FINAL
LOCATION HYDRAULICS REPORT

Florida's Turnpike (SR 91)
Widening Project Development and Environment (PD&E) Study

From Jupiter (Indiantown Road/SR 706) to Ft. Pierce (Okeechobee Road/SR 70)
MP 117 to MP 153.7

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Palm Beach, Martin, and St. Lucie Counties

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EXECUTIVE SUMMARY

Florida's Turnpike Enterprise (FTE) is conducting a Project Development and Environment (PD&E) study to evaluate the widening of Florida's Turnpike mainline (SR 91) from four to eight lanes by adding two general toll lanes in each direction from Jupiter (Indiantown Road/SR 706) to Ft. Pierce (Okeechobee Road/SR 70), in Palm Beach, Martin, and St. Lucie Counties. The purpose of this PD&E study is to evaluate engineering and environmental data and document information that will aid FTE in determining the location, type, and preliminary design of the proposed improvements. The total project length is approximately 36.7 miles. The study includes four (4) existing interchanges and the addition of two (2) potential new interchange access locations.

The proposed widening of the existing Turnpike mainline from four to eight lanes and associated interchange improvements will result in impacts to the adjacent Federal Emergency Management Agency (FEMA) floodplains. The anticipated floodplain impacts due to the proposed roadway widening were estimated to determine potential impacts to the 100-year floodplain; however, the impact volume from the proposed widening and necessary compensation will need to be assessed during the design phase, when survey of the existing ground, geotechnical data for the seasonal high water table (SHWT), and proposed cross sections are available. Off-site floodplain compensation sites, on-site swales, and infield storage areas should be evaluated to provide compensation for the floodplain impacts.

There are 23 culverts, 16 bridge culverts, and 10 bridges within the study limits. The necessary culvert and bridge culvert extensions will have transverse impacts on the existing floodplains that will need to be further analyzed during the design phase. The proposed bridge widenings over the regulatory floodways at Loxahatchee River, Roebuck Creek, and Ten Mile Creek will require a No-Rise Certification from FEMA or Conditional Letter of Map Revision (CLOMR). Loxahatchee River and Ten Mile Creek are also Sovereign Submerged Lands (SSLs). The Loxahatchee River is classified as an Outstanding Florida Waters (OFW) and a Wild and Scenic River.

The existing profile grades were used to estimate the floodplain impacts. The existing Turnpike mainline does not meet current criteria for minimum gutter grade and some locations exhibit a 100-year floodplain elevation above the existing roadway footprint, such as the Mapps Creek and Danforth Creek floodplains (MP 131 to MP 134). The estimated floodplain encroachments may increase significantly if the proposed improvements require substantial modifications to the profile to meet all FTE requirements. During the design phase, watershed modeling may be necessary to obtain more accurate floodplain elevations that reflect the existing stages during major storm events to assist with the design of the proposed profile.

There are several locations of documented flooding within the project limits per FTE Drainage and Maintenance reports, such as the Ft. Pierce Cell Tower, Port St. Lucie interchange, St. Lucie West Services District, Ft. Pierce Service Plaza, St. Lucie West Boulevard Overpass, Ten Mile Creek, and SW Sand Avenue. Particular care should be provided at these locations to ensure the proposed improvements do not worsen the conditions.

Replacement drainage structures for this project are limited to hydraulically equivalent structures which are not expected to increase the backwater surface elevations. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost, feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to eradicate flooding problems in any significant amount, existing flooding will continue, but will not increase as the result of the construction of this project.

Furthermore, the project will not affect existing flood heights or floodplain limits. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

1.0 INTRODUCTION

Florida's Turnpike Enterprise (FTE) is conducting a Project Development and Environment (PD&E) study to evaluate capacity improvements to the existing Florida's Turnpike mainline (SR 91) from Jupiter (Indiantown Road/SR 706) to Ft. Pierce (Okeechobee Road/SR 70), in Palm Beach, Martin, and St. Lucie Counties. The purpose of this PD&E study is to evaluate engineering and environmental data and document information that will aid FTE in determining the location, type, and preliminary design of the proposed improvements. The total project length is approximately 36.7 miles. The project consists of widening Florida's Turnpike from four to eight lanes by adding two general toll lanes in each direction.

Currently, Florida's Turnpike (SR 91) is a four (4) lane limited access toll facility. The study includes four (4) existing interchanges and two (2) potential new interchange access locations.

- Existing SW Martin Highway/SR 714 interchange (MP 133)
- Existing Becker Road interchange (MP 138)
- Existing Port St. Lucie Boulevard/SR 716 interchange (MP 142)
- Potential new interchange at Crosstown Parkway (MP 144.7)
- Potential new interchange at Midway Road (MP 150.4)
- Existing Okeechobee Road/SR 70 interchange (MP 152)

The interchange at Jupiter (Indiantown Road/SR 706) at MP 116 is not included in this study.

2.0 PROJECT DESCRIPTION

The intent of this Location Hydraulics Report (LHR) to identify the potential 100-year (base) floodplain encroachments resulting from the roadway and bridge improvements evaluated in this study. In accordance with 23 Code of Federal Regulation (CFR) 650 Subpart A, Section 650.111, floodplains are to be protected. The intent of these regulations is to avoid possible long and short-term adverse impacts associated with the modification of floodplains as a result of development. These regulations urge that where impacts are anticipated, alternatives should be sought out where practical and that development incompatible with floodplain values should be avoided. Conclusions and recommendations were developed using the best available data and conceptual roadway alignment and typical sections. The cross-drain lengths and exact locations shall be verified during the design phase, when survey is available.

The study limits are the Turnpike mainline (SR 91) from Jupiter (Indiantown Road/SR 706) to Ft. Pierce (Okeechobee Road/SR 70), from milepost (MP) 117.0 to MP 153.7. The total project length is 36.7 miles. The project is located within Palm Beach, Martin, and St. Lucie counties, Port St. Lucie, and Fort Pierce cities, and the town of Jupiter. The project is located within the sections, townships, and ranges provided in **Table 2.1**. A Project Location Map is provided in **Figure 2-1.**

Table 2.1: Section, Township, and Range Data

Range	Township	Section(s)
39E	35S	23, 25, 26, 36
39E	36S	1
40E	36S	6, 7, 18, 19, 30, 31
40E	37S	5, 6, 8, 16, 17, 21, 28, 33, 34
40E	38S	3, 10, 11, 14, 23, 24
41E	38S	43, 46
41E	39S	5, 8, 9, 16, 21, 28, 33, 34
41E	40S	2, 3, 11, 12, 13
42E	40S	18, 19, 29, 30, 32, 33
42E	41S	4

Figure 2-1: Project Location Map

The study involves widening the Turnpike mainline from four 12-foot lanes to eight 12-foot lanes by adding two general toll lanes in each direction and widening both the inside and outside shoulders from 10-feet to 12-feet. The proposed Mainline Typical Section is shown in **Figure 2-2**.

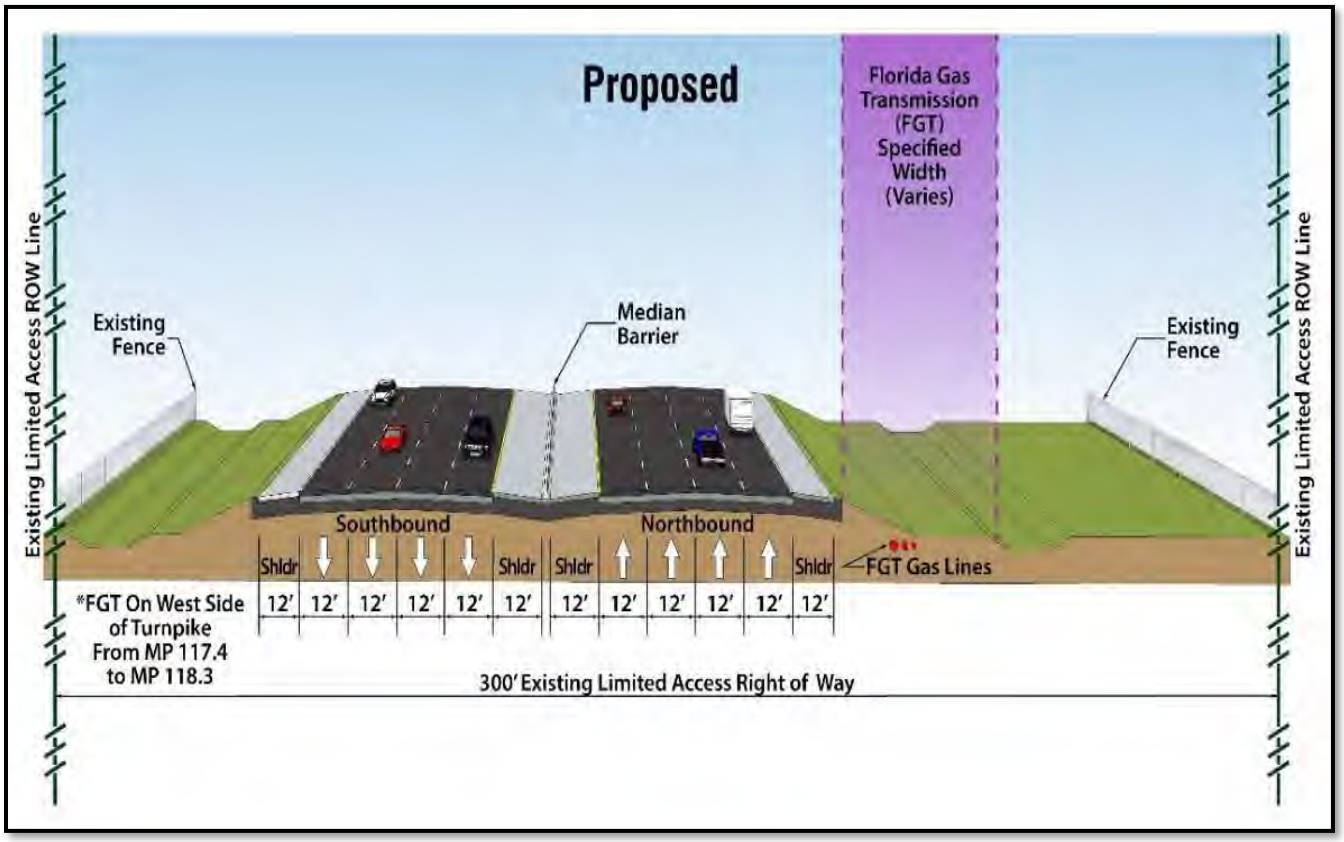


Figure 2-2: Proposed Mainline Typical Section

The datum used for this study is North American Vertical Datum of 1988 (NAVD 88). To convert from NAVD 88 to National Geodetic Vertical Datum of 1929 (NGVD 29), add 1.46 feet. Please refer to **Appendix B** for the datum conversion.

3.0 EXISTING CONDITIONS

The existing Turnpike roadway from Jupiter (Indiantown Road/SR 706) to Ft. Pierce (Okeechobee Road/SR 70) consists of four travel lanes with a 20-foot paved median, including a 2-foot concrete barrier wall, and 10-foot paved outside shoulders on both sides. **Figure 3-1** shows the Existing Mainline Typical Section.

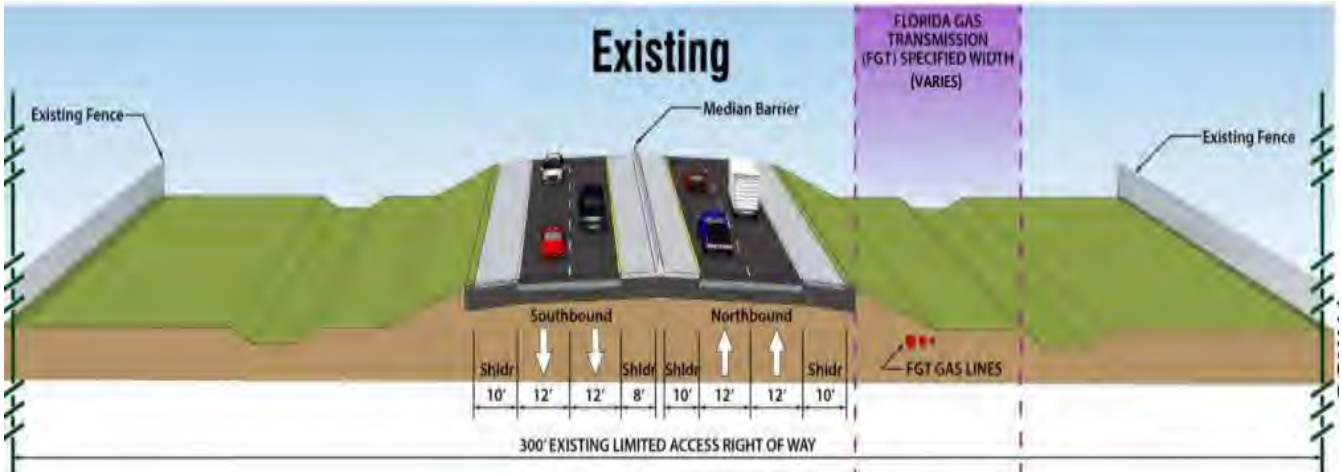


Figure 3-1: Existing Mainline Typical Section

Stormwater runoff sheet flows from the roadway into roadside ditches which flow into existing culverts and cross drains throughout the corridor. The culverts and cross drains discharge to existing canals or creeks, which carry the flow to three main water bodies: the Loxahatchee River, the South Fork St. Lucie River, and the North Fork St. Lucie River. All three rivers discharge into the Atlantic Ocean. The general flow of surface waters within the project limits is from west to east. Loxahatchee River and Ten Mile Creek are also Sovereign Submerged Lands (SSLs). The Loxahatchee River is classified as an Outstanding Florida Waters (OFW) and a Wild and Scenic River. Refer to **Appendix A** for the existing drainage maps.

The project is divided into 75 sub-basins based on the existing roadway profile, roadside ditch profiles, and culvert and cross drain locations. The station ranges provided in the sub-basin descriptions refer to baseline of survey. Refer to **Appendix H** for the Straight Line Diagrams.

BASIN 1

Basin 1 begins at Station 3640+00 and ends at Station 3663+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to ditches within Basin 2 at Station 3663+00. There are no cross drains in Basin 1.

BASIN 2
Basin 2 begins at Station 3663+00 and ends at Station 3686+70. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Loxahatchee Creek (Bridge No. 930241) at MP 117.6.

BASIN 3
Basin 3 begins at Station 3686+70 and ends at Station 105+00 (Station Equation: 3696+50.81 BK = 96+50.81 AH). Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Loxahatchee Creek (Bridge No. 930241) at MP 117.6.

BASIN 4
Basin 4 begins at Station 105+00 and ends at Station 132+15. Stormwater runoff is collected by roadside ditches and is conveyed to a wetland near Station 132+15 through Culvert No. 890072 (MP 118.4). The wetland drains to Cypress Creek, a tributary to the Loxahatchee River. Culvert No. 890072 is a double 20-ft by 9-ft concrete box culvert.

BASIN 5
Basin 5 begins at Station 132+15 and ends at Station 141+00. Stormwater runoff is collected by roadside ditches and is conveyed to a wetland near Station 132+15 through Culvert No. 890072 (MP 118.4). The wetland drains to Cypress Creek, a tributary to the Loxahatchee River. Culvert No. 890072 is a double 20-ft by 9-ft concrete box culvert.

BASIN 6
Basin 6 begins at Station 141+00 and ends at Station 163+85. Stormwater runoff is collected by roadside ditches and is conveyed to Cypress Creek near Station 163+85 through Bridge No. 890079 (MP 119.1). Bridge No. 890079 is a prestressed concrete multi-beam bridge.

BASIN 7
Basin 7 begins at Station 163+85 and ends at Station 196+90. Stormwater runoff is collected by roadside ditches and is conveyed to Cypress Creek near Station 163+85 through Bridge No. 890079 (MP 119.1). Bridge No. 890079 is a prestressed concrete multi-beam bridge.

BASIN 8
Basin 8 begins at Station 196+90 and ends at Station 225+70. Stormwater runoff is collected by roadside ditches and is conveyed to Culvert No. 890073 (MP 120.25) near Station 225+70. After passing through the culvert, the stormwater flows through an offsite ditch to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River. Culvert No. 890073 is a double 24-ft by 7-ft concrete box culvert.

BASIN 9

Basin 9 begins at Station 225+70 and ends at Station 255+00. Stormwater runoff is collected by roadside ditches and is conveyed to Culvert No. 890073 (MP 120.25) near Station 225+70. After passing through the culvert, the stormwater flows through an offsite ditch to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River. Culvert No. 890073 is a double 24-ft by 7-ft concrete box culvert.

BASIN 10

Basin 10 begins at Station 255+00 and ends at Station 284+70. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q002 (MP 121.4) at Station 284+70. Culvert No. 89Q002 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 11

Basin 11 begins at Station 284+70 and ends at Station 306+00. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q002 (MP 121.4) at Station 284+70. Culvert No. 89Q002 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 12

Basin 12 begins at Station 306+00 and ends at Station 328+20. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q003 (MP 122.2) at Station 328+20. Culvert No. 89Q003 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 13

Basin 13 begins at Station 328+20 and ends at Station 355+20. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q003 (MP 122.2) at Station 328+20. Culvert No. 89Q003 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 14

Basin 14 begins at Station 355+20 and ends at Station 382+25. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q004 (MP 122.7) at Station 355+20. Culvert No. 89Q004 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by

the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 15

Basin 15 begins at Station 382+25 and ends at Station 400+00. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q005 (MP 123.2) at Station 382+25. Culvert No. 89Q005 is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 16

Basin 16 begins at Station 400+00 and ends at Station 418+25. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890074 (MP 123.9) at Station 418+25. Culvert No. 890074 is a double 24-ft by 4.5-ft concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 17

Basin 17 begins at Station 418+25 and ends at Station 430+25. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890074 (MP 123.9) at Station 418+25. Culvert No. 890074 is a double 24-ft by 4.5-ft concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 18

Basin 18 begins at Station 430+25 and ends at Station 452+15. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890084 (MP 124.6) at Station 452+15. Culvert No. 890084 is a double 22.4-ft by 8.5-ft concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 19

Basin 19 begins at Station 452+15 and ends at Station 457+20. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890084 (MP 124.6) at Station 452+15. Culvert No. 890084 is a double 22.4-ft by 8.5-ft double cell culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 20

Basin 20 begins at Station 457+20 and ends at Station 469+30. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q006 (MP 124.6) at Station 457+20. This is a 10-ft by 12-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 21

Basin 21 begins at Station 469+30 and ends at Station 486+30. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890075 (MP 125.2) at Station 486+30. Culvert No. 890075 is a double 22-ft by 7-ft concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 22

Basin 22 begins at Station 486+30 and ends at Station 499+75. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q007 (MP 125.3) at Station 496+24. This is a 5-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff is carried south by the existing drainage system to a wetland draining to Kitchening Creek, which flows to the northwest fork of the Loxahatchee River.

BASIN 23

Basin 23 begins at Station 499+75 and ends at Station 523+25. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890076 (MP 125.9) at Station 523+25. Culvert No. 890076 is a double 24.2-ft by 7.2-ft concrete box culvert. After passing through the culvert, the stormwater runoff flows to a wetland draining to the South Fork of the St. Lucie River.

BASIN 24

Basin 24 begins at Station 523+25 and ends at Station 554+40. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q008 (MP 126.45) at Station 552+15 and Culvert No. 890082 (MP 126.47) at Station 554+40 over Phipp Canal. Culvert No. 89Q008 is a 5-ft by 10-ft single barrel culvert. Bridge No. 890082 is a concrete slab bridge structure. Phipp Canal drains east to the South Fork of the St. Lucie River.

BASIN 25

Basin 25 begins at Station 554+40 and ends at Station 581+55. Stormwater runoff is collected by roadside ditches and is conveyed through Bridge No. 890082 (MP 126.47) at Station 554+40 over Phipp Canal. Bridge No. 890082 is a concrete slab bridge structure. Phipp Canal drains east to the South Fork of the St. Lucie River.

BASIN 26

Basin 26 begins at Station 581+55 and ends at Station 597+20. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q009 (MP 126.97) at Station 581+55. This is a 10-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff flows to onsite ditches in Basin 25 to Phipp Canal, which drains to the South Fork of the St. Lucie River.

BASIN 27

Basin 27 begins at Station 597+20 and ends at Station 626+40. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 890077 (MP 127.3) at Station 597+20. Culvert No. 890077 is a double 22.4-ft by 7-ft double concrete box culvert. After passing through the culvert, the stormwater runoff flows to onsite ditches in Basin 28, ultimately discharging to the South Fork of the St. Lucie River.

BASIN 28

Basin 28 begins at Station 626+40 and ends at Station 650+00. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q010 (MP 128.2) at Station 650+00. This is a 10-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff traverses a wetland to the South Fork of the St. Lucie River.

BASIN 29

Basin 29 begins at Station 650+00 and ends at Station 677+00. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q010 (MP 128.2) at Station 650+00. This is a 10-ft by 10-ft single barrel concrete box culvert. After passing through the culvert, the stormwater runoff traverses a wetland to the South Fork of the St. Lucie River.

BASIN 30

Basin 30 begins at Station 677+00 and ends at Station 697+00. Stormwater runoff is collected by roadside ditches and is conveyed to a wetland discharging to the South Fork of the St. Lucie River. There are no cross drains in Basin 30.

BASIN 31

Basin 31 begins at Station 697+00 and ends at Station 719+00. Stormwater runoff is collected by roadside ditches and is conveyed to a wetland discharging to the South Fork of the St. Lucie River. There are no cross drains in Basin 31.

BASIN 32

Basin 32 begins at Station 719+00 and ends at Station 740+65. Stormwater runoff is collected by roadside ditches and is conveyed to Culvert No. 89Q014 (MP 130) at Station 742+00. Culvert No. 89Q014 is a 5-ft by 10-ft single barrel concrete box culvert discharging to a wetland and ultimately to the South Fork of the St. Lucie River.

BASIN 33

Basin 33 begins at Station 740+65 and ends at Station 775+00. Stormwater runoff is collected by roadside ditches and is conveyed to Roebuck Creek and ultimately to the St. Lucie (C-44) Canal. There are no cross drains in Basin 33.

BASIN 34

Basin 34 begins at Station 775+00 and ends at Station 796+00, at the Thomas B. Manuel Bridge highpoint over the St. Lucie Canal. Stormwater runoff is collected by roadside ditches and is conveyed to Roebuck Creek and ultimately to the St. Lucie (C-44) Canal.

BASIN 35

Basin 35 begins at Station 796+00, at the Thomas B. Manuel Bridge highpoint over the St. Lucie Canal, and ends at Station 827+00. Stormwater runoff is collected by roadside ditches and is conveyed to the St. Lucie (C-44) Canal.

BASIN 36

Basin 36 begins at Station 827+00 and ends at Station 841+85. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q011 (MP 131.0) at Station 841+85. Culvert No. 89Q011 is an 8-ft by 8-ft double barrel concrete box culvert. After passing through the culvert, the stormwater runoff is conveyed to a wetland draining to St. Lucie (C-44) Canal.

BASIN 37

Basin 37 begins at Station 841+85 and ends at Station 868+50. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q011 (MP 131.0) at Station 841+85. Culvert No. 89Q011 is an 8-ft by 8-ft double barrel concrete box culvert. After passing through the culvert, the stormwater runoff is conveyed to a wetland draining to St. Lucie (C-44) Canal.

BASIN 38

Basin 38 begins at Station 868+50 and ends at Station 927+75. Stormwater runoff is collected by roadside ditches and is conveyed through Culvert No. 89Q012 (MP 132.4) at Mapps Creek. Mapps Creek flows from west to east and eventually discharges into the St. Lucie (C-44) Canal.

BASIN 39

Basin 39 begins at Station 927+75 and ends at Station 956+00. Stormwater runoff sheet flows off the roadway to roadside ditches which discharge north to existing Culvert No. 890067 (MP 134.1) located at Station 956+00, which discharges into Danforth Creek. Culvert No. 890067 is a triple 30-ft by 9-ft bridge culvert. Danforth Creek flows from west to east and eventually discharges into the South Fork St. Lucie River.

BASIN 40

Basin 40 begins at Station 956+00 and ends at Station 983+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to existing Culvert No. 890067 (MP 134.1) located at Station 956+00, which discharges into Danforth Creek. Culvert No. 890067 is a triple 30-ft by 9-ft bridge culvert. Danforth Creek flows from west to east and eventually discharges into the South Fork St. Lucie River. Basin 40 includes the Martin Highway Interchange. Existing infield ponds provide treatment and attenuation for the interchange. The ponds discharge to the south to Danforth Creek. Several existing cross drains provide conveyance throughout the interchange.

BASIN 41

Basin 41 begins at Station 983+50 and ends at Station 1037+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 890085 (MP 135.6) located at Station 1037+00, which discharges into Bessey Creek. This bridge culvert is a concrete slab structure. Bessey Creek flows from west to east into the downstream portion of the C-23 Canal, and ultimately into the North Fork St. Lucie River.

BASIN 42

Basin 42 begins at Station 1037+00 and ends at Station 1069+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 890085 (MP 135.6) located at Station 1037+00, which discharges into Bessey Creek. This bridge culvert is a concrete slab structure. Bessey Creek flows from west to east into the downstream portion of the C-23 Canal, and ultimately into the North Fork St. Lucie River.

BASIN 43

Basin 43 begins at Station 1069+50 and ends at Station 1080+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 89Q013 (MP 136.4) located at Station 1080+00, which discharges into Bessey Creek. Culvert No. 89Q013 is a 7-ft by 8-ft single barrel concrete box culvert.

BASIN 44

Basin 44 begins at Station 1080+00 and ends at Station 1090+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 89Q013 (MP 136.4) located at Station 1080+00, which discharges into Bessey Creek. Culvert No. 89Q013 is a 7-ft by 8-ft single barrel concrete box culvert.

BASIN 45

Basin 45 begins at Station 1090+50 and ends at Station 1121+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 890070 (MP 137.25) at Station 1121+00, which discharges into Bessey Creek. Culvert No. 890070 is a 27-ft by 5.9-ft triple barrel bridge culvert.

BASIN 46

Basin 46 begins at Station 1121+00 and ends at Station 1135+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 890070 (MP 137.25) at Station 1121+00, which discharges into Bessey Creek. Culvert No. 890070 is a 27-ft by 5.9-ft triple barrel bridge culvert.

BASIN 47

Basin 47 begins at Station 1135+00 and ends at Station 1157+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 890083 (MP 138.1) located at Station 1166+00, which discharges into the C-23 Canal. The C-23 Canal flows from west to east and ultimately discharges into the North Fork St. Lucie River.

BASIN 48

Basin 48 begins at Station 1157+00 and ends at Station 1214+27. Basin 48 includes the Becker Road interchange. Stormwater runoff sheet flows from the roadway to roadside ditches and discharge to the C-23 Canal, the Horseshoe Canal, or the Becker Road interchange infield ponds. Existing infield ponds provide treatment and attenuation for the interchange. The ponds discharge to the south to the C-23 Canal, west to the Horseshoe Canal, and northeast to the Tesoro Golf and Country Club stormwater management system. Several existing cross drains provide conveyance throughout the interchange.

BASIN 49

Basin 49 begins at Station 1214+27 and ends at station 1250+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940061 (MP 139.7) located at Station 1250+50, which discharges into Winters Creek. Winters Creek flows from west to east and ultimately discharges into the North Fork St. Lucie River. Culvert No. 940061 is a 30-ft by 6.9-ft triple barrel structure.

BASIN 50

Basin 50 begins at Station 1250+50 and ends at station 1255+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 940061 (MP 139.7) located at Station 1250+50, which discharges into Winters Creek. Culvert No. 940061 is a 30-ft by 6.9-ft triple barrel structure.

BASIN 51

Basin 51 begins at Station 1255+00 and ends at Station 1283+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q001 (MP 140.2) located at Station 1277+00, which discharges into Blakeslee Creek. Blakeslee Creek flows from west to east and ultimately discharges into the North Fork St. Lucie River. Culvert No. 94Q001 is a double 9-ft by 9-ft concrete box culvert.

BASIN 52

Basin 52 begins at Station 1283+50 and ends at Station 1289+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q002 (MP 140.4) located at Station 1289+00, which discharges into Blakeslee Creek. Culvert No. 94Q002 is a double 9-ft by 9-ft concrete box culvert.

BASIN 53

Basin 53 begins at Station 1289+00 and ends at Station 1334+75. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 94Q002 (MP 140.4) located at Station 1289+00, which discharges into Blakeslee Creek. Culvert No. 94Q002 is a double 9-ft by 9-ft concrete box culvert.

BASIN 54

Basin 54 begins at Station 1334+75 and ends at Station 1384+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Bridge Nos. 940049 and 940082 (MP 142.3) located at Station 1384+00, over the C-24 Canal. The C-24 Canal flows from west to east and ultimately discharges into the North Fork St. Lucie River.

BASIN 55

Basin 55 begins at Station 1384+00 and ends at Station 1408+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to the C-24 Canal. The C-24 Canal flows from west to east and discharges to the North Fork of the St. Lucie River. There are no cross drains within Basin 55.

BASIN 56

Basin 56 begins at Station 1408+00 and ends at Station 1427+15. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to the C-24 Canal. The C-24 Canal flows from west to east and discharges to the North Fork of the St. Lucie River. There are no cross drains within Basin 56.

BASIN 57

Basin 57 begins at Station 1427+15 and ends at Station 1449+60. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to the C-24 Canal. The C-24 Canal flows from west to east and discharges to the North Fork of the St. Lucie River. There are no cross drains within Basin 57.

BASIN 58

Basin 58 begins at Station 1449+60 and ends at Station 1479+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 59

Basin 59 begins at Station 1479+00 and ends at Station 1510+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 60

Basin 60 begins at Station 1510+50 and ends at Station 1538+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 61

Basin 61 begins at Station 1538+50 and ends at Station 1560+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 62

Basin 62 begins at Station 1560+00 and ends at Station 1580+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 63

Basin 63 begins at Station 1580+00 and ends at Station 1600+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 940104 (MP 144.60 SB) and Culvert No. 940105 (MP 144.65 NB) near Station 1510+50. The culverts discharge to a regional unnamed ditch that flows to the North Fork of the St. Lucie River. The southbound culvert is a double 23-ft by 7.2-ft bridge culvert, and the northbound culvert is a double 20.6-ft by 7.2-ft bridge culvert.

BASIN 64

Basin 64 begins at Station 1600+00 and ends at Station 1624+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940106 (MP 147.7) at Station 1672+90. The culvert

discharges to a regional ditch draining to the North Fork of the St. Lucie River. Culvert No. 940106 is a double 23-ft by 7.2-ft bridge culvert.

BASIN 65

Basin 65 begins at Station 1624+00 and ends at Station 1648+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940106 (MP 147.7) at Station 1672+90. The culvert discharges to a regional ditch draining to the North Fork of the St. Lucie River. Culvert No. 940106 is a double 23-ft by 7.2-ft bridge culvert.

BASIN 66

Basin 66 begins at Station 1648+00 and ends at Station 1672+90. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 940106 (MP 147.7) at Station 1672+90. The culvert discharges to a regional ditch draining to the North Fork of the St. Lucie River. Culvert No. 940106 is a double 23-ft by 7.2-ft bridge culvert.

BASIN 67

Basin 67 begins at Station 1672+90 and ends at Station 1699+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 941000 (MP 148.2) at Station 1699+00. The culvert discharges to the C-107 Canal, which discharges to the North Fork of the St. Lucie River. Culvert No. 941000 is a double 20-ft by 12-ft bridge culvert.

BASIN 68

Basin 68 begins at Station 1699+00 and ends at Station 1725+65. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge south to Culvert No. 941000 (MP 148.2) at Station 1699+00. The culvert discharges to the C-107 Canal, which discharges to the North Fork of the St. Lucie River. Culvert No. 941000 is a double 20-ft by 12-ft bridge culvert.

BASIN 69

Basin 69 begins at Station 1725+65 and ends at Station 1753+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q004 (MP 148.7) at Station 1725+65. The culvert discharges to an unnamed regional ditch that flows to the North Fork of the St. Lucie River. Culvert No. 94Q004 is a single 5-ft by 10-ft concrete box culvert.

BASIN 70

Basin 70 begins at Station 1753+50 and ends at Station 1782+50. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q005 (MP 149.3) at Station 1753+50. The culvert discharges to the C-105 Canal, which discharges to the North Fork of the St. Lucie River. Culvert No. 94Q005 is a single 5-ft by 10-ft concrete box culvert.

BASIN 71

Basin 71 begins at Station 1782+50 and ends at Station 1811+31. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q006 (MP 149.8) at Station 1782+50. The culvert discharges to an unnamed regional ditch that flows to the North Fork of the St. Lucie River. Culvert No. 94Q006 is a single 5-ft by 10-ft concrete box culvert.

BASIN 72

Basin 73 begins at Station 1811+31 and ends at Station 1832+25. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q007 (MP 150.3) at Station 1811+31. The culvert discharges to an unnamed regional ditch that flows to the North Fork of the St. Lucie River. Culvert No. 94Q007 is a single 5-ft by 10-ft concrete box culvert.

BASIN 73

Basin 74 begins at Station 1832+25 and ends at Station 1869+65. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge north to Culvert No. 94Q008 (MP 150.9) at Station 1840+64. The culvert discharges to an unnamed regional ditch that flows to the North Fork of the St. Lucie River. Culvert No. 94Q008 is a single 5-ft by 8-ft concrete box culvert.

BASIN 74

Basin 74 begins at Station 1869+65 and ends at Station 1896+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge the Culvert No. 94Q025 (MP 151.5) at Station 1869+65. The culvert discharges to an unnamed regional ditch that flows to the North Fork of the St. Lucie River. Culvert No. 94Q025 is a single 5-ft by 12-ft concrete box culvert.

BASIN 75

Basin 75 begins at Station 1896+00 and ends at Station 1924+00. Stormwater runoff sheet flows from the roadway to roadside ditches, which discharge to Culvert No. 940072 (MP 152.5) at Station 1924+00. Culvert No. 940072 discharges to Ten Mile Creek, a tributary to the North Fork of the St. Lucie River.

3.1 SOILS

The predominant soils within and adjacent to the corridor are poorly drained sandy soils. The Natural Resource Conservation Service (NRCS) Web Soil Surveys of Palm Beach County, Martin County, and St. Lucie County were used to determine the soil types within the project limits. The Soil Survey indicates that much of the project corridor is underlain by mineral soils (sands). The presence of organics beneath the existing roadway's embankment is uncertain, although it is believed that they were removed and replaced with granular fill during the original construction.

The widening of the Turnpike mainline may encounter isolated organic subsoil deposits that will require special consideration during the design phase. The geotechnical investigation for the design will include muck probes to determine the presence of the organics beneath the existing and proposed embankments. The survey will recommend the design of embankments and will consider the presence of muck and the need for removal or soil improvement.

Based on a review and evaluation of subsurface information available for the project area, it is expected that soil and groundwater conditions found along the corridor are generally favorable for roadway improvements. Refer to **Appendix E** for a Soils Map. **Table 3.1** provides the soil names, as well as their hydrologic soil group and drainage condition.

Table 3.1: Soil Types

Soil Name	NRCS Map Unit	County	Hydrologic Soil Group	Drainage Class, Dominant Condition	Depth to SHWT (ft)
Anclote fine sand	2	Palm Beach	A/D	Very poorly drained	0.25
Basinger fine sand, 0 to 2 percent slopes	6	Palm Beach	A/D	Poorly drained	0.50
Basinger and Myakka sands, depressional	8	Palm Beach	A/D	Very poorly drained	0
Immokalee fine sand, 0 to 2 percent slopes	18	Palm Beach	B/D	Poorly drained	1
Oldsmar sand, 0 to 2 percent slopes	25	Palm Beach	A/D	Poorly drained	1
Pomello fine sand, 0 to 5 percent slopes	33	Palm Beach	A	Moderately well drained	2.75
Winder fine sand, 0 to 2 percent slopes	50	Palm Beach	C/D	Poorly drained	0.50
Lawnwood and Myakka fine sands	2	Martin	A/D	Poorly drained	1
Waveland-Lawnwood complex, depressional	5	Martin	C/D	Very poorly drained	0
Okeelanta muck, frequently ponded, 0 to 1 percent slopes	22	Martin	A/D	Very poorly drained	0
Salerno sand	35	Martin	A/D	Poorly drained	1
Arents, 0 to 2 percent slopes	36	Martin	A/D	Somewhat poorly drained	2.5

Soil Name	NRCS Map Unit	County	Hydrologic Soil Group	Drainage Class, Dominant Condition	Depth to SHWT (ft)
Floridana fine sand, frequently ponded, 0 to 1 percent slopes	38	Martin	C/D	Very poorly drained	0
Malabar fine sand, high, 0 to 2 percent slopes	52	Martin	A/D	Poorly drained	1
Udorthents, 0 to 35 percent slopes	53	Martin	A	Well drained	6.5
Wabasso and Oldsmar fine sands, depressional	56	Martin	C/D	Poorly drained	1
Hobe fine sand, 0 to 5 percent slopes	61	Martin	A	Somewhat excessively drained	5.5
Nettles Sand	63	Martin	C/D	Poorly drained	1
Kesson sand, tidal	67	Martin	A/D	Very poorly drained	0
Ankona and Farmton sands	2	St. Lucie	C/D	Poorly drained	1
Electra fine sand, 0 to 5 percent slopes	12	St. Lucie	A	Somewhat Poorly drained	2.75
Fluvaquents, frequently flooded	14	St. Lucie	D	Very poorly drained	0.25
Hobe sand, 0 to 5 percent slopes	17	St. Lucie	A	Somewhat excessively drained	5.5
Jonathan sand, 0 to 5 percent slopes	19	St. Lucie	A	Moderately well drained	4
Pendarvis and Pomello sands, 0 to 5 percent slopes	29	St. Lucie	A	Moderately well drained	2.75

Soil Name	NRCS Map Unit	County	Hydrologic Soil Group	Drainage Class, Dominant Condition	Depth to SHWT (ft)
Salerno and Punta sands	39	St. Lucie	A/D	Poorly drained	1
Samsula muck, frequently ponded, 0 to 1 percent slopes	40	St. Lucie	A/D	Very poorly drained	0
Waveland-Lawnwood complex, depressional	51	St. Lucie	C/D	Very poorly drained	0
Waveland and Immokalee fine sands	50	St. Lucie	B/D	Poorly drained	1

3.2 LAND USE

The land use within the right-of-way throughout the study limits is classified as Roads and Highways. The areas adjacent to the project right-of-way consist of the following land uses:

- From the beginning of the project at Indiantown Road (SR 706) to SW Kanner Highway - The project area is surrounded by agricultural land uses, such as citrus groves, sod farms, and field crops. There are some areas categorized as improved pastures, as well as residential areas. There are also some wetlands adjacent to the corridor, mainly at stream crossings and along the east side of the corridor where the roadway runs parallel to SR-9 (I-95).
- From SW Kanner Highway to the St. Lucie Canal - The land use along both sides of the corridor are predominantly residential and commercial.
- From the St. Lucie Canal to the Martin and St. Lucie County Line - The east side of the corridor is more developed, with most of the land use being medium and low density residential and areas classified as commercial. The west side of the corridor is mostly undeveloped land categorized as pine flatwoods and woodland pastures, with one small area categorized as commercial.
- From the Martin and St. Lucie County Line to W Midway Road - The lands adjacent to the corridor are mostly medium density residential with golf courses and some educational facilities.
- From W Midway Road to the crossing of SR 9 (I-95) - The adjacent land use is industrial and commercial, with one area of undeveloped hydric pine flatwoods on the east side of the Turnpike mainline.

- From the I-95 crossing to the end of the project at Okeechobee Road (SR 70) - The adjacent land use is predominantly undeveloped land, such as shrub and brushland, upland hardwood forests, and pine flatwoods.

Please refer to **Appendix F** for the existing and future Land Use Map.

3.3 CROSS CULVERTS

There are 23 existing culverts and 16 existing bridge culverts within the project limits. **Table 3.2** provides a summary of the existing culverts; **Table 3.3** provides a summary of the existing bridge culverts.

Table 3.2: Existing Culverts within Project Limits

Approx. Mile Post	Approx. STA	Cross Culvert Size	Existing Length (ft)	Number of Barrels	Turnpike Structure Number
119.70	196+90	10-ft x 10-ft	92.00	1	89Q001
121.40	284+70	5-ft x 10-ft	124.67	1	89Q002
122.20	328+20	5-ft x 10-ft	129.00	1	89Q003
122.70	355+20	5-ft x 10-ft	128.58	1	89Q004
123.20	382+25	5-ft x 10-ft	115.00	1	89Q005
124.60	457+20	10-ft x 12-ft	149.00	1	89Q006
125.30	496+24	5-ft x 10-ft	130.17	1	89Q007
126.50	552+15	5-ft x 10-ft	105.00	1	89Q008
126.97	581+55	10-ft x 10-ft	132.00	1	89Q009
128.20	650+00	10-ft x 10-ft	129.00	1	89Q010
130.00	740+65	5-ft x 10-ft	194.00	1	89Q014
131.90	841+85	8-ft x 8-ft	128.00	2	89Q011
132.40	868+50	8-ft x 8-ft	132.00	1	89Q012
136.40	1080+00	7-ft x 8ft	112.00	1	89Q013
140.20	1277+00	9-ft x 9-ft	132.00	2	94Q001
140.40	1289+00	9-ft x 9-ft	130.50	2	94Q002
148.70	1725+65	5-ft x 10-ft	127.00	1	94Q004
149.30	1753+50	5-ft x 10-ft	128.00	1	94Q005
149.80	1782+50	5-ft x 10-ft	141.08	1	94Q006
150.30	1811+31	5-ft x 10-ft	106.00	1	94Q007

Approx. Mile Post	Approx. STA	Cross Culvert Size	Existing Length (ft)	Number of Barrels	Turnpike Structure Number
150.90	1840+64	5-ft x 8-ft	169.00	1	94Q008
151.45	1867+00	5-ft x 8-ft	129.00	1	N/A
151.50	1869+65	5-ft x 12-ft	149.25	2	94Q025

Table 3.3: Existing Bridge Culverts within Project Limits

Structure Description	Approx. Mile Post	Approx. STA	Turnpike Structure Number	Bridge Culvert Existing Length (ft)	Bridge Culvert Existing Width (ft)	Bridge Culvert Existing Height (ft)
Bridge Culvert over Drainage Ditch	118.44	132+15	890072	128	20.0	9.0
Bridge Culvert over Drainage Canal	120.25	225+70	890073	102	24.0	7.0
Bridge Culvert over Drainage Canal	123.89	418+25	890074	102	24.0	4.5
Bridge Culvert over Drainage Ditch	124.45	425+15	890084	141	22.4	8.5
Bridge Culvert over Drainage Canal	125.19	486+30	890075	130	22.0	7.0
Bridge Culvert over Drainage Canal	125.89	523+25	890076	102	24.2	7.2
Bridge Culvert over Drainage Canal	127.28	597+20	890077	115	22.4	7
Bridge Culvert over Drainage Canal	127.86	626+40	890078	128	22.4	7
Bridge Culvert over Danforth Creek	134.08	956+00	890067	141	30	9
Bridge Culvert over Drainage Ditch	137.22	1121+00	890070	131	27	5.9
Bridge Culvert over Winters Creek	139.69	1250+50	940061	131	30	6.9
Bridge Culvert over Unnamed Canal	144.65	1510+50	940104	76	23	7.2
Bridge Culvert over Unnamed Canal	144.65	1510+50	940105	76	20.6	7.2

Structure Description	Approx. Mile Post	Approx. STA	Turnpike Structure Number	Bridge Culvert Existing Length (ft)	Bridge Culvert Existing Width (ft)	Bridge Culvert Existing Height (ft)
Bridge Culvert over Unnamed Outfall	147.74	1672+90	940106	131	23	7.2
Bridge Culvert over Unnamed Outfall	148.21	1699+00	941000	115	20	12
Bridge Culvert over Unnamed Outfall	153.70	1989+11	940064	191	22.4	7.0

3.4 BRIDGE STRUCTURES

There are 10 bridges within the project limits. **Table 3.4** provides a summary of the bridges and their locations.

Table 3.4: Existing Bridges within Project Limits

Structure Description	Approx. Mile Post	Approx. STA	Turnpike Structure Number
Bridge over Loxahatchee River	117.52	3686+70	930241
Bridge over Cypress Creek	119.10	163+85	890079
Bridge over Phipp Canal/Roebuck Creek	126.46	554+40	890082
Thomas B. Manuel Bridge over St. Lucie Canal	131.10	766+68	891000 890066
Bridge over Unnamed Channel	135.64	1037+00	890085
Bridge over C-23 Canal	138.07	1165+13	890083
Bridge over C-24 Canal	140.25	1384+00	940082 940049
Bridge over Ten Mile Creek	152.47	1924+00	940072

3.5 FLOODPLAINS AND FLOODWAYS

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for Palm Beach, Martin, and St. Lucie Counties were reviewed to determine the extents of the FEMA floodplains within the project limits. **Table 3.5** provides a summary of the FEMA FIRMs, including their effective dates. The FEMA FIRMs are provided in **Appendix D**.

Table 3.5: Summary of FEMA FIRMs

FEMA Panel Name	FEMA Panel Number	Effective Date
FIRM Palm Beach County, Florida And Incorporated Areas	12099C0158F	October 5, 2017
FIRM Palm Beach County, Florida And Incorporated Areas	12099C0159F	October 5, 2017
FIRM Palm Beach County, Florida And Incorporated Areas	12099C0166F	October 5, 2017
FIRM Palm Beach County, Florida And Incorporated Areas	12099C0167F	October 5, 2017
FIRM Martin County, Florida And Incorporated Areas	12085C0130H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0140H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0141H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0143H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0144H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0282H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0284H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0303H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0506H	February 19, 2020
FIRM Martin County, Florida And Incorporated Areas	12085C0508H	February 19, 2020
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0167J	February 16, 2012
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0169J	February 16, 2012
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0170J	February 16, 2012
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0260J	February 16, 2012
FIRM St. Lucie County, Florida And Incorporated Areas	12111CO276K	February 19, 2020
FIRM St. Lucie County, Florida And Incorporated Areas	12111CO278K	February 19, 2020
FIRM St. Lucie County, Florida And Incorporated Areas	12111CO288K	February 19, 2020
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0405K	February 19, 2020
FIRM St. Lucie County, Florida And Incorporated Areas	12111C0402K	February 19, 2020

The applicable Flood Insurance Studies (FIS) for this project are the Palm Beach County FIS (effective October 5, 2017), Martin County FIS (effective February 19, 2020), and St. Lucie County FIS (effective February 19, 2020). There are three regulatory floodways within this project corridor: Loxahatchee River, Roebuck Creek, and Ten Mile Creek. The Flood Insurance Studies have information concerning the floodways' drainage area, discharge, and flood profile. Loxahatchee River and Ten Mile Creek are also Sovereign Submerged Lands (SSLs).

3.5.1 LOXAHATCHEE RIVER FLOODPLAIN

The floodplain at the Turnpike mainline crossing of the Loxahatchee River is classified as Zone AE with a base flood elevation (BFE) of 6 feet on the east and is classified as a Zone A on the west (FIRM Panel No. 12099C0158F).

3.5.2 Roebuck Creek Floodplain

Beginning north of SW Kanner Road, the Zone AE floodplain (elevation 6 feet) at Roebuck Creek, a regulated floodway, is present along both sides of the corridor. This floodplain area extends into the roadway footprint near MP 131 and ends at the northern bank of the St Lucie Canal under the Thomas B. Manuel Bridge (FIRM Panel No. 12085C0282H).

3.5.3 Mapps Creek and Danforth Creek Floodplains

North of the crossing of I-95 and the Turnpike mainline, the Zone AE floodplain for Mapps Creek and Danforth Creek extends along both sides of the roadway with an elevation of 18 feet along the west side and 17 feet along the east side (FIRM Panel No. 12085C0143H). This floodplain area extends to the SW Martin Highway interchange, at approximately MP 134.6 (FIRM Panel No. 12085C0141H). Based on the FEMA FIRM, the extents of the floodplain encroach into the roadway footprint. Survey was obtained in this area in May 2019 to obtain the low edge of pavement elevations and compare them to the floodplain elevations. The survey indicated that the lowest low edge of pavement elevation within the floodplain limits is elevation 13 feet, while the floodplain elevation is 18 feet; however, FTE has no documented history of flooding or overtopping from MP 131 to MP 134.

FTE's All Electronic Tolling (AET) 8 project (FPID 431737-1) encountered similar issues regarding the existing roadway elevations and established FEMA floodplain elevations when designing Site 8. Investigations by the design team of the AET 8 project were summarized in a memo, *Site 8 FEMA Floodplain Discussion*, which is provided in **Appendix G.**

The Turnpike mainline is a hurricane evacuation route, and Section 211.9 of the FDOT Design Manual (FDM) requires the mainline travel lanes be above the 100-year floodplain elevation. While the FEMA floodplain elevations at Mapps Creek and Danforth Creek may be overestimated, this should be thoroughly reviewed during the design phase to ensure the proposed profile grade meets all FTE requirements. Watershed modeling may be necessary to obtain a more accurate floodplain elevation that reflects the existing stages during major storm events.

3.5.4 Bessey Creek Floodplain

Floodplains are present along the east and west of the Turnpike mainline, north of the SW Martin Highway interchange. These floodplains are the flooding effects of Bessey Creek and have a base floodplain elevation of 17 feet adjacent to the corridor. They extend to MP 135.8 on the east and to SW Sand Avenue on the west. North of MP 135.8, the floodplain is classified as Zone X, with a 0.2% annual chance of flood, which extends to the C-23 Canal (FIRM Panel No. 12085C0130H).

3.5.5 TEN MILE CREEK FLOODPLAIN

The flood effects from Ten Mile Creek extend from the I-95 crossing to the Okeechobee Road interchange. The area is categorized as a Zone AE with a base flood elevation of 15 adjacent to the corridor (FIRM Panel No. 12111C0169J).

3.5.6 ADDITIONAL FLOODPLAINS

In Martin County, the flood effects from Cypress Creek cross under the Turnpike mainline flowing through bridge culvert no. 890079. The area is categorized as a Zone AE with a base flood elevation of 5 adjacent to the corridor. (FEMA Panel No. 12085C0506H).

In St. Lucie County, there is a floodplain along the west side of the corridor located north of SE Becker Road that is classified as Zone AH (elevation 18 feet) that extends to MP 141.4. One-foot LiDAR contours of the area show the existing edge of pavement near elevation 18, placing the floodplain at or above the elevation of the southbound lanes. The C-24 Canal flooding effects, categorized as a Zone AE (elevation 6 feet), are contained within the banks of the canal adjacent to the Turnpike mainline (FIRM Panel No. 12111C0288K). Additionally, there are two Zone A floodplains, one at MP 140.2 and the other at MP 140.4 (FIRM Panel Nos. 12111C0405K and 12111C0288K).

4.0 PROPOSED CONDITIONS

The recommended improvements involve widening the Turnpike mainline from four 12-foot lanes to eight 12-foot lanes by adding two general toll lanes in each direction and widening both the inside and outside shoulders from 10-feet to 12-feet. The proposed Typical Mainline Section for the mainline is shown in **Figure 4-1**.

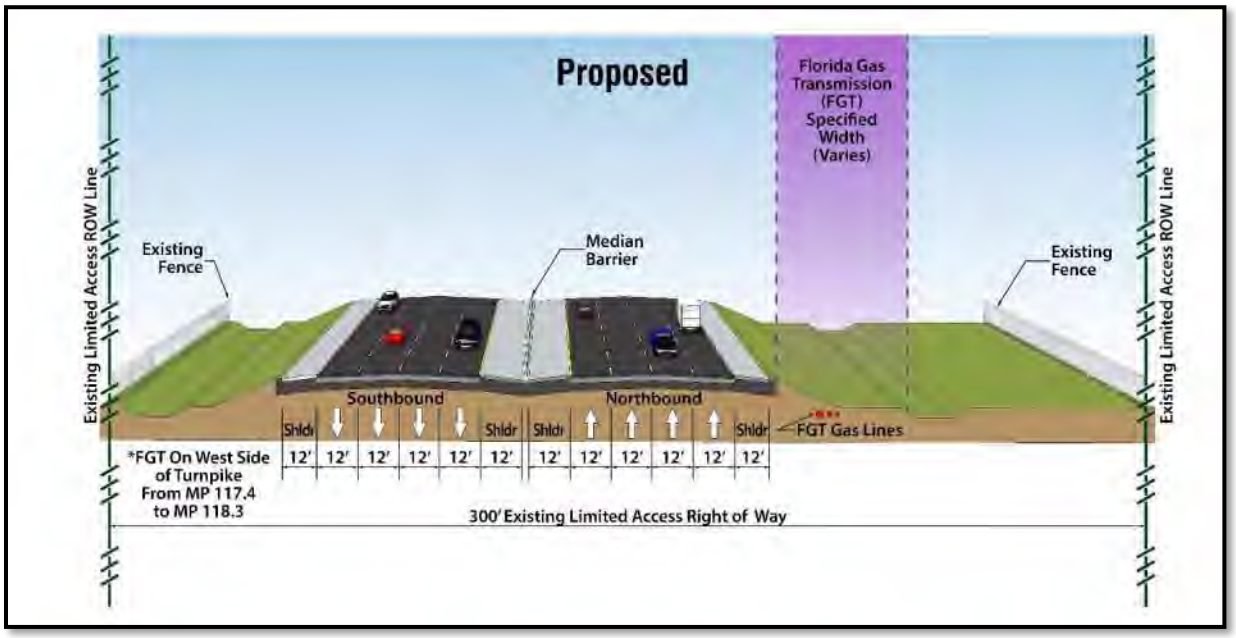


Figure 4-1: Proposed Mainline Typical Section

4.1 CROSS CULVERTS

The proposed roadway widening will require extensions to most existing cross drains along the Turnpike mainline. **Table 4.1** provides the projected improvements and modifications to each cross culvert. Based on As-Built plans, the original Turnpike mainline was constructed in 1955. Assuming the box culverts were designed for a 100-year service life for concrete box culverts, the existing culverts have 35 years remaining. The existing box culverts are recommended to be extended rather than replaced; however, this should be analyzed further during the design phase based on the culvert inspection reports and history of maintenance repairs for each culvert.

Table 4.1: Proposed Improvements and Modifications to Cross Culverts within Project Limits

Approx. Mile Post	Approx. STA	Turnpike Structure Number	Cross Culvert Size	Number of Barrels	Existing Length (ft)	Approx. Proposed Extension (ft)	Proposed Improvement or Modification	Notes
119.70	196+90	89Q001	10-ft x 10-ft	1	92.00	84.00	Extension	
121.40	284+69	89Q002	5-ft x 10-ft	1	124.67	52.00	Extension	
122.20	328+20	89Q003	5-ft x 10-ft	1	129.00	47.00	Extension	
122.70	355+20	89Q004	5-ft x 10-ft	1	128.58	48.00	Extension	
123.20	382+25	89Q005	5-ft x 10-ft	1	115.00	61.00	Extension	
124.60	457+23	89Q006	10-ft x 12-ft	1	149.00	27.00	Extension	
125.30	496+20	89Q007	5-ft x 10-ft	1	130.17	46.00	Extension	
126.50	554+39	89Q008	5-ft x 10-ft	1	105.00	71.00	Extension	
126.97	581+55	89Q009	10-ft x 10-ft	1	132.00	44.00	Extension	
128.20	650+00	89Q010	10-ft x 10-ft	1	129.00	47.00	Extension	
130.00	740+65	89Q014	5-ft x 10-ft	1	194.00	N/A	None	Within 100-year Floodplain
131.90	841+85	89Q011	8-ft x 8-ft	2	128.00	96.00 (48 x 2)	Extension	Within 100-year Floodplain
132.40	868+50	89Q012	8-ft x 8-ft	1	132.00	44.00	Extension	Within 100-year Floodplain
136.40	1079+80	89Q013	7-ft x 8ft	1	112.00	64.00	Extension	Within 100-year Floodplain
140.20	1276+47	94Q001	9-ft x 9-ft	2	132.00	66.00	Extension	Within 100-year Floodplain
140.40	1288+98	94Q002	9-ft x 9-ft	2	130.50	46.00	Extension	Within 100-year Floodplain
148.70	1725+68	94Q004	5-ft x 10-ft	1	127.00	49.00	Extension	
149.30	1753+50	94Q005	5-ft x 10-ft	1	128.00	48.00	Extension	
149.80	1782+50	94Q006	5-ft x 10-ft	1	141.08	35.00	Extension	
150.30	1811+31	94Q007	5-ft x 10-ft	1	106.00	37.00	Extension	
150.90	1841+14	94Q008	5-ft x 8-ft	1	169.00	N/A	None	
151.45	1867+03	N/A	5-ft x 8-ft	1	129.00	47.00	Extension	
151.50	1869+67	94Q025	5-ft x 12-ft	2	149.25	27.00	Extension	

Culvert No. 89Q013 at MP 136.4 has a documented history of flooding and should be analyzed during the design phase to ensure the extension does not result in significant changes to the headwater elevations and to see if improvements beyond extensions, such as raising the profile grade and adding conveyance, are warranted to alleviate the flooding concerns.

4.1.1 INTERCHANGE CULVERTS

The recommended improvements include reconfigurations of four (4) existing interchanges and the addition of two (2) new interchanges. Each interchange has two alternatives that are being considered, each requiring a different cross drain design. Proposed cross drains are necessary at the interchanges to maintain existing off-site flow patterns. **Table 4.2** provides the anticipated cross drains for each interchange alternative. The size of the proposed cross drains was estimated based on the size of the upstream cross drains. The exact location, size, and length of the proposed cross drains and box culverts will need to be determined during the design phase.

Table 4.2: Proposed Cross Drains per Interchange Alternative

Interchange	Alternative	Proposed Improvement or Modification	Approx. Sta.	Approximate Length (ft)	Proposed Cross Drain Size	Notes
Martin Highway (SR 714)	Alternative 7B	New Cross Drain	961+50	71	24-in pipe	Within 100-year Floodplain
		New Cross Drain	968+00	347	24-in pipe	
		New Cross Drain	971+50	151	24-in pipe	
		New Cross Drain	973+50	88	24-in pipe	
		Extension	970+00	146 (extension length)	24-in pipe	
		New Cross Drain	969+00	88	24-in pipe	Within 100-year Floodplain
	Alternative 7S	New Cross Drain	960+00	180	24-in pipe	Within 100-year Floodplain
		New Cross Drain	965+00	269	24-in pipe	
		New Cross Drain	966+00	120	24-in pipe	
		New Cross Drain	960+50	73	24-in pipe	

Interchange	Alternative	Proposed Improvement or Modification	Approx. Sta.	Approximate Length (ft)	Proposed Cross Drain Size	Notes
		New Cross Drain	965+50	149	24-in pipe	
		New Cross Drain	974+50	109	24-in pipe	
		New Cross Drain	969+00	293	24-in pipe	
		Extension	965+00	38	24-in pipe	
Becker Road	Alternative 1	New Cross Drain	1185+50	71	24-in pipe	Within 100-year Floodplain
		New Cross Drain	1179+00	347	24-in pipe	
	Alternative 3					This alternative does not require additional cross drains to establish and maintain positive drainage patterns within the interchange.
Port St. Lucie Boulevard	Alternative 1	New Cross Drain	1433+00	115	36-inch pipe	
		New Cross Drain	1439+00	115	36-inch pipe	
		New Cross Drain	1441+00	50	36-inch pipe	
		New Cross Drain	1427+50	181	36-inch pipe	
	Alternative 2	New Cross Drain	1433+00	115	36-inch pipe	
		New Cross Drain	1439+00	115	36-inch pipe	
		New Cross Drain	1441+00	50	36-inch pipe	
		New Cross Drain	1427+50	181	36-inch pipe	
		New Cross Drain	1421+00	49	36-inch pipe	

Interchange	Alternative	Proposed Improvement or Modification	Approx. Sta.	Approximate Length (ft)	Proposed Cross Drain Size	Notes
Crosstown Parkway	Alternative 3					This alternative does not require additional cross drains to establish and maintain positive drainage patterns within the interchange.
	Alternative 4					This alternative does not require additional cross drains to establish and maintain positive drainage patterns within the interchange.
Midway Road	Alternative 1	New Box Culvert	1811+25	476	5-ft x 10-ft (W x H)	
		New Box Culvert	1811+25	174	5-ft x 10-ft (W x H)	
		Box Culvert Extension	1811+25	39	5-ft x 10-ft (W x H)	
		New Cross Drain	1799+00	218	24-inch pipe	
		New Cross Drain	1814+00	64	24-inch pipe	
	Alternative 4	New Box Culvert	1811+25	476	5-ft x 10-ft (W x H)	
		New Box Culvert	1811+25	115	5-ft x 10-ft (W x H)	
		Box Culvert Extension	1811+25	39	5-ft x 10-ft (W x H)	
		New Cross Drain	1799+00	218	24-inch pipe	
		New Cross Drain	1814+00	70	24-inch pipe	
SR 70 (Okeechobee Road)	Alternative 1	New Cross Drain	1945+00	76	24-inch pipe	
		New Cross Drain	1950+00	37	24-inch pipe	

Interchange	Alternative	Proposed Improvement or Modification	Approx. Sta.	Approximate Length (ft)	Proposed Cross Drain Size	Notes
	Alternative 4	New Cross Drain	1968+50	132	24-inch pipe	
		New Cross Drain	1974+00	48	24-inch pipe	

4.2 BRIDGE STRUCTURES

All bridge culverts and bridges within the project limits will be modified or replaced to accommodate the proposed improvements.

Table 4.3: Proposed Improvements and Modifications to Bridge Structures within Project Limits

Structure Description	Approx. Mile Post	Approx. STA	Turnpike Structure Number	Notes
Bridge over Loxahatchee River	117.52	3685+79	930241	Within 100-year Floodplain
Bridge Culvert over Drainage Ditch	118.44	132+15	890072	
Bridge over Cypress Creek	119.10	163+85	890079	Within 100-year Floodplain
Bridge Culvert over Drainage Canal	120.25	225+70	890073	
Bridge Culvert over Drainage Canal	123.89	418+26	890074	
Bridge Culvert over Drainage Canal	124.45	425+15	890084	
Bridge Culvert over Drainage Canal	125.19	486+30	890075	
Bridge Culvert over Drainage Canal	125.89	523+25	890076	
Bridge over Phipp Canal/Roebuck Creek	126.46	552+34	890082	
Bridge Culvert over Drainage Canal	127.28	597+20	890077	
Bridge Culvert over Drainage Canal	127.86	626+40	890078	
Thomas B. Manuel Bridge over St. Lucie Canal	131.10	766+68	891000 890066	Within 100-year Floodplain
Bridge Culvert over Danforth Creek	134.08	956+01	890067	Within 100-year Floodplain
Bridge over Unnamed Channel	135.64	1037+00	890085	Within 100-year Floodplain
Bridge Culvert over Drainage Ditch	137.22	1121+00	890070	

Structure Description	Approx. Mile Post	Approx. STA	Turnpike Structure Number	Notes
Bridge over C-23 Canal	138.07	1165+13	890083	
Bridge Culvert over Winters Creek	139.69	1250+44	940061	Within 100-year Floodplain
Bridge over C-24 Canal	140.25	1383+82	940082 940049	Within 100-year Floodplain
Bridge Culvert over Unnamed Canal	144.65	1510+24	940104 940105	
Bridge Culvert over Unnamed Outfall	147.74	1672+91	940106	
Bridge Culvert over Unnamed Outfall	148.21	1699+00	941000	
Bridge over Ten Mile Creek	152.47	1924+00	940072	Within 100-year Floodplain
Bridge Culvert over Unnamed Outfall	153.70	1989+11	940064	

The following bridge structures are located in areas that have a documented history of flooding and should be further analyzed during the design phase to ensure the proposed bridge widenings do not result in significant changes to the water surface profile elevations and to see if additional improvements, such as raising the profile grade and adding conveyance, are warranted to alleviate the flooding concerns:

- Structure 890067 at STA 956+00
- Structure 890085 at STA 1037+00
- Structure 890070 at STA 1121+00

4.3 FLOODPLAINS AND FLOODWAYS

The anticipated floodplain impacts due to the proposed roadway widening were estimated to determine potential impacts to the 100-year floodplains and necessary compensation volumes. The anticipated impacts are provided in **Table 4.4** and **Table 4.5**. The impact volume from the proposed widening will need to be assessed during the design phase, when survey of the existing ground, geotechnical data for the seasonal high water table (SHWT), and proposed cross sections are available. Off-site floodplain compensation sites, on-site swales, and infield storage areas should be evaluated to provide compensation for the floodplain impacts.

Table 4.4: Mainline Floodplain Encroachment Estimates

Floodplain Description	Approximate Location (MP)	Approximate Location (STA)	Approximate Encroachment Area* (ac)
Loxahatchee River	117.50 to 117.52	3688+53 to 3685+79	0.26
Cypress Creek	119.06 to 119.10	161+40 to 163+50	0.10
Mapps Creek and Danforth Creek	130.03 to 134.60	740+38 to 981+88	36.72
Bessey Creek	134.63 to 135.76	983+46 to 1043+93	9.04
St. Lucie Canal / Roebuck Creek /Okeechobee Waterway (C-23 Canal)	135.76 to 137.08	1042+93 to 1109+35	5.28
Blakeslee Creek	138.73 to 141.28	1200+69 to 1332+65	10.20
C-24 Canal	142.22 to 142.27	1382+25 to 1384+89	0.40
TenMile Creek	151.97 to 152.82	1897+97 to 1942+76	6.80

*Note 1: Approximate encroachment area does not include floodplain encroachments at interchange locations.

Table 4.5: Interchange Floodplain Encroachment Estimates

Interchange	Floodplain Description	Approximate Location (STA)	Alternative	Approximate Encroachment Area (ac)
Martin Highway (SR 714)	Danforth Creek	980+00	Alternative 7S	4.72
			Alternative 7B	4.65
Becker Road	Winters Creek	1181+50	Alternative 1	0.12
			Alternative 3	0.12
Port St. Lucie Boulevard (SR 716)	None	1436+00	N/A	N/A
Crosstown Parkway	None	1518+00	N/A	N/A
Midway Road	None	1812+40	N/A	N/A
Okeechobee Road (SR 70)	None	1899+40	N/A	N/A

The transverse floodplain impacts associated with the proposed culvert and box culvert extensions and bridge widenings will need to be further analyzed during the design phase. The proposed bridge widenings over the regulatory floodways at Loxahatchee River, Roebuck Creek, Ten Mile Creek will require a No-Rise Certification from FEMA. The proposed improvements will have both transverse and longitudinal encroachments on the Loxahatchee River and Roebuck Creek, but only transverse encroachments are anticipated at Ten Mile Creek.

The existing profile grades were used to estimate the floodplain impacts. The existing Turnpike mainline does not meet current criteria for minimum gutter grade and some locations exhibit a 100-year floodplain elevation above the existing roadway footprint. The estimated floodplain encroachments may increase significantly if the proposed improvements require substantial modifications to the profile to meet all FTE requirements. Alternatively, additional conveyance could be added to provide a hydraulically equivalent post-development condition. For example, a large culvert could be proposed under the Turnpike mainline with an upstream weir set at the existing roadway profile grade. When the proposed profile is raised, the culvert would mimic the overtopping of the existing roadway without overtopping the proposed roadway or impacting the existing floodplain elevation.

4.4 Risk Evaluation

The proposed improvements were evaluated to determine whether there would be adverse floodplain impacts. The culverts and box culverts should be reviewed during the design phase, once survey is available and a more thorough hydrologic method of analysis is utilized, to determine the impact of the extensions on the headwaters.

Replacement drainage structures for this project are limited to hydraulically equivalent structures which are not expected to increase the backwater surface elevations. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to eradicate flooding problems in any significant amount, existing flooding will continue, but will not increase as the result of the construction of this project.

Furthermore, the project will not affect existing flood heights or floodplain limits. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

4.5 Coordination with Local Agencies

The Project Development and Environmental (PD&E) Study has included coordination with local agencies and South Florida Water Management District (SFWMD). A Pre-Application Meeting was held with SFWMD on November 16, 2017. Meeting Minutes are provided in **Appendix C**.

Through the Environmental Look Around (ELA) process, emails were distributed to SFWMD and the local water districts within the project limits on October 8, 2019: Hobe-St. Lucie Conservancy District, North St. Lucie River Water Control District, and Northern Palm Beach County Improvement District, and one special taxing district the

Loxahatchee River Environmental Control District. The purpose of the coordination was to explore watershed-wide stormwater needs and alternative permitting approaches based on regional stormwater needs and opportunities. The only responding agency was Hobe-St. Lucie Conservancy District, and they were not aware of any opportunities. The email correspondence is included in **Appendix G**.

4.6 PD&E REQUIREMENTS

4.6.1 HISTORY OF FLOODING

The documented history of flooding within the project limits was provided by the FTE Drainage and Maintenance offices and is summarized in **Table 4.6**.

Table 4.6: History of Flooding within the Project Limits

Location (MP)	Location (STA)	Location (Description)	Flooding History
134.5	979+00	Ft. Pierce Cell Tower	Asphalt millings placed around cell tower for reasons unknown. Tolls to have millings removed.
134 - 137	950+20 – 1109+35	Multiple Developments (NB Travel lanes)	Development on east side of TPK, such as the waste water treatment plant and construction of Sand Avenue, blocked flows from cross-drains. Flow is forced to run north and/or south in the Turnpike's ditch to Bessey Creek. Water levels get close to shoulder during high rains. Martin County to reroute flows on west side of TPK to reduce flows in TPK ditch. See subsequent discussion below this table.
136.5 - 138	1082+86 - 1162+15	Multiple Developments (NB Travel lanes)	Flooding due to western swales and eastern development that blocks canal connection. (Source: Bob May)
143	1423+50	Port St. Lucie Interchange	Pond draw-down issues south of interchange and north of SW Port St. Lucie Blvd on eastern side of TPK and swale flooding east of interchange and west of SW Bayshore Blvd on eastern side of TPK. (Source: Bob May) Likely not an issue anymore.
144	1476+36	St. Lucie West Services District	Adjacent property owners, west side, have been found pumping into TPK ROW during extreme events.
145	1529+30	Ft. Pierce Service Plaza	Northern Infield area experiences high water levels during extreme events due to outfall ditches being filled in by the truck parking lot expansion. The service plaza reconstruction project currently in construction (2012) will provide outfall to this northern infield area. System appears to be operating well.
146.5	1608+65	St. Lucie West Blvd Overpass	Flooding onto outer portion of SB lane from the St. Lucie West Blvd overpass to northern canal crossing due to western swales. (Source: Bob May) Further coordination during the

Location (MP)	Location (STA)	Location (Description)	Flooding History
			design phase is needed to determine if changes need to be made to the western swales.
153	1952+50	TenMile Creek	Creek rises into mainline ditches during extreme events. St. Lucie Water Control District has flood gates on this creek immediately upstream of the bridge. Bridge requires monitoring during large events.

In addition to the history of flooding, there is documentation of altered historical drainage patterns at the existing 8-ft by 7-ft culvert near MP 136.4 (Culvert No. 89Q013). This culvert serves an 820-acre area, which drains from west to east under the Turnpike mainline. The existing drainage pattern was altered with the construction of SW Sand Avenue (Sand Trail), a wastewater treatment plant, and a golf course located east of the culvert. Based on a letter dated June 2, 2006 from the FTE Drainage Engineer, "this blockage of historic flow has inundated the Florida's Turnpike right-of-way… It is suspected that during extreme events, water could get high enough to close part or all of the Florida's Turnpike at a time when the Florida's Turnpike is needed for hurricane evacuation… Further, until this historic pattern is re-established, the Florida's Turnpike will be unable to widen its highway because all available right-of-way is used up by this storm water blockage."

