DRAFT PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

District Four
3400 W Commercial Blvd
Fort Lauderdale, FL 33309

SR 9/Interstate 95 from South of SW 10 Street (MP 22.00) to North of SR 810 (Hillsboro Boulevard- MP 25.10)

Financial Management Number 436964-1-22-01
ETDM Number 14244

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016, and executed by FHWA and FDOT.

September 2020

Vilma Croft, P.E. (No. 40942)

HNTB Corporation

5900 North Andrews Ave., Suite 400

Fort Lauderdale, Florida 33309

Certificate of Authorization 6500

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1.1 Project Description and Location

The Florida Department of Transportation (FDOT) District Four conducted a Project Development and Environment (PD&E) Study, in accordance with the National Environmental Policy Act (NEPA), to assess potential operational and safety improvements along 3.1 miles of Interstate 95 (I-95), from south of NE 48 Street [Mile Post (MP) 22.0] to north of SR 810 (Hillsboro Boulevard) [MP 25.10] , in Broward County, Florida.

The project extends along I-95 from south of NE 48 Street to just north of Hillsboro Boulevard and along both SW 10 Street from just west of Military Trail east to SW Natura Boulevard and along Hillsboro Boulevard from Goolsby Boulevard east to SW Natura Boulevard. The entire project lies within the city of Deerfield Beach. I-95 is part of the Strategic Intermodal System and the National Highway System which is Florida's high priority network of transportation facilities important to the state's economy, mobility and defense.

The study evaluated alternatives for improvements to the I-95 partial cloverleaf interchanges at SW 10 Street and Hillsboro Boulevard and along I-95 from just south of NE 48 Street to just north of the Hillsboro Boulevard interchange. SW 10 Street provides a direct connection between I-95 and the Sawgrass Expressway. The study also evaluated improvements along both SW 10 Street and Hillsboro Boulevard near I-95.

Alternatives were also evaluated to modify the existing merge and diverge ramp areas at the SW 10 Street and Hillsboro Boulevard interchanges. Replacement of the existing SW 10 Street bridge over I-95 and a grade separation at the existing at-grade railroad crossing at Hillsboro Boulevard were also evaluated.

The project study area is shown in **Figure 1-1**.

Figure 1-1 Project Study Area

1.2 Purpose and Need

The purpose of this project is to eliminate existing operational and safety deficiencies along I-95 between and including the interchanges at SW 10 Street and Hillsboro Boulevard, and on SW 10 Street and Hillsboro Boulevard in the vicinity of I-95. The primary need for the project is based on capacity/operational and safety issues, with secondary considerations for the needs of evacuation and emergency services, transportation demand, system linkage, modal interrelationships, and social demands and economic development.

1.2.1 Capacity/Operational Deficiencies

FDOT has identified the need to improve traffic operations along I-95 between the SW 10 Street and Hillsboro Boulevard interchanges, especially at existing merge and diverge ramps that are the sources of traffic turbulence and collisions. The mainline directional volumes range from 4,400 to 5,850 vehicles per hour (vph) with ramp volumes from 800 to 1,250 vph at SW 10 Street and 400 to 1,000 vph at Hillsboro Boulevard.

Operational analyses along I-95 indicate that all freeway segments in the study area operate at Level of Service (LOS) D or better except for the following:

- The diverge segment at I-95 southbound (SB) off-ramp to SW 10 Street EB and WB during the AM and PM peak periods;
- The I-95 mainline segment between I-95 SB on-ramp from SW 10 Street eastbound (EB) and westbound (WB) and I-95 SB off-ramp to Sample Road EB and WB during the PM peak period;
- The I-95 mainline between I-95 SB On-Ramp from Palmetto Park Boulevard EB and I-95 SB Off-Ramp to Hillsboro Boulevard EB and WB during the AM peak period;
- The merge at I-95 SB on-ramp from Hillsboro Boulevard WB during AM and PM peak periods; and
- The diverge segment at I-95 northbound (NB) off-ramp to Hillsboro Boulevard EB during the AM peak period.

These conditions are existing concerns and are projected to worsen in the future if no action is taken. Year 2040 traffic projections show the mainline directional volumes ranging from 6,000 to 7,300 vph. Year 2040 peak hour directional volumes on I-95 Express are forecasted to range an additional 1,300 to 2,550 vph within the I-95 corridor. Operational analyses under the "No Action" option in year 2040 reflects

implementation of two major programmed improvements: 1) I-95 Express Phase 3 (two express travel lanes in each direction), and 2) I-95 Ramp Metering. All of the mainline freeway segments in the study area would operate at a deficient LOS (E or F) during one or both peak periods with the exception that the merge segment for I-95 SB On-Ramp from WB Hillsboro Boulevard would operate at LOS D during the PM peak hour.

1.2.2 Safety

A need exists to resolve safety issues within the project limits along I-95 as well as SW 10 Street and Hillsboro Boulevard. Crash analyses for the years 2008 through 2012 reveal that the I-95 segment within the Hillsboro Boulevard interchange area is classified as a high crash segment for four of the five study years. It should also be noted that the existing interchanges are closely located together and have short weave distances. Crash rates along SW 10 Street in the vicinity of I-95 exceed the statewide average for similar facilities for all five study years, but the segment along Hillsboro Boulevard in the vicinity of I-95 does not. Field observations indicate that the number of crashes along the Hillsboro Boulevard project segment may be influenced by queues extending from the railroad crossing into this area.

1.2.3 Evacuation and Emergency Services

The South Florida region has been identified by the National Oceanic and Atmospheric Administration (NOAA) as an area with a high degree of vulnerability to hurricanes and the Florida Division of Emergency Management has designated specific evacuation routes through the region. Both SW 10 Street and Hillsboro Boulevard are designated as emergency evacuation routes from I-95 to SR 5/US-1 and A1A. I-95 is designated as an emergency evacuation route throughout Broward County. A need exists to enhance capacity and traffic circulation along evacuation routes to improve evacuation and enhance emergency response.

1.2.4 Transportation Demand

A need exists to improve capacity and safety while meeting transportation demand and maintaining consistency with other transportation plans and projects, such as the Broward County Interchange Master Plan (IMP) and I-95 Express Lanes Phase III Project. The project is included in the FDOT Work Program with PE is scheduled for fiscal years 2017 and 2018. The Broward County MPO 2035 Long Range Transportation Plan (LRTP) included improvements to all I-95 interchanges in Broward County under Illustrative Roadway Projects. Illustrative projects are those

that cannot be included in the cost feasible plan due to financial constraints but could be included in a future approved Transportation Improvement Program.

1.2.5 System Linkage

A need exists to ensure that I-95 continues to meet the minimum requirements of a component of the state's Strategic Intermodal System (SIS) and the National Highway System (NHS), as well as provides access connectivity to other major arterials such as I-595 and Florida's Turnpike Intermodal System (SIS) and the National Highway System (NHS), as well as provides access and connectivity to other major arterials such as I-595 and Florida's Turnpike.

1.2.6 Modal Interrelationships

There exists a need for capacity improvements along the I-95 project corridor to enhance the mobility of public transit and goods by alleviating current and future congestion along the corridor and on the surrounding freight and transit networks. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses of the area.

Increased mobility to public transit operations are needed and will benefit as a result of this project. Although no designated Broward County Transit (BCT) Routes are provided within the SW 10 Street interchange area, Hillsboro Boulevard is serviced by BCT Route #48, which provides a connection from SR 7 to Deerfield Beach including a direct connection to the Deerfield Tri-Rail Station located just west of the Hillsboro interchange.

1.2.7 Social Demands and Economic Development

Social and economic demands on the I-95 corridor will continue to increase as population and employment increase. The Broward County MPO 2035 LRTP predicted that the population would grow from 1.7 million in 2005 to 2.3 million by 2035, an increase of 29 percent. Jobs were predicted to increase from 0.7 to 1 million during the same time period, an increase of 37 percent. A need exists for the proposed improvements to support the predicted social and economic travel.

1.3 Description of Preferred Alternative

This project and the recommended improvements were closely coordinated with the SW 10 Street Connector PD&E Study Project (FM 439891-1) which is studying the

feasibility of connecting the existing Sawgrass Expressway with the proposed connector lanes along SW 10 Street. An Alternatives Analysis Memorandum documenting the development and screening of various alternatives including No-Build, Partial Build and Build concepts was submitted to FDOT District 4 on June 29, 2018 and is included in Appendix I of the Systems Interchange Modification Report (SIMR) prepared for this PD&E Study.

The preferred alternative for the I-95 corridor is Build Alternative 2. Build Alternative 2 was refined to provide direct access from the SW 10 Street Connector to both the I-95 express lanes and general-purpose lanes compatible with the SW 10 Street Modified North Alignment Alternative. Alternative 2 proposes to maintain the existing number of general-purpose lanes throughout the I-95 corridor. The express lanes will be separated from the general-purpose lanes with tubular markers and a 2' to 4' wide buffer.

In the NB direction, an egress point is proposed for the NB express lanes north of the Sample Road interchange for traffic destined to the NB I-95 general-purpose lanes. A second egress point south of the SW 10 Street interchange is proposed for traffic destined to the WB SW 10 Street Connector lanes which braids over the general-purpose lanes and merges with the NB CD road on the east side of I-95.

Access from EB SW 10 Street Connector to I-95 NB is also provided for both the I-95 general-purpose and express-lanes. Access to the general-purpose lanes is provided by an egress access point from the express lanes north of SW 10 Street interchange. A new I-95 NB on-ramp is introduced for WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange relocating the existing left turn movement at the current intersection. The new I-95 NB on-ramp merges with EB on-ramp and the EB SW 10 Street Connector traffic destined to the I-95 general-purpose lanes on the NB CD road. The NB CD road braids over the NB Hillsboro Boulevard off-ramp to merge with the I-95 NB as an auxiliary lane just south of the Hillsboro Boulevard overpass bridge. It continues north connecting with the auxiliary lane being built by the I-95 Express Phase 3B-1 project to the north of Hillsboro Boulevard.

In the SB direction, an egress point is proposed from the express lanes south of Hillsboro Boulevard interchange for the traffic destined to the WB SW 10 Street Connector. Access to the SW 10 Street Connector from the general-purpose lanes is also provided south of the Hillsboro Boulevard interchange. The proposed CD road on the west side of I-95 braids over the I-95 SB traffic entering from EB/WB Hillsboro

Boulevard on-ramps. Traffic from the I-95 general-purpose lanes and express-lanes merge on the CD road to provide access to the SW 10 Street Connector.

Access from the EB SW 10 Street Connector to I-95 SB is provided for both the I-95 general-purpose and express-lanes. Access to the general-purpose lanes is provided by an egress access point from the I-95 express-lanes north of SW 10 Street interchange which braids over the general-purpose lanes to merge with the I-95 mainline on the west side of I-95.

The preferred alternative for SW 10 Street is the Modified North Alignment. The Modified North Alignment provides three 11-ft lanes with a 7-ft buffered bike lane and 6-ft sidewalk in the WB direction. A 12-ft shared use path is provided in the EB direction along SW 10 Street for local pedestrian and bike traffic. However, no sidewalk is provided along the north side from East Newport Center Drive/SW 12 Avenue intersection to Military Trail. Two 12-ft connector lanes are provided in each direction with direct connect ramps providing access to/from the I-95 express lanes and general-purpose lanes allowing regional connectivity to the express lanes network. In the EB direction along the connector lanes an egress ramp departs from the connector lanes west of the Military Trail intersection braiding over the EB SW 10 Street local lanes connecting along the outside lane. The egress ramp allows access to the Newport Center and local SW 10 Street east of the I-95 Interchange.

On SW 10 Street at the NB and SB legs of the East Newport Center Drive intersection triple right turn lanes and no left turn or through lanes are provided. In addition, dual left turn lanes and exclusive right turn lanes are provided for the EB and WB movements at this intersection. This configuration allows improved operations and mitigates congestion for the intersection, the interchange ramp intersections and along SW 10 Street.

A roundabout is provided at the intersection of West and East Newport Center Drive to improve left turn movements at the Newport Center. A loop ramp is provided along SW 12 Avenue that connects directly to the SW 10 Street Connector lanes to improve operations of the East Newport Center Drive intersection with SW 10 Street by allowing WB traffic making a right turn to bypass the signal.

The NB exit ramp terminal was expanded to accommodate triple left and triple right turn lanes. The intersection at Natura Boulevard is expanded to accommodate double left and single right turn lanes on all intersection approaches.

Alternatives 1 and 2 along Hillsboro Boulevard evaluated a depressed profile and an elevated section from Goolsby Boulevard to SW 12 Avenue but were considered non-viable due to significant impacts to property access, right of way, utilities, and major temporary traffic control impacts for both the railroad tracks and Hillsboro Boulevard. Therefore, the proposed improvements along Hillsboro Boulevard are limited to the ramp terminals.

The improvements include providing a two-lane NB exit ramp with a signal controlled and expanded storage for a triple-left turn movement for the NB to WB egress ramp terminal while maintaining the dual right turn movement for the EB traffic. This improvement resulted in the elimination of the NB off-ramp loop to WB Hillsboro Boulevard combining both NB egress ramps into one location. In addition, the NB on-ramp from WB Hillsboro Boulevard was realigned to be within the proximity of I-95. A new configuration is proposed for the EB to SB and the WB to SB on-ramp to minimize the weaving maneuvers within the interchange area. .

1.4 Commitments

The project commitments are listed below:

- Continue coordination with the City of Deerfield Beach and Newport area businesses during design and construction.
- A Bicycle lane and a shared use path will be provided along local SW 10 Street. The bike lane will be provided along the north side of SW 10 Street in the WB direction and the shared use path will be provided along the south side of SW 10 Street along the EB direction.
- Landscaping will be coordinated with the local communities and the City of Deerfield Beach and will be constructed as a separate project.
- The FDOT will not stage materials or make temporary use of any of the Section 4(f) resources during construction.
- Construction noise and vibration impacts to the project corridor will be minimized by adherence to the controls listed in the latest edition of the FDOT's Standard Specifications for Road and Bridge Construction.
- FDOT is committed to the construction of feasible noise abatement measures at the noise impacted locations identified in the NSR upon the following conditions:

  - Final recommendations on the construction of abatement measures are determined during the project's final design and through the public involvement process
  - Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement
  - Cost analysis indicates that the cost of the noise barriers will not exceed the cost reasonable criterion
  - Community input supporting types, heights, and locations of the noise barriers is provided to the District Four Office
  - Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.
- FDOT commits to providing ingress/egress points between local SW 10 Street and the connector lanes. In addition, residential access points will be maintained during and after construction.
- FDOT commits to constructing noise walls that are warranted and desired by a majority of the benefited residents as early as possible in the construction phase.
- FDOT commits that the managed lanes will open and remain without tolling until performance and operations fall below acceptable levels. When the introduction of tolling could improve the declining performance levels, at such time the FDOT will notify the public and solicit feedback for any tolling that is proposed in the future.
- FDOT commits that any future tolling of the managed lanes will be electronic tolling that does not require vehicles to stop and pay a toll.

2 Existing Conditions

Due to the uniqueness of this project, the analysis and evaluation of the existing conditions were separated into three corridors; I-95 (SR 9), SW 10 Street (SR 869) and Hillsboro Boulevard (SR 810). Data gathering for each of these corridors focused on the areas of roadway, bridge and environmental characteristics. Field reviews were conducted. The FDOT's Roadway Characteristics Inventory, Straight Line Diagrams (SLDs), Broward County MPO traffic counts, traffic and roadway data from Broward County Traffic and Engineering Division and other documents were reviewed and collected. A summary of the characteristics of the roadway facilities is presented in **Table 2-1.**

Table 2-1
Summary of Roadway Characteristics

Typical Section Element	Roadway		
	I-95	SW 10 Street	Hillsboro Boulevard
Facility Type	Freeway, Limited Access, SIS Facility	Arterial	Arterial
Functional Classification	Urban Principal Arterial - Interstate	Urban Principal Arterial - Other	Urban Principal Arterial - Other
Access Management Classification (FDOT)	Class 1	Class 3	Class 5
Typical Section	North of Sample Road to North of Hillsboro Boulevard Interchange: NB and SB: 3 GP, 1 EP / BW South of Sample Road Interchange: NB and SB: 1 AUX, 3 GP, 1 EP / BW Wall Median	EB & WB: 3 Lanes/Raised Median	EB & WB: 3 Lanes/Raised Median
Posted Speed Limit	65 mph	45 mph	45 mph
Legend: AUX-Auxiliary Lane GP-General Purpose Lane EP-Express Lane BW-Barrier			

2.1 Functional Classification

The roadway network within the project study area is comprised of interstate expressways, state roads, county roads and local roads that provide access and traffic circulation within residential, commercial and industrial areas.

2.1.1 I-95

Within the limits of the study for access management, I-95 is defined as Limited Access Class 1.2 Freeway in an Existing Urbanized Area with a functional classification as an urban principal arterial interstate. I-95 is an essential part of the Strategic Intermodal System (SIS) and National Highway System (NHS) networks. Within the limits of the project, I-95 has six general purpose lanes (three in each direction) and two Express lanes (EP) lanes (one in each direction).

2.1.2 SW 10 Street

SW 10 Street has a functional classification as an urban principal arterial other. SW 10 Street is classified as a six-lane divided State Principal Arterial west of I-95 and as a six-lane divided City Minor Arterial east of I-95. In addition, it is on the State Highway System (SHS) and SIS systems being classified as a SIS corridor.

2.1.3 Hillsboro Boulevard

Hillsboro Boulevard has a functional classification as an urban principal arterial other. Hillsboro Boulevard is classified as a six-lane divided State Minor Arterial west of I-95 and as a State Principal Arterial east of I-95. In addition, it is on the SHS and SIS systems being classified as a SIS connector classification as an urban principal arterial from the intersection at Goolsby Boulevard (MP 4.760) to I-95 (MP 5.365) since it connects the I-95 Expressway to South Florida Rail Corridor (SFRC).

2.2 Context Classification

Hillsboro Boulevard and SW 10 Street are classified as Suburban Commercial (C3C) which includes facilities that have mostly non-residential uses with large building footprints and large parking lots within large blocks and a disconnected or sparse roadway network.

2.3 Access Management

2.3.1 I-95

The access management classification for the I-95 corridor is Class 1.2, Freeway in an existing urbanized area with limited access.

2.3.2 SW 10 Street

SW 10 Street is designated as Class 3 for access management, where the highway is distinguished by restrictive medians, and the adjacent land is highly developed.

2.3.3 Hillsboro Boulevard

Hillsboro Boulevard is designated as Class 5 for access management, where the highway is distinguished by restrictive medians, and the adjacent land is highly developed.

2.4 Typical Sections

Table 2-2 summarizes the typical section characteristics for each corridor.

Table 2-2
Existing Typical Section Characteristics

Typical Section Element	Roadway		
	I- 95	SW 10 Street	Hillsboro Boulevard
Number of Travel Lanes	8	6	6
Travel Lane Width	12-ft	11 to 12-ft	11-ft
Parking Lane Width	n/a	n/a	n/a
Curb and Gutter	n/a	Type F	Type F
Inside Shoulders Width	12-ft	n/a	n/a
Outside Shoulders Width (Bike Lane)	12-ft	Varies 4-ft to 8-ft	Varies 4-ft to 6-ft
Median Width	26.5 ft	14 to 17.5 ft	15.5 ft
Sidewalk Width	n/a	Varies 5-6 ft	Varies 6-7 ft
Right-of-Way Width	240 ft – 300 ft	106 ft (+)	106 – 136 ft

2.4.1 I-95

Within the limits of the study, I-95 is an eight-lane divided limited access facility consisting primarily of a 2.5-ft center barrier wall with two 12-ft paved inside shoulders (one in each direction). The inside lane in each direction is a 12-ft wide express lane with a 2-ft striped buffer area separating the EP lane from the three 12-ft general-purpose lanes. In each direction, along the outside of the general-purpose lanes is a 12-ft shoulder [10-ft paved and 2-ft unpaved]. In the NB direction, a 12-ft auxiliary lane exists between the SW 10 Street on-ramp and Hillsboro Boulevard off-ramp. Additionally, in the SB direction a 12-ft auxiliary lane exists between the Hillsboro Boulevard on-ramp and SW 10 Street off-ramp. The existing roadway

segment is depicted in **Figure 2-1** and typical section for this corridor is shown in **Figure 2-2**.

Figure 2-1 Roadway Segment – I-95 Corridor

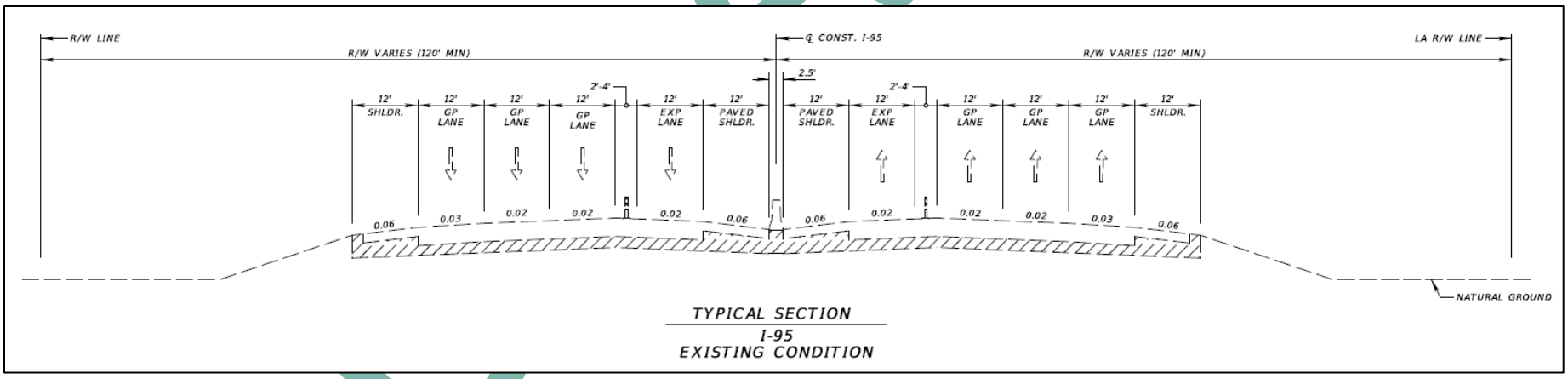

Figure 2-2 Existing Typical Section – I-95

2.4.2 SW 10 Street

Along SW 10 Street EB from approximately 1,000-ft west of the intersection of Military Trail to the intersection there are three 11-ft lanes, a 4- to 5-ft bike lane, and a 6-ft sidewalk. In the center, there is a 17.5-ft raised curb and gutter median.

Along SW 10 Street WB from approximately 1,000-ft west of the intersection of Military Trail to the intersection there are two 12-ft lanes, a 4-ft bike lane and a 4-ft unpaved shoulder.

In each direction, from the intersection at Military Trail to East Newport Center Drive there are three 11-ft lanes, a 4-ft bike lane, 2-ft curb and gutter and a 6-ft concrete sidewalk running along at the back of curb. In the center of the roadway there is a raised curb and gutter median that varies in width from 14-ft to 17.5-ft. In the WB direction, the outside lane is an auxiliary lane used for right turns and/or acceleration that terminates at the intersection with Military Trail. In the EB direction, a fourth (outside) 12-ft to 14-ft wide lane exists as an auxiliary lane used for right turns and/or acceleration and terminates at the SB on-ramp to I-95.

From East Newport Center Drive to SW Natura Boulevard/FAU Research Park Boulevard there are three 11-ft lanes in each direction, 2-ft curb and gutter with a 6-ft concrete sidewalk running along at the back of curb with no bicycle lane or shoulder. The outside EB lane terminates at the NB entrance ramp to I-95 and then remerges west of the NB I-95 off-ramp intersection continuing to the FAU Research Park Boulevard intersection. WB are three 11-ft lanes, 2-ft curb and gutter with a 6-ft concrete sidewalk running along at the back of curb with no bike lane or shoulder present. A fourth WB lane emerges at the SB I-95 off-ramp intersection and terminates at the East Newport Center Drive intersection. In the center of the roadway there is a raised curb and gutter median that varies in width from 14-ft to 20-ft.

The existing roadway segment is depicted in **Figure 2-3** and typical section for this corridor is shown in **Figure 2-4**.

Figure 2-3 Existing Roadway Segment – SW 10 Street

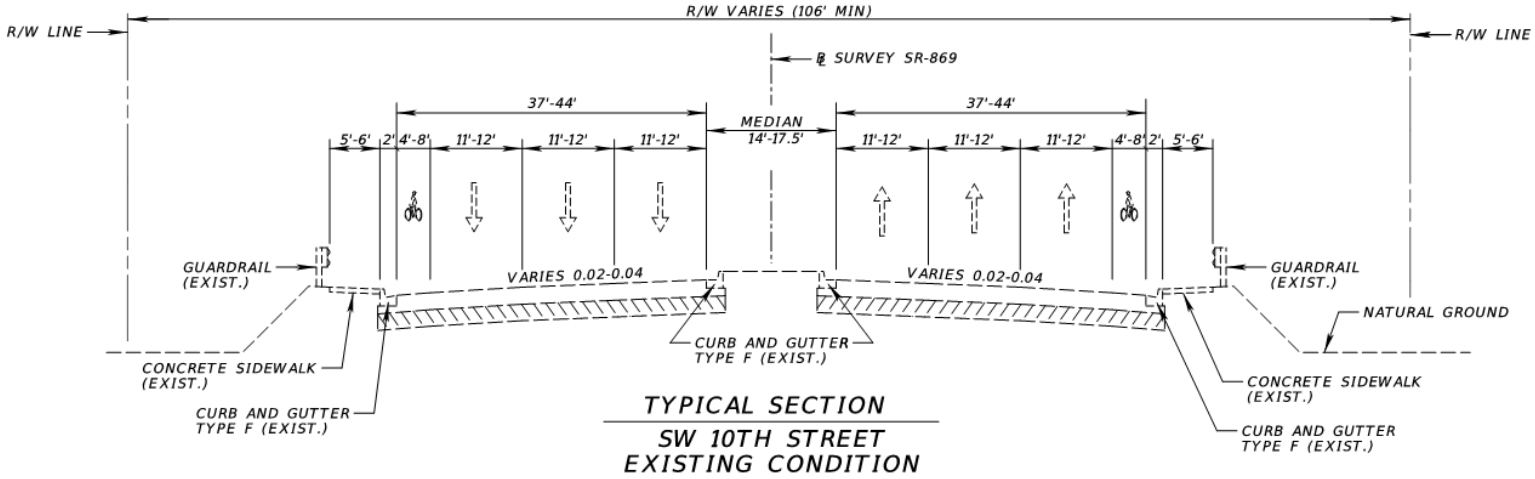

Figure 2-4 Existing Typical Section – SW 10 Street

2.4.3 Hillsboro Boulevard

Hillsboro Boulevard from east of the Military Trail intersection to the intersection with Natura Boulevard/Fairway Drive is an urban arterial typical section with a 15.5 ft raised median, six 11-ft thru lanes (3 lanes in each direction) and two 4-ft bicycle lanes (one in each direction) with Type F curb and gutter on both sides of the roadway. In each direction outside the bicycle lanes is a 2-ft curb and gutter with 6-ft concrete sidewalk running along at the back of curb. The right of way varies from 53-ft to 68-ft on each side.

The existing roadway segment is depicted in **Figure 2-5** and typical section for this corridor is shown in **Figure 2-6**.

