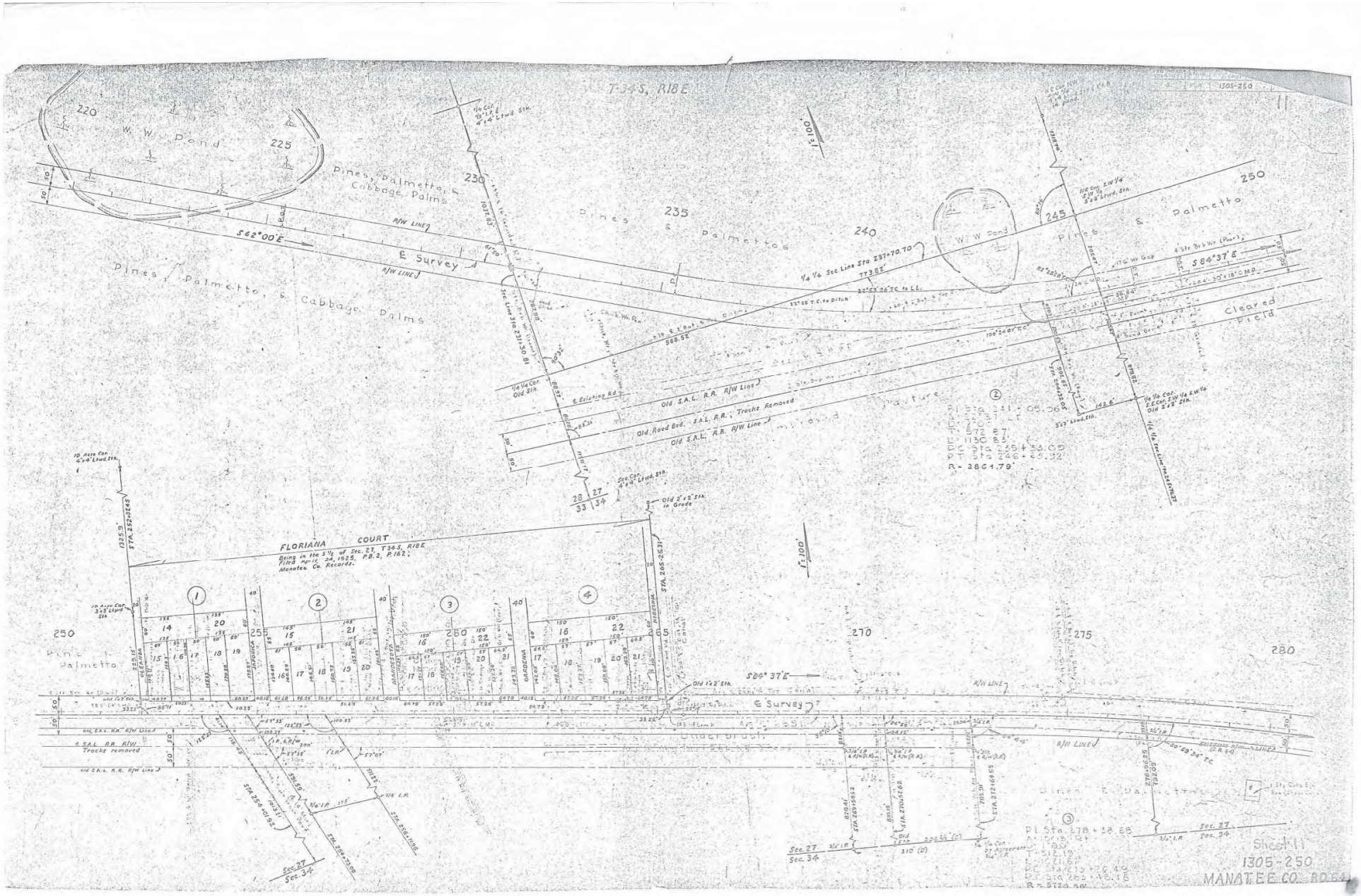
SECTION NO. 1305-250 SH. 9

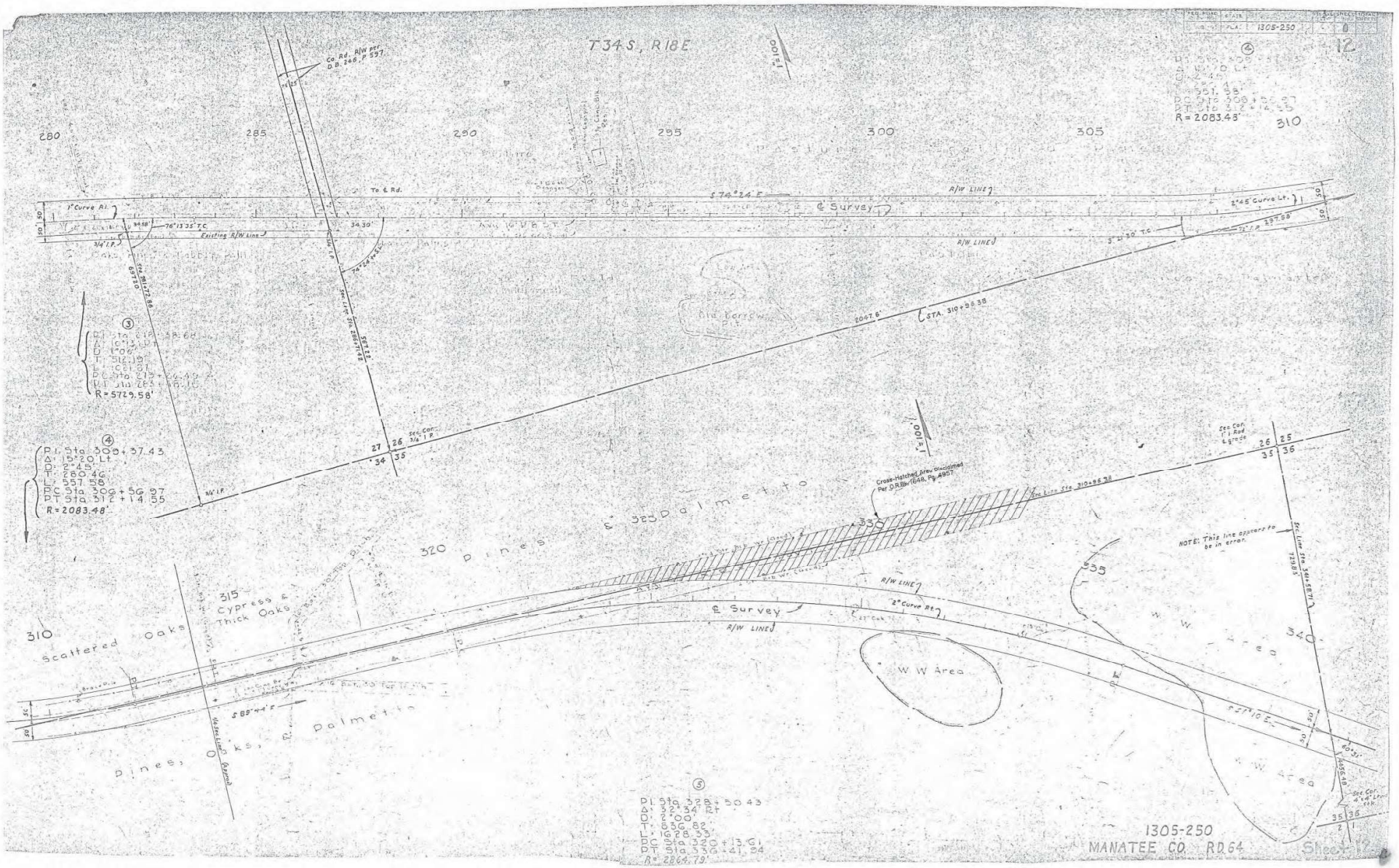
ROAD NO. 64 MANATEE COUNTY

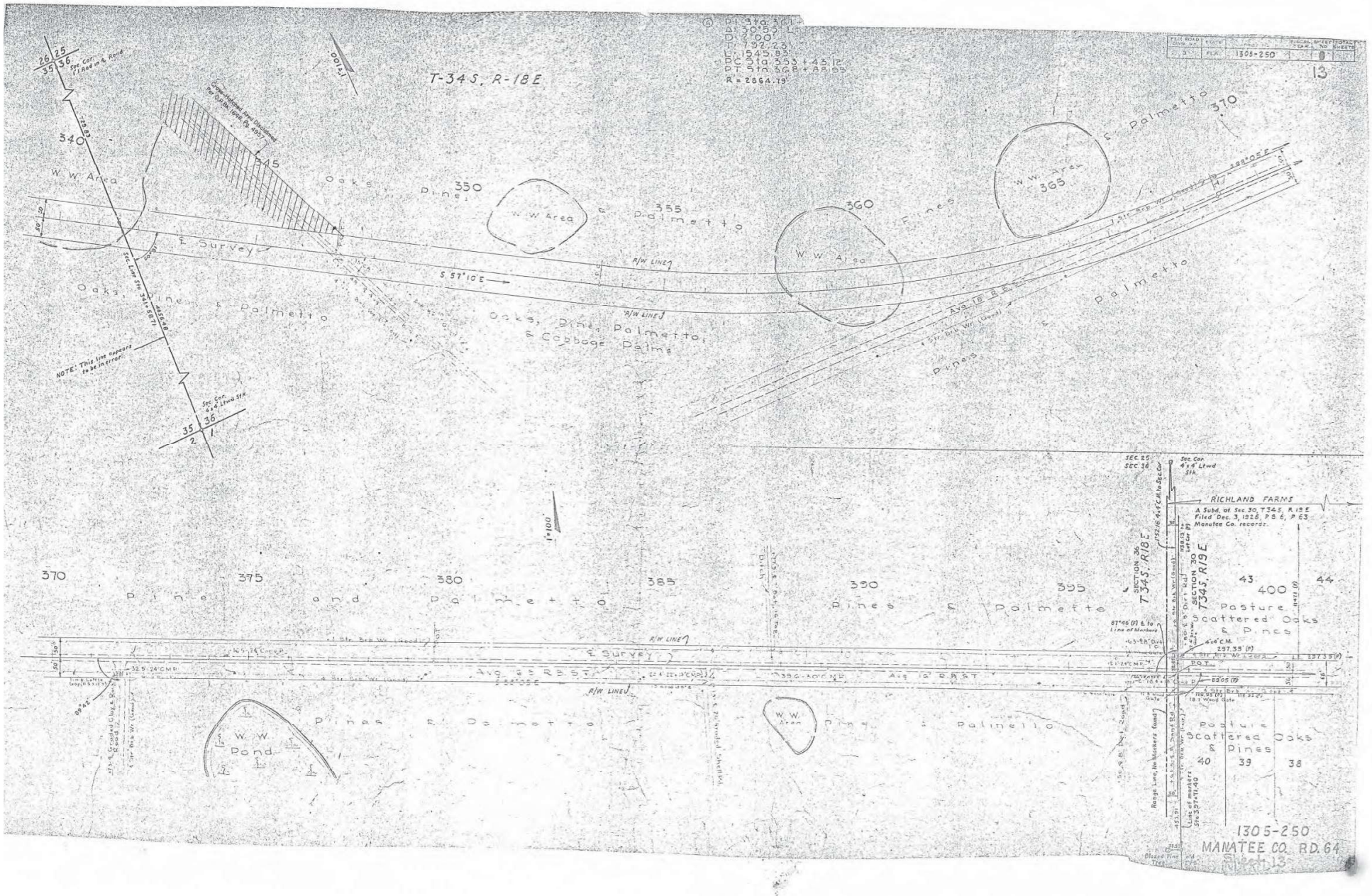
	NAMES	DATES	APPROVED BY
SCALE 1" =			
DRAWN	B.E.H.	10/27/53	
TRACED	B.E.H.	10/27/53	
INDEXED			
Rejoined			
Revised			

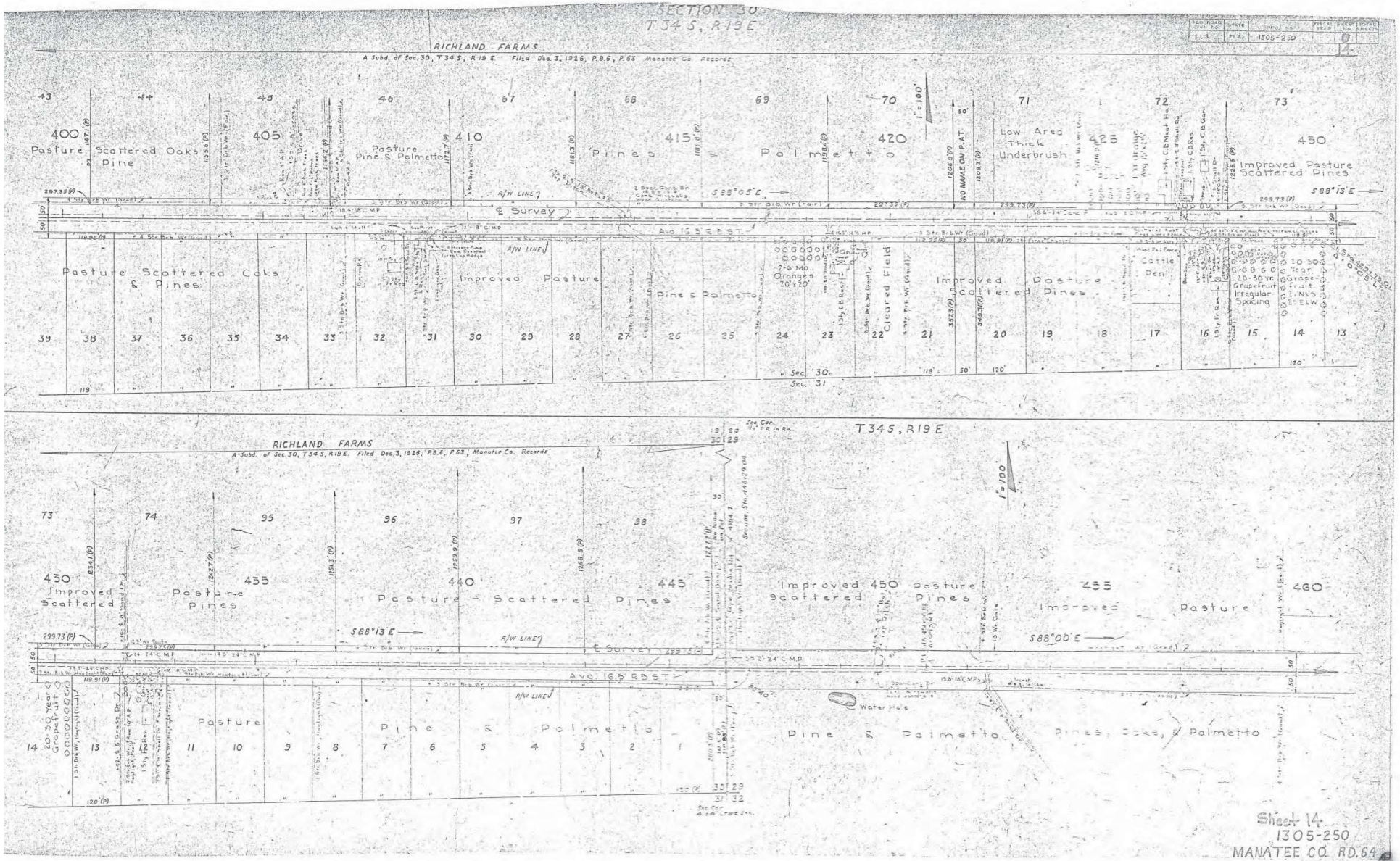
STATE HIGHWAY ENGINEER

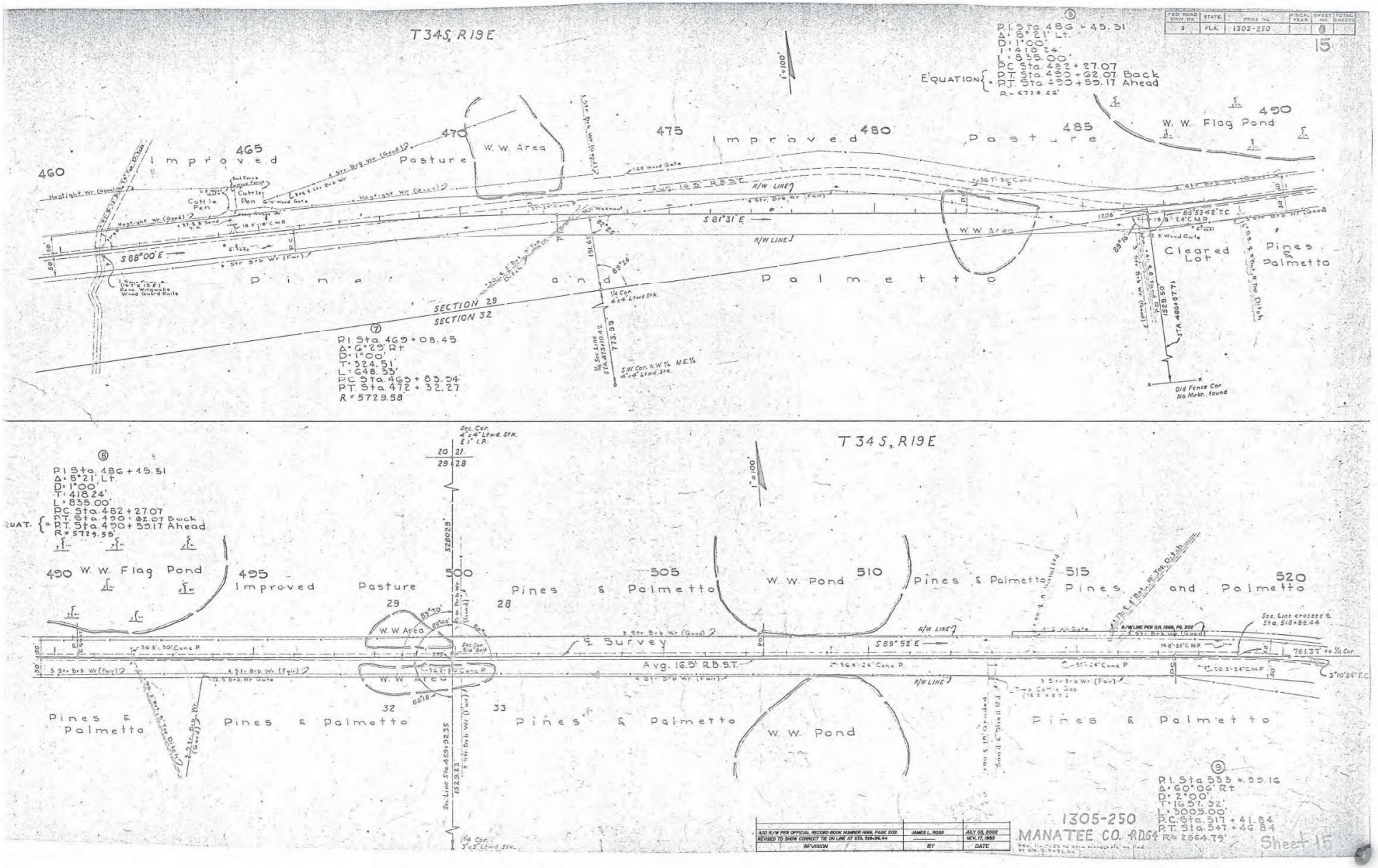

T-34 S., R-18 E.
Cleared Field
Pasture - Scattered Pine
Pasture
Low Area
Improved Pasture
Scattered Oaks Pines
Pine & Palmetto
Mangroves & Bay Scattered Cabb Palms
Thick Mangroves Scattered Cabb Palms
RIVER
N. 64°09' E.
S. 89°22' E.
S. 62°00' E.
Power Poles Owned By Fla. Power & Light Company, Bradenton.
Telephone Poles Owned By Peninsular Telephone Company, Bradenton.
P.I. Sta. 168+10.83
Δ = 26°29' Rt
D = 12°30'
T = 107.86'
L = 211.87' ; R = 458.37'
P.C. Sta. 167+02.97
P.T. Sta. 169+14.84
1305-250
MANATEE CO. RD. 64
SHT 10

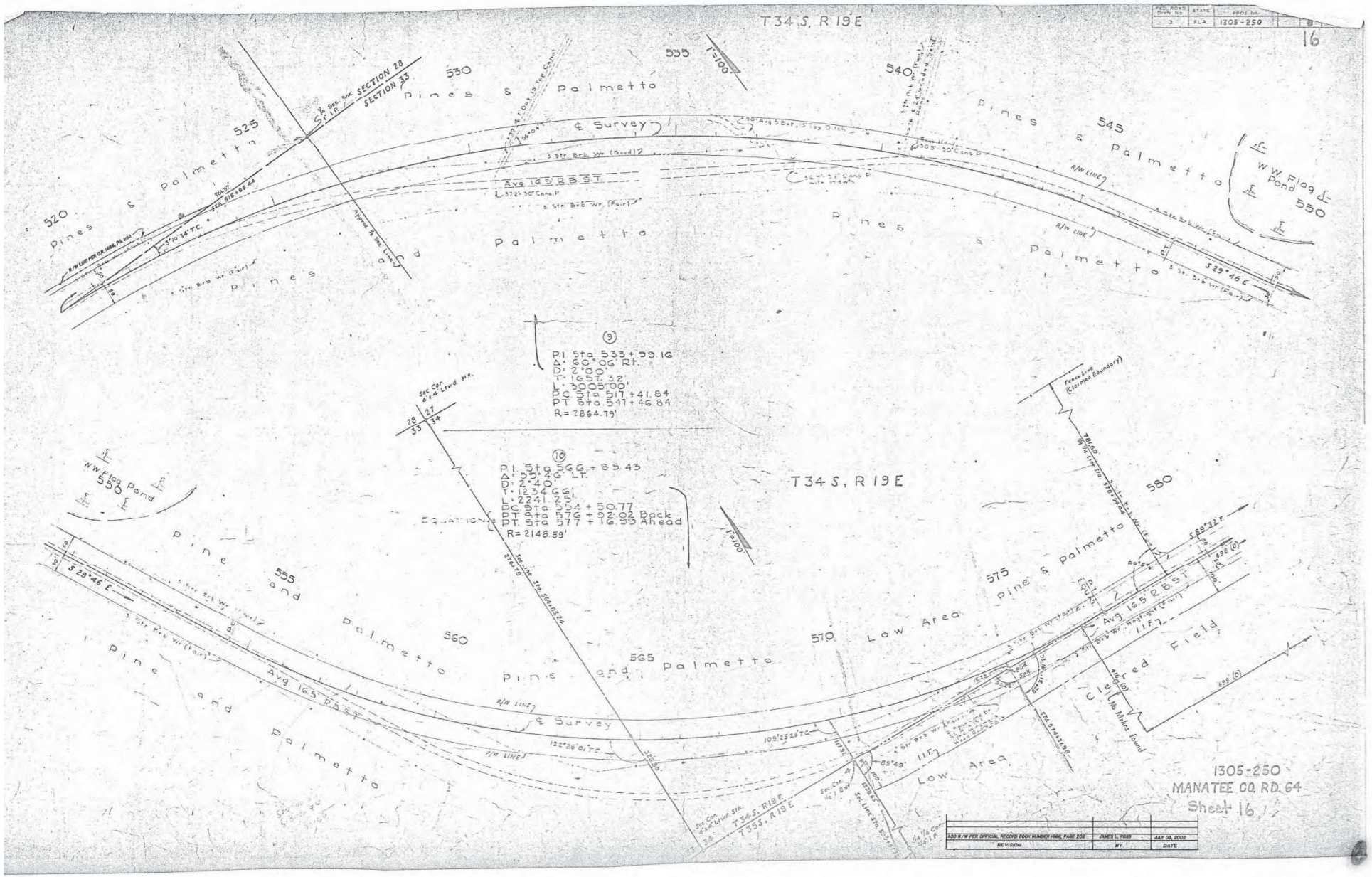

T-34-S, R18E
1305-250
W. W. Pond
Pines, Palmetto & Cabbage Palms
Pines & Palmettos
Pines & Palmetto
Cleared Field
S62°00'E
R/W LINE
℄ Survey
S 84°37' E
Old S.A.L. R.R. R/W Line
Old Road Bed, S.A.L. R.R., Tracks Removed
℄ Existing Rd.
FLORIANA COURT
Being in the S ½ of Sec. 27, T 34 S, R 18 E
Filed April 24, 1925, P.B. 2, P. 162,
Manatee Co. Records.
S89° 37' E
℄ S.A.L. RR R/W
Tracks removed
Sec. 27
Sec. 34
Pi Sta 241 + 05.05
Pi Sta 225 + 33.09
Pt Sta 226 + 65.32
R = 2861.79'
Pi Sta 278 + 38.68
Sheet 11
1305-250
MANATEE CO. RD 64

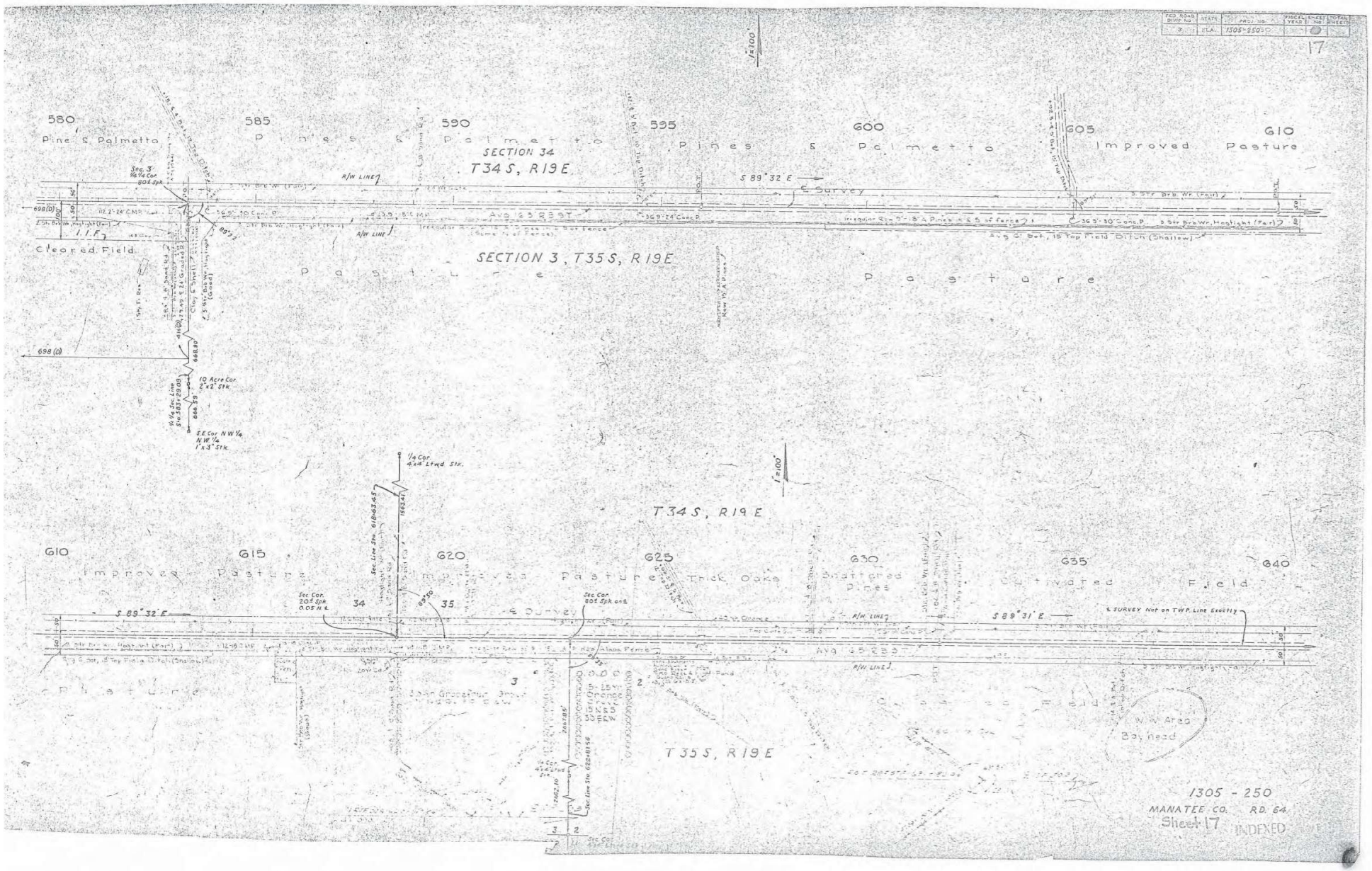

T34S, R18E
Co. Rd. R/W per D.B. 248, P. 597
280
285
290
295
300
305
310
To C. Rd.
S 74°24' E
℄ Survey
R/W LINE
Existing R/W Line
76°13'35" T.C.
3430'
3/4" I.P.
1" Curve Rt.
2°45' Curve Lt.
297.88'
5° 41' 30" T.C.
STA. 319+98.38
2047.6'
Sec. Cor. 3/4" I.P.
Sec. Line Sta 310+86.38
Cross-Hatched Area Disclaimed Per O.R.Bk. 1648, Pg. 4957
Sec. Cor. 1" Rod & Brass
NOTE: This line appears to be in error.
Sec. Line Sta 341+58.71
723.93'
315
Cypress & Thick Oaks
320
Pines & Palmetto
Scattered Oaks
325
330
335
340
W W Area
S 89°44' E
1/4 Sec. Line (Record)
S 27°10' E
Sec. Cor. 1/4" Rod & Brass
1305-250
MANATEE CO. RD 64
Sheet 12
1305-250
12
PI Sta 328+30.43
Δ: 32°34' Rt
D: 2°00'
T: 850.82'
L: 1628.33'
PC Sta 320+13.61
PT Sta 336+41.94
R= 2864.79'
PI Sta 308+37.43
Δ: 15°20' Lt
D: 2°45'
T: 280.46'
L: 557.58'
PC Sta 306+56.97
PT Sta 312+14.55
R= 2083.48'
PI Sta 298+58.68
Δ: 10°13' Lt
D: 1°00'
T: 512.19'
L: 1021.91'
PC Sta 312+46.49
PT Sta 322+68.40
R= 5729.58'

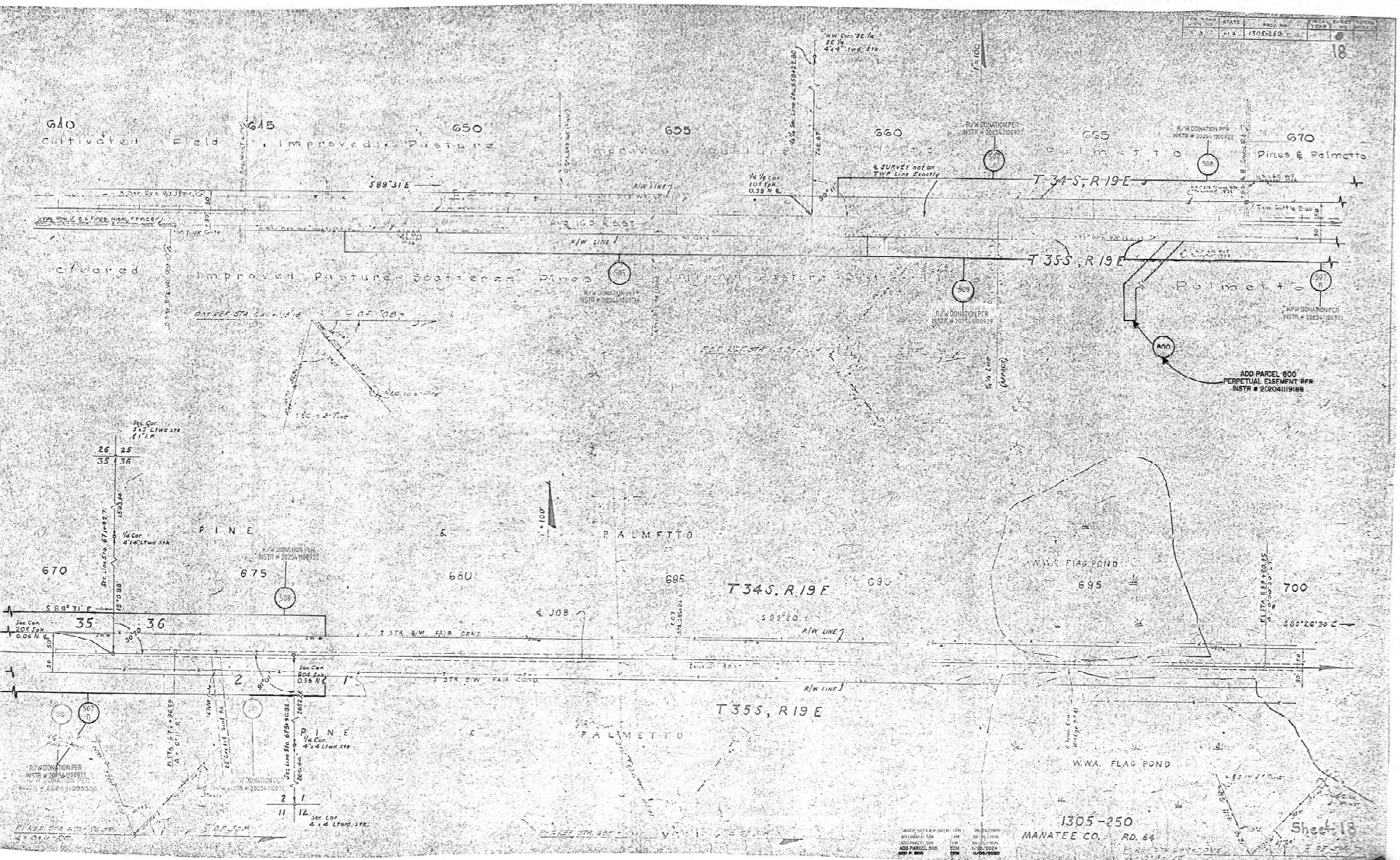

T-34 S, R-18E
Pines & Palmetto
Oaks, Pine, Palmetto & Cabbage Palms
W.W. Area
W.W. Pond
R/W LINE
S 57°10' E
Ave 18 RST
Ave 19 RST
Sec Line Sec 30 & 25
Sec Cor 4"x4" Lmwd Stk
Sec Cor Filled in & Round
NOTE: This line appears to be in error
RICHLAND FARMS
A Subd. of Sec 30, T 34 S, R 19 E
Filed Dec. 3, 1926, P.B. 6, P. 63
Manatee Co. records
SECTION 30 T 34 S, R 19 E
SECTION 25 T 34 S, R 18 E
Pasture Scattered Oaks & Pines
1305-250
MANATEE CO. RD. 64
Sheet 13

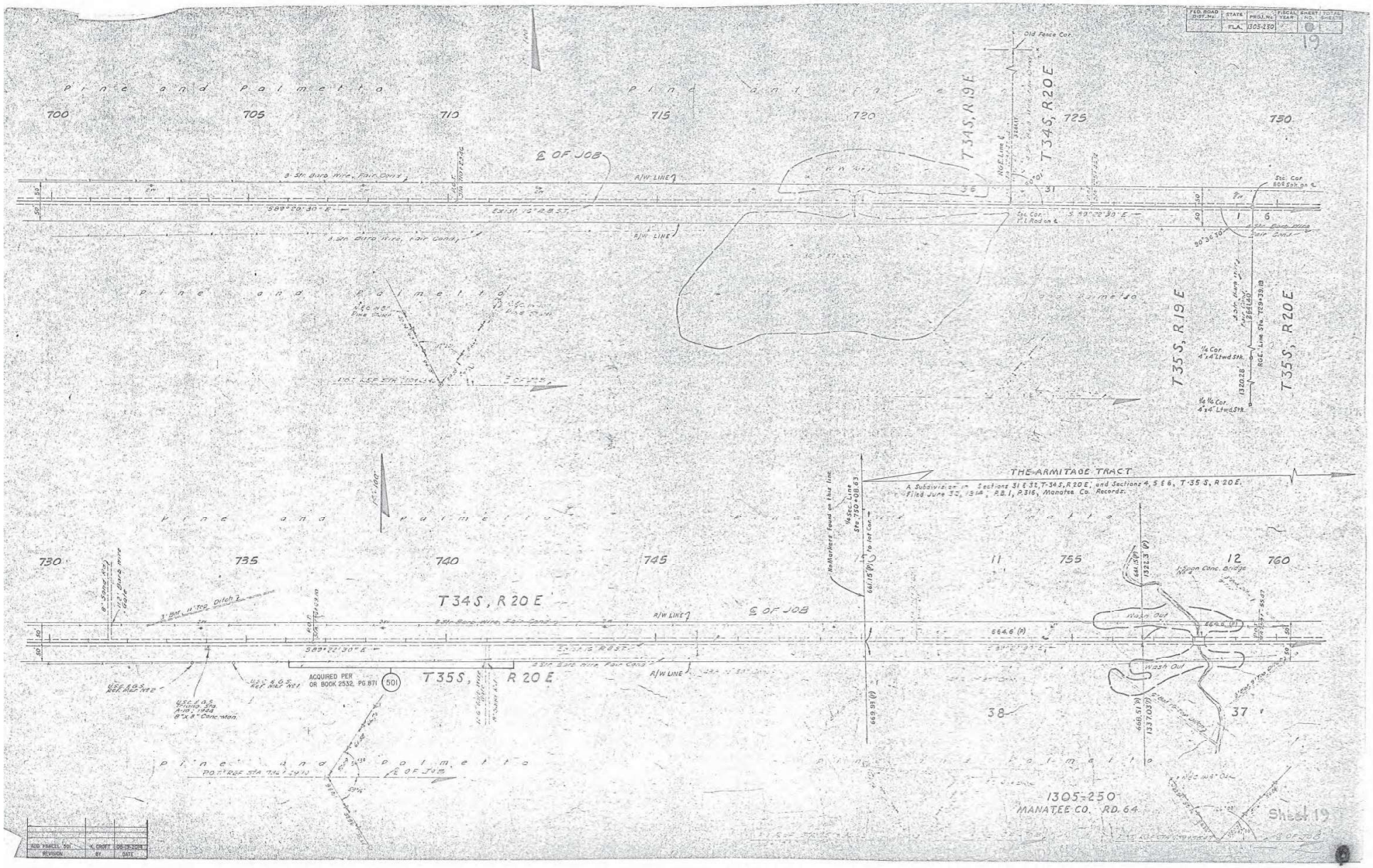

SECTION 30
T 34 S, R 19 E
RICHLAND FARMS
A Subd. of Sec. 30, T 34 S., R 19 E. Filed Dec. 3, 1926, P.B. 6, P. 63 Manatee Co. Records
ROAD NO. 64
STATE PROJ. NO. FLA. 1305-250
FISCAL YEAR
SHEET NO.
TOTAL SHEETS
1" = 100'
400
Pasture Scattered Oaks & Pine
405
Pasture Pine & Palmetto
410
Pine & Palmetto
415
Pine & Palmetto
420
Low Area Thick Underbrush
430
Improved Pasture Scattered Pines
NO NAME ON P.A.T.
S 88°05' E
S 88°13' E
299.73 (P)
297.33 (P)
R/W LINE
℄ Survey
Ave 165 RD S.T.
Pasture - Scattered Oaks & Pines
Improved Pasture
Pine & Palmetto
Cleared Field
2-6 Mo. Oranges 20'x20'
Improved Pasture Scattered Pines
Cattle Pen
20-30 Yr. Grapefruit Irregular Spacing
Sec. 30
Sec. 31
RICHLAND FARMS
A Subd. of Sec. 30, T 34 S, R 19 E. Filed Dec. 3, 1926, P.B. 6, P. 63, Manatee Co. Records
T 34 S, R 19 E
Sec Cor. of P.B. in R/W
430
Improved Pasture Scattered Pines
435
Pasture Pines
440
Pasture - Scattered Pines
445
Improved Pasture Scattered Pines
450
Improved Pasture
460
S 88°13' E
S 88°05' E
R/W LINE
℄ Survey
Ave 165 RD S.T.
Water Hole
20-30 Year Grapefruit
Pasture
Pine & Palmetto
Pines, Oaks, & Palmetto
Sec Cor. of P.B. in R/W
Sheet 14
1305-250
MANATEE CO. RD. 64

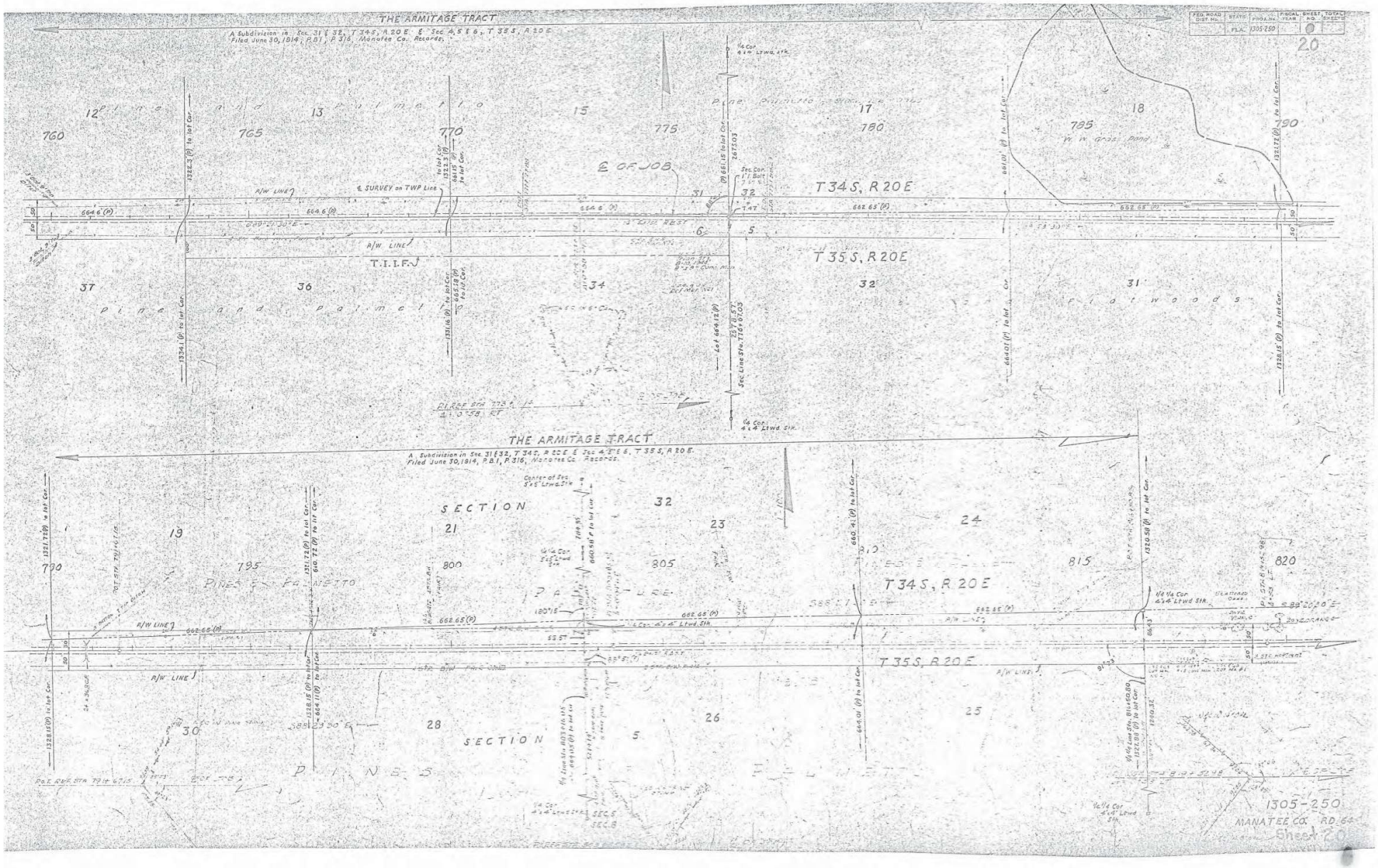

T34S, R19E
T 34 S, R19E
1"=100'
Avg. 16.5' R.B.S.T.
R/W LINE
W. W. Area
W. W. Flag Pond
W. W. Pond
Improved Pasture
Pines and Palmetto
Cleared Lot
Cattle Pen
SECTION 29
SECTION 32
S88°00'E
S81°31'E
S89°52'E
P.I. Sta. 486+45.31
Δ: 8°21' Lt.
D: 1°00'
T: 418.24'
L: 835.00'
P.C. Sta. 482+27.07
P.T. Sta. 490+62.07 Back
P.T. Sta. 490+59.17 Ahead
R = 5729.58'
EQUATION
P.I. Sta. 469+08.45
Δ: 6°29' Rt
D: 1°00'
T: 324.51'
L: 648.53'
P.C. Sta. 469+83.94
P.T. Sta. 472+32.27
R = 5729.58'
P.I. Sta. 533+99.16
Δ: 60°06' Rt
D: 2°00'
T: 1657.32'
L: 3005.00'
P.C. Sta. 517+41.84
P.T. Sta. 547+46.84
R = 2864.79'
1305-250
MANATEE CO. RD64
Sheet 15
FED. ROAD DIV. NO. 3
STATE FLA.
PROJ. NO. 1305-250
FISCAL YEAR
SHEET NO. 15
TOTAL SHEETS
ADD R/W PER OFFICIAL RECORD BOOK NUMBER 1666, PAGE 202 — JAMES L. ROSS — JULY 03, 2002
REVISED TO SHOW CORRECT TIE ON LINE AT STA. 518+86.44 — NOV. 17, 1953
REVISION — BY — DATE