The documentation also indicates the blockage of the 8-ft by 4-ft culvert (Culvert No. 890070) located immediately north of the 8-ft by 7-ft culvert. The letter states that the Sand Trail subdivision, located directly east of the downstream end of the cross drain, was designed without taking into consideration the flow coming from the 8-ft by 4-ft culvert and that the flow from 1,597 acres would enter the subdivision. The letter is addressed to a developer, SFRN, Inc., located in West Palm Beach. The letter indicates FTE's intent to work together with SFRN, Inc. and Martin County to re-establish the historic flow pattern at these locations. The Turnpike's legal department met with Martin County in 2006 and the County stated that it was developing a water retention area to intercept the flows. FTE also had discussions with SFWMD regarding the flooding issue in 2017. During the design phase, coordination between FTE, Martin County, and SFWMD should focus on concrete solutions to the flooding issue and how these will be funded. It is likely that watershed modeling will be needed to determine the best course of action in resolving the flooding issue. Correspondence documentation is provided in **Appendix G**.

Another area of concern is from approximately MP 131.5 to MP 134, the segment of the Turnpike mainline adjacent to SW High Meadows Ave. Based on the FEMA FIRMs (FIRM Panel Nos. 12085C0143H and 12085C0141H), the extents of the floodplain encroach into the roadway footprint. Survey obtained of this area in May 2019 indicated that the lowest low edge of pavement elevation within the floodplain limits is elevation 13 feet, while the floodplain elevation is 18 feet. Email correspondence from Turnpike Maintenance dated September 9, 2019, indicated that the Turnpike mainline MP 131.5 to MP 132.5 was under construction (at the time of the email) and

that there were no reports of flooding in that area. The mainline segment from MP 132.5 to MP 134 also has a low edge of pavement elevation lower than the 100-year floodplain elevation shown in the FEMA FIRMs, however, FTE has no documented history of flooding in this area. This segment is covered in Section 3.5.3.

5.0 RECOMMENDATIONS AND CONCLUSIONS

The proposed widening of the existing Turnpike mainline from four to eight lanes and associated interchange improvements will result in impacts to the adjacent FEMA floodplains. The anticipated floodplain impacts due to the proposed roadway widening were estimated to determine potential impacts to the 100-year floodplain; however, the impact volume from the proposed widening and necessary compensation will need to be assessed during the design phase, when survey of the existing ground, geotechnical data for the seasonal high water table (SHWT), and proposed cross sections are available. Off-site floodplain compensation sites, on-site swales, and infield storage areas should be evaluated to provide compensation for the floodplain impacts.

The necessary culvert and bridge culvert extensions will have transverse impacts on the existing floodplains that will need to be further analyzed during the design phase. The proposed bridge widenings over the regulatory floodways at Loxahatchee River, Roebuck Creek, and Ten Mile Creek will require a No-Rise Certification from FEMA. The proposed improvements will have both transverse and longitudinal encroachments on the Loxahatchee River and Roebuck Creek, but only transverse encroachments area anticipated at Ten Mile Creek.

The existing profile grades were used to estimate the floodplain impacts. The existing Turnpike mainline does not meet current criteria for minimum gutter grade and some locations exhibit a 100-year floodplain elevation above the existing roadway footprint. The estimated floodplain encroachments may increase significantly if the proposed improvements require substantial modifications to the profile to meet all FTE requirements. During the design phase, watershed modeling may be necessary to obtain more accurate floodplain elevations that reflect the existing stages during major storm events to assist with the design of the proposed profile.

There are several locations of documented flooding within the project limits. Particular care should be provided at these locations to ensure the proposed improvements do not worsen the conditions.

Replacement drainage structures for this project are limited to hydraulically equivalent structures which are not expected to increase the backwater surface elevations. The limitations to the hydraulic equivalency being proposed are basically due to restrictions imposed by the geometrics of design, existing development, cost feasibility, or practicability. An alternative encroachment location is not considered since it does not meet the project's purpose and need or is economically unfeasible. Since flooding conditions in the project area are inherent in the topography or are a result of other outside contributing sources, and there is no practical alternative to eradicate flooding problems in any significant amount, existing flooding will continue, but will not increase as the result of the construction of this project.

Furthermore, the project will not affect existing flood heights or floodplain limits. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as

the result of construction of this project. Therefore, it has been determined that this encroachment is not significant.

6.0 REFERENCES

FEMA FIRM Maps for Palm Beach, Martin, and St. Lucie Counties

Flood Insurance Studies for Palm Beach, Martin, and St. Lucie Counties

FDOT Project Development and Environment Manual, Effective: January 14, 2019

FDOT Drainage Manual, Effective January 2020

FDOT Drainage Design Guide, January 2019

NRCS – USDA Soil Surveys for Palm Beach, Martin and St. Lucie Counties, FL

FPID 431737-1 Phase IV Roadway Plans, AET 8 Project, December 14, 2018

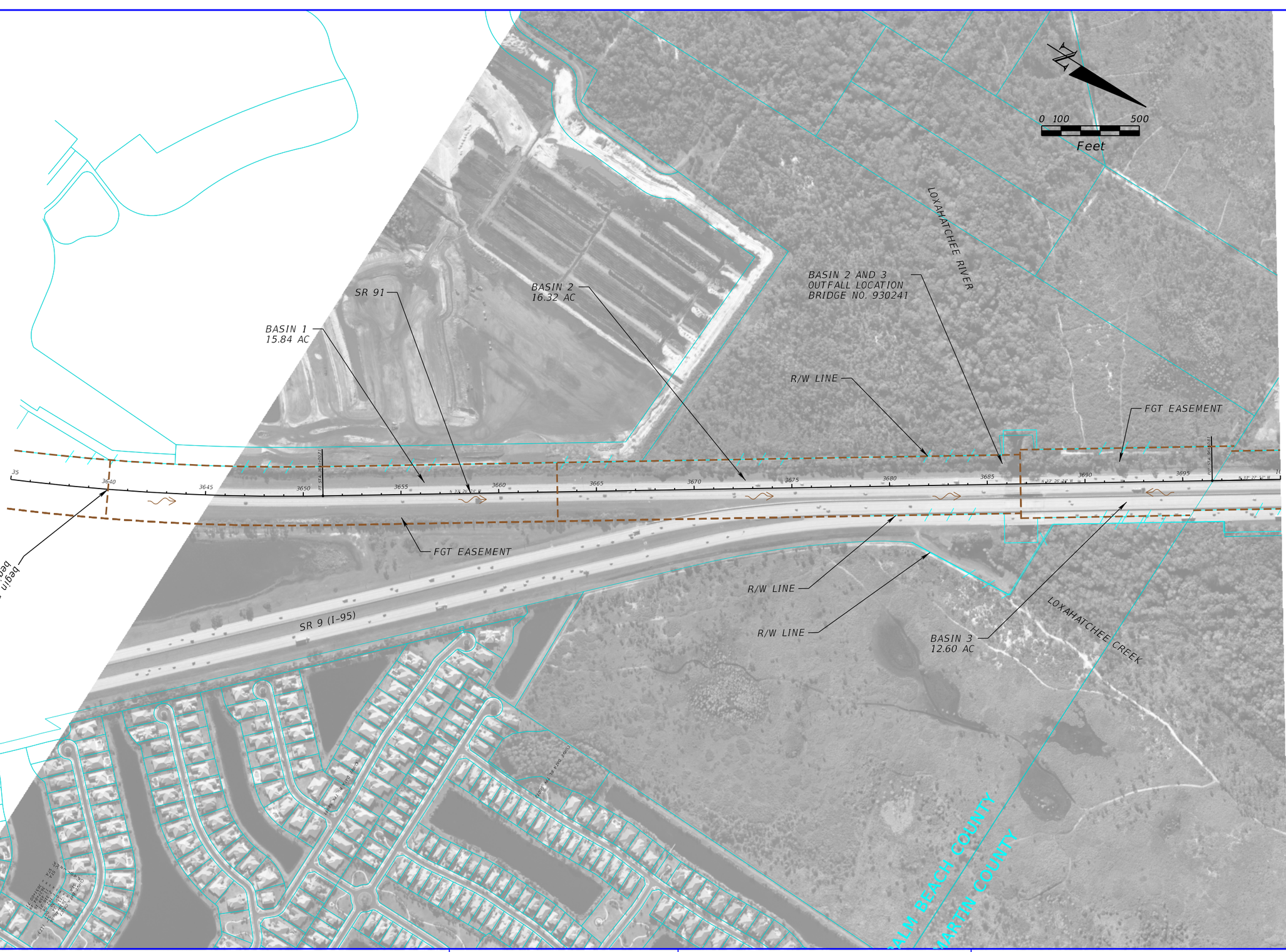
FPID 97890-0061 Final As-Built Roadway Plans

FPID 97890-0062 Final As-Built Roadway Plans

FPID 232413-1-52-01 Final As-Built Roadway Plans

FPID 418976-1-52-01 Final As-Built Roadway Plans

APPENDIX A
DRAINAGE MAPS



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Elizabeth M. Bartell, PE #69125

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	PALM BEACH	423374-1-22-01

DRAINAGE MAP
PRE-DEVELOPMENT

SHEET NO.

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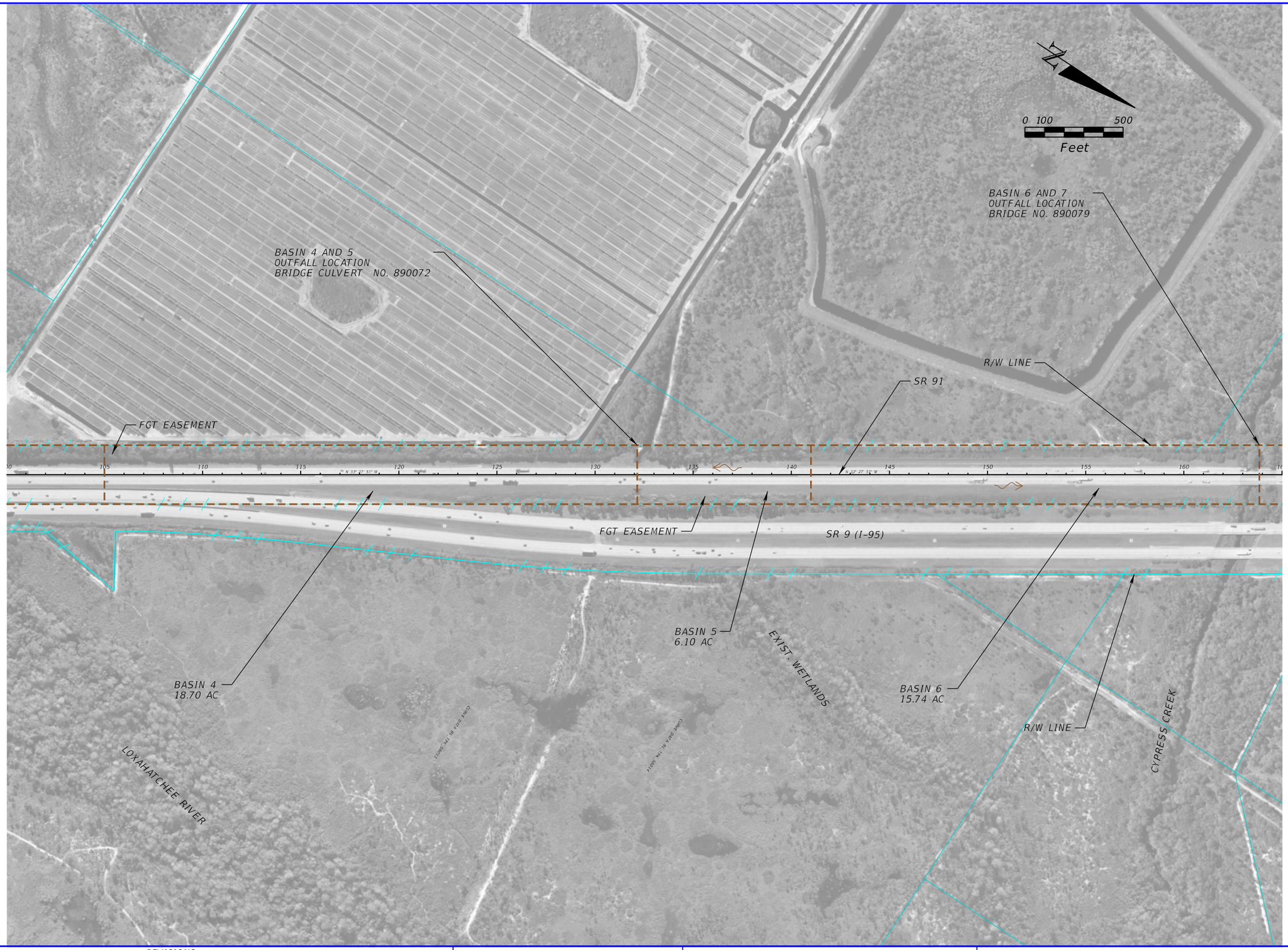

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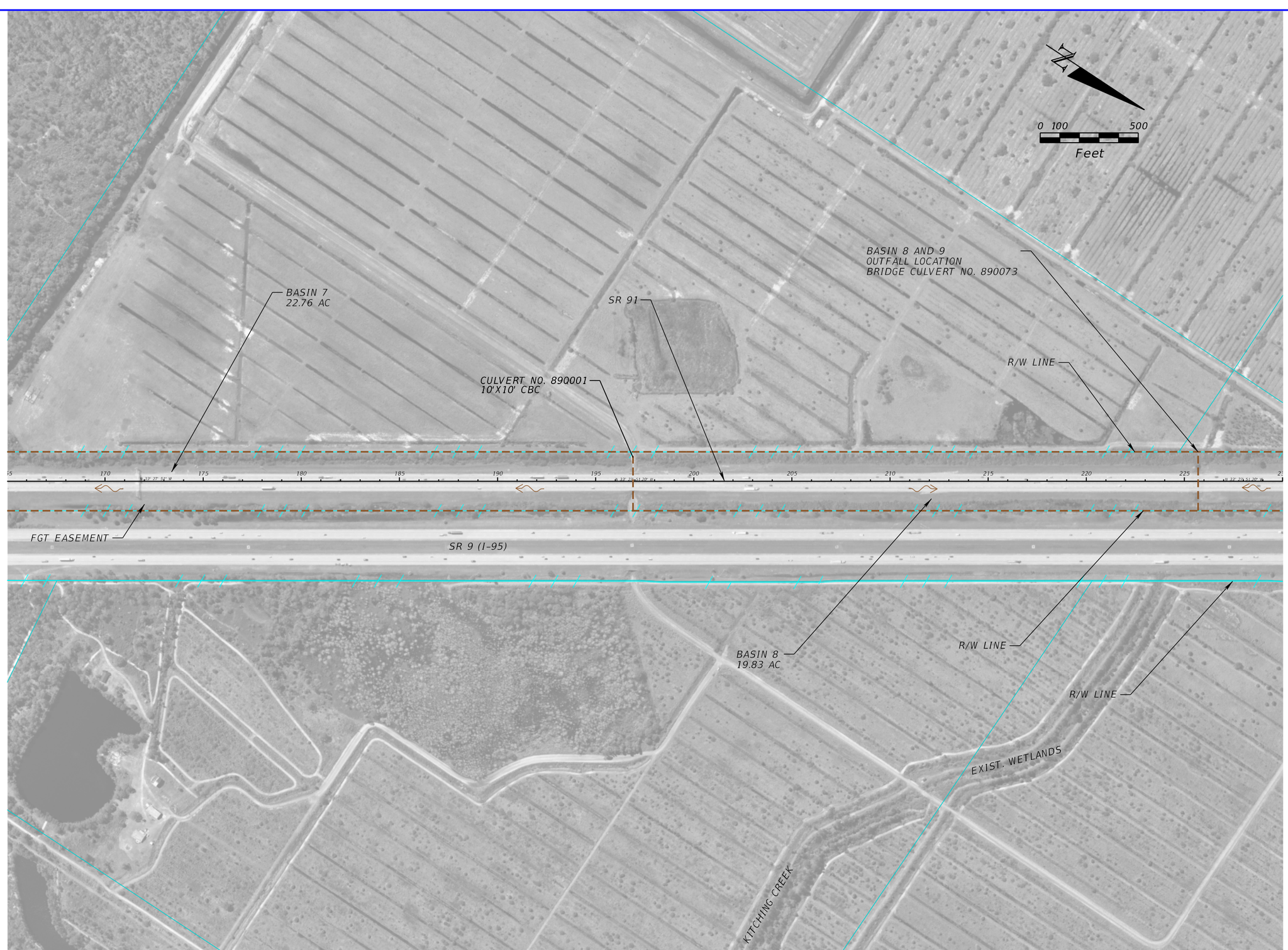
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.



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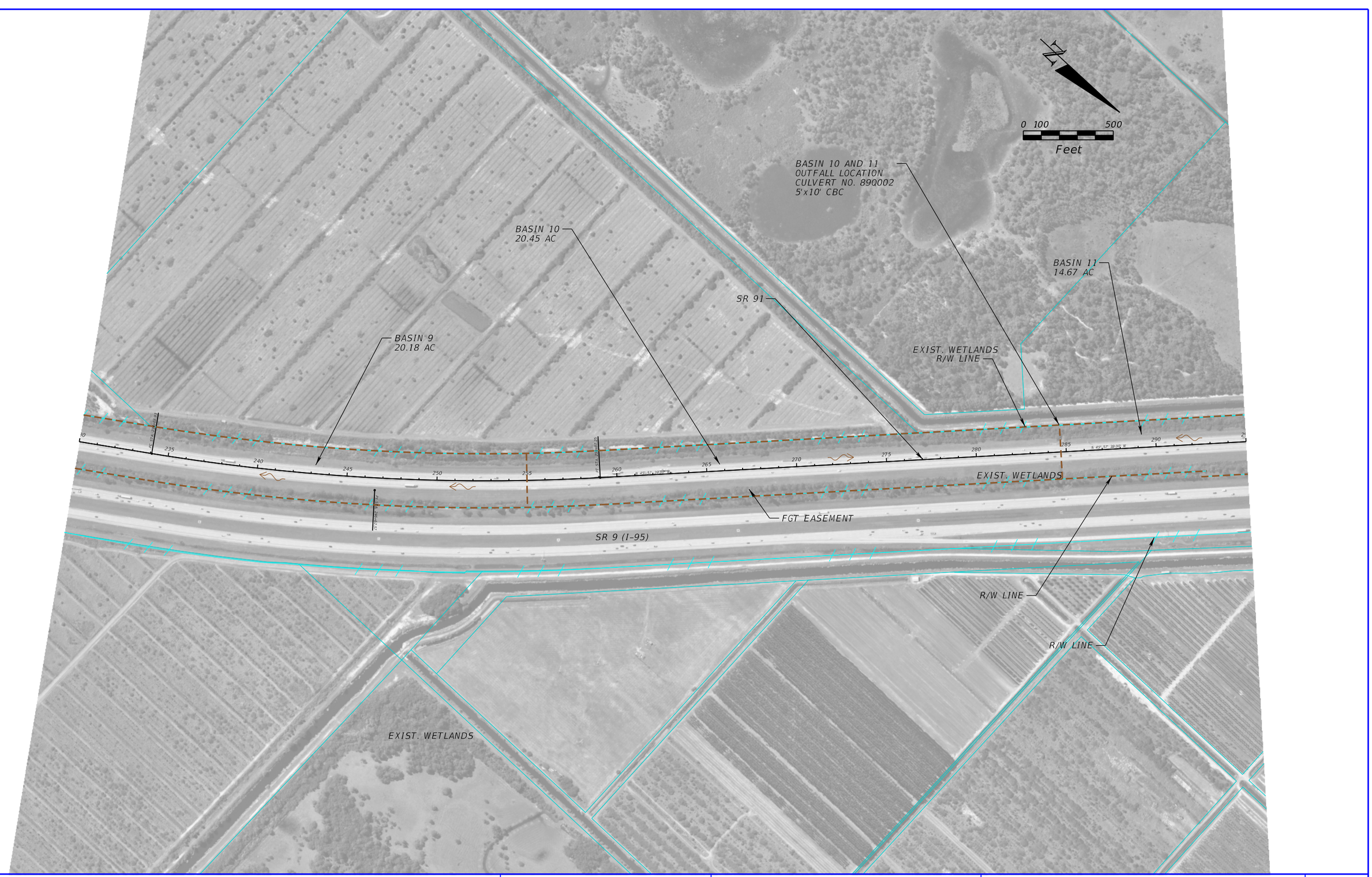
ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.



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DATE	DESCRIPTION	DATE	DESCRIPTION

PATEL, GREENE AND ASSOCIATES, LLC
280 W. Canton Ave. Suite 400
Winter Park, Florida 32789

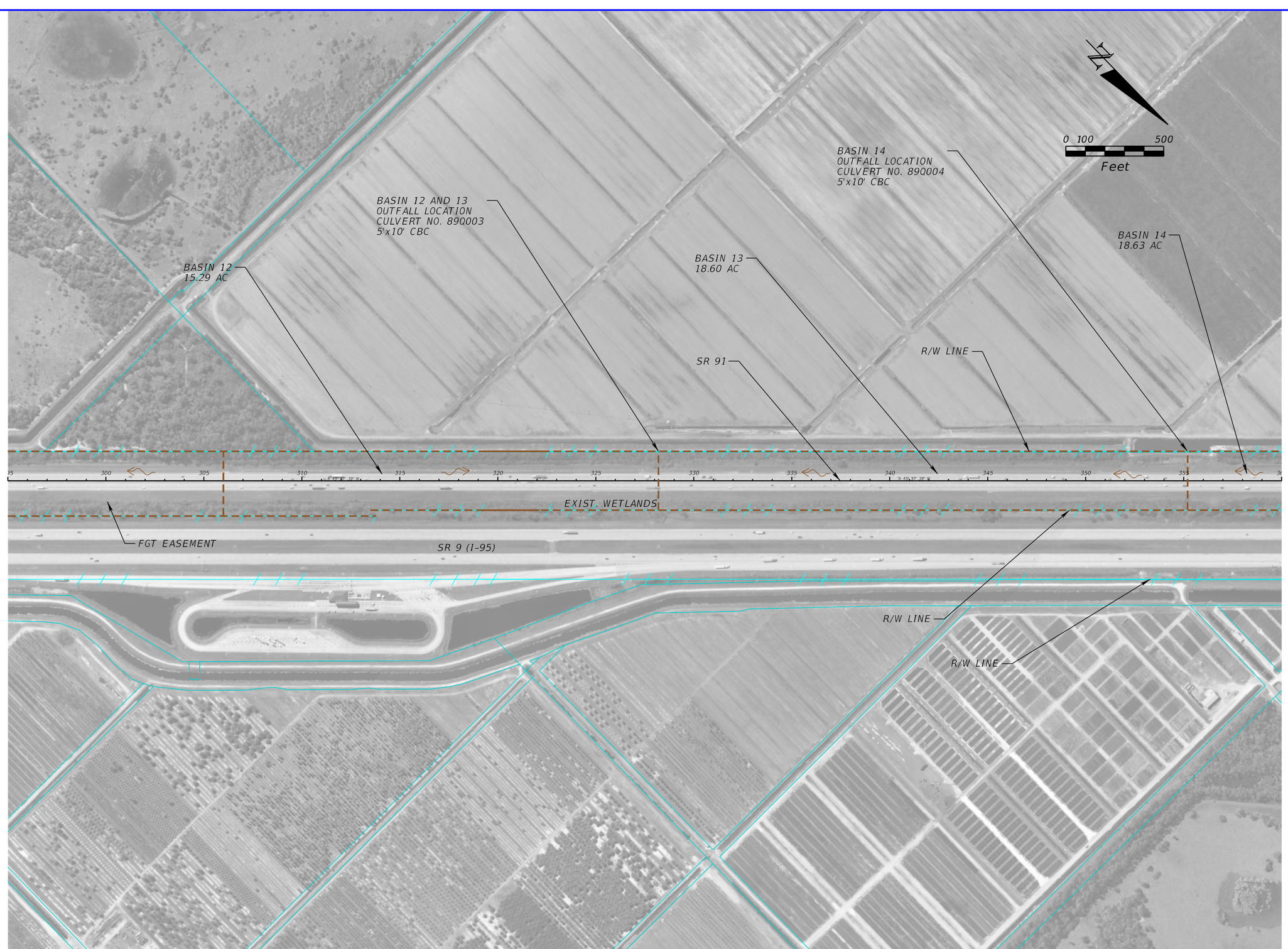
Elizabeth M. Bartell, PE #69125

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.



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DRAINAGE MAPS
PRE-DEVELOPMENT

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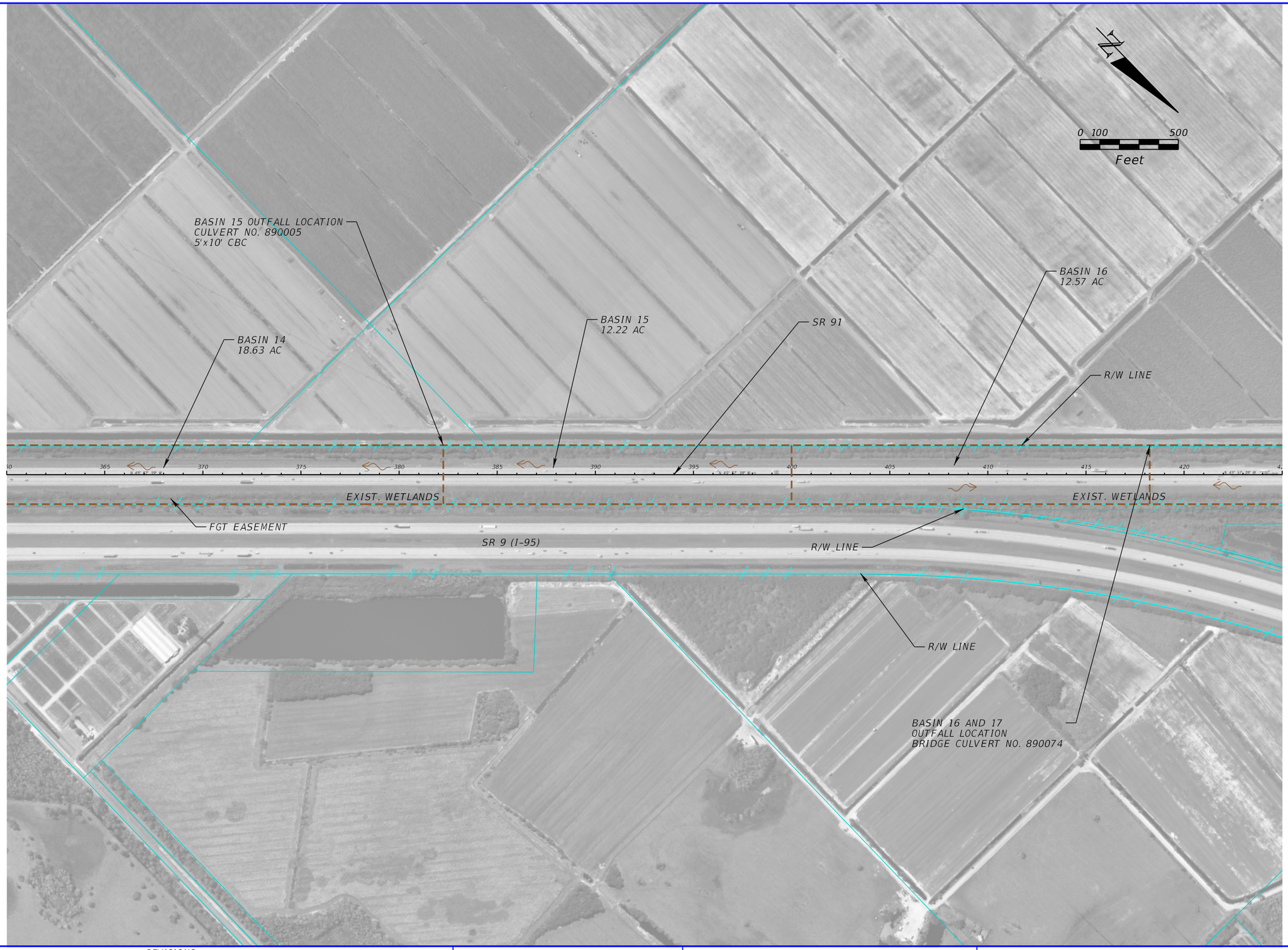

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DRAINAGE MAPS
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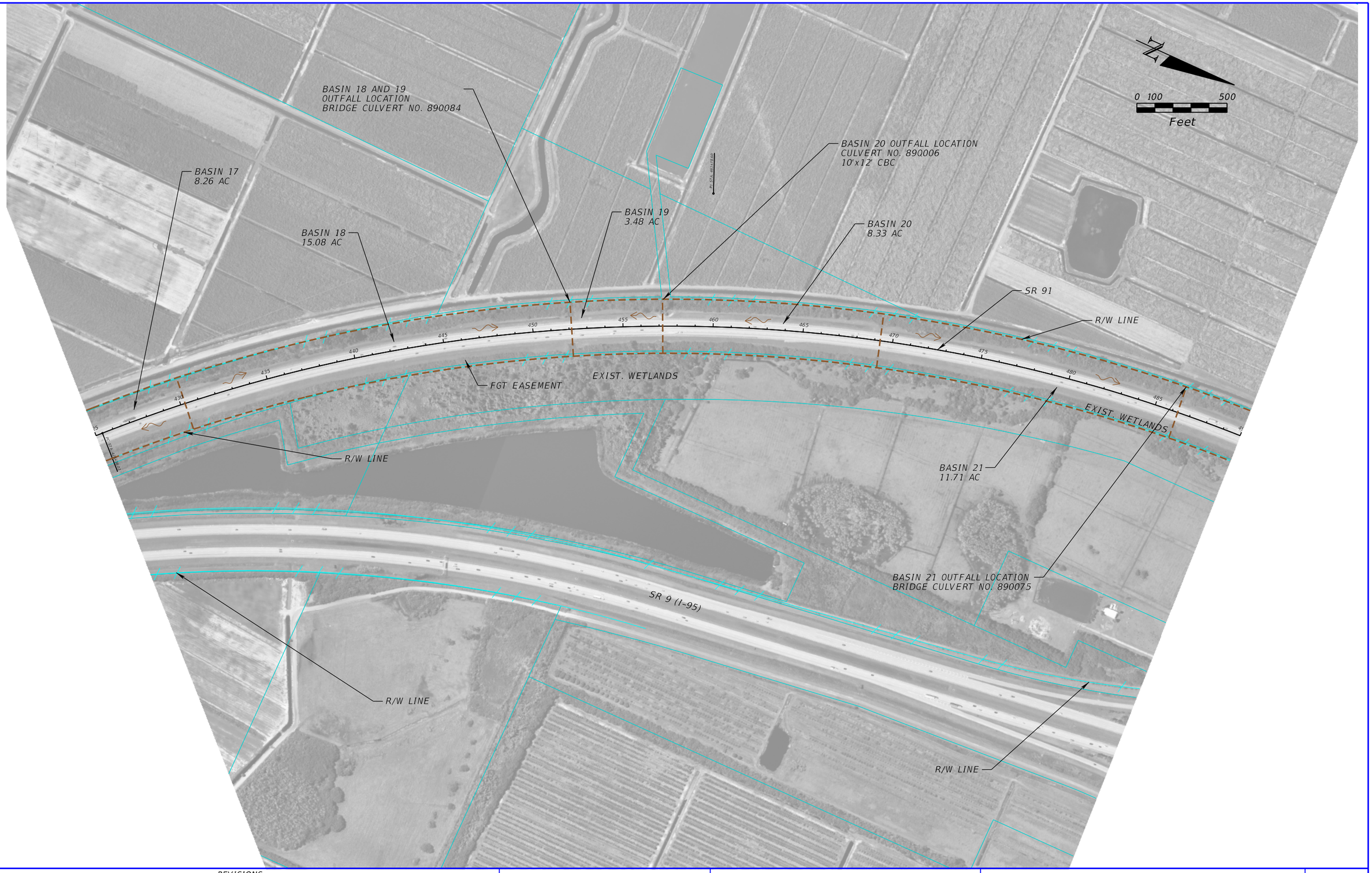

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DRAINAGE MAPS
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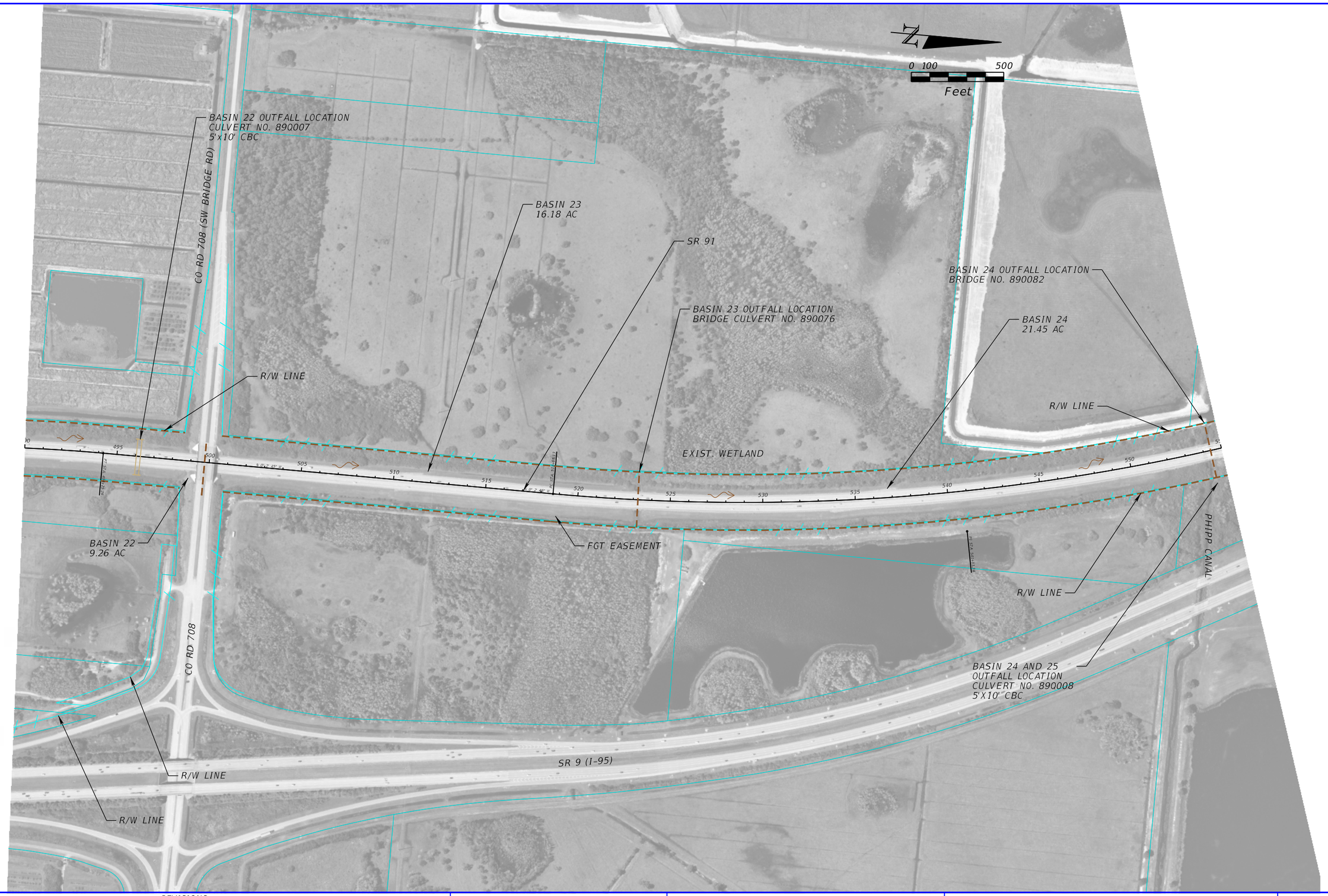

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SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
PRE-DEVELOPMENT

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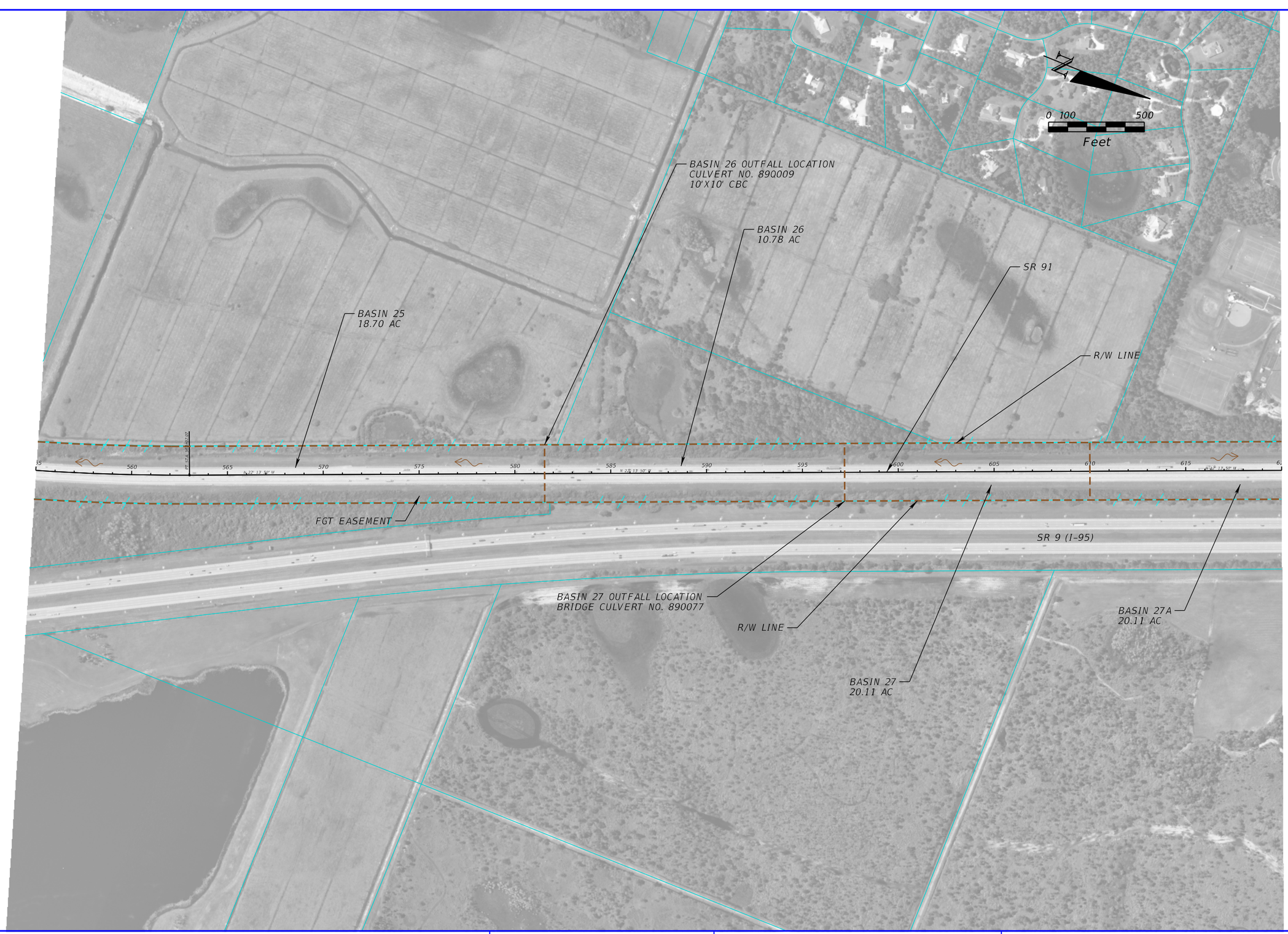

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DRAINAGE MAPS
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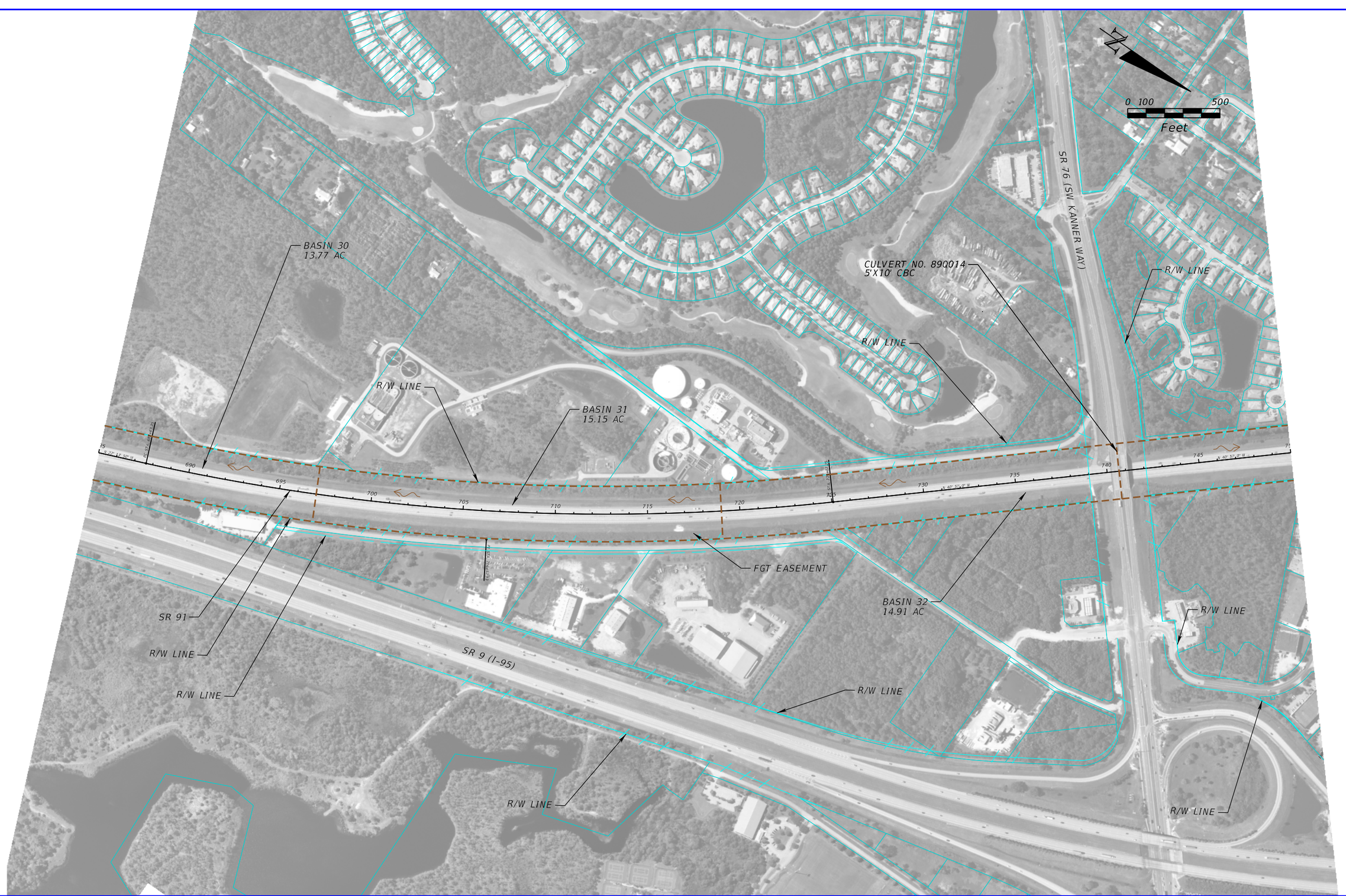

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DRAINAGE MAPS
PRE-DEVELOPMENT

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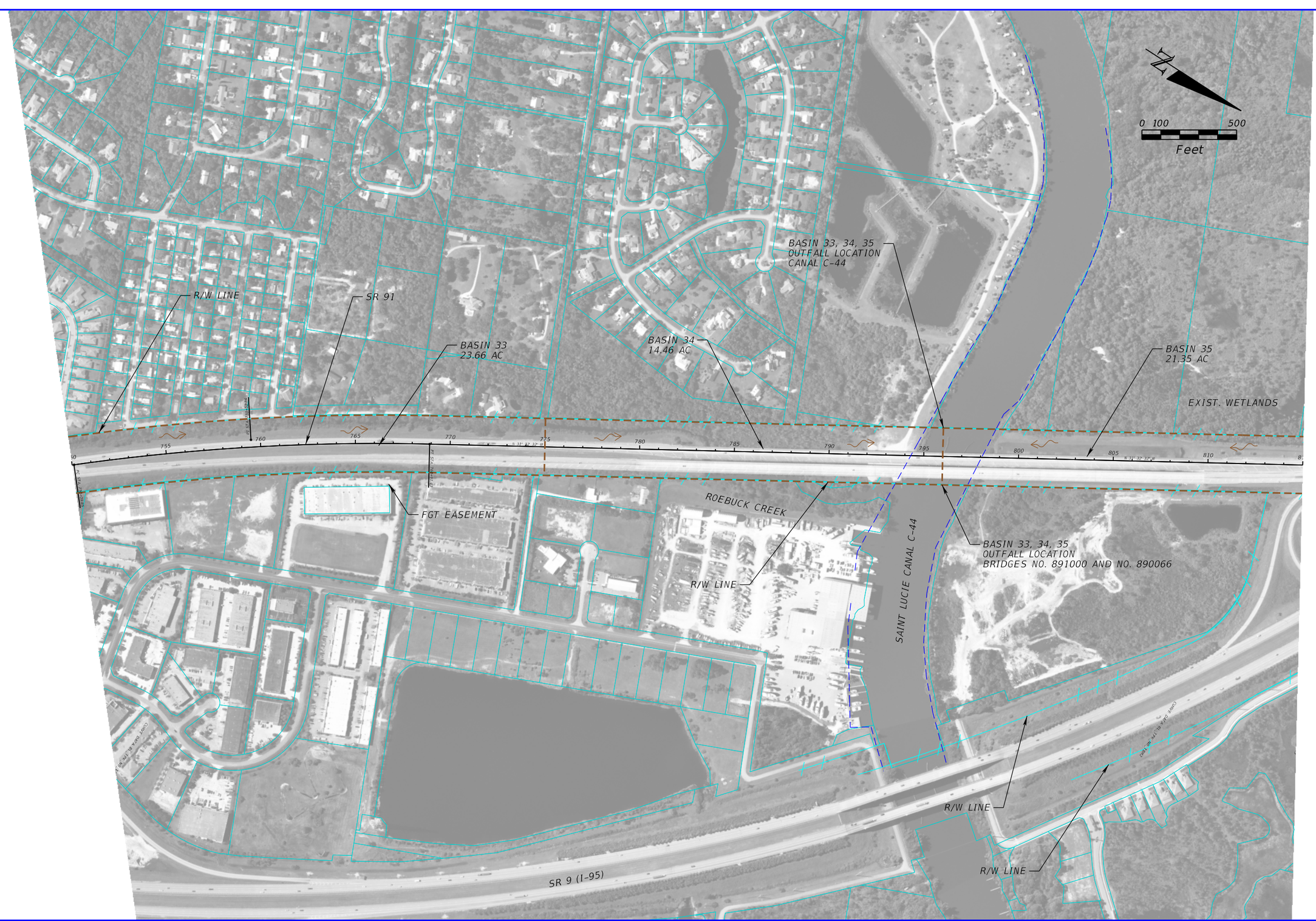

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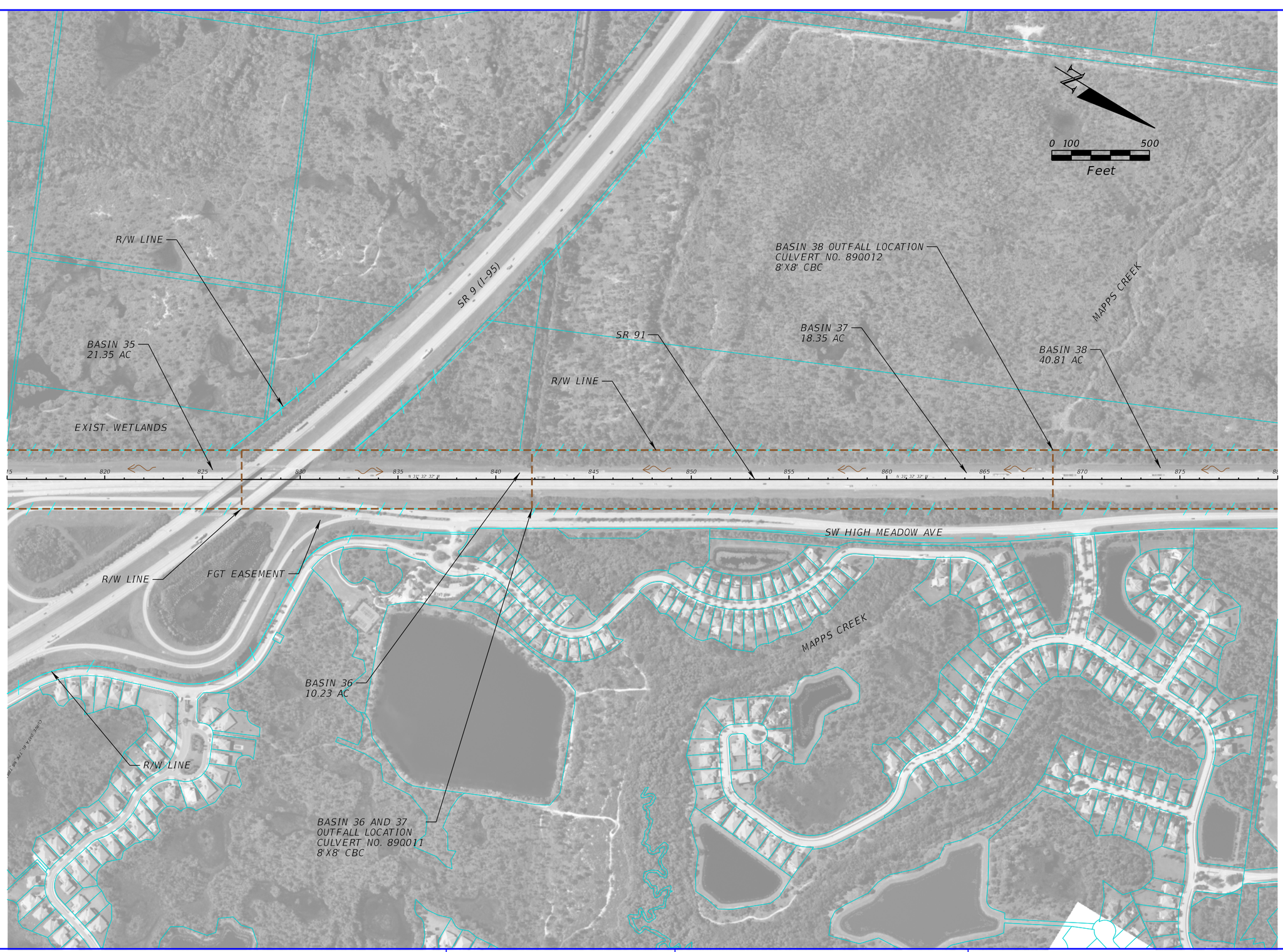

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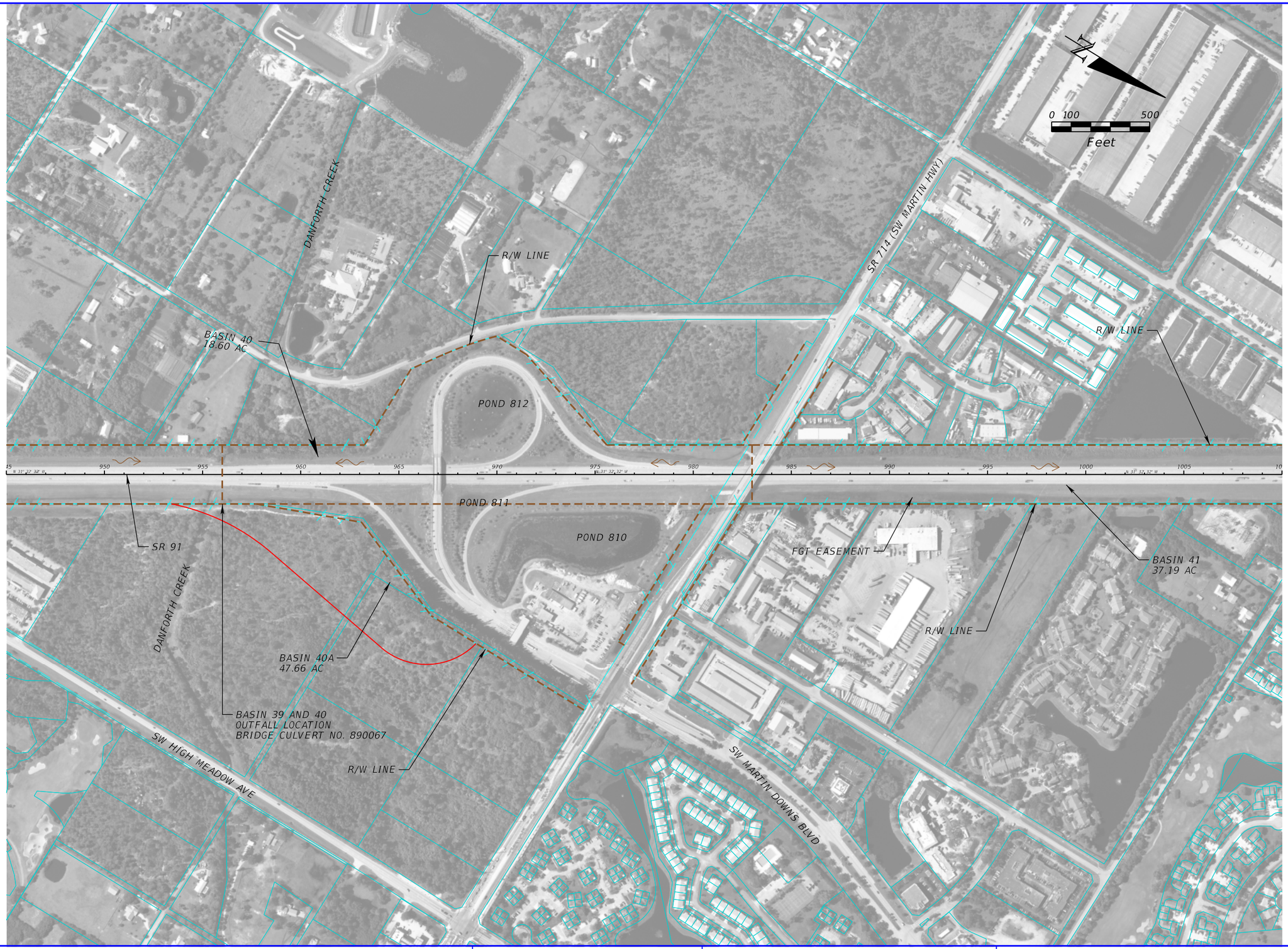

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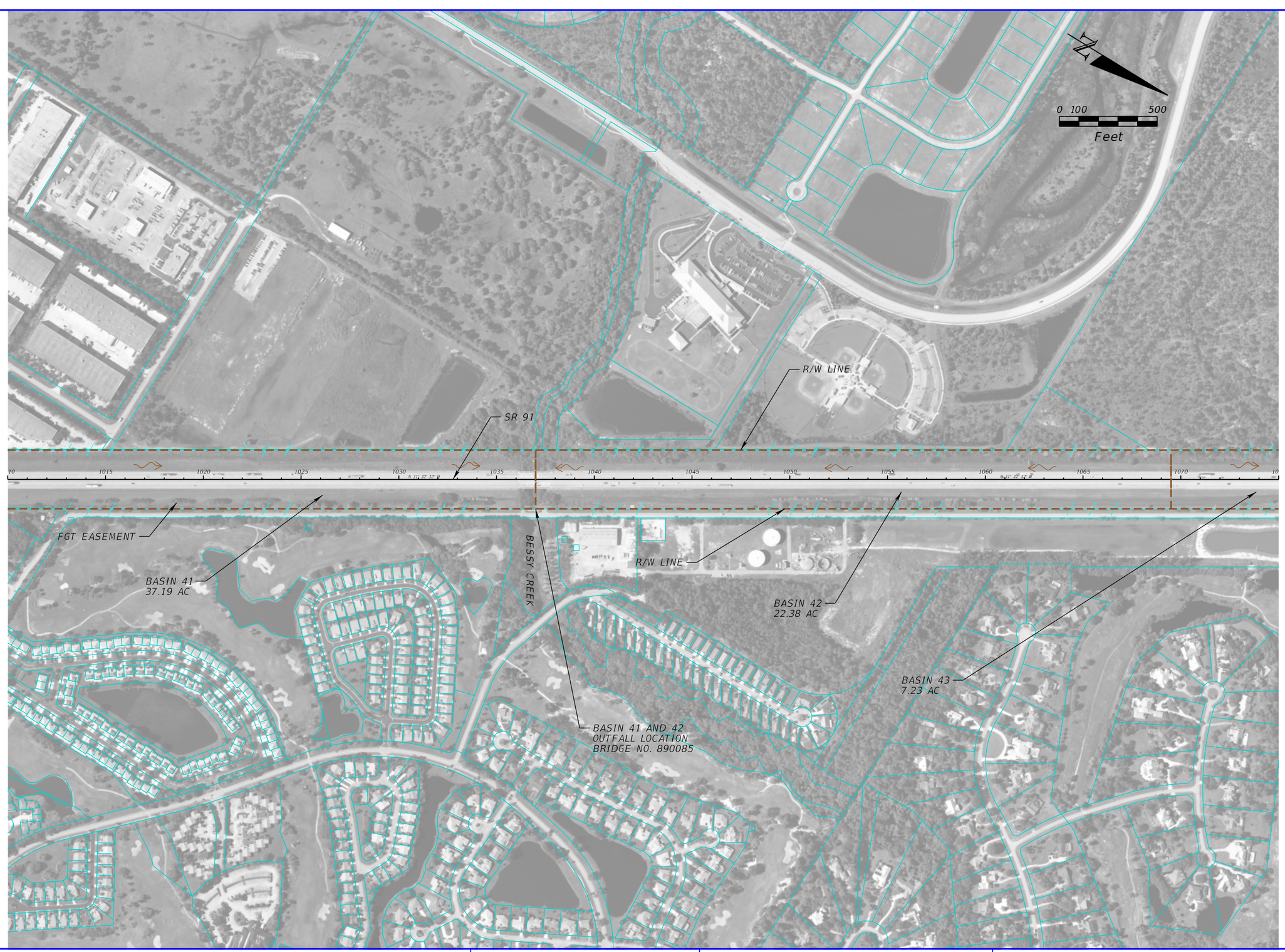

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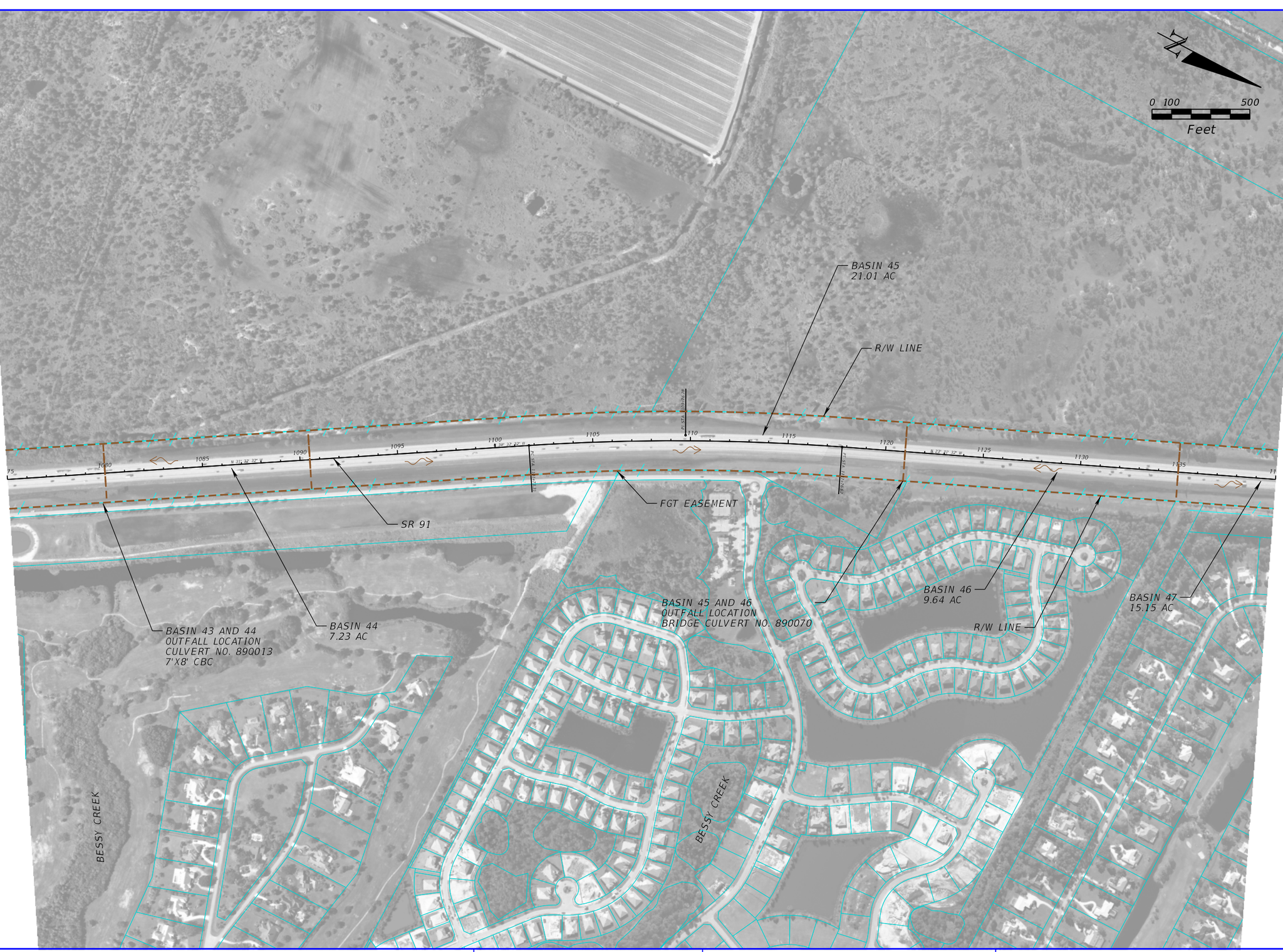

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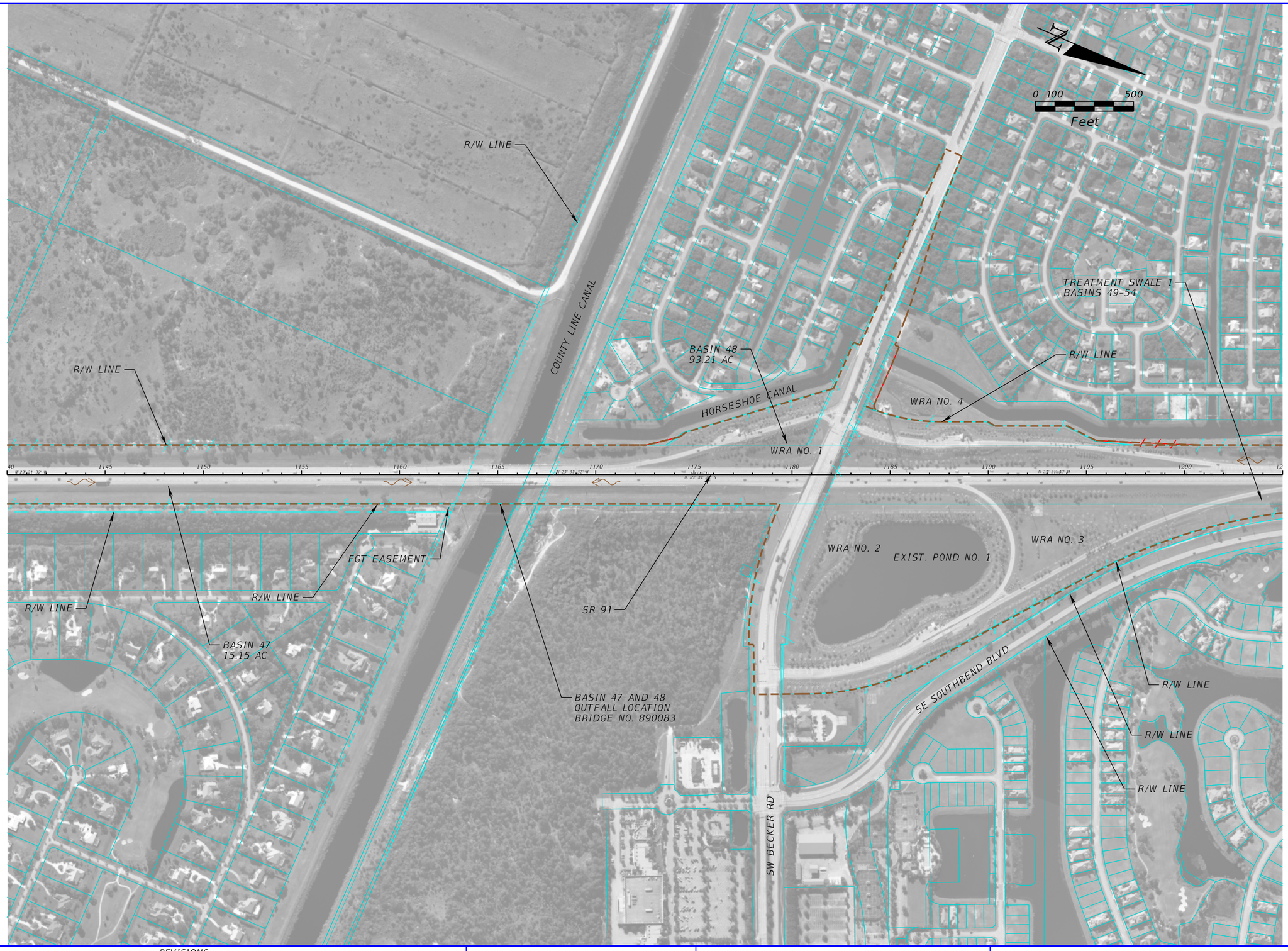

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DRAINAGE MAPS
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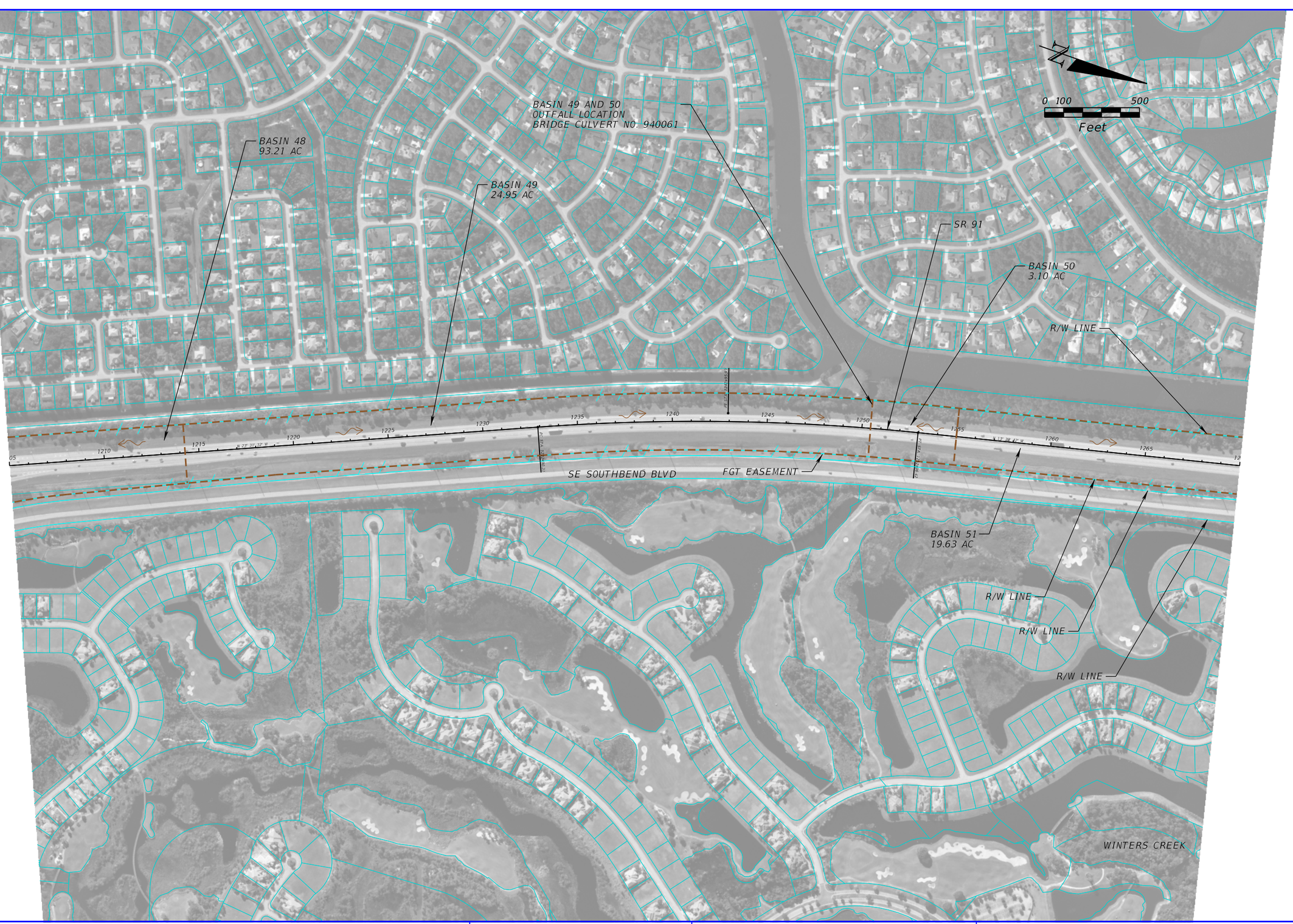

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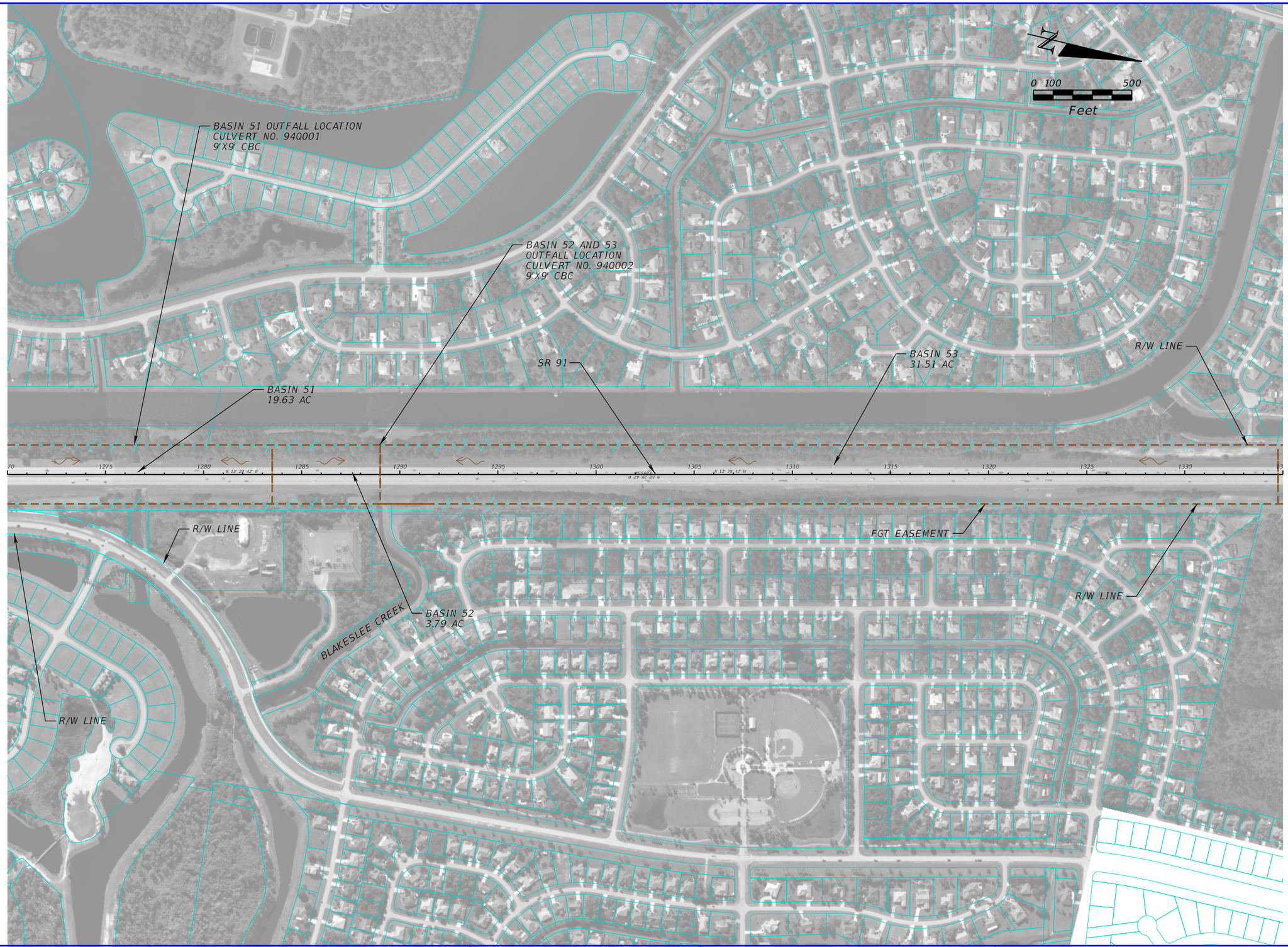

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DRAINAGE MAPS
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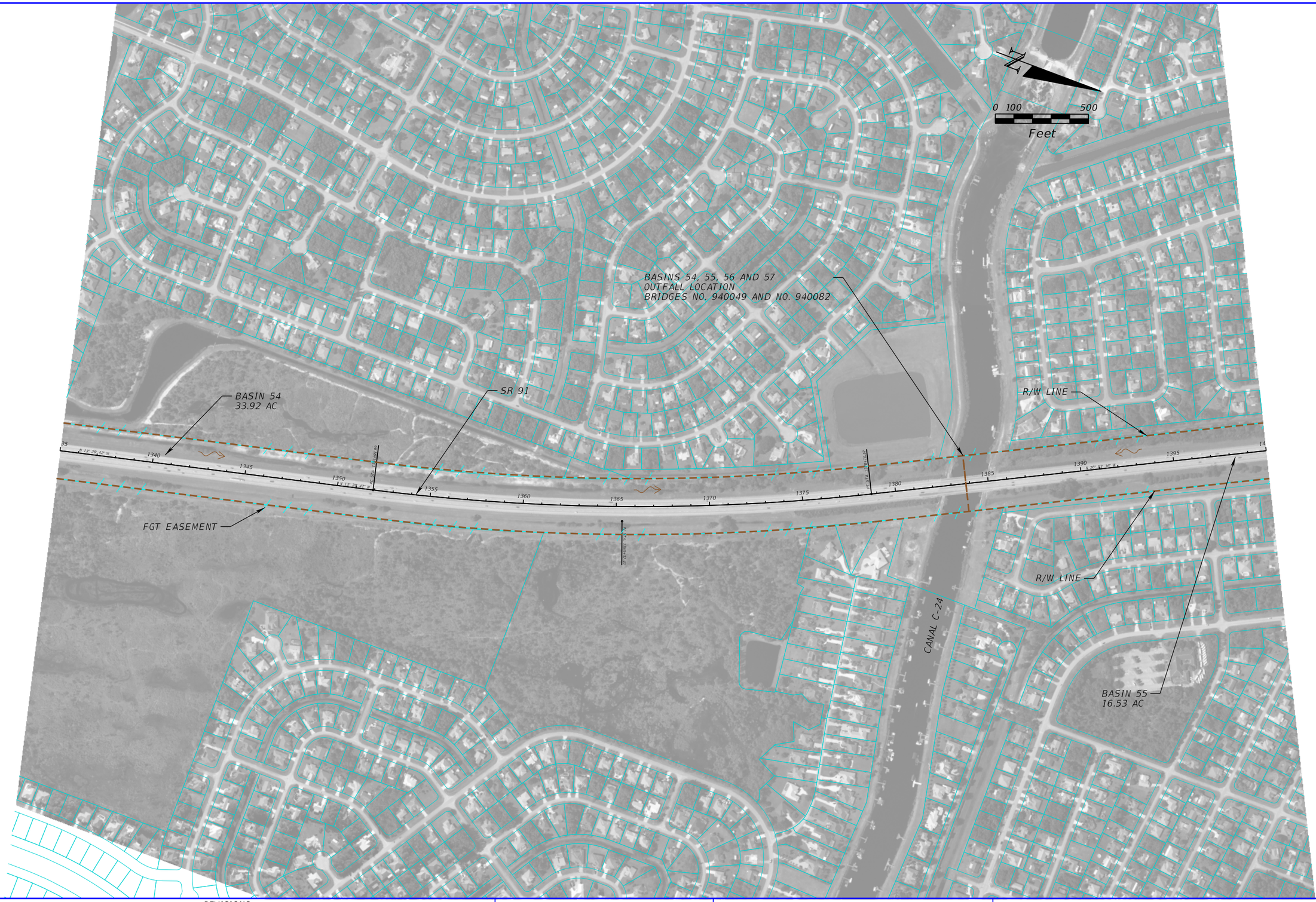

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DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.

