

PROJECT LOCATION: 2nd Street (Foresteria Drive to Evergreen Drive), map of project location attached.

PROJECT BACKGROUND: The interconnected channel and pond routing (ICPR4) H&H model developed for the Town's SWMP was used to perform hydrodynamic modeling of the rainfall/runoff process occurring throughout the watersheds. Hydrologic simulations were performed for three-year/24-hour, 10-year/24-hour, 25-year/three-day, 50-year/three-day and 100-year/three-day storm events. Results illustrate that the interconnected system of reinforced concrete pipes (RCP), corrugated metal pipes (CMP) and high-density polyethylene (HDPE) pipes do not have the capacity to convey runoff from mostly impervious dense urban areas for storm events of significance (greater than three-year frequency). Furthermore, there is localized flooding in areas (such as along 2nd Street) that do not possess a dedicated storm sewer system. This modeling aligns with real-world detrimental impacts that the Town is already experiencing.

The need is further demonstrated by the implications set forth as the result of projected climate change-based sea-level rise (SLR) by the United States Army Corps of Engineers (USACE). The change in SLR between 2019 and 2060 is estimated by USACE to be 36 inches. This corresponds to a 2060 average high tide of 2.7 feet NAVD. Once this occurs, preliminary ICPR4 H&H modeling (coded to reflect SLR of 2.7 feet) indicates that the problems being experienced today will grow in severity along the 60-inch trunk storm sewer and the 2nd Street vicinity, meaning that any drainage occurring along 2nd Street will not be able to enter the Southern Outfall by sheet flow or by pipe.

The roadside bioswales will serve two functions:

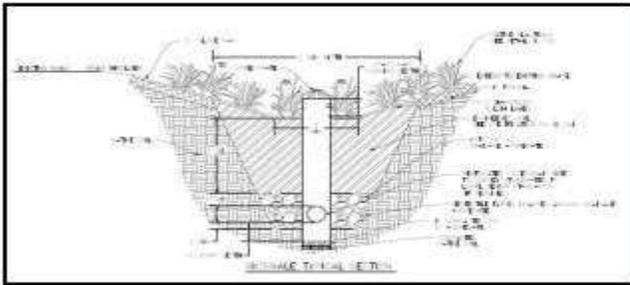
1. They will act to significantly mitigate pollutant-laden storm water runoff that otherwise would flow into the LWL and act as a natural filtration system to reduce total suspended solids.
2. They will reduce the centrality of the Southern Outfall 60-inch trunk-line pipe by diverting upstream storm water runoff sheet flow away from the main storm sewer trunk and to the underground water table aquifer, which will also introduce more resiliency into the storm water infrastructure system.

The 2nd Street project is a component of the 20-year long-term 5% Roadside Bioswale Plan that will ensure adequate resiliency and sustainability for a minimum of approximately 75% of its total land area.

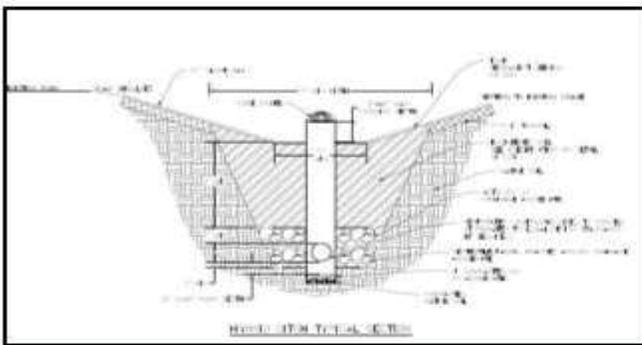
PROJECT DESCRIPTION: The proposed project entails the strategic placement of roadside bioswales at two locations on 2nd Street where flooding has been documented, including 2nd Street and Foresteria Drive, and 2nd Street and Evergreen Drive. The overall goal of the project is to intercept and collect sheetflow at its source along the 2nd Street right-of-way in the vicinity of the road and prevent runoff from entering the Southern Outfall trunk (via sheet flow to inlets). Instead, the bioswales will function to intercept runoff for filtration to the water table aquifer and reduce runoff volumes through evaporation and transpiration.



Example Roaside Bio-Swales



Bioswale with Planting



Bioswale with no planting



The proposed project has two primary objectives:

1. Access the physical conditions of the topography and the soil's infiltration rates at the two affected sites (see aforementioned site locations) and the feasibility of two types of bioswale designs to direct runoff production to the groundwater table via infiltration and deep percolation and deliver untreated runoff flows that otherwise would enter the Southern Outfall via sheet flow and be transferred to the Lake Worth Lagoon. The proposed roadside GI-based bioswales will also address the increasing adverse impact of higher climate change-based rainfall intensity volumes.
2. Mitigate pollutant-laden runoff load discharge to the Lake Worth Lagoon by providing water quality treatment and infiltration of runoff to the underground aquifer.