Figure 2-5 Existing Roadway Segment – Hillsboro Boulevard

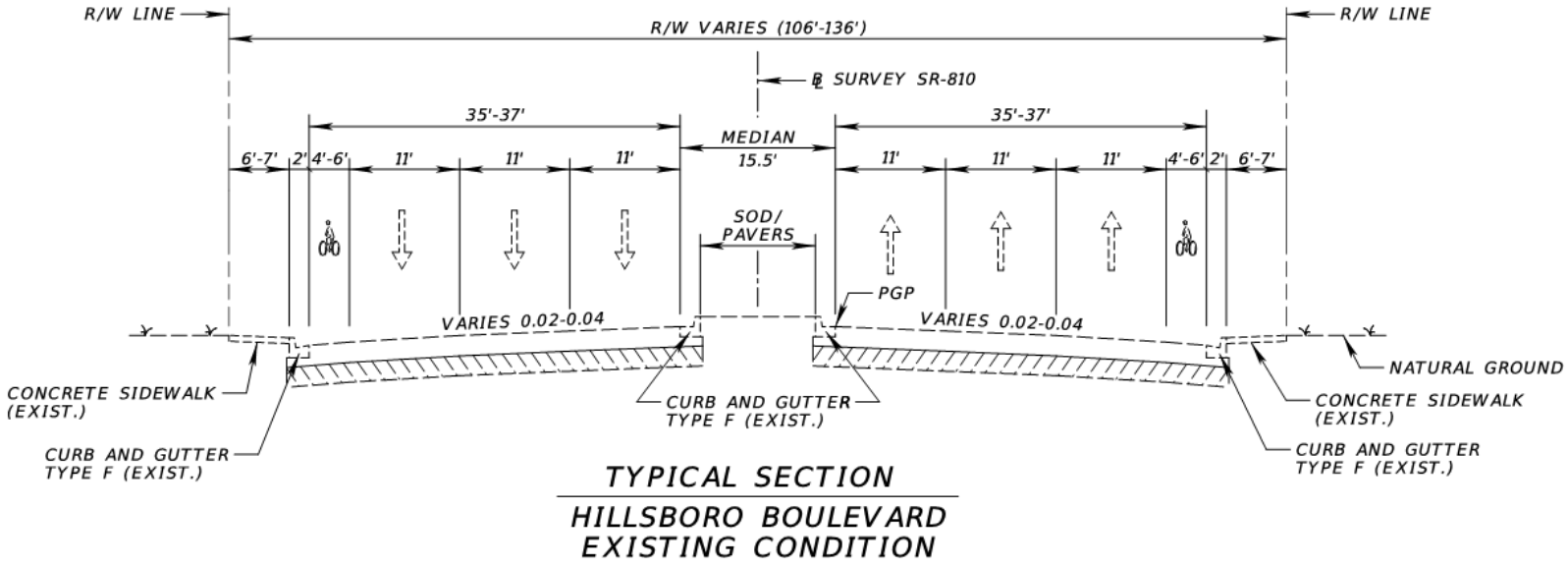

Figure 2-6 Existing Typical Section – Hillsboro Boulevard

2.5 Right of Way

2.5.1 I-95

The existing right of way along I-95 varies with a minimum of 240-ft and varies based on shoulder width and natural ground.

2.5.2 SW 10 Street

The existing right of way along SW 10 Street varies with a minimum of 106-ft and varies based on median width.

2.5.3 Hillsboro Boulevard

The existing right of way along Hillsboro Boulevard varies from 106- to 136-ft based on median width, shoulder width and natural ground.

2.6 Property Lines and Land Use

2.6.1 Existing Land Use

This project lies within the City of Deerfield Beach. West of I-95 within the project limits, the dominant land uses are industrial and commercial, including a Publix distribution center and several hotels in the vicinity of the interchanges. Additional land uses west of I-95 include City of Deerfield government offices located west of the SFRC and south of Hillsboro Boulevard, and a residential development southwest of SW 10 Street and the railroad. East of I-95 and south of Hillsboro Boulevard, land use is mainly single and multi-family residential with a mixture of commercial development at the interchanges. North of Hillsboro Boulevard, land use is mainly commercial along I-95 and Hillsboro Boulevard. Set behind the commercial development is the former Deerfield Country Club Golf Course.

The City of Deerfield Beach Zoning Map shown in **Figure 2-7** shows the NW quadrant of SW 10 Street interchange as zone I (Industrial), the SW quadrant as zone PID (Planned Industrial Development), the SE quadrants as zone B-2 (Business) and the NE quadrant as zones B-2 (Business) and PUD (Planned Unit Development).

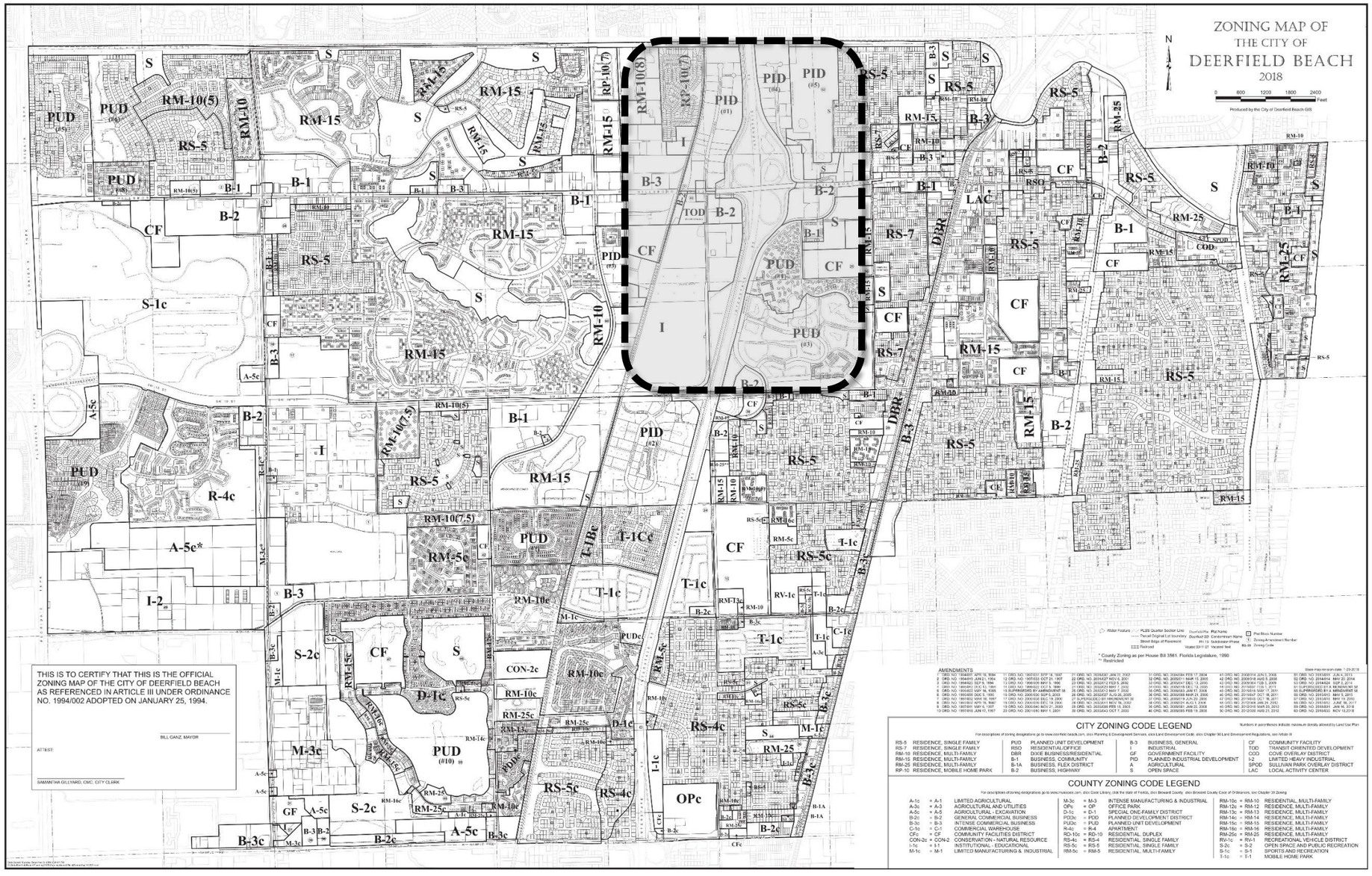

Figure 2-7 Zoning Map –Existing

2.7 Existing Structural Characteristics

2.7.1 Structures

As part of this PD&E study, seven existing bridge structures were evaluated. The bridge locations are identified in **Figure 2-8**.

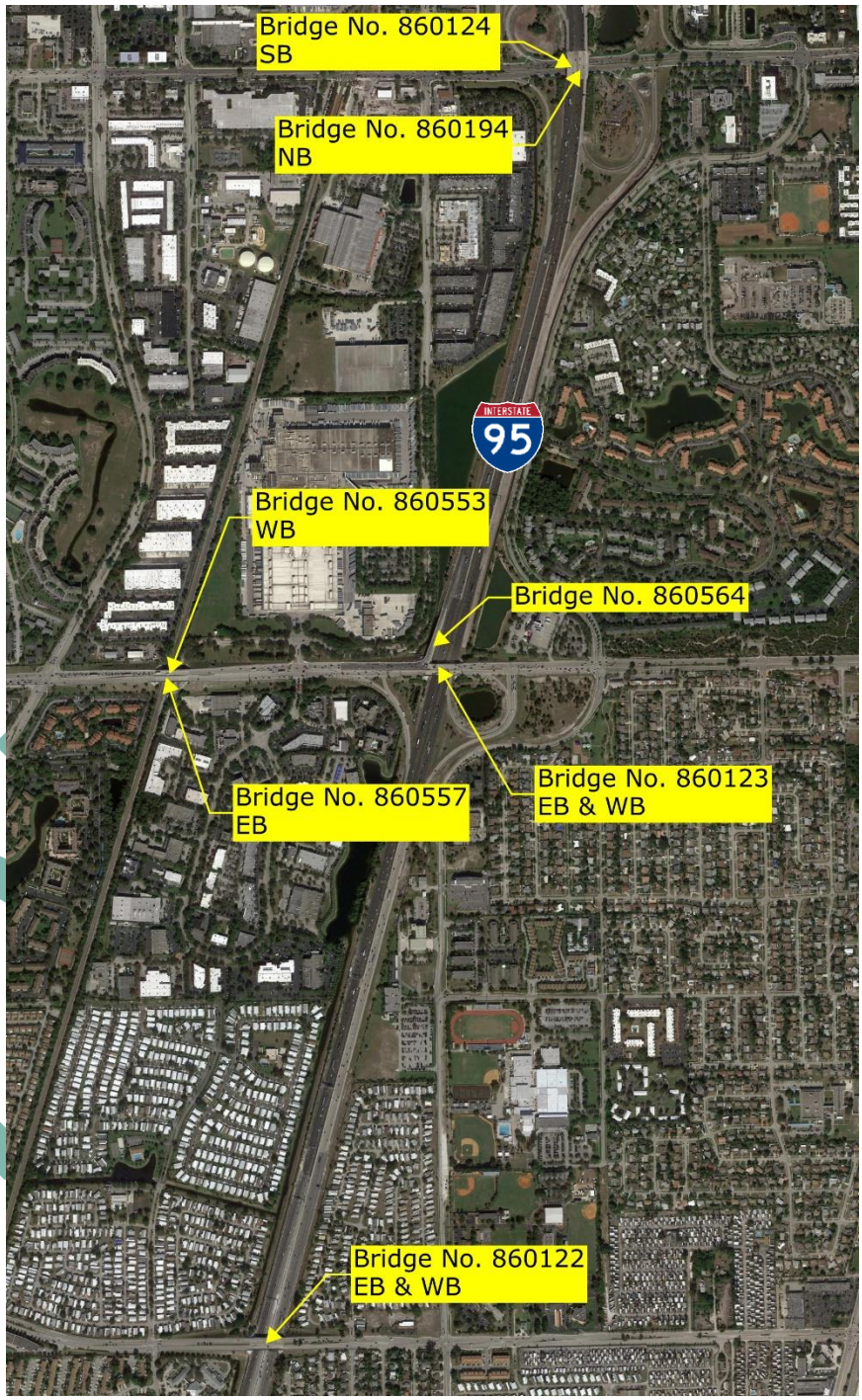

Figure 2-8 Existing Bridge Locations

2.7.1.1 Existing Bridges

There are seven existing bridge structures within the project limits including:

- I-95 NB over Hillsboro Boulevard (Bridge No. 860194),
- I-95 SB over Hillsboro Boulevard (Bridge No. 860124),
- SW 10 Street EB and WB over I-95 (Bridge No. 860123),
- I-95 SB off-ramp connecting to SW 10 Street (Bridge No. 860564),
- SW 10 Street EB and WB over SW 12 Avenue and SFRC railroad (Bridge Nos. 860557, 860553)
- NE 48th Street EB and WB over I-95 (Bridge No. 860122).

The existing bridges are shown in **Figure 2-9** through **Figure 2-21**. The location, geometrics, alignment, type of structure, and condition of the above-mentioned bridges are listed in **Table 2-3**, **Table 2-4**, **Table 2-5 and Table 2-6**.

2.7.1.1.1 Hillsboro Boulevard and I-95 Interchange

Table 2- 3 Existing Bridge Characteristics (Hillsboro Blvd. and I-95 Interchange)

Bridge ID No.			860194 (NB)	860124 (SB)
Location	Bridge Location		I-95 over Hillsboro Boulevard	I-95 over Hillsboro Boulevard
	Direction		NB	SB
Geometrics	Bridge Length (ft)		231	231
	Deck Width (ft)		87.17	87.17
	No. of Lanes		5 (3 GP, 1 HOV, 1 merge)	5 (3 GP, 1 HOV, 1 merge)
Alignment	Skew Angles (Degrees)		6	6
	Minimum Horizontal Clearance	Inside (LT)	8’-1”	8’-1”
		Outside (RT)	14’-1 3/4”, 14’-6 7/8” (1)	14’-1 3/4”, 14’-6 7/8” (1)
	Min. Vertical Clearance		N/A (2)	15.39 ft (2)
Structural	Number of Spans		4	4
	Interior Span Length (ft)		74.25	74.25
	Outer Span Length (ft)		41.25	41.25
	Superstructure Type		AASHTO Type III/II	AASHTO Type III/II
	Substructure Type		Multicolumn Pier/Bent/18" Prest. Piles	Multicolumn Pier/Bent/18" Prest. Piles
Conditio	Year Built / Widened		1972/1990	1972/1990
	Sufficiency Rating (percent)		98.0	98.0
	Health Index (percent)		99.81	99.93

Table 2- 3 Existing Bridge Characteristics (Hillsboro Blvd. and I-95 Interchange)			
	Inspection Date	5/8/2017	5/8/2017
	Number of Documented Hits	None	None
	Significant Deficiencies	None	None
	Load Rating (Inventory Rating Factor- IRF)	(IRF>1) 1.011	(IRF>1) 1.011

Notes:

1. Minimum horizontal clearance per existing bridge plans.
2. Minimum vertical clearance per the existing bridge plans for SB bridge, not available for NB bridge but larger than that of SB bridge due to superelevation.

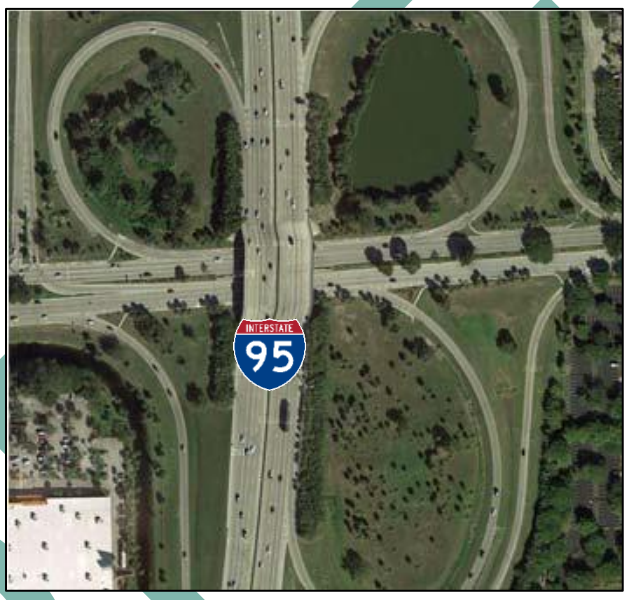

Figure 2-9 Bridges at Hillsboro Boulevard and I-95 Interchange (Bridge Nos. 860194 & 860124)

Figure 2-10 Bridge No. 860194 Looking West

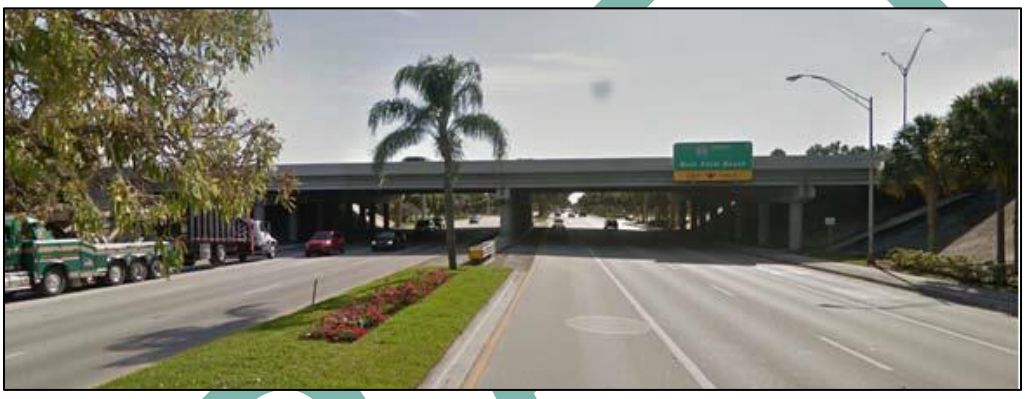

Figure 2-11 Bridge No. 860124 Looking East

2.7.1.1.2 SW 10 Street and I-95 Interchange

Table 2-4 Existing Bridge Characteristics (SW 10 Street and I-95 Interchange)				
Bridge ID No.			**860123**	**860564**
Location	Bridge Location		SW 10 Street over I-95	I-95 off-ramp connecting to SW 10 Street
	Direction		EB/WB	SB
Geometrics	Bridge Length (ft)		272	455
	Deck Width (ft)		97.75	Varies from 63.10 to 43.13
	No. of Lanes		7	3
Alignment	Skew Angles (Degrees)		16	0
	Minimum Horizontal Clearance	Inside (LT)	10'-4" (+/-) (1)	N/A
		Outside (RT)	30.04 ft (2)	N/A
	Min. Vertical Clearance		16.16 ft	N/A
Structural	Number of Spans		4	7
	Interior Span Length (ft)		103.75	65
	Outer Span Length (ft)		32.25	65
	Superstructure Type		AASHTO Type IV/II	AASHTO Type III
	Substructure Type		Multicolumn Pier/Bent/18" Prest. Piles	Pile Bent/18" Prest. Piles and Steel HP 14x89 Piles
Condition	Year Built / Widened		1972	1988/2018
	Sufficiency Rating (percent)		83	80.5
	Health Index (percent)		99.78	99.39
	Inspection Date		6/14/2016	8/10/2016
	Number of Documented Hits		None	None
	Significant Deficiencies		None	None
	Load Rating (Inventory Rating Factor- IRF)		(IRF > 1) 1.389	(IRF>1) 1.07

Notes:

1. Horizontal clearance: measured from the edge of the travel lane to the pier, per existing bridge plans.
2. Minimum vertical clearance: per the bridge inspection report.

Figure 2-12 Bridges at SW 10 Street and I-95 Interchange (Bridge Nos. 860123 & 860564)

Figure 2-13Bridge No. 860123 Looking North

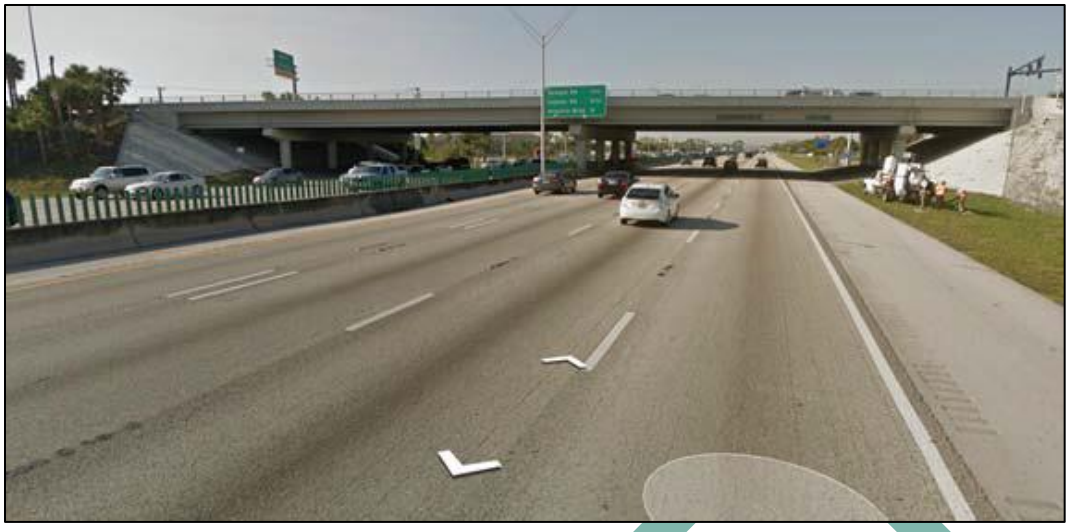

Figure 2-14Bridge No. 860123 Looking South

Figure 2-15 Bridge No. 860564 Looking West

2.7.1.1.3 SW 10 Street and SW 12 Avenue / SFRC Rail Interchange

Table 2-5 Existing Bridge Characteristics (SW 10 Street and SW 12 Avenue / SFRC Railroad Interchange)				
Bridge ID No.			**860553**	**860557**
Location	Bridge Location		SW 10 Street over SW 12 Avenue / SFRC Railroad	SW 10 Street over SW 12 Avenue / SFRC Railroad
	Direction		WB	EB
Geometrics	Bridge Length (ft)		286	286
	Deck Width (ft)		49.83	49.83
	No. of Lanes		3	3
Alignment	Skew Angles (Degrees)		17	17
	Minimum Horizontal Clearance	Inside (LT)	20’-5 ¾” (2) (to center of track)	20’-5 ¾” (2) (to center of track)
		Outside (RT)	16’-8 ¾” (2)	16’-8 ¾” (2)
	Min. Vertical Clearance		23.03 ft (1)	23.03 ft (1)
Structural	Number of Spans		4	4
	Interior Span Length (ft)		71	71
	Outer Span Length (ft)		82, 62	82, 62
	Superstructure Type		AASHTO Type III	AASHTO Type III
	Substructure Type		Multicolumn Pier/Bent/18" Prest. Piles	Multicolumn Pier/Bent/18" Prest. Piles
Condition	Year Built / Widened		1982	1982
	Sufficiency Rating (percent)		81.4	81.4
	Health Index (percent)		84.04	85.32
	Inspection Date		8/10/2016	8/10/2016
	Number of Documented Hits		None	None
	Significant Deficiencies		None	None
	Load Rating (Inventory Rating Factor- IRF)		(IRF>1) 1.244	(IRF>1) 1.244

Notes:

1. Minimum vertical clearance per the bridge inspection report.
2. Minimum horizontal clearance per existing bridge plans.

Figure 2-16 Bridges at SW 10 Street and SW 12 Avenue / SFRC Railroad Interchange (Bridge Nos. 860557 & 860553)

Figure 2-17 Bridge No. 860557 Looking North

Figure 2-18 Bridge No. 860553 Looking South

2.7.1.1.4 NE 48th Street and I-95

Table 2-6 Existing Bridge Characteristics (NE 48th Street and I-95)			
Bridge ID No.			**860122**
Location	Bridge Location		NE 48th Street over I-95
	Direction		EB/WB
Geometrics	Bridge Length (ft)		272
	Deck Width (ft)		97.75
	No. of Lanes		4
Alignment	Skew Angles (Degrees)		15.57
	Minimum Horizontal Clearance	Inside	30.08 ft (2)
		Outside	30.26 ft (2)
	Min. Vertical Clearance		16.65 ft(2) (16.16 ft(1))
Structural	Number of Spans		4
	Interior Span Length (ft)		104
	Outer Span Length (ft)		32
	Superstructure Type		AASHTO Type IV and Type II
	Substructure Type		Multicolumn Pier/Bent/18" Prest. Piles
Condition	Year Built / Widened		1973
	Sufficiency Rating (percent)		86.8
	Health Index (percent)		99.71
	Inspection Date		6/24/2020
	Number of Documented Hits		None

Table 2-6 Existing Bridge Characteristics (NE 48th Street and I-95)		
	Significant Deficiencies	None
	Load Rating (Inventory Rating Factor- IRF)	(IRF>1) 0.86

Notes:

1. Minimum vertical clearance per the bridge inspection report.
2. Information per existing bridge plans.

Figure 2-19 NE 48th Street and I-95 (Bridge No. 860122)

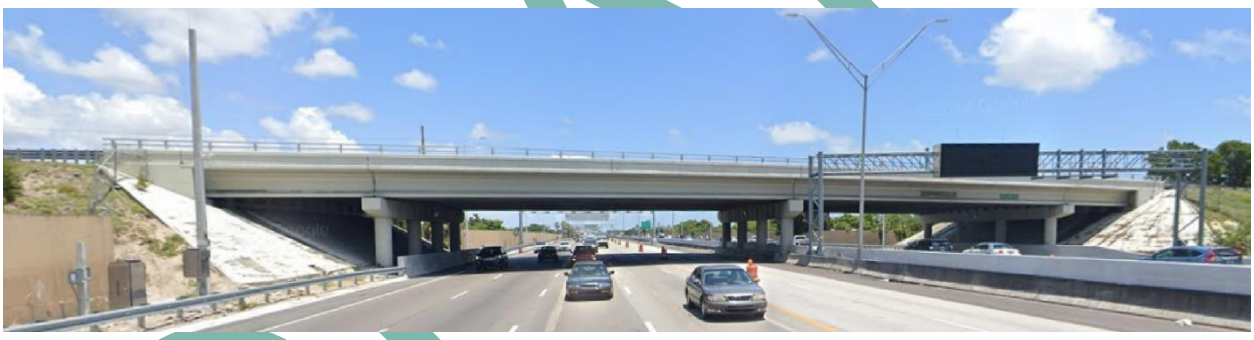

Figure 2-20 Bridge No. 860122 Looking North

Figure 2-21 Bridge No. 860122 Looking South

2.7.1.2 Type of Structure

Per the existing bridge plans, the superstructure of all existing seven bridges consists of cast-in-place (CIP) deck supported on pre-stressed AASHTO girders. The bridge inspection reports indicate that the deck of the bridges over SFRC (Bridge Nos. 86553 and 860557) was constructed with a partially CIP deck on precast panels. The substructure for all bridges except Bridge No. 860564 consists of multicolumn piers and pile end bents supported by 18 inches square pre-stressed concrete piles. The substructure of Bridge No. 860564 consists of pile bents supported by 18 inches square pre-stressed concrete piles and steel H piles (HP 14 x 89). The type of structure for each bridge within the project is summarized in **Table 2-3, Table 2-4, Table 2-5, and Table 2-6**.

2.7.1.3 Condition

Per the National Bridge Inventory (NBI) and Structural Inventory and Appraisal Program, FDOT is required by FHWA to perform biennial bridge inspections and produce Bridge Inspection Reports (BIR) to determine the overall condition of all its fixed bridges.

The most recent bridge inspection reports for the seven existing bridges that traverse the proposed project corridor were obtained from FDOT. The key identifiers from the bridge inspection reports are **Sufficiency Rating, Health Index, Noted Deficiencies, and Load Rating.**

The Sufficiency Rating is a measure used to evaluate a highway bridge to determine whether it should be repaired or replaced using the following factors:

- Structural Adequacy and Safety
- Serviceability and Functional Obsolescence
- Essentiality for Public Use
- Special Reductions

Approximately half of the above factors relate to the actual condition of the bridge. The Sufficiency Rating can vary between 0 (percent) to 100 (percent) with 0 indicating a bridge that is completely deficient and 100 indicating a bridge that is completely sufficient. Bridges with sufficiency rating of less than 80 but greater than 50 are eligible for rehabilitation using federal funding. Bridges with sufficiency rating less than 50 are eligible for replacement using federal funding.

The health index is a tool that measures the overall condition of a bridge. A health index of 100 (percent) represents a perfect bridge (entirely sufficient for its current use). A health index of 0 (percent) is the worst possible bridge (entirely insufficient for tis current use). A lower health index means that more work would be required to improve the bridge to an ideal condition. A health index below 85 generally indicates that some repairs are needed, although it doesn't mean the bridge is unsafe. A low health index may also indicate that it would be more economical to replace the bridge than to repair it. The bridge inspection reports were obtained from the FDOT District 4 Structures and Facilities library for each structure.

The existing I-95 NB bridge over Hillsboro Boulevard (Bridge No. 860194) is a slightly curved and skewed precast pre-stressed concrete AASHTO girder type structure. The bridge was constructed originally around 1972 and widened around 1990. The bridge was widened along the inside, and the original outside traffic railing was replaced with a F Shape Traffic Railing (Index No. 14286). The bridge is comprised of two outer and two middle spans, 41’-3” for each outer span and 74’-3” for each middle span with a total overall length of 231’-0”. The total bridge width is approximately 87’-2”. The bridge currently carries three travel lanes, one merge lane, an HOV lane, and shoulders on both sides. A concrete traffic railing barrier satisfying the current standards borders the bridge on each side. The minimum vertical clearance of the SB bridge is 15.39-ft. The minimum vertical clearance of the NB bridge is not given on the existing bridge plans. However, the minimum vertical clearance of the SB bridge governs, since both bridges are super-elevated toward the east side. The bridge inspection report (BIR) for this bridge indicates a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 98 out of a possible 100 and the health index is 99.81 out of a possible 100. The report also provides descriptions and pictures of the deficiencies that exist on this bridge.