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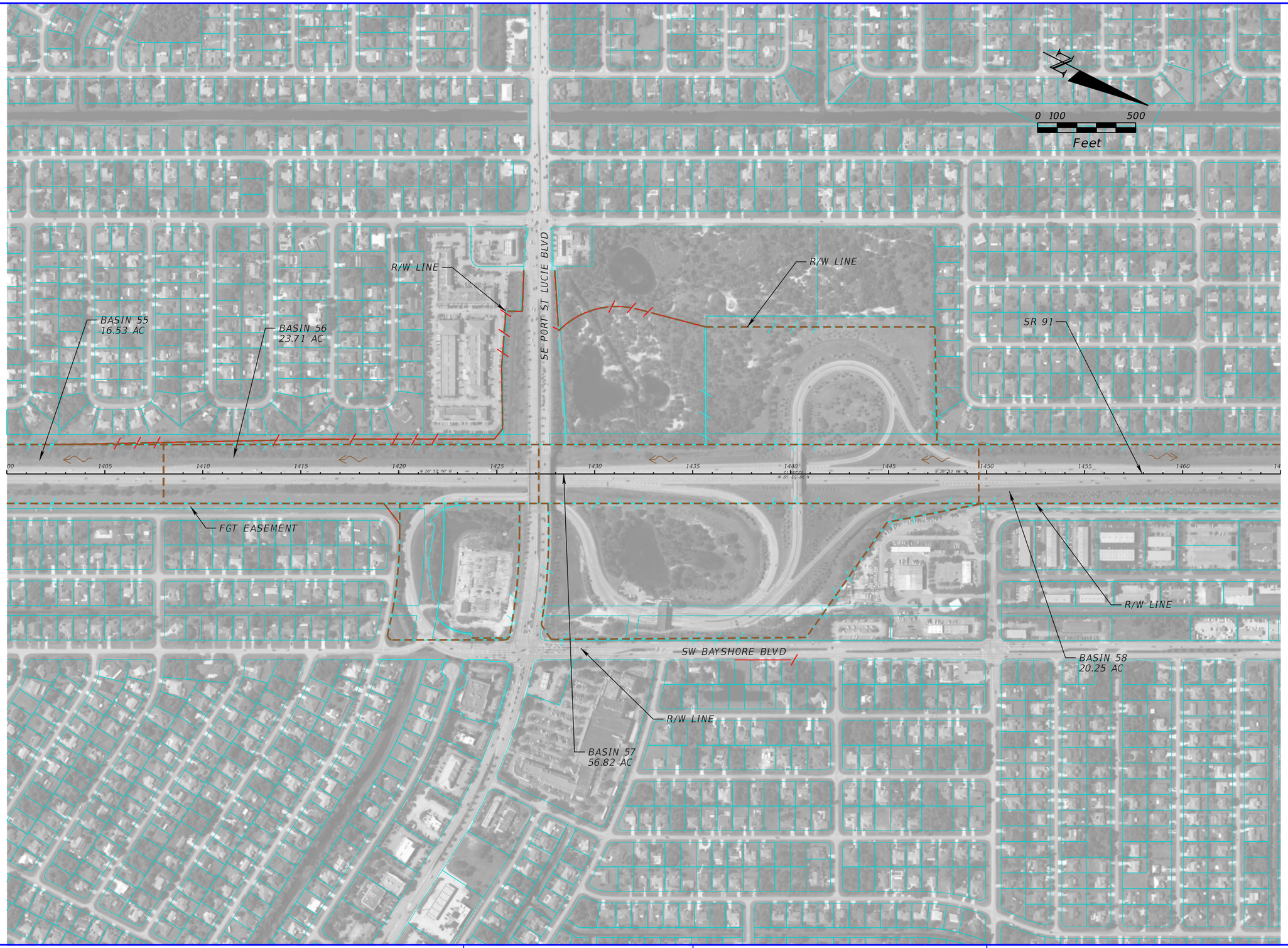

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DRAINAGE MAPS
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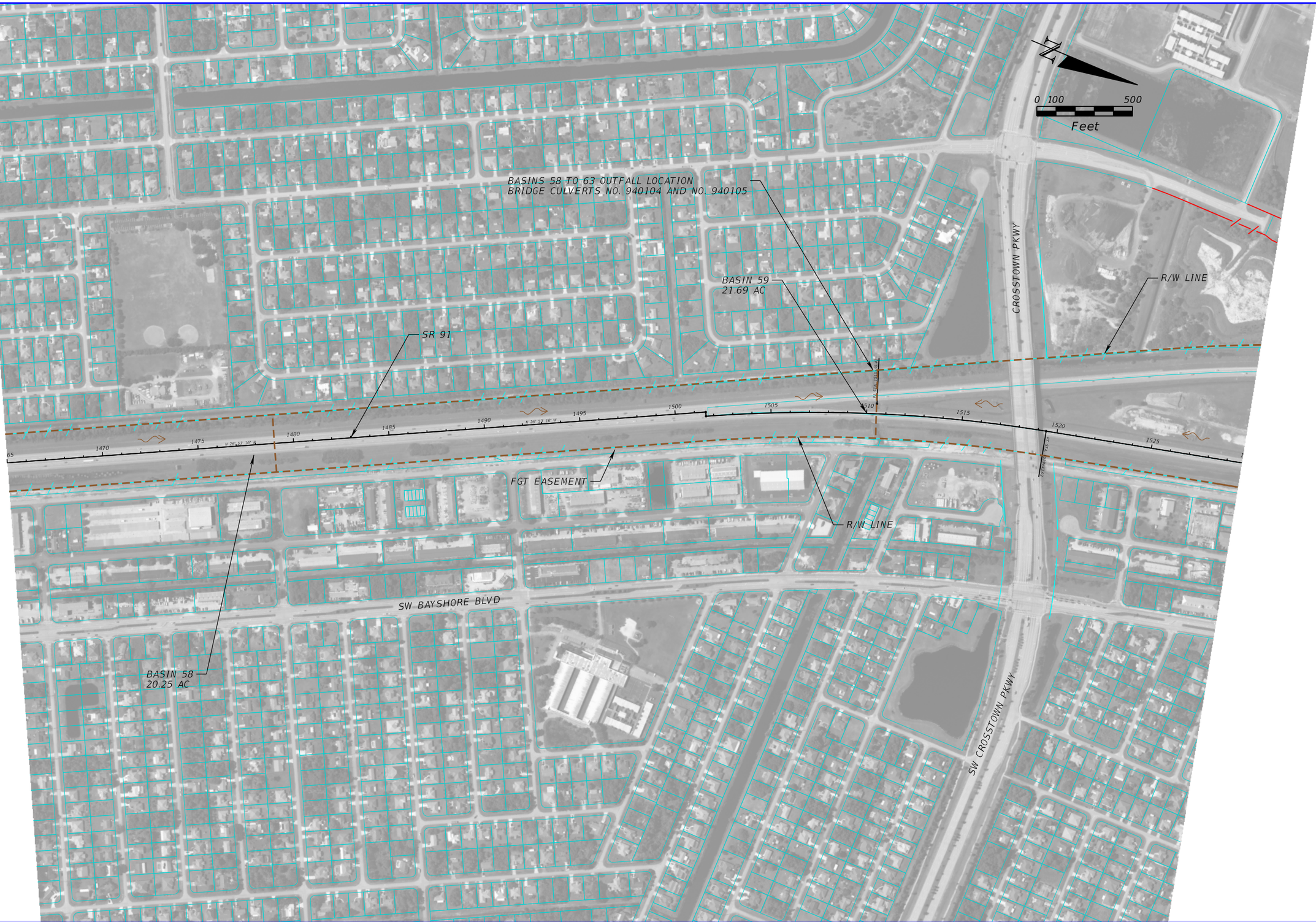

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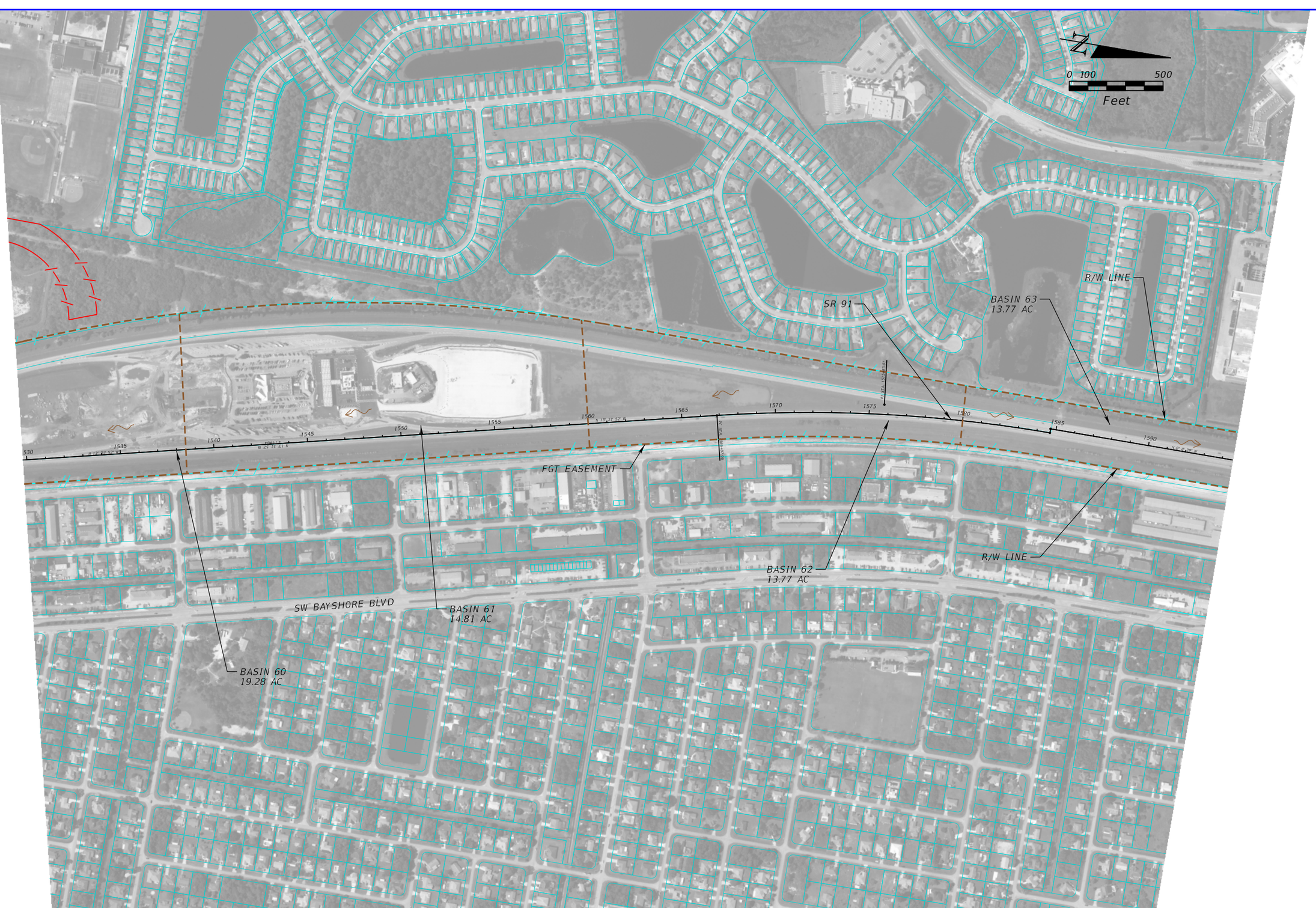

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DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.

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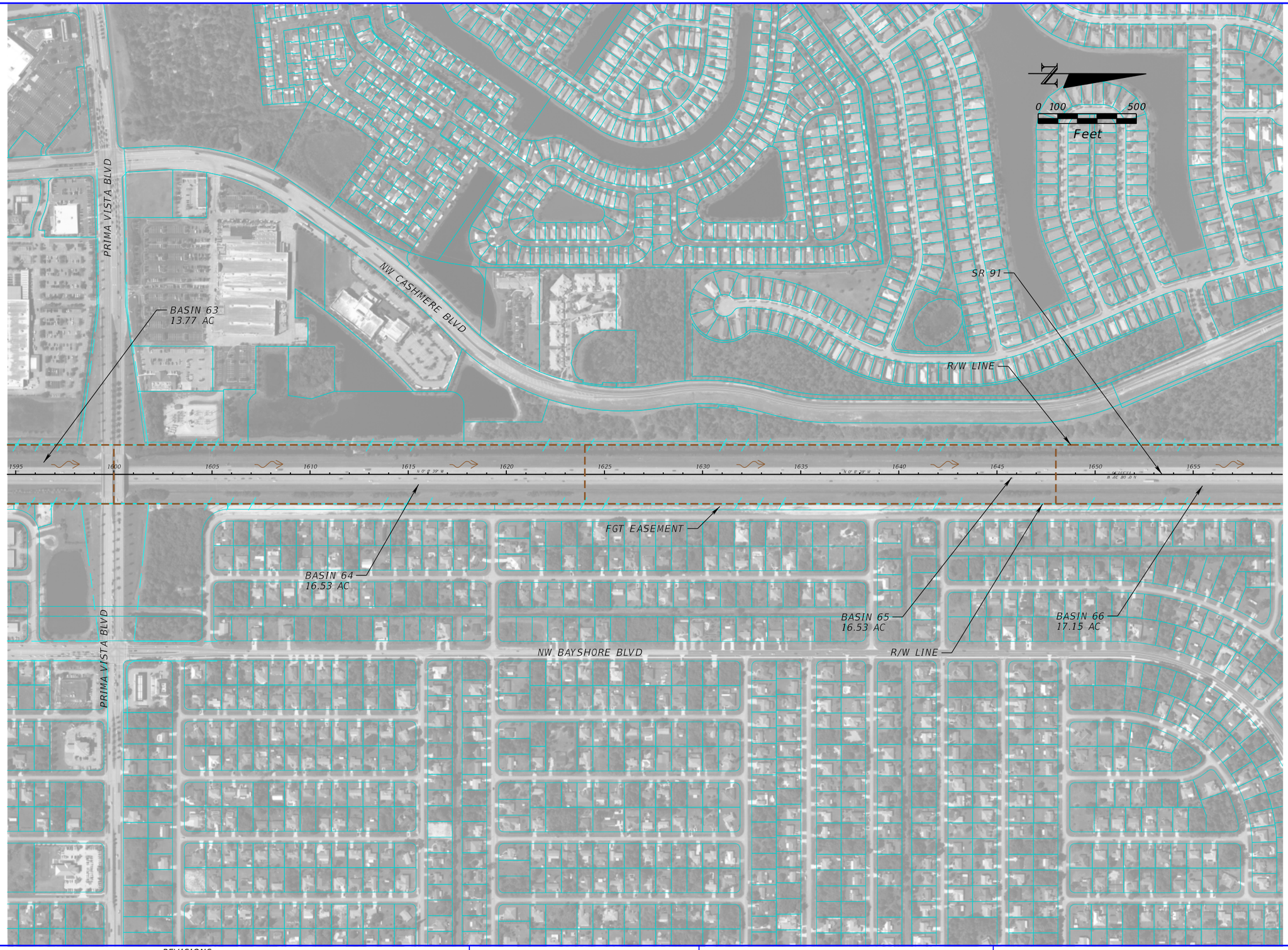

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DRAINAGE MAPS
PRE-DEVELOPMENT

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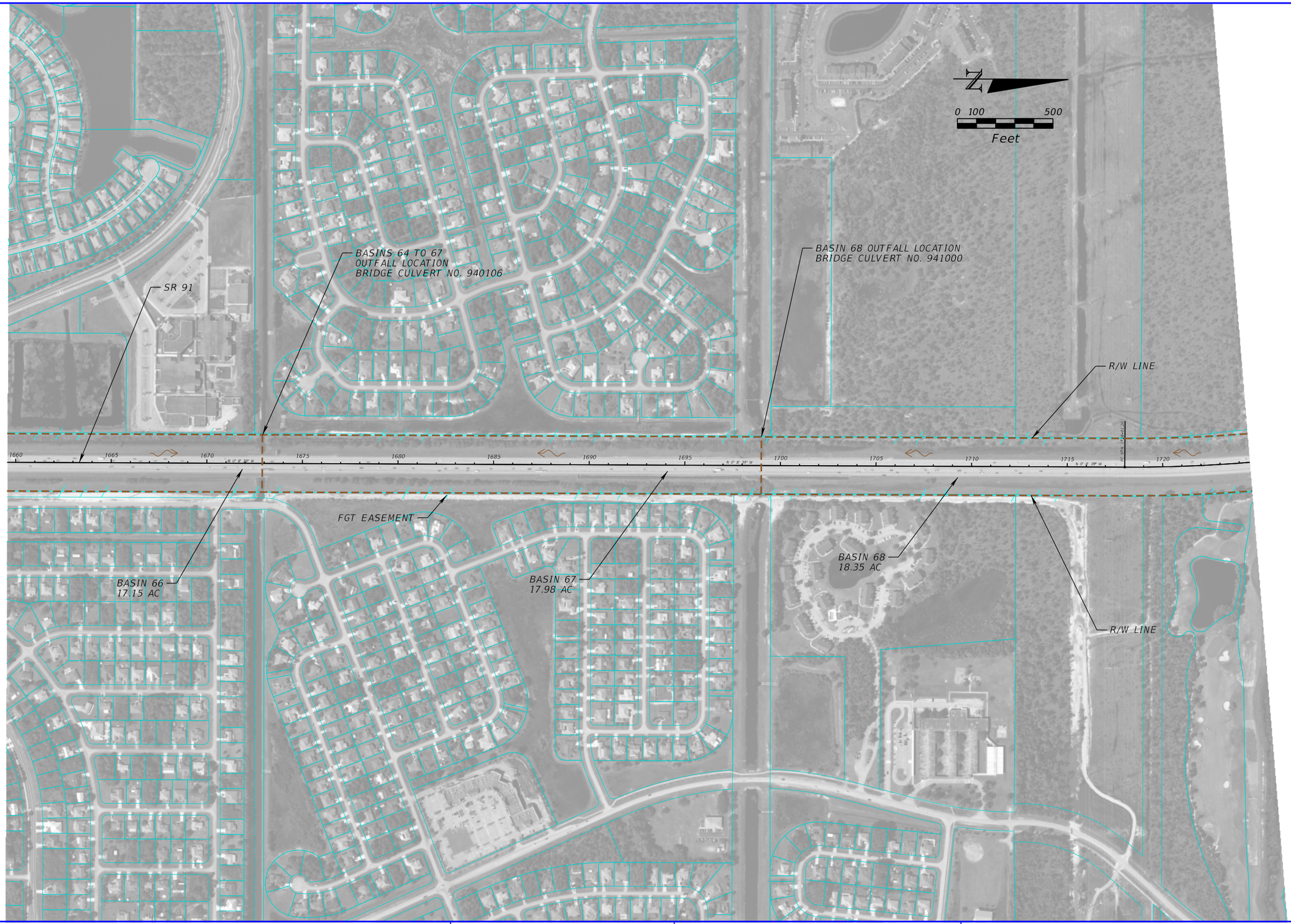

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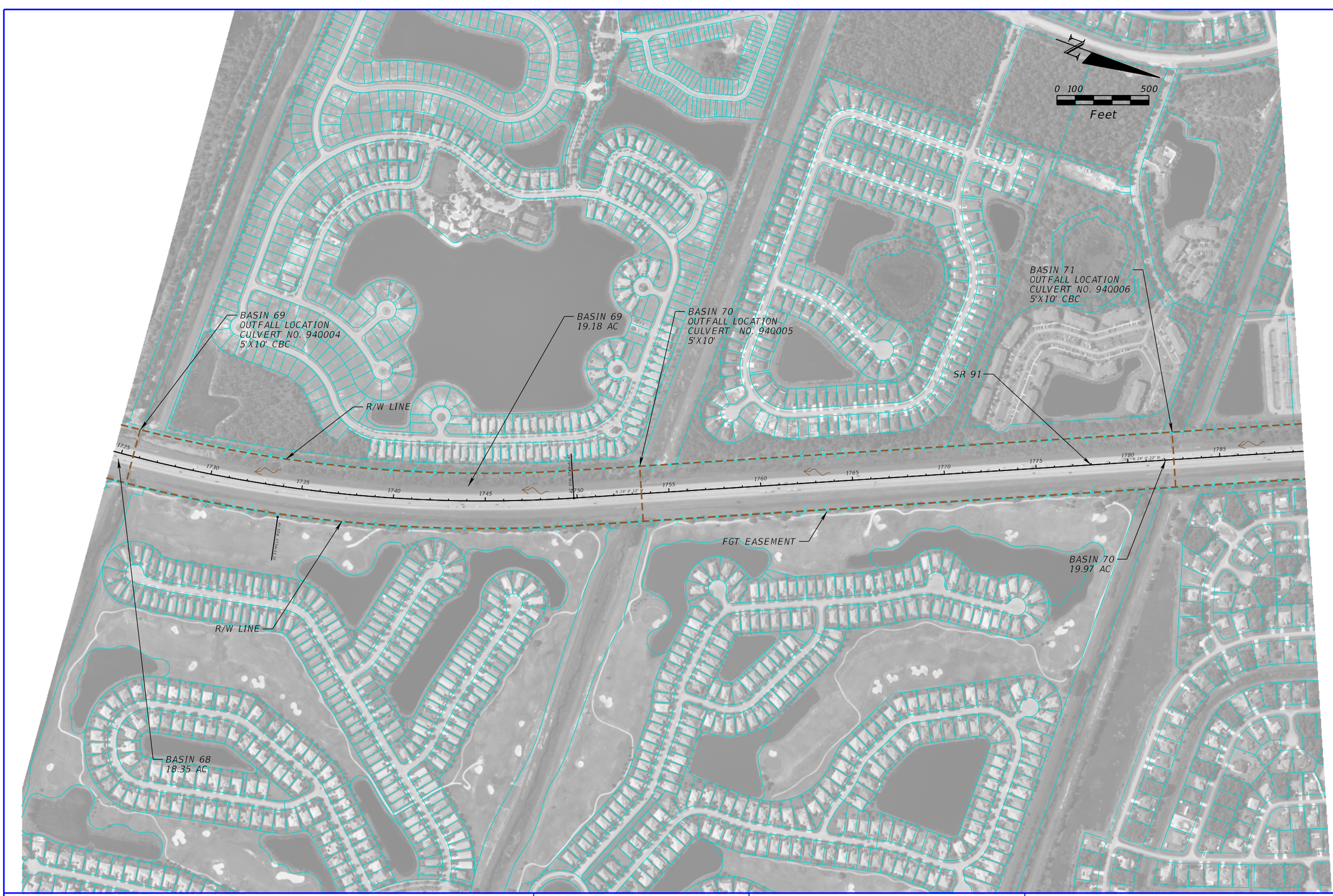

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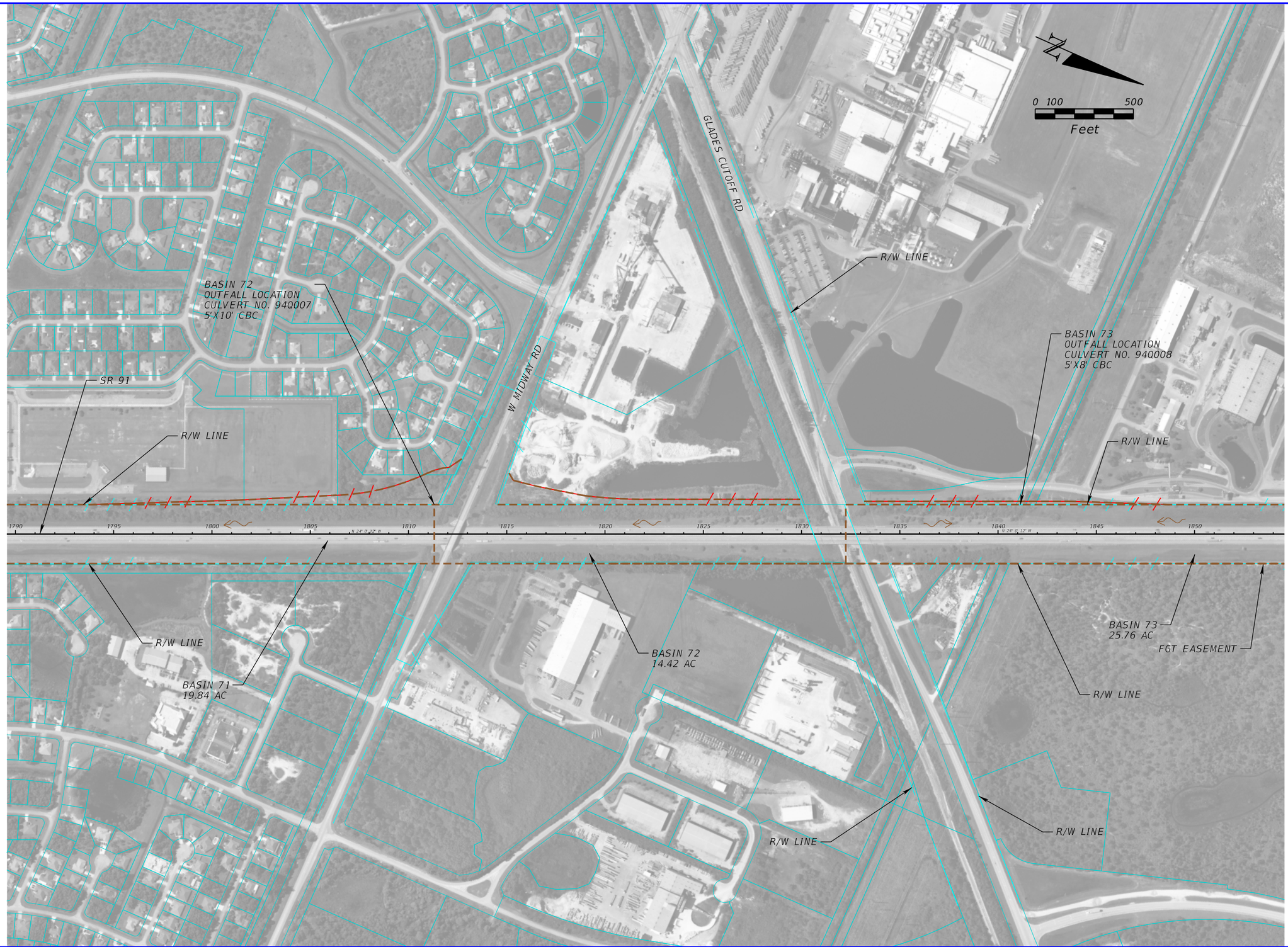

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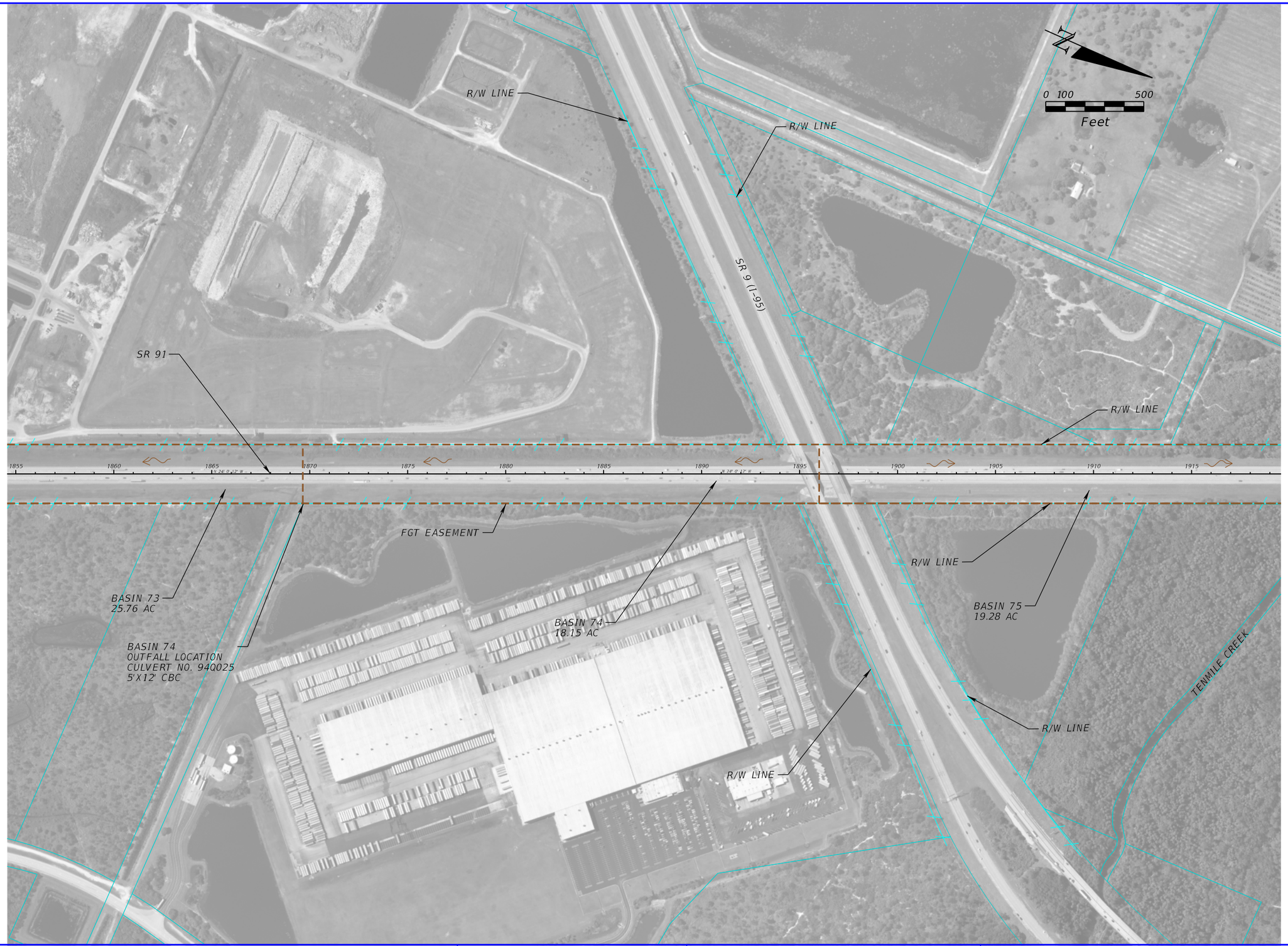

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DRAINAGE MAPS
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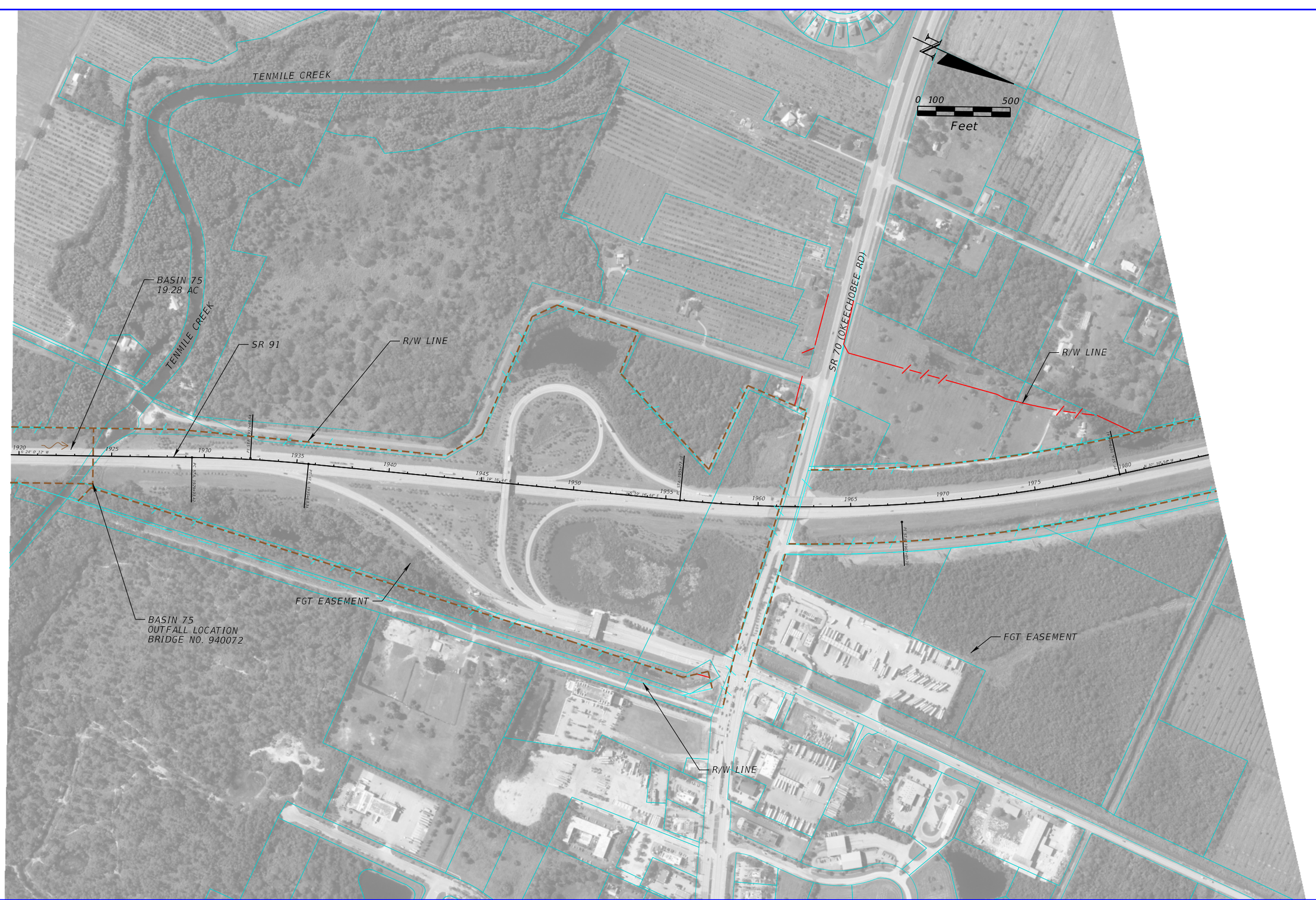

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	ST. LUCIE	423374-1-22-01

DRAINAGE MAPS
PRE-DEVELOPMENT

SHEET NO.

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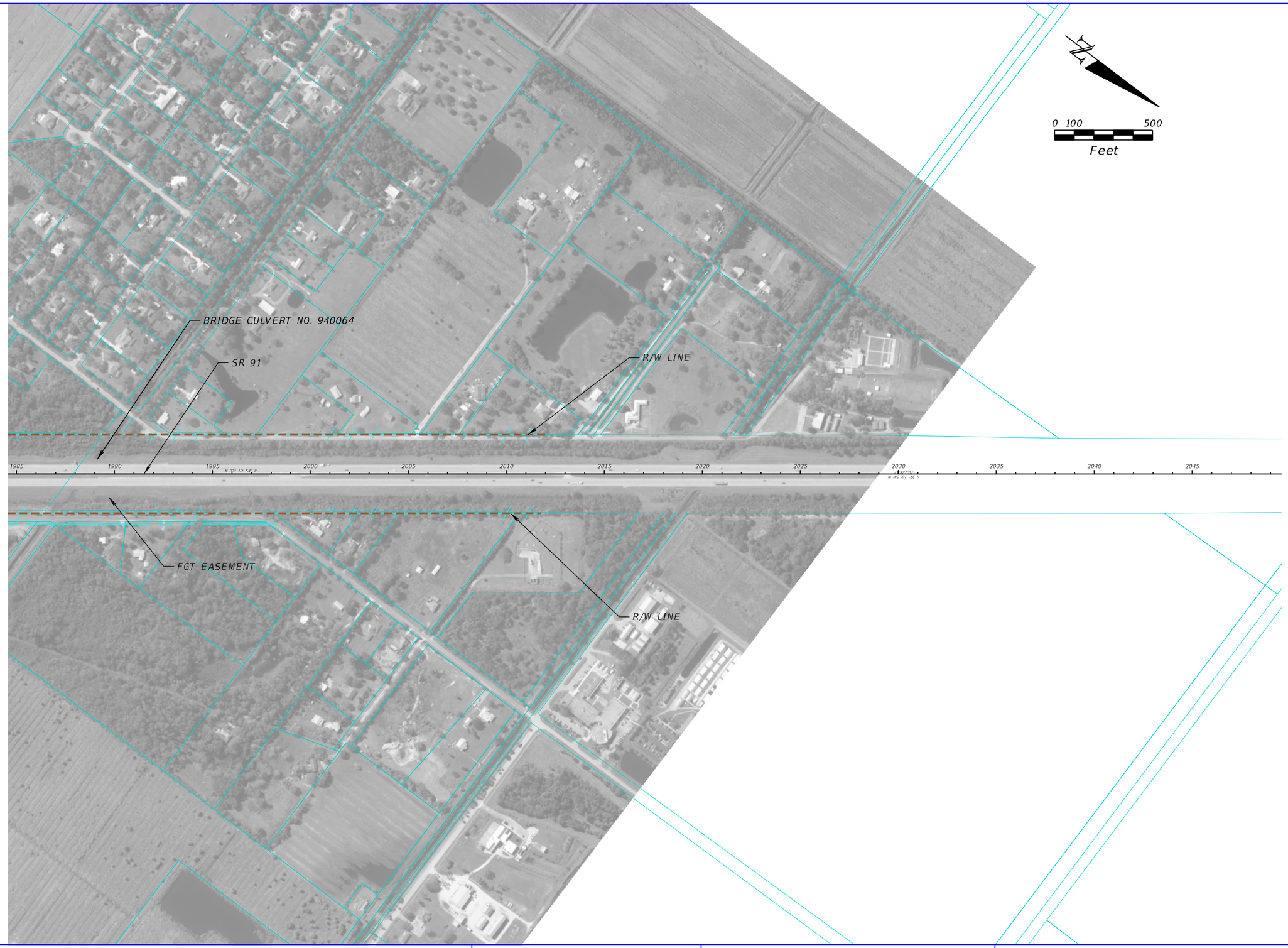

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DRAINAGE MAPS
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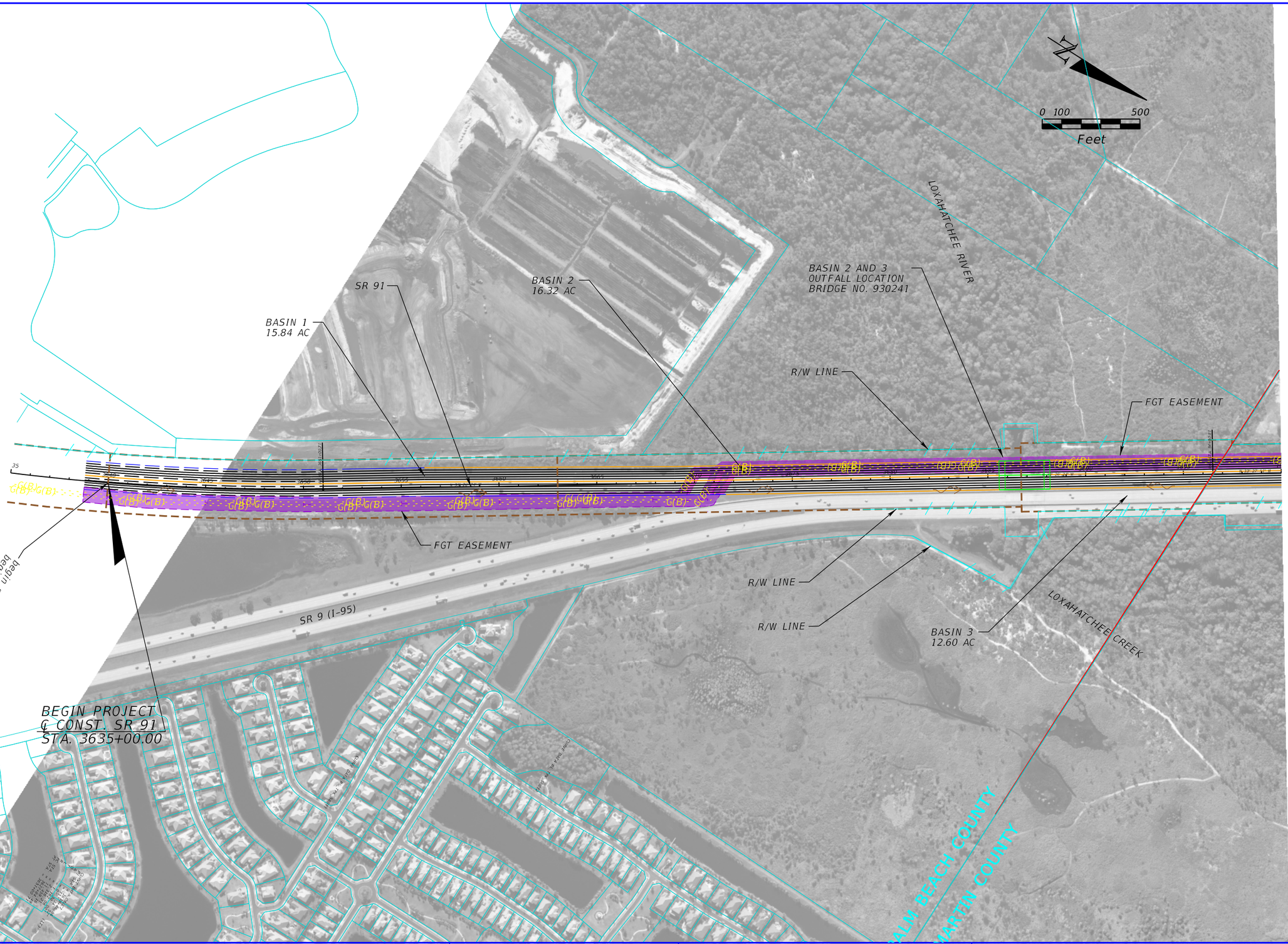

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DRAINAGE MAPS
POST-DEVELOPMENT

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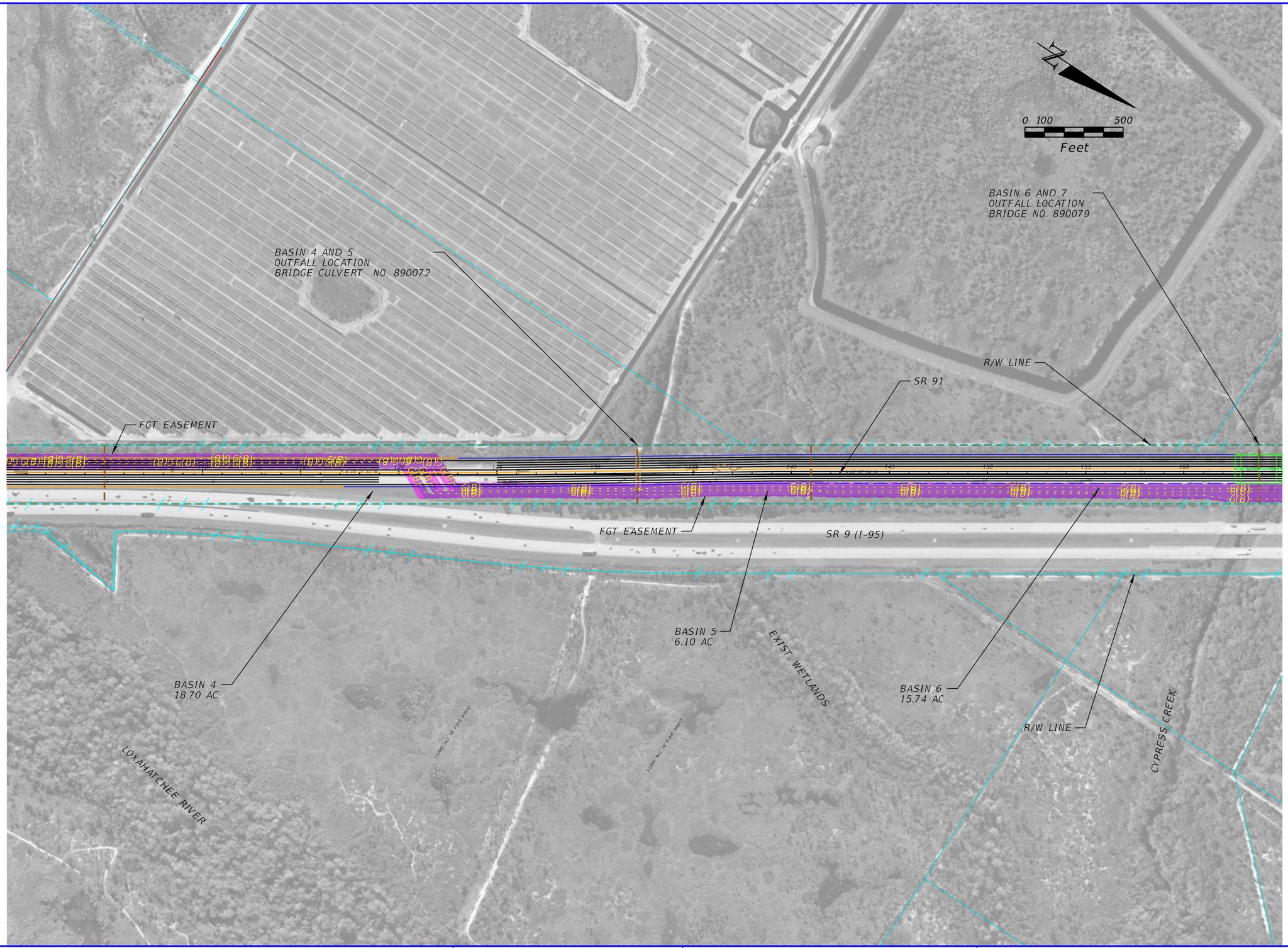

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DRAINAGE MAPS
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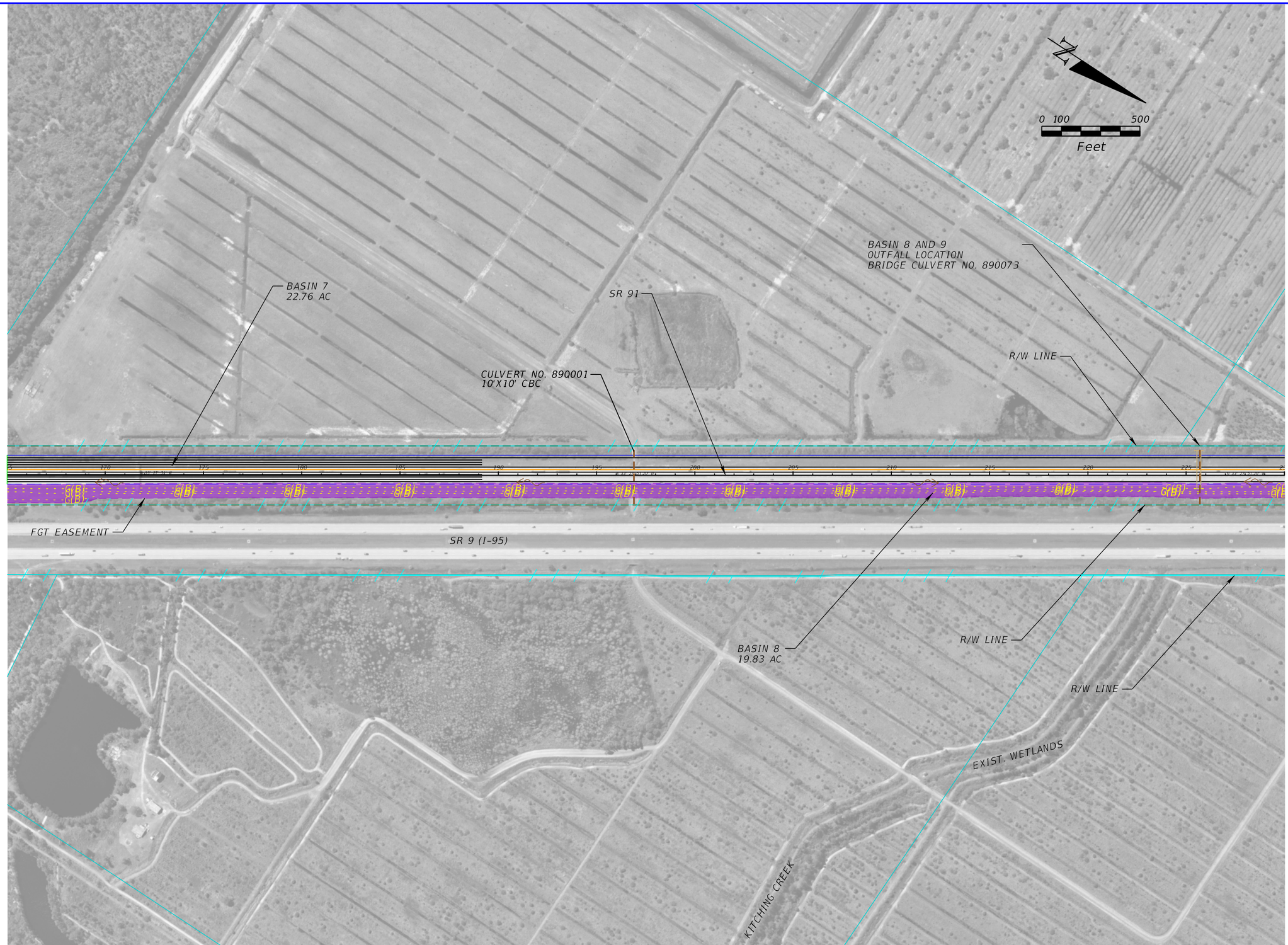

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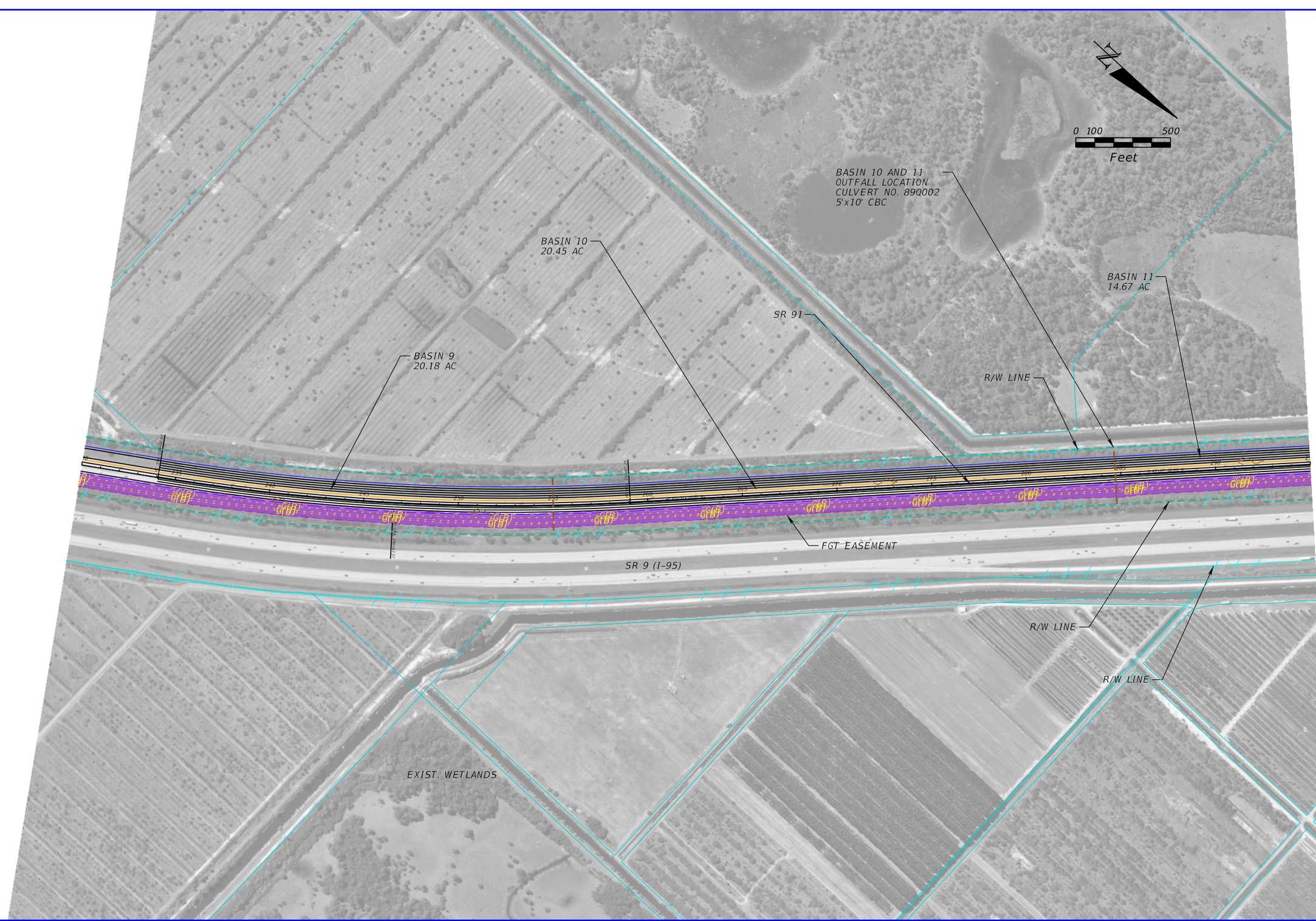

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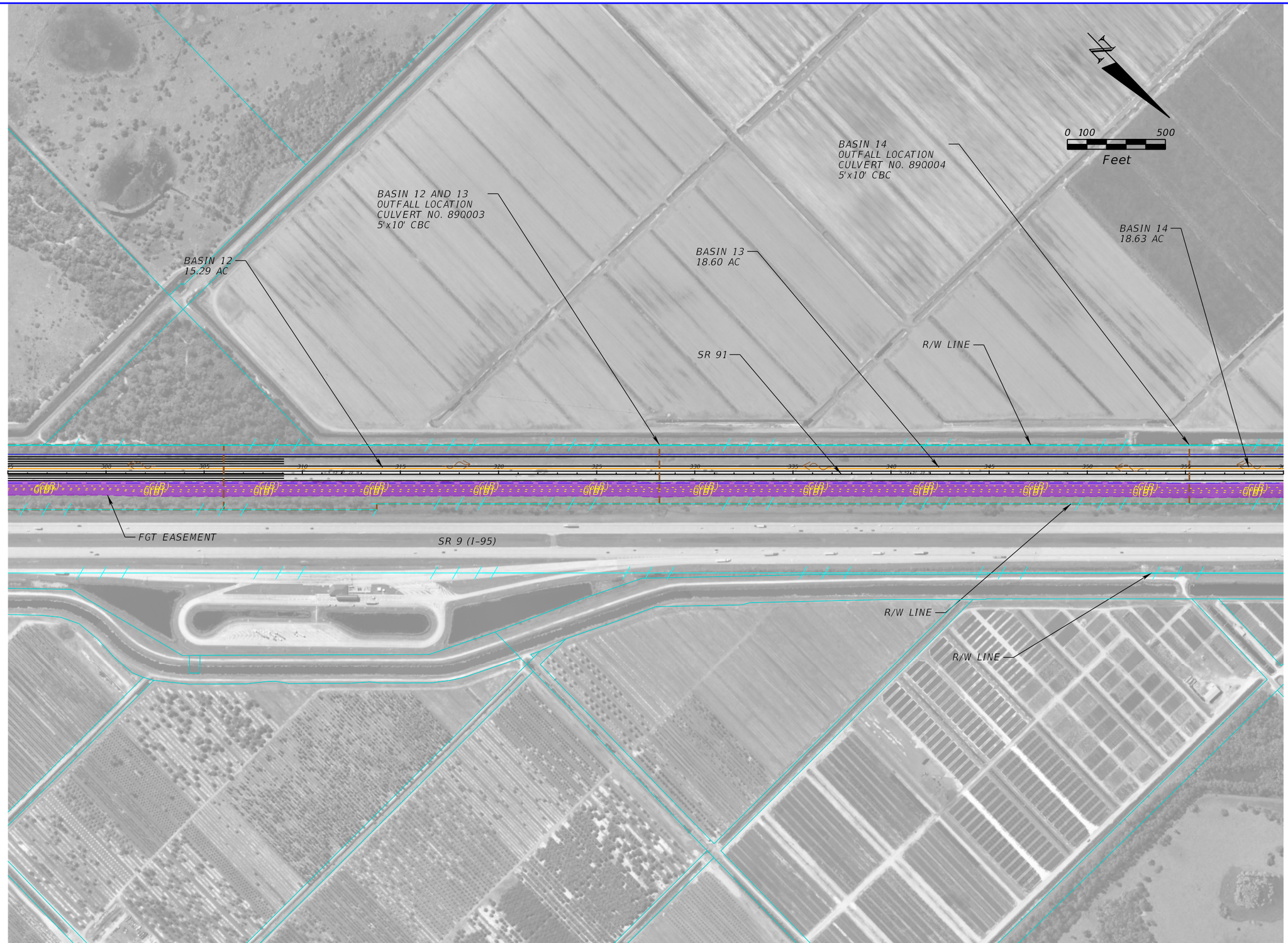

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DRAINAGE MAPS
POST-DEVELOPMENT

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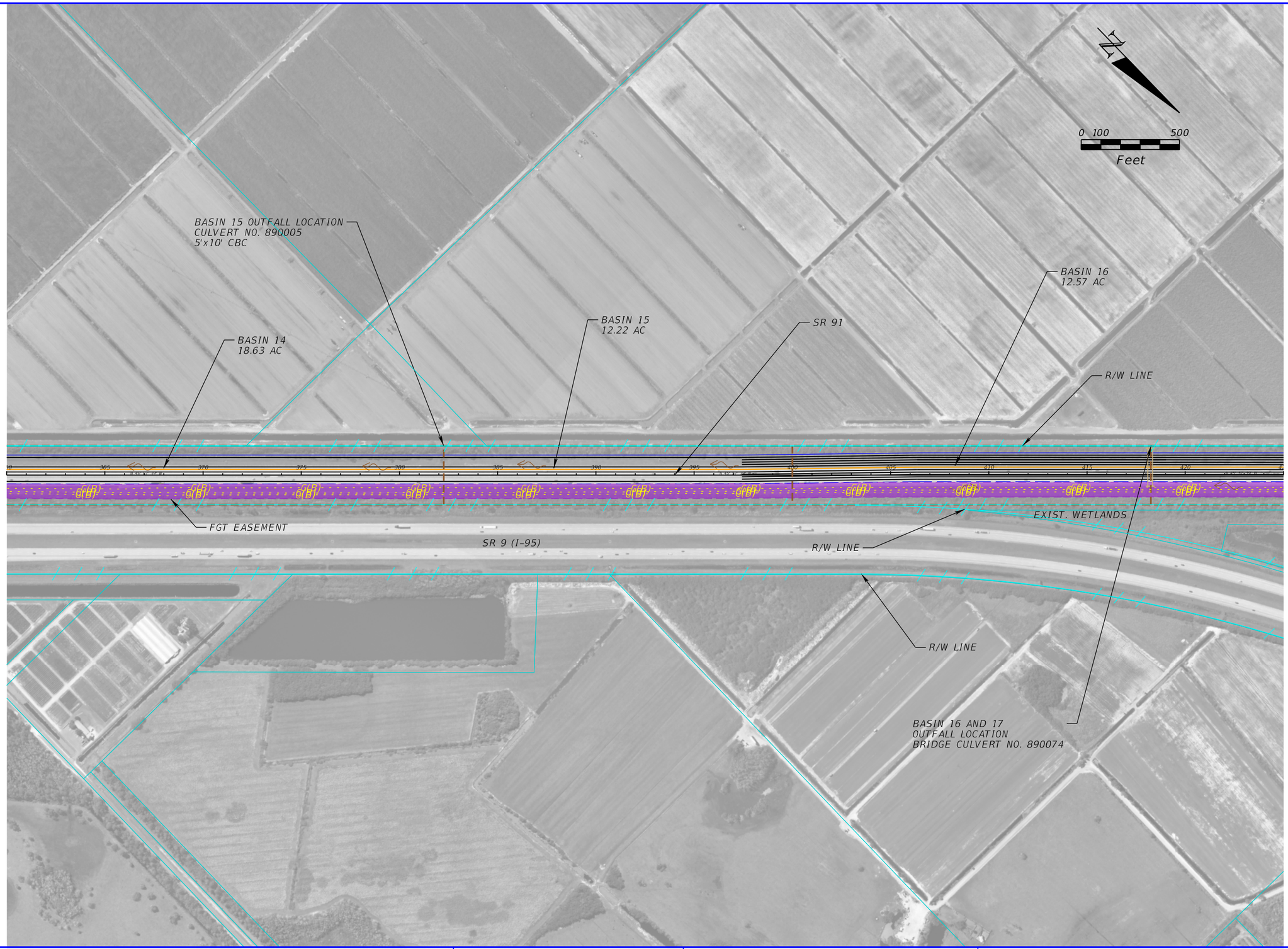

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DRAINAGE MAPS
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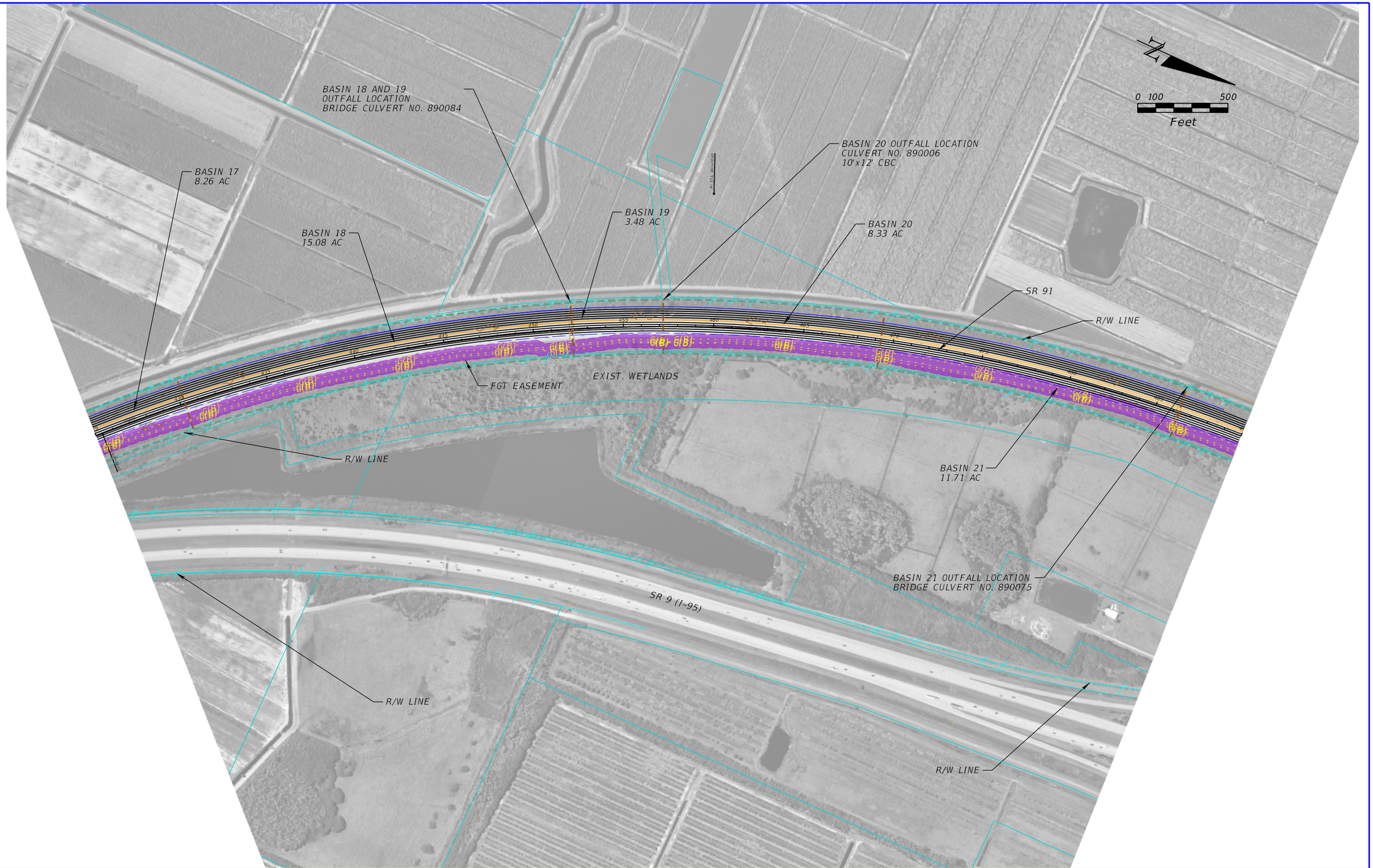

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DRAINAGE MAPS
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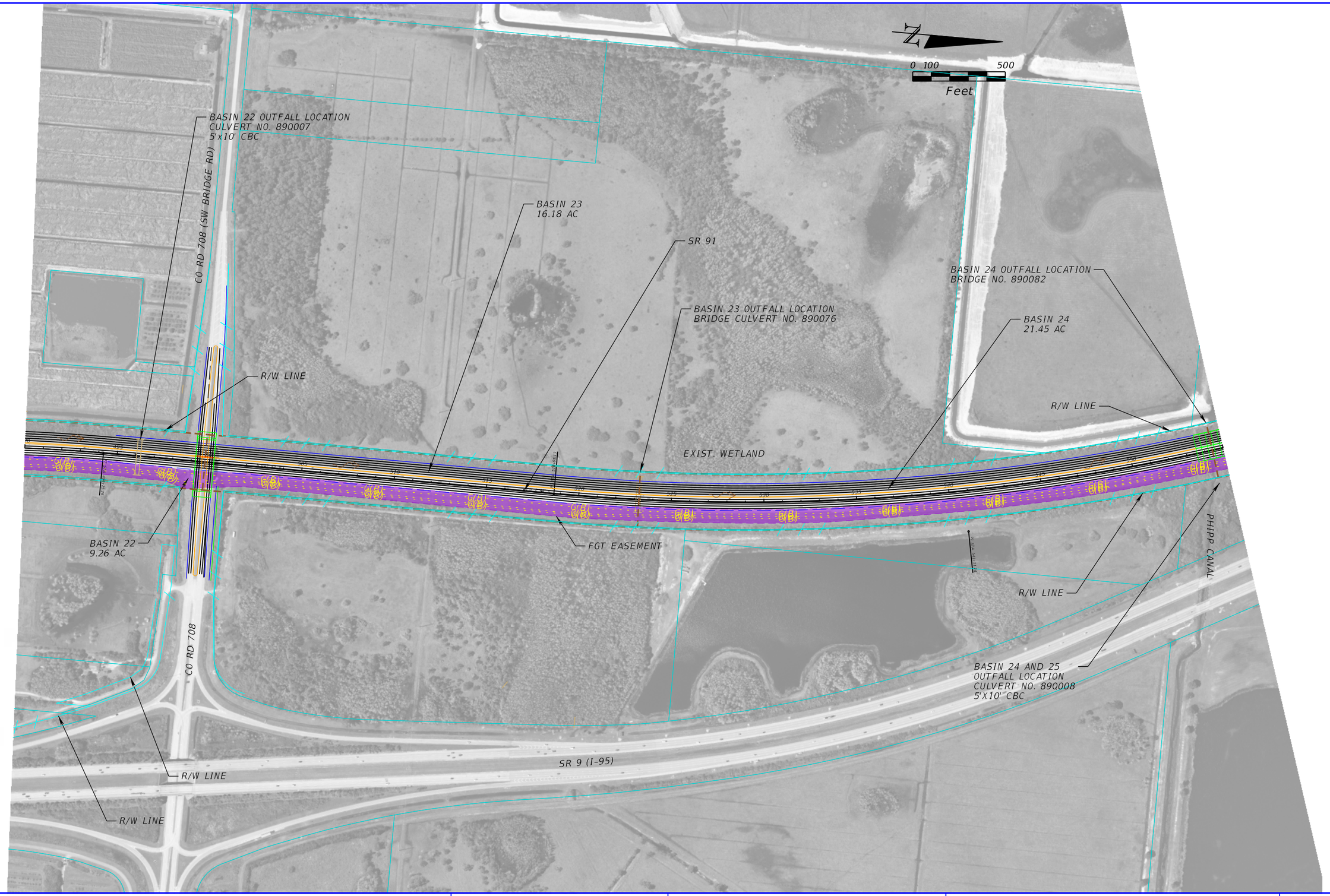