In order to achieve these objectives, this project will focus on data collection and management and the engineering design and specifications for the bio-swales, culminating in construction documents and bid package for implementation.

TASKS and DELIVERABLES:

Task #1: Data Collection and Management

Task Description: The Grantee will work with Water Resources Management Associations, Inc. (WRMA), which is currently under a five-year contract with the Town. WRMA will perform topographic surveys at the two proposed sites. WRMA will also secure the services of a geotechnical engineering firm for the acquisition of the soil's physical properties data via shallow augers and/or shallow piezometer wells. This data is necessary to perform drainage infiltration analysis and determine the size of the required bioswale media for treatment of local runoff. The picture below shows the location of proposed field testing. The testing scope of work includes:



- Two (2) borehole permeability/percolation tests, usual open hole, constant head test to be performed on grassed swale areas along 2nd Street. One will be located at the southeast corner of 2nd Street and Foresteria Drive, and a second at the southwest corner of 2nd Street and Evergreen Drive.
- Two (2) 10ft deep Standard Penetration Test (SPT) borings will be performed in grassed swale areas adjacent to the previous permeability tests for minimal disruption.
- Two (2) 10ft Standard Penetration Test (SPT) borings with pavement coring reporting format. These will be performed at the intersections of 2nd Street and Foresteria Drive, and 2nd Street and Evergreen Drive.

None of these field tests will be performed in environmental sensitive areas and will not require the use of any chemical pollutants.

Deliverables: Data Collection and Management Technical Report

Task #2: Preliminary Engineering Design and Planning (30% Plans)

Task Description: The Grantee will work with a professional engineer and certified floodplain management professional from WRMA that will apply the topographic and soils project data, combined with H&H design tools, to perform design plans and specifications for the two sites. WRMA will review the collected data and create 30% plans for the addition of GI-based bioswales at the two sites. This level of design entails the development of preliminary conceptual design options that could be implemented at the site depending upon major site constraints.

Deliverables: 30% Design Plans

Task #3: Engineering Design and Site Layout (60%)

Task Description: The Grantee will build upon the previous task to include the selection of the final bioswale placement at the two locations, include the type of, bioswales selected (bioswale with or without plantings), and any required adjustments to the road (edge of pavement, driveways, etc.).

Deliverables: 60% Design Plans and Quantity Takeoff Cost Estimate

Task #4: Detailed Engineering Design (90%)

Task Description: The Grantee will build upon the previous two tasks to include the preparation of design specifications and preliminary construction-ready plans. The design will also include the preparation of the project technical manual and a detailed engineer's opinion of probable cost.

Deliverables: 90% Design Plans and Engineer's Opinion of Probable Cost

Task #5: Final Plans and Specifications (100%)

Task Description: The Grantee will complete the design plans in preparation of the final design plans (ready for bidding/construction). Grantee will summarize project with a final report utilizing Exhibit F format.

Deliverables: 100% Final Ready For Construction Design Plans and Specifications, and Final Engineer's Opinion of Probable Cost. Final Report of project.

Performance Standard: The Department’s Grant Manager will review the deliverables to verify that they meet the specifications in the Grant Work Plan and the task description. Upon review and written acceptance by the Department’s Grant Manager of all deliverables under this task, the Grantee may proceed with payment request submittal.

Payment Request Schedule: Grantee may submit a payment request for cost reimbursement upon completion of each task and Department approval of all associated task deliverables.

PROJECT TIMELINE: The tasks must be completed by the corresponding task end date and all deliverables must be received by the designated due date.

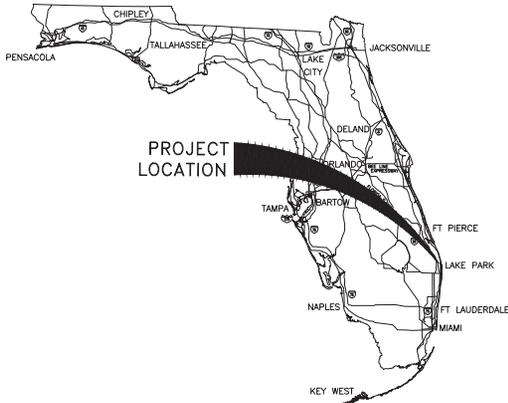
Task No.	Task or Deliverable Title	Deliverable Due Date
1	Data Collection and Management	10/31/2021
2	Pre-Liminary Engineering and Planning (30% Plans)	01/31/2022
3	Engineering Design and Site Layout (60% Plans)	04/30/2022
4	Detailed Engineering Design (90% Plans)	07/31/2022
5	Final Plans and Specifications (100% Plans)	08/31/2022

BUDGET DETAIL BY TASK:

Categories	Task 1	Task 2	Task 3	Task 4	Task 5	Totals
Contractual Services	\$10,000	\$4,000	\$10,000	\$2,000	\$4,000	\$30,000
Match Total	\$10,000	\$4,000	\$10,000	\$2,000	\$4,000	\$30,000
Total	\$20,000	\$8,000	\$20,000	\$4,000	\$8,000	\$60,000

PROJECT BUDGET SUMMARY: Cost reimbursable grant funding must not exceed the category totals for the project as indicated below. Match funding shall be provided in the categories indicated below.