The existing I-95 SB bridge over Hillsboro Boulevard (Bridge No. 860124) is a slightly curved and skewed precast pre-stressed concrete AASHTO girder type structure. The bridge was constructed originally around 1972 and widened around 1990. The bridge was widened along the inside, and the original outside traffic railing was replaced with a F Shape Traffic Railing (Index No. 14286). The bridge is comprised of two outer and two middle spans, 41’-3” for each outer span and 74’-3” for each middle span with a total overall length of 231’-0”. The total bridge width is approximately 87’-2”. The bridge currently carries three travel lanes, one merge lane, an HOV lane, and shoulders on both sides. A concrete traffic railing barrier satisfying the current

standards borders the bridge on each side. The minimum vertical clearance is approximately 15.40’ per the existing bridge plans. The bridge inspection report for this bridge indicates a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 98 out of a possible 100 and the health index is 99.93 out of a possible 100. The reports also provide descriptions and pictures of the deficiencies that exist on this bridge.

The existing SW 10 Street bridge over I-95 (Bridge No. 860123) is a slightly skewed precast pre-stressed concrete AASHTO girder type structure constructed originally around 1972. The bridge is comprised of two outer and two middle spans, approximately 32’-3” for each outer span and approximately 103’-9” for each middle span with an approximate total overall length of 272’-0”. The total bridge width is approximately 97’-9”. The bridge currently carries five travel lanes, two turn lanes, and a sidewalk on both sides of the bridge. A concrete traffic railing barrier borders the bridge on each side. The minimum vertical clearance is approximately 16.16’ per the BIR. The bridge inspection report for this bridge indicates a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 83.0 out of a possible 100 and the health index is 99.78 out of a possible 100. The report also provides descriptions and pictures of the deficiencies that exist on this bridge.

The existing I-95 SB off-ramp bridge connecting to SW 10 St (Bridge No. 860564) is a precast pre-stressed concrete AASHTO girder type structure. This bridge was constructed originally around 1988 and widened around 2018. The bridge is comprised of seven 65’-0” equally spaced spans, for a total overall length of 455’-0”. The bridge width varies between 64’-1 1/4” to 43’-1/8”. The bridge currently carries 3 travel lanes with shoulders on each side. A concrete traffic railing barrier satisfying the current standards borders the bridge on each side. The bridge inspection report for this bridge indicates a good to excellent overall National NBI ratings for this bridge. The Sufficiency Rating is 80.5 out of a possible 100 and the health index is 99.39 out of a possible 100. The report also provides descriptions and pictures of the deficiencies that exist on this bridge.

The existing SW 10 Street EB bridge over SW 12 Avenue and SFRC railroad (Bridge No. 860557), constructed originally around 1982, is a slightly skewed precast pre-stressed concrete AASHTO girder type structure. The bridge is comprised of two outer and two middle spans, 82’- 0” and 62’-0” for each outer span and 71’- 0” for each middle span with a total overall length of 286’-0”. The total bridge width is 49’-10”. The bridge currently carries three travel lanes, with a 4-6” shoulder on the North side

and 5’-0” sidewalk on the South side. A concrete traffic railing barrier satisfying the current standards borders the bridge on each side. The minimum vertical clearance is approximately 23’-0” to the top of rail. The bridge inspection report for this bridge indicates a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 81.4 out of a possible 100 and the health index is 85.32 out of a possible 100. The report also provides descriptions and pictures of the deficiencies that exist on this bridge. The bridge deck was constructed with CIP concrete deck on top of precast concrete panels per the BIR. The reinforced concrete deck on top of the precast panels has several longitudinal and transverse cracks with combined area of distress more than 25% but less than 50% of the total deck area. The deck is rated in satisfactory condition per the BIR but District 4 has slated it for replacement.

The existing SW 10 Street WB bridge over SW 12 Avenue and SFRC railroad (Bridge No. 860553), constructed originally around 1982, is a slightly skewed precast pre-stressed concrete AASHTO girder type structure. The bridge is comprised of two outer and two middle spans, 82’- 0” and 62’-0” for each outer span and 71’- 0” for each middle span with a total overall length of 286’-0”. The total bridge width is 49’-10”. The bridge currently carries two travel lanes and one turn lane, with a 4’-6” shoulder on the South side and 5’-0” sidewalk on the north side. A concrete traffic railing barrier satisfying the current standards borders the bridge on each side. The minimum vertical clearance is approximately 23’-0” to the of rail. The bridge inspection reports for this bridge indicate a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 81.4 out of a possible 100 and the health index is 84.04 out of a possible 100. The reports also provide descriptions and pictures of the deficiencies that exist on this bridge. The bridge deck was constructed with CIP concrete deck on top of precast concrete panels per the BIR. The reinforced concrete deck on top of the precast panels has several longitudinal and transverse cracks with combined area of distress more than 25% but less than 50% of the total deck area. The deck is rated in satisfactory condition per the BIR but District 4 has slated it for replacement.

The existing NE 48th Street bridge over I-95 (Bridge No. 860122) is a slightly skewed precast pre-stressed concrete AASHTO girder type structure constructed originally around 1973. The bridge is comprised of two outer and two middle spans, approximately 32’-0” for each outer span and approximately 104’-0” for each middle span with an approximate total overall length of 272’-0”. The total bridge width is approximately 97’-9”. The bridge currently carries four travel lanes, a median, and a

sidewalk on both sides of the bridge. A concrete traffic railing barrier borders the bridge on each side. The minimum vertical clearance is approximately 16.16' per the BIR. The bridge inspection report for this bridge indicates a good to excellent overall NBI ratings for this bridge. The Sufficiency Rating is 86.8.4 out of a possible 100, and the health index is 99.71 out of a possible 100. The report also provides descriptions and pictures of the deficiencies that exist on this bridge.

Per the existing bridge inspection reports, all bridges have acceptable Sufficiency Ratings varying from 80.5 to 98.0 and acceptable Health Indexes varying from 84.04 to 99.93.

Currently, there is no load posted on any of the existing bridges.

Per the load rating summary forms or load capacity forms included in the bridge inspection reports, the IRF of each bridge except I-95 off-ramp to SW 10 Street (Bridge No. 860564) was derived and summarized in **Table 2-3**, **Table 2-4**, **Table 2-5, and Table 2-6** above. All bridges have load rating factors greater than 1.0 except Bridge No. 860122, which has an IRF of 0.86. Based on the BIRs, none of the bridges have any significant structural deficiencies. The superstructures and substructures of all the bridges are in good condition and very good condition, respectively. Therefore, all bridges have sufficient structural capacities to carry traffic safely.

2.7.1.4 Horizontal and Vertical Clearance

Horizontal Clearance – The Horizontal Clearance underneath the existing bridges is the lateral distance from the edge of the travel lane to the bridge abutment or pier. The Horizontal Clearance is used to provide an area or Clear Zone to allow drivers of errant vehicles to regain control in case of an emergency. Per the FDOT 2020 Design Manual (FDM) and AASHTO requirements, bridge piers and abutments are to be placed either outside the Clear Zone or protected by FDOT approved barriers. For Hillsboro Boulevard with the Design Speed of 45 mph, the FDM calls for the Clear Zone to be 24-ft from the edge of travel lanes and multilane ramps, and 14 ft for auxiliary lanes and single lane ramps. For I-95, the width of the Clear Zone is 36 ft from the edge of travel lanes and multilane ramps, and 24 ft with auxiliary lanes and single lane ramps. Per the project survey and field reviews, proper Horizontal Clearance requirements and/or adequate pier protection barriers have been provided for all the existing bridge piers and abutments except for Bridge No. 860123.

The I-95 bridges over Hillsboro Boulevard (Bridge Nos. 860194 and 860124), with a horizontal clearance of 8'-1" to the median piers, do not have sufficient horizontal clearance required by FDM Table 215.2.2, and a concrete barrier wall is in place to protect the piers. The outer piers on both sides of Hillsboro Boulevard have a horizontal clearance of 14'-1 3/4" and 14'-6 7/8" for piers on the south side and north side, respectively. Given that the adjacent lane is an auxiliary lane, both outer piers exceed the 14 ft minimum horizontal clearance from an auxiliary lane required by the FDM.

The SW 10 Street EB and WB bridge over I-95 (Bridge No. 860123) has a median pier located within the Clear Zone with a horizontal clearance of approximately 10'-4". A concrete barrier is in place to protect the pier. The outer piers with a horizontal clearance of approximately 30.04' are located within the Clear Zone, and no concrete barriers are in place to protect the piers.

For the bridges over SFRC railroad (Bridge Nos. 860553 and 860557), the pier on the west side of the rail has a horizontal clearance of 20'-5 ¾" less than 25 ft, and a crash wall is in place to protect the pier meeting the requirements of FDM, Section 220.3.2 and Structures Design Guidelines, Section 2.6.7. The bridge piers along both sides of SW 12 Avenue are located within the Clear Zone with a horizontal clearance of 16'-8 ¾". Guardrails are in place along both sides of the street to protect the piers.

Vertical Clearance – FDM Section 260.6 defines the Vertical Clearance for bridges as the "least distance measured between the lowest bridge superstructure element and the traffic lane or shoulder directly below the element." Table 260.6.1 of the FDM lists the Minimum Vertical Clearance of a roadway bridge over a roadway as 16'-6", 23'-6" for a roadway bridge over a railroad. Per AASHTO article 2.3.3.2, the Minimum Vertical Clearance required is 16'-0". All of the existing bridges, except Bridge No. 860564 do not meet FDOT minimum vertical clearance requirements. However, four (4) of the existing bridges satisfy AASHTO vertical clearance requirements, but do not meet the Minimum Vertical Clearance set by FDOT. While two (2) of the bridges (Br. Nos. 860194 & 860124) do not meet the Minimum Vertical Clearance set by both FDOT and AASHTO.

2.8 Roadway Geometric Characteristics

2.8.1 Horizontal Alignment

The existing horizontal alignment was reviewed and evaluated to verify if the existing facility meets the current design standards for horizontal curves and sight distance. The design elements reviewed during the evaluation of the existing horizontal alignment conditions include curve radius, curve length, stopping sight distance (SSD), and superevelation of the roadway surface.

2.8.1.1 I-95

I-95 mainline contains one horizontal curve within the study limits. The curve occurs at the Hillsboro Boulevard interchange. The following **Table 2-7** contains the horizontal curve data.

Table 2-7 Horizontal Alignment I-95

Standard/ Location	Station	Radius	Length	Degree	Deflection Angle	Super-elevation	Stopping Sight Distance
FDM (65mph)	-	7639	1950	00°45'00"	-	0.025	360
Hillsboro Boulevard Interchange	PC 1393+75.35 PI 1406+27.93 PT 1418+58.41	7639.44	2483.06	00°45'00"	18°37'22" (LT)	0.030	1050

2.8.1.2 SW 10 Street

With the exception of the interchange at I-95, as built plans for SW 10 Street were not available. Within the Limited Access right of way, SW 10 Street contains one horizontal curve over I-95. Observation of survey data outside of the Limited Access right of way shows various deflections/curves that appear to not meet FDM criteria.

The following **Table 2-8** contains the horizontal curve data for the one curve within the Limited Access right of way.

Table 2-8 Horizontal Alignment – SW 10 Street							
Standard/ Location	**Station**	**Radius**	**Length**	**Degree**	**Deflection Angle**	**Super-elevation**	**Stopping Sight Distance**
FDM (45mph)	-	2865	675	02°00'00"	-	NC	730
I-95 Interchange	PC 20+56.79 PI 23+33.19 PT 26+09.57	22918.31	552.78	00°15'00"	1°22'55" (LT)	NC	1816

2.8.1.3 Hillsboro Boulevard

Hillsboro Boulevard contains no horizontal curves within the study limits. Therefore, Hillsboro Boulevard meets the current design standards for horizontal curves and sight distance.

2.8.2 Vertical Alignment

The existing vertical alignment was reviewed and evaluated to verify if the existing alignment meets the current design standards for vertical curves and sight distance. The following components were verified during the review: percent grade, changes in grade, stopping sight distance, length of vertical curve and K value.

The minimum K value set forth in the FDM Part 2, Chapter 210 Section 2.10.2 are based on the minimum stopping sight distance criteria.

2.8.2.1 I-95

I-95 mainline contains one vertical curve within the study limits. The curve occurs at the Hillsboro Boulevard interchange. The following **Table 2-9** contains the vertical curve data.

Table 2- 9 Vertical Alignment I-95							
Standard/ Location	**Station**	**Grade Back (%)**	**Grade Ahead (%)**	**Length (Sag) (ft)**	**Length (Crest) (ft)**	**K Value (Sag)**	**K Value (Crest)**
FDM (65mph)	-	3	3	800	1800	157	313
Hillsboro Boulevard	PC 1404+33.49 PI 1411+33.49 PT 1418+33.49	2.5	2.68	-	1400	-	270

2.8.2.2 SW 10 Street I-95

SW 10 Street contains two vertical curves within the study limits. The curves occur at the SFRC railroad crossing and I-95 interchange. The following **Table 2-10** contains the vertical curve data.

Table 2-10 Vertical Alignment – SW 10 Street

Standard/ Location	Station	Grade Back (%)	Grade Ahead (%)	Length (Sag) (ft)	Length (Crest) (ft)	K Value (Sag)	K Value (Crest)
FDM (45mph)	-	6	6	135	135	79	98
SFRC Railroad	PC 181+85.30 PI 183+95.30 PT 186+05.30	1.67	1.67		420		125.75
I-95 Interchange	PC 20+10.30 PI 24+10.30 PT 28+10.30	5	5		800		80

2.8.2.3 Hillsboro Boulevard

Hillsboro Boulevard contains no vertical curves within the study limits.

2.8.3 Posted Speed

The posted speed limit for I-95 is 65 mph. The posted speed limit for SW 10 Street is 35 mph EB between Military Trail and Natura/FAU Research Park Boulevard and 45 mph WB. The posted speed limit for Hillsboro Boulevard is 40 mph.

2.8.4 Design Speed

The design speed for I-95 is 65 mph. The design speed for SW 10 Street is 35 mph EB between Military Trail and Natura/FAU Research Park Boulevard and 45 mph WB. The design speed for Hillsboro Boulevard is 40 mph.

2.8.5 Pavement Condition

FDOT performs annual surveys of the entire State Highway System in support of the Department's Pavement Management Program. The data collected (in terms of crack, ride, and rut measurements) is used to assess the condition and performance of the State's roadways as well as to predict future rehabilitation needs.

2.8.5.1 I-95

The existing pavement type along I-95 is asphalt pavement (FC-5). Based on data obtained from the Pavement Condition Survey, I-95 was last resurfaced in 2008. The NB lanes along I-95 have adequate pavement ratings. The SB lanes along I-95 has adequate pavement ratings for Rideability and Rutting. I-95 is currently under construction to add lanes for I-95 Express within the limits of this study (FM 433108-6, Phase 3B-1) and will be completely resurfaced as part of that project.

2.8.5.2 SW 10 Street

The existing pavement type along SW 10 Street is asphalt pavement (FC-9.5). Based on data obtained from the Pavement Condition Survey, SW 10 Street was last resurfaced in 2014. Both the EB and WB lanes have adequate pavement ratings.

2.8.5.3 Hillsboro Boulevard

The existing pavement type along Hillsboro Boulevard is asphalt pavement (FC-9.5). Within the limits of this study, Hillsboro Boulevard was last resurfaced in 2017 (FM 430602-1). Therefore, both the EB and WB lanes have adequate pavement ratings.

2.8.6 Multi-Modal Facilities

Multi-modal facilities include pedestrian and bicycle features as well as existing transit services along each I-95, SW 10 Street and Hillsboro Boulevard.

2.8.6.1 Pedestrian

Continuous sidewalks exist on the north and south side of SW 10 Street and Hillsboro Boulevard. I-95 is limited access facility and as such does not provide sidewalks along the corridor.

2.8.6.2 Bicycle

Continuous bicycle lanes exist on the north and south side of SW 10 Street and Hillsboro Boulevard. I-95 is limited access facility and as such does not provide bicycle facilities along the corridor.

2.8.6.3 Transit

No designated transit services including Broward County Transit (BCT) Routes or commuter rail services are provided on the I-95 corridor or within the area of the SW 10 Street interchange.

Hillsboro Boulevard is serviced by BCT Route #48, which provides a connection from SR 7 to Deerfield Beach including a direct connection to the Deerfield Beach Station located just west of the Hillsboro interchange (**Figure 2-22**).

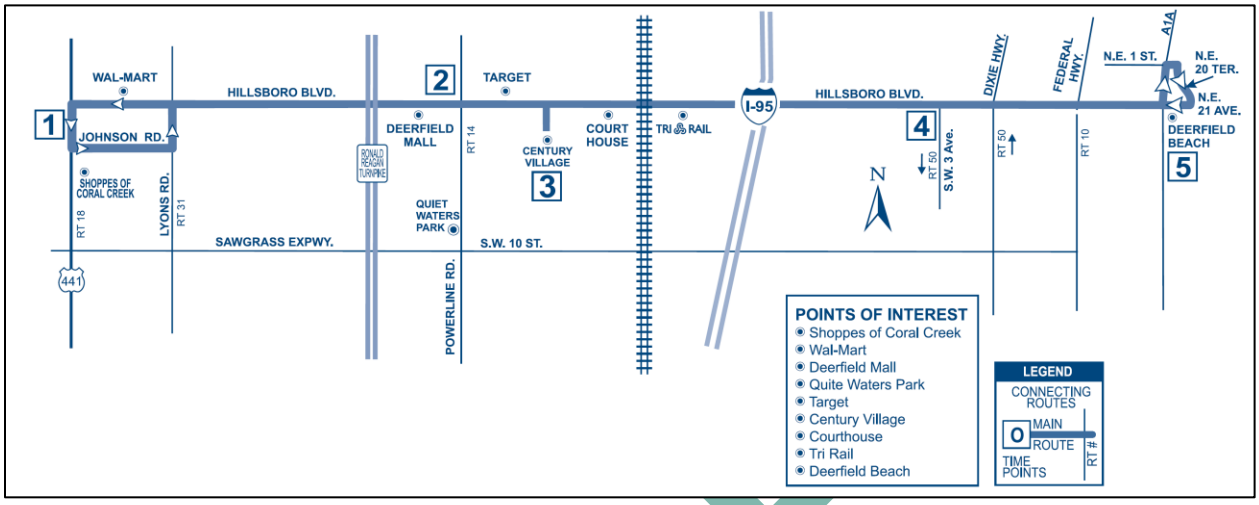

Figure 2-22 BCT Route 48

The Deerfield Beach Station provides commuter rail service for Tri-Rail and Amtrak which provide connections south to Miami-Dade County including Tri-Rail's southernmost terminus at Miami Airport Station (Miami Intermodal Center) and Amtrak's southernmost terminus at Miami Station, and to the north with Tri-Rail's northernmost terminus in West Palm Beach at Mangonia Park Station and Amtrak providing service throughout the state of Florida (**Figure 2-23)**.

Figure 2-23 Deerfield Beach Station

2.8.7 Intersections and Interchanges

The following **Figures 2-24** to **2-26** depicts the existing roadway and lane configurations for the I-95 corridor including interchanges with SW 10 Street and Hillsboro Boulevard.

Table 2-11 lists the locations of signalized intersections along SW 10 Street and the Hillsboro Boulevard corridors.

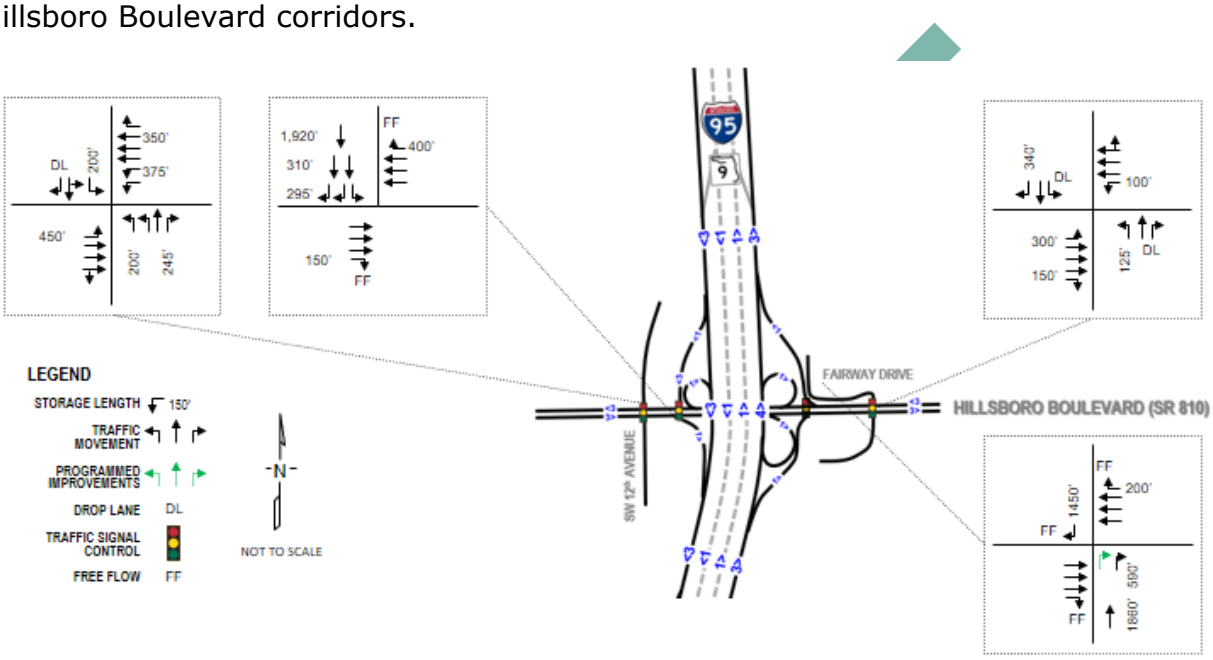

Figure 2-24 Existing Roadway and Intersection Lane Configurations Hillsboro Boulevard

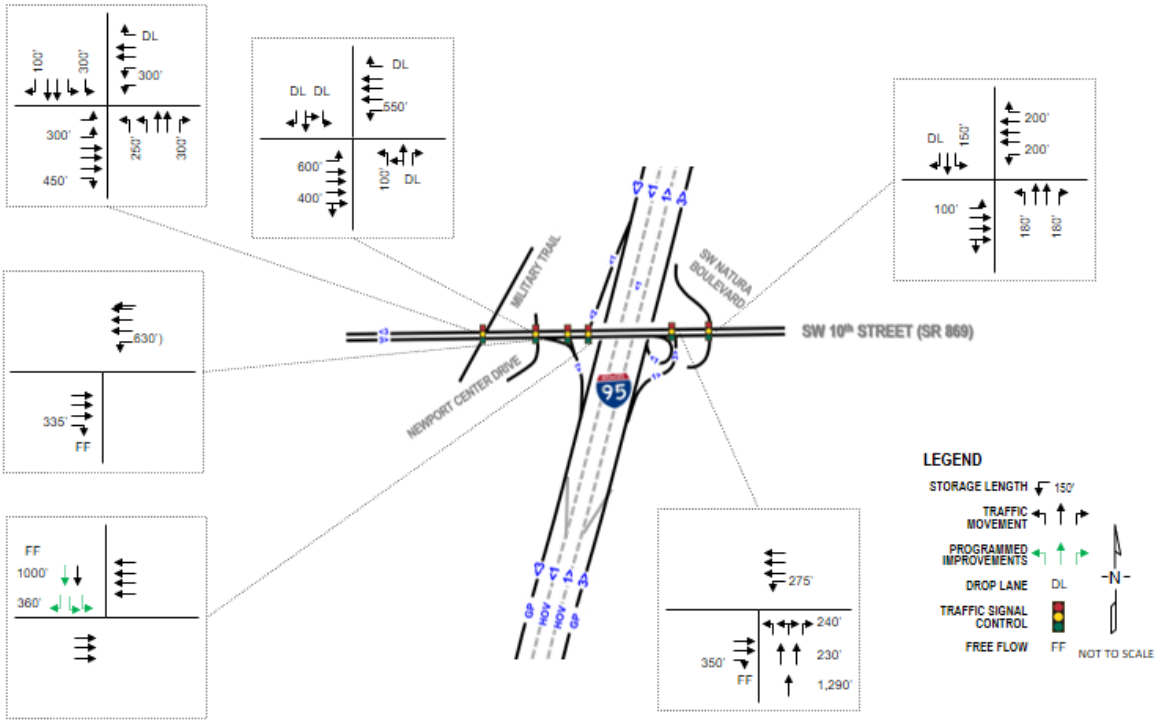

Figure 2-25 Existing Roadway and Intersection Lane Configurations SW 10 Street

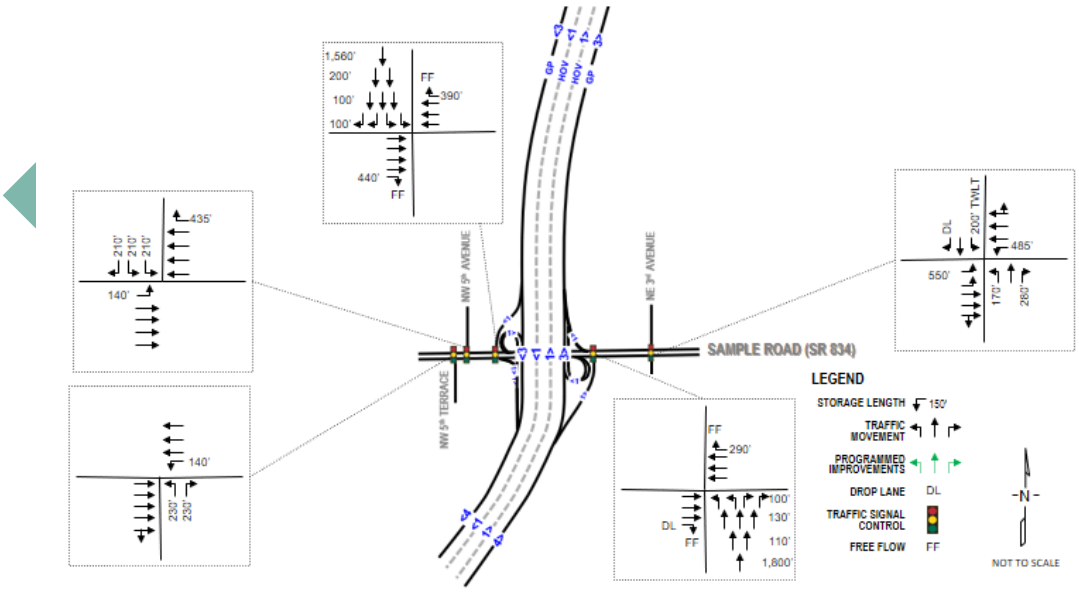

Figure 2-26 Existing Roadway and Intersection Lane Configurations Sample Road

Table 2-11 Signalized Intersections			
Hillsboro Boulevard			
Intersection	**Type**	**Technology**	**Operational Considerations**
Jim Moran Boulevard / SW 12 Avenue	Mast Arm	Standard	All directions of traffic
I-95 (West side of interchange)	Dual Mast Arm	Standard	SB off-ramp / WB traffic
Fairway Drive / Natura Boulevard	Concrete Strain Pole	Standard	All directions of traffic
SW 10 Street			
Military Trail	Concrete Strain Pole	Standard	All directions of traffic
E Newport Center Drive	Concrete Strain Pole	Standard	All directions of traffic
I-95 (West side of interchange)	Single Mast Arm	Standard	EB traffic
I-95 (West side of interchange)	Single Mast Arm	Standard	WB traffic
I-95 (West side of interchange)	Dual Mast Arm	Standard	SB to EB off-ramp traffic
I-95 (East side of interchange)	Mast Arm	Standard	EB traffic
I-95 (East side of interchange)	Dual Mast Arm	Standard	WB traffic / off-ramp traffic
SW Natura Boulevard	Concrete Strain Pole	Standard	All directions of traffic

2.8.7.1 Physical and Operational Restrictions

The South Florida region has been identified by the National Oceanic and Atmospheric Administration (NOAA) as an area with a high degree of vulnerability to hurricanes and the Florida Division of Emergency Management has designated specific evacuation routes through the region. Both SW 10 Street and Hillsboro Boulevard are designated as emergency evacuation routes from I-95 to SR 5/US-1 and A1A. I-95 is designated as an emergency evacuation route throughout Broward County.

2.9 Existing Traffic Data

2.9.1 Existing Traffic Volumes

FDOT District 4 provided existing 2016 volumes that had been summarized in the Traffic Data Collection & Traffic Projections for I-95 PD&E Study from SW 10 Street

to Hillsboro Boulevard, dated May 19, 2016. The data collection effort was completed March 8 through March 10, 2016.

As part of the SW 10 Street Connector PD&E Study (FPID 439891-1), a comparison of these volumes with volumes from previous studies revealed significant differences. In most cases, the District's March 2016 data showed lower volumes. To address the discrepancies and to supplement existing data, additional 4-hour turning movement counts were conducted at 16 locations and 2-day to 7-day directional machine counts were collected at 3 locations. These additional counts were collected by Florida's Turnpike Enterprise (FTE) between October 18 and October 25, 2016. The locations and summaries are documented in the SW 10 Street PD&E Project Traffic Forecast Memorandum dated September 2018 prepared by FTE and included here for reference.

