LOCATION HYDRAULICS REPORT

Florida Department of Transportation

District 4

I-95 (SR 9) Project Development and Environment (PD&E) Study

Miami-Dade/Broward County Line to North of Griffin Road

Broward County, Florida

Financial Management Number: 439170-1-22-02

ETDM Number: 14500

Date: March 2026

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. §327 and a Memorandum of Understanding dated May 26, 2022, and executed by Federal Highway Administration and FDOT.

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Project Development and Environment (PD&E) Studies
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FDOT District 4

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Financial Project ID No. 439170-1-22-02

Federal Aid Project No.: D421 105 B

March 2026

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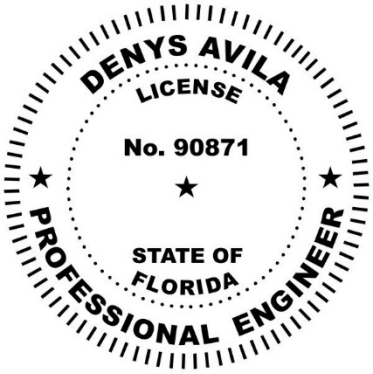

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EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study along I-95 (SR 9) from the Miami-Dade/Broward County Line to north of Griffin Road. The project proposes improving traffic operations at the existing interchanges and cross streets and enhancing the managed lanes along I-95 (SR 9) from the Miami-Dade/Broward County Line to North of Griffin Road. The I-95 project corridor is approximately 6.5 miles in Broward County, Florida. Figure 10 depicts the project location. This project is within the City of Hollywood, City of Dania Beach, Town of Pembroke Park, and City of Hallandale Beach. The existing interchanges and cross streets that will be evaluated include Sheridan Street (SR 822), Stirling Road (SR 848), and Griffin Road (SR 818).

Roadway improvements will require right-of-way acquisition of parcels in commercial, nurseries and vineyards, and residential areas. This will result in changes in future land use areas from the groups mentioned to new highway facilities. The improvements also impact existing stormwater management facilities and encroach into FEMA floodplain zones. The impacts were determined using end-area methods for both alternatives. Preliminary compensation calculations were obtained from proposed dry detention pond sites and dry detention swales using the least favorable alternative. Both alternatives will have the same pond sites with minor adjustments to maximize storage capacity. Additional drainage improvements will be determined in final design.

The proposed modifications to existing drainage structures within the project limits are anticipated to result in insignificant impacts to floodwater conveyance capacity. This study concludes that the encroachments into the floodplains will not result in any significant adverse impacts on the natural and beneficial floodplain values or on flood risks or damage. Chapter V of this report detail the project classification and risk evaluation conducted in accordance with Chapter 13 of FDOT's Project Development and Environment (PD&E) Manual, which supports this determination.

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I. PROJECT INTRODUCTION

This Location Hydraulic Report has been completed to support the Project Development and Environment (PD&E) Study prepared for the future improvements of I-95 (SR 9) from the Miami-Dade/Broward County Line to north of Griffin Road. This report documents the floodplain impacts associated with the proposed concepts.

I-95 is the primary north-south interstate facility that links numerous major cities along the Atlantic coast and is one of the most important transportation systems in southeast Florida. Within the study limits, it is functionally classified as an Urban Principal Arterial Interstate and has a posted speed limit of 65 miles per hour. This segment consists of eight general use lanes (four in each direction) and the managed lanes vary between four (two in each direction) and two lanes (one in each direction). The access management classification for the I-95 study corridor is Class 1. There are a total of six existing interchanges within the study limits; however, only three interchanges in the northern section are proposed for improvements as part of this project. The cross streets at the interchanges are all six lane divided facilities with varying functional classifications. Sheridan Street is classified as an Urban Principal Arterial Other to the west of the I-95 interchange, and to the east it is classified as an Urban Minor Arterial. Stirling Road is classified as an Urban Minor Arterial. Griffin Road is classified as an Urban Principal Arterial Other.

1.1 PROJECT LOCATION AND DATUM

This project is within Broward County, Florida, in Sections 28 & 33 in Township 50S and Range 42E, and in Sections 4, 8, 9, 17, 20, 21 and 28 in Township 51S and Range 42E. A project Location Map is provided in Figure 1 and USGS Quadrangle Maps are shown **in Appendix B**. The vertical datum for the proposed improvements refers to the North American Vertical Datum (NAVD), 1988 and is expressed in feet. The latitude/longitude of the datum shift point was taken as the approximate centroid of the project limits.
(See Appendix A)

Note: The conversion from NAVD 1988 to National Geodetic Vertical Datum (NGVD), 1929, is:

NGVD 29 – 1.608= NAVD 88.

1.2 STUDY PURPOSE

The purpose of the Location Hydraulic Report is to document the risk associated with the proposed improvements as it relates to the existing base floodplain as well as document proposed mitigation strategies to minimize impacts. Per the FDOT PD&E Manual; *"Protection of floodplains and floodways is required by EO 11988: Floodplain Management; USDOT Order 5650.2, Floodplain Management and Protection; and Federal-Aid Policy Guidance on Location and Hydraulic Design of Encroachments on Flood Plains, 23 CFR Part 650A. The intent of these*

regulations is to avoid or minimize highway and land use development encroachments that reduce storage and increase water surface elevations within base floodplains. Where encroachment is unavoidable, the regulations require FDOT to take appropriate measures to minimize or mitigate impacts". All elevation values are referenced in NAVD 1988.

1.3 PROJECT PURPOSE & NEED

Purpose:

The purpose of the study is to improve traffic operations at the existing interchanges, cross streets, and managed lanes, address existing and future traffic demand, and enhance safety along SR 9/I-95 from Miami-Dade/Broward County Line to north of Griffin Road in Broward County, Florida. The project will also address social demands, economic development, and modal interrelationships.

Need:

Between 2021 and 2050, traffic demand along the I-95 corridor in Broward County is projected to increase steadily at 0.5% annually, with AADT rising from a post-COVID range of 198,500–256,000 vehicles to an estimated 248,000–333,400 vehicles. Operational analyses reveal existing and future deficiencies at multiple interchanges—particularly Sheridan Street, Stirling Road, and Griffin Road—with several locations already operating at or below Level of Service E. Safety concerns are pronounced, with 4,764 crashes recorded over five years, including a high rate of rear-end collisions, attributed to congestion. The corridor ranks high on the MPO's severity index, signaling urgent need for safety improvements. The project addresses evacuation route performance, supports anticipated population and employment growth, and enhances multimodal connectivity. Proposed improvements will alleviate congestion, improve safety, support freight and express transit, and fill pedestrian and bicycle infrastructure gaps identified in the Broward MPO Complete Streets Master Plan.

1.4 EXISTING FACILITY AND PROPOSED IMPROVEMENTS.

1.4.1 EXISTING FACILITY

The existing I-95 typical consists primarily of 8 General Purpose Lanes (4 in each direction), the 2 outermost lanes being 12-foot wide and the 2 inner lanes 11-foot wide. Both directions include an 11-foot express lane and a 3-foot buffer area with pavement markings separating the express lanes from the general use lanes. The shoulders are 12-foot wide with 10-foot paved shoulders for the outer shoulders. The northbound and southbound arterials are separated by a center barrier wall. From station 257+82.86 to station 547+10.50 the typical includes an additional 11-foot express lane in each direction.

There are 6 full interchanges within the project limits which include: Hallandale Beach Blvd., Pembroke Road, Hollywood Blvd., Sheridan Street, Stirling Road and Griffin Road. Details can be found in Table 1.

Table 1: Summary of Interchanges

Road	Interchange Type	Lane Configuration
Hallandale Beach Blvd. - SR 858	Diamond	6 Lanes East of I-95 4 Lanes West of I-95
Pembroke Rd. – SR 824	Diamond	4 Lanes East of I-95 6 Lanes West of I-95
Hollywood Blvd. – SR 820	Diamond	4 Lanes East of I-95 6 Lanes West of I-95
Sheridan St. – SR 822	Diamond	6 Lanes East of I-95 6 Lanes West of I-95
Stirling Rd. – SR 848	Diamond	6 Lanes East of I-95 6 Lanes West of I-95
Griffin Rd. - SR 818	Diamond	6 Lanes East of I-95 6 Lanes West of I-95

1.4.2 PROPOSED IMPROVEMENTS

The alternatives for the proposed roadway improvements were analyzed with the consideration of previous studies such as I-95 Broward Interchange Masterplan, the Old Griffin Road and Griffin Road Concept Development (CD), I-95 Corridor Planning Study (CPS), and I-95 PD&E Study from south of Hallandale Beach Boulevard (S.R. 858) to north of Hollywood Boulevard (S.R. 820) (FPID# 436903-1). The improvements include:

1) Interchange improvements for I-95 at Sheridan Street, Stirling Road, and Griffin Road.
2) Improvements at the intersection of Griffin Road and Old Griffin Road
3) Entrance/exit express lane improvements

I-95 at Sheridan Street Interchange

The alternatives evaluated for the interchange at I-95 at **Sheridan Street** include:

- **Alternative A**: **Diamond Interchange (Modify Existing) -** Modifying the existing diamond interchange with additional turn lanes at the ramp terminal. The proposed northbound and southbound off-ramps consist of triple left turns and dual right turns. Dual right turn lanes from eastbound on Sheridan Street to southbound I-95 and westbound Sheridan Street to northbound I-95 are also proposed.



Figure 1 - I-95 at Sheridan Street Alt. A

- **Alternative B: Northbound to Westbound Flyover (Median Alignment):** This alternative consists of implementing a flyover from the median going northbound to westbound on Sheridan Street. The flyover improves the operation of the interchange by eliminating the majority of northbound to westbound turns.

The northbound to westbound at-grade left-turn movement remains to provide local traffic access to the side streets just west of I-95.



Figure 2 - I-95 at Sheridan Street Alt. B

- **Alternative C: Northbound to Westbound Flyover (East Alignment) –** This alternative is similar to Alternative B, where it introduces a northbound to westbound flyover. However, the flyover is proposed from the outside instead of from the median. Similarly, east alignment flyover improves the operation of the interchange by eliminating the majority of northbound to westbound turns. The northbound to westbound at-grade left-turn movement still remains to provide local traffic access to the side streets just west of I-95.

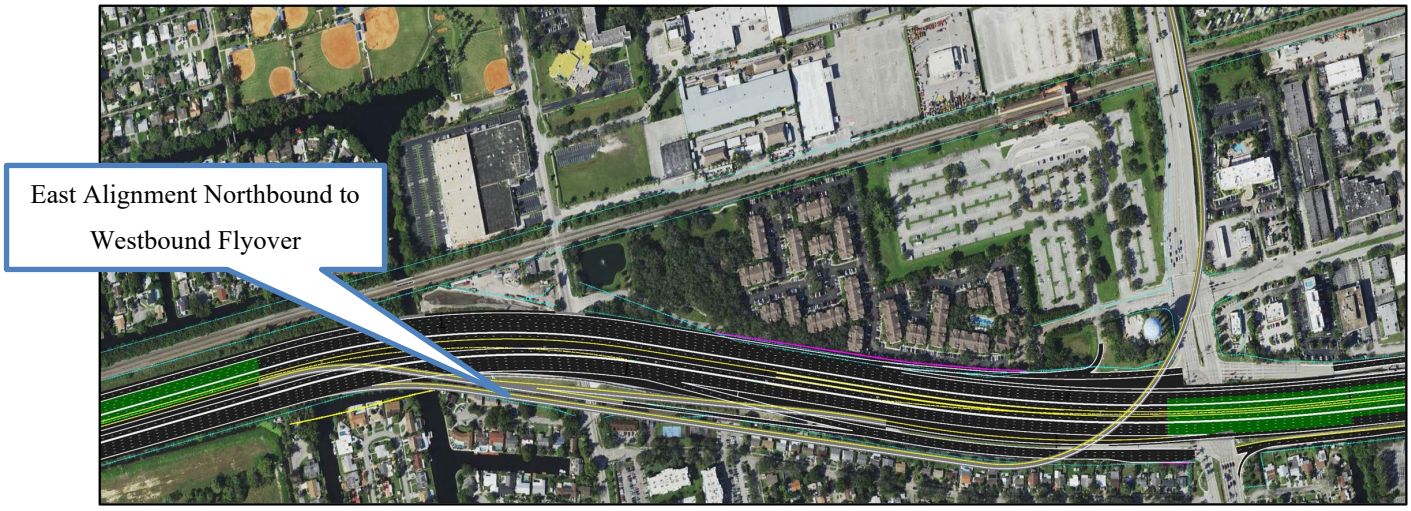


Figure 3 - I-95 at Sheridan Street Alt. C

I-95 at Stirling Road Interchange

Two (2) alternatives were evaluated for the interchange of I-95 at **Stirling Road** and are summarized as follows.

- **Alternative A: Diamond Interchange (Modify Existing) –** This alternative consists of modifying the existing diamond interchange with additional turn lanes at the ramp terminal intersections. The proposed northbound off-ramp consists of triple left turns and dual right turns. The proposed southbound off-ramp consists of dual left turns and dual right turns.

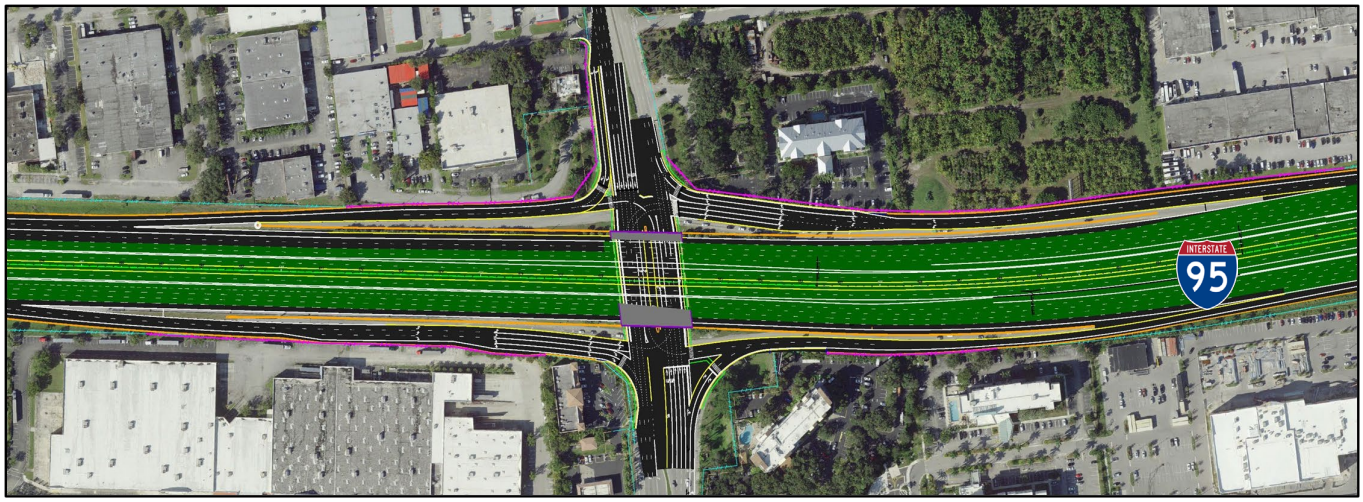


Figure 4 - I-95 at Stirling Road Alt. A

- **Alternative B: Diverging Diamond Interchange (DDI) –** This alternative consists of reconfiguring the existing diamond interchange to a Diverging Diamond Interchange (DDI). A DDI improves traffic flow and safety by temporarily shifting traffic to the left side of the road between freeway ramps, allowing for free-flowing, unhindered left turns onto the highway.



Figure 5 - I-95 at Stirling Road Alt. B

I-95 at Griffin Road Interchange

Two (2) alternatives were evaluated for the interchange of I-95 at Griffin Road and are summarized as follows

- **Alternative A: Diamond Interchange (Modify Existing) –** This alternative consists of modifying the existing diamond interchange with additional turn lanes at the ramp terminal intersections. The proposed northbound off-ramp consists of triple left turns and dual right turns. The proposed southbound off-ramp consists of triple left turns and triple right turns.

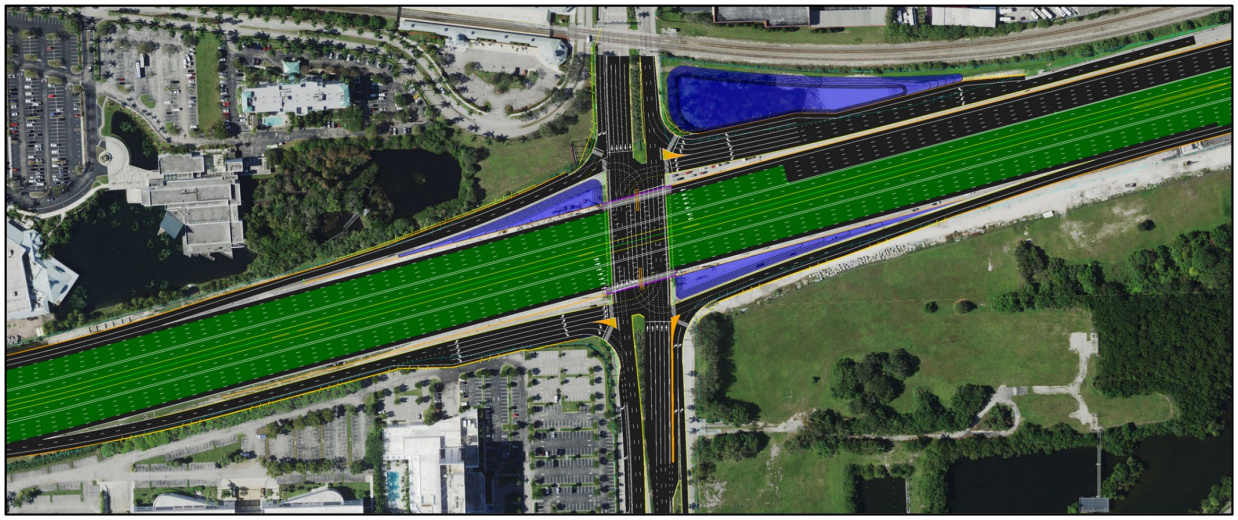


Figure 6 - I-95 at Griffin Road Alt. A

- **Alternative B: Diverging Diamond (DDI) –** This alternative consists of reconfiguring the existing diamond interchange to a DDI.



Figure 7 - I-95 at Griffin Road Alt. B

Griffin Road at Old Griffin Road Intersection

Two (2) alternatives were evaluated for the intersection of **Griffin Road at Old Griffin Road** and are summarized as follows.

Alternative A: Free Flow Eastbound – This alternative consists of modifying the existing intersection at Griffin Road and Old Griffin Road by eliminating the signal for the east bound movement on Griffin Road. This allows for free-flow travel for eastbound traffic. The westbound signal will still remain and the westbound to southbound left turn will be made when there is a break in eastbound traffic.

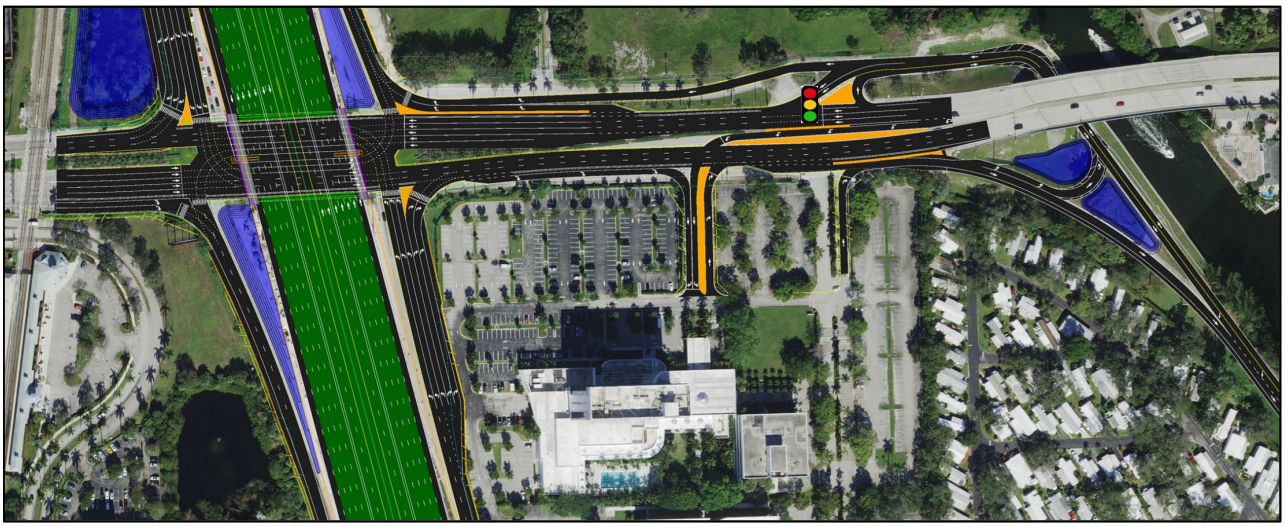


Figure 8 - Griffin Road at Old Griffin Road Alt. A

Alternative B: Stop Controlled Eastbound – This alternative consists of maintaining signals for both the eastbound and westbound movements on Griffin Road at Old Griffin Road.

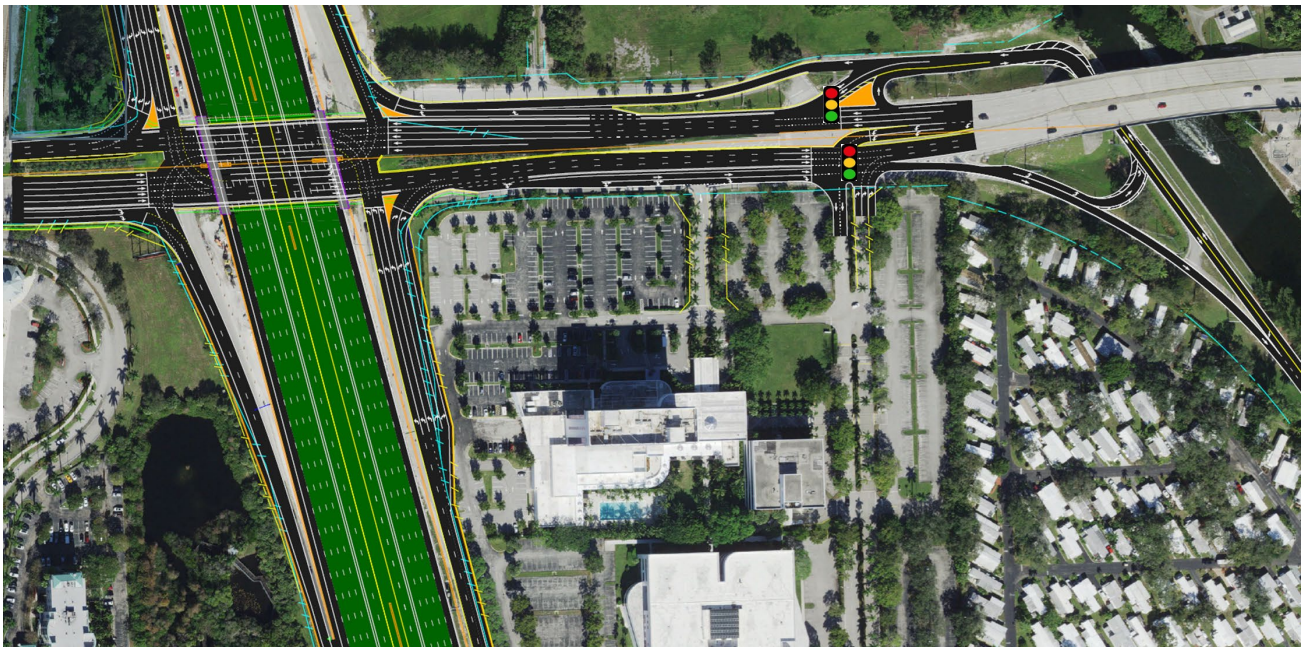


Figure 9 - Griffin Road at Old Griffin Road Alt. B

I-95 Mainline 'Build' Improvements

The mainline of I-95 is generally comprised of two (2) express lanes, four general purpose lanes, and in some locations, auxiliary lanes between interchanges. Although capacity improvements for the mainline are not the intent of the study, additional auxiliary lanes are proposed. Existing and Proposed Typical Sections can be found in

Appendix C. In addition, elevated express lanes for exits and entrances were evaluated but were only found to be feasible at the following two locations based on geometric and operational constraints:

1) Southbound elevated express lane exit south of Pembroke Road

2) Northbound elevated express lane exit south of Sheridan Street

I-95 between Ives Dairy Road to Hallandale Beach Boulevard (Section A) – Within this segment, coming from Miami-Dade County, there is no change in the typical section. The mainline will continue to operate with two express lanes and four general purpose lanes in each direction. The two (2) auxiliary lanes in the northbound direction and one in the southbound direction will also be maintained. No additional auxiliary lanes are proposed.

I-95 between Hallandale Beach Boulevard and Pembroke Road (Section B) – Within this segment, there is no change in the lane configurations. However, the inside shoulder in the northbound direction is proposed to be widened from six-ft to 12-ft, which will shift the lanes by six-ft to the outside. To not increase the mainline footprint, the additional six-ft outside widening will come from the separation of the I-95 mainline and northbound on-ramp from Hallandale Beach Boulevard.

I-95 between Pembroke Road and Hollywood Boulevard (Section C) – Within this segment, there is no change in the lane configurations. However, the existing 16-ft between the express lanes and general lanes which accounts for exiting the express lanes is proposed to be reduced to a three-ft separation with express lane marker. The remaining 13-ft will go to the inside shoulder, and the express lane exit is proposed to be moved to the inside as a braid over I-95 further north.

I-95 between Hollywood Boulevard and Sheridan Street (Section D) – To accommodate an elevated express lane exit ramp from the median, the mainline consisting of two express lanes, four general purpose lanes, and one auxiliary lane is proposed to be widened by 36-ft to the outside in the northbound direction. In the southbound direction, the mainline is proposed to be widened by 12-ft to accommodate an additional auxiliary lane for a total of two. The median modification does create a slight shift in the alignment to the east south of Sheridan Street.

I-95 between Sheridan Street and Stirling Road (Section E) – Within this segment, the mainline consists of two express lanes, four general purpose lanes, and one auxiliary lane in each direction in the 'No-Build' condition. The proposed improvements consist of widening 12-ft to the outside in both directions to allow for an additional general-purpose lane in each direction.

I-95 between Stirling Road and Griffin Road (Section F) – Within this segment, the mainline consists of two express lanes, four general purpose lanes, and one auxiliary lane in each direction in the 'No-Build' condition. The

proposed improvements consist of widening 12-ft to the outside in both directions to allow for an additional general-purpose lane in each direction.

I-95 between Griffin Road and I-595 (Section G) – Within this segment, the mainline consists of two express lanes, four general purpose lanes, and one auxiliary lane in each direction in the 'No-Build' condition. There is also one auxiliary lane in the northbound direction. The proposed improvements consist of widening 12-ft to the outside in the northbound direction to allow for an additional general-purpose lane. In the southbound direction, the express lane buffer is proposed to be reduced from four-ft to 1.4-ft and the four general purpose lanes are proposed to be reduced from 12-ft wide lanes to 11-ft wide each. This provides for total savings of 6.4-ft in pavement width. This additional width, along with 4.4-ft of pavement widening to the outside is proposed to accommodate an additional 11-ft wide general-purpose lane in the southbound direction. This does require resetting the barrier in the southbound direction between the outside shoulder of the I-95 mainline and the inside shoulder of the adjacent I-95 southbound on-ramp. The inside shoulder of the ramp is also being reduced from 10.4-ft to six-ft. In the northbound direction, 12-ft widening to the outside is proposed to include an additional general-purpose lane.

1.4.3 PREFERRED ALTERNATIVES

The preferred alternatives are as follows:

- I-95 at Sheridan Street - Alternative A: Diamond Interchange (Modify Existing). (See **Figure** 1).
- I-95 at Stirling Road Interchange – Alternative B: Diverging Diamond Interchange (DDI). (See **Figure 5**)
- I-95 at Griffin Road – Alternative A: Diamond Interchange (Modify Existing). (See **Figure 6**).
- Griffin Road at Old Griffin Road Intersection – Alternative B: Stop Controlled Eastbound. (See **Figure 9**).

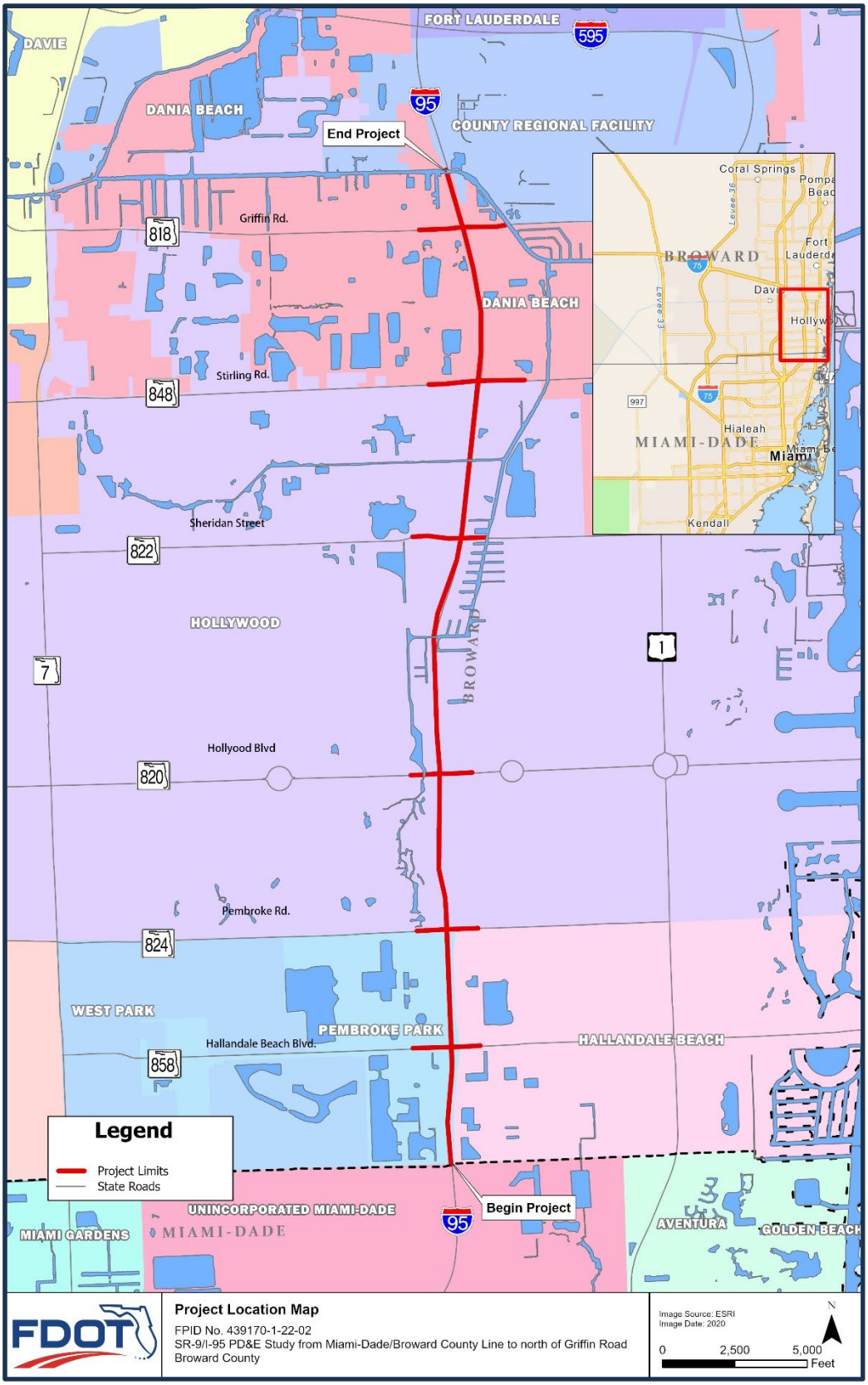


Figure 10: Project Location Map

II. RESOURCE DATA

2.1 RAINFALL DATA

Rainfall distribution data was sourced from SFWMD Rainfall maps. A summary of rainfall amounts in inches can be seen below and backup documentation in **Appendix A**.

Table 2: Rainfall

Source	Return Period (years)	Duration (hours)	Rainfall (inches)
SFWMD	100	72	17
SFWMD	25	72	14

2.2 SOIL DATA

Tierra South Florida conducted a Geotechnical Engineering Report for Bridge Widening and Associated Walls for the I-95 Express Lanes in Broward and Miami Dade Counties. The subsurface conditions encountered in the borings primarily consisted of sandy soils and limestone. Depth to groundwater ranged from 3 to 12 feet below existing grade. More information from this report can be found in **Appendix B.**
Soils report and spatial data was also sourced from the USDA Web Soil Survey application. The predominant soil groups shown are *Arents-Urban land complex* (15.6%), Dade-Urban land complex (14.6%) and *Urban land, 0 to 2 percent Slopes* (17.4%). Hydrologic Soil Group A is the predominant rating. A general description of the soil data can be seen in **Appendix B.**

2.3 SHGWT

The Seasonal High-Water Table (SHWT) will be based on the average wet season groundwater table taken from Broward County and previous FDOT projects, as defined in the SHWT Memo (see **Appendix E**)**.** The average elevation is 0.50’ NAVD (2.0’ NGVD).

2.4 LIDAR DATA

A Digital Elevation Model (DEM) is a representation of the topographic surface of the Earth excluding trees, buildings, and other surface objects. DEMs are created from a variety of sources, but primarily from Lidar Data sourced from the USGS application. Lidar data were converted to .Tiff files and compiled into one single DEM using ArcGIS Pro for the purpose of this project.

III. EXISTING CONDITIONS

3.1 EXISTING DRAINAGE

- **Basin 1**: This drainage basin encompasses I-95 between station limits 171+00 and 247+38. The basin extends from south of the Miami Dade/Broward County Line to the Hallandale Beach Boulevard (SR-858) interchange. Stormwater flows from the general-purpose lanes and shoulder into roadside swales and French drains located along the outside of I-95 and outfalls to the C-9/ Snake Creek Canal. The managed lanes and shoulder flow into the barrier wall inlets along the barrier walls. The swales are designed with a bottom elevation of 2.5 feet (NAVD) and a control elevation of 3.5 feet NAVD 88. Existing conditions have dry retention roadside swales provide water quality treatment and stormwater attenuation with ditch block weirs. The Miami-Dade County I-95 PD&E (FPID: 436903-1) study recently completed proposes new dry retention swales and pond alternatives to treat/attenuate the additional runoff proposed as part of that study. Basin 1 is located between the SFWMD C-9 East and North Biscayne Bay Basins. SFWMD permits 06-02942-P and 88-00053-S are within the basin's limits.

- **Basin 2**: This drainage basin encompasses I-95 between station limits 247+38 and 287+92 between Hallandale Beach Blvd. (SR 858) and Pembroke Rd. (SR 824). Stormwater flows from the general-purpose lanes and shoulder into roadside swales and French drains located along the outside of I-95 and outfalls to the C-10 Canal. The managed lanes and shoulder flow into the barrier wall inlets along the barrier walls. Dry detention roadside swales provide water quality treatment and stormwater attenuation with ditch block weirs. This basin discharges into an FDOT borrow pit called Chaves Lake. Excess stormwater runoff from Chaves Lake overflows to the C-10 Canal through a pump station located on the west side of the I-95. The Miami-Dade County I-95 PD&E (FPID: 436903-1) study recently completed proposes new dry retention swales and pond alternatives to treat/attenuate the additional runoff proposed as part of that study. Basin 2 is located between the SFWMD C-9 East and North Biscayne Bay Basins. SFWMD permits 06-02942-P and 88-00053-S are within the basin's limits.

- **Basin 3:** This drainage basin encompasses I-95 between station limits 287+92 and 342+06 between Pembroke Rd. (SR 824) and Hollywood Blvd. (SR 820). Stormwater flows from the general-purpose lanes and shoulder into roadside swales and French drains located along the outside of I-95 and outfalls to the C-10 canal. The managed lanes and shoulder flow into the barrier wall inlets along the barrier walls. Roadside swales provide partial water quality treatment and stormwater attenuation using ditch block weirs. The rest of the storage for treatment and attenuation is

discharged to Basin 4 and ultimately discharged to the C-10 Canal. The Miami-Dade County I-95 PD&E (FPID: 436903-1) study recently completed proposes new dry retention swales and pond alternatives to treat/attenuate the additional runoff proposed as part of that study. Basin 3 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S, 88-00053-S and 06-105283-P are within the basin's limits.

- **Basin 4:** This drainage basin encompasses I-95 between station limits 342+06 and 369+41between Hollywood Blvd. (SR 820) and Johnson St. Stormwater flows from the general-purpose lanes and shoulder into roadside swales located along both sides of the I-95 and Hollywood Boulevard interchange infield areas. The managed lanes and shoulder flow into the barrier wall inlets along the barrier walls. These roadside swales and interchange infield areas provide water quality treatment and stormwater attenuation with ditch block weirs. Excess stormwater runoff discharge into the C-10 Canal. The Miami-Dade County I-95 PD&E (FPID: 436903-1) study recently completed proposes new dry retention swales and pond alternatives to treat/attenuate the additional runoff proposed as part of that study. Basin 4 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S, 88-00053-S and 06-105283-P are within the basin's limits.

- **Basin 5**: This drainage basin encompasses I-95 between station limits 369+41 and 389+20 (between Johnson St. and the C-10 Canal). The managed lanes and shoulder flow into roadside swales and ponds located along both sides of the road and outfalls into the C-10 Canal. The managed lanes and shoulder flow into the barrier wall inlets along the barrier walls. The Miami-Dade County I-95 PD&E (FPID: 436903-1) study recently completed proposes new dry retention swales and the Sunset Golf Course Pond to treat/attenuate the additional runoff proposed as part of that study. This is the last basin of the Miami-Dade PD&E study that is an extension of this PD&E Study. Basin 5 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S and 06-105283-P are within the basin's limits.

- **System 9:** This drainage basin encompasses I-95 between station limits 389+20 to 425+00 between C-10 Canal and Sheridan Street. Stormwater is collected by barrier wall inlets or directly sheet flows into roadside dry detention swales and ponds located along both sides of the road and outfall to the C-10 via existing ditch blocks. The swale bottom elevation is 1.0 ft NAVD and has a discharge elevation of 2.0 ft NAVD. System 9 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S, 06-105306-P and 06-102237-P are within the basin's limits.

- **System 10:** This drainage basin encompasses I-95 between station limits 425+00 to 451+80 between Sheridan Street and the C-10 Spur Canal. Stormwater is collected by barrier wall inlets or directly sheet flows into roadside dry detention swales located along both sides of the road and outfall to the C-10 Spur Canal via existing ditch blocks. System 10 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S, 06-105306-P and 06-105283-P are within the basin's limits.

- **System 11:** This drainage basin encompasses I-95 between station limits 451+80 to 479+32 between the C-10 Spur Canal and Stirling Road. Stormwater is collected by barrier wall inlets or directly sheet flows into roadside dry detention swales located along both sides of the road and outfall to the C-10 Spur Canal via existing ditch blocks. System 11 is located within the SFWMD C-10 Basin. SFWMD permits 06-102237-P, and 06-105306-P are within the basin's limits.

- **System 12**: This drainage basin encompasses I-95 between station limits 479+32 to 533+23 between Stirling Rd (SR 848) and Griffin Rd (SR 818). Stormwater is collected by barrier wall inlets or directly sheet flows into roadside dry detention swales and ponds located along both sides of the road. From the ponds, stormwater is conveyed towards the middle via weir overflow along an existing ditch block with an existing 66" pipe that outfalls to the C-10 Canal. System 12 is located within the SFWMD C-10 Basin. SFWMD permits 06-01465-S, 06-105306-P, 06-102237-P and 06-01768-S are within the basin's limits.

- **System 13**: This drainage basin encompasses I-95 between station limits 533+23 to 604+54 between Griffin Rd (SR 818) to I-595. Stormwater is collected by barrier wall inlets or sheet flows into roadside swales and ponds located along both sides of the road and outfall to the Dania Cut-Off Canal. System 13 is located within the SFWMD Coral Reef Basin. SFWMD permits 06-01465-S, 06-01768-S and 06-102234-P are within the basin's limits.

3.2 EXISTING LAND USE

The existing land use within the project limits is primarily commercial and low/medium residential. No future land use change is anticipated within the project corridor as most of the land is fully developed. A complete land use map from Broward County can be seen in **Appendix A.**

3.3 FLOODPLAINS

The project is located within Federal Emergency Management Agency (FEMA) Insurance Rate Maps (FIRMs) 12011C0558J, 12011C0566J, 12011C0568J and12011C0731J. The project limits lie within flood

zones AH, AE, and X. Generally, the I-95 corridor lies above the 100-year floodplain, while adjacent ponds and swales lie within the lower elevations of Zones AE/AH.

The standard definitions for each flood zone according to FEMA are listed below:

- Zone AH*: "Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones."*

- Zone AE: "*The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones."*

- Zone B and X (Shaded): "*Area of moderate flood hazard, usually the area between the limits of the 100- year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile."*

In addition to the FEMA maps, this report will also look at the Broward County 100-Year Future (2060) Elevations Maps (See **Appendix B**) to determine if there are impacts to future flood zones. The Broward County Future Maps were modeled to include projected sea level rise, increased precipitation, saturated soil conditions and land use changes in the year 2060.

3.4 CROSS DRAINS

Existing cross drain locations were determined based on existing construction plans, the Straight-Line Diagram found in **Appendix B** and existing survey information. Cross Drains are described in Table 3.

Table 3: Summary of Cross Drains

Cross Drain No.	Station	Size	Approx. Length (ft)	Description
CD-1	215+77	18”	100	MBI to west ditch
CD-2	228+76	30”	200	MBI to side ditches
CD-3	266+84	30”	229	MBI to side ditches
CD-4	302+65	30”	246	Inlets connected to east ditch
CD-5	304+75	24”	116	MBI to east ditch
CD-6	312+85	24”	130	MBI to east ditch
CD-7	319+88	24”	250	MBI to side ditches
CD-8	325+34	24”	235	MBI to side ditches
CD-9	355+93	24” - 30”	158	MBI to west ditch
CD-10	382+45	24”	120	MBI to west ditch
CD-11	391+96	18”	114	MBI to east ditch
CD-12	407+90	30”	106	MBI to west ditch
CD-13	441+78	36”	112	MBI to east ditch
CD-14	457+76	18”	122	MBI to east ditch
CD-15	463+75	18”	119	MBI to west ditch
CD-16	490+76	18”	130	MBI to east ditch
CD-17	498+66	36”	245	MBI to side ditches
CD-18	499+75	36”	245	Cross Drain
CD-19	500+76	18”	122	MBI to east ditch
CD-20	507+36	18”	233	MBI to side ditches
CD-21	510+16	18”	123	MBI to east ditch
CD-22	512+96	15”	120	MBI to west ditch
CD-23	515+76	18”	129	MBI to east ditch
CD-24	520+76	24”	128	MBI to west ditch
CD-25	544+26	24”	234	MBI to east ditch (Skewed)
CD-26	546+31	24”	213	MBI to east ditch

MBI: Median Barrier Inlet

IV. PROPOSED CONDITIONS

4.1 PROPOSED DRAINAGE

- **Basin 1**: Proposed drainage evaluated in PD&E study FPID 436903-1-22-02. Runoff from I-95 sheet flows into roadside swales S-L1A, S-L1B, S-L1C, S-L1D, S-L2, S-L1E, S-R1A, S-RA1-1, S-R1, S-R2, and S-R4. Dry detention pond S-L3 is in a new parcel. French drains are proposed to provide additional storage to compensate for the deficit in provided storage within the proposed swale/ponds
- **Basin 2:** Proposed drainage evaluated in PD&E study FPID 436903-1-22-02. Runoff from I-95 sheet flows into roadside swales SL-4, S-R5, S-R6, S-R7, S-R7A and SR-8. Pond S-L5 and swale S-R7 are in two new parcels. These roadside swales will provide water quality treatment and stormwater attenuation using ditch block weirs. French drains within the right of way can be used for additional storage.
- **Basin 3:** Proposed drainage evaluated in PD&E study FPID 436903-1-22-02. Runoff from I-95 sheet flows into roadside swales and French Drains SR-9, SR-10 & SR-11 at east side and SL-5A-1, SL-5A-2, SL-5B, SL-5C & SL-5D at I-95 west side. Modified roadside swales provide partial water quality treatment and stormwater attenuation using ditch block weirs. The rest of the storage treatment will be discharged to Basin 4 and routed to a proposed stormwater pond within the Sunset Golf Course (Basin 5). A pump may be required to overcome hydraulic gradients. French drains can be used for additional storage
- **Basin 4:** From the PD&E study FPID 436903-1-22-02 runoff from I-95 sheet flows into roadside swales S-L6, S-R12, S-R13, S-R14 and S-R15. S-R13 is in two new parcels. These modified roadside swales provide water quality treatment and stormwater attenuation using ditch block weirs. The excess stormwater runoff will be discharged to the stormwater pond within the Sunset Golf Course. French drains can be used for additional storage.
- **Basin 4 & 5:** Existing swales S-L6, S-R15 & SR-16 will be reshaped for additional storage volume. A new dry detention pond S-R18 will be proposed within the existing right of way to compensate for loss of storage.
- **System 9:** Runoff from I-95 sheet flows into inlets that discharge to roadside swales. Proposed roadway will encroach into existing dry detention ponds and will be compensated by regrading existing swales and the addition of four new ponds. Swale 9-1 will be regraded for additional storage. Swales 9-2, 9-3 and 9-4 have storage loss due to the proposed improvements. The proposed new ponds include 9-5, 9-6 and 9-7. The combination of existing and proposed swales and ponds will provide the required water quality treatment and stormwater attenuation.

- **System 10:** Runoff from I-95 sheet flows into barrier wall inlets that discharge to roadside swales. Swales 10-1 & 10-2 are anticipated to be regraded up to a gravity wall and or cantilever retaining wall along the right of way for additional water quality treatment and attenuation. Two offsite pond alternatives are also provided in lieu of the regraded swales.
- **System 11:** Runoff from I-95 is collected by barrier wall inlets or directly sheet flows into roadside swales located along both sides of the road. Swales 11E, 11W are anticipated to be regraded up to a gravity wall and or cantilever retaining wall along the right-of-way for additional water quality treatment and attenuation. A new Swale 11NW will be added for additional storage. Two offsite pond alternatives are also provided in lieu of the regraded swales.
- **System 12:** Stormwater is collected by barrier wall inlets or directly sheet flows into roadside swales and ponds located along both sides of the road. Stormwater is conveyed in a manner consistent with the existing condition. Swales 12E, 12W are anticipated to be regraded up to a gravity wall and or cantilever retaining wall requiring a linear take across multiple parcels for additional water quality treatment and attenuation. Two offsite pond alternatives are also provided in lieu of the regraded swales.
- **System 13:** Stormwater is collected by barrier wall inlets or sheet flows into roadside swales and ponds located along both sides of the road. Stormwater is conveyed in a manner consistent with the existing condition. Ponds 13A-2, 13A-3 will be proposed within the existing right-of-way, and Ponds 13A-9, 13B-7 will be regraded to mitigate storage loss from the proposed improvements. Ponds 13B-9 and 13B-10 will remain unchanged.

4.2 FLOODPLAIN IMPACTS

The project limits encroaches into areas of the 100-year base floodplain of Basin 5 and Systems 9, 10, 11, 12 and 13. Preliminary floodplain encroachment calculations can be found in **Appendix E** and a summary of the encroachments is shown in **Table 4** . The proposed drainage described in **Chapter 4.1** will compensate for the loss of floodplain storage.

Table 4: Summary of Floodplain Encroachments

Diamond Alternative	Total Cut (ac-ft)	Total Fill (ac-ft)	Net (ac-ft)
Basin 5	2.00	1.40	0.60
System 9	9.44	9.07	0.37
System 10	3.21	0.52	2.69
System 11	6.01	0.81	5.2
System 12	9.63	8.37	1.26
System 13	8.61	0.85	7.76
TOTAL	**38.9**	**21.02**	**17.88**

DDI Alternative	Total Cut (ac-ft)	Total Fill (ac-ft)	Net (ac-ft)
Basin 5	2.00	1.33	0.67
System 9	9.44	7.39	2.05
System 10	3.23	0.34	2.85
System 11	6.01	0.73	5.28
System 12	9.63	6.31	3.32
System 13	9.00	0.28	8.72
TOTAL	**39.31**	**16.38**	**22.90**

Preferred Alternative	Total Cut (ac-ft)	Total Fill (ac-ft)	Net (ac-ft)
Basin 5	2.00	1.33	0.60
System 9	9.44	7.39	0.38
System 10	3.23	0.34	2.69
System 11	6.01	0.73	5.20
System 12	9.63	6.31	2.25
System 13	9.00	0.28	7.76
TOTAL	**39.31**	**16.38**	**18.87**

4.3 CROSS DRAINS

Cross drains within the project limits generally inlets to existing roadside dry detention swales. These cross drains have no direct impact to the existing floodplains.

Cross Drains lengthening and further modifications will be determined as part of the stormwater management final design. The proposed roadway footprint encroaches into the ditch block in system 12 that outfalls to the C-10 Canal. The ditch block will be redesigned as part of the stormwater management final design.

V. RISK EVALUATION AND PROJECT CLASSIFICATION

5.1 RISK EVALUATION

There are no significant changes in flood risk associated with this project. The proposed corridors encroachment into existing floodplains will not have a significant potential for interruption or termination of transportation facilities needed for emergency vehicles or used as an evacuation route. In addition, no significant adverse impacts on natural and beneficial floodplain values are anticipated and no significant impacts to highway users are expected.

5.2 PROJECT CLASSIFICATION

The improved corridor has minimal impacts to the existing floodplain. The project is anticipated to provide a net improvement to the floodplain as a result of the proposed pond sites and roadside ditches. Furthermore, there will be no significant or adverse impacts on natural and beneficial floodplain values, no significant change in flood risk, and no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes.

Following the PD & E Manual Figure 13-1 Flood Plain Statements the project can be categorized as:

Statement 3: Projects Involving Modification to Existing Drainage Structures

"Modifications to existing drainage structures included in this report will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant."

VI. PD&E MANUAL REQUIREMENTS FOR ALTERNATIVES CONTAINING MINIMAL ENCROACHMENTS

a. *General description of the project including location, length, existing and proposed typical sections, drainage basins, and cross drains.*

   Described in previous chapters

b. *Determination of whether the proposed action is in the base floodplain.*

   Floodplain Encroachment Calculations are shown in Appendix E.

c. *The history of flooding of the existing facilities and/or measures to minimize any impacts due to the proposed improvements.*

   There is no history of flooding of the existing facilities.

d. *Determination of whether the encroachment is longitudinal or transverse, and if it is a longitudinal encroachment, an evaluation and discussion of practicable avoidance alternatives.*

   Encroachments are longitudinal.

e. *The practicability of avoidance alternatives and/or measures to minimize impacts.*

   This study includes stormwater improvements to minimize impacts. Avoidance is not practical within the area of study.

f. *Impact of the project on emergency services and evacuation.*

   There will be no significant change in the potential for interruption or termination of emergency services or emergency evacuation routes as the result of modifications to existing drainage structures

g. *Impacts of the project on the base flood, likelihood of flood risk, overtopping, location of overtopping, backwater.*

   Floodplain encroachments will be mitigated as per the requirements of the SFWMD. No overtopping is anticipated.

h. *Determination of the impact of the project on regulatory floodways, if any, and documentation of coordination with FEMA and local agencies to determine the requirements for the project to be developed consistently with the regulatory floodway.*

   A Bridge Hydraulic report will be conducted to determine impacts on regulatory floodways.

i. *The impacts on natural and beneficial floodplain values, and measures to restore and preserve these values (this information may also be addressed as part of the wetland impact evaluation and recommendations).*

   No impacts on natural and beneficial floodplain values are anticipated.

j. *Consistency of the project with the local floodplain development plan or the land use elements in the Local Government Comprehensive Plan (LGCP), and the potential of encouraging development in the base floodplain.*

   The proposed improvements are consistent with Broward County plans and do not encourage development in the base floodplain.

k. *Measures to minimize flood-plain impacts associated with the project, and measures to restore and preserve the natural and beneficial flood-plain values impacted by the project.*

   Described in previous chapters.

l. *A map showing project, location, and impacted floodplains. A FIRM Map should be used if available. If not, other maps (e.g., US Geological Survey (USGS), USACE, Soil Conservation Service (SCS), Bureau of Land Management, U.S. Forest Service, or best available information from the WMDs) may be used. Copies of applicable maps should be included in the appendix.*

   Refer to the appendices of this study.

m. *Results of any risk assessments performed.*

   Refer to Chapter 5.1 Risk Evaluation.

VII. CONCLUSIONS

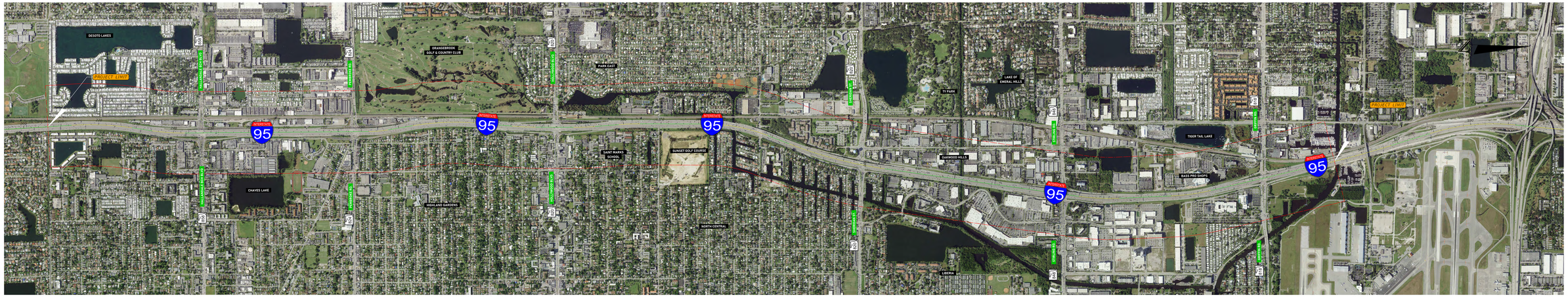
The project corridor has minimal encroachments to existing floodplains and this study presented mitigation alternatives that provide a net improvement to floodplain values. From the PD&E Manual Topic No. 650-000-001 *"Minimal encroachments on a floodplain occur when there is floodplain involvement but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts."*

VIII. REFERENCES

The design team collected and reviewed data from the following sources:

- *FDOT Drainage Manual, January 2025.*
- *FDOT Drainage Design Guide, January 2024.*
- *FDOT Straight Line Diagram, 86070000 (2019), 86070901 (2016), 86070902 (2016), 86015000 (2022), 86230000 (2021), 86016000 (2018).*
- *Natural Resources Conservation Service (NRCS) Soil Survey of Broward County.*
- *Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Broward County (12011C0558J, 12011C0566J, 12011C0568J, 12011C0731J & 12086C0131M).*
- *FDOT 409354-2-52-01, 422796-1-52-01 As-builts.*
- *National Oceanic Atmospheric Administration LIDAR data.*
- *US Army Corps of Engineers*
- *FDOT Project Development and Environment Manual*
- *SFWMD DBHydro*
- *SFWMD ERP Applicant's Handbook II*
- *USGS Quadrangle Maps*

APPENDIX A
Project Location Map



FDOT
FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FIVE
2140 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309
APRIL 2015

95
I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
From Nassau Duval Brevard County Line to North of Griffin Road
FPN No. 4105753-1-22-02
CODE No. 2024

I-95 (SR 9)
CORRIDOR BASE MAP

SHEET
NO.

APPENDIX B
Figures and Data

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map OnDemand Topo

7.5-MINUTE TOPO QUADRANGLE
FLORIDA - CUSTOM EXTENT
7.5-MINUTE TOPO



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: UNIVERSAL TRANSVERSE MERCATOR, ZONE 17R

Data is provided by The National Map (TNM), is the best available at the time of map generation, and includes data content from supporting themes of Elevation, Hydrography, Geographic Names, Boundaries, Transportation, Structures, Land Cover, and Orthoimagery. Refer to associated Federal Geographic Data Committee (FGDC) Metadata for additional source data information.

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands. Temporal changes may have occurred since these data were collected and some data may no longer represent actual surface conditions.

Learn About The National Map: https://nationalmap.gov

MN
GN
7°18'
130 MILS
0°22'
7 MILS
UTM GRID AND 2025 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
NJ
Grid Zone Designation
17R

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 5 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988
CONTOUR SMOOTHNESS = Medium

FLORIDA
QUADRANGLE LOCATION
Fort Lauderdale South
Port Everglades
North Miami
North Miami OE E
ADJOINING QUADRANGLES

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

7.5-MINUTE TOPO, FL
2025

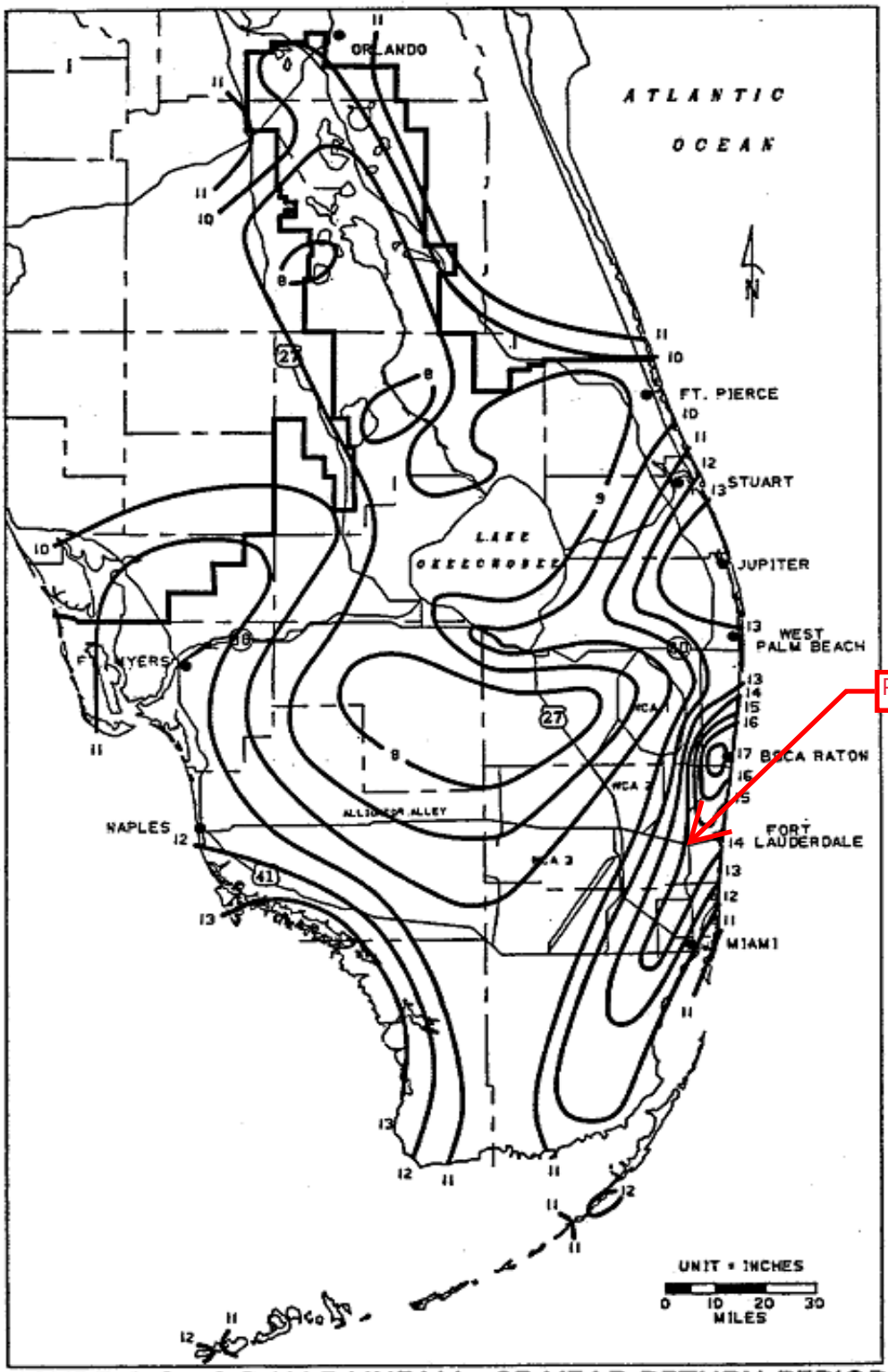


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

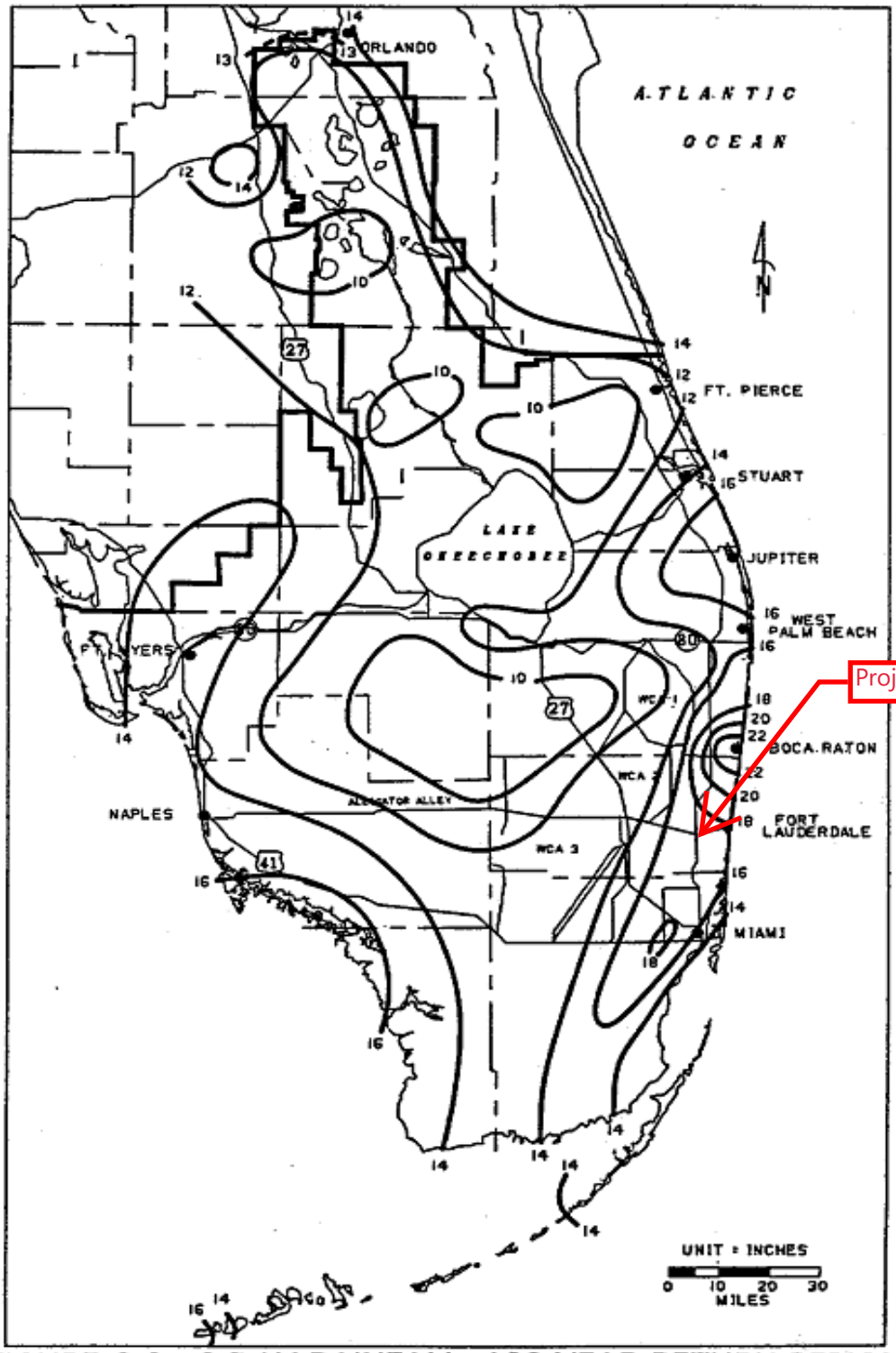


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD

- Commemorative Marks
- Applications of Geodesy

Search

Single Point Conversion | Multipoint Conversion | Web services | Downloads | Tutorial & FAQs | About NCAT

Convert/Transform from:

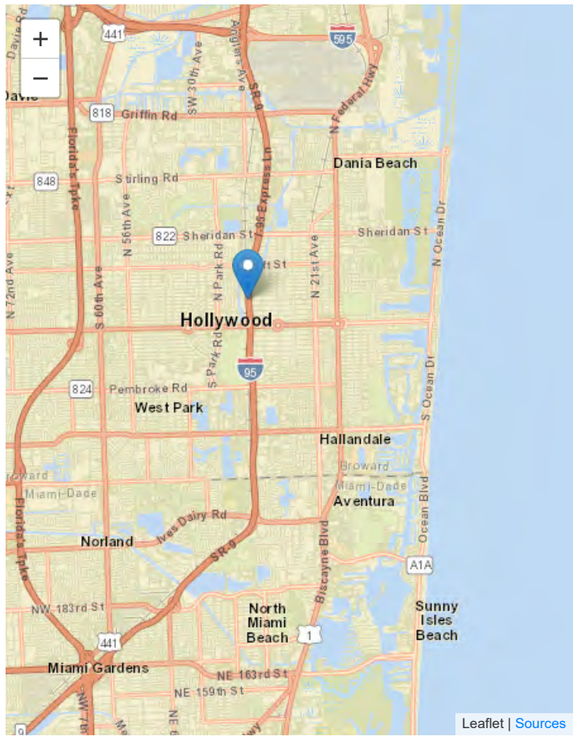
- ☐ Horizontal
- ◉ Horizontal+height
- ☐ XYZ

Select the type of horizontal coordinate:

- ◉ Geodetic lat-long
- ☐ SPC
- ☐ UTM
- ☐ USNG

Select a height

- ☐ Ellipsoidal
- ◉ Orthometric



Enter lat-lon in decimal degrees

Lat 26.0174518292

Lon -80.1675796509

or degrees-minutes-seconds

Lat N 26-01-02.82659

Lon W 080-10-03.28674

or drag map marker to a location of interest

Input reference frame (historically called 'horizontal datum') NAD83(2011)

Output reference frame (historically called 'horizontal datum') NAD83(2011)

Don't see a reference frame in the list?
Click here *to learn more.*

Orthometric Height 0.000

Units of height US Survey Feet

Input geopotential datum (historically called 'vertical datum') NGVD29

Output geopotential datum (historically called 'vertical datum') NAVD88

SPC zone Auto Pick (default zor

Submit

Click blue bar(s) to expand/collapse

Transformed Coordinate

Input Coordinate		Output Coordinate		Total Change + Uncertainty	
Latitude	N26° 01′ 02.82659″ N260102.82659 26.0174518292	Latitude	N26° 01′ 02.82659″ N260102.82659 26.0174518292	Latitude	0.00000″ ±0.000000″ (0.000 m ±0.0000 m)*
Longitude	E279° 49′ 56.71326″ W0801003.28674 -80.1675796509	Longitude	E279° 49′ 56.71326″ W0801003.28674 -80.1675796509	Longitude	0.00000″ ±0.000000″ (0.000 m ±0.0000 m)*
Ellipsoid Height (usft)	Not given	Ellipsoid Height (usft)	Not given	Ellipsoid Height	Not given
Orthometric Height (usft)	0.000	Orthometric Height (usft)	-1.608	Orthometric Height	-1.608 usft ±0.033 usft
Reference Frame	NAD83(2011)	Reference Frame	NAD83(2011)		
Geopotential Datum	NGVD29	Geopotential Datum	NAVD88		

*Approximate value to aid interpretation and not an actual distance. See TM NOS NGS 82 for more details.

Converted Coordinate

Customize Export

tierra
SOUTH FLORIDA
GEOTECHNICAL ENGINEERING / MATERIAL TESTING / INSPECTION SERVICES

Revised August 23, 2012
March 29, 2012

Metric Engineering, Inc.
615 Crescent Executive Court, Suite 524
Lake Mary, Florida 32746

Attention: Dale W. Cody, P.E.
Senior Vice President

Subject: **Geotechnical Engineering Report for Bridge Widening and Associated Walls**
Project: I-95 Express Lanes in Broward and Miami-Dade Counties
(Design-Build)
FPID Nos.: 422796-1-52-01 & 422796-2-52-01
TSF Project No: 7111-11-297

Dear Dale:

Tierra South Florida, Inc. (TSF) has completed a geotechnical study for the proposed bridge widening and associated walls at bridge approaches in subject project. The study was performed in general accordance with FDOT procedures. The results of our geotechnical study and subsequent geotechnical recommendations are presented in this report.

If you have any questions or comments regarding this report, please contact our office at your earliest convenience.

Sincerely,

TIERRA SOUTH FLORIDA, INC.

Raj Krishnasamy, P.E.
Principal Engineer/President
FL Registration No. 53567

N. Manoharan, Ph.D.
Senior Specialist

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1.0 PROJECT DESCRIPTION AND SCOPE OF SERVICES

The project involves construction of express lanes in SR-9/I-95 in Broward and Miami-Dade Counties, Florida. The project involves also widening of the following bridges and construction of associated walls:

- I-95 over Snake Creek Canal (Miami-Dade)
- I-95 over Hallandale Beach Boulevard (Broward)
- I-95 over Pembroke Road (Broward)
- I-95 over Hollywood Boulevard (Broward)
- I-95 over Stirling Road (Broward)

The purpose of this supplemental study is to provide geotechnical input to the design team to assist in the preparation of construction plans for the proposed bridge. The following services were provided:

1. Reviewed readily available published topographic and soils information. This information was obtained from the soil survey maps of Broward and Miami-Dade Counties published by the United States Department of Agriculture (USDA) Natural Resources Conservation Services (NRCS), and USGS Maps.

2. Performed a geotechnical study which included a total of 18 SPT borings to about 85 feet deep and 20 SPT borings to 40 feet deep.

3. Visually classified and stratified the samples in the laboratory using the Unified Soil Classification System (USCS).

4. Performed pile capacity analyses.

5. Performed external stability, global stability and settlement analyses for the proposed MSE walls.

6. Provided soil parameters for sheet pile wall design

7. Prepared this Geotechnical Services Report for bridges and associated walls.

These Geotechnical Services were performed in general accordance with FDOT Standards "Soils and Foundations Manual".

2.0 REVIEW OF USDA SOIL SURVEY INFORMATION

Based on a review of the Broward and Miami-Dade County Soil Survey Maps by United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), it appears that the bridge vicinities are mapped as follows:

Miami-Dade County:

- **Urban land**

Broward County:

- **Arents, organic substratum-Urban land complex**
- **Dade fine sand**
- **Udorthents, shaped**
- **Urban land**

Site Vicinity Map and USDA soil survey map are presented in Appendix A of this report.

3.0 FIELD EXPLORATION

Subsurface conditions at the bridge and associated MSE walls at bridge approaches were explored by a total of 18 SPT borings to about 85 feet deep and 20 SPT borings to 40 feet deep. Approximate locations of the borings are presented on Report of core borings in Appendix A. The borings were located in the field by TSF personnel using a hand-held GPS system. The SPT borings were drilled using CME-45 and CME-55 drill rigs and mud rotary procedures. The soil samples were returned to our laboratory for classification by a geotechnical engineer. Representative soil samples collected from the borings were classified and stratified in general accordance with the US Soil Classification System.

4.0 SUBSURFACE CONDITIONS

Subsurface conditions encountered in the borings primarily consisted of sandy soils (sand and silty sand) and limestone. Report of core borings are presented in Appendix A.

A Geotechnical engineer bases soil stratification on a visual review of the recovered samples, laboratory testing, and interpretation of the field boring logs. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles represent the conditions at the particular boring location and variations do occur and should be expected among the borings.

5.0 GROUNDWATER CONDITIONS

Depth to groundwater level was measured at the boring locations following termination of drilling. Depth to groundwater table generally ranged about 3 to 12 feet below existing grades. The groundwater table measured at each boring location is presented on the boring profiles in Appendix A.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing canals, swales, drainage ponds, under drains and areas of covered soils like, paved parking lots and sidewalks). Fluctuation should be anticipated. We recommend that the contractor determine the actual groundwater levels at the time of construction to determine groundwater impact on his construction procedure.

6.0 ENVIRONMENTAL CLASSIFICATIONS

Based on geotechnical data the environmental classification for bridges are as follows:

Bridge Location	Environmental Classification	
	Substructure	Superstructure
Snake Creek Canal	Moderately Aggressive (Resistivity 1600 ohm-cm)	Slightly Aggressive
Hallandale Beach Blvd.	Slightly Aggressive	Slightly Aggressive
Pembroke Road	Slightly Aggressive	Slightly Aggressive
Hollywood Blvd.	Slightly Aggressive	Slightly Aggressive
Stirling Road	Slightly Aggressive	Slightly Aggressive

7.0 ENGINEERING EVALUATIONS AND RECOMMENDATIONS

7.1 Driven Pile Axial Capacity

We understand that 18-inch pre-stressed precast square concrete piles will be used to support the bridge widening at Snake Creek Canal and steel H-piles (18x135) will be used for bridge widening at other locations. Axial capacity analyses were performed for 18-inch PPSC piles and H-piles as required in the project using the program FB-DEEP. The results are presented in Appendix B.

The results indicate that capacities are generated relatively uniformly as the pile penetrates the substrata. When piles penetrate into very dense sand or rock layers, refusal may be achieved and reach the design capacities at penetrations different than those indicated from the analyses.

Required Bearing Resistance is defined as (Factored Design Load + Net Scour + Downdrag)/Φ. A resistance factor of Φ=0.75 may be used assuming that all piles will be dynamically monitored (PDA testing).

No reduction of the individual pile capacities will be required if piles are spaced center-to-center at 3 times their width or greater.

Intermediate Bents of the bridge over Snake Creek canal will be located in the canal. Based on the information provided to us the canal bottom elevation is approximately -15 feet and estimated scour elevation (500 year) is about -22 feet. Estimated total scour resistance at the intermediate bents ranged about 9 to 28 tons and the details are included in Appendix B.

7.2 Pile Lateral Load Analysis

We understand that FB-Pier analysis will be performed for the bridges. Soil parameters that can be used in the FB-Pier analysis are included in Appendix C. L-Pile analysis was performed for typical bent/pier loading conditions to evaluate minimum pile elevations and the results are included in Appendix C.

7.3 Pile Installation

Pile installation should be carried out in accordance with the Florida Department of Transportation Standard Specifications, Section 455. The FDOT Standard Specifications,

7.4 MSE Walls at Bridge Approaches

In general, the existing subsurface soils encountered in the borings performed are suitable for supporting the proposed MSE wall construction after proper subgrade preparation. Site preparation should consist of normal clearing and grubbing followed by compaction of subgrade soils.

External Stability:

External stability analyses for MSE walls were conducted using the FDOT LRFD computer program. Analysis was based on the assumption of discontinuous reinforcement (metal strip reinforcement). The soil parameters considered for the external stability analyses of MSE walls are given below.

SOIL TYPE	APPROXIMATE SOIL UNIT WEIGHT (pcf)		SOIL ANGLE OF FRICTION (Degrees)	COHESION (psf)
	γ_{SAT}	γ_{SUB}		
Reinforced soil and random backfill	105	42.6	30	0
Foundation soil	110	47.6	30	0

Analysis was performed for walls with and without sloping backfill at the top. A summary of the external stability results (reinforcement length and factored bearing resistance) is given in Appendix D. It is our understanding that the internal wall stability analyses will be performed by others (proprietary wall companies).

Global Stability (overall Stability):

Global stability analysis of MSE walls were performed using the computer program ReSSA (3.0) for the following conditions:

- A 26 feet high wall with flat surface at the top
- A 16 feet high wall with a sloping backfill at the top.

The analysis was performed using Bishop method to compute the factor of safety against deep-seated circular failure. Traffic surcharge load of 250 psf was applied at the top. The overall stability was found to be adequate and the results are presented in the Appendix D.

Estimated Settlement:

Settlement analysis for the MSE walls was performed using the computer program FoSSA (2.0). This program is for calculation of stresses and settlement under uniformly loaded rectangle areas. Elastic constant (Young's modulus) of soil layers were selected in general as suggested in AASHTO Specifications. The results are presented in the Appendix D. Since the subsoils encountered are typically sandy soils and limestone, we anticipate that most of the estimated settlement will occur during construction. We recommend all MSE Walls be designed to accommodate the following settlements.

MSE WALL NO.	LONG TERM * SETTLEMENT (inch)	SHORT TERM ** SETTLEMENT (inch)	DIFFERENTIAL SETTLEMENT	
			Longitudinal (%)	Transverse (inch)
All walls	0.3	3.3	Less than 0.5%	N/A

* Long term settlement is measured from the end of wall fill placement.
** Short term settlement occurs during construction.

7.5 Soil Parameters for Sheet Pile Wall Design

We understand that permanent sheet pile walls will be required at Hallandale Beach Boulevard interchange. Soil parameters that may be used in the design are given below.

Soil Parameters for Sheet Pile Wall SPW-1 at I-95 over Hallandale Beach Boulevard

ELEVATION (feet)	BORINGS USED	SOIL DESCRIPTION (Depth 0 – 40ft)	AVERAGE SPT N-VALUE (Automatic Hammer)	AVERAGE SPT N-VALUE (Safety Hammer)	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	WALL FRICTION ANGLE (DEGREES)
					γ SAT	γ SUB			
Retained soil (bottom of articulated block wall and above)	-	Embankment fill	-	-	115	52.6	30	0	17
Below bottom of articulated block wall	WHA-4/ BH-2	SP/ML/ Limestone	15/22	19/27	110	47.6	32	0	17

Soil Parameters for Sheet Pile Wall SPW-2 at I-95 over Hallandale Beach Boulevard

ELEVATION (feet)	BORINGS USED	SOIL DESCRIPTION (Depth 0 – 40ft)	AVERAGE SPT N-VALUE (Automatic Hammer)	AVERAGE SPT N-VALUE (Safety Hammer)	APPROXIMATE SOIL UNIT WEIGHT (PCF)		SOIL ANGLE OF FRICTION (DEGREES)	COHESION (PSF)	WALL FRICTION ANGLE (DEGREES)
					γ SAT	γ SUB			
Retained soil (bottom of articulated block wall and above)	-	Embankment fill	-	-	115	52.6	30	0	17
Below bottom of articulated block wall	WHA-3/ BH-4	SP/ML/ Limestone	10/25	12/31	110	47.6	32	0	17

Notes: 1. Walls may be considered unsupported above the bottom of articulated block wall ignoring any passive resistance from embankment fill in front of the wall.
2. Slope of retained soil should be included in wall analysis.

8.0 REPORT LIMITATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This company is not responsible for the conclusions, opinions, or recommendations made by others based on this data.

The scope of the investigation was intended to evaluate soil conditions within the influence zone of the foundations. The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If any subsoil variations become evident during the course of this project, a re-evaluation of the recommendations contained in this report will be necessary after we have had an opportunity to observe the characteristics of the condition encountered. The applicability of the report should also be reviewed in the event significant changes occur in the design, nature or location of the proposed structure.

The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

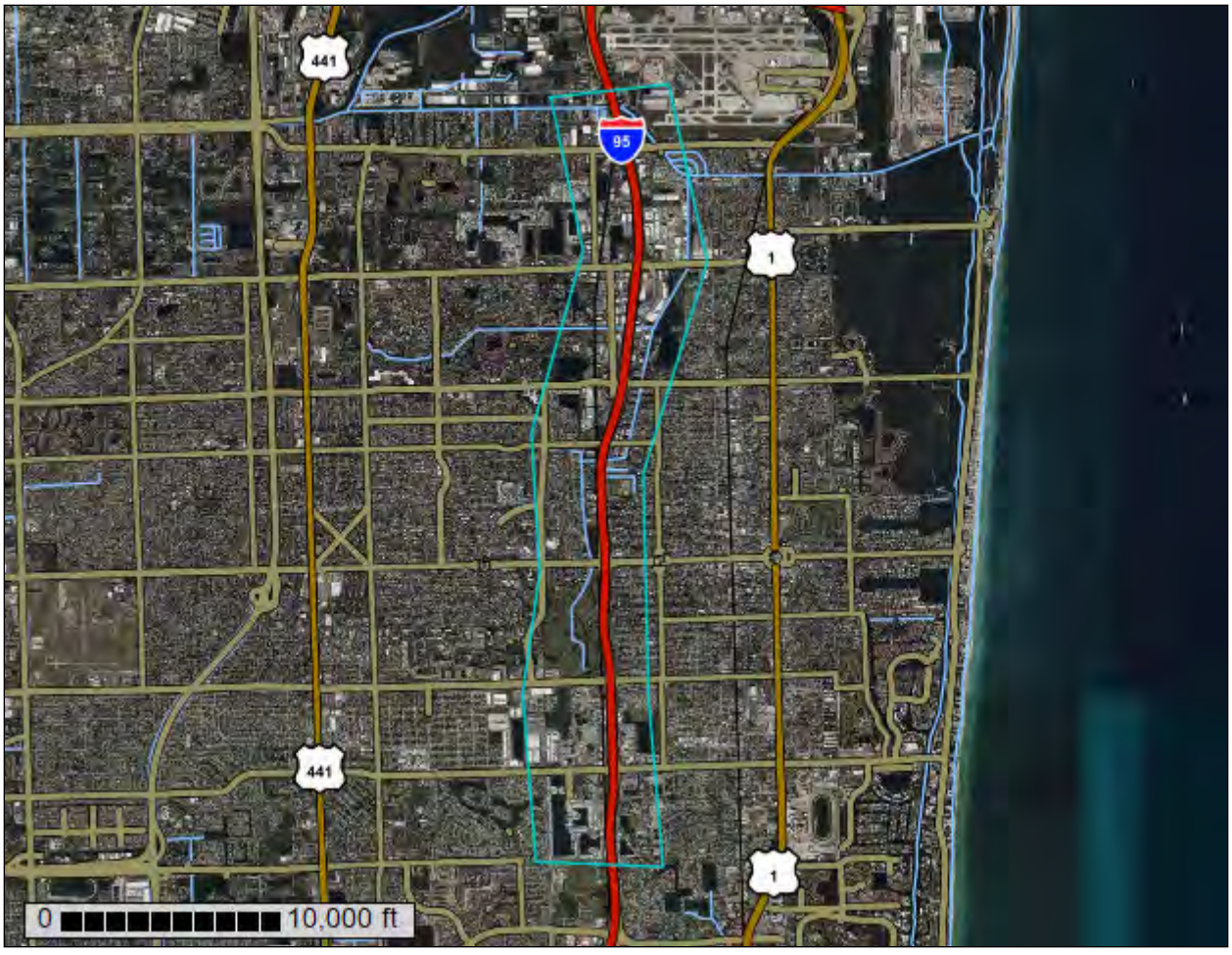
United States Department of Agriculture

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 Broward County, Florida, East Part; and Miami-Dade County Area, Florida



April 24, 2025

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.