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SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

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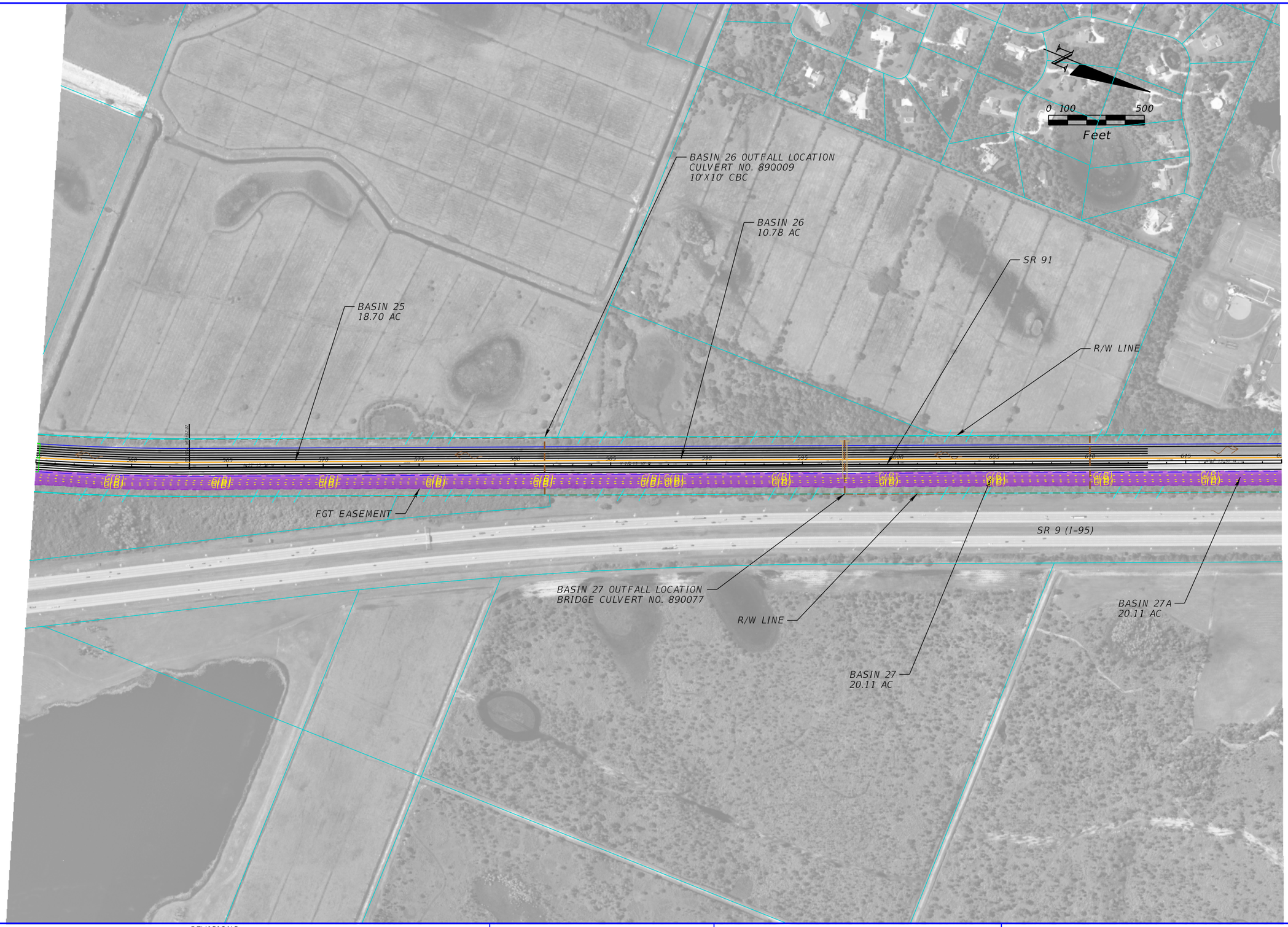

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SR 91	ST. LUCIE	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

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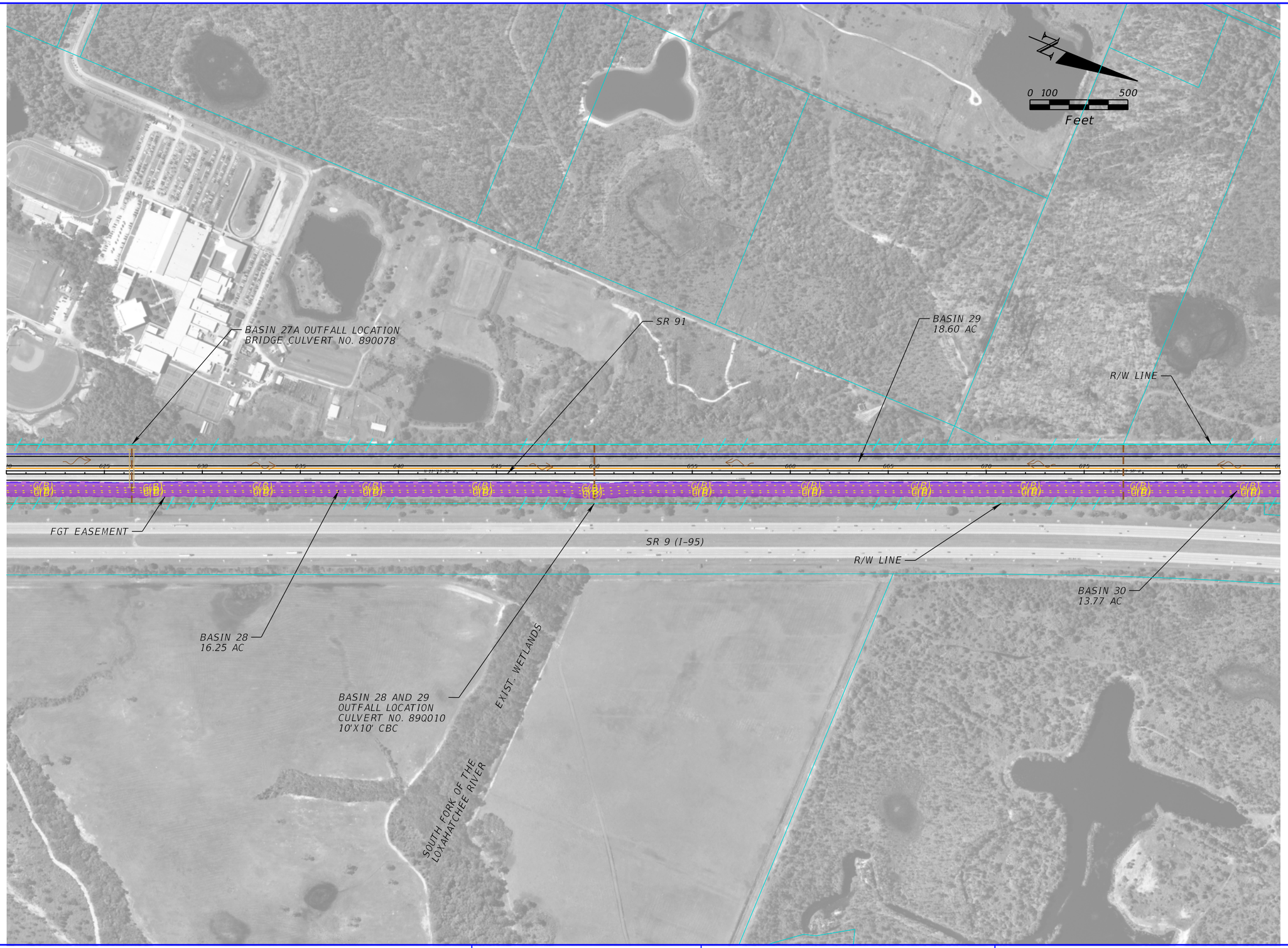

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DRAINAGE MAPS
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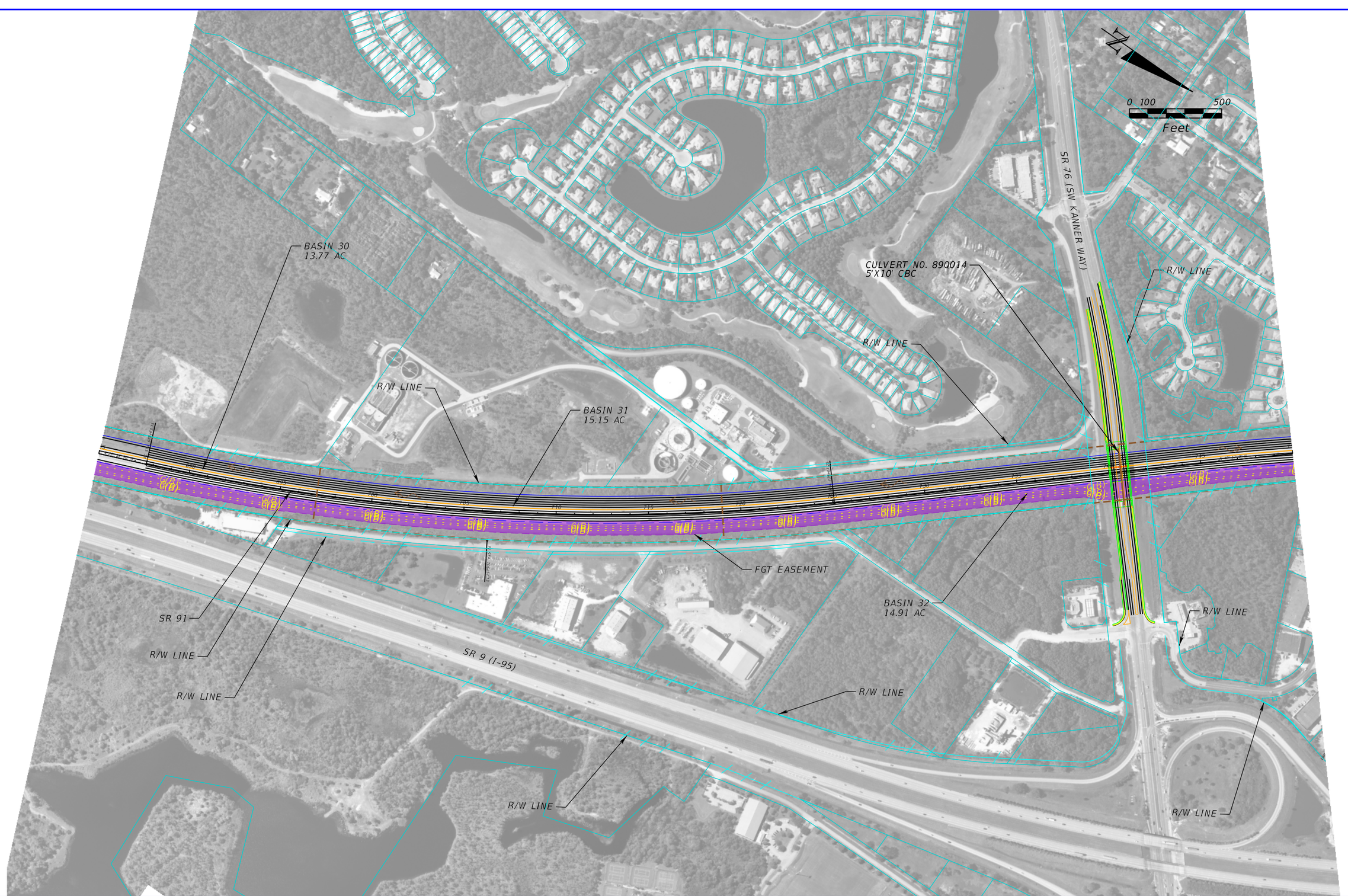

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DRAINAGE MAPS
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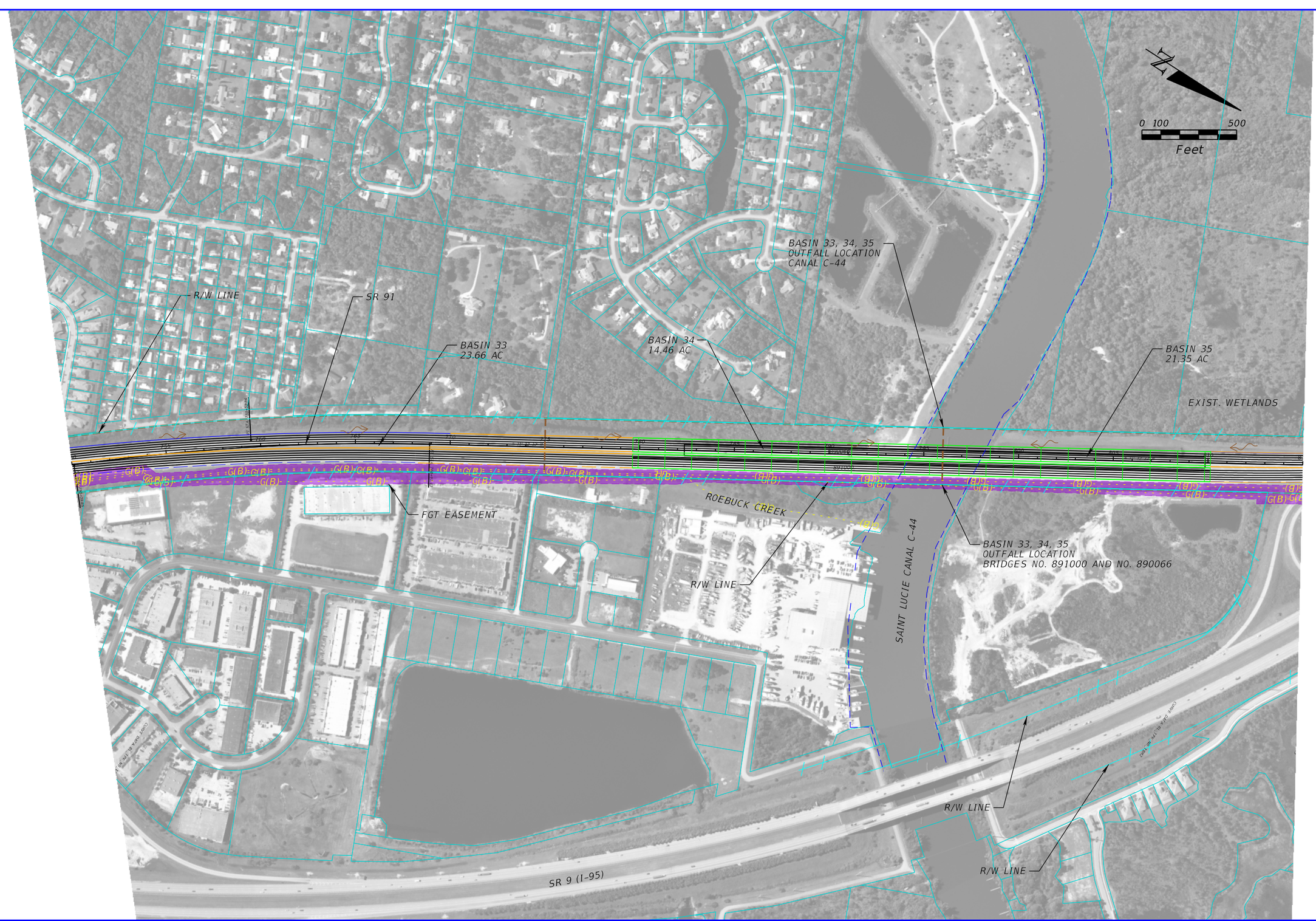

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SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

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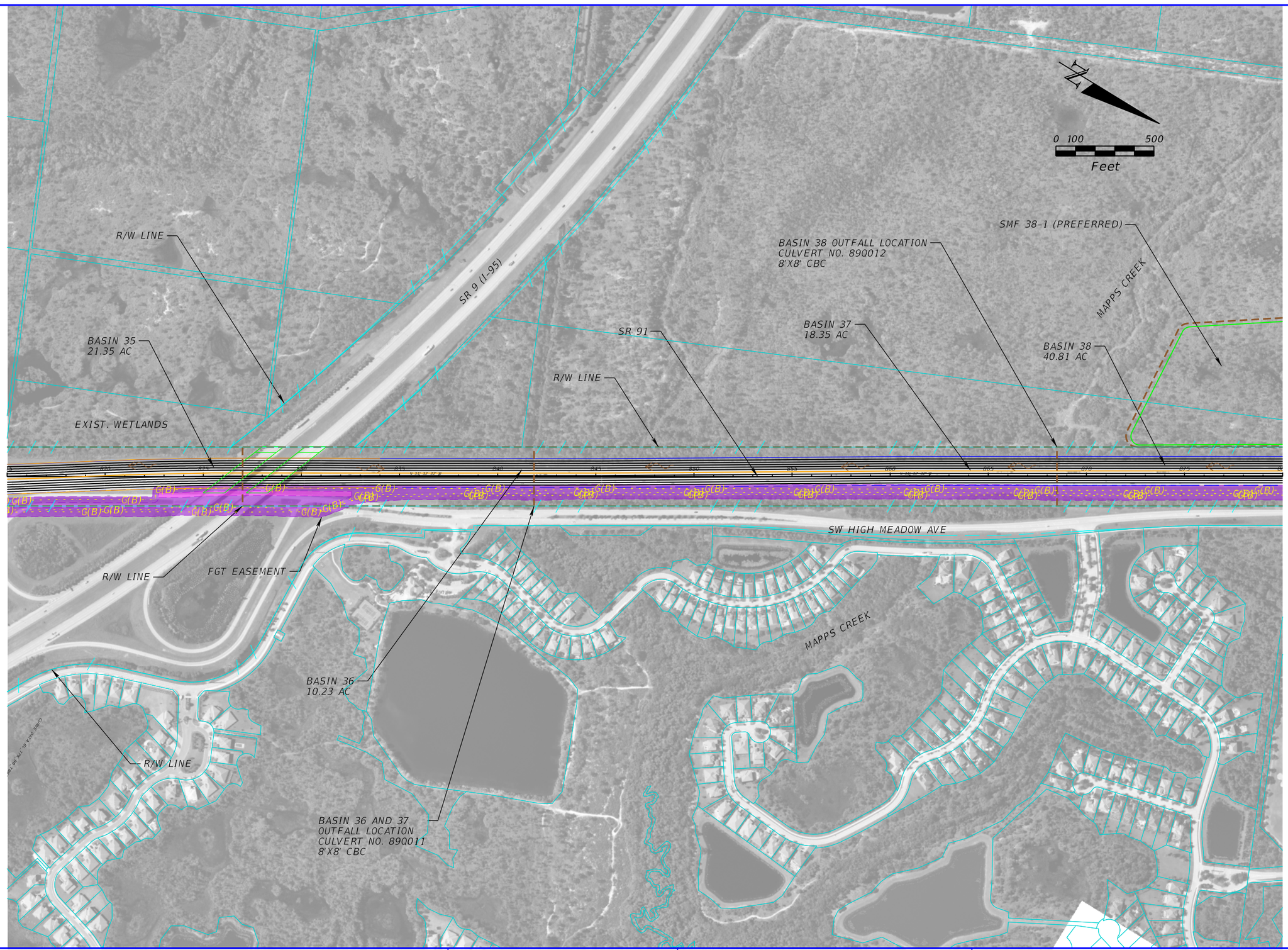

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DRAINAGE MAPS
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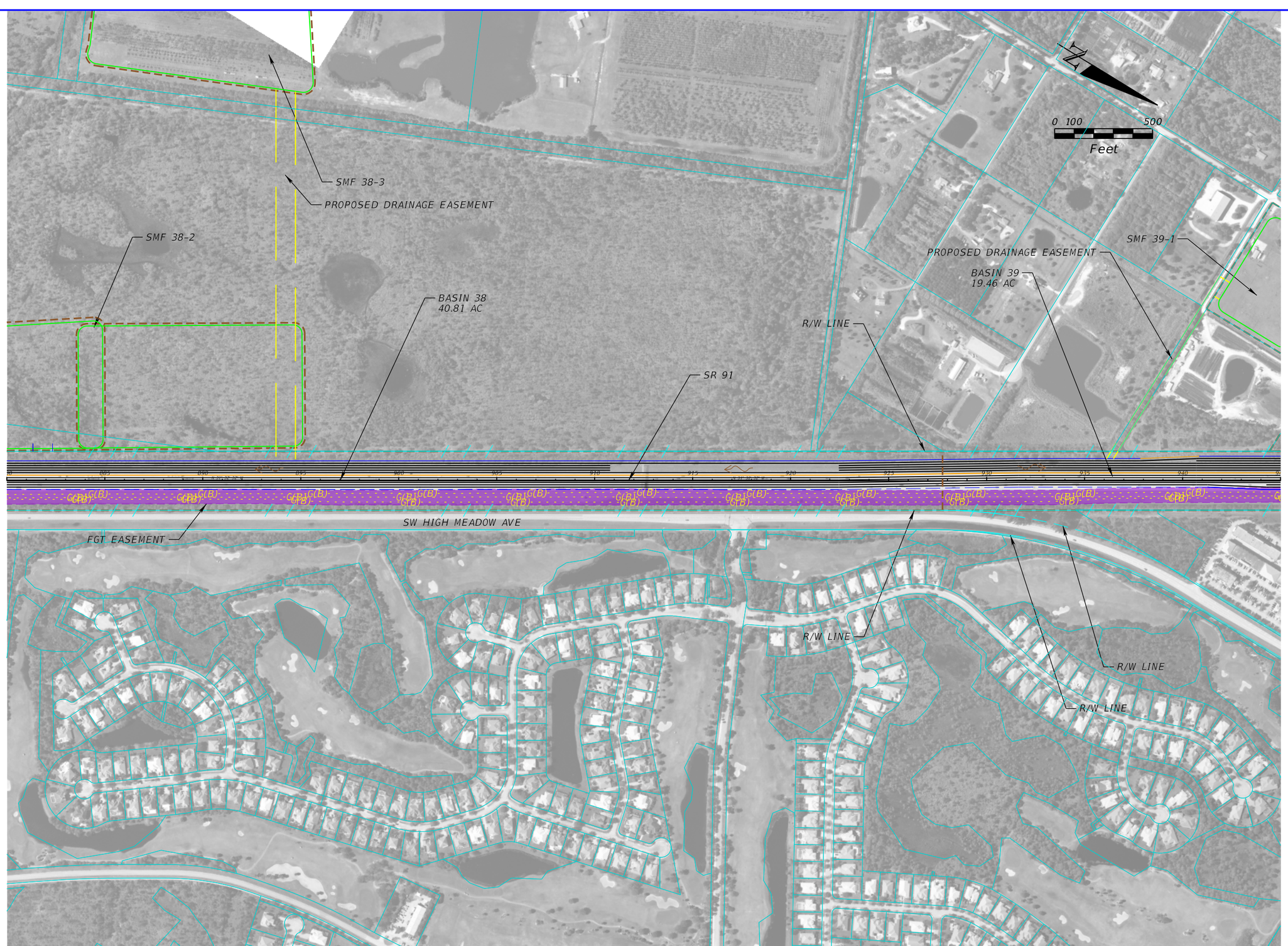

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DRAINAGE MAPS
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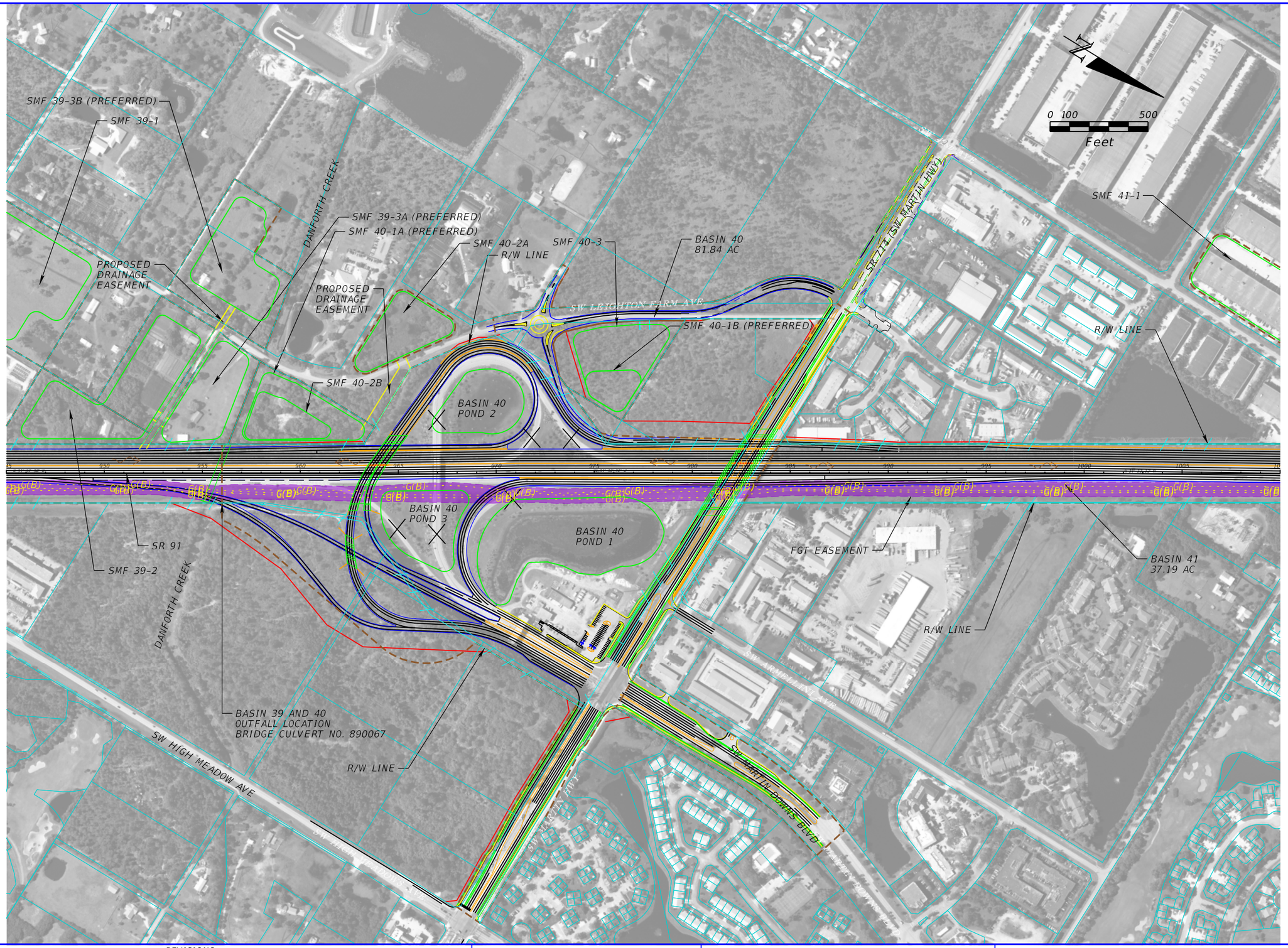

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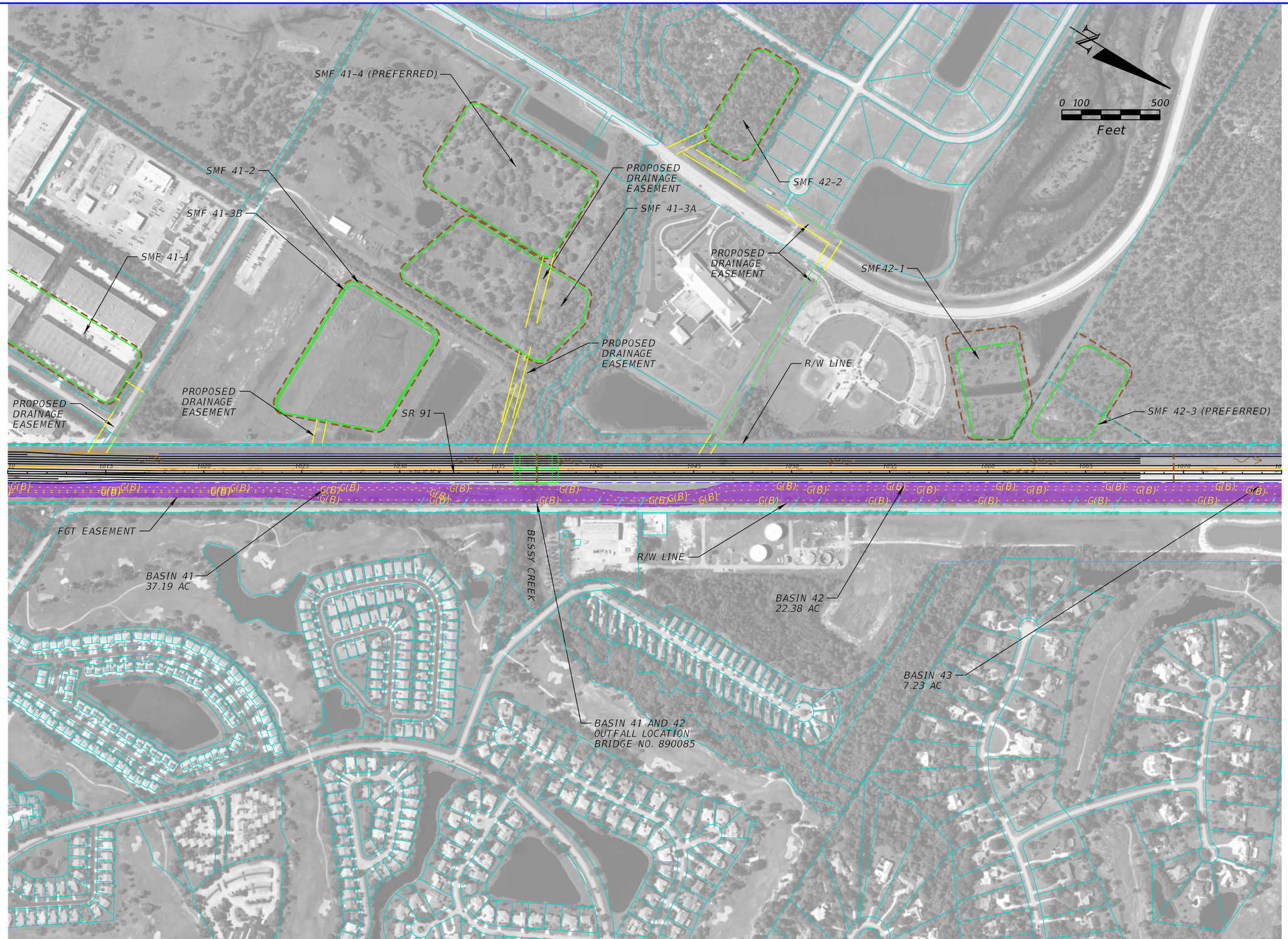

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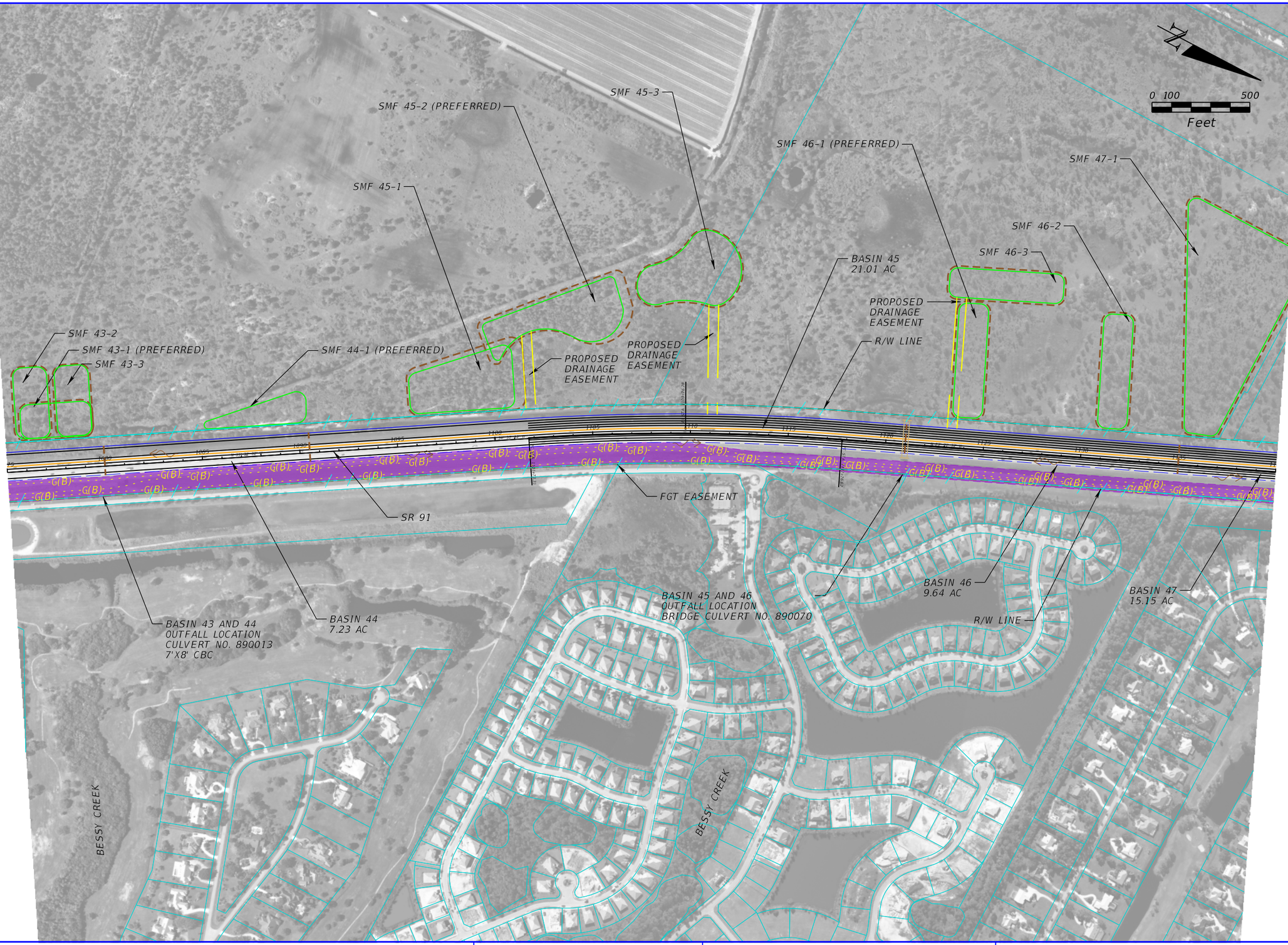

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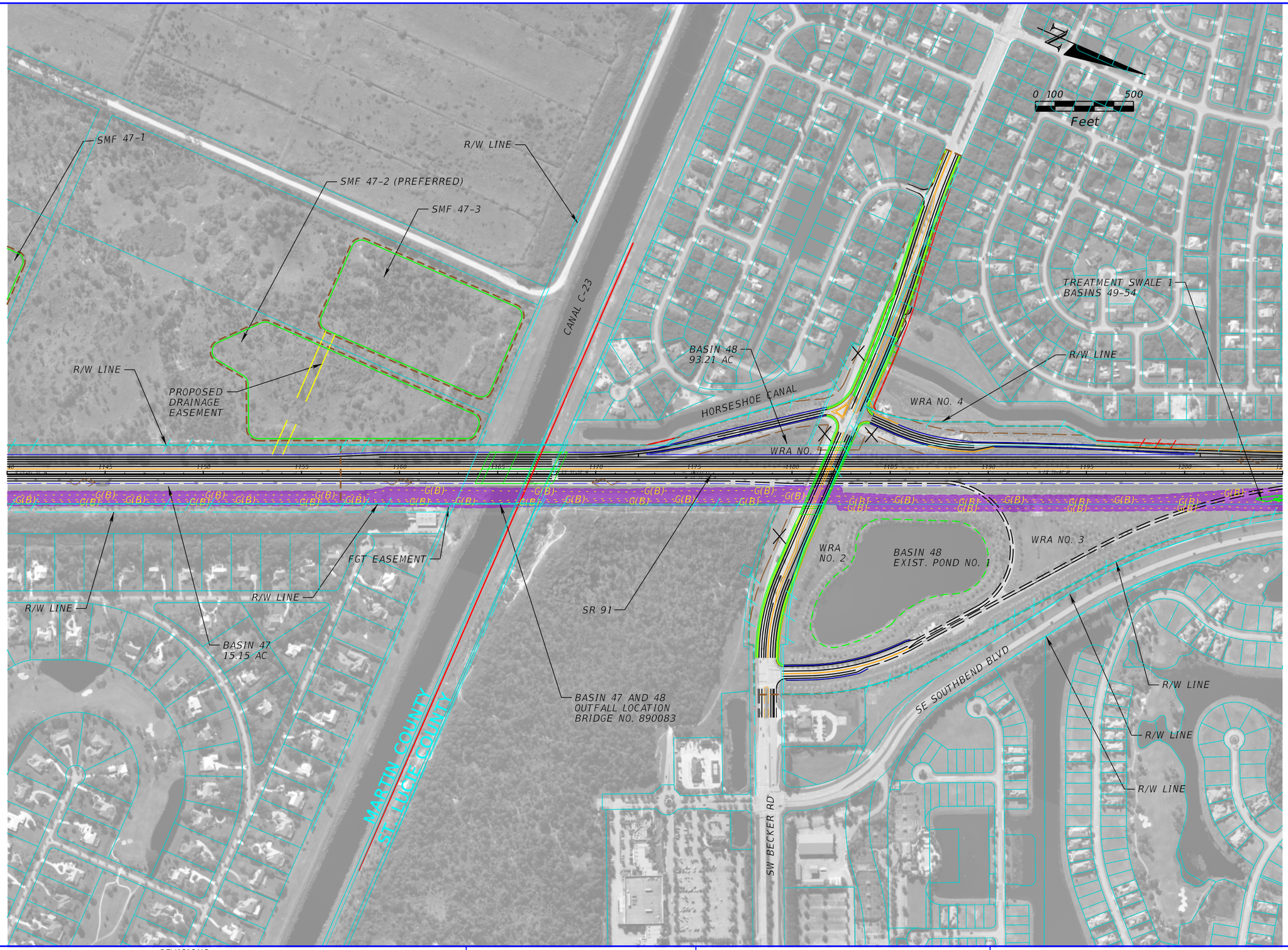

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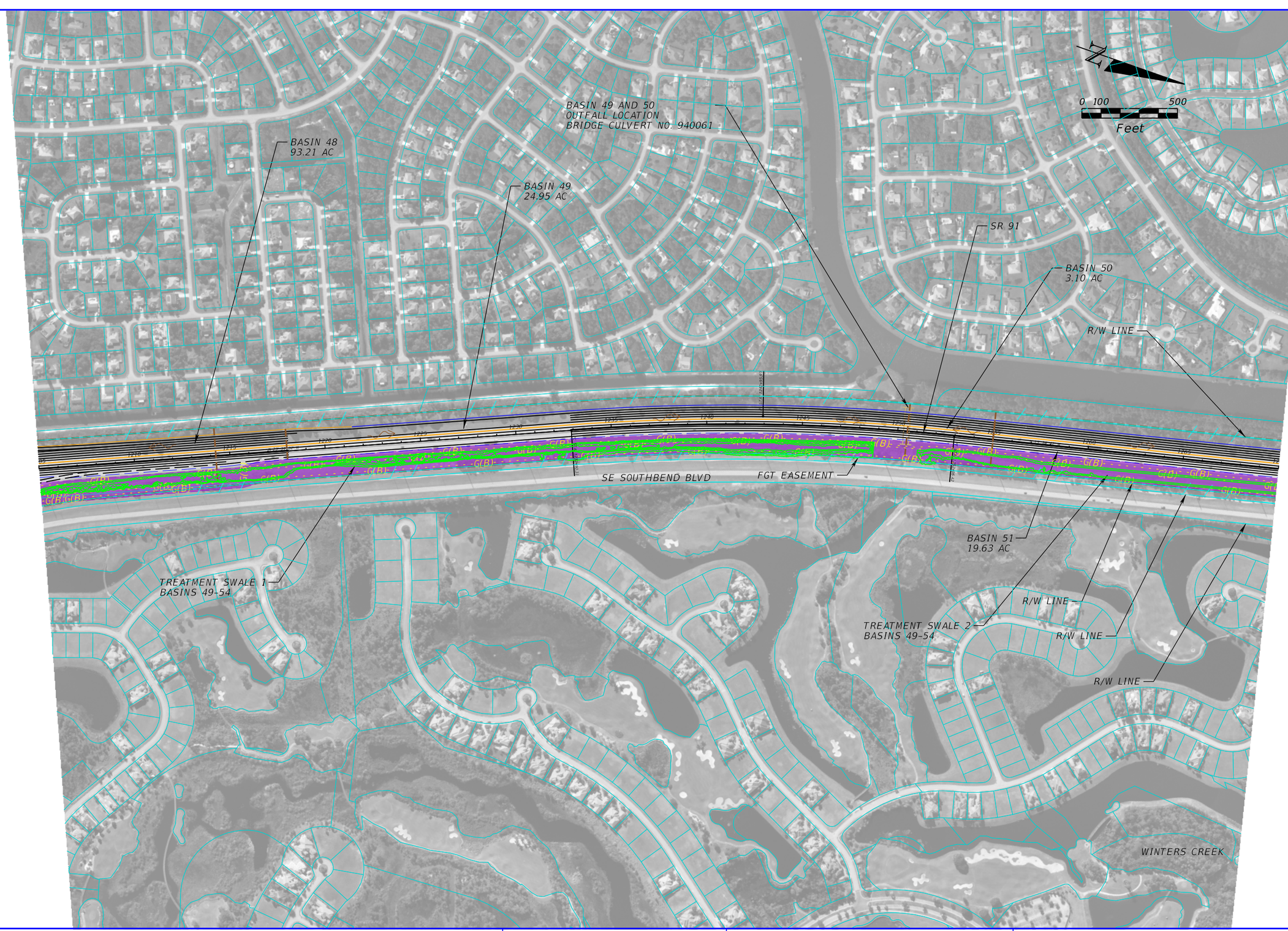

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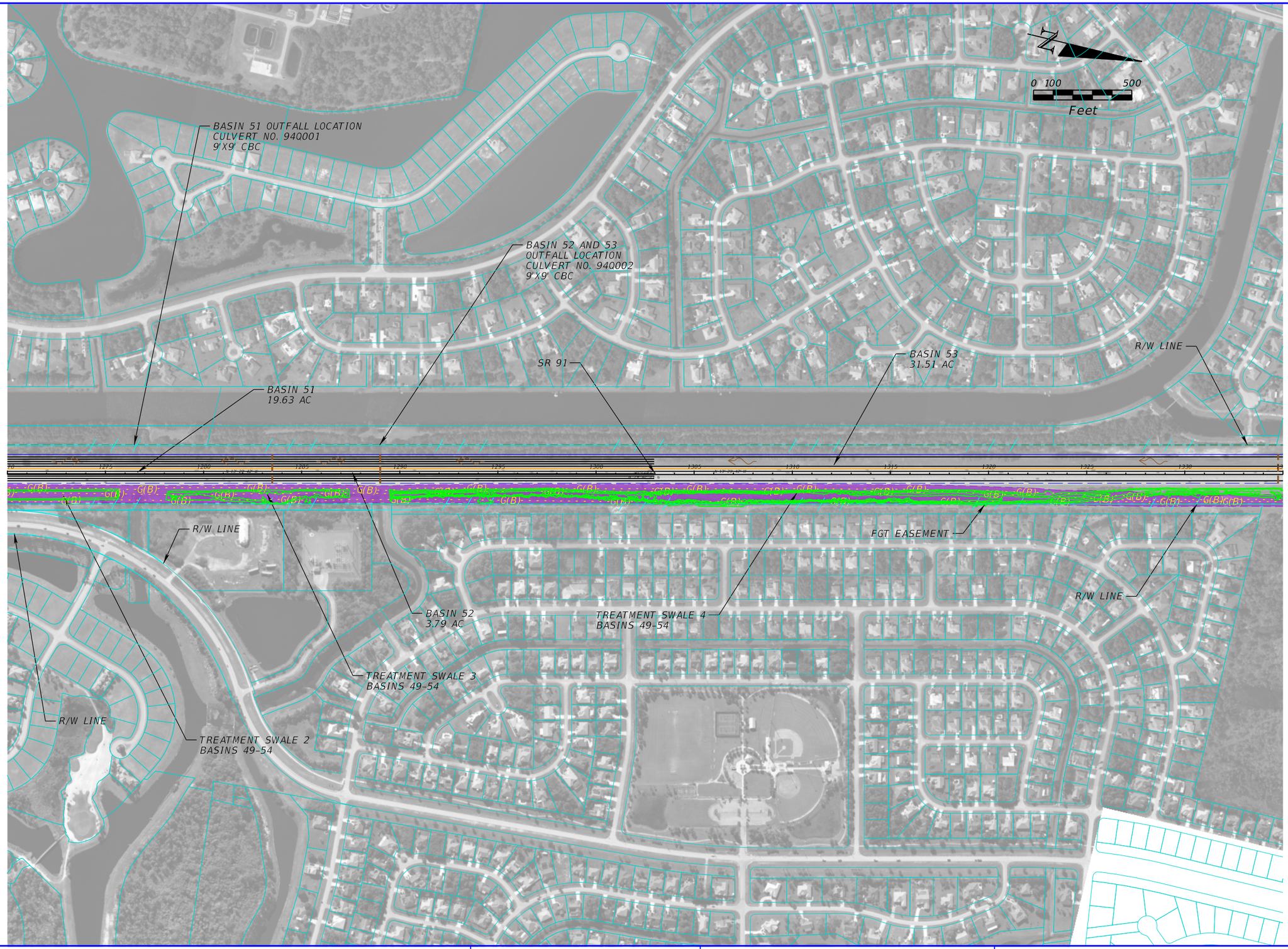

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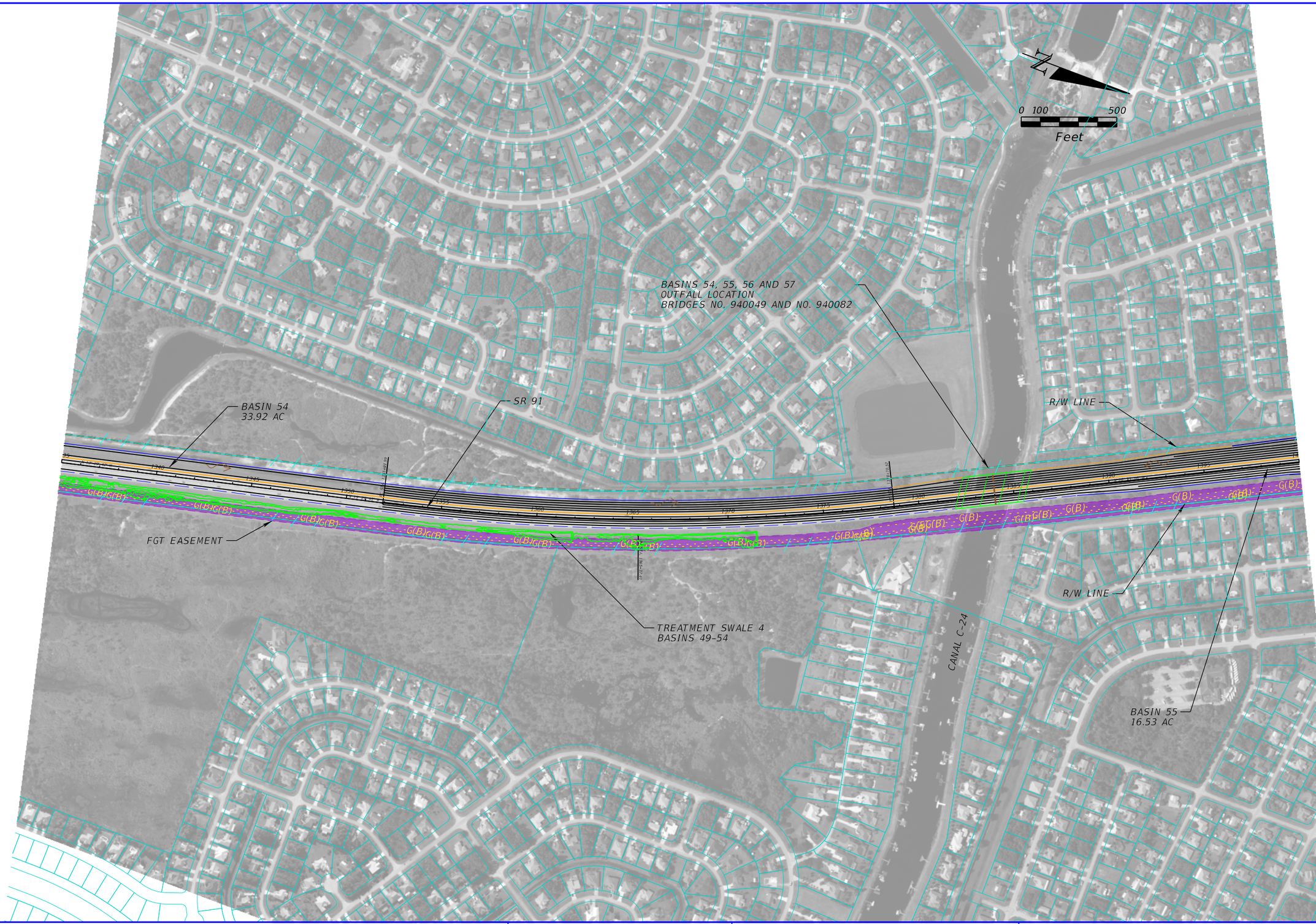

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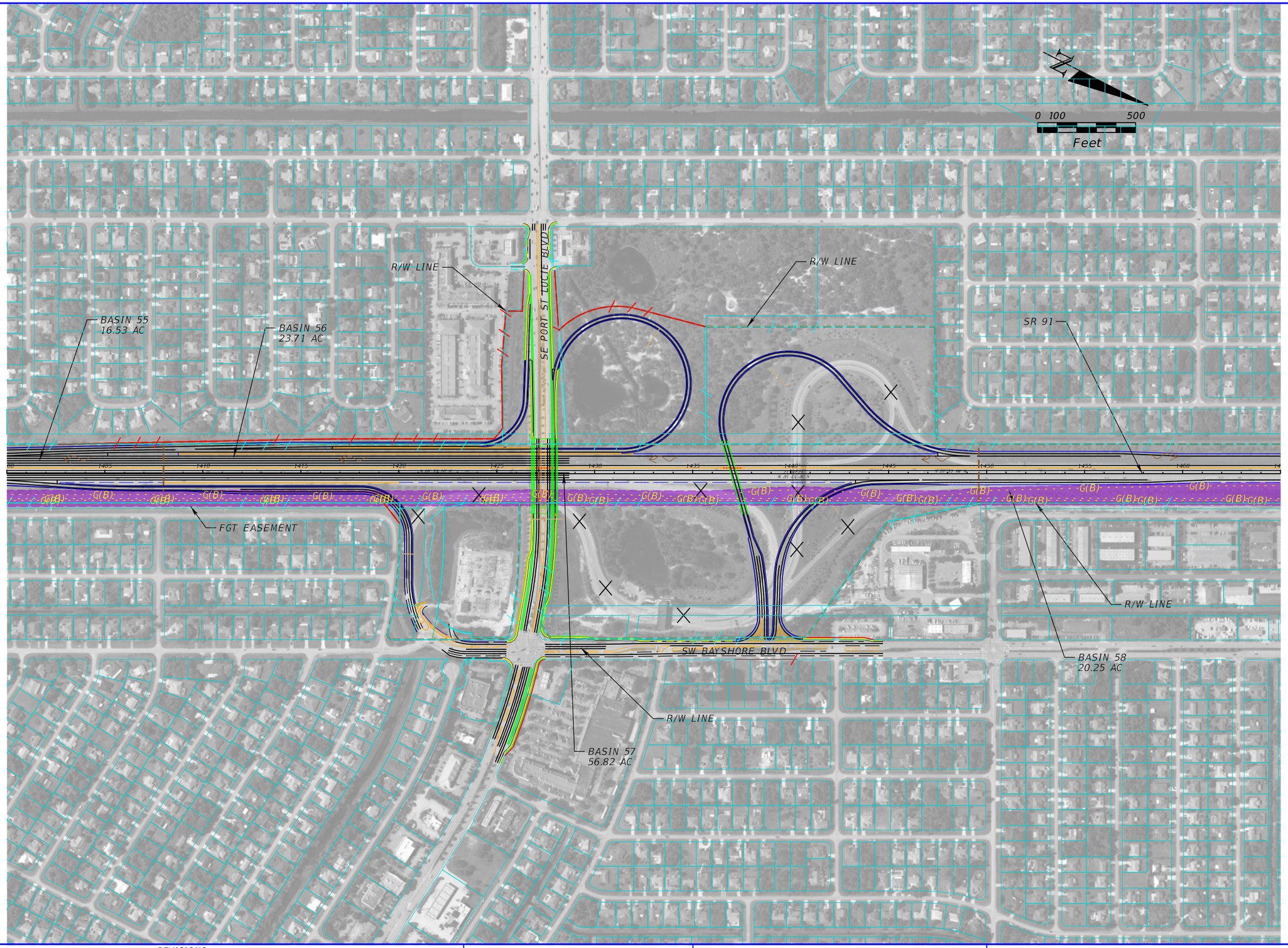

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DRAINAGE MAPS
POST-DEVELOPMENT

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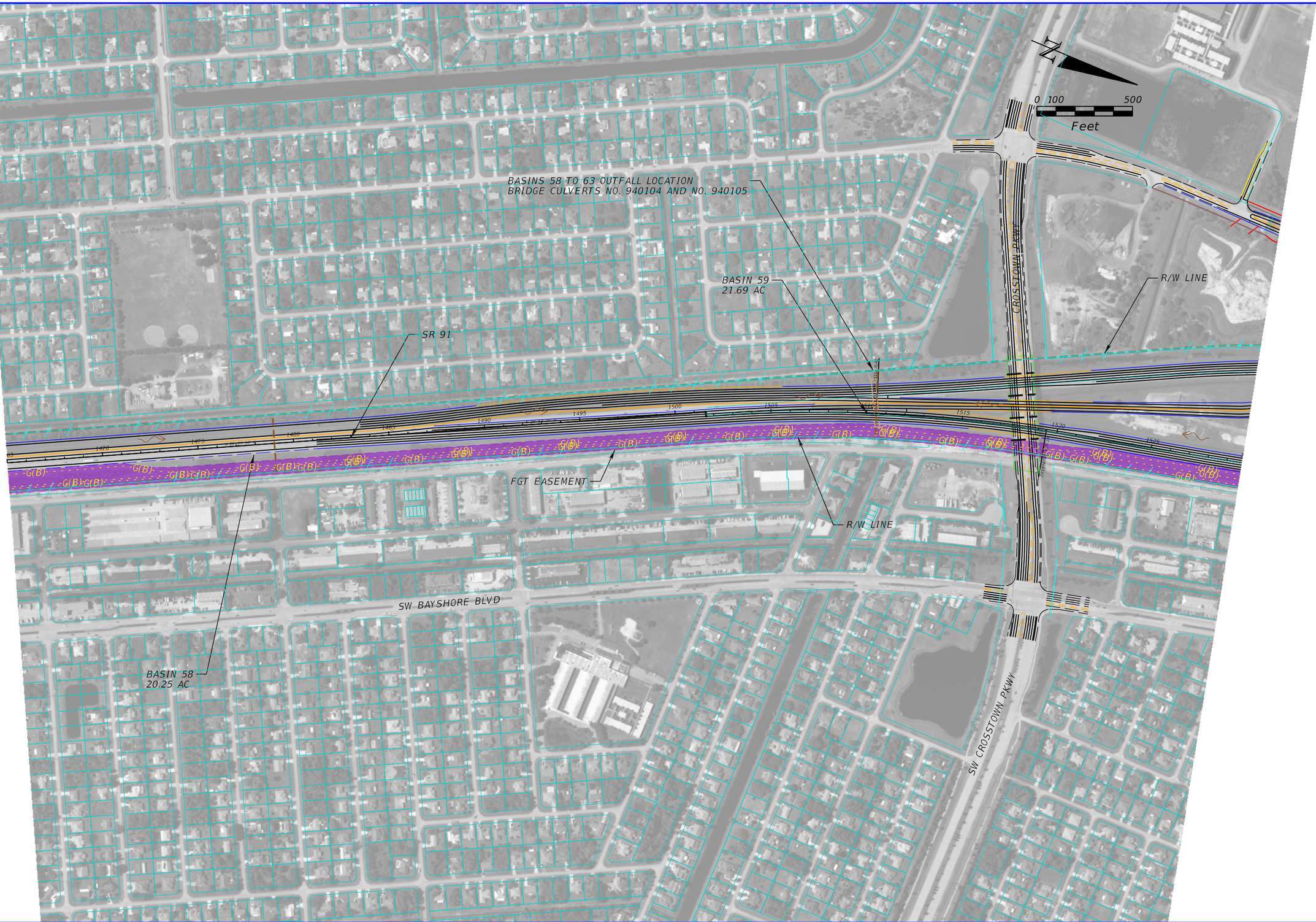

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POST-DEVELOPMENT

SHEET NO.

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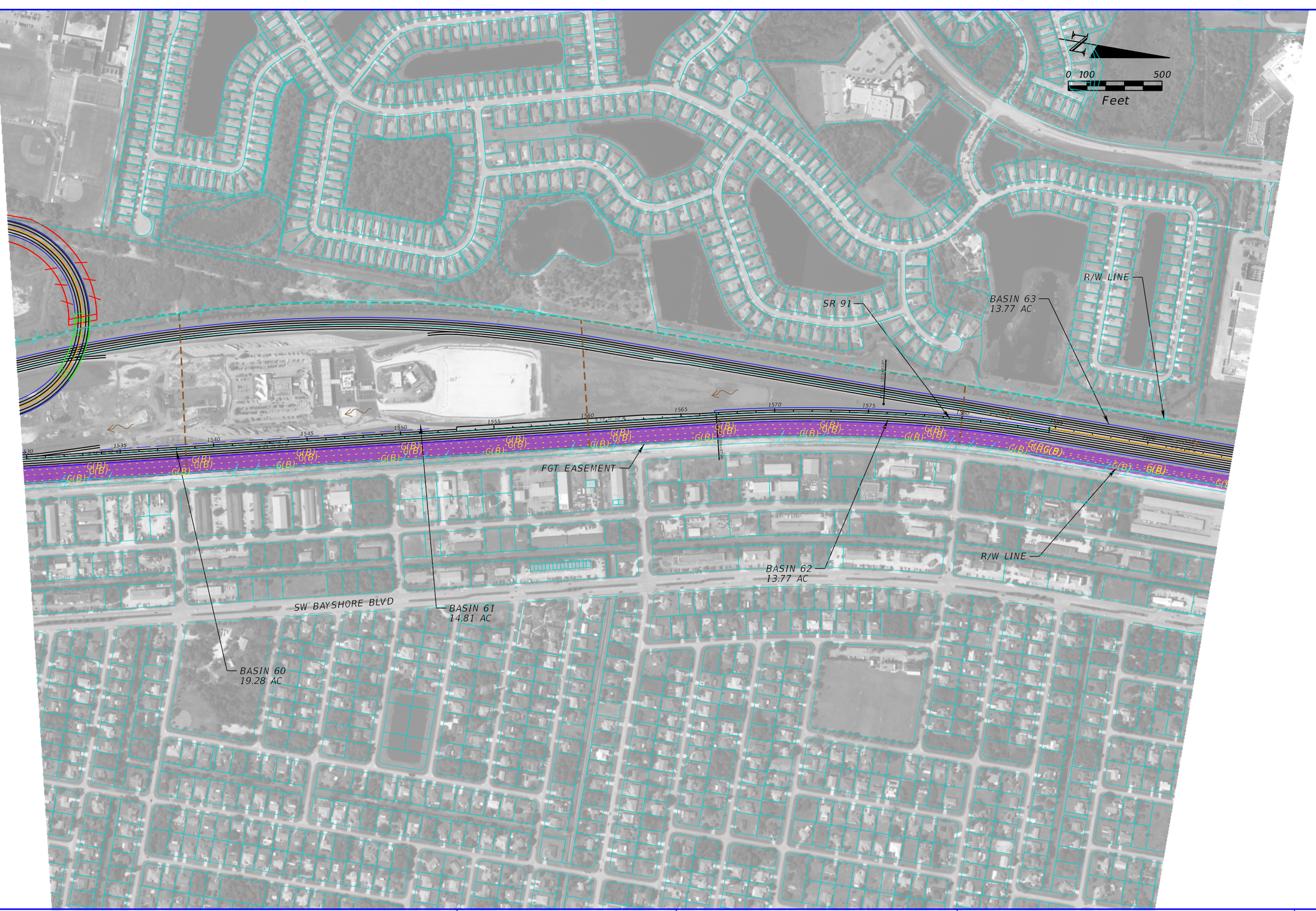

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

PATEL, GREENE AND ASSOCIATES, LLC
280 W. Canton Ave. Suite 400
Winter Park, Florida 32789

Elizabeth M. Bartell, PE #69125

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

SHEET NO.