The additional counts verified that the March 2016 data presented lower volumes. Therefore, adjustments were made to develop balanced existing 2016 traffic volumes throughout the study area. I-95 ramp volumes were adjusted to volumes obtained as part of the Broward County Interchange Master Plan reports.

Figure 2-27 to **Figure 2-29** present a summary of the balanced 2016 existing traffic volumes. The raw traffic counts and the existing signal timing are provided in The Systems Interchange Modification Report included here by reference. These volumes are consistent with the ongoing SW 10 Street Connector PD&E Study.

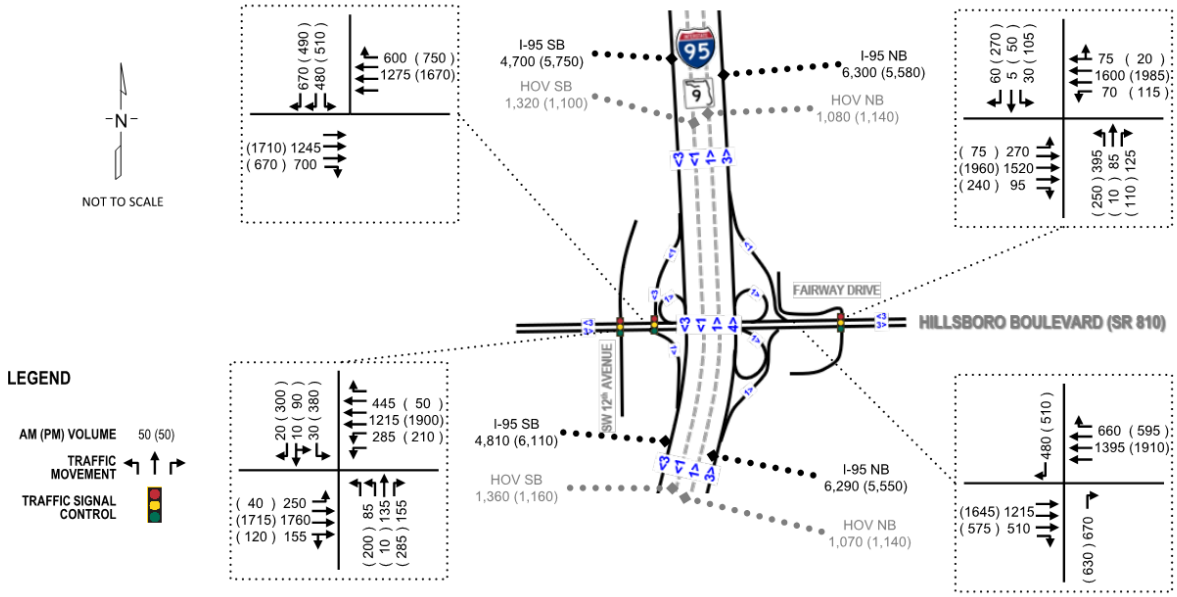

Figure 2-27 Existing Traffic Volumes – Hillsboro Boulevard

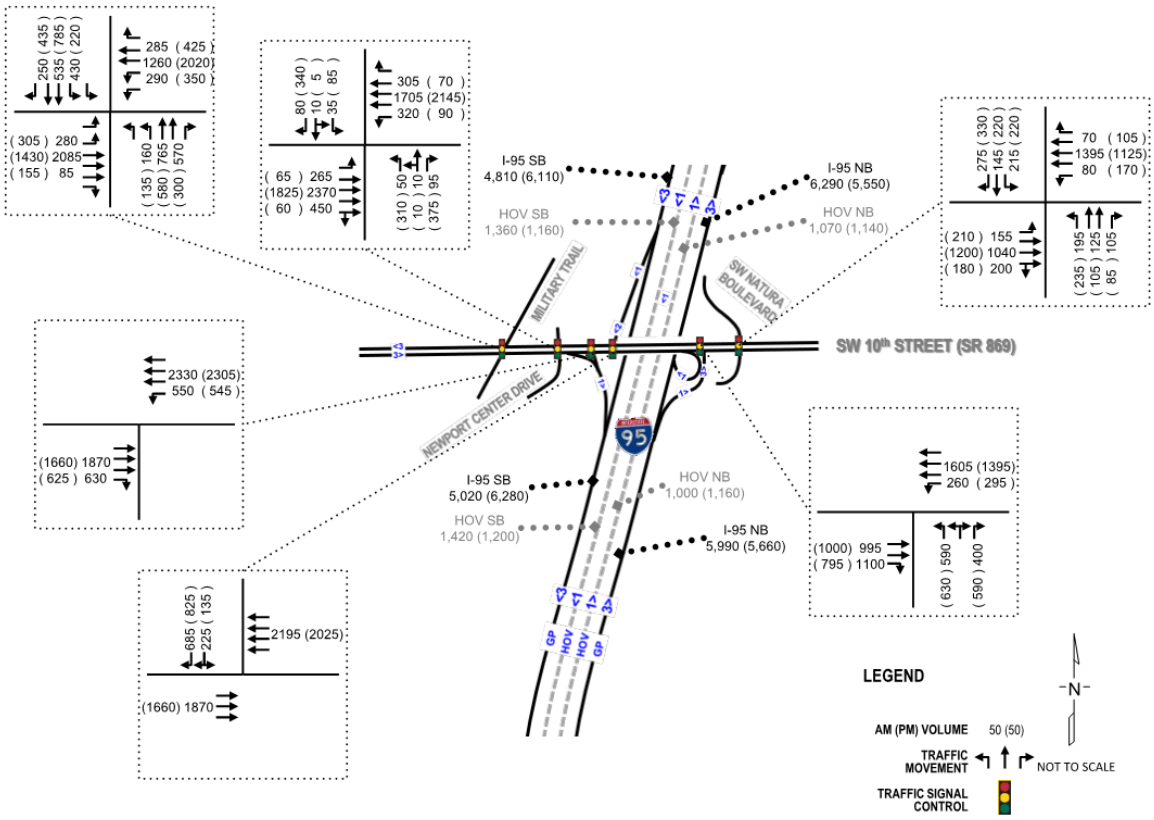

Figure 2-28 Existing Traffic Volumes – SW 10 Street

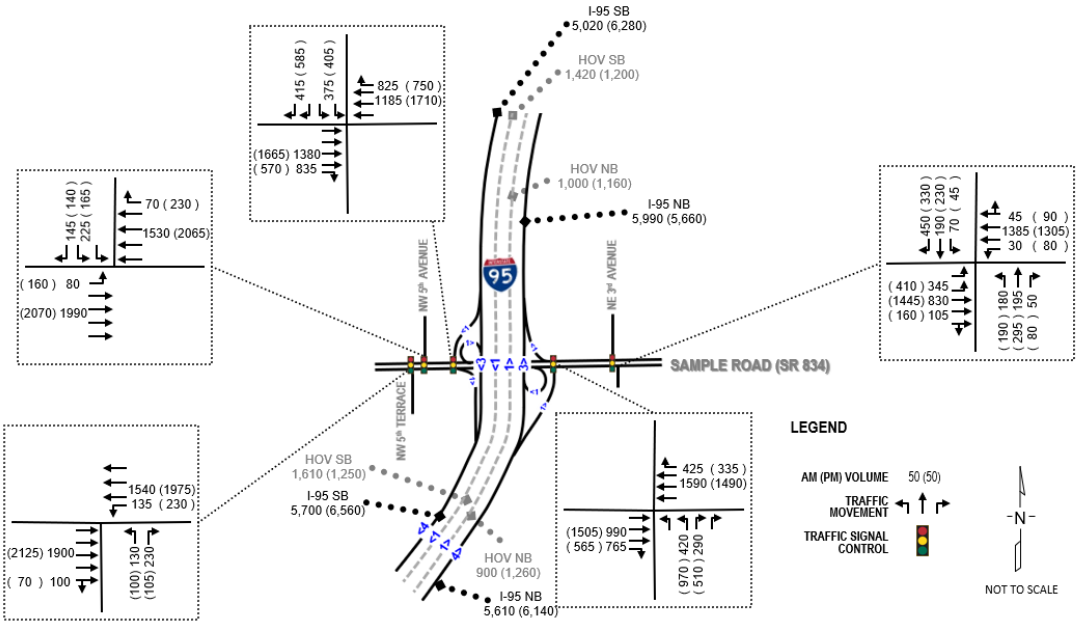

Figure 2-29 Existing Traffic Volumes – Sample Road

2.10 Roadway Operational Conditions

Traffic operational analyses were performed for the existing conditions and future No-Action alternative. Analyses were performed using the Highway Capacity Software (HCS2010), Version 6.60 and Synchro Version 9. HCS2010 was used for operational analyses of freeway segments - mainline, ramps, merge, diverge and weaving segments. Synchro analyses were performed for adjacent signalized intersections and interchange ramp terminal intersections. The HCS and Synchro operations analyses were performed for the following conditions:

- Existing year 2016 conditions, AM and PM peak hours
- Year 2020 conditions for No-Build, AM and PM peak hours
- Year 2040 No-Build, AM and PM peak hours

Design Hour Truck (DHT) values were calculated based on historical data from the FDOT count sites within the study area, mechanical classification counts and turning movement counts were conducted as part of the I-95 PD&E Study data collection efforts. Peak hour values from mechanical counts were calculated as half the daily value in accordance with the FDOT Project Traffic Forecasting Handbook. The calculated DHT used for the I-95 mainline was 3.0%. The calculated DHT used was 2.0% for the ramps and for the interchange cross-streets.

The measure of effectiveness used to estimate the LOS was density and volume to capacity ratio. The LOS for each freeway segment was determined using the corresponding HCS Freeways, Weaving or Ramps modules when applicable. When required by the specific geometry of a segment, additional ramp roadway (capacity checks) and/or major diverge analyses were conducted. Similarly, overlapping influence areas of on-ramp and off-ramp segments were analyzed both ways and the most restrictive output was reported. The upstream density of the major diverge areas was estimated using Equation 13-26 of the HCM. The capacity checks were documented as under capacity (Under) or over capacity (Over).

The HOV lane and corresponding volumes were excluded for the HCS analysis in order to be able to analyze the operating conditions of the general purpose lanes. The HOV lane demand was based on the data collection and analysis documented in the 2010 I-95 High-Occupancy Vehicle Lane Monitoring Report, dated May 2011. The report documents that the HOV NB lane demand is approximately 16% of the total traffic for the AM and PM peak hours and the HOV SB lane demand is approximately 16% and 18% for AM and PM peak hours, respectively. The percentile demand was applied

to the provided existing volumes. Documentation of the existing traffic freeway operational analysis is provided in detail in the I-95/SW 10 Street SIMR study. The results indicate that eight (8) of the sixteen (16) NB freeway segments in the study area operate at LOS E or F during one or both of the peak hours and three (3) of the fifteen (15) SB freeway segments in the study area operate at LOS E only during the PM peak hour.

2.11 Safety Analysis

The safety analysis included the evaluation of crash data for the freeway segment along I-95 as well as the arterial segments along SW 10 Street and Hillsboro Boulevard within the limits of the project shown in **Table 2-12**.

Table 2-12
Limits for the Safety Analysis

Road Name	Roadway ID	Segment	BMP	EMP
SW 10 Street	86012000	SW 10 Street from SW 24 Avenue to just east of I-95	1.014	2.152
I-95	86070000	I-95 from NE 48 Street to Hillsboro Canal	22.625	25.334
Hillsboro Boulevard	86120000	Hillsboro Boulevard from Century Boulevard to Natura Boulevard	4.465	5.712

Crash data was obtained from the FDOT Crash Analysis Reporting System (CARS) for the five-year analysis period from 2011 to 2015.

The analysis also looked at identifying major hotspots with crash accumulations, as described in the following sections.

2.11.1 I-95

Table 2-13 and **Figure 2-30** show the summary of crashes between 2011 and 2015 along I-95. A total of 1,429 crashes were recorded for the section of I-95 (Roadway ID: 86070000) between NE 48 Street (MP 22.625) and Hillsboro Canal (MP 25.334). A total of 223 of those crashes took place in 2011, 229 in 2012, 295 in 2013, 327 in 2014 and 355 in 2015. Based on the distribution of crashes by year it can be concluded that crashes along I-95 have increased in the last five years of available data. Crashes between 2011 and 2015 had an average growth rate of 13 percent.

Based on the crash severity, out of the 1,429 crashes reported, a total of 873 or 61 percent were property damage only (PDO) a total of 549 or 38 percent resulted in injuries and 7 crashes resulted in fatalities.

Based on crash type distribution it can be concluded that rear-end crashes are the most common type of crash along SW 10 Street with 834 crashes or 58 percent followed by sideswipe crashes with 194 or 39 percent and fix object crashes with 166 or 33 percent. The relatively high percentage of crashes could be an indication of unfavorable conditions within merging and weaving areas.

The lighting conditions recorded at the time of the crashes indicate that 67 percent of the crashes occurred during daylight conditions while the remaining 23 percent occurred at dusk, dawn or at night, which is lower than the 33 percent State average during the same period (2011-2015) according to Florida's Integrated Report Exchange System (FIRES). The surface conditions reveal that 74 percent of the crashes occurred on a dry surface while the remaining 26 percent took place while the pavement was wet, which is higher than the 15 percent State average. Drainage conditions should be inspected along the corridor to discard any connection between the number of crashes on wet pavement and the conditions of the road. The distribution of crashes by day indicate that most of the crashes take place during weekdays. The distribution of crashes by hour indicate that most of the crashes take place during the peak periods (21 percent between 6:00 and 9:00 AM and 25 percent between 3:00 and 6:00 PM) and at night (24 percent between 6:00 PM and midnight).

Table 2-13
Five Year Crash Summary for I-95

I-95 from NE 48 Street to Hillsboro Canal		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	118	118	179	197	222	834	167	58.4%
	Head On	0	0	0	0	0	0	0	0.0%
	Angle	15	9	9	8	12	53	11	3.7%
	Left Turn	0	0	0	0	0	0	0	0.0%
	Right Turn	0	0	0	0	0	0	0	0.0%
	Sideswipe	33	36	41	40	44	194	39	13.6%
	Backed Into	1	0	0	0	0	1	0	0.1%
	Pedestrian	0	0	0	1	0	1	0	0.1%
	Bicycle	0	0	0	0	0	0	0	0.0%
	Fixed Object	*30*	*28*	*30*	*33*	*45*	*166*	*33*	*11.6%*
	Other Non-Fixed Object Collisions	*4*	*13*	*6*	*14*	*5*	*42*	*8*	*2.9%*
	Non-Collisions	*11*	*16*	*9*	*12*	*9*	*57*	*11*	*4.0%*
	Others	11	9	21	22	18	81	16	5.7%
	Total Crashes	**223**	**229**	**295**	**327**	**355**	**1,429**	**286**	**100.0%**
SEVERITY	PDO Crashes	121	138	176	211	227	873	175	61.1%
	Fatal Crashes	2	2	2	0	1	7	1	0.5%
	Injury Crashes	100	89	117	116	127	549	110	38.4%
LIGHTING CONDITIONS	Daylight	135	156	205	218	247	961	192	67.2%
	Dusk	4	6	4	13	9	36	7	2.5%
	Dawn	2	1	2	11	4	20	4	1.4%
	Dark	82	66	84	85	95	412	82	28.8%
	Unknown	0	0	0	0	0	0	0	0.0%
SURFACE CONDITIONS	Dry	153	177	214	247	263	1,054	211	73.8%
	Wet	70	52	81	80	92	375	75	26.2%
	Others	0	0	0	0	0	0	0	0.0%
DAY OF WEEK	Monday	29	33	52	43	59	216	43	15.1%
	Tuesday	42	28	49	48	66	233	47	16.3%
	Wednesday	34	30	49	82	43	238	48	16.7%
	Thursday	36	41	39	46	46	208	42	14.6%
	Friday	41	51	54	52	58	256	51	17.9%
	Saturday	20	23	31	36	46	156	31	10.9%
	Sunday	21	23	21	20	37	122	24	8.5%
HOUR OF DAY	00:00-06:00	22	22	22	38	43	147	29	10.3%
	06:00-09:00	42	44	72	69	71	298	60	20.9%
	09:00-11:00	12	9	26	22	21	90	18	6.3%
	11:00-13:00	8	14	17	16	21	76	15	5.3%
	13:00-15:00	9	30	15	23	40	117	23	8.2%
	15:00-18:00	63	56	70	81	89	359	72	25.1%
	18:00-24:00	67	54	73	78	70	342	68	23.9%

Figure 2-30 Five Year Crash Characteristics for I-95

Some of the description information shown in **Table 2-14** about the fatal crashes was found in FDOT State Safety Office Geographic Information System (SSOGis) Crash Query Tool.

Table 2-14
Fatal Crashes along I-95

Crash No.	Year	Roadway ID	MP	Description
820871910	2011	86070000	23.665	Located on I-95 near SW 10 Street.
822706990	2011	86070000	23.933	Located just north of SW 10 Street along the NB direction of I-95.
829104240	2012	86070000	22.865	The crash took place on Saturday May 12th at 8:26 AM just north of NW 48 Street along the NB direction of I-95.
820037480	2012	86070000	23.165	The crash took place on Sunday November 11th at 1:45 PM between SW 10 Street and NW 48 Street on the SB direction of I-95.
832878780	2013	86070000	23.165	The crash took place on Monday April 1st at 9:30 PM between SW 10 Street and NW 48 Street on the SB direction of I-95.
832686520	2013	86070000	24.392	The crash took place on Wednesday January 2nd at 10:03 PM within the influence area of the SB I-95 on-ramp from Hillsboro Boulevard.
820121670	2015	86070000	25.262	The crash took place on Friday November 20th at 10:40 PM within the influence area of the SB I-95 off-ramp to Hillsboro Boulevard.

Table 2-15 and **Figure 2-31** show the crash distribution by year and by milepost along I-95. The entire segment of I-95 was divided into 0.25-mile sections. The last section from mileposts 25.125 and 25.334 is slightly shorter than the other sections (approximately 0.21 mile). The data shows a higher concentration of crashes starting just south of the SW 10 Street interchange (MP 23.375) and ending just north of the Hillsboro Boulevard interchange (MP 25.125). The 0.25-mile segment with the highest number of crashes is located within the influence area of the Hillsboro Boulevard interchange between MP 24.375 and MP 24.625.

Table 2-15 Crash Distribution by Year and Milepost along I-95						
Section	**2011**	**2012**	**2013**	**2014**	**2015**	**Total Crashes**
22.625 to 22.875	6	10	9	14	10	49
22.875 to 23.125	3	2	1	5	1	12
23.125 to 23.375	8	7	24	21	15	75
23.375 to 23.625	25	31	35	43	36	170
23.625 to 23.875	23	17	25	38	37	140
23.875 to 24.125	28	27	33	23	35	146
24.125 to 24.375	24	24	40	37	33	158
24.375 to 24.625	33	32	34	49	44	192
24.625 to 24.875	32	24	39	38	96	229
24.875 to 25.125	24	33	37	36	27	157
25.125 to 25.334	9	17	12	13	12	63

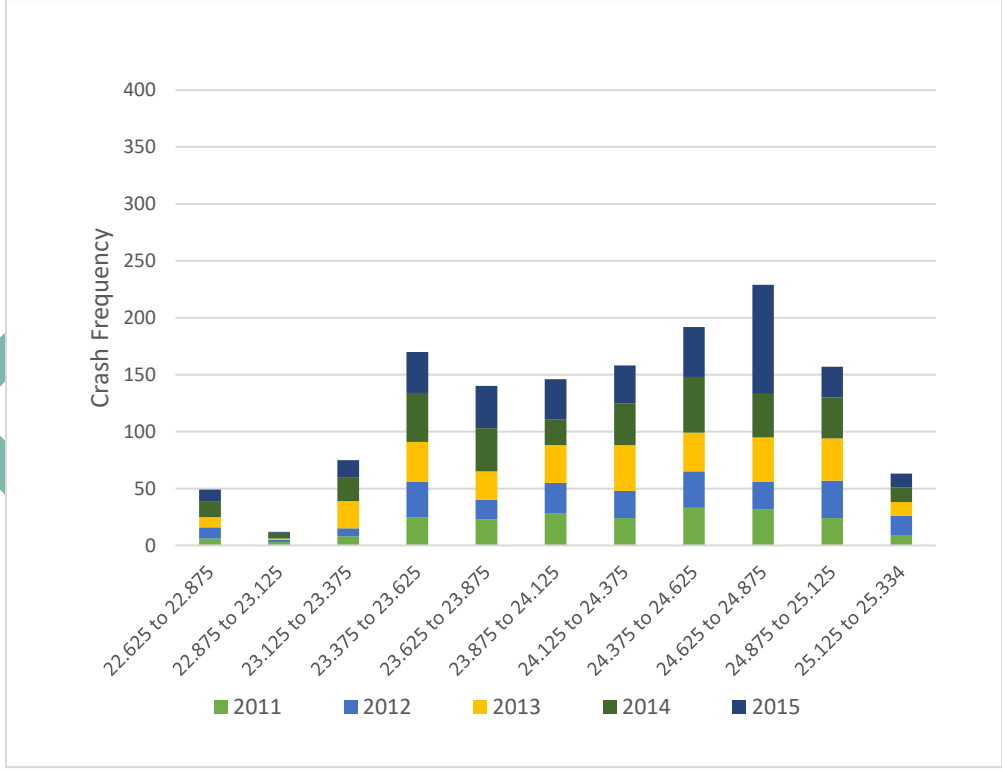

Figure 2-31 Crash Distribution by Year and Milepost along I-95

2.11.2 SW 10 Street

Table 2-16 and **Figure 2-32** show the summary of crashes between 2011 and 2015 along SW 10 Street. A total of 463 crashes were recorded for the section of SW 10 Street (Roadway ID: 86012000) between SW 24 Avenue (MP 1.014) and just east of I-95 (MP 2.152). A total of 65 of those crashes took place in 2011, 85 in in 2012, 80 in 2013, 113 in 2014 and 120 in 2015. Based on the distribution of crashes by year it can be concluded that crashes along SW 10 Street have increased in the last five years of available data. Crashes between 2011 and 2015 had an average growth rate of 18 percent with a small decline between 2012 and 2013.

Based on the crash severity, out of the 463 crashes reported, a total of 289 or 62 percent were PDO, a total of 174 or 38 percent resulted in injuries and no crashes resulted in fatalities.

Based on crash type distribution it can be concluded that rear-end crashes are the most common type of crash along SW 10 Street with 260 crashes or 56 percent followed by angle and sideswipe crashes with 11 percent. It is important to mention that rear-end crashes are common on congested urban corridors.

The lighting conditions recorded at the time of the crashes indicate that 73 percent of the crashes occurred during daylight conditions while the remaining 27 percent occurred at dusk, dawn or at night, which is lower than the 33 percent State average during the same period (2011-2015) according to FIRES. The surface conditions reveal that 83 percent of the crashes occurred on a dry surface while the remaining 17 percent took place while the pavement was wet, which is slightly higher than the 15 percent State average. Drainage conditions should be inspected along the corridor to discard any connection between the number of crashes on wet pavement and the conditions of the road. The distribution of crashes by day indicate that most of the crashes take place during weekdays. The distribution of crashes by hour on the other hand indicate that most of the crashes take place during the afternoon or at night (22 percent took place between 3:00 and 6:00 PM while 23 percent between 6:00 PM and midnight).

The detailed crash data is provided in the Safety Analysis Technical Memorandum prepared as part of this study and included here by reference.

Table 2-16
Five Year Crash Summary for SW 10 Street

SW 10 Street from SW 24 Avenue to just east of I-95		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	41	49	43	56	71	260	52	56.2%
	Head On	0	0	1	0	0	1	0	0.2%
	Angle	6	11	9	14	12	52	10	11.2%
	Left Turn	4	1	3	8	6	22	4	4.8%
	Right Turn	0	0	0	0	2	2	0	0.4%
	Sideswipe	5	14	7	14	10	50	10	10.8%
	Backed Into	0	0	0	0	0	0	0	0.0%
	Pedestrian	0	0	0	0	1	1	0	0.2%
	Bicycle	0	0	1	0	1	2	0	0.4%
	Fixed Object	*5*	*5*	*5*	*11*	*3*	*29*	*6*	*6.3%*
	Other Non-Fixed Object Collisions	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.0%*
	Non-Collisions	*1*	*1*	*1*	*2*	*2*	*7*	*1*	*1.5%*
	Others	3	4	10	8	12	37	7	8.0%
	Total Crashes	**65**	**85**	**80**	**113**	**120**	**463**	**93**	**100.0%**
SEVERITY	PDO Crashes	37	56	55	74	67	289	58	62.4%
	Fatal Crashes	0	0	0	0	0	0	0	0.0%
	Injury Crashes	28	29	25	39	53	174	35	37.6%
LIGHTING CONDITIONS	Daylight	56	60	57	77	89	339	68	73.2%
	Dusk	0	6	3	6	3	18	4	3.9%
	Dawn	1	3	0	1	1	6	1	1.3%
	Dark	8	16	20	29	27	100	20	21.6%
	Unknown	0	0	0	0	0	0	0	0.0%
SURFACE CONDITIONS	Dry	55	68	65	90	105	383	77	82.7%
	Wet	10	17	15	23	15	80	16	17.3%
	Others	0	0	0	0	0	0	0	0.0%
DAY OF WEEK	Monday	12	19	15	18	20	84	17	18.1%
	Tuesday	10	18	9	16	22	75	15	16.2%
	Wednesday	8	10	14	19	18	69	14	14.9%
	Thursday	13	9	8	20	18	68	14	14.7%
	Friday	14	20	14	17	22	87	17	18.8%
	Saturday	4	4	15	12	11	46	9	9.9%
	Sunday	4	5	5	11	9	34	7	7.3%
HOUR OF DAY	00:00-06:00	2	5	5	7	8	27	5	5.8%
	06:00-09:00	18	14	14	13	17	76	15	16.4%
	09:00-11:00	7	10	13	14	13	57	11	12.3%
	11:00-13:00	3	9	9	6	13	40	8	8.6%
	13:00-15:00	8	8	7	14	17	54	11	11.7%
	15:00-18:00	18	21	15	27	22	103	21	22.2%
	18:00-24:00	9	18	17	32	30	106	21	22.9%

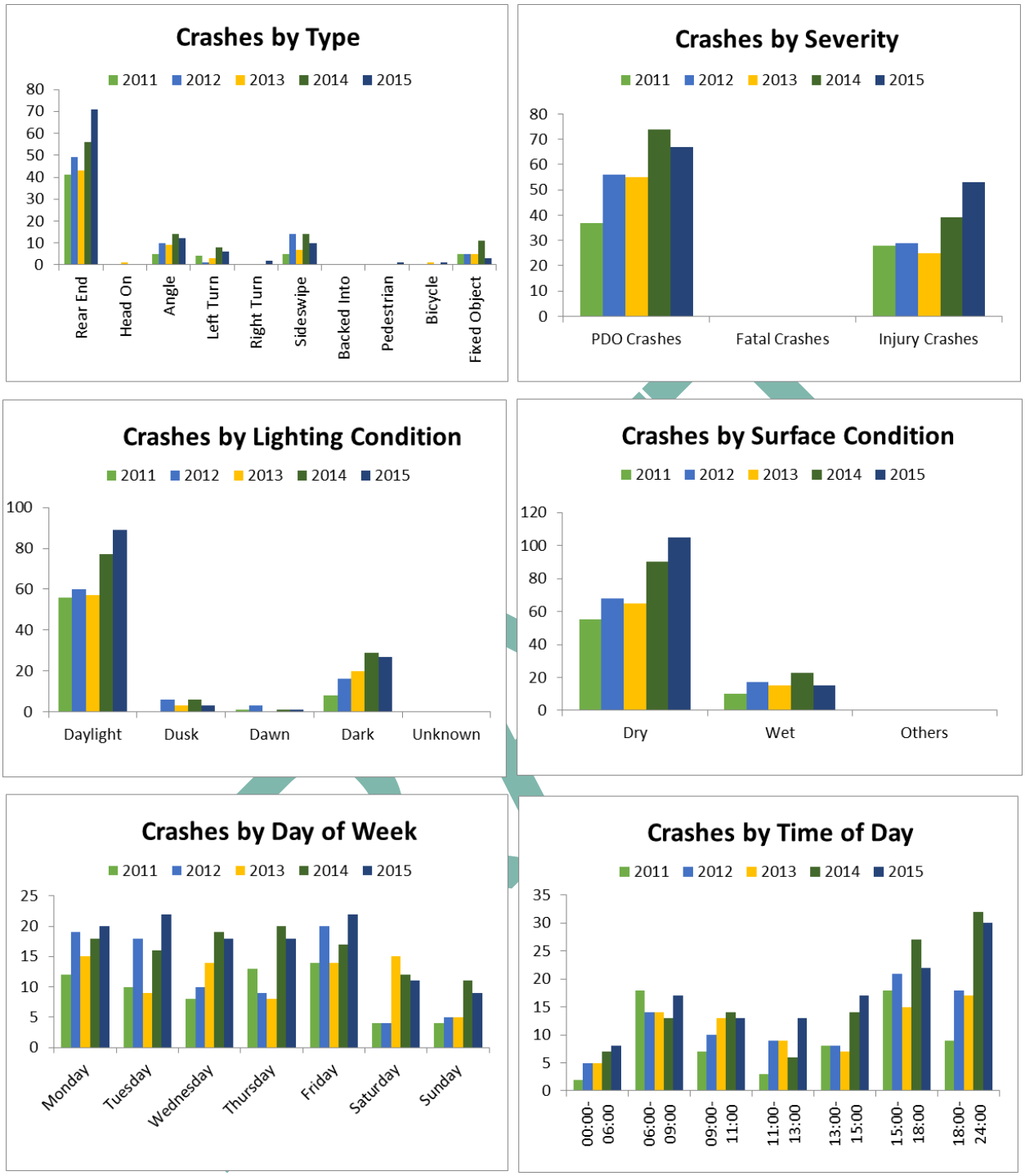

Figure 2-32 Five Year Crash Characteristics for SW 10 Street

Table 2-17 and **Figure 2-33** show the crash distribution by year and by milepost along SW 10 Street. The entire segment of SW 10 Street was divided into 0.25-mile sections. It is important to note that the last section from mileposts 2.014 and 2.152 is a relative short section (approximately 0.14 mile) and for that reason it only contains 45 crashes during the five years analyzed. The data shows two sections of roadway where most of the crashes are concentrated. The first section from MP 1.264 to MP 1.514 covers the area of the signalized intersection at Military Trail. The second section from MP 1.764 to MP 2.014 covers the area of the signalized intersections at E Newport Center Drive / SW 12 Avenue and at the SB I-95 ramps.