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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.

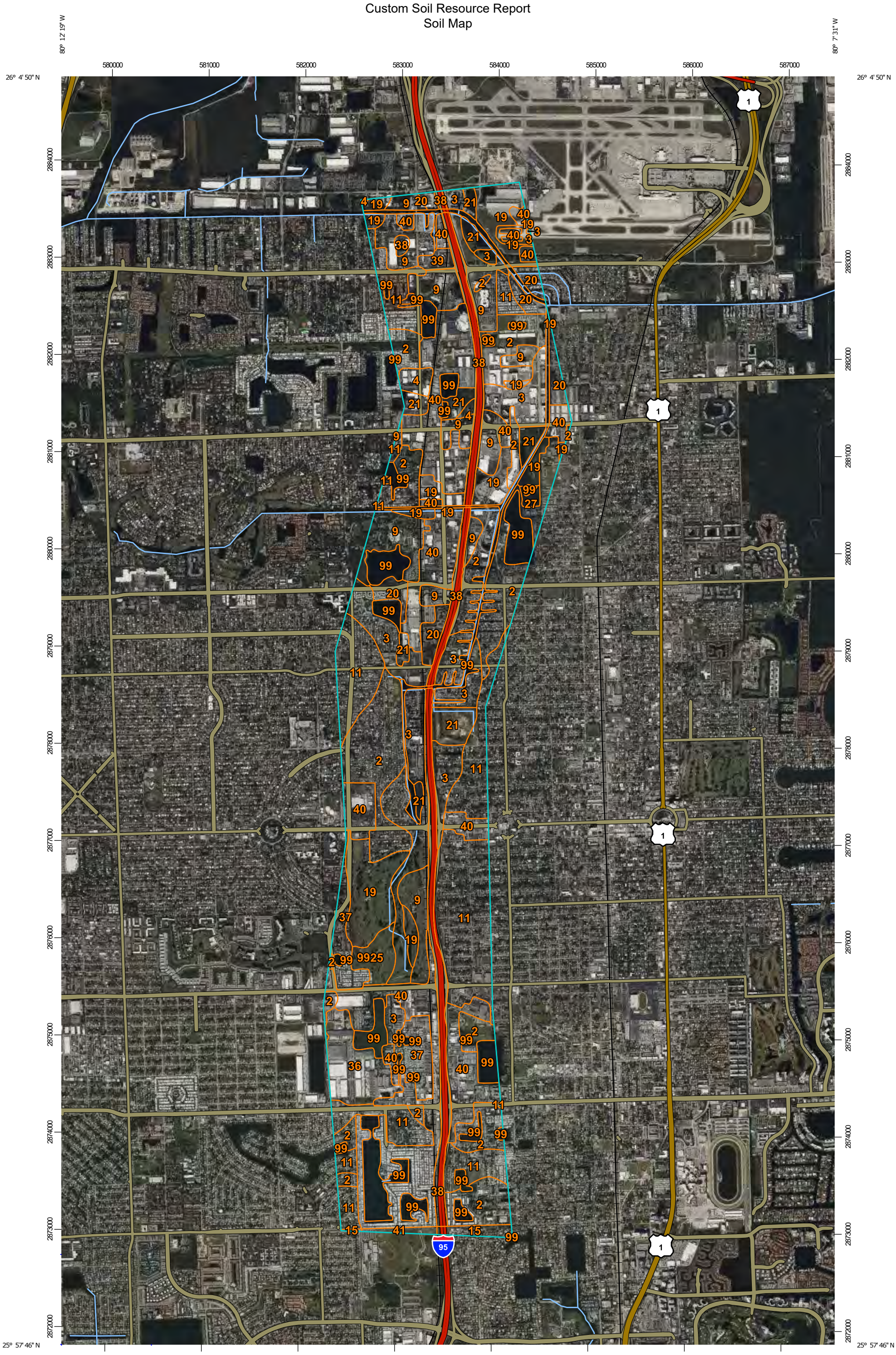
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



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 scales ranging from 1:20,000 to 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: Broward County, Florida, East Part
Survey Area Data: Version 20, Aug 20, 2024

Soil Survey Area: Miami-Dade County Area, Florida
Survey Area Data: Version 16, Aug 20, 2024

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 3, 2021—Jan 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
2	Arents-Urban land complex	698.8	15.6%
3	Arents, organic substratum-Urban land complex	437.2	9.8%
4	Basinger fine sand, 0 to 2 percent slopes	26.1	0.6%
9	Dade fine sand	402.0	9.0%
11	Dade-Urban land complex	653.5	14.6%
19	Margate fine sand, occasionally ponded, 0 to 1 percent slopes	302.1	6.8%
20	Matlacha, limestone substratum-Urban land complex	105.4	2.4%
21	Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes	128.5	2.9%
25	Pennsuco silty clay loam	42.7	1.0%
27	Plantation, ponded-Matlacha-Urban land complex, 0 to 2 percent slopes	7.8	0.2%
36	Udorthents	110.9	2.5%
37	Udorthents, marly substratum-Urban land complex	110.7	2.5%
38	Udorthents, shaped	222.9	5.0%
39	Udorthents-Urban land complex	16.0	0.4%
40	Urban land, 0 to 2 percent slopes	778.6	17.4%
99	Water	391.2	8.8%
Subtotals for Soil Survey Area		**4,434.4**	**99.3%**
Totals for Area of Interest		**4,466.9**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15	Urban land, 0 to 2 percent slopes	21.8	0.5%
41	Dade fine sand-Urban land complex, 0 to 2 percent slopes	10.6	0.2%
99	Water	0.0	0.0%
Subtotals for Soil Survey Area		**32.4**	**0.7%**
Totals for Area of Interest		**4,466.9**	**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.

Broward County, Florida, East Part

2—Arents-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8f
Elevation: 0 to 210 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

A - 0 to 4 inches: cobbly sand
C1 - 4 to 9 inches: cobbly sand
C2 - 9 to 32 inches: sand
2C - 32 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
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 18 to 36 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 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Arents, organic substratum

Percent of map unit: 3 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Udorthents, marly substratum

Percent of map unit: 2 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

3—Arents, organic substratum-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8g
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents, organic substratum and similar soils: 55 percent

Urban land: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents, Organic Substratum

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy dredge spoils over organic material over sandy marine deposits

Typical profile

A - 0 to 12 inches: gravelly sand
C - 12 to 38 inches: sand
Oa - 38 to 52 inches: muck
2C - 52 to 72 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
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 24 to 36 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 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

4—Basinger fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2svym
Elevation: 0 to 100 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: Not prime farmland

Map Unit Composition

Basinger and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basinger

Setting

Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Parent material: Sandy marine deposits

Typical profile

Ag - 0 to 2 inches: fine sand
Eg - 2 to 18 inches: fine sand
Bh/E - 18 to 36 inches: fine sand
Cg - 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: 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 12 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 5.9 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: Slough (R155XY011FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 6 percent
Landform: Flatwoods on marine terraces, drainageways 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

Immokalee

Percent of map unit: 4 percent
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

Placid

Percent of map unit: 4 percent
Landform: Depressions on marine terraces, drainageways 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

Pompano

Percent of map unit: 4 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave, linear
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

Felda

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces, flats on marine terraces
Landform position (three-dimensional): Tread, dip, talf

Down-slope shape: Linear
Across-slope shape: Concave, 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: 1 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
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

9—Dade fine sand

Map Unit Setting

National map unit symbol: 1hn8n
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Dade and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over soft limestone

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 27 inches: fine sand
Bh - 27 to 35 inches: fine sand
Cr - 35 to 39 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 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 1.2 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: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Other vegetative classification: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Hydric soil rating: No

Minor Components

Duette

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
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 (G156AC121FL)
Hydric soil rating: No

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
Hydric soil rating: Yes

Immokalee, limestone substratum

Percent of map unit: 1 percent
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: Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
Hydric soil rating: No

Margate

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

11—Dade-Urban land complex

Map Unit Setting

National map unit symbol: 1hn8q
Elevation: -20 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Dade and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over soft limestone

Typical profile

A - 0 to 8 inches: gravelly sand
E - 8 to 27 inches: fine sand
Bh - 27 to 35 inches: fine sand
Cr - 35 to 39 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained

Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 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 1.2 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: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R155XY180FL - Sandy Scrub on Rises, Ridges, and Knolls of Mesic Uplands
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Immokalee, limestone substratum

Percent of map unit: 2 percent
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: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Basinger

Percent of map unit: 2 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave

Ecological site: F155XY120FL - Sandy Flatwoods and Hammocks
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Margate

Percent of map unit: 1 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

19—Margate fine sand, occasionally ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2sm5l
Elevation: 0 to 30 feet
Mean annual precipitation: 55 to 70 inches
Mean annual air temperature: 72 to 81 degrees F
Frost-free period: 360 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Margate and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Margate

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Sandy marine deposits over limestone

Typical profile

A - 0 to 8 inches: fine sand
E - 8 to 16 inches: fine sand
Bw - 16 to 28 inches: fine sand
C - 28 to 32 inches: very gravelly fine sand
2R - 32 to 42 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 4 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: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: 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

Matlacha

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Plantation

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave

Ecological site: R156AY320FL - Subtropical Freshwater Non-Forested Wetlands of Miami Ridge/ Atlantic Coastal Strip
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

20—Matlacha, limestone substratum-Urban land complex

Map Unit Setting

National map unit symbol: 1hn90
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Matlacha, limestone substratum, and similar soils: 50 percent
Urban land: 45 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Matlacha, Limestone Substratum

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy mine spoil or earthy fill over limestone

Typical profile

C - 0 to 23 inches: gravelly fine sand
2Ab - 23 to 27 inches: fine sand
2Eb - 27 to 48 inches: fine sand
3R - 48 to 52 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
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: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Margate

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

21—Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tzwc
Elevation: 0 to 40 feet
Mean annual precipitation: 48 to 56 inches

Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Okeelanta, drained, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Okeelanta, Drained

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 31 inches: muck
Cg - 31 to 65 inches: fine 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
Calcium carbonate, maximum content: 2 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: Very high (about 14.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: R156BY020FL - Histisol Isolated Marshes and Swamps
Forage suitability group: Organic soils in depressions and on flood plains (G156AC645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Minor Components

Sanibel

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps

Other vegetative classification: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Tequesta

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R156BY021FL - Mineral Isolated Marshes and Swamps
Other vegetative classification: Freshwater Marshes and Ponds (R156BY010FL), Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Basinger

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Ecological site: F156BY040FL - Sandy Pine Flatwoods and Hammocks
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

25—Pennsuco silty clay loam

Map Unit Setting

National map unit symbol: 1hn95
Elevation: 10 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pennsuco, drained, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pennsuco, Drained

Setting

Landform: Marshes on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy marine deposits over limestone

Typical profile

A - 0 to 5 inches: silty clay loam
Bg - 5 to 38 inches: silt loam
2C - 38 to 53 inches: fine sand
2Cr - 53 to 80 inches: weathered bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 40 to 72 inches to paralithic bedrock
Drainage class: Poorly drained
Runoff class: Very high
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
Calcium carbonate, maximum content: 60 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Very high (about 14.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Loamy and clayey soils on flats of hydric or mesic lowlands (G156AC341FL)
Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G156AC341FL)
Hydric soil rating: Yes

Minor Components

Pennsuco, tidal

Percent of map unit: 2 percent
Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Perrine

Percent of map unit: 2 percent
Landform: Marshes on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Loamy and clayey soils on flats of hydric or mesic lowlands (G156AC341FL)
Hydric soil rating: Yes

Perrine variant

Percent of map unit: 1 percent
Landform: Tidal marshes on marine terraces

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

27—Plantation, ponded-Matlacha-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2y9j0
Elevation: 0 to 20 feet
Mean annual precipitation: 46 to 70 inches
Mean annual air temperature: 77 to 81 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Plantation and similar soils: 32 percent
Matlacha, limestone substratum, and similar soils: 28 percent
Urban land: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plantation

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Herbaceous organic material over sandy marine deposits over limestone

Typical profile

Oa - 0 to 10 inches: muck
A - 10 to 16 inches: fine sand
Cg - 16 to 33 inches: fine sandy loam
2R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 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 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: R156AY320FL - Subtropical Freshwater Non-Forested Wetlands of Miami Ridge/ Atlantic Coastal Strip
Forage suitability group: Organic soils in depressions and on flood plains (G156AC645FL)
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Description of Matlacha, Limestone Substratum

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy mine spoil or earthy fill over sandy marine deposits over limestone

Typical profile

^C - 0 to 23 inches: gravelly fine sand
2Ab - 23 to 28 inches: fine sand
2Eb - 28 to 44 inches: fine sand
2C - 44 to 48 inches: fine sandy loam
3R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 36 to 80 inches to lithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Very low
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 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 4 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 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G155XB999FL)

Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Shark valley

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, convex
Ecological site: R156AY220FL - Subtropical Freshwater Non-Forested Glades Marshes and Slough Wetlands of Everglades
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

Hallandale

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Margate

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip

Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Yes

Cooper town
Percent of map unit: 1 percent
Landform: Marshes on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Concave, linear
Across-slope shape: Concave, convex
Ecological site: R156AY220FL - Subtropical Freshwater Non-Forested Glades Marshes and Slough Wetlands of Everglades
Other vegetative classification: Organic soils in depressions and on flood plains (G156AC645FL)
Hydric soil rating: Yes

36—Udorthents

Map Unit Setting
National map unit symbol: 1hn9j
Elevation: 0 to 70 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile
C - 0 to 57 inches: cobbly sand

Properties and qualities
Slope: 2 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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: More than 80 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 2.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R156AY310FL - Subtropical Tidal Saline Wetlands of Miami Ridge/ Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

37—Udorthents, marly substratum-Urban land complex

Map Unit Setting
National map unit symbol: 1hn9k
Elevation: 0 to 20 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents, marly substratum, and similar soils: 55 percent
Urban land: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Marly Substratum

Setting
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile
C - 0 to 32 inches: gravelly sand
2C - 32 to 60 inches: marly silt loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained

Runoff class: 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 24 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

38—Udorthents, shaped

Map Unit Setting

National map unit symbol: 1hn9l
Elevation: 0 to 50 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, shaped and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Shaped

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C1 - 0 to 30 inches: gravelly sand
C2 - 30 to 50 inches: sand
2R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 0 to 45 percent
Depth to restrictive feature: 40 to 72 inches to paralithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 24 to 48 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): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 10 percent
Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

39—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 1hn9m
Elevation: 0 to 30 feet
Mean annual precipitation: 60 to 68 inches
Mean annual air temperature: 72 to 79 degrees F
Frost-free period: 358 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 55 percent
Urban land: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C1 - 0 to 30 inches: gravelly sand
C2 - 30 to 50 inches: sand
2R - 50 to 54 inches: weathered bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 40 to 72 inches to paralithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 24 to 48 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): 7s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)

Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Description of Urban Land

Setting
Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups
Land capability classification (irrigated): None specified
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Minor Components

Arents
Percent of map unit: 5 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

40—Urban land, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 2x9fc
Elevation: 0 to 200 feet
Mean annual precipitation: 40 to 68 inches
Mean annual air temperature: 68 to 79 degrees F
Frost-free period: 345 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills on marine terraces, ridges on marine terraces, knolls on marine terraces, rises on marine terraces, flatwoods on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: No parent material

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

Minor Components

Matlacha

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

St. augustine

Percent of map unit: 3 percent
Landform: Marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Linear
Across-slope shape: Convex
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

Paola

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 1 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex

Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Eaugallie

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Immokalee

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL), South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Myakka

Percent of map unit: 1 percent
Landform: Drainageways on flatwoods on marine terraces
Landform position (three-dimensional): Tread, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear, concave
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: 1 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL), Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Hydric soil rating: No

Apopka

Percent of map unit: 1 percent
Landform: Hills 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
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Hydric soil rating: No

Brynwood

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Cypress lake

Percent of map unit: 1 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Convex, linear
Across-slope shape: Linear, concave
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy over loamy soils on flats of hydric or mesic lowlands (G155XB241FL)
Hydric soil rating: Yes

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 (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Miami-Dade County Area, Florida

15—Urban land, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2z9t5
Elevation: 0 to 30 feet
Mean annual precipitation: 55 to 70 inches
Mean annual air temperature: 68 to 81 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills on marine terraces, ridges on marine terraces, knolls on marine terraces, rises on marine terraces, flatwoods on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise, talf
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F156AY390FL - Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip, F156AY380FL - Subtropical Hardwood Hammocks of Miami Ridge / Atlantic Coastal Strip, F156AY360FL - Subtropical Moist Hammocks of Miami Ridge / Atlantic Coastal Strip, R156AY310FL - Subtropical Tidal Saline Wetlands of Miami Ridge/ Atlantic Coastal Strip, R156AY370FL - Subtropical Coastal Zones of Miami Ridge / Atlantic Coastal Strip, R156AY320FL - Subtropical Freshwater Non-Forested Wetlands of Miami Ridge/ Atlantic Coastal Strip, F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip, F156AY330FL - Subtropical Freshwater Cypress Swamps of Miami Ridge / Atlantic Coastal Strip, F156AY350FL - Subtropical Forested Rocklands of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Naranja

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear

Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Sunny isles

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Margate

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

Hallandale

Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: South Florida Flatwoods (R155XY003FL), Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Dade

Percent of map unit: 3 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F156AY390FL - Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Hydric soil rating: No

41—Dade fine sand-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2z9sm
Elevation: 0 to 30 feet
Mean annual precipitation: 42 to 70 inches
Mean annual air temperature: 77 to 81 degrees F
Frost-free period: 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Dade and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dade

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over oolithic limestone

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 24 inches: fine sand
Bh - 24 to 27 inches: fine sand
2R - 27 to 37 inches: bedrock

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 50 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 60 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): 6s
Hydrologic Soil Group: A

Ecological site: F156AY390FL - Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Other vegetative classification: Shallow or moderately deep, sandy or loamy soils on rises and ridges of mesic uplands (G156AC521FL)
Hydric soil rating: No

Description of Urban Land

Setting
Landform: Flats on islands
Landform position (three-dimensional): Riser, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

Interpretive groups
Land capability classification (irrigated): None specified
Ecological site: F156AY390FL - Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Other vegetative classification: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Doral
Percent of map unit: 3 percent
Landform: Rises on flatwoods on marine terraces
Landform position (three-dimensional): Tread, rise, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F156AY390FL - Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Naranja
Percent of map unit: 3 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: No

Margate
Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear

Across-slope shape: Concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Sandy soils on stream terraces, flood plains, or in depressions (G156AC145FL)
Hydric soil rating: Yes

Grande oaks

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Linear, concave
Ecological site: F156AY340FL - Subtropical Pine Flatwoods and Palmetto Prairie of Miami Ridge / Atlantic Coastal Strip
Other vegetative classification: Sandy soils on flats of mesic or hydric lowlands (G156AC141FL)
Hydric soil rating: Yes

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
Ecological site: R156AY500FL - Subaqueous Haline Estuarine Habitats of MLRA 156A
Forage suitability group: Forage suitability group not assigned (G156AC999FL)
Other vegetative classification: Forage suitability group not assigned (G156AC999FL)
Hydric soil rating: Unranked

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

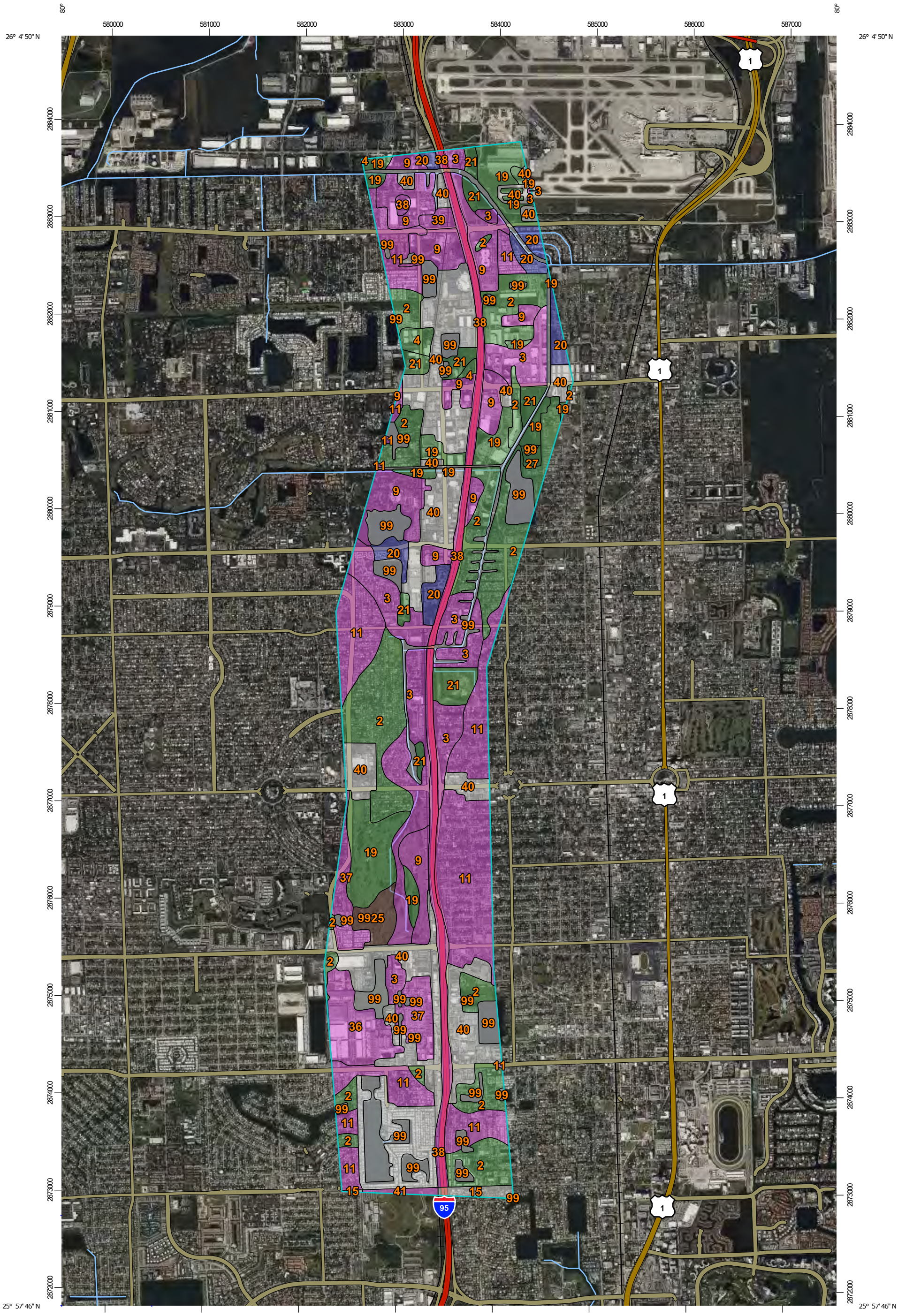
Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Map Scale: 1:36,600 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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 scales ranging from 1:20,000 to 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: Broward County, Florida, East Part
Survey Area Data: Version 20, Aug 20, 2024

Soil Survey Area: Miami-Dade County Area, Florida
Survey Area Data: Version 16, Aug 20, 2024

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 3, 2021—Jan 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Arents-Urban land complex	A/D	698.8	15.6%
3	Arents, organic substratum-Urban land complex	A	437.2	9.8%
4	Basinger fine sand, 0 to 2 percent slopes	A/D	26.1	0.6%
9	Dade fine sand	A	402.0	9.0%
11	Dade-Urban land complex	A	653.5	14.6%
19	Margate fine sand, occasionally ponded, 0 to 1 percent slopes	A/D	302.1	6.8%
20	Matlacha, limestone substratum-Urban land complex	B	105.4	2.4%
21	Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes	A/D	128.5	2.9%
25	Pennsuco silty clay loam	B/D	42.7	1.0%
27	Plantation, ponded-Matlacha-Urban land complex, 0 to 2 percent slopes	A/D	7.8	0.2%
36	Udorthents	A	110.9	2.5%
37	Udorthents, marly substratum-Urban land complex	A	110.7	2.5%
38	Udorthents, shaped	A	222.9	5.0%
39	Udorthents-Urban land complex	A	16.0	0.4%
40	Urban land, 0 to 2 percent slopes		778.6	17.4%
99	Water		391.2	8.8%
Subtotals for Soil Survey Area			**4,434.4**	**99.3%**
Totals for Area of Interest			**4,466.9**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
15	Urban land, 0 to 2 percent slopes		21.8	0.5%
41	Dade fine sand-Urban land complex, 0 to 2 percent slopes	A	10.6	0.2%
99	Water		0.0	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Subtotals for Soil Survey Area			**32.4**	**0.7%**
Totals for Area of Interest			**4,466.9**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

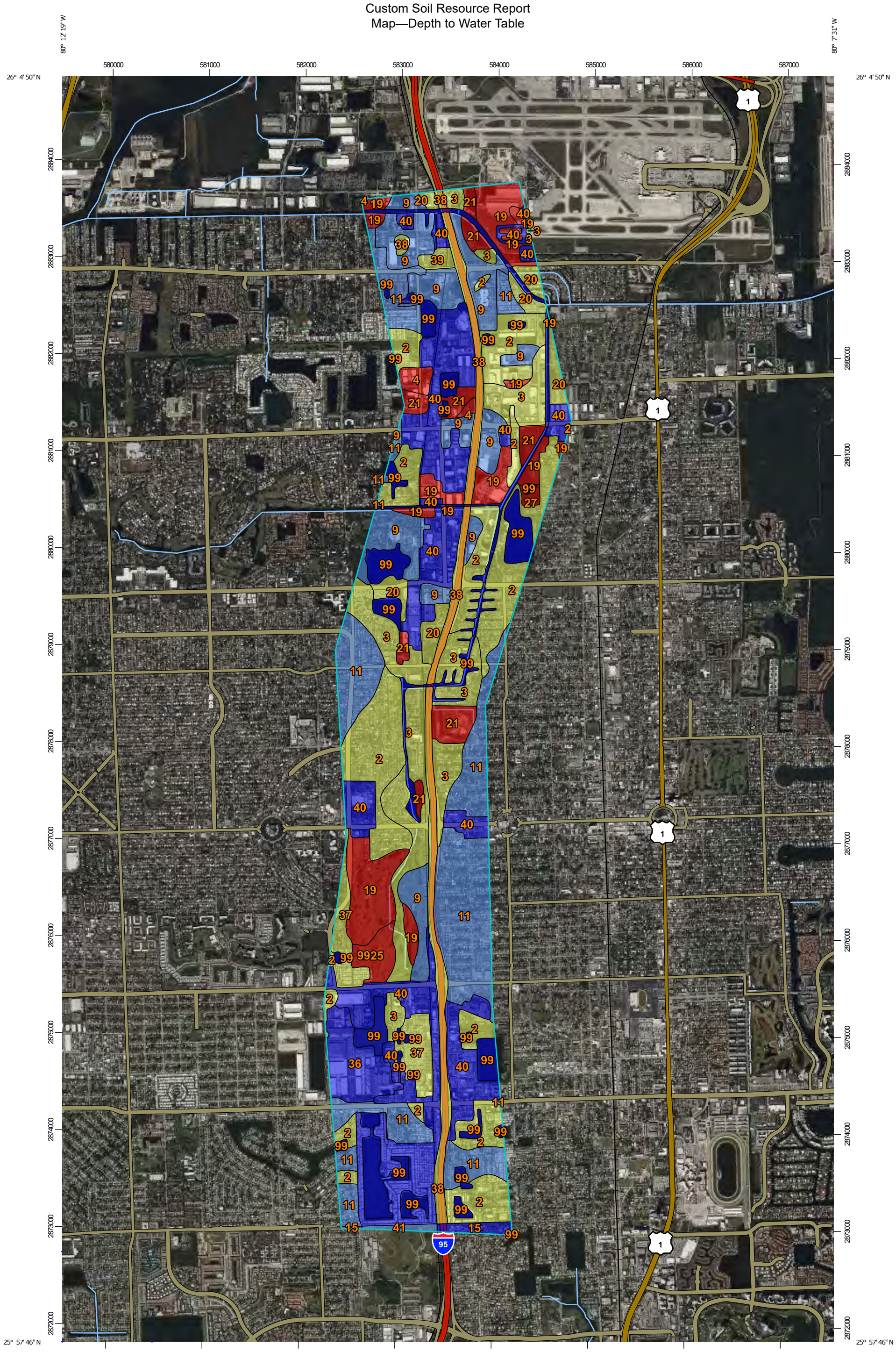
Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.


80° 12' 19" W
80° 7' 31" W
26° 4' 50" N
25° 57' 46" N
580000
581000
582000
583000
584000
585000
586000
587000
2884000
2883000
2882000
2881000
2880000
2879000
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2875000
2874000
2873000
2872000
1
95
Map Scale: 1:36,600 if printed on B portrait (11" x 17") sheet.
Meters
0 500 1000 2000 3000
Feet
0 1500 3000 6000 9000
N
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 Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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Coordinate System: Web Mercator (EPSG:3857)

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Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 3, 2021—Jan 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
2	Arents-Urban land complex	59	698.8	15.6%
3	Arents, organic substratum-Urban land complex	76	437.2	9.8%
4	Basinger fine sand, 0 to 2 percent slopes	15	26.1	0.6%
9	Dade fine sand	168	402.0	9.0%
11	Dade-Urban land complex	168	653.5	14.6%
19	Margate fine sand, occasionally ponded, 0 to 1 percent slopes	15	302.1	6.8%
20	Matlacha, limestone substratum-Urban land complex	76	105.4	2.4%
21	Okeelanta muck, drained, frequently ponded, 0 to 1 percent slopes	0	128.5	2.9%
25	Pennsuco silty clay loam	15	42.7	1.0%
27	Plantation, ponded-Matlacha-Urban land complex, 0 to 2 percent slopes	0	7.8	0.2%
36	Udorthents	>200	110.9	2.5%
37	Udorthents, marly substratum-Urban land complex	92	110.7	2.5%
38	Udorthents, shaped	92	222.9	5.0%
39	Udorthents-Urban land complex	92	16.0	0.4%
40	Urban land, 0 to 2 percent slopes	>200	778.6	17.4%
99	Water	>200	391.2	8.8%
Subtotals for Soil Survey Area			**4,434.4**	**99.3%**
Totals for Area of Interest			**4,466.9**	**100.0%**

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
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Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
Subtotals for Soil Survey Area			**32.4**	**0.7%**
Totals for Area of Interest			**4,466.9**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

References

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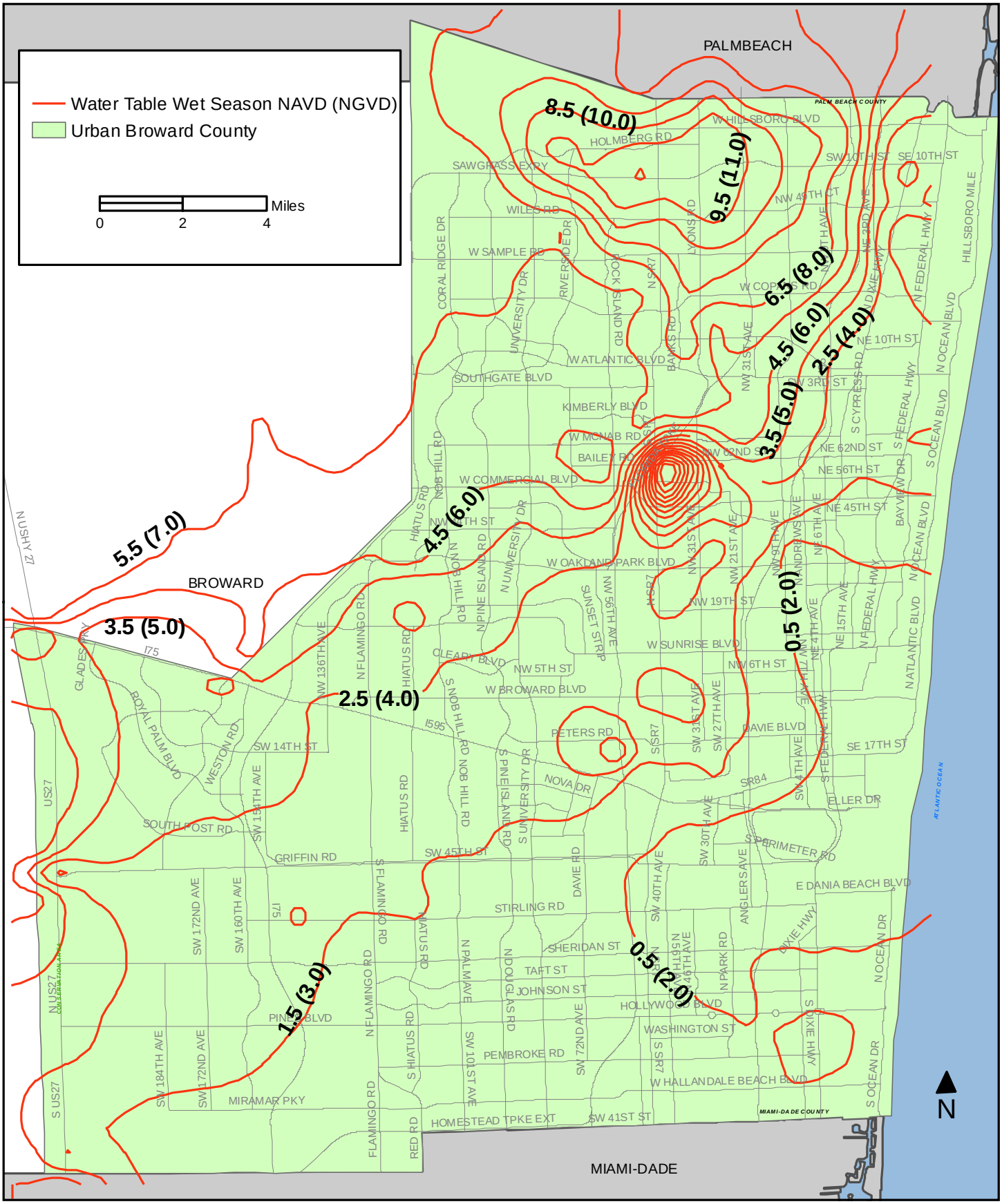
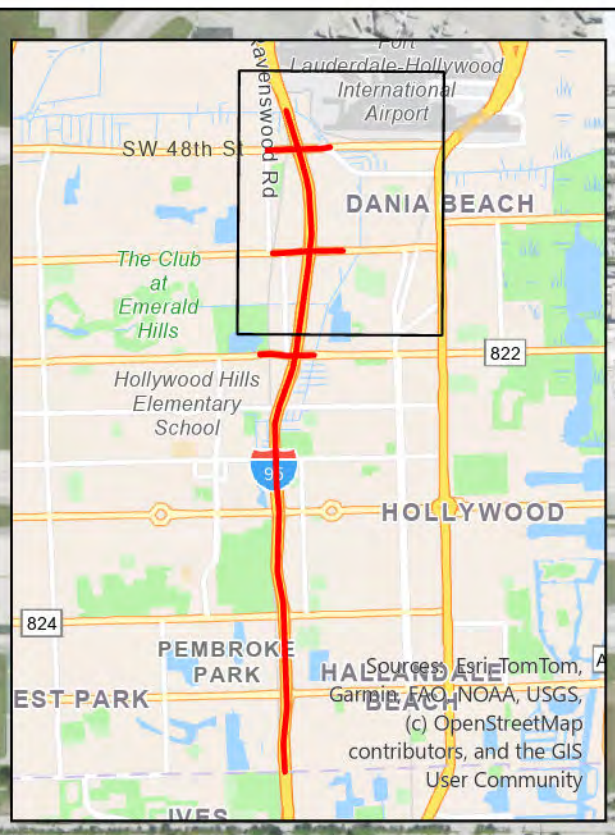
WATER TABLE MAP - AVERAGE WET SEASON



Division Name: Urban Planning Division
Department Name: Resilient Environment Department

This map is for conceptual purposes only and should not be used for legal boundary determinations.
Elevation converted from NGDV to NAVD using the FEMA approved conversion factor for Broward County of (-) 1.5



Legend

- Project Limits
- 500 ft Buffer

SFWMD Land Use and Cover Description (2023)

- Commercial and Services
- Industrial
- Institutional
- Nurseries and Vineyards
- Open Land
- Recreational
- Reservoirs
- Residential, High Density (Six Or More Dwelling Units Per Acre)
- Residential, Medium Density (Two-Five Dwelling Units Per Acre)
- Streams and Waterways
- Transportation
- Upland Hardwood Forests
- Vegetated Non-Forested Wetlands
- Wetland Hardwood Forests

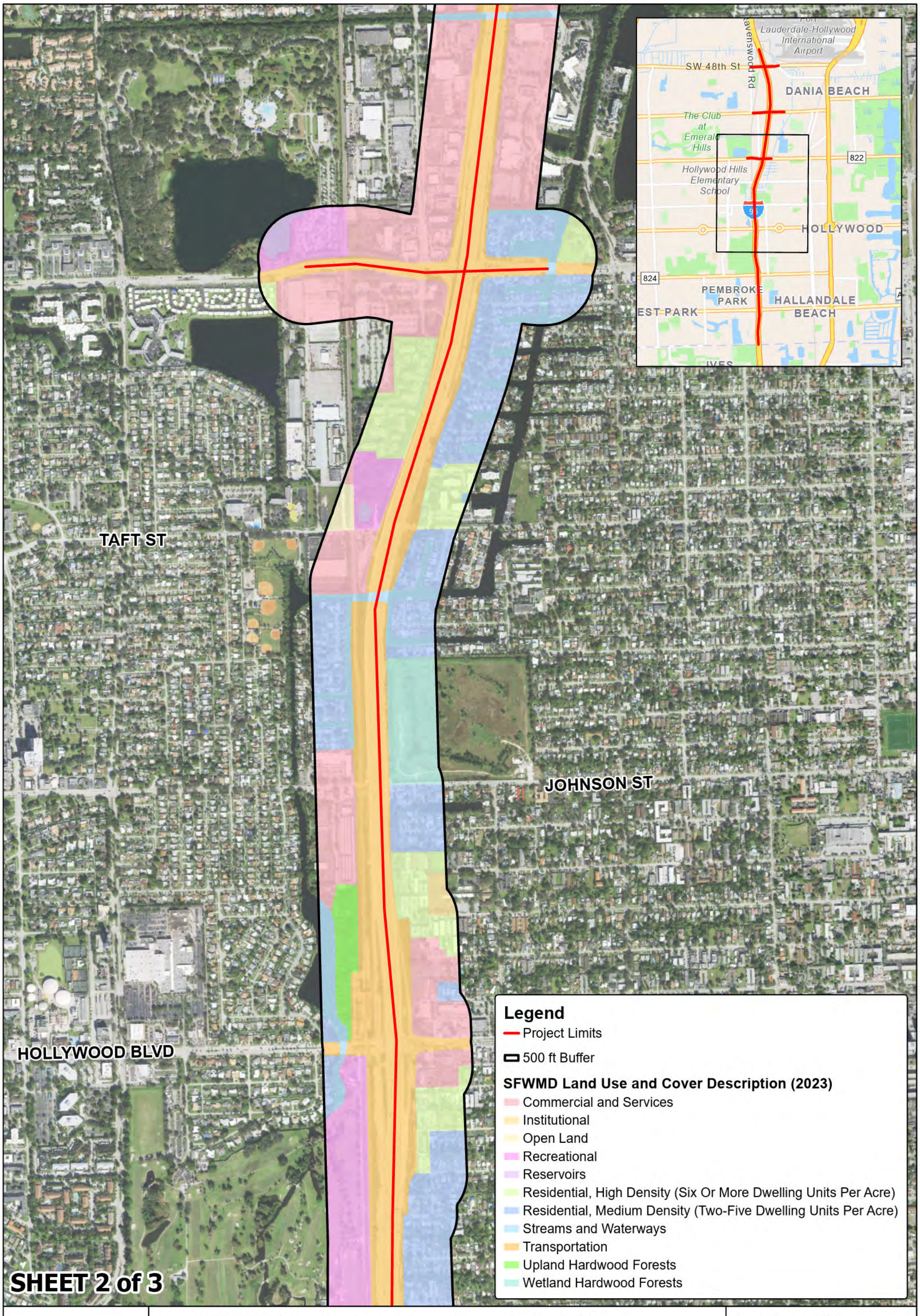
SHEET 3 of 3

FLUCFCS Level 2: Existing Land Use

FPID No. 439170-1-22-02
SR-9/I-95 PD&E Study from Miami-Dade/Broward County Line to north of Griffin Road and the cross roads at Griffin Rd, Stirling Rd, and Sheridan Rd
Broward County, FL

Image Source: ESRI
Image Date: 2024

0 500 1,000 US Feet

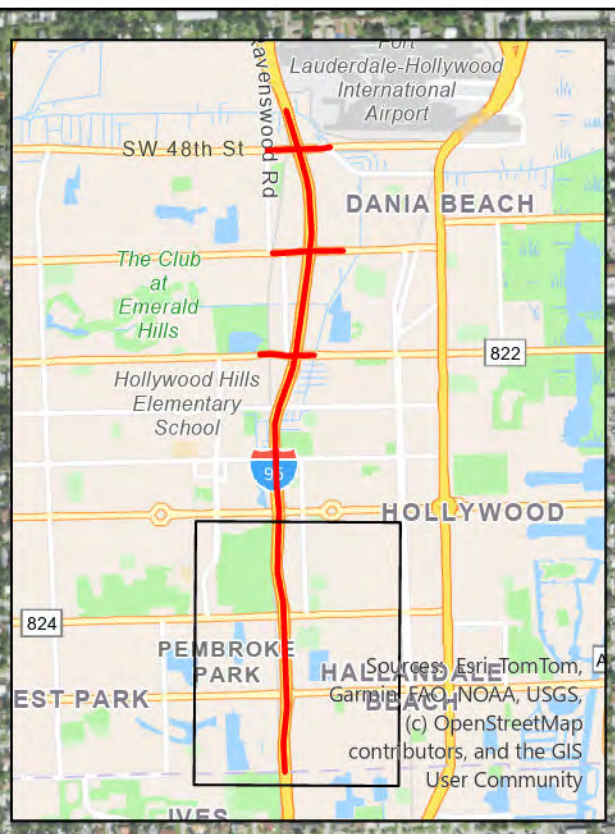


FLUCFCS Level 2: Existing Land Use

FPID No. 439170-1-22-02
SR-9/I-95 PD&E Study from Miami-Dade/Broward County Line to north of Griffin Road and the cross roads at Griffin Rd, Stirling Rd, and Sheridan Rd
Broward County, FL

Image Source: ESRI
Image Date: 2024

0 500 1,000
US Feet



PEMBROKE RD

HALLANDALE BEACH BLVD

Legend

- Project Limits
- 500 ft Buffer

SFWMD Land Use and Cover Description (2023)

- Commercial and Services
- Institutional
- Recreational
- Reservoirs
- Residential, High Density (Six Or More Dwelling Units Per Acre)
- Residential, Medium Density (Two-Five Dwelling Units Per Acre)
- Streams and Waterways
- Transportation

SHEET 1 of 3

FLUCFCS Level 2: Existing Land Use

FPID No. 439170-1-22-02
SR-9/I-95 PD&E Study from Miami-Dade/Broward County Line to north of Griffin Road and the cross roads at Griffin Rd, Stirling Rd, and Sheridan Rd
Broward County, FL

Image Source: ESRI
Image Date: 2024

0 500 1,000
US Feet

BROWARDNEXT

BROWARD COUNTY LAND USE PLAN

Adopted: April 25, 2017
Updated: March 6, 2025

LEGEND

- Palm Beach County Rural Residential-10
- Rural Ranches
- Rural Estates
- Estate (1) Residential
- Low (2) Residential
- Low (3) Residential
- Low (5) Residential
- Low-Medium (10) Residential
- Medium (16) Residential
- Medium-High (25) Residential
- High (50) Residential
- 0.0 Irregular Residential
- 0.0 Dashed-Line Area
- Activity Center
- Commerce
- Agricultural
- Conservation - Natural Reservations
- Conservation - Reserve Water Supply Areas
- Recreation and Open Space
- Commercial Recreation
- Community
- Electrical Generation Facilities
- Tribal Lands
- Mining
- Transportation
- Water

Palm Beach County

Atlantic Ocean

Miami-Dade County

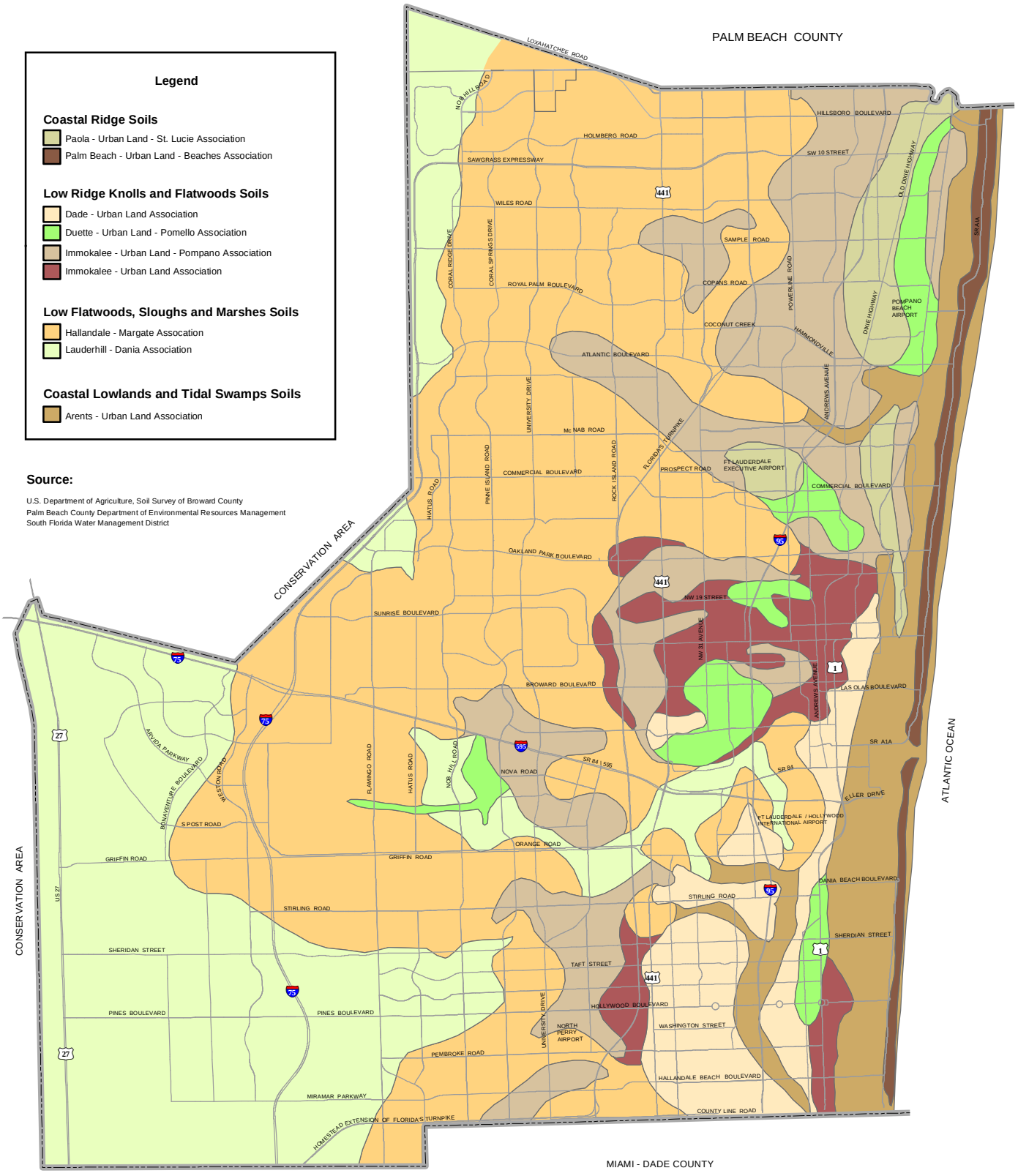
BROWARD COUNTY Planning Council

NOT TO SCALE

Municipal land use plans must be consistent with the Broward County Land Use Plan. The Broward County Planning Council reviews each municipal land use plan pursuant to the Broward County Charter and certifies those municipal land use plans which have been found to be in "substantial conformity" with the Broward County Land Use Plan. When certified by the Council, the municipal land use plan becomes the effective land use plan for the municipal jurisdiction. The land use designations on the Broward County Land Use Plan serve as the basis for municipal jurisdiction. The municipal land use plans may be more restrictive than the Broward County Land Use Plan and may depict uses and categories other than those shown on the Broward County Land Use Plan for specific parcels. Areas designated on the Broward County Land Use Plan Map or particular uses are approximate. The exact boundaries for zoning will be determined by the municipality within the reasonable limits of the designation on the map. For further information regarding identification of the effective land use plan for a specific area or for interpretation of the land use designation for a specific parcel, please contact the Broward County Planning Council at 954.357.6695.

BROWARD COUNTY LAND USE PLAN

Natural Resource Map Series- Eastern Broward County: Soils



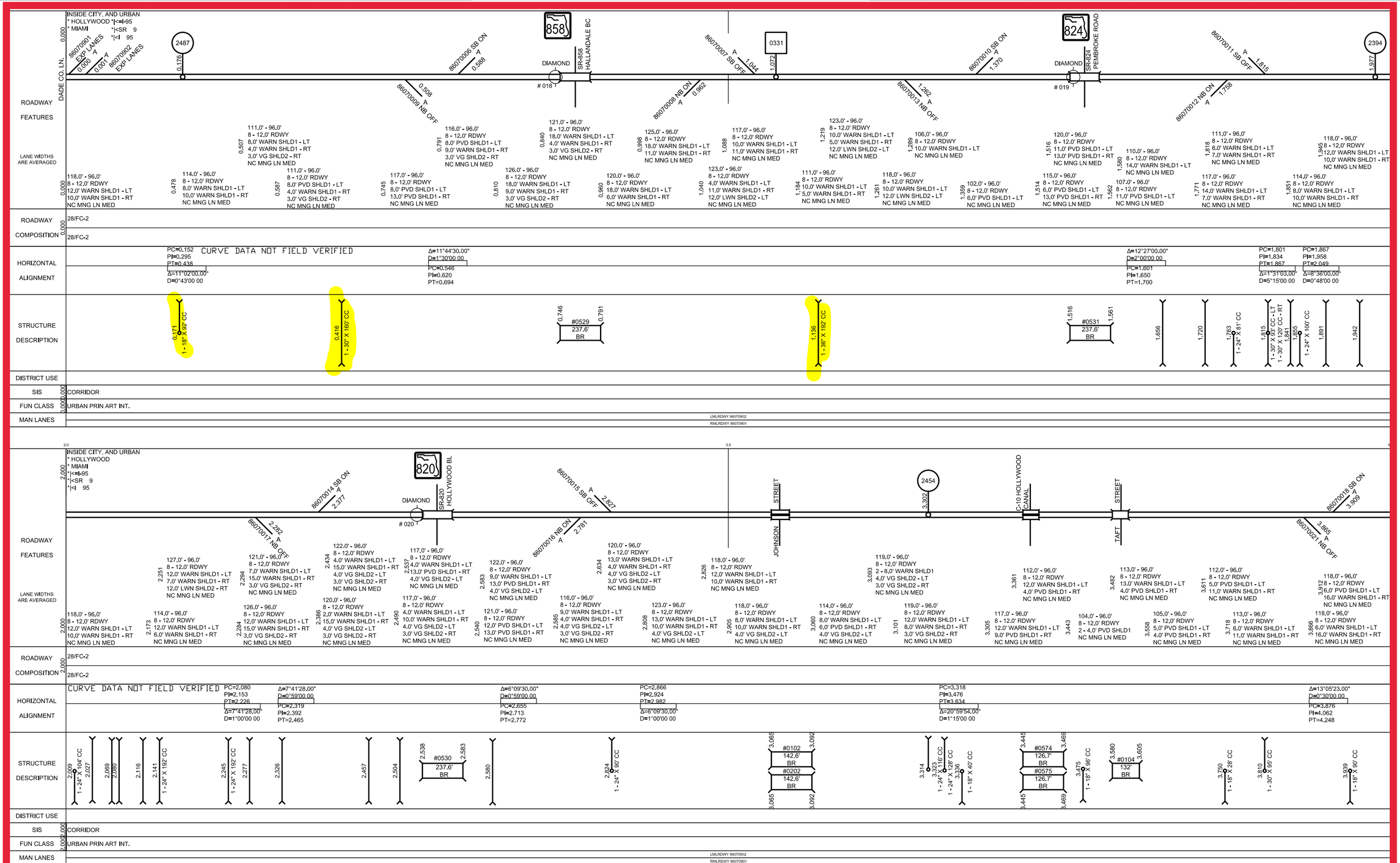
This Is a generalized map. This map should not be used to determine parcel boundaries or limits of depicted items. Please contact the Broward County Planning Council office regarding questions pertaining to parcel boundaries or limits.

	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	09/30/2019	10/07/2019	000.000	008.105	03/25/2021	03/25/2021 CTS
BY	CTS	CTS				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02	I 95	SR 9	BROWARD	04	86070000	1 OF 7



Version: 1.4.2.27 03/25/2021

	5 YR INV	SLD REV
DATE	09/30/2019	10/07/2019
BY	CTS	CTS

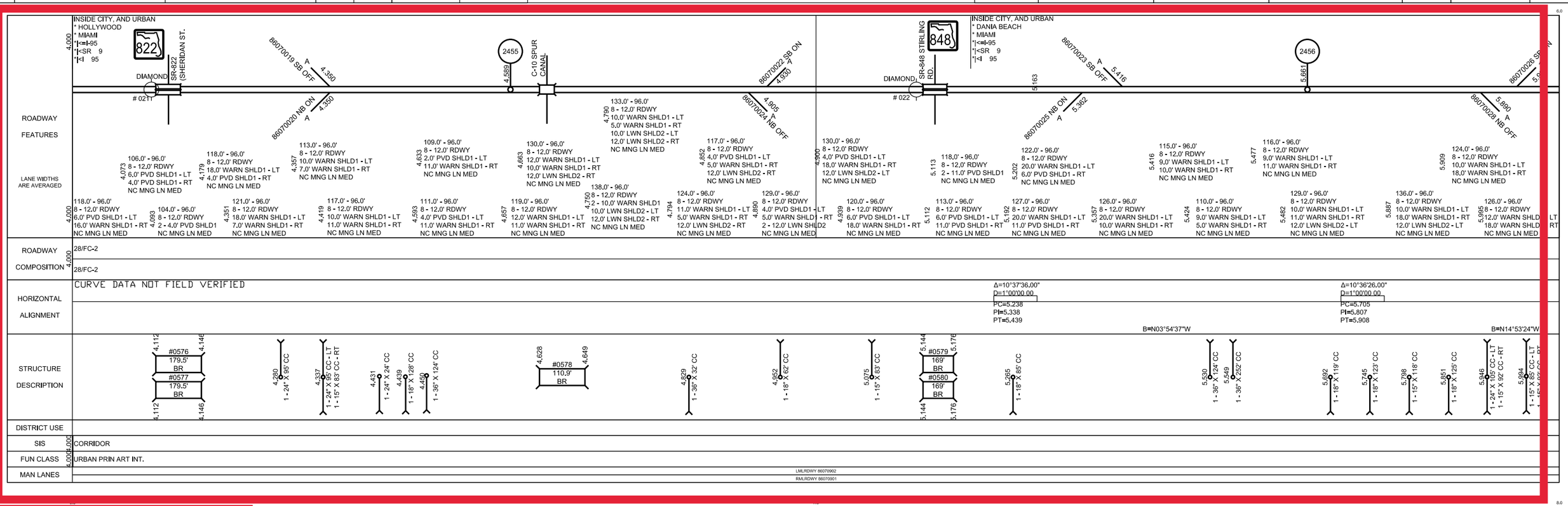
BMP	EMP	INV	SLD REV
000.000	008.105	03/25/2021	03/25/2021 CTS

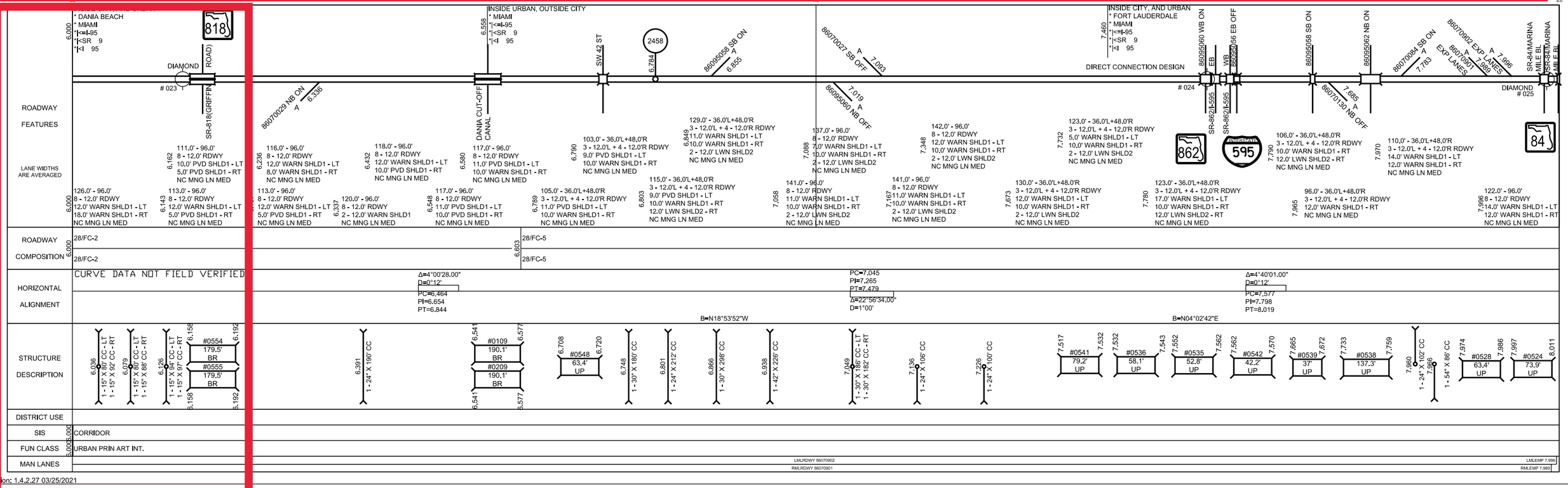
FLORIDA DEPARTMENT OF TRANSPORTATION

FDOT

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02	I 95	SR 9	BROWARD	04	86070000	2 OF 7





Version: 1.4.2.27 03/25/2021

	5 YR INV	SLD REV
DATE	11/08/2016	02/22/2017
BY	FTE	FTE

BMP	EMP	INV	SLD REV
000.000	007.989	12/03/2019 FDOT-D4	12/03/2019 FDOT-D4-CO
000.179	006.776	08/06/2019 FDOT-D4	08/06/2019 FDOT-D4
000.000	007.989	11/08/2016 FTE	02/21/2017 FTE

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
07	I 95	SR 9	BROWARD	04	86070901	1 OF 2

ROADWAY FEATURES

LANE WIDTHS ARE AVERAGED

INSIDE CITY, AND URBAN
* HOLLYWOOD
* MIAMI
*I<=I-95/SR-9 EXPRESS N
*I<SR 9
*I<I 95

ONE WAY
(0.000 TO 7.989)

DADE/BROWARD CO LINE 0.000

1487 at 0.179

BLVD / HALLANDALE at 0.348

RD/SR-824 / PEMBROKE at 0.969

824

1394 at 1.977

0.000 — 24.0' - 12.0'
1 - 12.0' RDWY
12.0' WARN SHLD1 - LT
FLEX POSTS MLSP

0.348 — 17.0' - 12.0'
1 - 12.0' RDWY
5.0' WARN SHLD1 - LT
FLEX POSTS MLSP

0.969 — 27.0' - 22.0'
2 - 11.0' RDWY
5.0' WARN SHLD1 - LT
FLEX POSTS MLSP

1.780 — 32.0' - 22.0'
2 - 11.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION 0.000: 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

0.744 #0529 264' BR 0.794

1.519 #0531 242.9' BR 1.565

DISTRICT USE

SIS 0.000: MANAGED/EXPRESS/REVERSIBLE

FUN CLASS 0.000: URBAN PRIN ART INT.

2.0 3.0 4.0

INSIDE CITY, AND URBAN
* HOLLYWOOD
* MIAMI
*I<=I-95/SR-9 EXPRESS N
*I<SR 9
*I<I 95

ONE WAY
(0.000 TO 7.989)

BLV / SR-820/HOLLYWOOD at 2.000

820

ST / JOHNSON at 3.000

1454

C-10 / CANAL at 3.300

ST / TAFT at 3.577

2.000 — 32.0' - 22.0'
2 - 11.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

2.276 — 28.0' - 22.0'
2 - 11.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION 2.000: 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

2.541 #0530 242.9' BR 2.587

3.069 #0202 147.8' BR 3.097

3.447 #0575 121.4' BR 3.470

3.577 #0104 126.7' BR 3.601

DISTRICT USE

SIS 2.000: MANAGED/EXPRESS/REVERSIBLE

FUN CLASS 2.000: URBAN PRIN ART INT.

Versi

5 YR INV	SLD REV
DATE 11/08/2016	02/22/2017
BY FTE	FTE

BMP	EMP	INV	SLD REV
000,000	007,989	12/03/2019 FDOT-D4	12/03/2019 FDOT-D4-CO
005,655	006,776	09/25/2019 FDOT-D4	09/25/2019 FDOT-D4
000,179	006,776	08/06/2019 FDOT-D4	08/06/2019 FDOT-D4

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
07	I 95	SR 9	BROWARD	04	86070901	2 OF 2

ROADWAY FEATURES

4.000 INSIDE CITY, AND URBAN
* HOLLYWOOD
* MIAMI
*|<=I-95/SR-9 EXPRESS N
*|<SR 9
*|<I 95

SHERIDAN ST — 1455 — 4.583 — C-10 SPUR CANAL

ONE WAY
(0,000 TO 7,989)

5.163 INSIDE CITY, AND URBAN
* DANIA BEACH
* MIAMI
*|<=I-95/SR-9 EXPRESS N
*|<SR 9
*|<I 95

STERLING RD

LANE WIDTHS ARE AVERAGED

4.000 28.0' - 22.0'
2 - 11.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

4.342 32.0' - 22.0'
2 - 11.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

4.757 28.0' - 22.0'
2 - 11.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

4.868 18.0' - 12.0'
1 - 12.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

5.435 23.0' - 12.0'
1 - 12.0' RDWY
11.0' WARN SHLD1 - LT
FLEX POSTS MLSP

5.800 18.0' - 12.0'
1 - 12.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION

4.000 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

4.114 #0577 21.1' BR 4.118

4.632 #0578 100.3' BR 4.651

5.144 #0580 179.5' BR 5.178

DISTRICT USE

SIS 4.000 MANAGED/EXPRESS/REVERSIBLE

FUN CLASS 4.000 URBAN PRIN ART INT.

6.000 INSIDE CITY, AND URBAN
* DANIA BEACH
* MIAMI
*|<=I-95/SR-9 EXPRESS N
*|<SR 9
*|<I 95

GRIFFIN RD

6.558 INSIDE URBAN, OUTSIDE CITY
* MIAMI
*|<=I-95/SR-9 EXPRESS N
*|<SR 9
*|<I 95

DANIA CUT OFF CANAL — SW 42 ST

ONE WAY
(0,000 TO 7.989)

7.460 INSIDE CITY, AND URBAN
* FORT LAUDERDALE
* MIAMI
*|<=I-95/SR-9 EXPRESS N
*|<SR 9
*|<I 95

EB I-595/SR-862 — 860950N0 NB I-95 TO I-595/SR-862WEB — 860950S6 SB I-95 TO — 860950S8 WB I-595 TO — 860950G2 EB I-595 TO — EB SR-84/SW 24 ST

INTERSTATE 595 — 862 — INTERSTATE 95 — INTERSTATE 595 — INTERSTATE 595 — 84

END OF SECTION

LANE WIDTHS ARE AVERAGED

6.000 18.0' - 12.0'
1 - 12.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

6.309 22.0' - 12.0'
1 - 12.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION

6.000 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

6.166 #0555 179.5' BR 6.200

6.551 #0209 195.4' BR 6.588

6.719 #0548 37' BR 6.726

7.526 #0536 73.9' UP 7.540

7.540 #0541 21.1' UP 7.544

7.544 #0535 52.8' UP 7.554

7.554 #0542 68.6' UP 7.567

7.656 #0539 37' UP 7.663

7.742 #0538 68.6' UP 7.755

7.971 #0528 63.4' UP 7.983

DISTRICT USE

SIS 6.000 MANAGED/EXPRESS/REVERSIBLE — MANAGED/EXPRESS/REVERSIBLE 7.989

FUN CLASS 6.000 URBAN PRIN ART INT.

END MP: 007.989 NET ROADWAY ID LENGTH: 7.989

Version: 1.4.2.27 12/03/2019

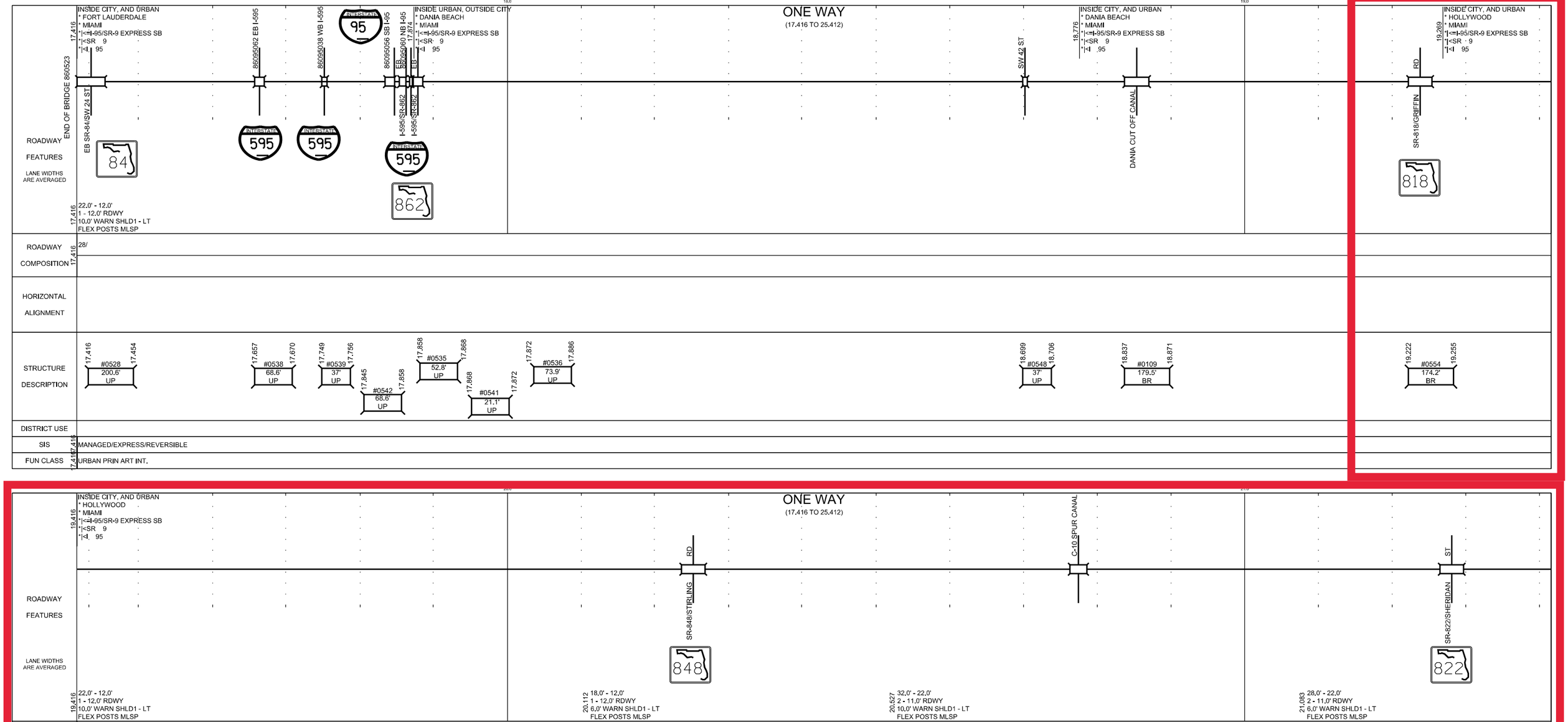
	5 YR INV	SLD REV
DATE	11/08/2016	02/22/2017
BY	FTE	FTE

BMP	EMP	INV	SLD REV
017.416	025.412	12/03/2019 FDOT-D4	12/03/2019 FDOT-D4-CO
017.418	025.412	11/08/2016 FTE	02/21/2017 FTE

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
07	I 95	SR 9	BROWARD	04	86070902	1 OF 2



	5 YR INV	SLD REV
DATE	11/08/2016	02/22/2017
BY	FTE	FTE

BMP	EMP	INV	SLD REV
017.416	025.412	12/03/2019 FDOT-D4	12/03/2019 FDOT-D4-CC
017.418	025.412	11/08/2016 FTE	02/21/2017 FTE

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
07	I 95	SR 9	BROWARD	04	86070902	2 OF 2

ROADWAY FEATURES

21.416 INSIDE CITY, AND URBAN
* HOLLYWOOD
* MIAMI
*|<=I-95/SR-9 EXPRESS SB
*|<SR 9
*|<I 95

ONE WAY
(17.416 TO 25.412)

ST TAFT — CANAL C-10 — ST JOHNSON — BLD SR-820/HOLLYWOOD — 820

LANE WIDTHS ARE AVERAGED

21.416 28.0' - 22.0'
2 - 11.0' RDWY
6.0' WARN SHLD1 - LT
FLEX POSTS MLSP

23.132 32.0' - 22.0'
2 - 11.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION

21.416 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

21.806 #0104 142.6' BR 21.833

21.944 #0574 142.6' BR 21.971

22.321 #0102 147.8' BR 22.349

22.825 #0530 31.7' BR 22.831

DISTRICT USE

SIS

21.416 MANAGED/EXPRESS/REVERSIBLE

FUN CLASS

21.416 URBAN PRIN ART INT.

24.0

25.0

ROADWAY FEATURES

23.416 INSIDE CITY, AND URBAN
* HOLLYWOOD
* MIAMI
*|<=I-95/SR-9 EXPRESS SB
*|<SR 9
*|<I 95

824 RD/SR-824 — PEMBROKE

ONE WAY
(17.416 TO 25.412)

24.432 INSIDE CITY, AND URBAN
* MIAMI
*|<=I-95/SR-9 EXPRESS SB
*|<SR 9
*|<I 95

HALLANDALE BCH BLVD

DADE/BROWARD CO LINE

LANE WIDTHS ARE AVERAGED

23.416 32.0' - 22.0'
2 - 11.0' RDWY
10.0' WARN SHLD1 - LT
FLEX POSTS MLSP

23.761 29.0' - 22.0'
2 - 11.0' RDWY
7.0' WARN SHLD1 - LT
FLEX POSTS MLSP

24.462 23.0' - 12.0'
1 - 12.0' RDWY
11.0' WARN SHLD1 - LT
FLEX POSTS MLSP

ROADWAY COMPOSITION

23.416 28/

HORIZONTAL ALIGNMENT

STRUCTURE DESCRIPTION

23.854 #0531 242.9' BR 23.900

24.624 #0529 242.9' BR 24.670

END MP: 025.412 NET ROADWAY ID LENGTH: 7.996

DISTRICT USE

SIS

23.416 MANAGED/EXPRESS/REVERSIBLE — MANAGED/EXPRESS/REVERSIBLE 25.412

FUN CLASS

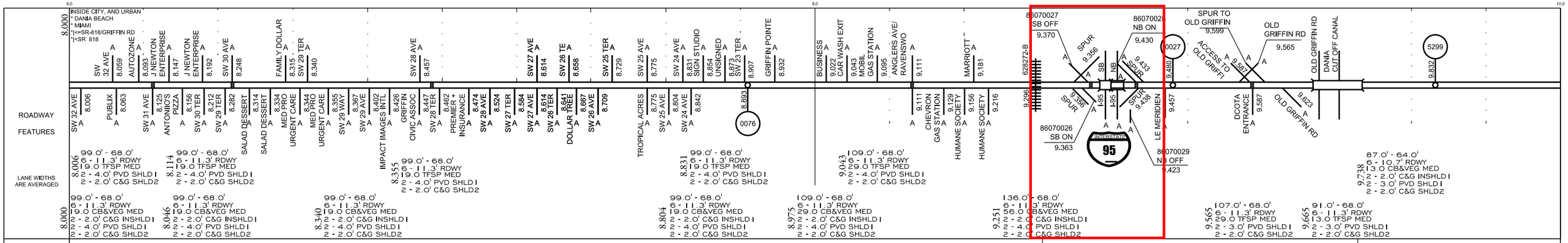
23.416 URBAN PRIN ART INT.