Category Totals	Grant Funding Not to Exceed	Match Funding	Total Project Funding
Contractual Services Total	\$30,000	\$30,000	\$60,000
Total:	\$30,000	\$30,000	\$60,000



TOWN OF LAKE PARK DEPARTMENT OF PUBLIC WORKS

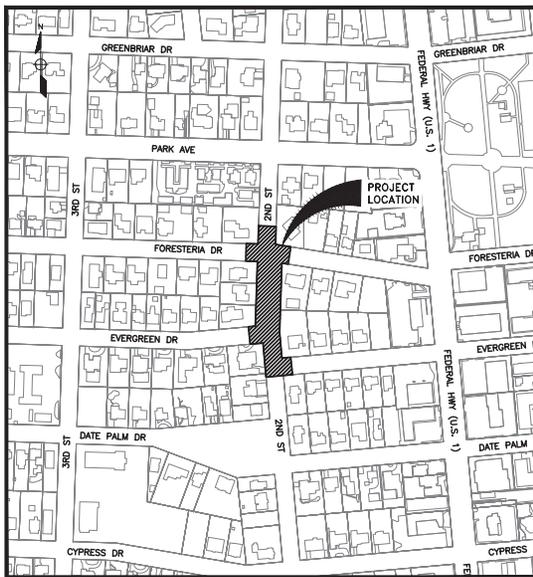
MAYOR MICHAEL O'ROURKE
VICE- MAYOR KIMBERLY GLAS-CASTRO
COMMISSIONER ERIN FLAHERTY
COMMISSIONER JOHN LINDEN
COMMISSIONER ROGER MICHAUD



CONTRACT DRAWINGS FOR

DIVISION E SECOND STREET GREEN INFRASTRUCTURE

AUGUST 2022
100% DESIGN



SITE LOCATION MAP
SCALE: 1" = 200'

TOWN OF LAKE PARK
DEPARTMENT OF PUBLIC WORKS
640 OLD DIXIE HWY
LAKE PARK, FL 33403
PHONE: (561) 861-3345
FAX: (561) 861-3349

WRMA
WATER RESOURCES MANAGEMENT ASSOCIATES, INC.
250 TEQUESTA DRIVE, SUITE 302, TEQUESTA, FL 33469
PHONE: 561-529-2075 | FAX: 561-401-9382



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SCALE

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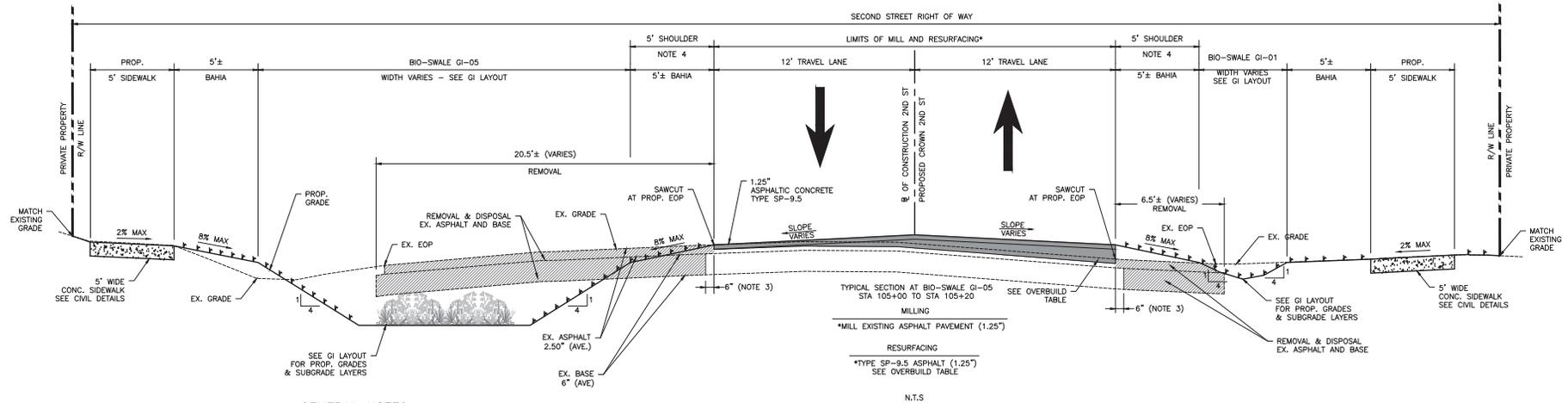
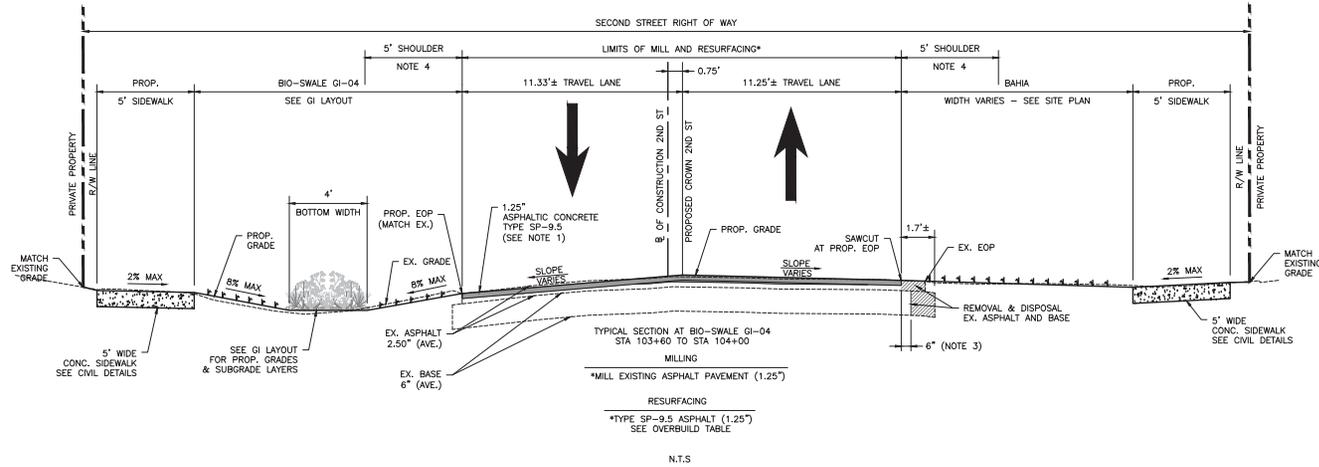
REVISIONS