Table 2-17
Crash Distribution by Year and Milepost along SW 10 Street

MP Section	2011	2012	2013	2014	2015	Total Crashes
1.014 to 1.264	1	2	4	4	1	12
1.264 to 1.514	18	28	23	33	40	142
1.514 to 1.764	1	2	1	0	2	6
1.764 to 2.014	24	26	32	32	43	157
2.014 to 2.152	5	13	5	13	9	45

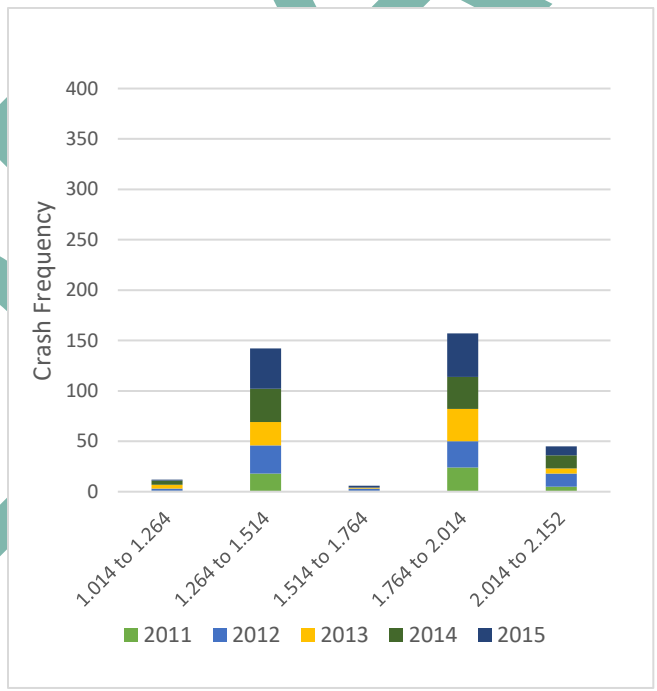

Figure 2-33 Crash Distribution by Year and Milepost along SW 10 Street

2.11.3 Hillsboro Boulevard

Table 2-18 and **Figure 2-34** show the summary of crashes between 2011 and 2015 along I-95. A total of 440 crashes were recorded for the section of Hillsboro Boulevard (Roadway ID: 86120000) between Century Boulevard (MP 4.465) and Natura Boulevard (MP 5.712). A total of 57 of those crashes took place in 2011, 105 in 2012, 87 in 2013, 85 in 2014 and 106 in 2015. Based on the distribution of crashes by year it can be concluded that crashes along Hillsboro Boulevard have increased in the last five years of available data. Crashes between 2011 and 2015 had an average growth rate of 22 percent.

Based on the crash severity, out of the 440 crashes reported, a total of 248 or 56 percent were PDO, a total of 188 or 43 percent resulted in injuries and 4 or 1 percent resulted in fatalities. **Table 2-19** shows the location of the fatal crashes.

Based on crash type distribution it can be concluded that rear-end crashes are the most common type of crash along Hillsboro Boulevard with 225 crashes or 51 percent followed by angle crashes with 58 or 13 percent. The relatively high percentage of angle crashes could be an indication of unfavorable operations at the signalized intersections.

The lighting conditions recorded at the time of the crashes indicate that 67 percent of the crashes occurred during daylight conditions while the remaining 23 percent occurred at dusk, dawn or at night, which is lower than the 33 percent State average during the same period (2011-2015) according to FIRES. The surface conditions reveal that 85 percent of the crashes occurred on a dry surface while the remaining 15 percent took place while the pavement was wet, which is equal to the 15 percent State average. The distribution of crashes by day indicate that most of the crashes take place during weekdays. The distribution of crashes by hour indicate that most of the crashes take place during the peak afternoon and evening hours (24 percent between 3:00 and 6:00 PM and 28 percent between 6:00 PM and midnight).

Table 2-18
Five Year Crash Summary for Hillsboro Boulevard

Hillsboro Boulevard from Century Boulevard to Natura Boulevard		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		Year							
		2011	2012	2013	2014	2015			
CRASH TYPE	Rear End	28	55	50	43	49	225	45	51.1%
	Head On	0	0	0	1	0	1	0	0.2%
	Angle	5	11	12	14	16	58	12	13.2%
	Left Turn	0	1	1	3	3	8	2	1.8%
	Right Turn	1	0	0	1	2	4	1	0.9%
	Sideswipe	6	9	7	5	12	39	8	8.9%
	Backed Into	0	0	0	0	1	1	0	0.2%
	Pedestrian	1	2	2	3	2	10	2	2.3%
	Bicycle	3	2	1	1	4	11	2	2.5%
	Fixed Object	7	10	9	7	9	42	8	9.5%
	Other Non-Fixed Object Collisions	0	0	2	2	1	5	1	1.1%
	Non-Collisions	0	0	2	3	3	8	2	1.8%
	Others	6	15	1	2	4	28	6	6.4%
	Total Crashes	57	105	87	85	106	440	88	100.0%
SEVERITY	PDO Crashes	33	63	51	42	59	248	50	56.4%
	Fatal Crashes	2	0	0	1	1	4	1	0.9%
	Injury Crashes	22	42	36	42	46	188	38	42.7%
LIGHTING CONDITIONS	Daylight	34	65	60	55	80	294	59	66.8%
	Dusk	0	4	3	3	3	13	3	3.0%
	Dawn	3	2	0	3	0	8	2	1.8%
	Dark	20	34	23	24	23	124	25	28.2%
	Unknown	0	0	1	0	0	1	0	0.2%
SURFACE CONDITIONS	Dry	50	90	72	68	94	374	75	85.0%
	Wet	7	15	15	17	12	66	13	15.0%
	Others	0	0	0	0	0	0	0	0.0%
DAY OF WEEK	Monday	14	16	10	20	18	78	16	17.7%
	Tuesday	12	9	13	10	28	72	14	16.4%
	Wednesday	9	10	14	11	15	59	12	13.4%
	Thursday	8	15	13	13	16	65	13	14.8%
	Friday	6	29	17	13	11	76	15	17.3%
	Saturday	3	13	16	13	9	54	11	12.3%
	Sunday	5	13	4	5	9	36	7	8.2%
HOUR OF DAY	00:00-06:00	4	12	7	8	5	36	7	8.2%
	06:00-09:00	5	9	10	8	13	45	9	10.2%
	09:00-11:00	2	14	8	9	9	42	8	9.5%
	11:00-13:00	3	6	11	9	12	41	8	9.3%
	13:00-15:00	6	13	6	8	15	48	10	10.9%
	15:00-18:00	18	20	21	18	30	107	21	24.3%
	18:00-24:00	19	31	24	25	22	121	24	27.5%

Figure 2-34 Five Year Crash Characteristics for Hillsboro Boulevard

Table 2-19 Fatal Crashes along Hillsboro Boulevard				
Crash No.	**Year**	**Roadway ID**	**MP**	**Description**
827429420	2011	86120000	5.712	The crash took place at the intersection of Hillsboro Boulevard and Natura Boulevard.
906725940	2011	86120000	5.636	The crash took place along the EB direction of Hillsboro Boulevard, just west of the intersection at Hillsboro Boulevard and Natura Boulevard.
843934590	2014	86120000	5.117	The crash took place on Tuesday April 22nd at 6:41 AM at the intersection of Hillsboro Boulevard and SW 12 Avenue/Jim Moran Boulevard.
847530960	2015	86120000	4.465	The crash took place on Friday May 15th at 10:17 AM at the intersection of Hillsboro Boulevard and Century Boulevard.

Table 2-20 and **Figure 2-35** show the crash distribution by year and by milepost along Hillsboro Boulevard. The entire segment of Hillsboro Boulevard was divided into 0.25-mile sections. The data shows that a high concentration of crashes take place between MP 4.465 and MP 4.715 which covers the signalized intersections at Century Boulevard, Military Trail, and Goolsby Boulevard. This coincides with the high percentage of angle crashes which is generally related to the operation at the intersections.

Table 2-20 Crash Distribution by Year and Milepost along Hillsboro Boulevard						
MP Section	**2011**	**2012**	**2013**	**2014**	**2015**	**Total Crashes**
4.465 to 4.715	18	32	19	20	33	122
4.715 to 4.965	13	25	24	17	16	95
4.965 to 5.215	8	25	20	20	18	91
5.215 to 5.465	2	3	2	7	8	22
5.465 to 5.712	10	16	8	13	17	64

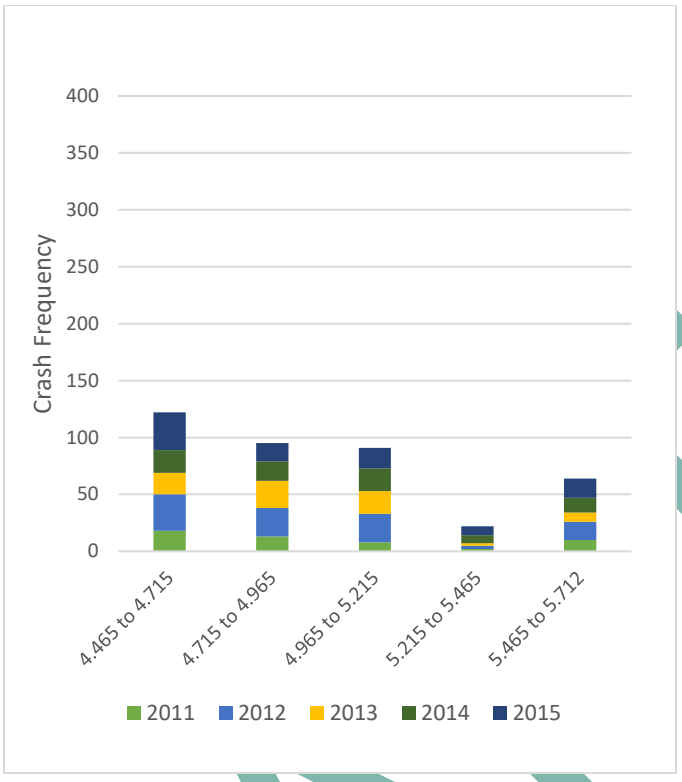

Figure 2-35 Crash Distribution by Year and Milepost along Hillsboro Boulevard

2.11.4 Crash Analysis Summary

Angle, rear-end, and sideswipe were the most common crash types in all three corridors which is typical of congested conditions. Crashes between 2011 and 2015 had an average growth rate between 13 and 22 percent with the highest growth rate shown along Hillsboro Boulevard. The only improvement occurred along SW 10 Street with a small growth rate decline between 2012 and 2013.

2.11.5 Economic Loss

Average crash costs were used for fatal, injury, and PDO type crashes within the project study area to calculate the economic loss per year for the five-year study period for all three corridors. The values were obtained from Chapter 122 of FDOT FDM Part 1, 2020.

For the average crash cost of **injury (A)** crashes**,** an *arithmetic mean* of the costs for severe, moderate and minor injury crashes were used.

- Fatal (K) $10,670,000
- Injury (A) $ 384,282

- Property Damage Only (O) $7,700

Using these values, the annual economic loss was estimated as follows:

Annual Economic Loss = (fatal crashes x $10,670,000 + injury crashes x $383,615 + property damage only x $7,700) / no. of years

= {[(11) x $10,670,000 + (911) x $384,282 + (1,410) x $7,700)} / 5

= **$95,661,580** ($95.7 million)

2.12 Railroad Crossing

The SFRC runs parallel to the west side of the I-95 interchange and SW 10 Street crosses over the tracks with a bridge. The SW 10 Street typical section within the limits of the limited access right of way is a six-lane urban divided roadway with a raised, landscaped median. In the EB direction, a drop right-turn lane is provided for the I-95 NB on-ramp and in the WB direction, a single left turn is provided for the I-95 SB on-ramp.

The SFRC runs parallel to the west side of the I-95 interchange and crosses Hillsboro Boulevard at grade. The Hillsboro Boulevard typical section within the limits of the limited access right of way is a six-lane urban divided roadway with a raised, landscaped median. Underneath the I-95 overpass, the EB and WB lanes are separated by median containing a raised concrete barrier wall as well as support piers for the I-95 overpass. In the EB direction, a right-turn lane is provided for the I-95 NB on-ramp and in the WB direction, an auxiliary lane is provided for the transition between the I-95 NB off-ramp merge lane and the right-turn lane provided for the I-95 SB on-ramp.

2.13 Existing Drainage

2.13.1 Existing Drainage Conditions

The project discharges into the Broward County Water Control District (BCWCD) #2 C-1 and C-2 canals. SW 10 Street, west of the railroad tracks, sheet flows into the BCWCD #2 C-2 canal. Hillsboro Boulevard, west of the railroad tracks, discharges into the BCWCD#2 C-2 canal via a closed storm drain system. East of the railroad tracks along SW 10 Street and Hillsboro Boulevard and SR 9 (I-95) discharge to BCWCD#2 C-1 canal by sheet flow or through closed storm drain systems. There are 13 cross drains within the project limits along SW 10 Street, Hillsboro Boulevard and

I-95 corridors. **Table 2-21** includes a summary of the existing cross drains. The BCWCD#2 C-1 and C-2 canals discharge north to the Hillsboro canal.

Table 2-21
Summary of Cross Drains

Cross Drain (CD)	Station (CL I-95)	Description
CD - 1	1333+50	1 – 36" RCP
CD - 2	1346+13	1 – 18" RCP
CD - 3	1352+15	1 – 72" RCP
CD - 4	1360+00	C-1 Control Structure
CD - 5	1368+14	1 – 18" RCP
CD - 6	1383+16	2 – 66" RCP
CD - 7	1396+34	1 – 18" RCP
CD - 8	1406+13	1 – 36" RCP
CD - 9	1410+37	C-1 Control Structure
CD - 10	1422+14	1 – 18" RCP
CD - 11	1428+13	1 – 18" RCP
CD - 12	1434+13	1 – 72" RCP
CD – 13	1441+14	1 – 18" RCP

2.14 Floodplains

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were used to evaluate the 100-year floodplain encroachment. The project area is located within four FEMA FIRM panels (August 2014). The floodplain encroachments are within the zones AE and AH with base flood elevations (BFE) ranging from 12 to 16 feet (NAVD 88).

2.15 Lighting

2.15.1 I-95

The I-95 existing lighting system consists of dual arm poles with conventional cobra head luminaires installed on the median barrier wall, and single arm pole luminaries along the outside shoulder at the NB and SB exit and entrance ramps.

2.15.2 SW 10 Street

The existing lighting along SW 10 Street consists of single arm poles with cobra head luminaires on the south side of the road and joint use FP&L poles on the north side of the road.

2.15.3 Hillsboro Boulevard

The lighting along Hillsboro Boulevard consists of single arm poles with cobra head luminaires on the south side of the road and joint use FPL transmission poles on the north side of the road.

2.15.4 Utilities

The following utility companies and government utility owners have facilities located near or within the project limits. Existing utility owners and contact information is listed in **Table 2-22**.

Table 2-22
Utility Agency Owners

No.	Utility Company	Address	Contact	Phone Number	Email
1	AT&T Distribution	8601 W. Sunrise Boulevard – 1st Floor Plantation, FL 33322	Mr. Otis Keeve	(954) 723-2540	ok1184@att.com
2	Broward County Traffic Engineering	2300 W. Commercial Blvd. Fort Lauderdale, Florida 33309	Bret Henderson	(954) 847-2702	brhenderson@broward.org
3	Broward County Water and Wastewater Services	2555 West Copans Road, Pompano Beach, FL 33069	Latissa Collins	(954) 831-4132	lcollins@broward.org
4	Comcast Cable	2601 SW 145 Ave. Miramar, FL 33027	Leonard Maxwell-Newbold	(954) 447-8405	Leonard_Maxwell-Newbold@cable.comcast.com
5	City of Deerfield Beach	200 Goolsby Blvd. Deerfield Beach, FL 33442	Rocky Figueroa	(954) 422-5822	rfigueroa@deerfield-beach.com
6	CVE Master Management Co Inc. **	277 Goolsby Blvd. Unit 4C Deerfield Beach, FL 33442	Craig A Smith and Associates Inc. (Jim Driscoll)	(561) 314-4445	jdriscoll@craigasmith.com
7	Florida Department of Transportation (FDOT)	3400 W Commercial Blvd, Fort Lauderdale, FL 33309	Carolyn Leach	(954) 847-2690	Carolyn.Leach@dot.state.fl.us
8	Florida Power & Light - Broward	Post Office Box 8248 Ft. Lauderdale, FL 33340-8248	Byron Sample	(954) 321-2056	byron.a.sample@fpl.com
9	FPL Fibernet LLC	810-B Charlotte Ave. West Palm Beach, FL 33401	Jacob Marroney	(561) 616-1884	Jacob.Marroney@fpl.com
10	Level 3 Communications	2121 W. Prospect Rd Tamarac, FL 33309	Jake Jacobson	(877) 366-8344	jake.jacobson@level3.com
11	MCI (Verizon Business Communications) *	2400 N. Glenville Drive Richardson, TX 75082	John Bachelder	(972) 729-6322	John.bachelder@verizon.com
12	TECO Peoples Gas South Florida	5101 NW 21 Avenue Suite 460 Ft. Lauderdale, FL 33309	Max Chamorro	(954) 453-0812	mjchamorro@tecoenergy.com

*Hillsboro Boulevard and SW 10 Street only, **SW 10 Street only

2.16 Soils Classification

Soils and soil profiles found in borings drilled for the roadway alignment study generally consisted of seven (7) general types:

Stratum 1: Brown sand with trace roots, sometimes with trace limerock fragments (Topsoil/A-8).

Stratum 2: Brown to light brown sand, sometimes with trace silt, trace limerock fragments (A-3).

Stratum 2A: Light brown sand and little to some limerock fragments with silt to silty (A-1-b).

Stratum 2B: Dark brown sand with silt, with trace organic (A-3).

Stratum 3: Light brown sandy to silty limestone.

Stratum 4: Light brown silty sand (A-2-4).

Stratum 5: Dark brown sand with silt, with few organic (A-8).

The majority of the project corridor is underlain with interlayering of Strata 1 and 2. Stratum 2A, 2B, 3 and 4 soils were found at some isolated boring locations at various depths along the project corridor. Stratum 5 soils were found at only one boring locations between 4 and 6 feet depth interval.

2.17 Aesthetic Features

There are no existing aesthetic features within the project corridor. Existing landscaping is limited to the I-95 interchange.

2.18 Traffic Signs

There are numerous single post signs along both SW 10 Street and Hillsboro Boulevard corridors on both sides of the road and includes speed limit signs and wayfinding signage. Signs are located primarily at the intersections.

3 Future Conditions

3.1 Future Land Use

The City of Deerfield Beach Future Land Use Map (adopted November 13, 2018) shown in **Figure 3-1** predicts that land uses within the project area will remain similar except for the conversion of the former Deerfield Country Club Golf Course into an employment center. The anticipated employment center has been branded as the Hillsboro Technology Center.

3.1.1.1 SW 10 Street

The City of Deerfield Beach Future Land Use Map shows the area west of the SW 10 Street Interchange as Industrial. The NE quadrant of the interchange is shown as Residential Moderate (10 DU/AC), Commercial and Conservation. The SE quadrant shows as Community Facility, Recreation Open Space, Residential- Medium (15 DU/AC), Residential Moderate (10 DU/AC) and Residential Low (5 DU/AC).

3.1.1.2 Hillsboro Boulevard

The City of Deerfield Beach Future Land Use Map shows the NW quadrant of the Hillsboro Boulevard Interchange as Industrial and Commercial while the NE quadrant is shown as Industrial, Commercial, Recreation Commercial, Recreation Open Space and Employment Center. The SE quadrant shows as Commercial, Residential Moderate (10 DU/AC) and Recreation Open Space. The SW quadrant shows as Commercial, Industrial and York Residential Transit Oriented Development.

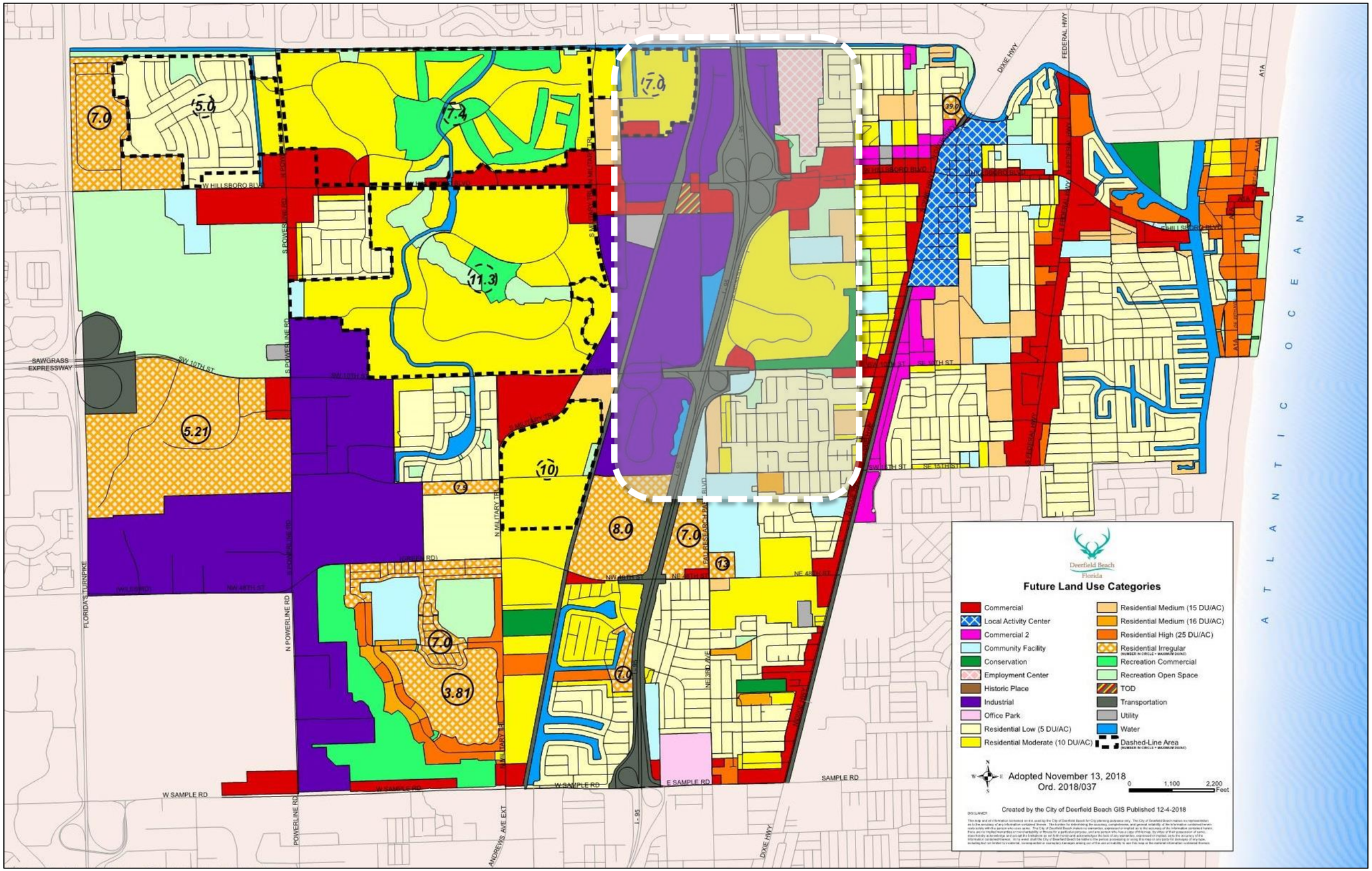

Figure 3-1 Future Land Use Map

3.2 Future Context Classification

Hillsboro Boulevard and SW 10 Street should be considered **Suburban Commercial (C3C)** as context classification for future conditions with no anticipated changes from existing.

3.3 Future Travel Forecast

To maintain consistency with the on-going SW 10 Street Connector PD&E Study, traffic projections for both the No-Action and Build conditions were obtained from the recently published SW 10 Street Connector PD&E Study Project Traffic Forecast Memorandum (PTFM) dated September 2018 (FM 439891-1) and included here by reference. Section 4 of the PTFM provides a detailed description of the modeling methodology and the development of the Directional Design Hour volumes (DDHVs).

Figure 3-2 presents the Future No-Action Alternative Lane Configuration. **Figure 3-3** and **Figure 3-4** depict the No-Action Traffic Projection Volumes for Opening Year 2020 and Design Year 2040.