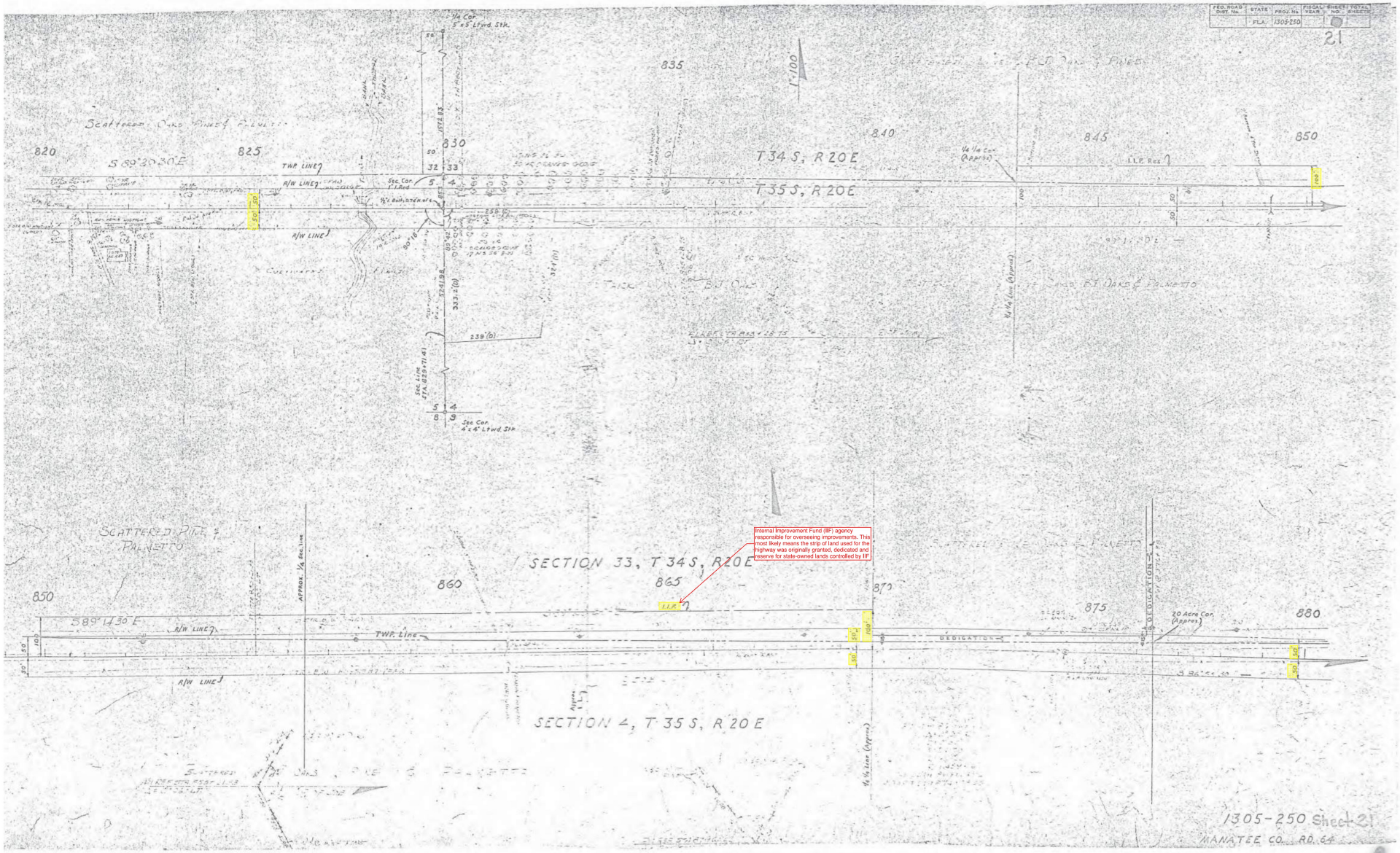

T34 S, R 19E
FED. ROAD DIVN NO. 3
STATE FLA
PROJ NO. 1305-250
16
SECTION 28
SECTION 33
Pines & Palmetto
Pine and Palmetto
Low Area
℄ Survey
R/W LINE
Avg 165 RBST
3 Str Brb Wr (Good)
3 Str Brb Wr (Fair)
5 Str Brb Wr (Fair)
5 Str Brb Wr (Poor)
3 Str Brb Wr (Poor)
Fence Line (Claimed Boundary)
WW Flog Pond
Cleared Field
Sec Cor & 4 Ltwd Stk
1/4 Sec Cor
1/16 Sec Cor
Sec Line Sta 564+85.84
Sec Line Sta 580+85.84
T=100'
(9)
P.I. Sta 533+99.16
Δ: 60°06' Rt.
D: 2°00'
T: 1661.32'
L: 3005.00'
PC Sta 517+41.84
PT Sta 547+46.84
R= 2864.79'
(10)
P.I. Sta 566+85.43
Δ: 55°46' Lt.
D: 2°40'
T: 1234.66'
L: 2241.66'
PC Sta 554+50.77
PT Sta 576+92.02 Back
PT Sta 577+16.55 Ahead
R= 2148.59'
EQUATION
S 29°46' E
S 89°32' E
108°25'26" TC
122°26'01" TC
88°49' Lt.
ADD R/W PER OFFICIAL RECORD BOOK NUMBER 1686, PAGE 202
JAMES L. ROSS
JAN 08, 2002
REVISION
BY
DATE
1305-250
MANATEE CO. RD. 64
Sheet 16

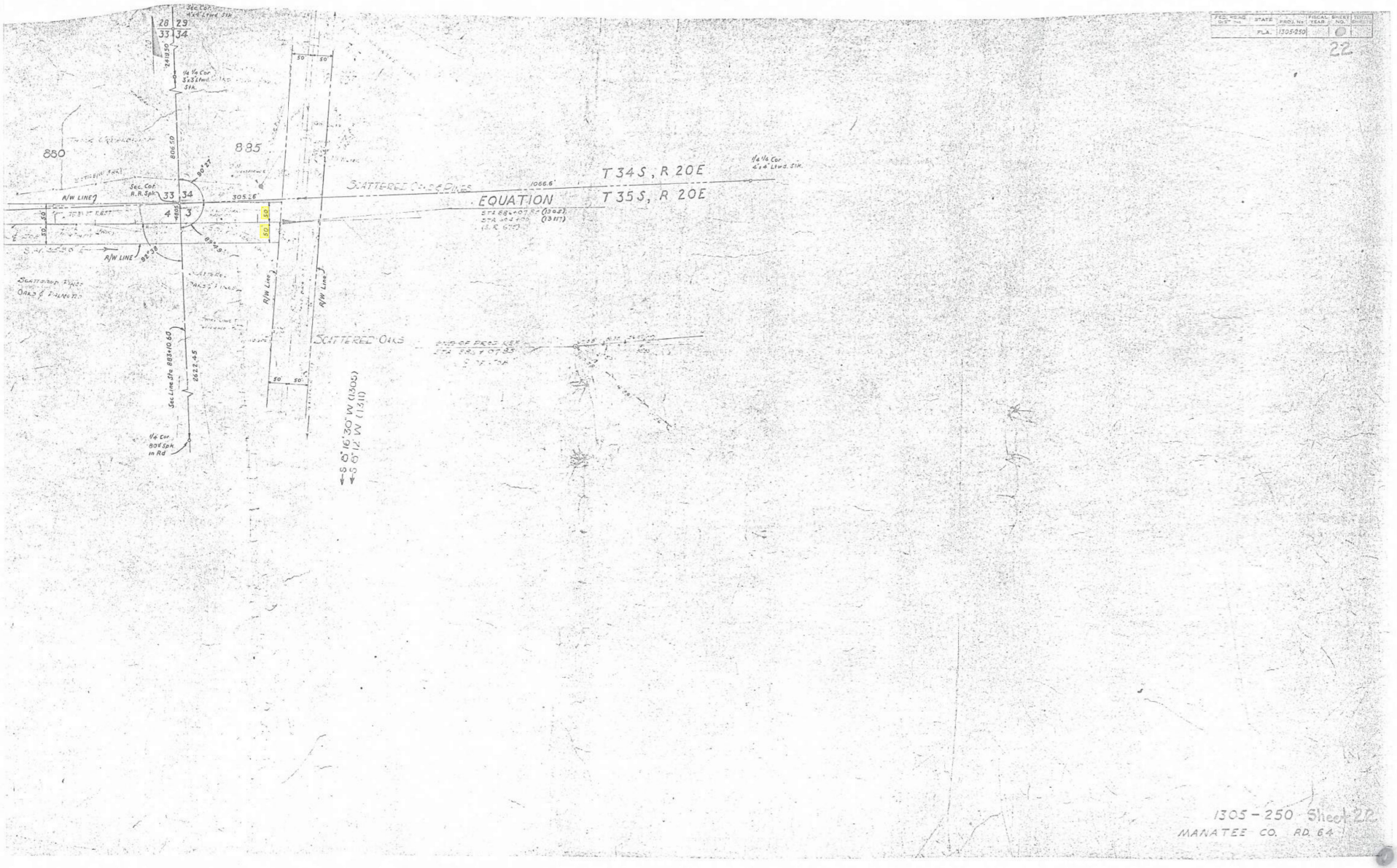

FED. ROAD DIST. NO. 3
STATE FLA.
PROJ. NO. 1305-250(3)
FISCAL YEAR
SHEET NO. 17
TOTAL SHEETS
1"=100'
580
585
590
595
600
605
610
Pine & Palmetto
Pines & Palmetto
Improved Pasture
SECTION 34
T34S, R19E
Sec. 3 1/4 1/4 Cor. 80.4 Spk.
R/W LINE
S 89° 32' E
℄ Survey
5 Str. Brb. Wr. (Fair)
Irregular Size 0'-8" A. Pines & S. of Fence
Avg. 6' Belt, 15' Top Field Ditch (Shallow)
Cleared Field
SECTION 3, T35S, R19E
Pasture
698.80
10 Acre Cor. 2"ø Stk.
S.E. Cor. N.W. 1/4 N.W. 1/4 1"x3' Stk.
T34S, R19E
615
620
625
630
635
640
Improved Pasture
Thick Oaks
Scattered Pines
Cultivated Field
1/4 Cor. 4x4 Ltwd Stk.
Sec. Cor. 20" Spk. 0.05 N & E
Sec. Cor. 80" Spk. ons.
34
35
S 89° 31' E
℄ SURVEY Not on TWP. Line Exactly
Pasture
T35S, R19E
W.W. Area
Bayhead
1305 - 250
MANATEE CO. RD. 64
Sheet 17
INDEXED

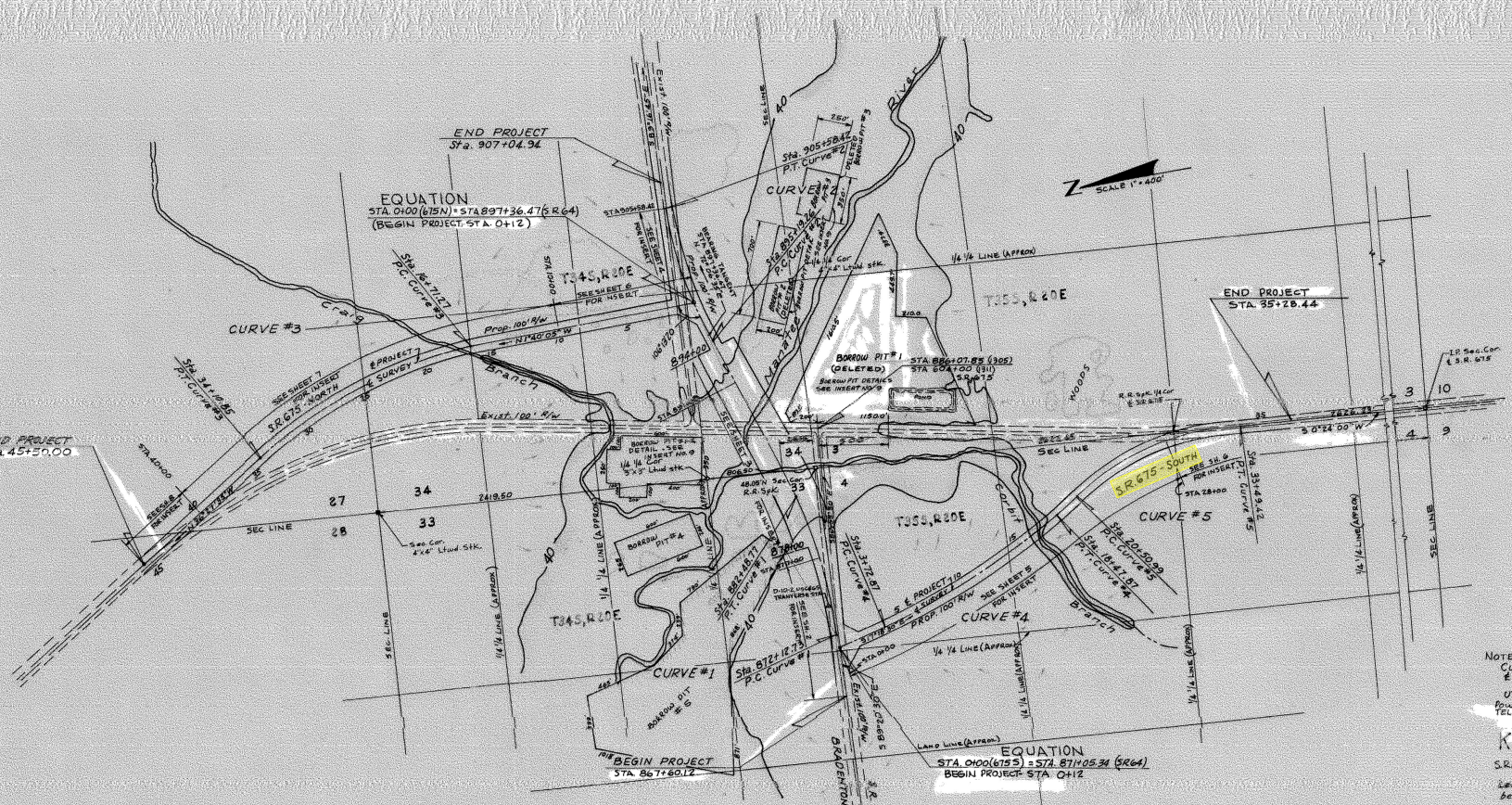

610
615
650
655
660
665
670
Cultivated Field
Improved Pasture
Pines & Palmetto
S 89°31'E
R/W LINE
T 34 S, R 19 E
T 35 S, R 19 E
AVG 150 FEET
1/4 1/8 Cor. 10.5 FtN 0.39 W
SURVEY not on TWP Line Exactly
R/W DONATION PER INSTR # 202541100922
R/W DONATION PER INSTR # 202541100929
R/W DONATION PER INSTR # 202541100921
ADD PARCEL 800 PERPETUAL EASEMENT PER INSTR # 202041119188
505
506
507
508
509
800
PINE & PALMETTO
W.W.A. FLAG POND
675
680
685
690
695
700
35
36
1
2
11
12
3 STR R/W FAIR COND.
1" = 100'
1305-250
MANATEE CO. RD. 64
Sheet 18


FED. ROAD DIST. No.
STATE
FLA.
PROJ. No.
305-250
FISCAL YEAR
SHEET No.
TOTAL SHEETS
9
pine and palmetto
700
705
710
715
720
725
730
735
740
745
750
755
760
T34S, R19E
T34S, R20E
T35S, R19E
T35S, R20E
℄ OF JOB
R/W LINE
3-Str. Barb Wire, Fair Cond.
Exist. 15' R.R.S.T.
S 89°22'30" E
Old Fence Cor.
Sec. Cor. 806 Sqft. on ℄
Sec. Cor. P.I. Road on ℄
S 89°22'30" E
1/4 Cor. 4'x4' Lt'wd Stk.
1/4 1/4 Cor. 4'x4' Lt'wd Stk.
RGE. Line Sta. 729+39.18
1320.28
THE ARMITAGE TRACT
A Subdivision in Sections 31 & 32, T-34S, R20E, and Sections 4, 5 & 6, T-35S, R20E.
Filed June 30, 1914, P.B. 1, P.316, Manatee Co. Records.
Northerly found on this line
1/4 Sec. Line Sta. 750+08.63
661.15' (P)
1322.3' (P)
664.6' (P)
669.95' (P)
1337.03' (P)
1-Span Conc. Bridge
Wash Out
Ditch
Top of Bank
Toe of Slope
ACQUIRED PER OR BOOK 2532, PG 871
501
T35S, R20E
Set P.R.M. Ref. Rec.
Found P.R.M. Ref. Rec.
4"x4" Conc. Mon.
Point Sta. 744+21.41
℄ OF JOB
38
37
1305-250
MANATEE CO. RD. 64
Sheet 19
ADD PARCEL 501
REVISION
K. CROFT
BY
10-15-2008
DATE


THE ARMITAGE TRACT
A Subdivision in Sec. 31 & 32, T 34 S, R 20 E & Sec 4, 5 & 6, T 35 S, R 20 E
Filed June 30, 1914, P.B.1, P 316, Manatee Co. Records
FED. ROAD DIST. NO.
STATE
PROJECT NO.
FISCAL YEAR
SHEET NO.
TOTAL SHEETS
FLA. 1305-250
20
T34S, R20E
T35S, R20E
E OF JOB
E SURVEY on TWP Line
R/W LINE
Pine and Palmetto
Flatwoods
SECTION
PINES
1305-250
MANATEE CO. RD 64
Sheet 20


FED. ROAD DIST. No.
STATE
PROJ. No.
FISCAL YEAR
SHEET NO.
TOTAL SHEETS
FLA.
1305-250
21
Scattered Oaks & Pines & Palmetto
S 89°30'30"E
T 34 S, R 20 E
T 35 S, R 20 E
SECTION 33, T 34 S, R 20 E
SECTION 4, T 35 S, R 20 E
S 89°14'30" E
Internal Improvement Fund (IIF) agency responsible for overseeing improvements. This most likely means the strip of land used for the highway was originally granted, dedicated and reserve for state-owned lands controlled by IIF
I.I.F.
I.I.F. Res.
R/W LINE
TWP. LINE
Sec. Cor. Fd.
Sec. Cor. 4 ± 4" Lfwd. Stk.
1/4 Cor. 5 ± 5" Lfwd. Stk.
1/4 1/4 Cor. (Approx.)
1/4 1/4 Line (Approx.)
20 Acre Cor. (Approx.)
DEDICATION
APPROX. 1/4 SEC. LINE
SEC. LINE
820
825
830
835
840
845
850
860
865
870
875
880
1305-250 Sheet 21
MANATEE CO. RD. 64


FED. ROAD DIV. No.
STATE
PROJ. No.
FISCAL YEAR
SHEET NO.
TOTAL SHEETS
FLA. 1305-250
10
22
T 34 S, R 20 E
T 35 S, R 20 E
EQUATION
SCATTERED OAKS
SCATTERED OAKS & PINES
1066.6'
305.26'
806.50'
R/W LINE
R/W Line
Sec. Cor. R.R. Spk.
1/4 Cor. 3.3' Iron Pipe Stk.
1/4 Cor. 4.4' Iron Stk.
Sec. Line Sta. 883+10.60
2622.45
1/4 Cor. 806 Spk in Rd
S 0° 16' 30" W (1305)
S 0° 12' 30" W (1311)
880
885
28
29
33
34
4
3
50'
80'
90° 00'
88° 58'
1305 - 250 Sheet 22
MANATEE CO. RD. 64



NOTE:
Curve data along ℄ survey or ℄ Project

UTILITY OWNERS

Power	PEACE RIVER ELEC. COOP. INC.
TELEPHONE	GENERAL TELEPHONE CO.

KEY MAP

S.R. 64 & SR. 615 (RELOCATION)

Land at the 40' contour shall be flow. will be within the Manatee County Reservoir.

REFERENCE BEARING — S 89° 20' 30" E.
ALL BEARINGS HAVE BEEN CALCULATED BY USING ℄ OF SURVEY BEARING BETWEEN STA 859+21.33 & STA 871+66.62 AS SHOWN ON SHEET NO. 22 SECTION NO. 1905-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-7-54.
THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM PLANS OBSERVATIONS MADE AT KI. STA. 361+35.35, MAY 11, 1953 AT 9:21'55" E.S.T. ON SRO R/W MAP 1305-250.

STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

STATE ROAD No. MANATEE COUNTY

SECTION 13050-250℄ SHEET 1 OF

NO.	DATE	DESCRIPTION	BY	CHK.
		REVISIONS		

RUSSELL & AXON · INC. ·
CONSULTING ENGINEERS
DAYTONA BEACH, FLA. ST. LOUIS, MO.

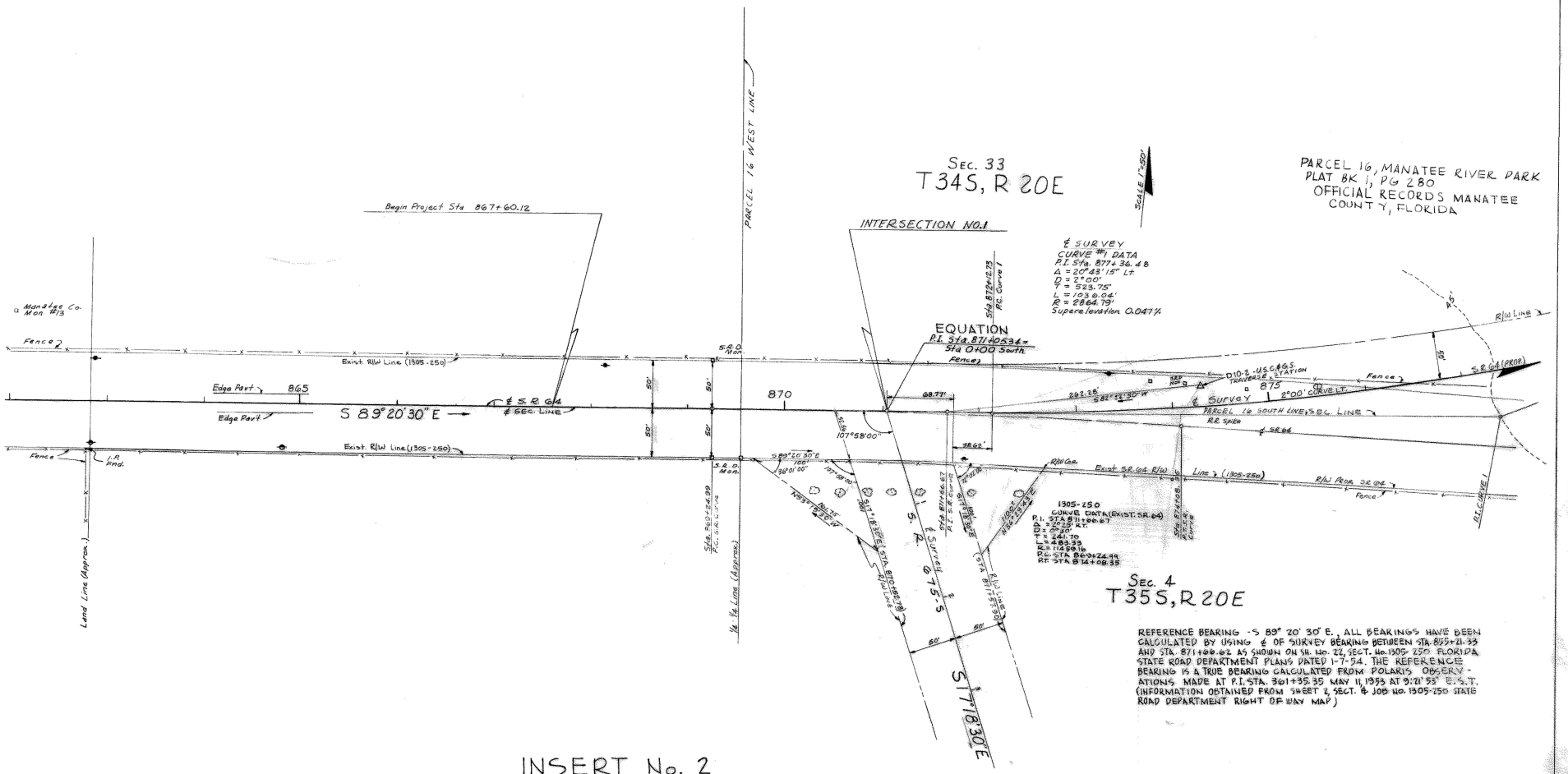
HIGHWAY RELOCATIONS

RIGHT OF WAY MAP

MANATEE COUNTY FLORIDA

DESIGNED BY	FILE NO.	SEAL	
DRAWN BY	6353-3		
CHECKED BY	SHEET NO.		
APPROVED			
DATE	SCALE		
Sept. 1963	1" = 400'		

STATE OF FLORIDA
No. 13085
REGISTERED ENGINEER
J. Randall Russell



REFERENCE BEARING - S 89° 20' 30" E. ALL BEARINGS HAVE BEEN CALCULATED BY USING ℄ OF SURVEY BEARING BETWEEN STA. 865+21.33 AND STA. 871+00.62 AS SHOWN ON SH. No. 22, SECT. No. 1305-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-7-54. THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM POLARIS OBSERVATIONS MADE AT P.I. STA. 301+35.35 MAY 11, 1953 AT 9:21'53" E.S.T. (INFORMATION OBTAINED FROM SHEET 2, SECT. & JOB No. 1305-250 STATE ROAD DEPARTMENT RIGHT OF WAY MAP)

INSERT No. 2

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS

RIGHT OF WAY MAP

MANATEE COUNTY FLORIDA

STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

STATE ROAD NO. MANATEE COUNTY

	BY	DATE
DRAWN		
TRACED		
CHECKED		
COMPARED		
NUMBER		

APPROVED BY: H. M. Johnson
ENGINEER OF HIGHWAY RELOCATIONS
5-4-66

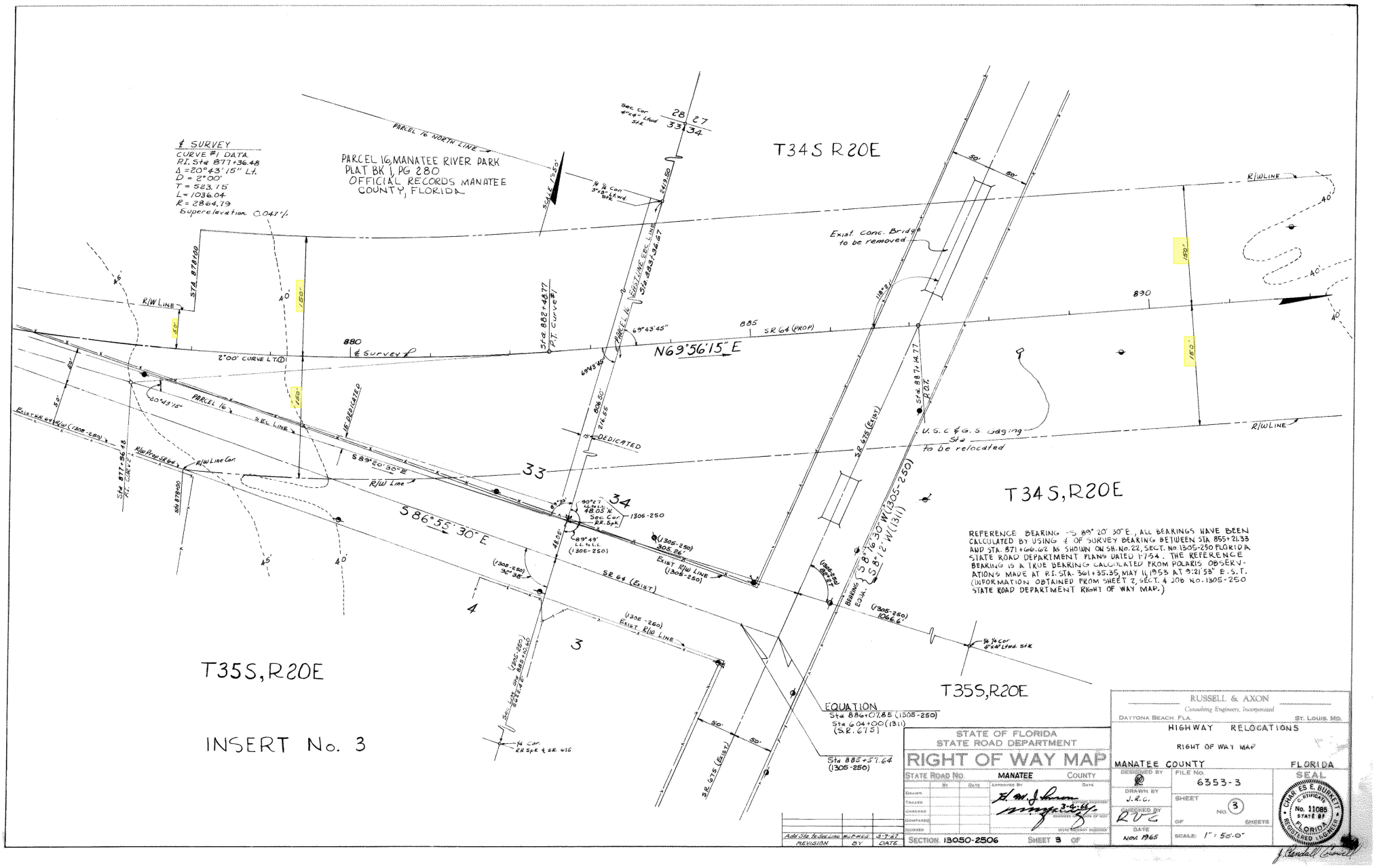
DESIGNED BY: JA
DRAWN BY: J.R.C.
CHECKED BY: RVE
DATE: Nov. 1965

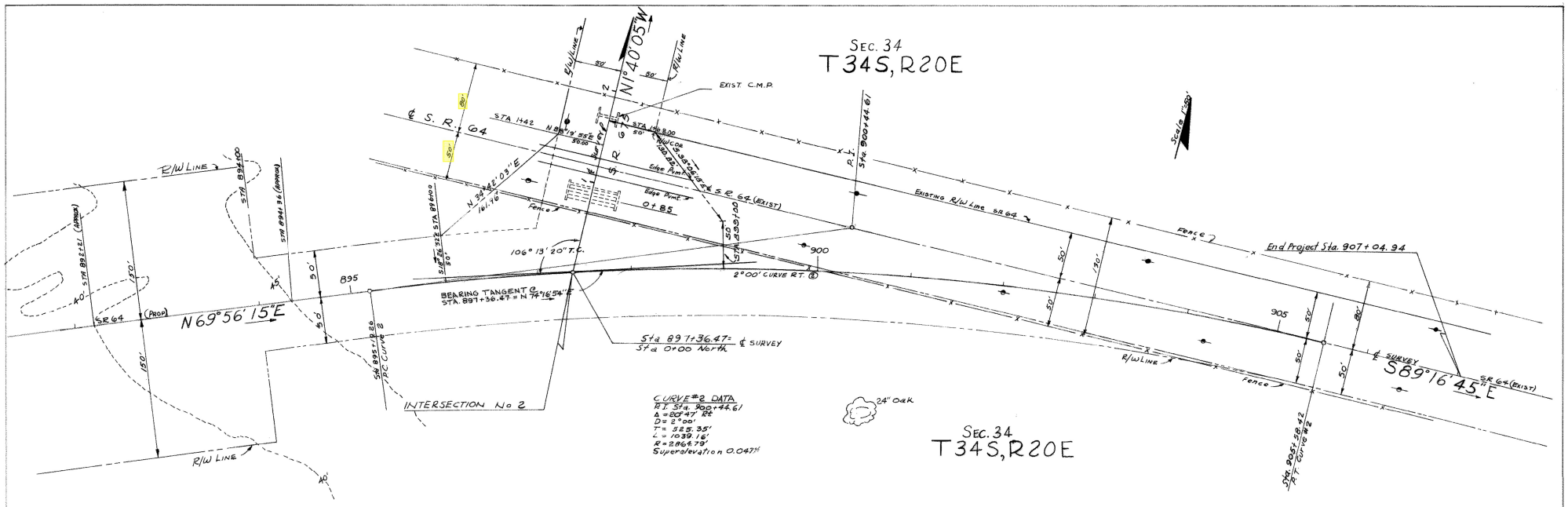
FILE NO. 6353-3
SHEET NO. 2 OF SHEETS
SCALE: 1"=50'-0"

SEAL: JAMES E. GUIRE, REGISTERED ENGINEER, No. 11085, STATE OF FLORIDA

SECTION 13050-2506 SHEET 2 OF

J. Randall Maguire


℄ SURVEY
CURVE #1 DATA
P.I. Sta 877+36.48
Δ = 20°43'15" Lt.
D = 2°00'
T = 523.15
L = 1036.04
R = 2864.79
Superelevation 0.047'/'
PARCEL 16, MANATEE RIVER PARK
PLAT BK 1, PG 280
OFFICIAL RECORDS MANATEE
COUNTY, FLORIDA
PARCEL 16 NORTH LINE
T34S R20E
Exist. Conc. Bridge to be removed
R/W LINE
℄ SURVEY
2°00' CURVE LT.
PARCEL 16
S.E'LY LINE
15' DEDICATED
S89°20'30"E
R/W Line
586°55'30"E
N69°56'15"E
SR 64 (PROP)
SR 64 (EXIST)
SR 675 (EXIST)
U.S.C & G.S. Tidal Sta to be relocated
T34S, R20E
T35S, R20E
INSERT No. 3
EQUATION
Sta 884+07.85 (1305-250)
Sta 604+00 (131)
(S.R. 675)
Sta 885+57.64 (1305-250)
REFERENCE BEARING IS S 89° 20' 30" E., ALL BEARINGS HAVE BEEN CALCULATED BY USING ℄ OF SURVEY BEARING BETWEEN STA 855+21.33 AND STA. 871+66.62 AS SHOWN ON SH. No. 22, SECT. No. 1305-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-1-54. THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM POLARIS OBSERVATIONS MADE AT R.L. STA. 361+35.35 MAY 14, 1953 AT 9:21'53" E.S.T. (INFORMATION OBTAINED FROM SHEET 2, SECT. 4 JOB No. 1305-250 STATE ROAD DEPARTMENT RIGHT OF WAY MAP.)
STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP
STATE ROAD No. MANATEE COUNTY
SECTION 13050-2506 SHEET 3 OF
RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.
HIGHWAY RELOCATIONS
RIGHT OF WAY MAP
MANATEE COUNTY FLORIDA
DESIGNED BY
DRAWN BY J.R.C.
CHECKED BY R.V.C.
DATE NOV. 1965
FILE No. 6353-3
SHEET No. 3 OF SHEETS
SCALE 1" = 50'-0"
SEAL
CHARLES E. BURKETT
No. 11085
STATE OF FLORIDA
REGISTERED ENGINEER



INSERT No. 4

REFERENCE BEARING - S 89°-20'-30" E, ALL BEARINGS HAVE BEEN CALCULATED BY USING ℄ OF SURVEY BEARING BETWEEN STA. 855+21.33 AND STA. 871+66.62 AS SHOWN ON SH. No. 22, SECT. NO. 1305-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-7-54. THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM POLARIS OBSERVATIONS MADE AT P.I. STA. 361+35.35, MAY 11, 1955 AT 9:21' 55" E.S.T. (INFORMATION OBTAINED FROM SHEET 2, SECT. & JOB NO. 1305-250 STATE ROAD DEPARTMENT RIGHT OF WAY MAP.)

Add'l R/W REVISION	W.P.A.L.S. BY	3-6-67 DATE

STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP

STATE ROAD NO. — MANATEE COUNTY

	BY	DATE
DRAWN		
TRACED		
CHECKED		
COMPARED		
INDEXED		

APPROVED BY: B. W. Johnson — DISTRICT ENGINEER
APPROVED BY: [signature] 3-4-66 — DIRECTOR OF RIGHTS OF WAY
CHIEF HIGHWAY ENGINEER

SECTION 13050-2506 SHEET 4 OF

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS

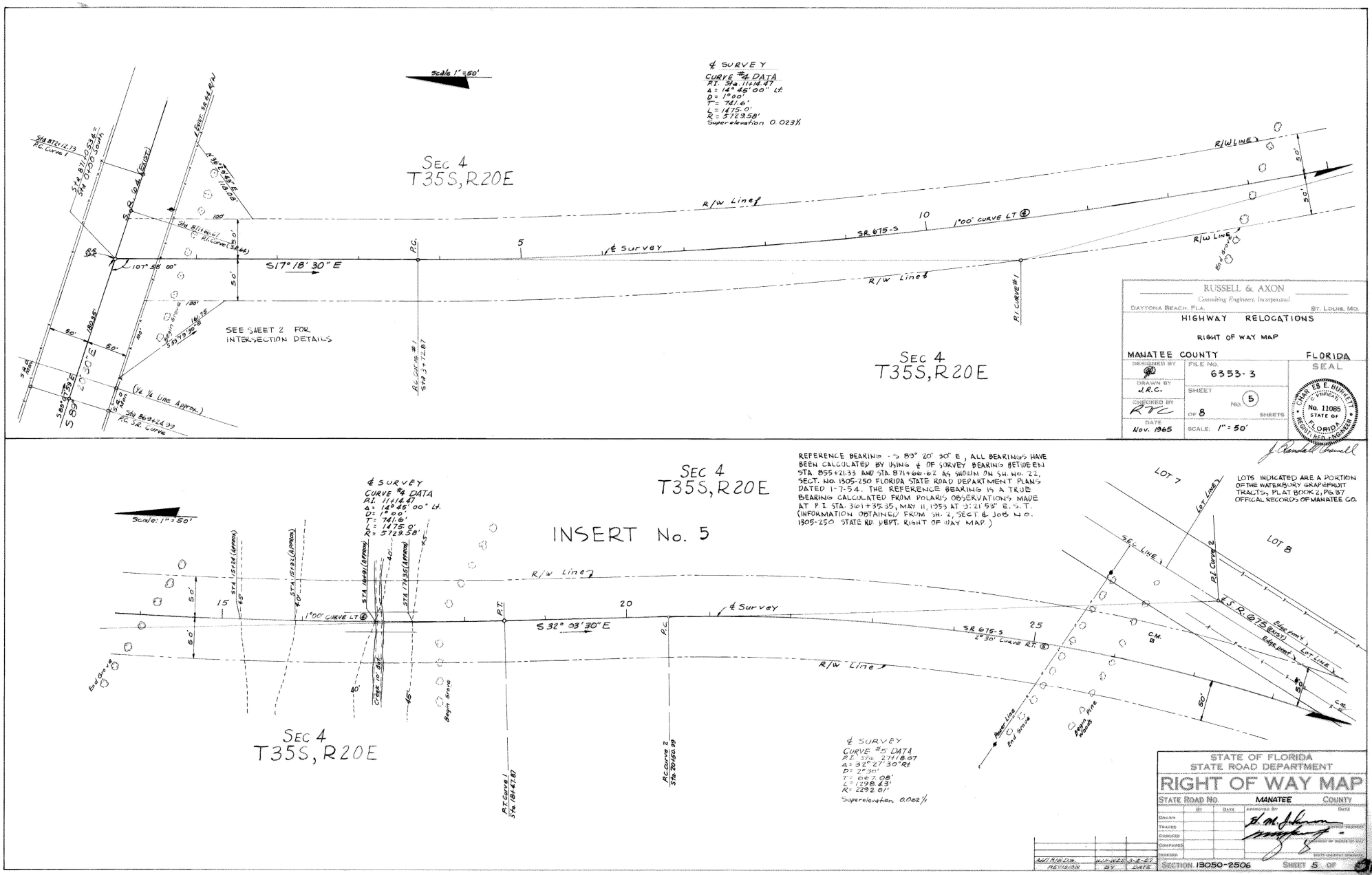
RIGHT OF WAY MAP

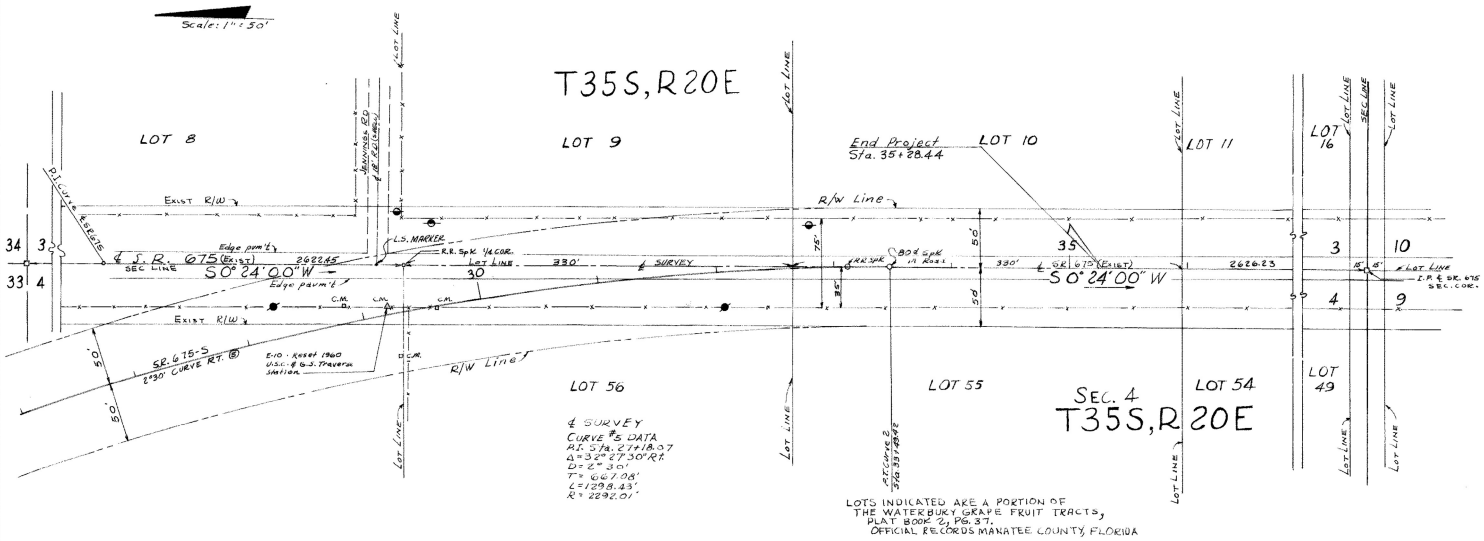
MANATEE COUNTY FLORIDA

DESIGNED BY	FILE NO. 6353-3
DRAWN BY J.R.S.	SHEET No. 4
CHECKED BY R.J.C.	OF SHEETS
DATE NOV. 1965	SCALE: 1"=50'-0"