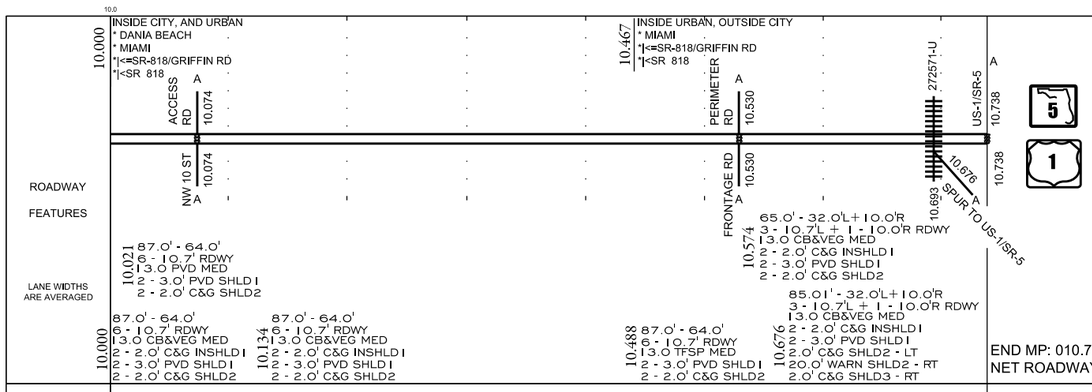
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	03/14/2022	04/12/2022				
BY	CALTRAN	CALTRAN				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
12		SR 818	BROWARD	04	86015000	3 OF 3





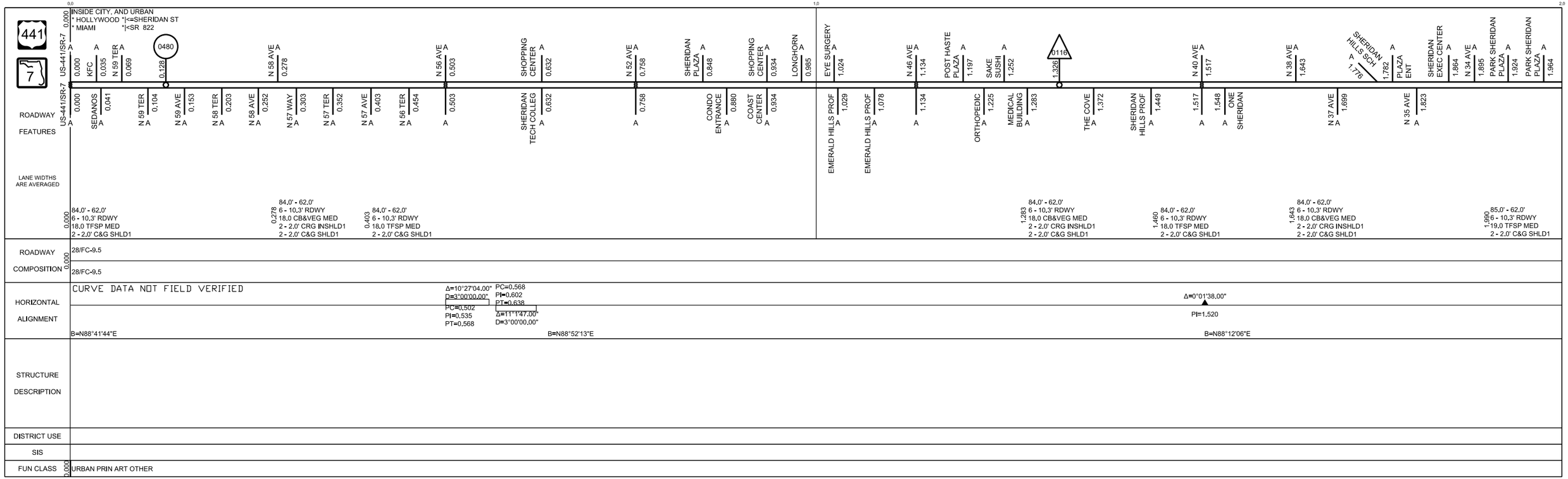
END MP: 010.738
NET ROADWAY ID LENGTH: 10.343

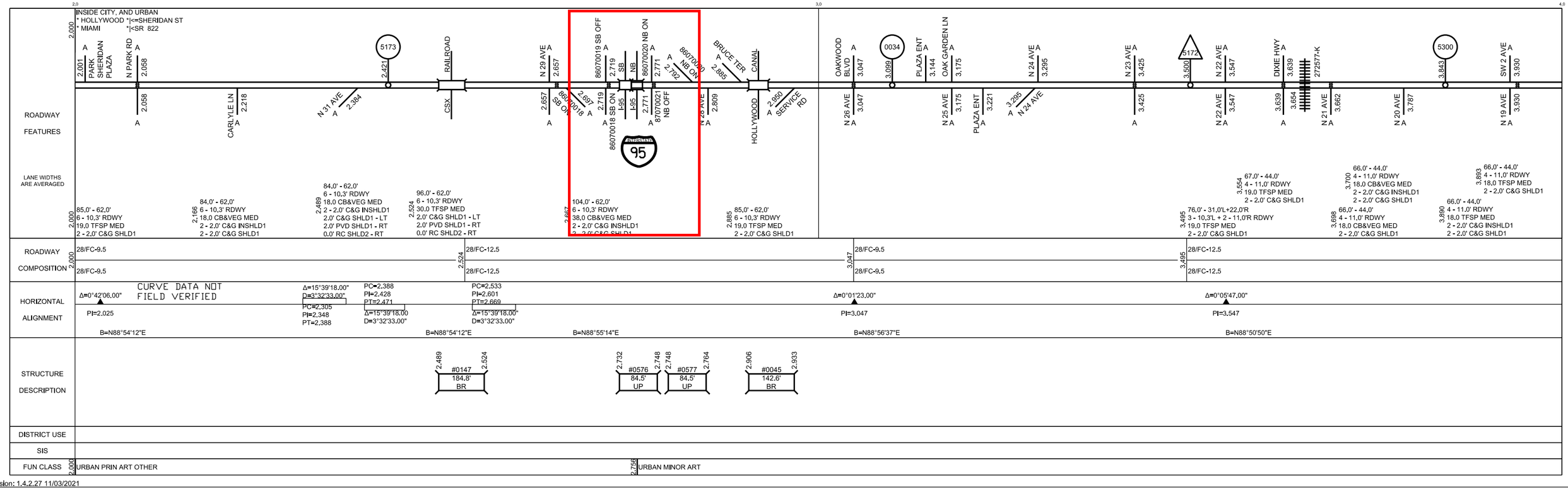
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	06/07/2021	06/21/2021	003.492	004.050	10/26/2021 CTS	11/03/2021 CTS
BY	AECOM	AECOM				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02		SR 822	BROWARD	04	86230000	1 OF 2





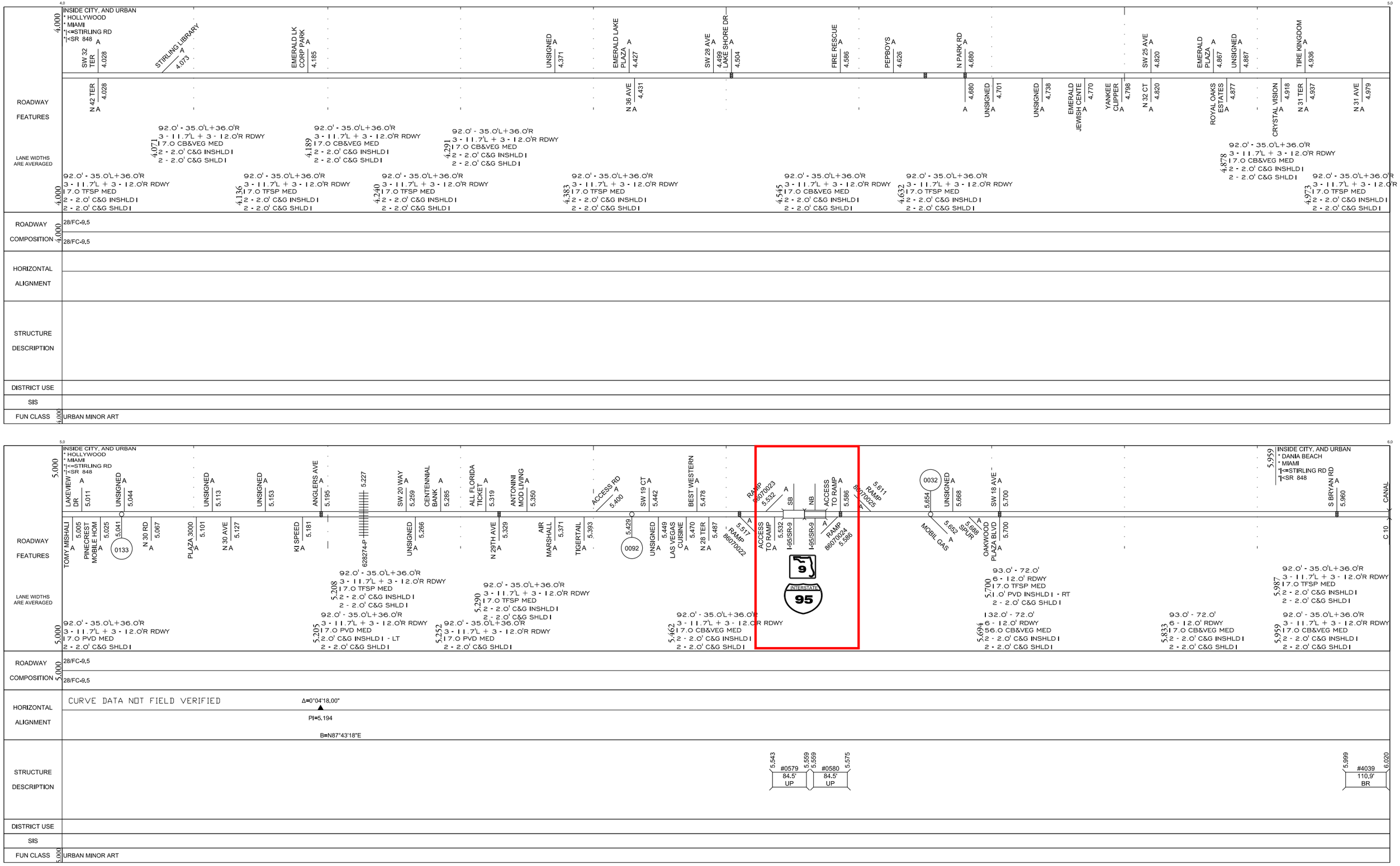
Version: 1.4.2.27 11/03/2021

	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	06/06/2018	07/18/2018				
BY	CALTRAN	CALTRAN				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

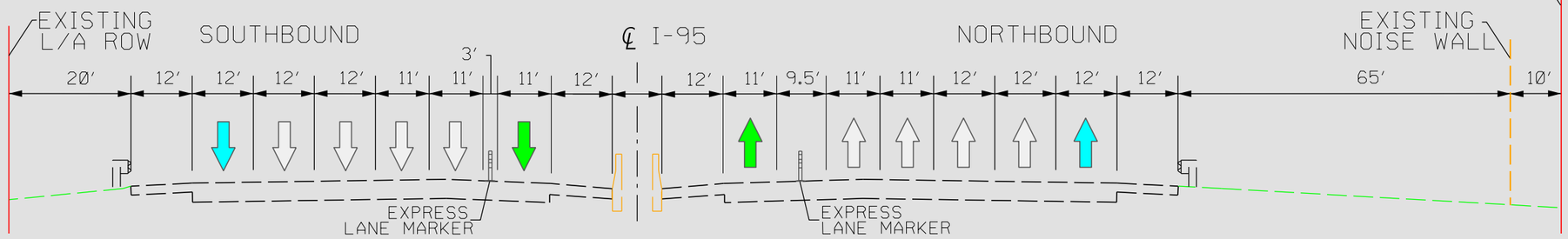
SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02		SR 848	BROWARD	04	86016000	3 OF 4



APPENDIX C
Typical Sections

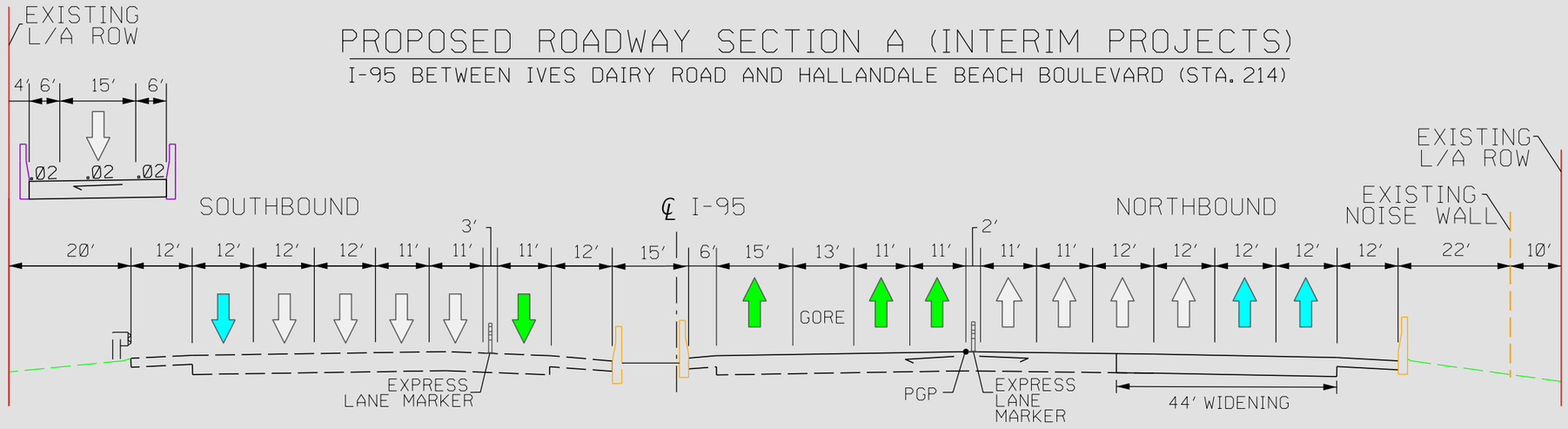
EXISTING ROADWAY SECTION A

I-95 BETWEEN IVES DAIRY ROAD AND HALLANDALE BEACH BOULEVARD (STA. 214)



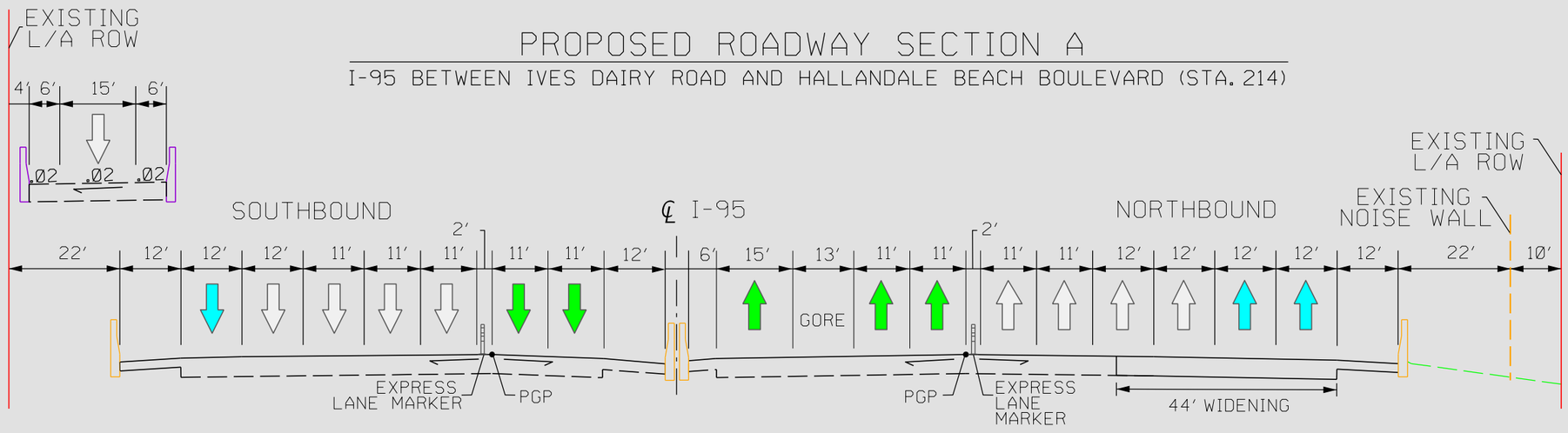
PROPOSED ROADWAY SECTION A (INTERIM PROJECTS)

I-95 BETWEEN IVES DAIRY ROAD AND HALLANDALE BEACH BOULEVARD (STA. 214)



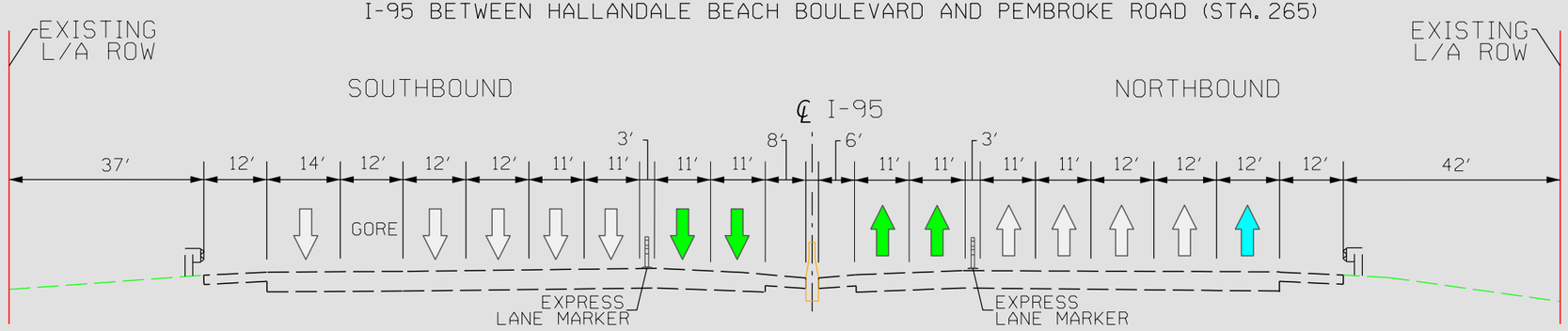
PROPOSED ROADWAY SECTION A

I-95 BETWEEN IVES DAIRY ROAD AND HALLANDALE BEACH BOULEVARD (STA. 214)



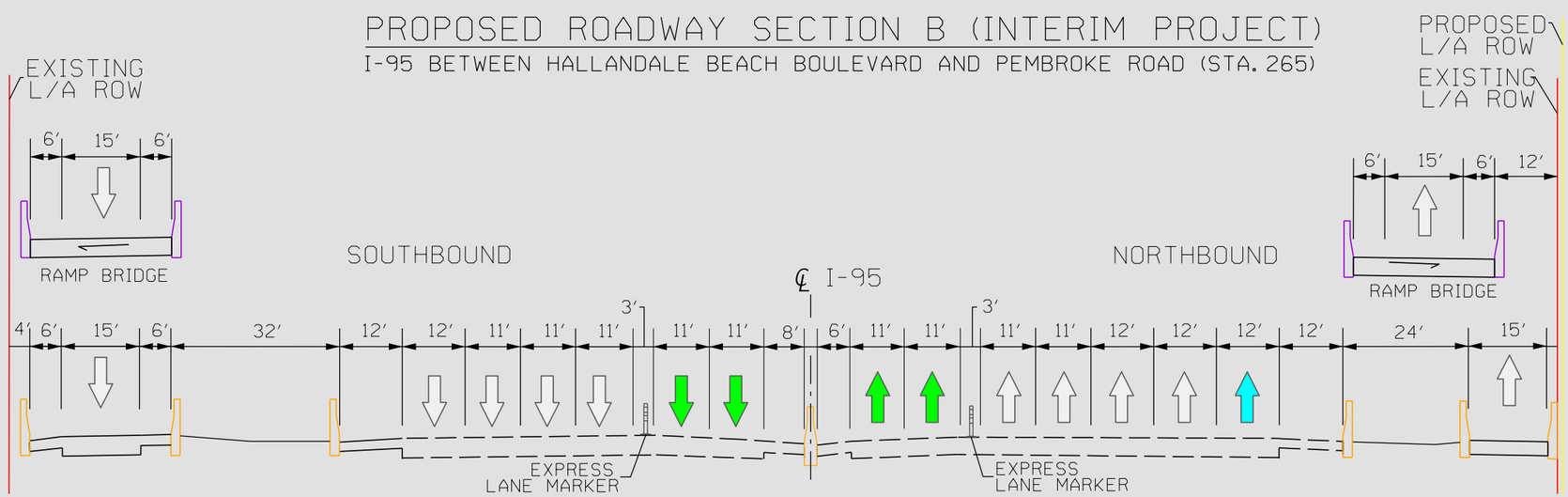
EXISTING ROADWAY SECTION B

I-95 BETWEEN HALLANDALE BEACH BOULEVARD AND PEMBROKE ROAD (STA. 265)



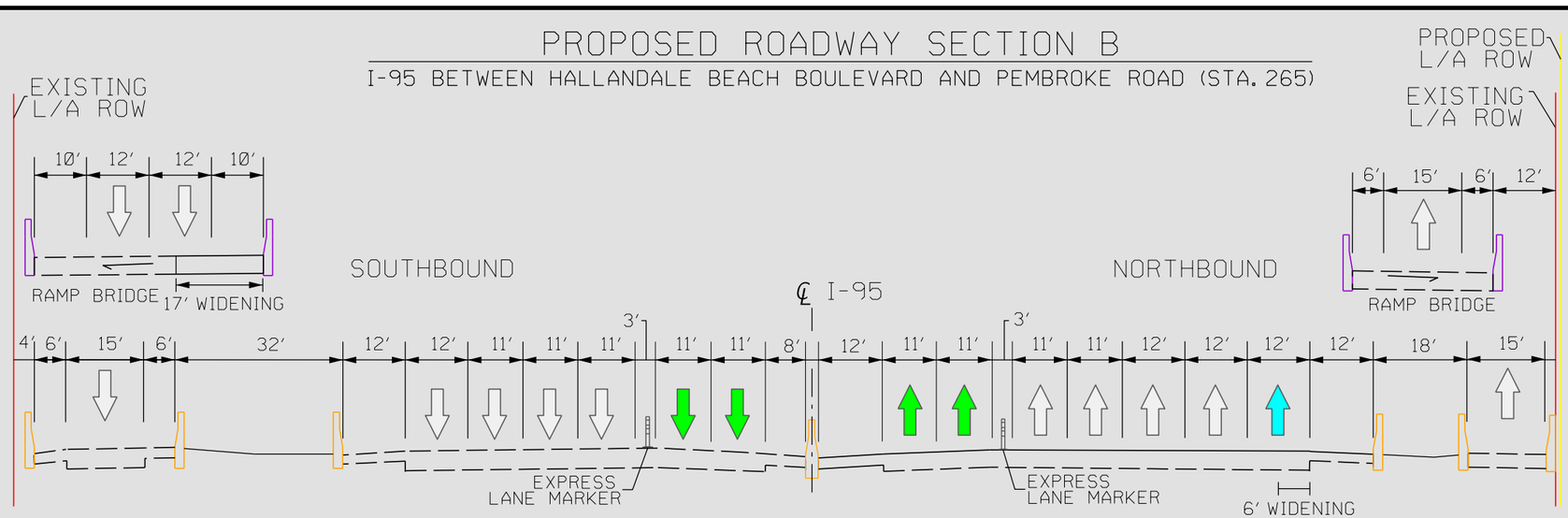
PROPOSED ROADWAY SECTION B (INTERIM PROJECT)

I-95 BETWEEN HALLANDALE BEACH BOULEVARD AND PEMBROKE ROAD (STA. 265)



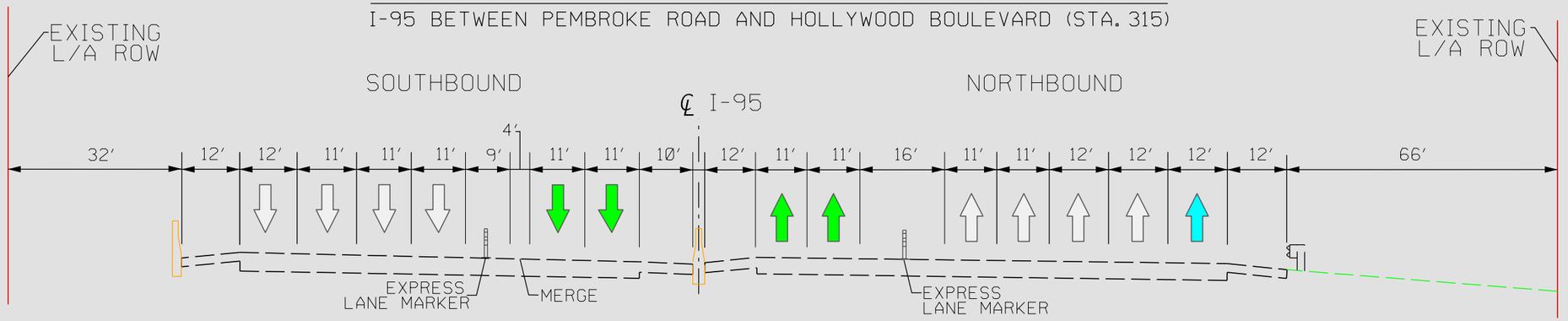
PROPOSED ROADWAY SECTION B

I-95 BETWEEN HALLANDALE BEACH BOULEVARD AND PEMBROKE ROAD (STA. 265)



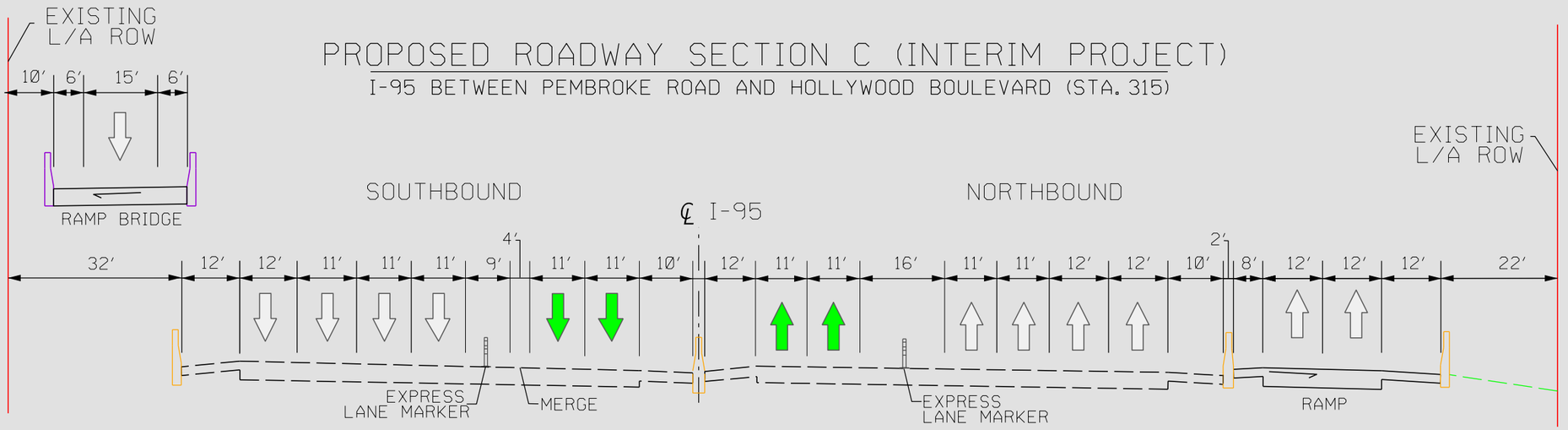
EXISTING ROADWAY SECTION C

I-95 BETWEEN PEMBROKE ROAD AND HOLLYWOOD BOULEVARD (STA. 315)



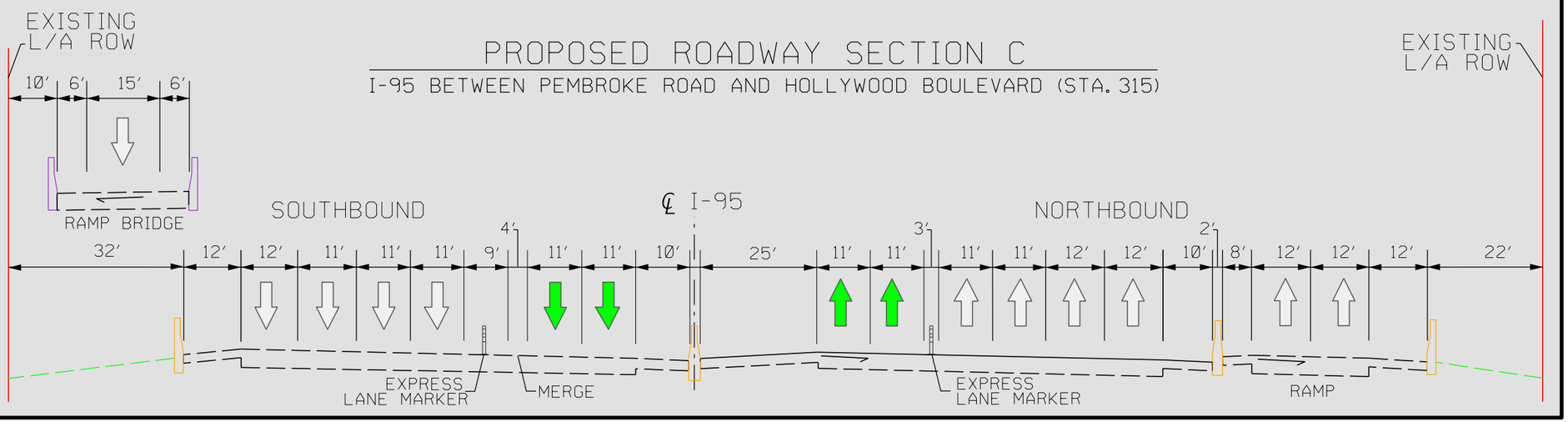
PROPOSED ROADWAY SECTION C (INTERIM PROJECT)

I-95 BETWEEN PEMBROKE ROAD AND HOLLYWOOD BOULEVARD (STA. 315)



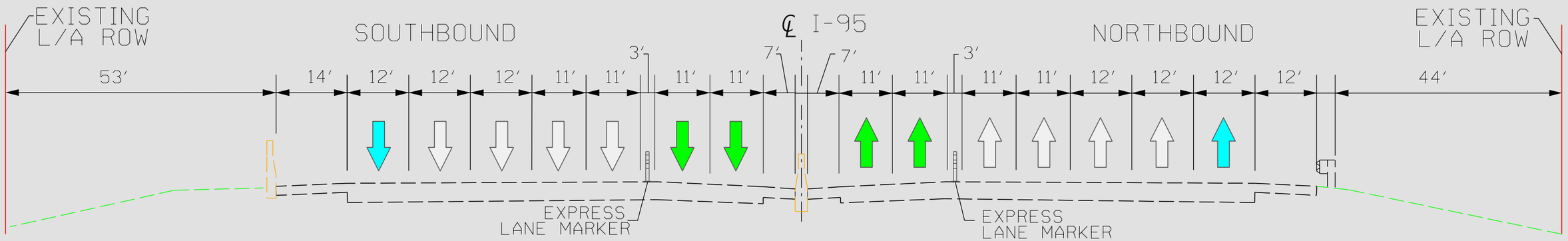
PROPOSED ROADWAY SECTION C

I-95 BETWEEN PEMBROKE ROAD AND HOLLYWOOD BOULEVARD (STA. 315)



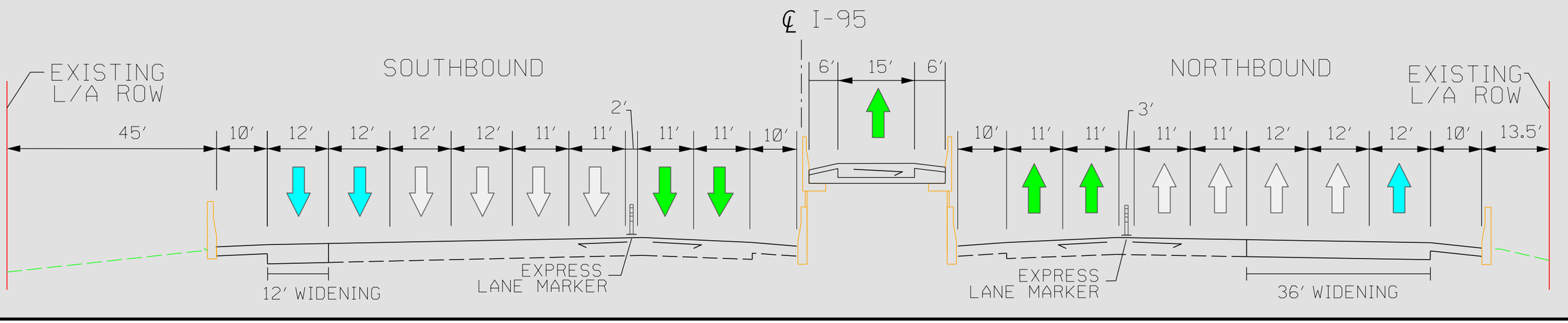
EXISTING ROADWAY SECTION D

I-95 BETWEEN HOLLYWOOD BOULEVARD AND SHERIDAN STREET (STA. 378)



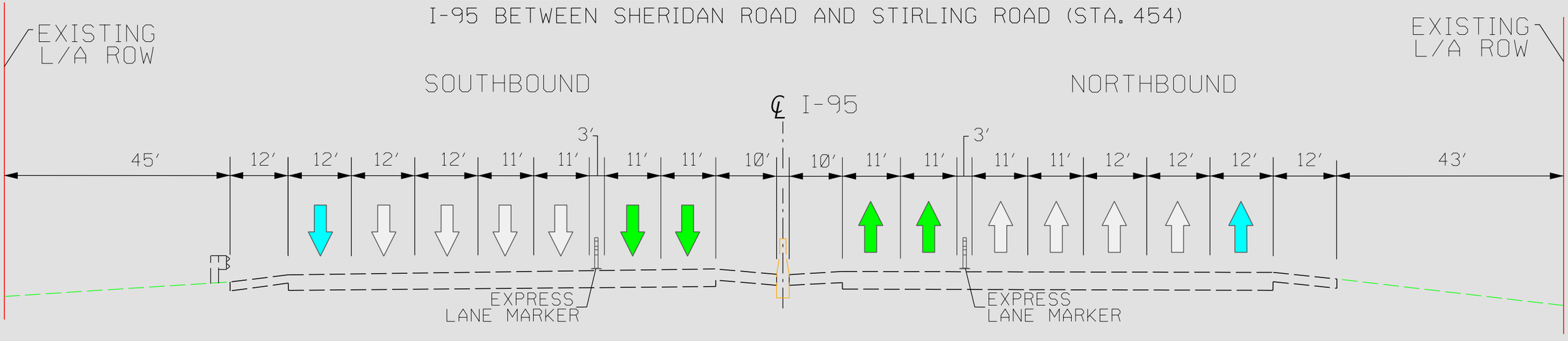
PROPOSED ROADWAY SECTION D

I-95 BETWEEN HOLLYWOOD BOULEVARD AND SHERIDAN STREET (STA. 378)



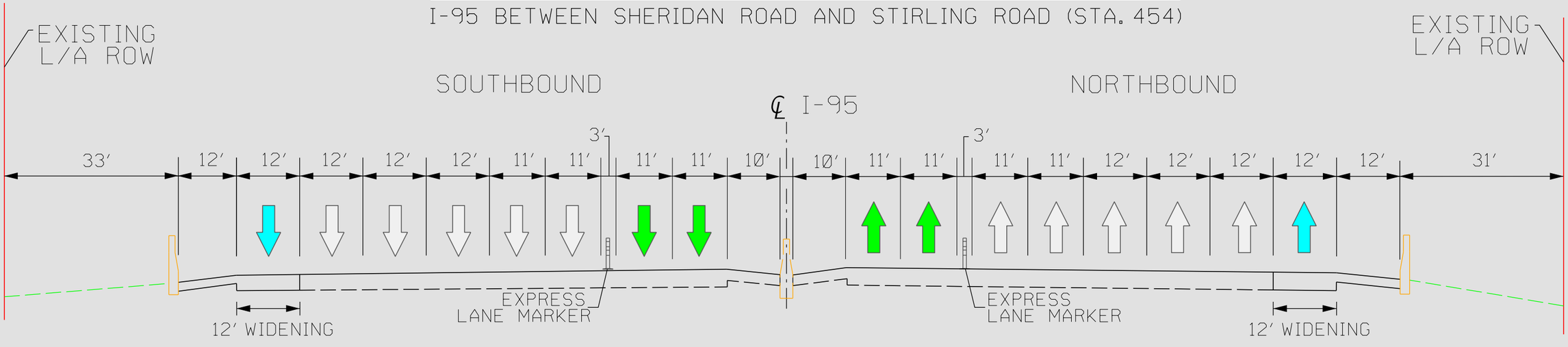
EXISTING ROADWAY SECTION E

I-95 BETWEEN SHERIDAN ROAD AND STIRLING ROAD (STA. 454)



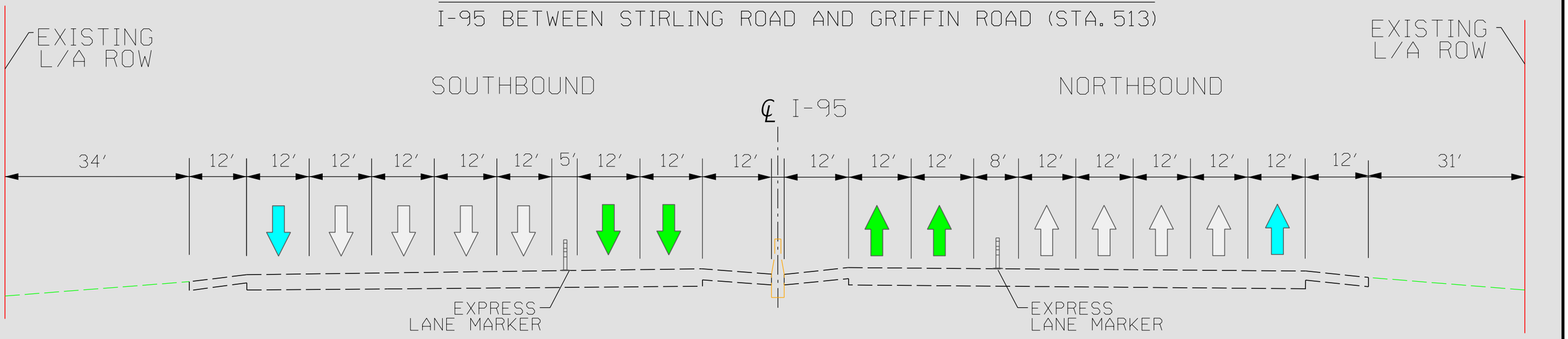
PROPOSED ROADWAY SECTION E

I-95 BETWEEN SHERIDAN ROAD AND STIRLING ROAD (STA. 454)



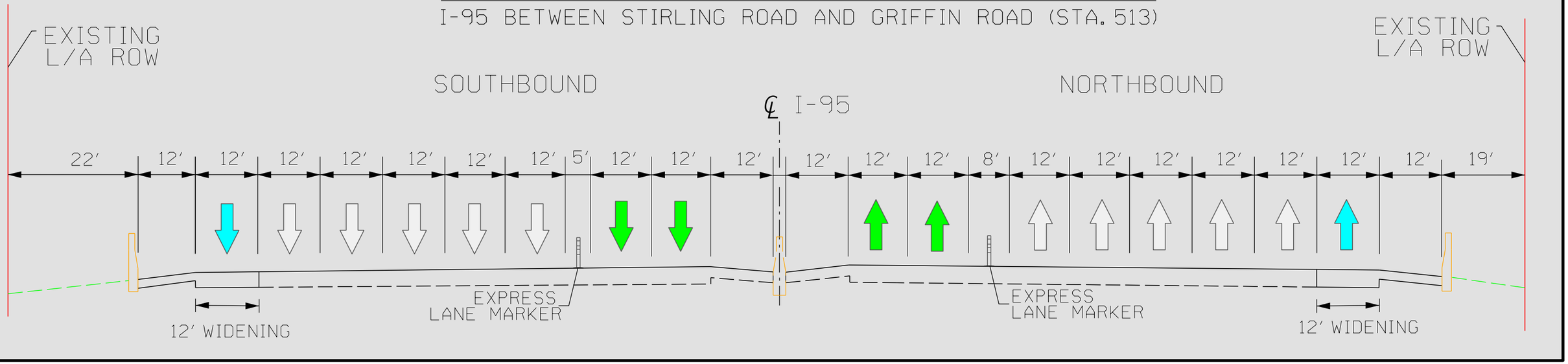
EXISTING ROADWAY SECTION F

I-95 BETWEEN STIRLING ROAD AND GRIFFIN ROAD (STA. 513)



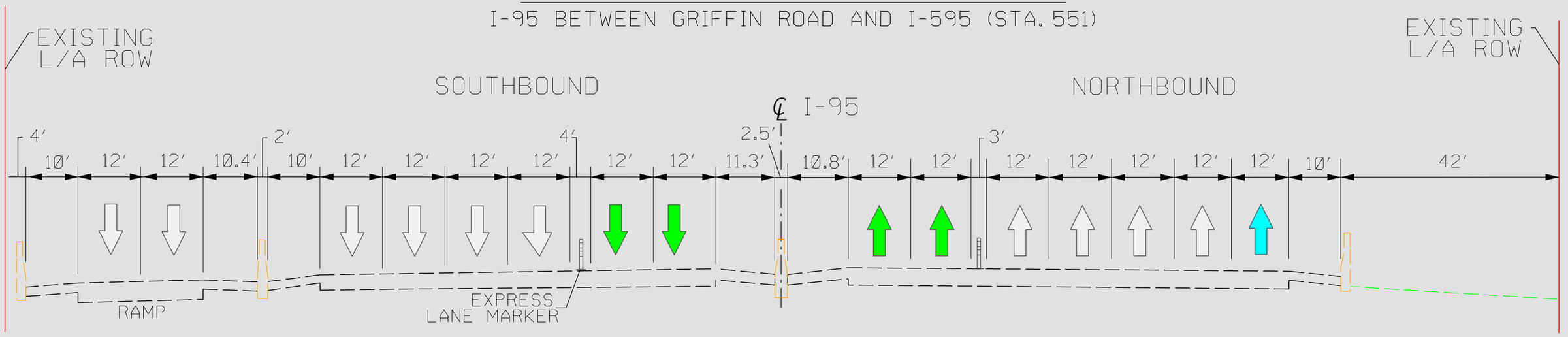
PROPOSED ROADWAY SECTION F

I-95 BETWEEN STIRLING ROAD AND GRIFFIN ROAD (STA. 513)



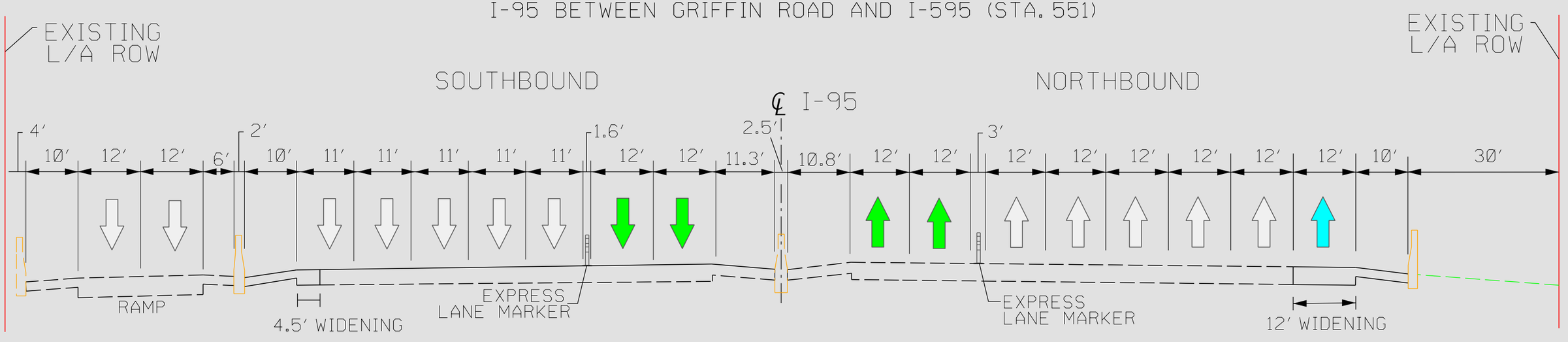
EXISTING ROADWAY SECTION G

I-95 BETWEEN GRIFFIN ROAD AND I-595 (STA. 551)

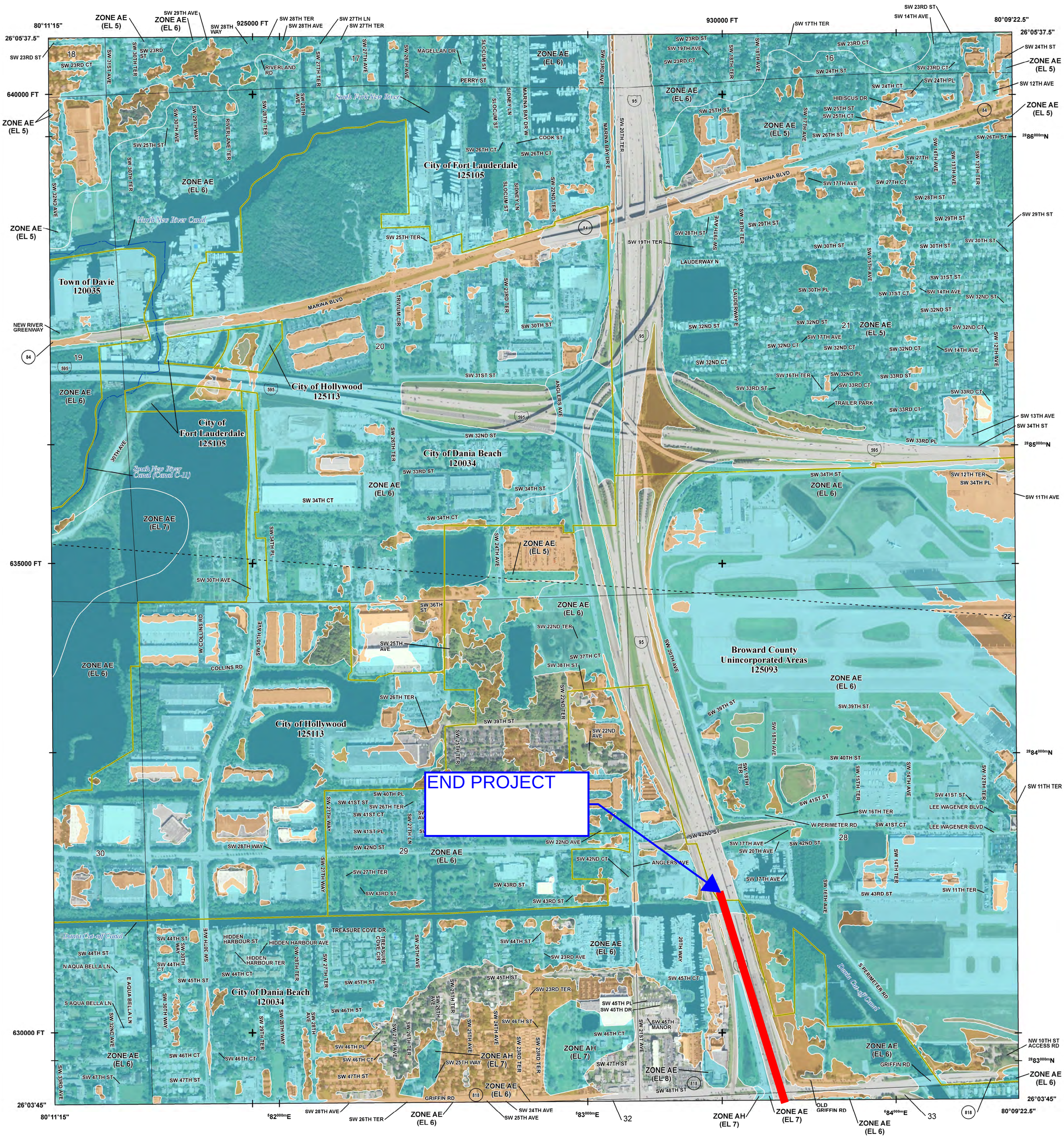


PROPOSED ROADWAY SECTION G

I-95 BETWEEN GRIFFIN ROAD AND I-595 (STA. 551)



APPENDIX D
FEMA FIRM Maps



FLOOD HAZARD INFORMATION

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HTTPS://MSC.FEMA.GOV

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- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

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GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

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SCALE

N

Map Projection:
State Plane Transverse Mercator, Florida East Zone 0901H; North American Datum 1983 HARN; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

BROWARD COUNTY, FLORIDA
and Incorporated Areas

PANEL 558 OF 751

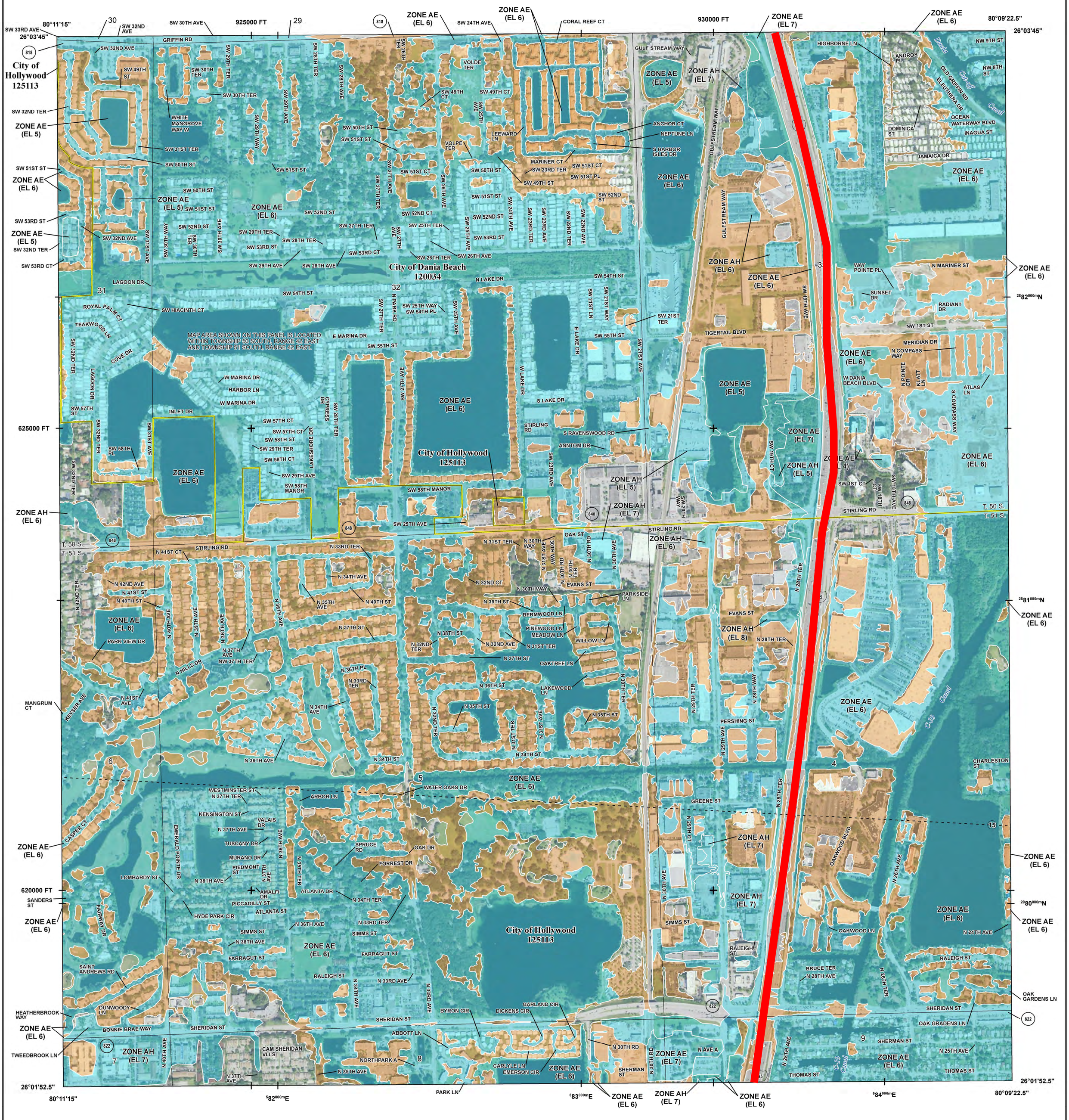
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
BROWARD COUNTY	125093	0558	J
DANIA BEACH, CITY OF	120034	0558	J
DAVIE, TOWN OF	120035	0558	J
FORT LAUDERDALE, CITY OF	125105	0558	J
HOLLYWOOD, CITY OF	125113	0558	J

VERSION NUMBER
2.6.3.5

MAP NUMBER
12011C0558J

MAP REVISED
JULY 31, 2024


80°11'15"
26°03'45"
925000 FT
930000 FT
80°09'22.5"
26°01'52.5"
625000 FT
620000 FT
City of Hollywood 125113
City of Dania Beach 120034
MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 50 SOUTH, RANGE 42 EAST AND TOWNSHIP 51 SOUTH, RANGE 42 EAST.
ZONE AE (EL 6)
ZONE AE (EL 5)
ZONE AE (EL 7)
ZONE AH (EL 6)
ZONE AH (EL 7)
ZONE AH (EL 5)
ZONE AH (EL 8)
GRIFFIN RD
SW 32ND AVE
SW 30TH AVE
SW 24TH AVE
CORAL REEF CT
GULF STREAM WAY
HIGHBORNE LN
NW 9TH ST
NW 8TH ST
OLD GRIFFIN RD
ELEUTHERA DR
OCEAN WATERWAY BLVD
INAGUA ST
JAMAICA DR
DOMINICA ST
ANDROS PL
SW 49TH ST
SW 32ND TER
SW 30TH TER
SW 29TH TER
SW 28TH TER
SW 28TH AVE
SW 29TH AVE
SW 29TH WAY
WHITE MANGROVE WAY W
SW 31ST TER
SW 50TH ST
SW 51ST ST
SW 49TH CT
VOLDE TER
LEEWARD LN
VOLPE TER
ANCHOR CT
NEPTUNE LN
S HARBOR ISLES DR
MARINER CT
SW 23RD TER
SW 51ST CT
SW 51ST PL
SW 49TH ST
SW 52ND ST
SW 51ST CT
SW 50TH ST
SW 27TH AVE
SW 27TH TER
SW 26TH AVE
SW 25TH AVE
SW 24TH AVE
SW 23RD AVE
SW 22ND TER
SW 22ND AVE
SW 52ND CT
SW 52ND ST
SW 53RD ST
SW 53RD CT
SW 27TH TER
SW 25TH TER
SW 26TH TER
SW 26TH AVE
SW 29TH TER
SW 28TH TER
SW 29TH AVE
SW 28TH AVE
SW 30TH WAY
SW 31ST AVE
SW 32ND TER
SW 53RD CT
LAGOON DR
ROYAL PALM CT
SW HIACINTH CT
TEAKWOOD LN
COVE DR
SW 54TH ST
N LAKE DR
E MARINA DR
SW 55TH ST
SW 25TH WAY
SW 54TH PL
N PARK RD
SW 27TH TER
SW 25TH AVE
SW 21ST LN
SW 21ST WAY
SW 21ST AVE
SW 21ST TER
SW 19TH AVE
TIGERTAIL BLVD
W MARINA DR
HARBOR LN
INLET DR
SW 57TH ST
SW 57TH CT
SW 58TH ST
SW 58TH CT
SW 58TH PL
SW 58TH MANOR
SW 29TH TER
SW 29TH AVE
SW 31ST AVE
SW 32ND TER
LAKESHORE DR
CYPRESS DR
SW 28TH TER
SW 27TH AVE
W LAKE DR
E LAKE DR
S LAKE DR
STIRLING RD
S RAVENSWOOD RD
ANNTOM DR
SW 23RD AVE
SW 20TH WAY
SW 19TH CT
SW 25TH AVE
SW 58TH MANOR
SW 1ST CT
SW 18TH CT
SW 18TH AVE
N COMPASS WAY
N POINTE DR
KLATT LN
ATLAS LN
S COMPASS WAY
W DANIA BEACH BLVD
MERIDIAN DR
NW 1ST ST
RADIANT DR
SUNSET DR
WAY POINTE PL
N MARINER ST
T. 50 S.
T. 51 S.
N 41ST CT
STIRLING RD
N 33RD TER
N 34TH AVE
N 42ND AVE
N 41ST ST
N 40TH ST
N 35TH AVE
N 42ND TER
N 40TH AVE
N 39TH AVE
N 38TH AVE
N 36TH AVE
N 37TH AVE
NW 37TH TER
PARK VIEW DR
N HILLS DR
N 37TH ST
N 36TH PL
N 33RD TER
N 36TH ST
N 35TH ST
N 34TH ST
N 32ND TER
N 32ND CT
N 32ND AVE
N 31ST TER
N 31ST AVE
N 30TH WAY
N 30TH RD
N 30TH TER
N 30TH AVE
N 31ST TER
OAK ST
EVANS ST
N 39TH ST
PARKSIDE LN
BERMWOOD LN
PINEWOOD LN
MEADOW LN
WILLOW LN
OAKTREE LN
LAKEWOOD LN
N 29TH TER
N 28TH WAY
N 28TH TER
PERSHING ST
N 29TH AVE
N 29TH CT
GREENE ST
OAKWOOD BLVD
N 26TH AVE
N 26TH TER
BRUCE TER
N 28TH AVE
RALEIGH ST
OAKWOOD LN
N 24TH AVE
SIMMS ST
MANGRUM CT
KEYSER AVE
N 41ST AVE
WESTMINSTER ST
N 37TH TER
ARBOR LN
KENSINGTON ST
VALAIS DR
N 37TH AVE
TUSCANY DR
MURANO DR
PIEDMONT ST
N 38TH AVE
LOMBARDY ST
EMERALD POINTE DR
CASPER CT
SANDERS ST
FAIRWAY DR
HYDE PARK CIR
PICCADILLY ST
AMALFI DR
ATLANTA ST
ATLANTA DR
N 34TH TER
N 36TH AVE
N 35TH TER
SPRUCE RD
OAK DR
FORREST DR
SAINT ANDREWS RD
FARRAGUT ST
RALEIGH ST
N 33RD AVE
N 33RD ST
HEATHERBROOK WAY
DUNWOODY LN
BONNIE BRAE WAY
SHERIDAN ST
TWEEDBROOK LN
CAM SHERIDAN VLLS
NORTHPARK A
ABBOTT LN
BYRON CIR
DICKENS CIR
GARLAND CIR
CARLYLE LN
EMERSON CIR
PARK LN
N 30TH RD
N AVE A
SHERMAN ST
THOMAS ST
OAK GRADENS LN
SHERIDAN ST
N 25TH AVE
C-10 Canal
Dania Canal
City of Dania
City of Hollywood
SW 33RD AVE
SW 32ND AVE
SW 49TH ST
SW 32ND TER
SW 51ST ST
SW 53RD ST
SW 32ND AVE
SW 32ND TER
SW 53RD CT
LAGOON DR
ROYAL PALM CT
SW HIACINTH CT
TEAKWOOD LN
SW 32ND TER
LAGOON DR
SW 57TH ST
SW 32ND TER
SW 58TH PL
SW 32ND TER
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SW 51ST ST
ZONE AE (EL 6)
SW 53RD ST
ZONE AE (EL 5)
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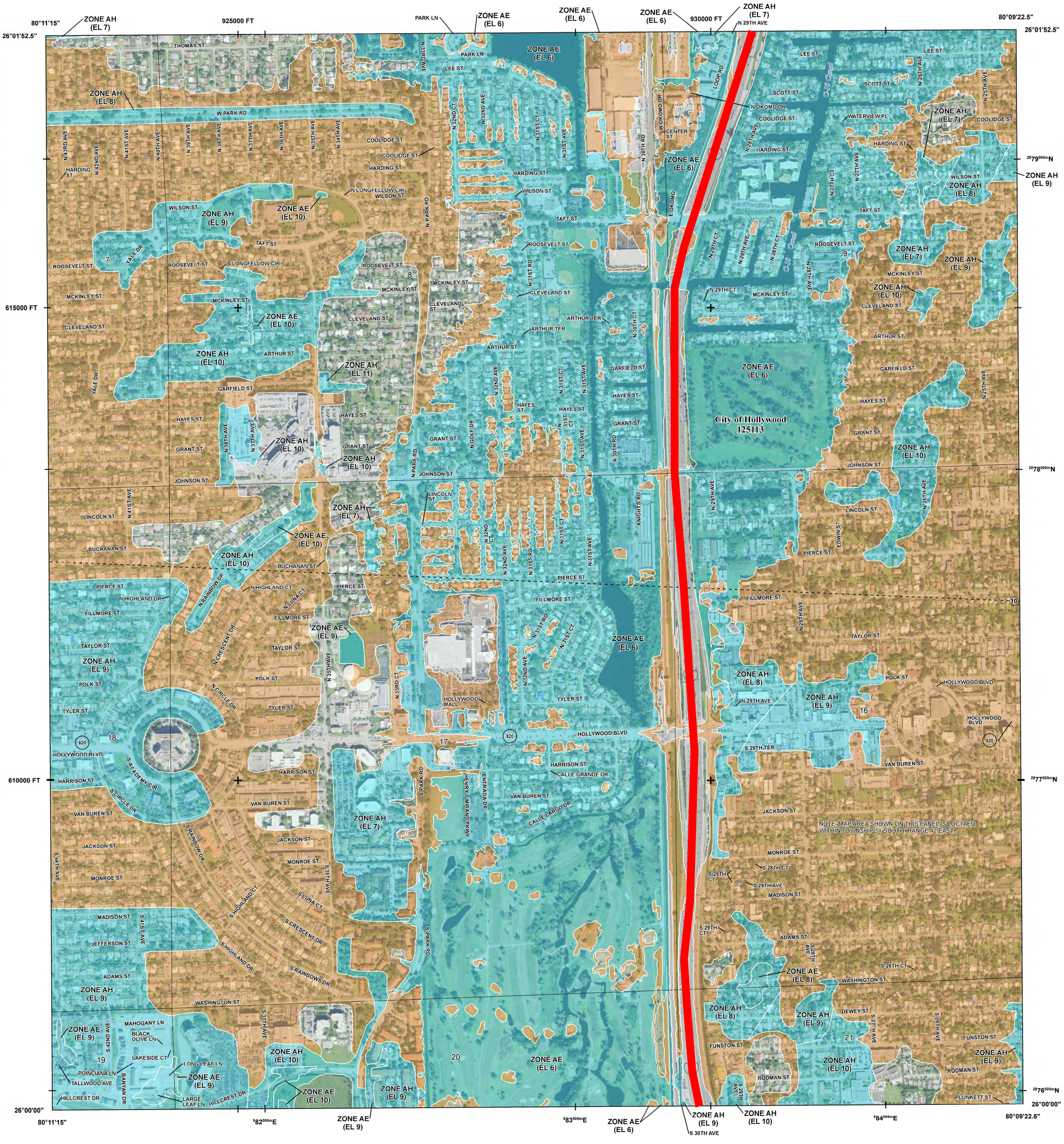
SW 53RD CT
ZONE AE (EL 6)
ZONE AH (EL 6)
ZONE AE (EL 6)
ZONE AE (EL 6)
ZONE AE



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- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

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- 8 — Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
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- Limit of Study
- Jurisdiction Boundary

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SCALE

N

Map Projection:
State Plane Transverse Mercator, Florida East Zone 0901H; North American Datum 1983 HARN; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

BROWARD COUNTY, FLORIDA
and Incorporated Areas

PANEL 568 OF 751

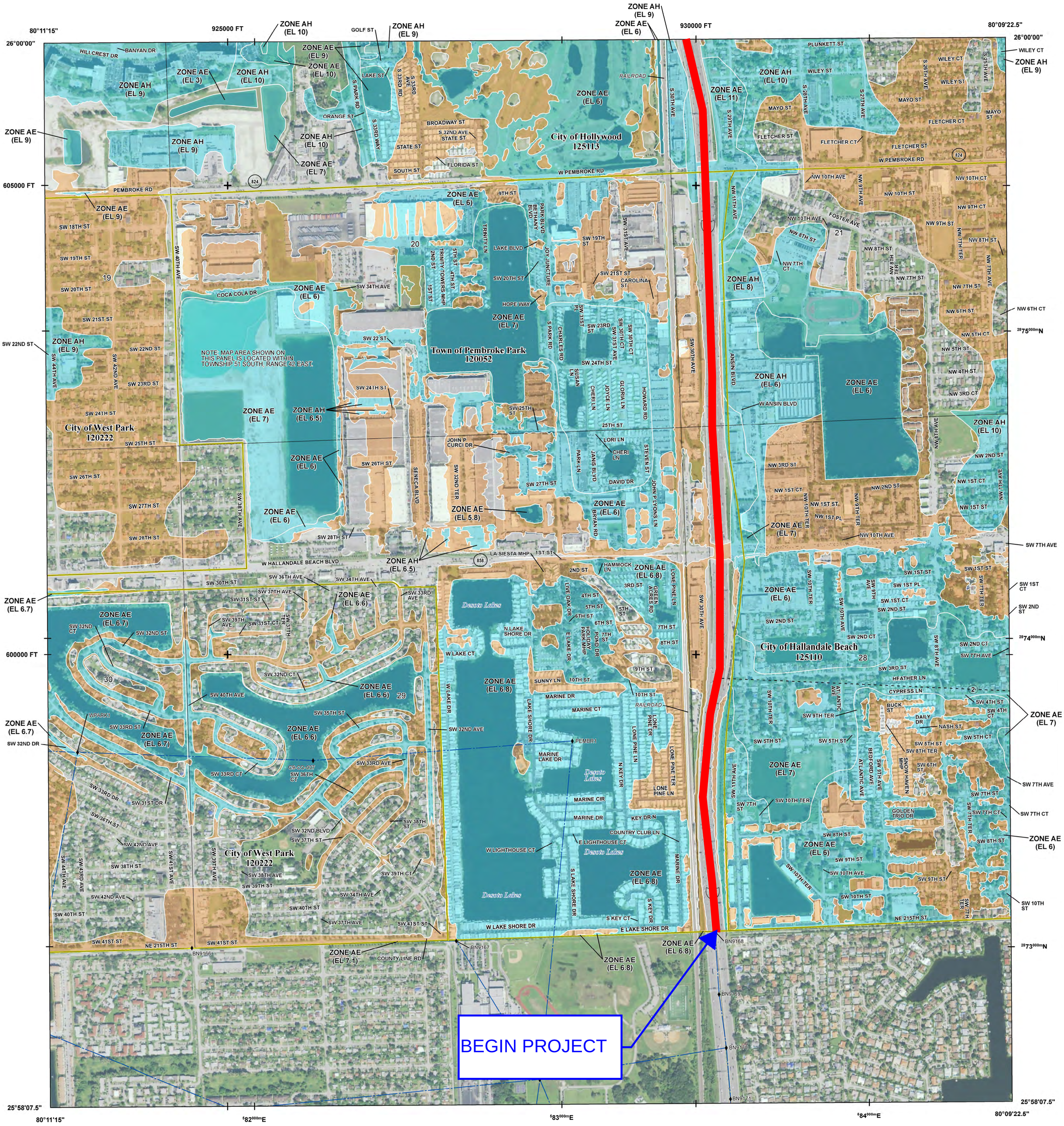
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
HOLLYWOOD, CITY OF	125113	0568	J

VERSION NUMBER
2.6.3.5

MAP NUMBER
12011C0568J

MAP REVISED
JULY 31, 2024



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SCALE

N

Map Projection:
State Plane Transverse Mercator, Florida East Zone 0901H; North American Datum 1983 HARN; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

BROWARD COUNTY, FLORIDA
and Incorporated Areas

PANEL 731 OF 751

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
HALLANDALE BEACH, CITY OF	125110	0731	J
HOLLYWOOD, CITY OF	125113	0731	J
PEMBROKE PARK, TOWN OF	120052	0731	J
WEST PARK, CITY OF	120222	0731	J

VERSION NUMBER
2.6.3.5

MAP NUMBER
12011C0731J

MAP REVISED
JULY 31, 2024

80°11'15" 925000 FT 930000 FT 80°09'22.5"
26°00'00" 26°00'00"
605000 FT 2875000mN
600000 FT 2874000mN
2873000mN
25°58'07.5" 25°58'07.5"
80°11'15" 5820000mE 5830000mE 5840000mE 80°09'22.5"

WPARK1 69-00-007 PEMBR1

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 51 SOUTH, RANGE 42 EAST

Miami-Dade County Unincorporated Areas 120635

BN9166 BN9167 BN9168 BN9169 BN9170 BN9171 C9_N_12

ZONE AE (EL 7.1) ZONE AE (EL 6.8) ZONE AE (EL 6) ZONE AE (EL 7) ZONE AE (EL 7.1)

NE 215TH ST NE 214TH ST NE 213TH TER NE 212TH TER NE 211TH TER NE 210TH TER NE 209TH TER NE 214TH LN NE 10TH AVE NE 9TH PL NE 8TH AVE NE 8TH CT NE 8TH PL NE 12TH CT NE 12TH AVE NE 14TH AVE NE 13TH PL NE 211TH ST NE 212TH TER NE 19TH AVE NE 214TH TER NE 213TH LN NE 18TH PL NE 21ST AVE NE 20TH AVE NE 20TH CT HIGHLAND LAKES BLVD NE 212TH ST NE 21ST CT NE 211TH TER NE 211TH LN NE 19TH CT NE 18TH CT NE 21ST PL NE 22ND CT NE 210TH ST NE 21ST CT NE 21ST AVE

31 32 33 77

95

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SCALE

N

Map Projection:
State Plane Transverse Mercator, Florida East Zone 0901; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

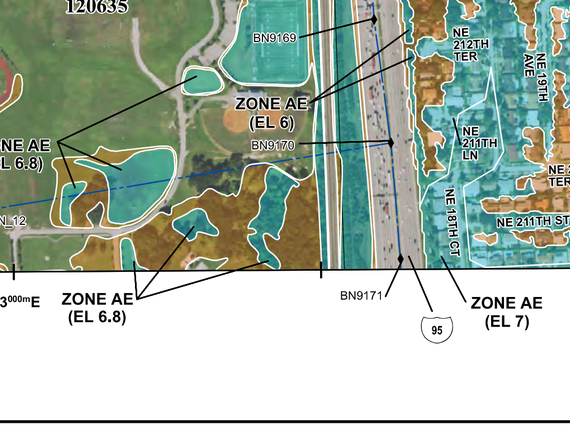
1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR





FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA
and Incorporated Areas

PANEL 131 OF 1031

Panel Contains:

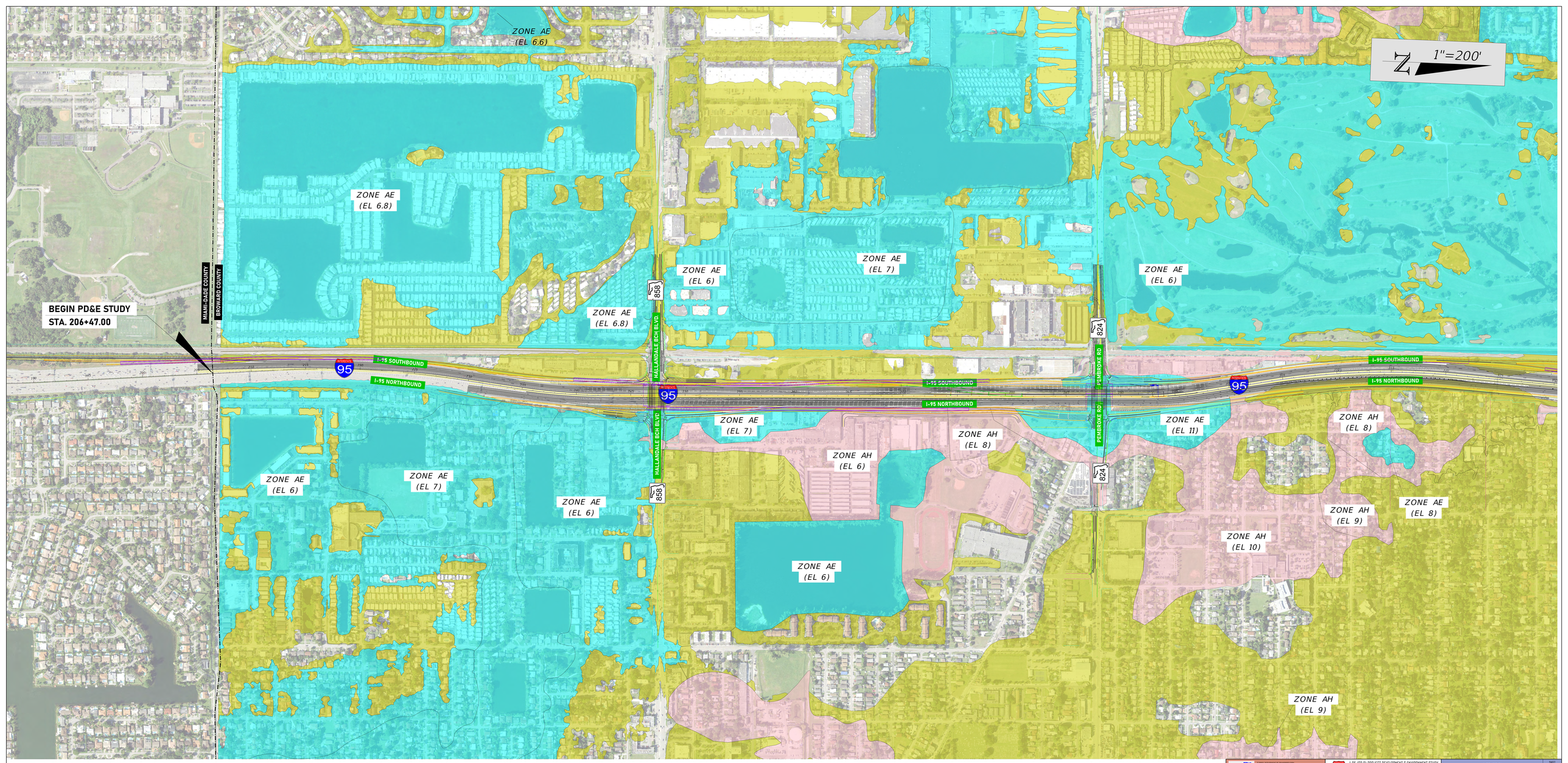
COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI-DADE COUNTY	120635	0131	M

REVISED PRELIMINARY 8/8/2024

VERSION NUMBER
2.6.3.5

MAP NUMBER
12086C0131M

MAP REVISED



FDOT FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT FOUR
2400 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309
APRIL 2020

95 I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
From Miami-Dade/Broward County Line to North of Griffin Road
(FPN No. 4105354-2-22-02)
(FEIS No. 4250)

I-95 (SR 9)
CORRIDOR BASE MAP

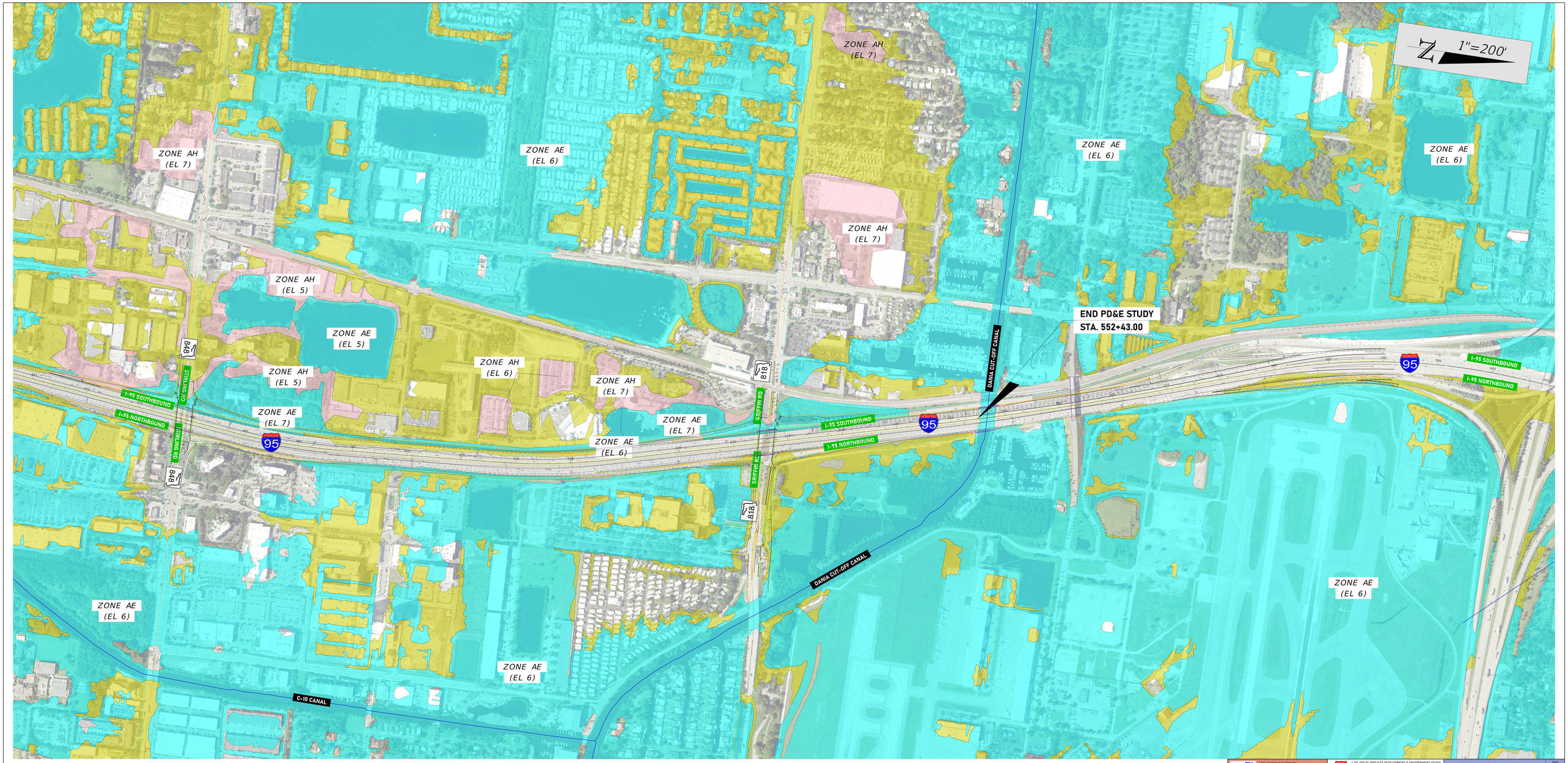
SHEET NO.



FDOT

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

I-95 (SR 9)
CORRIDOR BASE MAP



FDOT

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

I-95 (SR 9)
CORRIDOR BASE MAP

APPENDIX E
Calculations

I-95 PD&E-Diamond Alternative

Floodplain Calculations

	Net Acumulative (CY)
	Negative represents lost storage
Basin 5	0.60
System 9	0.38
System 10	2.69
System 11	5.20
System 12	1.26
System 13	7.76
Total	17.878

I-95 PD&E - Diamond Alternative

Floodplain Calculations

BASIN 5

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
375+00	0	RT	6.0	N.A.		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
378+00	300	RT	6.0	N.A.	0	0.0	76.96	38.5	0.0	213.8	-213.8	-213.8	-0.1325
381+00	300	RT	6.0	N.A.	0	0.0	126.03	63.0	0.0	563.9	-563.9	-777.6	-0.4820
384+00	300	RT	6.0	N.A.	0	0.0	92.41	46.2	0.0	606.8	-606.8	-1384.4	-0.8581
387+00	300	RT	6.0	N.A.	0	0.0	185.49	92.7	0.0	771.9	-771.9	-2156.4	-1.3366
387+42	42.28	RT	6.0	N.A.		0.0	96.06	48.0	0.0	110.2	-110.2	-2266.6	-1.4049
												-2266.6	-1.4049
SWALE S-R18	0	LT	6.0	N.A.	0	0.0	0	0.0	968.0	0.0	968.0	-1298.6	-0.8049
SWALE S-R16	0	RT	6.0	N.A.	0	0.0	0	0.0	2261.9	0.0	2261.9	963.3	0.5971
BASIN 5 TOTALS									**3229.9**	**2266.6**	**963.3**	**963.3**	**0.5971**

I-95 PD&E - Diamond Alternative

Floodplain Calculations

SYSTEM 9

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
395+16	0	LT	6.0	N.A.	0	0.0	212.91	106.5	0.0	0.0	0.0	0.0	0.0000
395+56	40	LT	6.0	N.A.	9.96	5.0	212.91	106.5	0.0	157.7	-157.7	-157.7	-0.0978
												-157.7	-0.0978
396+98	0	LT	6.0	N.A.		0.0	245.78	122.9	0.0	0.0	0.0	-157.7	-0.0978
399+00	201.83	LT/RT	6.0	N.A.	0	0.0	557.55	278.8	0.0	1501.3	-1501.3	-1659.0	-1.0283
402+00	300	LT/RT	6.0	N.A.	0	0.0	481.53	240.8	0.0	2886.3	-2886.3	-4545.3	-2.8173
405+00	300	LT/RT	6.0	N.A.	0	0.0	456.23	228.1	0.0	2604.9	-2604.9	-7150.2	-4.4319
408+00	300	LT/RT	6.0	N.A.	0	0.0	320.88	160.4	0.0	2158.6	-2158.6	-9308.8	-5.7699
411+00	300	LT/RT	6.0	N.A.	0	0.0	163.27	81.6	0.0	1344.9	-1344.9	-10653.7	-6.6035
414+00	300	LT/RT	6.0	N.A.	0	0.0	15.84	7.9	0.0	497.5	-497.5	-11151.2	-6.9119
417+00	300	LT/RT	6.0	N.A.	0	0.0	289.85	144.9	0.0	849.1	-849.1	-12000.4	-7.4382
420+00	300	LT/RT	6.0	N.A.	0	0.0	272.79	136.4	0.0	1562.9	-1562.9	-13563.2	-8.4070
423+00	300	LT/RT	6.0	N.A.	0	0.0	83.53	41.8	0.0	989.8	-989.8	-14553.0	-9.0205
423+97	96.77	LT/RT	6.0	N.A.	22.6	11.3	0	0.0	20.3	74.8	-54.6	-14607.6	-9.0543
			6.0									-14607.6	-9.0543
SWALE 9-1	0	LT	6.0	N.A.	0	0.0	0	0.0	275.9	0.0	275.9	-14331.7	-8.8833
SWALE 9-2	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-14331.7	-8.8833
SWALE 9-3	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-14331.7	-8.8833
SWALE 9-4	0	LT	6.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	-13621.9	-8.4433
SWALE 9-5	0	LT	6.0	N.A.	0	0.0	0	0.0	1919.9	0.0	1919.9	-11702.0	-7.2533
SWALE 9-6	0	LT	6.0	N.A.	0	0.0	0	0.0	274.3	0.0	274.3	-11427.7	-7.0833
SWALE 9-7 (ALT 3)	0	RT	6.0	N.A.	0	0.0	0	0.0	6743.7	0.0	6743.7	-4684.0	-2.9033
SWALE 9-7 (ALT 1)	0	RT	6.0	N.A.	0	0.0	0	0.0	5291.7	0.0	5291.7	607.7	0.3767
SYSTEM 9 TOTALS									**15235.6**	**14627.9**	**607.7**	**607.7**	**0.3767**

I-95 PD&E - Diamond Alternative

Floodplain Calculations

SYSTEM 10

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
441+00	0	LT/RT	6.0	N.A.	0	0.0	20.16	10.1	0.0	0.0	0.0	0.0	0.0000
444+00	300	LT/RT	6.0	N.A.	0	0.0	19.1	9.6	0.0	109.1	-109.1	-109.1	-0.0676
447+00	300	LT/RT	6.0	N.A.	0	0.0	77.64	38.8	0.0	268.7	-268.7	-377.8	-0.2342
450+00	300	LT/RT	6.0	N.A.	0	0.0	55.23	27.6	0.0	369.1	-369.1	-746.9	-0.4629
450+96	96.32	LT/RT	6.0	N.A.	0	0.0	43.91	22.0	0.0	88.4	-88.4	-835.3	-0.5177
SWALE 10-1	0	LT	6.0	N.A.	0	0.0	0	0.0	2331.3	0.0	2331.3	1496.0	0.9273
SWALE 10-2	0	RT	6.0	N.A.	0	0.0	0	0.0	2839.5	0.0	2839.5	4335.5	2.6873
SYSTEM 10 TOTALS									**5170.7**	**835.3**	**4335.5**	**4335.5**	**2.6873**

I-95 PD&E - Diamond Alternative

Floodplain Calculations

SYSTEM 11

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
452+40	0	LT/RT	6.0	N.A.	0	0.0	34.81	17.4	0.0	0.0	0.0	0.0	0.0000
452+91	51.16	LT/RT	6.0	N.A.	0	0.0	87.82	43.9	0.0	58.1	-58.1	-58.1	-0.0360
454+00	108.84	LT/RT	6.0	N.A.	0	0.0	63.67	31.8	0.0	152.7	-152.7	-210.8	-0.1306
456+00	200	LT/RT	6.0	N.A.	0	0.0	60.07	30.0	0.0	229.1	-229.1	-439.9	-0.2727
458+00	200	LT/RT	6.0	N.A.	0	0.0	73.2	36.6	0.0	246.8	-246.8	-686.7	-0.4256
460+00	200	LT/RT	6.0	N.A.	0	0.0	25.86	12.9	0.0	183.4	-183.4	-870.1	-0.5393
462+00	200	LT/RT	6.0	N.A.	0	0.0	55.54	27.8	0.0	150.7	-150.7	-1020.9	-0.6328
464+00	200	LT/RT	6.0	N.A.	0	0.0	40.26	20.1	0.0	177.4	-177.4	-1198.3	-0.7427
465+24	123.86	LT/RT	6.0	N.A.	0	0.0	12.58	6.3	0.0	60.6	-60.6	-1258.9	-0.7803
												-1258.9	-0.7803
475+50	0	LT	7.0	N.A.		0.0	14.31	7.2	0.0	0.0	0.0	-1258.9	-0.7803
477+00	150	LT	7.0	N.A.	9.96	5.0	2	1.0	0.0	22.7	-22.7	-1281.5	-0.7943
478+50	150	LT	7.0	N.A.	6.31	3.2	5.55	2.8	22.6	10.5	12.1	-1269.4	-0.7868
480+00	150	LT	7.0	N.A.	0	0.0	0	0.0	8.8	7.7	1.1	-1268.4	-0.7862
												-1268.4	-0.7862
SWALE 11E		RT	6.0	N.A.	0	0.0	0	0.0	3468.7	0.0	3468.7	2200.3	1.3638
SWALE 11W		LT	6.0	N.A.	0	0.0	0	0.0	6033.9	0.0	6033.9	8234.2	5.1038
SWALE 11NW		LT	6.0	N.A.	0	0.0	0	0.0	161.0	0.0	161.0	8395.2	5.2036
SYSTEM 11 TOTALS									**9694.9**	**1299.7**	**8395.2**	**8395.2**	**5.2036**

I-95 PD&E - Diamond Alternative

Floodplain Calculations

SYSTEM 12

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
480+00	0	LT	7.0	N.A.	0	0.0	92.9	46.5	0.0	0.0	0.0	0.0	0.0000
485+00	500	LT	7.0	N.A.	0	0.0	216.37	108.2	0.0	1431.8	-1431.8	-1431.8	-0.8875
490+00	500	LT	7.0	N.A.	0	0.0	192.59	96.3	0.0	1893.3	-1893.3	-3325.1	-2.0610
493+22	322.47	LT	7.0	N.A.	0	0.0	91.68	45.8	0.0	848.8	-848.8	-4173.9	-2.5871
												-4173.9	-2.5871
491+25	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-4173.9	-2.5871
491+85	59.66	RT	6.0	N.A.	0	0.0	23.72	11.9	0.0	13.1	-13.1	-4187.0	-2.5953
												-4187.0	-2.5953
494+00	0	LT	6.0	N.A.	0	0.0	57.15	28.6	0.0	0.0	0.0	-4187.0	-2.5953
495+00	100	LT	6.0	N.A.	0	0.0	58.44	29.2	0.0	107.0	-107.0	-4294.1	-2.6616
500+00	500	LT	6.0	N.A.	0	0.0	103.02	51.5	0.0	747.5	-747.5	-5041.6	-3.1249
505+00	500	LT	6.0	N.A.	0	0.0	83.19	41.6	0.0	862.1	-862.1	-5903.6	-3.6593
510+00	500	LT	6.0	N.A.	0	0.0	92.26	46.1	0.0	812.3	-812.3	-6715.9	-4.1628
515+00	500	LT	6.0	N.A.	0	0.0	73.42	36.7	0.0	767.0	-767.0	-7482.9	-4.6382
520+00	500	LT	6.0	N.A.	0	0.0	82.82	41.4	0.0	723.3	-723.3	-8206.3	-5.0865
525+00	500	LT	6.0	N.A.	0	0.0	0	0.0	0.0	383.4	-383.4	-8589.7	-5.3242
												-8589.7	-5.3242
518+80	0	RT	6.0	N.A.	0	0.0	3.53	1.8	0.0	0.0	0.0	-8589.7	-5.3242
519+00	20	RT	6.0	N.A.	0	0.0	4.43	2.2	0.0	1.5	-1.5	-8591.2	-5.3251
522+00	300	RT	6.0	N.A.	0	0.0	38.98	19.5	0.0	120.6	-120.6	-8711.8	-5.3999
525+00	300	RT	6.0	N.A.	0	0.0	30.96	15.5	0.0	194.3	-194.3	-8906.0	-5.5203
528+00	300	RT	6.0	N.A.	0	0.0	85.15	42.6	0.0	322.5	-322.5	-9228.6	-5.7202
530+08	208	RT	6.0	N.A.	0	0.0	28.98	14.5	0.0	219.8	-219.8	-9448.4	-5.8564
												-9448.4	-5.8564
492+52	0	RT	6.0	N.A.	0	0.0	38.89	19.4	0.0	0.0	0.0	-9448.4	-5.8564
495+00	248	RT	6.0	N.A.	0	0.0	110.16	55.1	0.0	342.3	-342.3	-9790.6	-6.0686
500+00	500	RT	6.0	N.A.	0	0.0	154.19	77.1	0.0	1223.8	-1223.8	-11014.5	-6.8272
505+00	500	RT	6.0	N.A.	0	0.0	80.61	40.3	0.0	1087.0	-1087.0	-12101.5	-7.5009
510+00	500	RT	6.0	N.A.	0	0.0	55.08	27.5	0.0	628.2	-628.2	-12729.7	-7.8903
514+67	466.93	LT	6.0	N.A.	0	0.0	20.43	10.2	0.0	326.5	-326.5	-13056.2	-8.0927
	0	LT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-13056.2	-8.0927
POND 12SE	0	RT	6.0	N.A.	0	0.0	0	0.0	3066.9	0.0	3066.9	-9989.2	-6.1917
POND 12SW		LT	6.0	N.A.	0	0.0	0	0.0	0.0	454.0	-454.0	-10443.2	-6.4731
SWALE 12E ALT. 1		RT	6.0	N.A.	0	0.0	0	0.0	4872.3	0.0	4872.3	-5570.9	-3.4531
SWALE 12W ALT. 1		LT	6.0	N.A.	0	0.0	0	0.0	7597.2	0.0	7597.2	2026.2	1.2559
SYSTEM 12 TOTALS									**15536.4**	**13510.2**	**2026.2**	**2026.2**	**1.2559**

I-95 PD&E - Diamond Alternative

Floodplain Calculations

SYSTEM 13

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
535+00	0	LT	7.0	N.A.	0	0.0	135.93	68.0	0.0	0.0	0.0	0.0	0.0000
536+00	100	LT	7.0	N.A.	0	0.0	132.47	66.2	0.0	248.5	-248.5	-248.5	-0.1540
538+00	200	LT	7.0	N.A.	0	0.0	118.43	59.2	0.0	464.6	-464.6	-713.1	-0.4420
540+00	200	LT	7.0	N.A.	0	0.0	11.93	6.0	0.0	241.4	-241.4	-954.6	-0.5917
542+00	200	RT	7.0	N.A.	0	0.0	71.82	35.9	0.0	266.0	-266.0	-1220.6	-0.7565
542+87	86.87	RT	7.0	N.A.	0	0.0	0	0.0	0.0	57.8	-57.8	-1278.3	-0.7923
POND 13-A1	0	LT	7.0	N.A.	0	0.0	0	0.0	0.0	96.8	-96.8	-1375.1	-0.8523
POND 13-A2	0	LT	7.0	N.A.	0	0.0	0	0.0	855.1	0.0	855.1	-520.1	-0.3223
POND 13-A3	0	LT	7.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	189.8	0.1177
POND 13-A9	0	LT	7.0	N.A.	0	0.0	0	0.0	8776.5	0.0	8776.5	8966.3	5.5577
POND 13-B7	0	RT	7.0	N.A.	0	0.0	0	0.0	3549.3	0.0	3549.3	12515.7	7.7577
SYSTEM 13 TOTALS									**13890.8**	**1375.1**	**12515.7**	**12515.7**	**7.7577**