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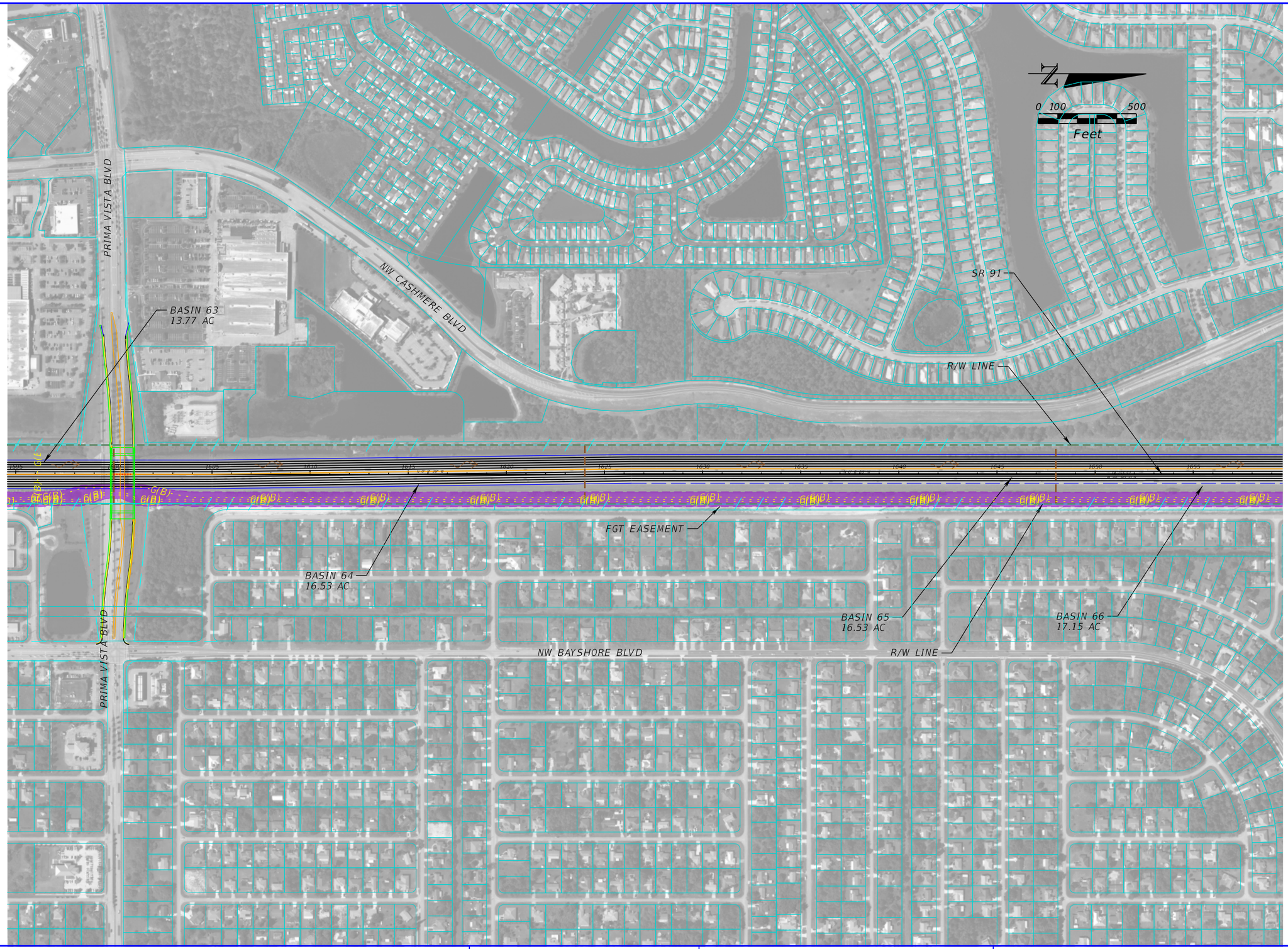

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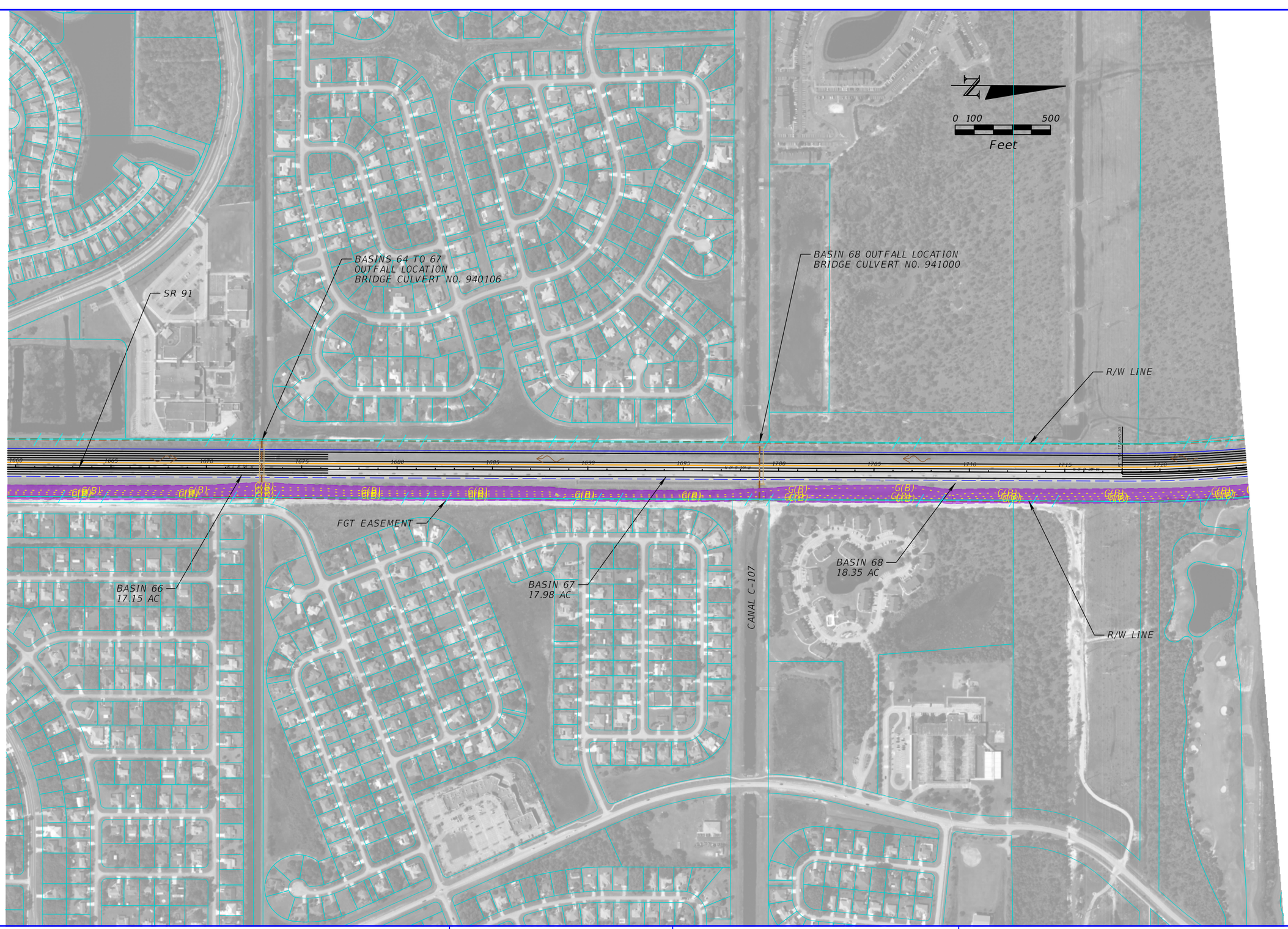

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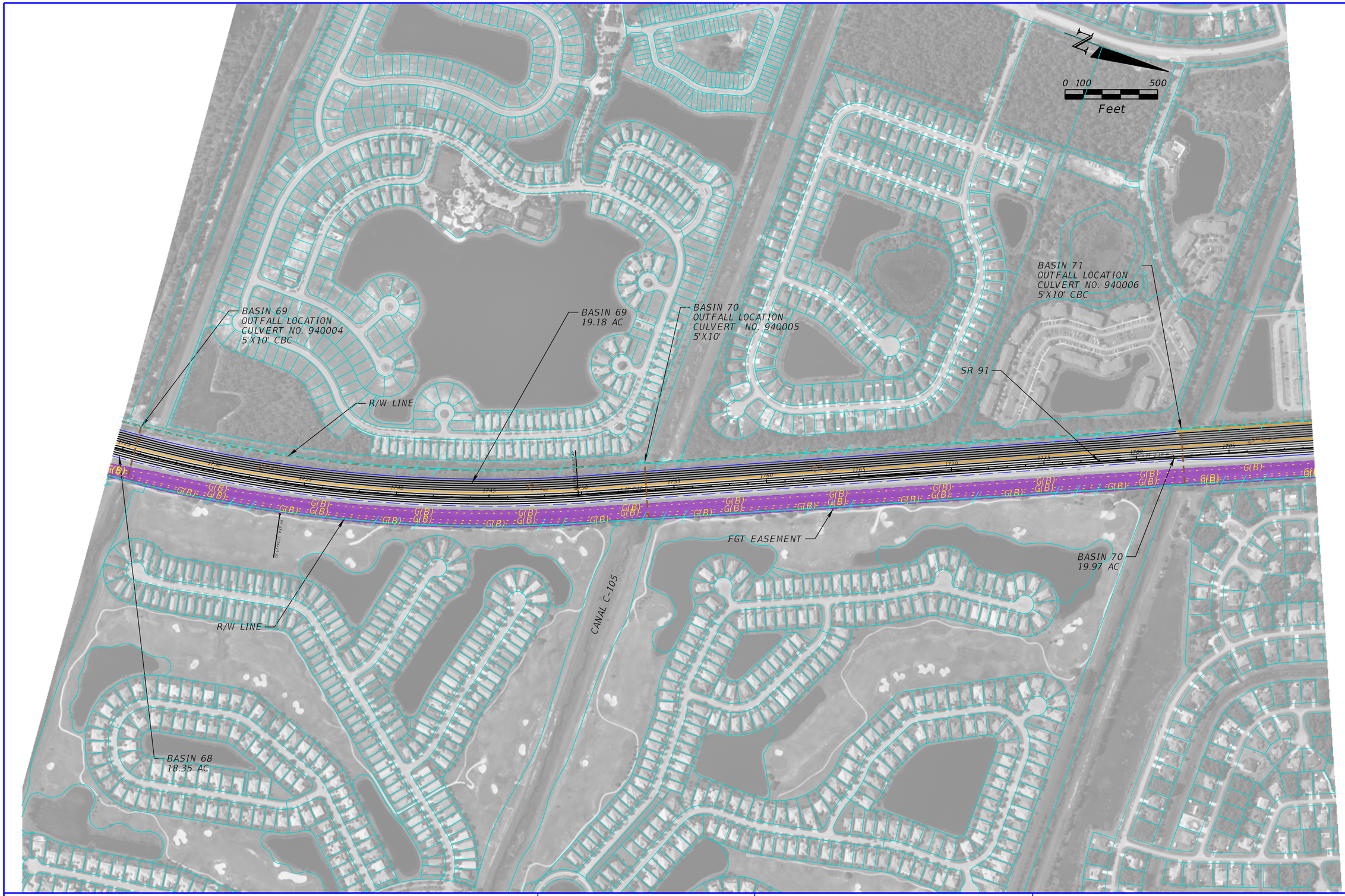

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SR 91	MARTIN	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

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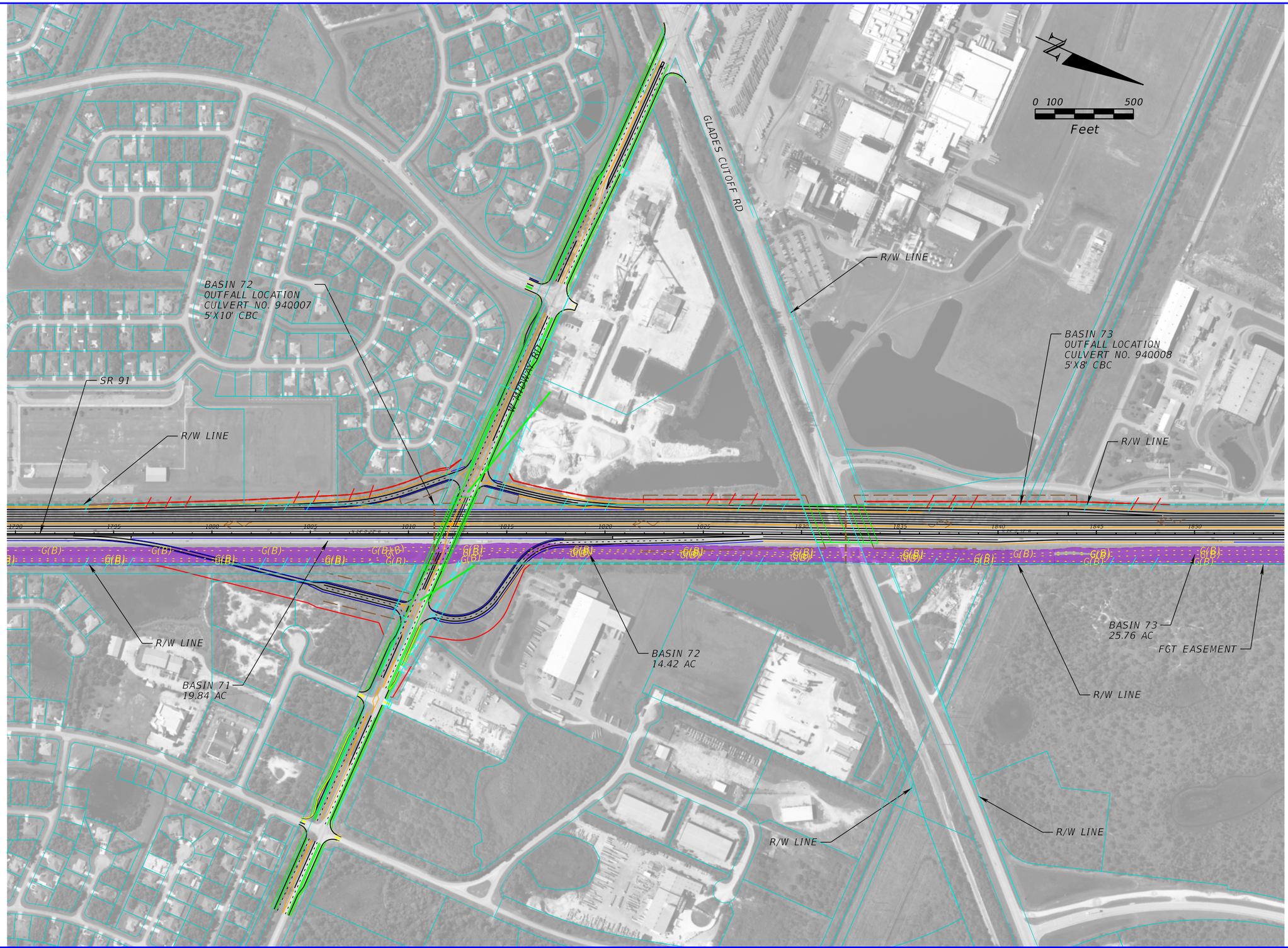

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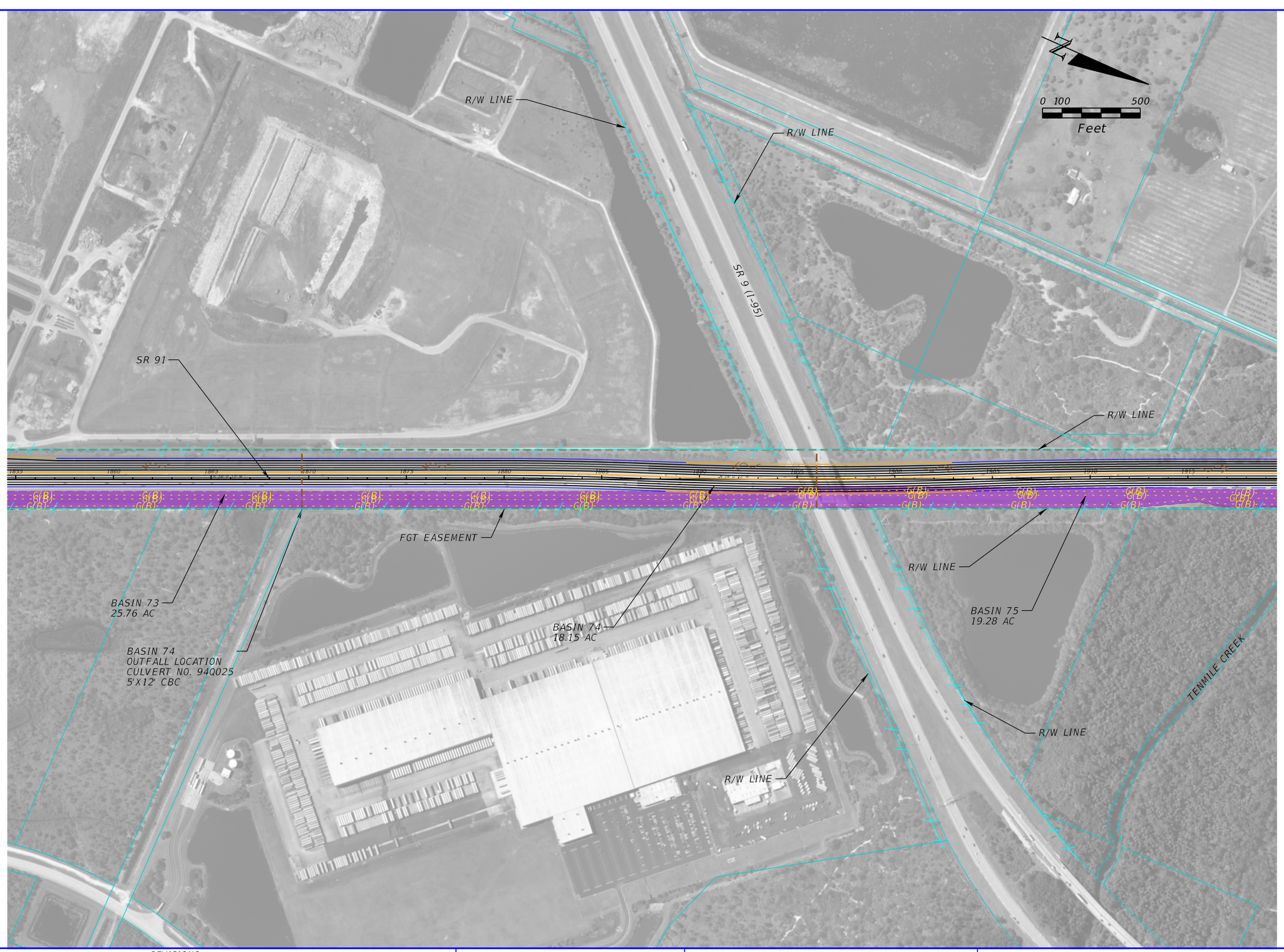

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DRAINAGE MAPS
POST-DEVELOPMENT

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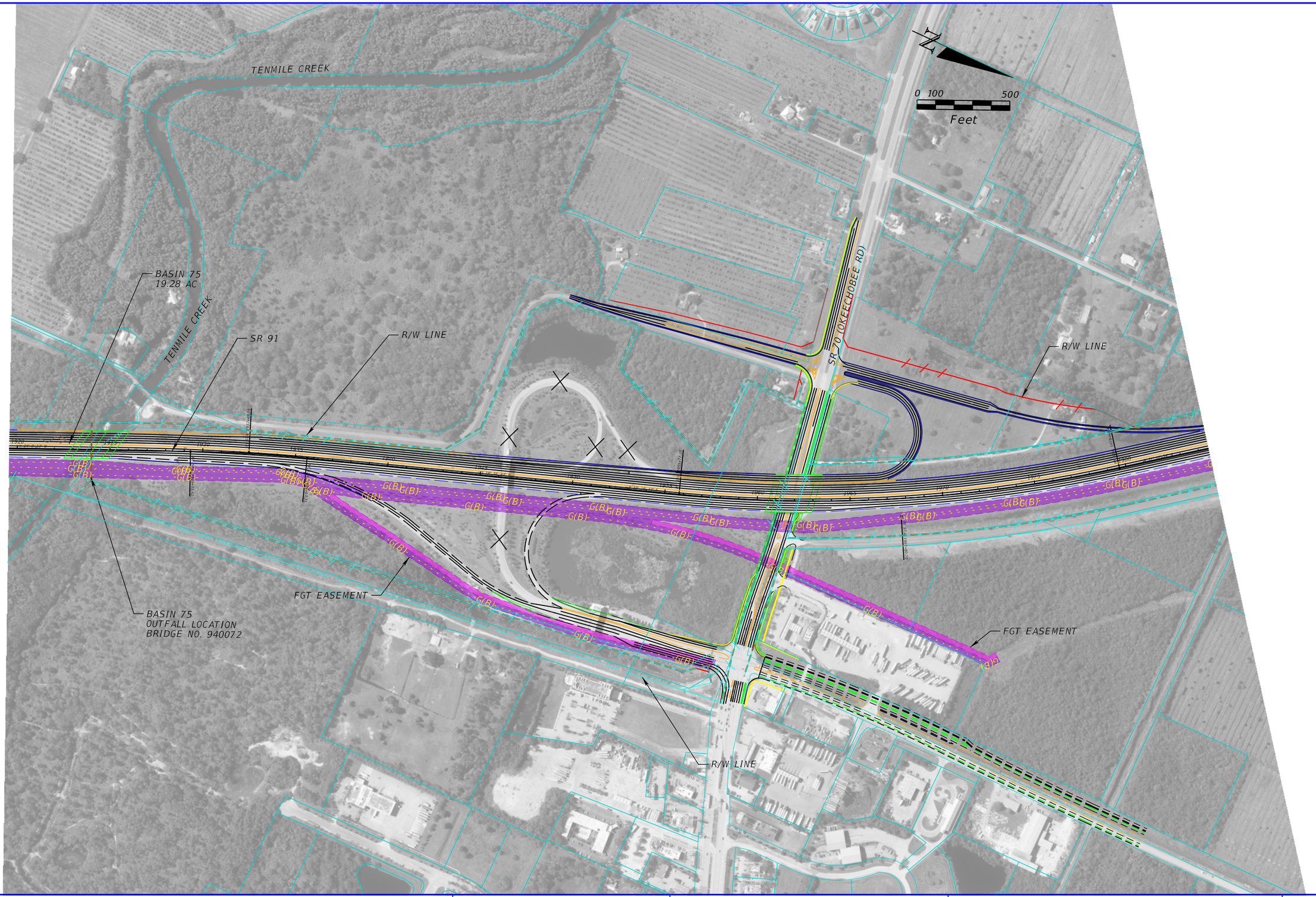

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DRAINAGE MAPS
POST-DEVELOPMENT

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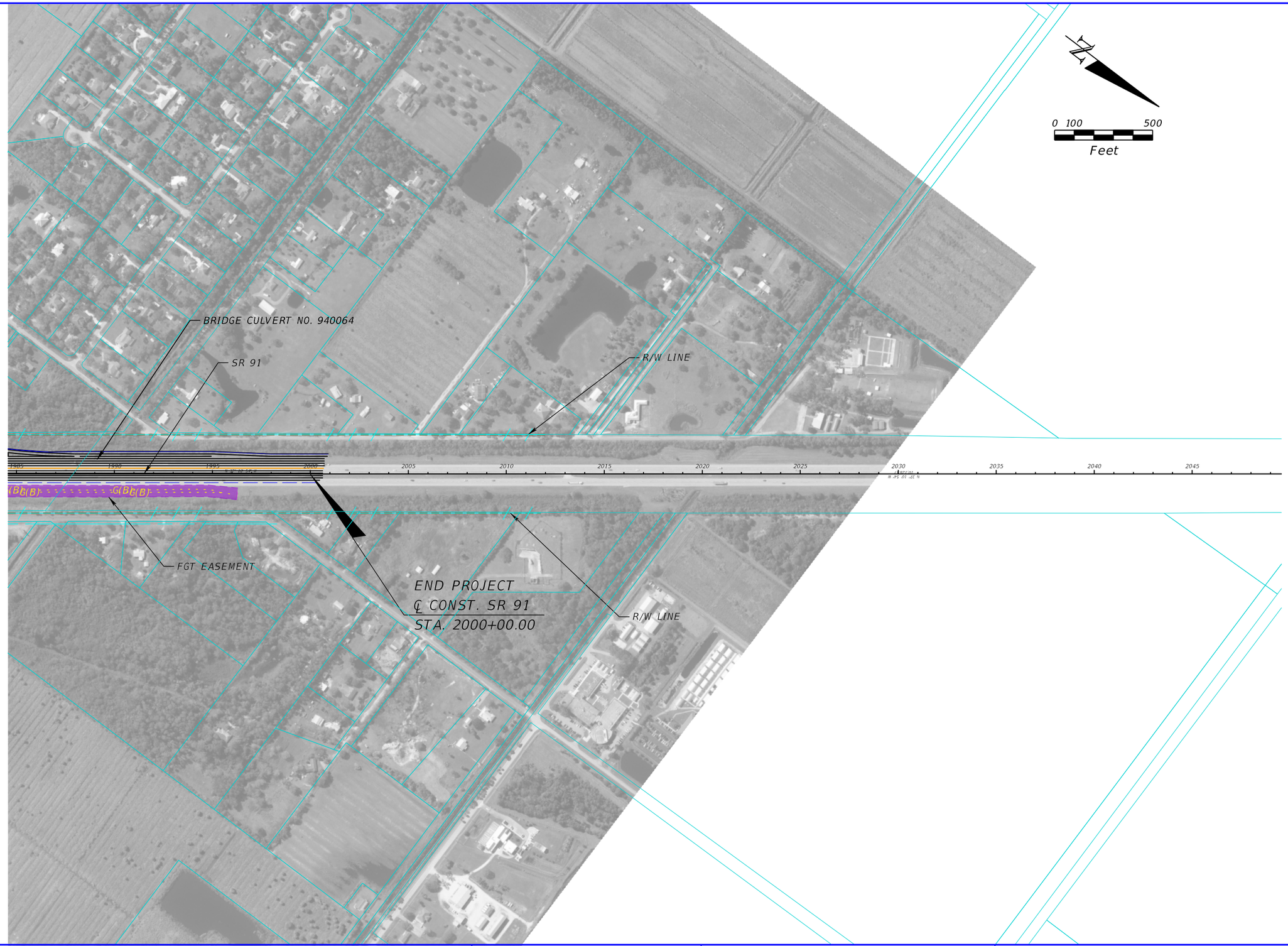

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 91	ST. LUCIE	423374-1-22-01

DRAINAGE MAPS
POST-DEVELOPMENT

SHEET NO.

APPENDIX B

VERTCON DATUM CONVERSION

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 27 12 40.33

Longitude: 080 20 23.13

NGVD 29 height: 0.00 ft

Datum shift(NAVD 88 minus NGVD 29): -1.473 feet

Converted to NAVD 88 height: -1.473 feet

APPENDIX C

SFWMD PRE-APPLICATION MEETING MINUTES

Meeting Minutes

Project: FPID 423374-1-22-01
Description: Turnpike Mainline (SR 91) Widening PD&E from Jupiter (Indiantown Road) to Okeechobee Road (SR 70) – Palm Beach, Martin, and St. Lucie Counties
Meeting: SFWMD Pre-Application Meeting
Date/Time: 11/16/17 @ 11:10 am
Location: SFWMD HQ

Attendees:
Beverly Miller (SFWMD)
Jason Debish (SFWMD)
Beth Kacvinsky (SFWMD)
Carlos de Rojas (SFWMD)
Trisha Stone (SFWMD)
Barbara Conmy (SFWMD)
Tarrie Ostrofsky (USACE)
Jennifer Schull (NOAA – Fisheries)
Erin Yao (FTE) – by phone
Martin Horwitz (FTE) – by phone
Fred Gaines (Atkins/FTE)
Liz Bartell (PGA)
Tim Polk (PGA)
Sarah Johnson (KCA)
Bill Howell (Lochner) – by phone
Tracy Ellison (Lochner) – by phone
Jack Miller (Lochner) – by phone

1. **Background**
    a. Fred introduced the project and stated that the PD&E Study limits are from Indiantown Road (SR 706) to Okeechobee Road (SR 70), MP 117 to MP 153.7.
    b. Liz stated that the project will be permitted for the future (8-lane) condition.
    c. Liz stated that the proposed future improvements include widening the mainline from two to four lanes in each direction. The two alternatives being evaluated during the PD&E Study consist of four general toll lanes in each direction or two general toll lanes and two express toll lanes in each direction. Liz stated that FTE would like to account for the added impervious necessary for express lanes when permitting the project, even though the express lanes may not be constructed at this time.
    d. Liz stated that the project will also include improvements to the following interchanges: Stuart (SW Martin Highway/SR 714), Becker Road, Port St. Lucie Boulevard (SR 716), and Okeechobee Road (SR 70). The PD&E will also evaluate the potential for new interchanges. The major bridges within the project limits are the Loxahatchee River and Thomas B. Manuel Bridge over the St. Lucie Canal. The project will also include bridge improvements over several other creeks and canals.

2. **Existing Permits**
    a. Turnpike mainline is permitted from MP 137.676 to 152.610 (Permit No. 56-00912-S). SFWMD confirmed that this permit should be modified for the proposed improvements.

Several other permits exist within the 37-mile project for interchanges, the service plaza, bridges, and canal protection.

3. **Water Quality**
    a. SFWMD confirmed that the required water quality volume is 2.5" over the new impervious area in areas of reconstruction and widening, but clarified that full treatment of new and existing impervious should be provided, if feasible. Carlos stated that the required water quality volume shall also include the treatment volume provided in the existing condition, whether permitted or not. Liz stated that the new impervious area will be calculated for the future condition.
    b. SFWMD confirmed that an additional 50% of treatment shall be provided for any direct discharge to Outstanding Florida Waters (OFWs).
    c. SFWMD confirmed that nutrient loading is required for any direct discharge to water bodies that are impaired for nitrogen (TN) or phosphorus (TP).
    d. Liz stated that there is a BMAP for St. Lucie River and Estuary Basin, but FTE is a de minimus stakeholder and has not been assigned an allocation for TN nor TP.
    e. Liz stated that the Loxahatchee TMDL Planning Unit (from Indiantown Road to SE Bridge Road) will be reviewed during the PD&E phase, but stated that there are no current TMDLs within the project limits.

4. **Water Quantity**
    a. SFWMD confirmed that the proposed peak discharge for the 25-year, 3-day design shall not exceed that of the existing condition.
    b. Liz stated that she was aware of the following allowable discharge rates: C-23 Canal (31.5 csm for the 10-year design frequency) and C-24 Canal (30.25 csm for the 10-year design frequency). SFWMD stated that any widening of the bridges over these canals, or the C-18 and C-25 canals, will require a right-of-way permit.

5. **Environmental Look Around (ELA)**
    a. Liz stated that the ELA will be started during the PD&E phase. The PD&E Team plans to coordinate with the following Special WMDs: Northern Palm Beach County Improvement District, Loxahatchee River Environmental Control District, Hobe-St. Lucie Conservancy District, and North St. Lucie River Water Control District.
    b. Liz asked whether SFWMD was aware of any regional opportunities within the project limits, such as funding a SFWMD project for nutrient removal credit, and discussed some alternative permitting approaches that may be necessary where the project is adjacent to sensitive lands to avoid off-site ponds:
        i. The project corridor is adjacent to two miles of SFWMD-owned property and two miles of Florida Forever lands. One alternative is to make use of SFWMD-owned lands and Florida Forever acquisitions. SFWMD stated that there may be an opportunity for funding of the pepper farm located on the SFWMD-owned lands (Martin County is part owner). SFWMD added that the pepper farm could also provide a potential for floodplain compensation by reconnecting Cypress Creek. SFWMD stated that there is also a plan to construct a flow through marsh on the Florida Forever land to capture agricultural discharge and provide attenuation. Tim stated that this project would also be suitable for floodplain compensation and pollutant loading reductions, and SFWMD agreed. The Florida Forever property was purchased with SWERP funds. SFWMD stated that there are no current opportunities for funding the flow through marsh, but there may be an opportunity for funding in the future.

ii. Another alternative Liz presented was to provide attenuation in the State-owned lands. Liz stated that this approach was used for the SR 710 from Martin/Palm Beach County Line to Pratt and Whitney Entrance (SFWMD Permit No. 50-04716-P), which was successfully permitted through SFWMD. The SR 710 project provided full treatment on-site, but attenuation was provided off-site in adjacent wetlands to avoid the need for off-site ponds within sensitive lands. Modeling was used to demonstrate a negligible stage increase in the wetlands and no adverse impacts to adjacent properties.
iii. Liz said that another alternative that may be reviewed is the use of Bio-Sorption Activated Media (BAM) filters. SFWMD said they were not familiar with this new technology and would need more information before granting approval to use for TN reduction. Liz stated that BAM has been permitted in other water management districts and additional information would be provided if the PD&E study identifies this alternative as a recommended approach.
iv. Liz stated that Martin County has been implementing septic-to-sewer conversions and asked whether nutrient removal credit could be obtained by funding a similar project. SFWMD said it would need to be discussed further if the PD&E study identifies this alternative as a recommended approach.

c. Liz stated that the PD&E will look at potential joint-use opportunities with the adjacent golf course and the City of Port St. Lucie.

6. <u>Floodplain</u>

a. Liz stated that there are several floodways within the project limits: Roebuck Creek, Danforth Creek, Bessy Creek, North Fork St. Lucie, and Tenmile Creek.
b. Liz stated that the FEMA floodplains within the project limits are riverine and compensation would be provided for any impacts to these floodplains; however, she noted that a portion of the project is downstream of a SFWMD weir control structure. Floodplain impacts at this location would not require compensation, as they are considered tidal. SFWMD added that the proposed improvements shall not create a backwater increase nor reduce the cross-sectional area at the bridges.

7. <u>Wetlands/Surface Waters</u>

a. Sarah presented the types of wetlands anticipated within the project limits: freshwater marsh, forested wetlands, shrub wetlands, reservoirs, natural rivers, and drainage ditches and canals.
b. Sarah stated that the following mitigation options will be reviewed: Loxahatchee Mitigation Bank, Bluefield Ranch Mitigation Bank, R.G. Reserve Mitigation Bank, and DuPuis Reserve (Martin County). A cumulative impact analysis may be necessary based on the location of impacts and mitigation bank service area. SFWMD added that credits may be low or out at the R.G. Reserve Mitigation Bank.

8. <u>Protected Species</u>

a. Sarah stated that no species-specific surveys have been conducted.
b. Sarah stated that there is a potential for the following protected species:
    i. Federal
        1. Eastern indigo snake
        2. Wood stork
        3. Crested caracara*
        4. Snail kite*
        5. Manatee*

6. Wood stork (5 CFAs)
7. Red-cockaded woodpecker*
8. Florida scrub-jay*
9. Florida grasshopper sparrow*

(* project in species consultation area)

ii. State
1. Wading birds
2. Rookery at Okeechobee Road (SR 70) Toll Plaza
3. Florida sandhill crane
4. Gopher tortoise
5. Southeastern American kestrel
6. Sherman's fox squirrel

iii. Other
1. Osprey
2. Bald eagle

c. Fred stated that the Florida Bonneted Bat Consultation Area (CA) may have changed, and Martin added that the USFWS is in the process of expanding the CA and removing the focal areas, but it is currently still in a draft form.

9. <u>Loxahatchee Wild and Scenic River</u>

a. Implemented under the Wild and Scenic River Act
   i. SFWMD confirmed that Section 7a approval is needed.
b. National Park Service is lead federal agency.
c. SFWMD/FDEP develop and administer management plan
d. Supported by Loxahatchee River Management Coordinating Council (25 members)
   i. Three Federal Agencies
   ii. Eight State Agencies
   iii. Nine Local Agencies
   iv. Five Non-Governmental Organizations
e. Extends from southern end of Jonathan Dickinson State Park to southern end of Riverbend Park (Martin and Palm Beach Counties)
f. Road crosses scenic segment of river.
g. Addresses Impacts:
   i. Free Flow Nature
   ii. Water Quality
   iii. Remarkable Values – (scenic, recreational, geological, fish & wildlife, historical, cultural)
h. SFWMD added that Cypress Creek connects to the Loxahatchee River, but it is not considered part of wild and scenic river. Sarah stated that the location of the Loxahatchee River within this PD&E project is considered scenic only (not wild).

10. <u>Cultural Resources</u>

a. Sarah stated that a CRAS will be completed as part of this PD&E.

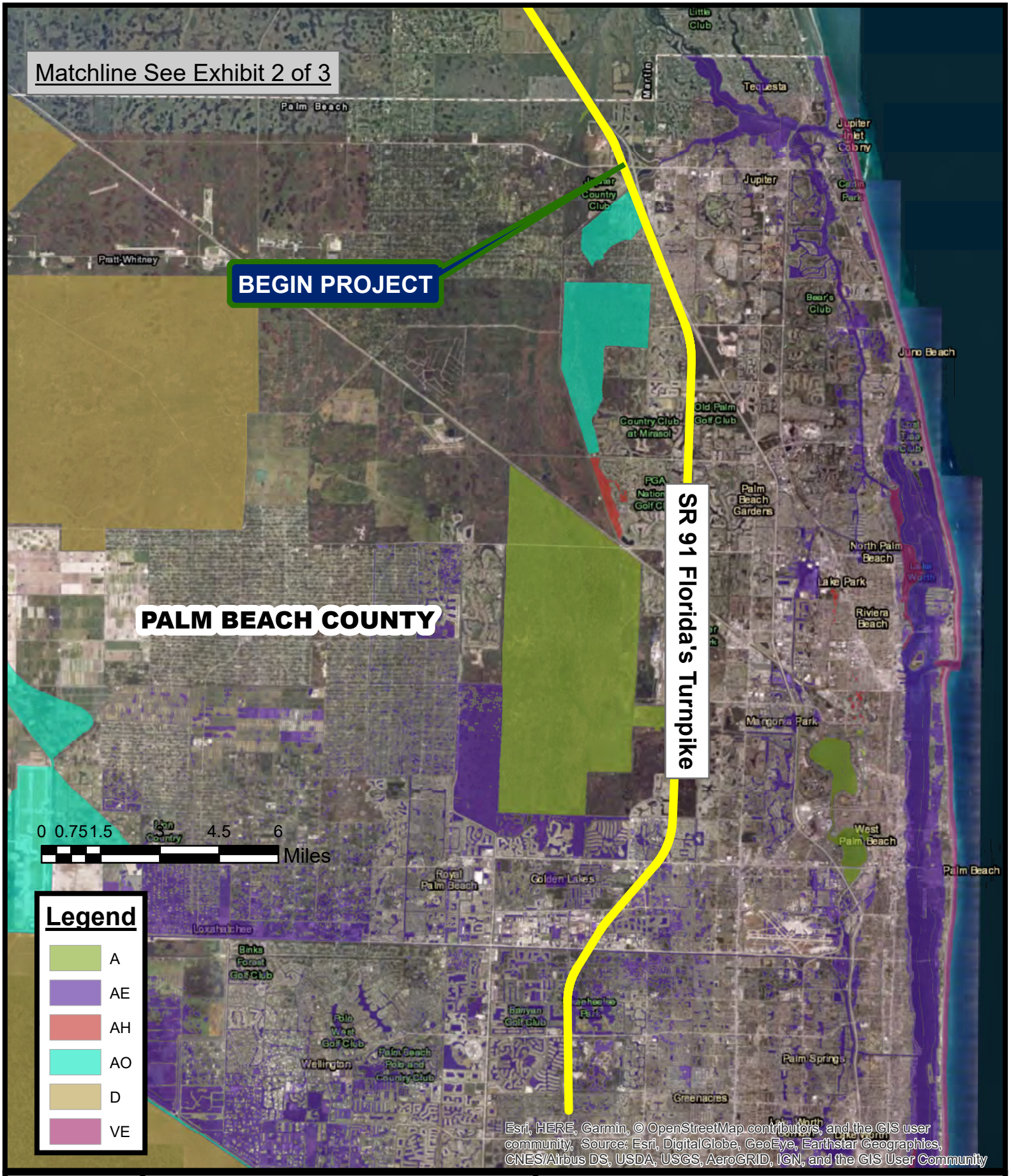
11. <u>Permits and Approvals</u>

a. Sarah stated that the following permits and approvals are anticipated:
   i. USACE – Section 404 Dredge and Fill Permit
   ii. USACE – Section 408 Alteration of a USACE Civil Works Project
      1. SFWMD said that a Section 408 will be needed for the C-23 canal.
   iii. US Coast Guard - Section 9 (Bridge) Permits

iv. US Coast Guard - Section 10 Rivers and Harbors Act
v. NPS – Section 7a Wild and Scenic Rivers Act Approval
vi. SFWMD – Environmental Resource Permit
vii. SFWMD - Right-of-Way Occupancy Permit
    1. SFWMD said that a Right-of-Way Occupancy permit will be necessary for the following canals: C-18 (if within the project limits), C-23 upstream of weir, C-24 downstream of weir, and C-25 downstream of weir.
viii. FDEP - Sovereign Submerged Lands Easements
    1. This will be submitted with the ERP, and SFWMD will review.
ix. FDEP – NPDES
x. FWC - Gopher Tortoise Relocation Permit
xi. FWC - Incidental Take Permit

b. Martin added that the ETDM number for this project is #14295.

APPENDIX D
FEMA FIRMS



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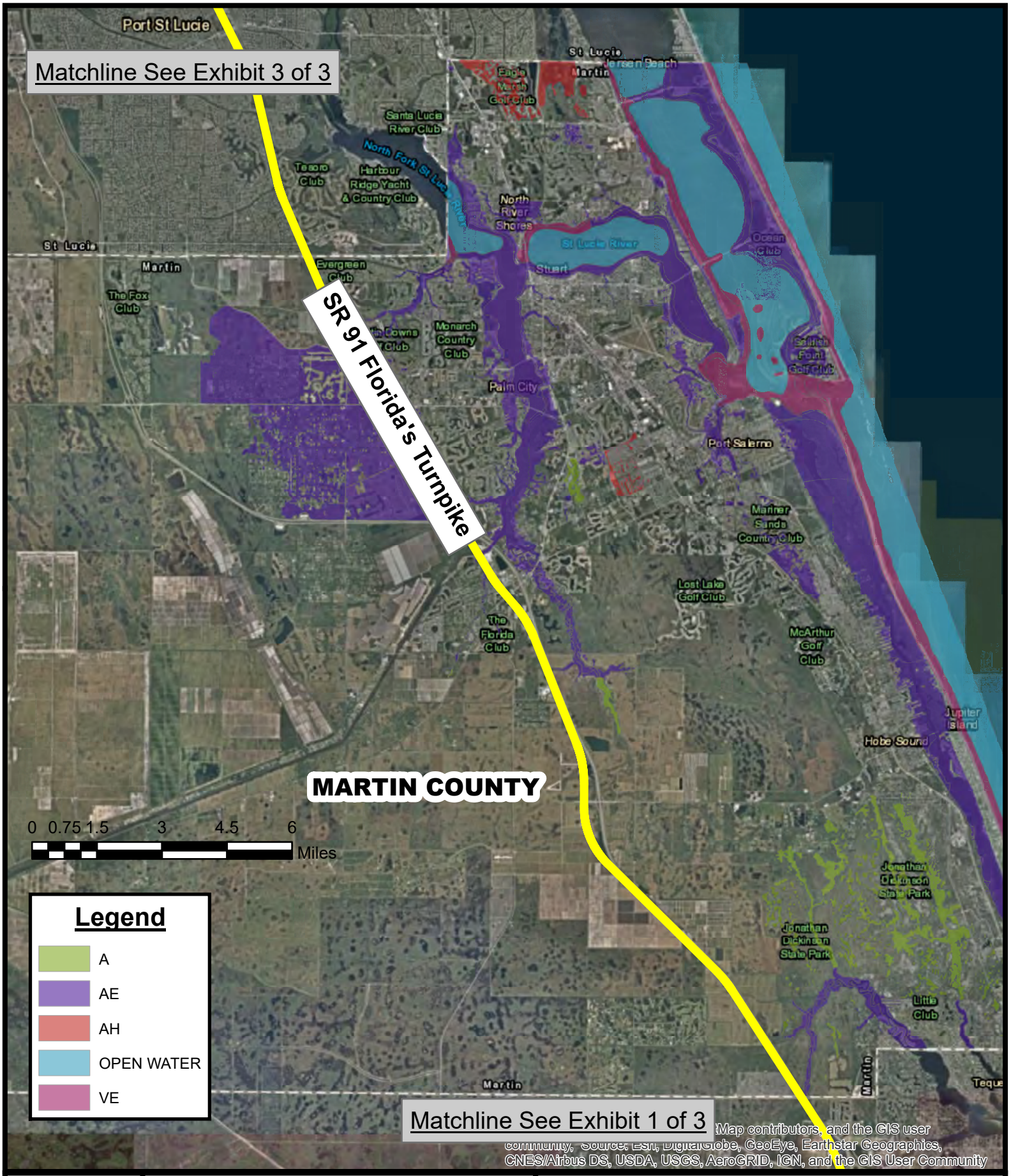
Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FEMA MAP

FPID 423374-1-22-01 Date: 1/17/2019

Exhibit 1 of 3



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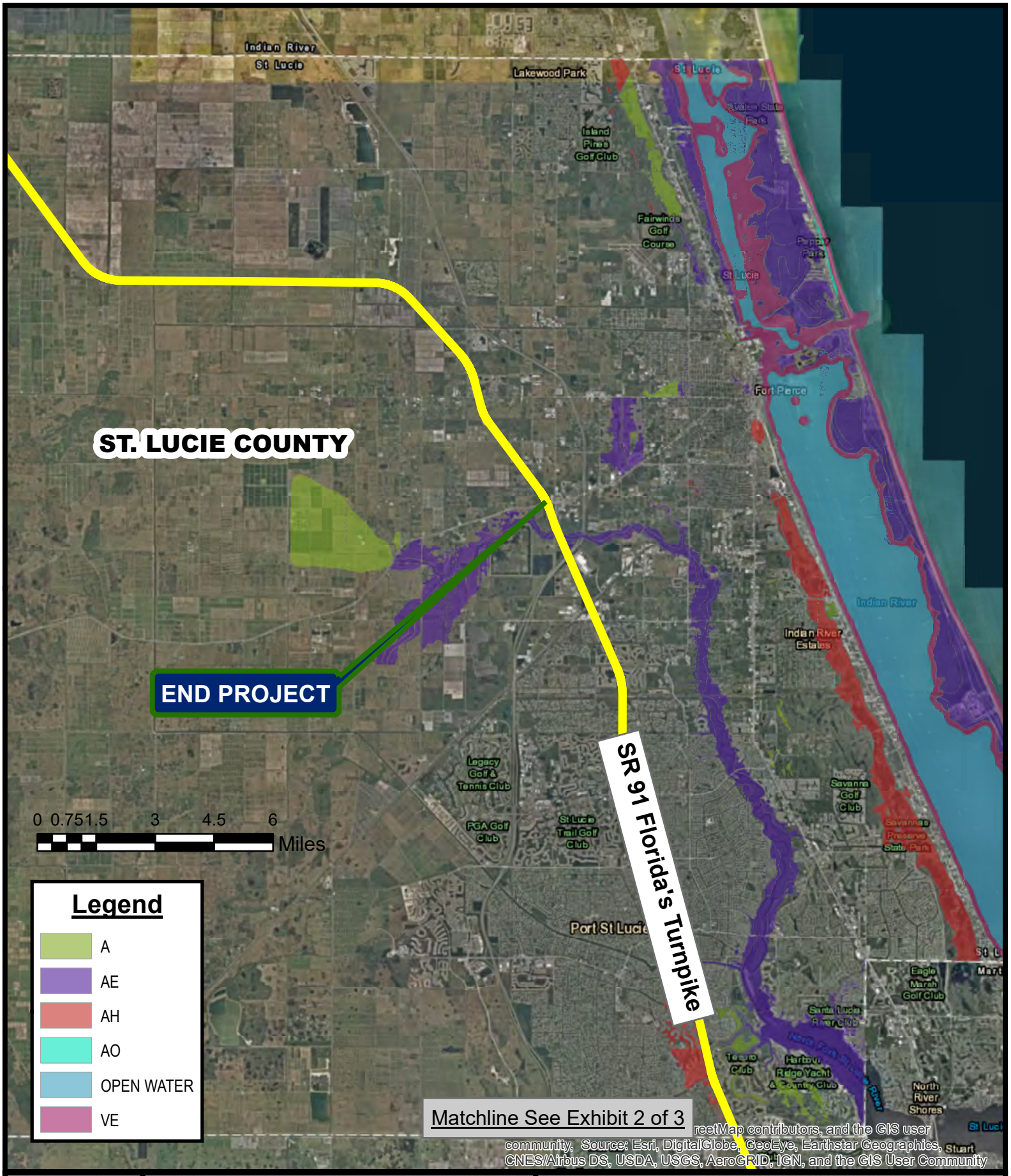
Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FEMA MAP

FPID 423374-1-22-01 Date: 1/17/2019

Exhibit 2 of 3



N
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Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FEMA MAP

FPID 423374-1-22-01 Date: 1/17/2019

Exhibit 3 of 3

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded tenth-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS Zone 0901 Feet. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

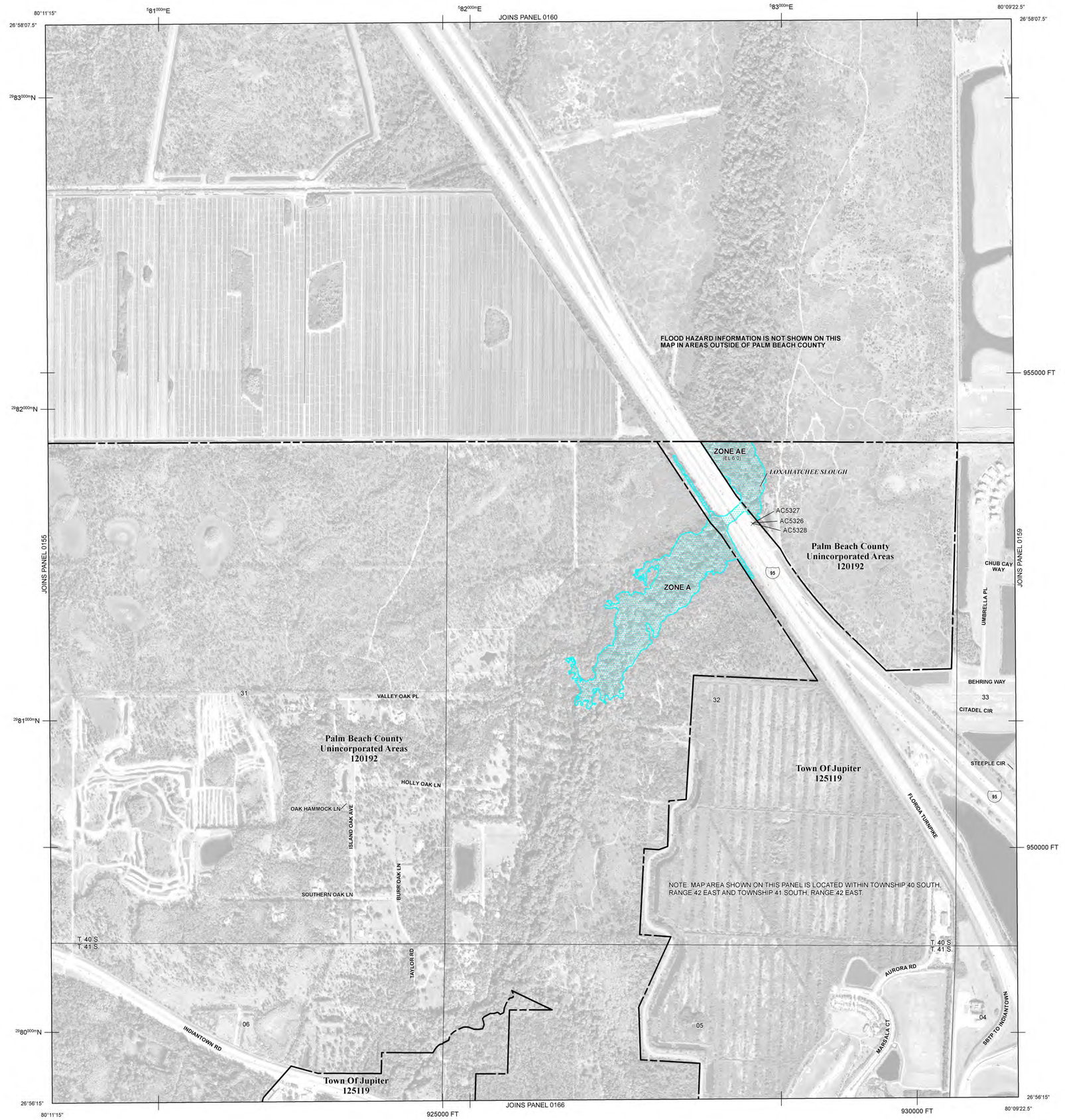
Base map information shown on this FIRM was provided in digital format by Palm Beach County. The original orthophotographic base imagery was provided in color with a one-foot pixel resolution at a scale of 1" = 200' from photography flown November 2010 - January 2011.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 901), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
OCTOBER 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0158F

FIRM

FLOOD INSURANCE RATE MAP

PALM BEACH COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 158 OF 1200

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JUPITER, TOWN OF	125119	0158	F
PALM BEACH COUNTY	120192	0158	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12099C0158F

EFFECTIVE DATE OCTOBER 5, 2017

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded tenth-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS Zone 0901 Feet. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

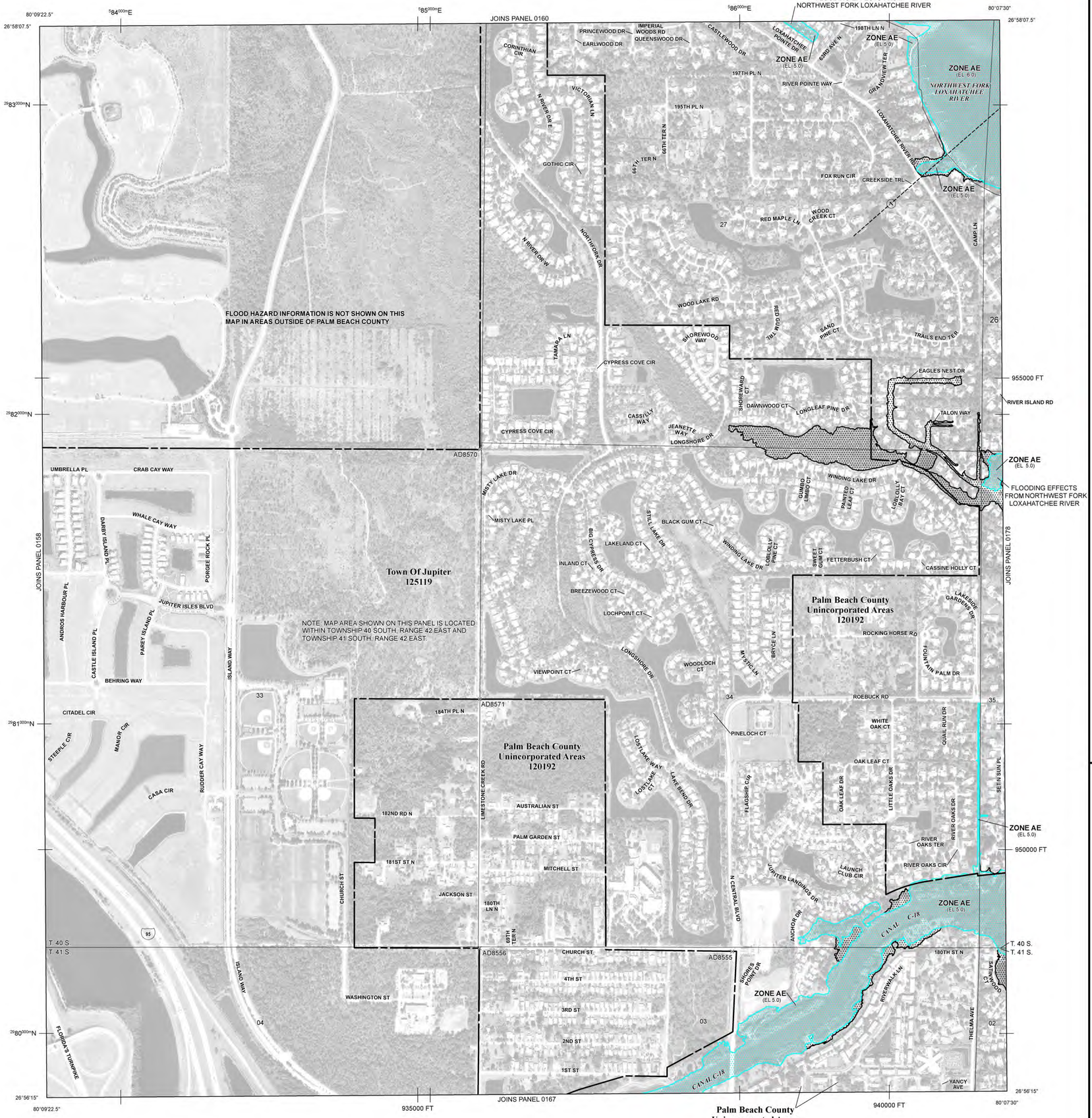
Base map information shown on this FIRM was provided in digital format by Palm Beach County. The original orthophotographic base imagery was provided in color with a one-foot pixel resolution at a scale of 1" = 200' from photography flown November 2010 - January 2011.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A)–(A) Cross section line
- (23)–(23) Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000mE 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 6000000 FT 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 901), Transverse Mercator projection
- DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
OCTOBER 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0159F

FIRM

FLOOD INSURANCE RATE MAP

PALM BEACH COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 159 OF 1200

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JUPITER, TOWN OF	125119	0159	F
PALM BEACH COUNTY	120192	0159	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12099C0159F

EFFECTIVE DATE OCTOBER 5, 2017

Federal Emergency Management Agency

NOTES TO USERS

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To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded tenth-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS Zone 0901 Feet. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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Silver Spring, Maryland 20910-3282
(301) 713-3242

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Base map information shown on this FIRM was provided in digital format by Palm Beach County. The original orthophotographic base imagery was provided in color with a one-foot pixel resolution at a scale of 1" = 200' from photography flown November 2010 - January 2011.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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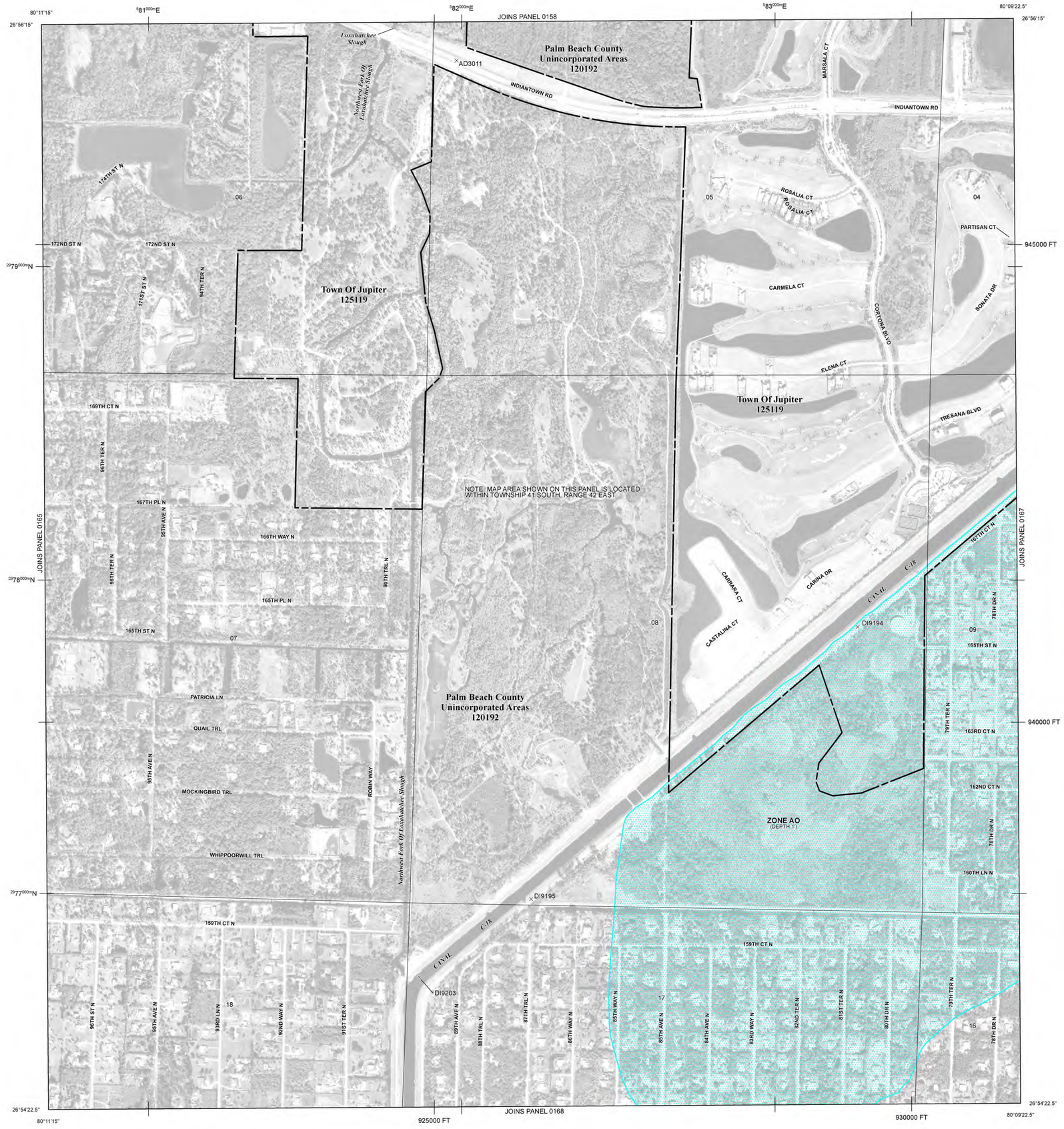

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
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Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 901), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
OCTOBER 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0166F

FIRM

FLOOD INSURANCE RATE MAP

PALM BEACH COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 166 OF 1200
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JUPITER, TOWN OF	125119	0166	F
PALM BEACH COUNTY	120192	0166	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12099C0166F

EFFECTIVE DATE
OCTOBER 5, 2017

Federal Emergency Management Agency

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

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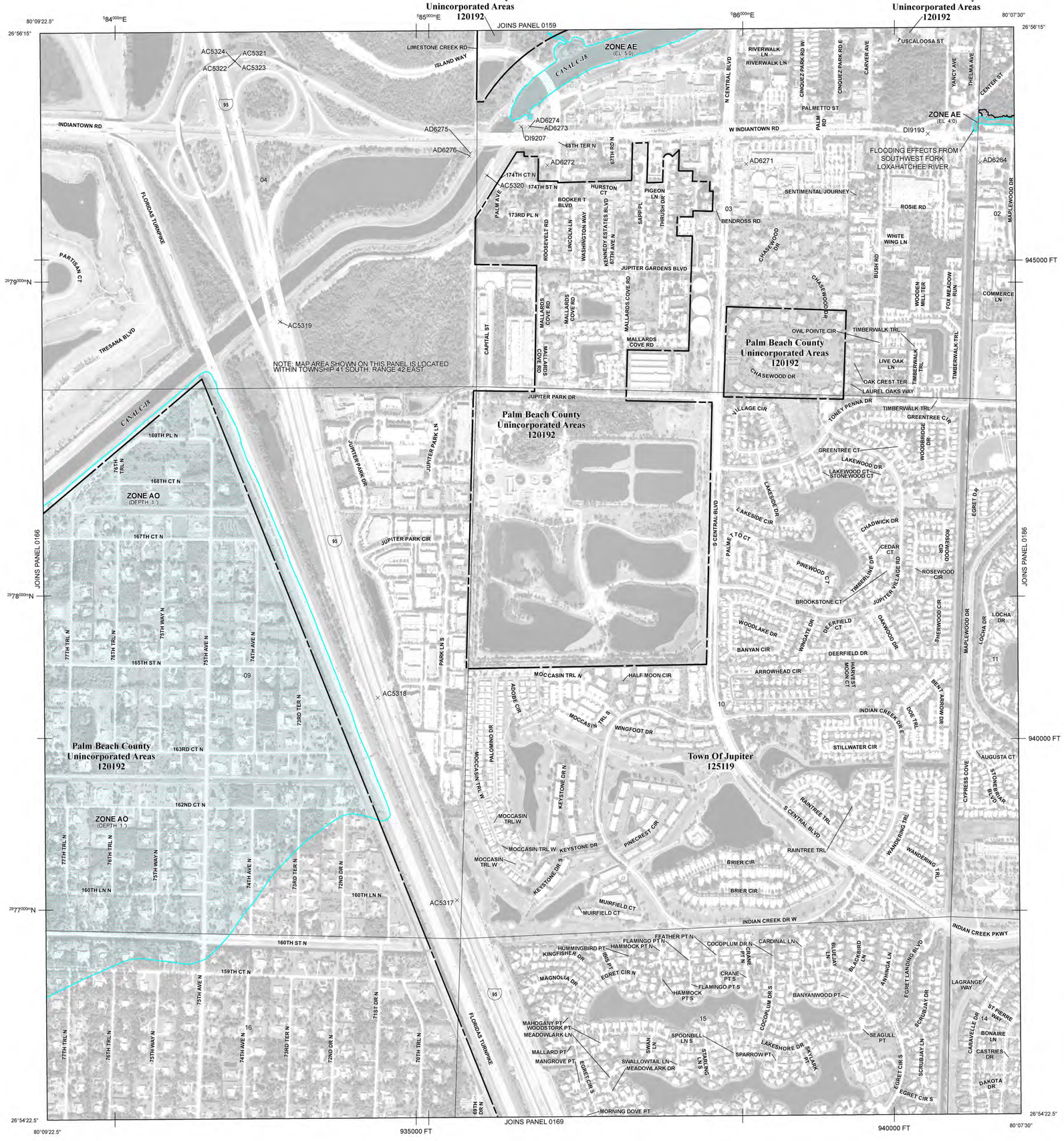

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A No Base Flood Elevations determined.

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ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
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Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
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(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
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A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 901), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
OCTOBER 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0167F

FIRM

FLOOD INSURANCE RATE MAP

PALM BEACH COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 167 OF 1200

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
JUPITER, TOWN OF	125119	0167	F
PALM BEACH COUNTY	120192	0167	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12099C0167F

EFFECTIVE DATE OCTOBER 5, 2017

Federal Emergency Management Agency

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99 With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X Future Conditions 1% Annual Chance Flood Hazard Zone X Area with Reduced Flood Risk due to Levee See Notes. Zone X Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard Zone X Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
	16.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect Coastal Transect Baseline Profile Baseline Hydrographic Feature Base Flood Elevation Line (BFE)
OTHER FEATURES		Limit of Study Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities participating in the National FIRM Program may obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Martin County Information Technology Services Department, dated 2003, 2012 and 2015, the Florida Department of Transportation, dated 2014, 2015 and 2019, the U.S. Geological Survey, dated 2006, and the U.S. Department of Agriculture, dated 2016.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and FCTs may reflect stream channel distances that differ from what is shown on the map.

SCALE

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

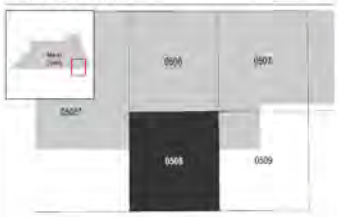
N

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MARTIN COUNTY, FLORIDA
and Incorporated Areas

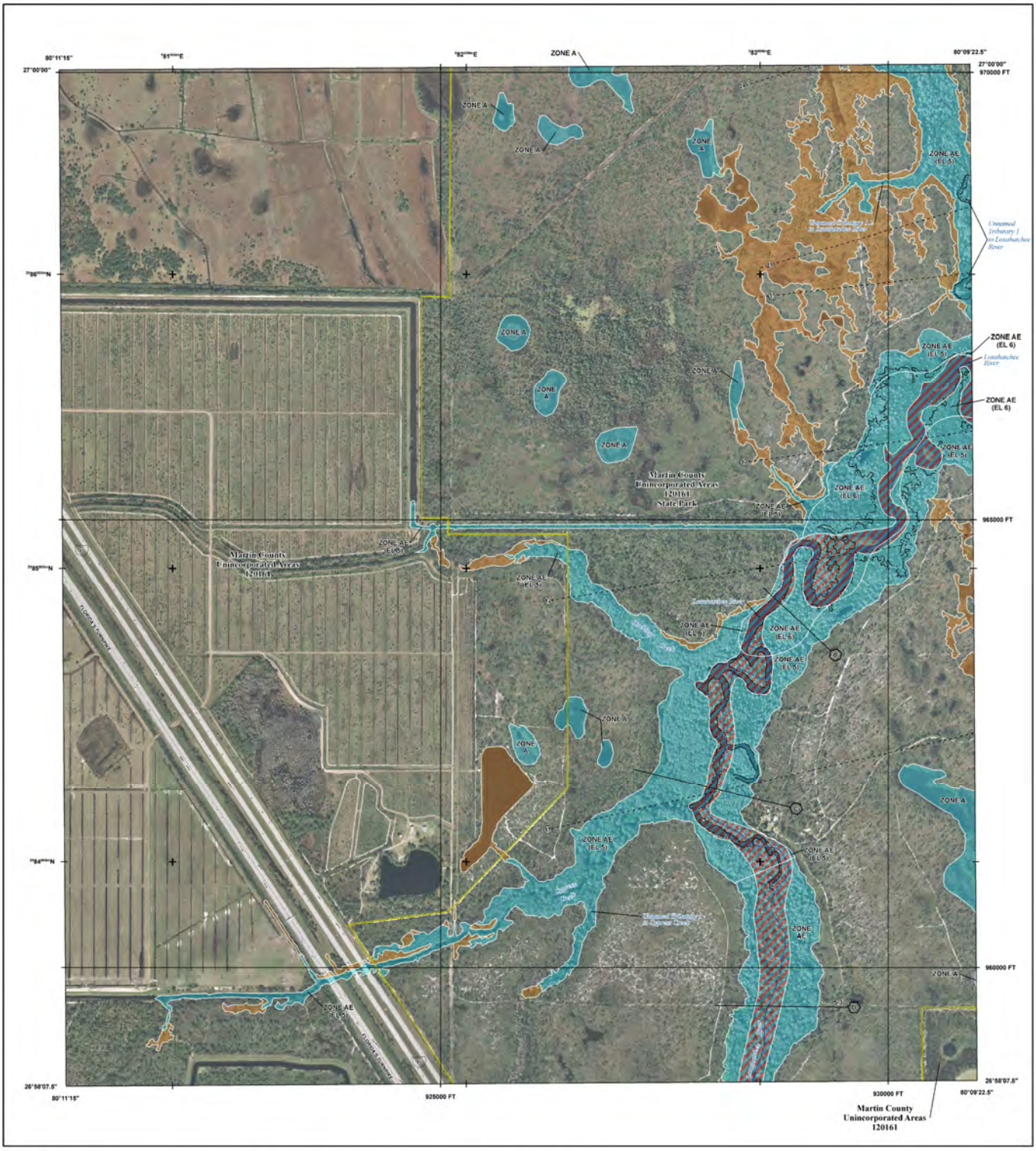
PANEL 508 OF 527

COMMUNITY	NUMBER	PANEL	SUFFIX
MARTIN COUNTY	120161	0508	H

VERSION NUMBER
2.3.3.2

MAP NUMBER
12085C0508H

MAP REVISED
FEBRUARY 19, 2020



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AH, AO, VE, V1-V30
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation (17.5 / 16.2)
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE) 513
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

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SCALE

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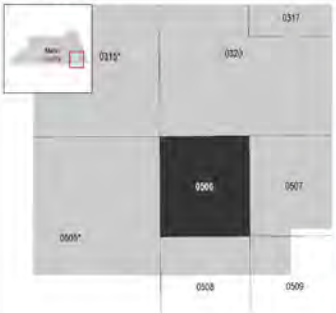
1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MARTIN COUNTY, FLORIDA and Incorporated Areas

PANEL 506 OF 527

COMMUNITY	NUMBER	PANEL	SUFFIX
MARTIN COUNTY	120161	0506	H

VERSION NUMBER 2.3.3.2

MAP NUMBER 12085C0506H

MAP REVISED FEBRUARY 19, 2020

FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

PANEL LOCATOR

FEMA

National Flood Insurance Program

FLOOD HAZARD INFORMATION

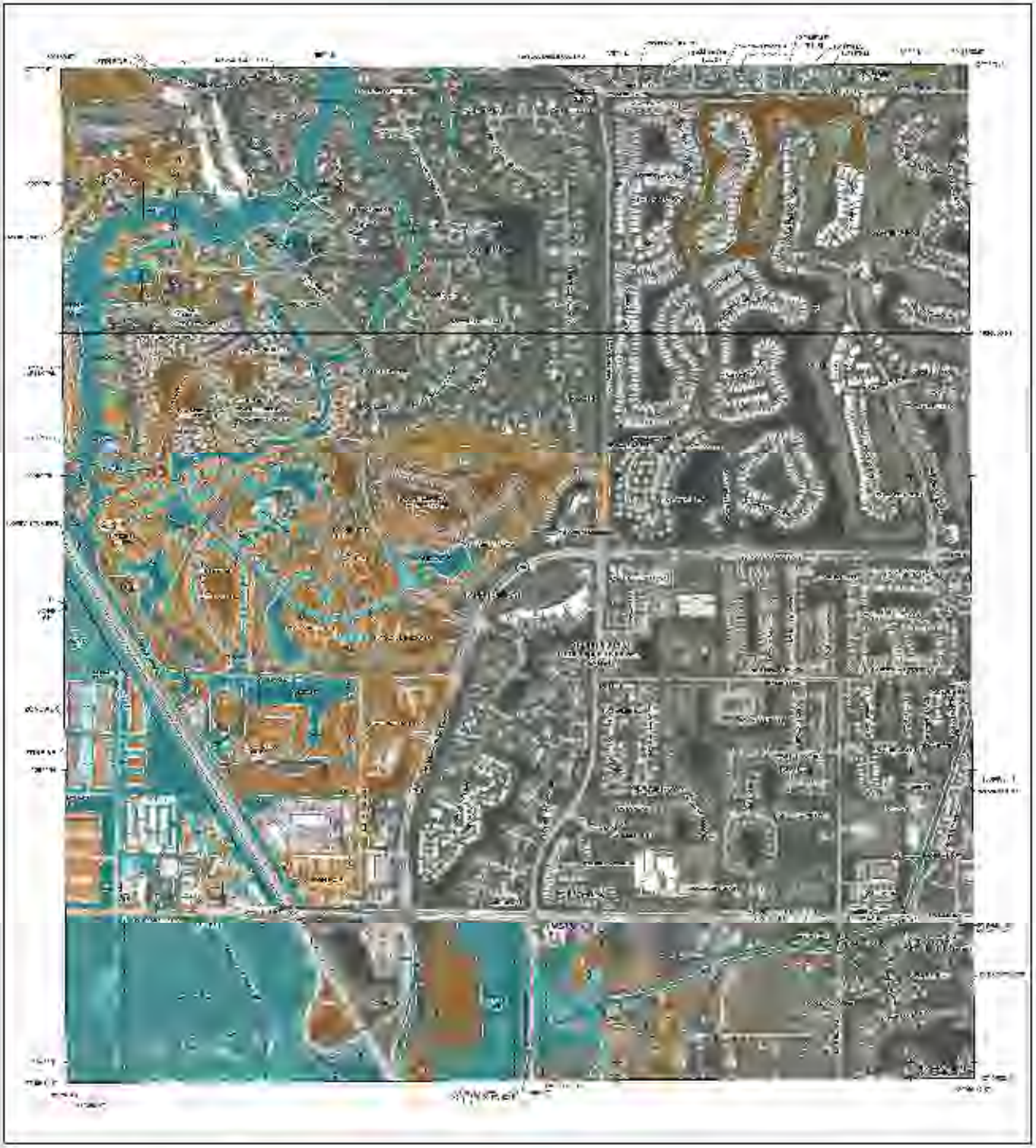
NOTES TO USERS

SCALE

PANEL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

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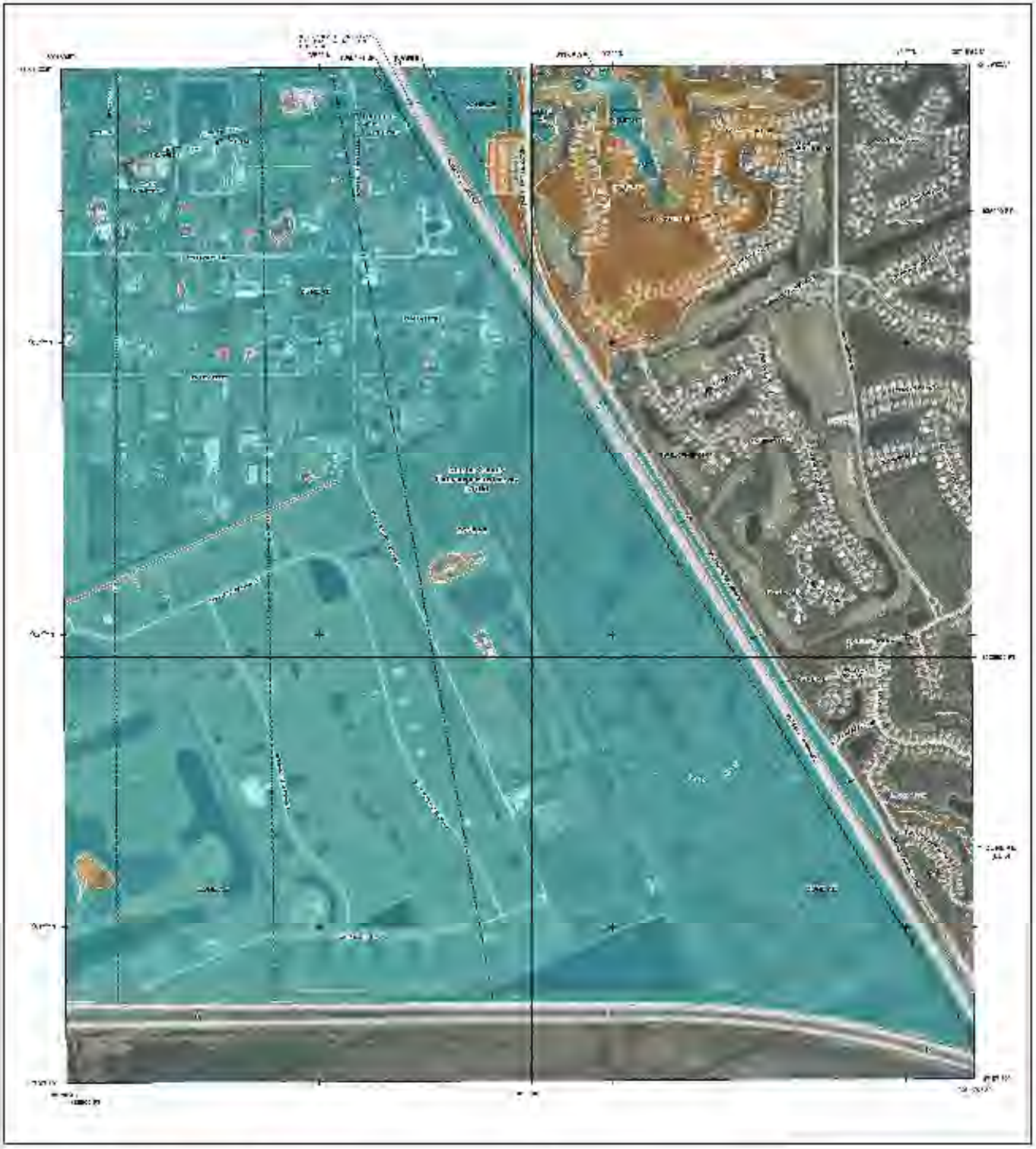
National Flood Insurance Program