SEAL
CHARLES E. BURNETT
CHIEF ENGINEER
No. 11085
STATE OF FLORIDA
REGISTERED ENGINEER

J. Randall Council


Scale 1"=50'
℄ SURVEY
CURVE #4 DATA
P.I. Sta. 11+14.47
Δ = 14° 45' 00" Lt.
D = 1°00'
T = 741.6'
L = 1475.0'
R = 5729.58'
Superelevation 0.023 ft
SEC 4
T35S, R20E
Sta 871+10.34 = Sta 0+00 South
P.C. Curve 1
Sta 871+12.19
Basic S.R. 64 (EXIST.)
N 18° 29' 45" E
119.08'
S.R. 64
Sta Bl+11.79
P.I. Curve (S.R. 64)
107° 58' 00"
S17° 18' 30" E
P.C.
5
℄ Survey
10
1°00' CURVE LT ④
SR 675-3
R/W Line
R/W LINE
End Grade
50'
50'
SEE SHEET 2 FOR INTERSECTION DETAILS
100'
180'
180.35'
50'
50'
16.75'
S 89° 39' 30" W
Sta Bl+24.93
P.C. S.R. Curve
(¼ ¼ Line Approx.)
P.I. Curve #1
Sta 3+72.87
P.I. CURVE #1
RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.
HIGHWAY RELOCATIONS
RIGHT OF WAY MAP
MANATEE COUNTY FLORIDA
DESIGNED BY
DRAWN BY J.R.C.
CHECKED BY R.T.C.
DATE Nov. 1965
FILE NO. 6353-3
SHEET NO. 5 OF 8 SHEETS
SCALE 1" = 50'
SEAL
No. 11085 STATE OF FLORIDA REGISTERED ENGINEER
J. Randall Connell
REFERENCE BEARING = S 89° 20' 30" E, ALL BEARINGS HAVE BEEN CALCULATED BY USING ℄ OF SURVEY BEARING BETWEEN STA. 855+21.33 AND STA. 871+66.62 AS SHOWN ON SH. NO. 22, SECT. NO. 1505-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-7-54. THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM POLARIS OBSERVATIONS MADE AT P.I. STA. 301+35.35, MAY 11, 1953 AT 3:21'53" E.S.T. (INFORMATION OBTAINED FROM SH. 2, SECT. & JOB NO. 1305-250 STATE RD. DEPT. RIGHT OF WAY MAP.)
SEC 4
T35S, R20E
INSERT No. 5
℄ SURVEY
CURVE #4 DATA
P.I. 11+14.47
Δ = 14° 45' 00" Lt.
D = 1°00'
T = 741.6'
L = 1475.0'
R = 5729.58'
Scale: 1"=50'
STA. 15+92 (APPROX.)
STA. 16+32 (APPROX.)
STA. 16+69 (APPROX.)
STA. 17+35 (APPROX.)
40'
45'
15
20
25
50'
50'
1°00' CURVE LT ④
R/W Line
℄ Survey
P.I.
P.C.
S 32° 03' 30" E
SR 675-5
2°30' Curve Rt. ⑤
End Grade
Bldg Grace
Bldg Grace
Bldg Grace
Bldg Grace
Edge Pvmt.
Edge Pvmt.
Lot Line
Lot Line
Sec Line
LOT 7
LOT 8
P.I. Curve 2
T.J. R. 675 (EXIST.)
C.M. B
C.M.
50'
50'
LOTS INDICATED ARE A PORTION OF THE WATERBURY GRAPEFRUIT TRACTS, PLAT BOOK 2, PG. 37 OFFICAL RECORDS OF MANATEE CO.
P.I. Curve 1 Sta. 18+47.87
P.C. Curve 3 Sta. 20+65.89
℄ SURVEY
CURVE #5 DATA
P.I. Sta. 27+18.07
Δ = 32° 27' 30" Rt
D = 2° 30'
T = 667.08'
L = 1298.23'
R = 2292.01'
Superelevation 0.062 ft
SEC 4
T35S, R20E
STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP
STATE ROAD NO. MANATEE COUNTY
DRAWN
TRACED
CHECKED
COMPARED
INDEXED
APPROVED BY
DATE
H. M. Johnson
DISTRICT ENGINEER
DIRECTOR OF DESIGN OR ROW
STATE HIGHWAY ENGINEER
Add R/W Dim.
REVISION
BY
DATE
W.L.P.
3-2-67
SECTION 13050-2506
SHEET 5 OF



INSERT No. 6

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS

RIGHT OF WAY MAP

MANATEE COUNTY FLORIDA

STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

STATE ROAD NO. MANATEE COUNTY

	BY	DATE
DRAWN		
TRACED		
CHECKED		
COMPARED		
INDEXED		

APPROVED BY — DISTRICT ENGINEER — DATE 3-4-66
STATE HIGHWAY ENGINEER

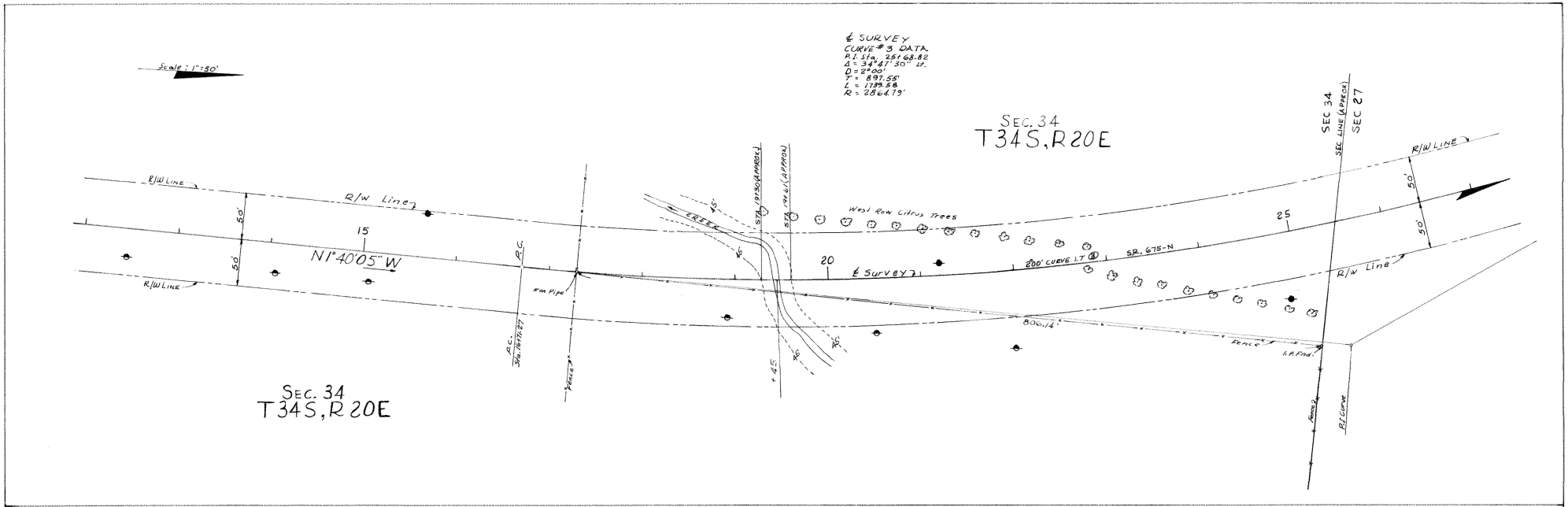
DESIGNED BY —
DRAWN BY J.R.C.
CHECKED BY
DATE NOV. 1965

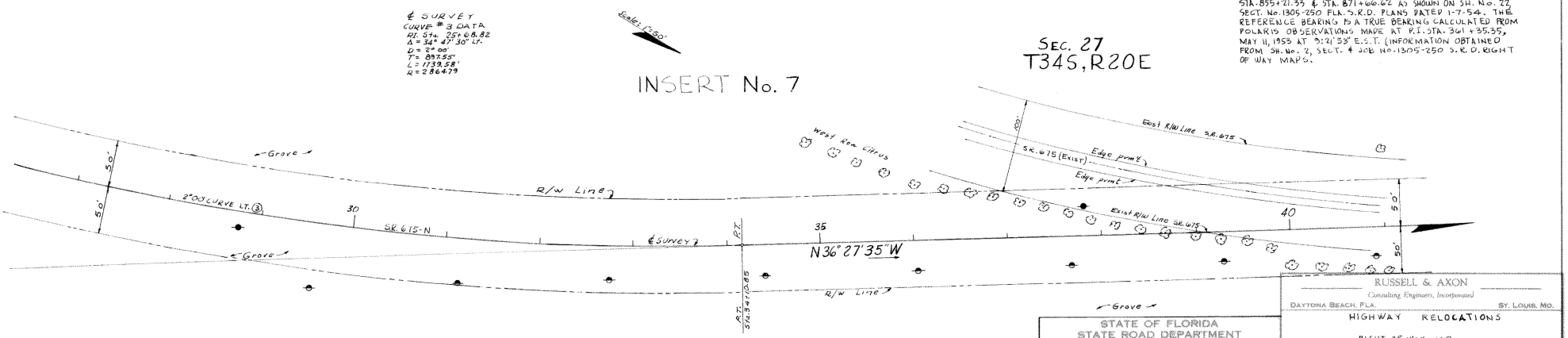
FILE NO. 6353-3
SHEET NO. 6
OF SHEETS
SCALE: 1" = 50'-0"

SEAL
CHARLES E. BURKETT
REGISTERED ENGINEER
No. 11085
STATE OF FLORIDA

SECTION 13050-2506 SHEET 6 OF

J. Randall Russell





STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

STATE ROAD NO. | MANATEE COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN			H. M. Johnson	3-2-66
TRACED			DISTRICT ENGINEER	
CHECKED				
COMPARED				
RECORDED			STATE RIGHT OF WAY ENGINEER	

SECTION 13050-2506 SHEET 7 OF

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS

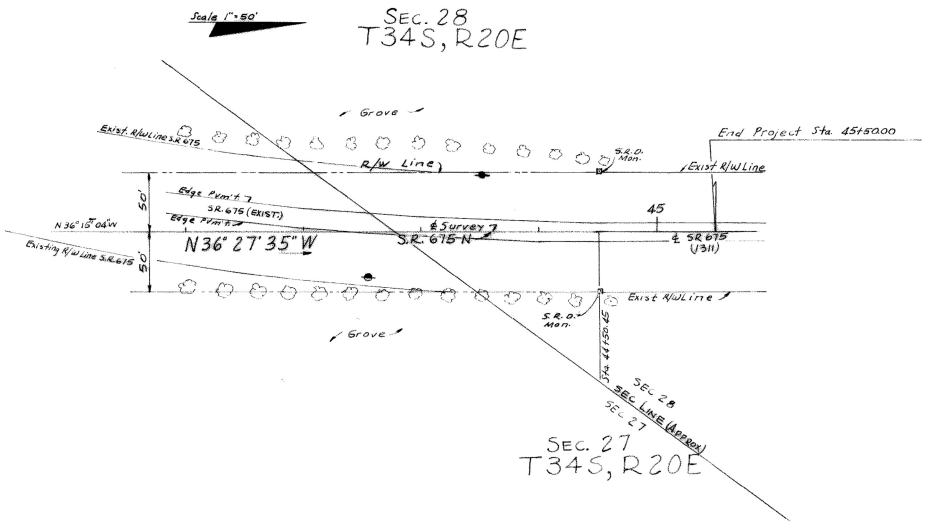
RIGHT OF WAY MAP

MANATEE COUNTY FLORIDA

DESIGNED BY	FILE NO. 6353-3
DRAWN BY J.R.C.	SHEET NO. 7
CHECKED BY R.V.C.	OF SHEETS
DATE Nov. 1965	SCALE: 1"=50'-0"

SEAL
CHARLES E. S. BURWELL
No. 11085
STATE OF FLORIDA
REGISTERED ENGINEER

J. Randall Burwell



INSERT No. 8

STATE OF FLORIDA
STATE ROAD DEPARTMENT

RIGHT OF WAY MAP

STATE ROAD No. | MANATEE COUNTY

	BY	DATE
DRAWN		
TRACED		
CHECKED		
COMPARED		
ENGINEER		

APPROVED BY: [signature] DISTRICT ENGINEER
DATE: 1-26-66
[signature] STATE HIGHWAY ENGINEER

SECTION 13050-2506 SHEET 8 OF

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS

RIGHT OF WAY MAP

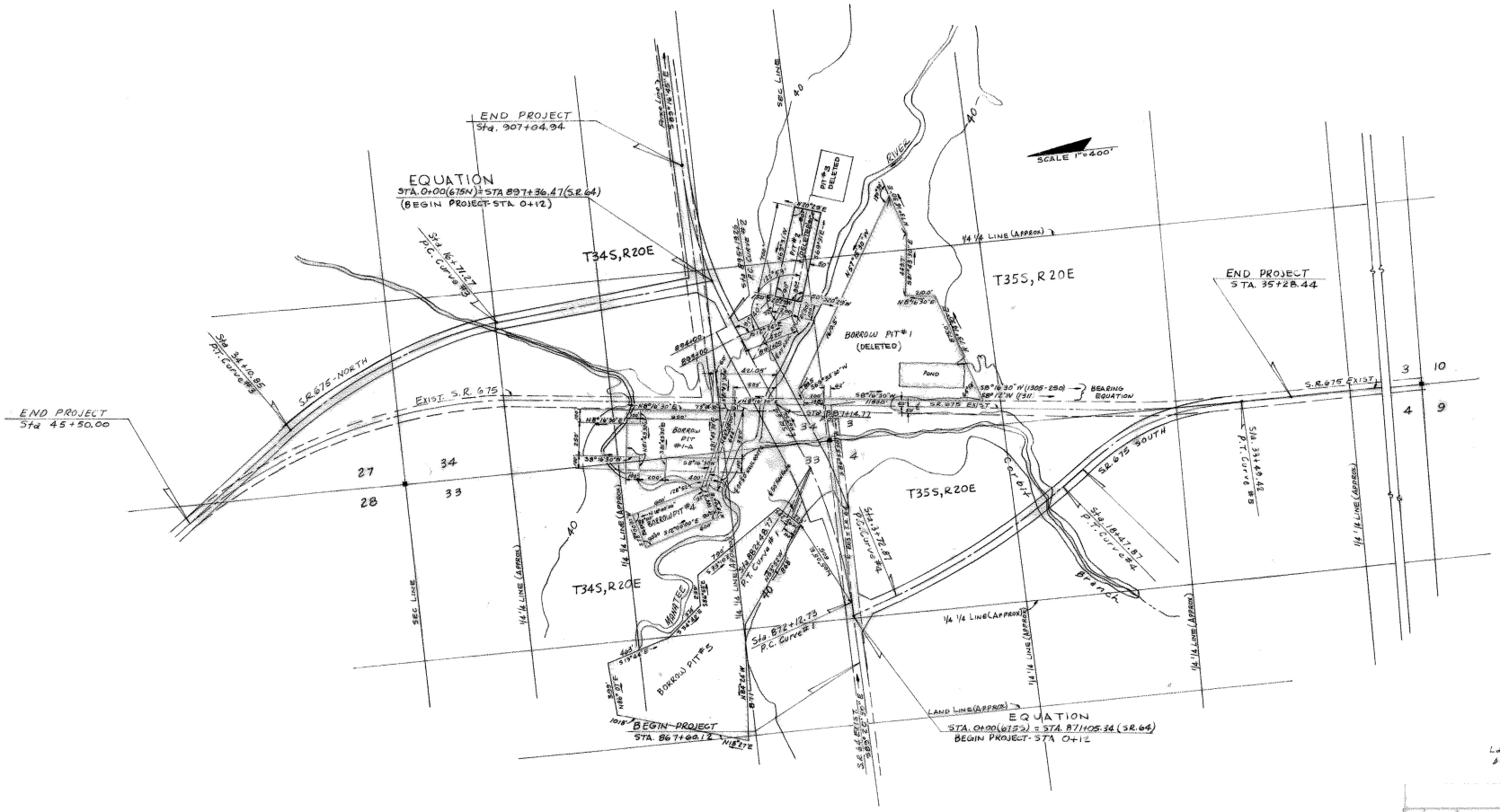
MANATEE COUNTY FLORIDA

DESIGNED BY: RP
DRAWN BY: J.R.C.
CHECKED BY: RVC
DATE: Nov. 1965

FILE NO. 6353-3
SHEET NO. 8 OF SHEETS
SCALE: 1"=50'-0"

SEAL
CHARLES E. BUSH
CIVIL ENGINEER
No. 11085
STATE OF FLORIDA
REGISTERED ENGINEER

[signature]



Land at the 40' contour and below will be within the Manatee County Reservoir

REFERENCE BEARING - S89°20'30"E
ALL BEARINGS HAVE BEEN CALCULATED BY USING ϕ OF SURVEY BEARING BETWEEN STA 855+21.83 & STA 871+68.62 AS SHOWN ON SHEET NO. 22 SECTION NO. 1805-250 FLORIDA STATE ROAD DEPARTMENT PLANS DATED 1-7-54. THE REFERENCE BEARING IS A TRUE BEARING CALCULATED FROM POLARIS OBSERVATION S MADE AT RT. STA. 861+35.35 MAY 11, 1963 AT 9:21'53" E.S.T. ON S.R.R/W MAP 1805-250

INSERT No. 9

STATE OF FLORIDA
STATE ROAD DEPARTMENT
RIGHT OF WAY MAP
STATE ROAD NO. MANATEE COUNTY
SECTION 13050-2506 SHEET 9 OF

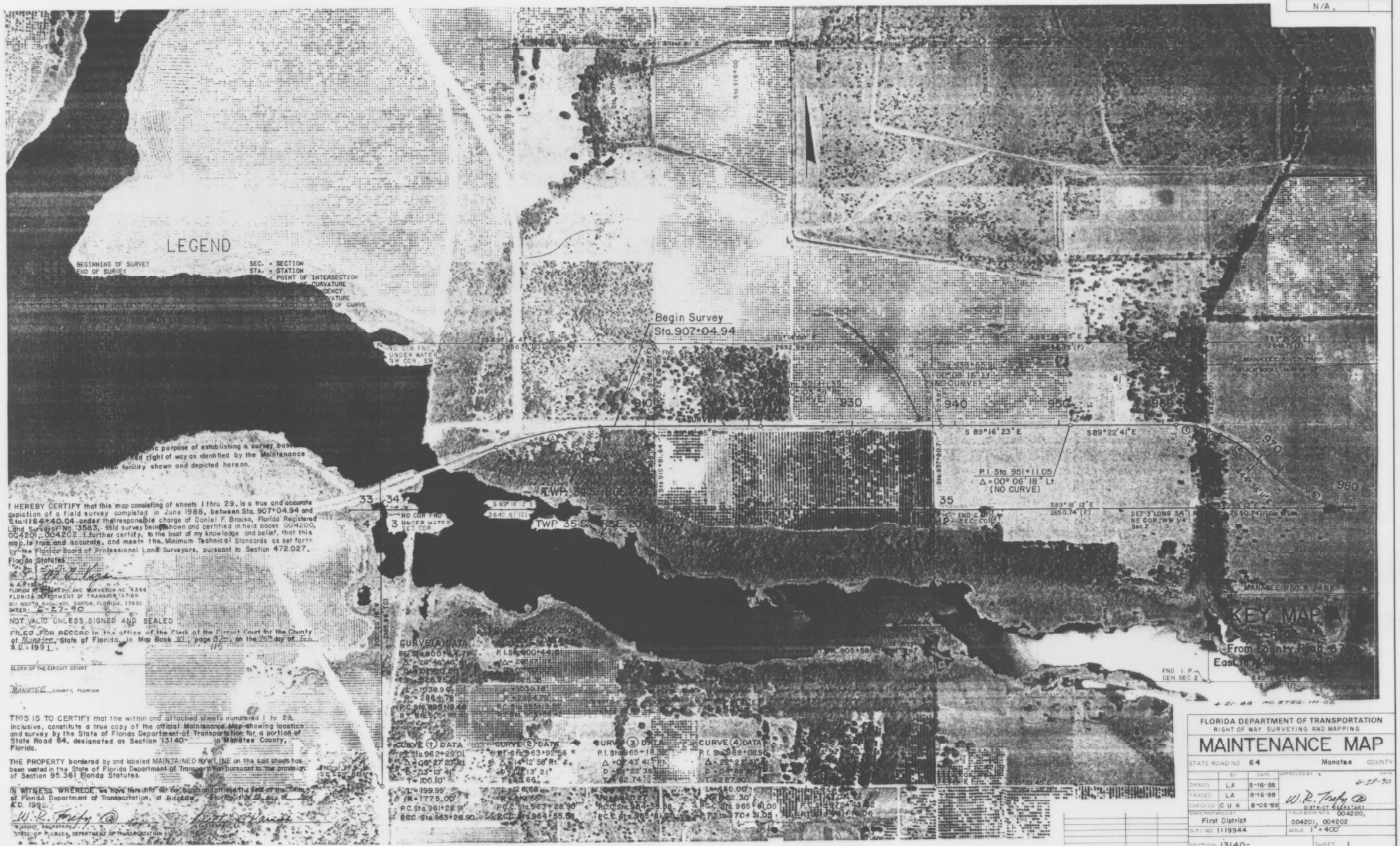
NO.	DATE	DESCRIPTION	BY	CKD.
		REVISIONS		

RUSSELL & AXON
Consulting Engineers, Incorporated
DAYTONA BEACH, FLA. ST. LOUIS, MO.

HIGHWAY RELOCATIONS
BORROW PIT LOCATION
MANATEE COUNTY FLORIDA

DESIGNED BY	FILE NO. 6353-3
DRAWN BY J.R.C.	SHEET No. 9
CHECKED BY JJC	OF SHEETS
DATE Dec. 1965	SCALE 1"=400'

SEAL



I HEREBY CERTIFY that this map consisting of sheets 1 thru 29, is a true and accurate depiction of a field survey completed in June 1988, between Sta. 907+04.94 and Sta. 1184+40.04 under the responsible charge of Daniel F. Brooks, Florida Registered Land Surveyor No. 3583, said survey being shown and certified in field books 004200, 004201, 004202. I further certify, to the best of my knowledge and belief, that this map is true and accurate, and meets the Minimum Technical Standards as set forth by the Florida Board of Professional Land Surveyors, pursuant to Section 472.027, Florida Statutes.

M.A. Tipton
FLORIDA REGISTERED LAND SURVEYOR NO. 4366
FLORIDA DEPARTMENT OF TRANSPORTATION
801 NORTH BROADWAY, BARTOW, FLORIDA, 33830
DATED 6-27-90

NOT VALID UNLESS SIGNED AND SEALED

FILED FOR RECORD in the office of the Clerk of the Circuit Court for the County of Manatee, State of Florida, in Map Book 10, page 82, on the 25th day of Feb. A.D. 1991.

CLERK OF THE CIRCUIT COURT

MANATEE COUNTY, FLORIDA

THIS IS TO CERTIFY that the within and attached sheets numbered 1 to 29, inclusive, constitute a true copy of the official Maintenance Map showing location and survey by the State of Florida Department of Transportation for a portion of State Road 64, designated as Section 13140- in Manatee County, Florida.

THE PROPERTY bordered by and labeled MAINTAINED R/W LINE on the said sheets has been vested in the State of Florida Department of Transportation pursuant to the provision of Section 95.361 Florida Statutes.

IN WITNESS WHEREOF, we have hereunto set our hands and affixed the Seal of the State of Florida Department of Transportation, at Bartow this 10th day of May A.D. 1990.

W.R. Trefry
DISTRICT SECRETARY

STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION

F.A. PROJECT NO. N/A

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE
DRAWN	LA	8-16-88
TRACED	LA	8-16-88
CHECKED	C U K	8-08-89

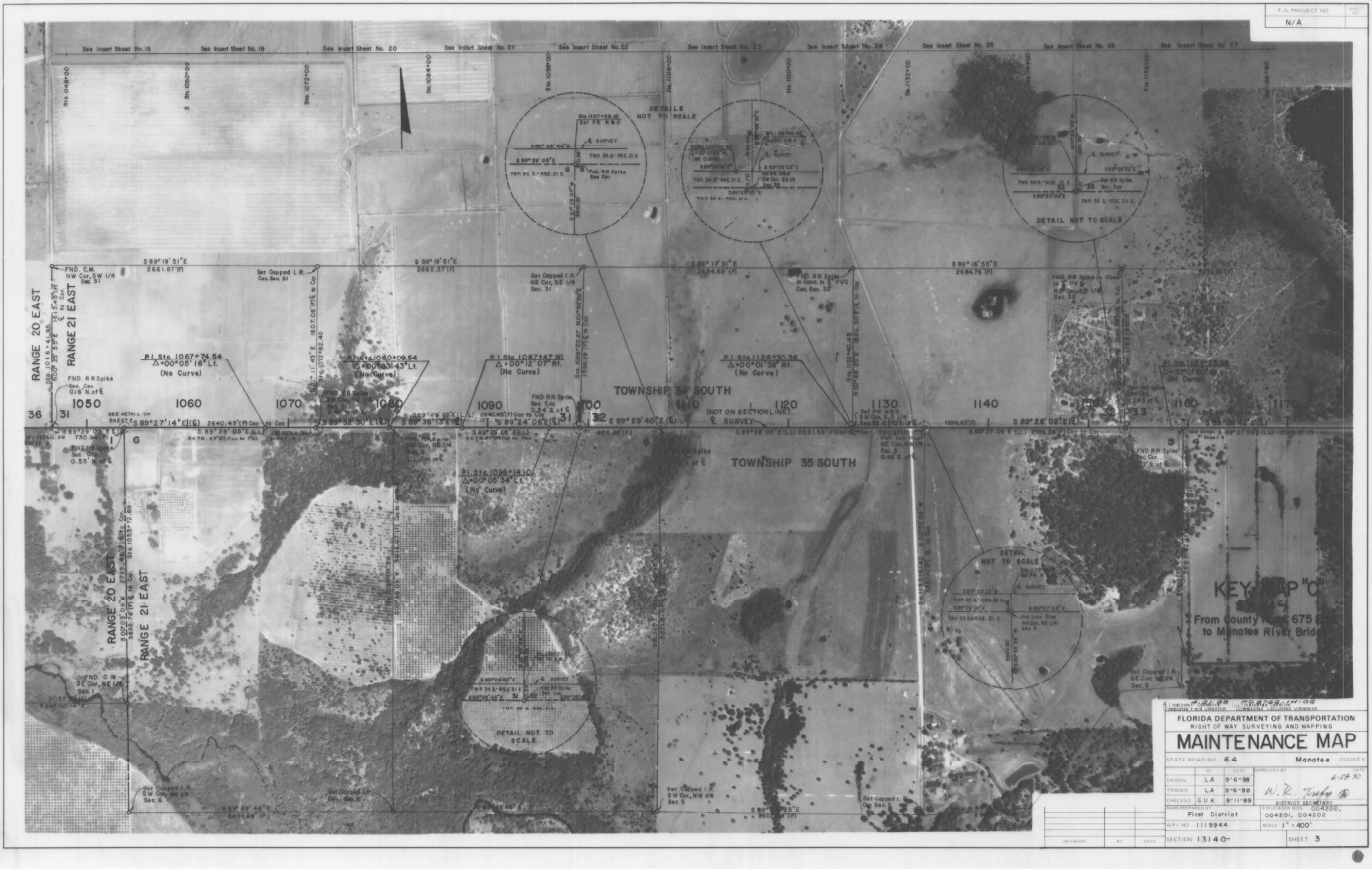
APPROVED BY: W.R. Trefry DISTRICT SECRETARY — DATE 6-28-90

SURVEY PREPARED BY: First District
FIELD BOOK NOS. 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 400'
SECTION 13140-
SHEET 1

REVISION	BY	DATE

13140-MA"


See Insert Sheet No. 10
See Insert Sheet No. 11
See Insert Sheet No. 12
See Insert Sheet No. 13
See Insert Sheet No. 14
See Insert Sheet No. 15
See Insert Sheet No. 16
See Insert Sheet No. 17
See Insert Sheet No. 18
See Insert Sheet No. 19
DETAILS NOT TO SCALE
MANATEE RIVER
PLAT BOOK 1
RANGE 20 EAST
RANGE 21 EAST
TOWNSHIP 35 SOUTH
PARK
KEY MAP B
S.R. 64
From County Road 675
East
950
960
970
980
990
1000
1010
1020
1030
1040
1050
1060
1070
P.I. Sta. 951+11.05
Δ=00°06'18" Lt
(No Curve)
P.I. Sta. 993+29.14
Δ=00°10'14" Lt.
(No Curve)
P.I. Sta. 1012+04.41
Δ=00°20'30" Lt.
S 89°22'41" E
S 89°18'12" E
2650.74' (F)
S 89°26'05" E
2648.75' (F)
S 89°20'20" E
2671.05' (F)
S 89°19'51" E
2681.87' (F)
S 89°22'01" E (℄)
S 89°32'15" E (LL)
S 89°25'08" E (LL)
S 89°27'14" E (LL)
S 89°29'05" E (LL)
2640.48' (F) Obs to Cor.
Set Capped I.R. Cen. Sec. 35
Set Capped I.R. NE Cor. SE 1/4 Sec. 35
Set Capped I.R. Cen. Sec. 1
FND CM NE Cor. SE 1/4 Sec. 36
Set Capped I.R. Cen. Sec. 31
3" Long Nail R.R. W Cor. NE 1/4 Sec. 2
See Detail on Insert Sheet No. 12
Fnd. I.P. Cen. Sec. 2
Fnd. I.P. Cen. Sec. 1
Fnd. I.P. SW Cor. SW 1/4 Sec. 1
Fnd. I.P. Cen. Sec. 6
Fnd. I.P. Cen. Sec. 5
Fnd. I.P. Cen. Sec. 36
Fnd. I.P. Cen. Sec. 31
Fnd. I.P. Cen. Sec. 32
Fnd. I.P. Cen. Sec. 33
Fnd. I.P. Cen. Sec. 34
Fnd. I.P. Cen. Sec. 35
Fnd. I.P. Cen. Sec. 4
Fnd. I.P. Cen. Sec. 3
Fnd. I.P. Cen. Sec. 10
Fnd. I.P. Cen. Sec. 9
Fnd. I.P. Cen. Sec. 8
Fnd. I.P. Cen. Sec. 7
Fnd. I.P. Cen. Sec. 12
Fnd. I.P. Cen. Sec. 11
Fnd. I.P. Cen. Sec. 14
Fnd. I.P. Cen. Sec. 13
Fnd. I.P. Cen. Sec. 24
Fnd. I.P. Cen. Sec. 23
Fnd. I.P. Cen. Sec. 26
Fnd. I.P. Cen. Sec. 25
Fnd. I.P. Cen. Sec. 30
Fnd. I.P. Cen. Sec. 29
Fnd. I.P. Cen. Sec. 32
Fnd. I.P. Cen. Sec. 31
Fnd. I.P. Cen. Sec. 34
Fnd. I.P. Cen. Sec. 33
Fnd. I.P. Cen. Sec. 36
Fnd. I.P. Cen. Sec. 35
Fnd. I.P. Cen. Sec. 2
Fnd. I.P. Cen. Sec. 1
Fnd. I.P. Cen. Sec. 6
Fnd. I.P. Cen. Sec. 5
Fnd. I.P. Cen. Sec. 31
Fnd. I.P. Cen. Sec. 32
Fnd. I.P. Cen. Sec. 33
Fnd. I.P. Cen. Sec. 34
Fnd. I.P. Cen. Sec. 35
Fnd. I.P. Cen. Sec. 36



F.A. PROJECT NO. N/A

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	LA	9-6-88		6-28-90
TRACED	LA	9-6-88	W.R. Tuby Jr.	
CHECKED	C.U.K.	8-11-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District
FIELD BOOK NOS. 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 400'
SECTION 13140-
SHEET 3

REVISION | BY | DATE



F.A. PROJECT NO.
N/A

SHEET NO.

℄ Indicates Centerline (L) Indicates Landline
(F) Indicates Field Dimension (C) Indicates Calculated Dimension

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-8-88		
TRACED	L A	9-8-88		6-28-90
CHECKED	C U K	8-11-89	W. R. Tirby	
			DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NOS.: 004200, 004201, 004202
W.P.I. NO.: 1119944
SCALE: 1" = 400'
SECTION: 13140
SHEET 4



F.A. PROJECT NO. N/A

SHEET NO.

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

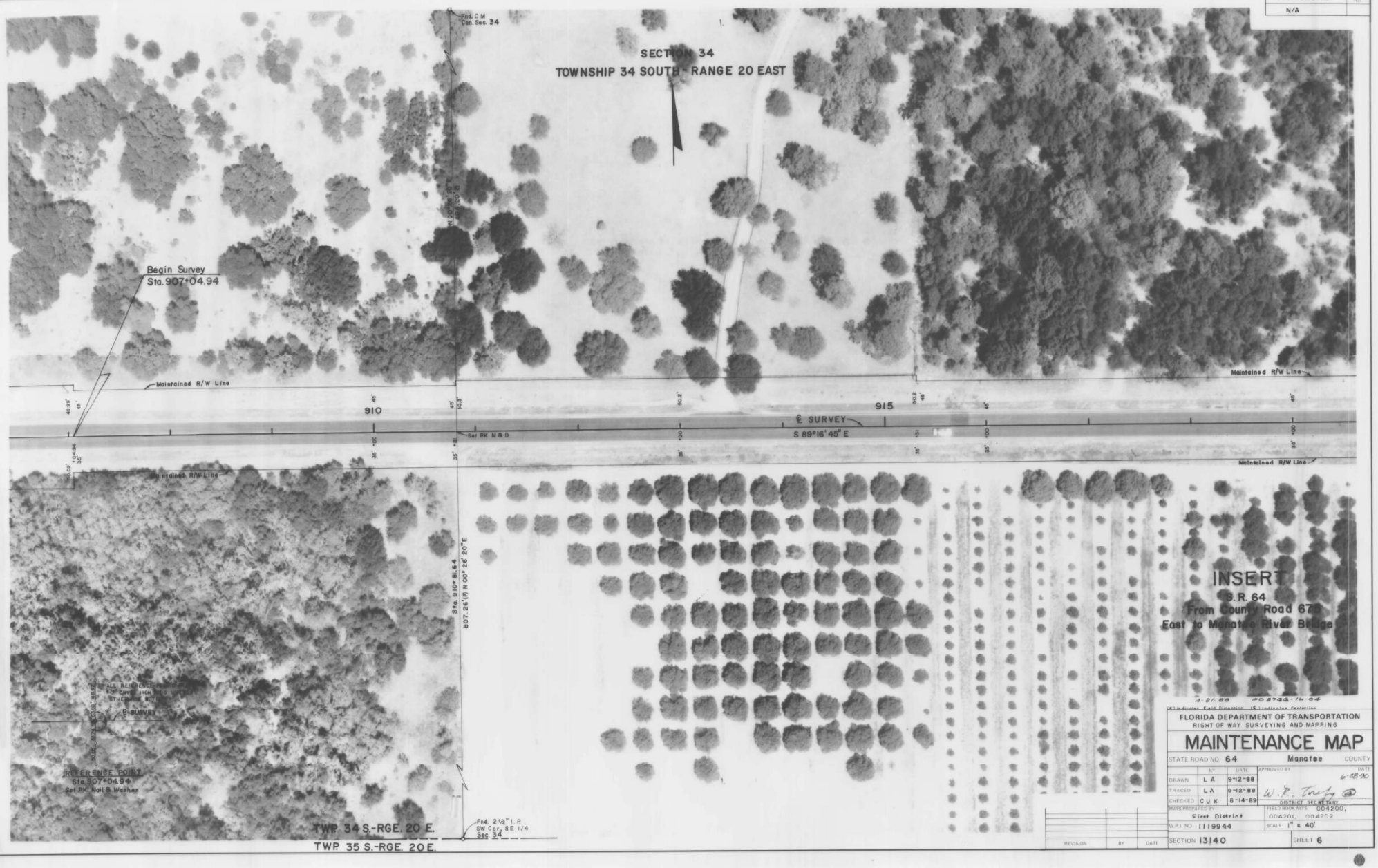
STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE
DRAWN	L A	9-9-88
TRACED	L A	9-9-88
CHECKED	C U K	8-14-89

APPROVED BY: W. D. Tracy II — DATE: 6-28-90
DISTRICT SECRETARY

MAPS PREPARED BY: First District
W.P.I. NO. 1119944
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1"=40'
SECTION 13140-
SHEET 5

REVISION	BY	DATE



F.A. PROJECT NO. N/A

SHEET NO.

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee — COUNTY

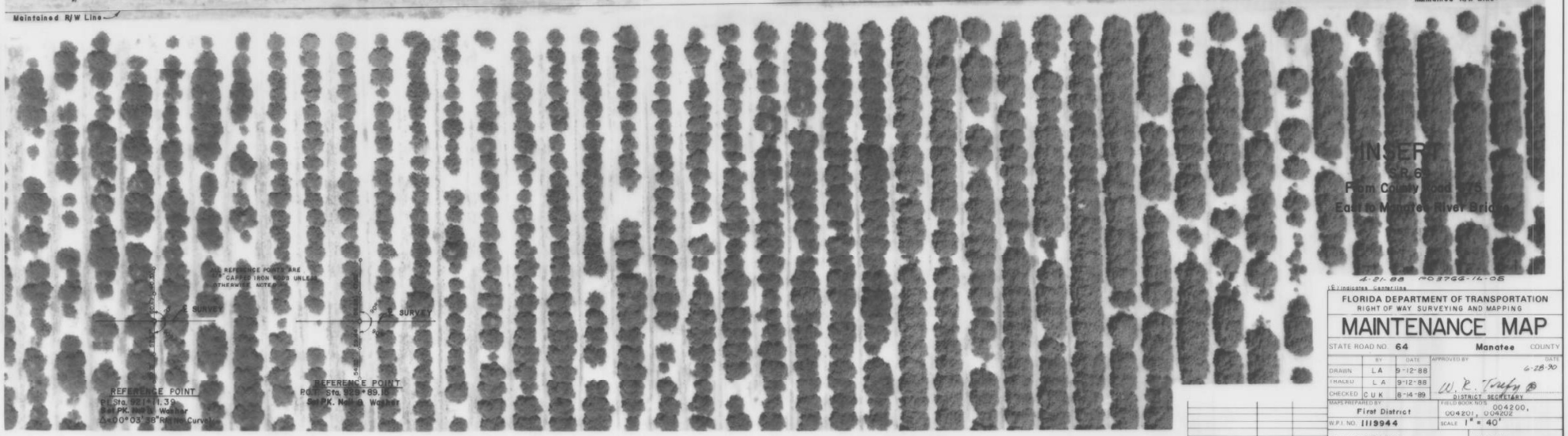
	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-12-88		
TRACED	L A	9-12-88	W.R. Turley	6-28-90
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NOS. 004200, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 6

REVISION	BY	DATE

F.A. PROJECT NO. N/A | SHEET NO.





4-21-88 FD 3766-14-05

(Engineers Centerline)

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-12-88		
TRACED	L A	9-12-88	W. R. Tracy	6-28-90
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District
FIELD BOOK NOS. 004200, 004201, 004202
W.P.I. NO. 1113944
SCALE 1" = 40'
SECTION 13140
SHEET 7

REVISIONS BY DATE



F.A. PROJECT NO. N/A

SHEET NO.

INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge

4-21-88 1037GE-16-06

(F) Indicates Field Dimension (℄) Indicates Centerline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-13-88		
TRACED	L A	9-13-88	W. R. Trefry	6-28-90
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District

FIELD BOOK NOS. 004200, 004201, 004202

W.P.I. NO. 1119944

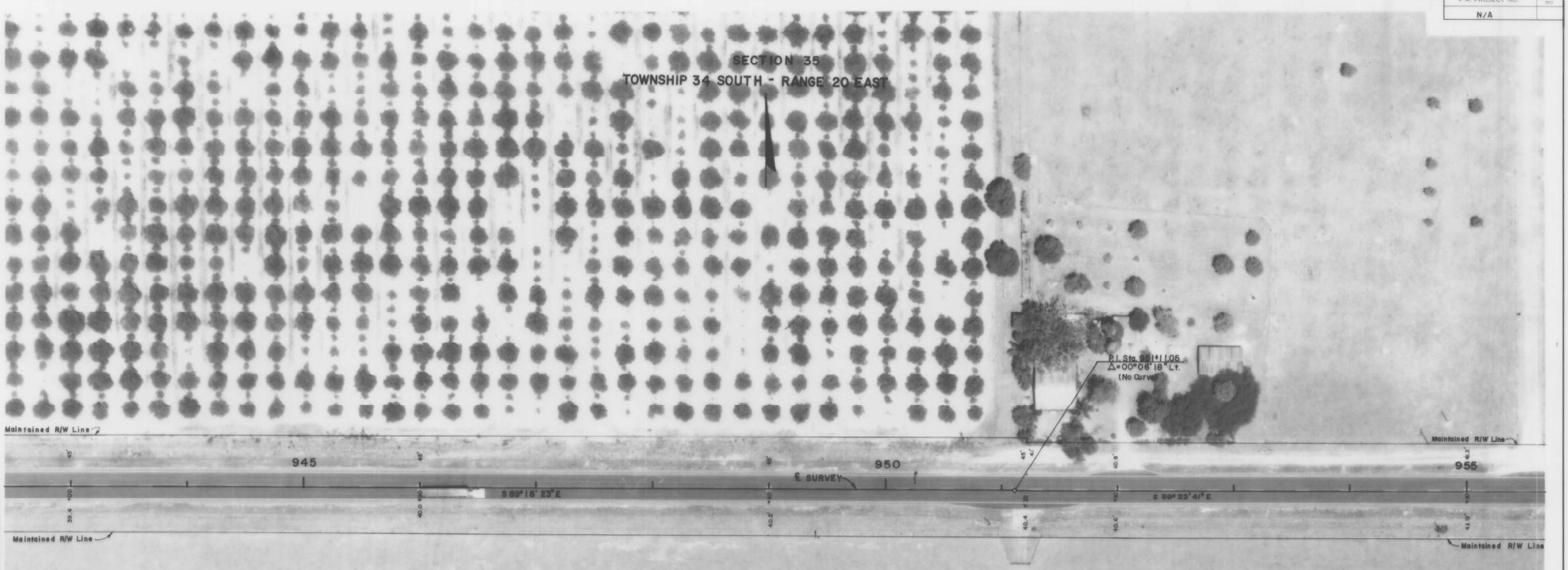
SCALE 1" = 40'

SECTION 13140

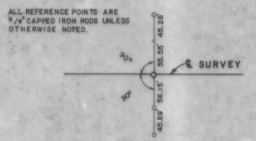
SHEET 8

REVISION	BY	DATE

F.A. PROJECT NO. N/A | SHEET NO.



INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge



REFERENCE POINT
P.I. Sta. 951+11.05
Set PK Nail & Washer
Δ = 00°06'18" Lt. (No Curve)

4-21-88 PD 37GG-1L-07

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

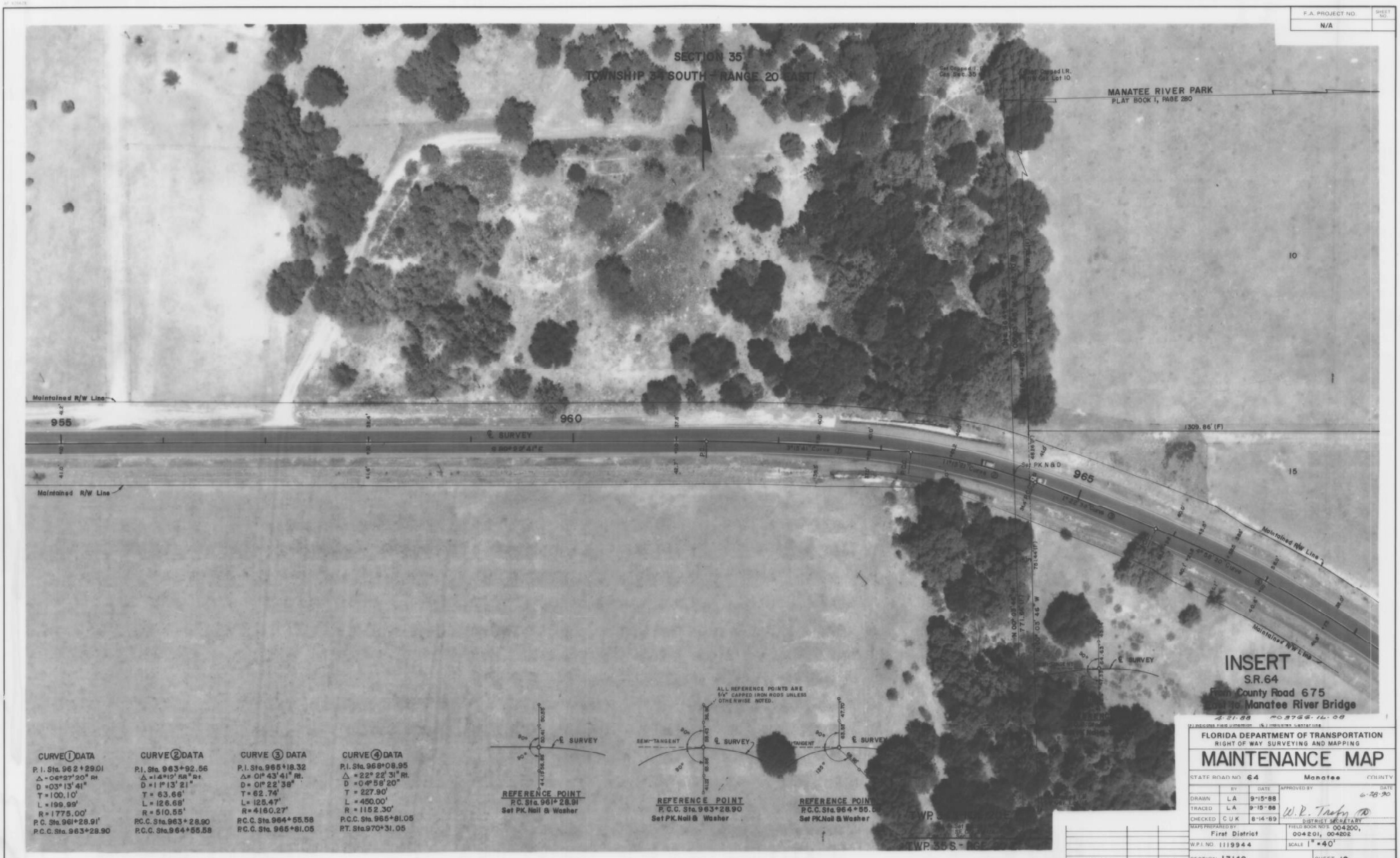
MAINTENANCE MAP

STATE ROAD NO. 64 | Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-13-88		6-28-90
TRACED	L A	9-13-88	D. P. Fiske D	
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
W.P.I. NO. 1119944
FIELD BOOK NO'S: 004200, 004201, 004202
SCALE: 1" = 40'
SECTION 13140 | SHEET 9

REVISION	BY	DATE



CURVE ① DATA	CURVE ② DATA	CURVE ③ DATA	CURVE ④ DATA
P. I. Sta. 962+29.01	P.I. Sta. 963+92.56	P.I. Sta. 965+18.32	P.I. Sta. 968+08.95
△ = 06°27'20" Rt.	△ = 14°19'58" Rt.	△ = 01° 43' 41" Rt.	△ = 22° 22' 31" Rt.
D = 03° 13' 41"	D = 1° 13' 21"	D = 01° 22' 38"	D = 04° 58' 20"
T = 100.10'	T = 63.66'	T = 62.74'	T = 227.90'
L = 199.99'	L = 126.68'	L = 125.47'	L = 450.00'
R = 1775.00'	R = 510.55'	R = 4160.27'	R = 1152.30'
P.C. Sta. 961+28.91'	P.C.C. Sta. 963+28.90	P.C.C. Sta. 964+55.58	P.C.C. Sta. 965+81.05
P.C.C. Sta. 963+28.90	P.C.C. Sta. 964+55.58	P.C.C. Sta. 965+81.05	P.T. Sta. 970+31.05

F.A. PROJECT NO. N/A | SHEET NO.

2-21-88 PO 3756-12-08

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 | Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	9-15-88		
TRACED	L A	9-15-88	W. P. Tarfy JR	6-28-90
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NO'S: 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 10



ALL REFERENCE POINTS ARE 5/8" CAPPED IRON RODS UNLESS OTHERWISE NOTED.

REFERENCE POINT
P. C. Sta. 972+43.32
Set PK Nail & Washer

CURVE (4) DATA	CURVE (5) DATA
P.I. Sta. 968+08.95	P.I. Sta. 977+03.33
Δ = 22°22'31" Rt.	Δ = 44°45'50" Lt.
D = 04°08'20"	D = 05°07'45"
T = 227.90'	T = 460.01'
L = 450.00'	L = 872.74'
R = 1152.30	R = 1117.07'
P.C.C. Sta. 965+81.05	P.C. Sta. 972+43.32
P.T. Sta. 970+31.05	P.T. Sta. 981+16.06

F.A. PROJECT NO. N/A | SHEET NO.

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

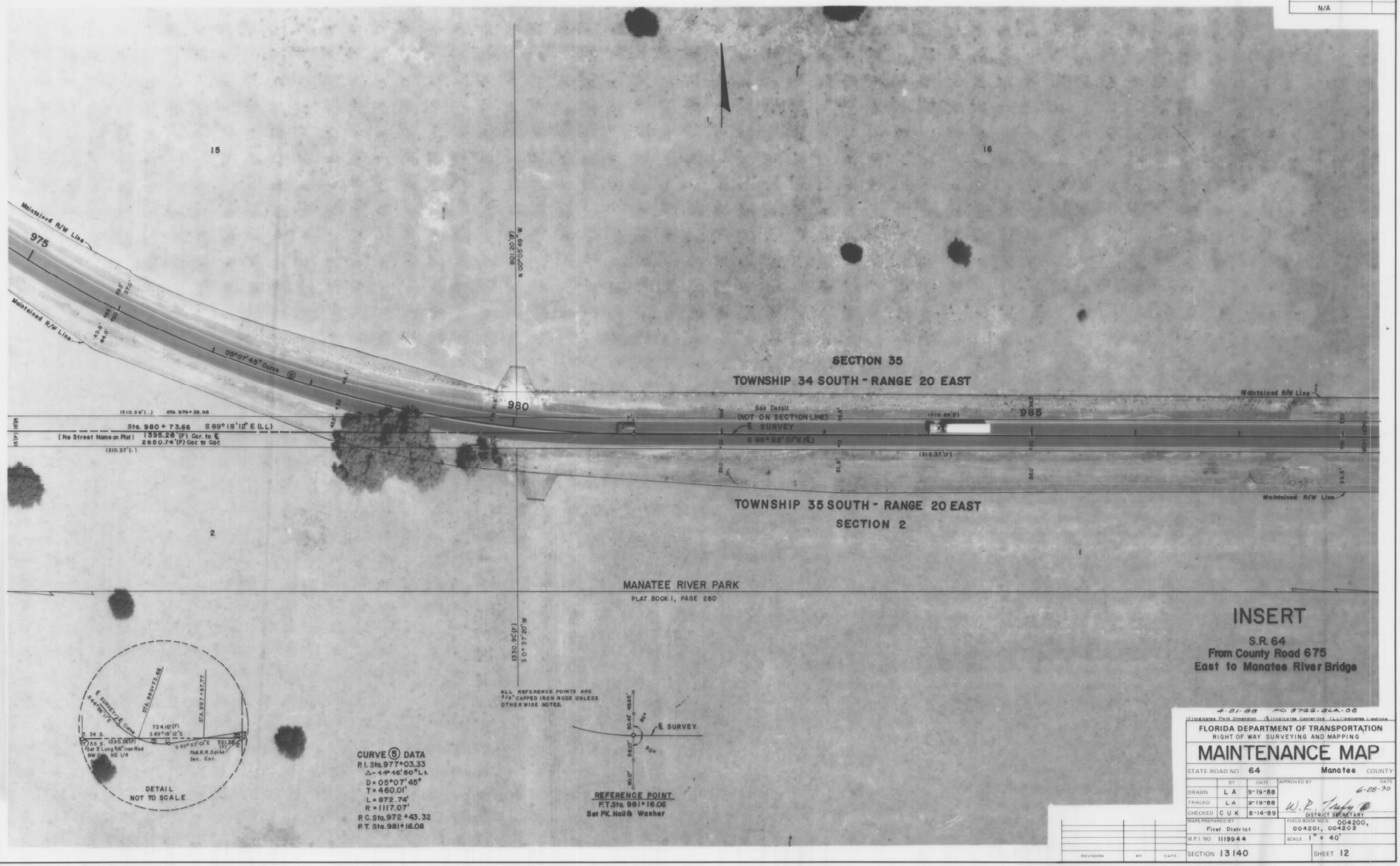
STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	LA	9-16-88		
TRACED	LA	9-16-88	W. R. Turby Jr.	6-28-90
CHECKED	C U K	8-14-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NO'S: 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 11

4-21-88 PD&E G.L.08

REVISION	BY	DATE


F.A. PROJECT NO.
N/A
SHEET NO.
15
16
2
975
980
985
Maintained R/W Line
Maintained R/W Line
05°07'48" Curve ⑤
SECTION 35
TOWNSHIP 34 SOUTH - RANGE 20 EAST
Sta. 980 + 73.66 S 89°18'12" E (LL)
(No Street Name on Plat) 1395.26' (F) Cor. to ℄
2650.74' (F) Cor. to Cor.
See Detail
(NOT ON SECTION LINE)
℄ SURVEY
S 89°22'01" E (G)
Maintained R/W Line
TOWNSHIP 35 SOUTH - RANGE 20 EAST
SECTION 2
MANATEE RIVER PARK
PLAT BOOK 1, PAGE 280
INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge
DETAIL
NOT TO SCALE
℄ Survey
724.10' (F)
S 89°18'12" E
T. 34 S.
R. 20 E.
Set 5' Long ⅝" Iron Rod
NW Cor., NE 1/4
Sec. 35
Find R.R. Spike
Sec. Cor.
S 89°22'01" E
CURVE ⑤ DATA
P.I. Sta. 977+03.33
Δ = 44°46'50" Lt.
D = 05°07'45"
T = 460.01'
L = 972.74'
R = 1117.07'
P.C. Sta. 972+43.32
P.T. Sta. 981+16.06
ALL REFERENCE POINTS ARE ½" ø CAPPED IRON RODS UNLESS OTHERWISE NOTED.
℄ SURVEY
REFERENCE POINT
P.T. Sta. 981+16.06
Set PK. Nail & Washer
4-21-88 PD 3726-214-05
FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING
MAINTENANCE MAP
STATE ROAD NO. 64
Manatee COUNTY
DRAWN L A 9-19-88
TRACED L A 9-19-88
CHECKED C U K 8-14-89
APPROVED BY
DATE 6-28-90
DISTRICT SECRETARY
MAPS PREPARED BY First District
FIELD BOOK NO'S. 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 12
REVISION BY DATE



F.A. PROJECT NO. N/A

SHEET NO.

4-21-88 FD 3726-214-03

(F) Indicates Field Dimension (℄) Indicates Centerline (R/L) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	LA	9-26-88		6-25-90
TRACED	LA	9-26-88		
CHECKED	C U K	8-15-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District — FIELD BOOK NO'S 004200, 004201, 004202

W.P.I. NO. 1119944 — SCALE 1" = 40'

SECTION 13140 — SHEET 13

REVISION	BY	DATE



F.A. PROJECT NO. N/A

SHEET NO.

(R) indicates Field Dimension (M) indicates Centerline (LL) indicates Longline

4-21-88 ROADWAY PLAN SHEET

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	LA	9-27-88		
TRACED	LA	9-27-88	W. R. Trabo	6-28-90
CHECKED	C U K	8-15-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District — FIELD BOOK NOS. 004200, 004201, 004202

W.P.I. NO. 1119944 — SCALE 1" = 40'

SECTION 13140 — SHEET 14

REVISION	BY	DATE



F.A. PROJECT NO. N/A

(F) Indicates Field Dimension (C) Indicates Calculation (L) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

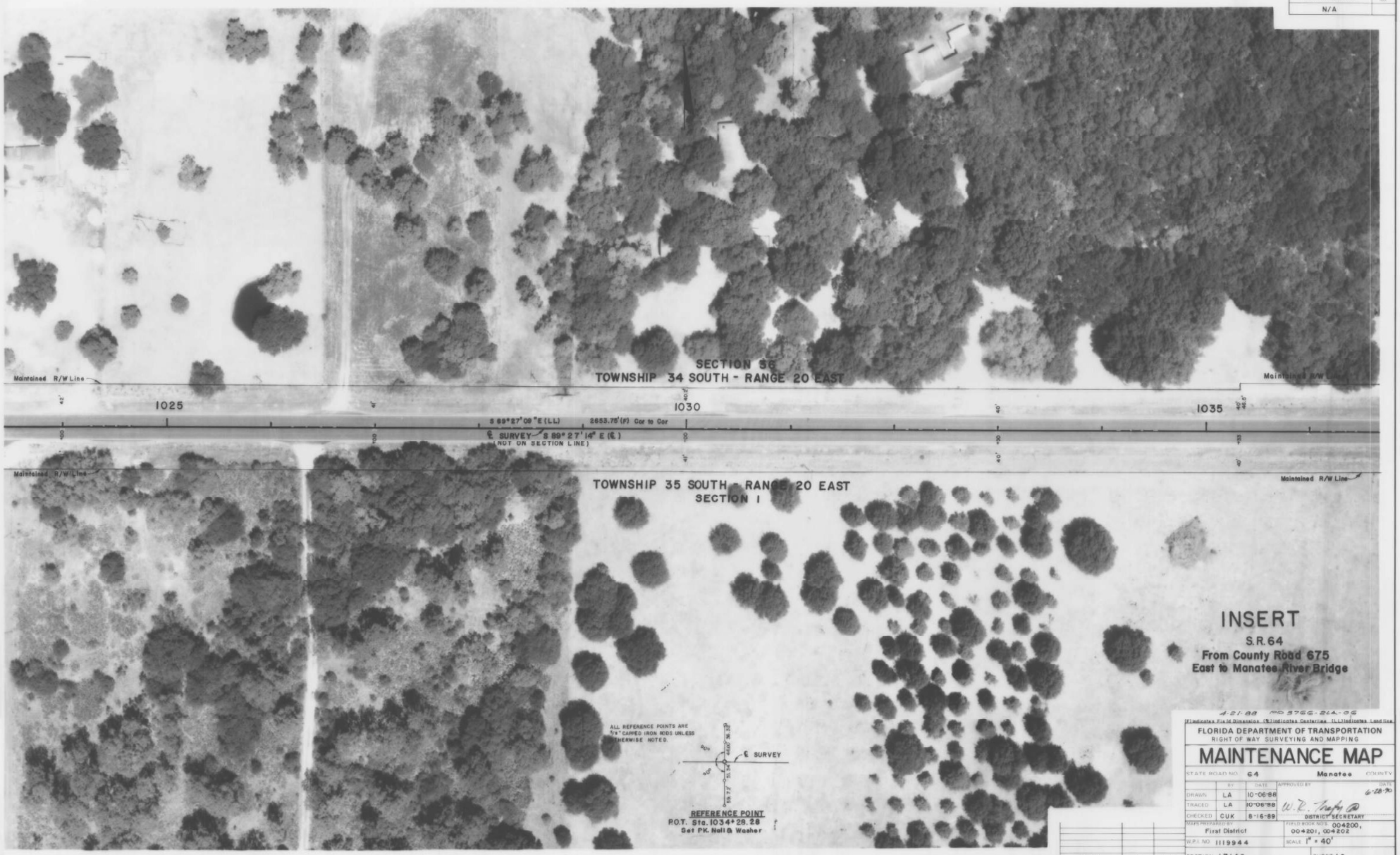
	BY	DATE	APPROVED BY	DATE
DRAWN	LA	10-6-88		
TRACED	LA	10-6-88		6-28-90
CHECKED	C U K	8-15-89	W. R. Trafty	

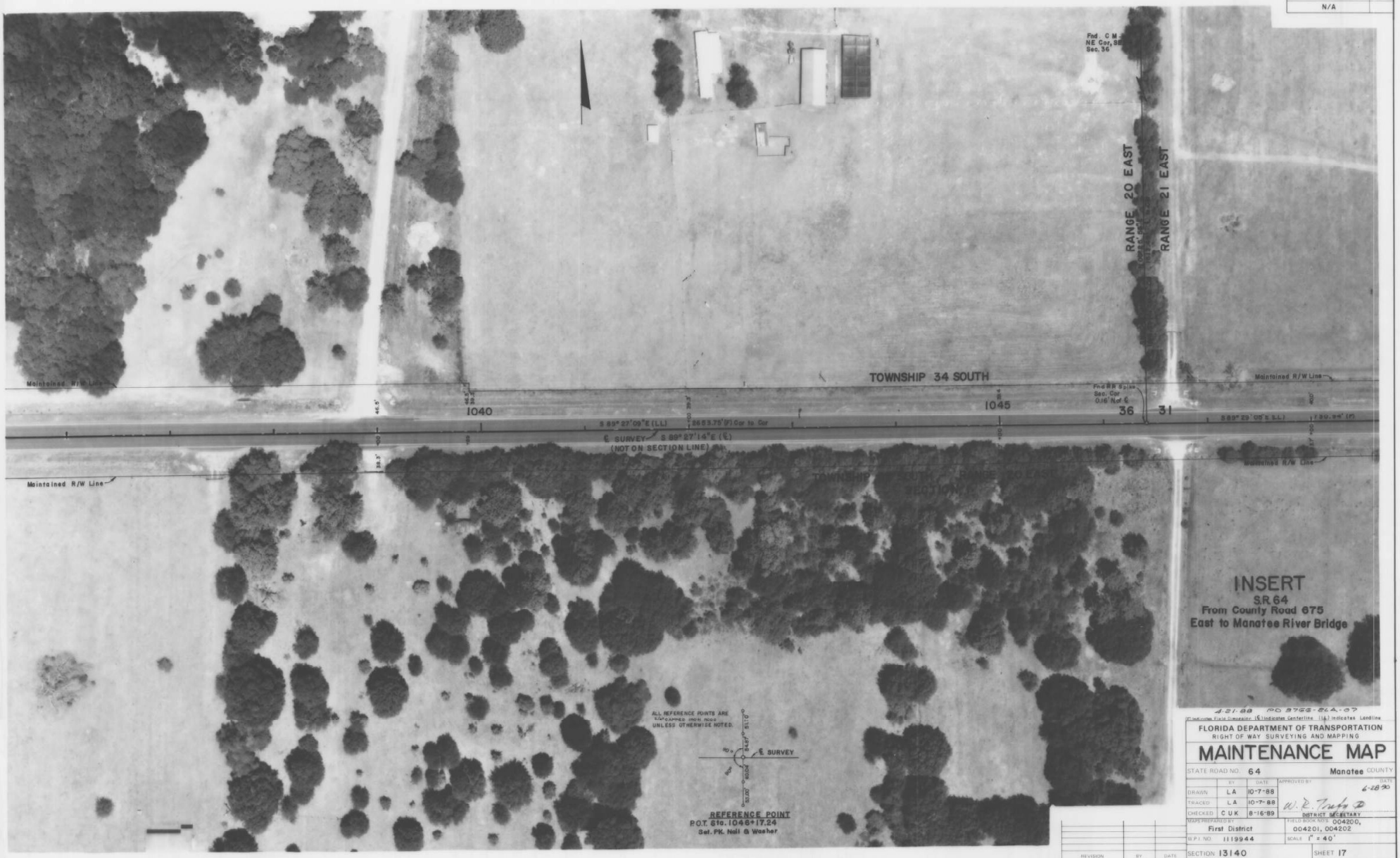
MAPS PREPARED BY: First District — DISTRICT SECRETARY

W.P.I. NO. 1119944 — FIELD BOOK NOS. 004200, 004201, 004202

SECTION 13140 — SCALE 1" = 40' — SHEET 15

REVISION	BY	DATE


F.A. PROJECT NO.
N/A
SECTION 36
TOWNSHIP 34 SOUTH - RANGE 20 EAST
Maintained R/W Line
1025
1030
1035
S 89°27'09"E (LL) 2653.75'(F) Cor to Cor
℄ SURVEY S 89°27'14" E (℄)
(NOT ON SECTION LINE)
TOWNSHIP 35 SOUTH - RANGE 20 EAST
SECTION 1
INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge
ALL REFERENCE POINTS ARE 5/8" CAPPED IRON RODS UNLESS OTHERWISE NOTED.
℄ SURVEY
REFERENCE POINT
P.O.T. Sta. 1034+28.28
Set PK. Nail & Washer
4-21-88 MD 57GG-2LA-05
(I) indicates Field Dimension (R) indicates Centerline (L) indicates Lead line
FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING
MAINTENANCE MAP
STATE ROAD NO. 64
Manatee COUNTY
DRAWN LA 10-06-88
TRACED LA 10-06-88
CHECKED CUK 8-16-89
APPROVED BY W. E. Crafty DISTRICT SECRETARY DATE 6-28-90
MAPS PREPARED BY First District
W.P.I. NO. 1119944
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1" = 40'
SECTION 13140
SHEET 16
REVISION BY DATE



F.A. PROJECT NO. N/A

SHEET NO.

4-21-88 PD 3766-264-07

(C) indicates Field Dimension (℄) Indicates Centerline (|) indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

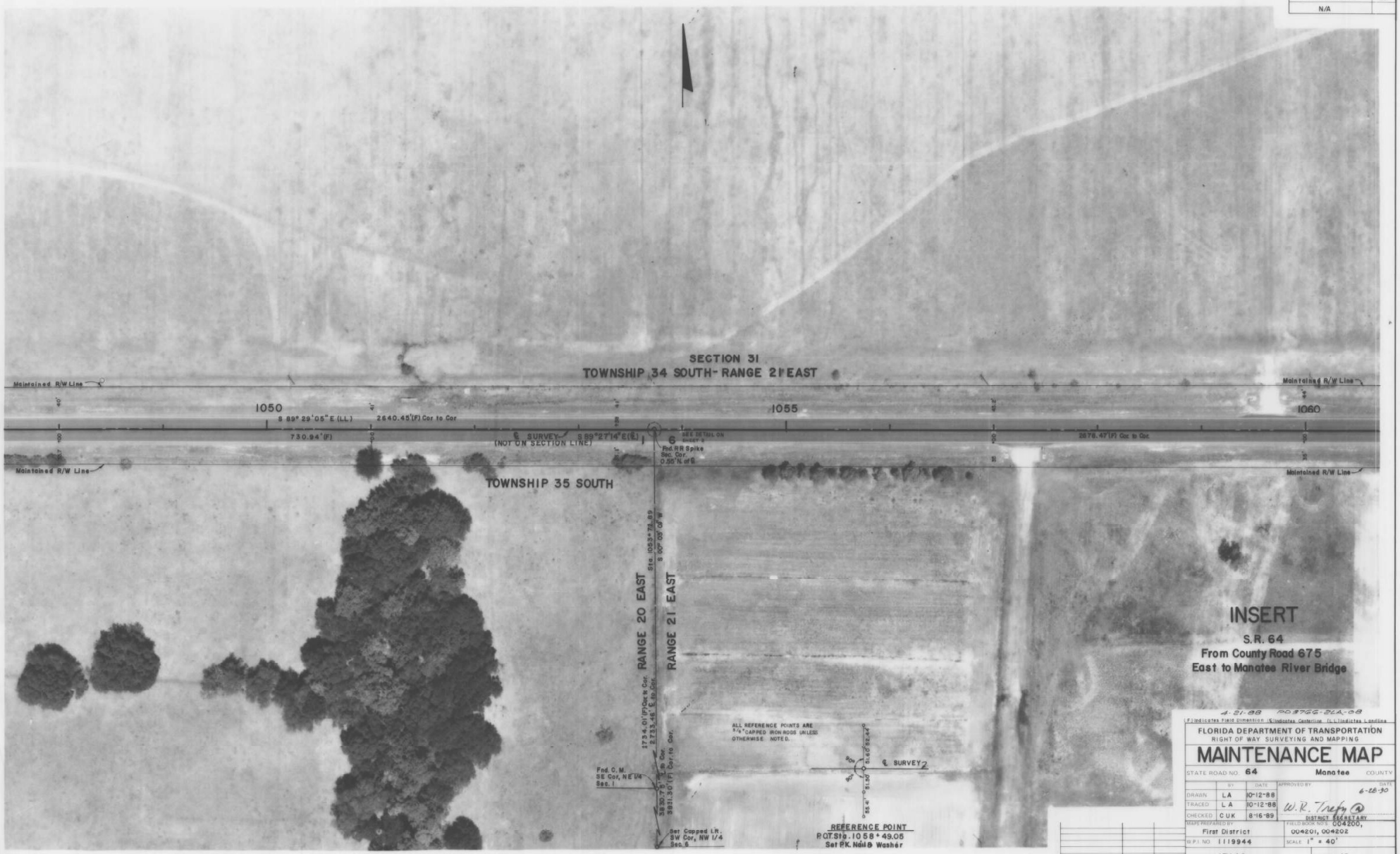
STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE
DRAWN	L A	10-7-88
TRACED	L A	10-7-88
CHECKED	C U K	8-16-89

APPROVED BY: W. R. Truby — DATE: 6-28-90
DISTRICT SECRETARY

MAPS PREPARED IN: First District
FIELD BOOK NOS: 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 17

REVISION	BY	DATE



F.A. PROJECT NO. N/A | SHEET NO.

4-21-88 RD37GG-2LA-08

F indicates Field Dimension ℄ indicates Centerline (L) indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

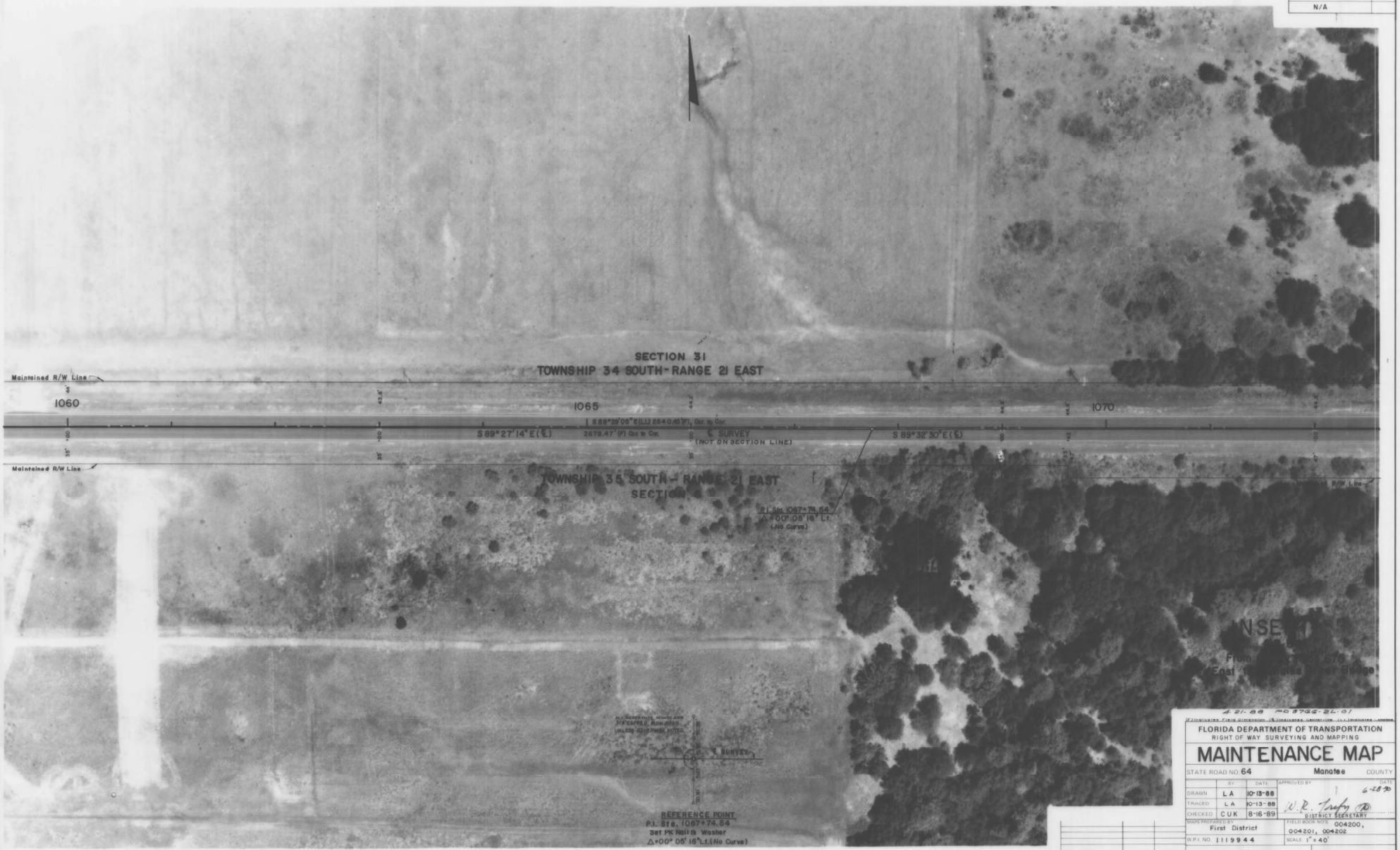
STATE ROAD NO. 64 | Manatee COUNTY

	BY	DATE
DRAWN	L A	10-12-88
TRACED	L A	10-12-88
CHECKED	C U K	8-16-89

APPROVED BY: W. R. Trefry @ DATE: 6-28-90
DISTRICT SECRETARY

MAPS PREPARED BY: First District
FIELD BOOK NOS: 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140 | SHEET 1@

REVISION | BY | DATE



F.A. PROJECT NO. N/A

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

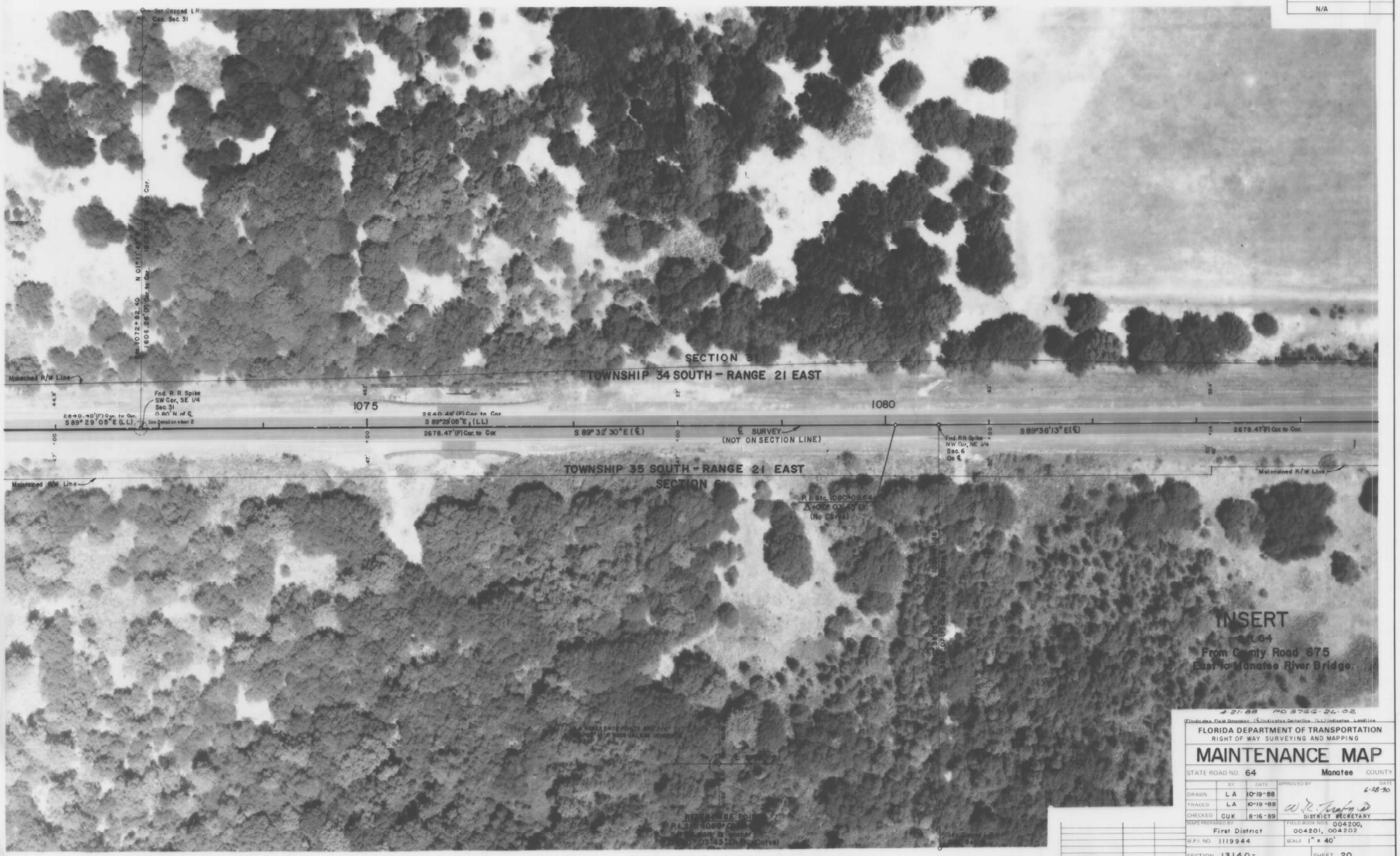
MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	10-13-88		
TRACED	L A	10-13-88		6-28-90
CHECKED	C U K	8-16-89	W. R. Tuffy Jr. DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NOS.: 004200, 004201, 004202
W.P.I. NO.: 1119944
SCALE: 1" = 40'
SECTION 13140
SHEET 19

REVISION	BY	DATE


SECTION 31
TOWNSHIP 34 SOUTH - RANGE 21 EAST
1075
1080
Maintained R/W Line
Fnd. R.R. Spike SW Cor, SE 1/4 Sec. 31 0.60' N. of ℄
S 89° 29' 05" E (L.L.)
2640.45'(F) Cor. to Cor.
S 89° 29' 05" E (L.L.)
2678.47'(F) Cor. to Cor.
S 89° 32' 30" E (℄)
℄ SURVEY (NOT ON SECTION LINE)
Fnd. RR Spike N.W. Cor., NE 1/4 Sec. 6 On ℄
S 89° 36' 13" E (℄)
2678.47'(F) Cor. to Cor.
TOWNSHIP 35 SOUTH - RANGE 21 EAST
SECTION 6
P.I. Sta. 1080+05.64
Δ=0° 03' 43" Lt.
(No Curve)
INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge.
4-21-88 FD 3752-24.02
FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING
MAINTENANCE MAP
STATE ROAD NO. 64
Manatee COUNTY
DRAWN L A 10-19-88
TRACED L A 10-19-88
CHECKED CUK 8-16-89
APPROVED BY
DISTRICT SECRETARY
6-28-90
MAPS PREPARED BY First District
W.P.I. NO. 1119944
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1" = 40'
SECTION 13140-
SHEET 20
F.A. PROJECT NO. N/A
REVISION BY DATE



F.A. PROJECT NO. N/A | SHEET NO.

4-21-88 PO 97GG-2L-08

(F) Indicates Field Dimension (L) Indicates Centerline (LL) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE
DRAWN	L A	10-20-88
TRACED	L A	10-20-88
CHECKED	C U K	8-16-89

APPROVED BY: W. R. Taylor — DISTRICT SECRETARY — DATE: 6-28-90

MAPS PREPARED BY: First District
W.P.I. NO. 1119944
SECTION 13140
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1" = 40'
SHEET 21

REVISION | BY | DATE



F.A. PROJECT NO.
N/A

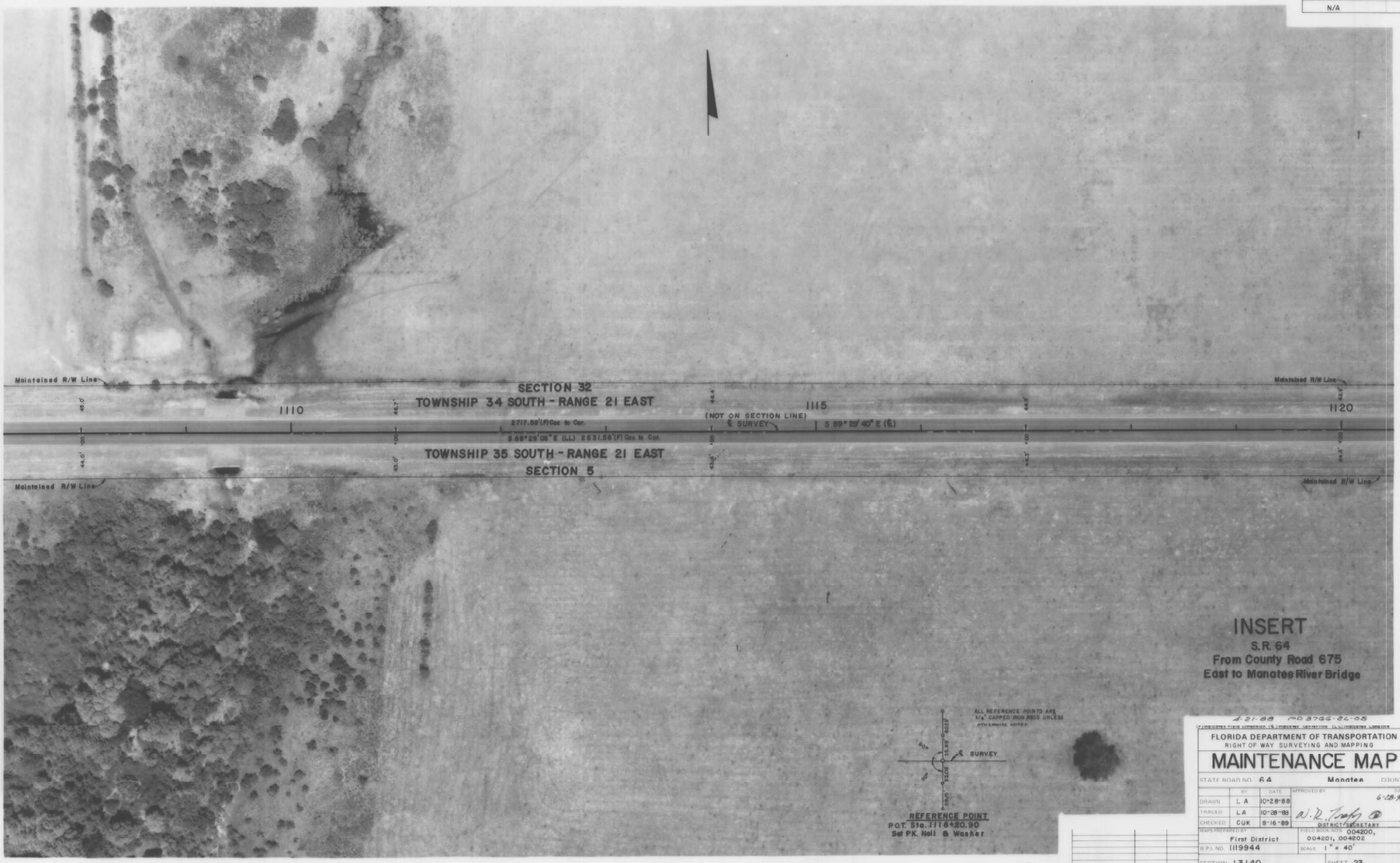
FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	10-27-88		6-28-90
TRACED	L A	10-27-88	W. R. Trefry II	
CHECKED	C U K	8-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NOS.: 004200, 004201, 004202
W.P.I. NO.: 1119944
SCALE: 1" = 40'
SECTION 13140
SHEET 22



INSERT
S.R. 64
From County Road 675
East to Manatee River Bridge

1-21-88 PD 3755-21-05

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

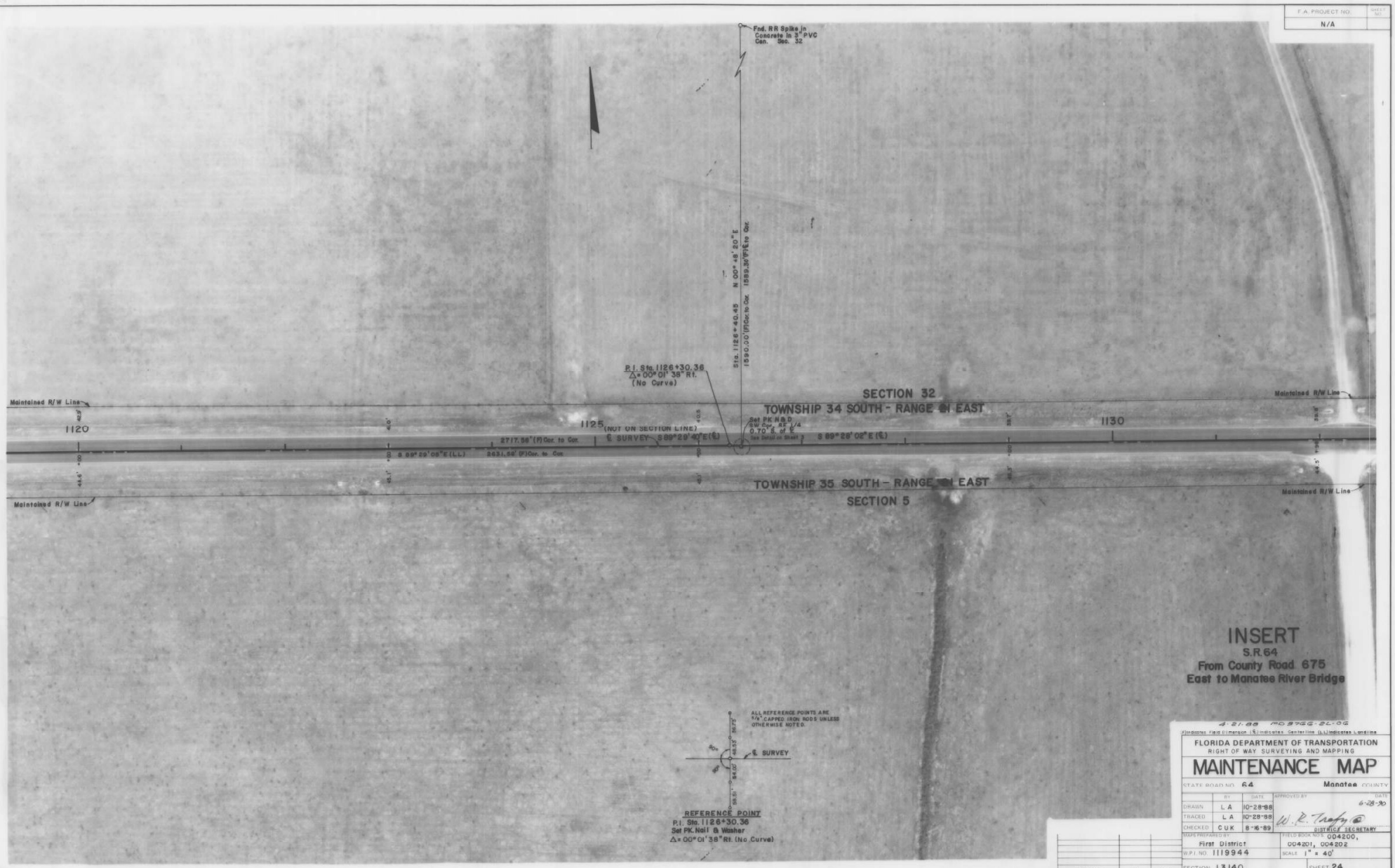
STATE ROAD NO. 64 Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	10-28-88		6-28-90
TRACED	L A	10-28-88	W. D. Tinsley	
CHECKED	CUK	8-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District
F.P.I. NO. 1119944
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1" = 40'
SECTION 13140
SHEET 23

REVISION	BY	DATE

F.A. PROJECT NO. N/A
SHEET NO.