I-95 PD&E - DDI Alternative

Floodplain Calculations

	Net Acumulative (CY)
	Negative represents lost storage
Basin 5	0.68
System 9	2.05
System 10	2.85
System 11	5.28
System 12	3.32
System 13	8.72
Total	22.90

I-95 PD&E - DDI Alternative

Floodplain Calculations

BASIN 5

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
375+00	0	RT	6.0	N.A.		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
378+00	300	RT	6.0	N.A.	0	0.0	76.96	38.5	0.0	213.8	-213.8	-213.8	-0.1325
381+00	300	RT	6.0	N.A.	0	0.0	126.03	63.0	0.0	563.9	-563.9	-777.6	-0.4820
384+00	300	RT	6.0	N.A.	0	0.0	92.41	46.2	0.0	606.8	-606.8	-1384.4	-0.8581
387+00	300	RT	6.0	N.A.	0	0.0	157.28	78.6	0.0	693.6	-693.6	-2078.0	-1.2880
387+42	42.28	RT	6.0	N.A.		0.0	0	0.0	0.0	61.6	-61.6	-2139.6	-1.3262
	0		0.0	0.0	0	0.0	0	0.0	0.0	0.0	0.0	-2139.6	-1.3262
SWALE S-R18	0	LT	6.0	N.A.	0	0.0	0	0.0	968.0	0.0	968.0	-1171.6	-0.7262
SWALE S-R16	0	RT	6.0	N.A.	0	0.0	0	0.0	2261.9	0.0	2261.9	1090.3	0.6758
BASIN 5 TOTALS									**3229.9**	**2139.6**	**1090.3**	**1090.3**	**0.6758**

I-95 PD&E - DDI Alternative

Floodplain Calculations

SYSTEM 9

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
396+98	0	LT	6.0	N.A.		0.0	234.37	117.2	0.0	0.0	0.0	0.0	0.0000
399+00	201.83	LT/RT	6.0	N.A.	0	0.0	566.33	283.2	0.0	1496.3	-1496.3	-1496.3	-0.9275
402+00	300	LT/RT	6.0	N.A.	0	0.0	481.53	240.8	0.0	2910.7	-2910.7	-4407.1	-2.7317
405+00	300	LT/RT	6.0	N.A.	0	0.0	478.09	239.0	0.0	2665.6	-2665.6	-7072.7	-4.3839
408+00	300	LT/RT	6.0	N.A.	0	0.0	310.73	155.4	0.0	2191.2	-2191.2	-9263.8	-5.7421
411+00	300	LT/RT	6.0	N.A.	0	0.0	163.27	81.6	0.0	1316.7	-1316.7	-10580.5	-6.5582
414+00	300	LT/RT	6.0	N.A.	0	0.0	15.84	7.9	0.0	497.5	-497.5	-11078.0	-6.8666
417+00	300	LT/RT	6.0	N.A.	0	0.0	75.16	37.6	0.0	252.8	-252.8	-11330.8	-7.0232
420+00	300	LT/RT	6.0	N.A.	0	0.0	40.78	20.4	0.0	322.1	-322.1	-11652.9	-7.2229
423+00	300	LT/RT	6.0	N.A.	0	0.0	40.44	20.2	0.0	225.6	-225.6	-11878.5	-7.3627
423+97	96.77	LT/RT	6.0	N.A.	14.69	7.3	0	0.0	13.2	36.2	-23.1	-11901.6	-7.3770
			6.0									-11901.6	-7.3770
SWALE 9-1	0	LT	6.0	N.A.	0	0.0	0	0.0	275.9	0.0	275.9	-11625.7	-7.2060
SWALE 9-2	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-11625.7	-7.2060
SWALE 9-3	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-11625.7	-7.2060
SWALE 9-4	0	LT	6.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	-10915.8	-6.7660
SWALE 9-5	0	LT	6.0	N.A.	0	0.0	0	0.0	1919.9	0.0	1919.9	-8995.9	-5.5760
SWALE 9-6	0	LT	6.0	N.A.	0	0.0	0	0.0	274.3	0.0	274.3	-8721.7	-5.4060
SWALE 9-7 (ALT 3)	0	RT	6.0	N.A.	0	0.0	0	0.0	6743.7	0.0	6743.7	-1977.9	-1.2260
SWALE 9-7 (ALT 1)	0	RT	6.0	N.A.	0	0.0	0	0.0	5291.7	0.0	5291.7	3313.8	2.0540
SYSTEM 9 TOTALS									**15228.5**	**11914.7**	**3313.8**	**3313.8**	**2.0540**

I-95 PD&E - DDI Alternative

Floodplain Calculations

SYSTEM 10

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
430+00	0	LT/RT	7.0	N.A.		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
432+00	200	LT/RT	7.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
435+00	300	LT/RT	7.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
438+00	300	LT/RT	7.0	N.A.	13.13	6.6	35.34	17.7	36.5	98.2	-61.7	-61.7	-0.0382
441+00	300	LT/RT	6.0	N.A.	0	0.0	9.86	4.9	36.5	125.6	-89.1	-150.8	-0.0935
444+00	300	LT/RT	6.0	N.A.	0	0.0	9.71	4.9	0.0	54.4	-54.4	-205.1	-0.1272
447+00	300	LT/RT	6.0	N.A.	0	0.0	36.43	18.2	0.0	128.2	-128.2	-333.3	-0.2066
450+00	300	LT/RT	6.0	N.A.	0	0.0	32.89	16.4	0.0	192.6	-192.6	-525.9	-0.3259
450+96	96.32	LT/RT	6.0	N.A.	0	0.0	17.87	8.9	0.0	45.3	-45.3	-571.1	-0.3540
SWALE 10-1	0	LT	6.0	N.A.	0	0.0	0	0.0	2331.3	0.0	2331.3	1760.1	1.0910
SWALE 10-2	0	RT	6.0	N.A.	0	0.0	0	0.0	2839.5	0.0	2839.5	4599.6	2.8510
SYSTEM 10 TOTALS									**5207.2**	**545.9**	**4661.3**	**4599.6**	**2.8510**

I-95 PD&E - DDI Alternative

Floodplain Calculations

SYSTEM 11

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
452+40	0	LT/RT	6.0	N.A.		0.0	27.25	13.6	0.0	0.0	0.0	0.0	0.0000
452+91	51.16	LT/RT	6.0	N.A.	0	0.0	79.19	39.6	0.0	50.4	-50.4	-50.4	-0.0313
454+00	108.84	LT/RT	6.0	N.A.	0	0.0	46.61	23.3	0.0	126.8	-126.8	-177.2	-0.1098
456+00	200	LT/RT	6.0	N.A.	0	0.0	57.61	28.8	0.0	193.0	-193.0	-370.2	-0.2295
458+00	200	LT/RT	6.0	N.A.	0	0.0	68.83	34.4	0.0	234.1	-234.1	-604.3	-0.3746
460+00	200	LT/RT	6.0	N.A.	0	0.0	25.86	12.9	0.0	175.4	-175.4	-779.7	-0.4833
462+00	200	LT/RT	6.0	N.A.	0	0.0	43.34	21.7	0.0	128.1	-128.1	-907.8	-0.5627
464+00	200	LT/RT	6.0	N.A.	0	0.0	41.22	20.6	0.0	156.6	-156.6	-1064.4	-0.6598
465+24	123.86	LT/RT	6.0	N.A.	0	0.0	26.12	13.1	0.0	77.2	-77.2	-1141.7	-0.7076
												-1141.7	-0.7076
474+00	0	LT	7.0	N.A.	0	0.0	14.31	7.2	0.0	0.0	0.0	-1141.7	-0.7076
475+50	150	LT	7.0	N.A.	9.96	5.0	2	1.0	0.0	22.7	-22.7	-1164.3	-0.7217
477+00	150	LT	7.0	N.A.	6.31	3.2	5.55	2.8	22.6	10.5	12.1	-1152.2	-0.7142
477+88	88	LT	7.0	N.A.	0	0.0	0	0.0	5.1	4.5	0.6	-1151.6	-0.7138
												-1151.6	-0.7138
SWALE 11E		RT	6.0	N.A.	0	0.0	0	0.0	3468.7	0.0	3468.7	2317.1	1.4362
SWALE 11W		LT	6.0	N.A.	0	0.0	0	0.0	6033.9	0.0	6033.9	8350.9	5.1762
SWALE 11NW		LT	6.0	N.A.	0	0.0	0	0.0	161.0	0.0	161.0	8512.0	5.2760
SYSTEM 11 TOTALS									**9691.3**	**1179.3**	**8512.0**	**8512.0**	**5.2760**

I-95 PD&E - DDI Alternative

Floodplain Calculations

SYSTEM 12

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd **Negative represents lost storage**	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
480+00	0	LT	7.0	N.A.	0	0.0	39.07	19.5	0.0	0.0	0.0	0.0	0.0000
485+00	500	LT	7.0	N.A.	0	0.0	58.23	29.1	0.0	450.5	-450.5	-450.5	-0.2792
490+00	500	LT	7.0	N.A.	0	0.0	192.59	96.3	0.0	1161.2	-1161.2	-1611.7	-0.9990
493+22	322.47	LT	7.0	N.A.	0	0.0	99.49	49.7	0.0	872.1	-872.1	-2483.8	-1.5395
												-2483.8	-1.5395
494+00	0	LT	6.0	N.A.	0	0.0	57.15	28.6	0.0	0.0	0.0	-2483.8	-1.5395
495+00	100	LT	6.0	N.A.	0	0.0	58.44	29.2	0.0	107.0	-107.0	-2590.8	-1.6059
500+00	500	LT	6.0	N.A.	0	0.0	92.72	46.4	0.0	699.8	-699.8	-3290.6	-2.0396
505+00	500	LT	6.0	N.A.	0	0.0	74.28	37.1	0.0	773.1	-773.1	-4063.8	-2.5189
510+00	500	LT	6.0	N.A.	0	0.0	81.93	41.0	0.0	723.2	-723.2	-4787.0	-2.9671
515+00	500	LT	6.0	N.A.	0	0.0	73.43	36.7	0.0	719.3	-719.3	-5506.2	-3.4129
520+00	500	LT	6.0	N.A.	0	0.0	39.63	19.8	0.0	523.4	-523.4	-6029.6	-3.7374
525+00	500	LT	6.0	N.A.	0	0.0	0	0.0	0.0	183.5	-183.5	-6213.1	-3.8511
												-6213.1	-3.8511
518+80	0	RT	6.0	N.A.	0	0.0	12.31	6.2	0.0	0.0	0.0	-6213.1	-3.8511
519+00	20	RT	6.0	N.A.	0	0.0	7.97	4.0	0.0	3.8	-3.8	-6216.9	-3.8534
522+00	300	RT	6.0	N.A.	0	0.0	49.71	24.9	0.0	160.2	-160.2	-6377.1	-3.9527
525+00	300	RT	6.0	N.A.	0	0.0	56.38	28.2	0.0	294.7	-294.7	-6671.8	-4.1354
528+00	300	RT	6.0	N.A.	0	0.0	1.58	0.8	0.0	161.0	-161.0	-6832.8	-4.2352
530+08	208	RT	6.0	N.A.	0	0.0	0	0.0	0.0	3.0	-3.0	-6835.8	-4.2371
												-6835.8	-4.2371
492+52	0	RT	6.0	N.A.	0	0.0	38.89	19.4	0.0	0.0	0.0	-6835.8	-4.2371
495+00	248	RT	6.0	N.A.	0	0.0	106.53	53.3	0.0	333.9	-333.9	-7169.8	-4.4441
500+00	500	RT	6.0	N.A.	0	0.0	96.24	48.1	0.0	938.8	-938.8	-8108.5	-5.0259
505+00	500	RT	6.0	N.A.	0	0.0	80.61	40.3	0.0	818.8	-818.8	-8927.3	-5.5334
510+00	500	RT	6.0	N.A.	0	0.0	41.35	20.7	0.0	564.6	-564.6	-9491.9	-5.8834
514+67	466.93	RT	6.0	N.A.	0	0.0	13.33	6.7	0.0	236.4	-236.4	-9728.3	-6.0299
												-9728.3	-6.0299
POND 12SE	0	RT	6.0	N.A.	0	0.0		0.0	3066.9	0.0	3066.9	-6661.3	-4.1289
POND 12SW		LT	6.0	N.A.	0	0.0		0.0	0.0	454.0	-454.0	-7115.3	-4.4103
SWALE 12E ALT. 1		RT	6.0	N.A.	0	0.0		0.0	4872.3	0.0	4872.3	-2243.1	-1.3903
SWALE 12W ALT. 1		LT	6.0	N.A.	0	0.0		0.0	7597.2	0.0	7597.2	5354.1	3.3187
SYSTEM 12 TOTALS									**15536.4**	**10182.3**	**5354.1**	**5354.1**	**3.3187**

I-95 PD&E - DDI Alternative

Floodplain Calculations

SYSTEM 13

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
535+00	0	LT	7.0	N.A.	0	0.0	77.83	38.9	0.0	0.0	0.0	0.0	0.0000
536+00	100	LT	7.0	N.A.	0	0.0	0	0.0	0.0	72.1	-72.1	-72.1	-0.0447
538+00	200	LT	7.0	N.A.	0	0.0	41.55	20.8	0.0	76.9	-76.9	-149.0	-0.0924
540+00	200	LT	7.0	N.A.	0	0.0	11.93	6.0	0.0	99.0	-99.0	-248.0	-0.1537
542+00	200	RT	7.0	N.A.	0	0.0	65.33	32.7	0.0	143.1	-143.1	-391.1	-0.2424
542+87	86.87	RT	7.0	N.A.	0	0.0	0	0.0	0.0	52.5	-52.5	-443.7	-0.2750
POND 13-A1	0	LT	7.0	N.A.	0	0.0	0	0.0	629.2	0.0	629.2	185.5	0.1150
POND 13-A2	0	LT	7.0	N.A.	0	0.0	0	0.0	855.1	0.0	855.1	1040.6	0.6450
POND 13-A3	0	LT	7.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	1750.5	1.0850
POND 13-A9	0	LT	7.0	N.A.	0	0.0	0	0.0	8776.5	0.0	8776.5	10527.0	6.5250
POND 13-B7	0	RT	7.0	N.A.	0	0.0	0	0.0	3549.3	0.0	3549.3	14076.3	8.7250
SYSTEM 13 TOTALS									**14520.0**	**443.7**	**14076.3**	**14076.3**	**8.7250**

I-95 PD&E-Preferred Alternative

Floodplain Calculations

	Net Acumulative (CY)
	Negative represents lost storage
Basin 5	0.60
System 9	0.38
System 10	2.69
System 11	5.20
System 12	2.25
System 13	7.76
Total	18.870

I-95 PD&E - Preferred Alternative

Floodplain Calculations

BASIN 5

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd **Negative represents lost storage**	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
375+00	0	RT	6.0	N.A.		0.0	0	0.0	0.0	0.0	0.0	0.0	0.0000
378+00	300	RT	6.0	N.A.	0	0.0	76.96	38.5	0.0	213.8	-213.8	-213.8	-0.1325
381+00	300	RT	6.0	N.A.	0	0.0	126.03	63.0	0.0	563.9	-563.9	-777.6	-0.4820
384+00	300	RT	6.0	N.A.	0	0.0	92.41	46.2	0.0	606.8	-606.8	-1384.4	-0.8581
387+00	300	RT	6.0	N.A.	0	0.0	185.49	92.7	0.0	771.9	-771.9	-2156.4	-1.3366
387+42	42.28	RT	6.0	N.A.		0.0	96.06	48.0	0.0	110.2	-110.2	-2266.6	-1.4049
												-2266.6	-1.4049
SWALE S-R18	0	LT	6.0	N.A.	0	0.0	0	0.0	968.0	0.0	968.0	-1298.6	-0.8049
SWALE S-R16	0	RT	6.0	N.A.	0	0.0	0	0.0	2261.9	0.0	2261.9	963.3	0.5971
BASIN 5 TOTALS									**3229.9**	**2266.6**	**963.3**	**963.3**	**0.5971**

I-95 PD&E - Preferred Alternative

Floodplain Calculations

SYSTEM 9

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
395+16	0	LT	6.0	N.A.	0	0.0	212.91	106.5	0.0	0.0	0.0	0.0	0.0000
395+56	40	LT	6.0	N.A.	9.96	5.0	212.91	106.5	0.0	157.7	-157.7	-157.7	-0.0978
												-157.7	-0.0978
396+98	0	LT	6.0	N.A.		0.0	245.78	122.9	0.0	0.0	0.0	-157.7	-0.0978
399+00	201.83	LT/RT	6.0	N.A.	0	0.0	557.55	278.8	0.0	1501.3	-1501.3	-1659.0	-1.0283
402+00	300	LT/RT	6.0	N.A.	0	0.0	481.53	240.8	0.0	2886.3	-2886.3	-4545.3	-2.8173
405+00	300	LT/RT	6.0	N.A.	0	0.0	456.23	228.1	0.0	2604.9	-2604.9	-7150.2	-4.4319
408+00	300	LT/RT	6.0	N.A.	0	0.0	320.88	160.4	0.0	2158.6	-2158.6	-9308.8	-5.7699
411+00	300	LT/RT	6.0	N.A.	0	0.0	163.27	81.6	0.0	1344.9	-1344.9	-10653.7	-6.6035
414+00	300	LT/RT	6.0	N.A.	0	0.0	15.84	7.9	0.0	497.5	-497.5	-11151.2	-6.9119
417+00	300	LT/RT	6.0	N.A.	0	0.0	289.85	144.9	0.0	849.1	-849.1	-12000.4	-7.4382
420+00	300	LT/RT	6.0	N.A.	0	0.0	272.79	136.4	0.0	1562.9	-1562.9	-13563.2	-8.4070
423+00	300	LT/RT	6.0	N.A.	0	0.0	83.53	41.8	0.0	989.8	-989.8	-14553.0	-9.0205
423+97	96.77	LT/RT	6.0	N.A.	22.6	11.3	0	0.0	20.3	74.8	-54.6	-14607.6	-9.0543
			6.0									-14607.6	-9.0543
SWALE 9-1	0	LT	6.0	N.A.	0	0.0	0	0.0	275.9	0.0	275.9	-14331.7	-8.8833
SWALE 9-2	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-14331.7	-8.8833
SWALE 9-3	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-14331.7	-8.8833
SWALE 9-4	0	LT	6.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	-13621.9	-8.4433
SWALE 9-5	0	LT	6.0	N.A.	0	0.0	0	0.0	1919.9	0.0	1919.9	-11702.0	-7.2533
SWALE 9-6	0	LT	6.0	N.A.	0	0.0	0	0.0	274.3	0.0	274.3	-11427.7	-7.0833
SWALE 9-7 (ALT 3)	0	RT	6.0	N.A.	0	0.0	0	0.0	6743.7	0.0	6743.7	-4684.0	-2.9033
SWALE 9-7 (ALT 1)	0	RT	6.0	N.A.	0	0.0	0	0.0	5291.7	0.0	5291.7	607.7	0.3767
SYSTEM 9 TOTALS									**15235.6**	**14627.9**	**607.7**	**607.7**	**0.3767**

I-95 PD&E - Preferred Alternative

Floodplain Calculations

SYSTEM 10

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
441+00	0	LT/RT	6.0	N.A.	0	0.0	20.16	10.1	0.0	0.0	0.0	0.0	0.0000
444+00	300	LT/RT	6.0	N.A.	0	0.0	19.1	9.6	0.0	109.1	-109.1	-109.1	-0.0676
447+00	300	LT/RT	6.0	N.A.	0	0.0	77.64	38.8	0.0	268.7	-268.7	-377.8	-0.2342
450+00	300	LT/RT	6.0	N.A.	0	0.0	55.23	27.6	0.0	369.1	-369.1	-746.9	-0.4629
450+96	96.32	LT/RT	6.0	N.A.	0	0.0	43.91	22.0	0.0	88.4	-88.4	-835.3	-0.5177
SWALE 10-1	0	LT	6.0	N.A.	0	0.0	0	0.0	2331.3	0.0	2331.3	1496.0	0.9273
SWALE 10-2	0	RT	6.0	N.A.	0	0.0	0	0.0	2839.5	0.0	2839.5	4335.5	2.6873
SYSTEM 10 TOTALS									**5170.7**	**835.3**	**4335.5**	**4335.5**	**2.6873**

I-95 PD&E - Preferred Alternative

Floodplain Calculations

SYSTEM 11

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
452+40	0	LT/RT	6.0	N.A.	0	0.0	34.81	17.4	0.0	0.0	0.0	0.0	0.0000
452+91	51.16	LT/RT	6.0	N.A.	0	0.0	87.82	43.9	0.0	58.1	-58.1	-58.1	-0.0360
454+00	108.84	LT/RT	6.0	N.A.	0	0.0	63.67	31.8	0.0	152.7	-152.7	-210.8	-0.1306
456+00	200	LT/RT	6.0	N.A.	0	0.0	60.07	30.0	0.0	229.1	-229.1	-439.9	-0.2727
458+00	200	LT/RT	6.0	N.A.	0	0.0	73.2	36.6	0.0	246.8	-246.8	-686.7	-0.4256
460+00	200	LT/RT	6.0	N.A.	0	0.0	25.86	12.9	0.0	183.4	-183.4	-870.1	-0.5393
462+00	200	LT/RT	6.0	N.A.	0	0.0	55.54	27.8	0.0	150.7	-150.7	-1020.9	-0.6328
464+00	200	LT/RT	6.0	N.A.	0	0.0	40.26	20.1	0.0	177.4	-177.4	-1198.3	-0.7427
465+24	123.86	LT/RT	6.0	N.A.	0	0.0	12.58	6.3	0.0	60.6	-60.6	-1258.9	-0.7803
												-1258.9	-0.7803
475+50	0	LT	7.0	N.A.		0.0	14.31	7.2	0.0	0.0	0.0	-1258.9	-0.7803
477+00	150	LT	7.0	N.A.	9.96	5.0	2	1.0	0.0	22.7	-22.7	-1281.5	-0.7943
478+50	150	LT	7.0	N.A.	6.31	3.2	5.55	2.8	22.6	10.5	12.1	-1269.4	-0.7868
480+00	150	LT	7.0	N.A.	0	0.0	0	0.0	8.8	7.7	1.1	-1268.4	-0.7862
												-1268.4	-0.7862
SWALE 11E		RT	6.0	N.A.	0	0.0	0	0.0	3468.7	0.0	3468.7	2200.3	1.3638
SWALE 11W		LT	6.0	N.A.	0	0.0	0	0.0	6033.9	0.0	6033.9	8234.2	5.1038
SWALE 11NW		LT	6.0	N.A.	0	0.0	0	0.0	161.0	0.0	161.0	8395.2	5.2036
SYSTEM 11 TOTALS									**9694.9**	**1299.7**	**8395.2**	**8395.2**	**5.2036**

I-95 PD&E - Preferred Alternative

Floodplain Calculations

SYSTEM 12

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
480+00	0	LT	7.0	N.A.	0	0.0	64.92	32.5	0.0	0.0	0.0	0.0	0.0000
485+00	500	LT	7.0	N.A.	0	0.0	60	30.0	0.0	578.3	-578.3	-578.3	-0.3585
490+00	500	LT	7.0	N.A.	0	0.0	186.93	93.5	0.0	1143.2	-1143.2	-1721.5	-1.0671
493+22	322.47	LT	7.0	N.A.	0	0.0	98.77	49.4	0.0	853.1	-853.1	-2574.6	-1.5958
												-2574.6	-1.5958
491+25	0	RT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-2574.6	-1.5958
491+85	59.66	RT	6.0	N.A.	0	0.0	23.72	11.9	0.0	13.1	-13.1	-2587.7	-1.6039
												-2587.7	-1.6039
494+00	0	LT	6.0	N.A.	0	0.0	57.15	28.6	0.0	0.0	0.0	-2587.7	-1.6039
495+00	100	LT	6.0	N.A.	0	0.0	58.44	29.2	0.0	107.0	-107.0	-2694.7	-1.6703
500+00	500	LT	6.0	N.A.	0	0.0	103.02	51.5	0.0	747.5	-747.5	-3442.2	-2.1336
505+00	500	LT	6.0	N.A.	0	0.0	83.19	41.6	0.0	862.1	-862.1	-4304.3	-2.6680
510+00	500	LT	6.0	N.A.	0	0.0	92.26	46.1	0.0	812.3	-812.3	-5116.6	-3.1714
515+00	500	LT	6.0	N.A.	0	0.0	73.42	36.7	0.0	767.0	-767.0	-5883.6	-3.6469
520+00	500	LT	6.0	N.A.	0	0.0	82.82	41.4	0.0	723.3	-723.3	-6606.9	-4.0952
525+00	500	LT	6.0	N.A.	0	0.0	0	0.0	0.0	383.4	-383.4	-6990.4	-4.3329
												-6990.4	-4.3329
518+80	0	RT	6.0	N.A.	0	0.0	3.53	1.8	0.0	0.0	0.0	-6990.4	-4.3329
519+00	20	RT	6.0	N.A.	0	0.0	4.43	2.2	0.0	1.5	-1.5	-6991.8	-4.3338
522+00	300	RT	6.0	N.A.	0	0.0	38.98	19.5	0.0	120.6	-120.6	-7112.4	-4.4085
525+00	300	RT	6.0	N.A.	0	0.0	30.96	15.5	0.0	194.3	-194.3	-7306.7	-4.5289
528+00	300	RT	6.0	N.A.	0	0.0	85.15	42.6	0.0	322.5	-322.5	-7629.2	-4.7289
530+08	208	RT	6.0	N.A.	0	0.0	28.98	14.5	0.0	219.8	-219.8	-7849.0	-4.8651
												-7849.0	-4.8651
492+52	0	RT	6.0	N.A.	0	0.0	38.89	19.4	0.0	0.0	0.0	-7849.0	-4.8651
495+00	248	RT	6.0	N.A.	0	0.0	110.16	55.1	0.0	342.3	-342.3	-8191.3	-5.0772
500+00	500	RT	6.0	N.A.	0	0.0	154.19	77.1	0.0	1223.8	-1223.8	-9415.1	-5.8358
505+00	500	RT	6.0	N.A.	0	0.0	80.61	40.3	0.0	1087.0	-1087.0	-10502.2	-6.5096
510+00	500	RT	6.0	N.A.	0	0.0	55.08	27.5	0.0	628.2	-628.2	-11130.4	-6.8990
514+67	466.93	LT	6.0	N.A.	0	0.0	20.43	10.2	0.0	326.5	-326.5	-11456.8	-7.1013
	0	LT	6.0	N.A.	0	0.0	0	0.0	0.0	0.0	0.0	-11456.8	-7.1013
POND 12SE	0	RT	6.0	N.A.	0	0.0	0	0.0	3066.9	0.0	3066.9	-8389.9	-5.2003
POND 12SW		LT	6.0	N.A.	0	0.0	0	0.0	0.0	454.0	-454.0	-8843.9	-5.4817
SWALE 12E ALT. 1		RT	6.0	N.A.	0	0.0	0	0.0	4872.3	0.0	4872.3	-3971.6	-2.4617
SWALE 12W ALT. 1		LT	6.0	N.A.	0	0.0	0	0.0	7597.2	0.0	7597.2	3625.6	2.2473
SYSTEM 12 TOTALS									**15536.4**	**11910.8**	**3625.6**	**3625.6**	**2.2473**

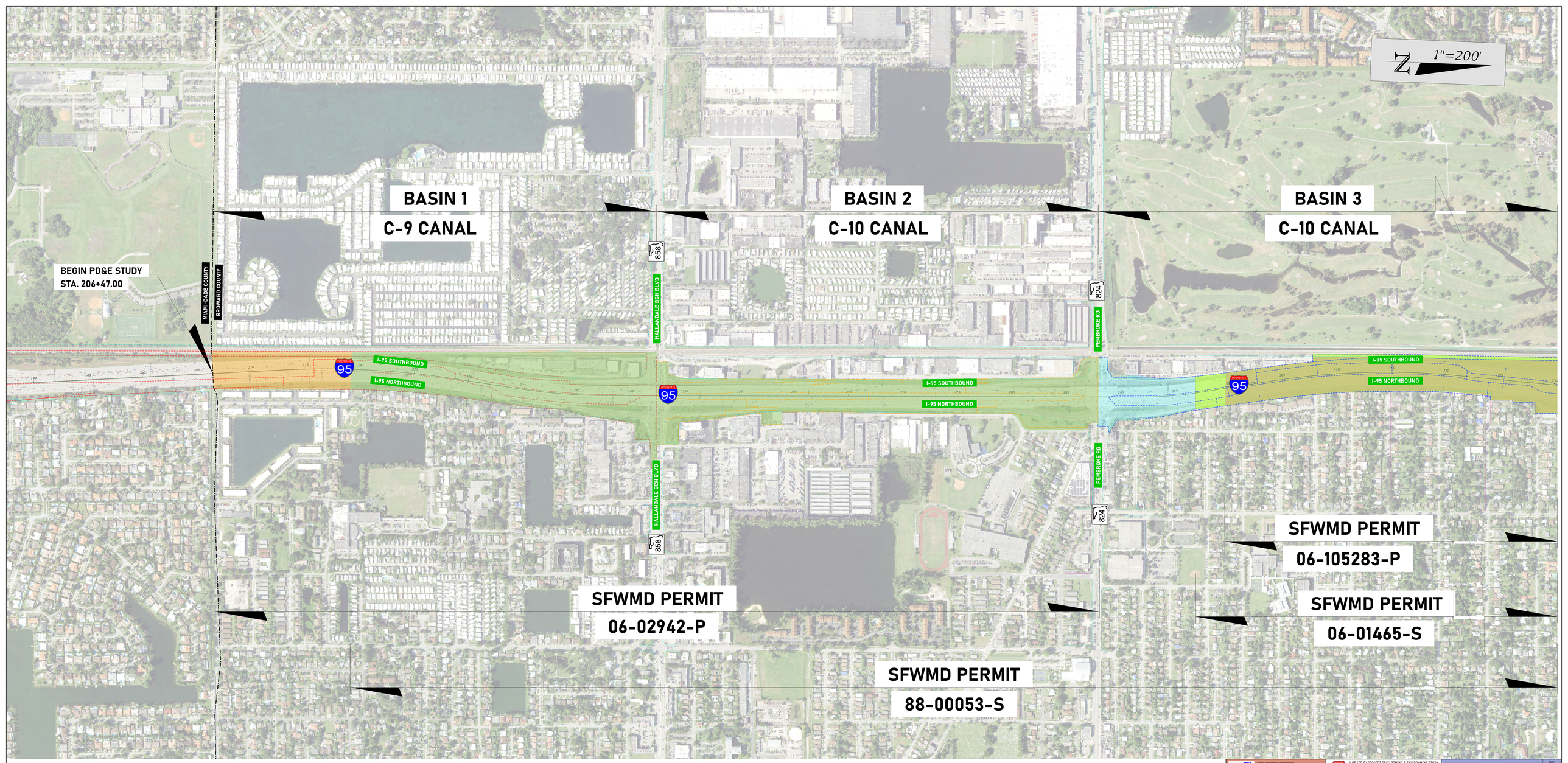
I-95 PD&E - Preferred Alternative

Floodplain Calculations

SYSTEM 13

Station	Distance	Location	Flood Plain Elevation	Crown Elevation	End Area Cut Cadd	End Area Cut	End Area Fill Cadd	End Area Fill	CY Cut	CY Fill	CY Net	CY Net Cumulative	Ac-Ft
					Negative represents lost storage								
535+00	0	LT	7.0	N.A.	0	0.0	135.93	68.0	0.0	0.0	0.0	0.0	0.0000
536+00	100	LT	7.0	N.A.	0	0.0	132.47	66.2	0.0	248.5	-248.5	-248.5	-0.1540
538+00	200	LT	7.0	N.A.	0	0.0	118.43	59.2	0.0	464.6	-464.6	-713.1	-0.4420
540+00	200	LT	7.0	N.A.	0	0.0	11.93	6.0	0.0	241.4	-241.4	-954.6	-0.5917
542+00	200	RT	7.0	N.A.	0	0.0	71.82	35.9	0.0	266.0	-266.0	-1220.6	-0.7565
542+87	86.87	RT	7.0	N.A.	0	0.0	0	0.0	0.0	57.8	-57.8	-1278.3	-0.7923
POND 13-A1	0	LT	7.0	N.A.	0	0.0	0	0.0	0.0	96.8	-96.8	-1375.1	-0.8523
POND 13-A2	0	LT	7.0	N.A.	0	0.0	0	0.0	855.1	0.0	855.1	-520.1	-0.3223
POND 13-A3	0	LT	7.0	N.A.	0	0.0	0	0.0	709.9	0.0	709.9	189.8	0.1177
POND 13-A9	0	LT	7.0	N.A.	0	0.0	0	0.0	8776.5	0.0	8776.5	8966.3	5.5577
POND 13-B7	0	RT	7.0	N.A.	0	0.0	0	0.0	3549.3	0.0	3549.3	12515.7	7.7577
SYSTEM 13 TOTALS									**13890.8**	**1375.1**	**12515.7**	**12515.7**	**7.7577**

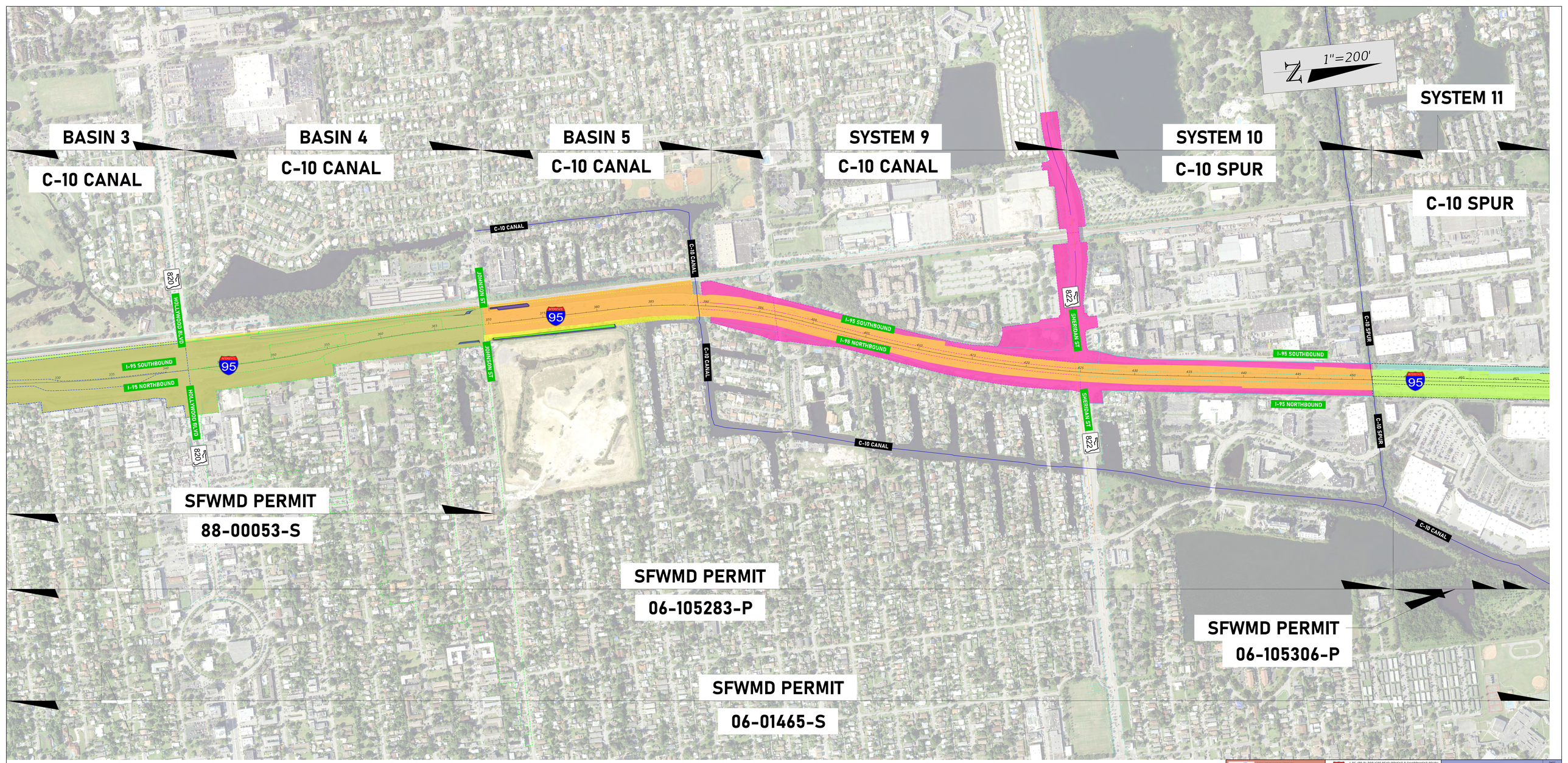
APPENDIX F
Pre-development Drainage Map



FDOT

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

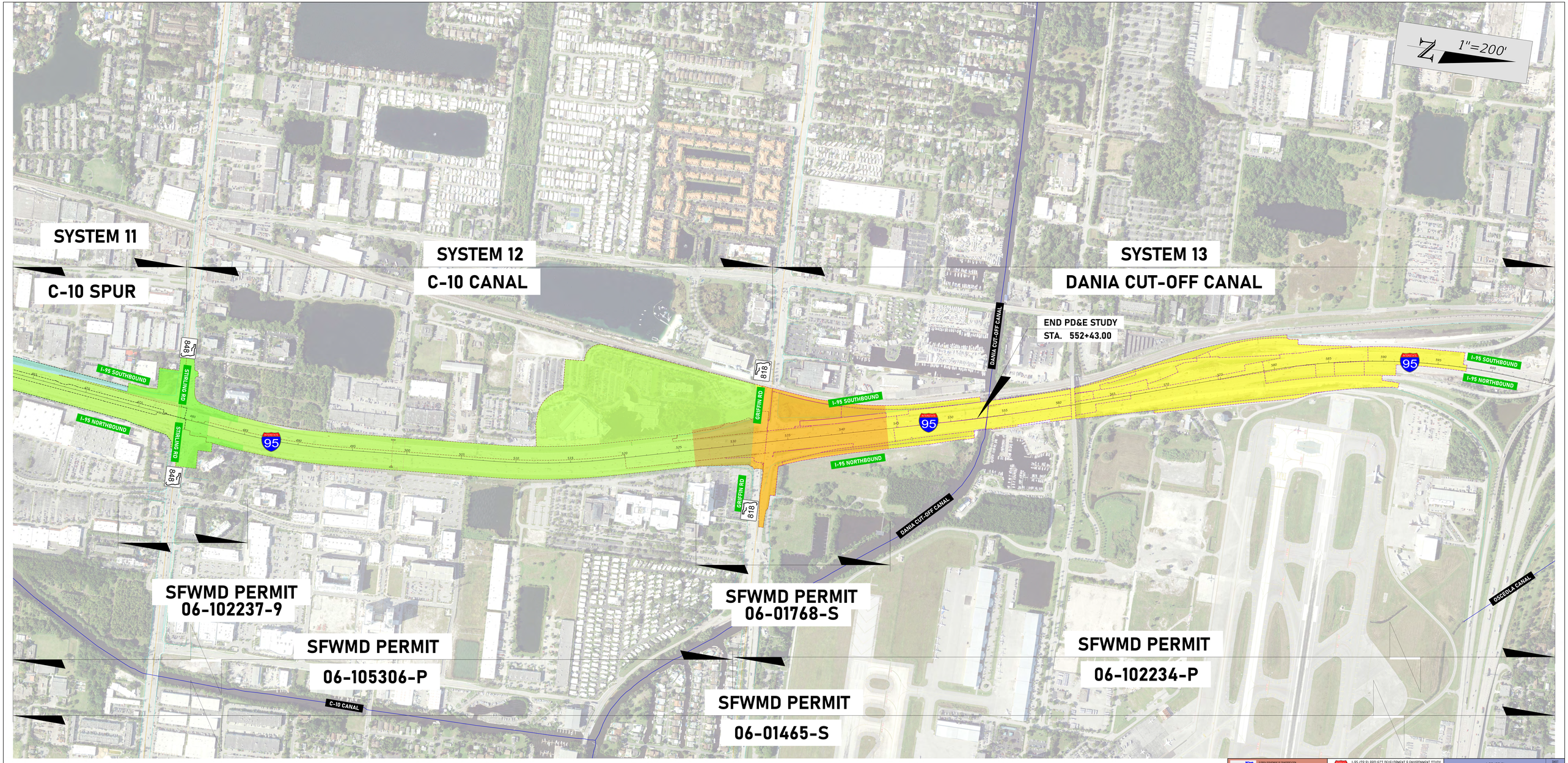
I-95 (SR 9)
CORRIDOR BASE MAP



FDOT

I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

I-95 (SR 9)
CORRIDOR BASE MAP


SYSTEM 11
C-10 SPUR
SYSTEM 12
C-10 CANAL
SYSTEM 13
DANIA CUT-OFF CANAL
END PD&E STUDY
STA. 552+43.00
DANIA CUT-OFF CANAL
I-95 SOUTHBOUND
I-95 NORTHBOUND
STIRLING RD
GRIFFIN RD
848
818
95
OSCEOLA CANAL
C-10 CANAL
SFWMD PERMIT
06-102237-9
SFWMD PERMIT
06-105306-P
SFWMD PERMIT
06-01768-S
SFWMD PERMIT
06-01465-S
SFWMD PERMIT
06-102234-P
1"=200'
I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY
I-95 (SR 9)
CORRIDOR BASE MAP



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DATE	DESCRIPTION	DATE	DESCRIPTION

ENGINEER OF RECORD

DENYS AVILA, P.E.
LICENSE NUMBER: 90871
SCALAR CONSULTING GROUP, LLC
5713 CORPORATE WAY, SUITE 200
WEST PALM BEACH, FLORIDA 33407

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	439170-1-22-02

PRE-DEVELOPMENT DRAINAGE MAP

SHEET NO.

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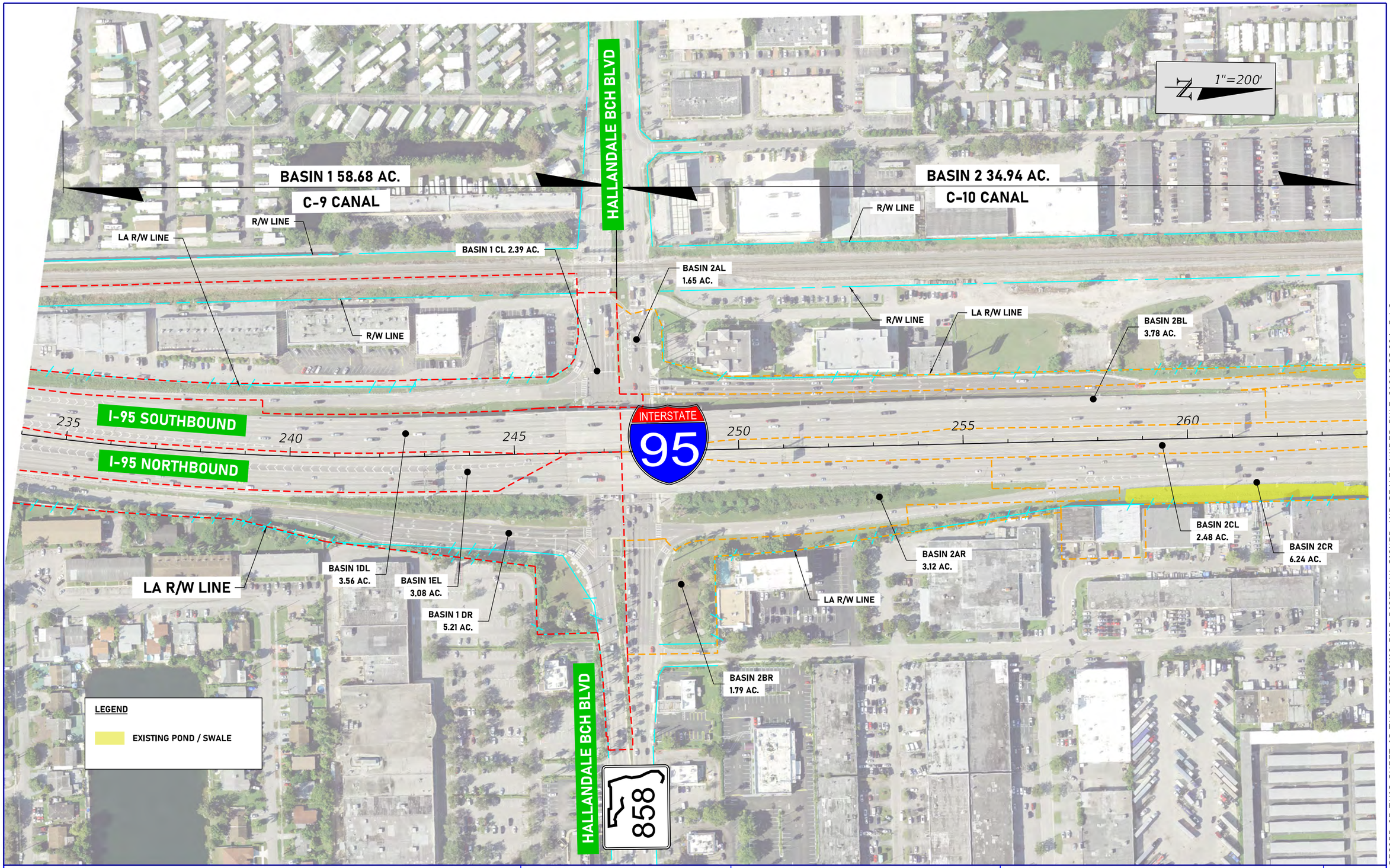

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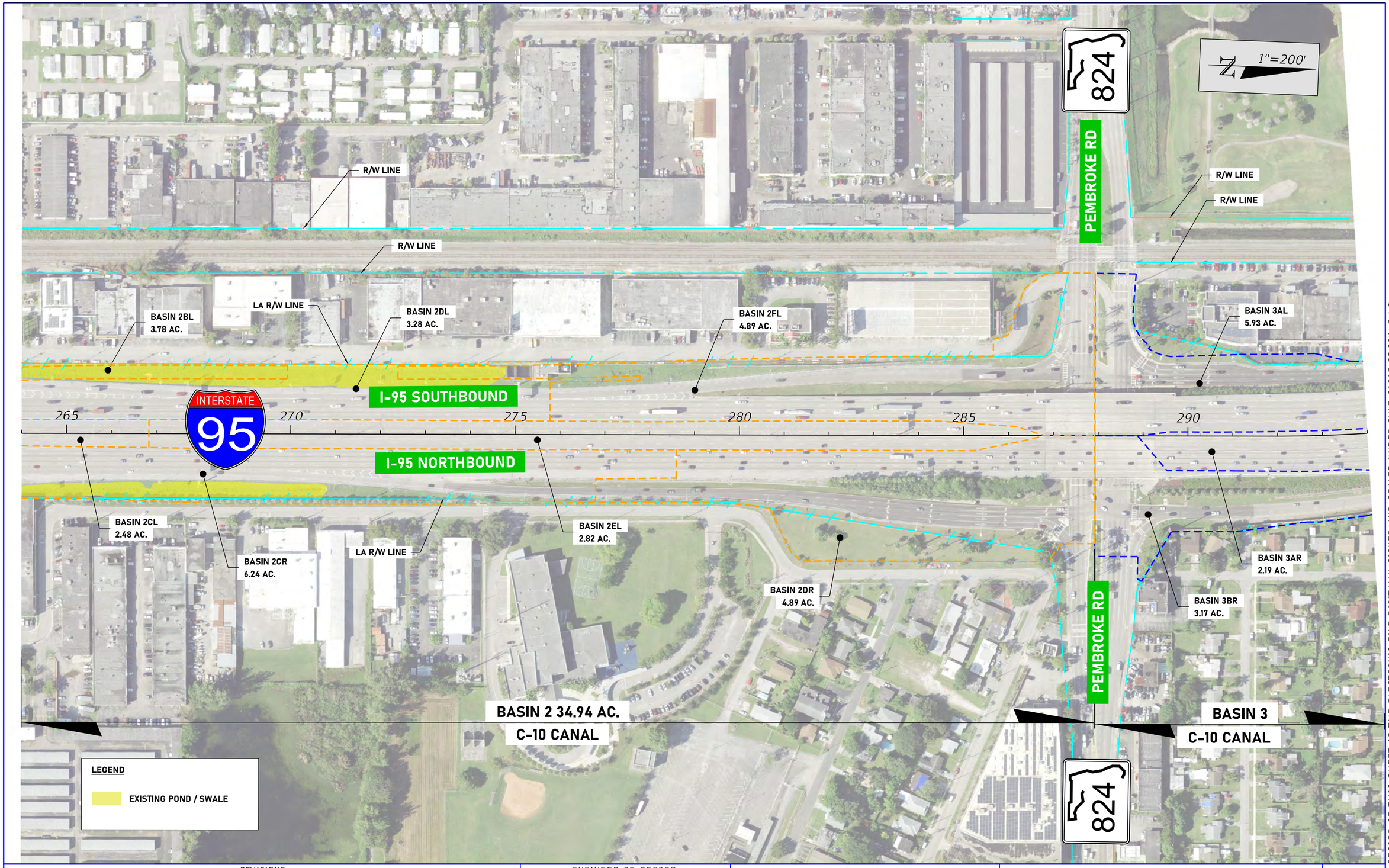

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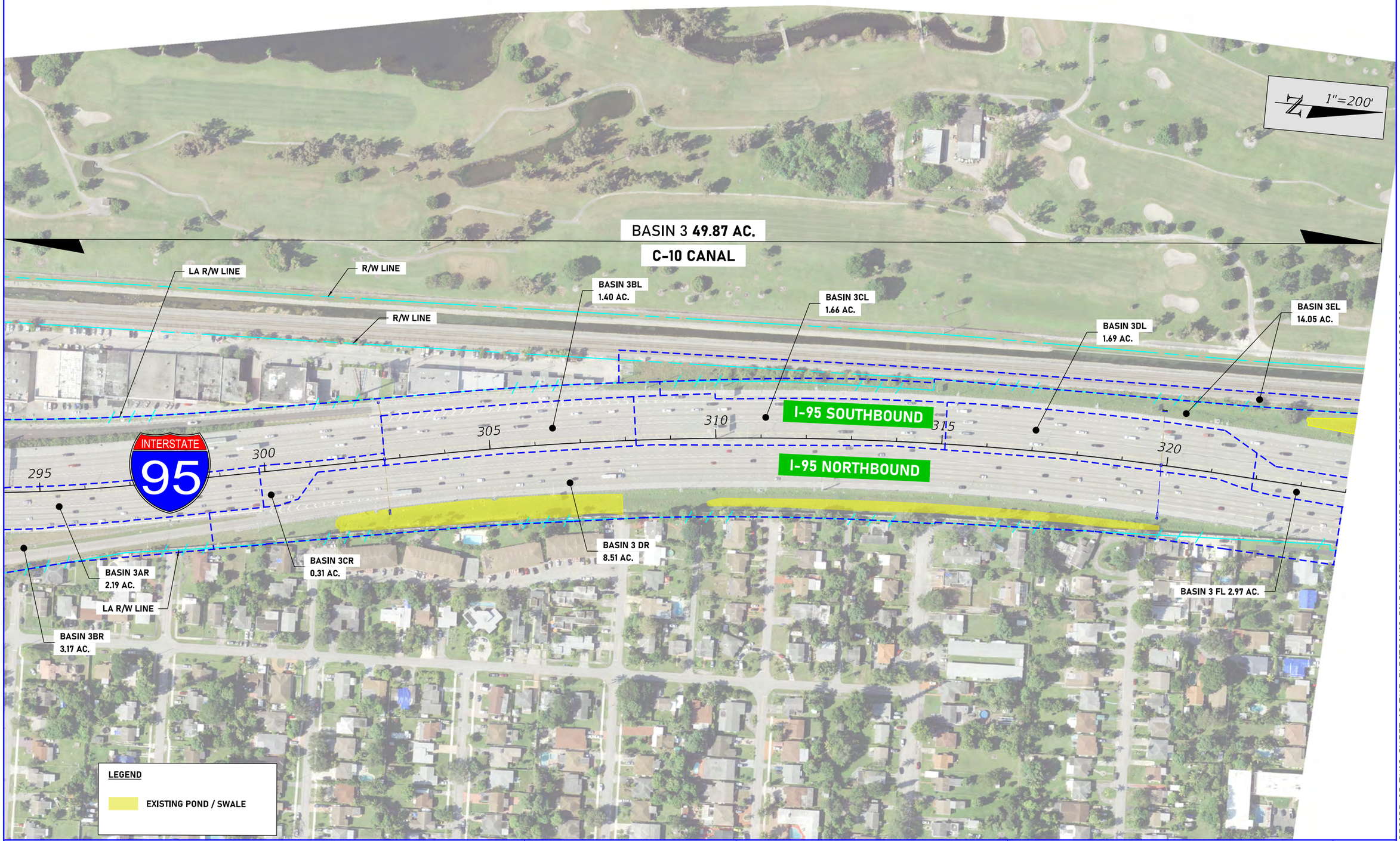

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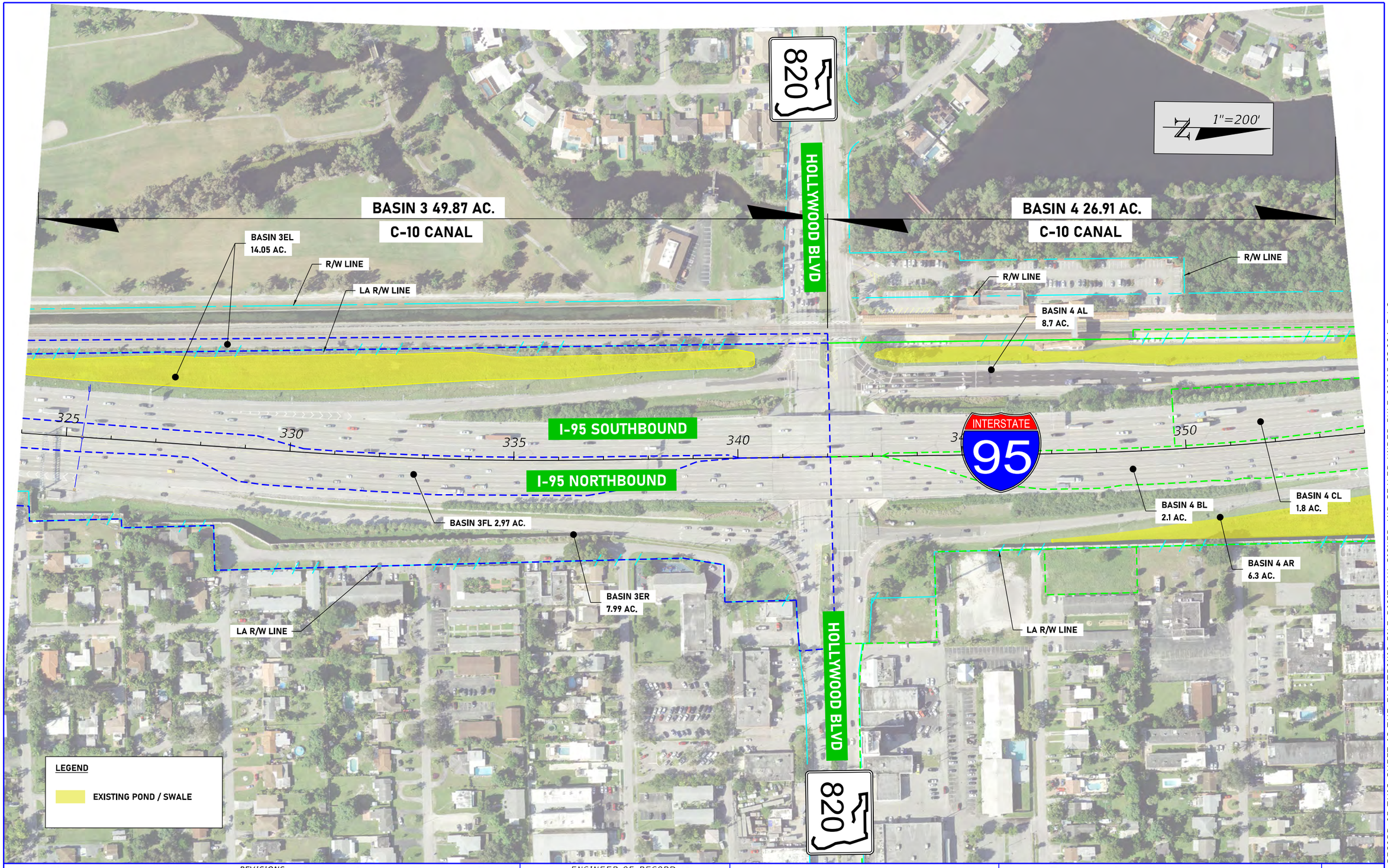

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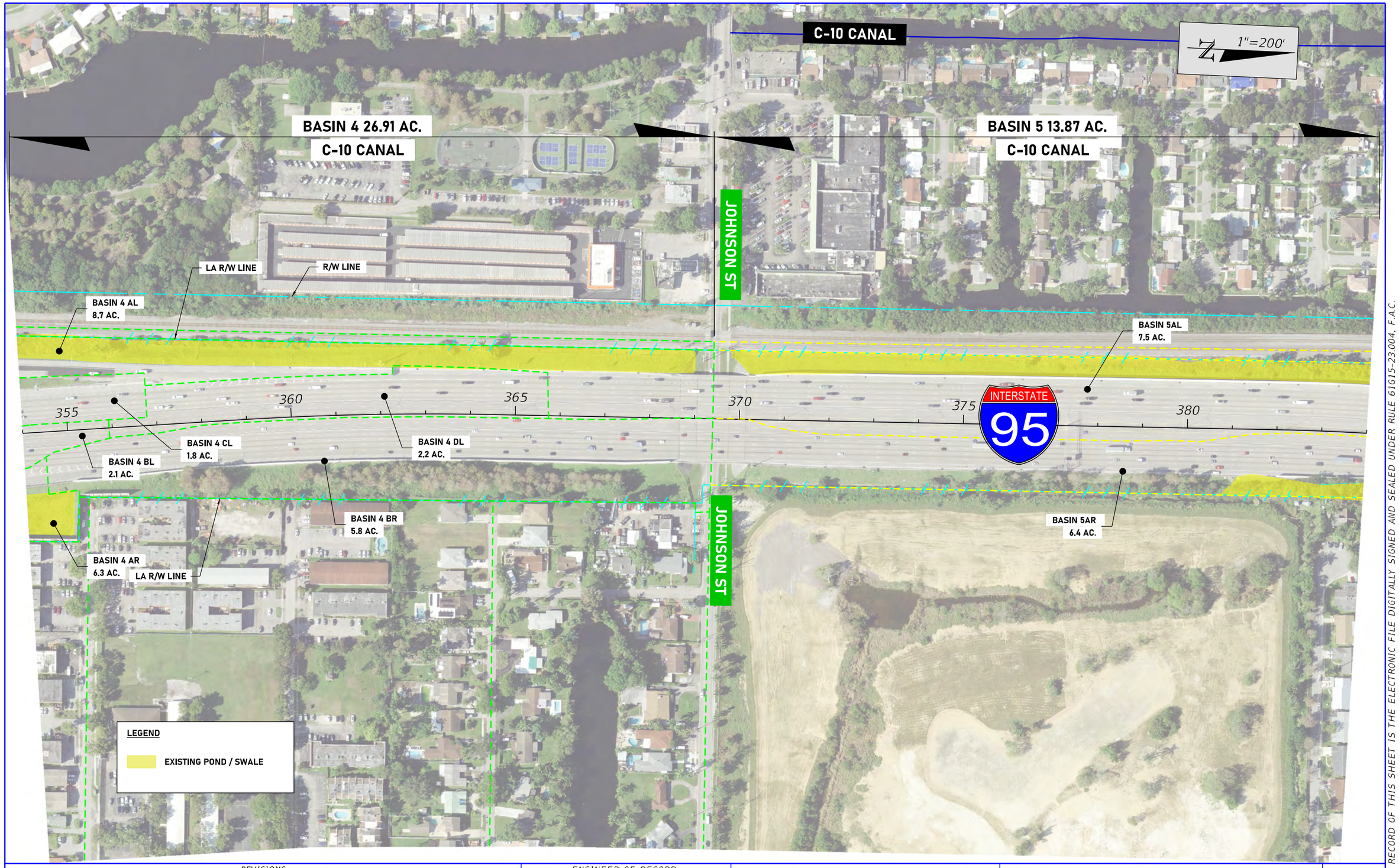

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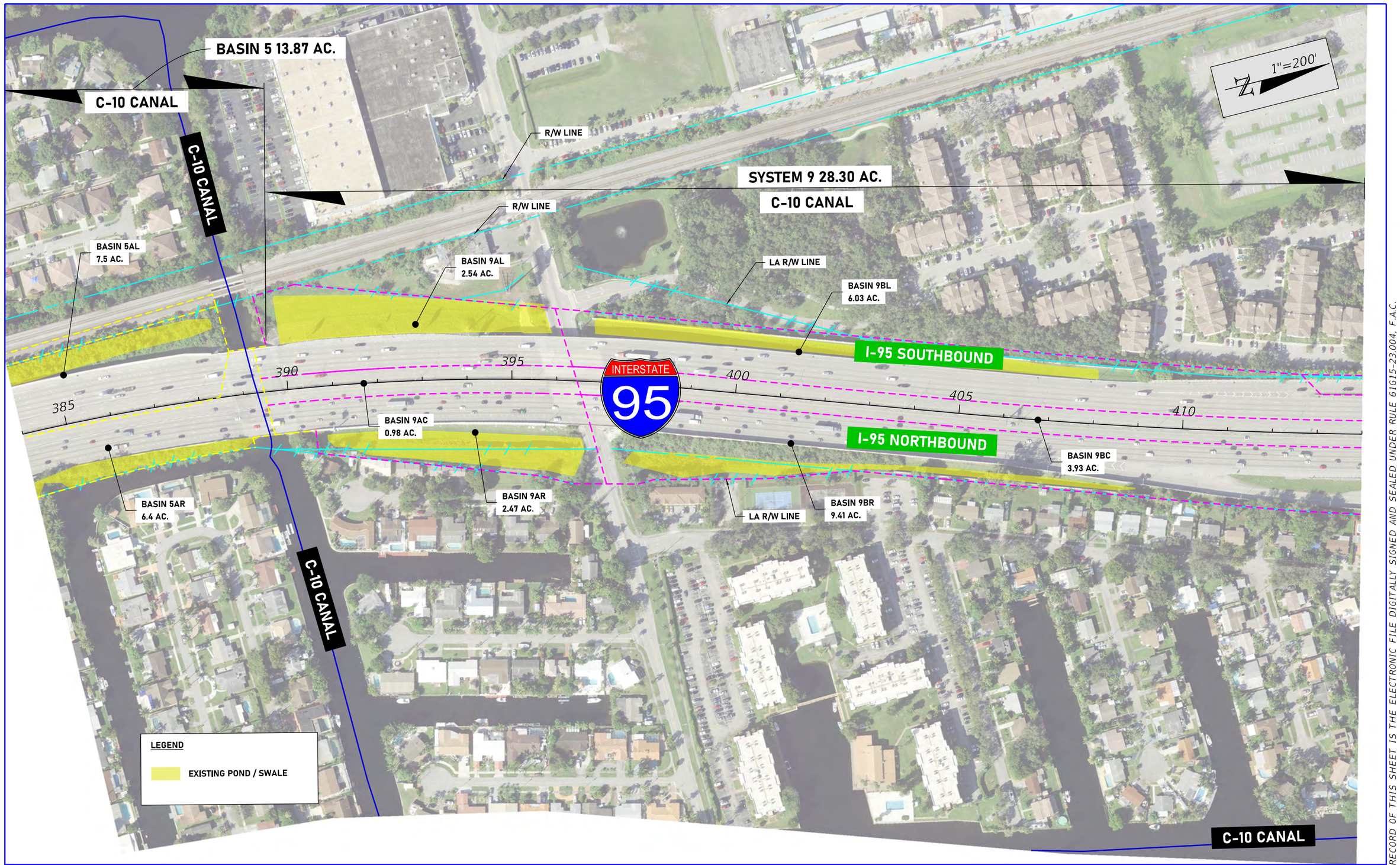

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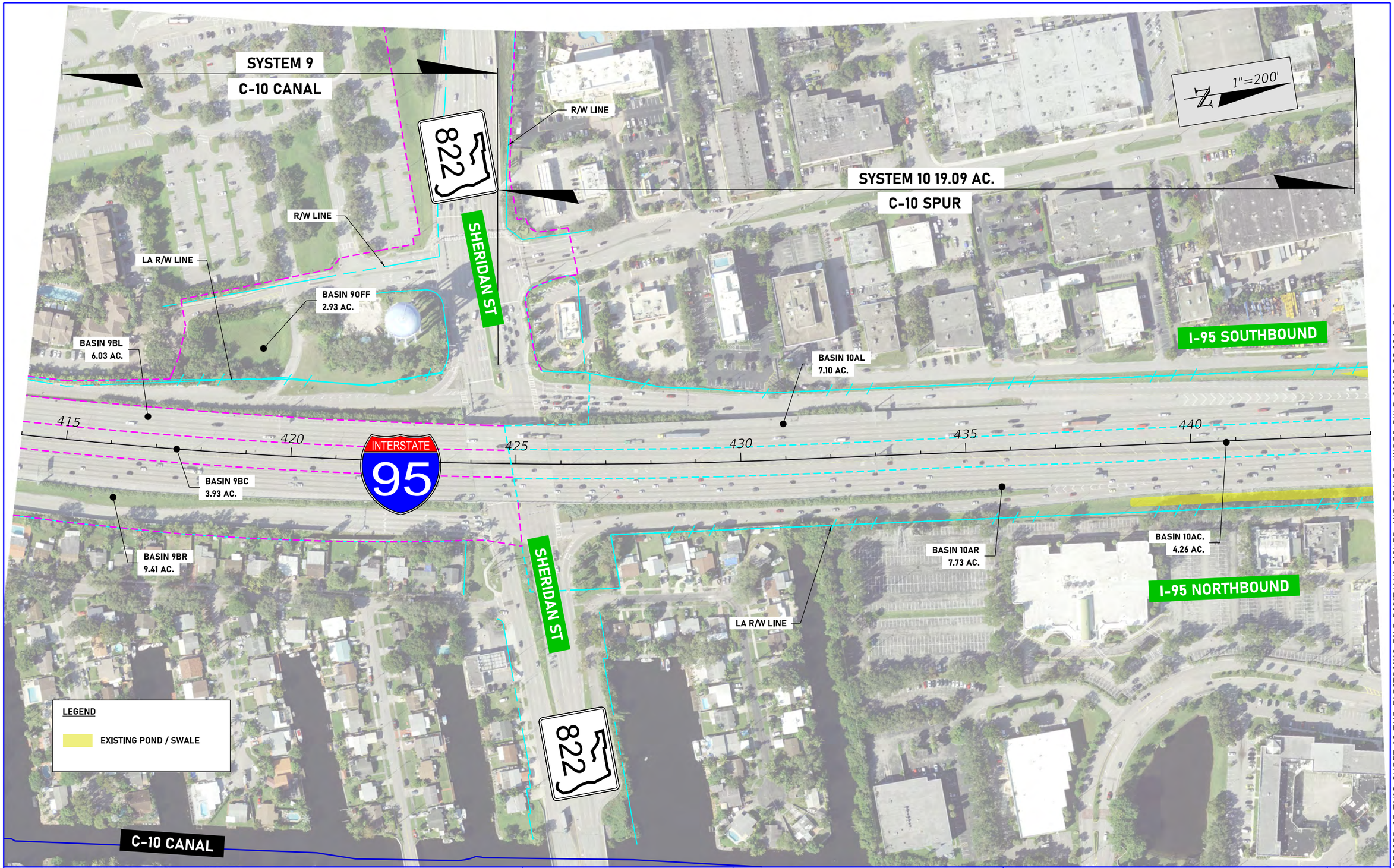

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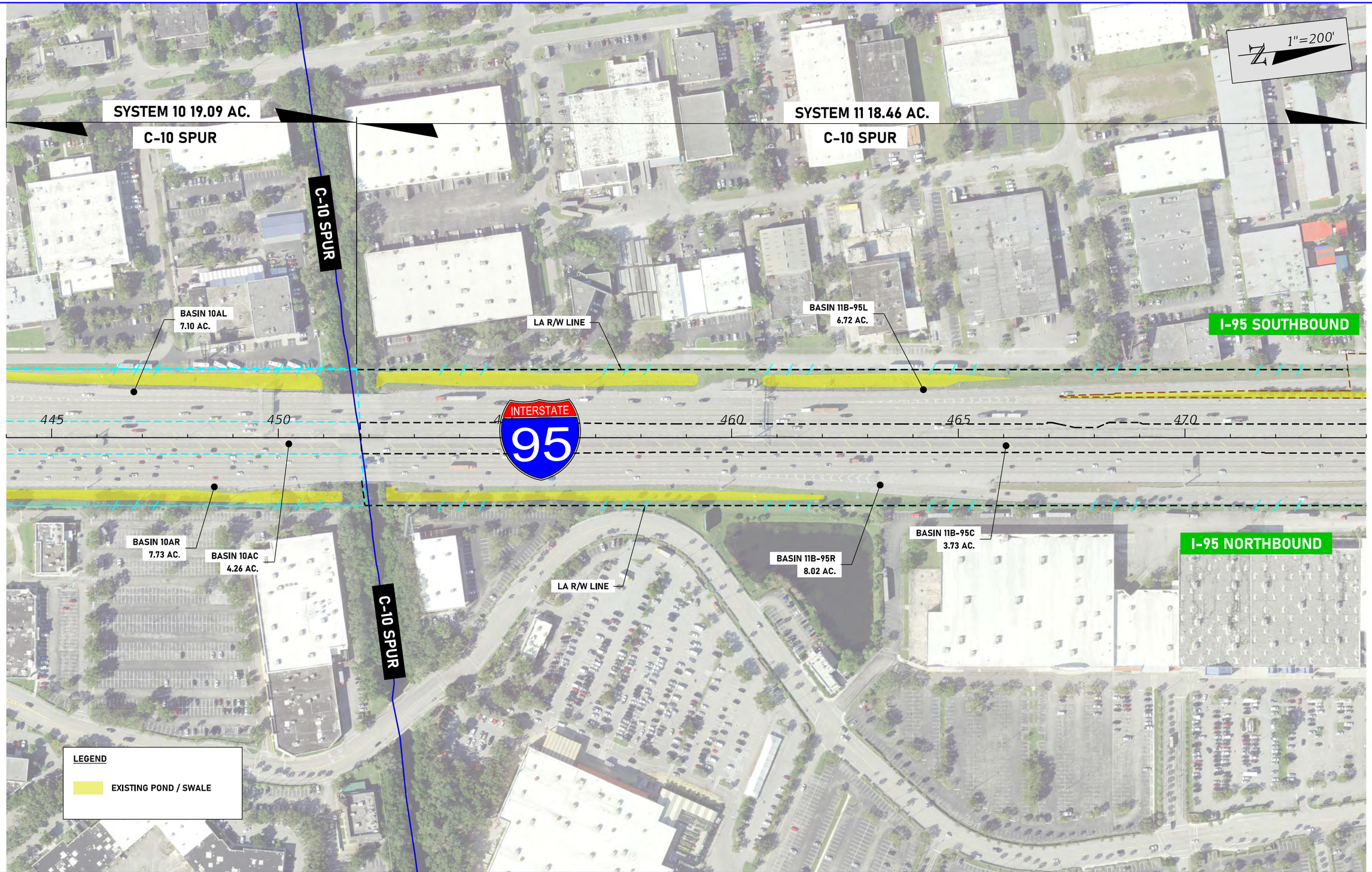

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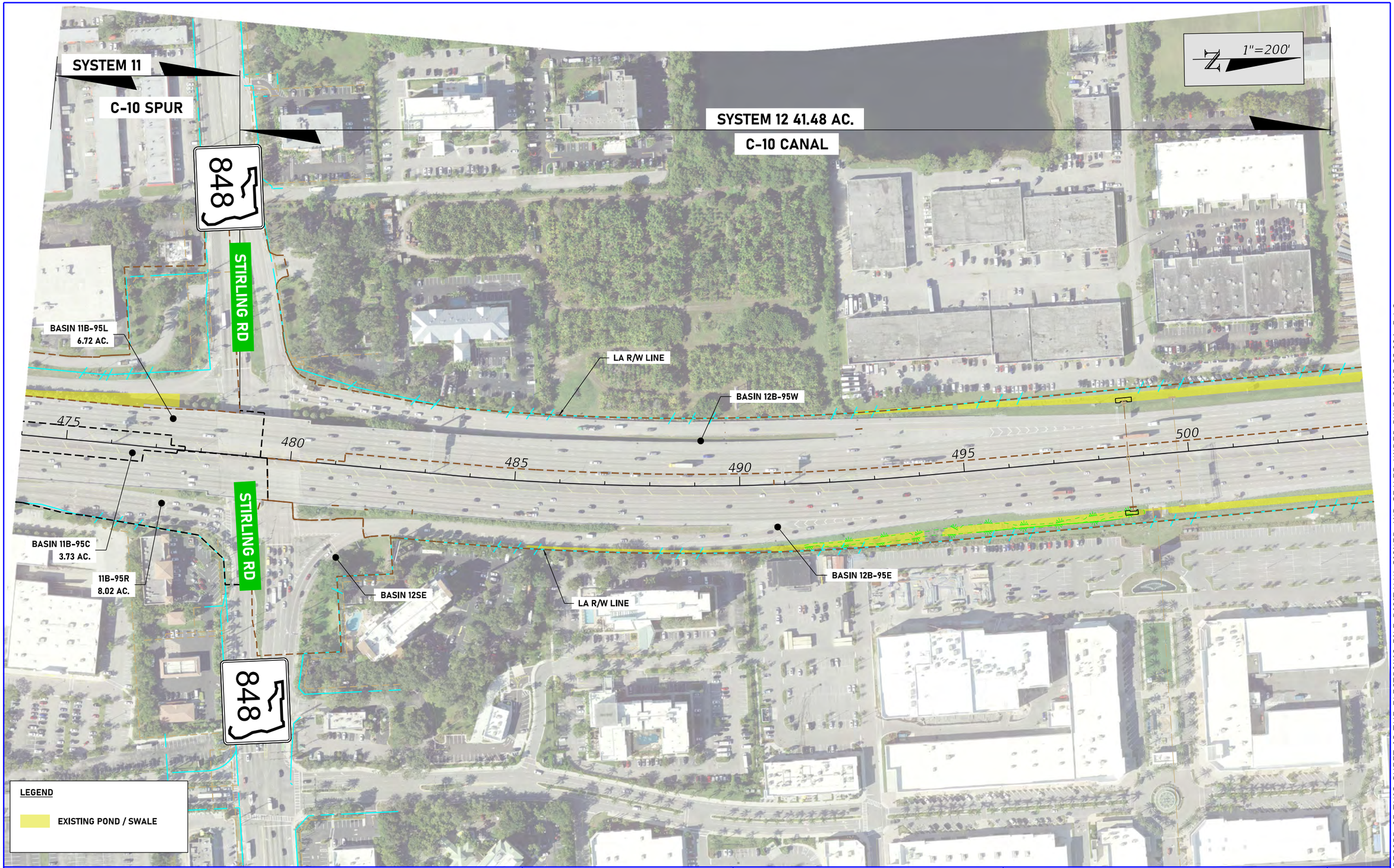

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REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			PRE-DEVELOPMENT DRAINAGE MAP	SHEET NO.
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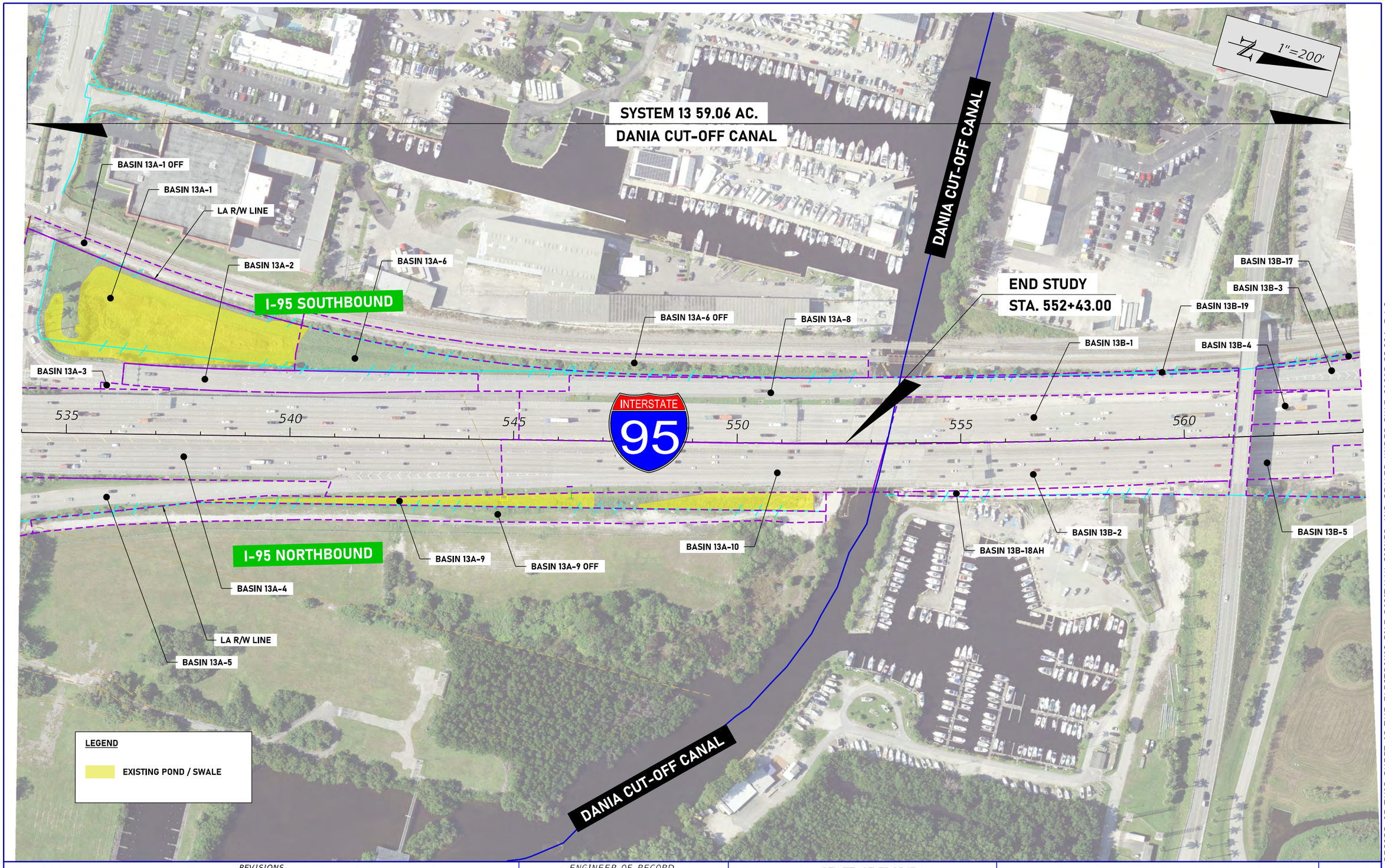

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DATE	DESCRIPTION	DATE	DESCRIPTION	DENYS AVILA, P.E. LICENSE NUMBER: 90871 SCALAR CONSULTING GROUP, LLC 5713 CORPORATE WAY, SUITE 200 WEST PALM BEACH, FLORIDA 33407	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PRE-DEVELOPMENT DRAINAGE MAP	
					SR 9	BROWARD	439170-1-22-02		

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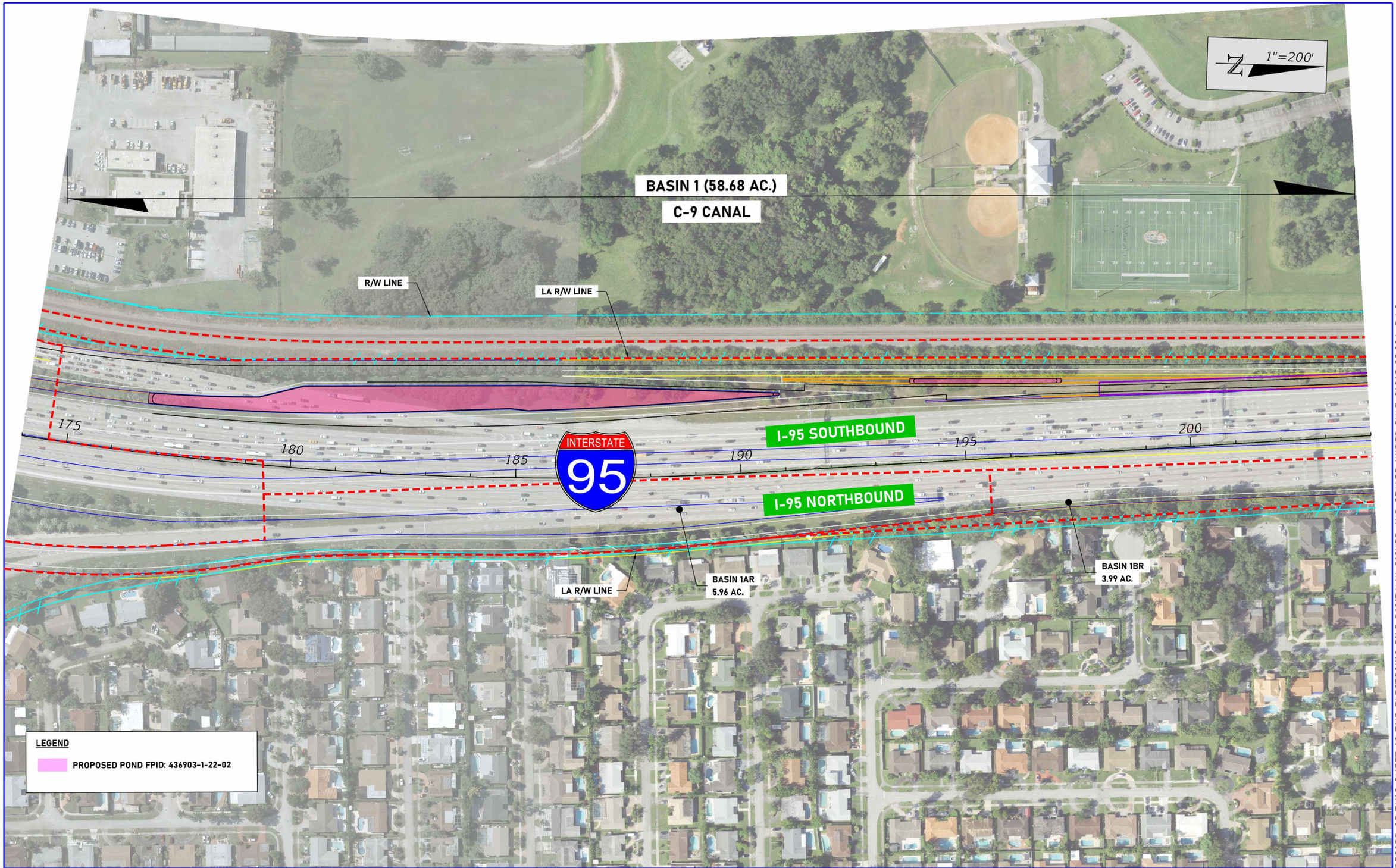
APPENDIX G
Post-Development Drainage Map