TOWN OF LAKE PARK
DEPARTMENT OF PUBLIC WORKS
STORMWATER IMPROVEMENT PROGRAM - DIVISION E
SECOND STREET GREEN INFRASTRUCTURE

COVER SHEET

GENERAL

SCALE	AS SHOWN	DRAWN	MIRN
CLIENT ID	G004	CHECKED	RMW
CONTRACT ID	G00401	SUBMITTED	WRMA
SURVEYED	JESA	RECOMMENDED	
DATE	8/8/2022		
CADD FILE	UPSW-C001		



GENERAL NOTES:

- ALL MATERIAL USED WITHIN THE ROADWAY MUST MEET FDOT SPECIFICATIONS AND BE SUPPLIED FROM A FDOT CERTIFIED MINING OPERATION AND ASPHALT PLANT. ASPHALT MIX SHALL NOT CONTAIN MORE THAN 30% RECLAIMED ASPHALT PAVEMENT (R.A.P.).
- CONTRACTOR SHALL TAKE CARE TO COVER BASE OR RESURFACE IN THE SAME WORK PERIOD IF BASE BECOMES EXPOSED DURING MILLING TO PREVENT ANY WATER INTRUSION INTO THE EXISTING BASE MATERIAL.
- COMMENCE WITH BASE MATERIAL REMOVAL A MINIMUM OF 6 INCHES BEYOND THE PROPOSED EDGE OF PAVEMENT SAWCUT.
- STABILIZE TOP 6 INCHES OF SHOULDER TO 50 P.S.I. F.B.V.
- ALL STRIPING AND DELINEATION TO CONFORM TO THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD) LATEST EDITION.
- ALL CROSSWALK SIGNS AND ADVANCED PAVEMENT MESSAGES SHALL BE DESIGNED AND INSTALLED PER FDOT STANDARD INDEX NO. 17346.
- REFERENCE THE 2020 FDOT 600 SERIES FOR ALL REQUIRED AND APPLICABLE MOT PLANS.
- REFER TO "MANUAL OF UNIFORM MINIMUM STANDARDS FOR DESIGN, CONSTRUCTION AND MAINTENANCE FOR STREETS AND HIGHWAYS", FOR CLEAR ZONES, CHAPTER 3, TABLE 3-12.
- ALL WORK FOR THIS PROJECT SHALL BE COMPLETED WITHIN AND FROM THE EXISTING RIGHT OF WAY.
- THE POSTED DESIGN SPEED FOR 2ND STREET IS 25 MPH.
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- ALL EXISTING UTILITY POLES AND GUY ANCHORS ARE TO REMAIN.
- NOTIFY OWNER'S REPRESENTATIVE 72 HOURS PRIOR TO MOBILIZATION.