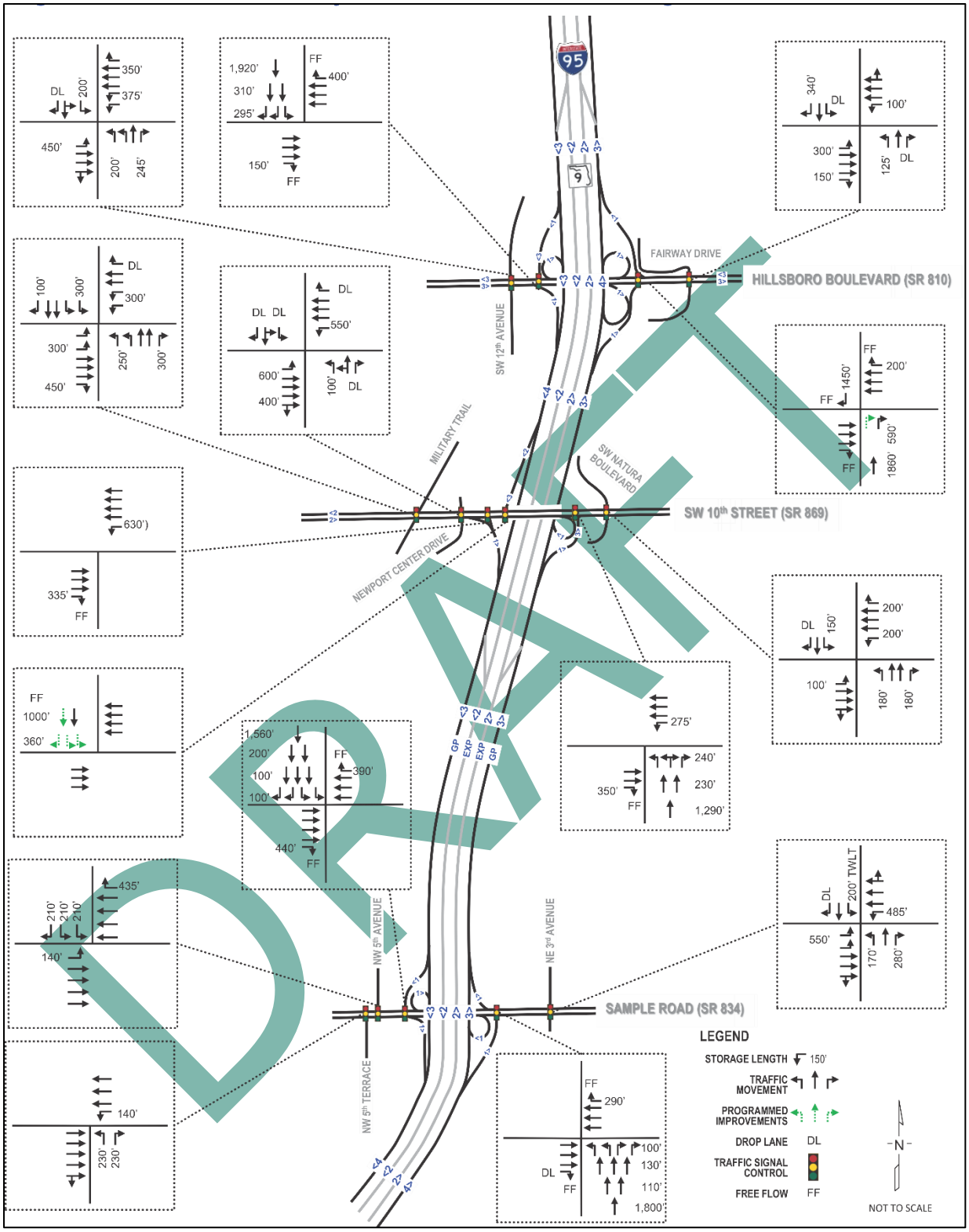

Figure 3-2 No-Action Roadway and Intersection Lane Configurations

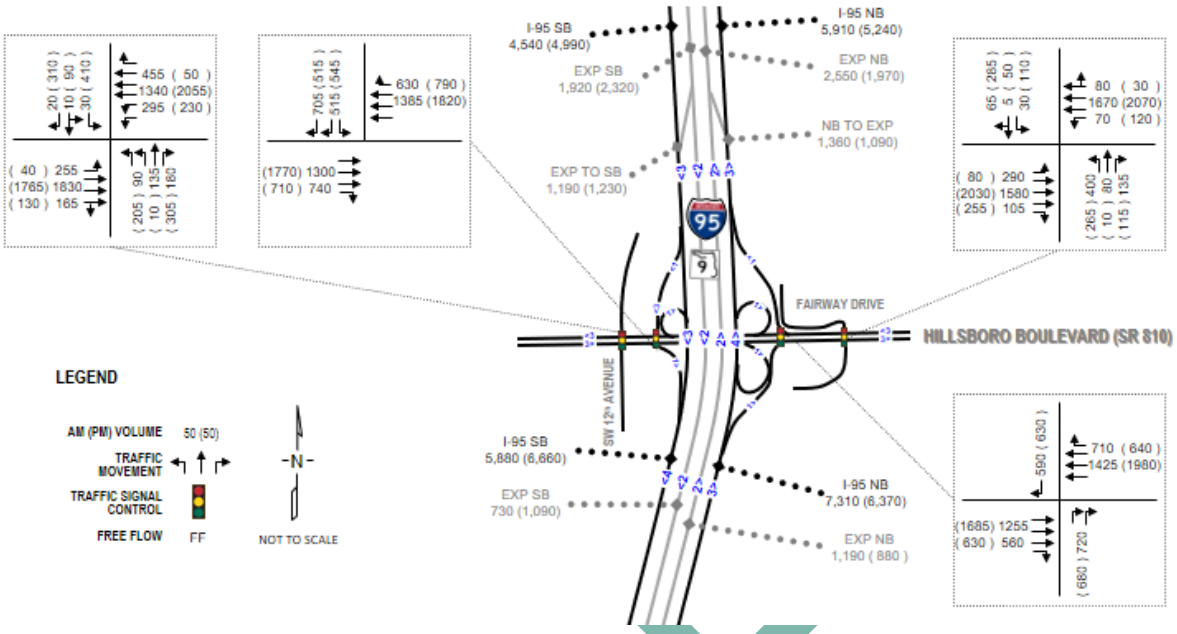

Figure 3-3 2020 No-Action Volumes – Hillsboro Boulevard

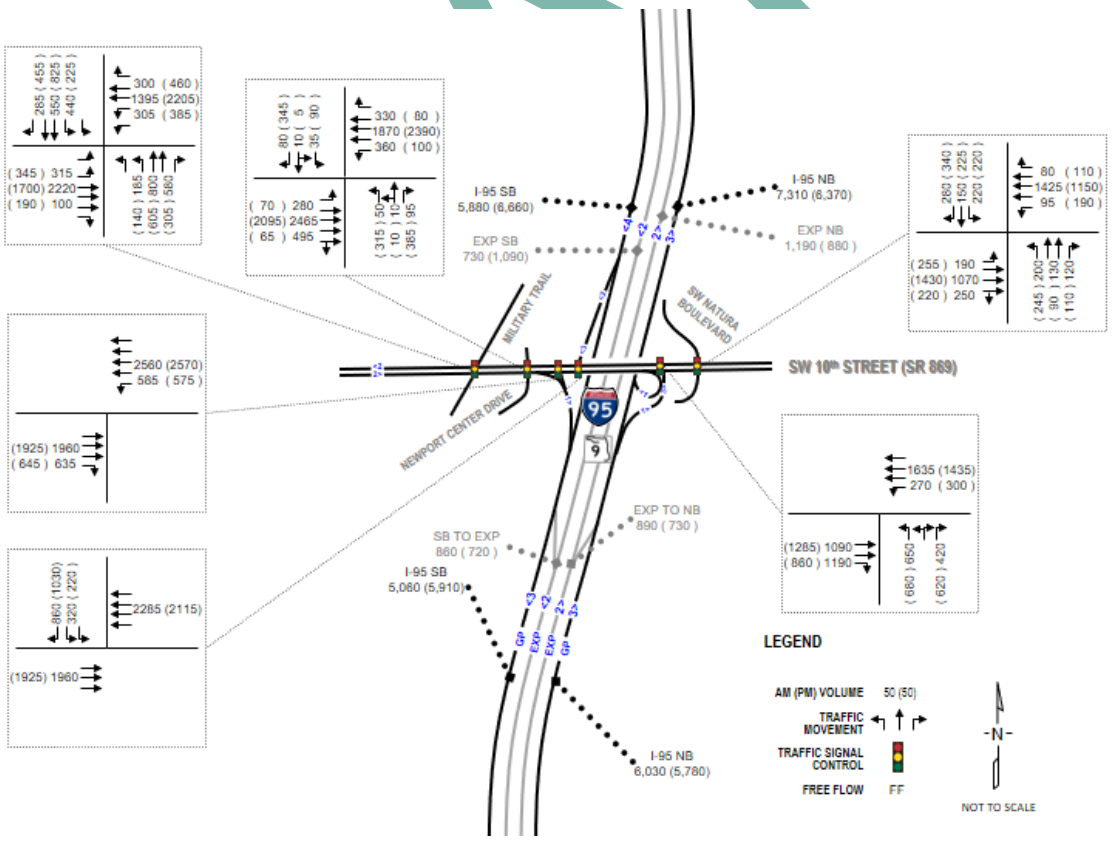

Figure 3-4 2020 No-Action Volumes – SW 10 Street

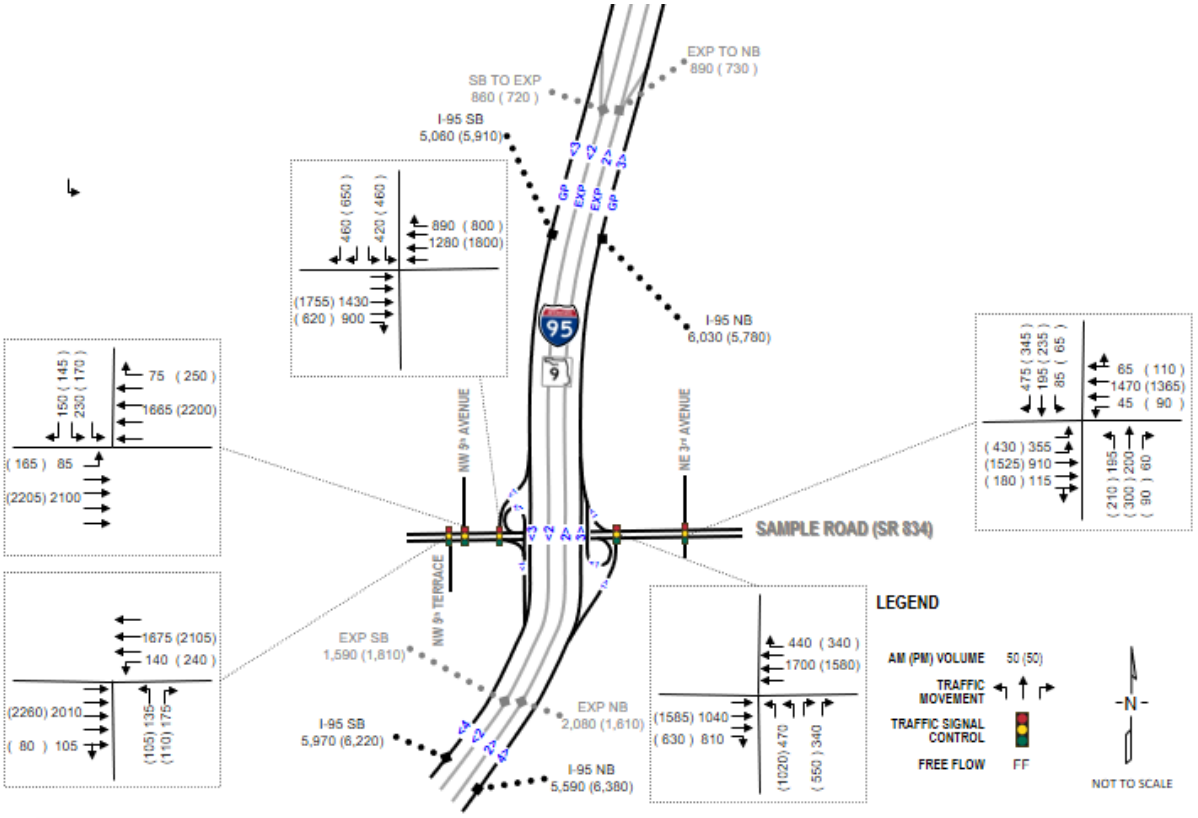

Figure 3-5 2020 No-Action Volumes – Sample Road

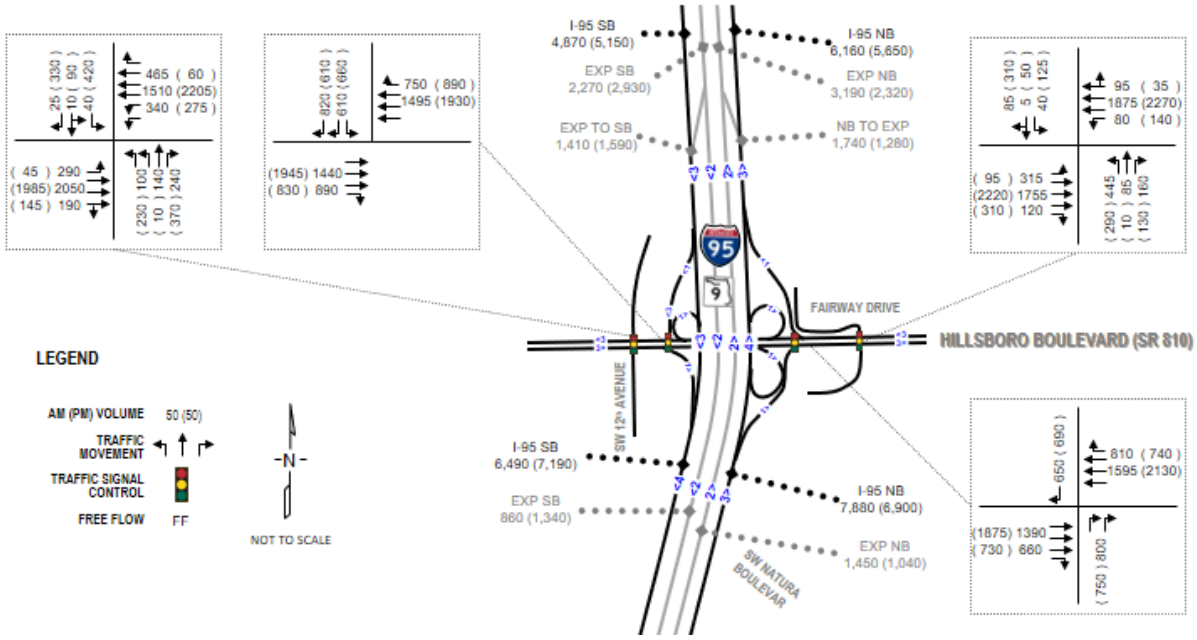

Figure 3-6 2040 No-Action Volumes – Hillsboro Boulevard

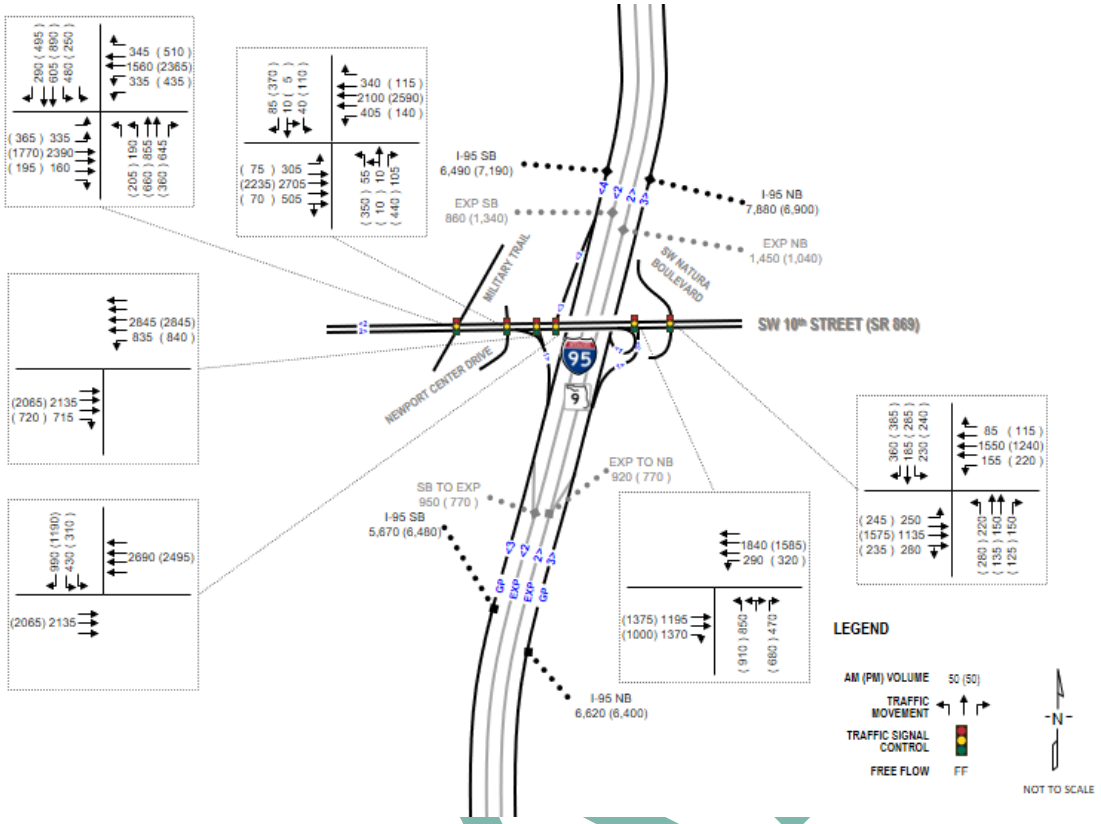

Figure 3-7 2040 No-Action Volumes – SW 10 Street

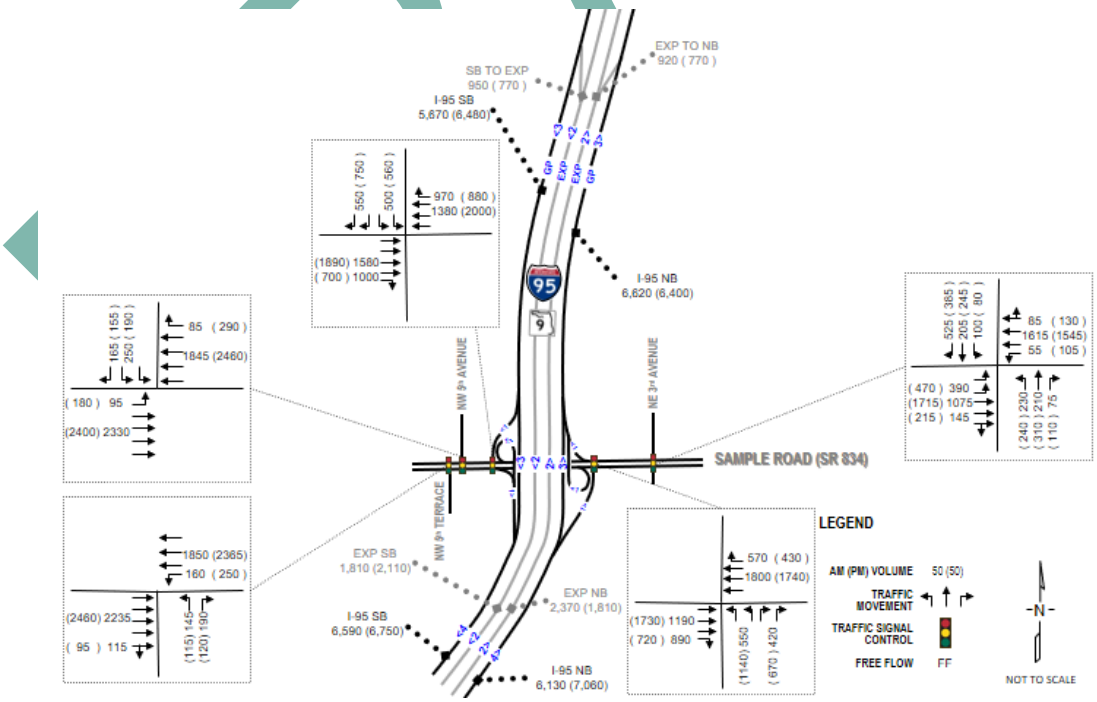

Figure 3-8 2040 No-Action Volumes – Sample Road

3.4 Future Improvement Plans

The Broward County MPO 2035 LRTP included improvements to all I-95 interchanges in Broward County under Illustrative Roadway Projects. Illustrative projects are those that cannot be included in the cost feasible plan due to financial constraints but could be included in a future approved Transportation Improvement Program.

4 Design Controls and Criteria

Several design standards and manuals were consulted to establish the final design criteria for this PD&E Study. The design criteria are based on design parameters outlined in the current editions of the following publications:

- Project Development and Environment Manual, FDOT, 2019
- FDOT Design Manual (FDM), FDOT, 2020
- A Policy on Geometric Design of Highways and Streets, 7th Edition, American Association of State Highway Transportation Officials (AASHTO), 2018
- FDOT Standards Plans, FDOT, FY 2020-2021
- Manual of Uniform Minimum Standards for Design, Construction and Maintenance of Streets and Highways, "Florida Greenbook (FGB)", FDOT, 2016
- Drainage Manual, FDOT, 2020
- Flexible Pavement Design Manual, FDOT, 2020
- Pavement Type Selection Manual, FDOT, 2019
- Highway Capacity Manual 6, Transportation Research Board, 2016
- Manual of Uniform Traffic Control Devices (MUTCD), FHWA, 2009
- Project Traffic Forecasting Handbook, FDOT, 2019
- Roadside Design Guide 4Th Edition (Errata), AASHTO, 2015
- Standard Specifications for Road and Bridge Construction, FDOT, 2020
- Structures Manual, FDOT, 2020
- Utility Accommodation Manual, FDOT, 2017

4.1 Roadway Design Criteria

Table 4-1 Roadway Design Controls – Mainline (SW 10 St)		
Design Element	**Design Standard**	**FDM January 2020**
Design Speed		
Arterial	Urban Collector 35-45 mph	
Lane Widths		
Through Lane	11-ft	FDM Table 210.2.1
Turn Lane	11-ft	
Median Widths		
Arterial and Collectors	22-ft	FDM Table 210.3.1
Design Speed≤45 mph		
Border Width		
Arterial Collectors = 45 mph	Bicycle Lanes or Other Auxiliary Lane, 12-ft	FDM Table 210.7.1
Pedestrian and Bicycle		
Bike Lanes	Required in or within 1 mile of urban area	FDM Chapter 223
Bike Lane Width	7-ft, Buffered Bike Lane	FDM Chapter 223.2.1.1
Sidewalks	6-ft, Adjacent to curb	FDM Chapter 222.2.1
Shared use path	12-ft with 4-ft separation	FDM Chapter 224.4 / 224.12
Roadway Cross Section Slope		
Roadway Pavement	0.02	FDM Figure 210.2.1
Roadway Grades		
Maximum Grade-Industrial	30-45 mph- 4%	FDM Table 210.10.1
Maximum Change-in-grade	Without a VC 30 mph - 1%, 40 mph - 0.80%	FDM Table 210.10.2
Base Clearance	Urban, 1-ft	FDM Chapter 210.10.3 (2)
Distance Between VPI's	250-ft	FDM Chapter 210.10.1.1
Minimum Grade	0.30%	
Horizontal Alignment- Arterials and Collectors, V= Design Speed in mph		
Maximum Deflection	Without a Horizontal Curve V≤ 40 mph- 2 Degrees	FDM Chapter 210.8.1
Length of Horizontal Curve	15V, minimum 400-ft	FDM Table 210.8.1
Maximum Curvature	Curb and Gutter, e max= 0.05 40 mph 14°15'	FDM Table 210.9.2

Table 4-2 Roadway Design Controls – I-95 Service Interchange Ramps			
Controlling Element	**AASHTO Criteria**	**FDOT Criteria, FDM 2020**	
Design Speed	35 to 60 mph	30 MPH to 60 mph	
Lane Width **Bridge Width**	15-ft one-lane, 24-ft two-lanes Approach Roadway Width	15-ft one-lane, 24-ft two-lanes Approach Roadway width	
Shoulder Width	10-ft outside 10-ft inside	Outside Full Width (Paved Width)	Median Full Width (Paved Width)
1-Lane Ramp (without shoulder gutter)		6-ft (4-ft)	6-ft (2-ft)
1-Lane Ramp (with shoulder gutter)		11.5 ft (4 ft)	11.5-ft (4-ft)
2-Lane Ramp Non-Interstate (without shoulder gutter)		10-ft (8-ft)	8-ft (4-ft)
2-Lane Ramp Non-Interstate (with shoulder gutter)		15.5-ft (8-ft)	13.5-ft (6-ft)
2-Lane Ramp Interstate (without shoulder gutter)		12-ft (10-ft)	8-ft (4-ft)
2-Lane Ramp Interstate (with shoulder gutter)		15.5-ft (8-ft)	13.5-ft (6-ft)
Auxiliary Lanes (without shoulder gutter)		12-ft (10-ft)	8-ft (4-ft)
Auxiliary Lanes (with shoulder gutter)		15.5-ft (8-ft)	8-ft (4-ft)
Horizontal Curve Radius Min. Radius	30 mph, 35 mph, 40 mph, 50 mph	30 mph to 45 mph	
Min. Radius (e-max 10%)	200-ft, 292-ft, 410-ft, 694-ft	300-ft (@30 mph)	
Superelevation	0.10 max	0.10 max	
Stopping Sight Distance		30 mph, 35 mph, 40 mph	
Vertical Alignment, SSD Minimum	200-ft, 250-ft, 305-ft, 360-ft, 425-ft (@ 30, 35, 40, 45, 50 mph)	182-ft, 226-ft, 275-ft upgrade (@7%) 218-ft, 276-ft, 339-ft downgrade (@ 7%)	
K Value – Sag SSD Minimum	37, 49, 64, 79, 96 (@ 30, 35, 40, 45, 50 mph)	37, 49, 64, 79, 96 (@ 30, 35, 40, 45, 50 mph)	
K Value – Crest (New Construction) SSD Minimum	19, 29, 44, 61, 84 (@ 30, 35, 40, 45, 50 mph)	31,47, 70 (@ 30 mph, 35 mph, 40 mph)	
K Value – Crest (RRR Criteria) SSD	19, 29, 44, 61, 84 (@ 30, 35, 40, 45, 50 mph)	19,29,44 (@ 30 mph, 35 mph, 40 mph)	
Maximum Grades	(@ 30, 35, 40, 45, 50 mph)	30 mph to 50 mph	
	8%, 7%, 7%, 6%, 6% upgrade	7% (<30 mph), 6% (35-40 mph), 5% (45-50 mph) upgrades	
	Downgrades may be increased by 2%	Downgrades may be increased by 2%	

Table 4-2 Roadway Design Controls – I-95 Service Interchange Ramps		
Controlling Element	**AASHTO Criteria**	**FDOT Criteria, FDM 2020**
Min. Vertical Curve Length		90-ft, 105-ft, 120-ft (@ 30 mph, 35 mph, 40 mph) Sag or Crest
Cross Slope (Travel Lanes) **Cross Slope (shoulder)**	0.015-0.003 (0.030 allowed on additional outside lanes) 0.06 on shoulders 0.05 max algebraic difference in cross slope	0.02-0.03 0.06 on shoulders 0.06 max algebraic difference < 35 MPH 0.05 max algebraic difference ≥ 35 MPH
Vertical Clearance Over Roadway **Over water (Drainage)**	16.0-ft minimum for traveled structures 17.0-ft min for overhead sign structures and pedestrian bridges	16.5-ft for traveled structures (16-ft existing) 17.5-ft for sign structures, pedestrian bridges and signals (17-ft existing) 19.5-ft for Dynamic Message Signs (19-ft existing) 2.0-ft min over design flood stage
Design Loading Structural Capacity	HL-93 (LRFD)	HL-93 (LRFD)

Table 4-3 Roadway Design Controls – Direct Connect ramps			
Controlling Element	**AASHTO Criteria**	**FDOT Criteria, FDM 2020**	
Design Speed	50 mph	50 mph	
Lane Width **Bridge Width**	15-ft one-lane, 24-ft two-lanes Approach Roadway Width	15-ft one-lane, 24-ft two-lanes Approach Roadway width	
Shoulder Width	Outside shoulder Inside shoulder	Outside Full Width	Median Full Width
1-Lane Ramp (without shoulder gutter)	10-ft outside 10-ft inside	6-ft	6-ft
2-Lane Ramp Non-Interstate (without shoulder gutter)		10-ft	8-ft
2-Lane Ramp Interstate (without shoulder gutter)		12-ft	8-ft
Auxiliary Lanes (without shoulder gutter)		12-ft	8-ft
Horizontal Curve Radius Min. Radius (e-max 10%)	694-ft (@50 mph)	695-ft (@50 mph)	
Superelevation	0.12 max	0.10 max	
Stopping Sight Distance	425	425	
Vertical Alignment, SSD Minimum	465-ft downgrade (@ 5%) 394-ft upgrade (@5%)	464-ft downgrade (@5%) 393-ft upgrade (@ 5%)	
K Value – Sag SSD Minimum	96 (@ 50 mph)	96 (@50 mph)	
K Value – Crest (New Construction) SSD Minimum	84 (@ 50 mph)	136 (@50 mph)	
Maximum Grades	(@50 mph)	50 mph	

Table 4-3 Roadway Design Controls – Direct Connect ramps		
Controlling Element	**AASHTO Criteria**	**FDOT Criteria, FDM 2020**
	5% upgrade	5% (45-50 mph) upgrades
	Downgrades may be increased by 2%	Downgrades may be increased by 2%
Min. Vertical Curve Length		200-ft (Sag) 300-ft (Crest)
Cross Slope (shoulder)	0.06 on shoulders 0.05 max algebraic difference in cross slope	0.06 on shoulders 0.05 max algebraic difference ≥ 35 MPH
Vertical Clearance Over Roadway **Over water (Drainage)**	16.0-ft minimum for traveled structures 17.0-ft min for overhead sign structures and pedestrian bridges	16.5-ft for traveled structures (16-ft existing) 17.5-ft for sign structures, pedestrian bridges and signals (17-ft existing) 19.5-ft for Dynamic Message Signs (19-ft existing)
Design Loading Structural Capacity	HL-93 (LRFD)	HL-93 (LRFD)

5 Alternative Analysis

5.1 No-Action Alternative

The No-Action Alternative assumes that no improvements would be implemented within the project corridor. It serves as a baseline for comparison against the Build Alternatives. It will however, include on-going construction projects and all funded or programmed improvements scheduled to be opened to traffic in the analysis years being considered. These improvements must be part of the FDOT's adopted Five-Year Work Program, Broward County Metropolitan Planning Organization Cost Feasible LRTP, transportation elements of Local Government Comprehensive Plans (LGCP), or developer-funded transportation improvements specified in approved development orders.

The advantage of the No-Action Alternative is that it does not require any expenditure of public funds for design, right-of-way acquisition, construction or utility relocation. In addition, there would not be any traffic delays or disruptions due to construction, no direct or indirect impacts to the environment and/or the socio-economic characteristics from the project. However, the No-Action Alternative does not address the purpose and need of the project.