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ENGINEER OF RECORD

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SCALAR CONSULTING GROUP, LLC
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
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POST-DEVELOPMENT DRAINAGE MAP

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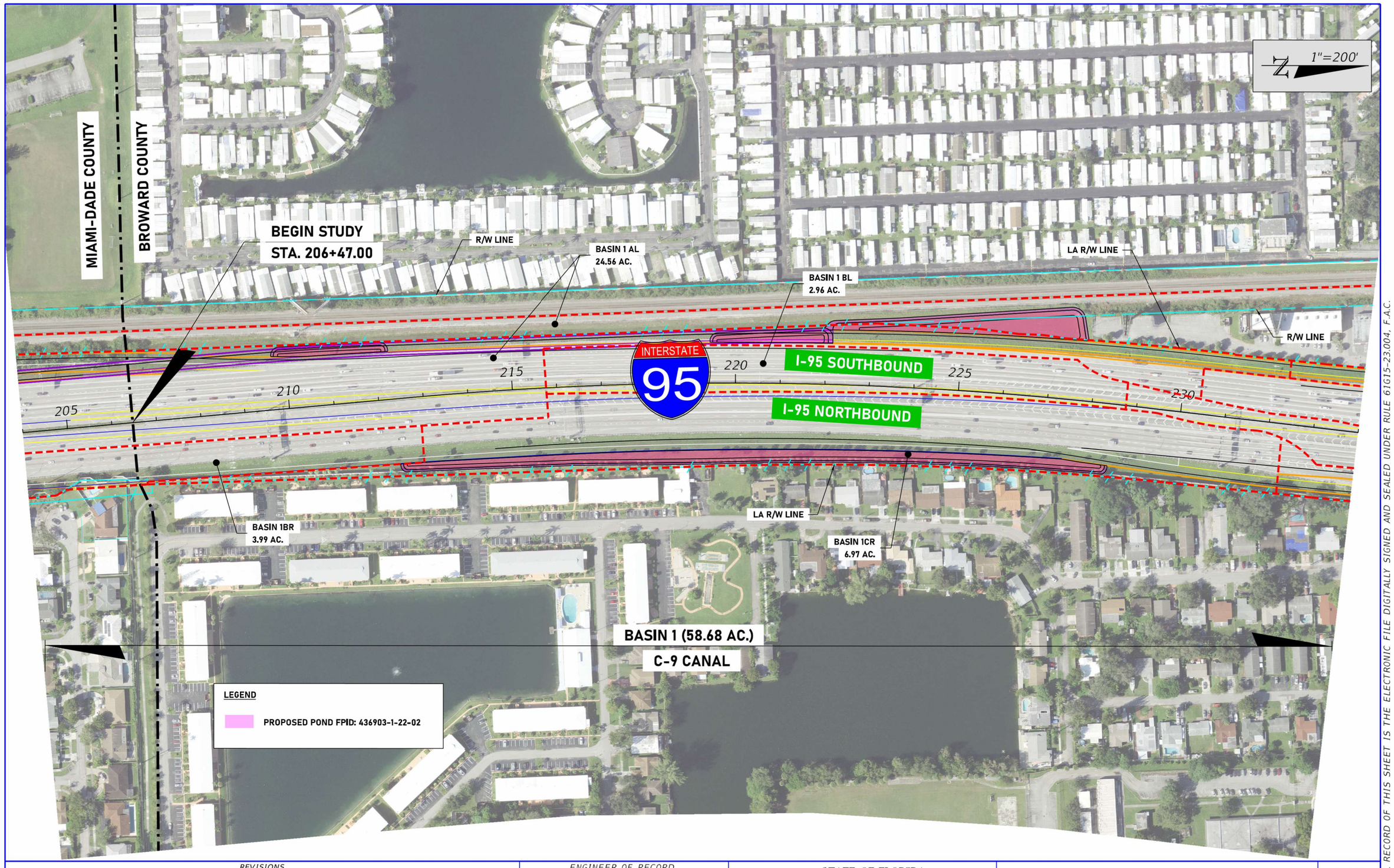

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POST-DEVELOPMENT DRAINAGE MAP

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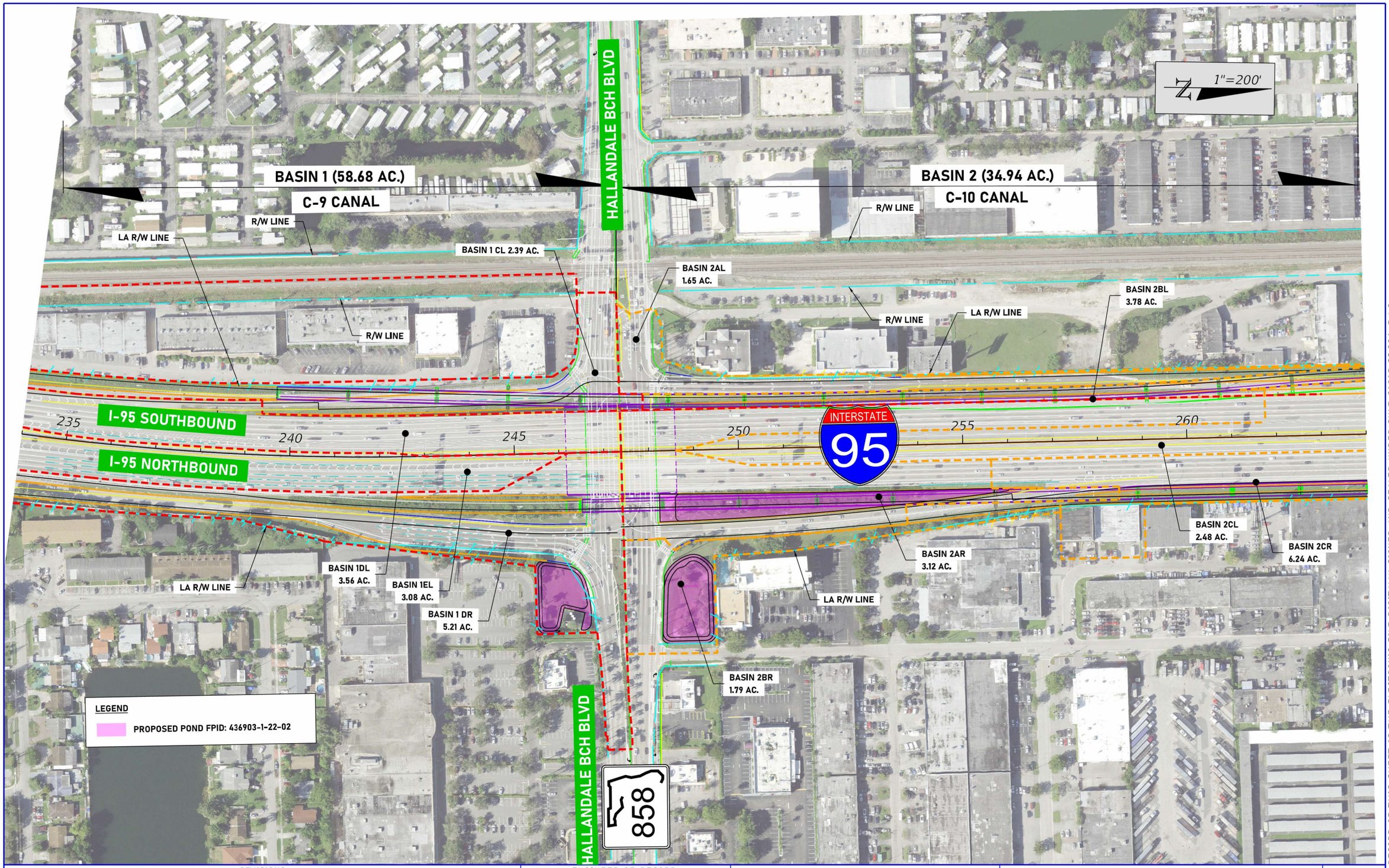

REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POST-DEVELOPMENT DRAINAGE MAP	SHEET NO.
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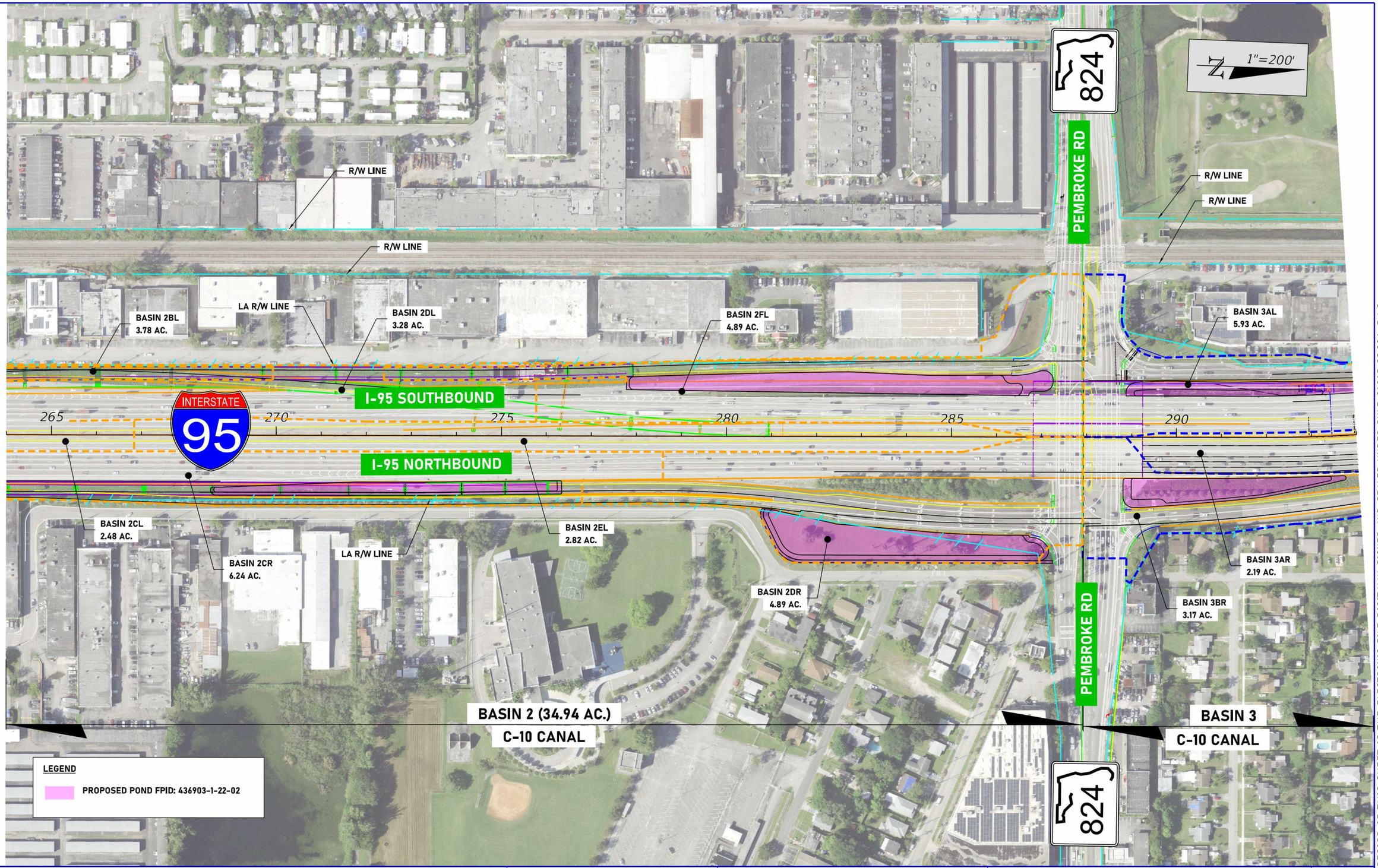

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POST-DEVELOPMENT DRAINAGE MAP

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REVISIONS			
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POST-DEVELOPMENT DRAINAGE MAP

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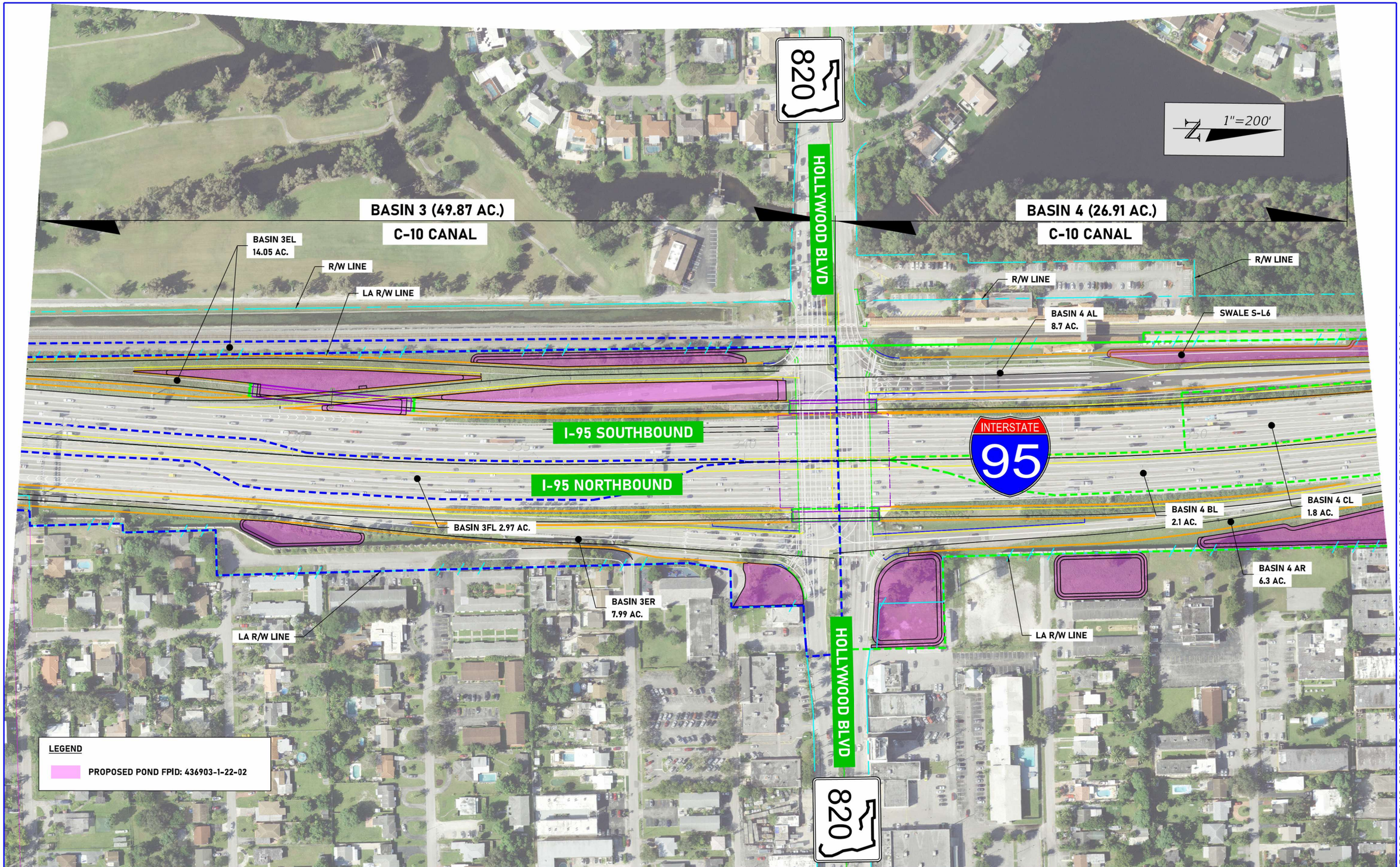

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5713 CORPORATE WAY, SUITE 200
WEST PALM BEACH, FLORIDA 33407

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	439170-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO.

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C-10 CANAL

1"=200'

BASIN 4 (26.91 AC.)

C-10 CANAL

BASIN 5 (13.87 AC.)

C-10 CANAL

JOHNSON ST

LA R/W LINE

R/W LINE

BASIN 4 AL
8.7 AC.

SWALE S-L6

SWALE S-R18

BASIN 5AL
7.5 AC.

355

360

365

370

375

INTERSTATE
95

380

BASIN 4 CL
1.8 AC.

BASIN 4 DL
2.2 AC.

BASIN 4 BL
2.1 AC.

BASIN 4 BR
5.8 AC.

SWALE S-R15

JOHNSON ST

BASIN 5AR
6.4 AC.

SWALE S-R16

BASIN 4 AR
6.3 AC.

LA R/W LINE

LEGEND

PROPOSED POND FPID: 436903-1-22-02

PROPOSED POND (WITHIN FDOT R/W)

POTENTIAL OFFSITE POND (NEW R/W)

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REVISIONS				ENGINEER OF RECORD	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POST-DEVELOPMENT DRAINAGE MAP	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	DENYS AVILA, P.E. LICENSE NUMBER: 90871 SCALAR CONSULTING GROUP, LLC 5713 CORPORATE WAY, SUITE 200 WEST PALM BEACH, FLORIDA 33407	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					SR 9	BROWARD	439170-1-22-02		

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BASIN 5 (13.87 AC.)

C-10 CANAL

C-10 CANAL

POND 9-7 ALT. 4

R/W LINE

SYSTEM 9 (36.83 AC.)

C-10 CANAL

R/W LINE

SWALE 9-1

BASIN 5AL
7.5 AC.

BASIN 9AL
2.14 AC.

LA R/W LINE

BASIN 9BL
5.58 AC.

I-95 SOUTHBOUND

INTERSTATE
95

I-95 NORTHBOUND

BASIN 9AC
1.34 AC.

BASIN 9BC
4.62 AC.

BASIN 5AR
6.4 AC.

BASIN 9AR
2.53 AC.

SWALE 9-2

BASIN 9BR
10.48 AC.

SWALE 9-3

LA R/W LINE

POND 9-7 (ALT. 1)

POND 9-7 (ALT. 2)

C-10 CANAL

FPID: 436903-1-22-02

FPID: 439170-1-22-02

LEGEND

PROPOSED POND (WITHIN FDOT R/W)

POTENTIAL OFFSITE POND (NEW R/W)

1" = 200'

385 390 395 400 405 410

1605 1610 1615 1625

900

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

ENGINEER OF RECORD

DENYS AVILA, P.E.
LICENSE NUMBER: 90871
SCALAR CONSULTING GROUP, LLC
5713 CORPORATE WAY, SUITE 200
WEST PALM BEACH, FLORIDA 33407

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	439170-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO.

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SYSTEM 9 (36.83 AC.)

C-10 CANAL

SYSTEM 10 (20.80 AC.)

C-10 SPUR

1"=200'

R/W LINE

822

SHERIDAN ST

BASIN SHERIDAN W
5.03 AC.

R/W LINE

PARK AND RIDE POND
(EXPANSION)

BASIN 9OFF
9.62 AC.

LA R/W LINE

SWALE 9-5

POND 10 (ALT. 3)

I-95 SOUTHBOUND

BASIN 9BL
5.58 AC.

BASIN 10AL
7.46 AC.

SWALE 10-1 (ALT. 1)

905 910 915 1000 1005 1010 1015

SWALE 9-6

415 420 425 430 435 440

INTERSTATE 95

BASIN 9BC
4.62 AC.

BASIN 9BR
11.00 AC.

1635 1640 300 305 310 315

SHERIDAN ST

BASIN 10NE
2.203 AC.

POND 10NE

BASIN 10AR
6.89 AC.

BASIN 10AC.
4.26 AC.

SWALE 10-2 (ALT. 1)

I-95 NORTHBOUND

POND 9-7 (ALT. 3)

LA R/W LINE

822

LEGEND

PROPOSED POND (WITHIN FDOT R/W)

POTENTIAL OFFSITE POND (NEW R/W)

C-10 CANAL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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5713 CORPORATE WAY, SUITE 200
WEST PALM BEACH, FLORIDA 33407

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	439170-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO.

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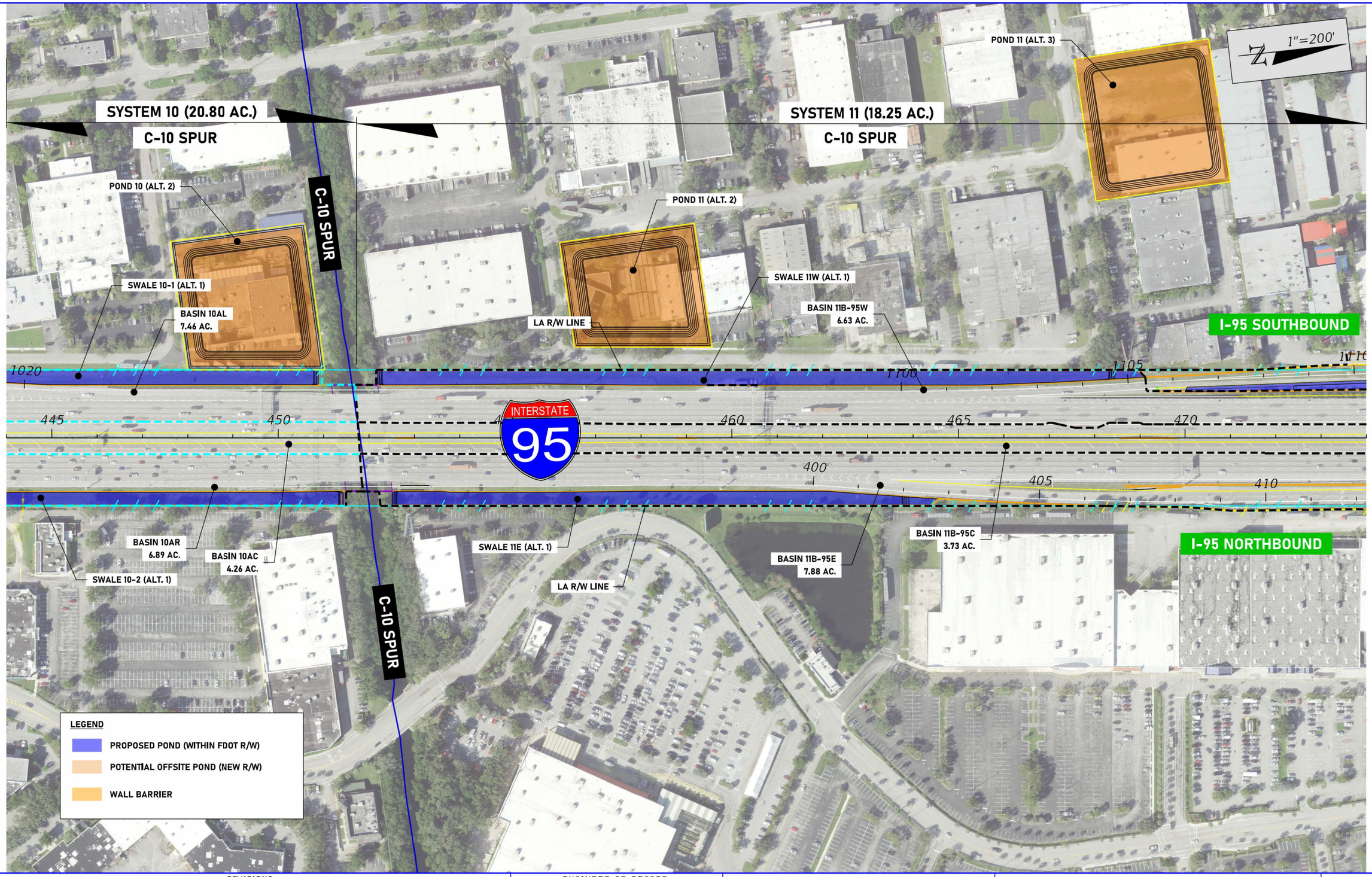

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	439170-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

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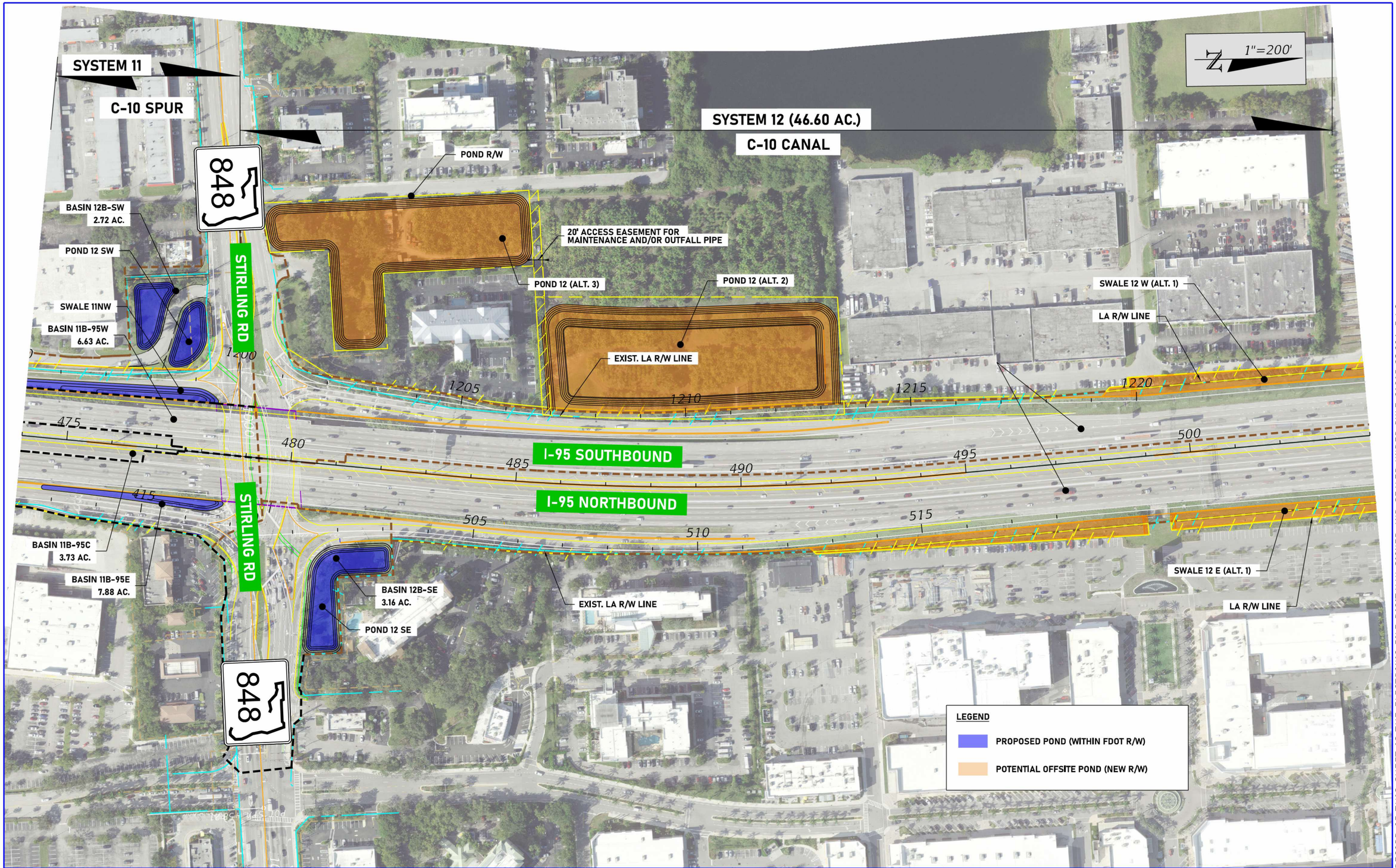

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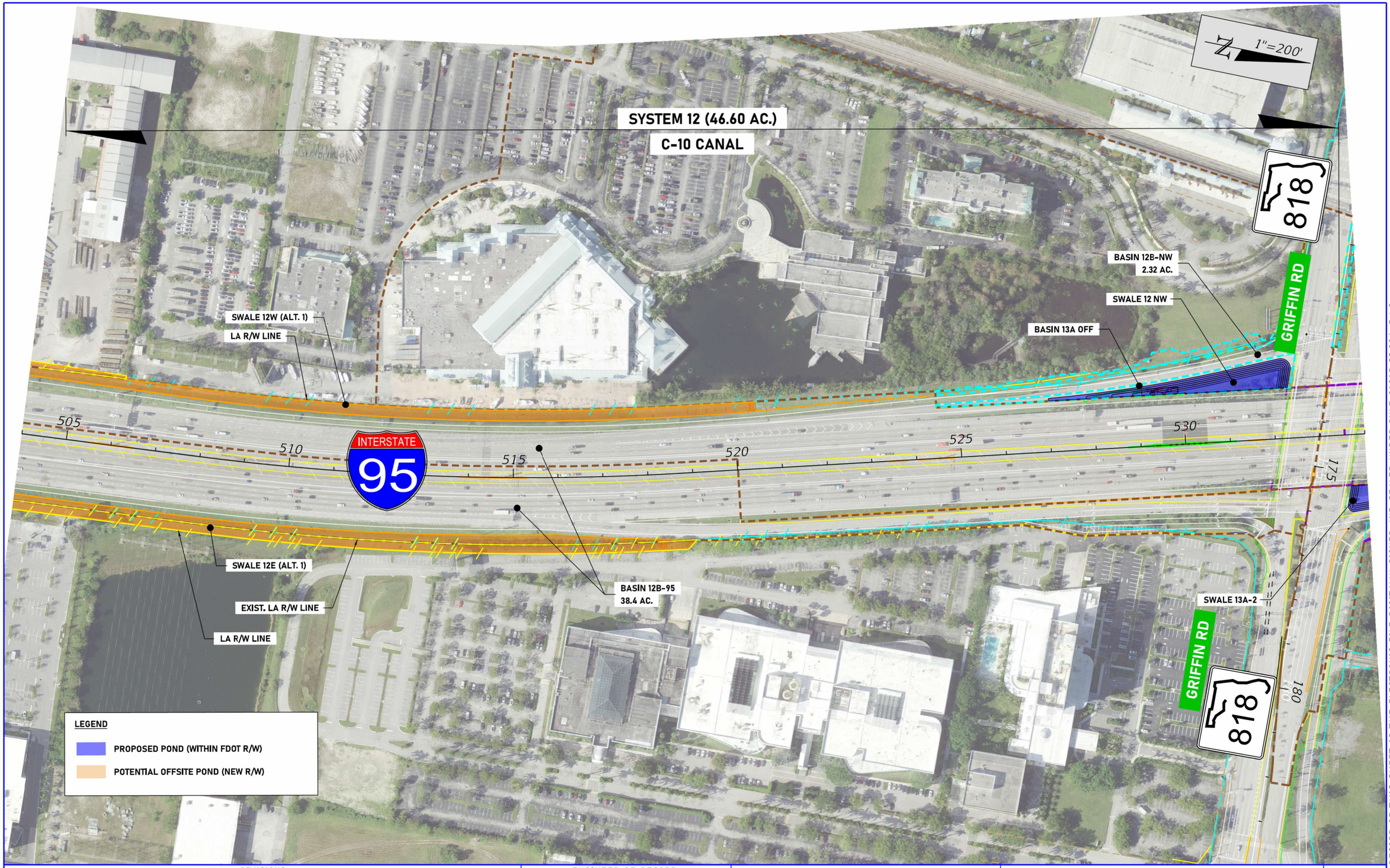

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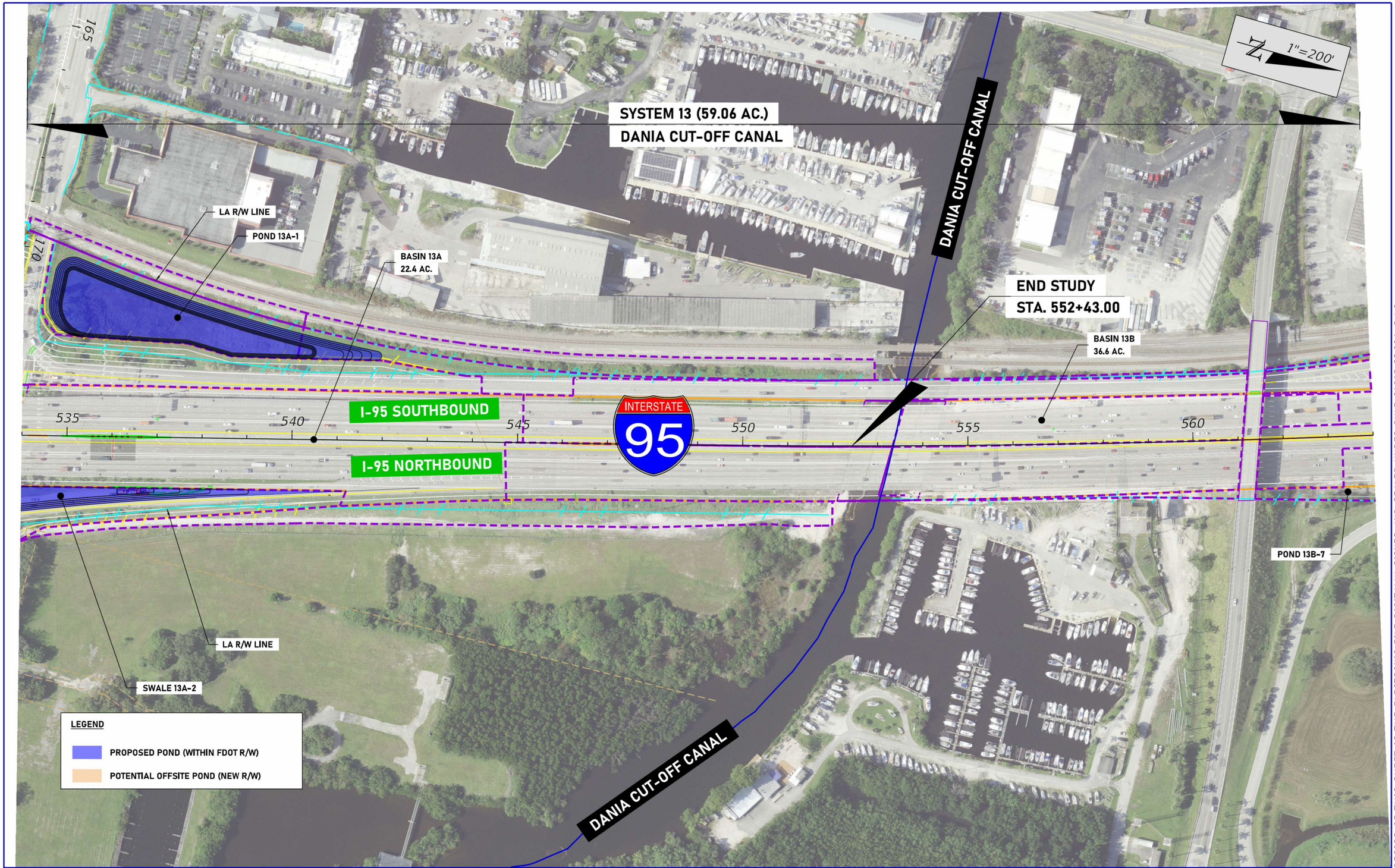

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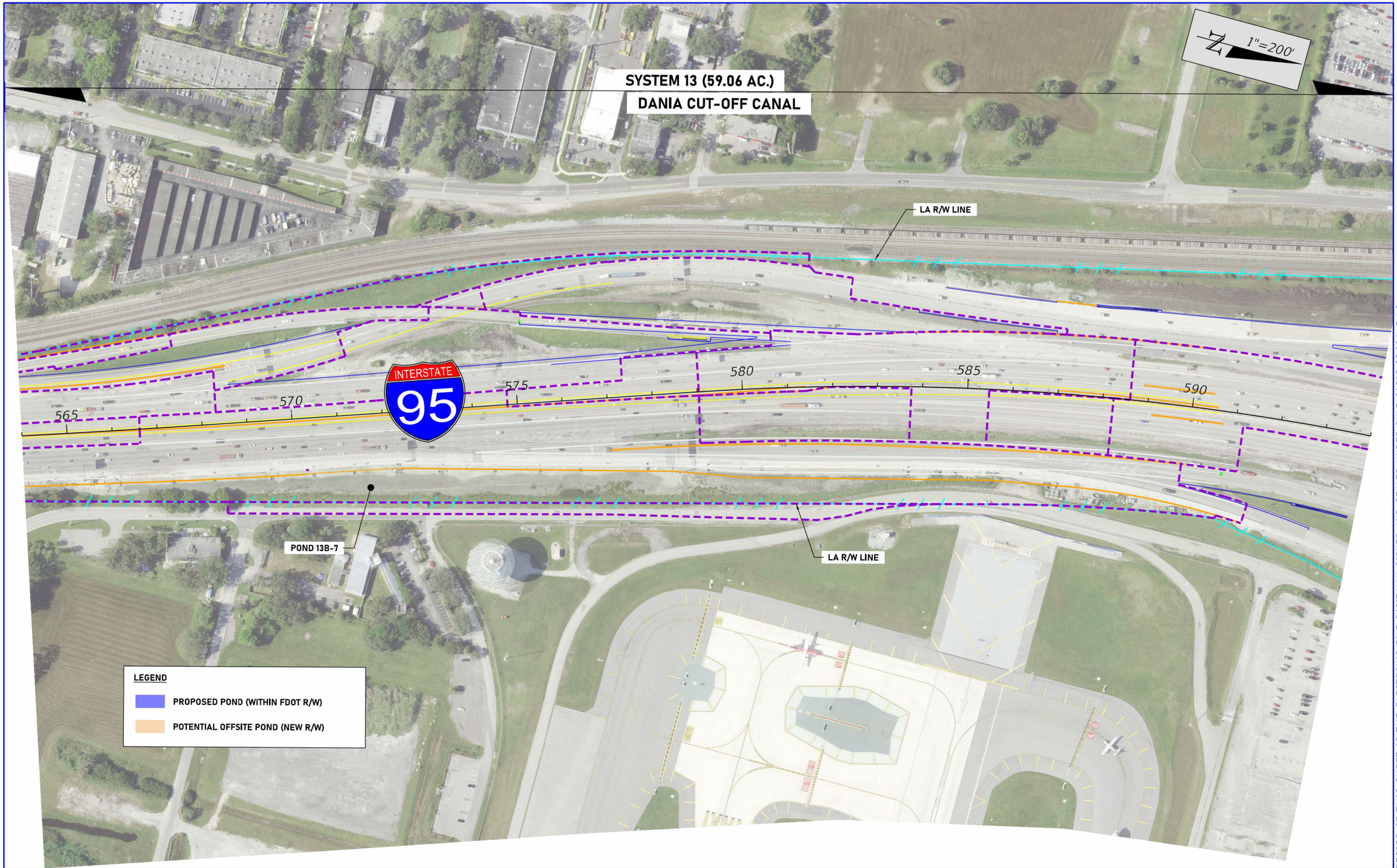

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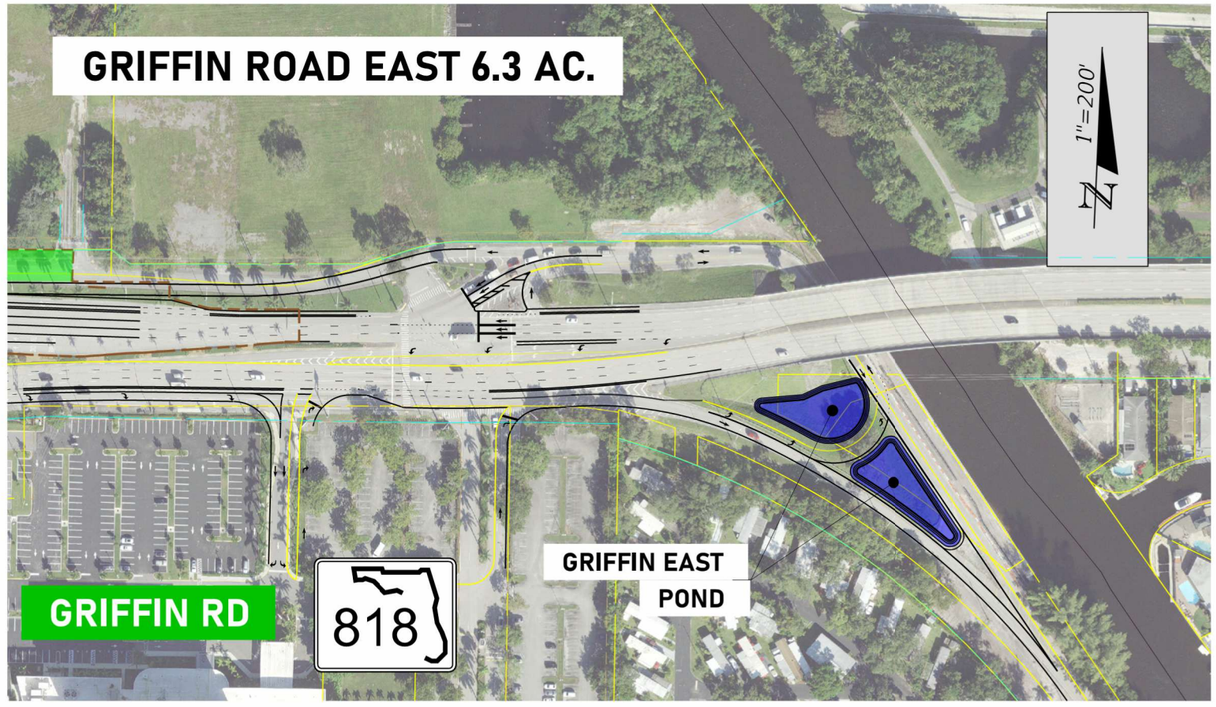

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APPENDIX H
Meeting Minutes

Meeting Minutes

Project:	FPID No. 439170-1-22-02 I-95 (SR 9) PD&E Study from Miami-Dade/Broward County Line to n. of Griffin Road
Subject:	Hallandale Beach Drainage Meeting
Date and time:	August 21, 2024, 10:00 AM
Meeting place:	Online Teams Meeting
Minutes by:	Scalar Consulting Group Inc.

Attendees:

Ronald Wallace – FDOT; ronald.wallace@dot.state.fl.us
James Poole – FDOT; james.poole@dot.state.fl.us
Jacob Ryan – FDOT; Jacob.Ryan@dot.state.fl.us
Ruben Rodriguez – FDOT; ruben.rodriguez@dot.state.fl.us
Jean Cariany – FDOT; jean.cariany@dot.state.fl.us
Rudy Gotmare – Scalar Consulting Group; agotmare@scalarinc.net
John Scarlatos – Scalar Consulting Group; jscarlatos@scalarinc.net
David Boyer – Scalar Consulting Group; dboyer@scalarinc.net
David Bennett – Scalar Consulting Group; dbennett@scalarinc.net
Jeffrey Odoms – City of Hallandale Beach; JOdoms@Hallandalebeachfl.gov
Vanessa Leroy – City of Hallandale Beach; vleroy@hallandalebeachfl.gov
Jeffrey Towne – City of Hallandale Beach; Jtowne@hallandalebeachfl.gov

Notes:

The meeting was held to discuss Chaves Lake and run-off, and contamination concerns related to the I-95 PD&E Study. Key points discussed are provided below.

- The meeting opened with a general discussion regarding the hydraulic and environmental aspects of I-95 and Lake Chaves. This included:
    - Lake Chaves outfalls via pumping to a FDOT pump station on the west side of I-95 then north to a concrete lined ditch which flows north to the C-11 canal.
    - Currently, I-95 does not contribute runoff to Lake Chaves, therefore, does not impact the lake.
    - FDOT had no relevant data regarding TMDL's since I-95 does not discharge to Lake Chaves.
- The City's concern over the potential impacts of the 1-95 project to Chaves Lake is due to the City's desire for capacity within the lake for future flooding relief, public use, water quality, etc.
- The city requested drainage data from FDOT. The current design is being performed by BCC. The BCC contact is Carlos Alcantara, calcantara@bcceng.com, 954-298-2246. Additional contacts are Juan H. Vázquez, PE, R J Behar & Company, jvazquez@rjbehar.com, 954-680-7771 and Patrick Leung, Stantec, Patrick.leung@stantec.com, 954-481-2812 x227.

Meeting Minutes
Drainage Pond Siting Alternatives
I-95 (SR 9) Project Development and Environment (PD&E) Study
Miami-Dade/Broward County Line to North of Griffin Road
Broward County, Florida
FPID No. 439170-1-22-01
August 18, 2025
Time: 4:00 pm to 5:00 pm

LOCATION:
FDOT D4 Office 3400 W. Commercial Blvd. Ft. Lauderdale, FL 33309
Virtual Attendees (Microsoft Teams)

Attendees:
Leslie Wetherell - FDOT Project Manager
Ruben Rodriguez – FDOT Drainage Designer
Jean Cariany – FDOT Drainage Designer
Ronald Wallace - FDOT Assistant Project Manager
Aniruddha Gotmare – SCALAR Project Manager
John Scarlatos – SCALAR Deputy Project Manager
David Boyer – SCALAR Drainage Engineer
Denys Avila - SCALAR Drainage Engineer of Record
Lucas Chaparro - SCALAR Drainage Engineer Intern

Purpose: The purpose of this meeting was to present the pond sites alternatives developed for the PD&E.

Discussion items:

a. Scalar described the limits of each basin and the proposed ponds for each basin.
    a. Basin 1, 2, 3, 4, 5 are part of the FPID: 436903-1-22-02 PD&E.
    b. System 9: from C-10 Canal to Sheridan Street. I-95 mainline 3 pond alternatives (Pond 9-7) with full take for R/W. Alternative 2 is preferred since those properties are already affected by the diamond interchange widening.
    c. Sheridan Basin has 3 pond alternatives (Pond 9-5) (two with right of way acquisition) to provide treatment/attenuation for the Sheridan Flyover.
        1. Alternative 2 is within the Tri-Rail Park & Ride parcel, which is owned by FDOT.
        2. Alternative 2 & 3 both will require MSE walls to be built along the approaches over the railroad and allow for a linear pond to be graded.

d. System 10: from Sheridan Street to C-10 Spur. Alternative 1 consists of roadside ditches graded up to a gravity and/or cantilever retaining wall along the right of way (This is the preferred alternative). Alternatives 2 & 3 are new ponds requiring full right-of-way acquisitions.
    1. Maintenance is of concern with a dry detention swale with walls on both sides. Maintenance access will need to be provided through an opening in the wall.
e. System 11: from C-10 Spur to Stirling Road. Equivalent layout to system 10.
f. System 12: from Stirling Road to Griffin Road. Alternative 1 consists of roadside ditches graded up to a gravity wall and/or cantilever retaining wall requiring a linear take across multiple parcels. Alternative 2 is a partial take of a palm tree nursery parcel. Alternative 3 full take of palm tree nursery parcels.
    1. Maintenance is of concern with a dry detention swale with walls on both sides. Maintenance access will need to be provided through an opening in the wall.
    2. Alternative 1 & 2 both have ODA signs that could be impacted and will be identified on roll plots.
g. System 13: From Griffin Road to I-595. New ponds within the right of way and regrading of the existing ponds. No R/W is required for this basin

Action items:

a. SCALAR to confirm ponds from PD&E FPID: 436903-1-22-02 and request updated files.
b. **System 9:** SCALAR to evaluate whether eliminating auxiliary lanes could potentially remove the need for right-of-way acquisition east of I-95. If the roadway design is determined to be constructible within the existing right-of-way, SCALAR will reevaluate the parcels to be affected.
c. **System 10, 11 & 12:** SCALAR and FDOT to coordinate with maintenance agencies to determine if access to roadside ditches between walls is adequate. SCALAR to develop maintenance access exhibit and typical section for drainage ditches with walls on both sides.
d. **System 10:** Evaluate the feasibility of utilizing proposed swales along Sheridan Street for mainline I-95 stormwater management, if the Sheridan Flyover alternative is disregarded.

Appendix I
Existing Data

Basin 1-5
PD&E Data

IVES ESTATES PARK

BASIN 1

C-9 CANAL

PROJECT LIMIT

SWALE S-L1A

BASIN 1AL
24.56 AC.

BASIN 1AL_OFF
13.66 AC.

R/W LINE

SWALE S-L1B

LA R/W LINE

S1-01 S1-02 S1-03 S1-04 S1-05 S1-06 S1-07 S1-08 S1-09 S1-10 S1-11 S1-12 S1-13 S1-14 S1-15 S1-16 S1-17 S1-19 S1-20 S1-21 S1-22 S1-23 S1-24 S1-25 S1-26 S1-27 S1-28 S1-29 S1-30 S1-31 S1-32 S1-33 S1-34 S1-35 S1-36 S1-37 S1-38 S1-39 S1-40 S1-41 S1-42 S1-43 S1-44 S1-45 S1-46 S1-47 S1-49 S1-50 S1-51 S1-52 S1-53

170 175 180 185 190 195

INTERSTATE 95

I-95 SOUTHBOUND

I-95 NORTHBOUND

IVES DAIRY RD

NE 206TH ST

NE 210TH ST

BASIN 1AR
5.96 AC.

SWALE S-R1A

SWALE S-R1A-1

FD1_1R

FD1_2R

MATCHLINE "A" (SEE SHEET 2)

0 50 200
Feet

LEGEND

BASIN 1 BOUNDARY

SX-XX PROPOSED STRUCTURE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 1

IVES ESTATES PARK

BASIN 1

C-9 CANAL

SWALE S-L1D

SWALE S-L1C

BASIN 1BL
2.96 AC.

BASIN 1AL_OFF
13.66 AC.

R/W LINE

BASIN 1AL
24.56 AC.

S1-56 S1-57 S1-60 S1-64 S1-63 S1-66 S1-70 S1-71 S1-73 S1-74 S1-76 S1-80 S1-79 S1-82

LA R/W LINE

I-95 SOUTHBOUND

I-95 NORTHBOUND

INTERSTATE 95

200 205 210 215 220

N 5° 12' 56" W

S1-54 S1-55 S1-59 S1-58 S1-61 S1-62 S1-65 S1-67 S1-68 S1-69 S1-72 S1-75 S1-77 S1-78 S1-81

LA R/W LINE

BASIN 1CR
6.97 AC.

SWALE S-R1

BASIN 1BR
3.99 AC.

MIAMI DADE COUNTY

BROWARD COUNTY

SW 8TH ST

SW 11TH ST

FD1_3R

MATCHLINE "A" (SEE SHEET 1)

MATCHLINE "B" (SEE SHEET 3)

0 50 200
Feet

LEGEND

BASIN 1 BOUNDARY

SX-XX PROPOSED STRUCTURE

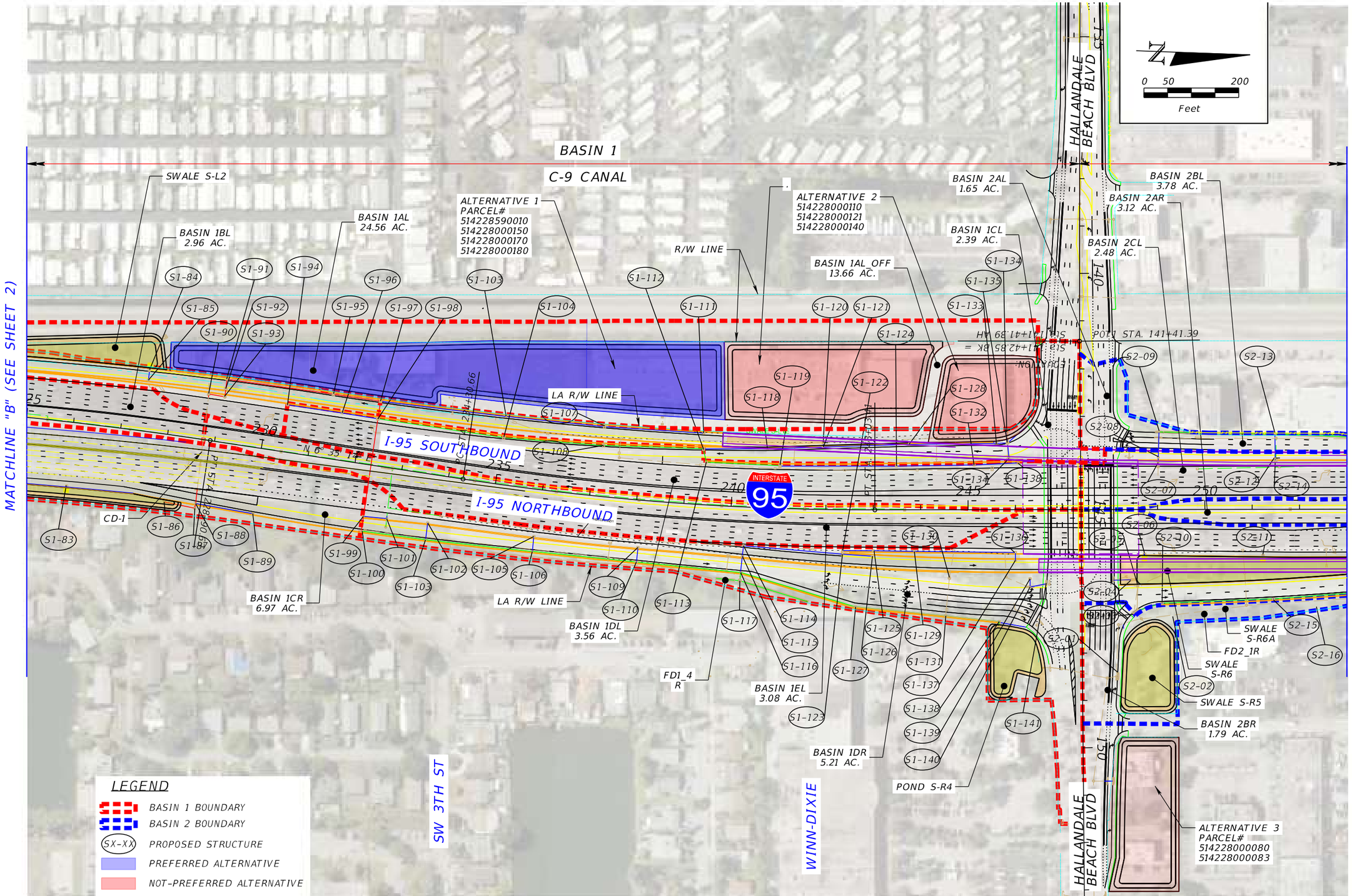
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 2



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 3

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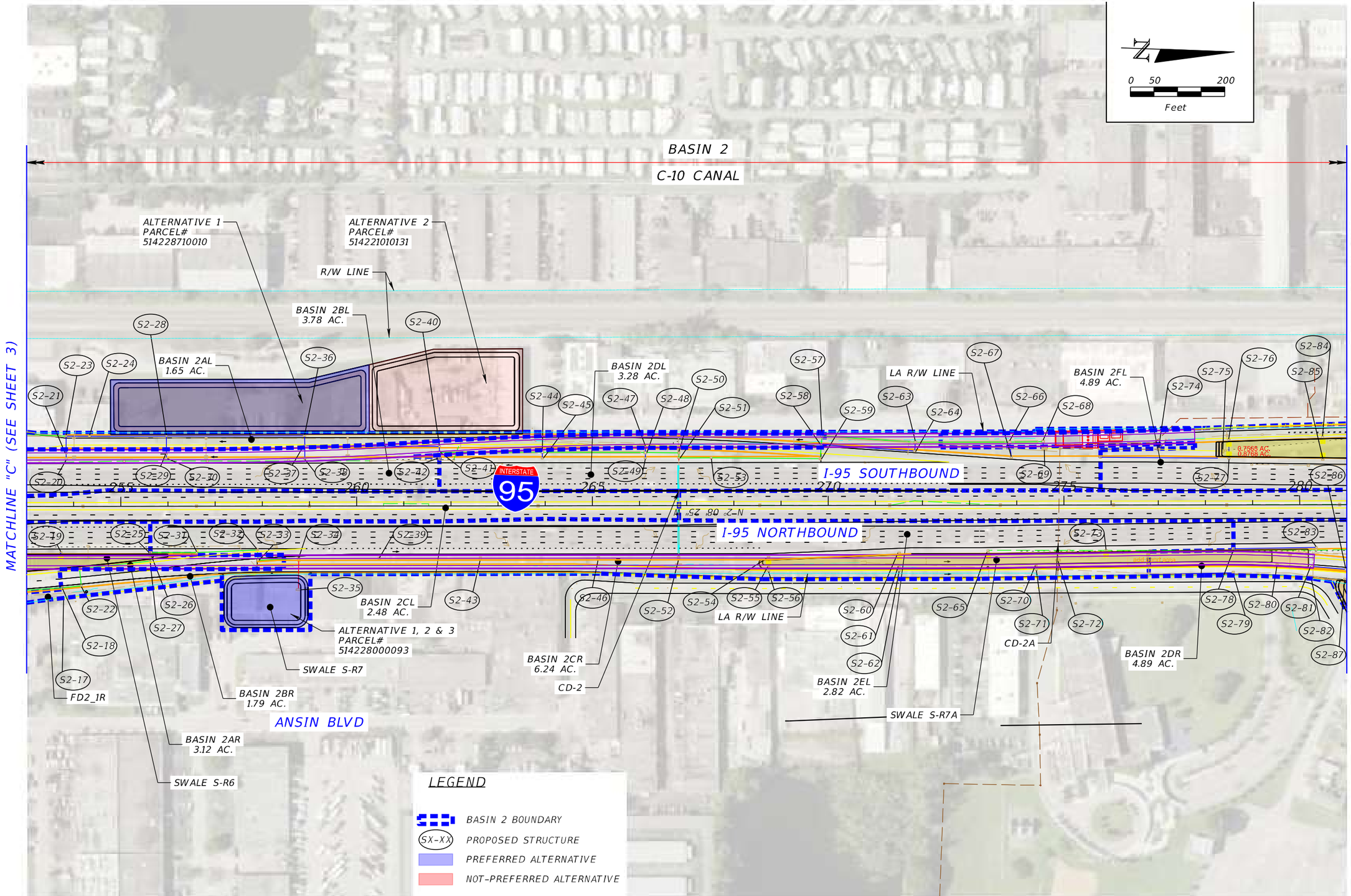

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POST-DEVELOPMENT DRAINAGE MAP	SHEET NO.
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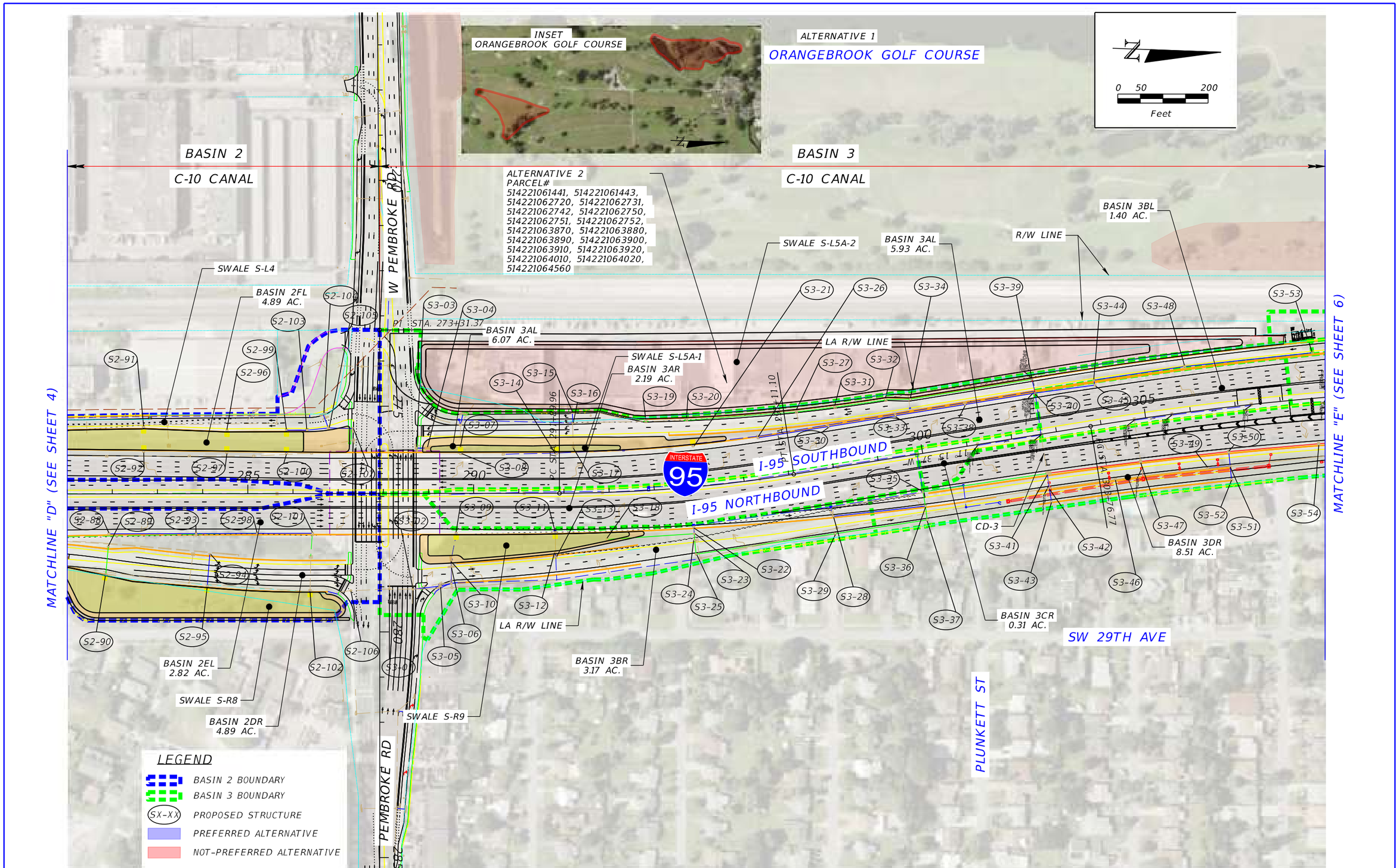
				SR 9	BROWARD	436903-1-22-02		4



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 5

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ORANGEBROOK GOLF COURSE

BASIN 3

C-10 CANAL

0 50 200
Feet

MATCHLINE "E" (SEE SHEET 5)

MATCHLINE "F" (SEE SHEET 7)

SWALE S-L5C

SWALE S-L5E

SWALE S-L5A-2

SWALE S-L5B

BASIN 3CL
1.66 AC.

BASIN 3DL
1.69 AC.

BASIN 3EL_OFF
2.38 AC.

BASIN 3EL
14.05 AC.

BASIN 3FL
2.97 AC.

R/W LINE

LA R/W LINE

S3-55 S3-56 S3-57 S3-58 S3-59 S3-60 S3-61 S3-62 S3-63 S3-64 S3-65 S3-66 S3-67 S3-68 S3-69 S3-70 S3-71 S3-72 S3-73 S3-74 S3-75 S3-76 S3-77 S3-78 S3-79 S3-80 S3-89 S3-90 S3-91 S3-92 S3-93 S3-94 S3-95 S3-96 S3-97 S3-98 S3-99 S3-100 S3-101 S3-102 S3-103 S3-104 S3-105 S3-106 S3-107 S3-108 S3-109 S3-110 S3-111 S3-112 S3-113 S3-114 S3-115 S3-116 S3-117 S3-118 S3-119 S3-120 S3-03

310 315 320 325 330 335

INTERSTATE 95

I-95 NORTHBOUND

I-95 SOUTHBOUND

N 73° 14' 00" E

CD-4

CD-5

BASIN 3DR
8.51 AC.

BASIN 3ER
7.99 AC.

SWALE S-R10

SW 29TH AVE

MONROE ST

LEGEND

- BASIN 3 BOUNDARY
- SX-XX PROPOSED STRUCTURE
- PREFERRED ALTERNATIVE
- NOT-PREFERRED ALTERNATIVE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 6

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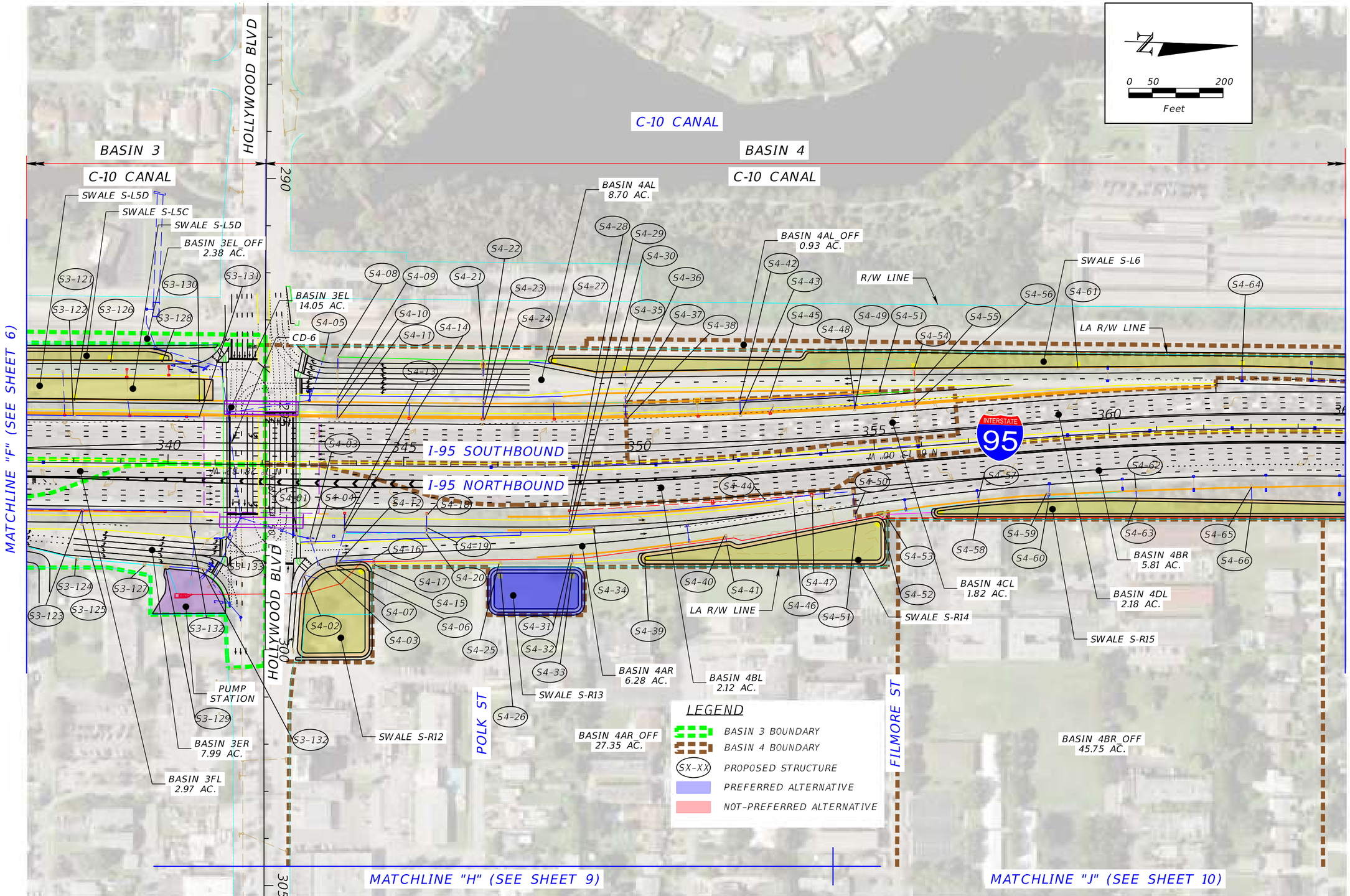

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	436903-1-22-02

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 7

C-10 CANAL

C-10 CANAL

0 50 200
Feet

BASIN 4

BASIN 5

C-10 CANAL

C-10 CANAL

SWALE S-L6

BASIN 4AL
8.70 AC.

S4-70

BASIN 4AL_OFF
0.93 AC.

S5-02

BASIN 5AL_OFF
1.06 AC.

S5-06

PROJECT LIMIT

R/W LINE

BASIN 5AL
7.91 AC.

S4-69

S4-72

S5-03

S5-07

S5-08

LA R/W LINE

I-95 SOUTHBOUND

370

375

380

385

390

N 1° 32' 30" W

INTERSTATE 95

I-95 NORTHBOUND

S5-05

STA. 382+08.71

S4-67

S4-68

S4-71

S4-73

BASIN 4BR
5.81 AC.

LA R/W LINE

S5-10

BASIN 5AR
6.36 AC.

SWALE
S-R15

S5-01

S5-04

S5-09

JOHNSON ST

SWALE
S-R16

POND
S-R17

ALTERNATIVE 2
PARCEL#
514209000200

CLEVELAND ST

BASIN 4CR_OFF
32.16 AC.

SUNSET GOLF COURSE

FLOOD COMPENSATION SITE
12.76 AC

LEGEND

- BASIN 4 BOUNDARY
- BASIN 5 BOUNDARY
- SX-XX PROPOSED STRUCTURE
- PREFERRED ALTERNATIVE
- NOT-PREFERRED ALTERNATIVE

MATCHLINE "G" (SEE SHEET 7)

MATCHLINE "K" (SEE SHEET 10)

REVISIONS				STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			POST-DEVELOPMENT DRAINAGE MAP	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				SR 9	BROWARD	436903-1-22-02		8

TABLE 1. WATER QUALITY/QUANTITY SUMMARY

Basin Area Calculation							Water Quality Calculation Summary	Water Quantity Calculation Summary	Required Storage For Stormwater Management	Storage Calculation Summary					Remarks
Project Basin		Station		Side	Total Area	Impervious Area	Water Quality Treatment Req'd	Net Runoff Increase (Post-Pre)		Available Storage within Exist. R/W (Ac.ft.)	Available Storage in FD (Ac.Ft.)	Additional Storage Needed outside Exist. R/W (Ac.ft.)	Additional Storage Provided outside Exist. R/W (Ac.ft.)	Surplus Storage (Ac.ft.)	Remarks
No.	Name	From	To	LT/RT	(Ac.)	(Ac.)	(Ac.ft.)	(Ac.ft.)	(Ac.ft.)						
1	Basin 1AL	172+00	236+00	LT	24.56	20.49	4.27	2.05	4.27	2.35	0.00	-1.92	5.91		Swale S-L2 & Swale S-L3 (Parcel 514228000170 & 514118000180)
2	Basin 1BL	217+50	228+80	LT	2.96	2.96	0.62	0.50	0.62	0.13	0.00	-0.48	0.00		Swale S-L1B
3	Basin 1CL	237+50	247+38	LT	2.39	1.92	0.40	0.52	0.52	0.08	0.00	-0.44	0.00		Swale S-L1C
4	Basin 1DL	236+00	247+38	LT	3.56	3.56	0.74	1.35	1.35	0.19	0.00	-1.16	0.00		Swale S-L1D
5	Basin 1EL	228+80	245+20	LT	3.08	3.08	0.64	0.18	0.64	0.16	0.00	-0.48	0.00		Swale S-L1E
6	Basin 1AR	177+50	192+00	RT	5.96	4.68	0.98	3.88	3.88	3.42	0.62	0.16	0.00		Swale S-R1A, Swale S-R1A-1, FD1_1R & FD1_2R
7	Basin 1BR	192+00	205+20	RT	3.99	3.34	0.70	0.95	0.95	1.36	0.23	0.63	0.00		Swale S-R1, FD1_3R
8	Basin 1CR	177+50	192+00	RT	6.97	5.39	1.12	-1.30	1.12	0.00	0.00	-1.12	0.00		
9	Basin 1DR	177+50	192+00	RT	5.21	4.04	0.84	0.47	0.84	0.48	0.08	-0.28	0.00		Pond S-R4, FD1_4R
From beginning of the project to Hallandale Beach Blvd. (Basin 1)									**14.19**	**8.16**	**0.92**	**-5.11**	**5.91**	**0.80**	

TABLE 1. WATER QUALITY/QUANTITY SUMMARY (CONTINUED)

Basin Area Calculation							Water Quality Calculation Summary	Water Quantity Calculation Summary	Required Storage For Stormwater Management	Storage Calculation Summary					Remarks
Project Basin		Station		Side	Total Area	Impervious Area	Water Quality Treatment Req'd	Net Runoff Increase (Post-Pre)		Available Storage within Exist. R/W (Ac.ft.)	Available Storage in FD (Ac.Ft.)	Additional Storage Needed outside Exist. R/W (Ac.ft.)	Additional Storage Provided outside Exist. R/W (Ac.ft.)	Surplus Storage (Ac.ft.)	Remarks
No.	Name	From	To	LT/RT	(Ac.)	(Ac.)	(Ac.ft.)	(Ac.ft.)	(Ac.ft.)						
1	Basin 2AL	247+38	262+00	LT	1.65	1.36	0.28	-0.55	0.28	0.00	0.00	0.28	2.75		Pond S-L5, (Parcels 514228710010, 514221010131, 514228640010, 514228740010 & 514228000102)
2	Basin 2BL	247+38	262+00	LT	3.78	3.78	0.79	1.45	1.45	0.00	0.00	1.45	0.00		
3	Basin 2CL	248+60	266+80	LT	2.48	2.48	0.52	0.01	0.52	0.00	0.00	0.52	0.00		
4	Basin 2DL	262+00	274+80	LT	3.28	2.74	0.57	0.55	0.57	0.00	0.00	0.57	0.00		
5	Basin 2EL	266+80	286+80	LT	2.82	2.82	0.59	0.00	0.59	1.51	0.00	-0.92	0.00		Swale S-R7A
6	Basin 2FL	274+80	288+00	LT	4.89	3.51	0.73	-0.04	0.73	0.84	0.00	-0.11	0.00		Swale S-L4
7	Basin 2AR	247+38	257+00	RT	3.12	2.87	0.60	0.89	0.89	1.35	0.00	-0.47	0.00		Swale S-R6
8	Basin 2BR	247+38	257+60	RT	1.79	0.73	0.15	-0.14	0.15	0.63	0.00	-0.48	0.00		Swale S-R5, FD2_1R
9	Basin 2CR	254+20	275+00	RT	6.24	5.73	1.19	2.20	2.20	0.00	0.00	2.20	0.59		Swale S-R7 (Parcel #514228000092 & 514228000093)
10	Basin 2DR	273+30	288+00	RT	4.89	3.14	0.65	-0.42	0.65	1.72	0.00	-1.07	0.00		Swale S-R8
From Hallandale Beach Blvd. to Pembroke Road. (Basin 2)									**8.02**	**6.05**	**0.00**	**1.97**	**3.34**	**1.37**	

TABLE 1. WATER QUALITY/QUANTITY SUMMARY (CONTINUED)

Basin Area Calculation							Water Quality Calculation Summary	Water Quantity Calculation Summary	Required Storage For Stormwater Management	Storage Calculation Summary					Remarks
Project Basin		Station		Side	Total Area	Impervious Area	Water Quality Treatment Req'd	Net Runoff Increase (Post-Pre)		Available Storage within Exist. R/W (Ac.ft.)	Available Storage in FD (Ac.Ft.)	Additional Storage Needed outside Exist. R/W (Ac.ft.)	Additional Storage Provided outside Exist. R/W (Ac.ft.)	Surplus Storage (Ac.ft.)	Remarks
No.	Name	From	To	LT/RT	(Ac.)	(Ac.)	(Ac.ft.)	(Ac.ft.)	(Ac.ft.)						
1	Basin 3AL	288+00	302+60	LT	5.93	5.08	1.06	0.47	1.06	0.41	0.00	0.65	0.80		Parcels 514221064500, 514221064590 & 514221064591
2	Basin 3BL	302+60	308+10	LT	1.40	1.40	0.29	-0.45	0.29	0.00	0.00	0.29	0.00		
3	Basin 3CL	308+10	315+00	LT	1.66	1.66	0.35	-0.11	0.35	0.74	0.00	-0.39	0.00		
4	Basin 3DL	315+00	322+00	LT	1.69	1.69	0.35	0.00	0.35	0.00	0.00	0.35	0.00		
5	Basin 3EL	310+00	342+00	LT	14.05	11.84	2.47	7.90	7.90	2.37	0.00	5.53	0.00		
6	Basin 3FL	322+00	340+00	LT	2.97	2.97	0.62	0.00	0.62	0.00	0.00	0.62	0.00		
7	Basin 3AR	289+00	300+00	RT	2.19	2.19	0.46	0.00	0.46	0.00	0.00	0.46	0.00		
8	Basin 3BR	288+00	298+80	RT	3.17	1.92	0.40	0.35	0.40	0.54	0.00	-0.14	0.00		
9	Basin 3CR	300+00	302+60	RT	0.31	0.31	0.06	0.00	0.06	0.00	0.00	0.06	0.00		
10	Basin 3DR	299+60	324+00	RT	8.51	7.76	1.62	1.46	1.62	0.00	0.00	1.62	0.00		
11	Basin 3ER	324+00	342+00	RT	7.99	5.54	1.15	1.58	1.58	0.34	0.00	1.24	0.00		
From Pembroke Road to Hollywood Blvd. (Basin 3)									**14.69**	**4.40**	**0.00**	**10.29**	**0.80**	**-9.49**	Provide in Sunset Golf Course

TABLE 1. WATER QUALITY/QUANTITY SUMMARY (CONTINUED)

Basin Area Calculation							Water Quality Calculation Summary	Water Quantity Calculation Summary	Required Storage For Stormwater Management	Storage Calculation Summary					Remarks
Project Basin		Station		Side	Total Area	Impervious Area	Water Quality Treatment Req'd	Net Runoff Increase (Post-Pre)		Available Storage within Exist. R/W (Ac.ft.)	Available Storage in FD (Ac.Ft.)	Additional Storage Needed outside Exist. R/W (Ac.ft.)	Additional Storage Provided outside Exist. R/W (Ac.ft.)	Surplus Storage (Ac.ft.)	Remarks
No.	Name	From	To	LT/RT	(Ac.)	(Ac.)	(Ac.ft.)	(Ac.ft.)	(Ac.ft.)						
1	Basin 4AL	342+00	369+50	LT	8.70	6.43	1.34	0.28	1.34	2.76	0.00	-1.42	0.00		Swale S-L6
2	Basin 4BL	343+00	355+90	LT	2.12	2.12	0.44	0.00	0.44	0.00	0.00	0.44	0.00		
3	Basin 4CL	349+80	356+80	LT	1.82	1.82	0.38	0.45	0.45	0.00	0.00	0.45	0.00		
4	Basin 4DL	355+90	369+50	LT	2.18	2.18	0.45	0.12	0.45	0.00	0.00	0.45	0.00		
5	Basin 4AR	342+00	355+00	LT	6.28	3.68	0.77	1.36	1.36	1.73	0.00	-0.36	0.56		Swale S-R12, Swale S-R14 & Swale S-R13 (Parcel No. 514216026520 & 51426026530),
6	Basin 4BR	354+60	369+50	LT	5.81	3.88	0.81	0.35	0.81	1.62	0.00	-0.81	0.00		Swale S-R15
From Hollywood Blvd. to Johnson Street (Basin 4)									**4.86**	**6.10**	**0.00**	**-1.25**	**0.56**	**1.81**	

TABLE 1. WATER QUALITY/QUANTITY SUMMARY (CONTINUED)

Basin Area Calculation							Water Quality Calculation Summary	Water Quantity Calculation Summary	Required Storage For Stormwater Management	Storage Calculation Summary					Remarks
Project Basin		Station		Side	Total Area	Impervious Area	Water Quality Treatment Req'd	Net Runoff Increase (Post-Pre)		Available Storage within Exist. R/W (Ac.ft.)	Available Storage in FD (Ac.Ft.)	Additional Storage Needed outside Exist. R/W (Ac.ft.)	Additional Storage Provided outside Exist. R/W (Ac.ft.)	Surplus Storage (Ac.ft.)	Remarks
No.	Name	From	To	LT/RT	(Ac.)	(Ac.)	(Ac.ft.)	(Ac.ft.)	(Ac.ft.)						
1	Basin 5AR	369+50	390+50	LT	6.36	4.66	0.97	0.07	0.97	0.34	0.00	0.63	9.62		
From Johnson Street to end of the project (Basin 5)									**0.97**	**0.34**	**0.00**	**0.63**	**9.62**	**9.00**	

BASIN No.	WATER MANAGEMENT FACILITIES					CONTROL /BOTTOM EL		TREATMENT AND ATTENUATION EL		STORAGE	REMARKS
	DESCRIPTION	From Sta.	To Sta.	Side	TREATMENT METHOD	Elev. (ft.)	Area (Ac.)	Elev (ft.)	Area (Ac.)	Volume (Ac-ft)	Minimum Berm EL
1	Swale S-L1A	176+20	191+00	LT	Dry Detention	2	0.98	4.2	1.15	2.35	6.00
	Swale S-L1B	193+90	197+20	LT	Dry Detention	2	0.04	4.2	0.08	0.13	6.00
	Swale S-L1C	209+80	212+50	LT	Dry Detention	2	0.02	4.2	0.05	0.08	6.50
	Swale S-L1D	219+50	222+30	LT	Dry Detention	2	0.06	4.2	0.11	0.19	5.00
	Swale S-L2	222+00	227+80	LT	Dry Detention	2	0.28	4.2	0.38	0.72	6.50
	Swale S-L1E	239+70	242+00	LT	Dry Detention	2	0.05	4.2	0.09	0.16	6.00
	Pond S-L3	224+90	239+80	LT	Dry Detention	2	2.23	4.2	2.49	5.19	5.50
	Swale S-R1A	171+00	175+80	RT	Dry Detention	2	1.08	4.2	1.26	2.58	8.00
	Swale S-R1A-1	171+00	175+80	RT	Dry Detention	2	0.33	4.2	0.43	0.84	8.00
	Swale S-R1	212+10	228+50	RT	Dry Detention	2	0.55	4.2	0.68	1.36	6.00
	Pond S-R4	245+20	246+80	RT	Dry Detention	2	0.18	4.2	0.26	0.48	5.50
									Σ Dry Detention =	*14.07*	
	TOTAL AVAILABLE STORAGE BASIN 1 = 14.07 AC-FT										
2	Swale S-L4	278+10	286+20	LT	Dry Detention	1.5	0.28	4	0.39	0.84	9.00
	Pond S-L5	254+90	260+20	LT	Dry Detention	1.5	1.00	4	1.20	2.75	9.00
	Swale S-R5	248+20	249+60	RT	Dry Detention	1.5	0.18	4	0.32	0.63	5.50
	Swale S-R6	248+20	255+80	RT	Dry Detention	1.5	0.47	4	0.61	1.35	5.50
	Swale S-R7	257+20	259+00	RT	Dry Detention	1.5	0.19	4	0.28	0.59	6.00
	Swale S-R7A	268+50	280+20	RT	Dry Detention	1.5	0.53	4	0.68	1.51	5.00
	Swale S-R8	280+10	285+10	RT	Dry Detention	1.5	0.61	4	0.77	1.72	7.00
									Σ Dry Detention =	*9.39*	
	TOTAL AVAILABLE STORAGE BASIN 1 = 9.39 AC-FT										
3	Swale S-L5A-1	289+90	295+80	LT	Dry Detention	1.5	0.17	3.5	0.24	0.41	7.50
	Swale S-L5A-2	314+30	321+70	LT	Dry Detention	1.5	0.30	3.5	0.44	0.74	4.50
	Swale S-L5B	326+20	334+20	LT	Dry Detention	1.5	0.35	3.5	0.45	0.80	5.00
	Swale S-L5C	333+80	340+10	LT	Dry Detention	1.5	0.18	3.5	0.25	0.43	5.00
	Swale S-L5D	332+30	340+90	LT	Dry Detention	1.5	0.47	3.5	0.58	1.05	5.00
	Swale S-L5E	330+40	332+40	LT	Dry Detention	1.5	0.03	3.5	0.06	0.09	5.00
	Swale S-R9	288+90	293+80	RT	Dry Detention	1.5	0.23	3.5	0.31	0.54	7.50
	Swale S-R10	329+00	331+80	RT	Dry Detention	1.5	0.14	3.5	0.20	0.34	4.50
									Σ Dry Detention =	*4.40*	
	TOTAL AVAILABLE STORAGE BASIN 1 = 4.40 AC-FT										
4	Swale S-L6	348+00	369+00	LT	Dry Detention	1.5	1.29	3.5	1.47	2.76	4.50
	Swale S-R12	342+90	346+30	RT	Dry Detention	1.5	0.29	3.5	0.43	0.72	6.00
	Swale S-R13	346+70	348+90	RT	Dry Detention	1.5	0.24	3.5	0.32	0.56	5.00
	Swale S-R14	350+00	355+10	RT	Dry Detention	1.5	0.45	3.5	0.56	1.01	5.50
	Swale S-R15	346+10	369+00	LT	Dry Detention	1.5	0.74	3.5	0.88	1.62	4.50
									Σ Dry Detention =	*6.66*	
	TOTAL AVAILABLE STORAGE BASIN 1 = 6.66 AC-FT										
5	Swale S-R16	370+10	375+05	RT	Dry Detention	1.5	0.14	3.5	0.20	0.34	5.00
	Pond S-R17	370+00	382+05	RT	Dry Detention	1.5	4.56	3.5	5.06	9.62	6.00
									Σ Dry Detention =	*9.97*	
	TOTAL AVAILABLE STORAGE BASIN 1 = 9.97 AC-FT										

indicates outside r/w

SYSTEM 9											
C-10 Canal to Sheridan Street											
Permit 88-00050-S											
Station	**Side**	**Ditch Fill Area (SF)**	**Ditch Excavation Area (SF)**	**Ditch Fill Volume * (CY)**	**Ditch Excavation Volume * (CY)**	**Station**	**Side**	**Ditch Fill Area (SF)**	**Ditch Excavation Area (SF)**	**Ditch Fill Volume * (CY)**	**Ditch Excavation Volume * (CY)**
418+00.00	LT	0.00	0.00	0.000	0.000	418+00.00	RT	0.00	0.00	0.000	0.000
419+00.00	LT	0.00	0.00	0.000	0.000	419+00.00	RT	0.00	0.00	0.000	0.000
420+00.00	LT	0.00	0.00	0.000	0.000	420+00.00	RT	0.00	0.00	0.000	0.000
421+00.00	LT	0.00	0.00	0.000	0.000	421+00.00	RT	0.00	0.00	0.000	0.000
422+00.00	LT	0.00	0.00	0.000	0.000	422+00.00	RT	0.00	0.00	0.000	0.000
423+00.00	LT	0.00	0.00	0.000	0.000	423+00.00	RT	0.00	0.00	0.000	0.000
			Sub-Total (CY) =	**22.370**	**2141.278**				**Sub-Total (CY) =**	**24.704**	**1723.981**
			Sub-Total (Ac-ft) =	**0.014**	**1.327**				**Sub-Total (Ac-ft) =**	**0.015**	**1.069**

System 9 Totals: **Fill Total (Ac-ft): 0.029** **Excavation Total (Ac-ft): 2.396**

* Volumes calculated for ditch stations above are based on a ditch bottom elevation of 1.0-ft NAVD to a control elevation of 2.0-ft NAVD (information based on existing permit).