F.A. PROJECT NO. N/A

4-21-89 MD 97GG-2L-0G

(P) indicates Field Dimension (℄) Indicates Centerline (LL) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

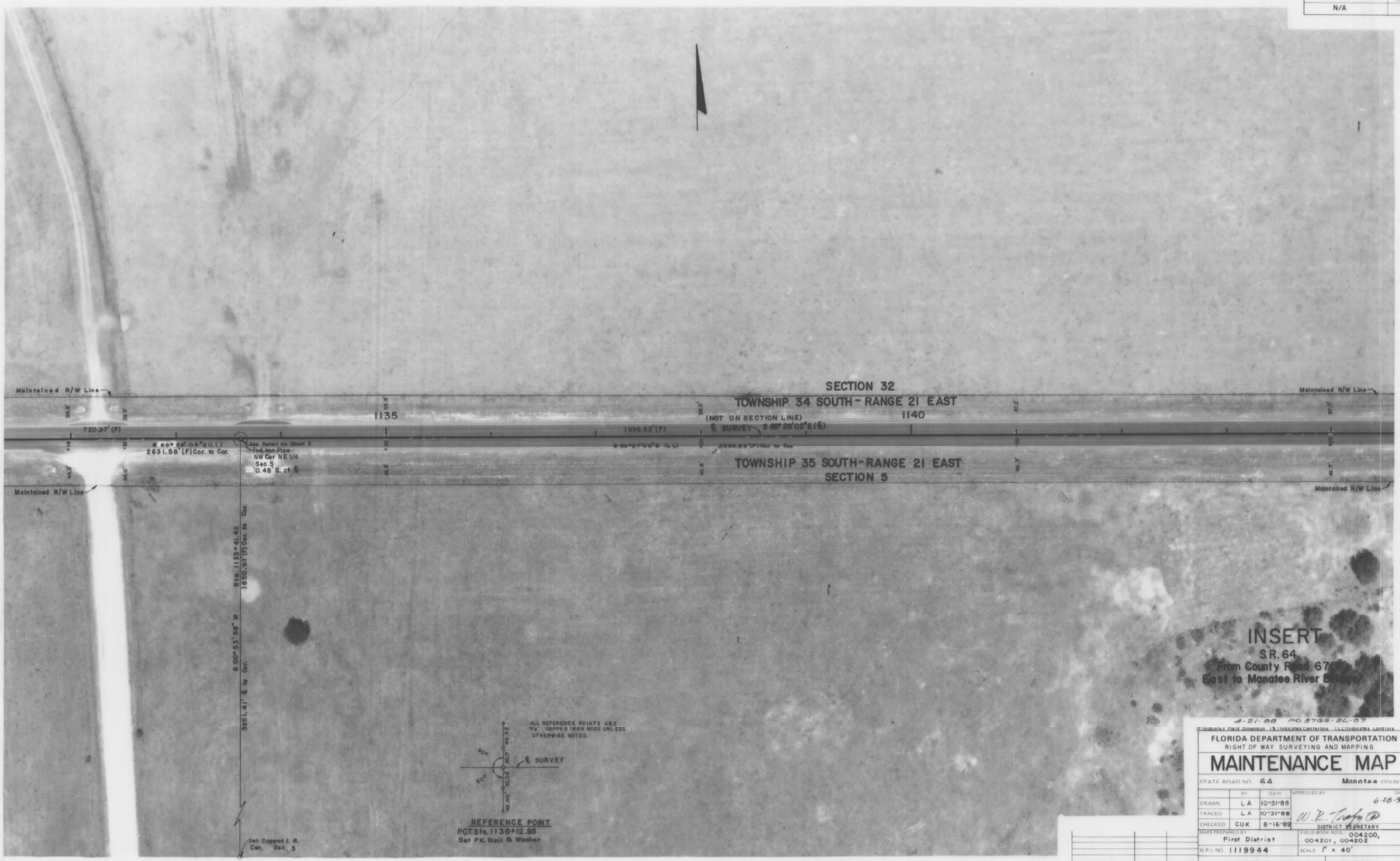
MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	10-28-88		6-28-90
TRACED	L A	10-28-88	W. R. Trafton	
CHECKED	C U K	8-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
W.P.I. NO. 1119944
SECTION 13140
FIELD BOOK NOS. 004200, 004201, 004202
SCALE 1" = 40'
SHEET 24

REVISION | BY | DATE



F.A. PROJECT NO. N/A

SHEET NO.

4-21-88 PD 97GG-2C-97

(Y) Indicates Field Dimension (R) Indicates Centerline (L) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	10-31-88		6-28-90
TRACED	L A	10-31-88	W. P. Trafton	
CHECKED	CUK	8-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY First District
FIELD BOOK NO'S. 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 25

REVISION BY DATE



F.A. PROJECT NO. N/A

4-21-88 NO SCALE 24.02

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE
DRAWN	L A	11-01-88
TRAVELED	L A	11-01-88
CHECKED	C U K	8-16-89

APPROVED BY: W.K. Tratyo — DISTRICT SECRETARY — DATE: 6-28-90

MAPS PREPARED BY: First District
W.P.I. NO. 1119944
SECTION 13140
FIELD BOOK NO'S 004200, 004201, 004202
SCALE 1" = 40'
SHEET 26

REVISION	BY	DATE



F.A. PROJECT NO. N/A

SHEET NO.

4-21-88 MD 87GG-24-03

(P) indicates Plane Dimension (G) indicates Geometric (LL) indicates Longitude

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

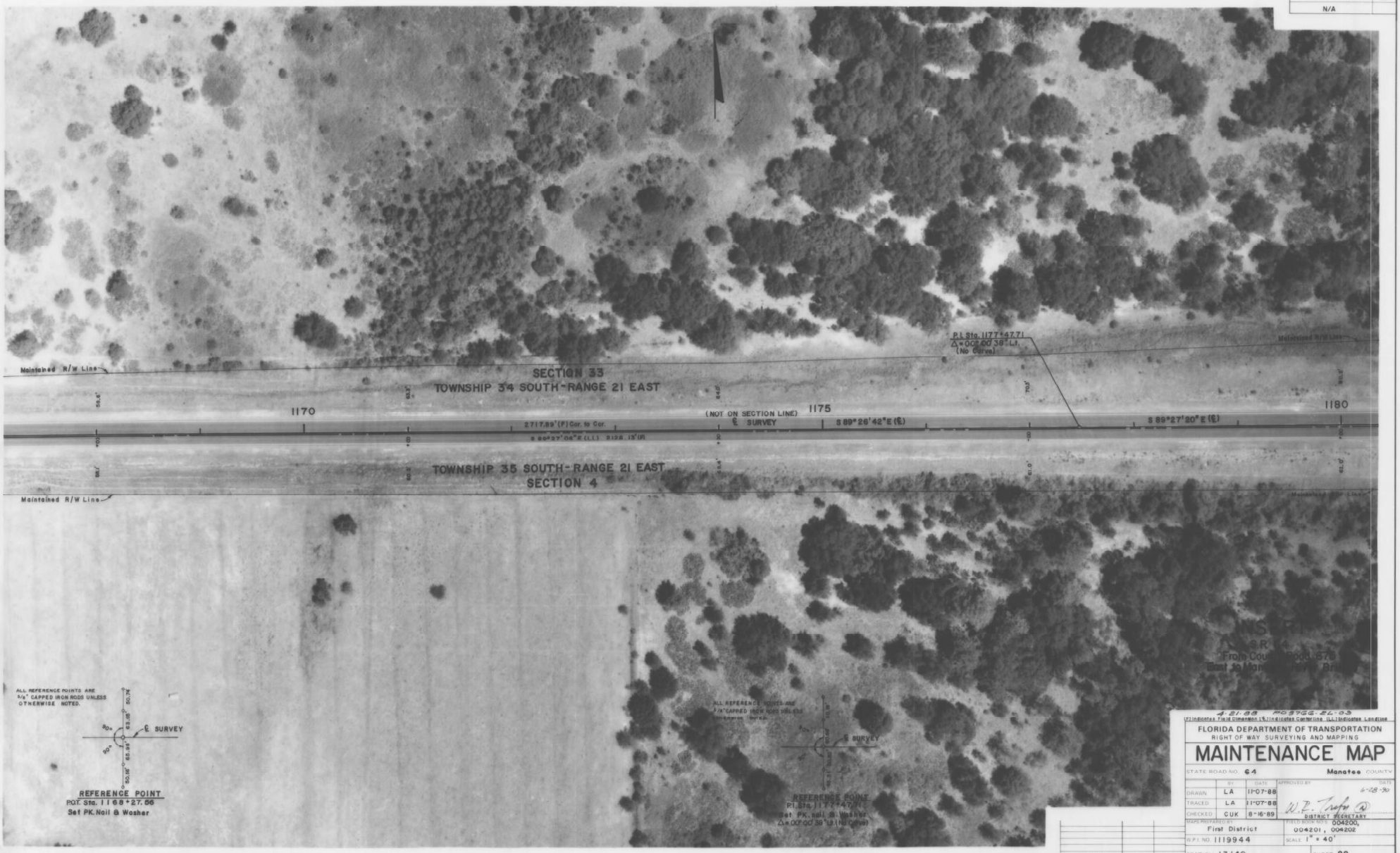
MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	11-03-88	W. R. Graham	6-28-90
TRACED	L A	11-03-88	DISTRICT SECRETARY	
CHECKED				

MAP PREPARED BY: First District
FIELD BOOK NOS: 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 27

REVISION BY DATE



F.A. PROJECT NO. N/A

4-21-88 FD3926-2L-03

(F) Indicates Field Dimension (℄) Indicates Centerline (L) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	LA	11-07-88		
TRACED	LA	11-07-88	W.P. Trafton	6-28-90
CHECKED	CUK	8-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NO'S: 004200, 004201, 004202
R.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 28

REVISIONS BY DATE



F.A. PROJECT NO. N/A

SHEET NO.

4-21-88 RD 3726-2L-16

F Indicates Field Dimension (℄ Indicates Centerline (L.L.) Indicates Landline

FLORIDA DEPARTMENT OF TRANSPORTATION
RIGHT OF WAY SURVEYING AND MAPPING

MAINTENANCE MAP

STATE ROAD NO. 64 — Manatee COUNTY

	BY	DATE	APPROVED BY	DATE
DRAWN	L A	11-08-88		6-28-90
TRACED	L A	11-08-88	W. R. Trufo	
CHECKED	C U K	6-16-89	DISTRICT SECRETARY	

MAPS PREPARED BY: First District
FIELD BOOK NOS. 004200, 004201, 004202
W.P.I. NO. 1119944
SCALE 1" = 40'
SECTION 13140
SHEET 29

REVISION	BY	DATE

APPENDIX G

PLANNING-LEVEL HYDROLOGICAL EVALUATION REPORT

Technical Memo

To: Laura Baumberger, PE

From: Michael Attia, PhD, PE

Project title Manatee County SRF

Client: Carollo Engineers

Project number: US0041069.5316

Subject: Manatee County SRF SAHM – Pipeline Resiliency Hydrogeologic Evaluation of the East County Wellfield for Facilities Plan

Date: August 17, 2026

1. Purpose

WSP USA (WSP) has been retained by Carollo Engineers to support Manatee County with a planning-level hydrogeologic evaluation of the East County Wellfield (ECW) as part of the facilities plan required for funding support through the Florida Department of Environmental Protection (FDEP) Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Program. A redundant pipeline is proposed to improve the reliability of the wellfield, and two new supply wells may be constructed as part of the funded project, which includes approximately 18 miles of new 20-inch diameter water pipeline.

This Technical Memorandum presents a review and evaluation of historical wellfield performance, including pumpage records, groundwater level monitoring data, and water quality monitoring results for the ECW. The evaluation is intended to characterize the hydrogeology of the wellfield area, assess wellfield performance under the current WUP No. 13343 issued by the Southwest Florida Water Management District (SWFWMD), and identify trends or conditions that may influence the siting of new supply or monitoring wells.

2. Site Description and Hydrogeologic Setting

The East County Wellfield (ECW) is located in eastern Manatee County, Florida, and is operated by Manatee County Utilities under WUP No. 13343. The wellfield consists of seven production wells (ECW-1 through ECW-7, SWFWMD District IDs 128 through 134) that withdraw groundwater from the Upper Floridan Aquifer (UFA). Five monitoring wells (District IDs 150 through 154) are used to monitor groundwater levels and water quality across the surficial aquifer system (SAS), the intermediate aquifer system (IAS), and the UFA. Site locations are shown in **Figures 1 and 2.**

The regional hydrostratigraphy beneath the ECW site consists of three principal hydrogeologic units:

- **Surficial Aquifer System (SAS):** An unconfined aquifer composed of unconsolidated sands and shell deposits, extending from land surface to approximately 30 feet below land surface (bls). Monitored by wells ECW-SMW-50 (monitored interval 12 to 30 ft) and ECW-SMW-54 (monitored interval 25 to 35 ft).
- **Intermediate Aquifer System (IAS):** A series of interbedded carbonate and clastic units that function as a semi-confining unit between the SAS and the UFA. Monitored by well ECW-IAMW-52 (monitored interval 145 to 250 ft bls).
- **Upper Floridan Aquifer (UFA):** The principal production aquifer, composed of Tertiary-age limestone and dolomite. Production wells are cased to approximately 500 to 580 feet bls with open-hole completions extending to approximately 1,200 to 1,250 feet bls. The UFA is monitored by wells ECW-UFMW-51 (monitored interval 444 to 752 ft) and ECW-UFMW-53 (monitored interval 959 to 1,315 ft), representing the upper and lower production zones, respectively.

3. Wellfield Configuration

The ECW operates under WUP No. 13343 and includes seven production wells and five monitoring wells. The production wells withdraw groundwater from the UFA, while the monitoring wells are completed at various depths to monitor conditions in the SAS, the IAS, and the UFA. Well construction details and permitted withdrawal quantities are summarized in **Tables 1 and 2**, and well locations are shown in **Figures 1 and 2.**

Table 1 East County Wellfield production wells (WUP No. 13343)

Well ID	District ID	Casing Dia. (in.)	Casing Depth (ft bls)	Total Depth (ft bls)	Permitted Avg. (GPD)	Permitted Peak (GPD)
ECW-1	128	20	500	1,250	2,283,700	2,908,000
ECW-2	129	20	510	1,235	2,283,700	2,908,000
ECW-3	130	20	500	1,250	2,283,700	2,908,000
ECW-4	131	20	500	1,250	2,283,700	2,908,000
ECW-5	132	20	520	1,246	2,283,700	2,908,000
ECW-6	133	20	580	1,200	2,283,700	2,908,000
ECW-7	134	20	500	1,250	2,283,700	2,908,000

Table 2 East County Wellfield monitoring wells (WUP No. 13343)

Well ID	District ID	Casing Dia. (in.)	Casing Depth (ft bls)	Total Depth (ft bls)	Aquifer Monitored	Data Collected
ECW-SMW-50	150	4	12	30	Surficial (SAS)	Water Levels
ECW-UFMW-51	151	12	444	752	Upper Floridan	Water Levels, WQ
ECW-IAMW-52	152	8	145	250	Intermediate	Water Levels, WQ
ECW-UFMW-53	153	14	959	1,315	Upper Floridan	Water Levels, WQ
ECW-SMW-54	154	2	25	35	Surficial (SAS)	Water Levels

4. Data Sources and Methods

Data used in this evaluation were obtained from the SWFWMD Water Management Information System (WMIS) and from records provided by Manatee County Utilities. The following data types were compiled and evaluated:

- **Pumpage Data (Appendix A):** Monthly withdrawal volumes for production wells ECW-1 through ECW-7, as well as total wellfield production.
- **Groundwater Level Data (Appendix B):** Water level measurements from monitoring wells ECW-SMW-50, ECW-UFMW-51, ECW-IAMW-52, ECW-UFMW-53, and ECW-SMW-54, representing the surficial, intermediate, and Upper Floridan aquifer systems.
- **Water Quality Data (Appendix C):** Laboratory analytical results for total dissolved solids (TDS), chloride, and sulfate from production and monitoring wells.
- **Rainfall Data (Appendix D):** Monthly rainfall totals from the SWFWMD ROMP 39 Oak Knoll rainfall gauge (Station No. 25611), the nearest long-term rainfall record to the ECW site, used to evaluate the climatic influence on groundwater levels across the period of record.

Data were compiled and time series plots were generated for each data type to facilitate visual assessment of temporal trends and wellfield performance.

5. Results and Discussion

5.1 Pumpage Review

Monthly pumpage data for ECW production wells ECW-1 through ECW-7 were reviewed for the period of record from January 2013 through late 2026 (**Figures A-1 through A-7**). Wellfield operations exhibit a seasonal pumping pattern consistent with regional water demand, with higher withdrawal rates during the dry season (typically November through May) and reduced pumping during the wet season (June through the end of September).

Individual well pumpage records indicate that the County employs a well rotation strategy, cycling wells on and off to distribute withdrawals across the wellfield. Wells ECW-1, ECW-3, and ECW-5 operated most consistently throughout the period of record, while ECW-6 exhibited the most intermittent operation, with extended periods of inactivity (e.g., January 2013 through mid-2014, late 2018 through mid-2020, and portions of 2022 through 2023). ECW-4 also shows periods of reduced operation, including an extended

low-pumping interval from mid-2018 through early 2019. ECW-7 was largely inactive from mid-2015 through mid-2017 before returning to regular operation.

When active, individual well monthly pumpage values typically range from approximately 50 to 150 million gallons (MG), with seasonal peaks occasionally reaching 150 to 175 MG for the higher-producing wells (e.g., ECW-3 and ECW-4). The pumpage data for ECW-2 include an anomalous value of approximately 820 MG in late 2023, and ECW-7 shows a spike of approximately 470 MG in early 2018. These values are inconsistent with the typical operating range for individual wells and likely represent data entry or reporting errors.

Interannual variability in wellfield pumpage is broadly consistent with rainfall patterns. During drier years, seasonal pumping peaks tend to be higher and more sustained across the wellfield, while wetter years typically show lower total wellfield production. Monthly rainfall totals from the SWFWMD ROMP 39 Oak Knoll rainfall gauge are summarized in Appendix D (Figure D-1) and provide context for the interpretation of the pumpage and groundwater level records.

Total monthly wellfield pumpage, computed as the sum of ECW-1 through ECW-7, is presented in Figure A-8. Monthly wellfield totals typically ranged from approximately 300 to 550 MG throughout the period of record, with a general upward trend in seasonal peaks from approximately 400 to 500 MG during 2013 to 2017 to approximately 500 to 550 MG during 2021 to 2026. The seasonal pattern observed at the individual wells is also evident in the wellfield total, with higher production during the dry season (November through May) and reduced production during the wet season (June through the end of September). Two anomalous monthly totals are apparent in the record: approximately 820 MG in late 2017 and approximately 1,270 MG in late 2023. These values propagate directly from the individual-well pumpage anomalies noted previously at ECW-7 (early 2018) and ECW-2 (late 2023) and are inconsistent with the typical operating range of the wellfield.

5.2 Groundwater Level Evaluation

Groundwater level data from the five ECW monitoring wells were reviewed for the period of record from January 2013 through late 2026 (**Figure B-1 to B-3**). Water levels are reported as elevations in feet relative to the National Geodetic Vertical Datum (NGVD).

The surficial aquifer system (SAS) monitoring wells (**Figure B-1**), ECW-SMW-50 and ECW-SMW-54, recorded water level elevations ranging from approximately 107 to 121 ft NGVD throughout the period of record. Both wells exhibit seasonal fluctuations of approximately 3 to 8 feet, with higher water levels during the wet season and lower levels during the dry season. These seasonal patterns are consistent with rainfall-driven recharge and evapotranspiration cycles. No significant long-term declining trends are apparent through most of the record, though both wells show a notable decline in late 2025 into 2026. This recent decline is consistent with regional drought conditions. The SWFWMD ROMP 39 Oak Knoll rainfall gauge recorded only 36.85 inches of total rainfall in 2025, compared to the long-term annual average of approximately 51.87 inches (based on complete years of record), a deficit of approximately 15 inches

(roughly 29 percent below normal) (SWFWMD, 2026). The observed late-2025 to 2026 decline in SAS water levels at ECW-SMW-50 and ECW-SMW-54 is therefore attributable to reduced rainfall-driven recharge rather than to wellfield operations, as the SAS is hydraulically separated from the UFA production zone by the intermediate confining unit. Water levels in the SAS are anticipated to recover with a return to more normal rainfall patterns. Monthly rainfall totals from the SWFWMD ROMP 39 Oak Knoll rainfall gauge are presented in Appendix D (Figure D-1).

The intermediate aquifer system (IAS) monitoring well (**Figure B-2**), ECW-IAMW-52, exhibited generally stable water levels, remaining within a range of approximately 105 to 110 ft NGVD under typical conditions with minimal seasonal variation. However, beginning in late 2023, water levels rose sharply to approximately 115 ft NGVD before declining through 2025 and into 2026. This anomalous rise warrants further review with the County and SWFWMD to confirm whether the response reflects actual aquifer conditions or a data or instrument-related adjustment. Under typical conditions, the stability of IAS water levels suggests that the intermediate confining unit is providing effective hydraulic separation between the SAS and the UFA production zone. The anomalous IAS rise in late 2023 is inconsistent with the concurrent rainfall record: 2023 was itself a drought year at the ROMP 39 gauge (approximately 36.7 inches, roughly 29 percent below the long-term average; Appendix D, Figure D-1), and a rising IAS water level during a dry year is not consistent with a rainfall-driven response. This pattern further supports investigation of instrument recalibration, well construction changes, or reporting adjustments as potential explanations for the observed rise.

The Upper Floridan Aquifer (UFA) monitoring wells (**Figure B-3**), ECW-UFMW-51 and ECW-UFMW-53, recorded water level elevations ranging from approximately 15 to 45 ft NGVD under typical conditions. These wells display more pronounced seasonal fluctuations of approximately 15 to 25 feet, reflecting the influence of seasonal pumping demand on the potentiometric surface of the production aquifer. Seasonal low water levels in the UFA correspond to the dry season when pumping rates are highest, and recovery occurs during the wet season when pumping is reduced. The data for ECW-UFMW-51 shows an anomalous decline in water levels beginning in mid-2024, with values dropping to approximately -8 ft NGVD before recovering by late 2024. ECW-UFMW-53 shows a corresponding but less severe decline during the same period. The magnitude of the UFMW-51 drop is not consistent with the drawdown response at the nearby UFMW-53 well, and the rainfall record is inconsistent with a drought-driven decline: 2024 was a wetter-than-average year at the ROMP 39 gauge (approximately 64 inches, roughly 23 percent above the long-term average; Appendix D, Figure D-1). Given the close proximity of the two wells and the absence of a comparable signal at UFMW-53, the anomaly is more likely to reflect a data or instrumentation issue at UFMW-51 rather than a hydrologic driver such as drought or increased regional pumping. Verification with the County and SWFWMD is recommended before the data are used for interpretation or modeling.

5.3 Water Quality Evaluation

Water quality data for total dissolved solids (TDS), chloride, and sulfate were reviewed for ECW production wells (ECW-1 through ECW-7) and monitoring wells (ECW-IAMW-52, ECW-UFMW-51, and ECW-UFMW-53) for the period of record from January 2013 through late 2026 (Figures C-1 through C-9). Water quality data were not available for the surficial aquifer system (SAS) monitoring wells (ECW-SMW-50 and ECW-SMW-54), as these wells are equipped for water level monitoring only. Results are compared to the applicable secondary maximum contaminant levels (SMCLs) established under the National Secondary Drinking Water Regulations.

5.3.1 Total Dissolved Solids (TDS)

TDS concentrations at all production and monitoring wells remained well below the SMCL of 500 mg/L throughout the period of record (**Figures C-1, C-2, and C-3**).

The IAS monitoring well (ECW-IAMW-52) recorded TDS concentrations within a notably narrow and stable range of approximately 250 to 290 mg/L throughout the period of record (**Figure C-1**). The minimal variability in TDS at this well is consistent with the relatively stable water levels observed in the IAS (Section 5.2) and further supports effective hydraulic separation provided by the intermediate confining unit. TDS concentrations in the IAS are within the same general range as those observed in the production wells, suggesting similar water quality conditions across the intermediate and Upper Floridan aquifer systems at this site.

TDS values across the production wells generally ranged from approximately 250 to 350 mg/L, with occasional values reaching approximately 355 mg/L at ECW-6 (**Figure C-2**). The UFA monitoring wells ECW-UFMW-51 and ECW-UFMW-53 exhibited TDS concentrations ranging from approximately 220 to 330 mg/L, with ECW-UFMW-51 generally plotting slightly higher than ECW-UFMW-53 (**Figure C-3**). No sustained upward trends in TDS are apparent at any well, and current data indicate stable water quality conditions within the production zone. Continued monitoring is recommended to confirm that these stable conditions persist.

5.3.2 Chloride

Chloride concentrations at all wells were consistently well below the SMCL of 250 mg/L throughout the period of record (**Figures C-4, C-5, and C-6**). Measured chloride values at the production wells generally ranged from approximately 9 to 13 mg/L (**Figure C-5**).

The IAS monitoring well (ECW-IAMW-52) recorded chloride concentrations within a remarkably narrow and stable range of approximately 10 to 12.5 mg/L throughout the period of record (**Figure C-4**). Similar to the TDS results, the minimal variability in chloride at this well is consistent with the stable hydraulic conditions observed in the IAS (Section 5.2) and further supports that the intermediate confining unit is effectively limiting vertical migration of water between the surficial and Floridan aquifer systems.

The UFA monitoring wells showed slightly more variability, with ECW-UFMW-51 ranging from approximately 10 to 16 mg/L and ECW-UFMW-53 ranging from approximately 9.5 to 11 mg/L (**Figure C-**

6). ECW-UFMW-51 consistently plots higher than ECW-UFMW-53, though both wells remain at concentrations far below any level of concern. A notable temporary decline in chloride was observed at ECW-UFMW-51 around 2022 to 2023, where values dropped from approximately 14 to 15 mg/L to approximately 10 mg/L before recovering. The uniformly low and stable chloride concentrations across all wells indicate no current evidence of saltwater intrusion or upward migration of saline water into the production zone based on the available data.

5.3.3 Sulfate

Sulfate concentrations at all wells remained well below the SMCL of 250 mg/L throughout the period of record (**Figures C-7, C-8, and C-9**). Sulfate values at the production wells generally ranged from approximately 60 to 95 mg/L, with ECW-6 and ECW-7 tending to plot at the higher end of the range (**Figure C-8**).

The IAS monitoring well (ECW-IAMW-52) recorded sulfate concentrations ranging from approximately 0 to 4 mg/L throughout the period of record (**Figure C-7**), which are markedly lower than concentrations observed in both the production wells and the UFA monitoring wells. This distinct geochemical signature is consistent with the different hydrochemical characteristics of the intermediate aquifer system in this area and further supports effective hydraulic separation between the SAS and the UFA production zone. Sulfate values at this well also appear to show a general decrease over the period of record, with concentrations more frequently at or near 0 mg/L from approximately 2022 onward.

The UFA monitoring wells showed distinct separation, with ECW-UFMW-53 ranging from approximately 62 to 71 mg/L and ECW-UFMW-51 exhibiting lower and more variable concentrations of approximately 37 to 69 mg/L (**Figure C-9**). ECW-UFMW-51 shows a notable decline in sulfate beginning around 2022, dropping to approximately 37 mg/L before partially recovering, which may correspond to the anomalous water level changes observed at this well during the same period (Section 5.2). No significant upward trends in sulfate concentrations are apparent at any well, and available data indicate stable geochemical conditions.

6. Summary

WSP conducted a planning-level hydrogeologic evaluation of the East County Wellfield (ECW) in support of the FDEP SAHM facilities plan. The evaluation encompassed pumpage records, groundwater level monitoring data, and water quality results spanning January 2013 through late 2026. The principal findings are as follows:

The ECW has been operated in a manner consistent with SWFWMD-permitted wellfields in the region. Pumpage records confirm a seasonal withdrawal pattern, with higher production during the dry season (November through May) and reduced withdrawals during the wet season (June through end of September). The County employs a well rotation strategy across the seven production wells, cycling

individual wells on and off to distribute aquifer stress. Wells ECW-1, ECW-3, and ECW-5 have operated most consistently, while ECW-6 has exhibited the most intermittent use. When active, individual wells typically produce 50 to 150 MG per month, with seasonal peaks occasionally reaching 150 to 175 MG. Anomalous pumpage values identified at ECW-2 (approximately 820 MG in late 2023) and ECW-7 (approximately 470 MG in early 2018) are inconsistent with the typical operating range and likely represent data reporting errors.

Water levels in the SAS have remained generally stable throughout most of the period of record, with seasonal fluctuations between approximately 107 and 121 ft NGVD in response to rainfall and evapotranspiration, though both SAS wells show a notable decline in late 2025 into 2026 that coincides with a pronounced regional rainfall deficit (36.85 inches at the SWFWMD ROMP 39 Oak Knoll gauge in 2025 versus a long-term annual average of approximately 51.87 inches, roughly 29 percent below normal; Appendix D, Figure D-1), consistent with reduced recharge to the shallow aquifer. IAS water levels at ECW-IAMW-52 remain generally stable under typical conditions (approximately 105 to 110 ft NGVD), indicating that the intermediate confining unit provides effective hydraulic separation between the shallow and deep aquifer systems; however, an anomalous rise to approximately 115 ft NGVD beginning in late 2023 warrants verification with the County and SWFWMD. UFA potentiometric levels range from approximately 20 to 45 ft NGVD under typical conditions, with seasonal fluctuations of 15 to 25 feet corresponding to pumping cycles. The consistent seasonal recovery of UFA water levels during the wet season is consistent with withdrawal rates that have not resulted in long-term declines under recent conditions. Anomalous water level declines at ECW-UFMW-51 beginning in late 2023, with values dropping to approximately -8 ft NGVD before recovering by mid-2024, are most likely attributable to a data error or instrumentation issue at that well, as 2024 was a wetter-than-average year at the ROMP 39 Oak Knoll gauge (approximately 23 percent above the long-term average; Appendix D, Figure D-1), which is inconsistent with a drought-driven decline, and the closely spaced ECW-UFMW-53 well shows no comparable signal. This anomaly should be verified with the County and SWFWMD to confirm whether the data should be flagged or corrected in the record.

All monitored water quality parameters (TDS, chloride, and sulfate) have remained well below applicable SMCLs at all production and monitoring wells throughout the period of record. TDS concentrations range from approximately 250 to 350 mg/L (SMCL = 500 mg/L), chloride concentrations are uniformly below 16 mg/L (SMCL = 250 mg/L), and sulfate concentrations range from approximately 60 to 95 mg/L at the production wells (SMCL = 250 mg/L). The IAS monitoring well (ECW-IAMW-52) exhibits distinctly low sulfate concentrations (0 to 4 mg/L), consistent with the geochemical signature of the intermediate aquifer system. The available data do not indicate saltwater intrusion, upconing of deeper saline water, or progressive water quality degradation at any monitored location during the evaluation period.

7. Recommendations

Based on the findings of this evaluation, the hydrogeologic conditions at the ECW are favorable for the construction of additional supply wells as part of the proposed redundant pipeline and wellfield expansion project. The following recommendations are provided for consideration during the facilities planning and design phases:

1) **New Production Well Siting**: New supply wells should be sited to maintain adequate spacing from existing production wells (ECW-1 through ECW-7) to minimize well interference and drawdown overlap. Well spacing should also consider the existing well rotation strategy to allow operational flexibility. The southern and eastern portions of the wellfield area, where available monitoring data suggest favorable aquifer conditions, should be considered among the potential locations to be evaluated during design.

2) **Well Construction:** New production wells should be constructed to specifications consistent with the existing ECW wells, with 20-inch diameter casing extending to approximately 500 to 580 ft bls and open-hole completions into the UFA to approximately 1,200 to 1,250 ft bls. Final casing and total depths should be determined based on site-specific geophysical logging and aquifer testing during construction.

3) **Monitoring Well Network**: The addition of new supply wells may necessitate the installation of supplemental monitoring wells to satisfy WUP compliance requirements and to monitor the effects of expanded withdrawals on the surrounding hydrogeologic system. Monitoring well locations and completion intervals should be coordinated with SWFWMD during the WUP modification process, if required.

4) **Groundwater Modeling Support:** The groundwater flow model currently being developed under the separate WUP modification scope should be used to quantitatively evaluate potential well locations, simulate the effects of expanded withdrawals on the UFA potentiometric surface, and assess potential impacts to nearby environmental features and existing permitted users. Model results are expected to provide useful input for optimizing the wellfield configuration and supporting the WUP modification application.

5) **Step Drawdown Testing**: Following construction of the new supply wells, step drawdown (yield) tests should be conducted on each well to confirm well efficiency, establish sustainable yield, and assess interference with existing production wells. Results should be used to refine the groundwater model and establish baseline conditions.

8. Limitations

This memorandum has been prepared for the specific purpose described herein, at the request of and for the exclusive use of the Client. The observations, conclusions, and recommendations presented represent professional opinions based on the scope of services performed, data collected through site-specific measurements and observations by WSP USA, and review and interpretation of relevant published and unpublished information.

The evaluation may include interpretation of subsurface conditions, groundwater flow, and hydrogeologic characteristics between monitoring locations and beyond the depth of available data. Temporal trends and variability in climatic, hydrologic, and water-quality parameters may also be inferred based on available datasets. These interpretations are inherently limited by the spatial and temporal resolution of the data and are intended to be representative rather than definitive. No responsibility is assumed for differences between the conditions described herein and conditions that may be observed in future investigations or monitoring events.

Data used in this evaluation were obtained from publicly available databases maintained by the Southwest Florida Water Management District (SWFWMD) and from records provided by Manatee County Utilities. WSP has not independently verified the accuracy or completeness of the data provided by others. Anomalous values identified in the pumpage records (e.g., ECW-2 and ECW-7) have been noted in the text but have not been corrected or excluded from the dataset, as the source and nature of these anomalies could not be confirmed within the current scope of services.

Unless otherwise agreed to in writing, WSP USA assumes no responsibility for the use of, or reliance upon, this memorandum by any party other than the Client. Any use of this memorandum by third parties is undertaken at their own risk, and WSP USA disclaims liability for any loss, damage, or expense arising from such use.

9. Signatures

Prepared by



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10. References

Florida Department of Environmental Protection (FDEP). Supplemental Appropriations for Hurricanes Helene and Milton (SAHM) Program.

Manatee County Utilities. Water Use Permit No. 13343. Southwest Florida Water Management District.

Southwest Florida Water Management District (SWFWMD). Water Management Information System (WMIS), including groundwater level and water quality records for ECW monitoring wells and the ROMP 39 Oak Knoll rainfall gauge (Station No. 25611). Accessed June and July 2026. https://www.swfwmd.state.fl.us/resources/data-maps

11. Figures

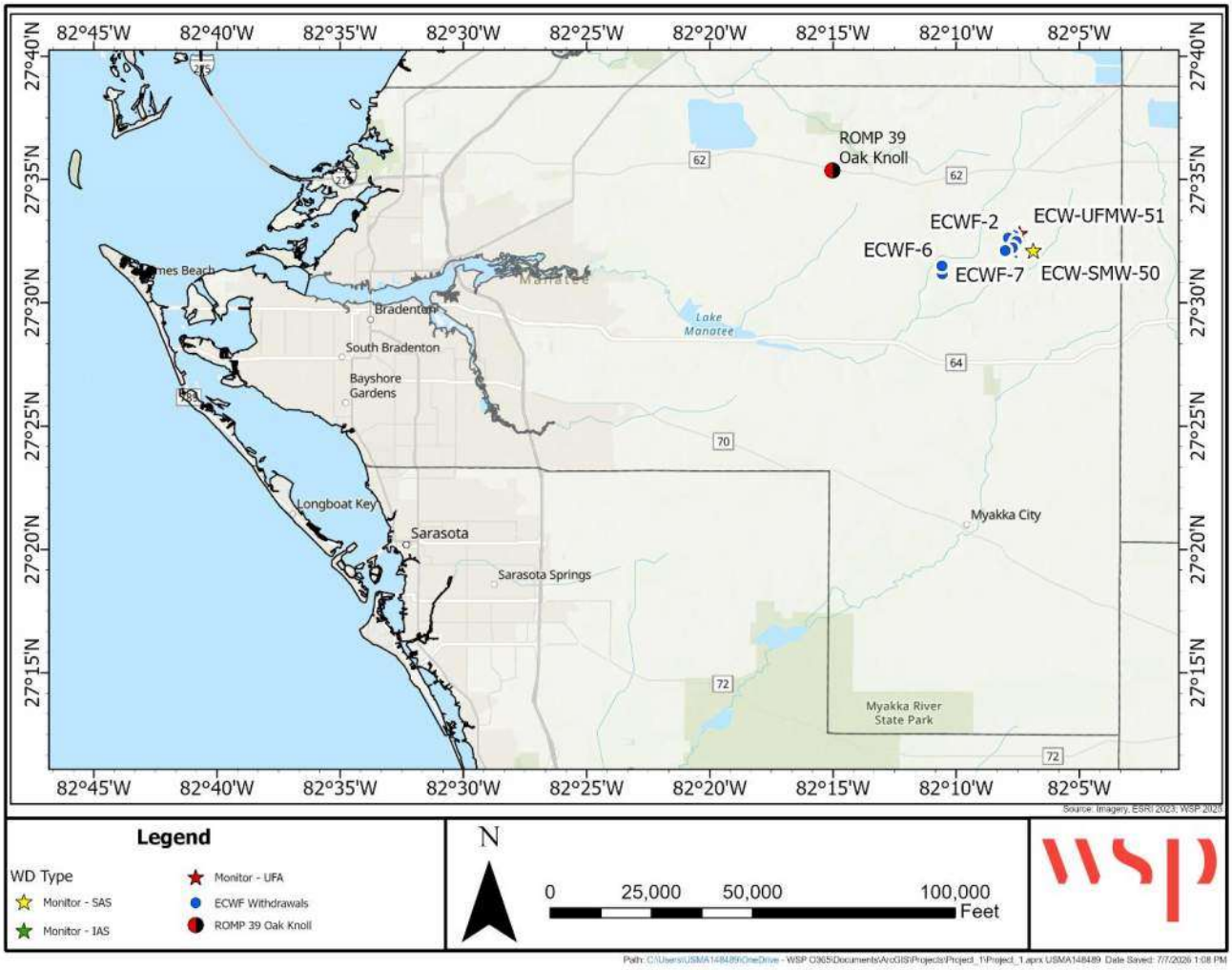


Figure 1 Site location map showing the East County Wellfield (ECW) production wells (ECW-1 through ECW-7), monitoring wells (ECW-SMW-50, ECW-UFMW-51, ECW-IAMW-52, ECW-UFMW-53, and ECW-SMW-54) under WUP No. 13343, and the nearby SWFWMD ROMP 39 Oak Knoll rainfall gauge (Station No. 25611) used for the climate context in Appendix E.

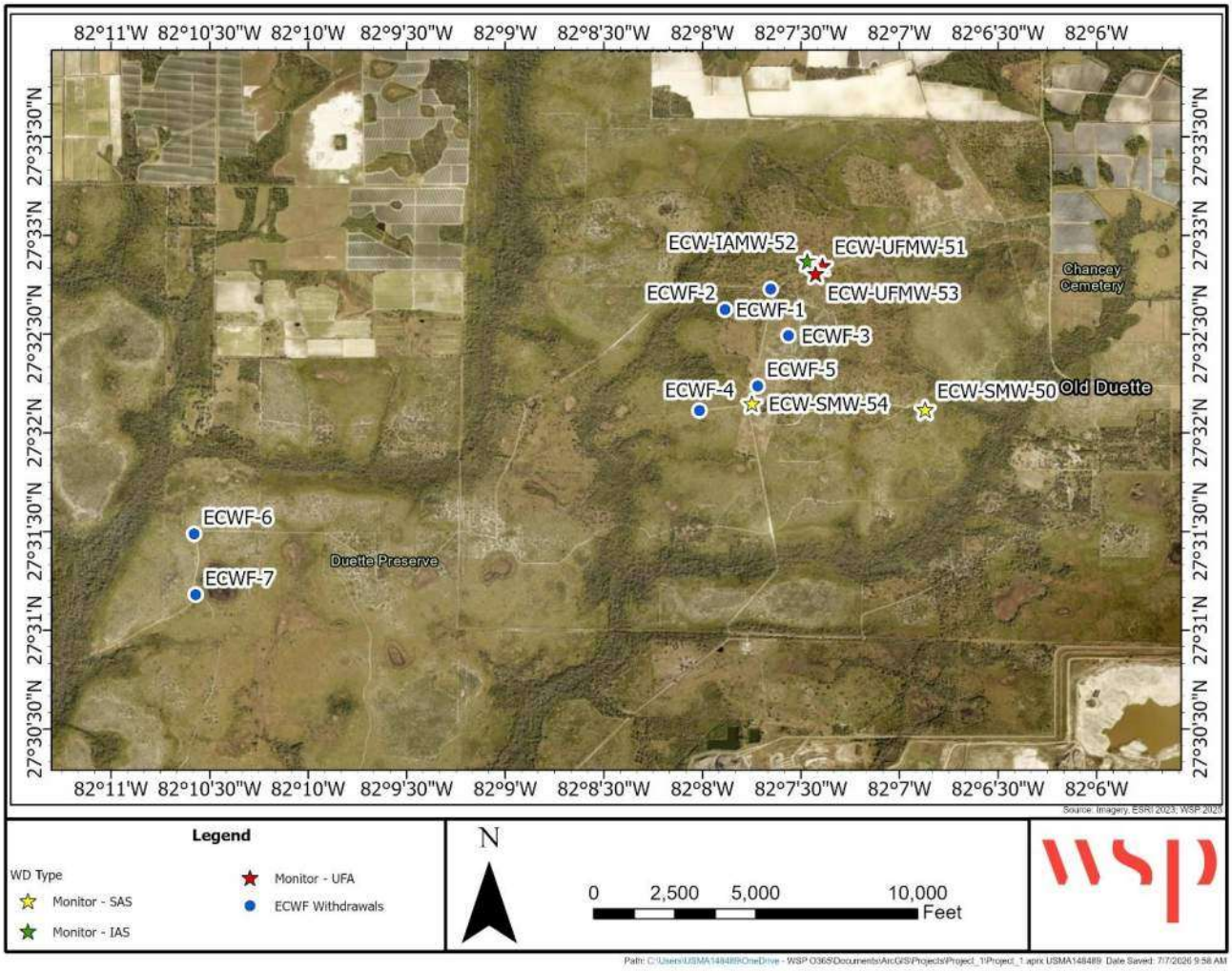


Figure 2 Detailed view of the East County Wellfield (ECW) showing groundwater production wells (ECW-1 through ECW-7), surficial monitoring wells (ECW-SMW-50 and ECW-SMW-54), Upper Floridan monitoring wells (ECW-UFMW-51 and ECW-UFMW-53), and intermediate aquifer monitoring well (ECW-IAMW-52).