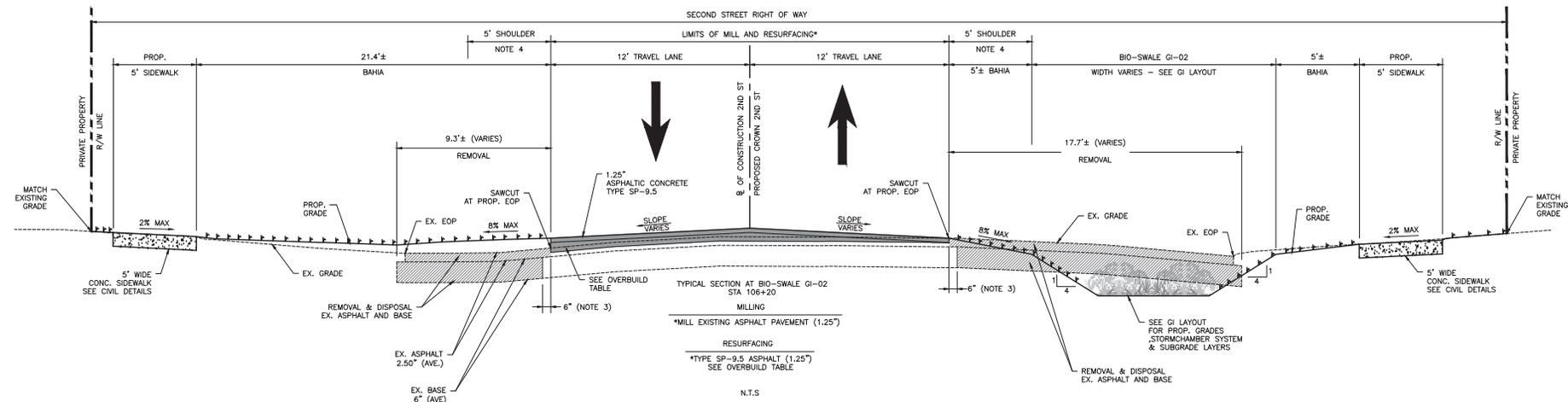
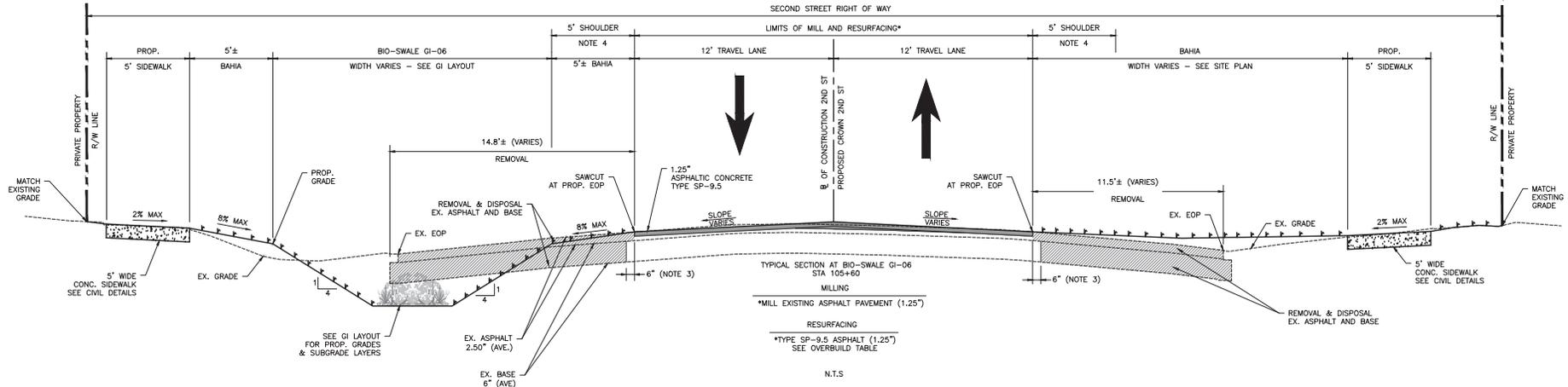
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REVISIONS		
NO.	DESCRIPTION	BY DATE

TOWN OF LAKE PARK
DEPARTMENT OF PUBLIC WORKS
STORMWATER IMPROVEMENT PROGRAM - DIVISION E
SECOND STREET GREEN INFRASTRUCTURE

TYPICAL SECTIONS
SHEET 1

SCALE	AS SHOWN	DRAWN	MRM
CUSTOMER ID	G004	CHECKED	MRM
CONTRACT ID	G00401	SUBMITTED	WRMA
SURVEYED	JESA	RECOMMENDED	
DATE	8/8/2022		
CADD FILE	LP5WC-C001		



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14. ALL EXISTING UTILITY POLES AND GUY ANCHORS ARE TO REMAIN.
15. NOTIFY OWNER'S REPRESENTATIVE 72 HOURS PRIOR TO MOBILIZATION.