System 9
Existing Data

1" = 300'

SYSTEM 6
PERMIT 88-00053-S

SYSTEM 7
PERMIT 88-00053-S

SYSTEM 8
PERMIT 88-00050-S

SYSTEM 9
PERMIT 88-00050-S

MATCH LINE (STA. 359+46.45)

MATCH LINE (STA. 397+19.17)

JOHNSON ST.

STA. 381+80.50

C-10 CANAL

TAFT ST.

SB SR 9 (I-95)

NB SR 9 (I-95)

R/W LINE

SWALE 6-4

SWALE 9-1

SWALE 9-2

ADDITIONAL IMP. AREA A6-10 = 0.004 AC

ADDITIONAL IMP. AREA A7-1 = 0.002 AC

ADDITIONAL IMP. AREA A7-3 = 0.007 AC

ADDITIONAL IMP. AREA A7-4 = 0.003 AC

ADDITIONAL IMP. AREA A6-9 = 0.009 AC

ADDITIONAL IMP. AREA A7-2 = 0.002 AC

ADDITIONAL IMP. AREA A8-1 = 0.016 AC

ADDITIONAL IMP. AREA A8-2 = 0.078 AC

ADDITIONAL IMP. AREA A9-1 = 0.092 AC

ADDITIONAL IMP. AREA A9-2 = 0.013 AC

ADDITIONAL IMP. AREA A9-3 = 0.031 AC

ADDITIONAL IMP. AREA

PROP. POND/SWALE

EXIST. POND/SWALE

DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND ASSISTANCE TO THE CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DAVID R. VERLANDER, P.E.
P.E. LICENSE NUMBER 81420
GAI CONSULTANTS, INC.
618 E. SOUTH STREET - SUITE 700
ORLANDO, FL 32801
CERTIFICATE OF AUTHORIZATION 9951

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 3

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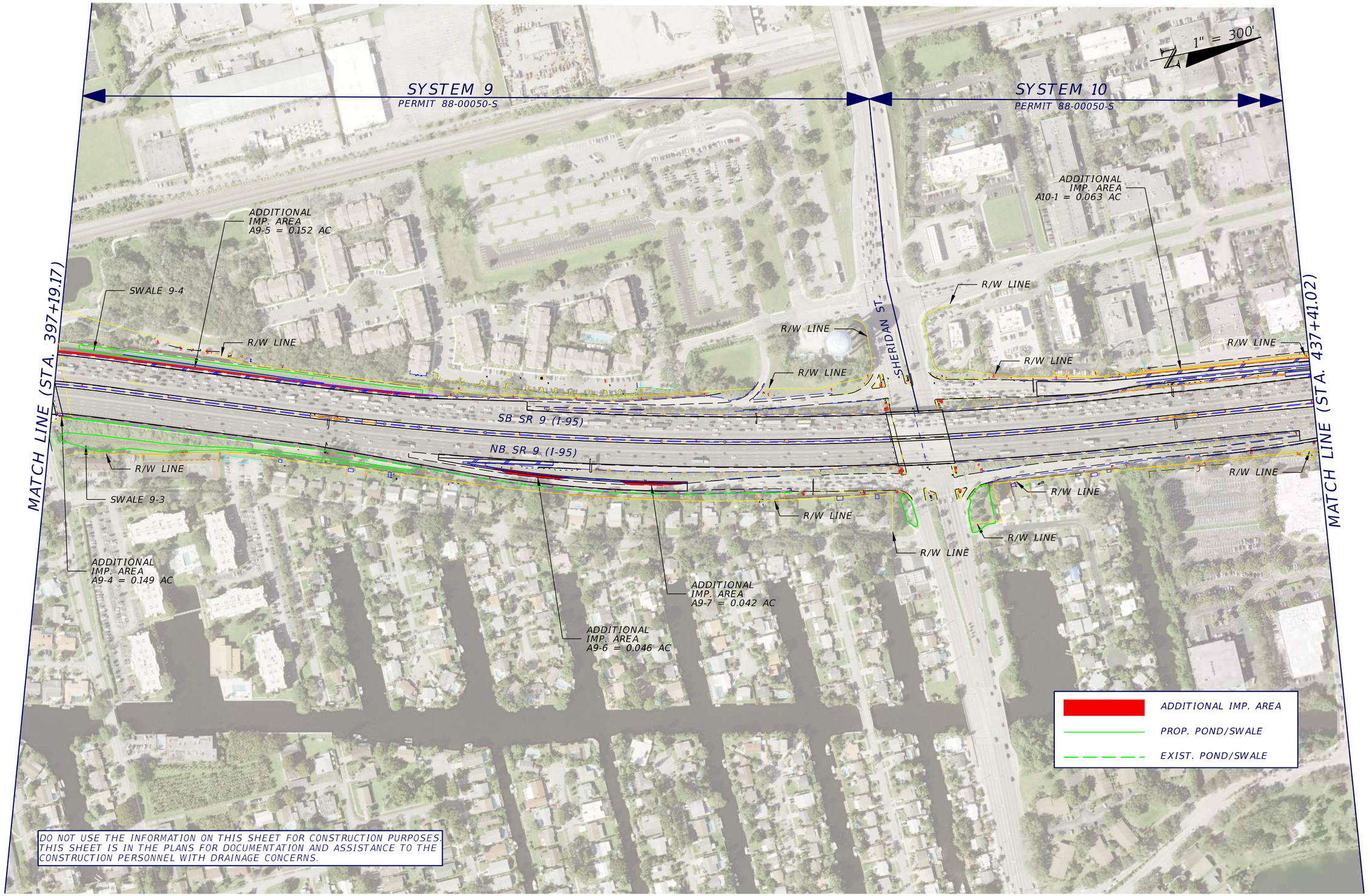

REVISIONS			
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ORLANDO, FL 32801
CERTIFICATE OF AUTHORIZATION 9951

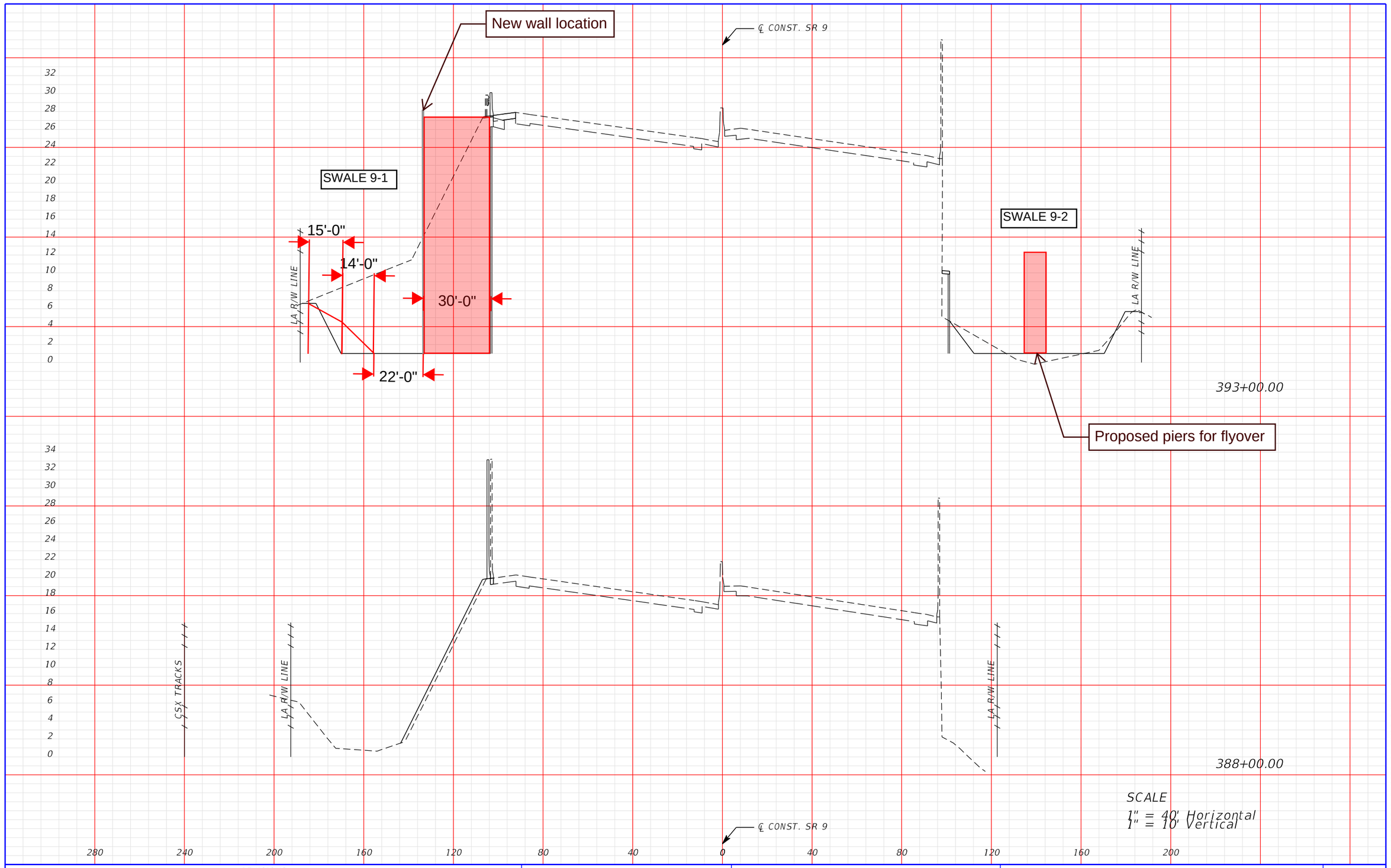
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 4

SYSTEM 9											
C-10 Canal to Sheridan Street											
Permit 88-00050-S											
Station	Side	Ditch Fill Area (SF)	Ditch Excavation Area (SF)	Ditch Fill Volume * (CY)	Ditch Excavation Volume * (CY)	Station	Side	Ditch Fill Area (SF)	Ditch Excavation Area (SF)	Ditch Fill Volume * (CY)	Ditch Excavation Volume * (CY)
390+00.00	LT	0.00	**112.51**			390+00.00	RT	0.00	0.00		
391+00.00	LT	0.00	**103.93**	0.000	400.815	391+00.00	RT	0.00	**4.30**	0.000	7.963
392+00.00	LT	0.00	**86.03**	0.000	351.778	392+50.00	RT	0.00	**24.56**	0.000	80.167
393+00.00	LT	0.00	**67.61**	0.000	284.519	393+00.00	RT	0.00	**16.24**	0.000	37.778
394+00.00	LT	0.00	**62.50**	0.000	240.944	394+00.00	RT	0.00	**38.73**	0.000	101.796
395+00.00	LT	0.00	**43.83**	0.000	196.907	395+00.00	RT	0.00	**50.07**	0.000	164.444
396+00.00	LT	0.00	0.00	0.000	81.167	396+00.00	RT	0.00	0.00	0.000	92.722
397+00.00	LT	0.00	**3.39**	0.000	6.278	397+00.00	RT	0.00	0.00	0.000	0.000
398+00.00	LT	0.00	**7.20**	0.000	19.611	398+00.00	RT	0.00	**82.05**	0.000	151.944
399+00.00	LT	0.00	**14.59**	0.000	40.352	399+00.00	RT	0.00	**52.28**	0.000	248.759
400+00.00	LT	0.00	**22.88**	0.000	69.389	400+00.00	RT	0.00	**34.33**	0.000	160.389
401+00.00	LT	0.00	**21.24**	0.000	81.704	401+00.00	RT	**6.67**	**30.87**	12.352	120.741
402+00.00	LT	0.00	**20.38**	0.000	77.074	402+00.00	RT	0.00	**27.25**	12.352	107.630
403+00.00	LT	0.00	**20.38**	0.000	75.481	403+00.00	RT	0.00	**23.55**	0.000	94.074
404+00.00	LT	0.00	**20.24**	0.000	75.222	404+00.00	RT	0.00	**18.96**	0.000	78.722
405+00.00	LT	0.00	**19.75**	0.000	74.056	405+00.00	RT	0.00	**16.08**	0.000	64.889
406+00.00	LT	0.00	**3.08**	0.000	42.278	406+00.00	RT	0.00	**17.81**	0.000	62.759
407+00.00	LT	0.00	**1.25**	0.000	8.019	407+00.00	RT	0.00	**16.83**	0.000	64.148
408+00.00	LT	0.00	**3.13**	0.000	8.111	408+00.00	RT	0.00	**14.55**	0.000	58.111
409+00.00	LT	**6.04**	**0.48**	11.185	6.685	409+00.00	RT	0.00	0.00	0.000	26.944
410+00.00	LT	0.00	0.00	11.185	0.889	410+00.00	RT	0.00	0.00	0.000	0.000
411+00.00	LT	0.00	0.00	0.000	0.000	411+00.00	RT	0.00	0.00	0.000	0.000
412+00.00	LT	0.00	0.00	0.000	0.000	412+00.00	RT	0.00	0.00	0.000	0.000
413+00.00	LT	0.00	0.00	0.000	0.000	413+00.00	RT	0.00	0.00	0.000	0.000
414+00.00	LT	0.00	0.00	0.000	0.000	414+00.00	RT	0.00	0.00	0.000	0.000
415+00.00	LT	0.00	0.00	0.000	0.000	415+00.00	RT	0.00	0.00	0.000	0.000
416+00.00	LT	0.00	0.00	0.000	0.000	416+00.00	RT	0.00	0.00	0.000	0.000
417+00.00	LT	0.00	0.00	0.000	0.000	417+00.00	RT	0.00	0.00	0.000	0.000



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON, P.E.
P.E. LICENSE NUMBER 61898
RS&H, INC.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

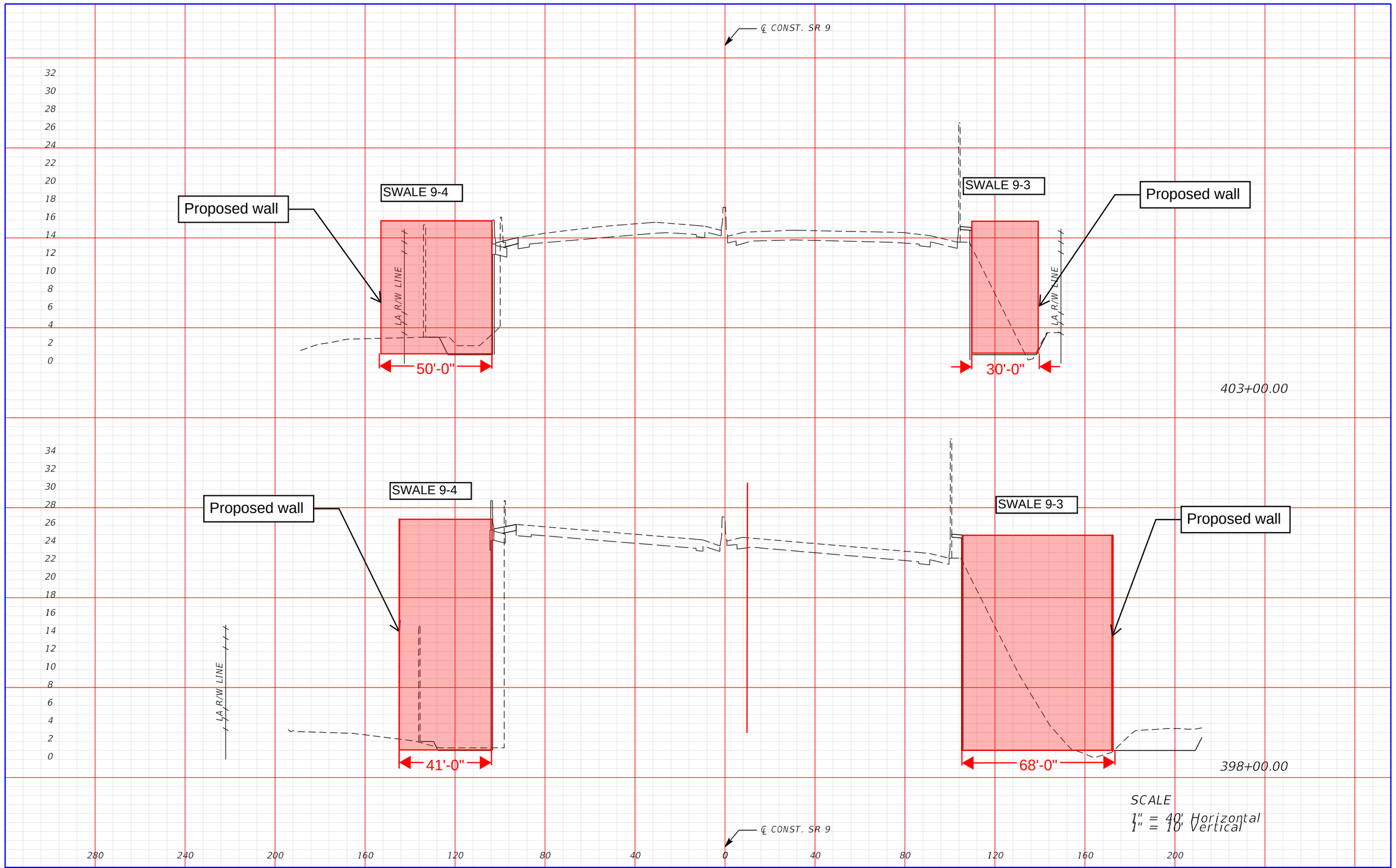
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-8

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



SCALE
1" = 40' Horizontal
1" = 10' Vertical

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS			
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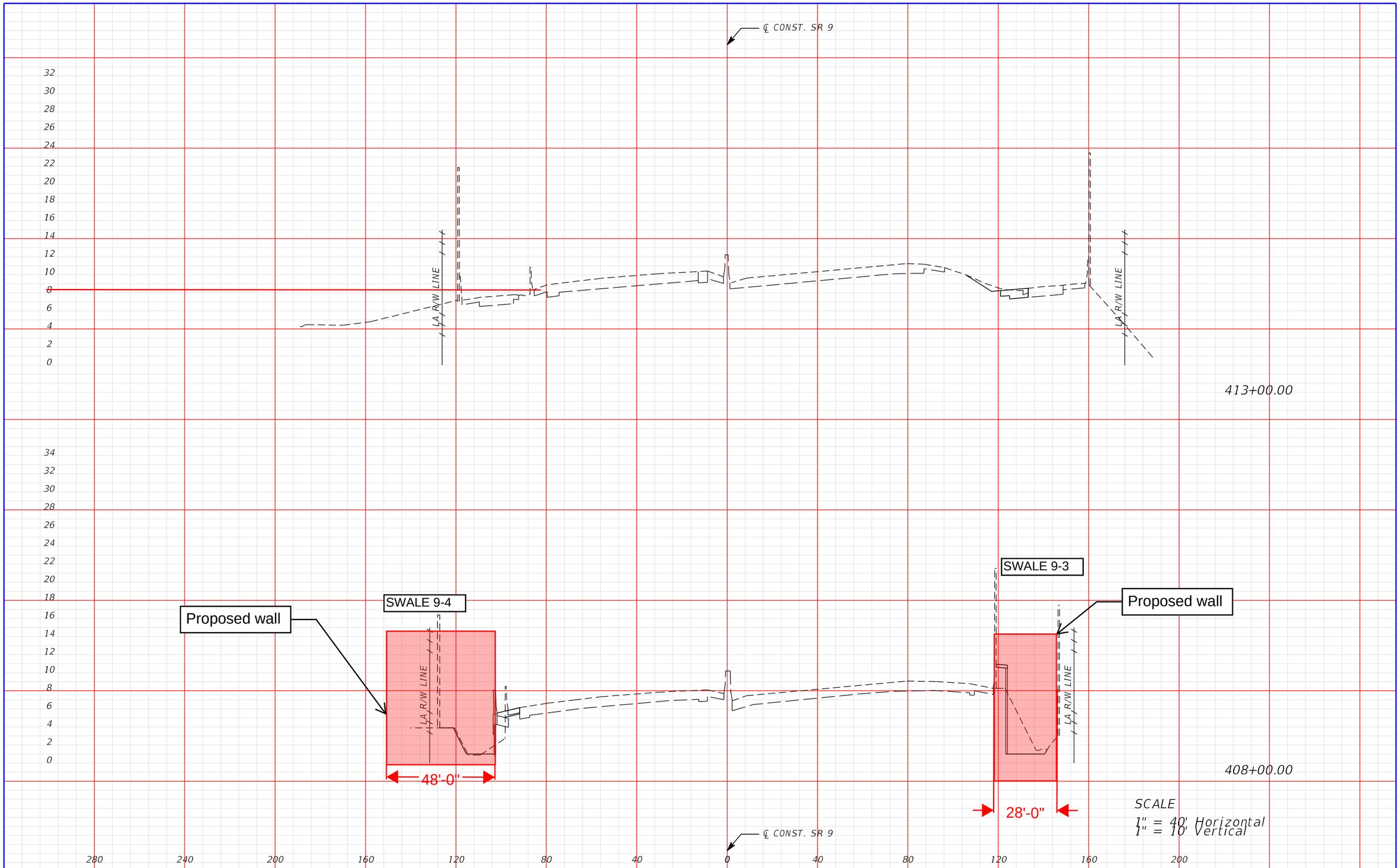
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-9



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-10

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

Table 2: Project Area Breakdown and Land Use Summary

PRE-DEVELOPMENT				
System	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
	Roadway / Sidewalk, etc.	Wet Storage		
System 6	43.72	0.00	18.15	61.86
System 7	6.19	0.00	2.35	8.54
System 8	3.73	0.00	1.54	5.27
System 9	21.07	0.00	8.02	29.10
System 10	16.88	0.00	3.21	20.09

POST-DEVELOPMENT				
System	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
	Roadway / Sidewalk, etc.	Wet Storage		
System 6	45.71	0.00	16.16	61.86
System 7	6.20	0.00	2.34	8.54
System 8	3.82	0.00	1.45	5.27
System 9	21.60	0.00	7.50	29.10
System 10	17.01	0.00	3.07	20.09

Table 3: Water Quality Summary

POST-DEVELOPMENT			
System	Water Quality Required (ac·ft)	Water Quality Provided (ac·ft)	Surplus Water Quality Provided (ac·ft)
System 6	0.311	2.621	2.310
System 7	0.011	0.076	0.065
System 8	0.077	0.248	0.171
System 9	0.427	0.868	0.441
System 10	0.115	0.472	0.357

DRAINAGE SYSTEM 9 CALCULATIONS

FIGURE 9.1 - SYSTEM 9

DITCH LEFT:

STATION	EXISTING DITCH AREA (SF)	PROPOSED DITCH AREA (SF)	EXISTING DITCH VOLUME (CY)	PROPOSED DITCH VOLUME (CY)
445+00.00	26.6	10.8		
450+00.00	30.6	70.9	530	756
		TOTAL =	530	756

DITCH RIGHT:

STATION	EXISTING DITCH AREA (SF)	PROPOSED DITCH AREA (SF)	EXISTING DITCH VOLUME (CY)	PROPOSED DITCH VOLUME (CY)
435+00.00	9.9	19.0		
440+00.00	12.0	23.1	203	390
445+00.00	39.6	37.7	478	563
450+00.00	50.2	52.0	831	831
		TOTAL =	1512	1783

NET VOLUME PROVIDED (PROPOSED DITCH VOLUME) - (EXISTING DITCH VOLUME) = 498 CY

= 0.309 Ac-Ft

NET VOLUME NEEDED PER ADD'L IMPERVIOUS AREA OVER 2.5 in = 0.189 Ac-Ft

1.207 Ac Add'l Impev
2.5" Runoff Treatment
75% Dry Retention

CONCLUSION: VOLUME PROVIDED FOR ADDITIONAL IMPERVIOUS AREA IS SUFFICIENT TO TREAT AND STORE THE ADDITIONAL IMPERVIOUS AREA REQUIREMENTS OVER THE FIRST 2.5 INCHES OF RUNOFF

*The stations listed above represent only the areas where volumetric storage has been disturbed

DRAINAGE SYSTEM 10 CALCULATIONS

FIGURE 10.1 - SYSTEM 10

DITCH RIGHT:

STATION	EXISTING DITCH AREA (SF)	PROPOSED DITCH AREA (SF)	EXISTING DITCH VOLUME (CY)	PROPOSED DITCH VOLUME (CY)
455+00.00	14.3	27.0		
460+00.00	13.6	29.8	258	526
		TOTAL =	258	526

DITCH LEFT:

STATION	EXISTING DITCH AREA (SF)	PROPOSED DITCH AREA (SF)	EXISTING DITCH VOLUME (CY)	PROPOSED DITCH VOLUME (CY)
455+00.00	39.8	71.9		
460+00.00	2.1	63.6	388	1255
465+00.00	11.6	60.8	127	1152
		TOTAL =	515	2406

NET VOLUME PROVIDED (PROPOSED DITCH VOLUME) - (EXISTING DITCH VOLUME) = 2159 CY

= 1.338 Ac-Ft

NET VOLUME NEEDED PER ADD'L IMPERVIOUS AREA OVER 2.5 in = 0.039 Ac-Ft

0.248 Ac Add'l Imperv
2.5" Runoff Treatment
75% Dry Retention

CONCLUSION: VOLUME PROVIDED FOR ADDITIONAL IMPERVIOUS AREA IS SUFFICIENT TO TREAT AND STORE THE ADDITIONAL IMPERVIOUS AREA REQUIREMENTS OVER THE FIRST 2.5 INCHES OF RUNOFF

*The stations listed above represent only the areas where volumetric storage has been disturbed

DRAINAGE SYSTEM 11 CALCULATIONS

FIGURE 11.1 - SYSTEM 11

DITCH RIGHT:

STATION	EXISTING DITCH AREA (SF)	PROPOSED DITCH AREA (SF)	EXISTING DITCH VOLUME (CY)	PROPOSED DITCH VOLUME (CY)
500+00.00	13.6	51.5		
505+00.00	0.0	25.5	126	713
510+00.00	4.2	27.7	39	493
515+00.00	0.0	19.3	39	895
		TOTAL =	204	2101

NET VOLUME PROVIDED (PROPOSED DITCH VOLUME) - (EXISTING DITCH VOLUME) = 1897 CY

= 1.176 Ac-Ft

NET VOLUME NEEDED PER ADD'L IMPERVIOUS AREA OVER 2.5 in = 0.072 Ac-Ft

0.461 Ac Add'l Imperv
2.5" Runoff Treatment
75% Dry Retention

CONCLUSION: VOLUME PROVIDED FOR ADDITIONAL IMPERVIOUS AREA IS SUFFICIENT TO TREAT AND STORE THE ADDITIONAL IMPERVIOUS AREA REQUIREMENTS OVER THE FIRST 2.5 INCHES OF RUNOFF

*The stations listed above represent the areas only where volumetric storage has been disturbed

FLOOD

PROJECT PARK & RIDE @ SHERIDAN JT. PROJECT NO. 3511.100
SUBJECT DETENTION & TREATMENT VOLUMES DESIGNED BY JMG DATE OCT '91
CHECKED BY DATE
SHEET NO. 3 OF 3

DETENTION BASIN *

STAGE VS. STORAGE :

STAGE	AREA (SF)	STORAGE (AC-FT)
3	15 310.	Ø
4	17970.	0.388
5	20130	0.825
6	22 290.	1.312

* NO WATER TREATMENT, ONLY ATTENUATION IN DETENTION BASIN!

STATE PROJ. NO.	SHEET NO.
86070-3495	14

STA. 8+30 ℄ CONST. N. 29TH AVE.
BEGIN CONSTRUCTION CONN. TO EXIST. PAVT.

STA. 63+64.66, 8' LT. ℄ ACCESS RD.
STA. 122+00, 16.51' LT. ℄ RAMP 'E'
END CONST. CONN. TO EXIST. SHLD.

P.C. STA. 120+67.32 ℄ RAMP 'E'
STA. 64+97.83 END ℄ ACCESS RD.

STA. 123+37.51, 16' LT. ℄ RAMP 'E'
STA. 62+33.77, 16' LT. ℄ ACCESS RD.

EQUATION:
STA. 10+56.96 BK. =
STA. 10+56.24 AH.

MATCH LINE STA. 11+60

NOTE:
1. FOR DETAILED BASELINE GEOMETRICS AND CURVE DATA SEE SHEET NO. 9
2. FOR DETAIL ON TYPE 'B' FENCE SEE INDEX NO. 452.

ADD./REVISED SUBMITTAL
SEP 22 1992

ADD./REVISED SUBMITTAL
SEP 22 1992

EXHIBIT 5

FINAL APPROVED
OCT 15 1992
WPB

06-01607-5

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

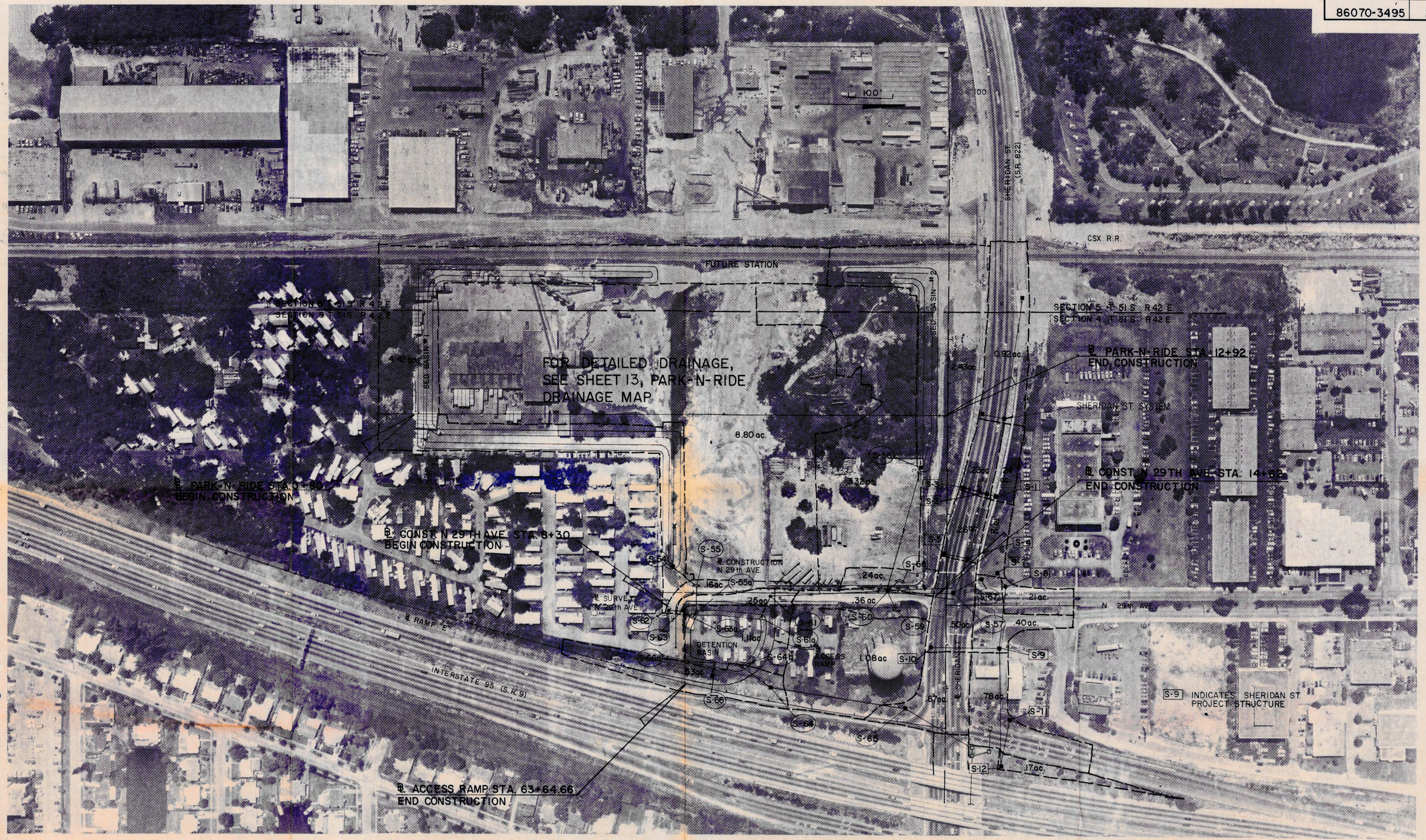
P29A.DGN 08-SEP-92

	NAME	DATE		NAME	DATE
DESIGNED BY	AVERY	10-91	DRAWN BY	NGUYEN	10-91
CHECKED BY	MADDEN	10-91	CHECKED BY	McBRAYER	10-91
SUPERVISED BY: H. MADDEN					

FLORIDA DEPARTMENT OF TRANSPORTATION
APPROVED BY: H. MADDEN
DATE: 12-17-91

PLAN N. 29TH AVE. 8+30 - 11+60 & ACCESS ROAD 60+00 - 63+64.66

STATE PROJ. NO.	SHEET NO.
86070-3495	2



REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

	NAME	DATE		NAME	DATE
DESIGNED BY	D. GILE	10/91	DRAWN BY	E. HODGES	10/91
CHECKED BY	MARDEN	10/91	CHECKED BY	GILE	10/91
SUPERVISED BY					

FLORIDA DEPARTMENT OF TRANSPORTATION

APPROVED BY

DATE

ORIGINAL SUBMITTAL

AUG 03 1992

DRAINAGE MAP

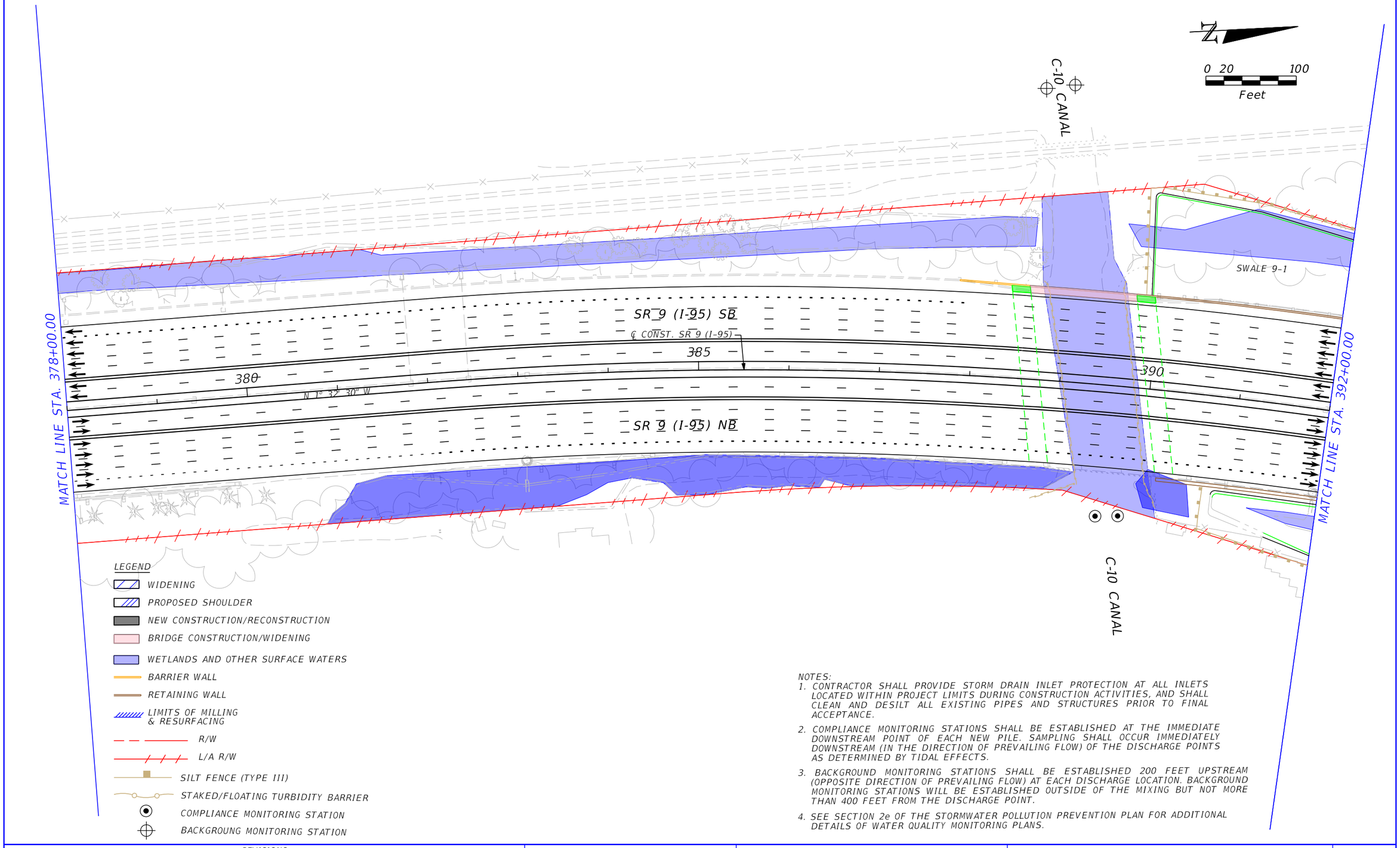
SOUTHERN RESOURCE MAPPING CORP.
ORMOND BEACH, FLORIDA

FINAL APPROVED
OCT 15 1992
WPB

11-26-91

08-01607-5

EXHIBIT 2



LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
- RETAINING WALL
- LIMITS OF MILLING & RESURFACING
- R/W
- L/A R/W
- SILT FENCE (TYPE III)
- STAKED/FLOATING TURBIDITY BARRIER
- COMPLIANCE MONITORING STATION
- BACKGROUNG MONITORING STATION

NOTES:

1. CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.
2. COMPLIANCE MONITORING STATIONS SHALL BE ESTABLISHED AT THE IMMEDIATE DOWNSTREAM POINT OF EACH NEW PILE. SAMPLING SHALL OCCUR IMMEDIATELY DOWNSTREAM (IN THE DIRECTION OF PREVAILING FLOW) OF THE DISCHARGE POINTS AS DETERMINED BY TIDAL EFFECTS.
3. BACKGROUND MONITORING STATIONS SHALL BE ESTABLISHED 200 FEET UPSTREAM (OPPOSITE DIRECTION OF PREVAILING FLOW) AT EACH DISCHARGE LOCATION. BACKGROUND MONITORING STATIONS WILL BE ESTABLISHED OUTSIDE OF THE MIXING BUT NOT MORE THAN 400 FEET FROM THE DISCHARGE POINT.
4. SEE SECTION 2e OF THE STORMWATER POLLUTION PREVENTION PLAN FOR ADDITIONAL DETAILS OF WATER QUALITY MONITORING PLANS.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-7

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

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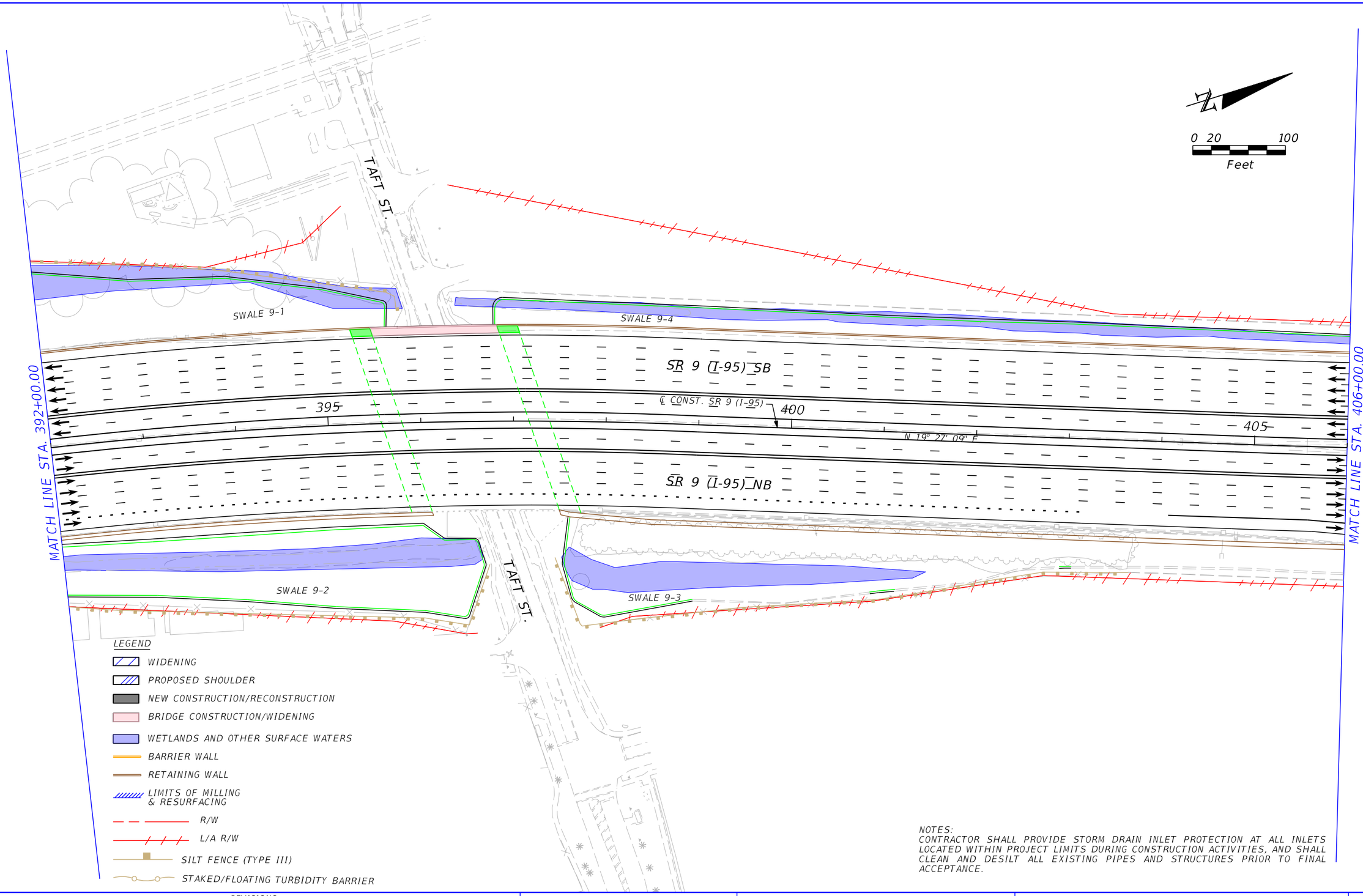

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

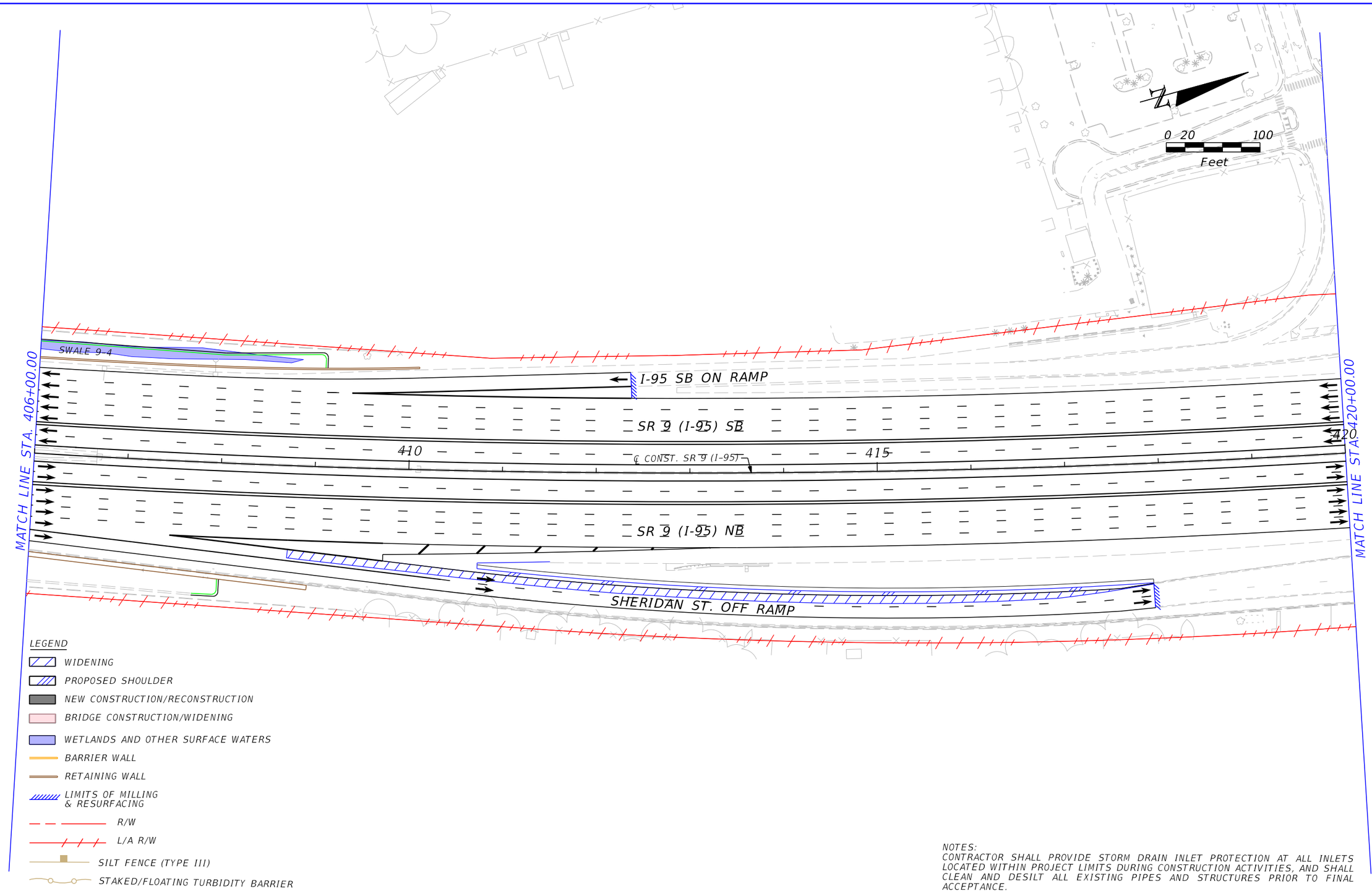
CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-8



NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

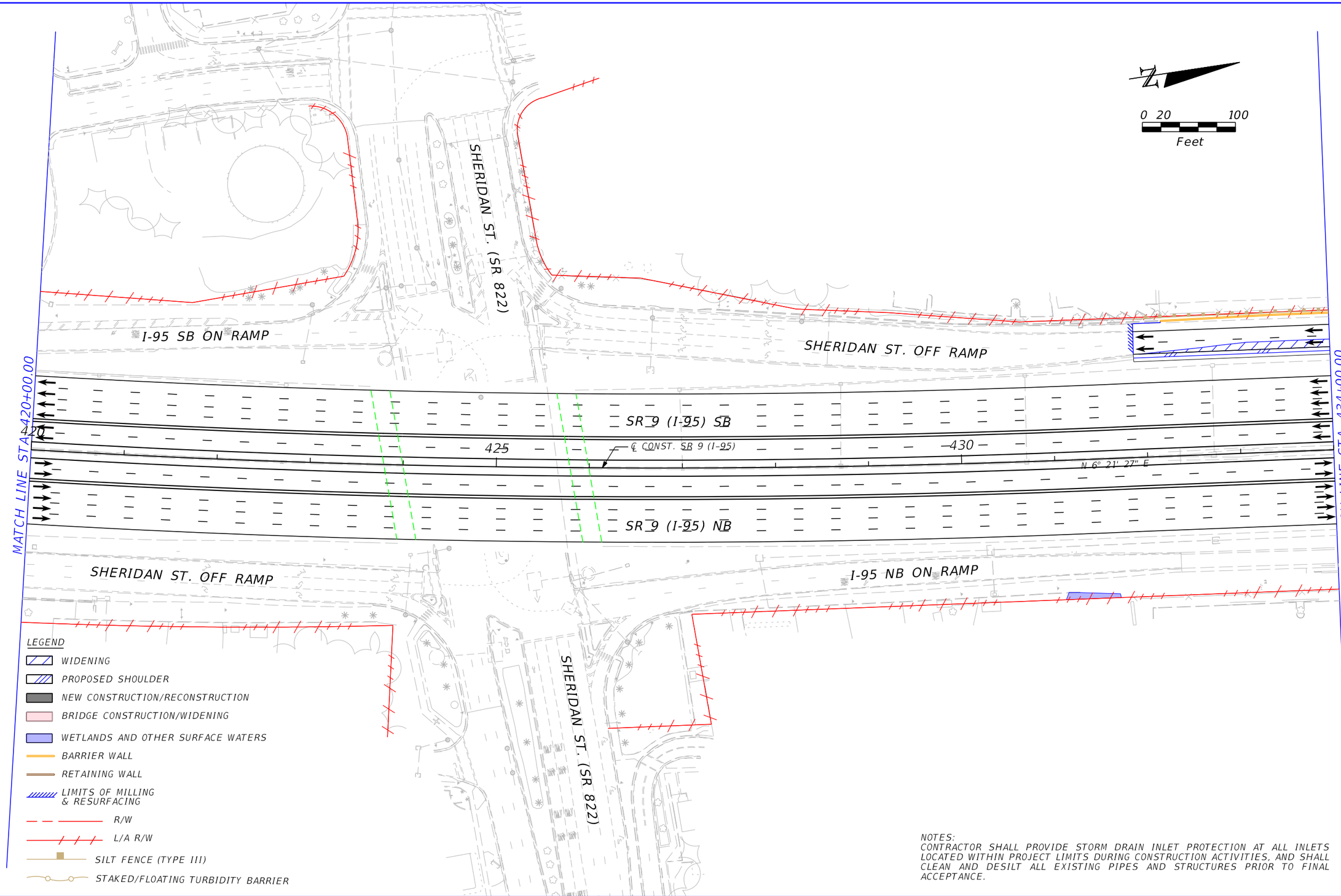
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-9

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-10

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

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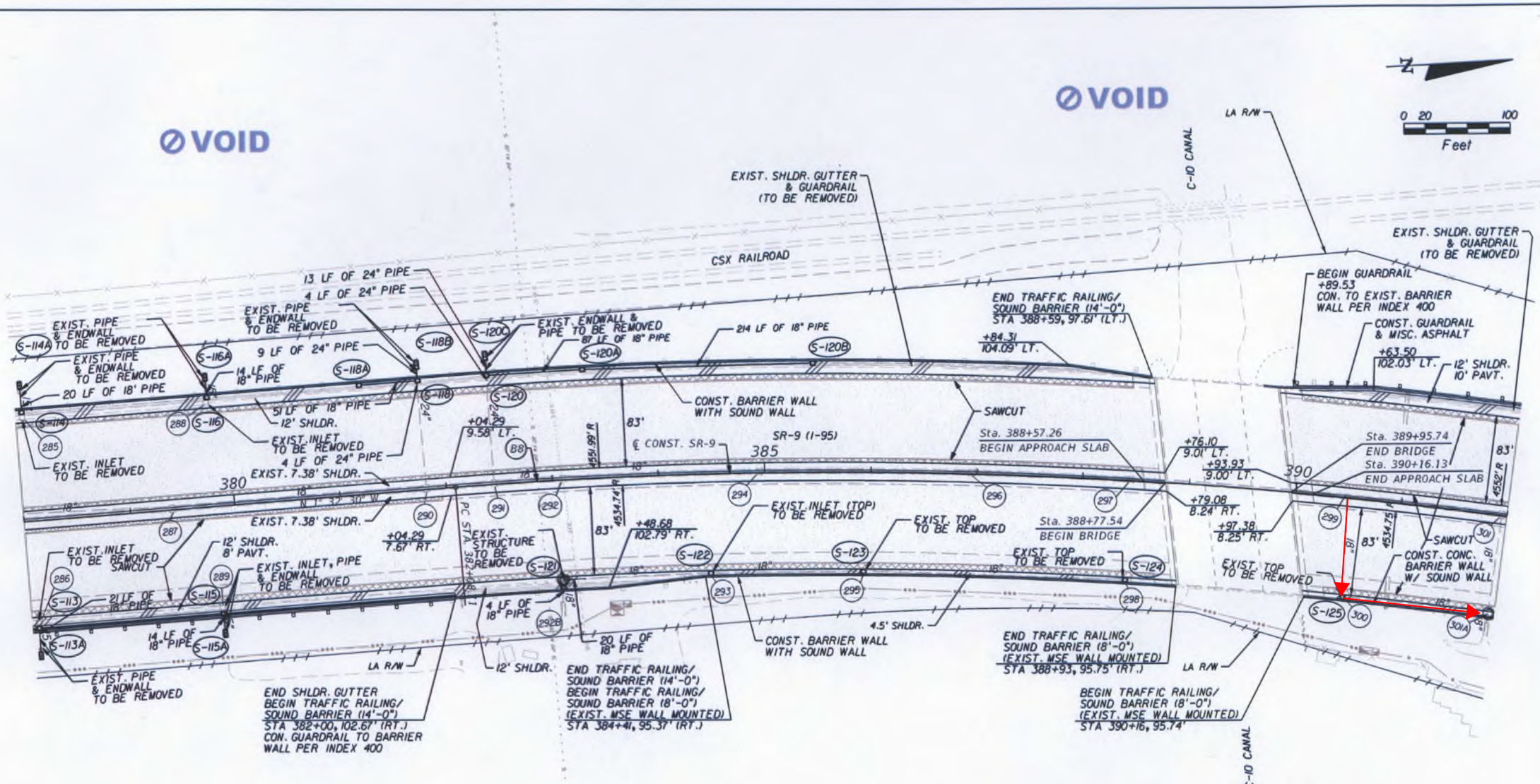
⊘VOID



LEGEND:

- WIDENING
- MILL & RESURFACE
- PROPOSED SHOULDER

⊘VOID

RELEASED FOR CONSTRUCTION

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

C. BRIAN FULLER, P.E. # 49524
METRIC ENGINEERING, INC.
615 CRESCENT EXECUTIVE CT
SUITE 524
LAKE MARY, FLORIDA 32746
TEL. (407) 644-1898
FAX. (407) 644-1921
CERTIFICATE OF AUTHORIZATION 2294
● ENGINEERS ● PLANNERS ● SURVEYORS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 54

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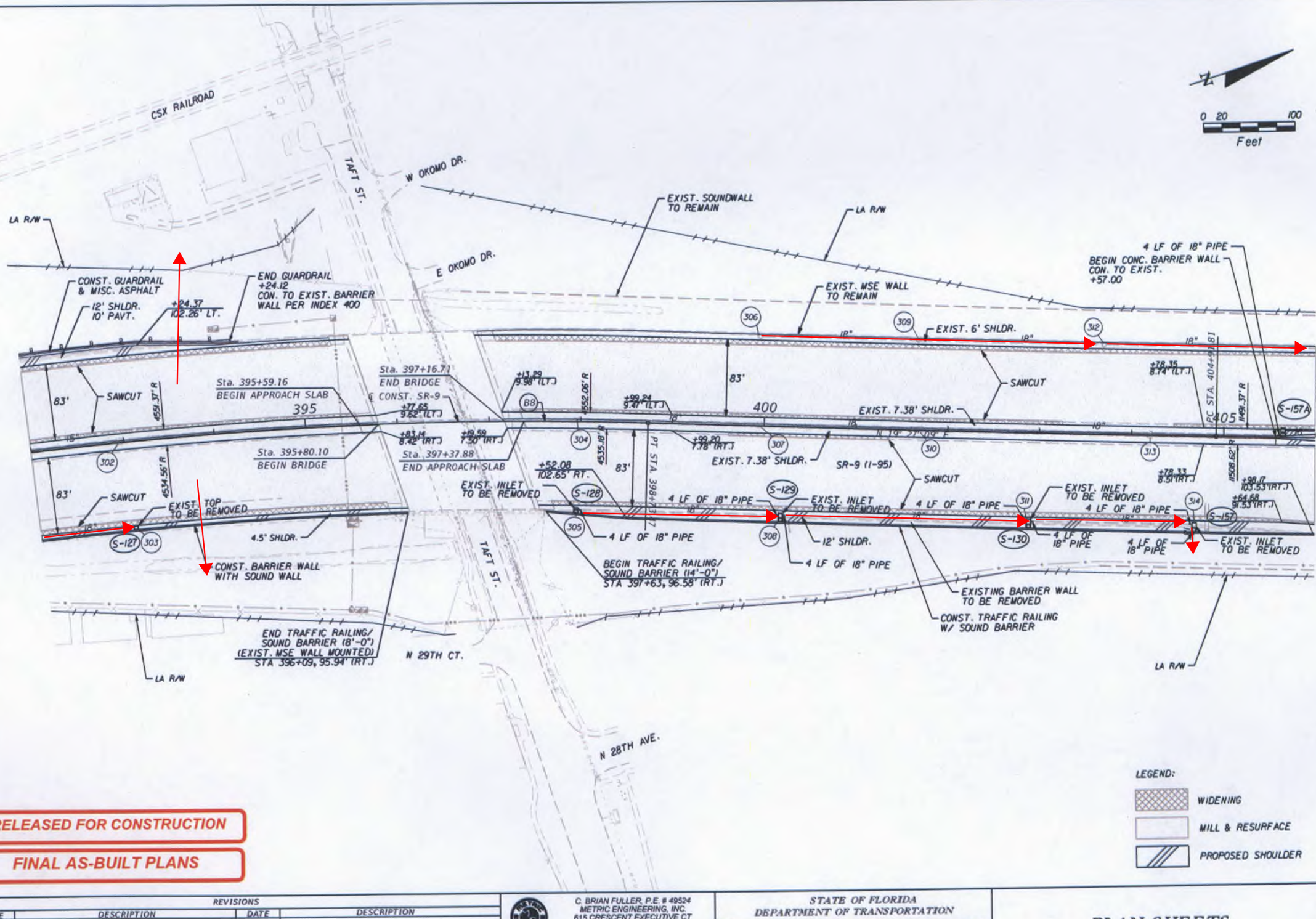

RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

C. BRIAN FULLER, P.E. # 49524
METRIC ENGINEERING, INC.
615 CRESCENT EXECUTIVE CT
SUITE 524
LAKE MARY, FLORIDA 32746
TEL. (407) 644-1898
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 55

anthony.smith 5/3/2013 12:14:32 PM F:\PROJECT\42279615201_Broward_Express\electronic delivery\42279615201\roadway\PL

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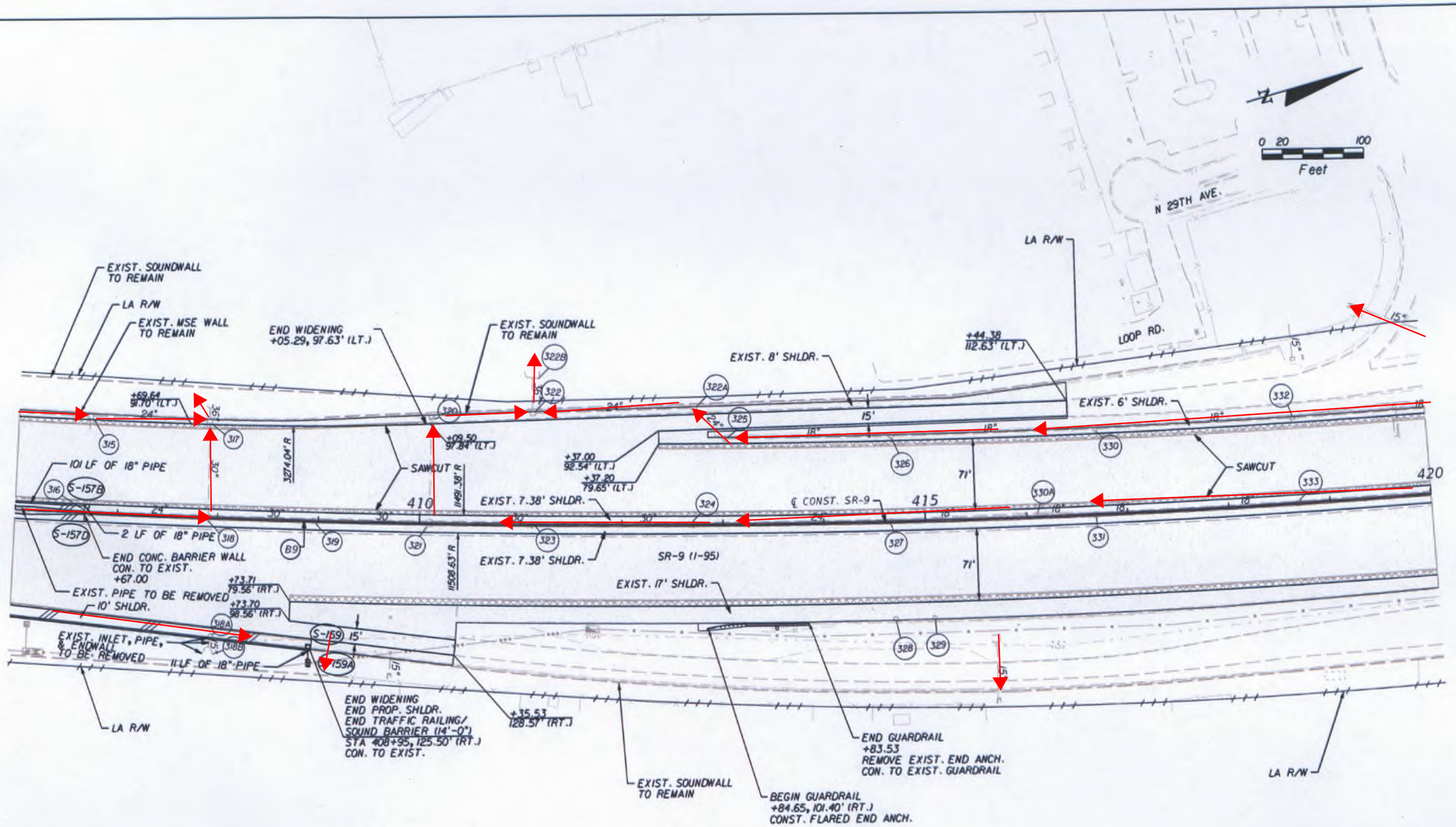

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D = 0° 45' 00"
T = 368.47
L = 736.38
R = 7,639.44
PC STA. = 1404+40.31
PT STA. = 1411+76.69

RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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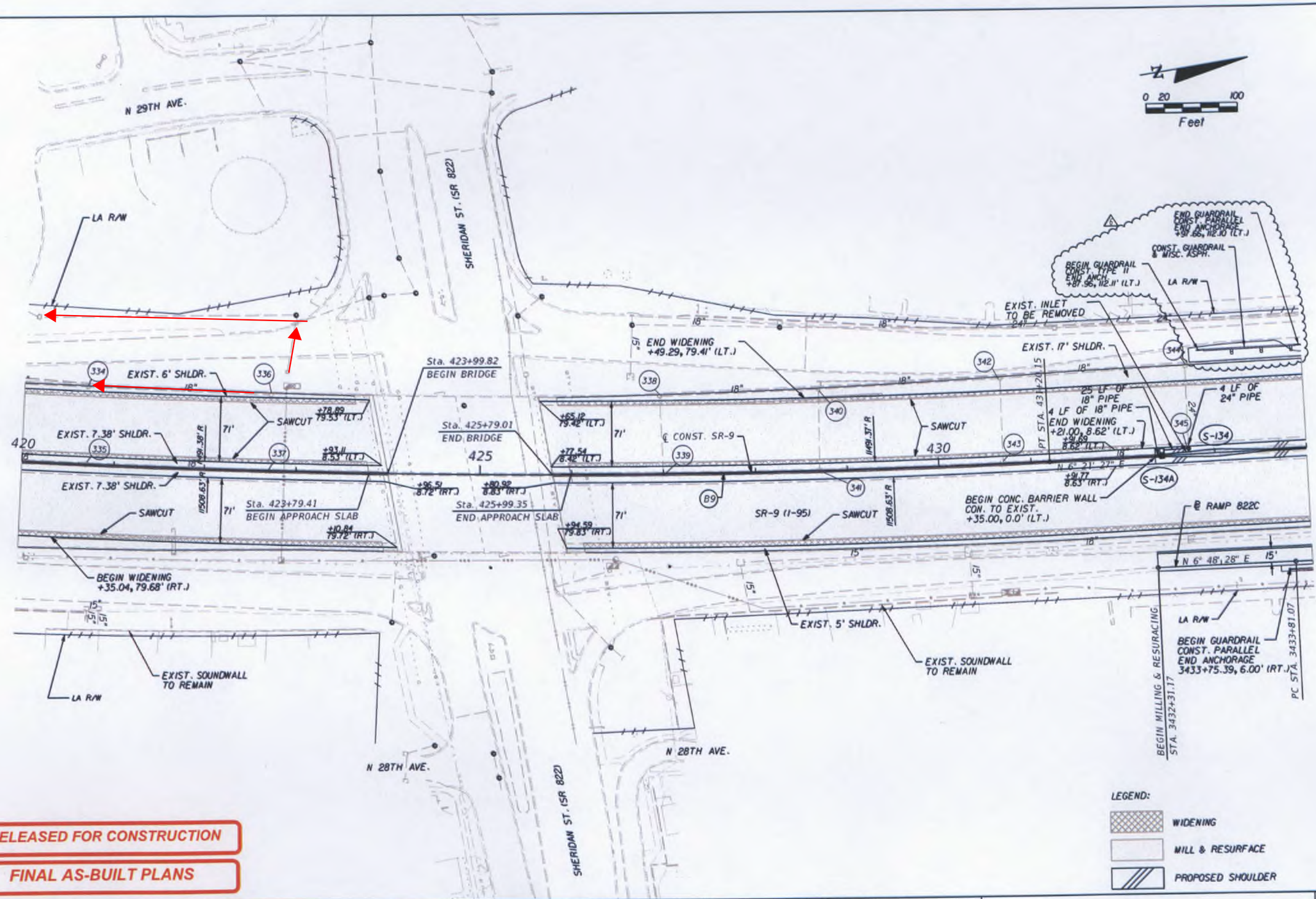
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 56

anthony.smith 5/3/2013 12:14:37 PM F:\PROJECT\42279615201_Broward_Express\electronic delivery\42279615201\roadway\PL



RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
10/9/13	⚠6 ADDED GUARDRAIL AT SS 95-53		

C. BRIAN FULLER, P.E. # 49524
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 57

bgillette 10/14/2013 1:49:25 PM F:\PROJECT\422796152O1\roadway\PLANRD31.dgn

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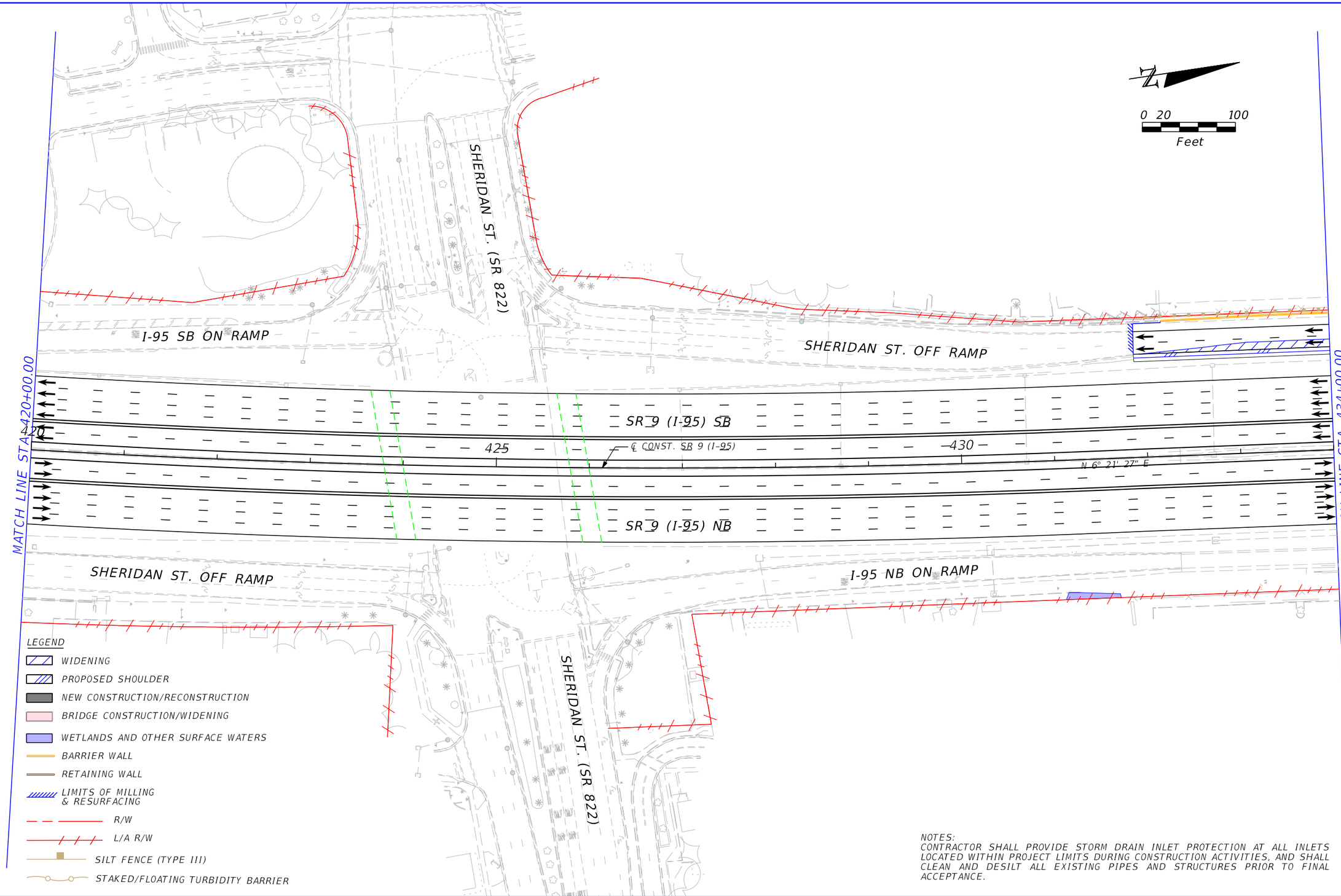
Existing Data



NOTES:
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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-10

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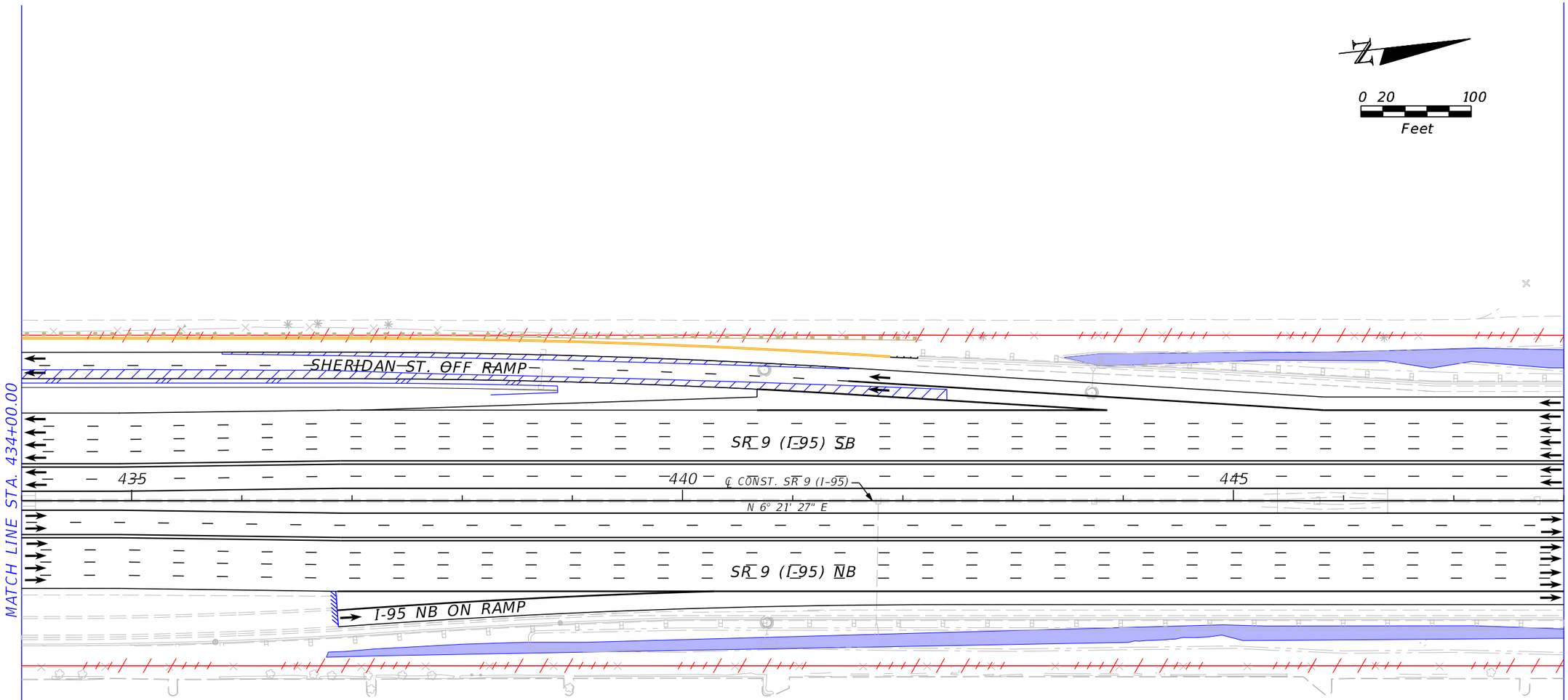

LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
- RETAINING WALL
- LIMITS OF MILLING & RESURFACING
- R/W
- L/A R/W
- SILT FENCE (TYPE III)
- STAKED/FLOATING TURBIDITY BARRIER

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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3125 W. COMMERCIAL BLVD., SUITE 130
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CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-11

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

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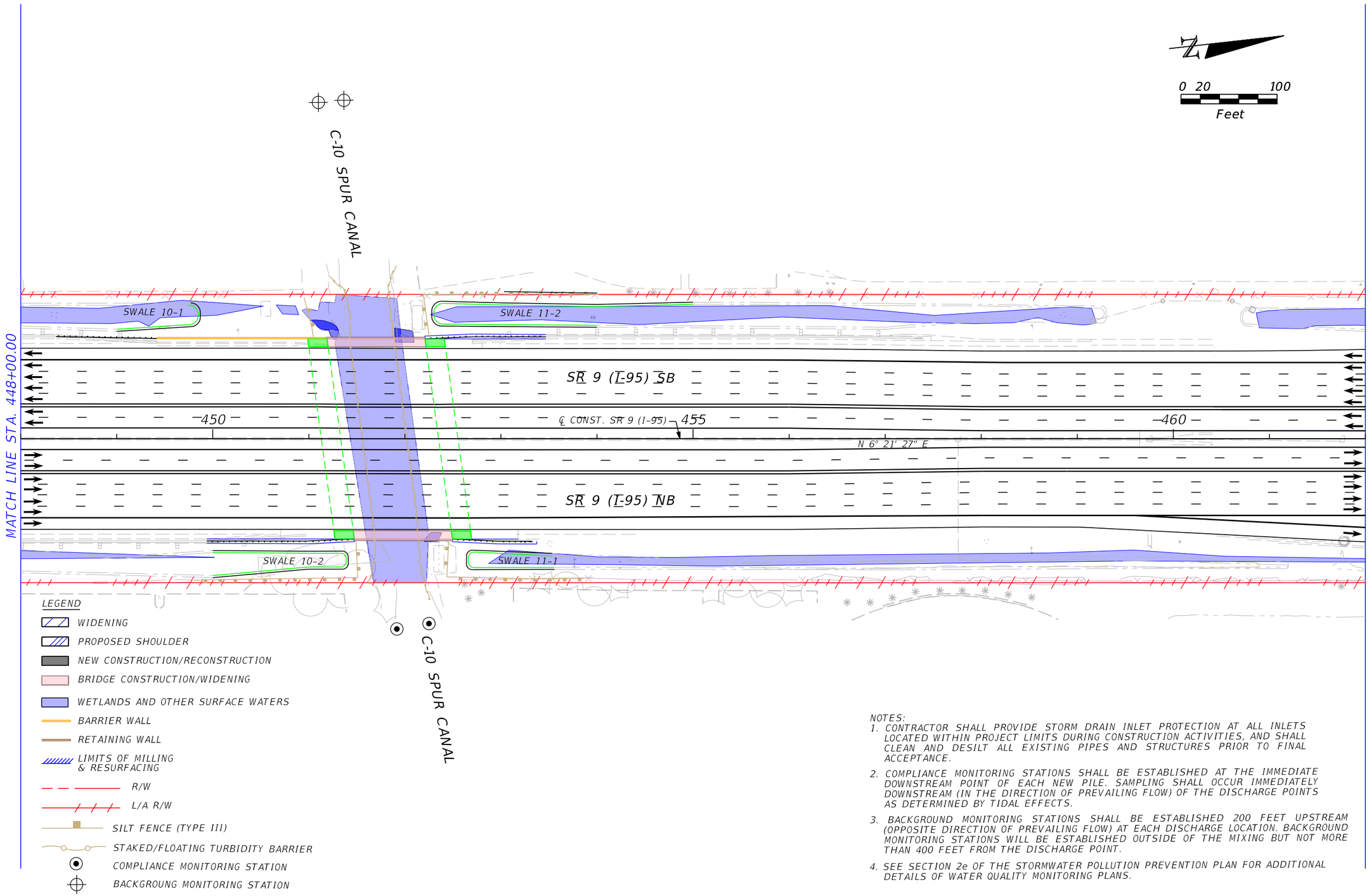

NOTES:

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3. BACKGROUND MONITORING STATIONS SHALL BE ESTABLISHED 200 FEET UPSTREAM (OPPOSITE DIRECTION OF PREVAILING FLOW) AT EACH DISCHARGE LOCATION. BACKGROUND MONITORING STATIONS WILL BE ESTABLISHED OUTSIDE OF THE MIXING BUT NOT MORE THAN 400 FEET FROM THE DISCHARGE POINT.
4. SEE SECTION 2e OF THE STORMWATER POLLUTION PREVENTION PLAN FOR ADDITIONAL DETAILS OF WATER QUALITY MONITORING PLANS.