FLOOD HAZARD INFORMATION

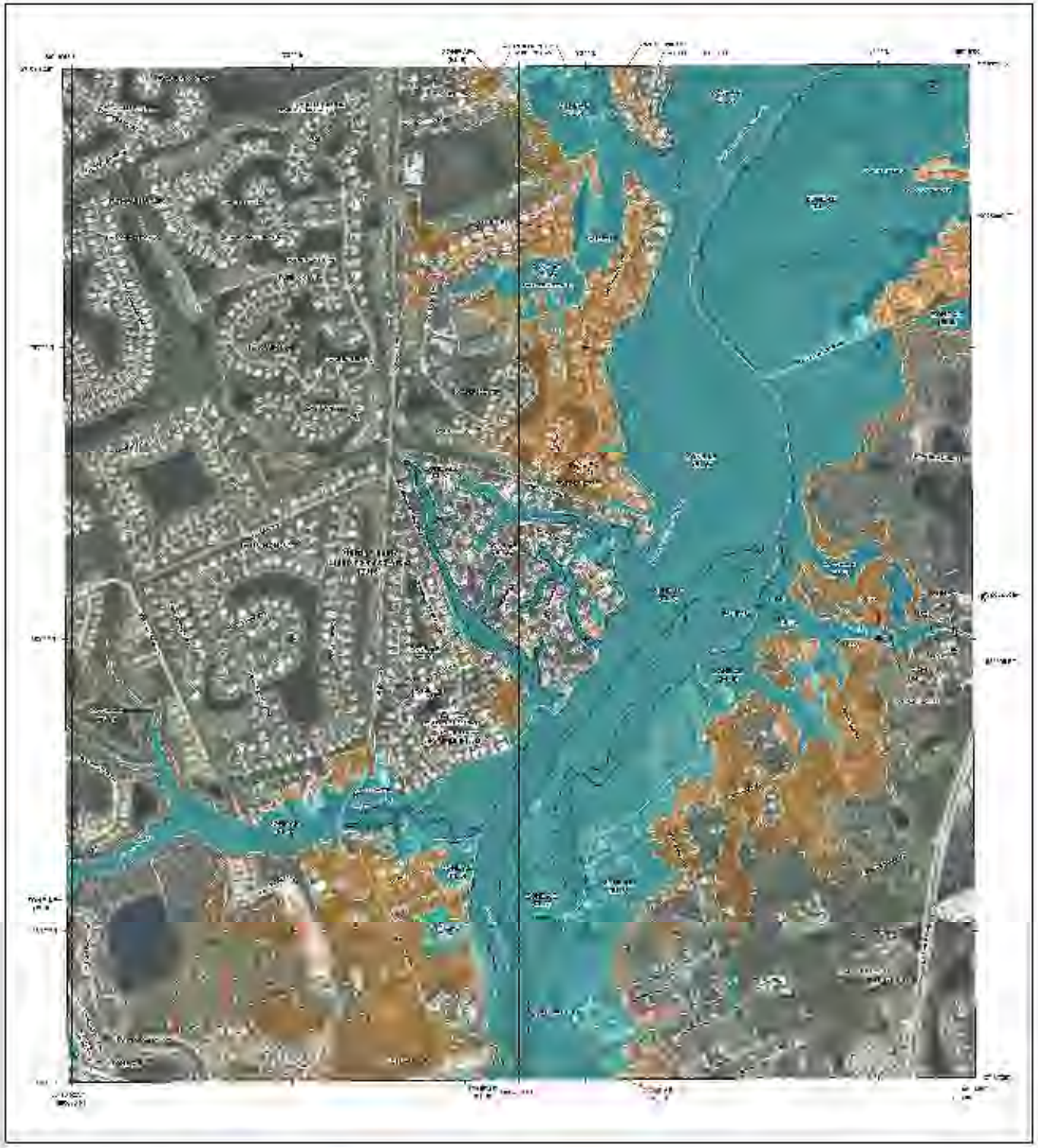
NOTES TO USERS

SCALE

PANEL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

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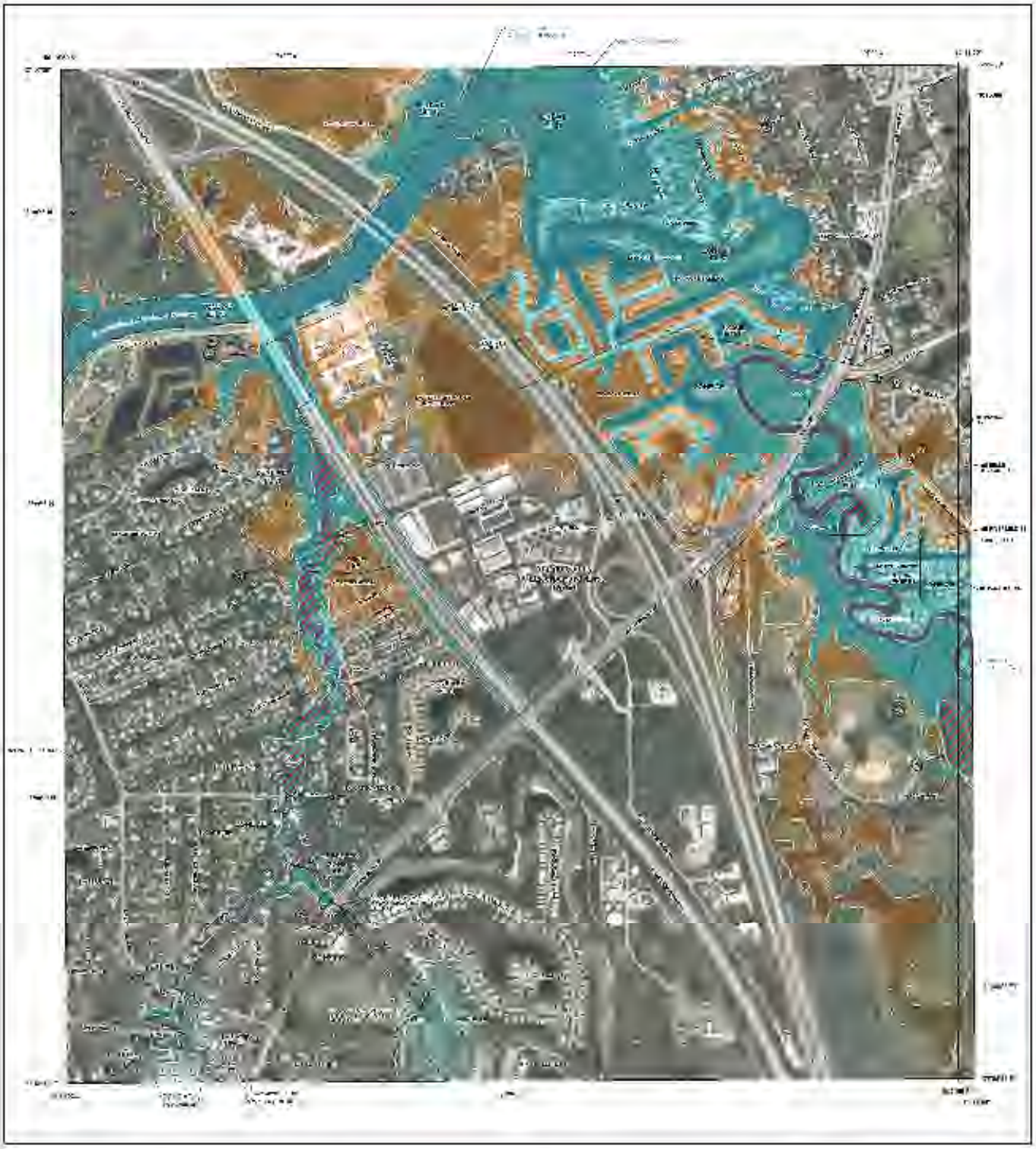
PANEL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

PANEL LOCATION

FEMA

National Flood Insurance Program

FLOOD HAZARD INFORMATION

NOTES TO USERS

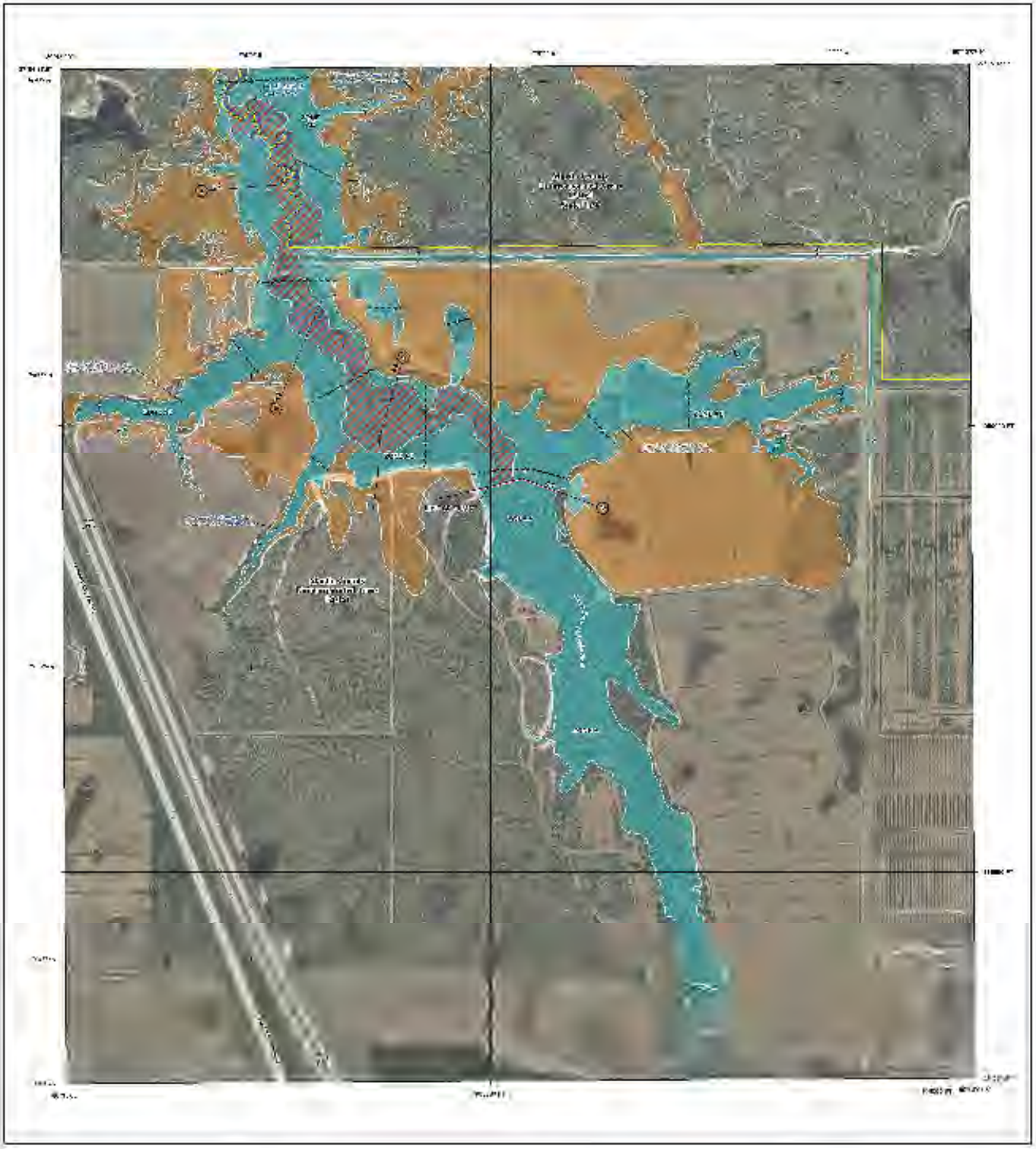
SCALE

N

FOR EL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

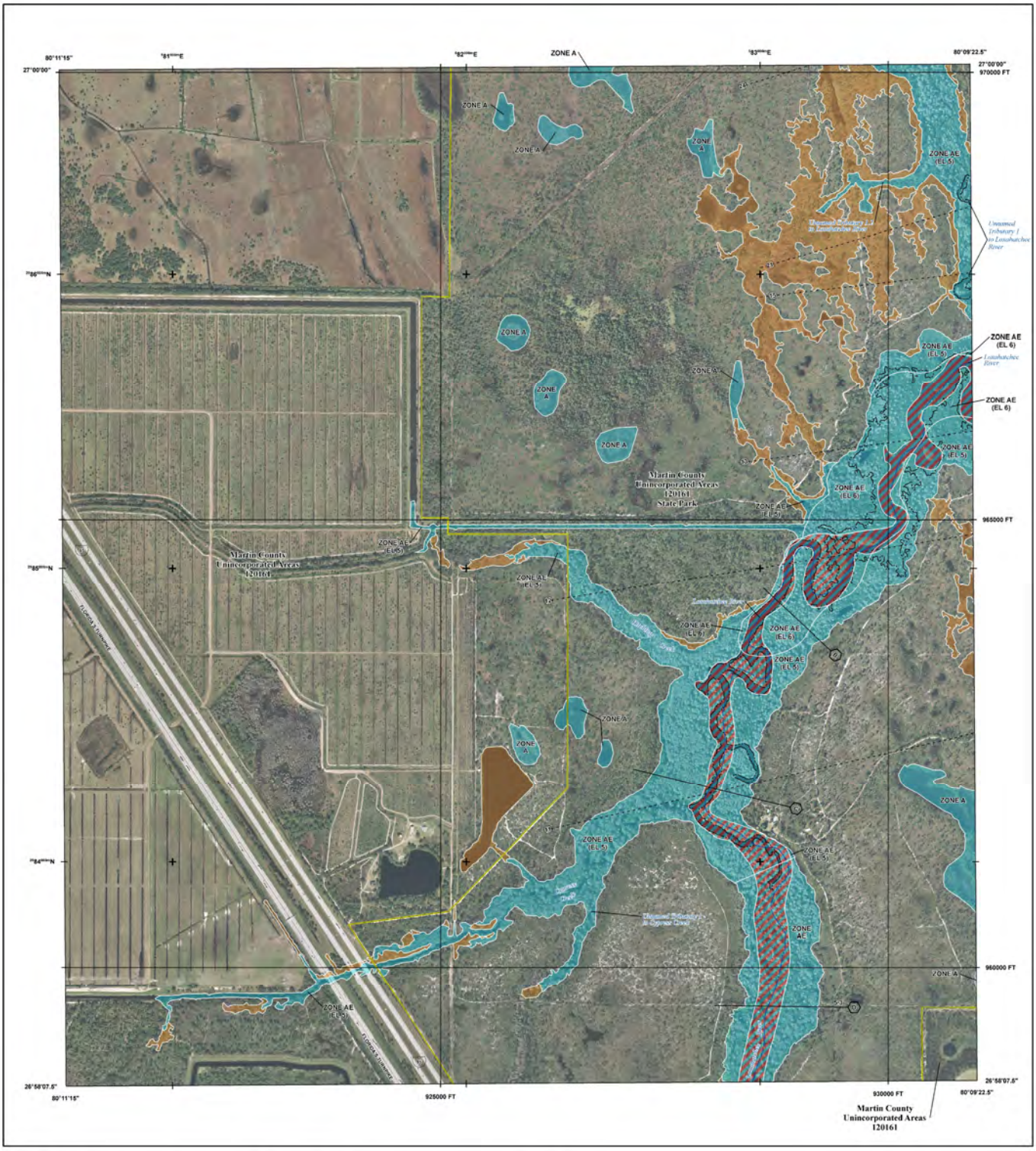
NOTES TO USERS

SCALE

PANEL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

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- Cross Sections with 1% Annual Chance Water Surface Elevation (17.5 / 16.2)
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- Coastal Transect Baseline
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- Base Flood Elevation Line (BFE) 513
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Communities participating in the National FIRM Program must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the Martin County Information Technology Services Department, dated 2003, 2012 and 2015, the Florida Department of Transportation, dated 2014, 2015 and 2016, the U.S. Geological Survey, dated 2006, and the U.S. Department of Agriculture, dated 2016.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and FCTs may reflect stream channel distances that differ from what is shown on the map.

SCALE

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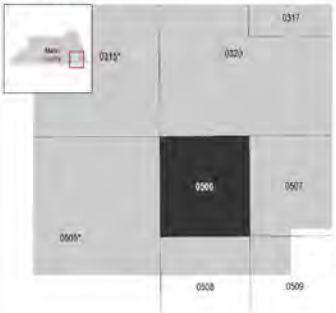
1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR



*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MARTIN COUNTY, FLORIDA and Incorporated Areas

PANEL 506 OF 527

COMMUNITY	NUMBER	PANEL	SUFFIX
MARTIN COUNTY	120161	0506	H

VERSION NUMBER 2.3.3.2

MAP NUMBER 12085C0506H

MAP REVISED FEBRUARY 19, 2020

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS 0901. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by St. Lucie County and the Florida Geographic Data Library.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

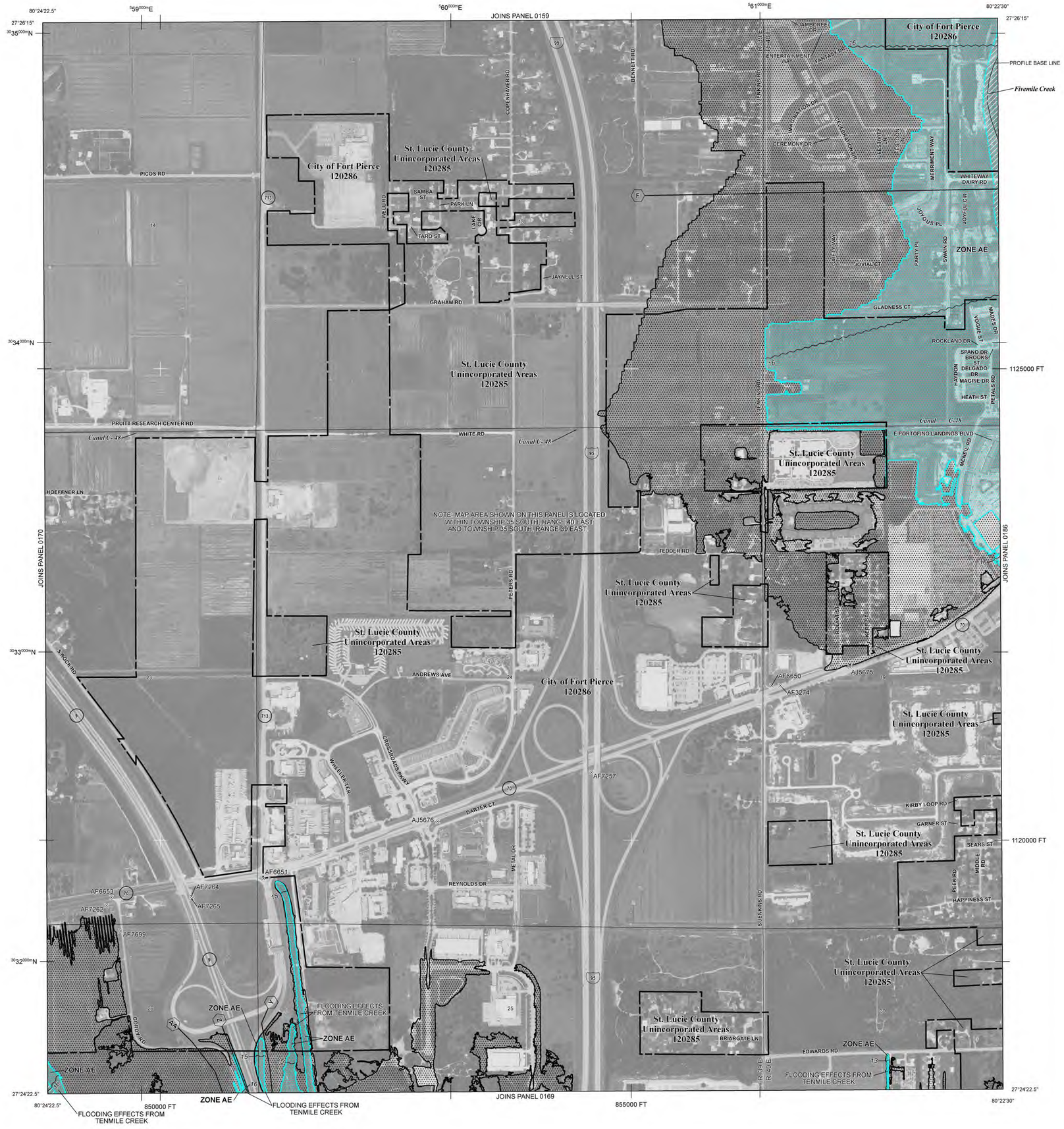
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Information eXchange (FMIX)** at 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FMIX may also be reached at its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17

6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 19, 1991

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
November 4, 1992

June 30, 1999

February 16, 2012 - to update corporate limits, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to add roads and road names, to update the effects of wave action, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0167J

FIRM

FLOOD INSURANCE RATE MAP

ST. LUCIE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 167 OF 420

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FORT PIERCE, CITY OF	120286	0167	J
ST. LUCIE COUNTY	120285	0167	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12111C0167J

MAP REVISED
FEBRUARY 16, 2012

Federal Emergency Management Agency

NOTES TO USERS

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Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

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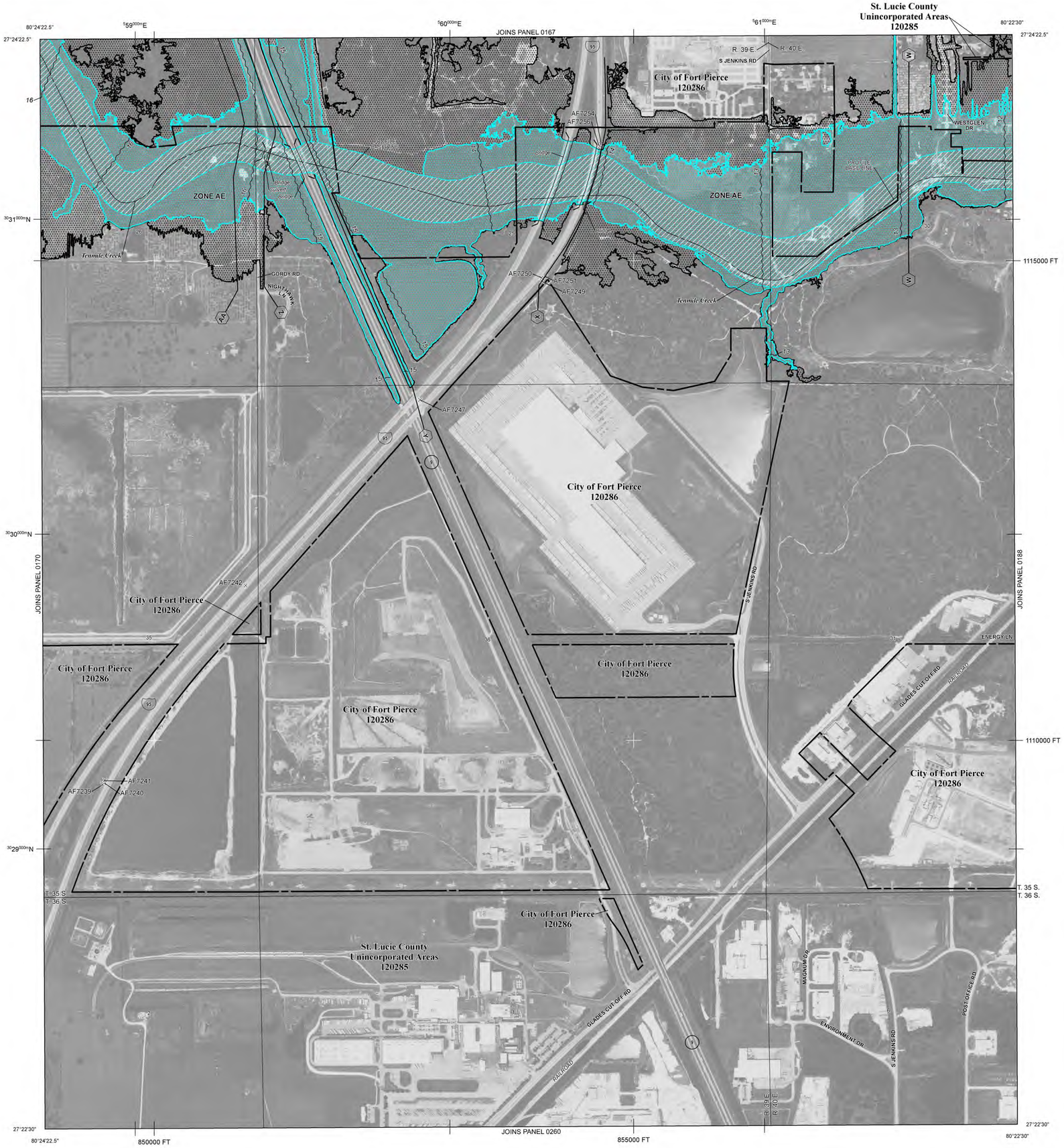

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
A–A — Cross section line
23–23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 19, 1991

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
November 4, 1992

June 30, 1999

February 16, 2012 - to update corporate limits, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to add roads and road names, to update the effects of wave action, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 250 500 750 1,000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0169J

FIRM

FLOOD INSURANCE RATE MAP

ST. LUCIE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 169 OF 420

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FORT PIERCE, CITY OF	120286	0169	J
ST. LUCIE COUNTY	120285	0169	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12111C0169J

MAP REVISED
FEBRUARY 16, 2012

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS 0901. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

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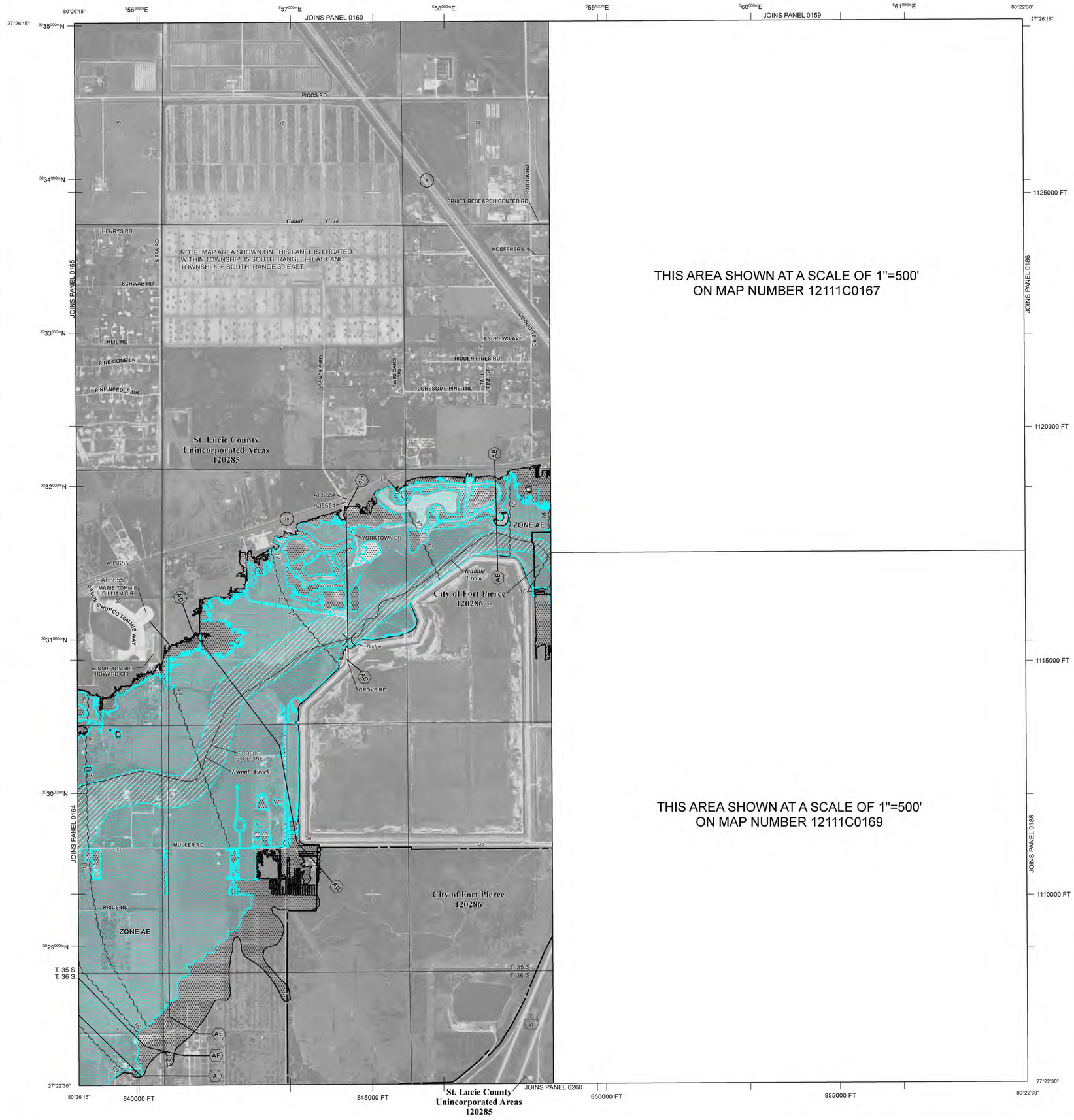

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
A — A — Cross section line
23 — 23 — Transect line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

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EFFECTIVE DATE OF COUNTYWIDE
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August 19, 1991

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MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0170J

FIRM

FLOOD INSURANCE RATE MAP

ST. LUCIE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 170 OF 420

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FORT PIERCE, CITY OF	120286	0170	J
ST. LUCIE COUNTY	120285	0170	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12111C0170J

MAP REVISED
FEBRUARY 16, 2012

Federal Emergency Management Agency

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LEGEND

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ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

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0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988
A — A — Cross section line
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6000000 FT — 5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection
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M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 19, 1991

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
November 4, 1992

June 30, 1999

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MAP SCALE 1" = 1000'

500 0 500 1,000 1,500 2,000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0260J

FIRM

FLOOD INSURANCE RATE MAP

ST. LUCIE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 260 OF 420

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

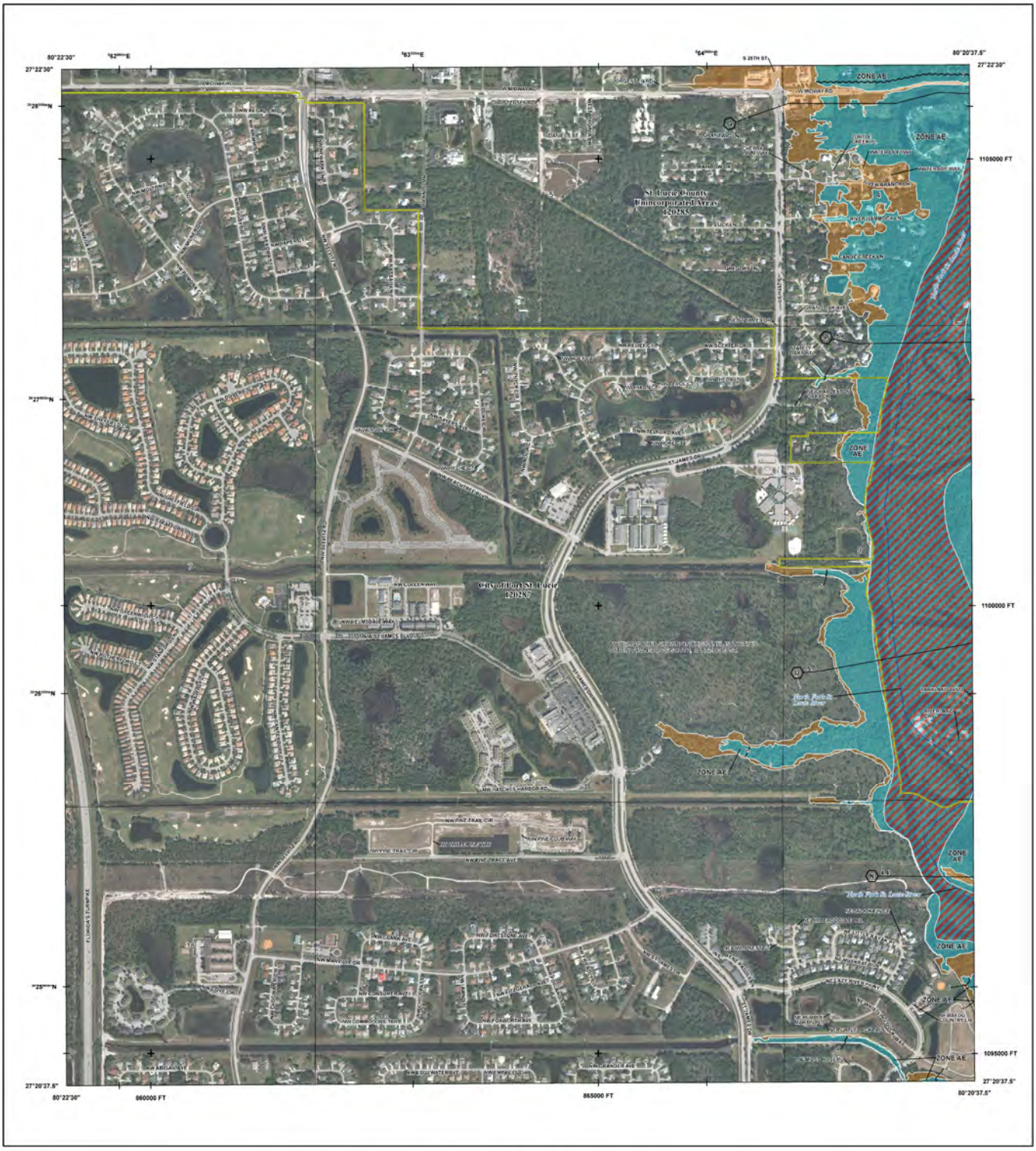
COMMUNITY	NUMBER	PANEL	SUFFIX
FORT PIERCE, CITY OF	120286	0260	J
PORT ST. LUCIE, CITY OF	120287	0260	J
ST. LUCIE COUNTY	120285	0260	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12111C0260J

MAP REVISED FEBRUARY 16, 2012

Federal Emergency Management Agency



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AH, AO, VE, V1-V30
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall
- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- Base Flood Elevation Line (BFE)

OTHER FEATURES
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities participating in the National FIRM Program must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by the St. Lucie County Planning and Development Services Department, dated 2009, 2010 and 2019, the Florida Department of Transportation, dated 2019, the Bureau of Land Management, dated 2004, and the U.S. Department of Agriculture, dated 2019.

SCALE

N

1 inch = 500 feet 1:6,000

0 250 500 750 1,000 2,000 feet

0 125 250 500 meters

PANEL LOCATOR

*PANEL NOT PRINTED

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

ST. LUCIE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 276 OF 420

COMMUNITY	NUMBER	PANEL	SUFFIX
PORT ST. LUCIE, CITY OF	120297	0276	K
ST. LUCIE COUNTY	120285	0276	K

VERSION NUMBER
2.3.3.2

MAP NUMBER
12111C0276K

MAP REVISED
FEBRUARY 19, 2020

FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

N

PANEL LOCATION

FEMA

National Flood Insurance Program

FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

PANEL LOCATION

FEMA

National Flood Insurance Program

FLOOD HAZARD INFORMATION

NOTES TO USERS

SCALE

N

PANEL LOCATION

FEMA

National Flood Insurance Program

FLOOD HAZARD INFORMATION

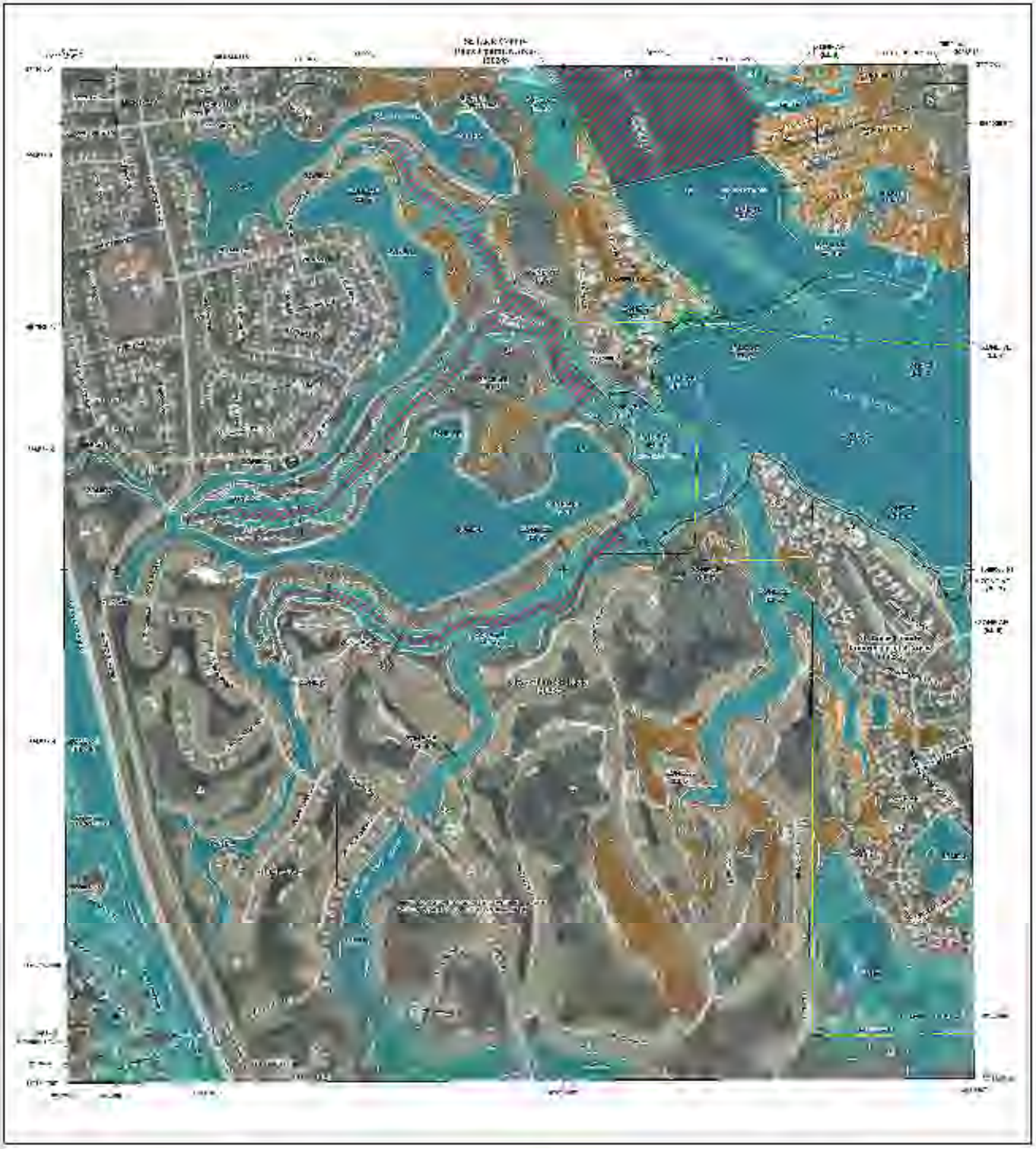
NOTES TO USERS

SCALE

PSN EL LOCATOR

FEMA

National Flood Insurance Program



FLOOD HAZARD INFORMATION

NOTES TO USERS

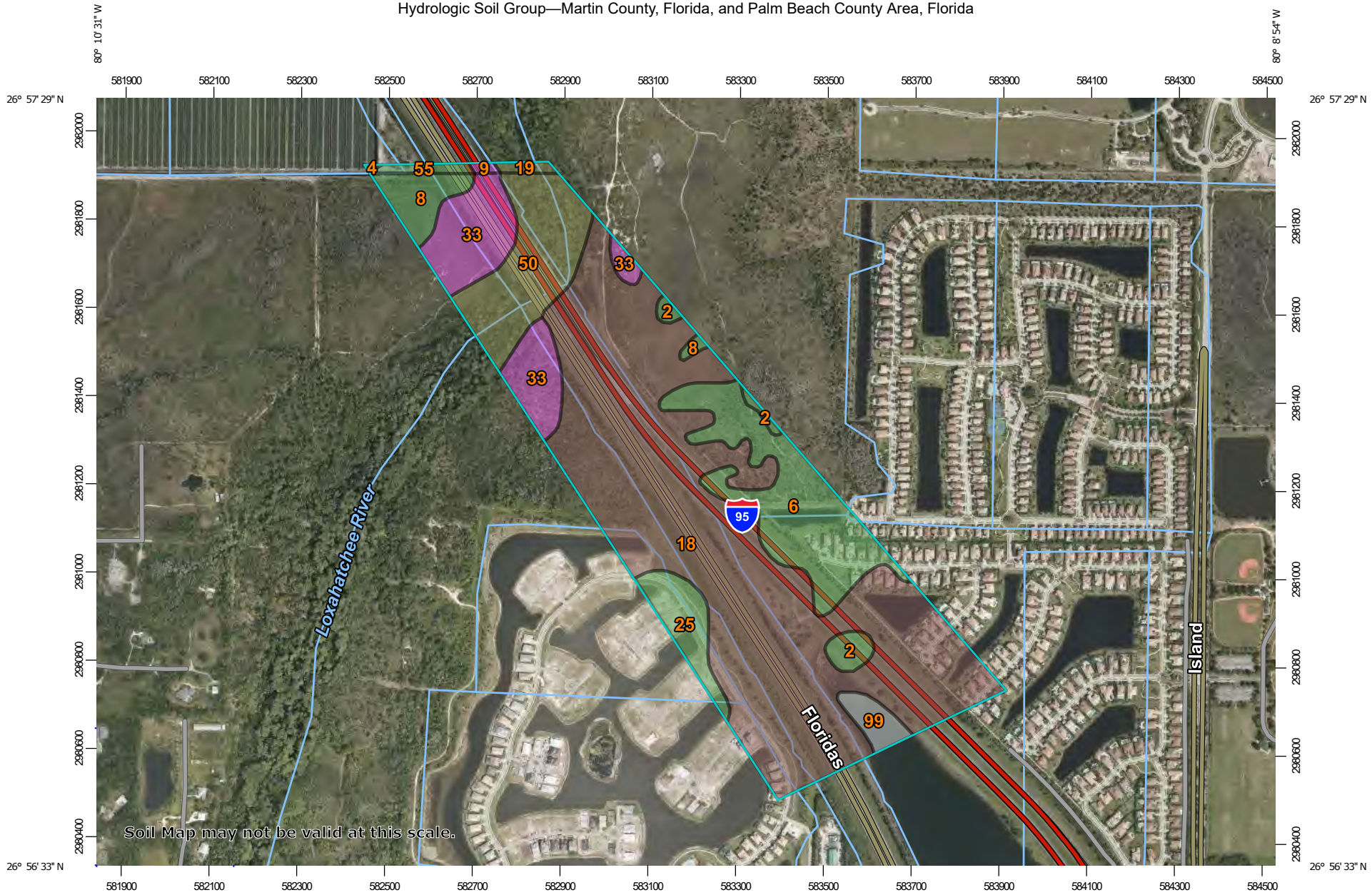
SCALE

PANEL LOCATOR

FEMA

National Flood Insurance Program

APPENDIX E
SOILS DATA



Map Scale: 1:12,300 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Martin County, Florida
Survey Area Data: Version 19, Jun 9, 2020

Soil Survey Area: Palm Beach County Area, Florida
Survey Area Data: Version 17, Jun 9, 2020

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: Mar 7, 2019—Mar 13, 2019

MAP LEGEND

MAP INFORMATION

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	A/D	0.1	0.0%
9	Pomello sand, 0 to 5 percent slopes	A	0.3	0.2%
19	Winder sand, frequently ponded, 0 to 1 percent slopes	C/D	0.8	0.4%
55	Basinger fine sand, 0 to 2 percent slopes	A/D	1.2	0.6%
Subtotals for Soil Survey Area			**2.4**	**1.3%**
Totals for Area of Interest			**185.4**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Anclote fine sand	A/D	3.0	1.6%
6	Basinger fine sand, 0 to 2 percent slopes	A/D	22.7	12.2%
8	Basinger and Myakka sands, depressional	A/D	5.4	2.9%
18	Immokalee fine sand, 0 to 2 percent slopes	B/D	109.2	58.9%
25	Oldsmar sand, 0 to 2 percent slopes	A/D	6.1	3.3%
33	Pomello fine sand, 0 to 5 percent slopes	A	16.5	8.9%
50	Winder fine sand, 0 to 2 percent slopes	C/D	17.2	9.3%
99	Water		2.8	1.5%
Subtotals for Soil Survey Area			**182.9**	**98.7%**
Totals for Area of Interest			**185.4**	**100.0%**

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher


80° 18' 43" W
80° 16' 16" W
27° 9' 57" N
27° 7' 3" N
568400
569000
569600
570200
570800
571400
572000
3004700
3004100
3003500
3002900
3002300
3001700
3001100
3000500
2999900
Danforth Creek
Mapps Creek
23
99
36
63
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53
52
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99
61
67
35
61
99
61
95
Map Scale: 1:26,200 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 350 700 1400 2100
Feet
0 1000 2000 4000 6000
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 1:20,000.

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: Martin County, Florida
Survey Area Data: Version 16, Oct 5, 2017

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
23	Urban land		5.7	0.7%
35	Salerno sand	A/D	0.3	0.0%
36	Arents, 0 to 2 percent slopes	A	37.2	4.7%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	C/D	0.8	0.1%
52	Malabar fine sand, high, 0 to 2 percent slopes	A/D	17.8	2.2%
53	Udorthents, 0 to 35 percent slopes	A	2.9	0.4%
56	Wabasso and Oldsmar fine sands, depressional	C/D	8.6	1.1%
61	Hobe fine sand, 0 to 5 percent slopes	A	10.7	1.3%
63	Nettles sand	C/D	688.0	86.4%
67	Kesson sand, tidal	A/D	14.5	1.8%
99	Water		9.7	1.2%
Totals for Area of Interest			**796.2**	**100.0%**

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Map Scale: 1:21,600 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 300 600 1200 1800

Feet: 0 1000 2000 4000 6000

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 1:20,000.

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: Martin County, Florida
Survey Area Data: Version 16, Oct 5, 2017

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Waveland and Lawnwood fine sands, depressional	A/D	6.4	0.8%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	A/D	4.4	0.6%
23	Urban land		6.6	0.9%
36	Arents, 0 to 2 percent slopes	A	22.5	2.9%
56	Wabasso and Oldsmar fine sands, depressional	C/D	12.2	1.6%
61	Hobe fine sand, 0 to 5 percent slopes	A	69.4	9.1%
63	Nettles sand	C/D	622.6	81.6%
67	Kesson sand, tidal	A/D	14.6	1.9%
99	Water		4.6	0.6%
Totals for Area of Interest			**763.3**	**100.0%**

Description

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.

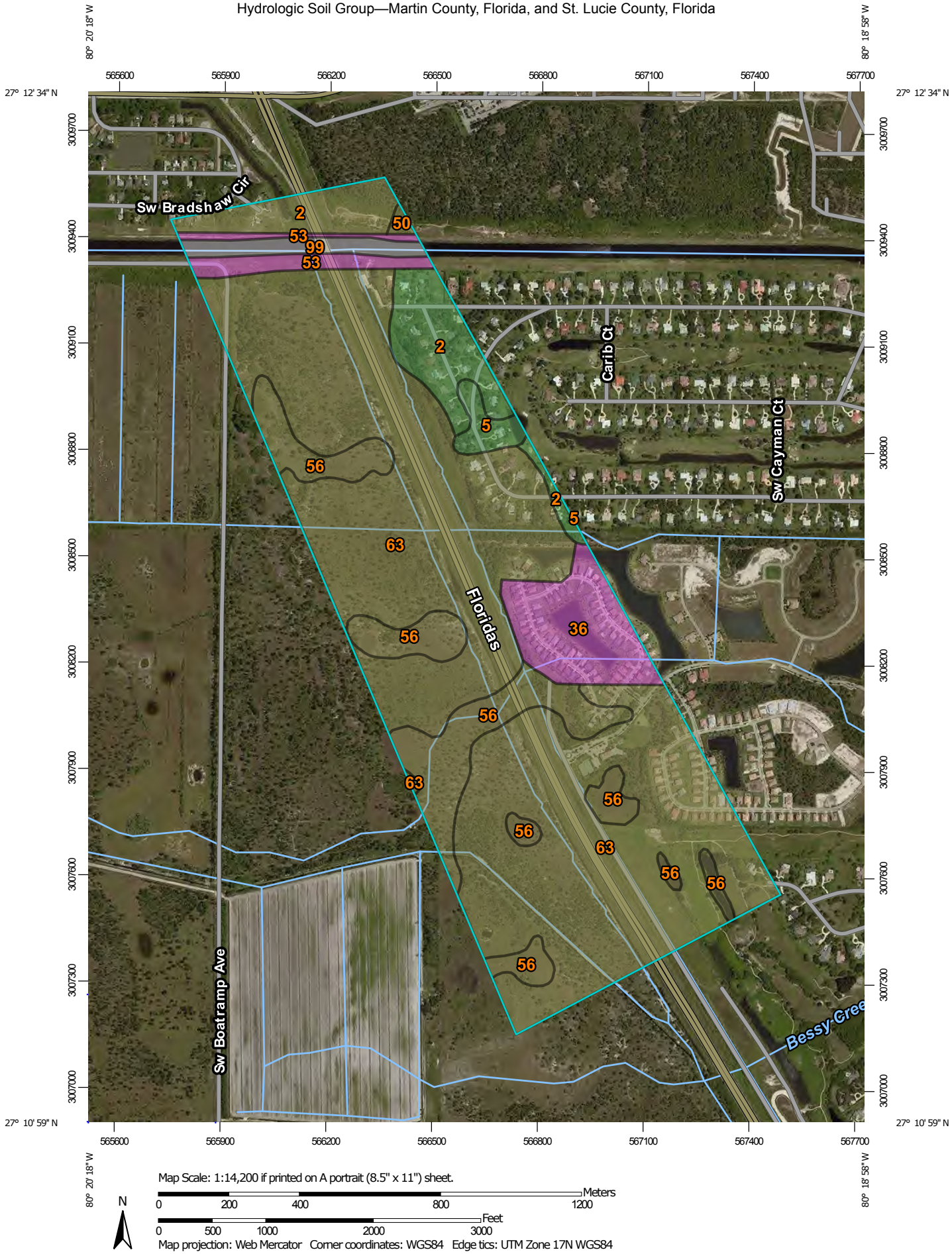
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher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80° 18' 58" W
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565900
566200
566500
566800
567100
567400
567700
27° 12' 34" N
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3009700
3009400
3009100
3008800
3008500
3008200
3007900
3007600
3007300
3007000
Sw Bradshaw Cir
Caribb Ct
Sw Cayman Ct
Floridas
Sw Boatramp Ave
Bessy Cree
2
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56
56
56
Map Scale: 1:14,200 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0
200
400
800
1200
Feet
0
500
1000
2000
3000
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: Martin County, Florida
Survey Area Data: Version 16, Oct 5, 2017

Soil Survey Area: St. Lucie County, Florida
Survey Area Data: Version 10, Oct 6, 2017

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: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Lawnwood and Myakka fine sands	A/D	22.5	5.2%
5	Waveland and Lawnwood fine sands, depressional	A/D	5.5	1.3%
36	Arents, 0 to 2 percent slopes	A	26.3	6.1%
53	Udorthents, 0 to 35 percent slopes	A	10.4	2.4%
56	Wabasso and Oldsmar fine sands, depressional	C/D	55.4	12.9%
63	Nettles sand	C/D	286.1	66.5%
99	Water		7.8	1.8%
Subtotals for Soil Survey Area			**414.0**	**96.2%**
Totals for Area of Interest			**430.5**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ankona and Farmton sands	C/D	15.6	3.6%
50	Waveland and Immokalee fine sands	C/D	0.9	0.2%
Subtotals for Soil Survey Area			**16.5**	**3.8%**
Totals for Area of Interest			**430.5**	**100.0%**

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Map Scale: 1:11,300 if printed on A portrait (8.5" x 11") sheet.

N

0 150 300 600 900 Meters

0 500 1000 2000 3000 Feet

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 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: St. Lucie County, Florida
Survey Area Data: Version 10, Oct 6, 2017

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
14	Fluvaquents, frequently flooded	D	8.6	2.9%
19	Jonathan sand, 0 to 5 percent slopes	A	5.5	1.9%
29	Pendarvis and Pomello sands, 0 to 5 percent slopes	A	11.5	4.0%
39	Salerno and Punta sands	A/D	35.6	12.3%
40	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D	8.3	2.9%
50	Waveland and Immokalee fine sands	C/D	189.2	65.2%
51	Waveland-Lawnwood complex, depressional	C/D	7.5	2.6%
99	Water		24.0	8.3%
Totals for Area of Interest			**290.2**	**100.0%**

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Map Scale: 1:14,300 if printed on A portrait (8.5" x 11") sheet.

N

0 200 400 800 1200 Meters

0 500 1000 2000 3000 Feet

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 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: St. Lucie County, Florida
Survey Area Data: Version 10, Oct 6, 2017

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ankona and Farmton sands	C/D	251.5	60.3%
19	Jonathan sand, 0 to 5 percent slopes	A	2.3	0.6%
50	Waveland and Immokalee fine sands	C/D	121.6	29.2%
51	Waveland-Lawnwood complex, depressional	C/D	38.8	9.3%
99	Water		2.7	0.7%
Totals for Area of Interest			**417.0**	**100.0%**

Description

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.

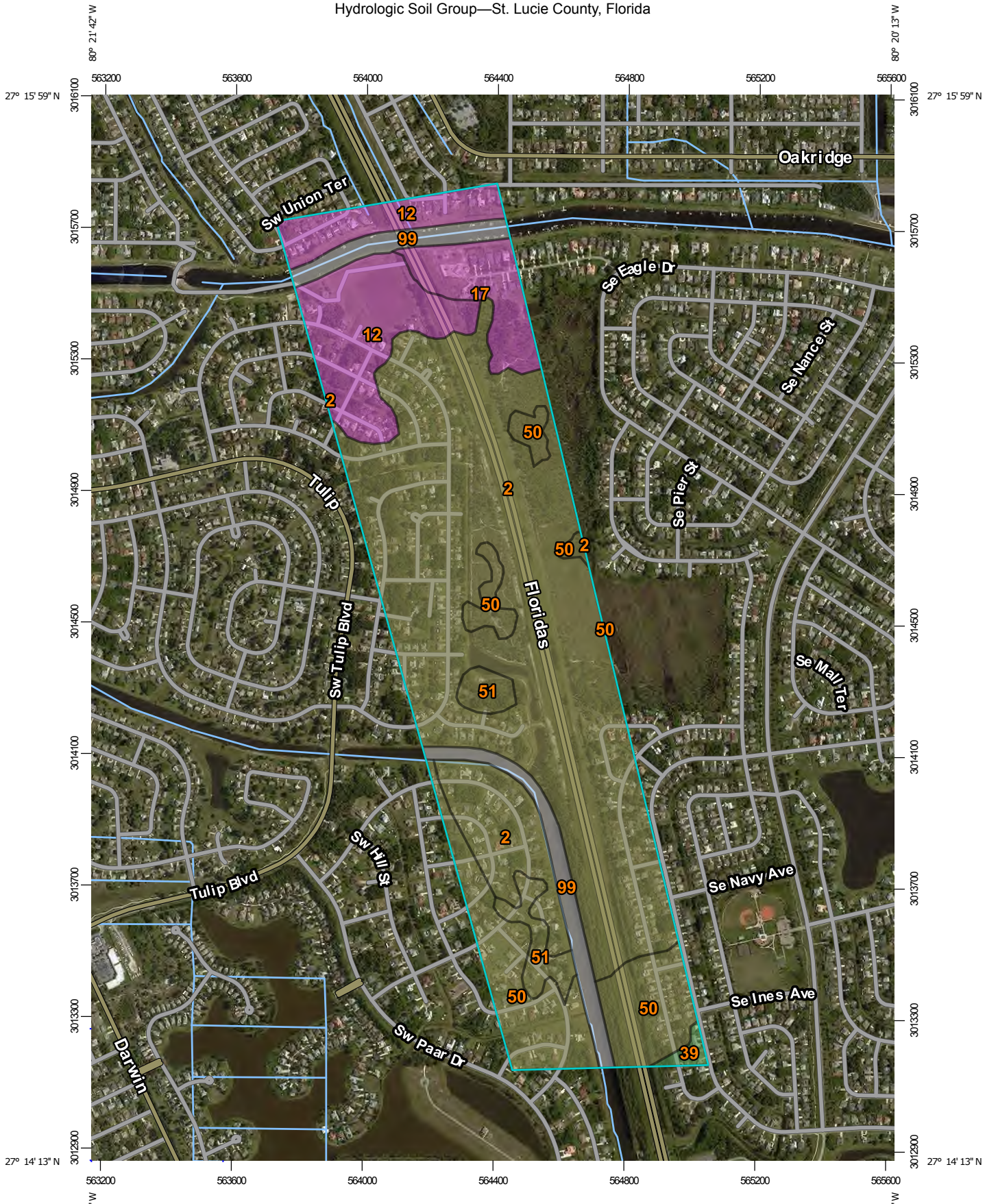
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher


80° 21' 42" W
80° 20' 13" W
27° 15' 59" N
27° 14' 13" N
563200
563600
564000
564400
564800
565200
565600
3016100
3015700
3015300
3014900
3014500
3014100
3013700
3013300
3012900
Oakridge
Sw Union Ter
Se Eagle Dr
Se Nance St
Se Pier St
Tulip
Sw Tulip Blvd
Floridas
Se Mall Ter
Sw Hill St
Tulip Blvd
Se Navy Ave
Se Ines Ave
Sw Paar Dr
Darwin
12
99
17
12
2
50
2
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2
50
50
51
2
99
51
50
50
39
Map Scale: 1:15,800 if printed on A portrait (8.5" x 11") sheet.
N
Meters
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200
400
800
1200
Feet
0
500
1000
2000
3000
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 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: St. Lucie County, Florida
Survey Area Data: Version 10, Oct 6, 2017

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ankona and Farmton sands	C/D	248.9	58.3%
12	Electra fine sand, 0 to 5 percent slopes	A	57.4	13.4%
17	Hobe sand, 0 to 5 percent slopes	A	20.7	4.9%
39	Salerno and Punta sands	A/D	2.3	0.5%
50	Waveland and Immokalee fine sands	C/D	60.6	14.2%
51	Waveland-Lawnwood complex, depressional	C/D	13.4	3.1%
99	Water		23.9	5.6%
Totals for Area of Interest			**427.1**	**100.0%**

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Map Scale: 1:90,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 1000 2000 4000 6000

Feet
0 4000 8000 16000 24000

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: Martin County, Florida
Survey Area Data: Version 17, Sep 17, 2018

Soil Survey Area: St. Lucie County, Florida
Survey Area Data: Version 11, Sep 17, 2018

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 15, 2010—May 8, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Lawnwood and Myakka fine sands	A/D	11.6	0.4%
5	Waveland and Lawnwood fine sands, depressional	A/D	4.7	0.2%
22	Okeelanta muck, frequently ponded, 0 to 1 percent slopes	A/D	3.9	0.1%
23	Urban land, 0 to 2 percent slopes		6.6	0.2%
35	Salerno sand	A/D	1.0	0.0%
36	Arents, 0 to 2 percent slopes	A	69.3	2.4%
38	Floridana fine sand, frequently ponded, 0 to 1 percent slopes	C/D	0.0	0.0%
52	Malabar fine sand, high, 0 to 2 percent slopes	A/D	17.4	0.6%
53	Udorthents, 0 to 35 percent slopes	A	12.7	0.4%
56	Wabasso and Oldsmar fine sands, depressional	C/D	58.5	2.0%
61	Hobe fine sand, 0 to 5 percent slopes	A	70.7	2.5%
63	Nettles sand	C/D	1,338.6	46.6%
67	Kesson sand, tidal	A/D	30.4	1.1%
99	Water		23.7	0.8%
Subtotals for Soil Survey Area			**1,649.1**	**57.4%**
Totals for Area of Interest			**2,874.3**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Ankona and Farmton sands	C/D	524.1	18.2%
12	Electra fine sand, 0 to 5 percent slopes	A	83.8	2.9%
14	Fluvaquents, frequently flooded	D	12.1	0.4%
17	Hobe sand, 0 to 5 percent slopes	A	24.1	0.8%
19	Jonathan sand, 0 to 5 percent slopes	A	11.4	0.4%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
29	Pendarvis and Pomello sands, 0 to 5 percent slopes	A	12.7	0.4%
39	Salerno and Punta sands	A/D	45.9	1.6%
40	Samsula muck, frequently ponded, 0 to 1 percent slopes	A/D	17.2	0.6%
50	Waveland and Immokalee fine sands	C/D	378.1	13.2%
51	Waveland-Lawnwood complex, depressional	C/D	61.4	2.1%
99	Water		54.2	1.9%
Subtotals for Soil Survey Area			**1,225.2**	**42.6%**
Totals for Area of Interest			**2,874.3**	**100.0%**

Description

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:

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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.

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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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX F

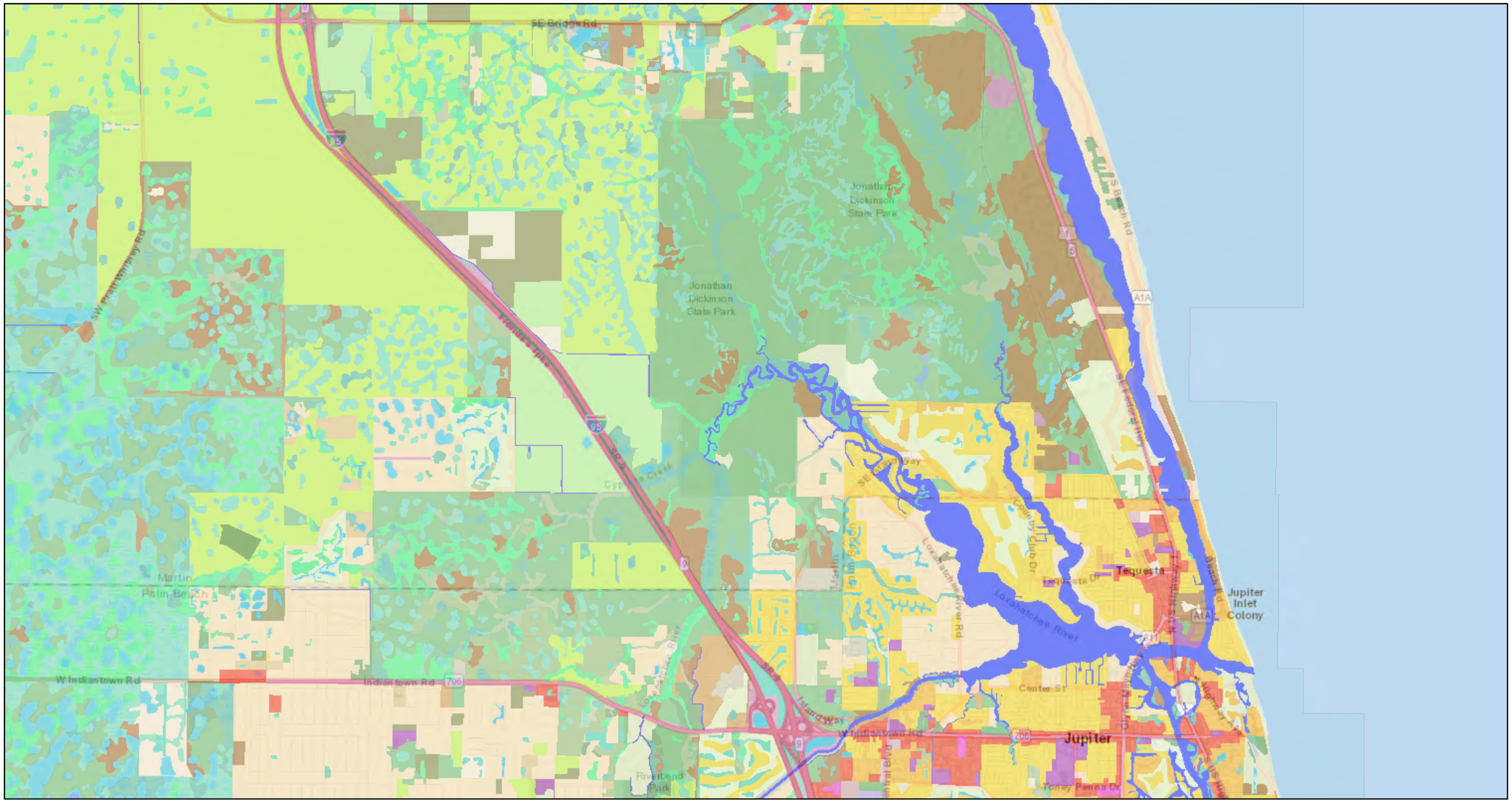
EXISTING AND FUTURE LAND USE MAP

Existing Land Use Maps Legend

Statewide Land Use Land Cover

- Residential Low Density
- Residential Medium Density
- Residential High Density
- Commercial and Services
- Industrial
- Extractive
- Institutional
- Recreational
- Open Land
- Cropland and Pastureland
- Tree Crops
- Feeding Operations
- Nurseries and Vineyards
- Specialty Farms
- Other Open Lands <Rural>
- Herbaceous
- Shrub and Brushland
- Mixed Rangeland
- Upland Coniferous Forests
- Upland Hardwood Forests
- Upland Mixed Forests
- Tree Plantations
- Streams and Waterways
- Lakes
- Reservoirs
- Bays and Estuaries
- Major Springs
- Slough Waters
- Oceans Seas and Gulfs
- Wetland Hardwood Forests
- Wetland Coniferous Forests
- Wetland Forested Mixed
- Vegetated Non-Forested Wetlands
- Non-Vegetated
- Salt Flats
- Beaches Other Than Swimming Beaches
- Sand Other Than Beaches
- Exposed Rock
- Disturbed Lands
- Riverine Sandbars
- Transportation
- Communications
- Utilities

Existing Land Use Map (Palm Beach and Martin Counties)



April 19, 2021

1:72,224

Statewide Land Use Land Cover

- Residential Low Density
- Residential Medium Density
- Residential High Density
- Commercial and Services
- Industrial
- Extractive

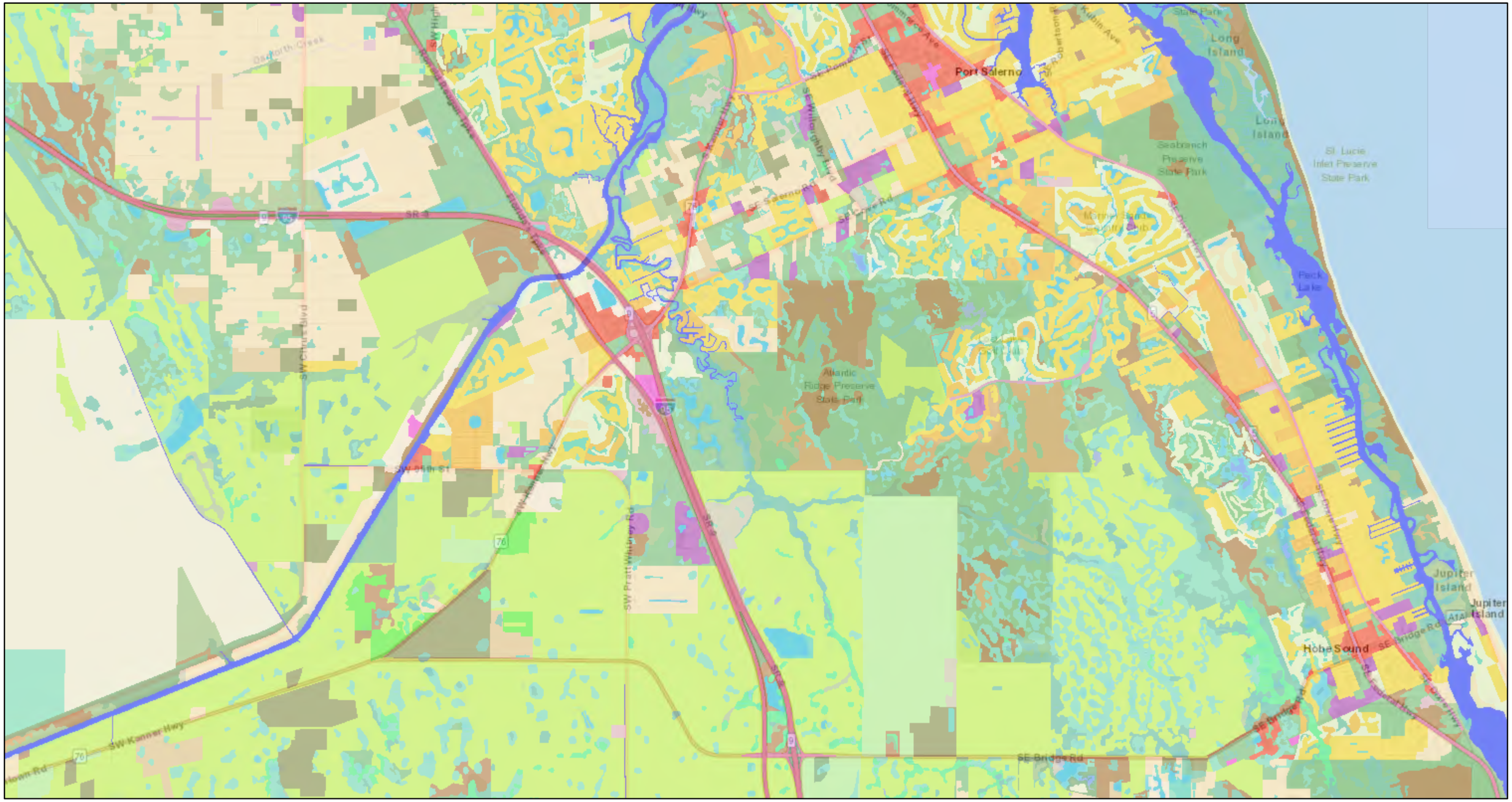
0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, SRWMD,SJRWMD, SFWMD, SWFWMD, NWFWMD

Map created by Map Direct, powered by ESRI.

Existing Land Use Map (Martin County)



April 19, 2021

1:72,224

Statewide Land Use Land Cover

- Residential Low Density
- Residential Medium Density
- Residential High Density
- Commercial and Services
- Industrial
- Extractive

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, SRWMD,SJRWMD, SFWMD, SWFWMD, NWFWMD

Map created by Map Direct, powered by ESRI.