5.2 Transportation Systems Management and Operation

Transportation Systems Management and Operations (TSM&O) aims to optimize the performance of existing multimodal infrastructure through implementation of systems and services to preserve capacity and improve the safety and reliability of our transportation system. TSM&O improvements include traffic management and operations solutions such as Information Technology System (ITS) devices, signal retiming, and adaptive signal control. The TSM&O is not an alternative on its own, however, the TSM&O improvements are included in each viable Build Alternative.

The TSM&O alternative, however, will not significantly improve the capacity issues through the corridor by the design year 2040. Long term improvements are necessary to address the existing traffic congestion and meet the safety and capacity needs of the corridor.

5.3 Build Alternatives

Build alternatives were developed along I-95, SW 10 Street and Hillsboro Boulevard to address the purpose and need of the project.

5.3.1 I-95

All Build Alternatives considered for I-95 include:

- Two 12-foot wide express lanes (one in each direction)* Design Variation for 11-foot lane width in some areas.
- Six 12-foot wide general purpose lanes (three in each direction)
- Four-foot to two-foot wide buffer with tubular markers separating the general purpose lanes from the express lanes
- A 12-foot wide paved inside shoulder with some areas with 10-foot inside shoulders
- A 12-foot wide outside shoulder (ten-feet paved and two-feet unpaved) with some areas with 10-foot outside shoulders
- A 2.5-foot wide center barrier wall
- Twelve-foot wide auxiliary lanes at selected locations

Alternative 1:

Alternative 1 provides a 2-lane, physically separated NB collector distributer (CD) road on the east side of I-95 between SW 10 Street and Hillsboro Boulevard that combines the EB to NB and WB to NB on-ramps. A braided ramp is proposed for the NB CD road to separate the traffic destined to I-95 mainline from the traffic exiting at Hillsboro Boulevard. A proposed auxiliary lane on the west side of I-95 combines the EB to SB and WB to SB on-ramps. A braided ramp is proposed to separate the traffic destined to I-95 mainline from traffic exiting at SW 10 Street. All the services interchange ingress and egress ramps remain configured similar to the existing except for the new WB SW 10 Street to NB ingress ramp which is provided as a free-flow right turn in the NE quadrant. Alternative 1 is shown in Figure 5-1.

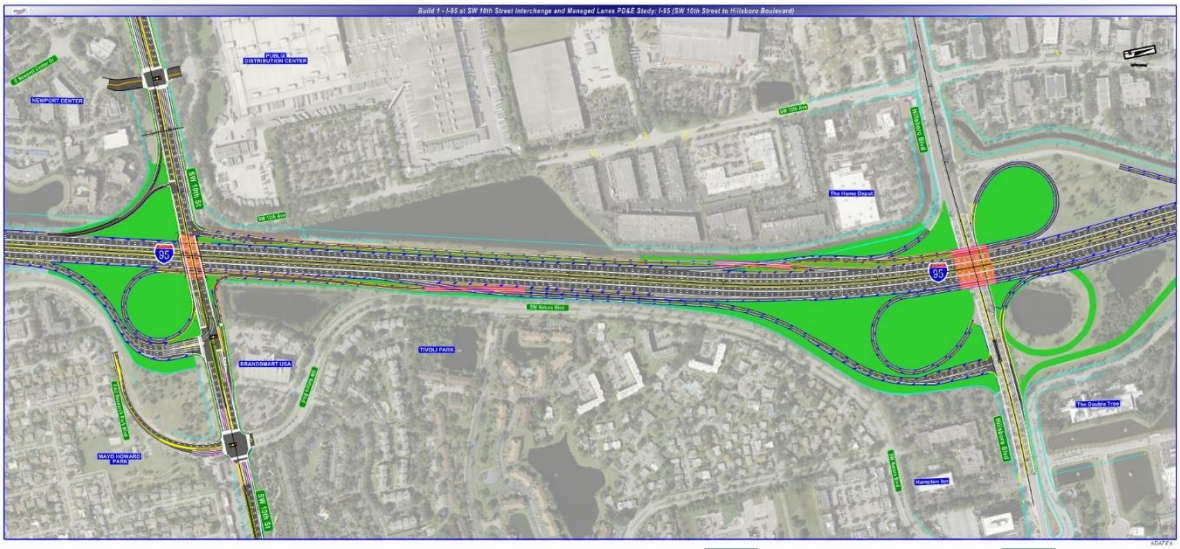

Figure 5-1 Build 1 - I-95 (SW 10 Street to Hillsboro Blvd)

Alternative 2:

Alternative 2 provides the NB CD road and SB auxiliary lane as described for Alternative 1. Additionally, it proposes widening in the median along I-95 to accommodate one 12-ft EL in each direction. Alternative 2 also maintains all the services interchange ingress and egress ramps configured similar to the existing except for the new WB SW 10 Street to NB ingress ramp which is provided as a free flow right turn in the NE quadrant.

5.3.2 SW 10 Street

The Build alternatives considered along SW 10 Street provide two connector lanes in each direction along SW 10 Street with direct connect access ramps to/from the I-95 express lanes. A WB on-ramp access to the connector lanes is provided just west of Newport center, and an EB off-ramp access to local SW 10 Street is provided west of the Military Trail intersection. Improvements at the NB ramp terminal to accommodate triple lefts and triple rights, as well as, relocating the WB to NB entrance ramp access from the SE quadrant of the interchange to the NE quadrant remains the same for both build alternatives.

Three 11-ft lanes with a 7-ft buffered bike lane and 6-ft sidewalk are proposed in each direction along SW 10 Street. However, no sidewalk is provided along the north

side from East Newport Center Drive/SW 12 Avenue intersection to Military Trail. A roundabout is provided at the intersection of W. and E. Newport Center Drive. Triple rights are provided at the NB and SB legs of the SW 12 Avenue/E. Newport Center Drive intersection with SW 10 Street. Two alignments were considered for the connector lanes.

- North Alignment
- Center Alignment

Both north and center alignment options have a similar configuration. The north alignment, however, provides direct access to the SW 10 Street Connector from SW 12 Avenue. Minor right-of-way acquisition is required on the north and south sides of SW 10 Street including six privately owned and three government owned parcels. No relocations are required.

The center alignment alternative also requires minor right-of-way acquisition on the north side as well as on the south side including 15 privately owned and nine government owned parcels. No relocations are required.

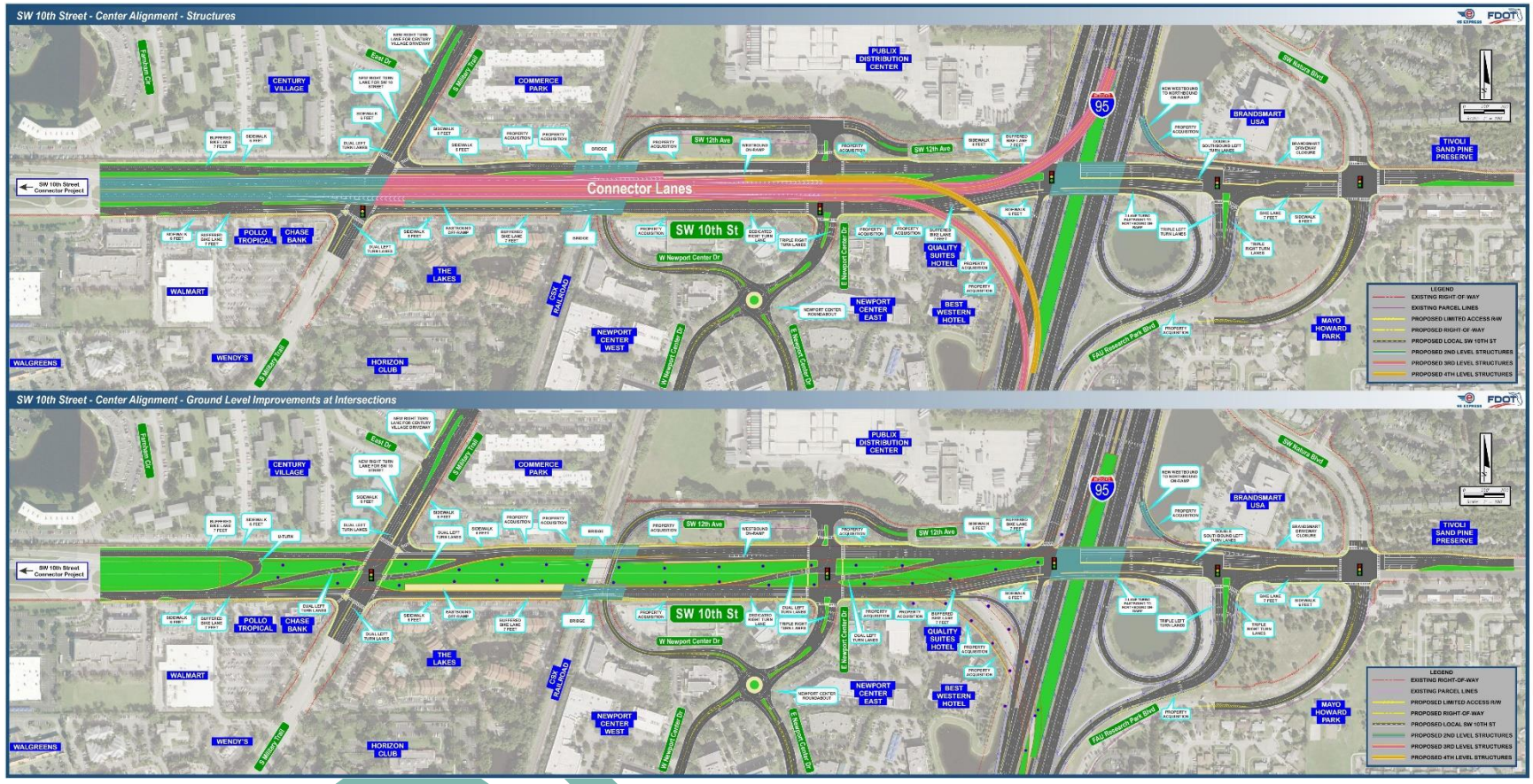

Figure 5-2 SW 10 Street – Center Alignment Concept Plan

Figure 5-2 shows the Center Alignment concept. The top figure illustrates the proposed SW 10 Street Connector to be constructed above local SW 10 Street. The lower figure illustrates the local SW 10 Street configuration and intersection design.

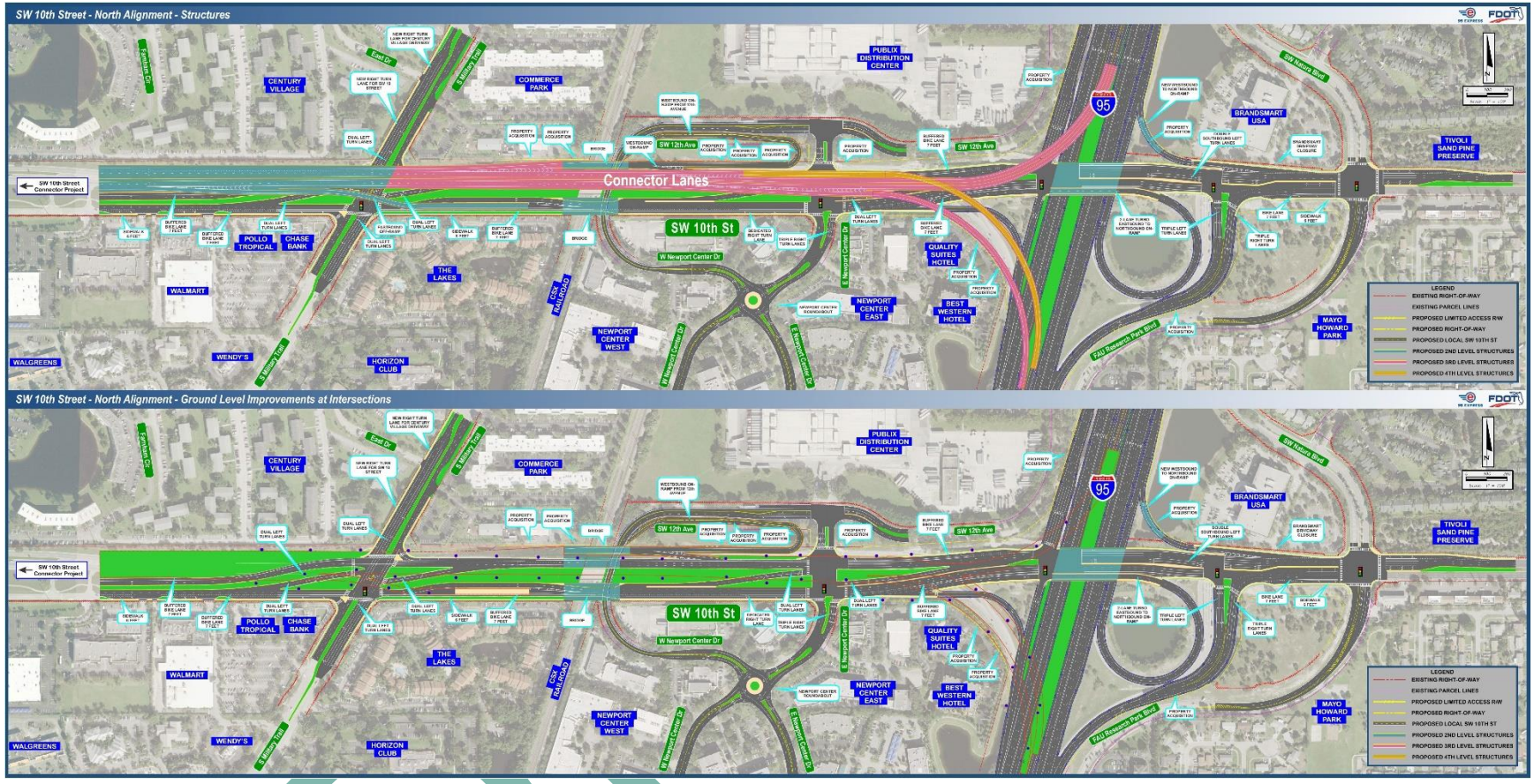

Figure 5-3 SW 10 Street – North Alignment Concept Plan

Figure 5-3 shows the North Alignment concept. The top figure illustrates the proposed SW 10 Street Connector to be constructed above local SW 10 Street. The lower figure illustrates the local SW 10 Street configuration and intersection design.

5.3.3 Hillsboro Boulevard

Two Build Alternatives were considered along Hillsboro Boulevard. Alternative 1 proposes a depressed section while Alternative 2 proposes an elevated section. Improvements at the I-95 ramp terminals remained the same for both Build Alternatives and include providing a 2-lane NB exit ramp combining both exit ramps into a single ramp with a signal controlled. The NB exit ramp terminal will provide expanded storage for a triple left and double right turn lanes. Additional improvements include expanding the north leg of Jim Moran Boulevard to allow for SB double left and double right turn lanes, extending the NB to WB left turn lane storage and the EB to SB right turn storage at Natura Boulevard.

Alternative 1:

Alternative 1 proposes a depressed section from Goolsby Boulevard to SW 12 Avenue with two 11-ft lanes in each direction and a 7.5-ft inside shoulder. An access road is proposed on each side with one 11-ft lane, 7-ft buffered bike lane and 6-ft sidewalk. This alternative was deemed not viable due to impacts to the SFRC line and access to adjacent properties.

Alternative 2:

Alternative 2 proposes an elevated section from Goolsby Boulevard to SW 12 Avenue with two 11-ft lanes in each direction, a 7.5-ft inside shoulder, and 13-ft median. An access road is proposed on each side with one 11-ft lane, 7-ft buffered bike lane and 6-ft sidewalk. This alternative was deemed not viable due to access impacts to adjacent properties and the steep profile grade required to meet existing grade before the I-95 interchange.

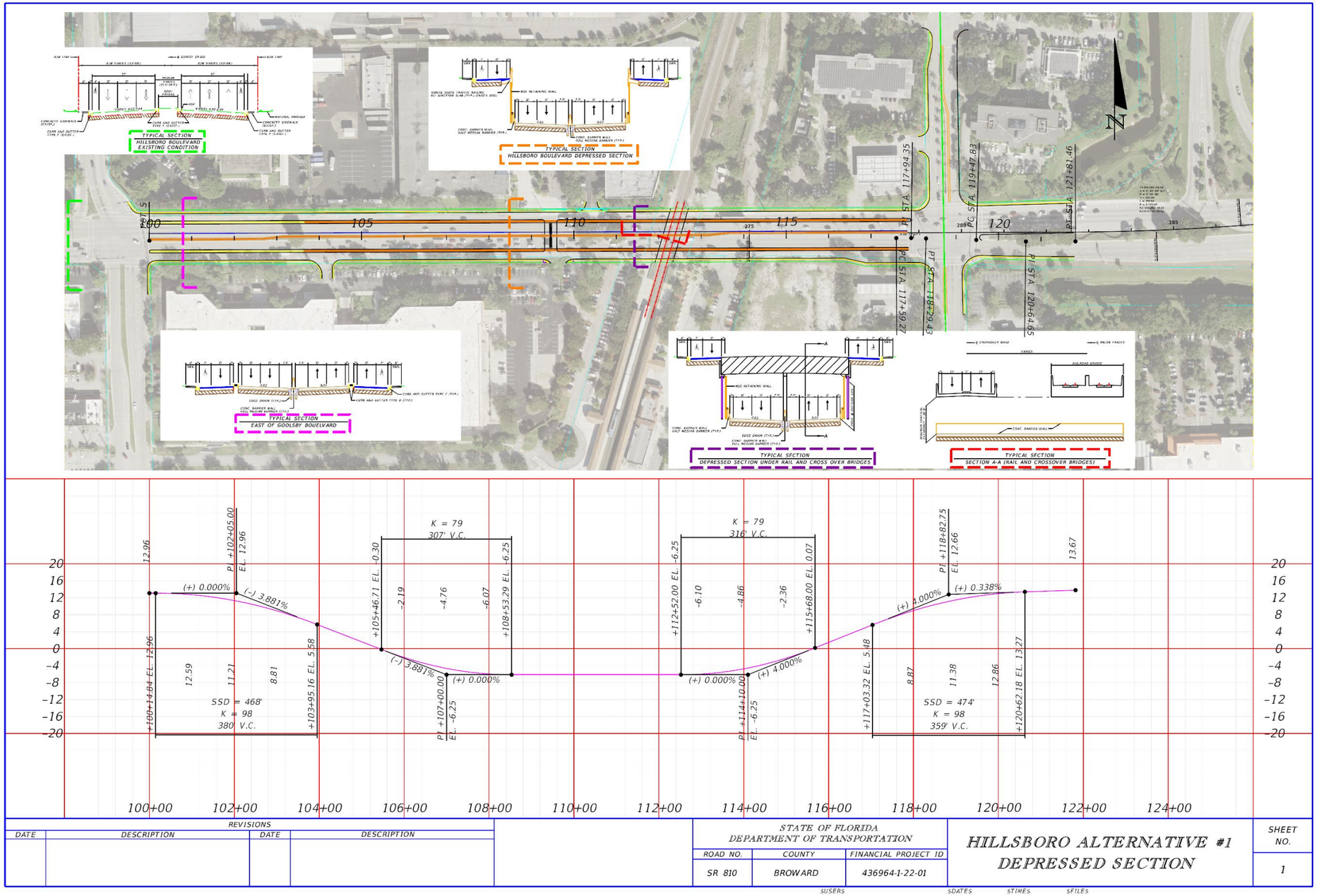

Figure 5-4 Hillsboro Boulevard – Concept Plan – Alternative 1

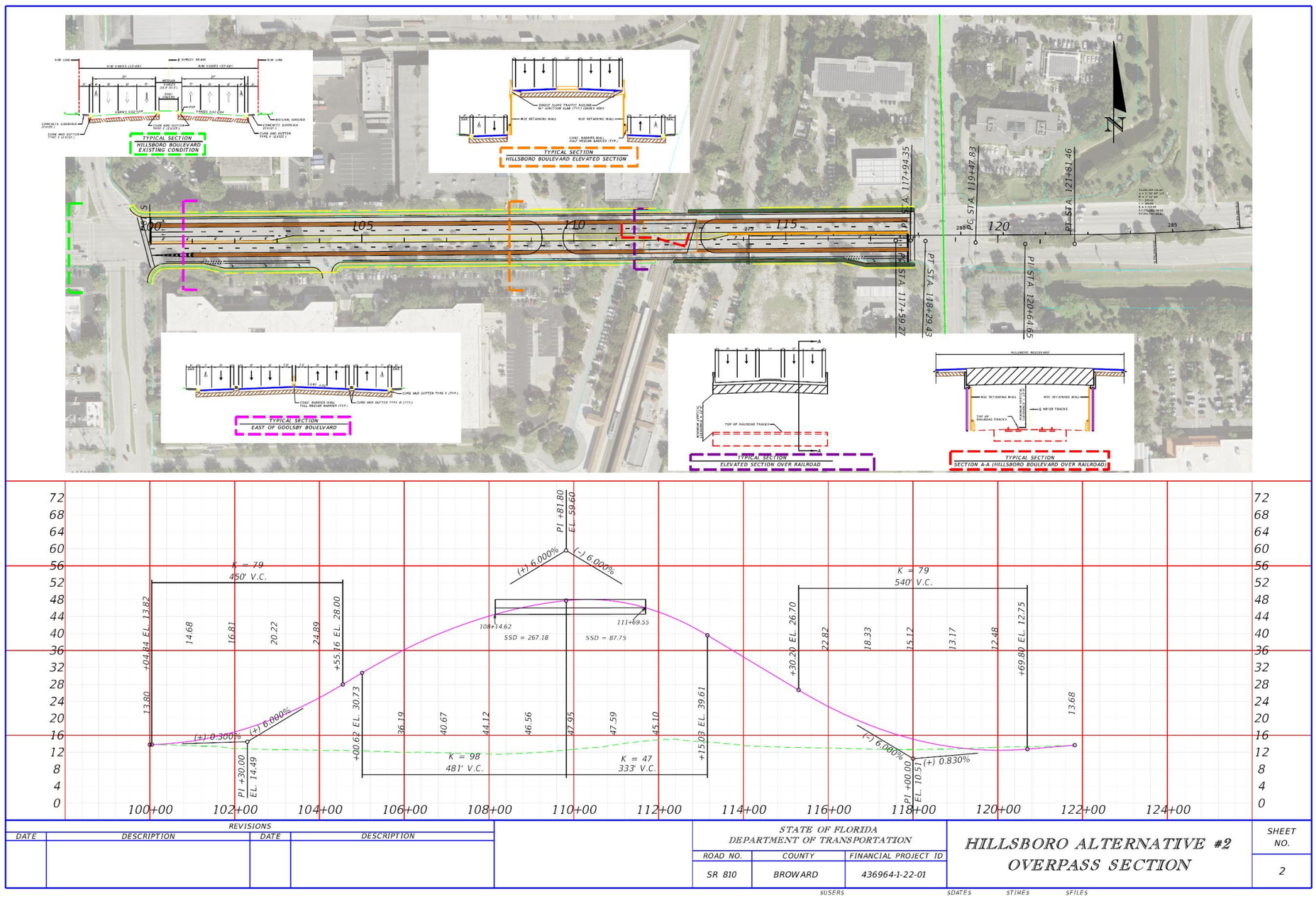

Figure 5-5 Hillsboro Boulevard – Concept Plan – Alternative 2

5.4 Alternative Evaluation

A qualitative Comparative Evaluation Matrix was used to determine the alternative that best addressed the purpose and need of the project, minimized impacts to the natural and physical environment and incorporated stakeholder's input.

5.4.1 Evaluation Criteria

The criteria selected for the evaluation matrix was based on engineering and environmental analysis and stakeholder's coordination. The criteria used in the evaluation matrix is described in **Table 5-1**.

Table 5-1 Evaluation Criteria
Project Cost
Design Phase: Compares the cost of the design phase for each alternative.
Right of Way Acquisition: Compares right-of-way costs between alternatives.
Construction: Compares each alternative based on construction costs.
Construction Engineering and Inspection (CEI): Measures the potential cost of construction engineering inspection.
Social and Economic Environment
Right of Way Acquisition: Compares the potential right-of-way acquisition impacts of each alternative.
Number of Relocations: (Commercial, Residential, and Government Owned): Measures the total number of potential relocation for each alternative.
Social and Neighborhood Effects (includes aesthetics): Measures the potential effect of each alternative on the social and neighborhood effects.
Economic and Employment Effects: Measures the potential economic and employment effects of each alternative.
Mobility: Measures the potential mobility improvements or congestion effects of each alternative.
Cultural Environment
Section 4(f): Measures the alternative's potential effect on Section 4(f).
Historic Sites and Districts: Measures the degree of impact associated with existing historic sites within the project corridor for each alternative.
Recreational Areas: Measures each alternative's potential effect on recreational areas.
Natural Environment
Wetlands/Surface Waters: Measures the potential effect on wetlands and/or surface waters for each alternative.
Protected Species and Habitat: Measures the potential effect on protected species and habitat for each alternative.
Physical Environment
Contamination: Measures the impact on existing or potential hazardous material sites and or generators.
Noise Receptors: Measures the alternative's potential impact on noise.

Table 5-1 Evaluation Criteria
Air Quality: Measures each alternative's impact against pre-established air quality standards.
Utility Impacts: Measures the utility impacts of the alternatives. This includes potential conflicts and relocation of the utility lines that are located within the existing and/or proposed right of way.
Bicycles and Pedestrians: Measures the impacts of each alternative on bicycles and pedestrians.
Traffic Operations and Safety
Bicycles and Pedestrians: Measures each alternative's improvements for bicycles and pedestrians**.**
Local Throughput (Vehicle Trips): Measures the amount of throughput of each alternative on local SW 10 Street.
Connector Throughput (Vehicle Trips): Measures the amount of throughput of each alternative on the SW 10 Street Connector.
Travel Time: Compares travel time between alternatives.
Safety: Measures potential safety impacts for each alternative.
Emergency Evacuation Response: Compares impacts of each alternative on emergency evacuation.
Travel Time Reliability: Measures the travel time reliability of each alternative.

5.4.2 Comparative Alternative Evaluation

The Comparative Alternative Evaluation matrix for the No-Action and Build Alternatives for SW 10 Street is shown in **Table 5-2. Table 5-3** shows the Comparative Alternative Evaluation matrix for the No-Action and Build Alternatives for Hillsboro Boulevard.

Table 5-2 Comparative Alternative Evaluation – SW 10 Street

LEGEND: Substantial Improvement or Best Alternative = 5 points Major Improvement or Good Alternative= 4 points Moderate Improvement or Moderate Alternative = 3 points Minor Improvement or Inferior Alternative = 2 points Negative Effect or Worst Alternative = 1 point

EVALUATION CRITERIA	PROJECT COST					SOCIAL AND ECONOMIC ENVIRONMENT				
	Design Phase	Right of Way Acquisition	Construction	Construction Engineering and Inspection (CEI)	Utility Relocation Cost	Right of Way Acquisition	Number of Relocations (Commercial, Residential and Government owned)	Social and Neighborhood Effects (includes aesthetics)	Economic and Employment Effects	Mobility
No-Action Alternative	5 No cost	5 No cost	5 No cost	5 No cost	5 No cost	5 None	5 None	5 No effects	1 Increased congestion will impact access to businesses and employment centers.	1 Increased congestion.
TSM&O	4 Very Low cost	5 No cost	4 Very Low cost	5 Low cost	5 No cost	5 None	5 None	5 No effects	1 Increased congestion will impact access to businesses and employment centers.	1 Increased congestion.
Build Alternative 2 North Alignment	3 Low cost	3 Medium Cost	3 High Cost	3 Low Cost	2 Highest Cost	4 Minimal	5 None	4 Community Focal Points unaffected. Limited right of way acquisition. Limited visual effects.	5 Reduced congestion will improve access to employment centers, Tri-Rail and Amtrak services.	5 Reduced congestion improves regional connectivity, transit, and freight operations.
Build Alternative 2 Center Alignment	3 Low cost	2 Highest Cost	3 High Cost	3 Low Cost	3 Medium Cost	3 Minor	5 None	3 Community Focal Points unaffected. Minor right of way acquisition. . Limited visual effects.	5 Reduced congestion will improve access to employment centers, Tri-Rail and Amtrak services.	5 Reduced congestion improves regional connectivity, transit, and freight operations.