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REVISIONS

DATE	DESCRIPTION	DATE	DESCRIPTION

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CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

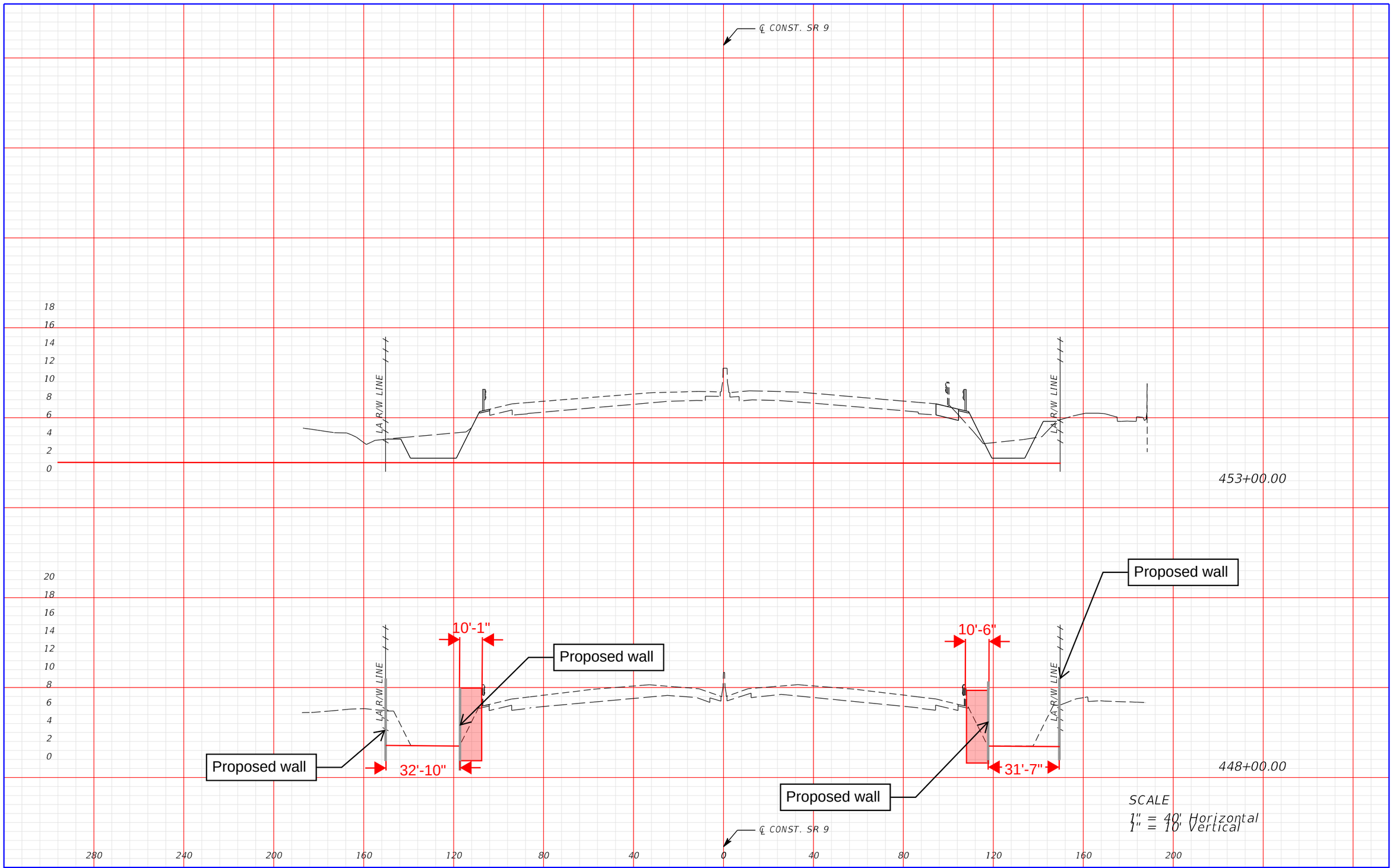
ROADWAY PLAN

SHEET NO. R-12

SYSTEM 10															
Sheridan Street to C-10 Canal Spur															
Permit 88-00050-S															
Station	Side	Ditch Fill Area (SF) Exaggerated	Ditch Fill Area (SF)	Ditch Excavation Area (SF) Exaggerated	Ditch Excavation Area (SF)	Ditch Fill Volume * (CY)	Ditch Excavation Volume * (CY)	Station	Side	Fill Area (SF) Exagge	Ditch Fill Area (SF)	Ditch Excavation Area (SF) Exaggerated	Ditch Excavation Area (SF)	Ditch Fill Volume * (CY)	Ditch Excavation Volume * (CY)
424+00.00	LT	0	0.00	0.00	0.00			424+00.00	RT	0	0.00	0.00	0.00		
425+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	425+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
426+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	426+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
427+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	427+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
428+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	428+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
429+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	429+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
430+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	430+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
431+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	431+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
432+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	432+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
433+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	433+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
434+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	434+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
435+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	435+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
436+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	436+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
437+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	437+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
438+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	438+00.00	RT	0	0.00	0.00	0.00	0.000	0.000
439+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	439+00.00	RT	2.91	0.73	19.67	4.92	1.347	9.106
440+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	440+00.00	RT	0	0.00	33.29	8.32	1.347	24.519
441+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	441+00.00	RT	0.89	0.22	55.96	13.99	0.412	41.319
442+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	442+00.00	RT	0	0.00	42.92	10.73	0.412	45.778
443+00.00	LT	0	0.00	0.00	0.00	0.000	0.000	443+00.00	RT	0	0.00	10.70	2.68	0.000	24.824
444+00.00	LT	0	0.00	70.38	17.60	0.000	32.583	444+00.00	RT	0	0.00	13.70	3.43	0.000	11.296
445+00.00	LT	0	0.00	51.30	12.83	0.000	56.333	445+00.00	RT	0	0.00	18.57	4.64	0.000	14.940
446+00.00	LT	0	0.00	84.65	21.16	0.000	62.940	446+00.00	RT	0	0.00	31.31	7.83	0.000	23.093
447+00.00	LT	4.50	1.13	23.36	5.84	2.083	50.006	447+00.00	RT	0	0.00	5.25	1.31	0.000	16.926
448+00.00	LT	1.24	0.31	42.68	10.67	2.657	30.575	448+00.00	RT	0	0.00	1.94	0.49	0.000	3.329
449+00.00	LT	4.33	1.08	46.62	11.66	2.579	41.343	449+00.00	RT	0	0.00	84.02	21.01	0.000	39.796
450+00.00	LT	0.00	0.00	102.86	25.72	2.005	69.204	450+00.00	RT	1.53	0.38	36.70	9.18	0.708	55.889
451+00.00	LT	0.00	0.00	0.00	0.00	0.000	47.621	451+00.00	RT	0	0.00	93.40	23.35	0.708	60.231
					Sub-Total (CY) =	**9.324**	**390.605**						**Sub-Total (CY) =**	**4.935**	**371.046**
					Sub-Total (Ac-ft) =	**0.006**	**0.242**						**Sub-Total (Ac-ft) =**	**0.003**	**0.230**

System 10 Totals: **Fill Total (Ac-ft): 0.009** **Excavation Total (Ac-ft): 0.472**

* Volumes calculated for ditch stations above are based on a ditch bottom elevation of 1.5-ft NAVD to a control elevation of 2.6-ft NAVD (information based on existing permit).



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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON, P.E.
P.E. LICENSE NUMBER 61898
RS&H, INC.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-14

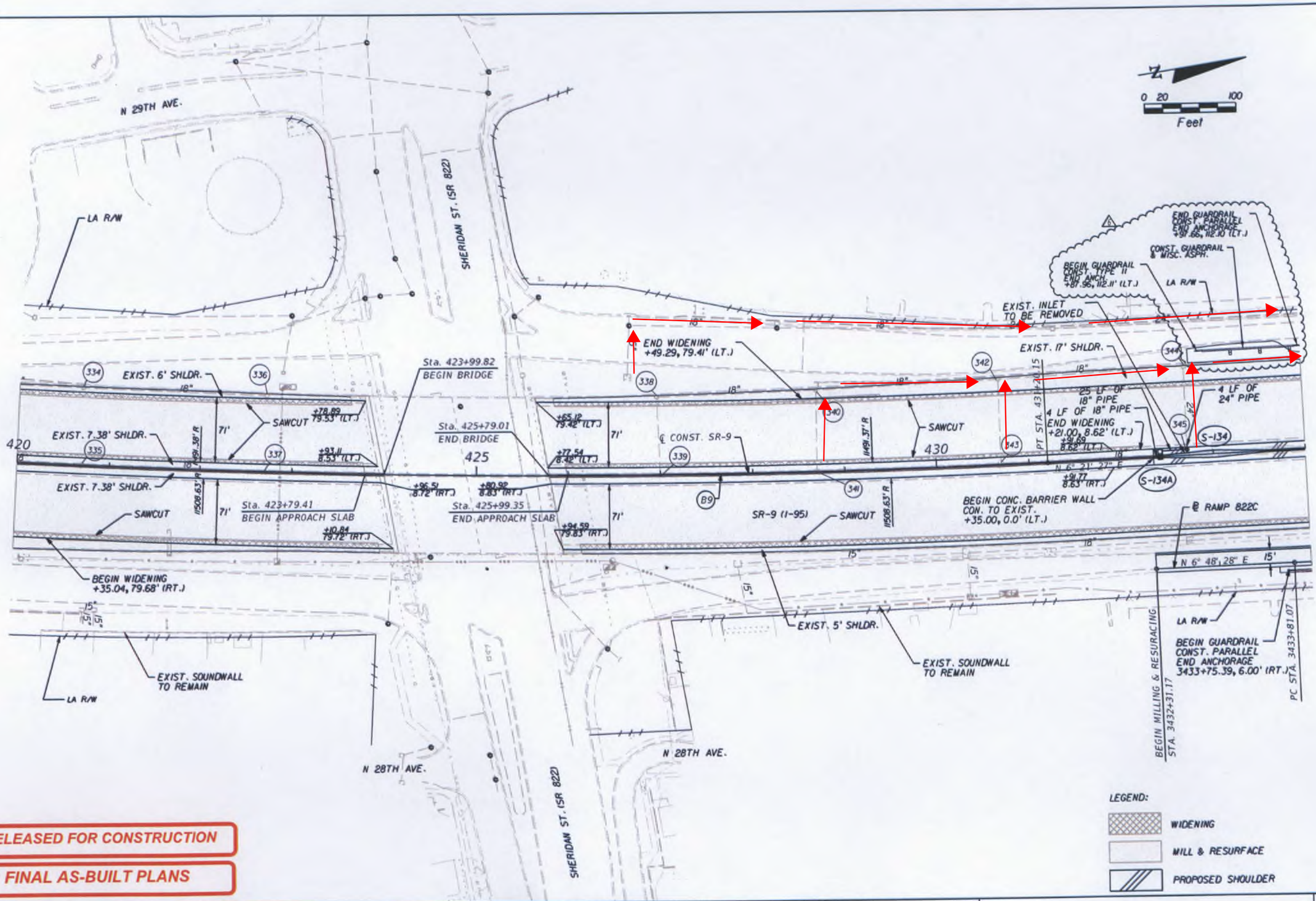
Table 2: Project Area Breakdown and Land Use Summary

PRE-DEVELOPMENT				
System	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
	Roadway / Sidewalk, etc.	Wet Storage		
System 6	43.72	0.00	18.15	61.86
System 7	6.19	0.00	2.35	8.54
System 8	3.73	0.00	1.54	5.27
System 9	21.07	0.00	8.02	29.10
System 10	16.88	0.00	3.21	20.09

POST-DEVELOPMENT				
System	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
	Roadway / Sidewalk, etc.	Wet Storage		
System 6	45.71	0.00	16.16	61.86
System 7	6.20	0.00	2.34	8.54
System 8	3.82	0.00	1.45	5.27
System 9	21.60	0.00	7.50	29.10
System 10	17.01	0.00	3.07	20.09

Table 3: Water Quality Summary

POST-DEVELOPMENT			
System	Water Quality Required (ac·ft)	Water Quality Provided (ac·ft)	Surplus Water Quality Provided (ac·ft)
System 6	0.311	2.621	2.310
System 7	0.011	0.076	0.065
System 8	0.077	0.248	0.171
System 9	0.427	0.868	0.441
System 10	0.115	0.472	0.357



RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
10/9/13	6 ADDED GUARDRAIL AT SS 95-53		

C. BRIAN FULLER, P.E. # 49524
METRIC ENGINEERING, INC.
615 CRESCENT EXECUTIVE CT
SUITE 524
LAKE MARY, FLORIDA 32746
TEL. (407) 644-1898
FAX. (407) 644-1921
CERTIFICATE OF AUTHORIZATION 2294

● ENGINEERS
● PLANNERS
● SURVEYORS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 57

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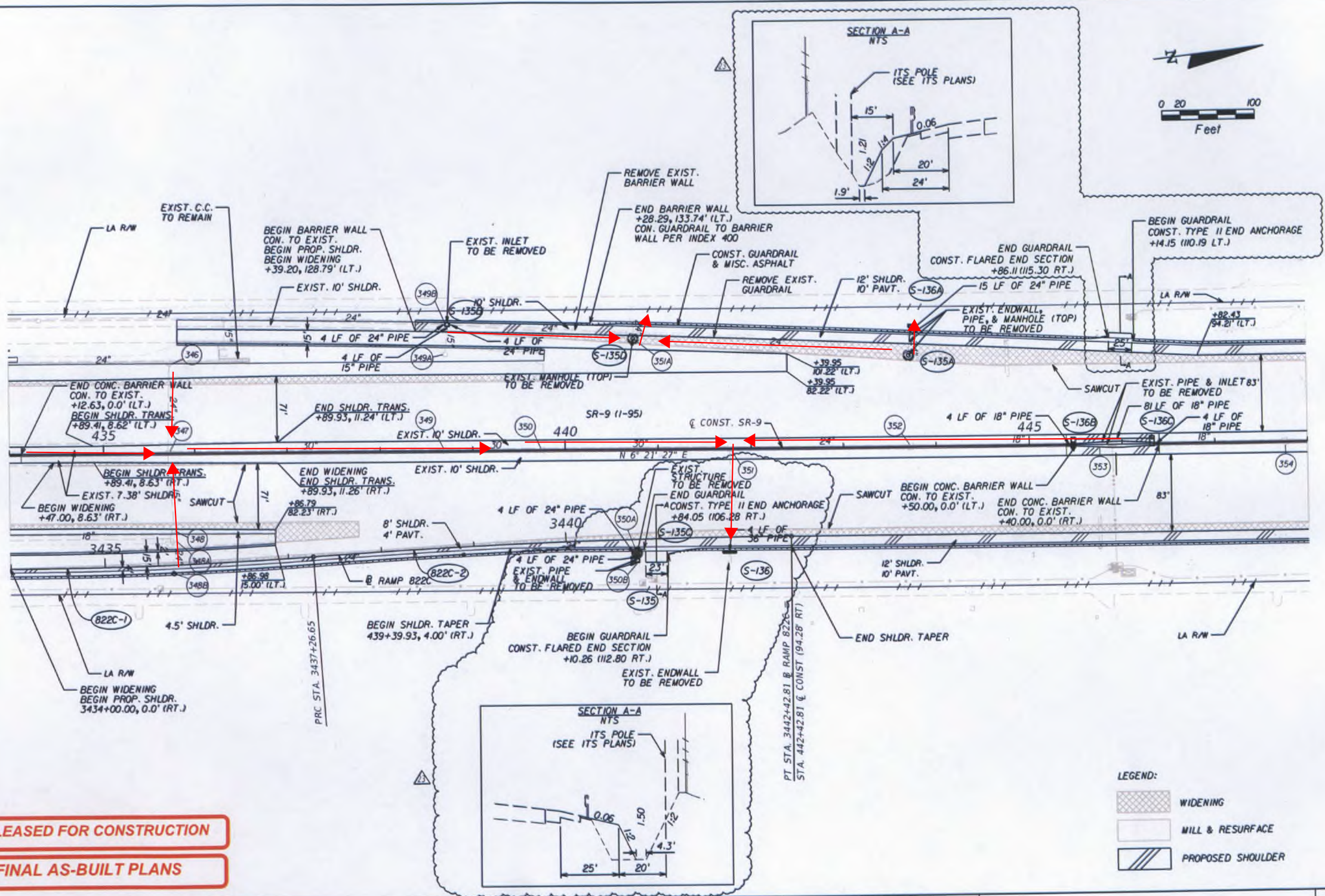

RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
12/18/15	13 ITS ACCESS AS-BUILT		

C. BRIAN FULLER, P.E. # 49524
METRIC ENGINEERING, INC.
615 CRESCENT EXECUTIVE CT
SUITE 524
LAKE MARY, FLORIDA 32746
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● ENGINEERS
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DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 58

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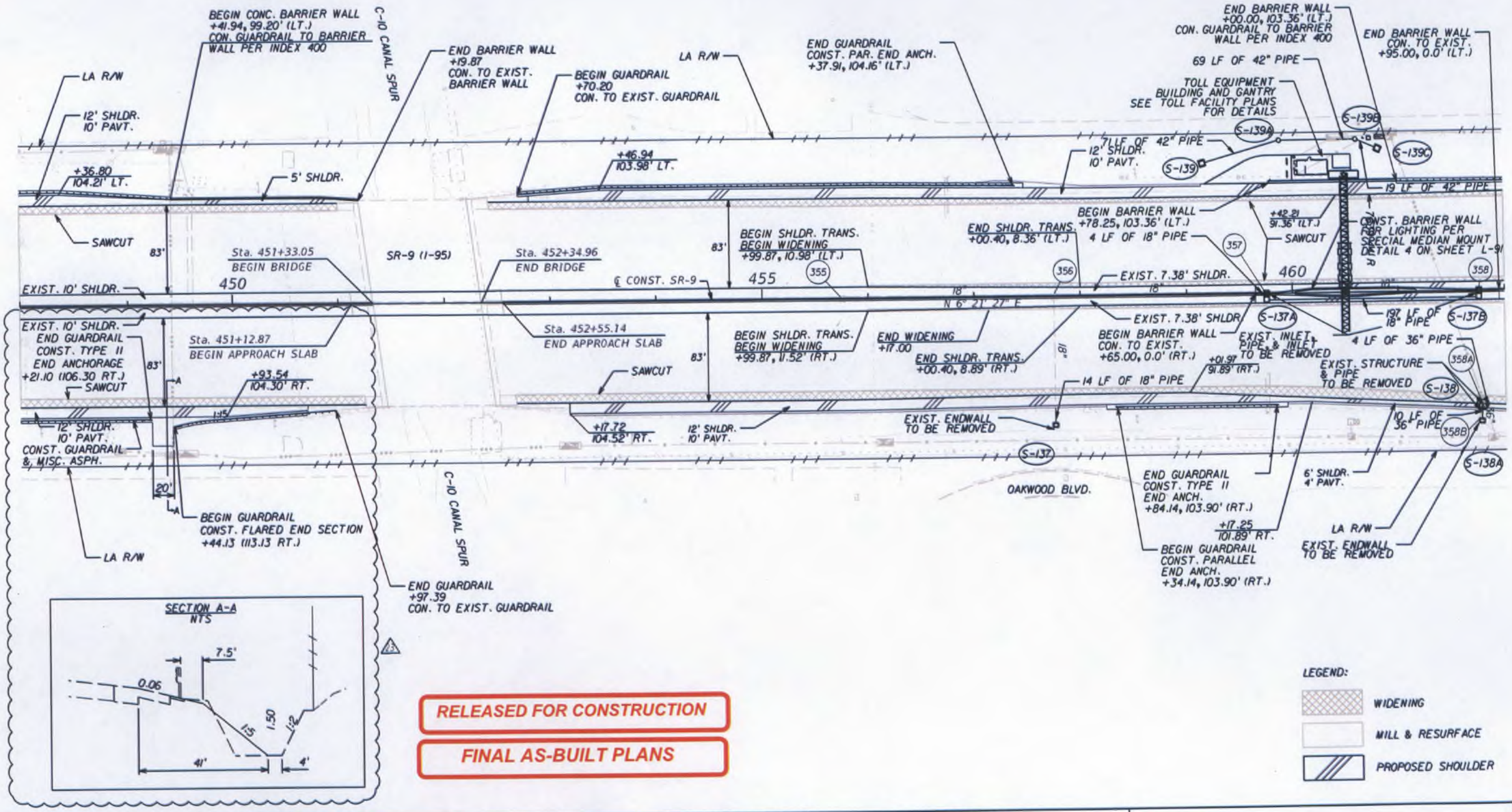
NOTE: NO RUMBLE STRIPS WITHIN TOLL PLAZA SHLDR. PAVT. LIMITS

0 20 100
Feet



RELEASED FOR CONSTRUCTION

FINAL AS-BUILT PLANS

LEGEND:

- WIDENING
- MILL & RESURFACE
- PROPOSED SHOULDER

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
12/18/15	13 ITS ACCESS AS-BUILT		

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● ENGINEERS ● PLANNERS ● SURVEYORS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

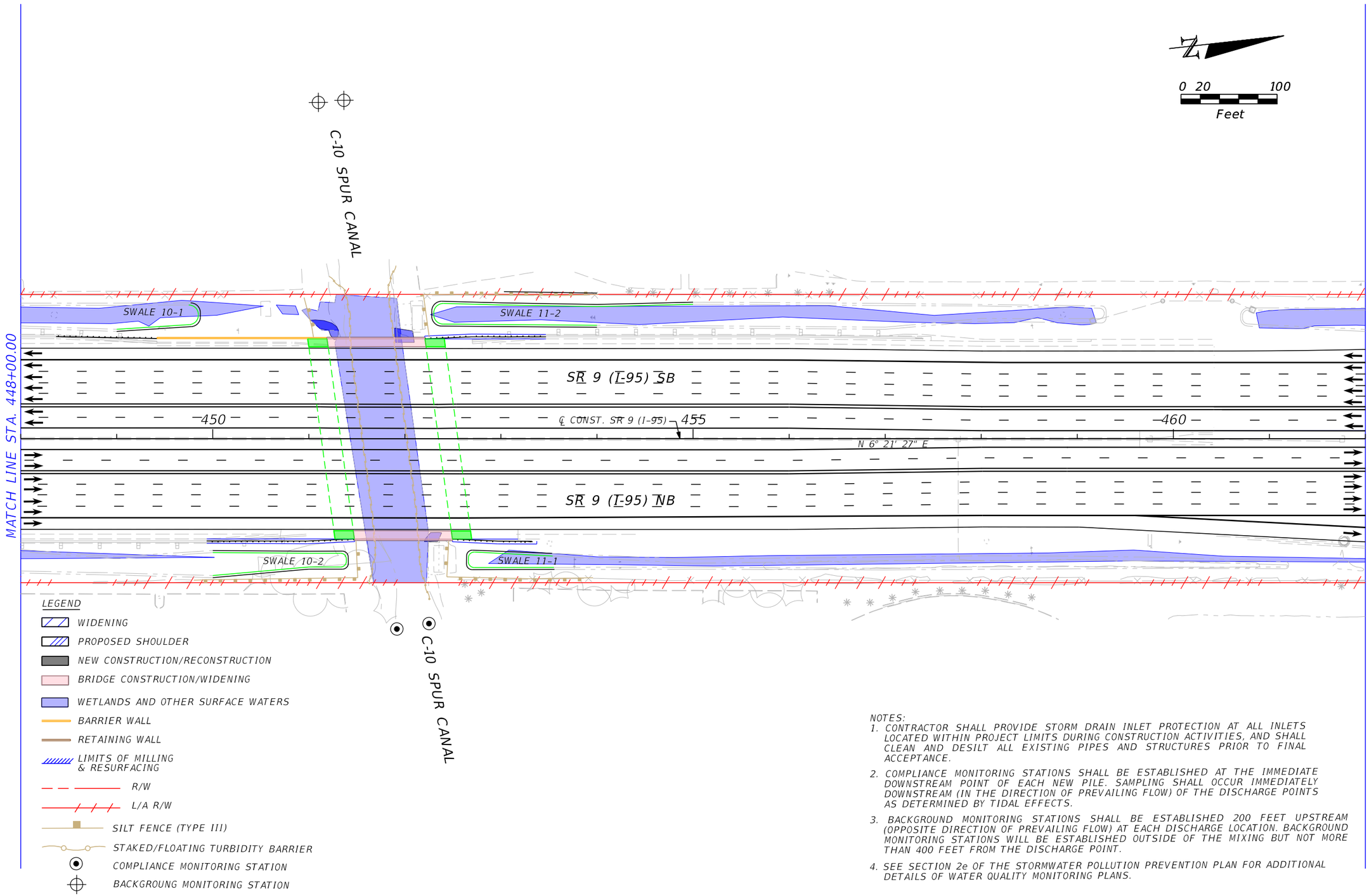
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD MIAMI-DADE	422796-1-52-01 422796-2-52-01

PLAN SHEETS

SHEET NO. 59

bgillette 9/14/2016 2:18:52 PM F:\PROJECT\422796152O1\roadway\PLANRD33.dgn

System 11
Existing Data



NOTES:

1. CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.
2. COMPLIANCE MONITORING STATIONS SHALL BE ESTABLISHED AT THE IMMEDIATE DOWNSTREAM POINT OF EACH NEW PILE. SAMPLING SHALL OCCUR IMMEDIATELY DOWNSTREAM (IN THE DIRECTION OF PREVAILING FLOW) OF THE DISCHARGE POINTS AS DETERMINED BY TIDAL EFFECTS.
3. BACKGROUND MONITORING STATIONS SHALL BE ESTABLISHED 200 FEET UPSTREAM (OPPOSITE DIRECTION OF PREVAILING FLOW) AT EACH DISCHARGE LOCATION. BACKGROUND MONITORING STATIONS WILL BE ESTABLISHED OUTSIDE OF THE MIXING BUT NOT MORE THAN 400 FEET FROM THE DISCHARGE POINT.
4. SEE SECTION 2e OF THE STORMWATER POLLUTION PREVENTION PLAN FOR ADDITIONAL DETAILS OF WATER QUALITY MONITORING PLANS.

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REVISIONS

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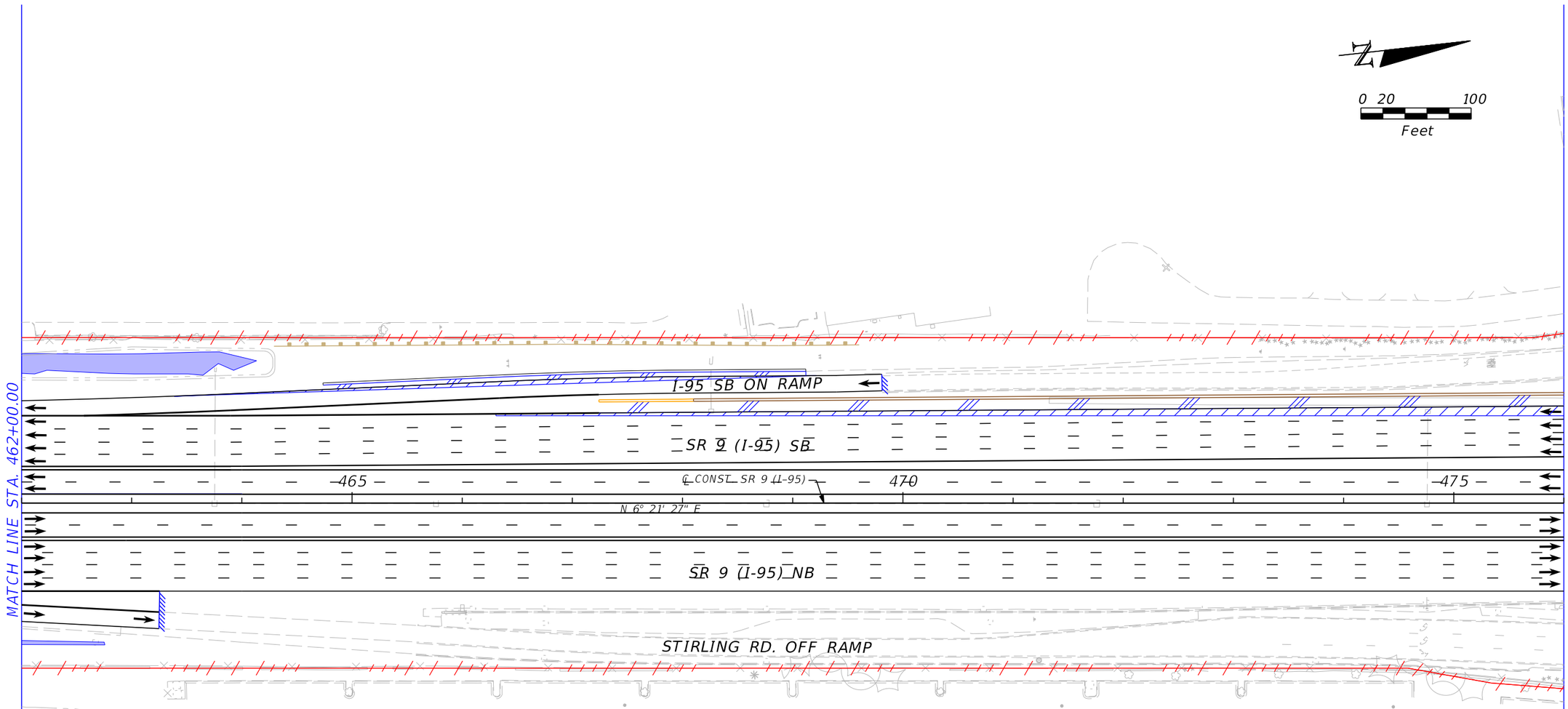
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-12



LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
- RETAINING WALL
- LIMITS OF MILLING & RESURFACING
- R/W
- L/A R/W
- SILT FENCE (TYPE III)
- STAKED/FLOATING TURBIDITY BARRIER

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-13

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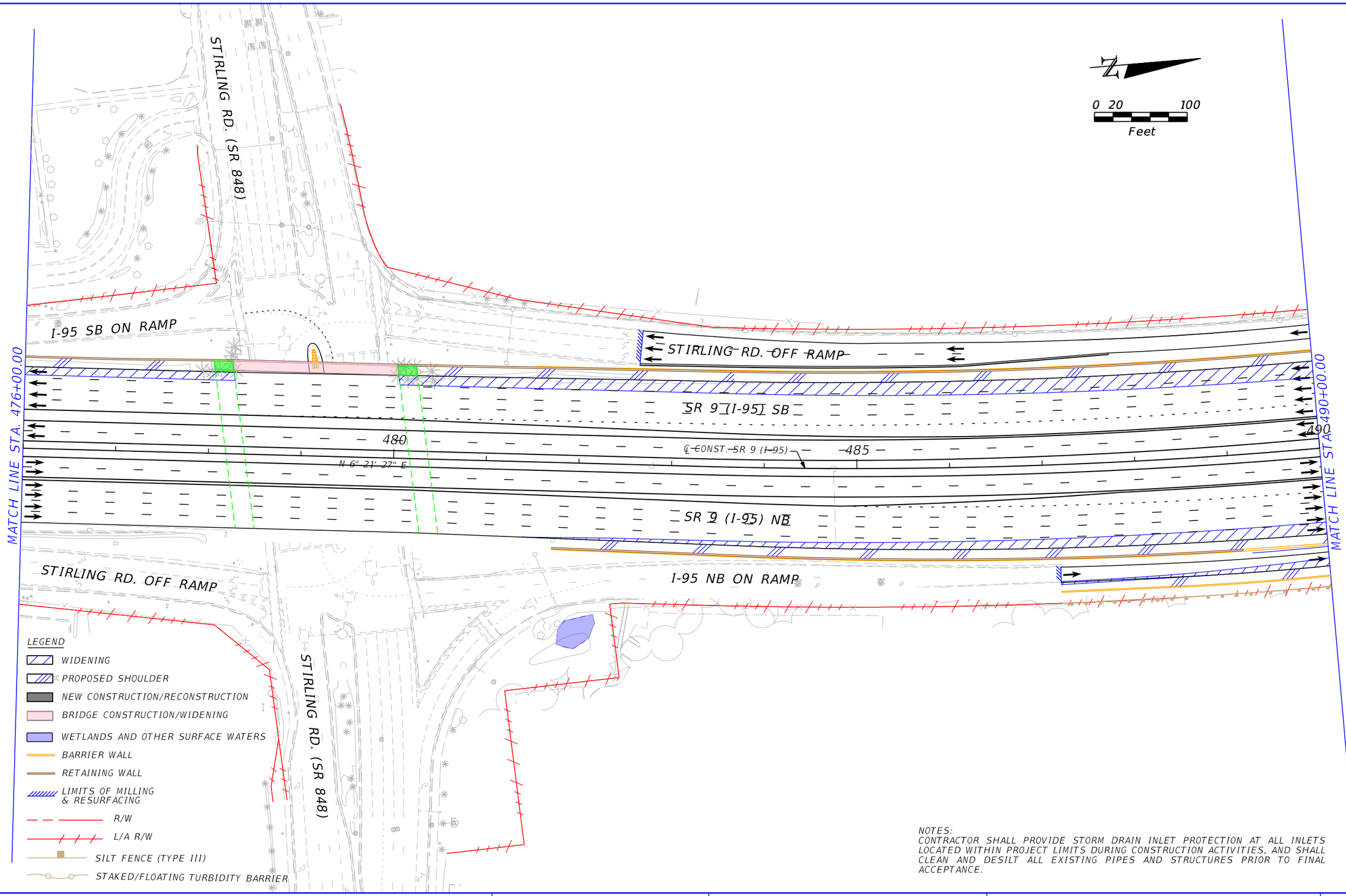

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

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DATE	DESCRIPTION	DATE	DESCRIPTION

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FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-14

Prepared by:	HS	Date:	3/16/2021
Checked by:	CF	Date:	3/16/2021
Approved by:	WR	Date:	3/16/2021

I-95 PHASE 3C DRAINAGE CALCULATIONS

POST-DEVELOPMENT LAND-USE - SEGMENT 1B

DRAINAGE SYSTEM: 11 & 12 **SHGWT EL. (ft-NAVD):** 0.50

SYSTEM	BASIN	TIME OF CONC. tc (min.)	TOTAL AREA (Ac.)	TOTAL ONSITE AREA (Ac.)	ONSITE IMPERVIOUS AREA (Ac.)	ONSITE WATER SURFACE AREA (Ac.)	ONSITE PERVIOUS AREA (Ac.)	TOTAL OFFSITE AREA (Ac.)	OFFSITE IMPERVIOUS AREA (Ac.)	OFFSITE WATER SURFACE AREA (Ac.)	OFFSITE PERVIOUS AREA (Ac.)
11	11B-95	10	18.84	18.68	15.14	0.00	3.53	0.17	0.11	0.00	0.06
	11B-C10	10	0.12	0.12	0.04	0.08	0.00	0.00	0.00	0.00	0.00
	BASIN 11 TOTALS		**18.96**	**18.80**	**15.19**	**0.08**	**3.53**	**0.17**	**0.11**	**0.00**	**0.06**
12	12B-95	10	37.39	37.39	32.48	0.00	4.91	0.00	0.00	0.00	0.00
	12B-SW	10	2.42	2.42	1.39	0.00	1.03	0.00	0.00	0.00	0.00
	BASIN 12 TOTALS		**39.81**	**39.81**	**33.86**	**0.00**	**5.94**	**0.00**	**0.00**	**0.00**	**0.00**
12E	12B-SE	10	1.67	1.67	1.00	0.00	0.67	0.00	0.00	0.00	0.00
	BASIN 12E TOTALS		**1.67**	**1.67**	**1.00**	**0.00**	**0.67**	**0.00**	**0.00**	**0.00**	**0.00**
SEGMENT 1B TOTALS*			**60.44**	**60.27**	**50.05**	**0.08**	**10.15**	**0.17**	**0.11**	**0.00**	**0.06**

**Note: This land-use table is associated with Permit No. 88-00050-S. Basin 13A is associated under a different permit.*

Prepared by:	CF	Date:	2/15/2021
Checked by:	WR	Date:	2/15/2021
Approved by:	LR	Date:	2/15/2021

I-95 PHASE 3C DRAINAGE CALCULATIONS

POST-DEVELOPMENT WATER QUALITY CALCULATIONS

PERMIT No. 88-00050-S											
SYSTEM	SHGWT EL. (FT-NAVD)	PRE-DEVELOPMENT			POST-DEVELOPMENT			Add'l Impervious Area [1] (ac.)	WQ REQUIREMENTS	DRY DETENTION [2]	VOLUME PROVIDED
		Total Onsite Area (ac.)	Pervious Area (ac.)	Impervious Area (ac.)	Total Onsite Area (ac.)	Pervious Area (ac.)	Impervious Area (ac.)		2.5" Over Additional Impervious Area (ac-ft)	75% Dry Detention Volume (ac-ft)	Net Storage Volume Provided [3]
BASIN 11	0.50	18.53	3.51	14.92	18.80	3.53	15.19	0.266	0.055	0.042	0.254
BASIN 12	0.50	41.33	9.75	31.58	41.48	6.62	34.86	3.281	0.683	0.513	0.401
SEGMENT 1B TOTALS*:		59.86	13.27	46.50	60.27	10.15	50.05	3.55	0.739	0.554	0.655

NOTES:

Existing Systems 11 and 12 were permitted via Cut & Fill and are part of a network of drainage systems (Systems 9-12 from Permit No. 88-00050-S) that discharge to the C-10 Spur Canal. The existing conditions show that the existing swales do not provide the sufficient water quality required due to the complexity of it's interconnectivity on off-site drainage runoff and minimal storage capacity in the corridor. This analysis was conducted to show that the proposed conditions will not only meet the water quality requirements for the additional impervious area, but also compensate for some of the deficiency in the Systems. The Conceptual Permit had accounted for a small deficiency in the water quality provided for the additional impervious area (-0.016 Ac-ft). This is also consistent with the existing Drainage Report previously approved by SFWMD in September 2009 under 85-00070-S.

[1] Add'l Impervious Area - Difference between Post-Development and Pre-Development Impervious Areas.

[2] Dry Detention - Per SFWMD guidelines, utilizing dry detention facilities credits the permittee to a reduced 75% water quality requirement.

[3] Net Storage Volume Provided - Difference between Post-Development WQ Volume and Pre-Development WQ Volume. *(See Stage Storage Calculations)*

**Note: This calculation table is associated with Permit No. 88-00050-S. Basin 13A is associated under a different permit.*

Prepared by:	CF	Date:	10/21/2020
Checked by:	WR	Date:	10/21/2020
Approved by:	LR	Date:	10/21/2020

I-95 3C CALCULATIONS

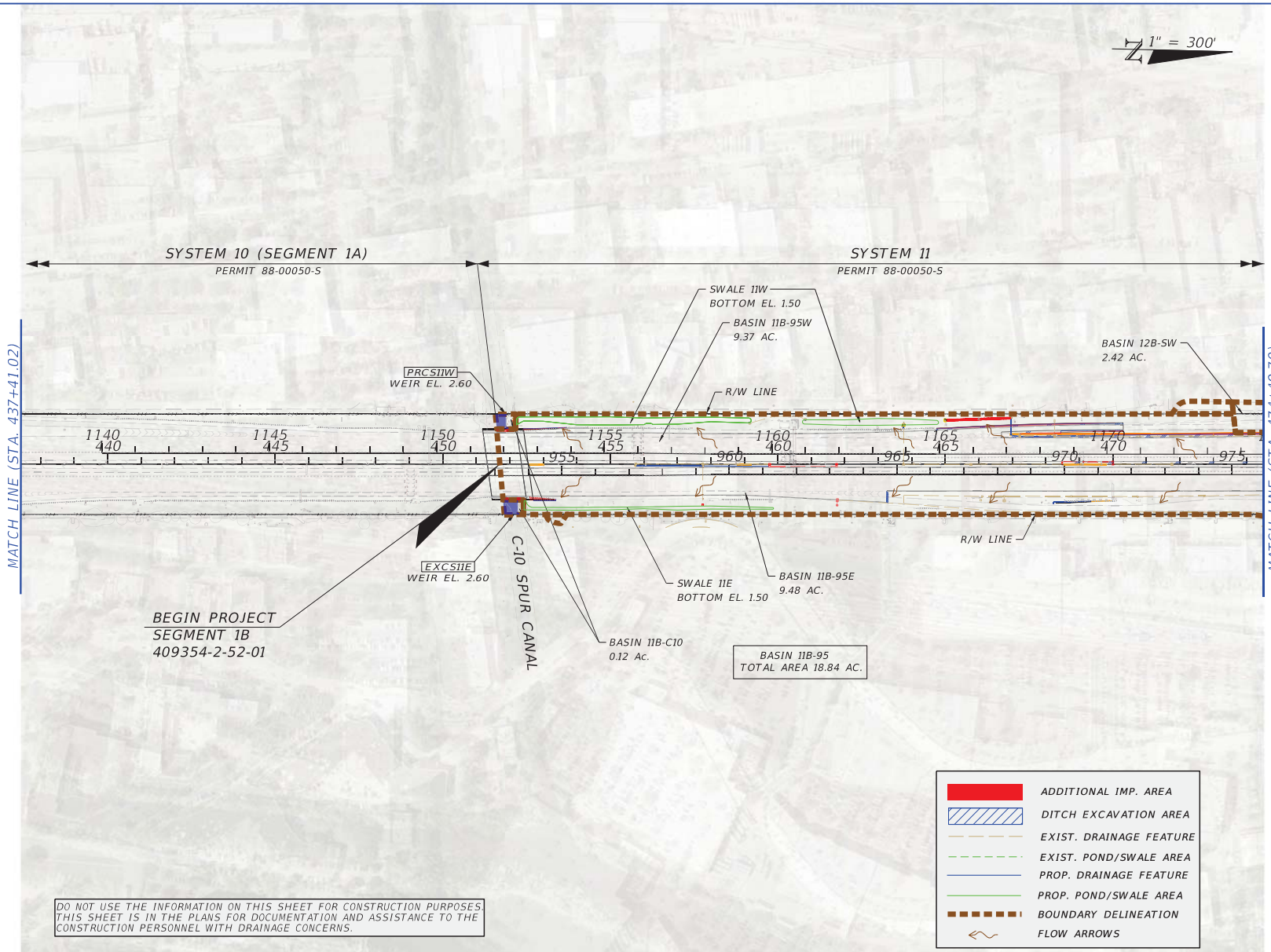
STAGE-STORAGE CALCULATION
POST-DEVELOPMENT

SWALE 11E

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
1.50	**0.139**	0.000	0.000	
2.00	**0.192**	0.083	0.083	
2.50	**0.261**	0.113	0.196	
2.60	0.279	0.027	0.223	Exist. Weir Elevation (ExCS11E)
3.00	**0.347**	0.125	0.348	
3.50	**0.430**	0.194	0.543	
4.00	**0.535**	0.241	0.784	
4.50	0.639	0.293	1.077	
5.00	0.744	0.346	1.423	
5.04	0.752	0.030	1.453	Overflow EL. Into R/W (1:30)
5.26	0.799	0.171	1.624	Warning Stage - Ramp
5.50	0.849	0.198	1.821	
6.00	0.954	0.451	2.272	

SWALE 11W

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
1.50	**0.448**	0.000	0.000	
2.00	**0.517**	0.241	0.241	
2.50	**0.585**	0.275	0.517	
2.60	0.599	0.059	0.576	Exist. Weir Elevation (PrCS11W)
3.00	**0.655**	0.251	0.827	
3.50	**0.737**	0.348	1.175	
3.85	0.804	0.270	1.444	Overflow EL. Into R/W (1:195)
4.00	**0.832**	0.123	1.567	
4.50	0.927	0.440	2.007	
5.00	1.022	0.487	2.494	
5.50	1.117	0.535	3.029	
6.00	1.212	0.582	3.611	



DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND ASSISTANCE TO THE CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

LUIS A. RODRIGUEZ, P.E.
P.E. LICENSE NUMBER 63983
BCC ENGINEERING, INC.
6401 SW 87th AVE, SUITE 200
MIAMI, FLORIDA 33173
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 5

mramirez 3/16/2021 10:46:21 AM c:\bms\bcc-pw-01\misael ramirez\d0139039\DRMPRD01_1B_POST 11-12.dgn

℄ CONST. SR 9

24
22
20
18
16
14
12
10
8
6
4
2
0

LA R/W LINE

LA R/W LINE

483+00.00

22
20
18
16
14
12
10
8
6
4
2
0

LA R/W LINE

Swale 11NW

23'-0"

LA R/W LINE

478+00.00

SCALE
1" = 40' Horizontal
1" = 10' Vertical

280 240 200 160 120 80 40 0 40 80 120 160 200

℄ CONST. SR 9

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REVISIONS			
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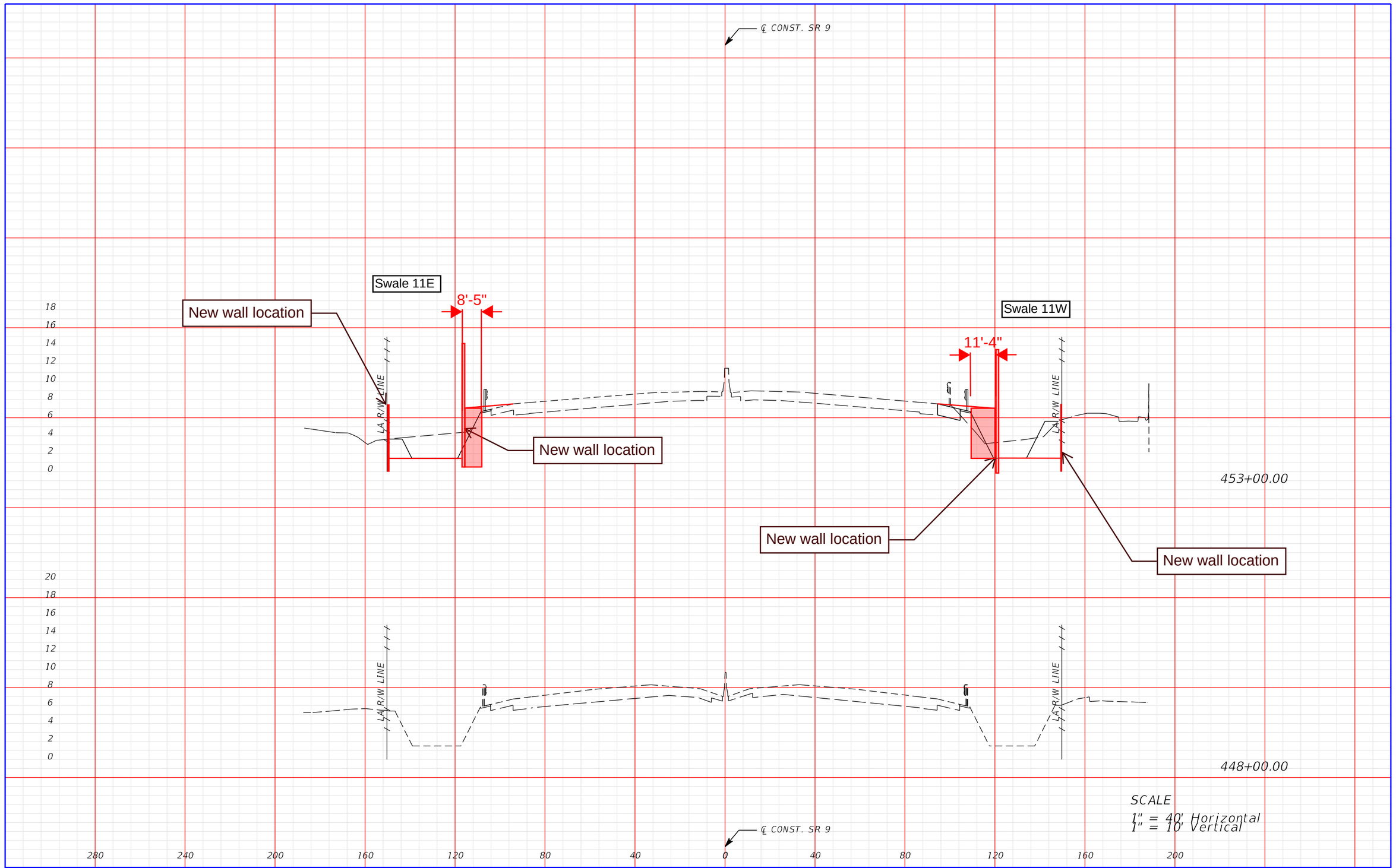
CHRISTIAN B. JACKSON, P.E.
P.E. LICENSE NUMBER 61898
RS&H, INC.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-17



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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-14

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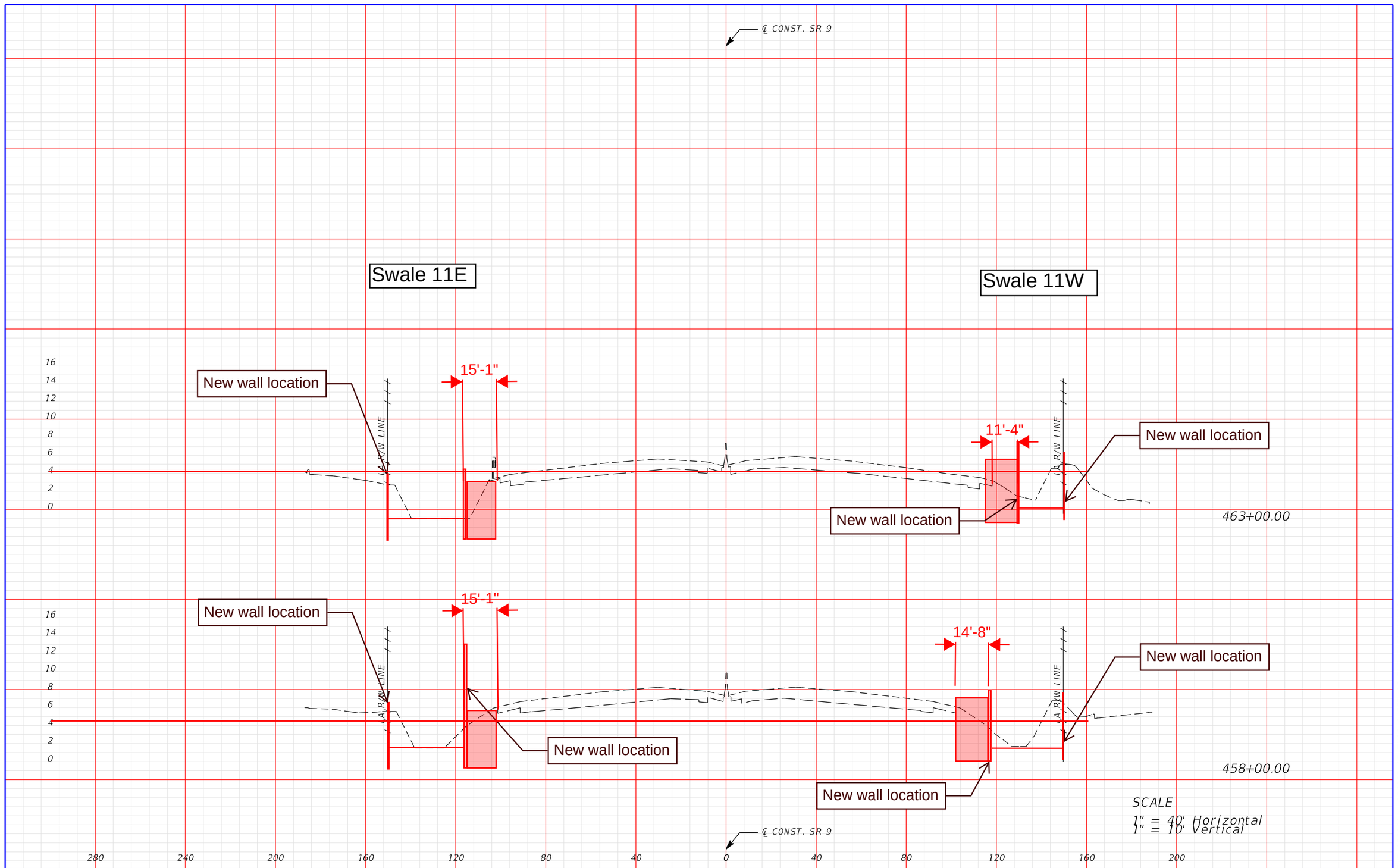

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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-15

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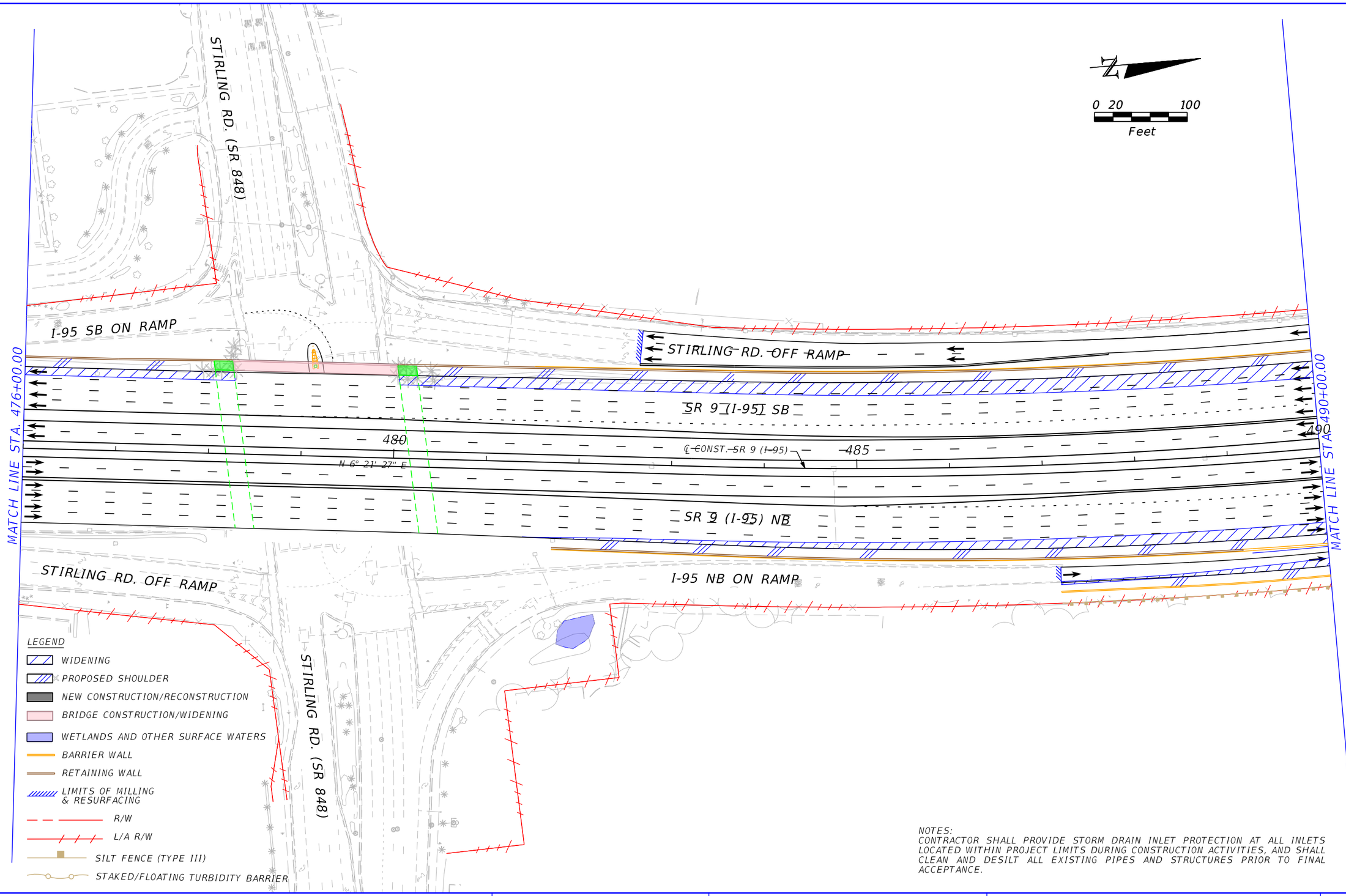
System 12
Existing Data



NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

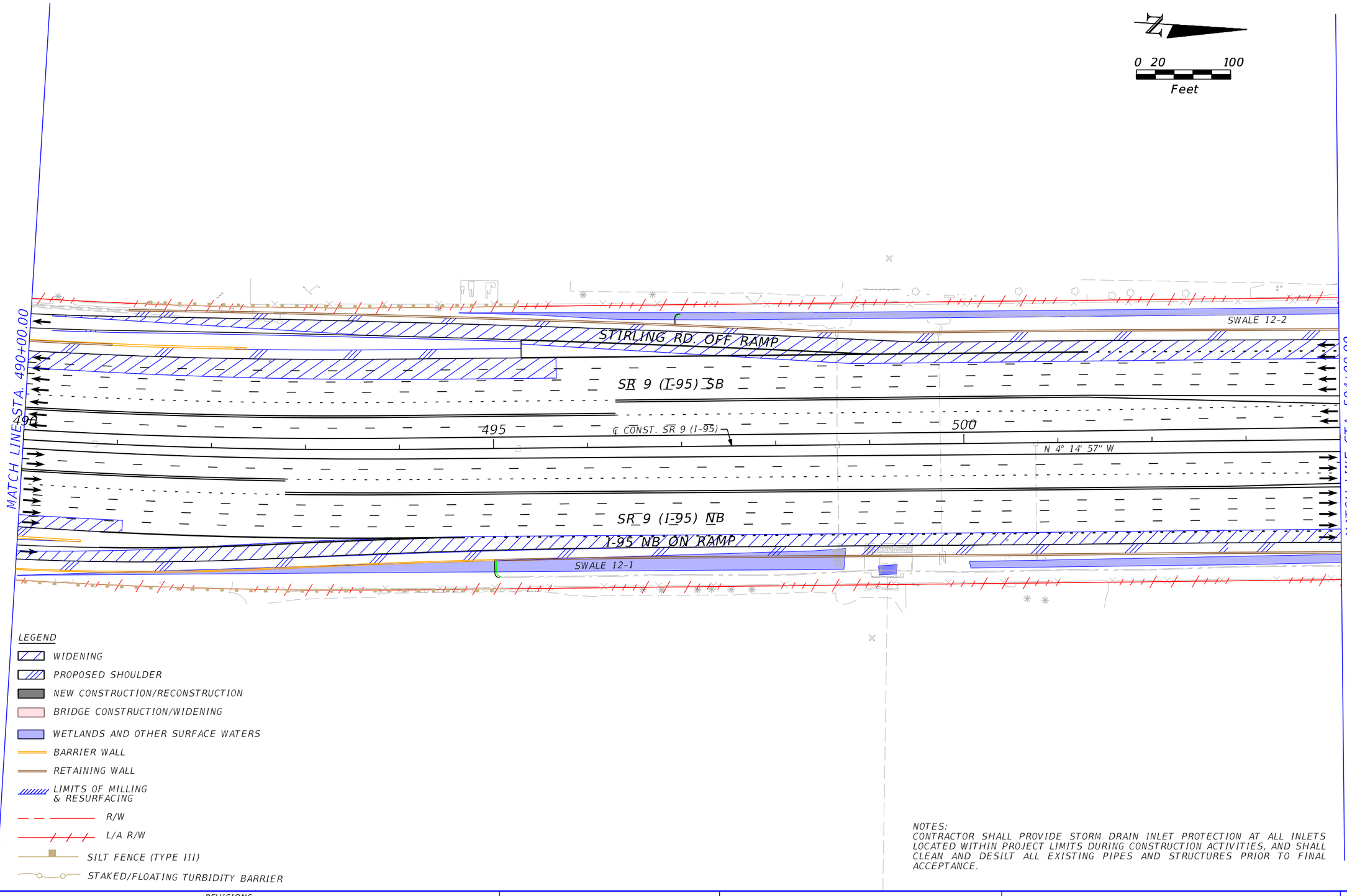
CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-14



LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
- RETAINING WALL
- LIMITS OF MILLING & RESURFACING
- R/W
- L/A R/W
- SILT FENCE (TYPE III)
- STAKED/FLOATING TURBIDITY BARRIER

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

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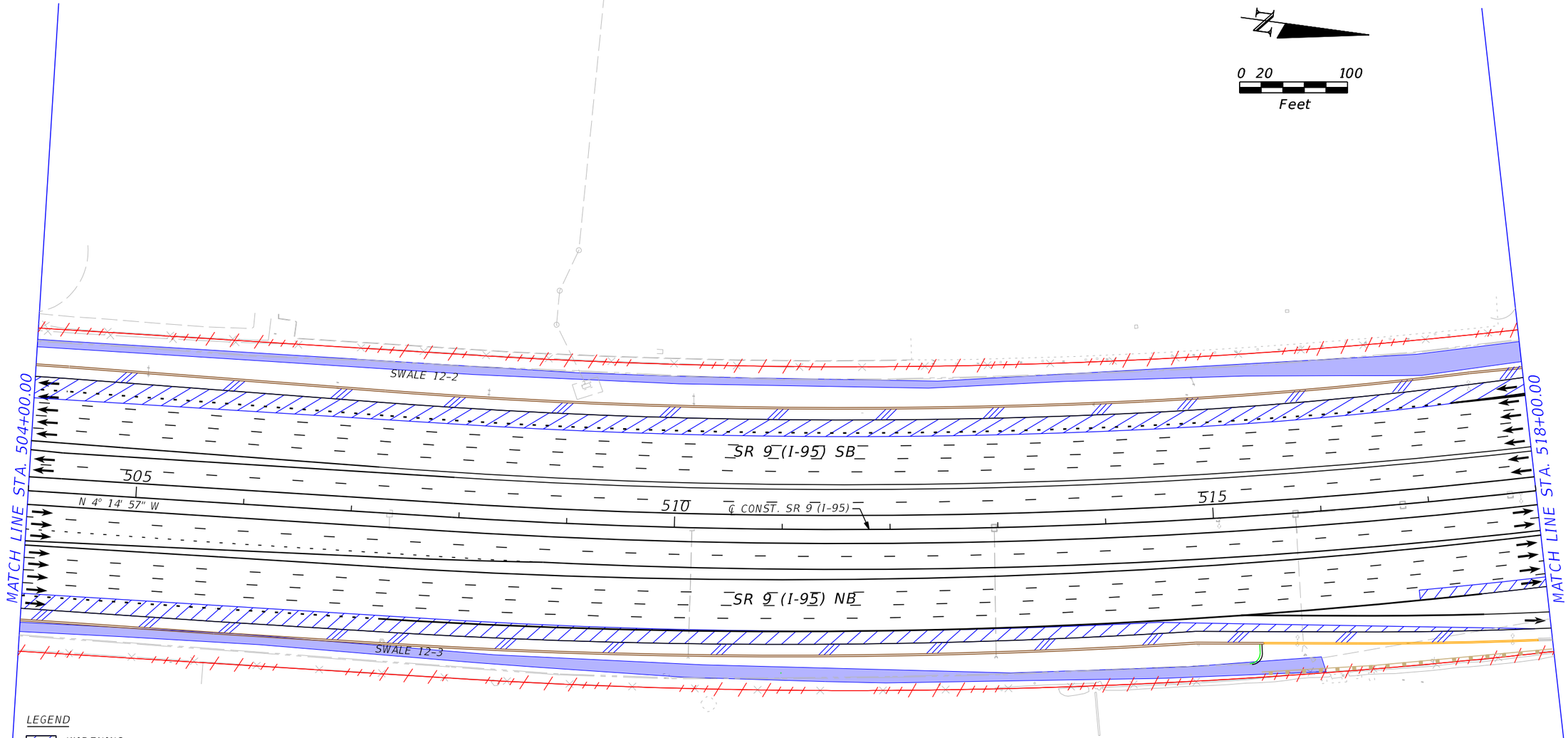
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-15



LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-16

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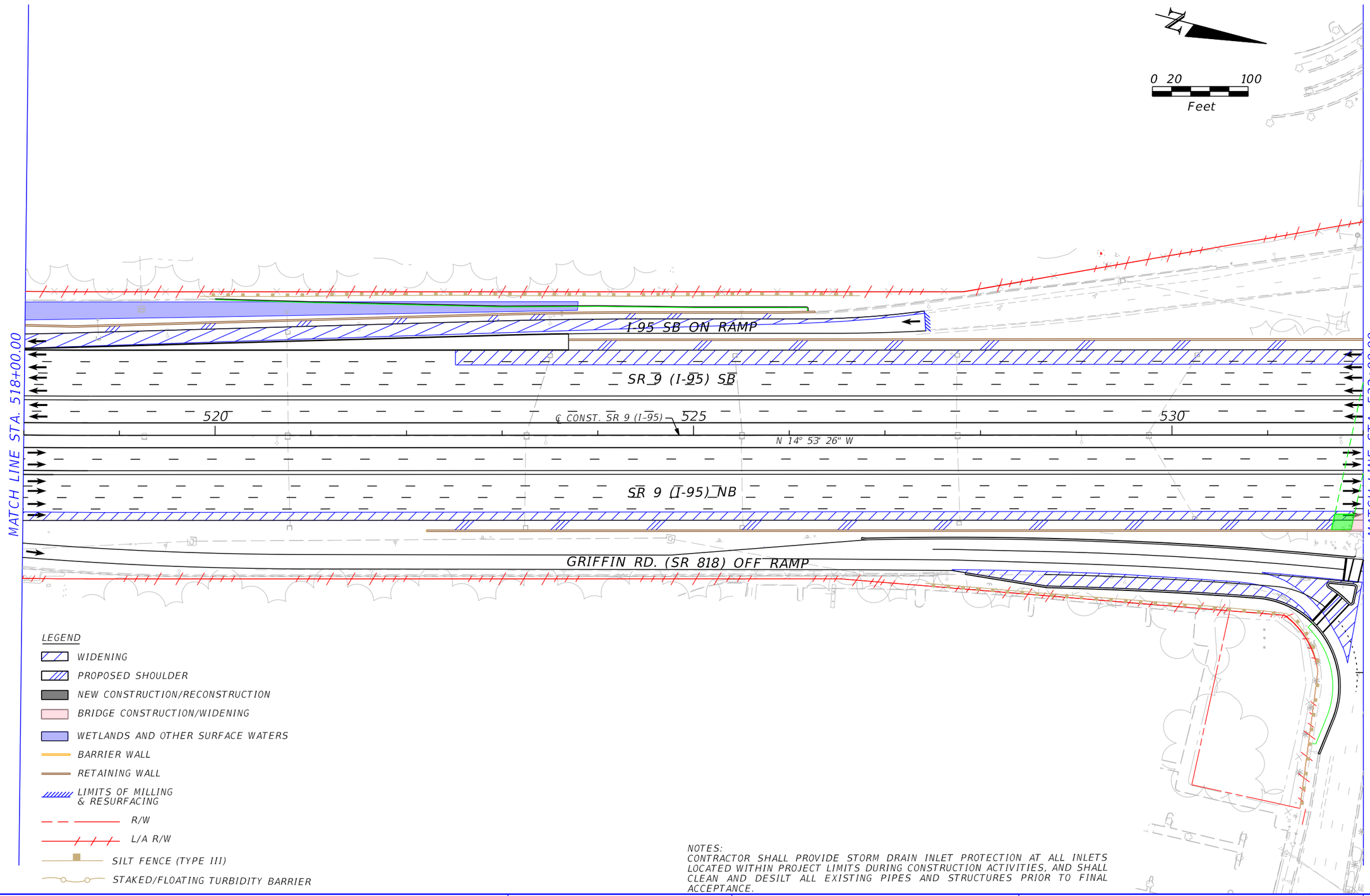

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FORT LAUDERDALE, FL 33309-3451
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-17

Prepared by:	HS	Date:	3/16/2021
Checked by:	CF	Date:	3/16/2021
Approved by:	WR	Date:	3/16/2021

I-95 PHASE 3C DRAINAGE CALCULATIONS

POST-DEVELOPMENT LAND-USE - SEGMENT 1B

DRAINAGE SYSTEM: 11 & 12 **SHGWT EL. (ft-NAVD):** 0.50

SYSTEM	BASIN	TIME OF CONC. tc (min.)	TOTAL AREA (Ac.)	TOTAL ONSITE AREA (Ac.)	ONSITE IMPERVIOUS AREA (Ac.)	ONSITE WATER SURFACE AREA (Ac.)	ONSITE PERVIOUS AREA (Ac.)	TOTAL OFFSITE AREA (Ac.)	OFFSITE IMPERVIOUS AREA (Ac.)	OFFSITE WATER SURFACE AREA (Ac.)	OFFSITE PERVIOUS AREA (Ac.)
11	11B-95	10	18.84	18.68	15.14	0.00	3.53	0.17	0.11	0.00	0.06
	11B-C10	10	0.12	0.12	0.04	0.08	0.00	0.00	0.00	0.00	0.00
	BASIN 11 TOTALS		**18.96**	**18.80**	**15.19**	**0.08**	**3.53**	**0.17**	**0.11**	**0.00**	**0.06**
12	12B-95	10	37.39	37.39	32.48	0.00	4.91	0.00	0.00	0.00	0.00
	12B-SW	10	2.42	2.42	1.39	0.00	1.03	0.00	0.00	0.00	0.00
	BASIN 12 TOTALS		**39.81**	**39.81**	**33.86**	**0.00**	**5.94**	**0.00**	**0.00**	**0.00**	**0.00**
12E	12B-SE	10	1.67	1.67	1.00	0.00	0.67	0.00	0.00	0.00	0.00
	BASIN 12E TOTALS		**1.67**	**1.67**	**1.00**	**0.00**	**0.67**	**0.00**	**0.00**	**0.00**	**0.00**
SEGMENT 1B TOTALS*			**60.44**	**60.27**	**50.05**	**0.08**	**10.15**	**0.17**	**0.11**	**0.00**	**0.06**

**Note: This land-use table is associated with Permit No. 88-00050-S. Basin 13A is associated under a different permit.*

Prepared by:	CF	Date:	2/15/2021
Checked by:	WR	Date:	2/15/2021
Approved by:	LR	Date:	2/15/2021

I-95 PHASE 3C DRAINAGE CALCULATIONS

POST-DEVELOPMENT WATER QUALITY CALCULATIONS

PERMIT No. 88-00050-S											
SYSTEM	SHGWT EL. (FT-NAVD)	PRE-DEVELOPMENT			POST-DEVELOPMENT			Add'l Impervious Area [1] (ac.)	WQ REQUIREMENTS	DRY DETENTION [2]	VOLUME PROVIDED
		Total Onsite Area (ac.)	Pervious Area (ac.)	Impervious Area (ac.)	Total Onsite Area (ac.)	Pervious Area (ac.)	Impervious Area (ac.)		2.5" Over Additional Impervious Area (ac-ft)	75% Dry Detention Volume (ac-ft)	Net Storage Volume Provided [3]
BASIN 11	0.50	18.53	3.51	14.92	18.80	3.53	15.19	0.266	0.055	0.042	0.254
BASIN 12	0.50	41.33	9.75	31.58	41.48	6.62	34.86	3.281	0.683	0.513	0.401
SEGMENT 1B TOTALS*:		59.86	13.27	46.50	60.27	10.15	50.05	3.55	0.739	0.554	0.655

NOTES:

Existing Systems 11 and 12 were permitted via Cut & Fill and are part of a network of drainage systems (Systems 9-12 from Permit No. 88-00050-S) that discharge to the C-10 Spur Canal. The existing conditions show that the existing swales do not provide the sufficient water quality required due to the complexity of it's interconnectivity on off-site drainage runoff and minimal storage capacity in the corridor. This analysis was conducted to show that the proposed conditions will not only meet the water quality requirements for the additional impervious area, but also compensate for some of the deficiency in the Systems. The Conceptual Permit had accounted for a small deficiency in the water quality provided for the additional impervious area (-0.016 Ac-ft). This is also consistent with the existing Drainage Report previously approved by SFWMD in September 2009 under 85-00070-S.

[1] Add'l Impervious Area - Difference between Post-Development and Pre-Development Impervious Areas.

[2] Dry Detention - Per SFWMD guidelines, utilizing dry detention facilities credits the permittee to a reduced 75% water quality requirement.