Existing Land Use Map (Martin and St. Lucie Counties)

April 19, 2021

Statewide Land Use Land Cover

- Residential Low Density
- Residential Medium Density
- Residential High Density
- Commercial and Services
- Industrial
- Extractive

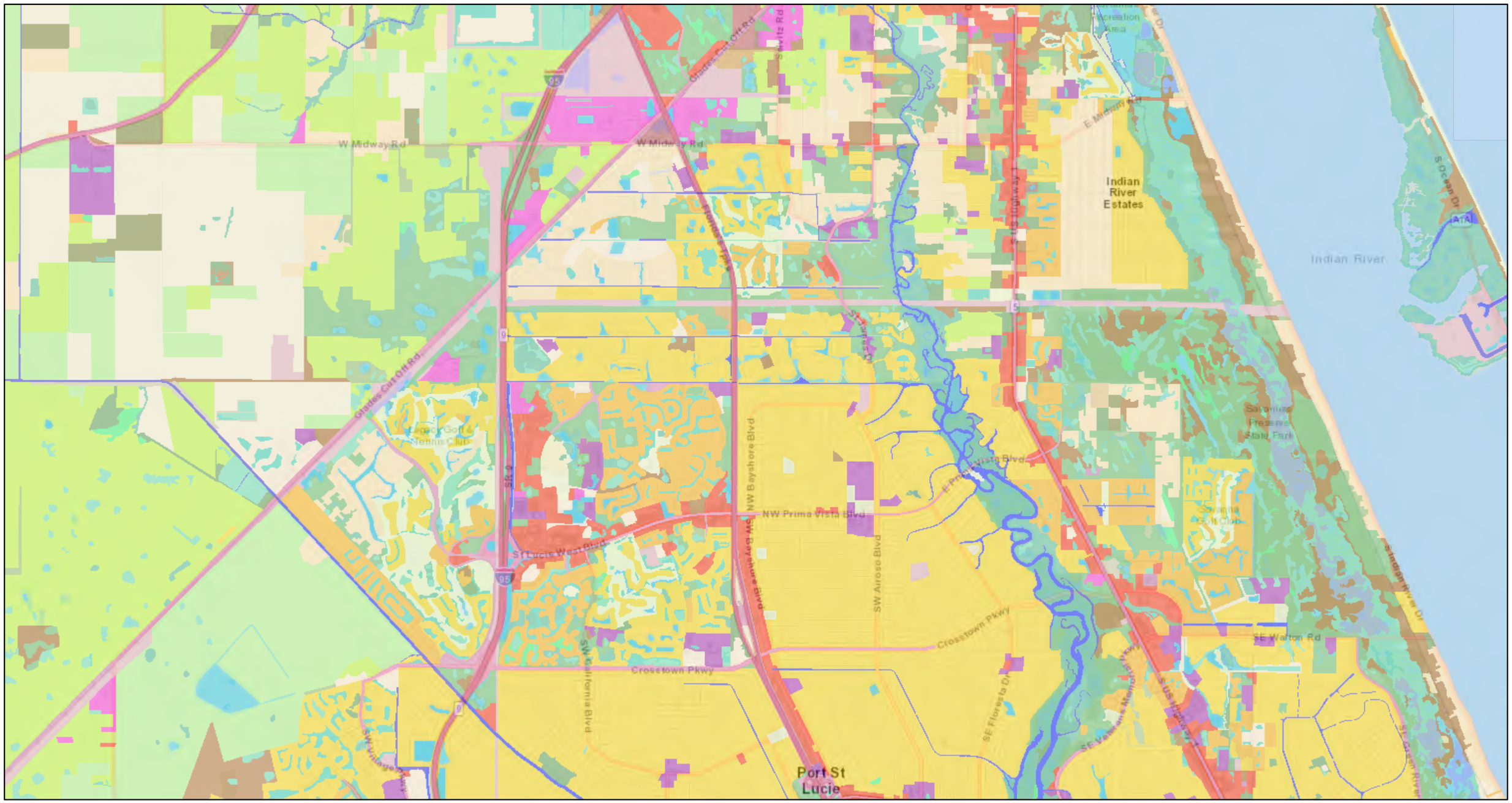
1:72,224

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

SRWMD,SJRWMD, SFWMD, SWFWMD, NWFWMD

Existing Land Use Map (St. Lucie County)



April 19, 2021

1:72,224

Statewide Land Use Land Cover

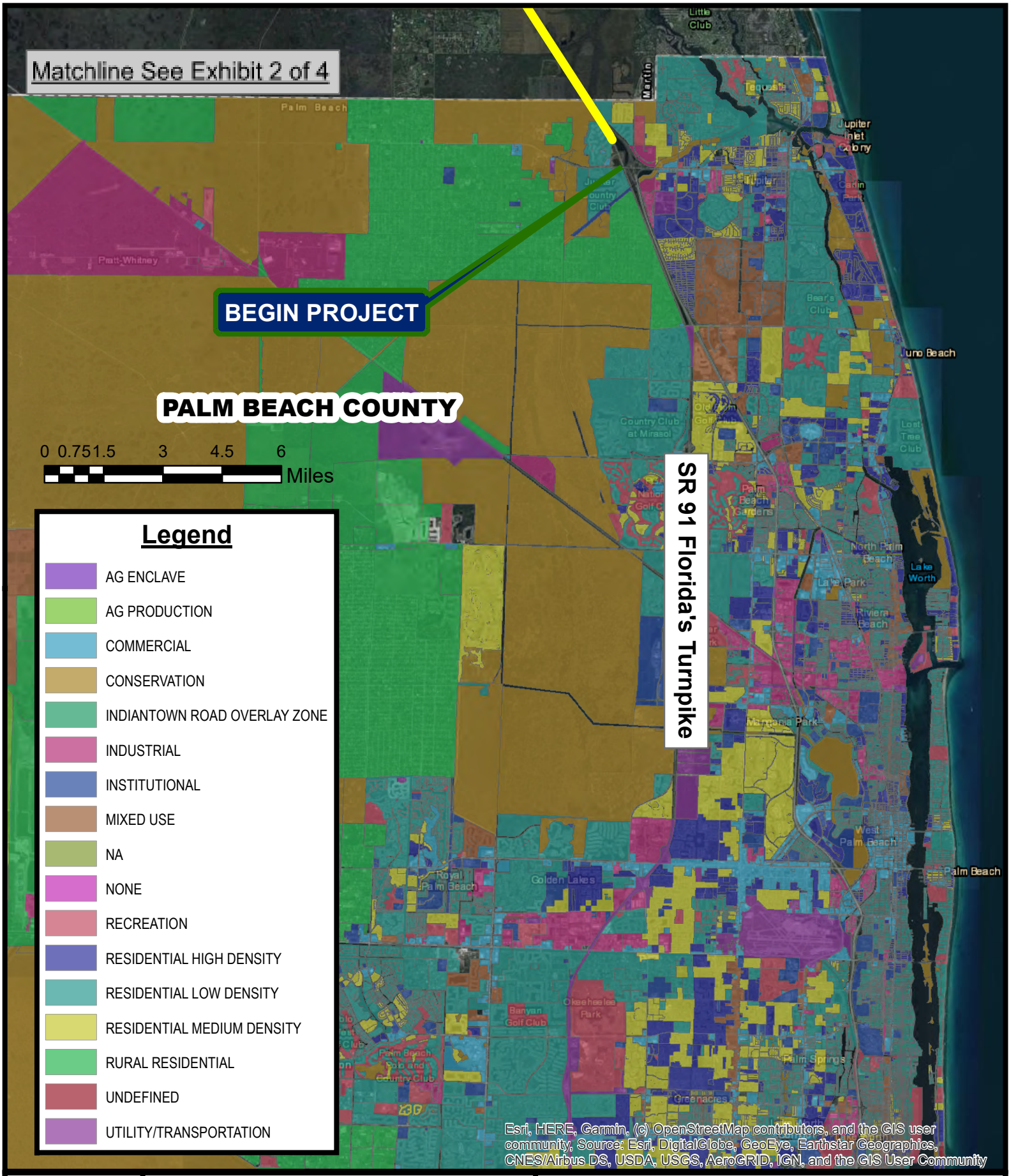
- Residential Low Density
- Residential Medium Density
- Residential High Density
- Commercial and Services
- Industrial
- Extractive

0 0.75 1.5 3 mi

0 1.25 2.5 5 km

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, SRWMD,SJRWMD, SFWMD, SWFWMD, NWFWMD

Map created by Map Direct, powered by ESRI.



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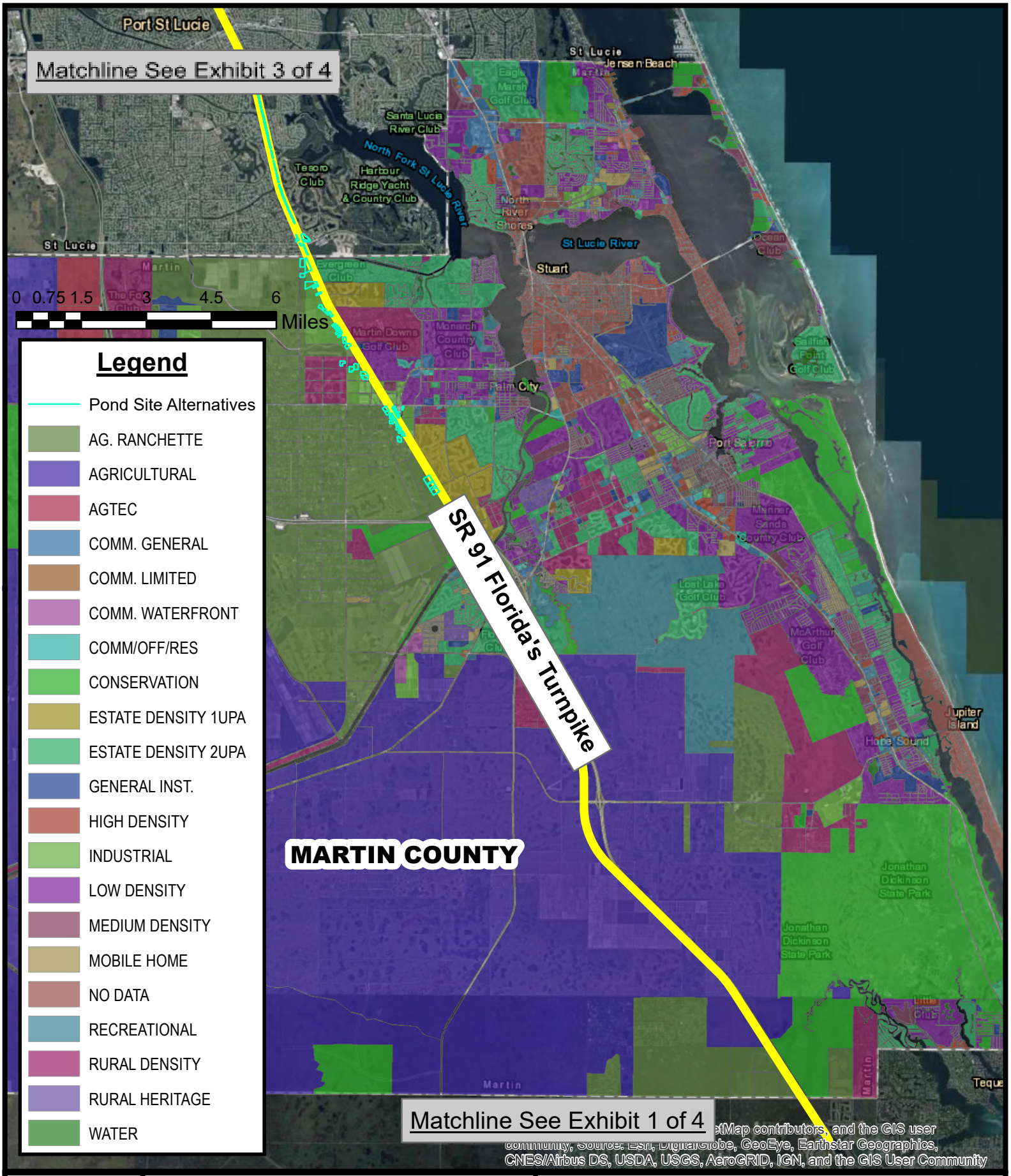
W E
S

Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FUTURE LAND USE MAP

FPID 423374-1-22-01 Date: 3/20/2020

Exhibit 1 of 4



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W E
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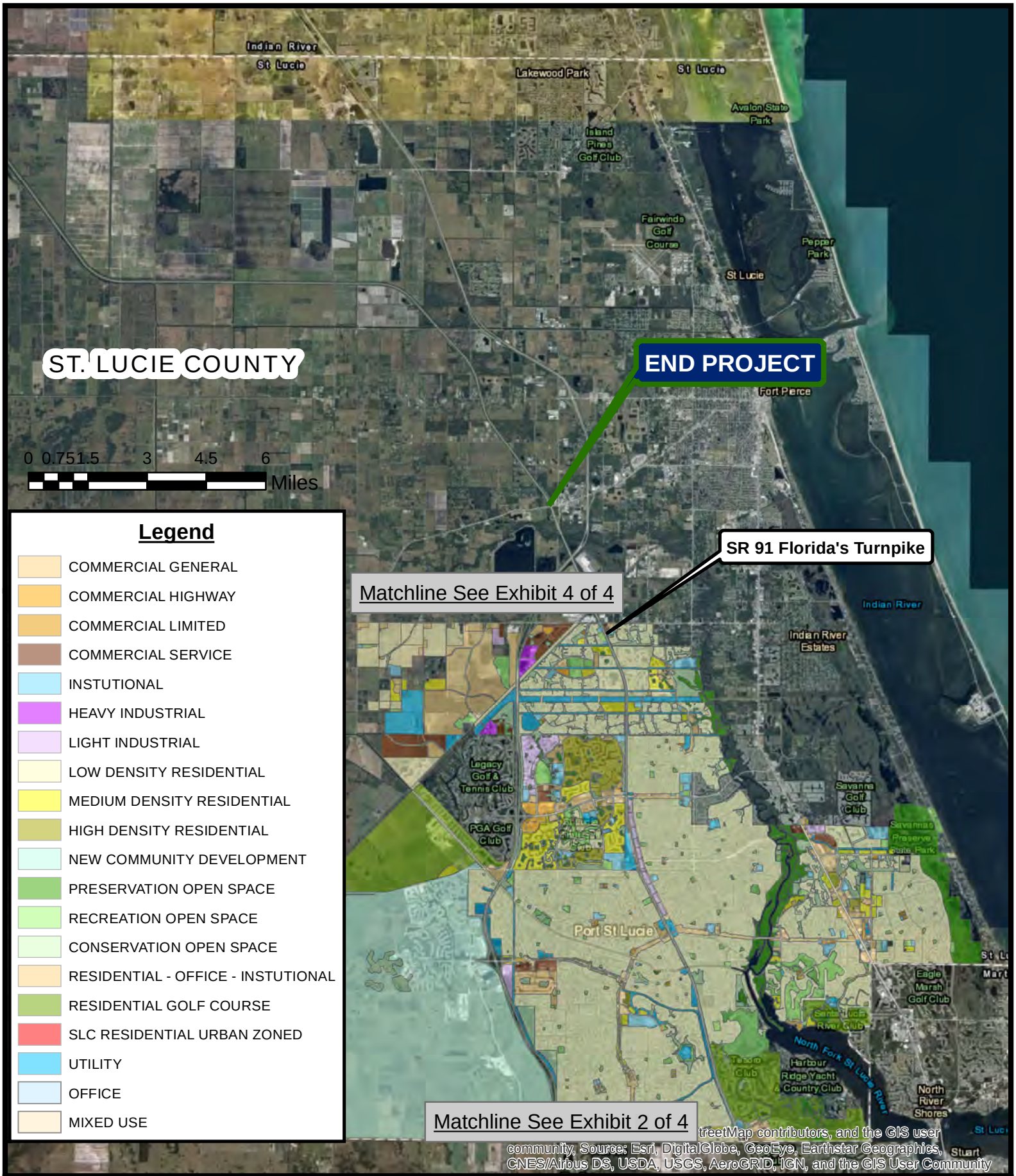
Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FUTURE LAND USE MAP

FPID 423374-1-22-01 Date: 3/20/2020

Exhibit 2 of 4



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W E
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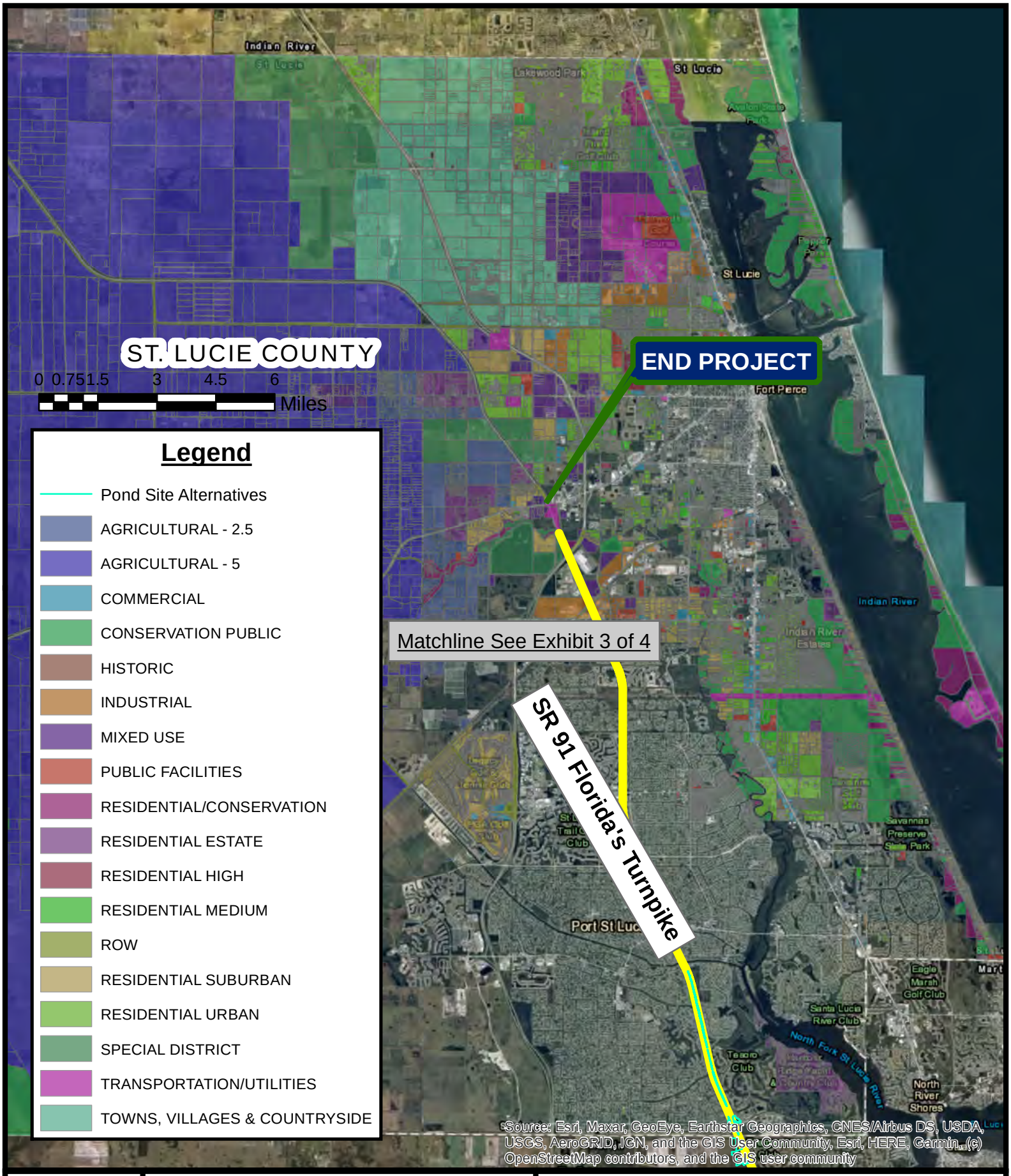
Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FUTURE LAND USE MAP

FPID 423374-1-22-01 Date: 6/10/2020

Exhibit 3 of 4



N
W E
S

Florida's Turnpike Mainline (SR 91)
Turkey Lake Service Plaza
Ocoee, Florida 34761

FUTURE LAND USE MAP

FPID 423374-1-22-01 Date: 9/24/2020

Exhibit 4 of 4

APPENDIX G

CORRESPONDENCE

Jen Rehrl

From: Miranda, Javier <Javier.Miranda@dot.state.fl.us>
Sent: Monday, September 9, 2019 10:58 AM
To: May, Robert; Giron, Amilcar
Subject: RE: 423374-1_ML(Jup-FtP) - Flood Monitoring Area

Good morning Bob,

MP 131.5 to MP 132.5 is currently under construction. I'm not aware of any flooding in that particular area. The area that I notice during Hurricane Dorian that might be an area of concern for flooding is from MP 136.0 to MP 138.

Amilcar,

Do you know of any flooding issues From MP 131.5 to MP 132.5?

Regards,

Javier Miranda

Zone 2 Roadway Maintenance Project Manager - Jacobs/Castillo

Traffic Engineering and Maintenance General Consultant to Florida's Turnpike

Physical Address:

MP 145, Turnpike Operations

Port St. Lucie, FL 34984

Office: 772-873-6535

Fax: 772-871-7634

Mobile: 561-504-8477

From: May, Robert
Sent: Thursday, August 29, 2019 9:45 AM
To: Miranda, Javier <Javier.Miranda@dot.state.fl.us>
Subject: FW: 423374-1_ML(Jup-FtP) - Flood Monitoring Area

Javier,

I meant to inquire about this earlier, but things have been crazy. It was previously noted that the mainline roadway from approximately MP 131.5 to MP 132.5 is below the 100-year flood elevation, causing staff to ask if this portion of the

system has experienced any flooding issues, or if the FIRM maps may be wrong. Are you aware of any issues in this area as a result of this summer's rain? Possibly we should wait until after Dorian to answer that question, huh?

I look forward to any information you may have,

Bob

Robert C. May
Plans Review & Special Projects Manager - Jacobs
Traffic Engineering and Maintenance General Consultant to Florida's Turnpike
Physical Address: Mile Post 263, Florida's Turnpike - Operations Building 5317, Ocoee, FL 34761
US Mail: P.O. Box 613069, Ocoee, FL 34761
Phone: 407-264-3473
Cell: 407-466-3636

From: Ribaric, Brian <Brian.Ribaric@dot.state.fl.us>
Sent: Monday, August 26, 2019 11:11 AM
To: May, Robert <Robert.May@dot.state.fl.us>
Cc: Yao, Erin <Erin.Yao@dot.state.fl.us>; Kirwan, Adriana <Adriana.Kirwan@dot.state.fl.us>
Subject: RE: 423374-1_ML(Jup-FtP) - Flood Monitoring Area

Bob,
After our past few months of rain, did any area have concerns in this area?

Brian

Brian P Ribaric P.E

Senior Project Manager
North America
Engineering, Design and Project Management
Tel: +1.407.264.3095 Mob: +1.407.619.9256

Atkins, member of the SNC-Lavalin Group
Florida's Turnpike Milepost 263, Building 5315
P.O. Box 613069, Ocoee, Florida 34761

From: Ribaric, Brian
Sent: Wednesday, May 22, 2019 14:38
To: May, Robert <Robert.May@dot.state.fl.us>
Cc: Yao, Erin <Erin.Yao@dot.state.fl.us>; Kirwan, Adriana <Adriana.Kirwan@dot.state.fl.us>
Subject: 423374-1_ML(Jup-FtP) - Flood Monitoring Area

Bob,
As part of the Mainline Widening from Indiantown Road to SR 70 PD&E Study, we have come across a segment of the mainline that appears to be below the current 100-year floodplain. The segment of roadway is from MP 131.5 to 132.5. It's just north of the Thomas B Manuel bridge.

According to the FIRM Maps the 100-year floodplain is near elevation 18. The team surveyor obtained spot shots at the EOP around elevation 13. Thus, the mainline is 5 feet below the floodplain????

Erin mentioned that this area wasn't on her "hot spot" list, so we are wondering the validity of the data (FIRM Maps). As we approach the rainy summer, could we have the maintenance team keep an eye out for this area.

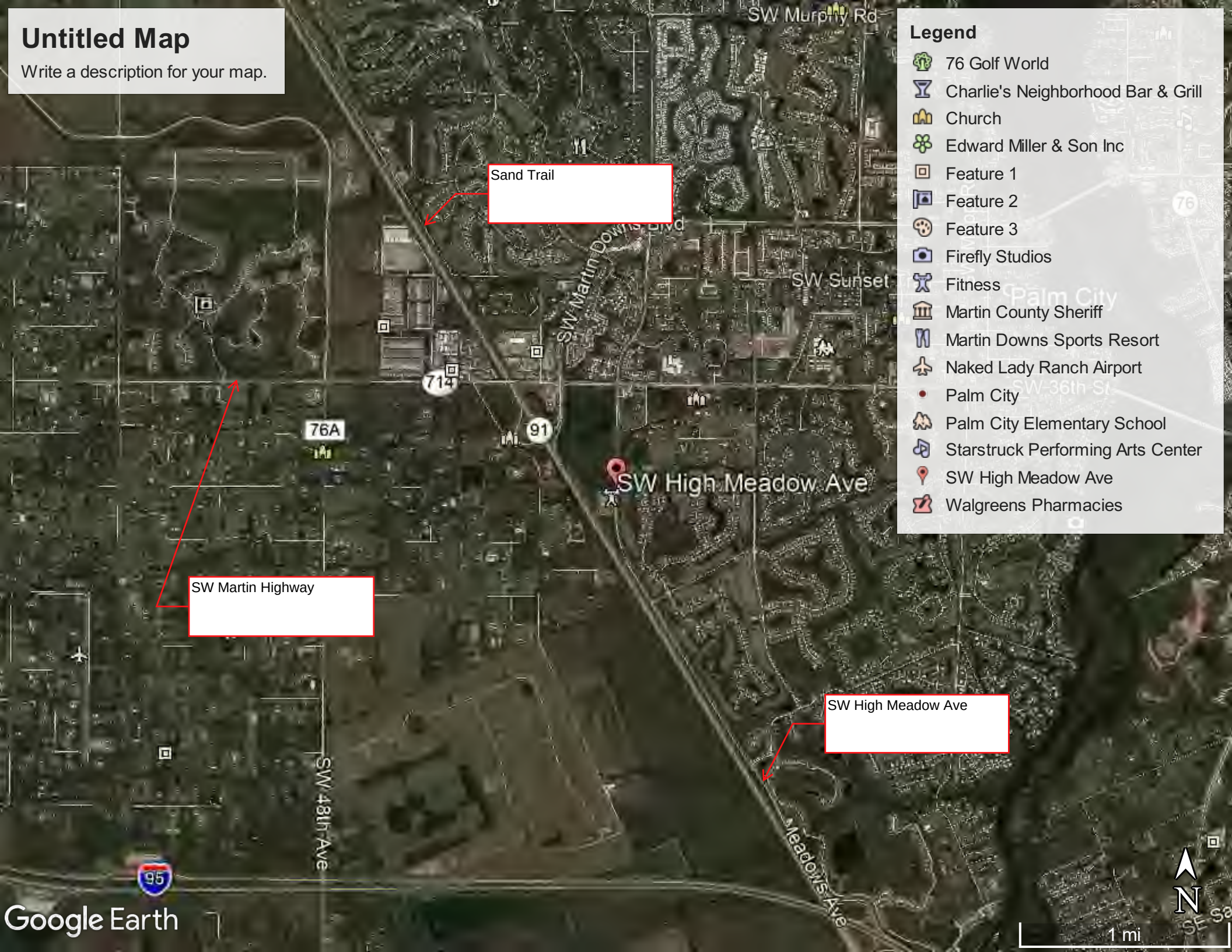
Or if you have any experience with any flooding in this area. Erin mentioned that further north near Martin Highway has some issues, but this area is well south of those issues.

Thanks,
Brian

Brian P Ribaric P.E

Senior Project Manager
North America
Engineering, Design and Project Management
Tel: +1.407.264.3095 Mob: +1.407.619.9256

Atkins, member of the SNC-Lavalin Group
Florida's Turnpike Milepost 263, Building 5315
P.O. Box 613069, Ocoee, Florida 34761


Untitled Map
Write a description for your map.
Legend
76 Golf World
Charlie's Neighborhood Bar & Grill
Church
Edward Miller & Son Inc
Feature 1
Feature 2
Feature 3
Firefly Studios
Fitness
Martin County Sheriff
Martin Downs Sports Resort
Naked Lady Ranch Airport
Palm City
Palm City Elementary School
Starstruck Performing Arts Center
SW High Meadow Ave
Walgreens Pharmacies
Sand Trail
SW Martin Highway
SW High Meadow Ave
SW Murphy Rd
SW Martin Downs Blvd
SW Sunset
Palm City
SW 36th St
76A
714
91
SW 48th Ave
Meadows Ave
95
Google Earth
N
1 mi

Jen Rehrl

From: Yao, Erin <Erin.Yao@dot.state.fl.us>
Sent: Tuesday, May 14, 2019 11:32 AM
To: Liz Bartell
Cc: Ribaric, Brian; Howell, William G.; Abe Neemeh (ANeemeh@hwlochner.com); Jen Rehrl; Kirwan, Adriana; Theresa Ellison; Ciabatti, Mattias; Pedersen, Josh; DeLaRosa, Francis; Sharp, Stephanie; Beverly, James E; Tosspon, Jason; Sanchez, Geraldo
Subject: RE: Turnpike PD&E from Jupiter to Ft. Pierce (423374-1) - Floodplain
Attachments: 431737-1: AET 8 - Site 8 - FEMA Floodplain; RE: FPID 431737-1-32-01 AET 8, Site 8 Coordination

Hello Liz,

Please see attached emails. My recollection regarding this discussion was that there may be a need/desire to model this area in more detail to confirm floodplain elevations and that there may be an opportunity to lower the elevation. We did not scope AET8 with this effort but may want to consider this exercise in the future when we widen. Based on my recollection, for AET8 the travel lanes (interim only) are above the **FEMA established** floodplain elevation. We did have them evaluate the ultimate section as well and I believe they were able to accommodate a small profile adjustment based on an **assumed** typical section and profile (not sure if the assumptions meet current TDH and FDM criteria). Please let me know if you have any further questions.

Thank you,

Erin T Yao, PE, CFM
Florida's Turnpike Enterprise
District Drainage Engineer

P.O.Box 613069
MP 263, Blg 5315
Ocoee, Florida 34761-3069

☎: Direct: (407) 264-3479
☎: Cell: (407) 756-7063
✉: erin.yao@dot.state.fl.us

From: Liz Bartell [mailto:Liz.Bartell@patelgreene.com]
Sent: Monday, May 13, 2019 8:06 PM
To: Yao, Erin <Erin.Yao@dot.state.fl.us>
Cc: Ribaric, Brian <Brian.Ribaric@dot.state.fl.us>; Howell, William G. <bhowell@hwlochner.com>; Abe Neemeh (ANeemeh@hwlochner.com) <ANeemeh@hwlochner.com>; Jen Rehrl <Jen.Rehrl@patelgreene.com>; Kirwan, Adriana <Adriana.Kirwan@dot.state.fl.us>; Theresa Ellison <tellison@hwlochner.com>; Ciabatti, Mattias <mciabatti@hwlochner.com>
Subject: RE: Turnpike PD&E from Jupiter to Ft. Pierce (423374-1) - Floodplain

Hi Erin,

We recently obtained survey in areas where the edge of pavement elevation may be lower than the FEMA floodplain elevation for the subject PD&E. Not surprisingly, we have an issue just north of the Thomas B. Manual Bridge (near MP 132.5), which is in the vicinity of the floodplain elevation issue you noted in your below email that was encountered with AET 8. Could you please update us on what was determined regarding the floodplain elevation in this area, as I believe some level of analysis was necessary to determine the finished floor elevation for Toll Site 8?

Thanks,
Liz

Elizabeth M. Bartell, PE, CFM
Sr. Drainage Engineer

Patel, Greene & Associates, PLLC (PGA)
280 W Canton Avenue, Suite 400, Winter Park, FL 32789
Office: (407) 720-7420 Ext. 403 | Cell: (321) 331-9447 | Email: Liz.Bartell@patelgreene.com

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From: Yao, Erin <Erin.Yao@dot.state.fl.us>
Sent: Tuesday, February 27, 2018 8:23 AM
To: Liz Bartell <Liz.Bartell@patelgreene.com>
Cc: Ramoutar, Richard <Richard.Ramoutar@dot.state.fl.us>; Ribaric, Brian <Brian.Ribaric@dot.state.fl.us>; Howell, Bill <bhowell@hwlochner.com>; Pedersen, Josh <Josh.Pedersen@dot.state.fl.us>; May, Robert <Robert.May@dot.state.fl.us>; Mayer, Tamara <Tamara.Mayer@dot.state.fl.us>; Horwitz, Martin <Martin.Horwitz@dot.state.fl.us>; Stewart, Kevin <Kevin.Stewart@dot.state.fl.us>; Sanchez, Geraldo <Geraldo.Sanchez@dot.state.fl.us>
Subject: Turnpike PD&E from Jupiter to Ft. Pierce (423374-1) - Floodplain

Hello Liz,

I have a question for the PD&E from Jupiter to Ft. Pierce. We are working on our AET8 project and trying to determine the finished floor elevation for one of the toll sites (Site 8 at MM 132.5) in order to meet the GTR criteria for 1.5' of clearance from the established floodplain elevation to the finished floor of the building. Have you all researched the floodplain elevation yet at this location as it relates to your PD&E? I'm not sure if your scope included roadway profile work, but if so, in particular I was interested to see what your scope and schedule includes for the below criteria. See attached document that summarizes the problem we are facing. Essentially, the FEMA map established elevation is at the existing roadway profile elevation already, but it appears there could possibly be an error in the floodplain elevation of the FEMA map at this location.

2.6 Grades

The profile grade line defines the vertical alignment for roadway and bridge construction. As with other design elements, the characteristics of vertical alignment are influenced greatly by basic controls related to design speed, traffic volumes, functional classification, drainage and terrain conditions. Within these basic controls, several general criteria are considered. See ***Tables 2.6.1 – 2.6.4***.

Minimum clearances for structures over railroads are given in ***Table 2.10.1***. Additional information, including at-grade crossings, is given in ***Chapter 6*** of this Volume.

The Department's minimum for clearance over all highways is given in the criteria tables and figures. Exceptions to this policy will be permitted only when justified by extenuating circumstances and approved as a Design Variation or Design Exception.

The clearance required for the roadway base course above the Base Clearance Water Elevation is given in the criteria tables and figures. The relationship between the pavement elevation and the Design Flood Elevation is discussed in ***Section 4.4 (3)*** of the ***FDOT Drainage Manual*** ***(Topic No. 625-040-002)***. Turnpike facilities are generally used for Hurricane Evacuation. Design Turnpike mainline travel lanes to be above the 100 year flood plain elevation established by FEMA or other pertinent studies.

Design grades for structures over water to provide the minimum vertical clearance as stipulated in ***Section 2.10***.

The ***Design Standards*** lists minimum covers and maximum fill heights for all types of culverts. For utility clearances, refer to the ***Utility Accommodation Manual***.

Please let us know if you have looked into any of this already, or plan to if it is already in your scope.

Thanks for your help.

Erin T Yao, PE, CFM
Florida's Turnpike Enterprise
District Drainage Engineer

P.O.Box 613069
MP 263, Blg 5315
Ocoee, Florida 34761-3069

☎: Direct: (407) 264-3479
☎: Cell: (407) 756-7063
✉: erin.yao@dot.state.fl.us

Jen Rehrl

From: Jennifer Nunn <jnunn@balmoralgroup.us>
Sent: Friday, February 16, 2018 2:35 PM
To: Yao, Erin
Cc: Pedersen, Josh; Jeffers, Nicole; Ramoutar, Richard; Jeff Glenn; Molly deVivero
Subject: 431737-1: AET 8 - Site 8 - FEMA Floodplain
Attachments: Site 8 FEMA Floodplain Discussion.docx

Erin,
Within AET 8, Site 8 is proposed on the southbound side at MP 132.5 and appears to be within a FEMA Flood Zone AE with an established BFE of 18 ft NAVD. Projecting the ultimate typical is this area estimates a FFE for the proposed building at 17.5, based on preliminary estimates. I have attached a brief memo summarizing the information TBG has reviewed regarding the FEMA elevations and existing water elevations in this area.

As shown in the attached Figure 1, it appears the floodplain extends for over 3 miles along the western side of the Turnpike. Have you assumed the established BFE to govern design? Has the Turnpike established a different BFE in this area? Do you have any other forms of analyses or calculations in this area? Do you know if there has been any overtopping or flooding in this area?

Please feel free to call with questions. I'm also available for a remote meeting if we need to have a group discussion.

Thanks,

Jennifer A. Nunn, P.E., D.WRE

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AET 8 - Site 8 (MP 132.5) FEMA Floodplain Discussion

Existing Information Review and Discussion

According to the Martin County FEMA Flood Insurance Study (FIS) dated July 12, 2017 (marked Preliminary), Site 8 falls within a FEMA Flood Zone AE, which has an established Base Flood Elevation (BFE) of 18 ft NAVD on the Southbound side and 17 ft NAVD on the Northbound side. Review of the FIS and delineated floodplains shows the floodplain is hydraulically connected to the Danforth Creek, which crosses the Turnpike just south of the CR 714 Interchange (Site 8I), approximately 1.5 miles north of Site 8 See **Figure 1** below.

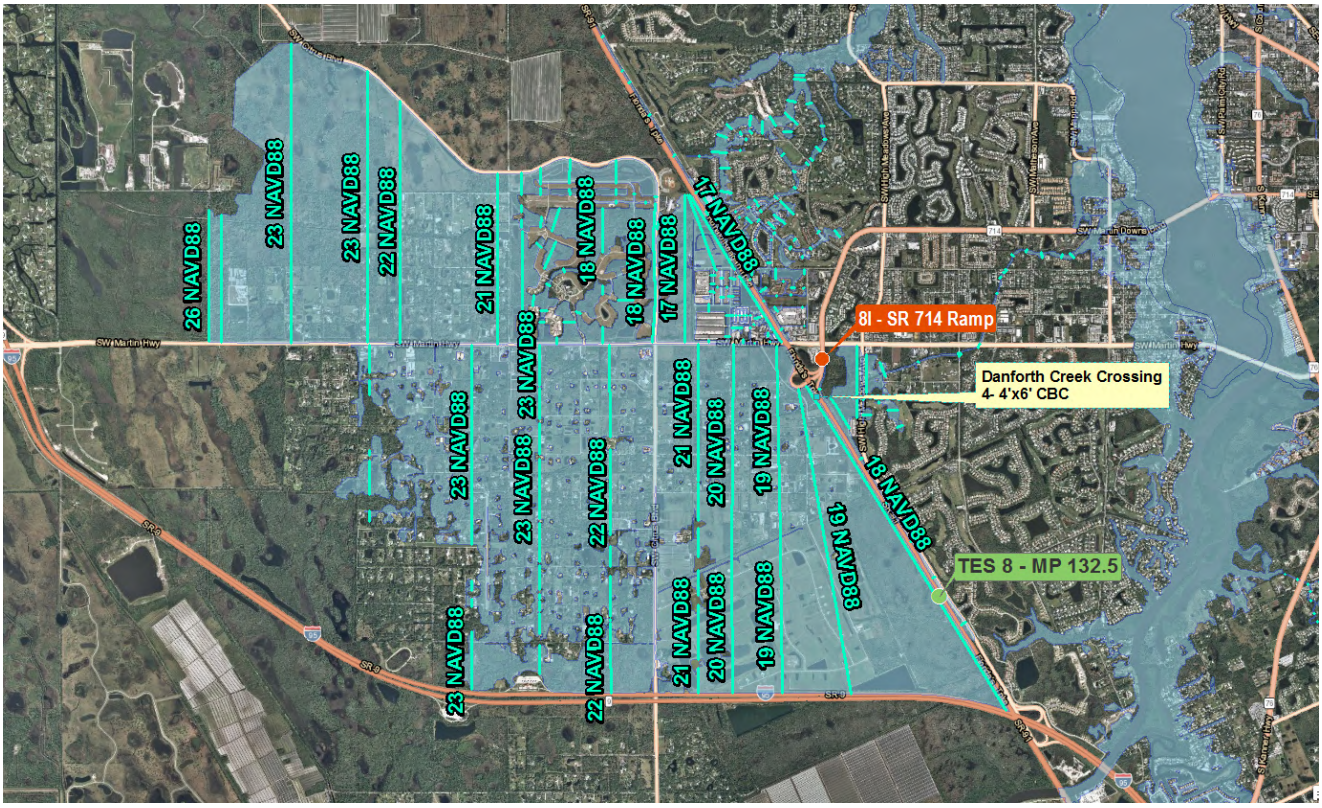


Figure 1- FEMA Floodplain with BFE upstream of Turnpike

The 2017 FIS states that detailed studies were performed on Danforth Creek downstream of the Turnpike in more recent years; however, the Zone AE tributaries were performed in 1997 and did not have a known study limit. The methods to produce these elevations is undetermined from review of the FIS. An excerpt is provided in **Plate 1**.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Atlantic Ocean	Jupiter Island, Town of; Martin County, Unincorporated Areas	Entire Coastline	Entire Coastline	03090206	22.0		N	VE, AE	2016
Bessey Creek	Martin County, Unincorporated Areas	Confluence with County Line Canal	Approximately 40 feet downstream of SW Andrews Drive	03090206	1.9		N	AE	2016
Bessey Creek	Martin County, Unincorporated Areas	Approximately 40 feet downstream of SW Andrews Drive	84th Avenue	03090206	4.6		N	AE	1997
Bessey Creek Zone AE Tributaries	Martin County, Unincorporated Areas	Not provided	Not provided	03090206	5.9		N	AE	1997
Connector Channel	Martin County, Unincorporated Areas	Not provided	Not provided	03090206	3.0		N	AE	1997
Coral Gardens Canal	Martin County, Unincorporated Areas; Stuart, City of	Confluence with South Fork St. Lucie River	Approximately 940 feet downstream of SE Norfolk Boulevard	03090206	0.8		Y	AE	2016
Coral Gardens Canal	Martin County, Unincorporated Areas	Approximately 940 feet downstream of SE Norfolk Boulevard	Downstream face of Willoughby Boulevard	03090206	1.0		Y	AE	2012
Danforth Creek	Martin County, Unincorporated Areas	Confluence with South Fork St. Lucie River	Approximately 1,535 feet downstream of SW Sunset Trail	03090206	0.8		N	AE	2016
Danforth Creek	Martin County, Unincorporated Areas	Approximately 1,535 feet downstream of SW Sunset Trail	Approximately 1.1 miles upstream of SW 48th Avenue	03090206	4.2		N	AE	2012
Danforth Creek Zone AE Tributaries	Martin County, Unincorporated Areas	Not provided	Not provided	03090206	2.5		N	AE	1997

Plate 1- From Martin County FIS dated 7/12/2017

It appears the BFE were extended the full length between roadways, with SW Citrus Blvd serving as the northern boundary to I-95 as the southern boundary. What this mimics is a condition where the Turnpike acts as a dam without any flood relief, except through the box culvert at the Danforth Creek and the bridge crossing at the Bessey Creek located approximately 1.5 miles north of the Danforth Creek crossing. This is consistent with the FDOT Straight-Line Diagram which does not show any other cross drains between I-95 (MP 131.5) and MP 137, except for these two crossings.

That being said, there are known cross drains conveying offsite runoff from west to east across the Turnpike which convey Maple Creek. (Note in several previous permit documents, this creek is referred to as Mapps Creek, Mapple Creek and Maple Creek.) **Figure 2** shows a snapshot of the original Turnpike Drainage Map (Contract No. 6.1, dated 1955), which pre-dates the I-95 construction. Culverts numbered 6.1-1 and 6.1-2 convey the south and north branches of Maple Creek, while 6.1-3 conveys Danforth Creek and Bridge No. 63 conveys Bessey Canal.

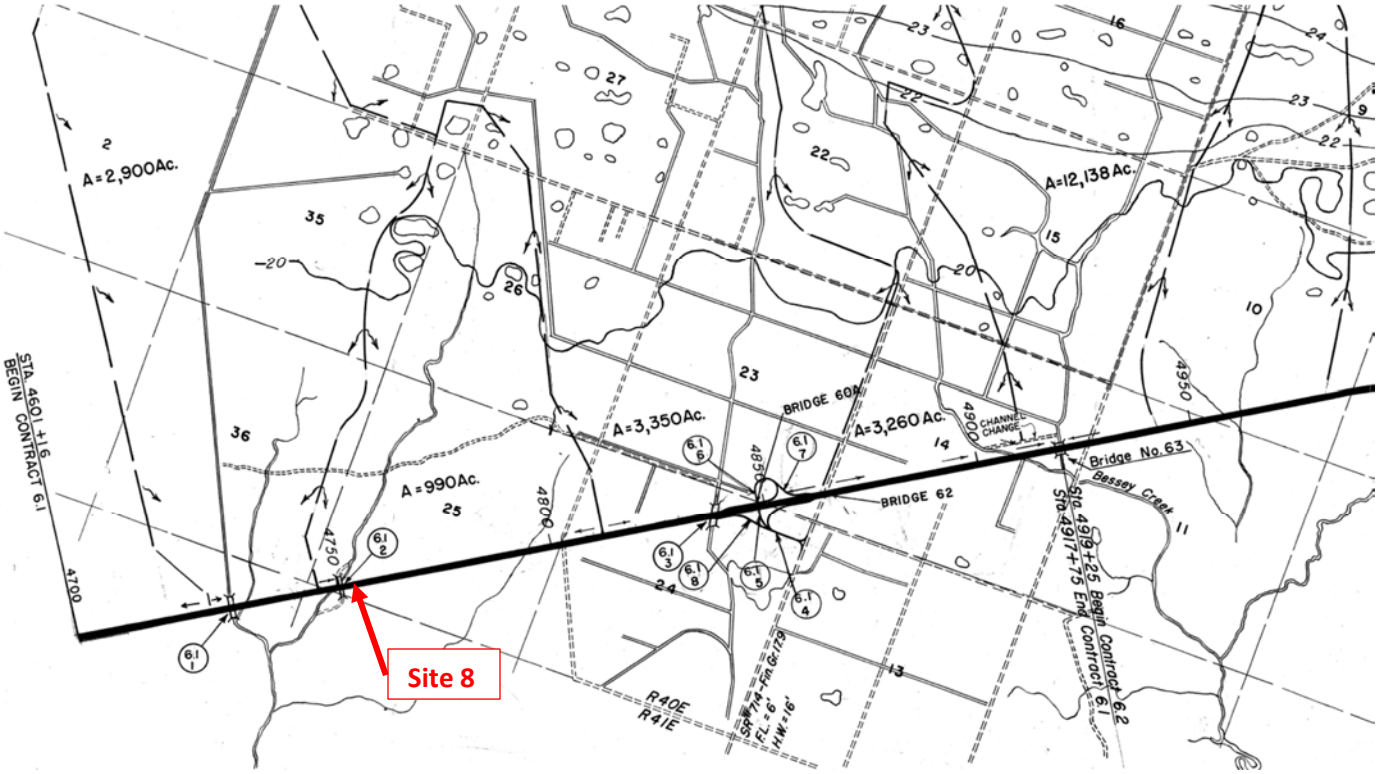


Plate 2- Drainage Map from Contract 6.1 Turnpike - 1955 plans

Proposed TES 8 is located approximately 500 feet north of Culvert 6.1-2, which was surveyed as part of the AET 8 field work. It is a single 8' x 8' box culvert with a western (upstream) invert of 5.04 ft (NAVD) and an eastern (downstream) invert of 5.25 ft (NAVD). Water at the culvert was observed and had a surveyed water elevation of 7.0 ft NAVD. In the 1955 plans, there is no design high water elevation listed in the plans; however there is an existing high water label of 13.7 ft NGVD (12.17 ft NAVD) (See **Plate 3**). It appears the channel downstream was dug out to maintain existing drainage patterns. See **Plate 5.** Due to the significant modifications to the channel directly downstream, it is unclear how appropriate the existing high water mark of 12.17 ft NAVD reflects current conditions.

Approximately half of the original contributing area (990 acres) defined in the 1955 plans to Culvert 6.1-2 has been permitted and developed as an equestrian residential neighborhood Fox Grove (SFWMD App. 030728-7 in 2004). There is no mention in the calculations or plans for provisions for floodplain compensation or that floodplain impacts were considered. See **Plate 4** for the extents of the Fox Grove Permit in comparison to the contributing area.

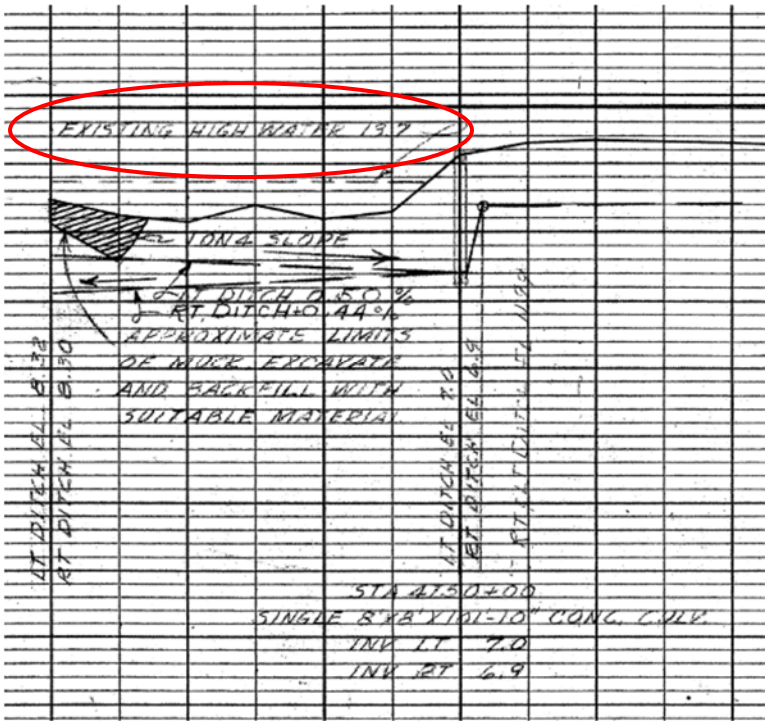


Plate 3- Profile from Contract 6.1 Turnpike - 1955 plans

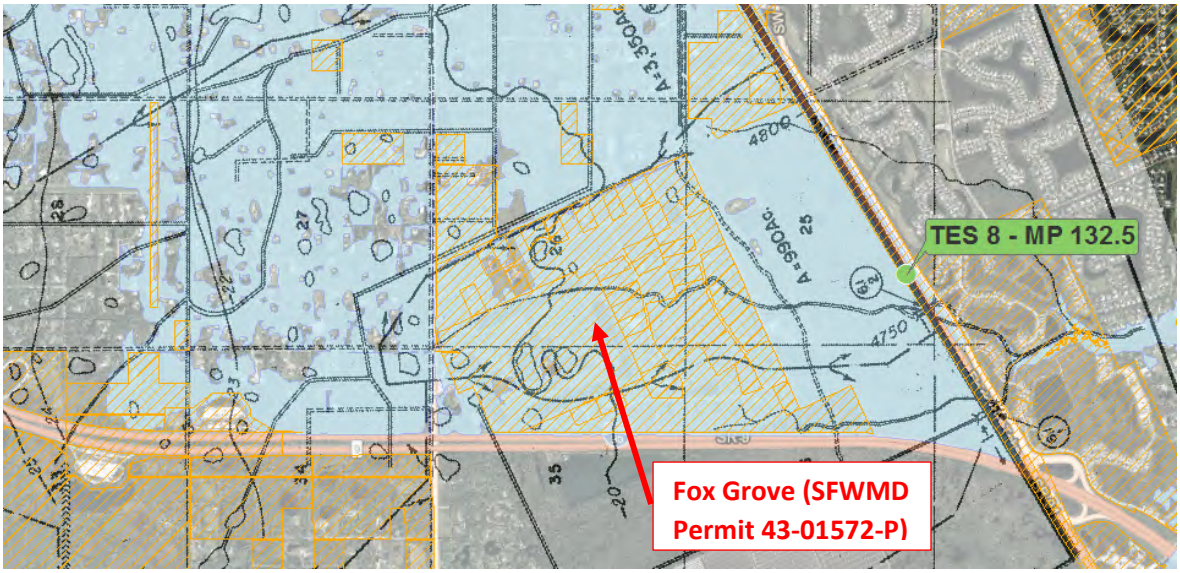
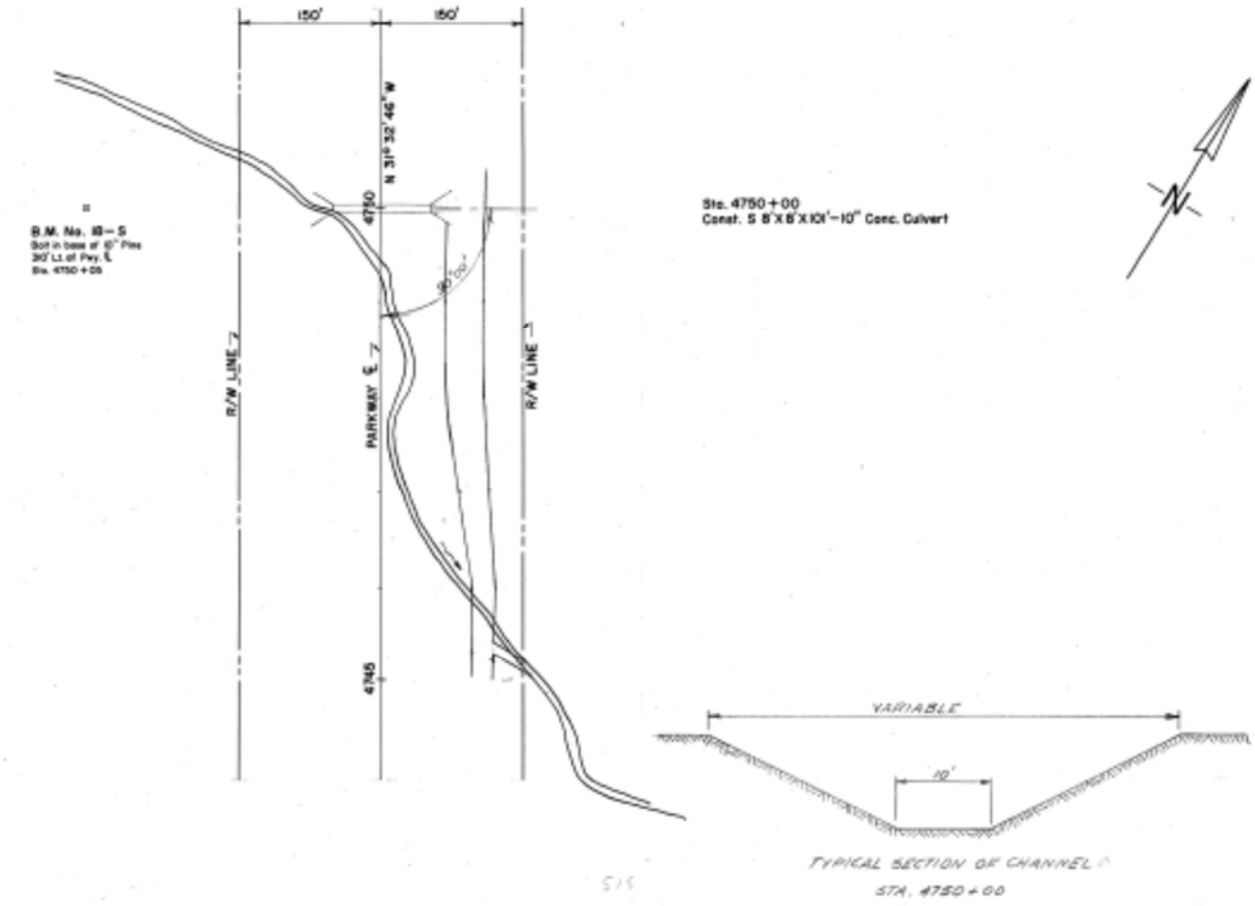


Plate 4- SFWMD Permit overlaid on FEMA boundary and 1955 Drainage Map



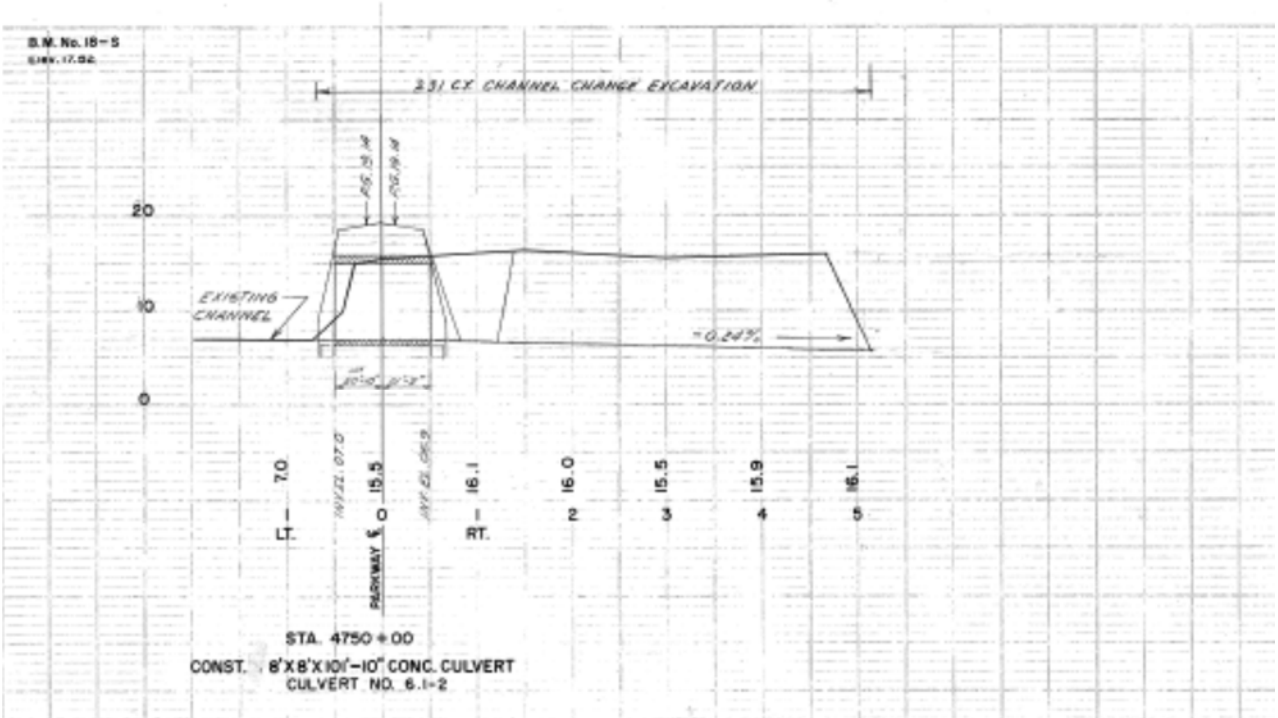


Plate 5- Plan/Profile Drainage Structure 6.1-2 - 1955 plans

On the east side of the Turnpike, SW High Meadows Avenue was permitted (SFWMD Permit # 43-00369-S) and constructed in 1986 (SFWMD App. 06-066A) with modifications in 2004 (SFWMD App. 040301-5). As part of those improvements, a 8'x8' box culvert was installed to convey flow from the Maple Branch (North segment) to maintain existing drainage patterns. See **Plate 6** for the SW High Meadows permitted drainage map.

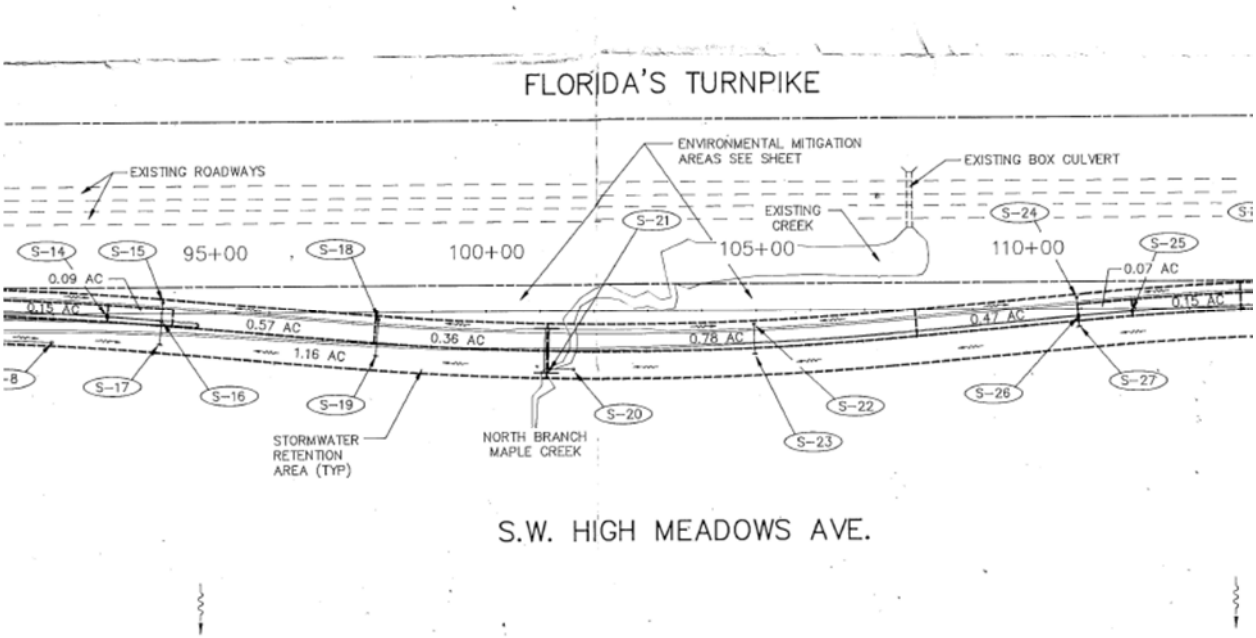


Plate 6- SW High Meadows Ave Drainage Map (SFWMD App. 06-066A

No hydraulic calculations were available in the previously permitted documents; however the cross section of the proposed culvert shows an ordinary high water of 7.9 ft NGVD (6.37 ft NAVD) and an ordinary low water of 6.0 ft NGVD (4.47 ft NAVD). See **Plate 7.** These seem consistent with the surveyed water elevation at the upstream end of the Turnpike culvert.

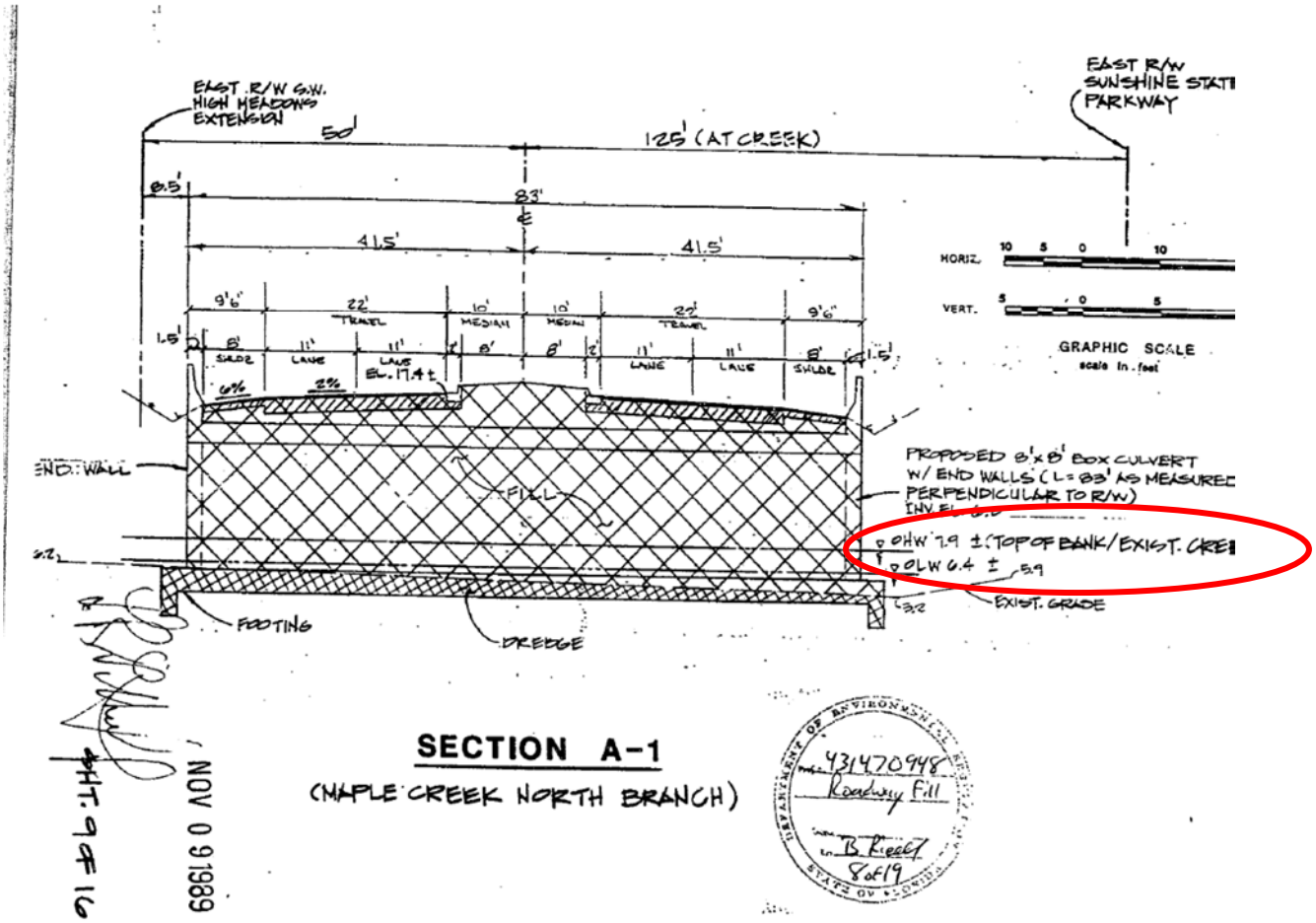


Plate 7- Cross Section of Culvert (App. 06-066A)

PBSJ

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General Consultant
Florida's Turnpike Enterprise
Florida Department of Transportation

June 2, 2006

Mr. Keith Jackson, P.E.
SFRN Inc.
1201 Belvedere Road
West Palm Beach, FL 33405

RE: Roadway Improvement for Sand Trail
And Sand Trail PUD
SFWMD ERP No. 43-01651-P
Martin County

As you know, the Florida's Turnpike Enterprise recently requested construction plans from you in regard to the subject projects above in response to flooding issues on the Florida's Turnpike. It was observed during our investigation that subdivision and roadway construction activities were underway adjacent to the Florida's Turnpike without a drainage connection permit. Preliminary review concludes that a drainage connection permit is required for the Sand Trail Road due to direct connections to the Florida's Turnpike right-of-way and possible overtopping of the treatment swales for larger storms adjacent to the Florida's Turnpike.

Apart from the connection permit issue, two other regional drainage issues were discovered. I bring this to your attention since they will affect your projects.

First, attached are 6 sheets with the number 1 circled in the upper right hand corner signifying the first drainage issue. The first sheet is the drainage map from the original construction of the Florida's Turnpike in the vicinity of the above projects. Highlighted in yellow is an 820 acre area of land that drains from west to east through an 8'X7' box culvert under the Florida's Turnpike near Sand Trail station 99+25. You may wish to consider this issue prior to improving sand trail from a dirt road to a permanent paved road. The following 5 sheets are aerial photographs from 2005, 1986, 1972, 1966, and 1952 illustrating the changes made at the 8'X7' box culvert outfall by the sand trail, wastewater treatment plant and golf course to the historic flow patterns. This blockage of historic flow has inundated the Florida's Turnpike right-of-way by causing runoff from 820 acres of land to pond on the Florida's Turnpike before staging high enough to spill over to adjacent cross drain outfalls (one to the north and one to the south). Each year during the rainy season, flood levels come close to the travel lane. It is suspected that during extreme events, water could get high enough to close part or all of the Florida's Turnpike at a time when the Florida's Turnpike is needed for Hurricane evacuation. The ponded water on the side of the road could also present a safety issue to the traveling public as well as any peak events that may temporary flood the roadway. The Florida's Turnpike would like to work with SFRN and Martin County to re-establish this historic flow pattern. Further, until this historic flow pattern is re-established, the Florida's

P.O. Box 613069 • Ocoee, FL 34761
Turnpike Mile Post 263, Building 5315 • Ocoee, Florida 34761 • Telephone: 407.532.3999

Turnpike will be unable to widen its highway because all available right-of-way is used up by this storm water blockage.

Second, attached are 8 sheets with the number 2 circled in the upper right hand corner signifying the second drainage issue that affects the Sand Trail Subdivision. The first sheet is the drainage map from the original construction of the Florida's Turnpike in the vicinity of the above projects. Highlighted in yellow is a 1597 acre area of land that drains from west to east through a triple 8'X4' box culvert under the Florida's Turnpike toward the planned Sand Trail subdivision. This cross drain is located immediately to the north of the cross drain mentioned above in the first drainage issue and accepts some of the spill over from the first blockage. The second sheet is the drainage master plan you submitted and is illustrated with a blue arrow the point at which the 1597 acres of runoff will enter the subdivision. It does not appear that this flow has been taken into consideration and that this historic flow pattern will also be blocked. If this occurs, the conditions mentioned above will be exacerbated by the increase of area that will pond on the Florida's Turnpike from 820 acres to 2417 acres. The third sheet is an excerpt of SFRN's survey of the subdivisions property. The remaining 5 sheets are aerial photographs from 2005, 1986, 1972, 1966, and 1952 demonstrating historic flow patterns. Please submit additional plans and calculations demonstrating that the subdivisions drainage system will adequately accept flow from the cross drain for the 100 year storm event.

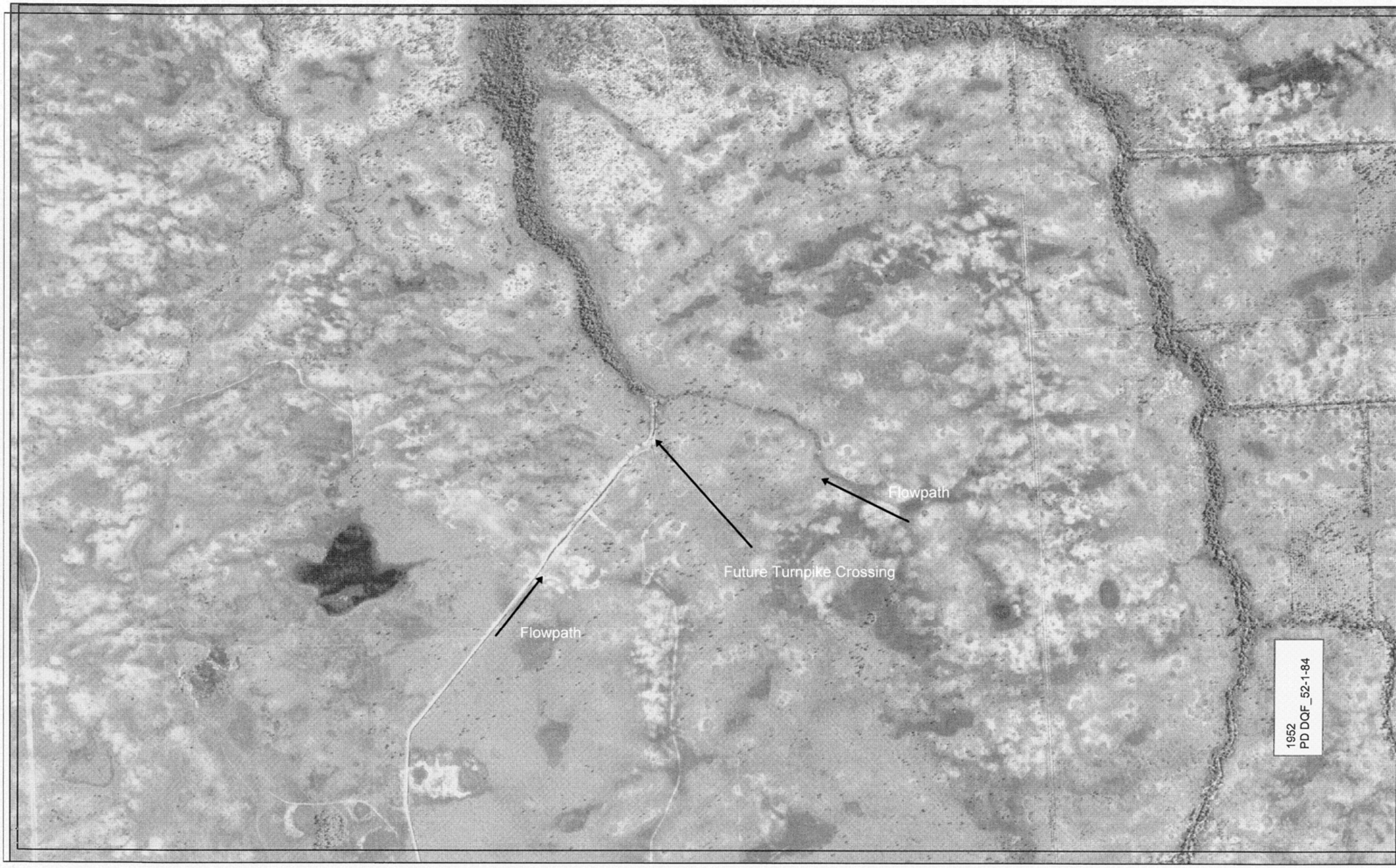
When you have had time to review, please call me at (407) 264-3417 to discuss. It may be necessary for the Florida's Turnpike to meet with SFRN, Martin County, and any other interested parties in order to come to an amicable solution to these important issues.