Appendix A: Individual Production Well Pumpage

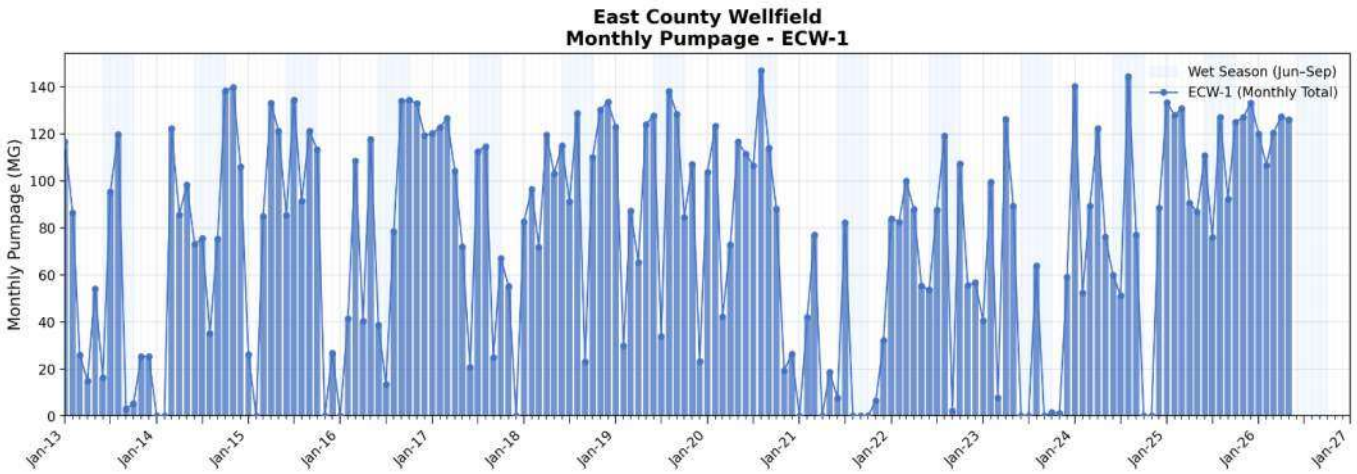


Figure A-1 Monthly pumpage (MG) for production well ECW-1 (District ID 128), January 2013 through late 2026. Shaded bands indicate the wet season (June through the end of September).

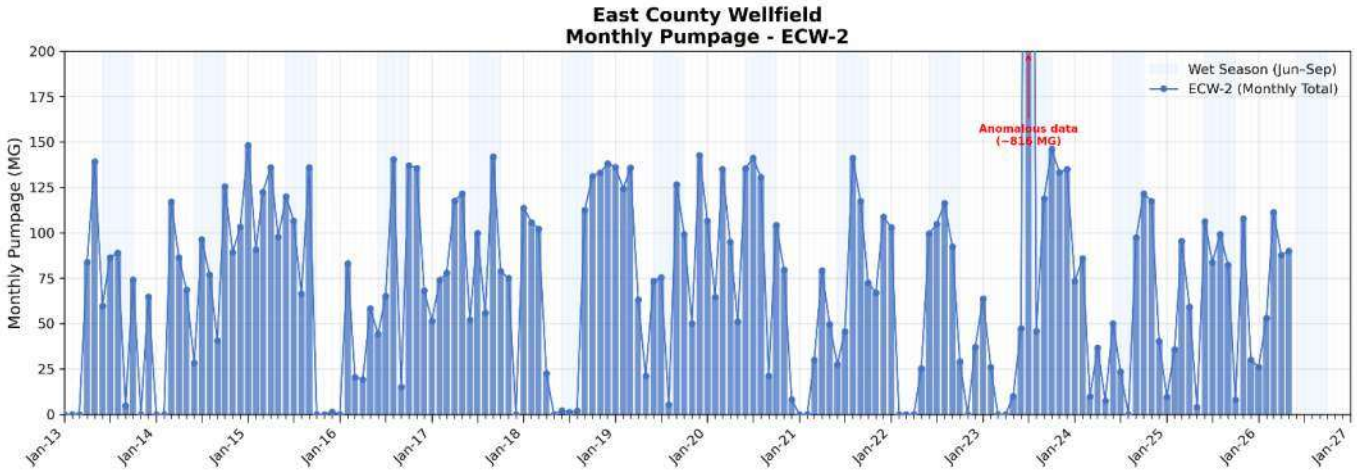


Figure A-2 Monthly pumpage (MG) for production well ECW-2 (District ID 129), January 2013 through late 2026.

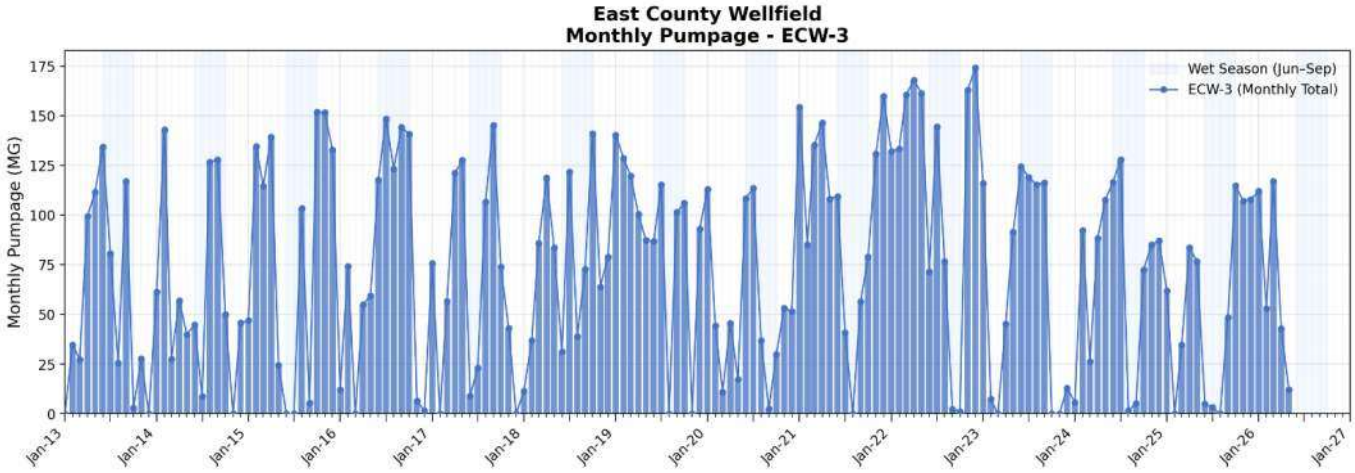


Figure A-3 Monthly pumpage (MG) for production well ECW-3 (District ID 130), January 2013 through late 2026.

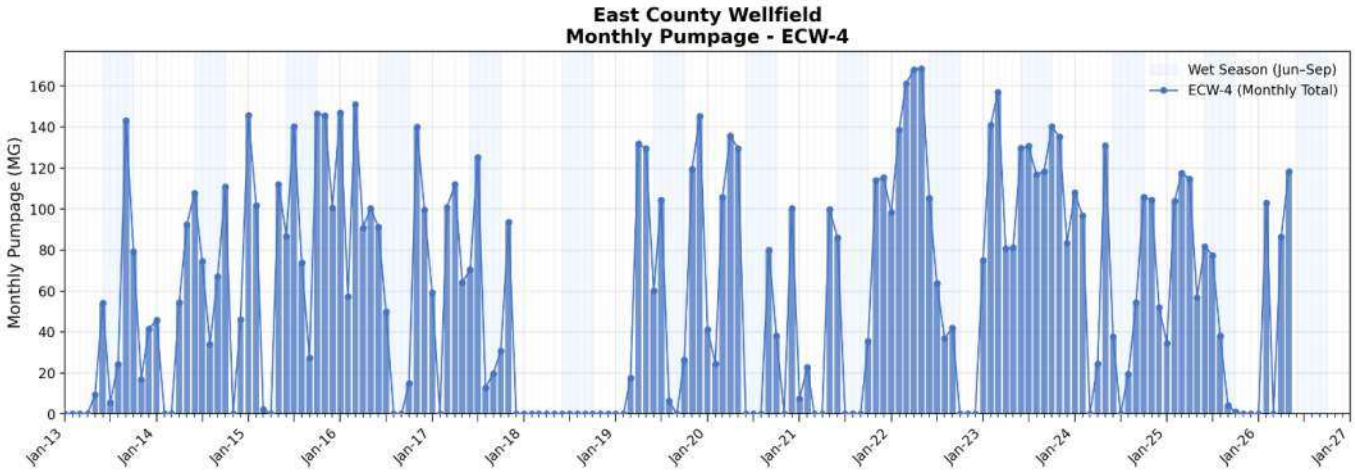


Figure A-4 Monthly pumpage (MG) for production well ECW-4 (District ID 131), January 2013 through late 2026.

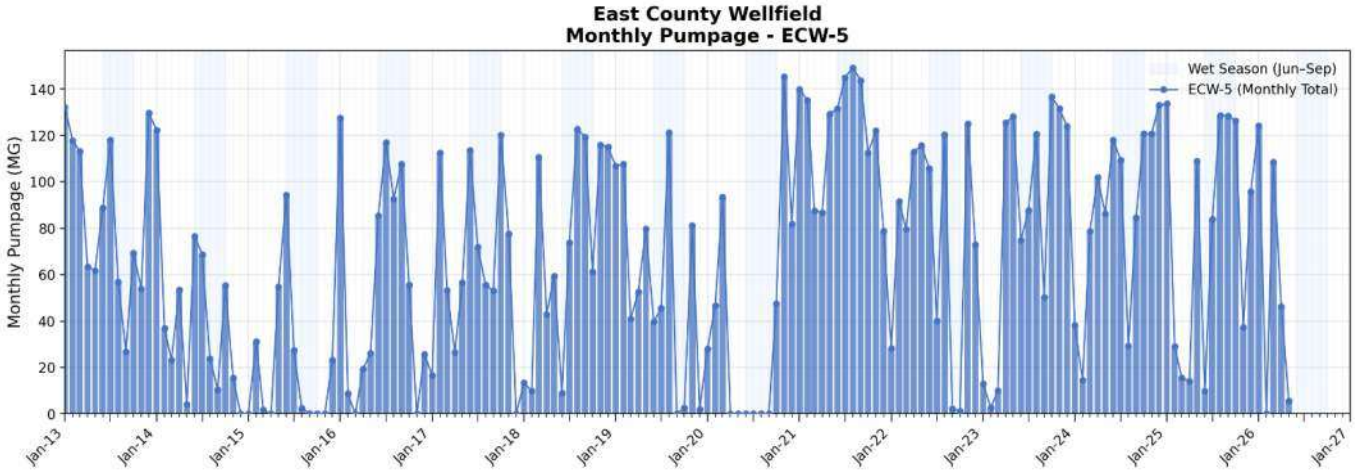


Figure A-5 Monthly pumpage (MG) for production well ECW-5 (District ID 132), January 2013 through late 2026.

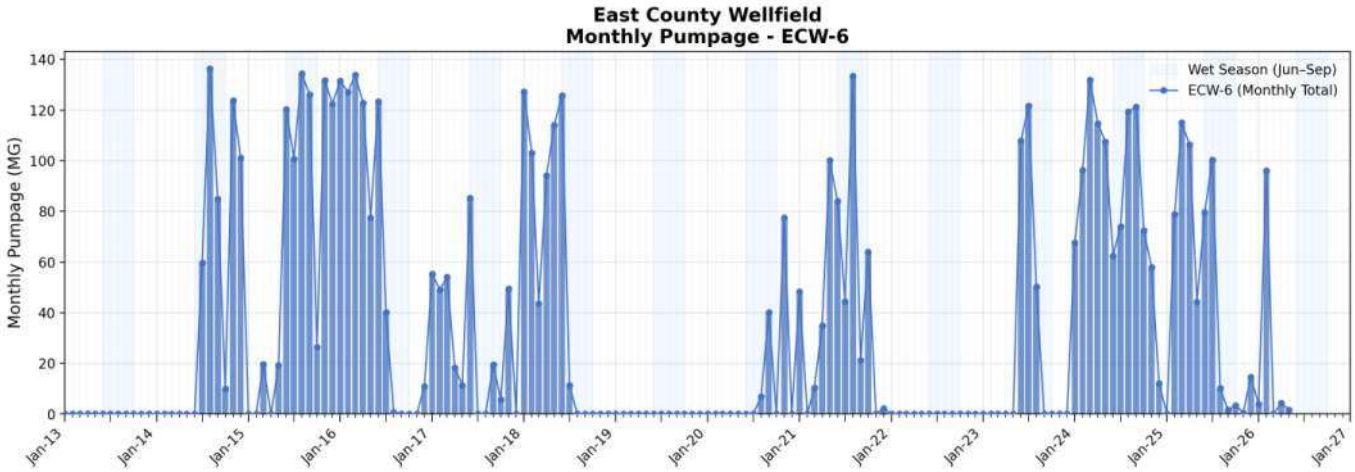


Figure A-6 Monthly pumpage (MG) for production well ECW-6 (District ID 133), January 2013 through late 2026.

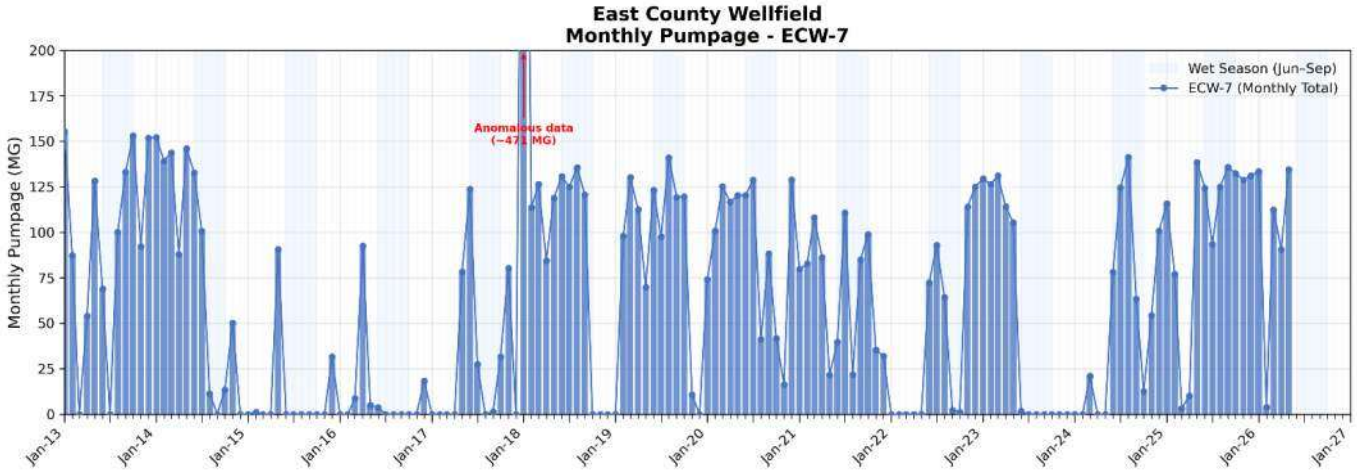


Figure A-7 Monthly pumpage (MG) for production well ECW-7 (District ID 134), January 2013 through late 2026.

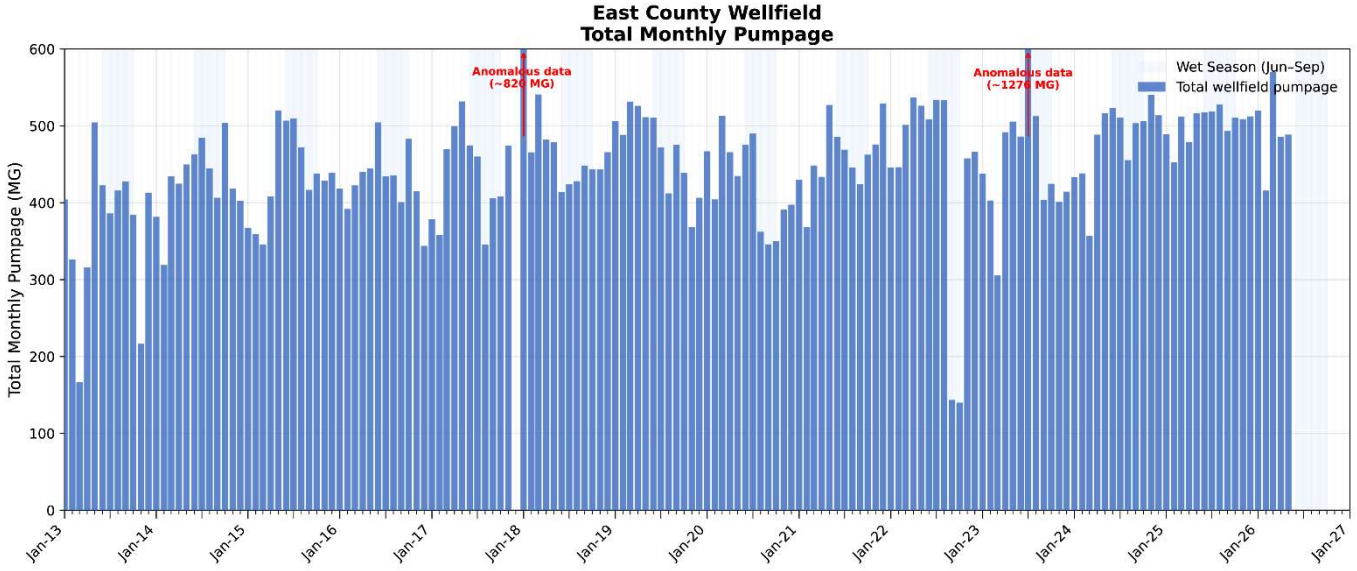


Figure A-8 Total monthly pumpage (MG) for all production wells ECW-1 through ECW-7, January 2013 through late 2026".

Appendix B: Ground Water Levels

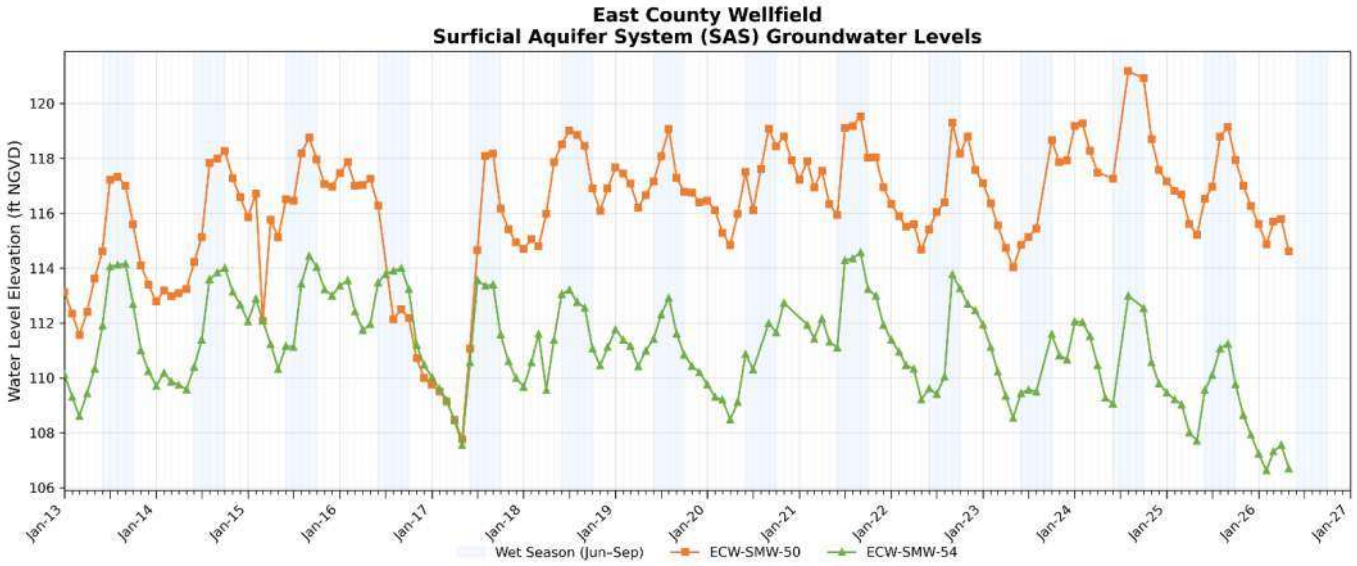


Figure B-1 Groundwater level elevations (ft NGVD) at surficial aquifer system (SAS) monitoring wells ECW-SMW-50 and ECW-SMW-54. Shaded bands indicate the wet season (June through the end of September).

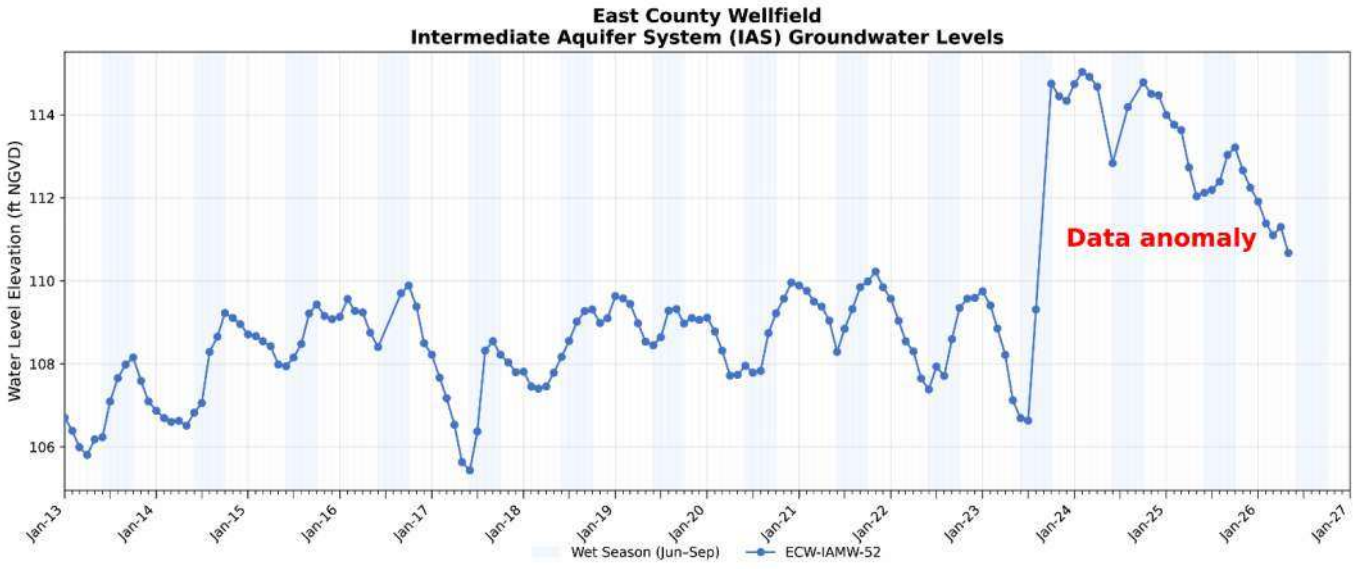


Figure B-2 Groundwater level elevations (ft NGVD) at intermediate aquifer system (IAS) monitoring well ECW-IAMW-52.

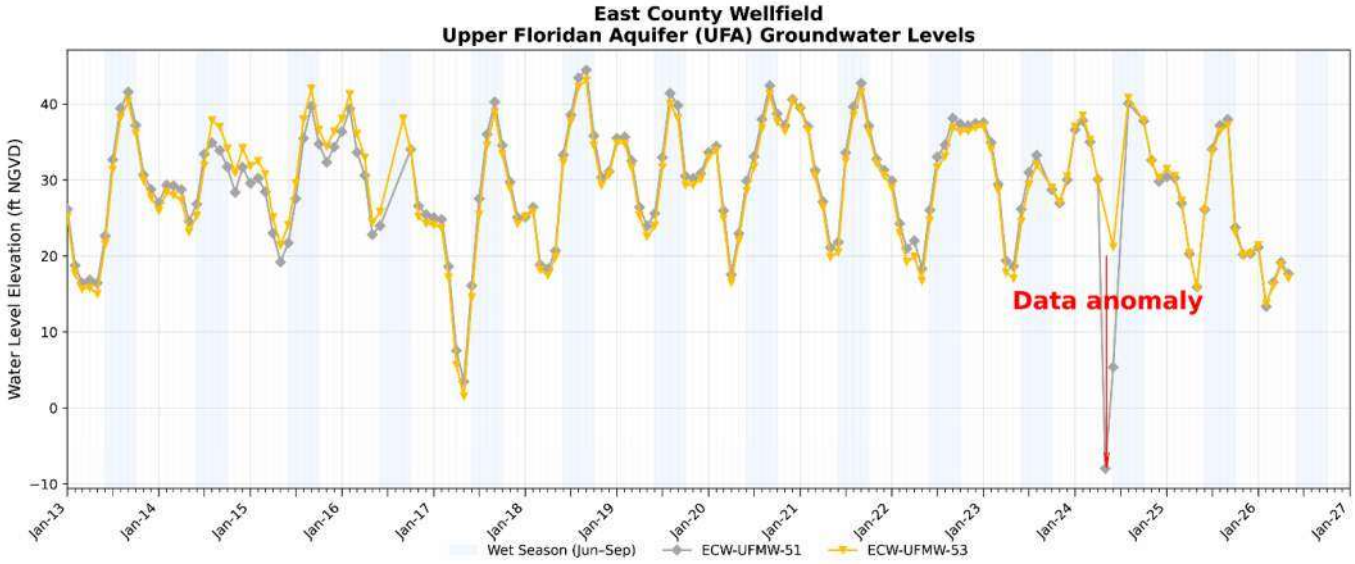


Figure B-3 Groundwater level elevations (ft NGVD) at Upper Floridan Aquifer (UFA) monitoring wells ECW-UFMW-51 and ECW-UFMW-53.

Appendix C: Water Quality

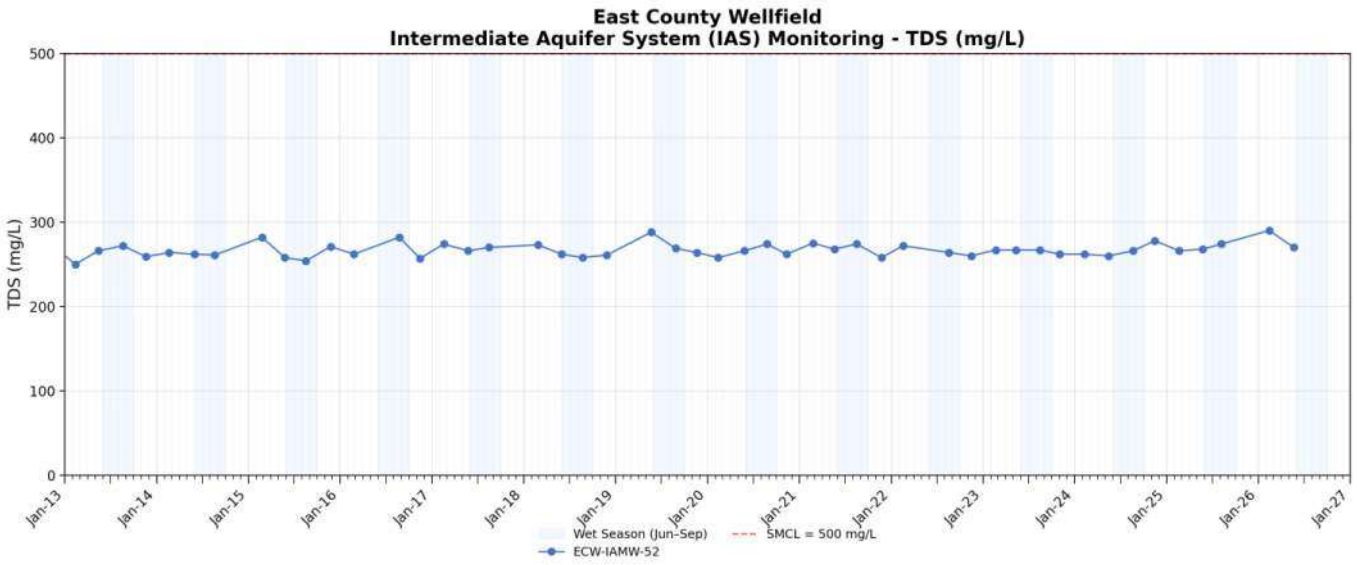


Figure C-1 Total dissolved solids (TDS) concentrations (mg/L) at the intermediate aquifer system (IAS) monitoring well ECW-IAMW-52, January 2013 through late 2026. Shaded bands indicate the wet season (June through the end of September).

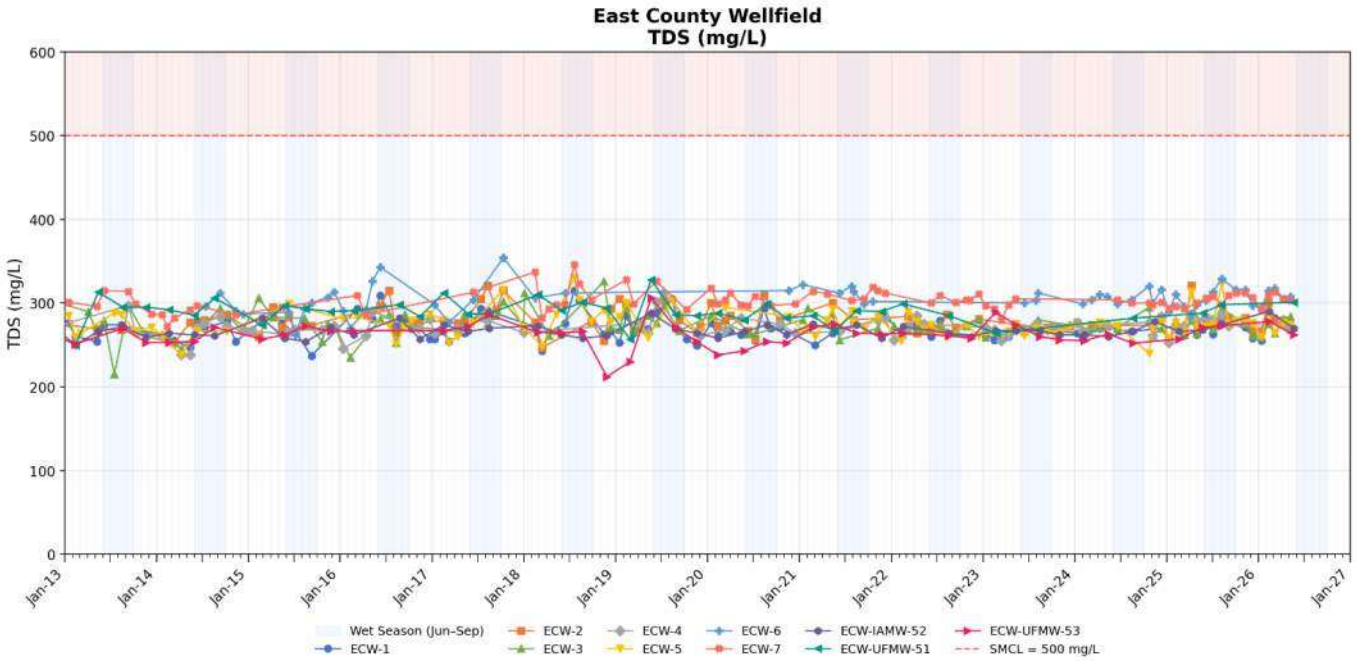


Figure C-2 Total dissolved solids (TDS) concentrations (mg/L) at ECW production wells (ECW-1 through ECW-7), January 2013 through late 2026. The dashed red line represents the secondary MCL (SMCL) of 500 mg/L.

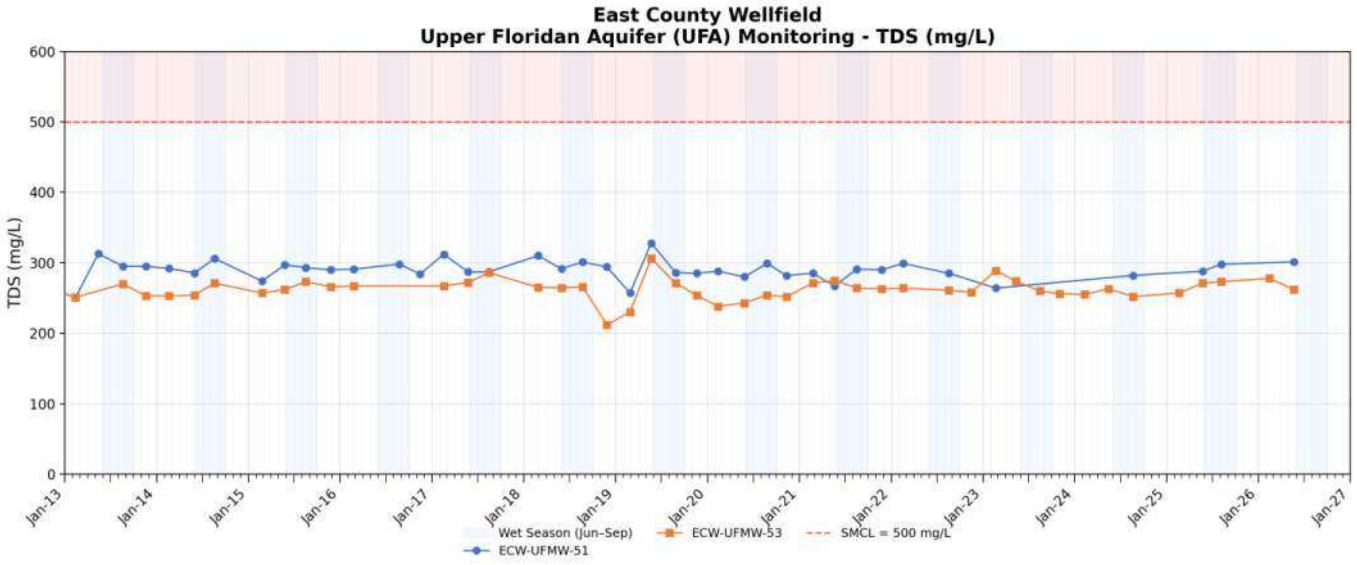


Figure C-3 Total dissolved solids (TDS) concentrations (mg/L) at Upper Floridan Aquifer (UFA) monitoring wells ECW-UFMW-51 and ECW-UFMW-53, January 2013 through late 2026. The dashed red line represents the secondary MCL (SMCL) of 500 mg/L.

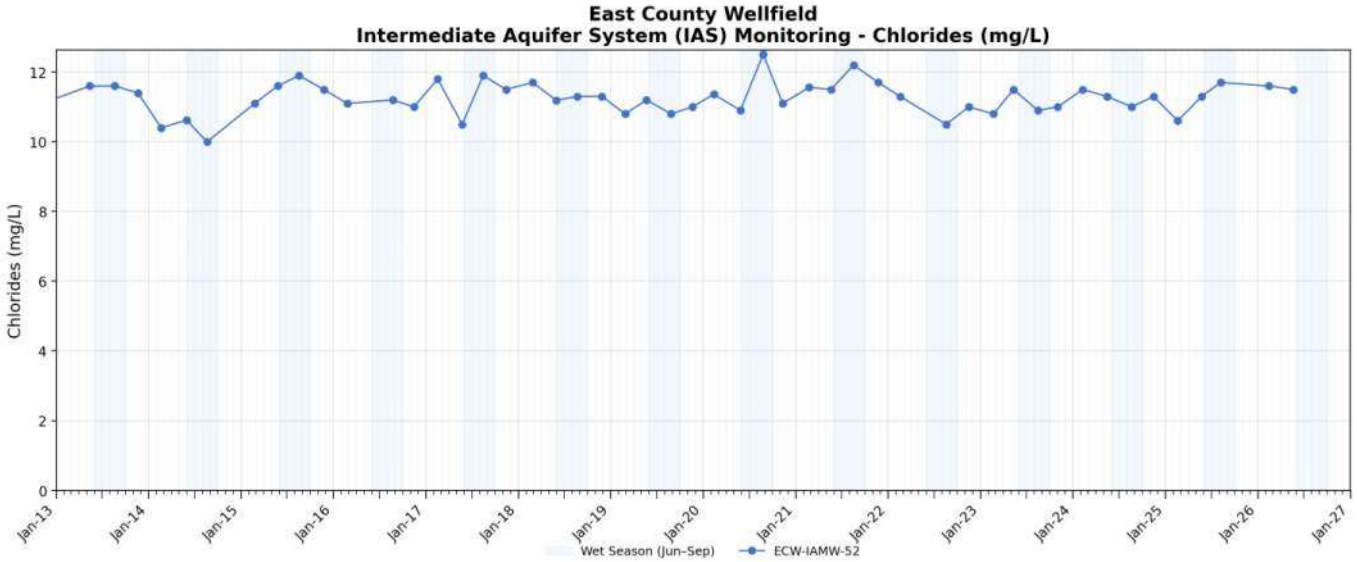


Figure C-4 Chloride concentrations (mg/L) at the intermediate aquifer system (IAS) monitoring well ECW-IAMW-52, January 2013 through late 2026.

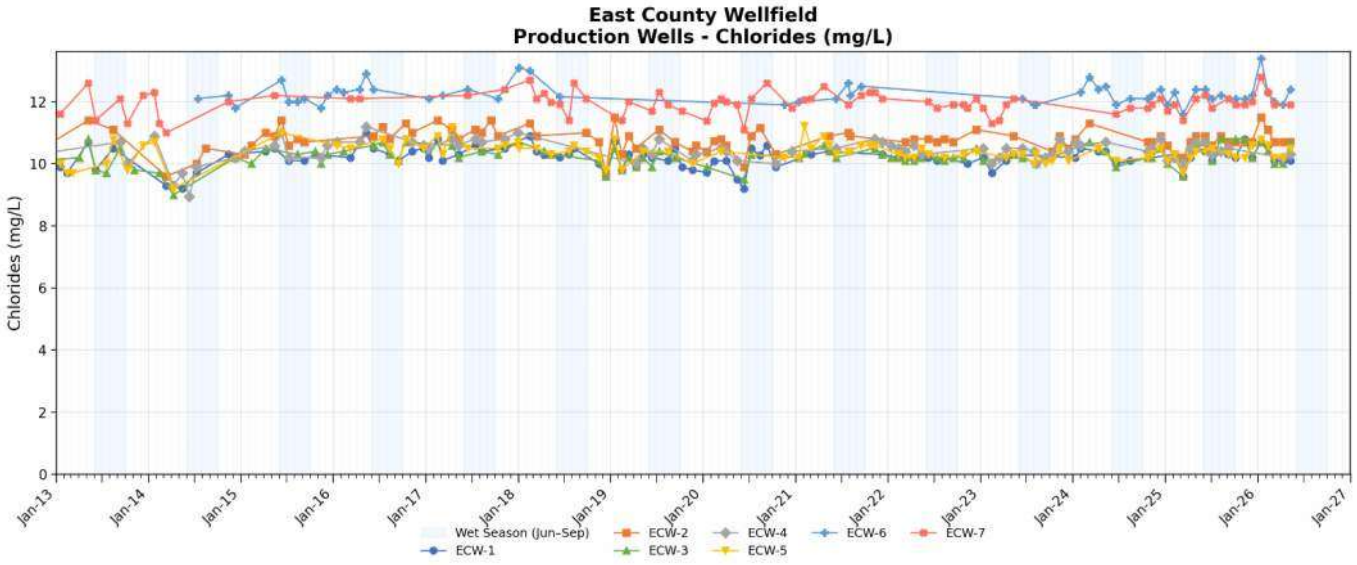


Figure C-5 Chloride concentrations (mg/L) at ECW production wells (ECW-1 through ECW-7), January 2013 through late 2026.

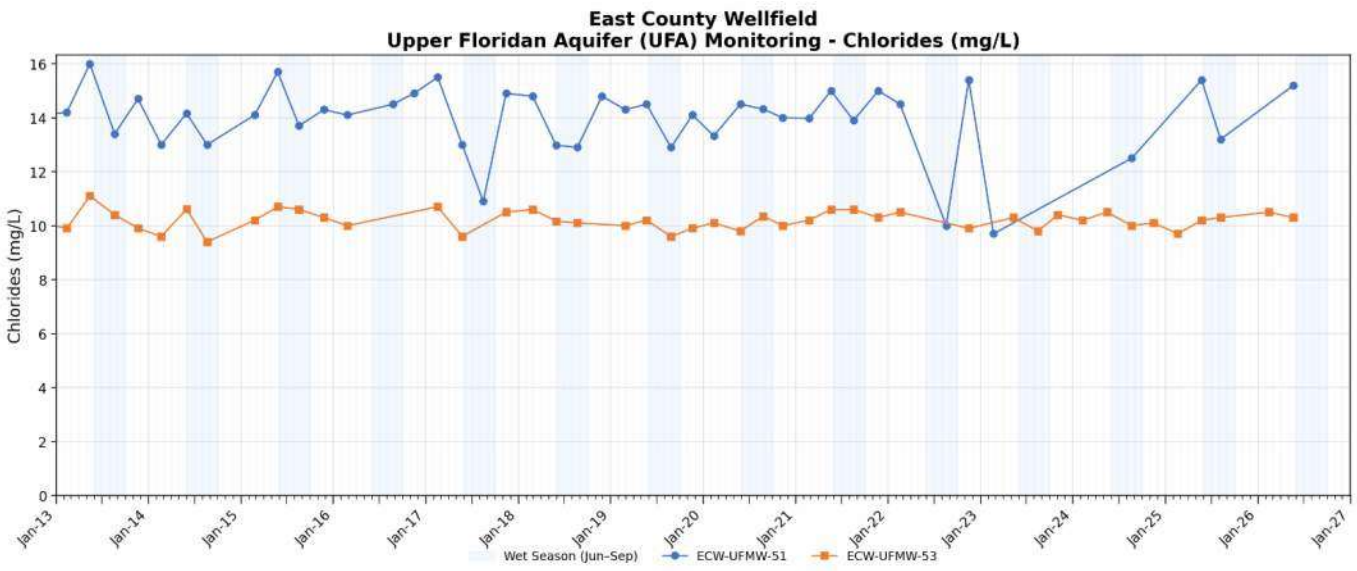


Figure C-6 Chloride concentrations (mg/L) at Upper Floridan Aquifer (UFA) monitoring wells ECW-UFMW-51 and ECW-UFMW-53, January 2013 through late 2026.