100% DESIGN

REVISIONS		
NO.	DESCRIPTION	BY DATE

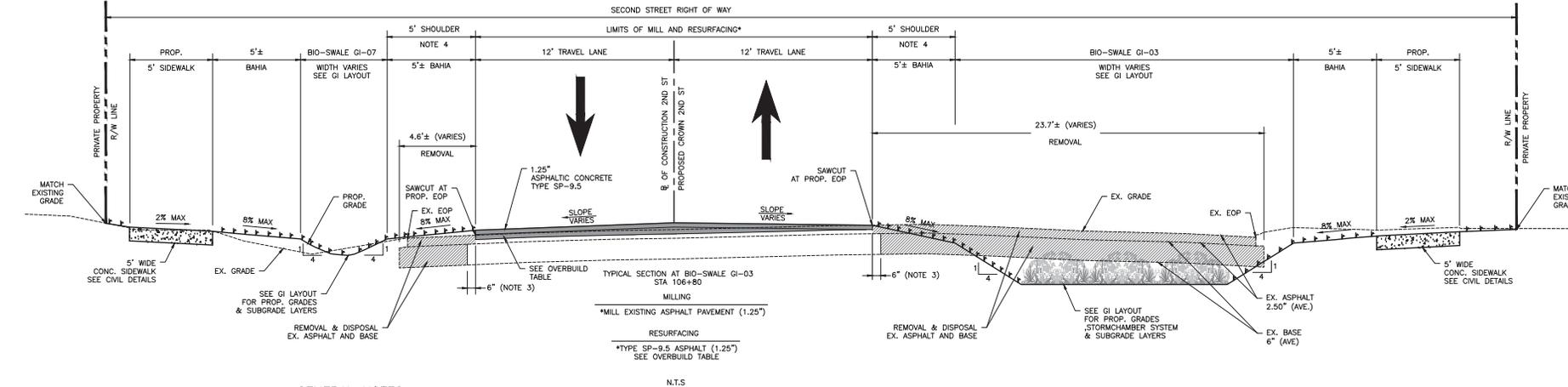
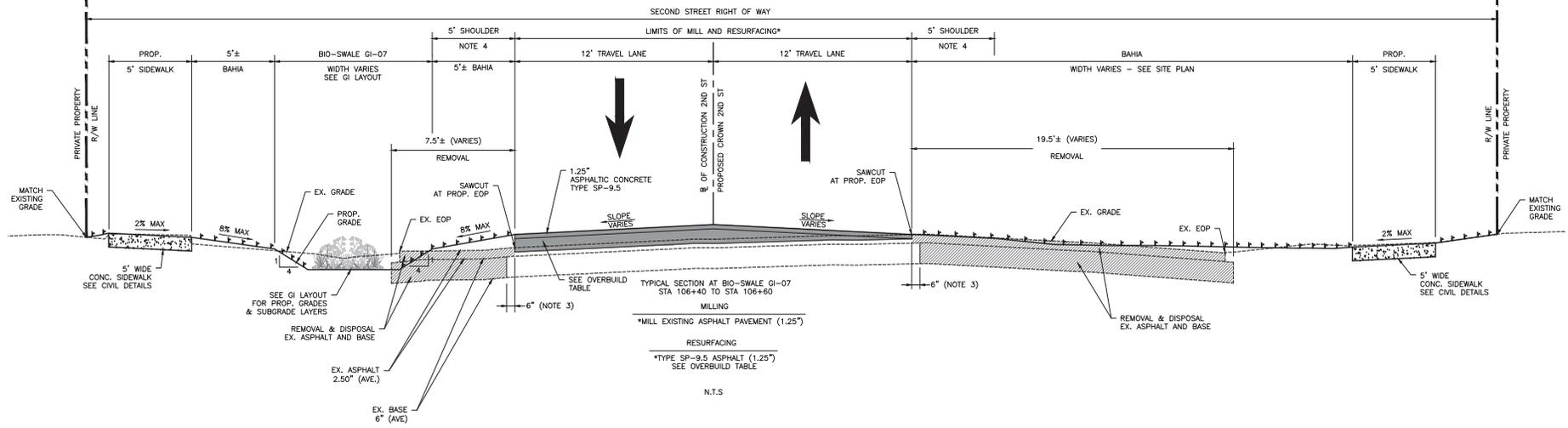
TOWN OF LAKE PARK
DEPARTMENT OF PUBLIC WORKS
STORMWATER IMPROVEMENT PROGRAM - DIVISION E
SECOND STREET GREEN INFRASTRUCTURE

**TYPICAL SECTIONS
SHEET 2**

SCALE	AS SHOWN	DRAWN	MRM
CLIENT ID	G004	CHECKED	MRM
CONTRACT ID	G00401	SUBMITTED	WRMA
SURVEYED	JESA		
DATE	8/8/2022	RECOMMENDED	
CADD FILE	LP5WC-002		