[3] Net Storage Volume Provided - Difference between Post-Development WQ Volume and Pre-Development WQ Volume. *(See Stage Storage Calculations)*

**Note: This calculation table is associated with Permit No. 88-00050-S. Basin 13A is associated under a different permit.*

Prepared by:	CF	Date:	3/16/2021
Checked by:	WR	Date:	3/16/2021
Approved by:	LR	Date:	3/16/2021

I-95 3C CALCULATIONS

STAGE-STORAGE CALCULATION
POST-DEVELOPMENT

POND 12SW (06-102237-P, ESTIMATED)

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
2.50	**0.200**	0.000	0.000	Area from 06-102237-P SFWMD ERP
3.00	0.218	0.104	0.104	Estimated using 1:4 slope
4.00	0.255	0.236	0.340	Estimated using 1:4 slope
5.00	0.295	0.275	0.615	Estimated using 1:4 slope
6.00	0.338	0.316	0.932	Estimated using 1:4 slope

POND 12SE (06-102237-P)

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
3.50	**0.087**	0.000	0.000	
4.00	**0.123**	0.053	0.053	
4.50	**0.140**	0.066	0.118	
5.00	**0.159**	0.075	0.193	
5.50	**0.178**	0.084	0.277	
5.70	**0.185**	0.036	0.313	Exist. Weir Elevation (Ex12SE)
6.00	**0.197**	0.057	0.371	
6.50	**0.218**	0.104	0.474	
7.00	**0.241**	0.115	0.589	
7.50	**0.276**	0.129	0.718	
8.00	**0.328**	0.151	0.869	

Prepared by:	CF	Date:	10/21/2020
Checked by:	WR	Date:	10/21/2020
Approved by:	LR	Date:	10/21/2020

I-95 3C CALCULATIONS

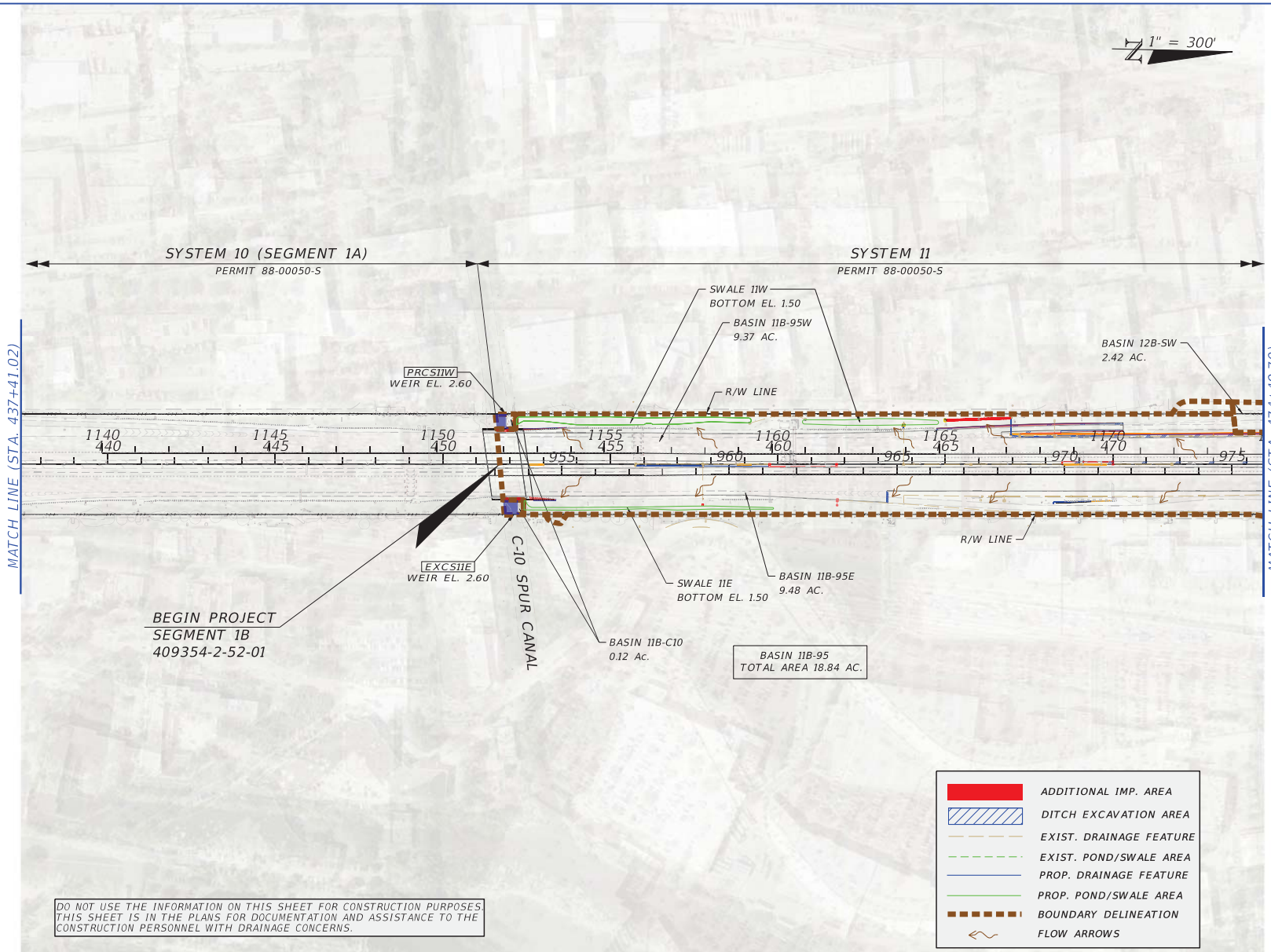
STAGE-STORAGE CALCULATION
POST-DEVELOPMENT

SWALE 12E

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
1.50	**0.877**	0.000	0.000	
1.95	0.942	0.409	0.409	Exist. Weir Elevation (ExCS12E)
2.00	**0.950**	0.047	0.457	
2.50	**1.010**	0.490	0.946	
3.00	**1.075**	0.521	1.468	
3.45	1.132	0.497	1.964	Overflow EL. Into R/W (1:60)
3.50	**1.139**	0.057	2.021	
4.00	**1.206**	0.586	2.607	
4.20	1.226	0.243	2.850	Overflow EL. Into R/W (1:133.3)
4.50	1.273	0.375	3.225	
5.00	1.341	0.653	3.879	
5.50	1.408	0.687	4.566	
6.00	1.475	0.721	5.287	

SWALE 12W

Elev.	Area (Ac)	Incr. Vol. (Ac-Ft)	Treatment Volume (Ac-Ft)	Remark
1.50	**0.645**	0.000	0.000	
1.95	0.733	0.310	0.310	Exist. Weir Elevation (PrCS12E)
2.00	**0.743**	0.037	0.347	
2.33	0.812	0.257	0.604	Overflow EL. Into R/W (1:53)
2.50	**0.848**	0.141	0.745	
2.77	0.903	0.236	0.981	Overflow EL. Into Offsite (10' Width)
3.00	**0.950**	0.449	1.194	
3.50	**1.047**	0.499	1.693	
4.00	**1.145**	0.548	2.241	
4.50	1.243	0.597	2.839	
5.00	1.342	0.646	3.485	Warning Stage - Sag
5.50	1.440	0.695	4.180	
6.00	1.538	0.744	4.924	



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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

LUIS A. RODRIGUEZ, P.E.
P.E. LICENSE NUMBER 63983
BCC ENGINEERING, INC.
6401 SW 87th AVE, SUITE 200
MIAMI, FLORIDA 33173
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 5

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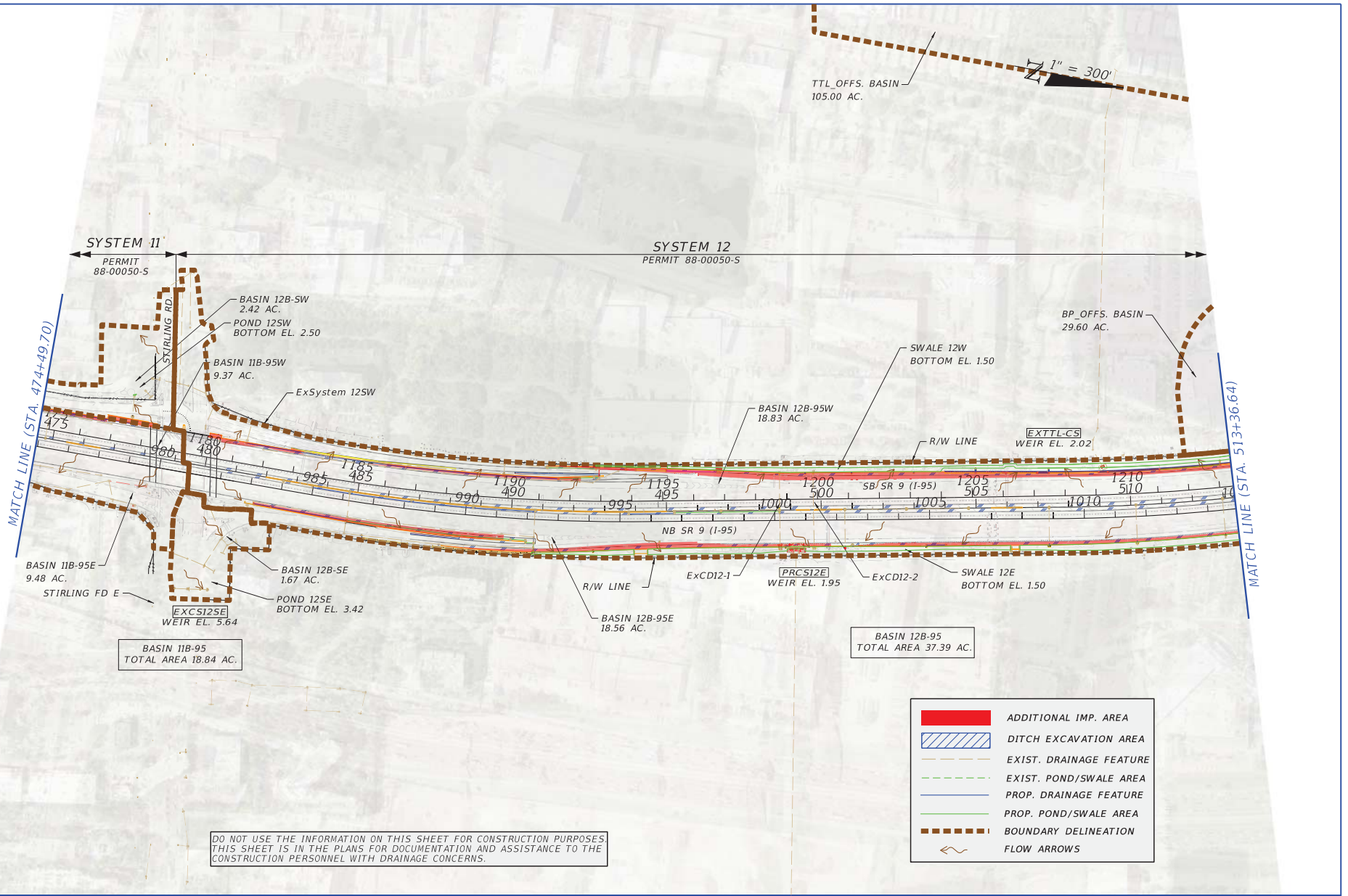

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POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 6

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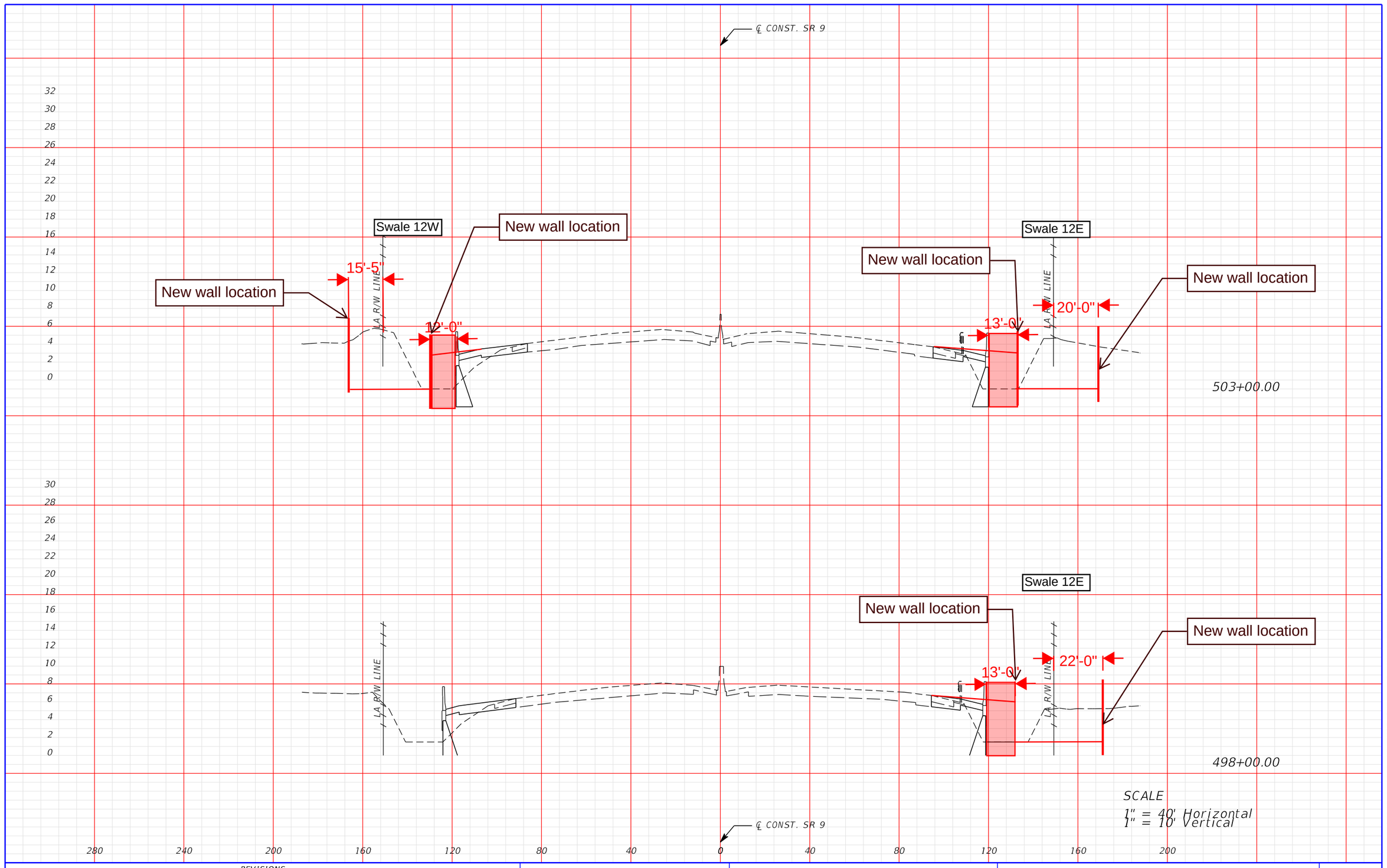

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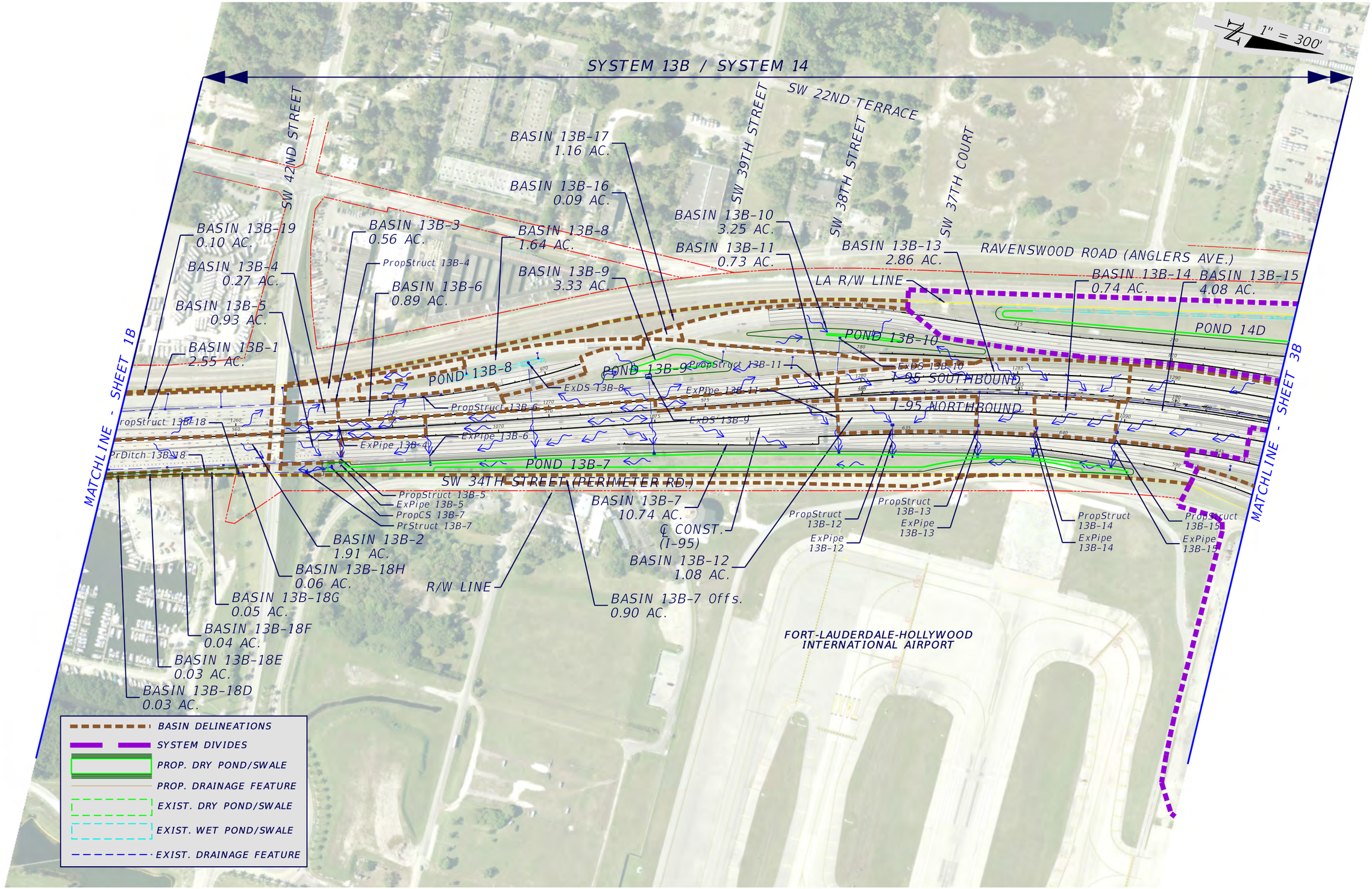
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

CROSS SECTIONS

SHEET NO.
XS-19



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

95 EXPRESS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 2B

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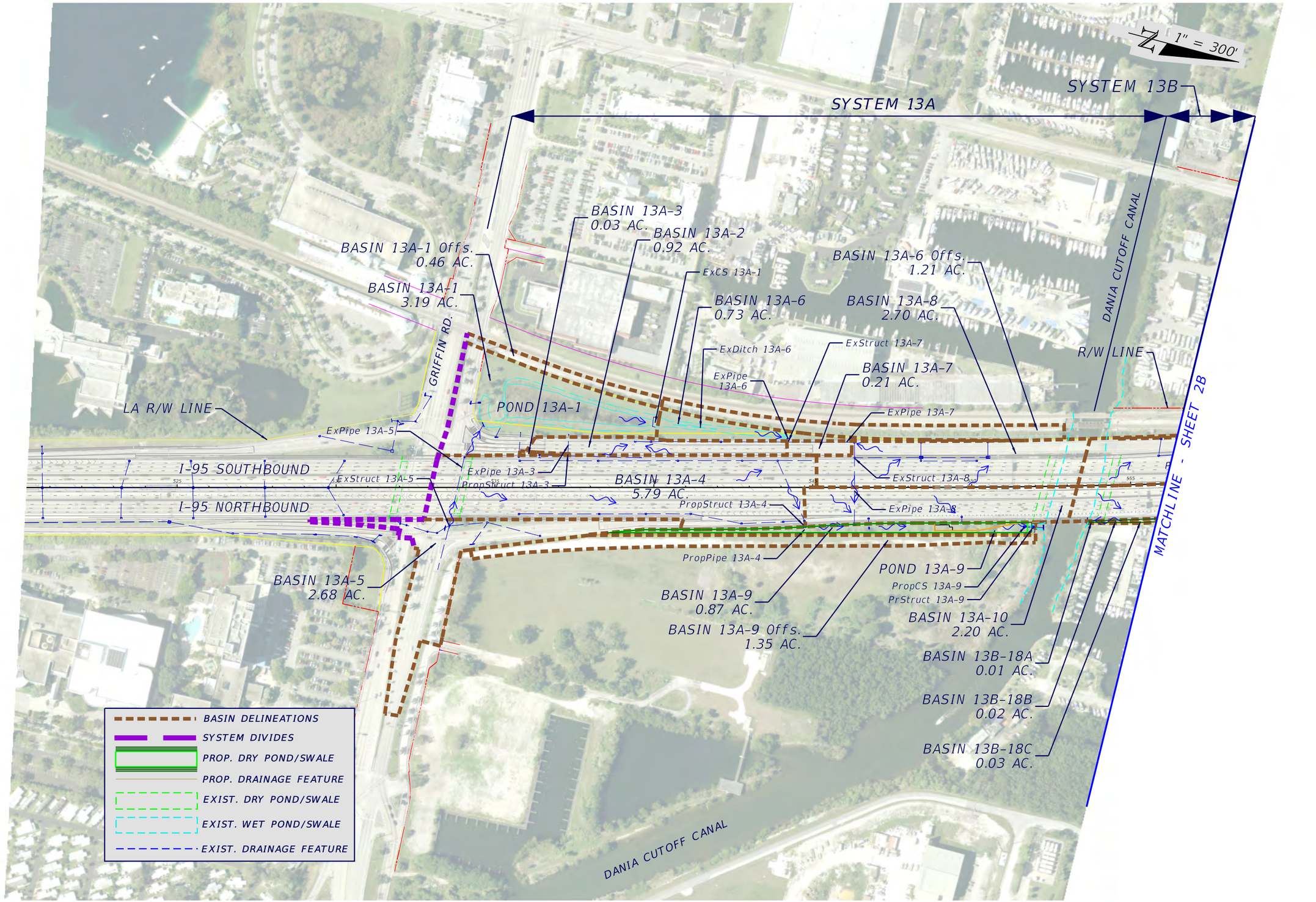
System 13
Existing Data



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

95 EXPRESS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
9	BROWARD	409354-2-52-01

POST-DEVELOPMENT DRAINAGE MAP

SHEET NO. 1B

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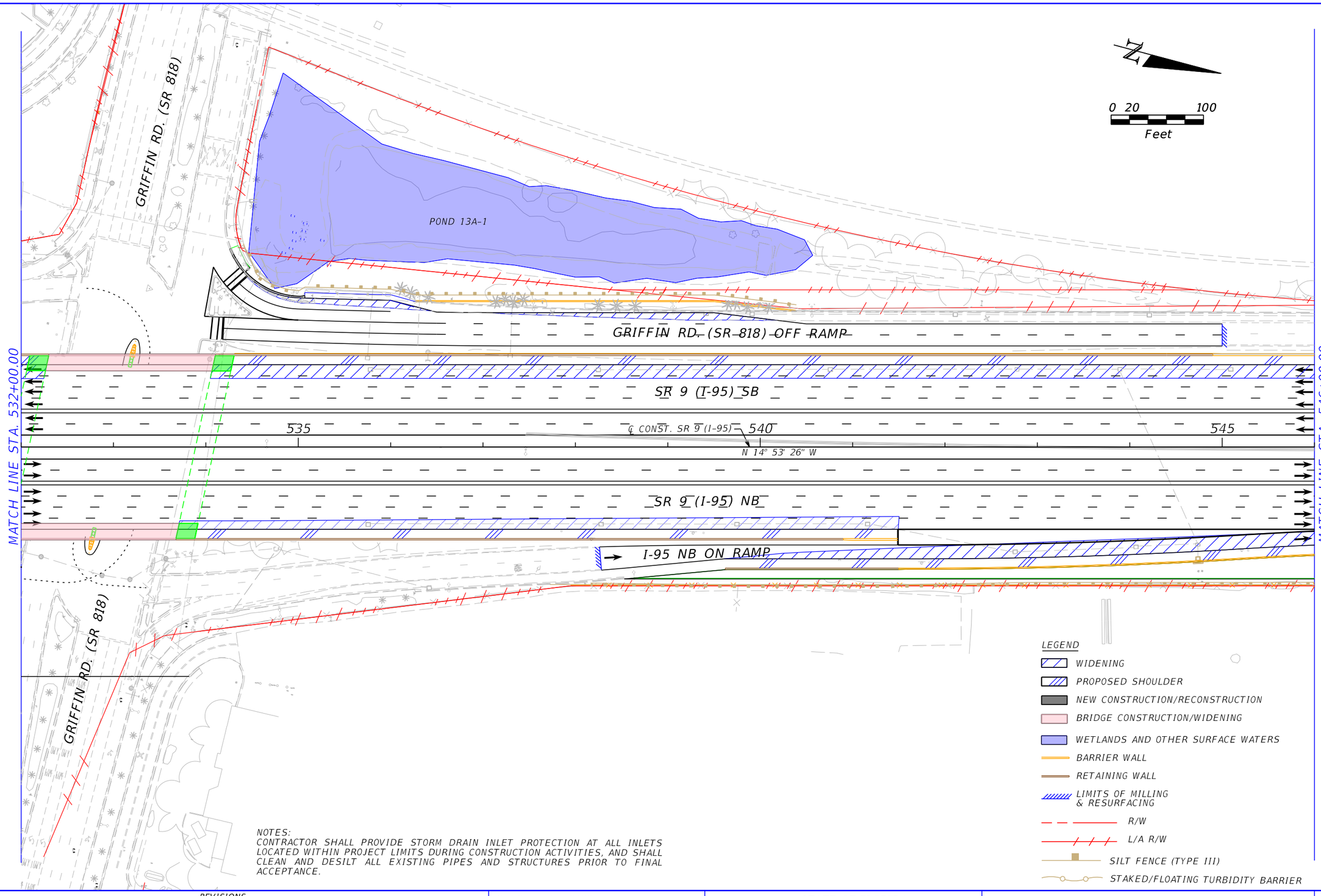
11. PROJECT SUMMARY TABLES

Table 3 – Project Area Breakdown and Land Use Summary

PRE-DEVELOPMENT					
System	Sub-system	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
		Roadway / Sidewalk, etc.	Wet Storage		
System 13	System 13A	14.71	0.01	7.72	22.44
	System 13B	24.43	0.00	12.19	36.62
System 14	--	66.39	2.71	55.48	124.57
System 15	--	26.98	1.13	4.97	33.08
Basin 8	Basin 8E & 8G	30.95	0.48	38.96	70.39
Basin 9	--	6.54	2.11	0.00	8.65
Basin 10	--	65.33	8.29	44.83	118.45
TOTAL		**235.33**	**14.73**	**164.15**	**414.20**

POST-DEVELOPMENT					
System	Sub-system	Impervious Area (ac)		Pervious Area (ac)	Total Area (ac)
		Roadway / Sidewalk, etc.	Wet Storage		
System 13	System 13A	15.55	0.00	6.79	22.34
	System 13B	28.44	0.00	9.64	38.08
System 14	--	62.41	2.71	58.48	123.60
System 15	--	28.36	1.13	4.38	33.87
Basin 8	Basin 8E & 8G	32.88	0.48	36.98	70.34
Basin 9	--	9.43	0.00	0.00	9.43
Basin 10	--	73.96	6.14	39.00	119.10
TOTAL		**251.03**	**10.46**	**155.27**	**416.76**



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ROADWAY PLAN

SHEET NO. R-18

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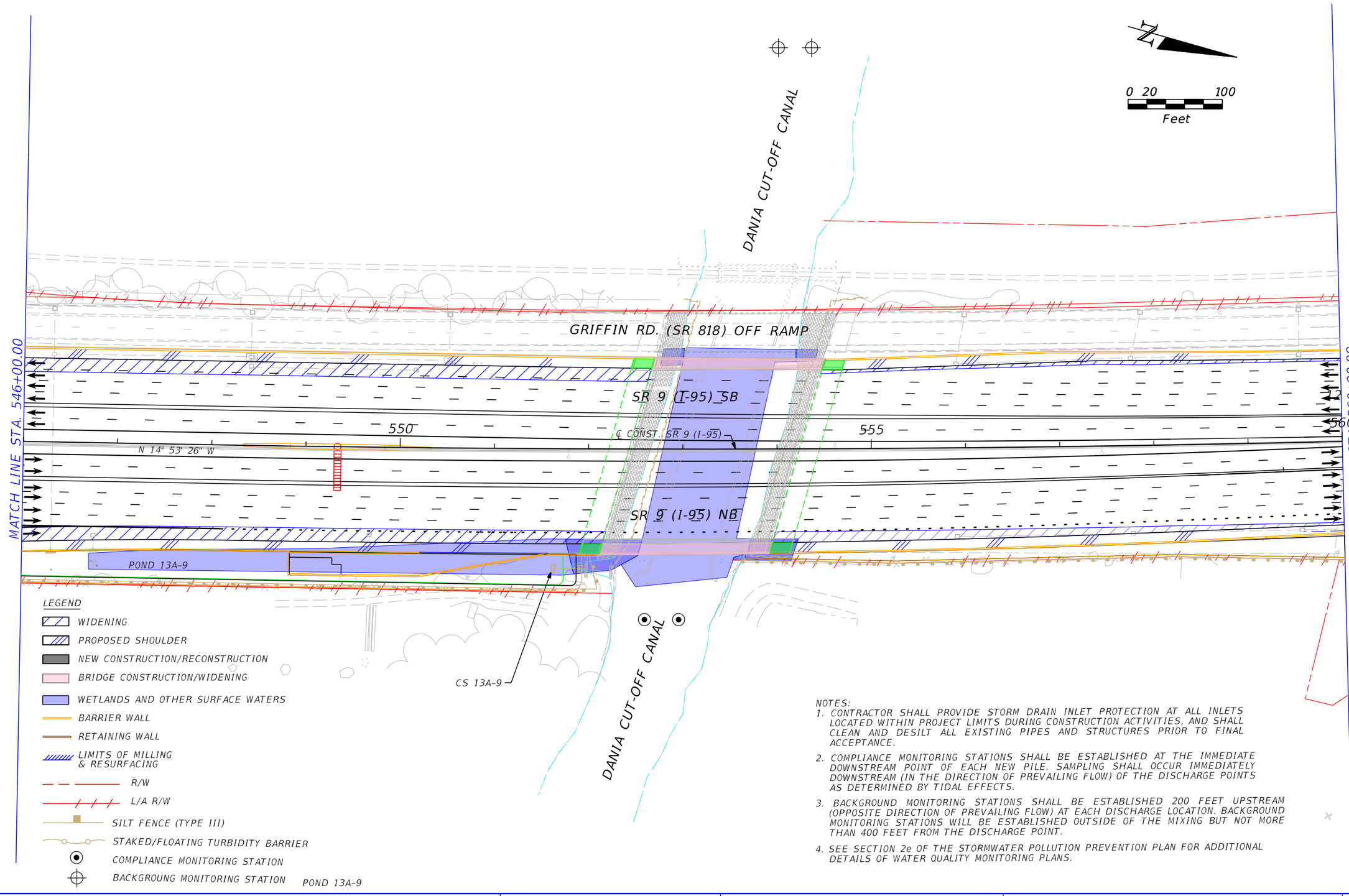

NOTES:

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2. COMPLIANCE MONITORING STATIONS SHALL BE ESTABLISHED AT THE IMMEDIATE DOWNSTREAM POINT OF EACH NEW PILE. SAMPLING SHALL OCCUR IMMEDIATELY DOWNSTREAM (IN THE DIRECTION OF PREVAILING FLOW) OF THE DISCHARGE POINTS AS DETERMINED BY TIDAL EFFECTS.
3. BACKGROUND MONITORING STATIONS SHALL BE ESTABLISHED 200 FEET UPSTREAM (OPPOSITE DIRECTION OF PREVAILING FLOW) AT EACH DISCHARGE LOCATION. BACKGROUND MONITORING STATIONS WILL BE ESTABLISHED OUTSIDE OF THE MIXING BUT NOT MORE THAN 400 FEET FROM THE DISCHARGE POINT.
4. SEE SECTION 2e OF THE STORMWATER POLLUTION PREVENTION PLAN FOR ADDITIONAL DETAILS OF WATER QUALITY MONITORING PLANS.

REVISIONS			
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ROADWAY PLAN

SHEET NO. R-19

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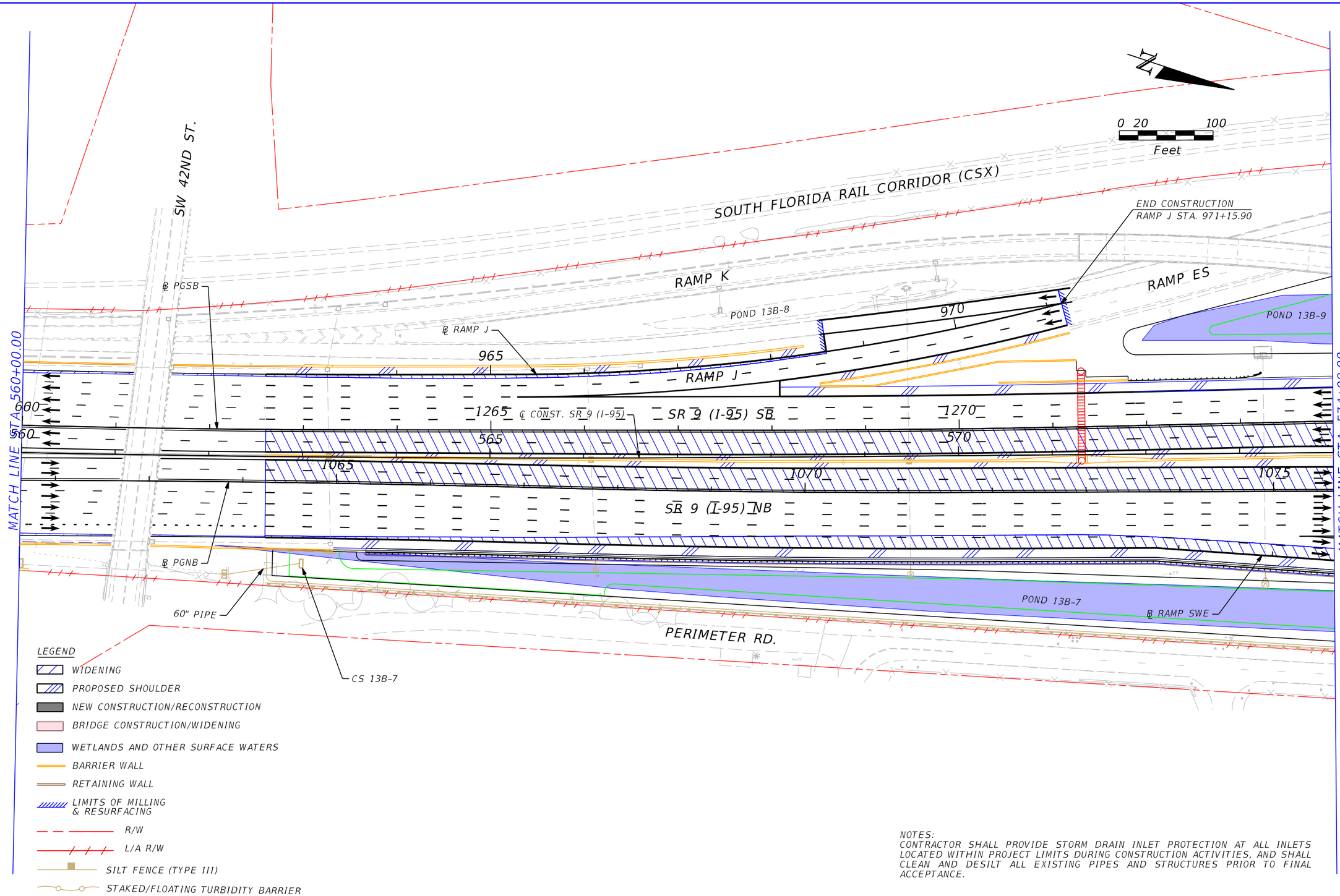


NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

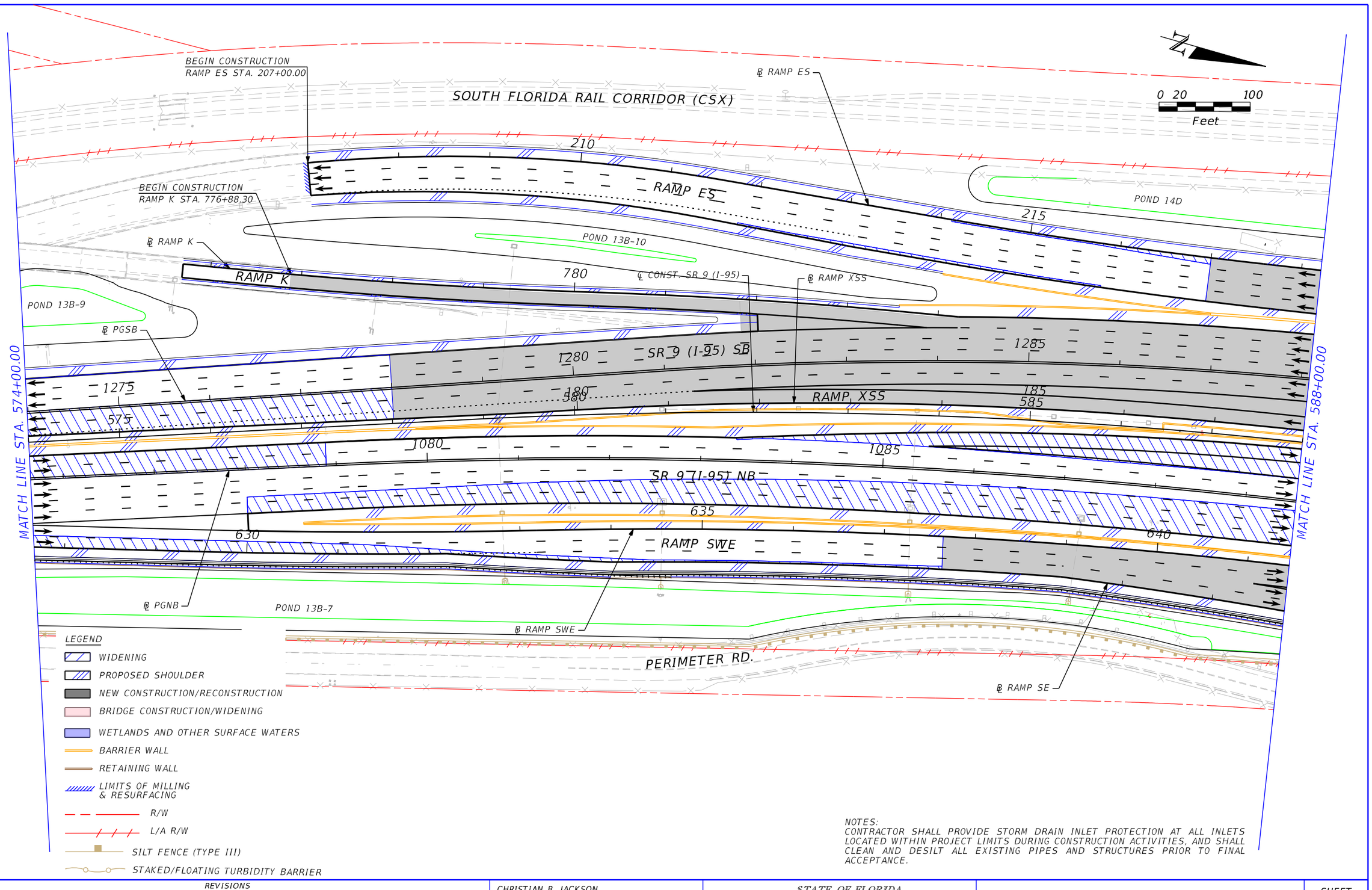
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-20

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.



NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO. R-21

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

SOUTH FLORIDA RAIL CORRIDOR (CSX)

POND 14D

℄ RAMP ES

END CONSTRUCTION
RAMP ES STA. 227+20.01

℄ RAMP WS

RAMP ES

0 20 100
Feet

RAMP WS

POND 14C

℄ RAMP XSS

℄ PGSB

225

220

810

815

820

END CONSTRUCTION
RAMP WS STA. 820+20.82

℄ RAMP XS

SR 9 (I-95) SB

1290

1295

1300

190

590

RAMP XSS

690

195

595

695

700

RAMP XS

RAMP XSN

1095

℄ RAMP XSN

1100

1090

SR 9 (I-95) NB

645

MATCH LINE STA. 588+00.00

MATCH LINE STA. 602+00.00

℄ CONST. SR 9 (I-95)

℄ PGNB

RAMP SE

590

℄ RAMP SW

RAMP SW

END CONSTRUCTION
RAMP SW STA. 918+69.73

595

℄ RAMP SE

PERIMETER RD.

END CONSTRUCTION
RAMP SE STA. 597+92.08

LEGEND

- WIDENING
- PROPOSED SHOULDER
- NEW CONSTRUCTION/RECONSTRUCTION
- BRIDGE CONSTRUCTION/WIDENING
- WETLANDS AND OTHER SURFACE WATERS
- BARRIER WALL
- RETAINING WALL
- LIMITS OF MILLING & RESURFACING
- R/W
- L/A R/W
- SILT FENCE (TYPE
- STAKED/FLOATIN

NOTES:
CONTRACTOR SHALL PROVIDE STORM DRAIN INLET PROTECTION AT ALL INLETS LOCATED WITHIN PROJECT LIMITS DURING CONSTRUCTION ACTIVITIES, AND SHALL CLEAN AND DESILT ALL EXISTING PIPES AND STRUCTURES PRIOR TO FINAL ACCEPTANCE.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CHRISTIAN B. JACKSON
P.E. LICENSE NUMBER 61898
RS&H, Inc.
3125 W. COMMERCIAL BLVD., SUITE 130
FORT LAUDERDALE, FL 33309-3451
CERTIFICATE OF AUTHORIZATION 5620

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 9	BROWARD	409354-2-52-01

ROADWAY PLAN

SHEET NO.
R-22

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

I-95 CDC DRAINAGE CALCULATIONS
WATER QUALITY

Drainage System: ***13A***

SYSTEM	SHGWT EL. (ft-NAVD)	TOTAL ONSITE AREA (Ac.) *[POST-DEV.]*	ONSITE IMPERVIOUS AREA (Ac.) *[POST-DEV.]*	ONSITE PERVIOUS AREA (Ac.) *[POST-DEV.]*	1" OVER TOTAL ONSITE AREA (Ac-ft)	2.5" OVER IMPERVIOUS AREA (Ac-ft)	[1]WATER QUALITY TREATMENT REQUIRED (Ac-ft)	DRY-DETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	WET-DETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	DRY- / WET-RETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	FRENCH DRAIN TREATMENT VOLUME PROVIDED (Ac-ft)	[2]TOTAL TREATMENT VOLUME PROVIDED (Ac-ft)	SURPLUS TREATMENT VOLUME PROVIDED (Ac-ft)
13A	0.42	19.32	14.83	4.49	1.61	3.09	**3.09**	0.21	0.00	1.42	0.00	**3.12**	**0.03**

[1]Greater of 1" over Total Onsite Area and 2.5" over Onsite Impervious Area; Volume based on wet detention requirements.
[2]Sum of all treatment provided; Retention and Dry Detention volumes divided by 0.50 and 0.75, respectively to account for 50% and 25% credits.

POND 13A-1			POND 13A-9		
TYPE:	DRY RETENTION / DETENTION		TYPE:	DRY DETENTION	
STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)
0.92	0.56	--	1.42	0.480	--
1.00	0.57	0.05	2.00	0.482	0.28
2.00	0.72	0.69	3.00	0.484	0.76
3.00	0.87	1.49	4.00	0.486	1.25
4.00	1.02	2.43	5.00	0.489	1.73
5.00	1.18	3.53	6.00	0.511	2.23
6.00	1.45	4.85			

BASIN 13A : POND 13A-1 DRY RETENTION TOTALS	STAGE-AREA RELATIONSHIP			REQUIRED WATER QUALITY TREATMENT VOLUME	MINIMUM WEIR ELEVATION FOR FULL WATER QUALITY TREATMENT	PROVIDED WATER QUALITY TREATMENT	
	TYPE:	DRY RETENTION					
	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	VOLUME (Ac-ft)	ELEVATION (ft-NAVD)	WEIR ELEVATION (ft-NAVD)	VOLUME PROVIDED (Ac-ft)
	0.92	0.56	0.00	DRY RETENTION	DRY RETENTION	EXIST.	
	1.00	0.57	0.05	**1.54**	**3.07**	**2.92**	**1.42**
	2.00	0.72	0.69				
	3.00	0.87	1.49				
	4.00	1.02	2.43				
	5.00	1.18	3.53				
	6.00	1.45	4.85				

BASIN 13A: DRY DETENTION TOTALS	STAGE-AREA RELATIONSHIP			REQUIRED WATER QUALITY TREATMENT VOLUME	MINIMUM WEIR ELEVATION FOR FULL WATER QUALITY TREATMENT	PROVIDED WATER QUALITY TREATMENT		
	TYPE:	DRY DETENTION						
	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	VOLUME (Ac-ft)	ELEVATION (ft-NAVD)	WEIR ELEVATION (ft-NAVD)	VOLUME PROVIDED (Ac-ft)	SURPLUS VOLUME (Ac-ft)
	1.42	0.48	0.00	DRY DETENTION	DRY DETENTION	PROP.		
	2.00	0.48	0.28					
	2.92	1.34	1.12					
	3.00	1.35	1.23					
	4.00	1.51	2.66	0.18	1.80	1.85	0.21	0.03
	5.00	1.67	4.24					
	6.00	1.96	6.06					

I-95 CDC DRAINAGE CALCULATIONS
WATER QUALITY

Drainage System: ***13B***

SYSTEM	SHGWT EL. (ft-NAVD)	TOTAL ONSITE AREA (Ac.) *[POST-DEV.]*	ONSITE IMPERVIOUS AREA (Ac.) *[POST-DEV.]*	ONSITE PERVIOUS AREA (Ac.) *[POST-DEV.]*	1" OVER TOTAL ONSITE AREA (Ac-ft)	2.5" OVER IMPERVIOUS AREA (Ac-ft)	[1]WATER QUALITY TREATMENT REQUIRED (Ac-ft)	DRY-DETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	WET-DETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	DRY- / WET-RETENTION TREATMENT VOLUME PROVIDED (Ac-ft)	FRENCH DRAIN TREATMENT VOLUME PROVIDED (Ac-ft)	[2]TOTAL TREATMENT VOLUME PROVIDED (Ac-ft)	SURPLUS TREATMENT VOLUME PROVIDED (Ac-ft)
B13B-9	0.42	3.42	1.81	1.61	0.29	0.38	**0.38**	0.00	0.00	1.59	0.00	**3.18**	**2.80**
B13B-10	0.42	3.25	1.70	1.55	0.27	0.35	**0.35**	0.00	0.00	0.92	0.00	**1.85**	**1.49**
REST OF 13B	0.42	30.51	24.36	6.15	2.54	5.08	**5.08**	3.87	0.00	0.00	0.00	**5.16**	**0.09**
13B TOTAL	0.42	37.18	27.87	9.31	3.10	5.81	**5.81**	3.87	0.00	2.51	0.00	**10.19**	**4.38**

[1]Greater of 1" over Total Onsite Area and 2.5" over Onsite Impervious Area; Volume based on wet detention requirements.

[2]Sum of all treatment provided; Retention and Dry Detention volumes divided by 0.50 and 0.75, respectively to account for 50% and 25% credits.

POND 13B-7			POND 13B-9			POND 13B-10		
TYPE:	DRY DETENTION		TYPE:	DRY RETENTION		TYPE:	DRY RETENTION	
STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)
1.42	1.57	--	1.42	0.18	--	2.00	0.04	--
2.00	1.72	0.96	2.00	0.23	0.12	3.00	0.14	0.09
3.00	1.99	2.81	3.00	0.30	0.38	4.00	0.26	0.29
4.00	2.25	4.93	4.00	0.37	0.72	5.00	0.40	0.62
5.00	2.51	7.31	5.00	0.46	1.13	6.00	0.54	1.09
6.00	2.78	9.95	6.00	0.54	1.63			

	STAGE-AREA RELATIONSHIP			REQUIRED WATER QUALITY TREATMENT VOLUME	MINIMUM WEIR ELEVATION FOR FULL WATER QUALITY TREATMENT	PROVIDED WATER QUALITY TREATMENT		
	TYPE:	DRY RETENTION						
	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	VOLUME (Ac-ft)	ELEVATION (ft-NAVD)	WEIR ELEVATION (ft-NAVD)	VOLUME PROVIDED (Ac-ft)	SURPLUS VOLUME (Ac-ft)
BASIN 13B-9	1.42	0.18	0.00	DRY RETENTION	DRY RETENTION	EXIST.		
	2.00	0.23	0.12	**0.19**	**2.27**	**5.92**	**1.59**	**2.80**
	3.00	0.30	0.38					
	4.00	0.37	0.72					
	5.00	0.46	1.13					
	6.00	0.54	1.63					

	STAGE-AREA RELATIONSHIP			REQUIRED WATER QUALITY TREATMENT VOLUME	MINIMUM WEIR ELEVATION FOR FULL WATER QUALITY TREATMENT	PROVIDED WATER QUALITY TREATMENT		
	TYPE:	DRY RETENTION						
	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	VOLUME (Ac-ft)	ELEVATION (ft-NAVD)	WEIR ELEVATION (ft-NAVD)	VOLUME PROVIDED (Ac-ft)	SURPLUS VOLUME (Ac-ft)
BASIN 13B-10	2.00	0.04	0.00	DRY RETENTION	DRY RETENTION	EXIST.		
	3.00	0.14	0.09	**0.18**	**3.66**	**5.92**	**0.92**	**1.49**
	4.00	0.26	0.29					
	5.00	0.40	0.62					

	STAGE-AREA RELATIONSHIP			REQUIRED WATER QUALITY TREATMENT VOLUME	MINIMUM WEIR ELEVATION FOR FULL WATER QUALITY TREATMENT	PROVIDED WATER QUALITY TREATMENT		
	TYPE:	DRY DETENTION						
	STAGE (ft-NAVD)	AREA (Ac.)	VOLUME (Ac-ft)	VOLUME (Ac-ft)	ELEVATION (ft-NAVD)	WEIR ELEVATION (ft-NAVD)	VOLUME PROVIDED (Ac-ft)	SURPLUS VOLUME (Ac-ft)
REST OF BASIN 13B	1.42	1.57	0.00	DRY DETENTION	DRY DETENTION	PROP.		
	2.00	1.72	0.96	**3.81**	**3.47**	**3.50**	**3.87**	**0.09**
	3.00	1.99	2.81					
	4.00	2.25	4.93					
	5.00	2.51	7.31					
	6.00	2.78	9.95					

Griffin Road
Existing Data

STATE PROJ. NO.	SHEET NO.
86070-3488	2

EXHIBIT 2

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

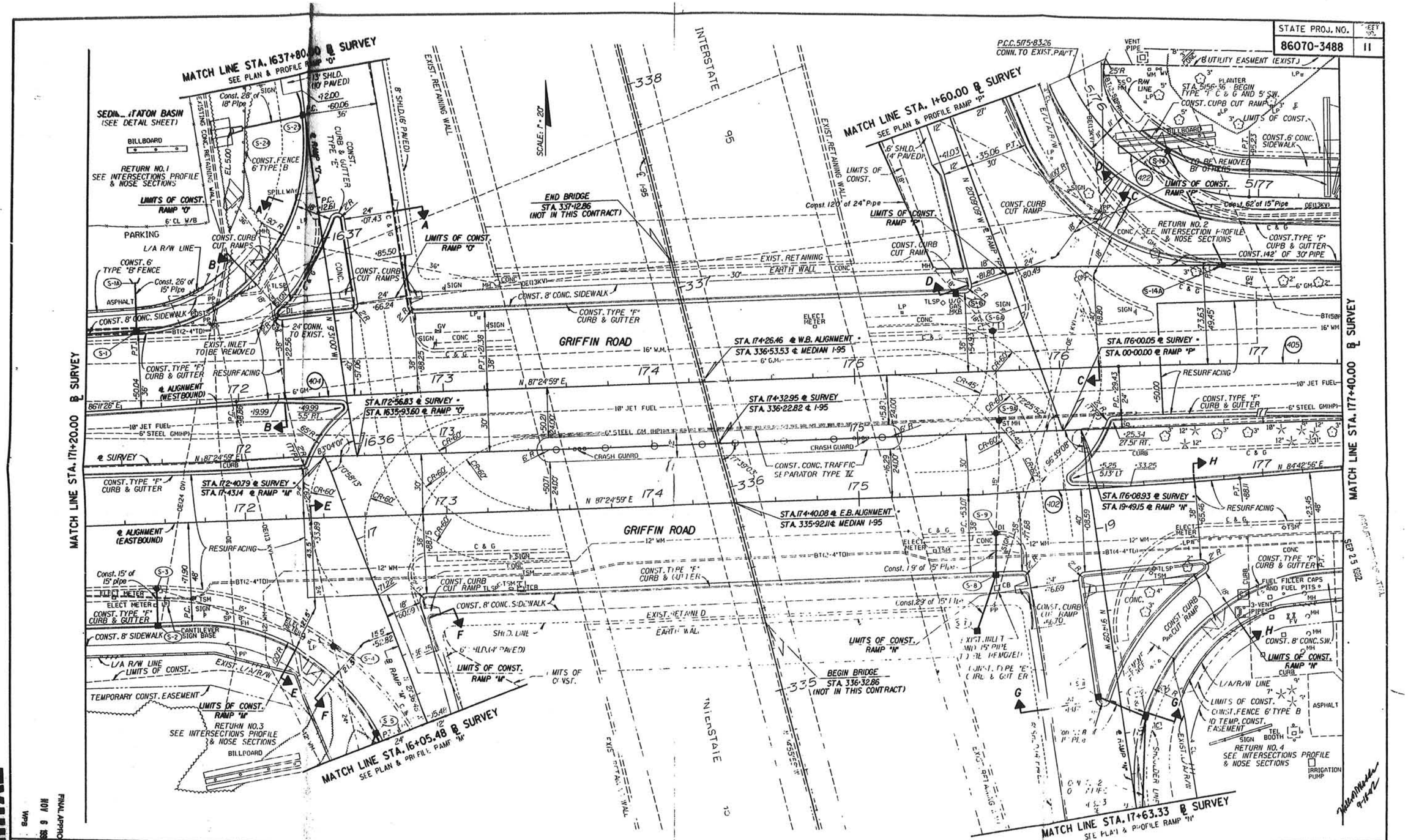
	NAME	DATE		NAME	DATE
DESIGNED BY	LUGENBEEL	12/88	DRAWN BY	D.NGUYEN	1/89
CHECKED BY	E. WAGNER	1/89	CHECKED BY	E. WAGNER	1/89
SUPERVISED BY					

FLORIDA DEPARTMENT OF TRANSPORTATION

APPROVED BY

DATE

DRAINAGE MAP GRIFFIN ROAD


STATE PROJ. NO.
86070-3488
SHEET NO.
11
MATCH LINE STA. 1637+80.00 ℄ SURVEY
SEE PLAN & PROFILE RAMP "O"
MATCH LINE STA. 1+60.00 ℄ SURVEY
SEE PLAN & PROFILE RAMP "P"
MATCH LINE STA. 171+20.00 ℄ SURVEY
MATCH LINE STA. 177+40.00 ℄ SURVEY
MATCH LINE STA. 16+05.48 ℄ SURVEY
SEE PLAN & PROFILE RAMP "M"
MATCH LINE STA. 17+63.33 ℄ SURVEY
SEE PLAN & PROFILE RAMP "N"
INTERSTATE 95
GRIFFIN ROAD
END BRIDGE
STA. 337+12.86
(NOT IN THIS CONTRACT)
BEGIN BRIDGE
STA. 336+32.86
(NOT IN THIS CONTRACT)
STA. 174+26.46 ℄ W.B. ALIGNMENT
STA. 336+53.53 ℄ MEDIAN I-95
STA. 174+32.95 ℄ SURVEY
STA. 336+22.82 ℄ I-95
STA. 174+40.08 ℄ E.B. ALIGNMENT
STA. 335+92.11 ℄ MEDIAN I-95
STA. 172+56.83 ℄ SURVEY
STA. 1635+93.60 ℄ RAMP "O"
STA. 172+40.79 ℄ SURVEY
STA. 17+43.14 ℄ RAMP "M"
STA. 176+00.05 ℄ SURVEY
STA. 00+00.00 ℄ RAMP "P"
STA. 176+08.93 ℄ SURVEY
STA. 19+49.15 ℄ RAMP "N"
SEDIMENTATION BASIN
(SEE DETAIL SHEET)
RETURN NO. 1
SEE INTERSECTIONS PROFILE & NOSE SECTIONS
RETURN NO. 2
SEE INTERSECTION PROFILE & NOSE SECTIONS
RETURN NO. 3
SEE INTERSECTIONS PROFILE & NOSE SECTIONS
RETURN NO. 4
SEE INTERSECTIONS PROFILE & NOSE SECTIONS
LIMITS OF CONST. RAMP "O"
LIMITS OF CONST. RAMP "P"
LIMITS OF CONST. RAMP "M"
LIMITS OF CONST. RAMP "N"
CONST. 8' CONC. SIDEWALK
CONST. TYPE "F" CURB & GUTTER
CONST. CURB CUT RAMPS
CONST. CONC. TRAFFIC SEPARATOR TYPE IV
CRASH GUARD
RESURFACING
EXIST. RETAINING WALL
EXIST. RETAINING EARTH WALL
PARKING
BILLBOARD
TEMPORARY CONST. EASEMENT
SCALE: 1" = 20'
SEP 25 1992
FINAL APPROVED
NOV 6 1992
WPB
EXHIBIT 8
C6-01768-S
GRIFFIN2.DGN 31-JAN-92
PLAN GRIFFIN ROAD
STA. 171+20.00 - STA. 177+40.00

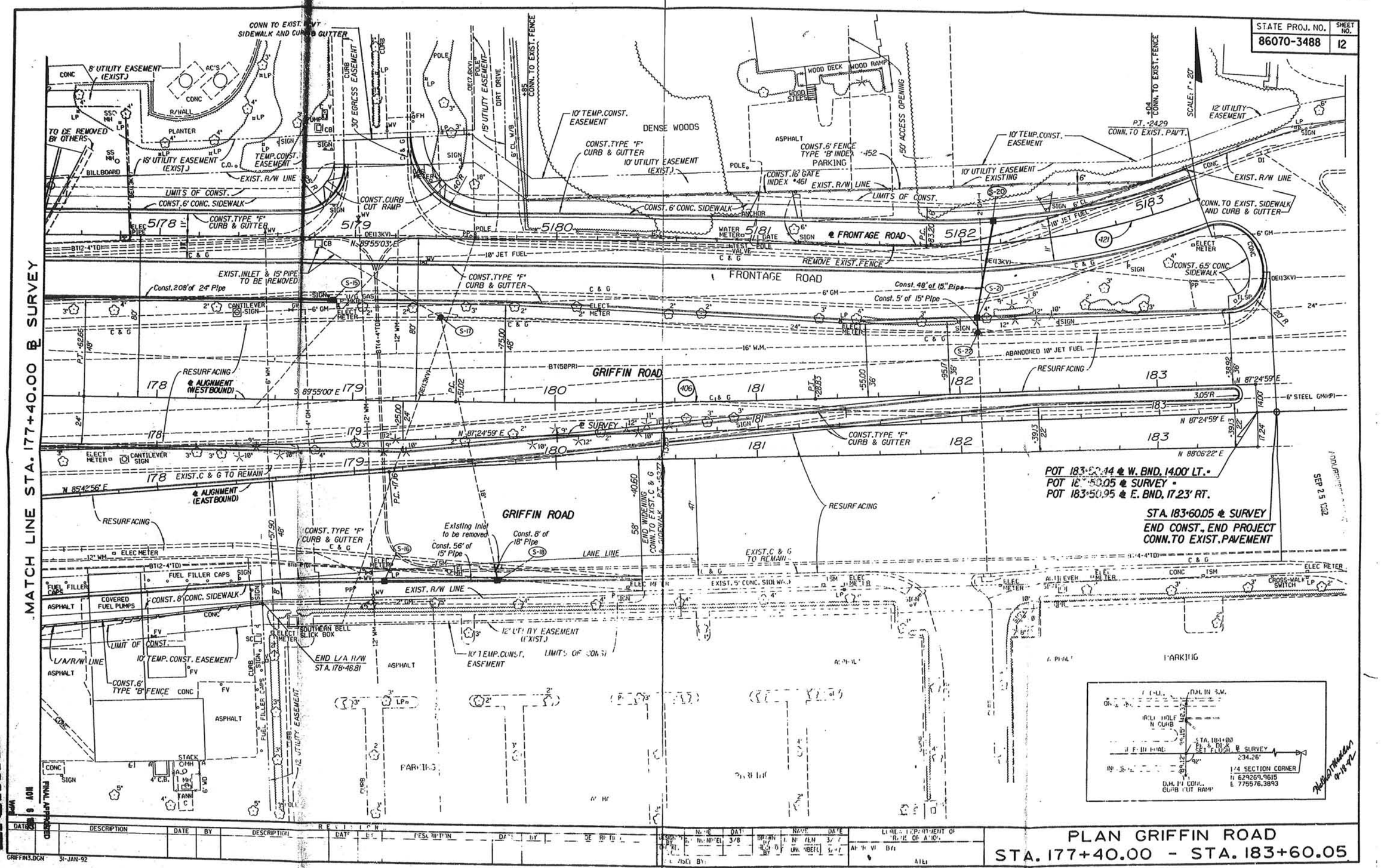

STATE PROJ. NO. 86070-3488
SHEET NO. 12
MATCH LINE STA. 177+40.00 ℄ SURVEY
FRONTAGE ROAD
GRIFFIN ROAD
℄ FRONTAGE ROAD
℄ SURVEY
℄ ALIGNMENT (WESTBOUND)
℄ ALIGNMENT (EASTBOUND)
DENSE WOODS
PARKING
POT 183+50.44 ℄ W. BND. 14.00' LT.
POT 183+50.05 ℄ SURVEY
POT 183+50.95 ℄ E. BND. 17.23' RT.
STA. 183+60.05 ℄ SURVEY
END CONST., END PROJECT
CONN. TO EXIST. PAVEMENT
END L/A R/W STA. 178+48.81
1/4 SECTION CORNER
N 629269.9615
E 775576.3893
SCALE: 1" = 20'
SEP 25 1992
PLAN GRIFFIN ROAD
STA. 177+40.00 - STA. 183+60.05
GRIFFIN3.DGN 31-JAN-92

EXHIBIT 9

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTH FLORIDA
SUBDISTRICT

3301 GUN CLUB ROAD
P.O. BOX 3858
WEST PALM BEACH, FLORIDA 33402

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

WARREN G. STRAHM
SUBDISTRICT MANAGER

December 16, 1981

Broward County Engineering
Division
c/o Mid South Engineering
Company
233 Commercial Boulevard
Lauderdale-by-the-Sea, FL 33308

D&F - Broward County
Stormwater System/
Griffin Road from
S.R. 7/U.S. 441 to
U.S. 1, Dania

Dear Sirs:

Enclosed is Permit Number DF 06-30905-6E, dated Dec. 16, 1981, to construct a dredge and fill project issued pursuant to Section 403.087, Florida Statutes.

Should you object to this permit, including any and all of the conditions contained therein, you may file an appropriate petition for administrative hearing. This petition must be filed within fourteen (14) days of the receipt of this letter. Further, the petition must conform to the requirements of Section 28-5.201, Florida Administrative Code, (see reverse side of this letter). The petition must be filed with the Office of General Counsel, Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301.

If no petition is filed within the prescribed time, you will be deemed to have accepted this permit and waived your right to request an administrative hearing on this matter.

Acceptance of the permit constitutes notice and agreement that the Department will periodically review this permit for compliance, including site inspections where applicable, and may initiate enforcement action for violation of the conditions and requirements thereof.

Sincerely,

Roy M. Duke, Jr., P.E.
Subdistrict Manager
RMD:rwj
Enclosure

cc: Broward County Environmental Quality Control Board
Florida Game & Fresh Water Fish Comm.
Florida Marine Patrol, Miami
U.S. Army Corps of Engineers, Miami

DER Form 17-1.122(66)

SP82-09

5

RULES OF THE ADMINISTRATION COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

PART II
FORMAL PROCEEDINGS

28-5.201 Initiation of Formal Proceedings.

(1) Initiation of formal proceedings shall be made by petition to the agency responsible for rendering final agency action. The term petition as used herein includes any application or other document which expresses a request for formal proceedings. Each petition should be printed, typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners, and an explanation of how his/her substantial interests will be affected by the agency determination;

(c) A statement of when and how petitioner received notice of the agency decision or intent to render a decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief;

(f) A demand for relief to which the petitioner deems himself entitled; and

(g) Other information which the petitioner contends is material.

****

A petition may be denied if the petitioner does not state adequately a material factual allegation, such as a substantial interest in the agency determination, or if the petition is untimely. (Section 28-5.201 (3) (a), FAC)

GP82-09

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTH FLORIDA
SUBDISTRICT

3301 GUN CLUB ROAD
P.O. BOX 3858
WEST PALM BEACH, FLORIDA 33402

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

WARREN G. STRAHM
SUBDISTRICT MANAGER

APPLICANT:

Broward County Engineering Division
c/o Mid South Engineering Company
233 Commercial Boulevard
Lauderdale-by-the-Sea, FL 33308

PERMIT/CERTIFICATION
NO. DF 06-30905-6E

COUNTY: Broward

PROJECT: Stormwater System/Griffin Road from S.R. 7/U.S. 441, to U.S. 1, Dania

This permit is issued under the provisions of Chapter 253 and 403, Florida Statutes, and Chapter 17-4, Florida Administrative Code. The above named applicant, hereinafter called Permittee, is hereby authorized to perform the work or operate the facility shown on the approved drawing(s), plans, documents, and specifications attached hereto and made a part hereof and specifically described as follows:

To construct a stormwater drainage/retention system for an expanded Griffin Road (6 lane) from SR 7 /US 441 to U.S. 1, Dania, as per the stamped attached drawings. The system includes curb and gutter design with swale retention areas, 3,834 linear feet of seepage trenches, pollutant retardent structures and outfalls to the Florence Canal (48" R.C.P.), Tiger Tail Lake (42" R.C.P.), Dania Cutoff Canal (36" R.C.P.), canals connected to the Dania Cutoff Canal (Three: 42" R.C.P.; 30" R.C.P.; 84" R.C.P.) and the airport drainage canals (two: 48" R.C.P.; 36" R.C.P.). The project also includes filling a portion of the airport drainage canal and the construction of a 102" culvert connecting the airport drainage ditchto the Dania Cutoff Canal. This connection would include the excavation of a terminal retention canal with weir control prior to discharge to the Dania Cutoff Canal.

Subject to General Conditions 1 through 13 and Specific Conditions 1 and 2.

GP82-09

7 10

DER FORM 17-1.122(53) 1/4 (1/80)

PERMIT NO.: DF 06-30905-6E
APPLICANT: Broward County Engineering Division

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions:, and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalities therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

13. This permit also constitutes:

[ ] Determination of Best Available Control Technology (BACT)
[ ] Determination of Prevention of Significant Deterioration (PSD)
[X] Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

GP82-09

PERMIT NO.: DF 06-30905-6E
APPLICANT: Broward County Engineering Division

SPECIFIC CONDITIONS:

1. Written notification shall be provided to the DER South Florida Subdistrict Office in West Palm Beach a minimum of forty-eight (48) hours prior to commencement of construction and a maximum of forty-eight (48) hours after completion of construction.

2. Turbidity curtains shall be utilized during all dredging/filling authorized by this permit.

Expiration Date: December 16, 1984

Issued this 16th day of December, 1987.

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Roy M Duke Jr
Signature
Roy M. Duke, Jr., P.E.
Subdistrict Manager

RW
pw

GP82-09

DER FORM 17-1 122(63) 4/4 (1/80)

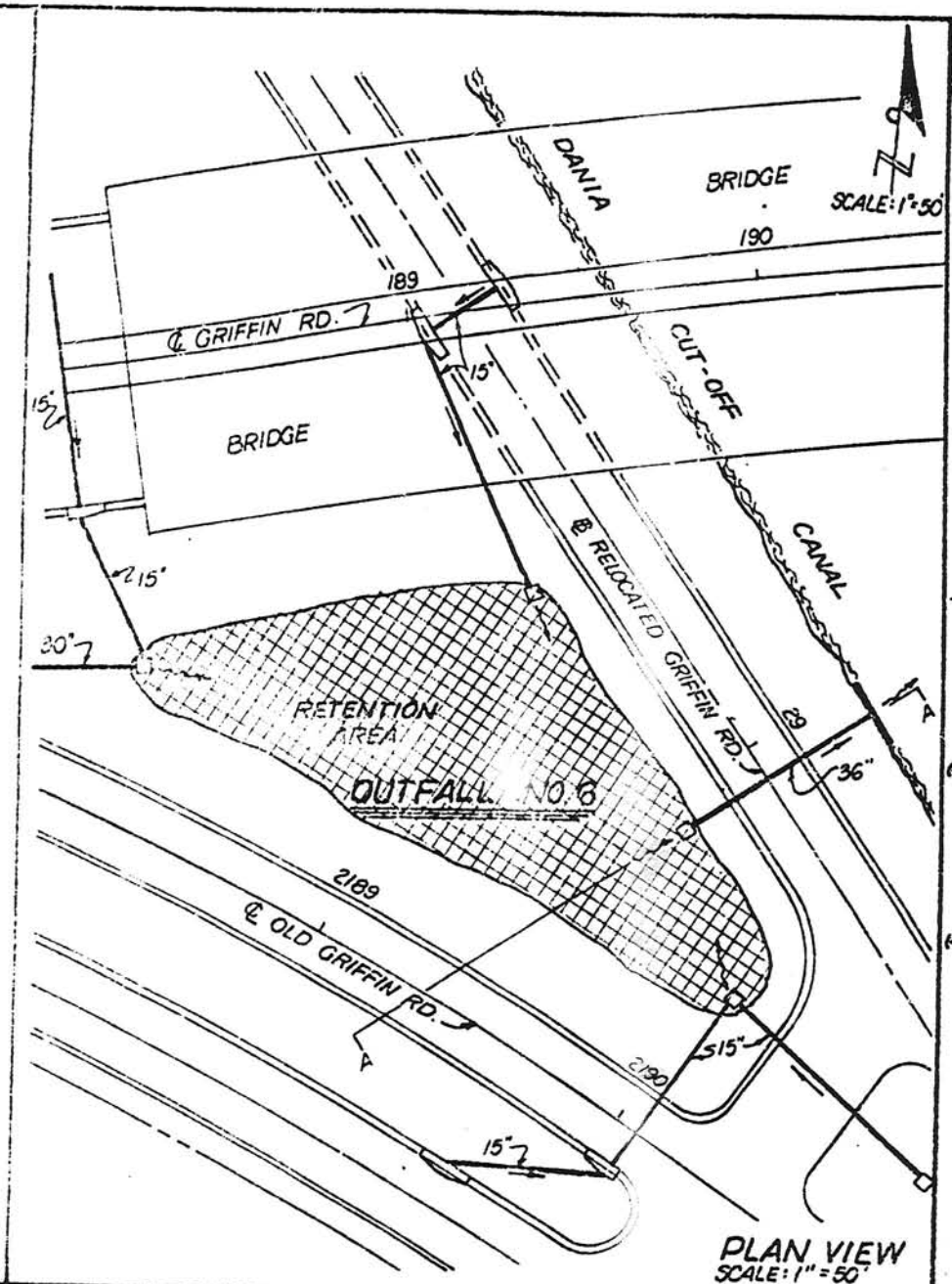
89

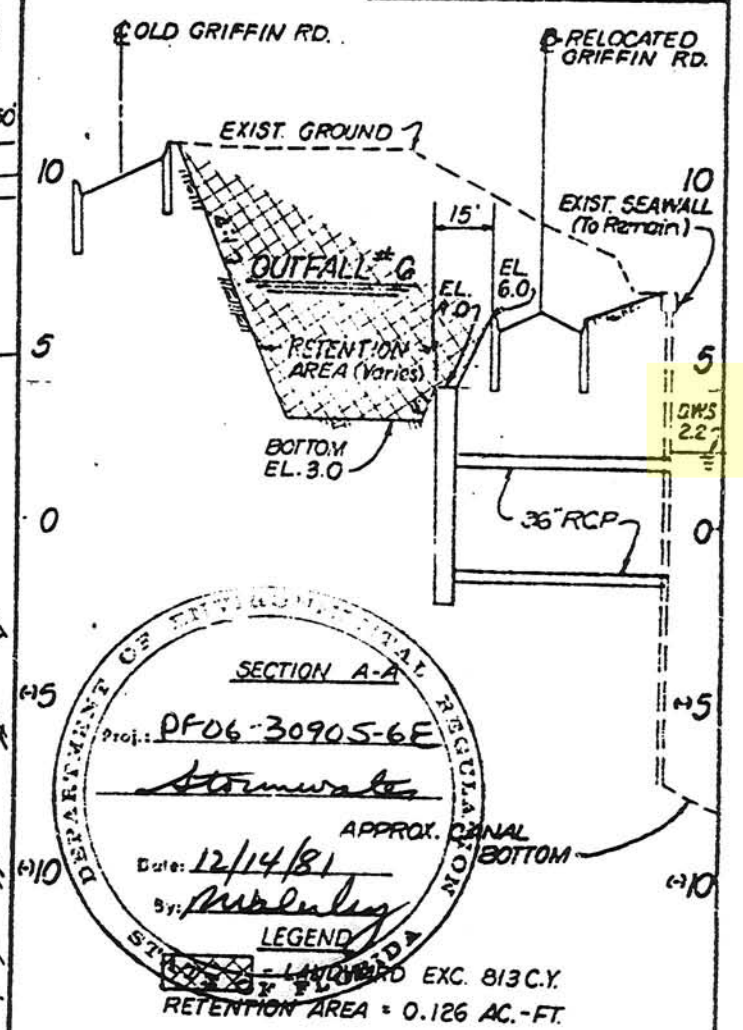
PERMIT NO.:
APPLICANT:

SPECIFIC CONDITIONS:

GP 82-09

SHEET NO. 11 OF 11





OUTFALL NO.6 DETAIL-
PROFILE VIEW
SCALE: 1" = 50' HORIZ.
1" = 5' VERT. 6-25-82

APPENDIX J
Bridge Hydraulics Memo

BRIDGE HYDRAULICS MEMO

Project Development and Environment (PD&E) Studies
S.R.-9/I-95 from Miami-Dade/Broward County Line to North of Griffin Road

FDOT District 4

Broward County

Financial Project ID No. 439170-1-22-02

Federal Aid Project No.: D421 105 B

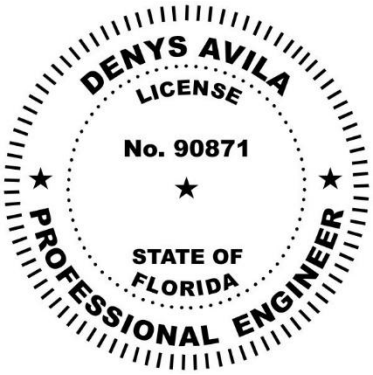
March 2026

Prepared for:

Florida Department of Transportation, District 4

Prepared By:
Scalar Consulting Group, LLC.
5713 Corporate Way, Suite 200
West Palm Beach, FL 33407
Ph: (561) 429-5065

This item has been digitally signed and sealed by



On the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies. The above-named professional engineer shall be responsible for the contents of this report in accordance with Rule 61G15-23.004, F.A.C.

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study along I-95 (S.R. 9) from the Miami-Dade/Broward County Line to north of Griffin Road. The project proposes improving traffic operations at the existing interchanges and cross streets and enhancing the managed lanes along I-95 (S.R. 9) from the Miami-Dade/Broward County Line to North of Griffin Road. The I-95 project corridor is approximately 6.5 miles in Broward County, Florida. This project is within the City of Hollywood, City of Dania Beach, Town of Pembroke Park, and City of Hallandale Beach. The existing interchanges and cross streets that will be evaluated include Sheridan Street (S.R. 822), Stirling Road (S.R. 848), and Griffin Road (S.R. 818).

The purpose of the hydraulic analysis is to quantify the potential impacts to the C-10 Canal, C-10 Spur and Dania Cut-Off Canal. Within the project's limits three crossings will be widened: Bridges No. 860574 & 860575 over C-10 Canal, Bridge No. 860578 over C-10 Spur Canal, and Bridges No. 860109 & 860209 over Dania Cut-Off Canal. No hydraulic changes to the canal flows are anticipated under the 50-year, 100-year and 500-year storm events. In this preliminary analysis it has been concluded that only the extension of existing standard FDOT abutment protection would be required.

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I. PROJECT INTRODUCTION

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study along I-95 (S.R. 9) from the Miami-Dade/Broward County Line to north of Griffin Road. The project proposes improving traffic operations at the existing interchanges and cross streets and enhancing the managed lanes along I-95 (S.R. 9) from the Miami-Dade/Broward County Line to North of Griffin Road. The I-95 project corridor is approximately 6.5 miles in Broward County, Florida. Figure 1 depicts the project location. This project is within the City of Hollywood, City of Dania Beach, Town of Pembroke Park, and City of Hallandale Beach. The existing interchanges and cross streets that will be evaluated include Sheridan Street (S.R. 822), Stirling Road (S.R. 848), and Griffin Road (S.R. 818).

1.1 PROJECT LOCATION AND DATUM

This project is within Broward County, Florida, in Sections 28 & 33 in Township 50S and Range 42E, and in Sections 4, 8, 9, 17, 20, 21 and 28 in Township 51S and Range 42E. A project Location Map is provided in Figure 1 and USGS Quadrangle Maps are shown in Appendix A. The vertical datum for the proposed improvements refers to the North American Vertical Datum (NAVD), 1988 and is expressed in feet. The latitude/longitude of the datum shift point was taken as the approximate centroid of the project limits (See Appendix A).

The study area is located within the South Florida Water Management District C-10 Basin and Coral Reef Basin and traverses WBID 3282 (Southeast Coastal, C10 Canal) and WBID 3277E (Southeast Coastal, Dania Cutoff Canal).

Note: The vertical datum for the proposed improvements refers to the North American Vertical Datum (NAVD), 1988 and is expressed in feet. The conversion from NAVD 1988 to National Geodetic Vertical Datum (NGVD), 1929, is:

NGVD29 – 1.608= NAVD88



Figure 1: Project Location Map

1.2 STUDY PURPOSE

The purpose of this hydraulic analysis is to quantify the potential impacts to the C-10 Canal, C-10 Spur Canal and Dania Cut-Off Canal from the bridge improvements. The Desing Flood, scour design events, horizontal and vertical clearance and tailwater/backwater elevations have been defined for future bridge hydraulic studies during design phase. All bridge improvements and potential impacts are described in this report.

1.3 EXISTING WATERSHED DRAINAGE INFORMATION

The C-10 Canal, C-10 Spur and Dania Cut-Off Canal are located in Broward County and are controlled by SFWMD. The C-10 Spur runs west to east beneath the I-95 bridge and 1100 ft downstream joins the to the C-10 Canal which subsequently runs north 7000 ft to join the Dania Cut-Off Canal and finally outfalls to the Intracoastal Waterway (13500 ft). These canals drain the C-10 Watershed, a highly urbanized basin in eastern Broward County, Florida, with a surface area of approximately 9057.51 acres. Downstream of this watershed lies the Coral Reef Watershed, a larger watershed of approximately 56575.089 acres that receives freshwater inflows from multiple canals including the C-10 system before draining to the Intracoastal Waterway.

1.4 TAILWATER / BACKWATER

The historic tailwater elevations approved by SFWMD Right-of-Way occupancy permits for the C-10 Canal, C-10 Spur Canal and Dania Cutoff Canal are summarized in the following table.

Table 1: Summary of Tailwater from Conceptual Bridge Hydraulic Reports

BRIDGES	DISTANCE TO SEA (ft)	TAILWATER 50-YEAR	TAILWATER 100-YEAR	TAILWATER 500-YEAR	FEMA BASE FLOOD (100-YEAR)
I-95 over C-10 Canal	27600	1.93	2.39	4.01	5
I-95 over C-10 Spur Canal	21600	2.89	3.29	3.59	5
I-95 over Dania Cut-Off Canal	18500	4.06	5.46	5.58	6

1.5 WETLAND & FLOODPLAIN IMPACTS AND MITIGATION

The C-10 Canal is within the Federal Emergency Management Administration (FEMA) Zone AE (Base Flood Elevations Determined). Per FEMA Flood Insurance Rate Map (FIRM) No. 12011C0568J, the base flood elevation (100-year frequency) is 6.00 ft-NAVD. The C-10 Canal is not designated as a floodway.

The C-10 Spur Canal is within the Federal Emergency Management Administration (FEMA) Zone AE (Base Flood Elevations Determined). Per FEMA Flood Insurance Rate Map (FIRM) No. 12011C0566J, the base flood elevation (100-year frequency) is 6.00 ft-NAVD. The C-10 Spur Canal is not designated as a floodway.

The Dania Cut-off Canal is within the Federal Emergency Management Administration (FEMA) Zone AE (Base Flood Elevations Determined). Per FEMA Flood Insurance Rate Map (FIRM) No. 12011C0558J, the base flood elevation (100-year frequency) is 6.00 ft-NAVD. The Dania Cut-off Canal is not designated as a floodway. The FEMA Map (Firmette) showing the project location is included in Appendix A.

1.6 RULES & REGULATIONS / REGULATORY AGENCY COORDINATION

The agencies with stormwater permitting jurisdiction over the proposed study area include:

- SFWMD - Issuance of a Right of Way Occupancy Permit.
- United States Army Corps of Engineers – Dredge and fill permit is required for proposed work in, under or above surface waters or wetlands, as associated with bridge widening work at the canals studied in this report.

1.7 DESIGN CRITERIA

The design criteria are based on the Florida Greenbook, FDOT Drainage Manual and SFWMD standards.

Design Frequency: The FDOT Drainage Manual (January 2025) Chapter 4.3 Table 4.1 recommends a design frequency of 50-years for permanent facilities that are High Use with a project 20-year AADT greater than 1500. Additionally, a 100-year check event is required to verify that the drainage system does not produce adverse flooding impacts under extreme storm conditions. Scour evaluations including long-term scour, 100-year and 500-year storm events are also required to be assessed to determine the need for scour protection.

Minimum Vertical Clearance: FDOT Drainage Manual refers to the FDOT Design Manual (FDM) (Section 260.8.1) which sets the minimum clearance between the design flood stage and the low member of the bridge as two feet. The SFWMD Right of Way Criteria Manual for Use of Works or Lands of the District recommends a minimum vertical clearance of 6 feet above the seasonal high

optimum water control elevation or two feet above the design water surface elevation, whichever produces the higher low member elevation.

Horizontal Clearance: The FDM (Section 260.8.2) recommends 10 feet between piers, fender systems, culvert walls, etc. for crossings subject to boat traffic. SFWMD requires a center span of 25 feet clear bent spacing measured perpendicular to the channel and approach spans of 20 feet between faces of bents.

Manning's Roughness Coefficients: Based on aerial photographs, it was concluded that the banks of the three canals consist of predominantly turf grass up to the water's edge.

Head Loss: SFWMD requires a maximum allowable head loss through a bridge structure to be one-tenth of a foot (0.1').

Channel Protection: SFWMD requires a minimum of 25 feet up and downstream of the proposed project.

II. HYDROLOGIC ANALYSIS

2.1 BRIDGE DESIGN DATA

The existing bridges over C-10 Canal (#860574 & #860575) have been modified under the I-95 Express Lanes – Phase 3C. The modified bridges have three spans with an overall bridge length of 118 feet, the approach spans have 37 feet, and the central span is 44 feet. The approach slabs on either side are 20 feet. The Southbound Bridge has total width of 102'-8", two 11-foot express lanes, two 11-foot lanes, three 12-foot lanes, a 3-foot buffer, a 7-foot inside shoulder and a 10-foot outside shoulder. The Northbound Bridge has total width of 97'-8", two 11-foot express lanes, two 11-foot lanes, three 12-foot lanes, a 3-foot buffer, a 7-foot inside shoulder and a 5-foot outside shoulder. The Southbound bridge will have a widening of 29 feet along the west edge of the deck, and the Northbound bridge will have a widening of 16.5 feet along east edge of the deck.

The existing bridge over the C-10 Spur Canal (#860578) has been modified in the I-95 Express lanes – Phase 3C project. The modified bridge has three spans with an overall length of bridge of 102 feet. The approach spans are 34 feet, the central span has a length of 34 feet, and the approach slabs measure 20 feet on either side. The typical in both directions consists of two 11-foot express lanes, a 3-foot buffer, two 11-foot general purpose lanes, three 12-foot general purpose lanes, a 10-foot inside/outside shoulder and an exterior 36" single slope traffic railing. The bridge will have a 20'-1 ½" widening along the west edge of the deck and a 19'-8" widening along the east edge of the deck.

The existing bridges over Dania Cut-Off Canal (#860109 & #860209) have been modified in the I-95 Express lanes – Phase 3C project. The modified bridges have three spans with an overall length of 180'-2 1/2". The south approach span is 49'-11 3/4", the north approach span is 50'-1 5/8", the central span is 80'-1 1/8", and the approach slabs measure 20 feet on either side. The Southbound Bridge has two 12-foot express lanes, a 4-foot buffer, four 12-foot general purpose lanes, a 10-foot outside shoulder and an inside shoulder that varies with a minimum of 8'-2". The Northbound Bridge has two 12-foot express lanes, a 4-foot buffer, five 12-foot general purpose lanes, a 10-foot outside shoulder and an inside shoulder that varies with a minimum of 8'-9". The Southbound Bridge will have a 13'-1 1/8" widening along the west edge of the deck. The Northbound Bridge will have a 24'-11 1/8" widening along the east edge of the deck.

The following tables summarize the values from Bridge Hydraulic Recommendations Sheets of the I-95 Express Lanes Phase 3C project FPID: 409354-2-52-01.

Table 2: Summary of Water Surface Elevations

WATER SURFACE ELEVATIONS		
BRIDGES NO. 860574 & 860575 I-95 over C-10 Canal	M.H.W. (Tidal, Concept Tailwater)	1.93’
	M.L.W. (Tidal, M.L.L.W.)	1.84’
BRIDGES NO. 860578 I-95 Over C-10 Spur Canal	M.H.W. (Tidal, Concept Tailwater)	2.89’
	M.L.W. (Tidal, M.L.L.W.)	1.84’
BRIDGES NO. 860109 & 860209 I-95 over Dania Cut-Off Canal	M.H.W. (Tidal, Concept Tailwater)	4.06’
	M.L.W. (Tidal, M.L.L.W.)	1.84’

Table 3: Summary of Existing Hydraulic Design Data

	FLOOD DATA	DESIGN FLOOD	BASE FLOOD	GREATEST FLOOD
BRIDGES NO. 860574 & 860575 over C-10 Canal	Stage EL. NAVD (ft)	1.96	2.42	4.05
	Discharge (cfs)	469.5	542.7	858.8
	Average Velocity (f/s)	0.9	1.64	2.56
	Exceedance Prob. (%)	2	1	0.2
	Frequency (yr.)	50	100	500
BRIDGES NO. 860578 I-95 Over C-10 Spur Canal	Stage EL. NAVD (ft)	2.94	3.34	3.65
	Discharge (cfs)	537	600	720
	Average Velocity (f/s)	0.94	1.05	1.25
	Exceedance Prob. (%)	2	1	0.2
	Frequency (yr.)	50	100	500
BRIDGES NO. 860109 & 860209 I-95 over Dania Cut-Off Canal	Stage EL. NAVD (ft)	4.08	5.48	5.65
	Discharge (cfs)	1507	1837	3122
	Average Velocity (f/s)	1.61	1.96	3.30
	Exceedance Prob. (%)	2	1	0.2
	Frequency (yr.)	50	100	500

Table 4: Existing Scour Predictions

BRIDGES NO. 860574 & 860575 I-95 over C-10 Canal	PIER NO.	SIZE & TYPE	LONG TERM SCOUR EL.	WORST CASE < 100 yr	WORST CASE < 500 yr.
	2	18”x18”	-1.80’	-7.6’	-9.85’
	3	18”x18”	-3.10’	-8.66’	-11.15’
BRIDGES NO. 860578 I-95 Over C-10 Spur Canal	2	18”x18”	-4.80’	-8.2’	-8.4’
	3	18”x18”	-5.0’	-8.4’	-8.6’
BRIDGES NO. 860109 & 860209 I-95 over Dania Cut-Off Canal	Bent 9-2 & 9-3	18”x18”	-7.03’ (Exist.)	-9.90’	-10.64’
	Fenders (LT & RT)	14”x14”	-9.73’ (Exist.)	-14.00’	-15.00’

Table 5: Hydraulic Design Recommendations for Bridges No. 860574 and 860575 (I-95 over C-10 Canal)

1	Begin Bridge Station	388+77.52	
	End Bridge Station	389+95.52	
	Skew Angle	10°	
2	Clearance Provided	NAV: Horiz. 42’ Vert. 13.62’ Above EL. 0.44’	Drift: Horiz. 42’ Vert. 12.10’ Above EL. 1.96’
3	Minimum Clearance	NAV: Horiz. 30’ Vert. 6.00’ Above EL. 0.44’	Drift: Horiz. 30’ Vert. 2.00’ Above EL. 1.96’
4	Abutments		
	Description	Begin Bridge	End Bridge
	Rubble Grade	4.00′	4.00′
	Slope	1:1.5 (Existing)	1:1.5 (Existing)
	Buried or Non-Buried Horiz. Toe	Non-Buried	Non-Buried
	Toe Horiz. Distance	15.00′	20.00′
	Limit of Protection	Approach Slope	Approach Slope
5	Deck Drainage	Flow on shoulders to end of approach (No scuppers needed)	

Table 6: Hydraulic Design Recommendations for Bridge No. 860578 (I-9 over C-10 Spur Canal)

1	Begin Bridge Station	451+33.15	
	End Bridge Station	452+35.15	
	Skew Angle	7.82°	
2	Clearance Provided	NAV: Horiz. 32.3’ Vert. 5.37’ Above EL. 0.44’	Drift: Horiz. 32.3’ Vert. 2.87’ Above EL. 2.94’
3	Minimum Clearance	NAV: Horiz. 25’ Vert. 6’ Above EL. 0.44’	Drift: Horiz. 25’ Vert. 2’ Above EL. 2.94’
4	Abutments		
	Description	Begin Bridge	End Bridge
	Rubble Grade	3.50’	3.50′
	Slope	1:1.5 (Existing)	1:1.5 (Existing)
	Buried or Non-Buried Horiz. Toe	Non-Buried	Non-Buried
	Toe Horiz. Distance	10.00′	10.00′
	Limit of Protection	Approach Slope	Approach Slope
5	Deck Drainage	Flow on shoulders to end of approach (No scuppers needed)	

Table 7: Hydraulic Design Recommendations for Bridges No. 860109 and No. 860209 (I-95 over Dania Cut-Off Canal)

1	Begin Bridge Station	552+43.05	
	End Bridge Station	554+23.25	
	Skew Angle	16°03′16″	
2	Clearance Provided	NAV: Horiz. 60’ Vert. 8.12’ Above EL. 3.3’	Drift: Horiz. 60’ Vert. 7.34’ Above EL. 4.08’
3	Minimum Clearance	NAV: Horiz. 25’ Vert. 6’ Above EL. 3.3’	Drift: Horiz. 25’ Vert. 2’ Above EL. 4.08’
4	Abutments		
	Description	Begin Bridge	End Bridge
	Rubble Grade	Sand-Cement-Riprap	Sand-Cement-Riprap
	Slope	1:1.5 (Existing)	1:1.5 (Existing)
	Buried or Non-Buried Horiz. Toe	Buried	Buried
	Toe Horiz. Distance	1’-6”	1’-6”
	Limit of Protection	Min. 10’ beyond either side of bridge	Min. 10’ beyond either side of bridge
5	Deck Drainage	Exist. 4-inch scuppers will be relocated to the toe of the new deck barrier.	

III. BRIDGE DECK DRAINAGE ANALYSIS

Based on the preliminary spread calculations presented in **Appendix C**, it was determined that bridge deck drainage is not required as the water spreads at the ends of the downhill approach slabs are less than 10 feet. Therefore, the hydraulic recommendations for the I-95 express lanes phase 3C project can be applied. For bridges 860574, 860575 and 860578, the Phase 3C hydraulic recommendations consisted of storm water sheet flowing along the shoulders toward the end approaches; scuppers were not required. For bridges 860109 and 860209, the Phase 3C project recommendation, consisted of utilizing the existing 4-inch scuppers, which were recommended to be relocated to the toe of the new deck barrier. The recommendations for the I-95 express lanes phase 3C project can be found in **Appendix A**.

IV. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the recommended bridge lengths for bridges 860574, 860575, 860578, 860109 and 860209 are 118 ft, 118 ft, 102 ft, 180.2 ft, and 180.2 ft, respectively. The proposed low member elevations are 13.40 ft for bridges 860574 and 860575, 5.57 ft for bridge 860578 and 10.99 ft for bridges 860109 and 860209. The existing scour protection is considered adequate to protect the beginning and ending bridge structures, including the proposed widening improvements.

V. REFERENCES

The design team collected and reviewed data from the following sources:

- FDOT Drainage Manual, January 2025.
- FDOT Drainage Design Guide, January 2024.
- FDOT Straight Line Diagram, 86070000 (2019), 86070901 (2016), 86070902 (2016), 86015000 (2022), 86230000 (2021), 86016000 (2018)
- Natural Resources Conservation Service (NRCS) Soil Survey of Broward County.
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for Broward County (12011C0558J, 12011C0566J, 12011C0568J, 12011C0731J & 12086C0131M).
- FDOT 409354-2-52-01, 422796-1-52-01 As-builts.
- National Oceanic Atmospheric Administration LIDAR data.
- US Army Corps of Engineers
- FDOT Project Development and Environment Manual
- SFWMD DBHydro
- SFWMD ERP Applicant's Handbook II
- USGS Quadrangle Maps