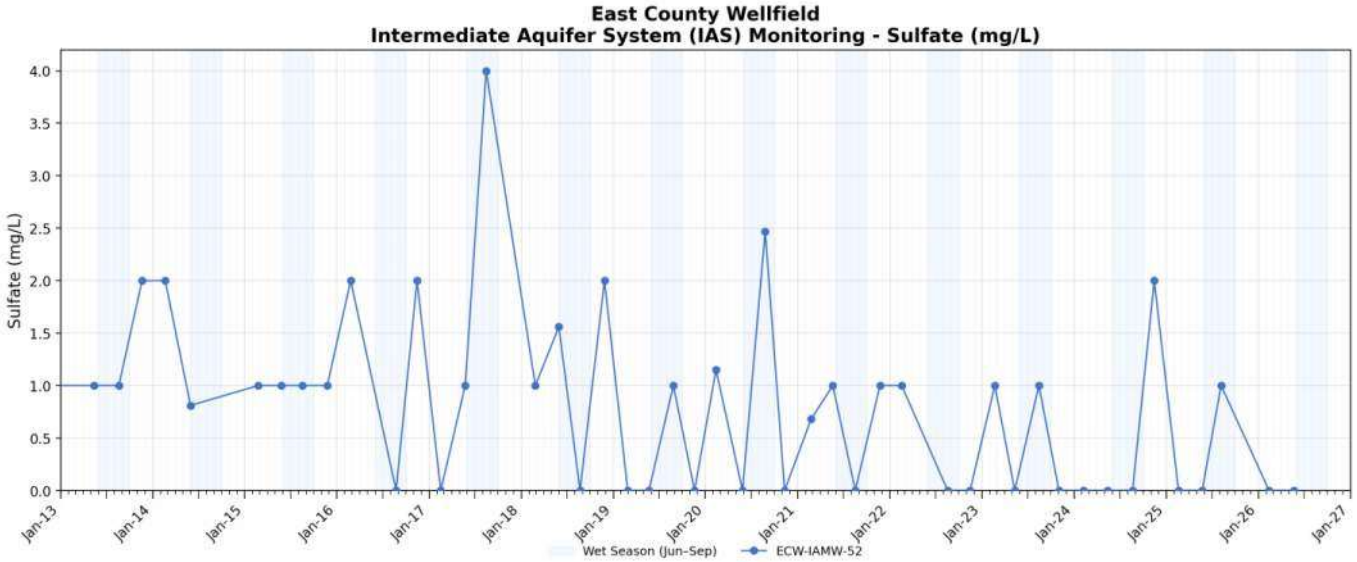


Figure C-7 Sulfate concentrations (mg/L) at the intermediate aquifer system (IAS) monitoring well ECW-IAMW-52, January 2013 through late 2026.

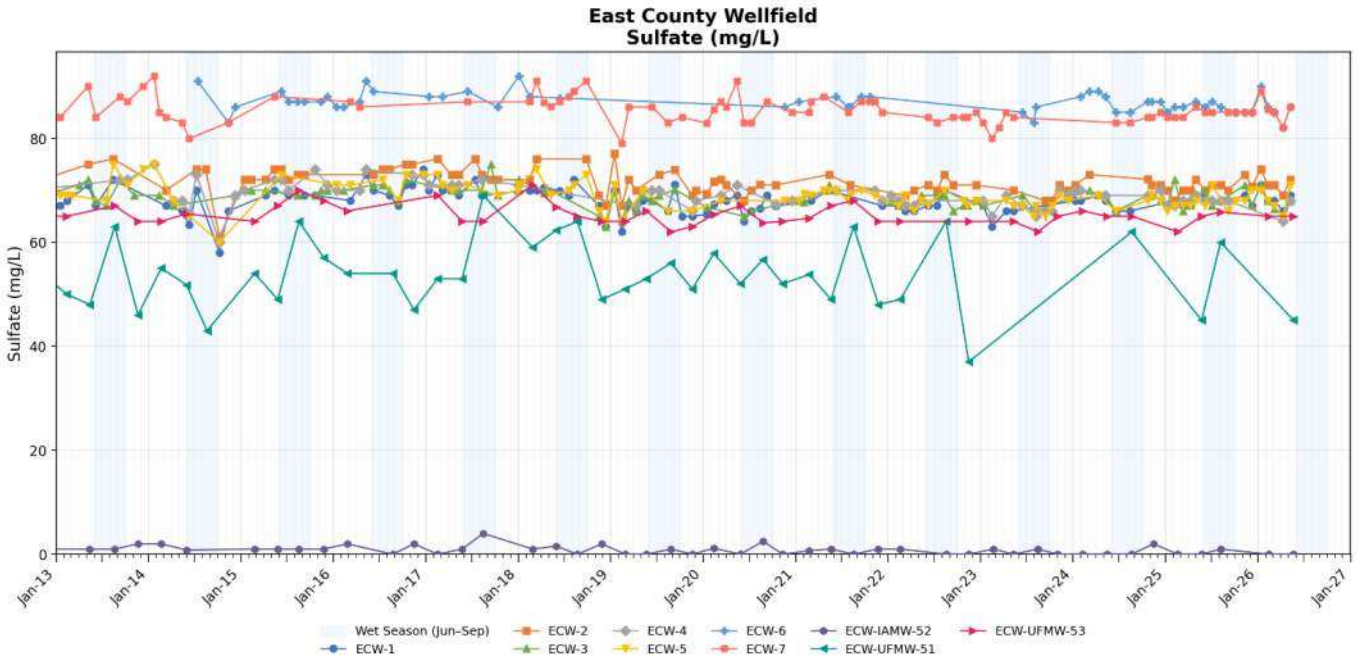


Figure C-8 Sulfate concentrations (mg/L) at ECW production wells (ECW-1 through ECW-7), January 2013 through late 2026.

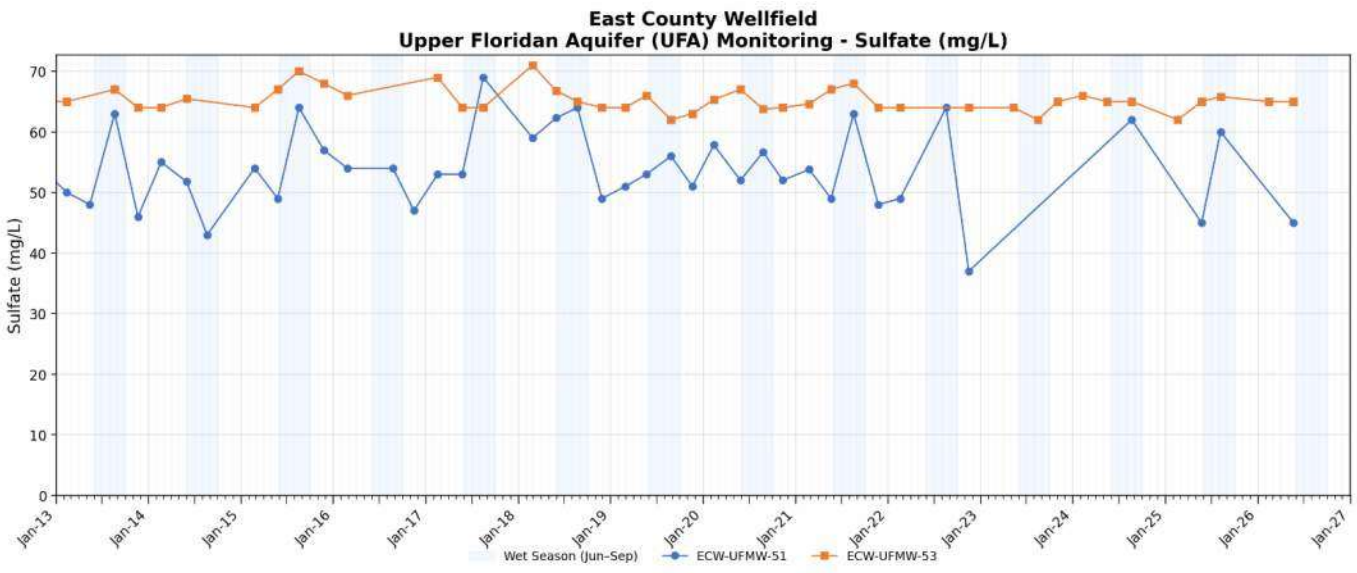


Figure C-9 Sulfate concentrations (mg/L) at Upper Floridan Aquifer (UFA) monitoring wells ECW-UFMW-51 and ECW-UFMW-53, January 2013 through late 2026.

Appendix E: Rainfall

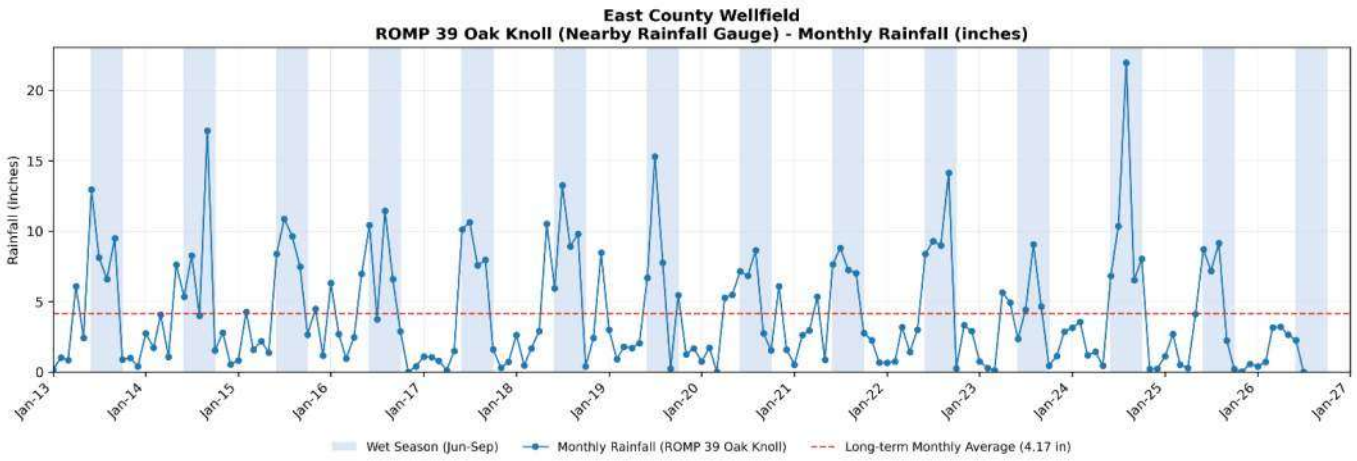
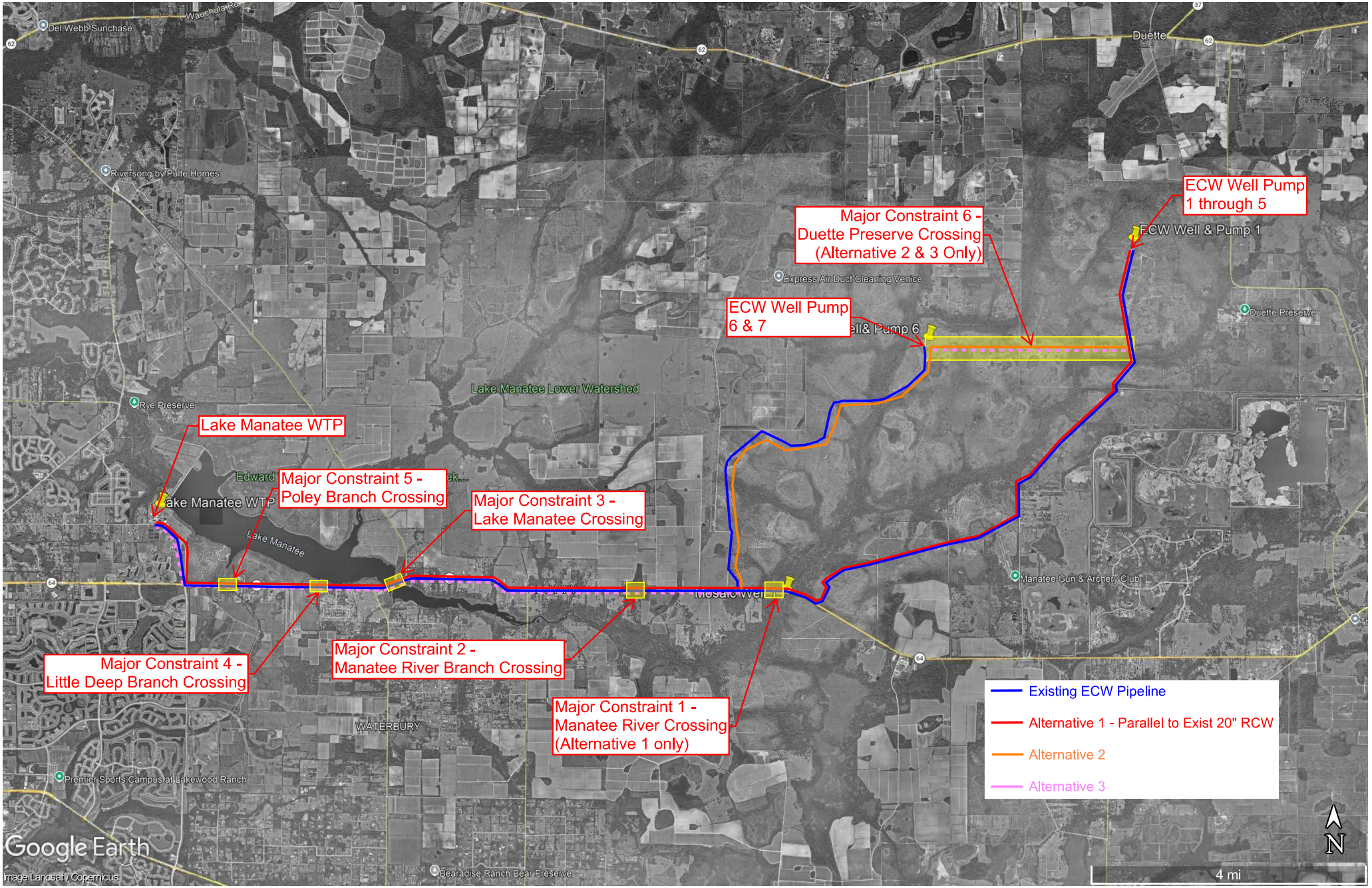
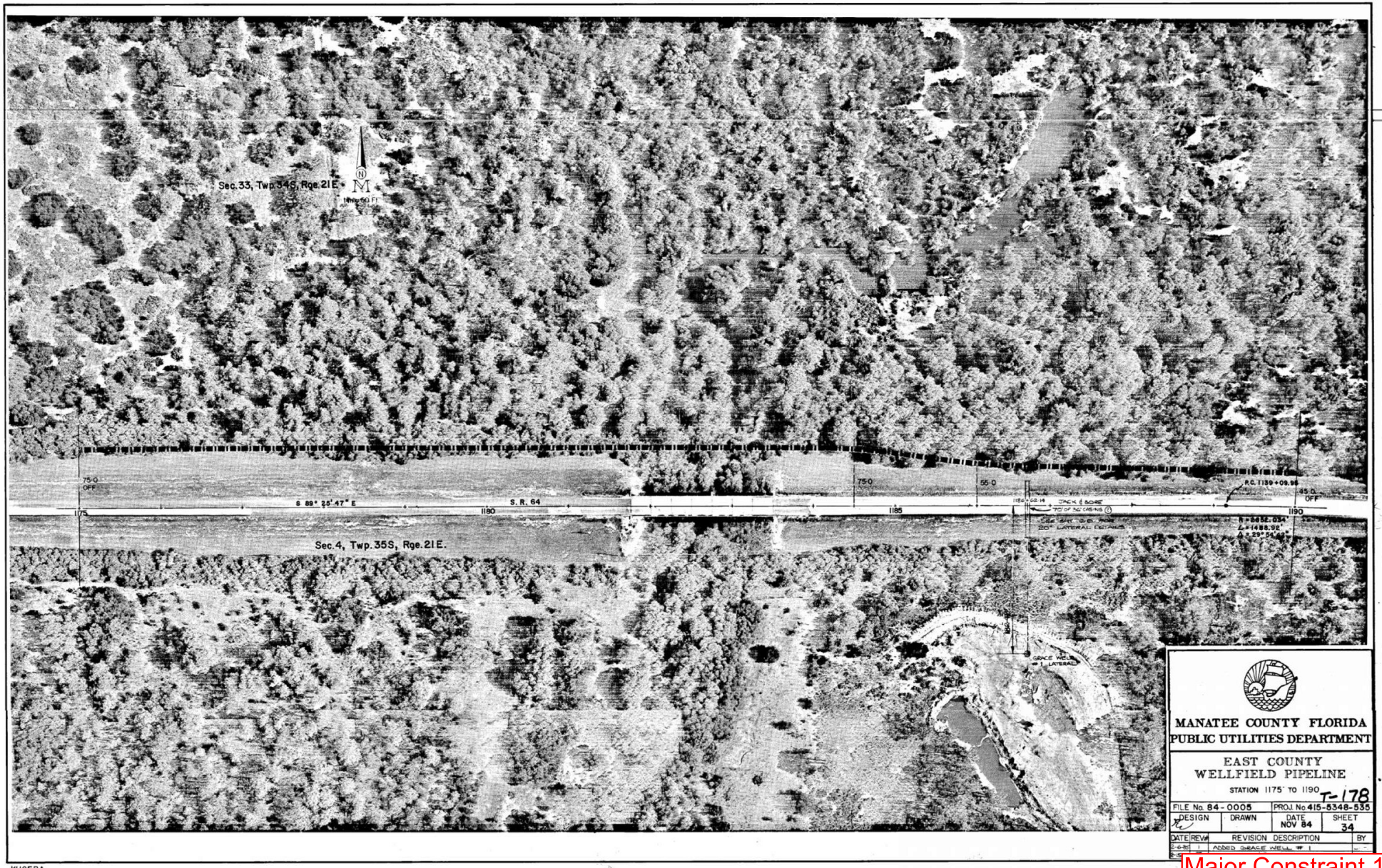


Figure D-1 Monthly rainfall totals (inches) at the SWFWMD ROMP 39 Oak Knoll rainfall gauge (Station No. 25611), January 2013 through mid-2026, with the long-term monthly average of approximately 4.17 inches shown for reference. Shaded bands indicate the wet season (June through the end of September).

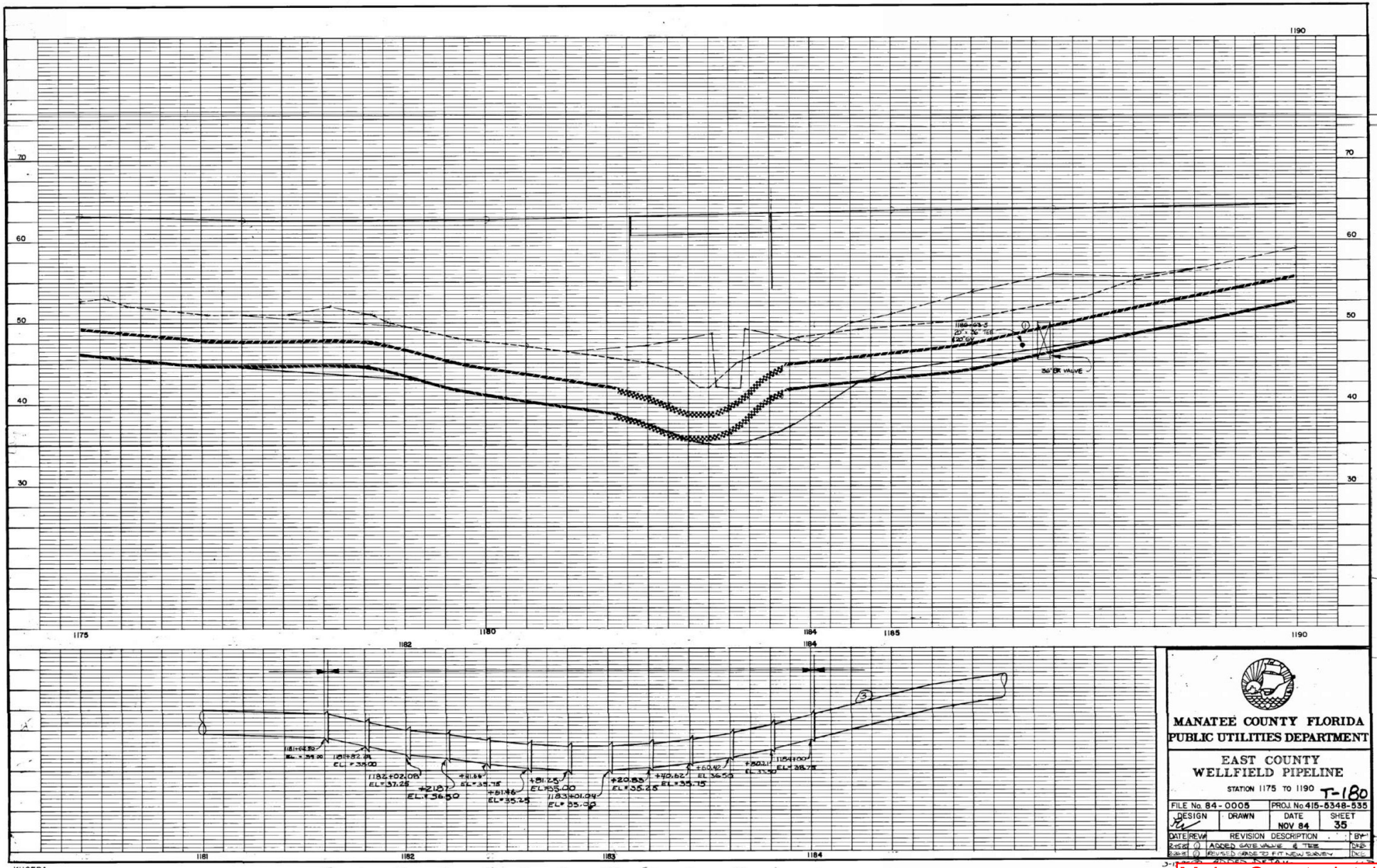
APPENDIX H

MAJOR CROSSINGS AND TRANSMISSION MAIN RECORD DRAWINGS


Lake Manatee WTP
Major Constraint 5 - Poley Branch Crossing
Major Constraint 3 - Lake Manatee Crossing
Major Constraint 4 - Little Deep Branch Crossing
Major Constraint 2 - Manatee River Branch Crossing
Major Constraint 1 - Manatee River Crossing (Alternative 1 only)
Major Constraint 6 - Duette Preserve Crossing (Alternative 2 & 3 Only)
ECW Well Pump 6 & 7
ECW Well Pump 1 through 5
ECW Well & Pump 1
Existing ECW Pipeline
Alternative 1 - Parallel to Exist 20" RCW
Alternative 2
Alternative 3
Lake Manatee Lower Watershed
WATERBURY
Duette
Duette Preserve
Manatee Gun & Archery Club
Riversong by Pulte Homes
Del Webb Sunchase
Rye Preserve
Premier Sports Campus at Lakewood Ranch
Bearadise Ranch Bear Preserve
Express Air Duct Cleaning Venice
Google Earth
Image Landsat / Copernicus
4 mi
N



Major Constraint 1 - Manatee River Crossing (Alternative 3 only)



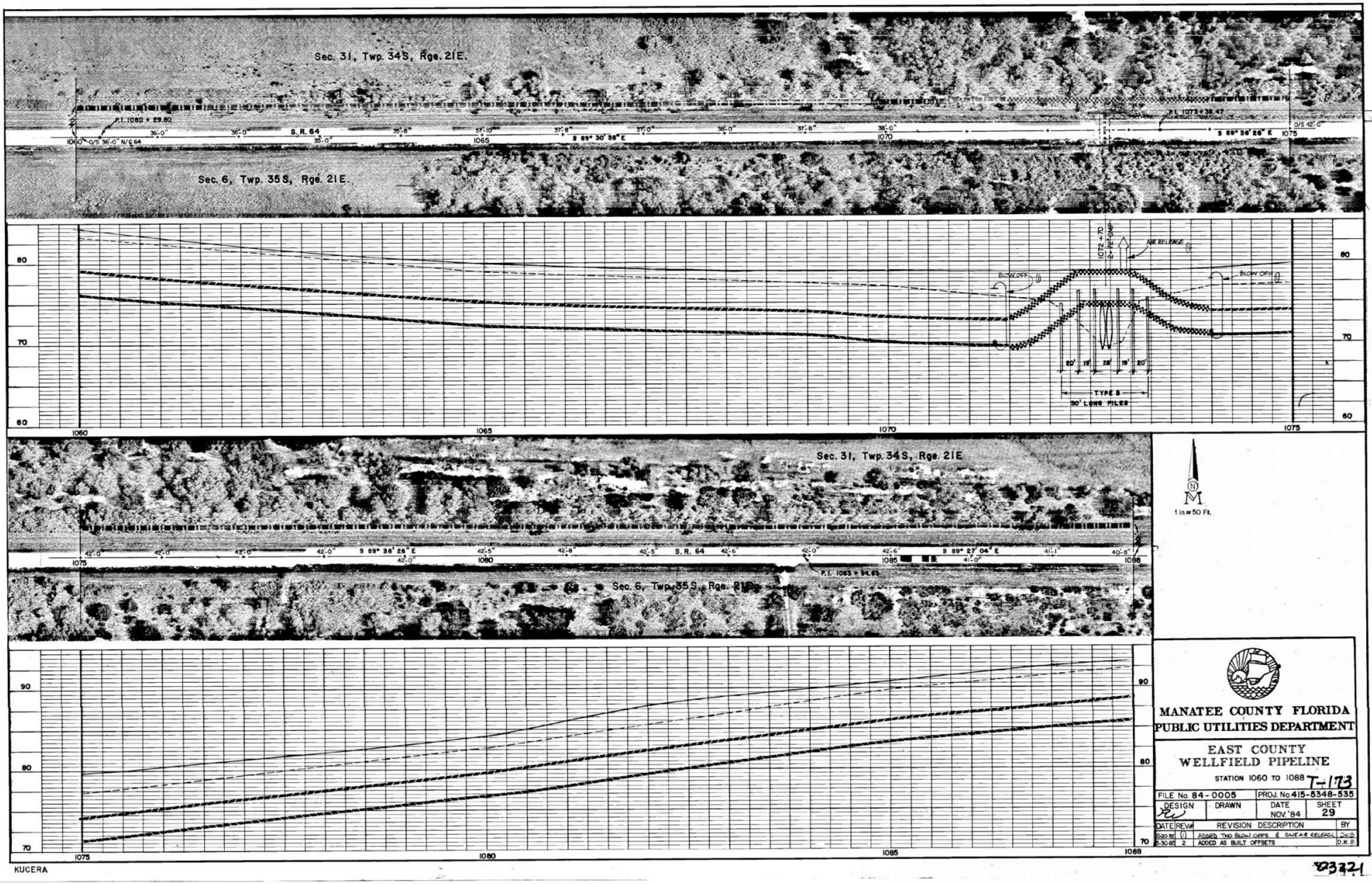
MANATEE COUNTY FLORIDA
PUBLIC UTILITIES DEPARTMENT

EAST COUNTY
WELLFIELD PIPELINE
STATION 1175 TO 1190 T-180

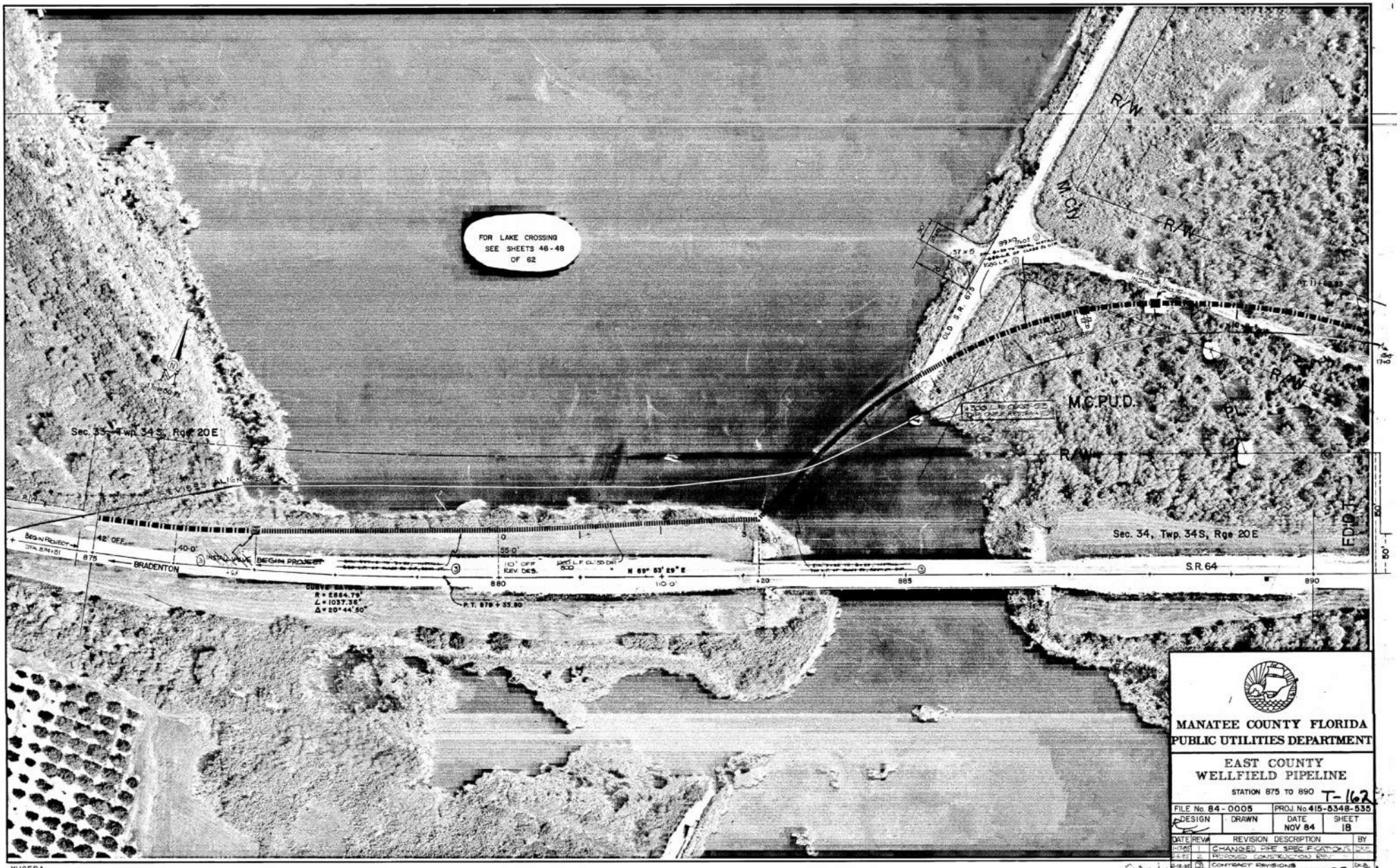
FILE No. 84-0005		PROJ. No. 415-5348-535	
DESIGN	DRAWN	DATE NOV 84	SHEET 35

DATE	REV.	REVISION DESCRIPTION	BY
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3-18-85	2	REVISED GRADE TO FIT NEW SURVEY	DKG

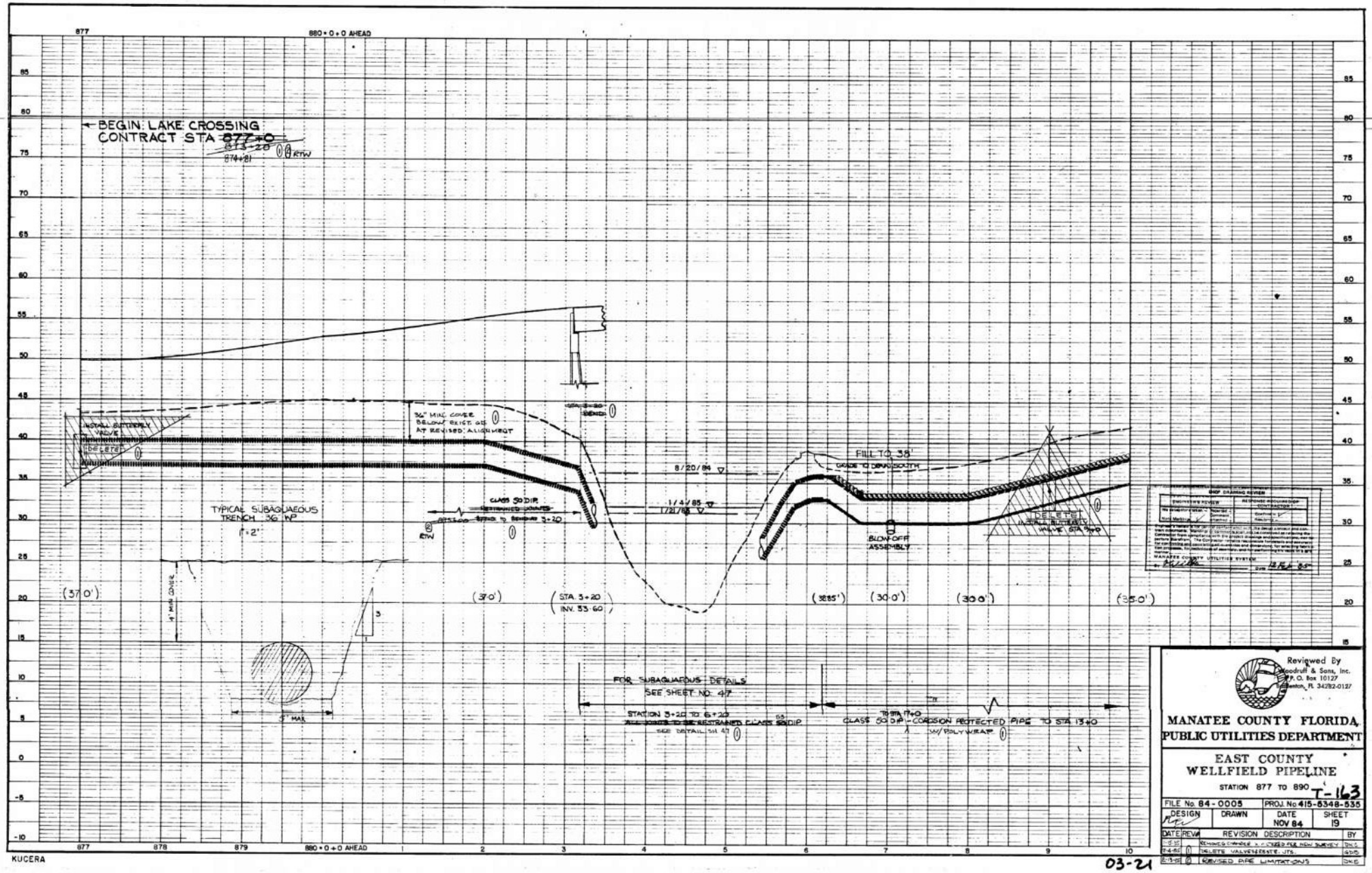
Major Constraint 1 - Manatee River Crossing (Alternative 3 only)



Major Constraint 2 -
Manatee River Branch Crossing



Major Constraint 3 -
Lake Manatee Crossing



Reviewed By
Woodruff & Sons, Inc.
P.O. Box 10127
Benton, FL 34282-0127

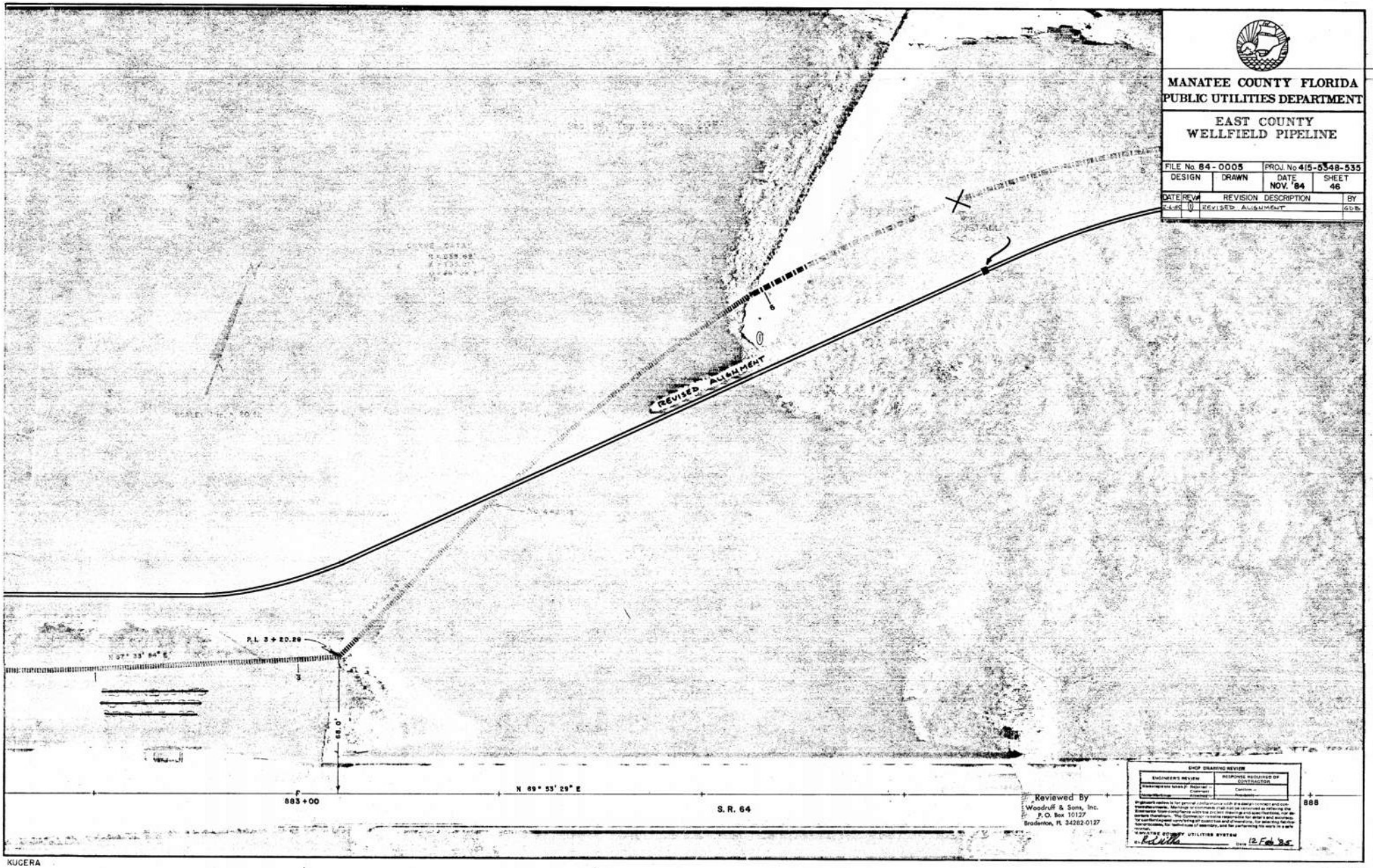
MANATEE COUNTY FLORIDA
PUBLIC UTILITIES DEPARTMENT

EAST COUNTY
WELLFIELD PIPELINE
STATION 877 TO 890 T-163

FILE No. 84-0005		PROJ. No 415-6348-535	
DESIGN	DRAWN	DATE NOV 84	SHEET 19

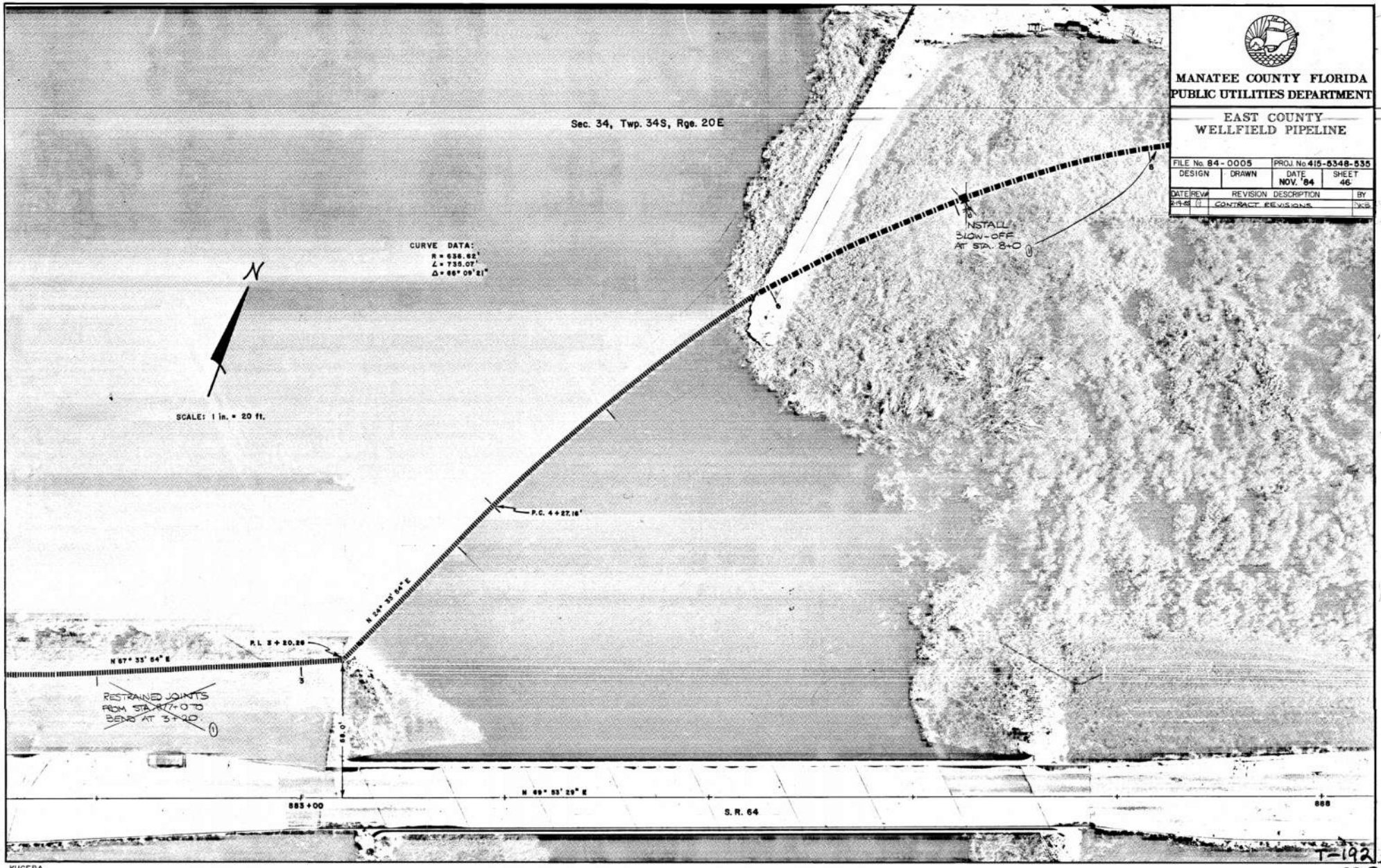
DATE	REV#	REVISION DESCRIPTION	BY
1-15-85		REVISED CHANGE + / - OVER PIPE NEW SURVEY	DLS
7-4-85	1	DELETE VALVE/ERASE JTS.	DLS
8-19-85	2	REVISED PIPE LIMITATIONS	DKC

Major Constraint 3 - Lake Manatee Crossing

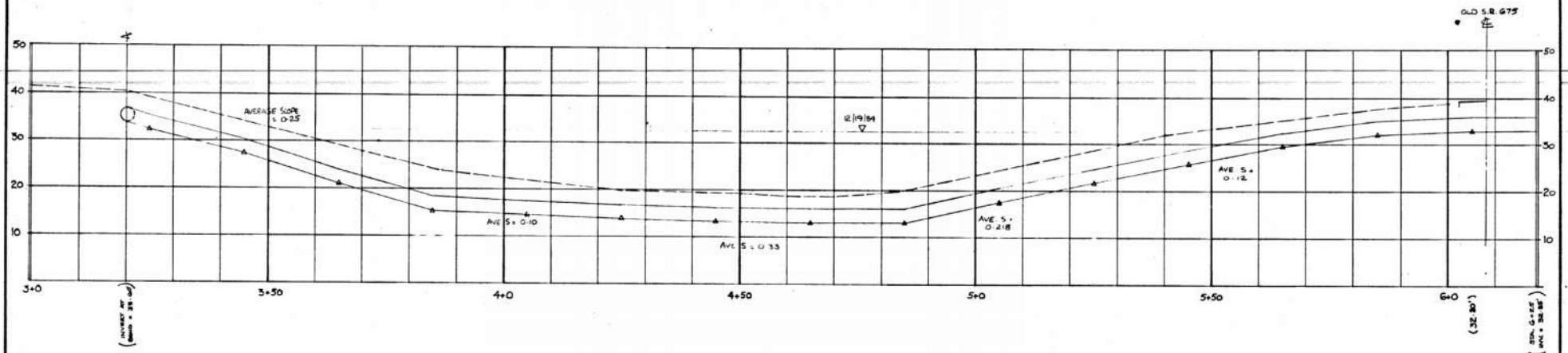


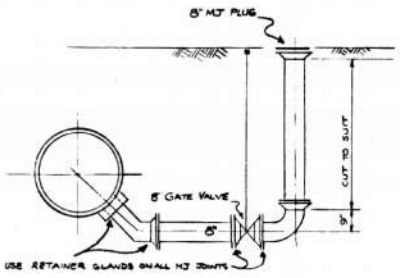
T-191
03-21

Major Constraint 3 -
Lake Manatee Crossing

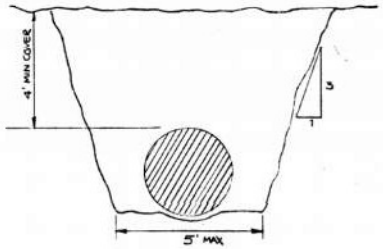


Major Constraint 3 - Lake Manatee Crossing

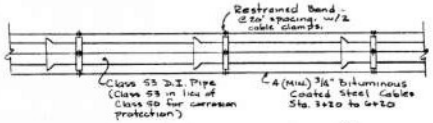




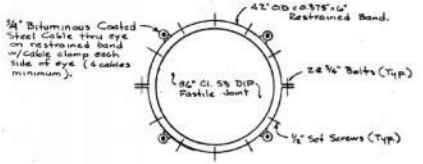
DETAIL - 8" BLOW-OFF
(1 REQ'D)



TYPICAL SUBAQUEOUS TRENCH 36" I.P.
1"=2'



SUB-AQUEOUS PIPE CROSSING ①
Station 3+20 to 6+20



Restrained Band - 15 Req'd. ①

NOTES FOR SUB-AQUAEOUS PORTION STATION 3+20 TO 6+20

① THIS SECTION OF THE PROJECT SHALL BE ~~PROVIDED WITH~~ RESTRAINED ~~JOINTS, INCLUDING THE BEND AT STATION 3+20.~~

THE DESIGN SHOWN ABOVE IS PREDICATED UPON RESTRAINED JOINT PIPE AND FITTINGS FOR A DESIGN PRESSURE OF 300 PSI. BIDDERS ARE ENCOURAGED TO PROPOSE AND SUBMIT THEIR OWN DESIGN, WHICH WILL ACCOMPLISH THE REQUIRED CRITERIA, IN A MANNER SUBJECT TO APPROVAL BY THE ENGINEER. THE BIDDER'S DECLARED TIME OF COMPLETION WILL BE OF THE UTMOST CONSIDERATION.