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REDUCTION VERIFICATION SCALE 0 10 INCHES



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REVISIONS		
NO.	DESCRIPTION	BY DATE

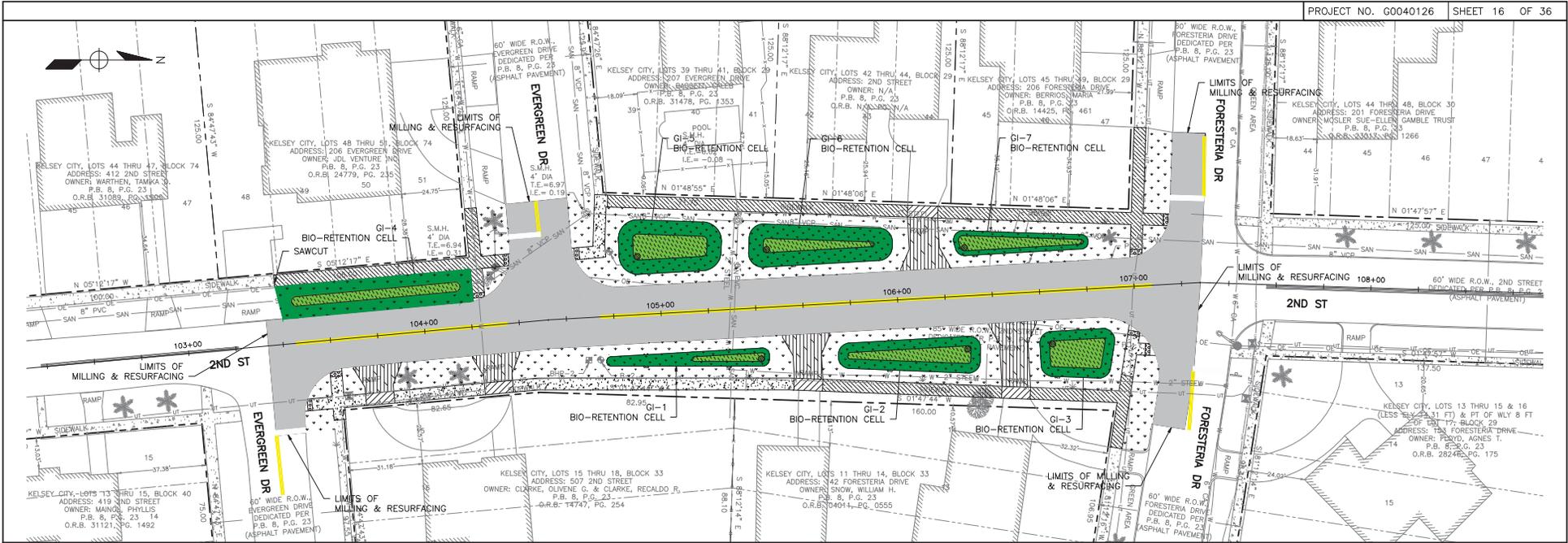
TOWN OF LAKE PARK
DEPARTMENT OF PUBLIC WORKS
STORMWATER IMPROVEMENT PROGRAM - DIVISION E
SECOND STREET GREEN INFRASTRUCTURE

**TYPICAL SECTIONS
SHEET 3**

SCALE	AS SHOWN	DRAWN	MRM
CUSTOMER ID	G004	CHECKED	WRMA
CONTRACT ID	G00401	SUBMITTED	WRMA
SURVEYED	JESA	RECOMMENDED	
DATE	8/8/2022		
CADD FILE	LF9W-C003		

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REDUCTION VERIFICATION SCALE 0 10 INCHES



GENERAL NOTES:

1. ALL ELEVATIONS WHERE SHOWN REFERENCE VERTICAL DATUM NAVD 88 AND NAD 83 FLORIDA EAST ZONE HORIZONTAL DATUM.
2. LOCATIONS OF EXISTING BURIED UTILITIES ARE SHOWN AS APPROXIMATE. CONTRACTOR SHALL PERFORM FIELD LOCATION OF ALL EXISTING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION PRIOR TO START OF CLEARING AND DEMOLITION OF EXISTING STRUCTURES OR PAVEMENT. CALL SUNSHINE 811 48 HOURS PRIOR TO MOBILIZATION OR EXCAVATION ON SITE.
3. ACCESS EXISTING DRAINAGE AND UTILITY EASEMENTS AS NECESSARY FOR ACCESS TO STORMWATER AND UTILITIES LINES.
4. ALL STRIPING AND DELINEATION TO CONFORM TO THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD) LATEST EDITION.
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11. TOWN OF LAKE PARK SHALL BE RESPONSIBLE FOR COORDINATING THE REMOVAL OF PRIVATE LANDSCAPE AND ABOVE GROUND APPURTENANCES PRIOR TO CONSTRUCTION.
12. FIRE HYDRANT RELOCATION SHALL BE COORDINATED AND COMPLETED BY THE TOWN OF LAKE PARK IN CONJUNCTION WITH SEACOAST UTILITIES PRIOR TO CONSTRUCTION.
13. ALL EXISTING UTILITY POLES AND GUY ANCHORS ARE TO REMAIN.
14. NOTIFY OWNER'S REPRESENTATIVE 72 HOURS PRIOR TO MOBILIZATION.