Sincerely,

Kevin G. Stewart, P.E.
Florida's Turnpike Drainage Engineer

Attachments

cc: Will Sloup, Florida's Turnpike Design Engineer
Mike Davis, Florida's Turnpike Production Design
Tony Waterhouse, SFWMD
Don G. Donaldson, Martin County Director of Engineering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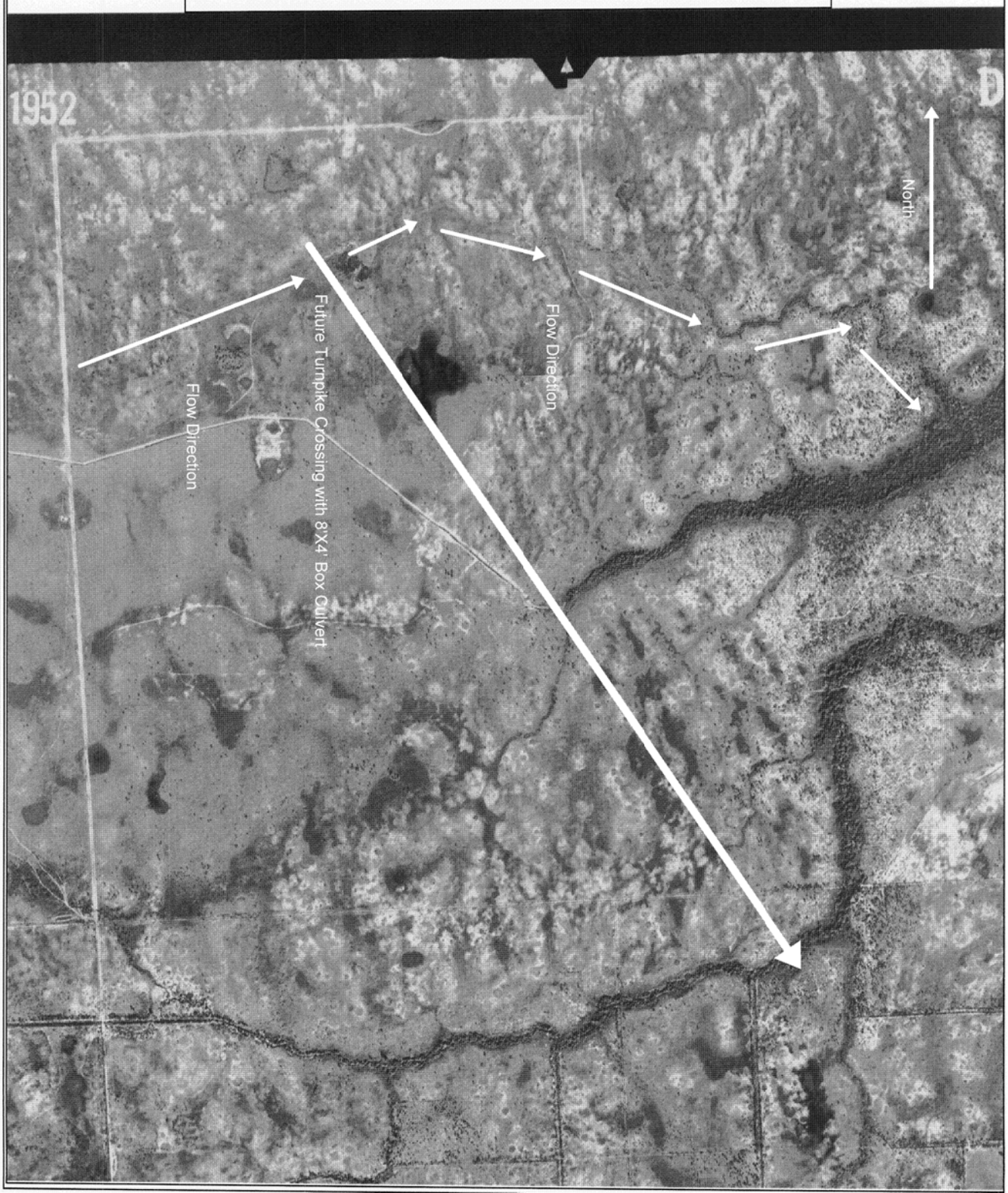
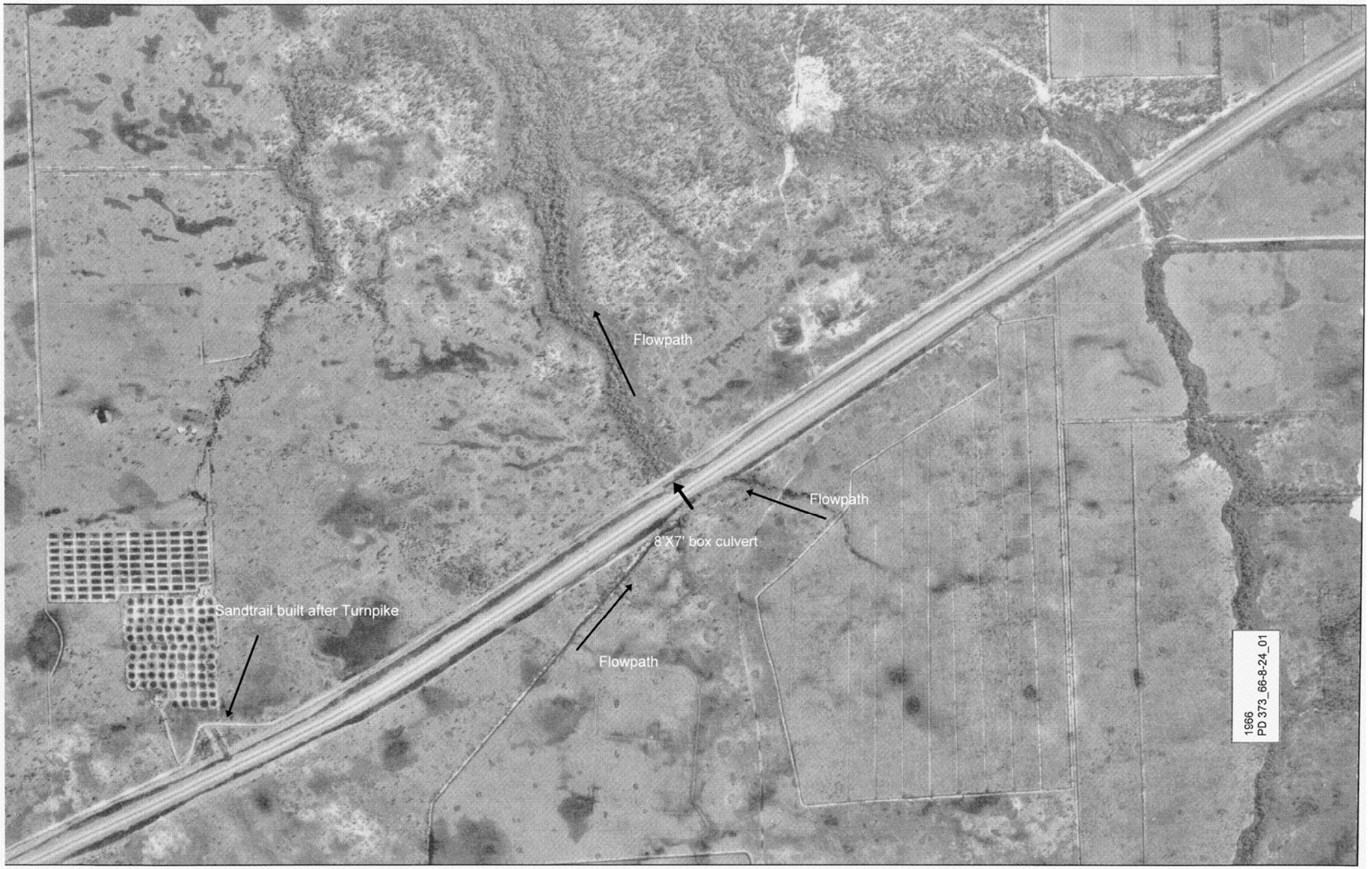
Future Turnpike Crossing
Flowpath
1952
PD DQF_52-1-84

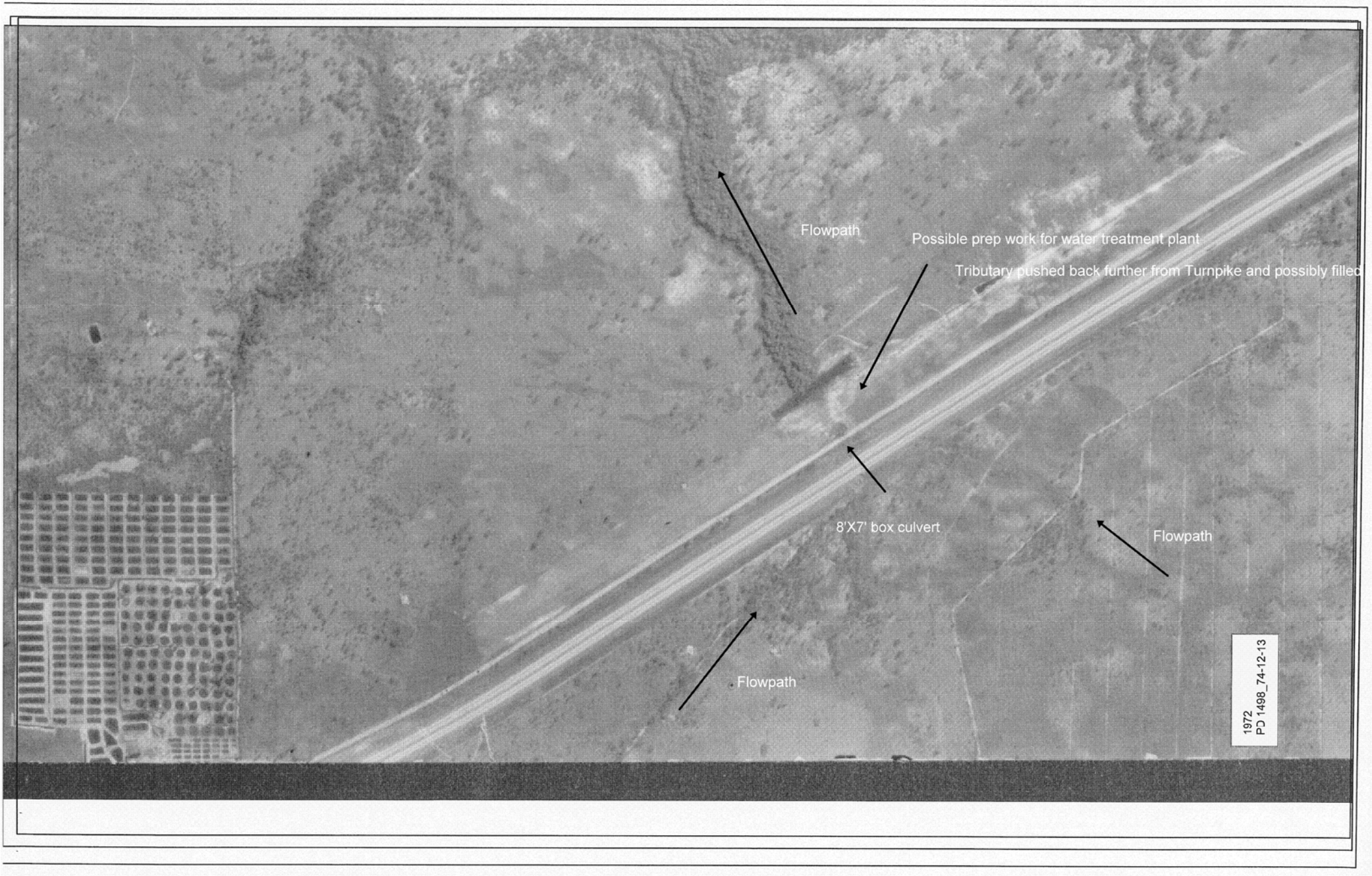
March 1952

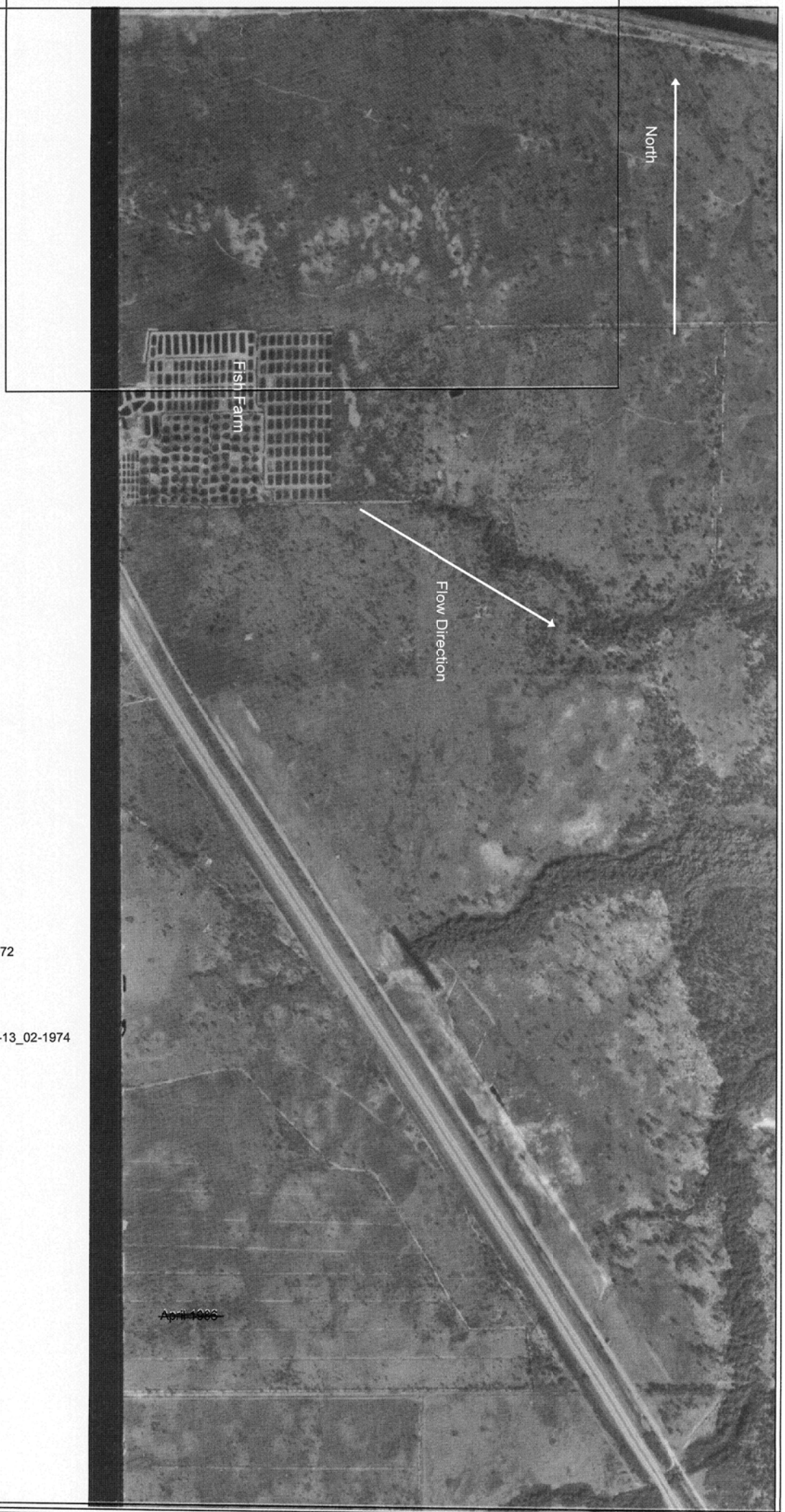
PD DQF_52-1-84_03-1952




Flowpath
Flowpath
8'X7' box culvert
Sandtrail built after Turnpike
Flowpath
1966
PD 373_66-8-24_01


North
Flow Direction
Fish Farm
Triple 8'X4' Box Culvert
Flow Direction
Jan. 1966
PD 373_66_8-20_01-1966

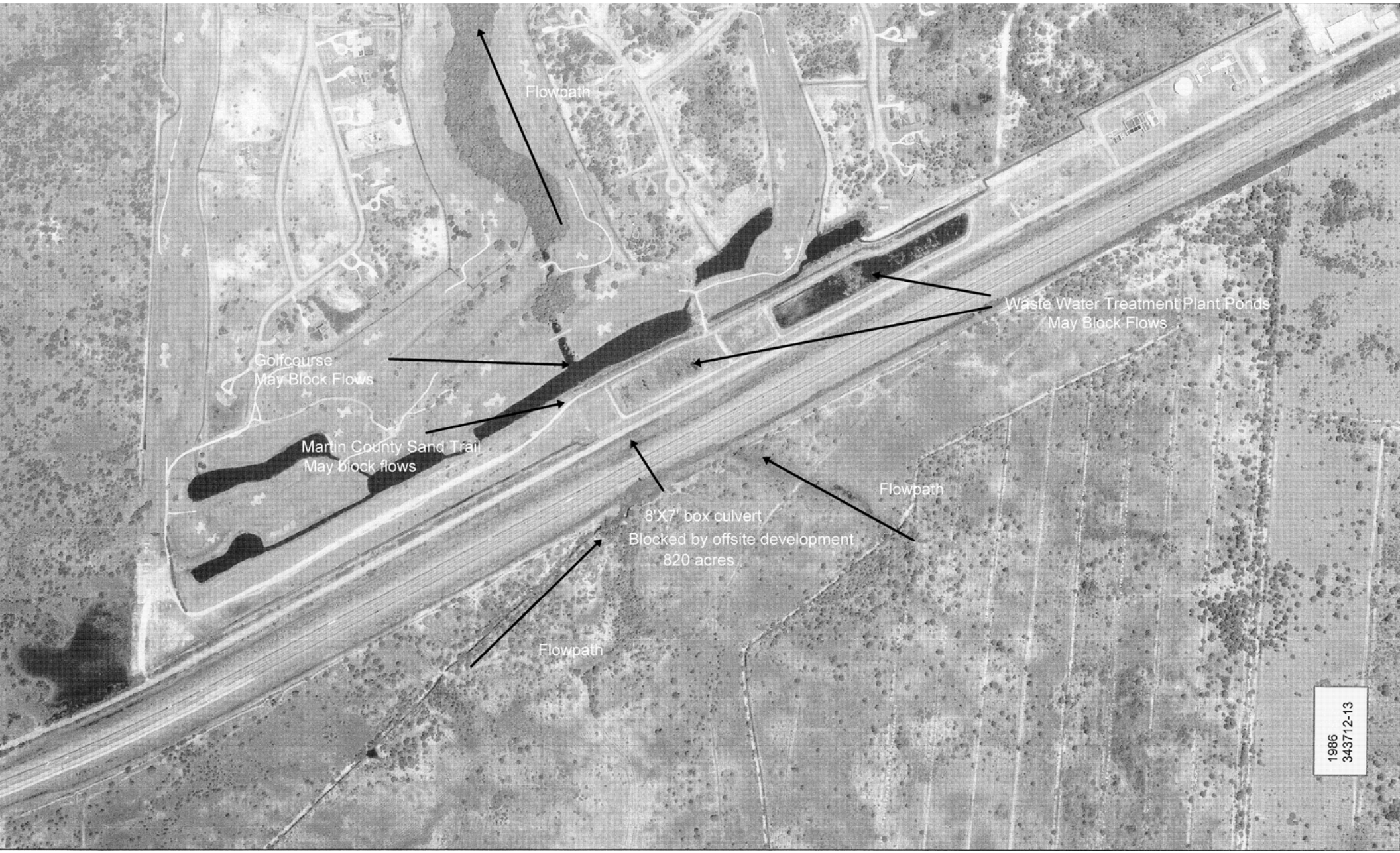

Flowpath
Possible prep work for water treatment plant
Tributary pushed back further from Turnpike and possibly filled
8'X7' box culvert
Flowpath
Flowpath
1972
PD 1498_74-12-13



FEB. 1972

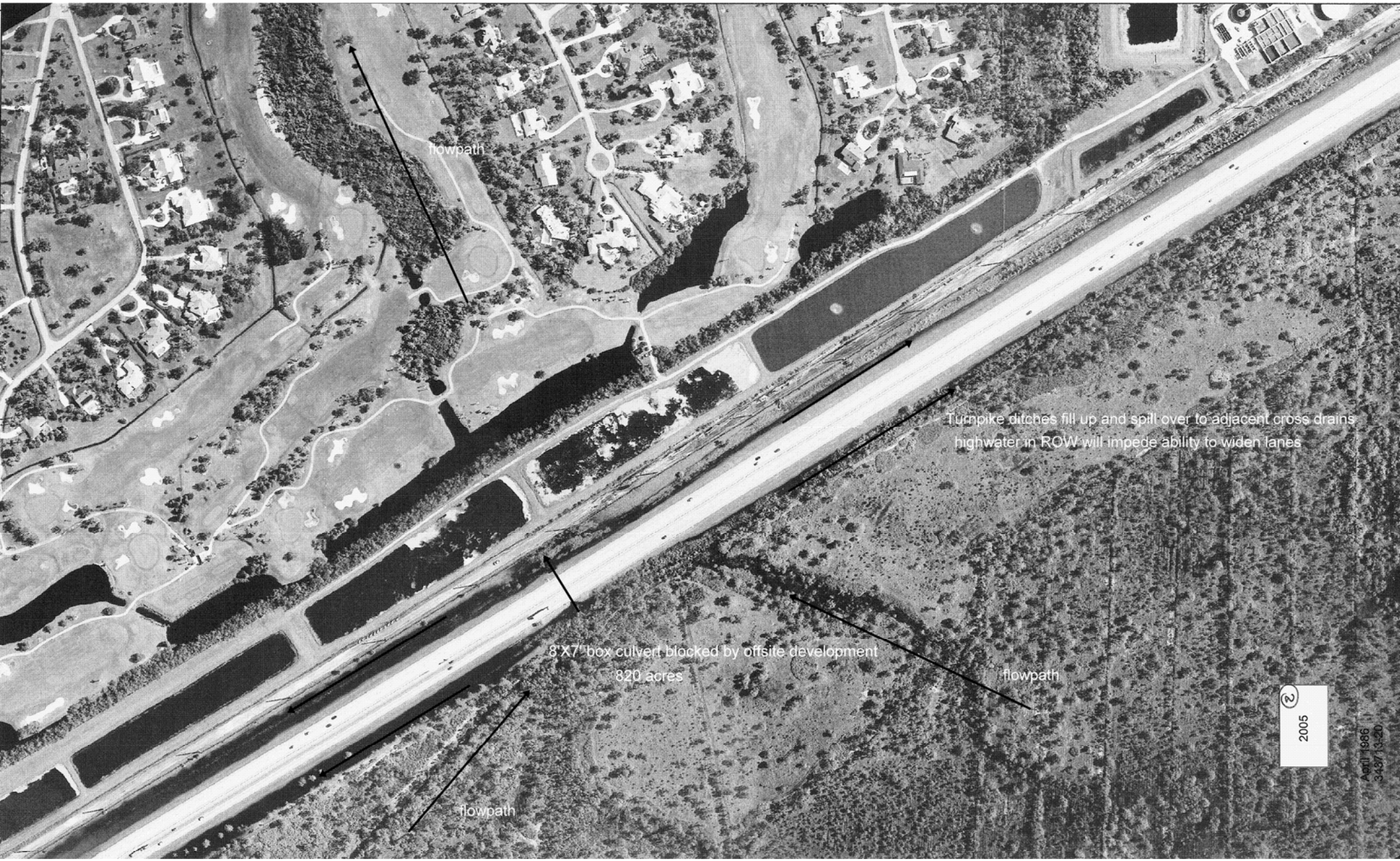
PD 1498_74-12-13_02-1974

~~April 1986~~

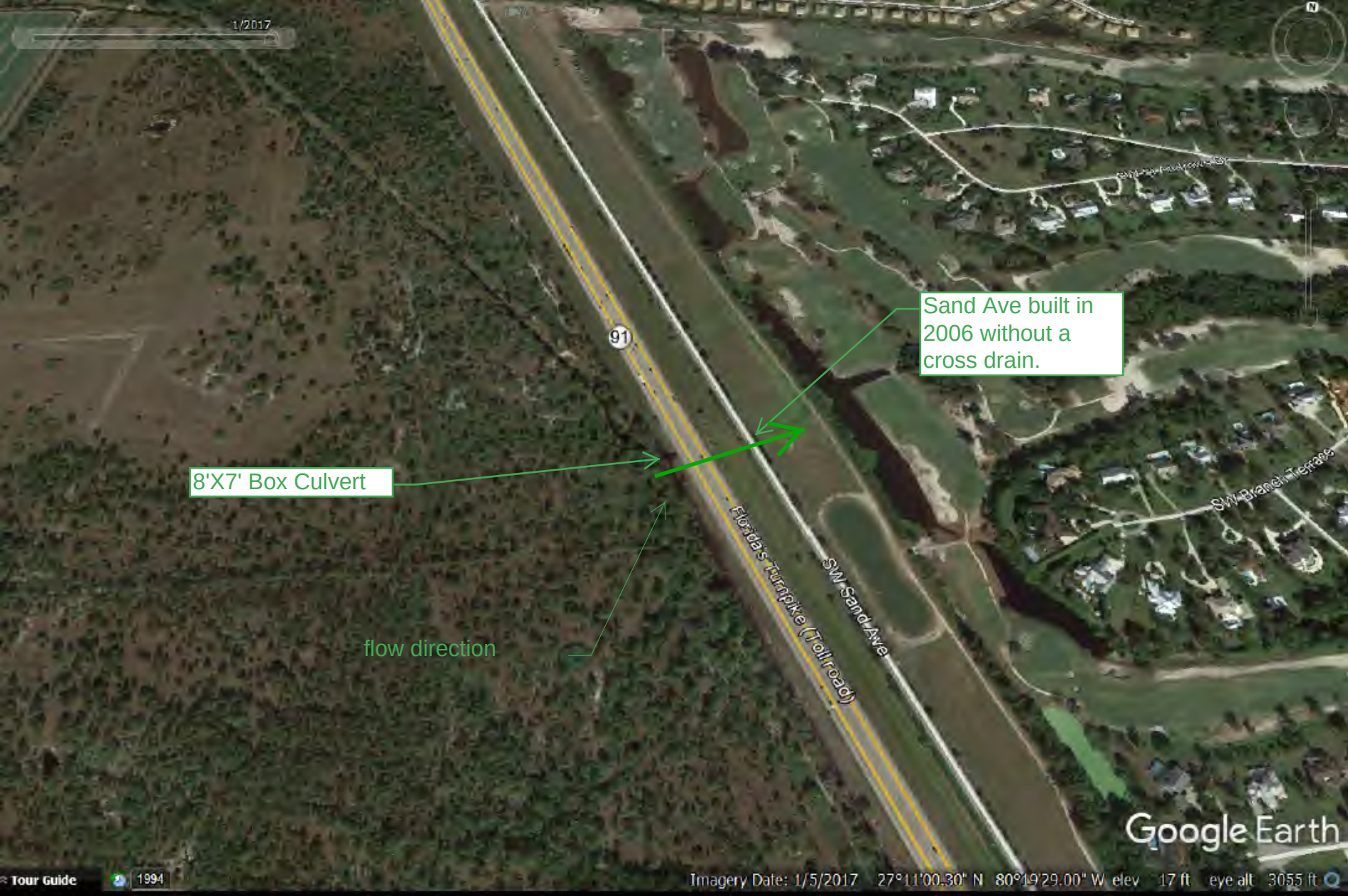

Flowpath
Waste Water Treatment Plant Ponds
May Block Flows
Golfcourse
May Block Flows
Martin County Sand Trail
May block flows
Flowpath
8'X7' box culvert
Blocked by offsite development
820 acres
Flowpath
1986
343712-13

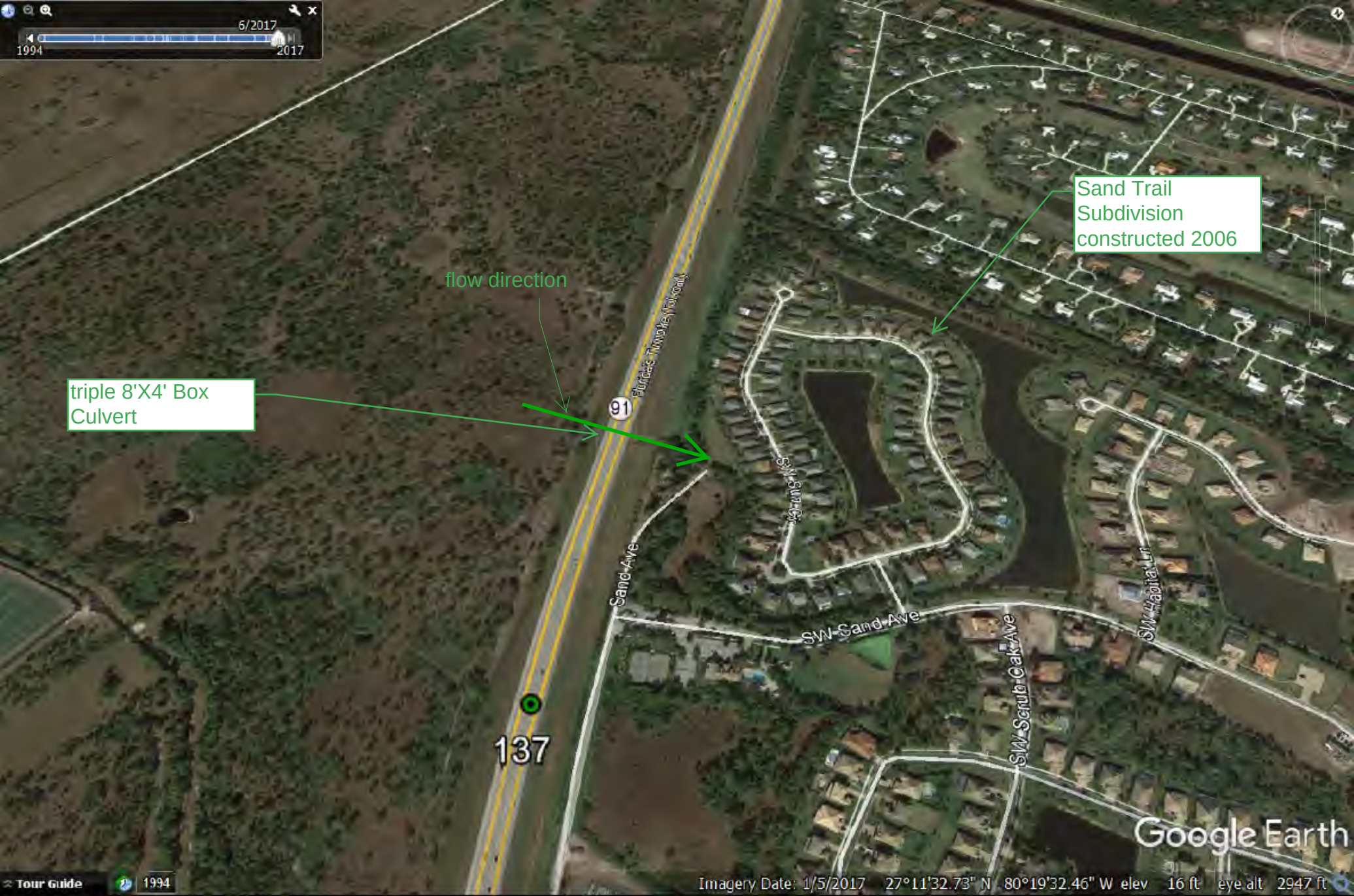
April 1986

343712-19


flowpath
Turnpike ditches fill up and spill over to adjacent cross drains
highwater in ROW will impede ability to widen lanes
8'X7' box culvert blocked by offsite development
820 acres
flowpath
flowpath
2005
April 1986
343/13-20


Fish Farm
Triple 8'X4' Box Culvert


Sand Ave built in 2006 without a cross drain.
8'X7' Box Culvert
flow direction
91
Florida's Turnpike (Toll road)
SW Sand Ave
SW Branch Terrace
Google Earth
Imagery Date: 1/5/2017 27°11'00.30" N 80°19'29.00" W elev 17 ft eye alt 3055 ft


6/2017
1994
2017
Sand Trail Subdivision constructed 2006
flow direction
triple 8'X4' Box Culvert
91
Florida's Turnpike Mainline
SW Sand Ave
SW Sand Ave
SW Scrub Oak Ave
SW Hackberry Ln
137
Google Earth
Tour Guide
1994
Imagery Date: 1/5/2017 27°11'32.73" N 80°19'32.46" W elev 16 ft eye alt 2947 ft

APPENDIX H

STRAIGHT LINE DIAGRAMS

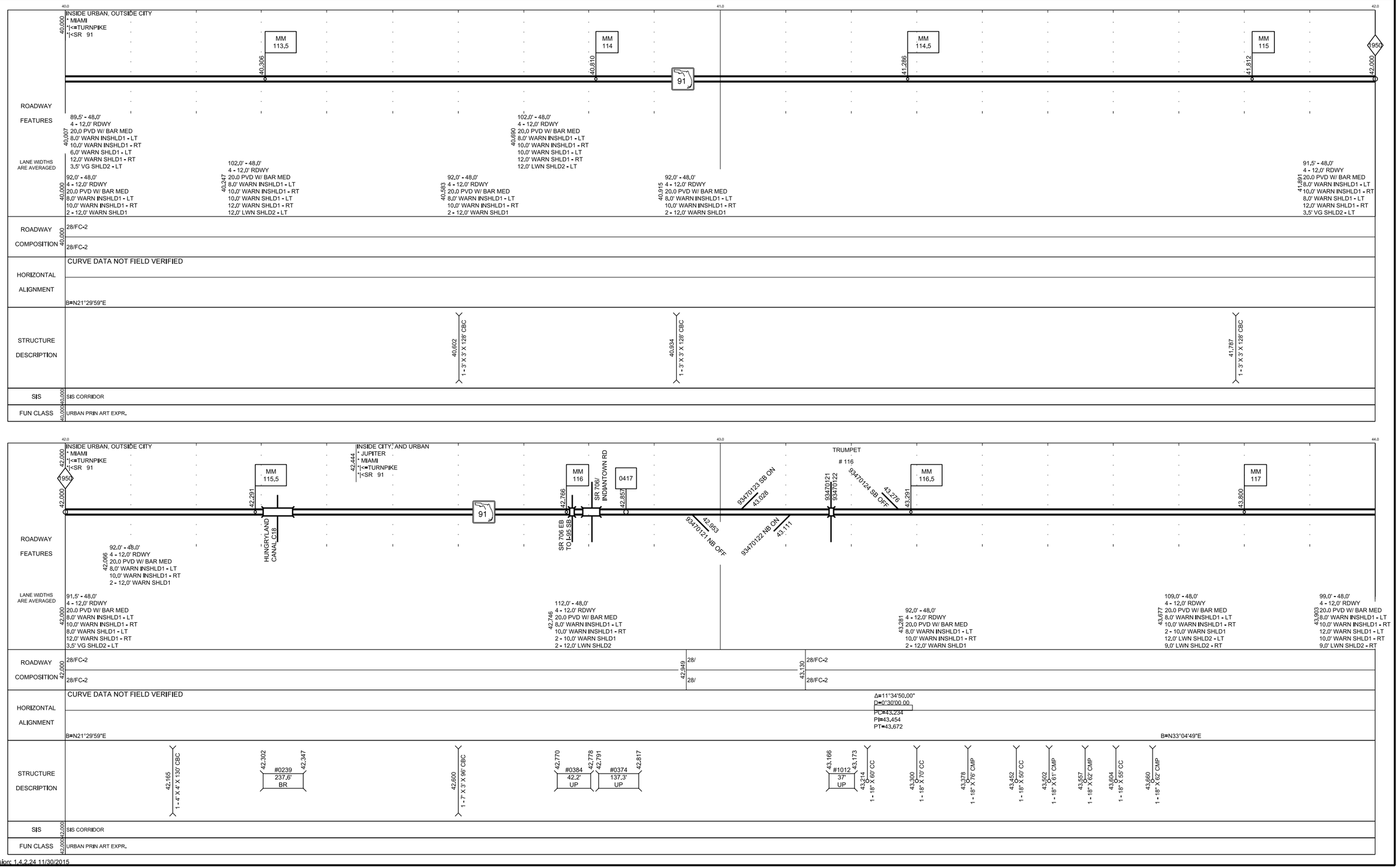
	5 YR INV	SLD REV
DATE	09/30/2011	11/30/2011
BY	Juan Echevarria - URS	Juan Echevarria - URS

BMP	EMP	INV	SLD REV
000,000	044,561	Feature 241 Update	11/30/2015 AECOM
000,000	044,561	F326-DQE P2 2014	02/03/2015 AECOM
000,000	044,561	F121,F124 Updates	08/22/2014 JE-URS

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 91	PALM BEACH	08	93470000	11 OF 12



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Version: 1.4.2.24 11/30/2015

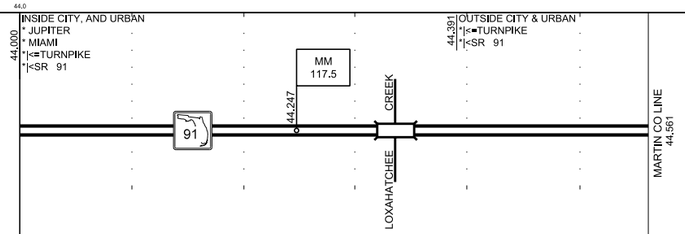
	5 YR INV	SLD REV
DATE	09/30/2011	11/30/2011
BY	Juan Echevarria - URS	Juan Echevarria - URS

BMP	EMP	INV	SLD REV
000.000	044.561	Feature 241 Update	11/30/2015 AECOM
000.000	044.561	F326-DQE P2 2014	02/03/2015 AECOM
000.000	044.561	F121,F124 Updates	08/22/2014 JE-URS

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 91	PALM BEACH	08	93470000	12 OF 12



ROADWAY FEATURES

LANE WIDTHS ARE AVERAGED

44.000
99.0' - 48.0'
4 - 12.0' RDWY
20.0 PVD W/ BAR MED
8.0' WARN INSHLD1 - LT
10.0' WARN INSHLD1 - RT
12.0' WARN SHLD1 - LT
10.0' WARN SHLD1 - RT
9.0' LWN SHLD2 - RT

END MP: 044.561
NET ROADWAY ID LENGTH: 44.561

ROADWAY COMPOSITION

44.000
28/FC-2
28/FC-2

HORIZONTAL ALIGNMENT

CURVE DATA NOT FIELD VERIFIED

B=N33°04'49"E

STRUCTURE DESCRIPTION

SIS	44.000	SIS CORRIDOR	SIS CORRIDOR	44.561
FUN CLASS	44.000	URBAN PRIN ART EXPR.	44.391 RURAL PRIN ART EXPR.	

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Version: 1.4.2.24 11/30/2015

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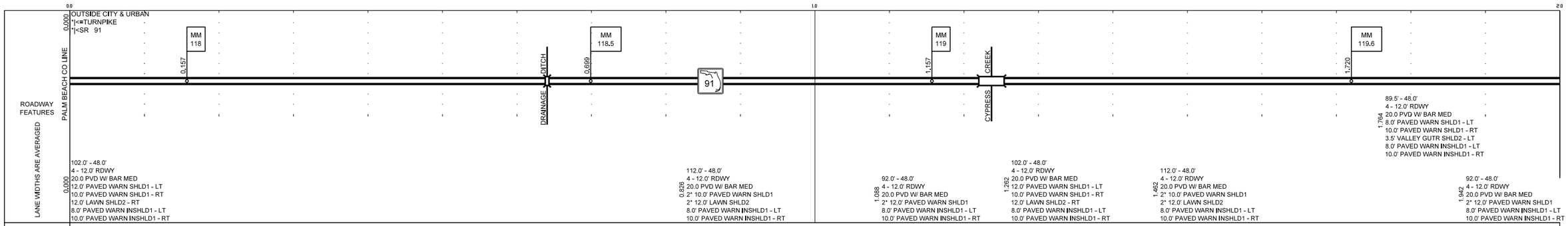
DATE	11/10/2012	01/11/2013
BY	Juan Echevarría - URS	Juan Echevarría - URS

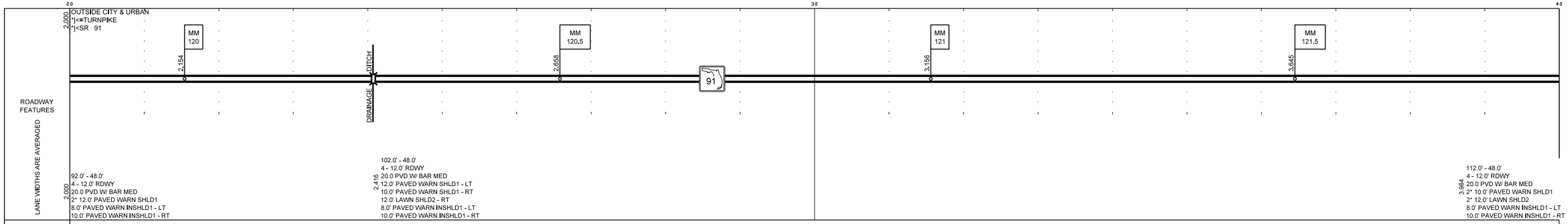
BMP	EMP	INV	SLD REV
012.000	019.000	Feature 326 Update	12/03/2015 AECOM
000.000	020.249	Feature 241 Update	12/01/2015 AECOM
000.000	020.249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	1 OF 6





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Version: 1.4.2.24 12/01/2015

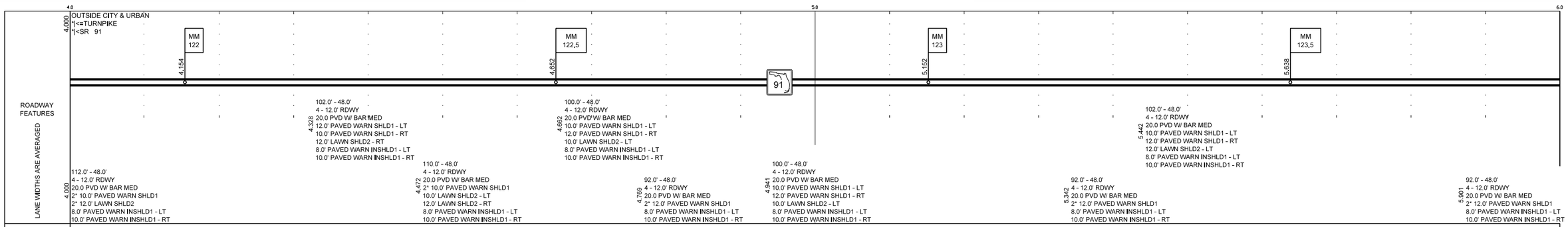
	5 YR INV	SLD REV
DATE	11/10/2012	01/11/2013
BY	Juan Echevarria - URS	Juan Echevarria - URS

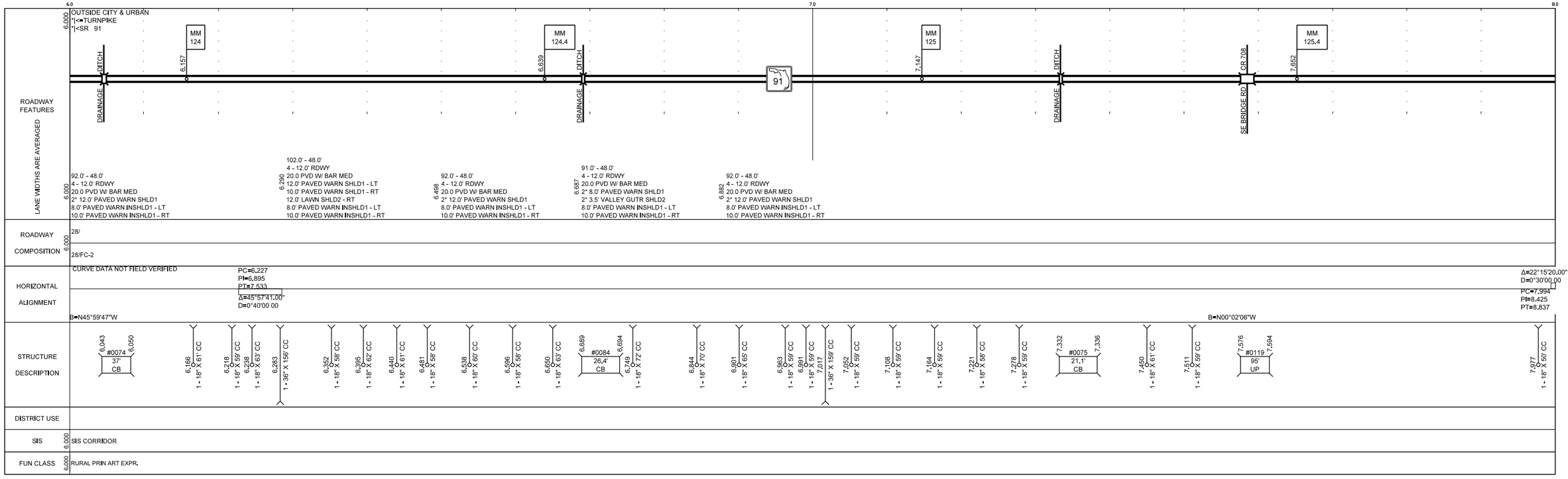
BMP	EMP	INV	SLD REV
012.000	019.000	Feature 326 Update	12/03/2015 AECOM
000.000	020.249	Feature 241 Update	12/01/2015 AECOM
000.000	020.249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	2 OF 6





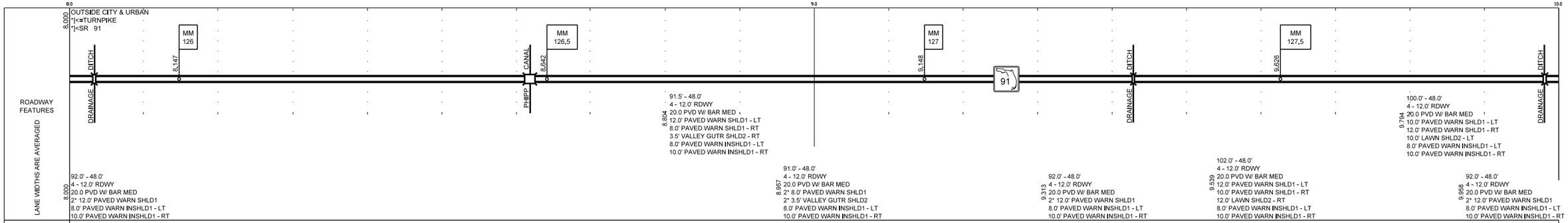
	5 YR INV	SLD REV
DATE	11/10/2012	01/11/2013
BY	Juan Echevarria - URS	Juan Echevarria - URS

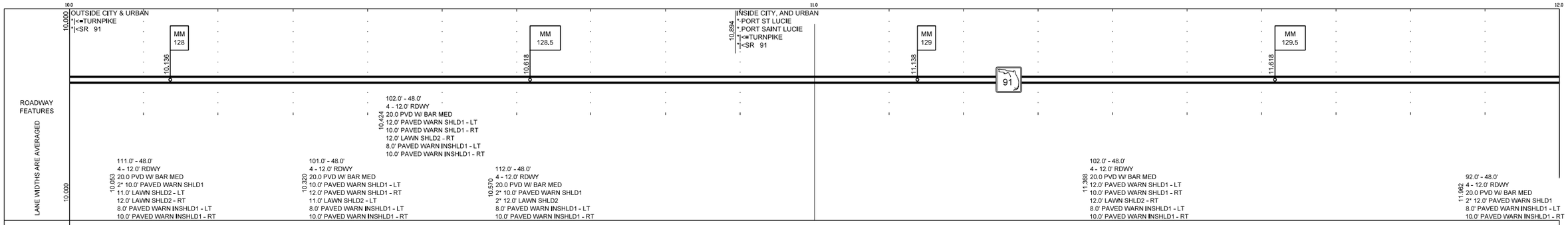
BMP	EMP	INV	SLD REV
012.000	019.000	Feature 326 Update	12/03/2015 AECOM
000.000	020.249	Feature 241 Update	12/01/2015 AECOM
000.000	020.249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	3 OF 6





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Version: 1.4.2.24 12/01/2015

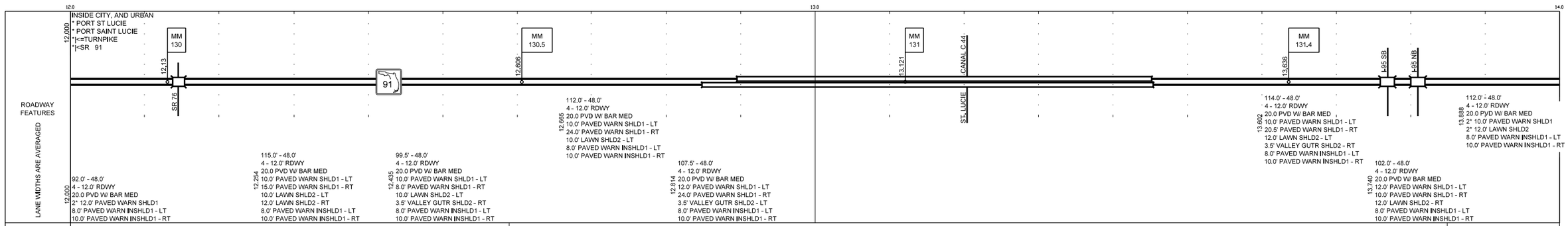
	5 YR INV	SLD REV
DATE	11/10/2012	01/11/2013
BY	Juan Echevarria - URS	Juan Echevarria - URS

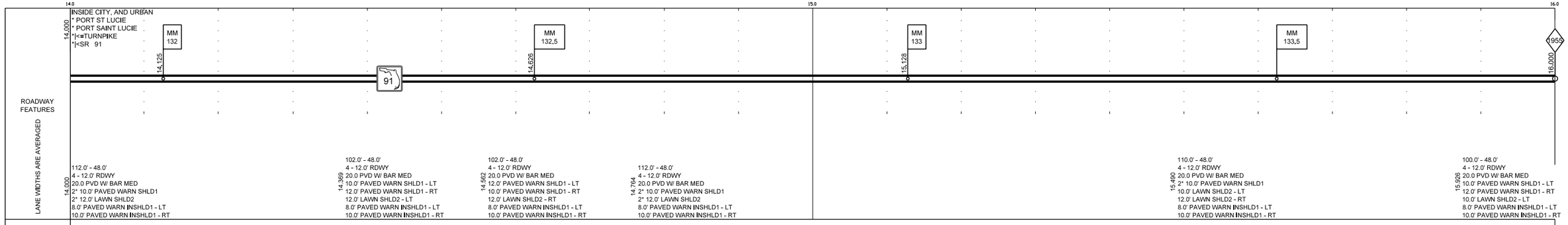
BMP	EMP	INV	SLD REV
012,000	019,000	Feature 326 Update	12/03/2015 AECOM
000,000	020,249	Feature 241 Update	12/01/2015 AECOM
000,000	020,249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	4 OF 6





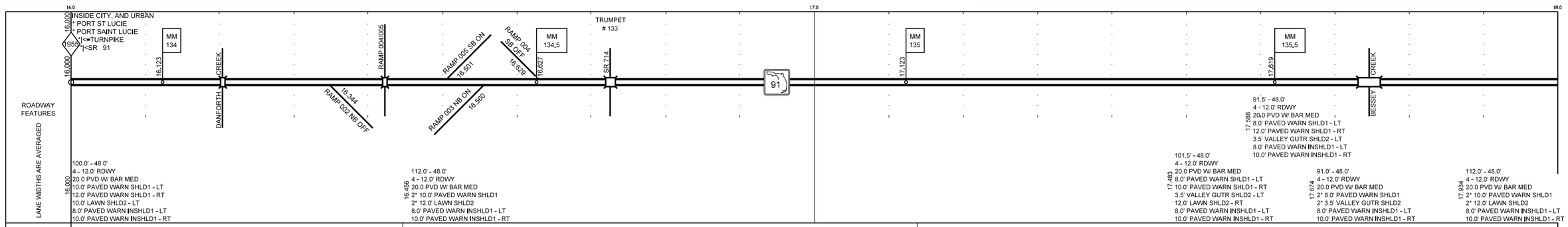
	5 YR INV	SLD REV
DATE	11/10/2012	01/11/2013
BY	Juan Echevarria - URS	Juan Echevarria - URS

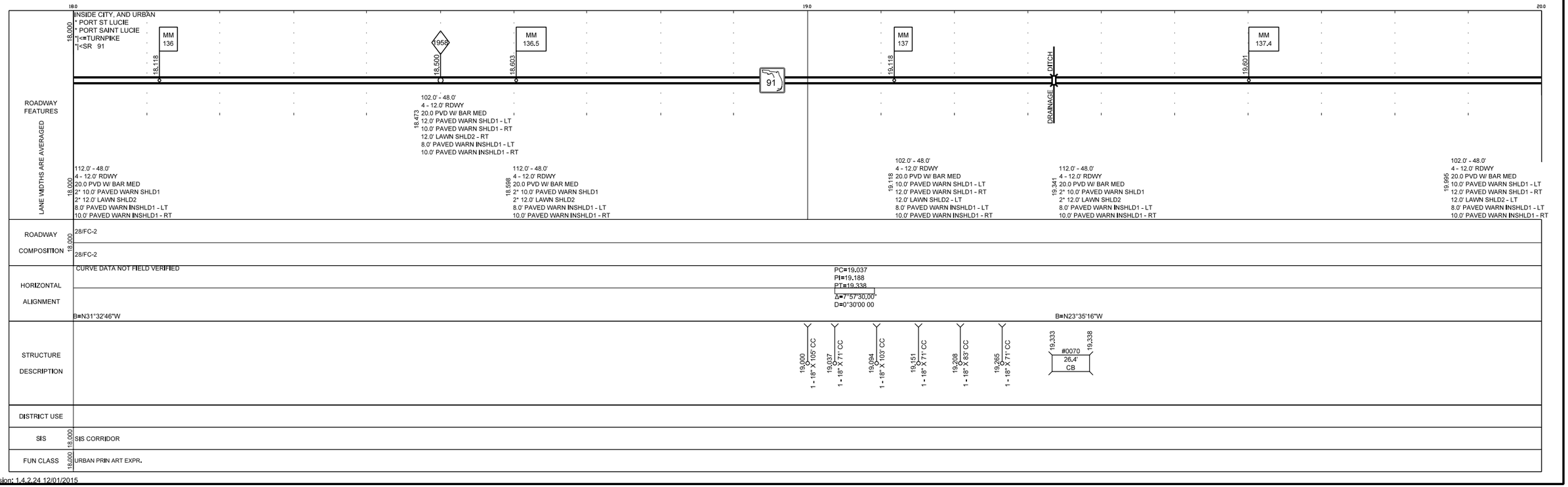
BMP	EMP	INV	SLD REV
012,000	019,000	Feature 326 Update	12/03/2015 AECOM
000,000	020,249	Feature 241 Update	12/01/2015 AECOM
000,000	020,249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	5 OF 6





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Version: 1.4.2.24 12/01/2015

	5 YR INV	SLD REV
DATE	11/10/2012	01/11/2013
BY	Juan Echevarría - URS	Juan Echevarría - URS

BMP	EMP	INV	SLD REV
012.000	019.000	Feature 326 Update	12/03/2015 AECOM
000.000	020.249	Feature 241 Update	12/01/2015 AECOM
000.000	020.249	F121,F124 Update	08/21/2014 JE-URS

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 91	MARTIN	08	89470000	6 OF 6

ROADWAY FEATURES	20.000 INSIDE CITY, AND URBAN * PORT ST LUCIE * PORT SAINT LUCIE *|<=TURNPIKE *|<SR 91 MM 138 91 20.118 CANAL C-23 ST. LUCIE CO LINE 20.249	END MP: 20.249 NET ROADWAY ID LENGTH: 20.249
LANE WIDTHS ARE AVERAGED	20.000 102.0' - 48.0' 4 - 12.0' RDWY 20.0 PVD W/ BAR MED 10.0' PAVED WARN SHLD1 - LT 12.0' PAVED WARN SHLD1 - RT 12.0' LAWN SHLD2 - LT 8.0' PAVED WARN INSHLD1 - LT 10.0' PAVED WARN INSHLD1 - RT	
ROADWAY COMPOSITION	20.000 28/FC-2 28/FC-2	
HORIZONTAL ALIGNMENT	CURVE DATA NOT FIELD VERIFIED B=N23°35'16"W	
STRUCTURE DESCRIPTION	20.155 #0083 496.3' BR 20.249	
DISTRICT USE		
SIS	20.000 SIS CORRIDOR	
FUN CLASS	20.000 URBAN PRIN ART EXPR.	

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Version: 1.4.2.24 12/01/2015

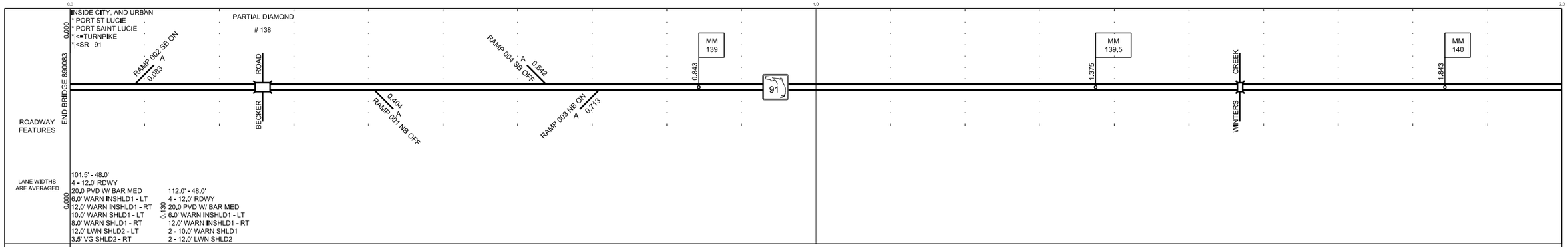
	5 YR INV	SLD REV
DATE	08/22/2012	09/30/2012
BY	Juan Echevarria - URS	Juan Echevarria - URS

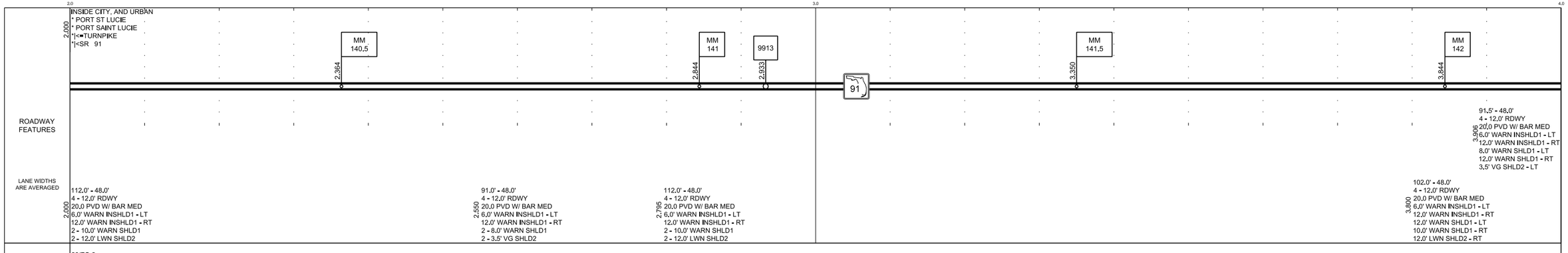
BMP	EMP	INV	SLD REV
000.000	034.959	F121,F124 Updates	09/04/2014 JE-URS
000.000	034.959		06/05/2013 JE-URS
000.000	034.959	06/16/2011 JE-URS	10/06/2011 JE-URS

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 91	ST. LUCIE	08	94470000	1 OF 9





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Version: 1.4.2.23 09/04/2014

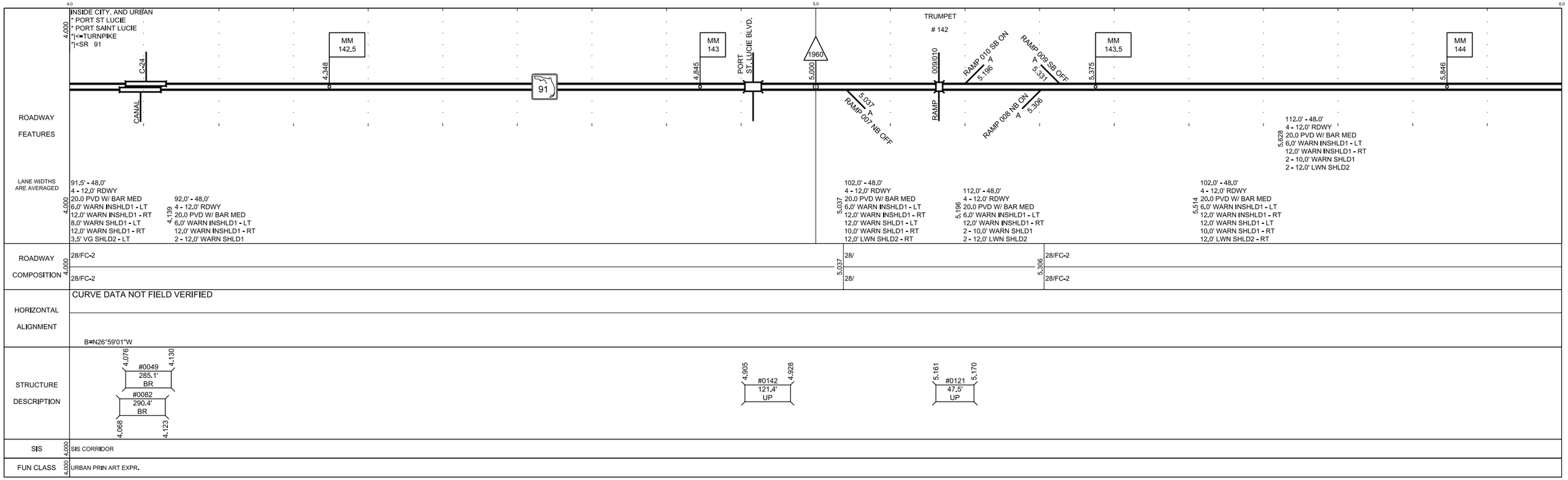
	5 YR INV	SLD REV
DATE	08/22/2012	09/30/2012
BY	Juan Echevarria - URS	Juan Echevarria - URS

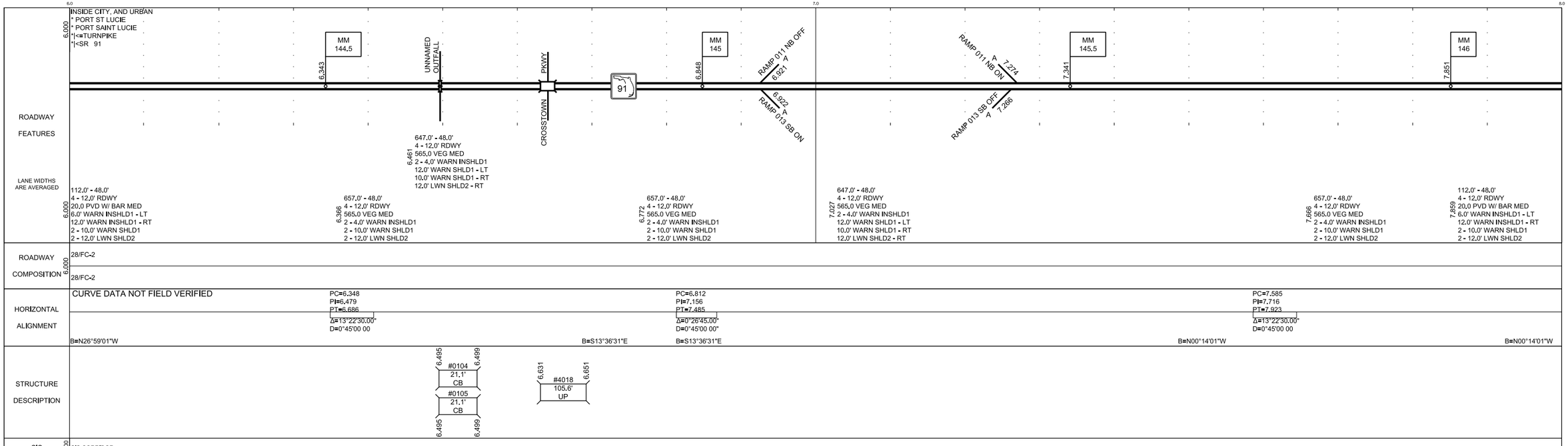
BMP	EMP	INV	SLD REV
000.000	034.959	F121,F124 Updates	09/04/2014 JE-URS
000.000	034.959		06/05/2013 JE-URS
000.000	034.959	06/16/2011 JE-URS	10/06/2011 JE-URS

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 91	ST. LUCIE	08	94470000	2 OF 9





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Version: 14.2.23 09/04/2014

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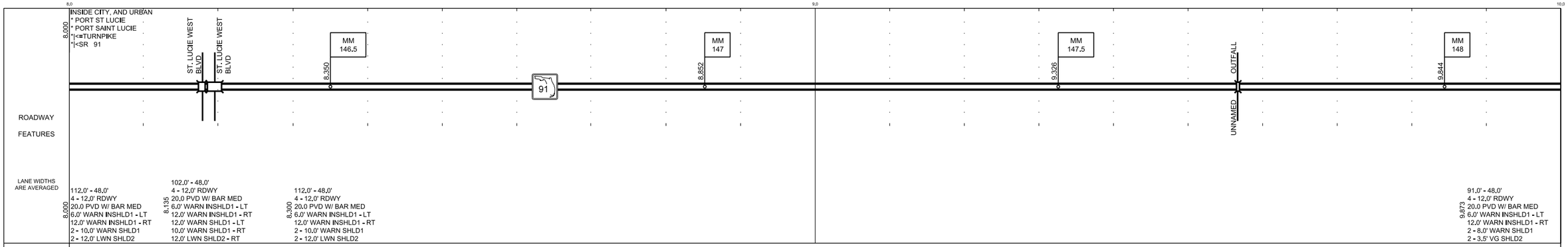
DATE	08/22/2012	09/30/2012
BY	Juan Echevarria - URS	Juan Echevarria - URS

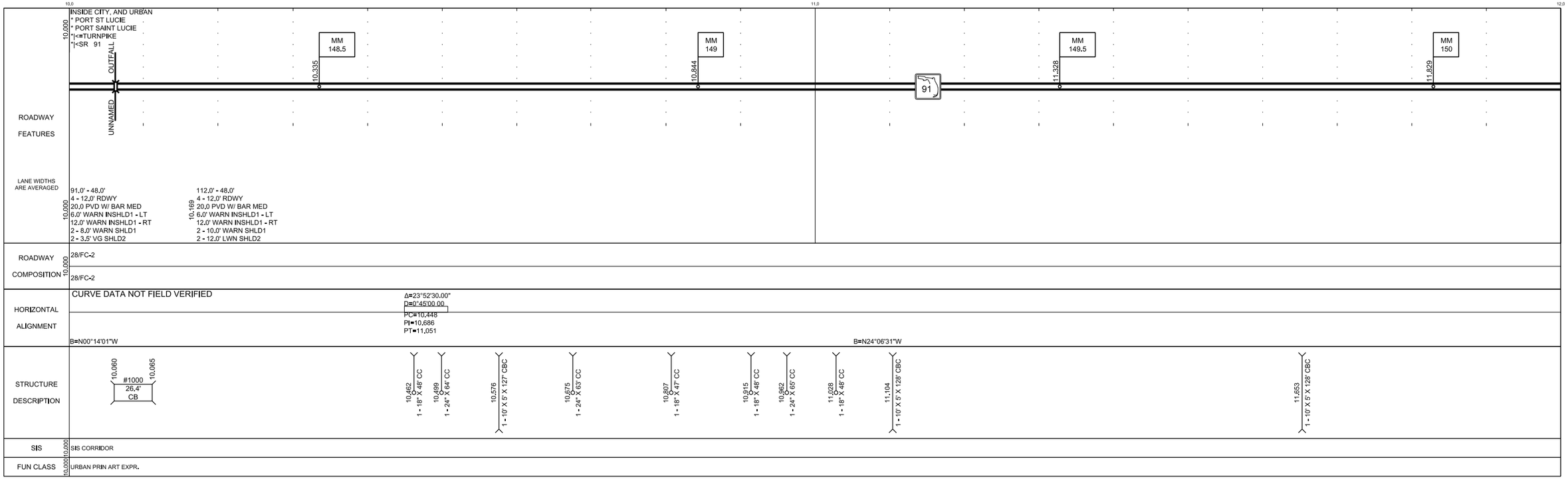
BMP	EMP	INV	SLD REV
000.000	034.959	F121,F124 Updates	09/04/2014 JE-URS
000.000	034.959		06/05/2013 JE-URS
000.000	034.959	06/16/2011 JE-URS	10/06/2011 JE-URS

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 91	ST. LUCIE	08	94470000	3 OF 9





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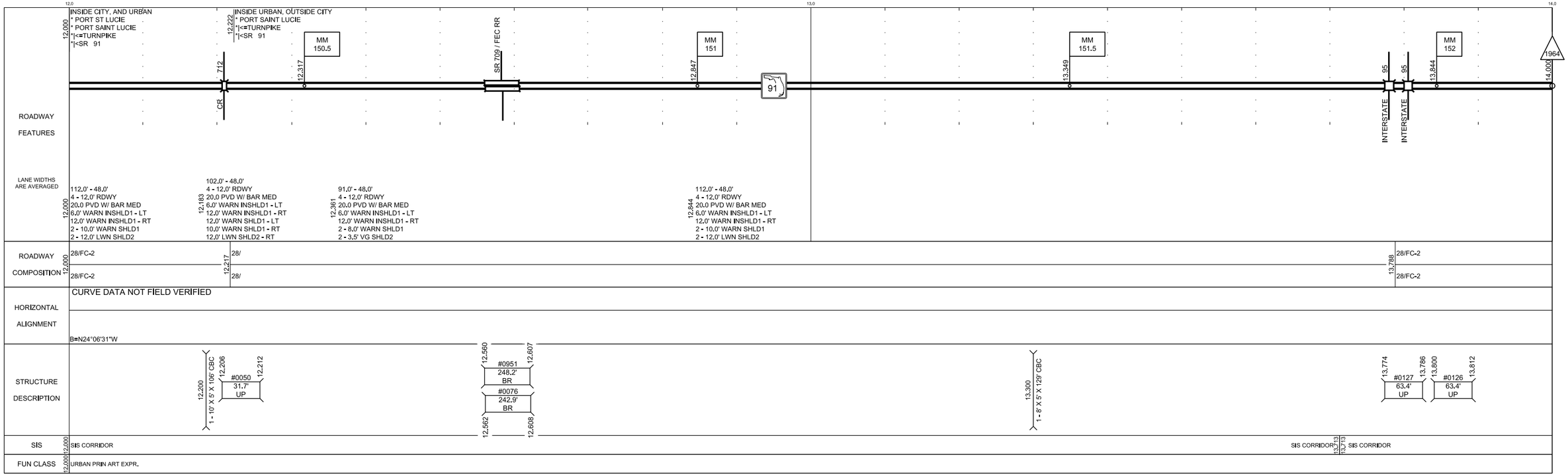
DATE	08/22/2012	09/30/2012
BY	Juan Echevarria - URS	Juan Echevarria - URS

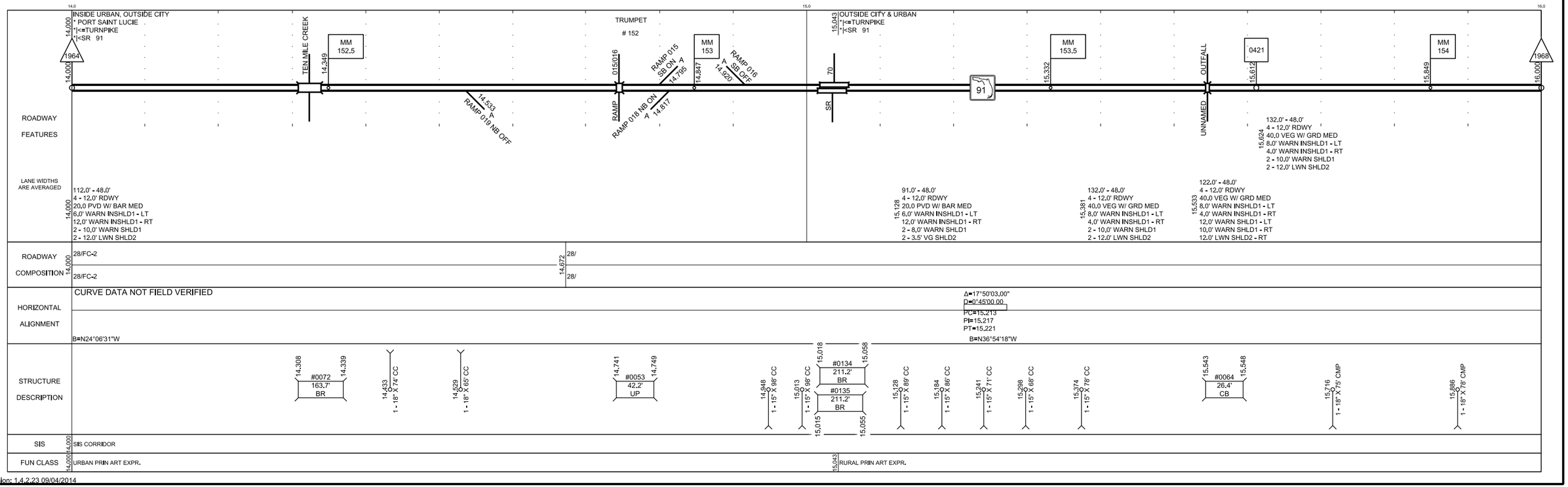
BMP	EMP	INV	SLD REV
000.000	034.959	F121,F124 Updates	09/04/2014 JE-URS
000.000	034.959		06/05/2013 JE-URS
000.000	034.959	06/16/2011 JE-URS	10/06/2011 JE-URS

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 91	ST. LUCIE	08	94470000	4 OF 9





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