SHOP DRAWING REVIEW

ENGINEER'S REVIEW	RESPONSE REQUIRED OF CONTRACTOR
Not exceptions taken	Resubmit - Corrected Copies Attached	Confirm - Resubmit -

Engineer's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the project drawings and specifications, nor as partial Relinquishment. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of assembly, and for performing his work in a safe manner.

MANATEE COUNTY UTILITIES SYSTEM
By: [signature] Date: 12-5-84

MANATEE COUNTY FLORIDA
PUBLIC UTILITIES DEPARTMENT

EAST COUNTY
WELLFIELD PIPELINE

T-193

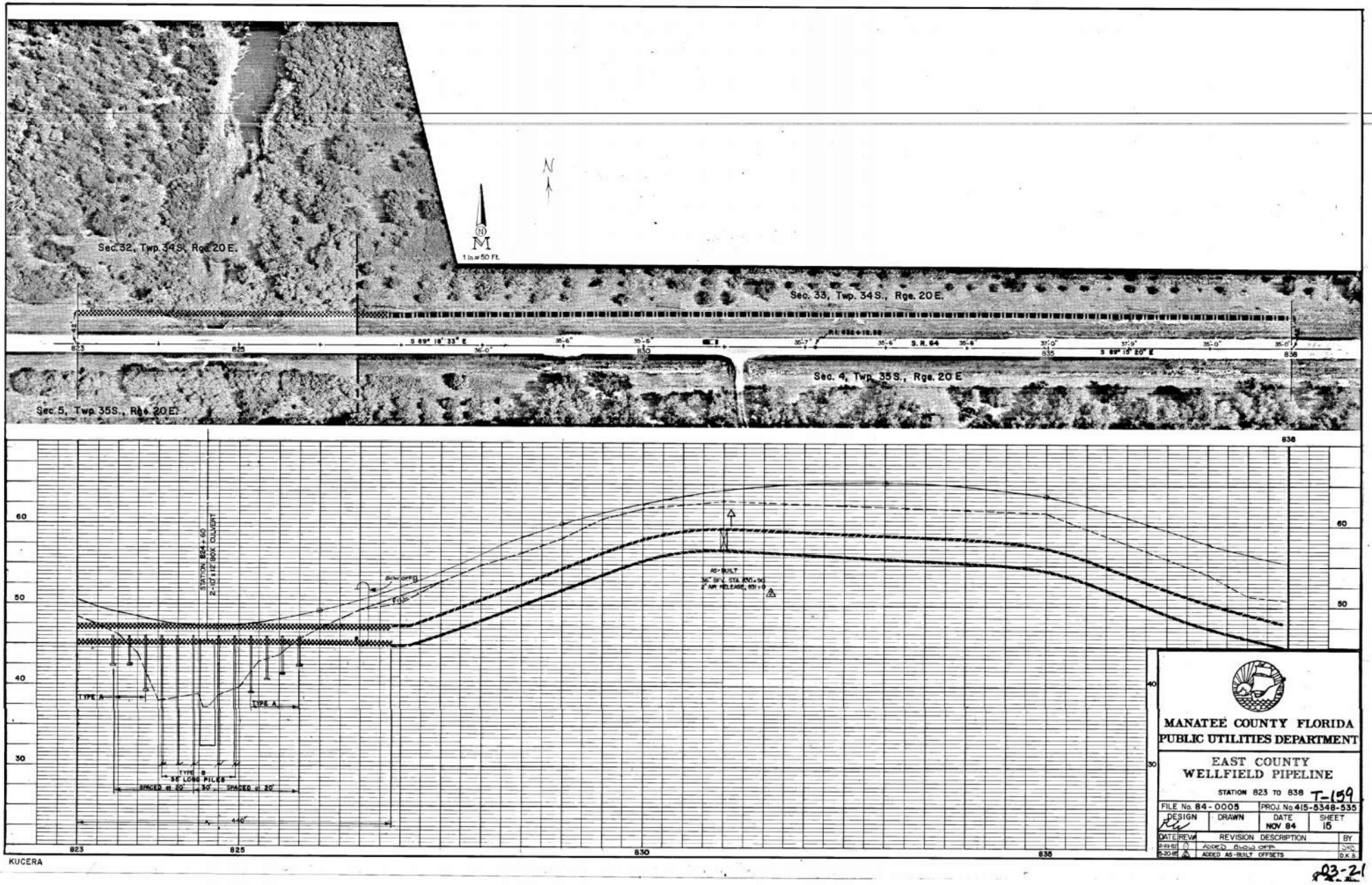
FILE No. 84-0005		PROJ. No. 415-5348-535	
DESIGN [illegible]	DRAWN D.K.B.	DATE JAN '85	SHEET 47

DATE	REVN	REVISION DESCRIPTION	BY
2-6-85	①	Add Subaqueous Detail	KDM

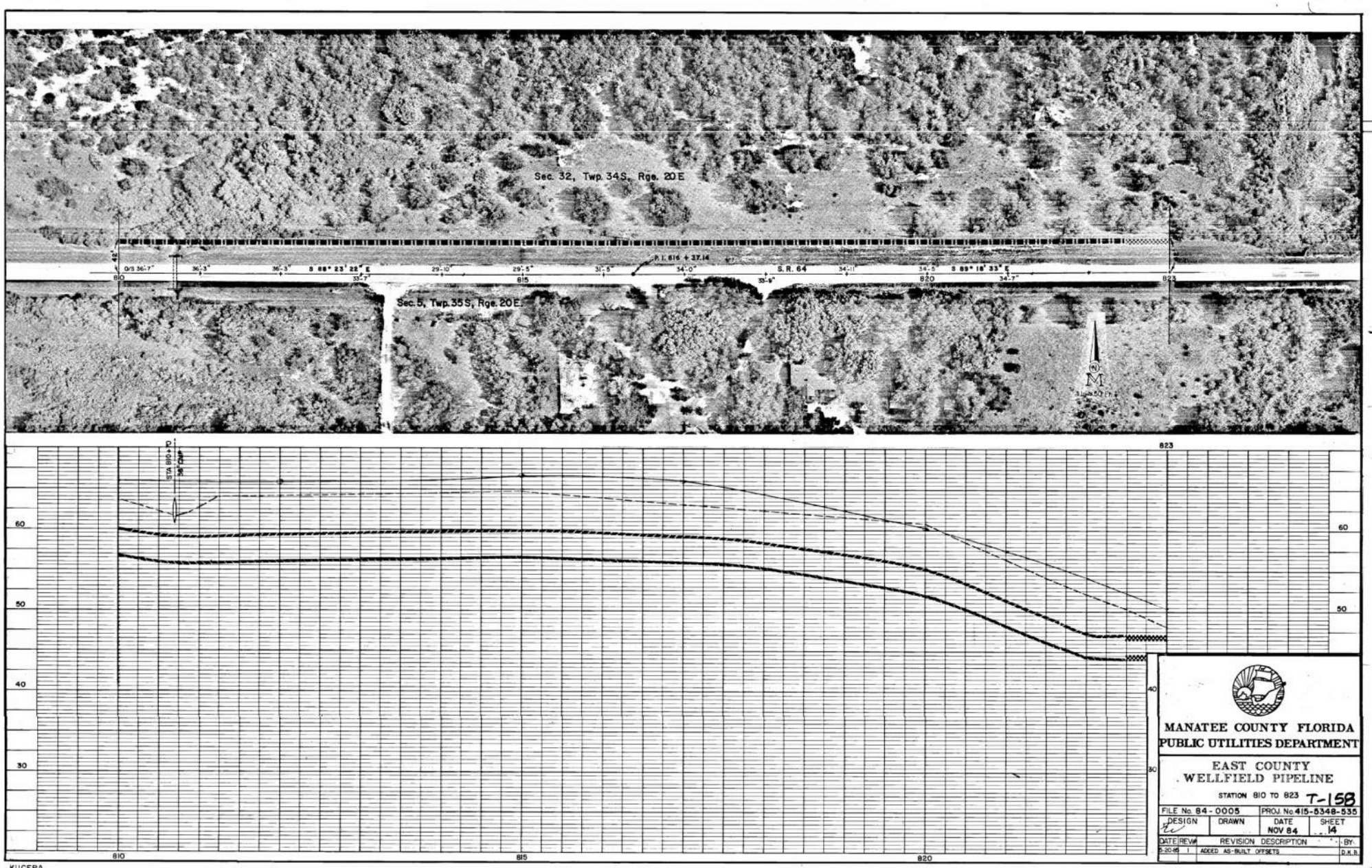
Reviewed By
Woodruff & Sons, Inc.
P.O. Box 10127
Bradenton, FL 34282-0127

03-21

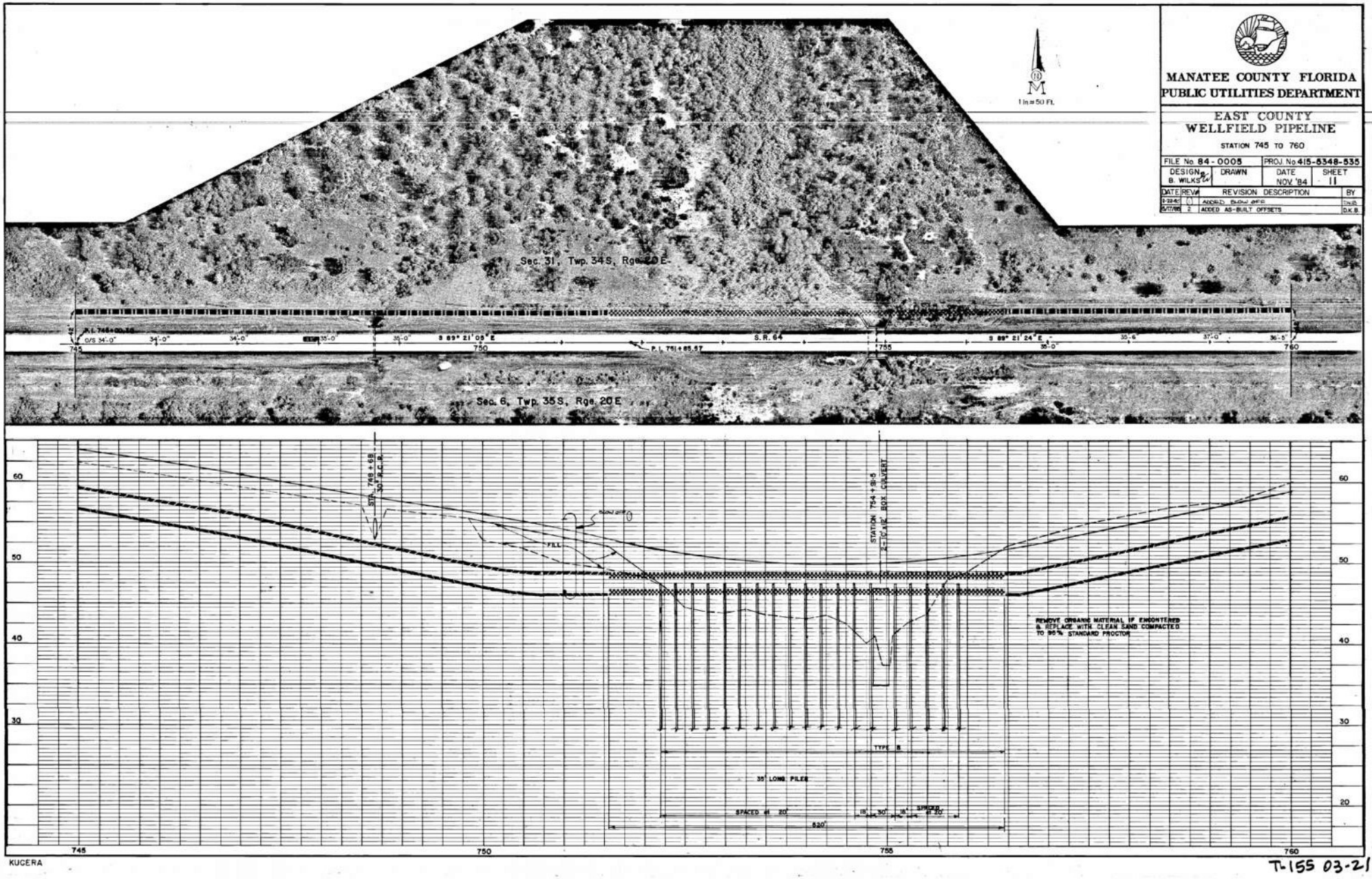
Major Constraint 3 - Lake Manatee Crossing



Major Constraint 4 -
Little Deep Branch Crossing



Major Constraint 4 -
Little Deep Branch Crossing



Major Constraint 5 - Poley Branch Crossing

APPENDIX I

ALTERNATIVES 1-3 PLANNING-LEVEL CAPITAL COST ESTIMATES

Alternative 1 - Planning-Level Capital Cost

Description	Unit	Quantity	Unit Cost	Estimated Cost
Bid-Based Pipeline Construction				
A-B 36-inch DIP	LF	48,300	$450	$21,735,000
B-C 42-inch DIP	LF	48,700	$625	$30,437,500
Pipeline Construction Subtotal				**$52,172,500**
Alternative-Specific Allowances				
Lake Manatee HDD Crossing - Assumed 2,000 LF	LS	1	$3,200,000	$3,200,000
Major Waterway Crossing 1 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 2 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 3 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 4 - Assumed 500 LF	LS	1	$500,000	$500,000
Valves / Air Release / Blowoffs	LS	1	$800,000	$800,000
Tie-ins	LS	1	$1,000,000	$1,000,000
Allowances Subtotal				**$7,000,000**
Design and Construction Contingency				
Utility Coordination	LS	1	$500,000	$500,000
Access / Restoration	LS	1	$500,000	$500,000
Wetland Mitigation	LS	1	$500,000	$500,000
Environmental Mitigation	LS	1	$800,000	$800,000
Engineering / Design Development (7%)	LS	1	$4,150,000	$4,150,000
Construction Contingency (10%)	LS	1	$5,920,000	$5,920,000
Construction Management (7%)	LS	1	$4,150,000	$4,150,000
Design and Construction Contingency Subtotal				**$16,520,000**
			Total	**$75,692,500**

Alternative 2 - Planning-Level Capital Cost

Description	Unit	Quantity	Unit Cost	Estimated Cost
Bid-Based Pipeline Construction				
A-D and D-B 36-inch DIP	LF	56,000	$450	$25,200,000
B-C 42-inch DIP	LF	48,700	$625	$30,437,500
Pipeline Construction Subtotal				**$55,637,500**
Alternative-Specific Allowances				
Lake Manatee HDD Crossing - Assumed 2,000 LF	LS	1	$3,200,000	$3,200,000
Major Waterway Crossing 1 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 2 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 3 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 4 - Assumed 500 LF	LS	1	$500,000	$500,000
Valves / Air Release / Blowoffs	LS	1	$800,000	$800,000
Tie-ins	LS	1	$1,000,000	$1,000,000
Allowances Subtotal				**$7,000,000**
Design and Construction Contingency				
Utility Coordination	LS	1	$500,000	$500,000
Access / Restoration	LS	1	$500,000	$500,000
Wetland Mitigation	LS	1	$1,500,000	$1,500,000
Environmental Mitigation	LS	1	$1,000,000	$1,000,000
Gopher Tortoise Mitigation	LS	1	$500,000	$500,000
Engineering / Design Development (10%)	LS	1	$4,390,000	$4,390,000
Construction Contingency (10%)	LS	1	$6,270,000	$6,270,000
Construction Management (7%)	LS	1	$4,390,000	$4,390,000
Design and Construction Contingency Subtotal				**$19,050,000**
			Total	**$81,687,500**

Alternative 3 - Planning-Level Capital Cost

Description	Unit	Quantity	Unit Cost	Estimated Cost
Bid-Based Pipeline Construction				
A-D 36-inch DIP	LF	24,950	$450	$11,227,500
B-C 42-inch DIP	LF	48,700	$625	$30,437,500
Pipeline Construction Subtotal				**$41,665,000**
Alternative-Specific Allowances				
Lake Manatee HDD Crossing - Assumed 2,000 LF	LS	1	$3,200,000	$3,200,000
Major Waterway Crossing 1 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 2 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 3 - Assumed 500 LF	LS	1	$500,000	$500,000
Major Waterway Crossing 4 - Assumed 500 LF	LS	1	$500,000	$500,000
Valves / Air Release / Blowoffs	LS	1	$500,000	$500,000
Tie-ins	LS	1	$800,000	$800,000
Allowances Subtotal				**$6,500,000**
Design and Construction Contingency				
Utility Coordination	LS	1	$200,000	$200,000
Access / Restoration	LS	1	$300,000	$300,000
Wetland Mitigation	LS	1	$300,000	$300,000
Environmental Permitting	LS	1	$500,000	$500,000
Engineering / Design Development (10%)	LS	1	$3,380,000	$3,380,000
Construction Contingency (10%)	LS	1	$4,820,000	$4,820,000
Construction Management (7%)	LS	1	$3,380,000	$3,380,000
Design and Construction Contingency Subtotal				**$12,880,000**
			Total	**$61,045,000**

APPENDIX J

PUBLIC NOTICE

MANATEE COUNTY GOVERNMENT

STATE OF FLORIDA

COUNTY OF MANATEE

Before the undersigned authority personally appeared **Quantana Acevedo,** who on oath says that she is a **County Employee of Manatee County Government, Manatee County, Florida**; that the attached copy of advertisement, being a public notice in the matters of **Public Notice of Special Meeting** for **Proposed Manatee County Pipeline Resilience Facility Plan,** in Manatee County Florida, was published on the publicly accessible website of Manatee County Government, Manatee County, Florida, of www.mymanatee.org on **September 1, 2026**.

Affiant further says that the website complies with all legal requirements for publication in Chapter 50, Florida Statutes.

By: _____
Quantana Acevedo, Planning and Zoning Tech III

Sworn to and subscribed before me this 1st day of September, 2026, by Quantana Acevedo, who is personally known to me or who has produced (type of identification) as identification.

ABIGAIL RUTH-ELLEN BONDS
Notary Public-State of Florida
Commission # HH 815493
My Commission Expires
July 26, 2030

_____
(Signature of Notary Public)

Abigail Bonds
(Print Name of Notary Public)

Notary Public
(Title)

My Commission Expires: July 26, 2030

Commission Number: HH 815493

PUBLIC NOTICE

Notice is hereby given that the Board of County Commissioners of Manatee County, Florida, will hold a special meeting on September 15, 2026. The meeting is at 6:00 p.m. at 16410 Rangeland Parkway, Bradenton, Florida, for the purpose of considering the approval of the proposed Manatee County Pipeline Resiliency Facility Plan.

This hearing will include a discussion of the Facilities Plan and the financial impact on system users. The hearing is intended to afford the opportunity to individuals to be heard on the economic and social effects of the location, design, and environmental impact of the East County wellfield Pipeline Resiliency Project.

Responsible Entity: Florida Department of Environmental Protection
Applicant: Manatee County
Project Title(s): Pipeline Resiliency Project

Location of Proposed Work: 17915 Water Line Service Road, Bradenton, FL 34212
GPS Coordinates: 27° 29' 16.7892" N82° 21' 41.4252" W

A portion of the funding for this project is anticipated to come from the Florida Department of Environmental Protection (FDEP) Supplemental Appropriations for Hurricanes Helene and Milton and Hawai'i Wildfires (SAHM) program. Financial impacts on utility users will be presented at the hearing. All interested persons are invited to attend and be heard.

COMMENTS: This will serve as both the initial and final public notice regarding the project funded by the FDEP SAHM program. Interested persons may submit comments, questions, or request documents and data relevant to this specific project by writing to Chad Butzow at Manatee County Utilities Administration, 3647 Cortez Road West, Bradenton, FL 34210, or by emailing chad.butzow@mymanatee.org. Comments should be sent in writing or by email with the subject line "FDEP SHAM Pipeline Resiliency Project Facility Plan" at the above address within 14 days of the date of this notice.

SPECIAL REQUIREMENTS: If you require special aid or services as addressed in the American Disabilities Act, please contact the County Clerk's Office at (904) 652-8521, no less than five (5) days prior to the above stated hearing date.

THIS NOTICE MAY BE REMOVED FROM PUBLIC VIEW ON THE 14TH DAY FROM ORIGINAL DATE OF POSTING.

NOTICE WAS POSTED ON THE 1ST DAY OF SEPTEMBER 2026

APPENDIX K

PUBLIC NOTICE MEETING MINUTES

MEETING MINUTES

MANATEE COUNTY UTILITIES DEPARTMENT

Pipeline Resiliency Project – SAHM Funding Planning Support

Prepared By: Nestor Murray **Issued Date:** 9/16/2026

Meeting Date: September 15, 2026

Location: Lakewood Ranch Branch Library (16410 Rangeland Parkway, Bradenton, Florida)

Subject: Public Meeting

Attendees: Refer to Sign-In Sheet attached.

The following is our understanding of the subject matter. If this differs from your understanding, please notify us. A copy of the supporting material presented at the public meeting is attached to these minutes for informational purposes.

Meeting Objectives

The meeting objectives were to:

1. Explain the purpose and need for the FDEP SAHM-funded Pipeline Resiliency Project.
2. Review the recommended facilities plan, project alternatives, and expected benefits.
3. Gather public input on implementation, environmental considerations, and community impacts.

Discussion Topics

The workshop covered the following topics:

1. Introductions
2. Key Discussion Items:
    a. Facilities Plan and FDEP SAHM program.
    b. Existing Lake Manatee WTP water supply infrastructure and potential upgrades.
    c. Existing and potential new wells at the East County Wellfield.
    d. Existing raw water pipeline, potential redundant pipeline alignments options, and environmental constraints.
3. Public Input
    a. No public comments or objections were received.

Manatee County Pipeline Resiliency Project Public Meeting

September 15, 2026

Lakewood Ranch Library

Name	Address	Preferred Contact Method (Phone or Email)
Sue Dunn	3647 Carter Rd. W. Bradenton	941-792-8811 x5342
Tina saldana	3647 Cortez Rd W	941-525-0707
Brent Laudicina	2212 33rd Ave Dr West	941-792-8811 x8025
~~Pat Short~~	4630 Sweet Retreat Run	320 492-0269
Kathleen Bassett	1501 Dam Road	941-290-8018
Nestor Murry		813-812-4391
Jim Rennebarg	7607 Addison Ave	763-258-4856
Kevin Doorman	4282 Garbett Terrace, NP 3475	941-536-6986

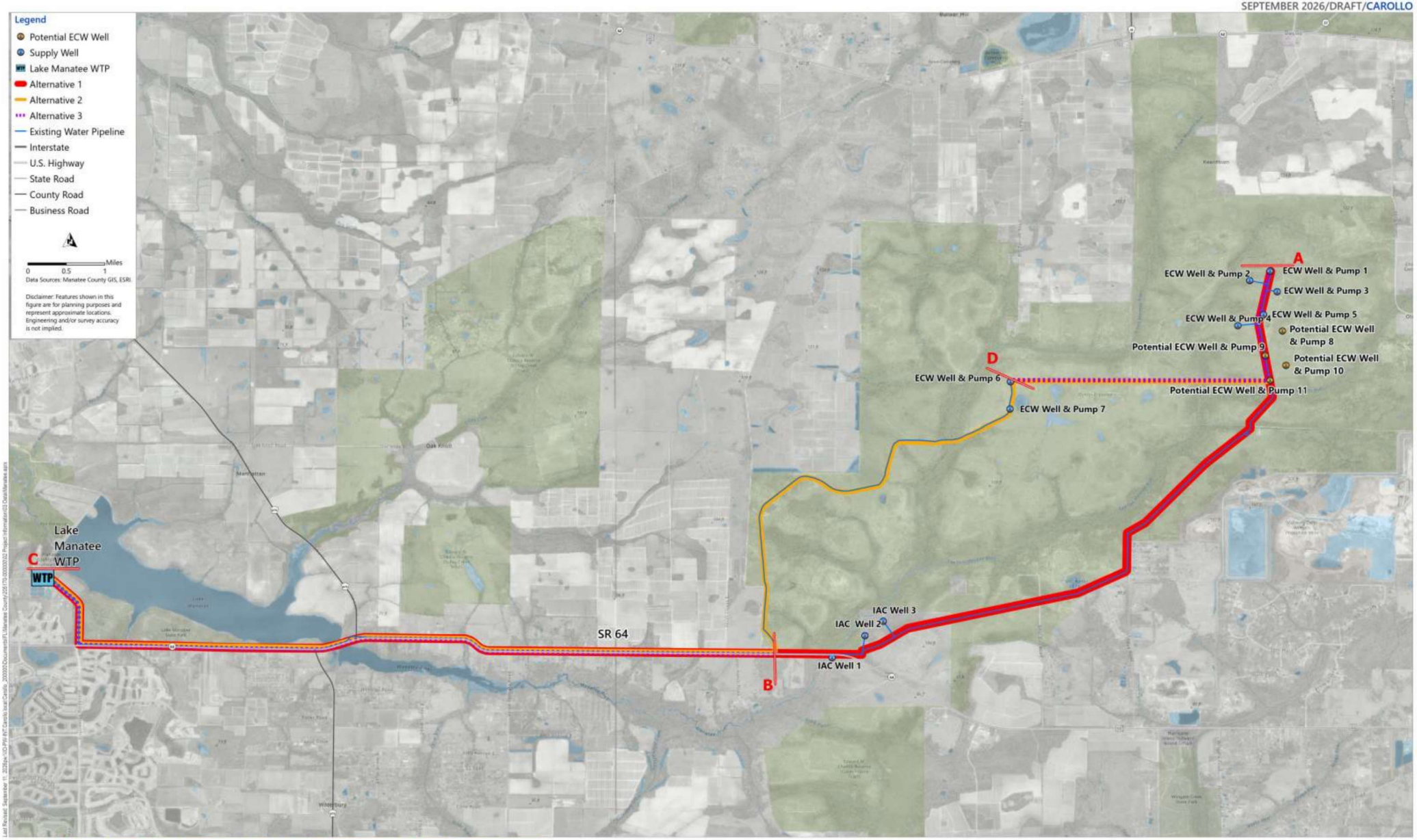


Figure # 1-3 EAST COUNTY WELLFIELD POTENTIAL NEW WELLS AND POTENTIAL PIPELINE ALIGNMENT ALTERNATIVES MAP

MANATEE COUNTY
PIPELINE RESILIENCY STUDY

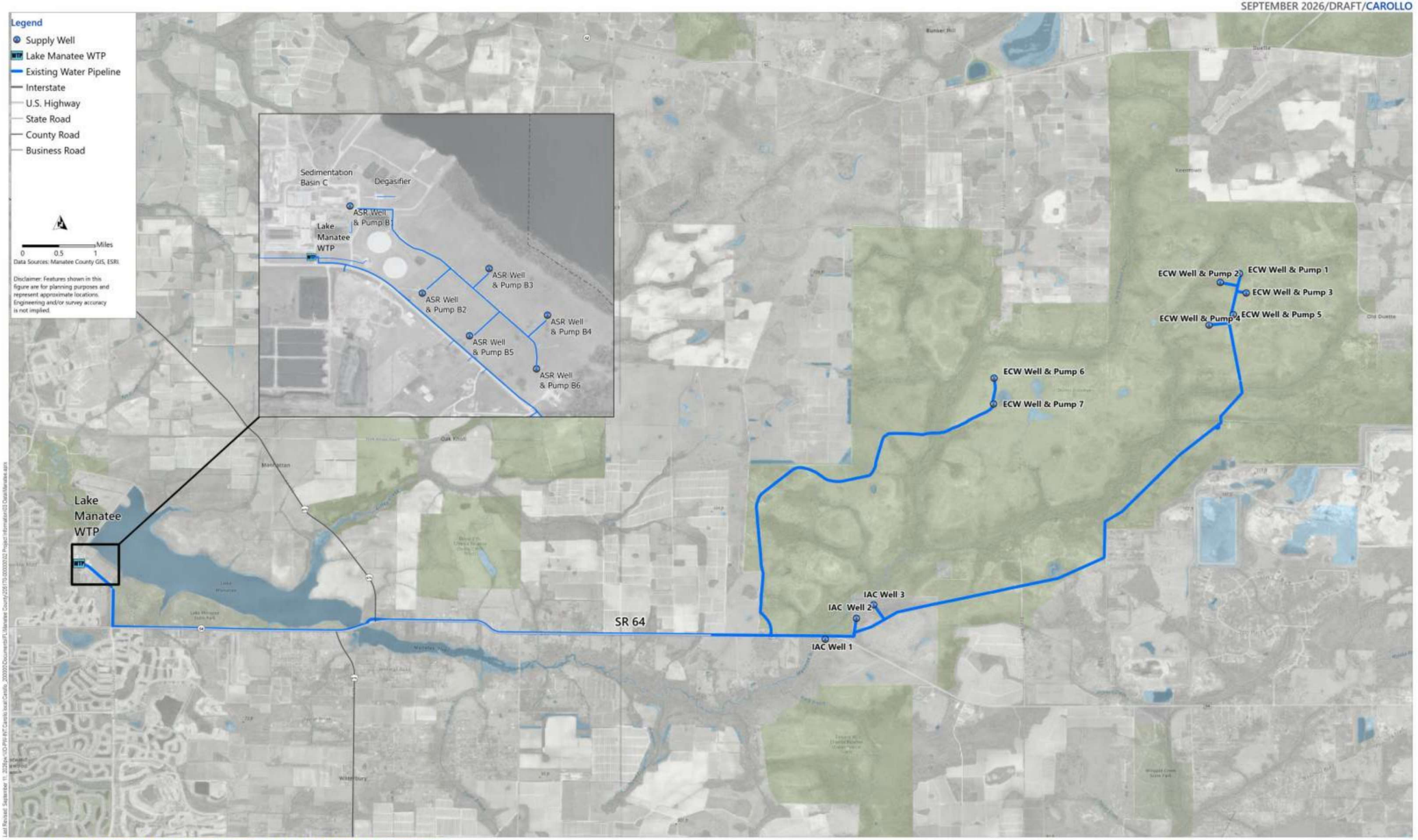


Figure # 1-2 LAKE MANATEE WTP EAST COUNTY WELLFIELD AND EXISTING PIPELINE ALIGNMENT MAP
MANATEE COUNTY
PIPELINE RESILIENCY STUDY



Figure # 2-4 EAST COUNTY WELLFIELD POTENTIAL NEW WELLS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

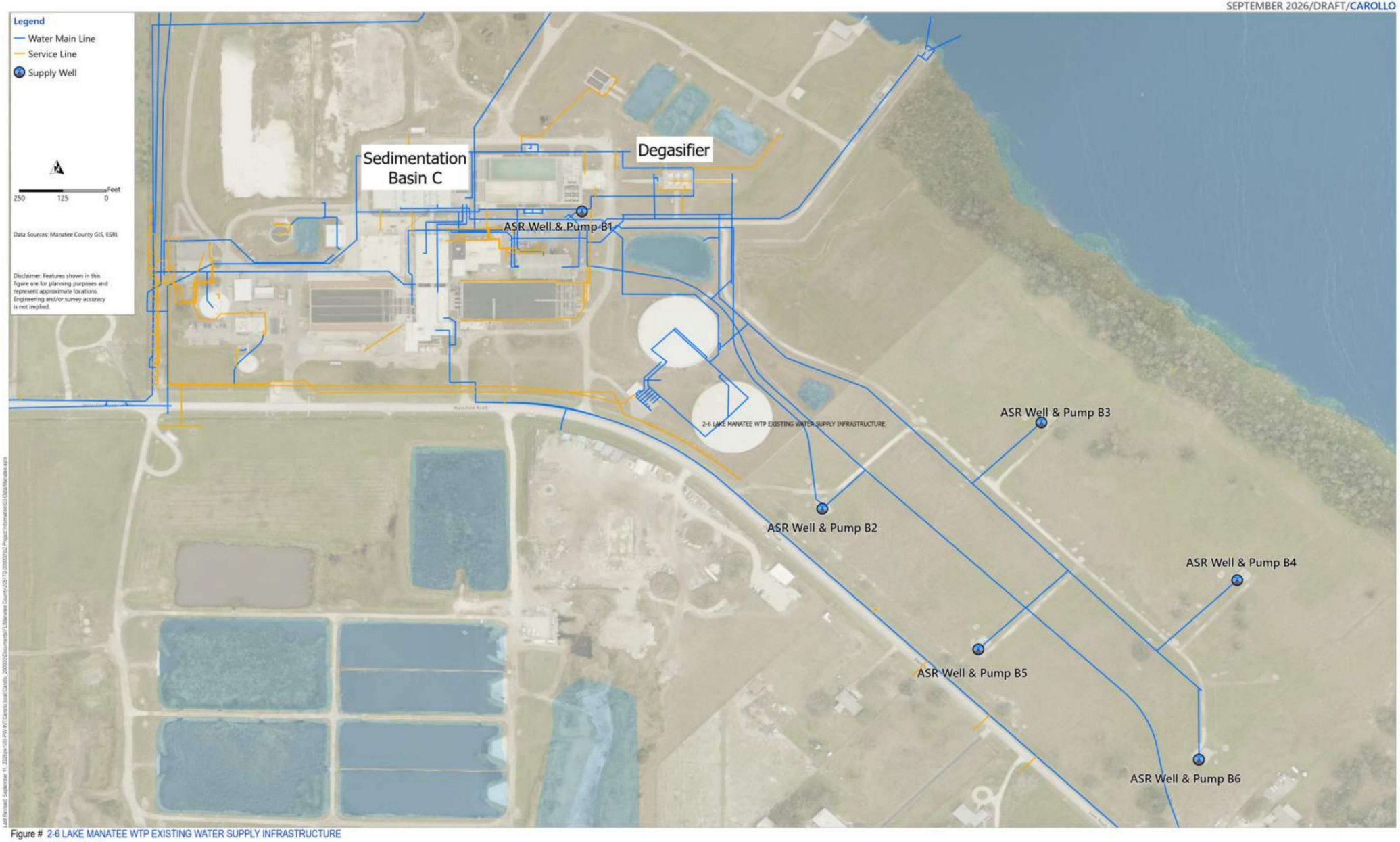


Figure # 2-6 LAKE MANATEE WTP EXISTING WATER SUPPLY INFRASTRUCTURE
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

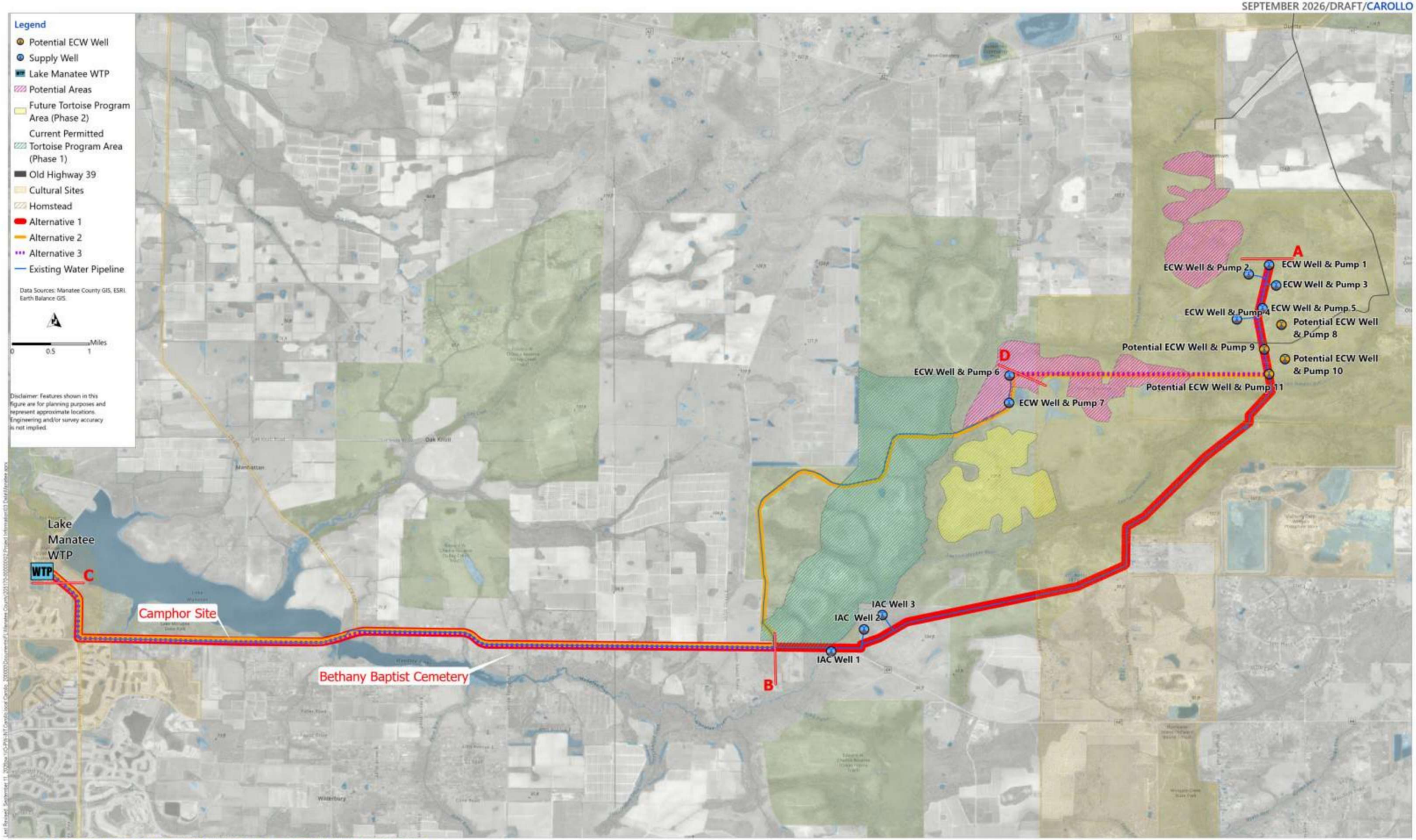


Figure # 5-2 POTENTIAL PIPELINE ALIGNMENT ALTERNATIVES MAP - ENVIRONMENTAL COMMITMENTS
MANATEE COUNTY
PIPELINE RESILIENCY STUDY

APPENDIX L

USEFUL LIFE CERTIFICATION

STATE OF FLORIDA STATE REVOLVING FUND (SRF)
PROJECT SPONSOR'S USEFUL LIFE CERTIFICATION

Project Sponsor: Manatee County
Project Name: Pipeline Resiliency Project
Project Number: DW41015

We certify that the useful life of the project equals or exceeds the amortization period of the assistance agreement. Note that the standard assistance agreement amortization period is 20 years for a construction loan but can be increased to 30 years if the project is to serve a small community qualifying as having a financial hardship.

Please enter the projected useful life of the proposed project along with the desired amortization period of the assistance agreement in the table below:

Useful Life of the Project:	75 years
Desired Duration of the Assistance Agreement:	20 years

We understand that falsifying information on this certification may be grounds for termination of the SRF loan agreement.

Project Authorized Representative		**Professional Engineer**	
Print Name:	Charlie Bishop, County Administrator	Print Name:	Nestor Murray, Carollo Engineers
Signature:	Charlie Bishop Charlie Bishop (Sep 11, 2026 16:26:26 EDT)	Signature:	Nestor Murray, PE Nestor Murray, PE (Sep 17, 2026 11:41:12 EDT)
Date:	09/11/2026	Date:	09/17/2026

APPENDIX M

COST AND EFFECTIVENESS CERTIFICATION

STATE OF FLORIDA STATE REVOLVING FUND (SRF)
PROJECT SPONSOR'S COST AND EFFECTIVENESS CERTIFICATION
AND WATER/ENERGY CONSERVATION CERTIFICATION

Project Sponsor: Manatee County
Project Name: Pipeline Resiliency Project
Project Number: DW41015

On June 10, 2014, the Water Resources Reform and Development Act of 2014 (WRRDA) was signed into law. Among its provisions are amendments to Titles I, II, V, and VI of the Federal Water Pollution Control Act (FWPCA). Sections 602(b)(13)(A) and (B) of the FWPCA requires that the loan recipient:

> *(A) has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under this title; and*
>
> *(B) has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account –*
> *(i) the cost of constructing the project or activity;*
> *(ii) the cost of operating and maintaining the project or activity over the life of the project or activity; and*
> *(iii) the cost of replacing the project or activity;*

We certify that the above referenced project meets the requirements set for in Sections 602(b)(13)(A) and (B) of the FWPCA. We also certify that the documentation justifying this certification will be made available upon request.

We understand that falsifying information on this certification may be grounds for termination of the SRF loan agreement.

Project Authorized Representative

Print Name: Charlie Bishop, County Administrator

Signature: Charlie Bishop
Charlie Bishop (Sep 11, 2026 16:26:26 EDT)

Date: 09/11/2026

Professional Engineer

Print Name: Nestor Murray, Carollo Engineers

Signature: Nestor Murray, PE
Nestor Murray, PE (Sep 17, 2026 11:41:12 EDT)

Date: 09/17/2026

APPENDIX N

BUISINESS PLAN (NOT INCLUDED)