EXISTING FEATURES LEGEND

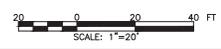
- ME10 EXISTING SPOT ELEVATION
- W WATER
- GAS GAS
- GAS GAS ABANDONED
- UE UNDERGROUND ELECTRIC
- OE OVERHEAD ELECTRIC
- IR IRRIGATION
- STM STORMWATER
- FM SANITARY GRAVITY SEWER
- FM SANITARY FORCE MAIN
- UT UNDERGROUND TELEPHONE
- OT OVERHEAD TELEPHONE
- UT UNDERGROUND TELEPHONE
- COMM UNDERGROUND COMMUNICATION
- UF UNDERGROUND FIBER OPTICS
- T0B TOP OF BANK
- TOE TOE OF BANK
- X FENCE
- SF SILT FENCE
- UDS UNDER DRAIN SOLID
- UDP UNDER DRAIN PERFORATED
- SCB STORMWATER CATCH BASIN
- SMH STORMWATER MANHOLE
- EMH ELECTRICAL MANHOLE
- SMH SANITARY MANHOLE
- TCM TELECOMMUNICATIONS MANHOLE
- WAM WATER MAIN ACCESS MANHOLE
- LP LIGHT POLE
- ME METER WATER/ELECTRIC
- GV GATE VALVE
- BP BACKFLOW PREVENTER
- GU GAS UTILITY VALVE
- GI GAS INSTRUMENTATION
- CH CABLE HANDHOLD
- SS STREET/STOP SIGN
- HYD HYDRANT

LEGEND:

- PROP. SWALE
- PROP. BIORETENTION MEDIA
- PROP. RESURFACED ASPHALT ROADWAY
- PROP. 4" THICK CONCRETE REMOVE & REPLACE
- PROP. 4" THICK CONCRETE NEW CONSTRUCTION
- PROP. 6" THICK CONCRETE SIDEWALK
- PROP. 6" THICK CONCRETE DRIVEWAY
- PROP. GRASS RESTORATION

TOWN OF LAKE PARK
 DEPARTMENT OF PUBLIC WORKS
 640 OLD DIXIE HWY
 LAKE PARK, FL 33403
 PHONE: (561) 881-3345
 FAX: (561) 881-3349

WRMA
 WATER RESOURCES MANAGEMENT ASSOCIATES, INC.
 250 TEJUESTA DRIVE, SUITE 302, TEJUESTA, FL 33469
 PHONE: 561-529-2075 | FAX: 561-401-9385



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NO.	DESCRIPTION	BY	DATE
REVISIONS			
TOWN OF LAKE PARK DEPARTMENT OF PUBLIC WORKS STORMWATER IMPROVEMENT PROGRAM - DIVISION E SECOND STREET GREEN INFRASTRUCTURE			
PROPOSED GREEN INFRASTRUCTURE BIO-SWALE PLAN			
Civil			
SCALE	AS SHOWN	DRAWN	MJM
CLIENT ID	G00401	CHECKED	WRMA
CONTRACT ID	G00401	SUBMITTED	WRMA
SURVEYED	JESA	RECOMMENDED	
DATE	8/8/2022		
CADD FILE	LPSPW-C012		



CROSS SECTION - LOCATION 104+00.00

PLANT PALETTE |



BUTTONBUSH



DWARF COCOPLUM



WIREGRASS



SAND CORDGRASS



SWAMP MILKWEED



CANNA LILY



**CHALKY BROOMSEDGE
BLUESTEM**



BLUE FLAG IRIS



LEAVENWORTH'S TICKSEED



MUHLY GRASS



DWARF FAKAHATCHEE GRASS

BIOSWALE / RAIN GARDEN

PLANT PALETTE |



CROSS SECTION - LOCATION 105+00.00



BUTTONBUSH



DWARF COCOPLUM



WIREGRASS



SAND CORDGRASS



SWAMP MILKWEED



CANNA LILY



**CHALKY BROOMSEDGE
BLUESTEM**



BLUE FLAG IRIS



LEAVENWORTH'S TICKSEED



MUHLY GRASS



DWARF FAKAHATCHEE GRASS

BIOSWALE / RAIN GARDEN

2ND STREET
Lake Park, Florida



DEPARTMENT
OF PUBLIC WORKS



BIOSWALE / RAIN GARDEN



BIOSWALE / RAIN GARDEN