Comparative Alternative Evaluation – SW 10 Street

LEGEND: Substantial Improvement or Best Alternative = 5 points Major Improvement or Good Alternative= 4 points Moderate Improvement or Moderate Alternative = 3 points Minor Improvement or Inferior Alternative = 2 points Negative Effect or Worst Alternative = 1 point

EVALUATION CRITERIA	CULTURAL ENVIRONMENT			NATURAL ENVIRONMENT		PHYSICAL ENVIRONMENT				
	Section 4(f)	Historic Sites and Districts	Recreational Areas	Wetlands/Surface Waters	Protected Species and Habitat	Contamination	Noise Receptors	Water Quality and Quantity	Air Quality	Utility Impacts
No-Action Alternative	5 No use	5 No impacts	5 No use.	5 No impacts.	5 No impacts.	5 No impacts.	2 No increase in capacity and therefore no noise abatement considerations.	1 No improvement.	1 No realized benefits due to congestion.	5 No impacts.
TSM&O	5 No use	5 No impacts	5 No use.	5 No impacts.	5 No impacts.	5 No impacts.	2 No increase in capacity and therefore no noise abatement considerations.	2 Existing system has minimal treatment. Minimal improvement – confined to intersections	2 Improved benefits due to congestion.	5 No impacts.
Build Alternative 2 North Alignment	5 No use	5 No impacts	5 No use.	3 No impacts to wetlands. Less than 2 acres of impact to surface water/drainage features which will be mitigated with construction of new drainage system.	3 Not likely to adversely affect 4 federally listed wildlife species, and no effect to 8 federally listed wildlife species and 4 federally listed plant species	3 Three medium risk concerns identified, two low risk concerns, three no risk concerns. Concerns will be addressed during design.	4 Traffic noise impacts expected. Noise barriers being evaluated for feasibility and reasonableness.	5 Existing system has minimal treatment. The new drainage system proposed will meet or exceed water quality and quantity criteria.	4 Slight benefit due to increased mobility.	3 Minor Utility Impacts
Build Alternative 2 Center Alignment	5 No use	5 No impacts	5 No use.	3 No impacts to wetlands. Less than 2 acres of impact to surface water/drainage features which will be mitigated with construction of new drainage system.	3 Not likely to adversely affect 4 federally listed wildlife species, and no effect to 8 federally listed wildlife species and 4 federally listed plant species	3 Three medium risk concerns identified, two low risk concerns, three no risk concerns. Concerns will be addressed during design.	4 Traffic noise impacts expected. Noise barriers being evaluated for feasibility and reasonableness.	5 Existing system has minimal treatment. The new drainage system proposed will meet or exceed water quality and quantity criteria.	4 Slight benefit due to increased mobility.	4 Minimal utility Impacts.

Comparative Alternative Evaluation – SW 10 Street								
LEGEND: Substantial Improvement or Best Alternative = 5 points	Major Improvement or Good Alternative= 4 points	Moderate Improvement or Moderate Alternative = 3 points	Minor Improvement or Inferior Alternative = 2 points	Negative Effect or Worst Alternative = 1 point				
EVALUATION CRITERIA	**TRAFFIC OPERATIONS AND SAFETY**							**RANKING**
	Bicycles and Pedestrians	**Local Throughput (Vehicle Trips)**	**Connector Lanes Throughput (Vehicle Trips)**	**Travel Time**	**Safety**	**Emergency Evacuation Response**	**Travel Time Reliability**	
No-Action Alternative	1 No improvements.	1 Lowest throughput.	1 Does not provide connector lanes.	1 Highest travel time.	1 Increased congestion would most likely increase number of crashes.	1 Will get worse with congestion.	1 No Improvements.	89 **4**
TSM&O	1 No improvements.	1 Lowest throughput.	1 Does not provide connector lanes.	1 Does not improve travel time.	1 No Improvements.	 No Improvements from No-Action.	1 No Improvements.	94 **3**
Build Alternative 2 North Alignment	5 Improves connectivity. Adds buffered bicycle lanes and ADA ramps.	5 Provides the highest throughput.	5 30,000	5 Lowest travel time of all alternatives.	5 Most prevalent types of crashes on the corridor are typical of congested conditions. Safety improves with better Level of Service.	5 Improves with better Level of Service and the lowest travel time.	5 Best travel time reliability.	112 **1**
Build Alternative 2 Center Alignment	5 Improves connectivity. Adds buffered bicycle lanes and ADA ramps.	4 Provides lower throughput than Build 1.	5 30,000	4 Travel time higher than Build 1.	4 Most prevalent types of crashes on the corridor are typical of congested conditions. Safety improves with better Level of Service.	4 Improves with better Level of Service but has higher travel times than Build 1.	4 Travel time reliability lower than Build 1.	102 **2**

Table 5-3 Comparative Alternative Evaluation- Hillsboro Blvd.

LEGEND: Substantial Improvement or Best Alternative = 5 points Major Improvement or Good Alternative= 4 points Moderate Improvement or Moderate Alternative = 3 points Minor Improvement or Inferior Alternative = 2 points Negative Effect or Worst Alternative = 1 point

EVALUATION CRITERIA	PROJECT COST										SOCIAL AND ECONOMIC ENVIRONMENT									
	Design Phase		Right of Way Acquisition		Construction		Construction Engineering and Inspection (CEI)		Utility Relocation Cost		Right of Way Acquisition		Number of Relocations (Commercial, Residential and Government owned)		Social and Neighborhood Effects (includes aesthetics)		Economic and Employment Effects		Mobility	
No-Action Alternative	No cost	5	No cost	5	No cost	5	No cost	5	No cost	5	None	5	None	5	No effects	5	Increased congestion will impact access to businesses and employment centers.	1	Increased congestion.	1
Build Alternative 1 – Depressed Section	High cost	1	Moderate cost	3	Very high cost	1	Very high cost	1	Very high cost	1	Moderate	3	None	5	Limited visual effects. Major accessibility impacts for residents.	1	Reduced congestion will improve access to employment centers, Tri-Rail and Amtrak services.	3	Reduced congestion improves regional connectivity, transit, and freight operations.	3
Build Alternative 2 – Elevated Section	Moderate cost	3	High cost	1	High cost	2	High cost	2	Moderate cost	3	High	1	None	5	Limited visual effects.	3	Reduced congestion will improve access to employment centers, Tri-Rail and Amtrak services.	3	Reduced congestion improves regional connectivity, transit, and freight operations.	3

Comparative Alternative Evaluation- Hillsboro Blvd.																						
LEGEND: Substantial Improvement or Best Alternative = 5 points Major Improvement or Good Alternative= 4 points Moderate Improvement or Moderate Alternative = 3 points Minor Improvement or Inferior Alternative = 2 points Negative Effect or Worst Alternative = 1 point																						
EVALUATION CRITERIA	**CULTURAL ENVIRONMENT**						**NATURAL ENVIRONMENT**				**PHYSICAL ENVIRONMENT**											
	Section 4(f)		**Historic Sites and Districts**		**Recreational Areas**		**Wetlands/Surface Waters**		**Protected Species and Habitat**		**Contamination**		**Noise Receptors**		**Water Quality and Quantity**		**Air Quality**		**Utility Impacts**			
No-Action Alternative	No use.	5	No impacts.	5	No use.	5	No impacts.	5	No impacts.	5	No impacts.	5	No increase in capacity and therefore no noise abatement considerations.	3	No impacts to groundwater basins. No water quality improvements.	3	No realized benefits due to congestion.	1	No impacts.	5		
Build Alternative 1 – Depressed Section	No use.	5	Limited coordination needed for visual impacts.	3	No use.	5	Minor impacts.	3	No to low impacts.	3	Low to moderate contamination concerns along corridor.	2	Depressed traffic therefore, less traffic noise impacts.	4	Major impacts to groundwater basins and drainage structures. The new drainage system will meet or exceed water quality and quantity criteria.	1	Improved benefits due to reduced congestion.	3	Major impacts.	1		
Build Alternative 2 – Elevated Section	No use.	5	Limited coordination needed for visual impacts.	3	No use.	5	Minor impacts.	3	No to low impacts.	3	Low to moderate contamination concerns along corridor.	2	Traffic noise impacts expected. Noise barriers to be evaluated for feasibility and reasonableness.	2	Minor impacts to drainage structures. The new drainage system will meet or exceed water quality and quantity criteria.	2	Improved benefits due to reduced congestion.	3	Moderate utility Impacts.	2		

Comparative Alternative Evaluation- Hillsboro Blvd.													
LEGEND: Substantial Improvement or Best Alternative = 5 points Major Improvement or Good Alternative= 4 points Moderate Improvement or Moderate Alternative = 3 points Minor Improvement or Inferior Alternative = 2 points Negative Effect or Worst Alternative = 1 point													
EVALUATION CRITERIA	**TRAFFIC OPERATIONS AND SAFETY**												**RANKING**
	Bicycles and Pedestrians		**Local Throughput (Vehicle Trips)**		**Driveway Access**		**Safety**		**Emergency Evacuation Response**		**Travel Time Reliability**		
No-Action Alternative	No improvements.	3	Lowest throughput.	1	No impacts.	5	Increased congestion would most likely increase number of crashes.	1	Will get worse with congestion.	1	No improvements	1	93 **1**
Build Alternative 1 – Depressed Section	Reduces accessibility for pedestrians and bicycles.	1	Improved throughput	3	Major access impacts.	1	Safety improves with reduced congestion.	3	Improved accessibility and travel times would result in improved emergency responses.	3	Improves travel time reliability.	3	66 **3**
Build Alternative 2 – Elevated Section	Improves connectivity. Adds bicycle lanes and ADA ramps.	5	Improved throughput	3	Moderate access impacts.	3	Safety improves with reduced congestion.	3	Improved accessibility and travel times would result in improved emergency responses.	3	Improves travel time reliability.	3	76 **2**

5.5 Alternative Analysis

5.5.1 I-95

Alternative 2 is the preferred alternative for I-95. Alternative 2 proposes to add one tolled express lane in each direction in the median with NB braided ramps at the SW 10 Street interchange and SB braided ramps at the Hillsboro Boulevard interchange. The braided ramps not only reduce the number of merge and diverge points along I-95 but also provide for longer off-ramp storage lengths. In addition, alternative 2 proposes new connector ramps from SW 10 Street to the I-95 express lanes in the NB and SB directions. Freeway analysis projects significant improvements over the No-Action conditions in the merge, diverge and mainline operations in both directions. The System Interchange Modification report prepared for the project and included here by reference includes the traffic analysis for the I-95 interchange.

5.5.2 SW 10 Street

The north alignment was selected as the preferred alternative. The north alignment was further refined to improve operations and reduce right of way impacts. Refinements to the north alignment include:

- Connector lanes along SW 10 Street were shifted slightly to the north to allow shifting the EB to SB direct connect ramp to avoid right of way impacts at the southwest corner of I-95 and SW 10 Street.
- The WB ingress ramp was placed on the inside of the WB connector lanes to reduce weaving and improve operations.
- The WB direct connect ramps were realigned/braided. To minimize weaving and improve operations the SB to WB ramp connection was placed on the inside lane of the connector lanes along SW 10 Street. The NB to WB direct connect ramp showing lower traffic volumes was placed on the outside lane of the connector lanes along SW 10 Street.
- The roundabout located at the intersection of SW 12 Avenue and East/West Newport Center Drive south of SW 10 Street in the Newport Center was modified from a double lane roundabout to a single lane roundabout with separate right turn by-pass lanes for the heavier right turn movements. This change minimized right of way impacts.

- The right turn directional islands along Newport Center Drive were redesigned to better align the drivers with SW 10 Street in a directional right turn movement and eliminated the through and left turn movements across the intersection.
- The SW 10 Street local lanes were slightly realigned to accommodate more cost feasible placement of piers in medians for the connector lanes and direct connect ramp structures.
- The WB to NB ingress ramp was realigned and the curve radius reduced to minimize right of way impacts, eliminate a bridge over the existing drainage pond, and increase the merge distance along the I-95 NB CD road.
- Adjustments were made to the SB ingress ramp from EB SW 10 Street local lanes to SB I-95 that extended the merge further to the north thereby eliminating a bridge structure over the existing drainage pond along the west side of I-95.

Additional refinements to the north alignment to improve vehicular and pedestrian access include:

- The 7-ft buffered bike lane and 6-ft sidewalk on the south side was replaced with a shared use path, and WB bike lanes were introduced on the north side of the road.
- The SW 10 Street connector lanes were modified to include access to both the I-95 express and general-purpose lanes for both the SB and NB traffic.
- The proposed shared use path on the south side of SW 10 Street allowed for reduced right of way impacts.

5.5.3 Hillsboro Boulevard

Alternatives 1 and 2 were both determined non-viable due to construction impacts to the SFRC line and access impacts to adjacent properties. Proposed improvements at Hillsboro Boulevard are limited to the ramp terminals at the I-95 interchange.

6 Public Involvement

A Project Involvement Plan (PIP) was developed for the project and is included here by reference. The PIP documents the appropriate level of public involvement for this project in compliance with the Florida Department of Transportation's (FDOT) *Project Development and Environment (PD&E) Manual, Part 1, Chapter 11,* and *Part 2, Chapter 9*; the FDOT *Public Involvement Handbook*; *Section 339.155, Florida Statutes; Executive Orders 11990 and 11988; Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA*); and *23 Code of Federal Regulations (CFR) 771*. The results of the PIP will be supportive of the NEPA process and local needs.

The objectives of the PIP are to ensure that the concerns and issues of those living and working within the study area, and those near the corridor who may be affected by the project, are identified; that stakeholders are given opportunities to review and comment on the findings of the alternative analysis; and that stakeholder concerns are addressed in the analysis process. The PIP provides an outline for:

- Early and continuous involvement of stakeholders;
- Reasonable availability of technical and other project information;
- Collaborative input on alternative transportation improvements for the study area and the criteria against which they will be measured and evaluated; and,
- Open access to the decision-making process

A project website was developed for the project. The project website was updated regularly and included the project information as well as a summary of all public meetings and presentations.

7 Preferred Alternative

7.1 I-95

The preferred alternative for the I-95 corridor is Build Alternative 2. Build Alternative 2 was refined to provide direct access from the SW 10 Street Connector to both the I-95 express lanes and general-purpose lanes compatible with the SW 10 Street Modified North Alignment Alternative. Alternative 2 proposes to maintain the existing number of general-purpose lanes throughout the I-95 corridor. The express lanes will be separated from the general-purpose lanes with tubular markers and a 2' to 4' wide buffer.

In the NB direction, an egress point is proposed for the NB express lanes north of the Sample Road interchange for traffic destined to the NB I-95 general-purpose lanes. A second egress point south of the SW 10 Street interchange is proposed for traffic destined to the WB SW 10 Street Connector lanes which braids over the general-purpose lanes and merges with the NB CD road on the east side of I-95.

Access from EB SW 10 Street Connector to I-95 NB is also provided for both the I-95 general-purpose and express-lanes. Access to the general-purpose lanes is provided by an egress access point from the express lanes north of SW 10 Street interchange. A new I-95 NB on-ramp is introduced for WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange relocating the existing left turn movement at the current intersection. The new I-95 NB on-ramp merges with EB on-ramp and the EB SW 10 Street Connector traffic destined to the I-95 general-purpose lanes on the NB CD road. The NB CD road braids over the NB Hillsboro Boulevard off-ramp to merge with the I-95 NB as an auxiliary lane just south of the Hillsboro Boulevard overpass bridge. It continues north connecting with the auxiliary lane being built by the I-95 Express Phase 3B-1 project to the north of Hillsboro Boulevard.

In the SB direction, an egress point is proposed from the express lanes south of Hillsboro Boulevard interchange for the traffic destined to the WB SW 10 Street Connector. Access to the SW 10 Street Connector from the general-purpose lanes is also provided south of the Hillsboro Boulevard interchange. The proposed CD road on the west side of I-95 braids over the I-95 SB traffic entering from EB/WB Hillsboro Boulevard on-ramps. Traffic from the I-95 general-purpose lanes and express-lanes merges on the CD road to provide access to the SW 10 Street Connector.

Access from the EB SW 10 Street Connector to I-95 SB is provided for both the I-95 general-purpose and express-lanes. Access to the general-purpose lanes is provided by an egress access point from the I-95 express-lanes north of SW 10 Street interchange which braids over the general-purpose lanes to merge with the I-95 mainline on the west side of I-95.

Figure 7-1 shows the proposed improvements south of the SW 10 Street interchange, and Figure 7-2 shows the proposed improvements north of the SW 10 Street interchange.

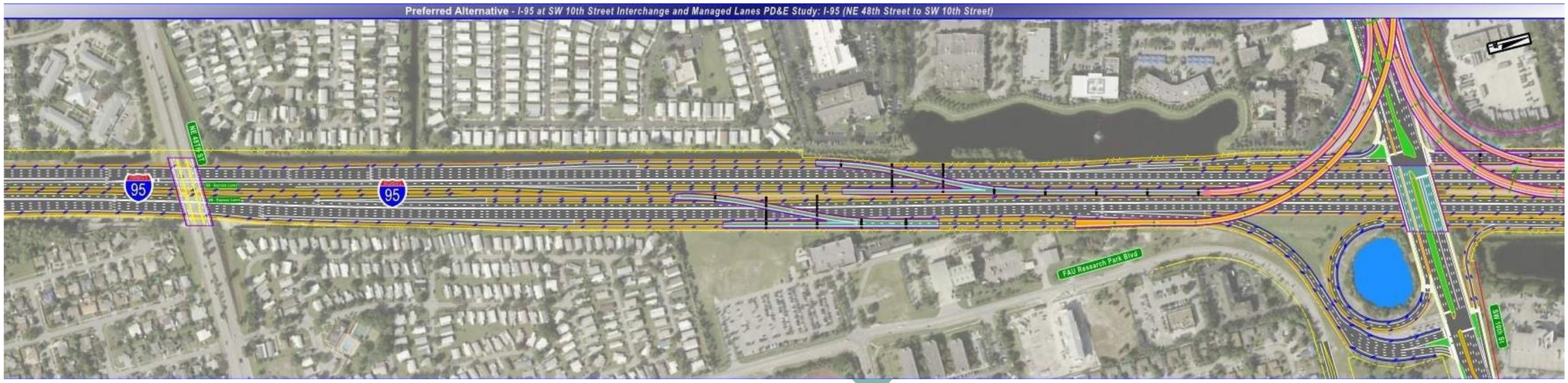

Figure 7-1 I-95 – Preferred Alternative Concept Plan (S of SW 10 St)

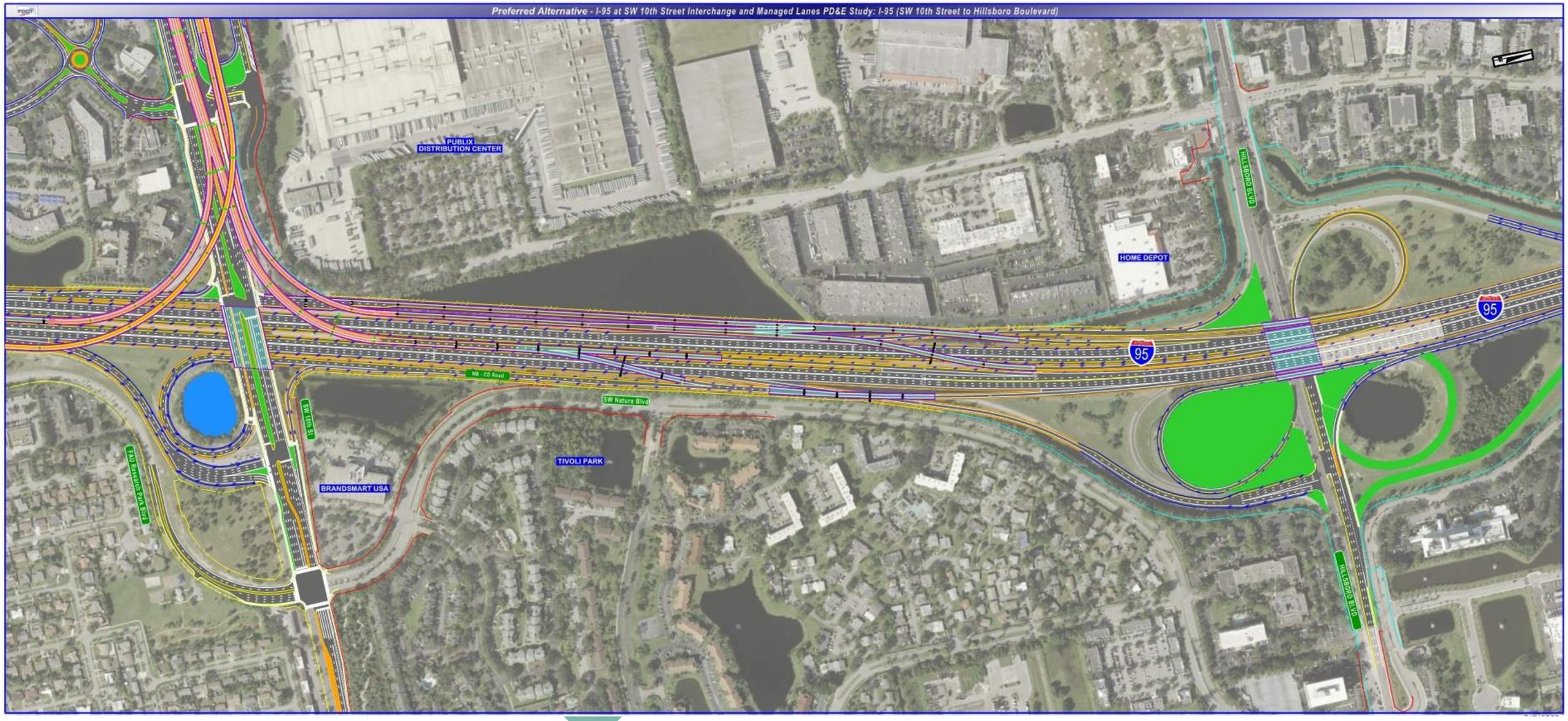

Figure 7-2 I-95 – Preferred Alternative Concept Plan (N of SW 10 St)

7.2 SW 10 Street

The preferred alternative for SW 10 Street is the Modified North Alignment. The Modified North Alignment provides three 11-ft lanes with a 7-ft buffered bike lane and 6-ft sidewalk in the WB direction. A 12-ft shared use path is provided in the EB direction along SW 10 Street for local pedestrian and bike traffic. However, no sidewalk is provided along the north side from East Newport Center Drive/SW 12 Avenue intersection to Military Trail. Two 12-ft connector lanes are provided in each direction with direct connect ramps providing access to/from the I-95 express lanes and general-purpose lanes allowing regional connectivity to the express lanes network. In the EB direction along the connector lanes an egress ramp departs from the connector lanes west of the Military Trail intersection braiding over the EB SW 10 Street local lanes connecting along the outside lane. The egress ramp allows access to the Newport Center and local SW 10 Street east of the I-95 Interchange.

On SW 10 Street at the NB and SB legs of the East Newport Center Drive intersection triple right turn lanes and no left turn or through lanes are provided. In addition, dual left turn lanes and exclusive right turn lanes are provided for the EB and WB movements at this intersection. This configuration allows improved operations and mitigates congestion at the intersection, the interchange ramp intersections and along SW 10 Street.

A roundabout is provided at the intersection of West and East Newport Center Drive to improve left turn movements at the Newport Center. A loop ramp is provided along SW 12 Avenue that connects directly to the SW 10 Street Connector lanes to improve operations of the East Newport Center Drive intersection with SW 10 Street by allowing WB traffic making a right turn to bypass the signal.

At I-95, the NB exit ramp terminal was expanded to accommodate triple left and triple right turn lanes. The intersection at Natura Boulevard is expanded to accommodate double left and single right turn lanes on all intersection approaches. Figure 7-3 shows the preferred alternative described in this section.

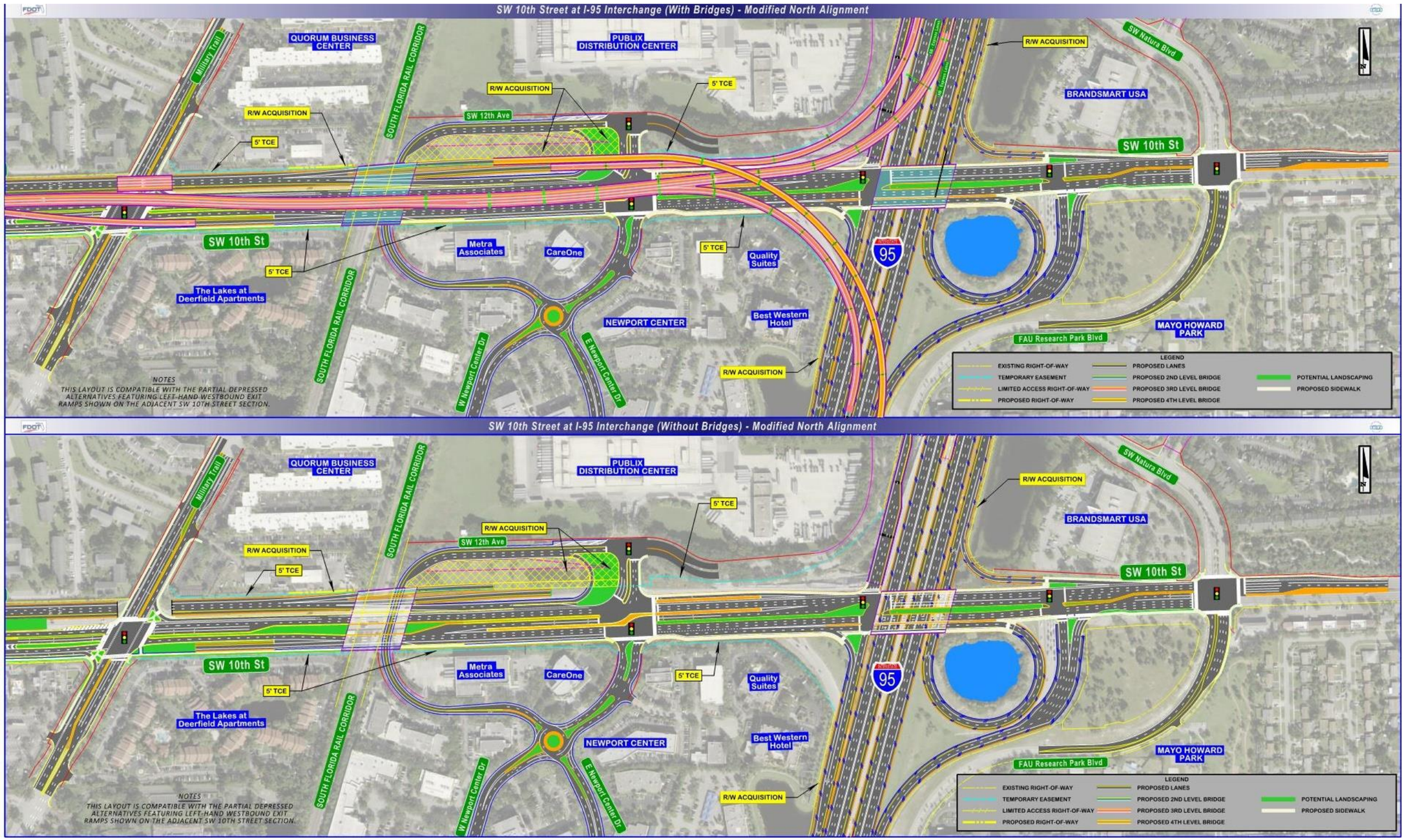

Figure 7-3 SW 10 Street – Modified North Alignment Concept Plan

Figure 7-3 shows the modified north Alignment concept. The top figure illustrates the proposed SW 10 Street Connector to be constructed above local SW 10 Street. The lower figure illustrates the local SW 10 Street configuration and intersection design.

7.3 Hillsboro Boulevard

Alternatives 1 and 2 along Hillsboro Boulevard evaluated a depressed profile and an elevated section from Goolsby Boulevard to SW 12 Avenue but were considered non-viable due to significant impacts to property access, right of way, utilities, and major temporary traffic control impacts for both the railroad tracks and Hillsboro Boulevard. Therefore, the proposed improvements along Hillsboro Boulevard are limited to the ramp terminals.

The improvements include providing a two-lane NB exit ramp with a signal controlled and expanded storage for a triple-left turn movement for the NB to WB egress ramp terminal while maintaining the dual right turn movement for the EB traffic. This improvement resulted in the elimination of the NB off-ramp loop to WB Hillsboro Boulevard combining both NB egress ramps into one location. In addition, the NB on-ramp from WB Hillsboro Boulevard was realigned to be within the proximity of I-95. A new configuration is proposed for the EB to SB and the WB to SB on-ramp to minimize the weaving maneuvers within the interchange area. A new bridge is proposed to be constructed on the west side of the I-95 mainline, due to the existing vertical clearance above Hillsboro Boulevard. The new bridge over Hillsboro Boulevard will be adjacent to the existing bridge and will provide the desired 16’-6” vertical clearance over Hillsboro Boulevard.

7.4 Typical Section

7.4.1 I-95

The preferred alternative mainline I-95 typical section will consist of the following:

- Four 12-ft wide express lanes (two in each direction)
- Six 12-ft wide general-purpose lanes (three in each direction)
- Four-ft to two-ft wide buffer with tubular markers separating the general-purpose lanes from the express lanes
- A 12-ft wide paved inside shoulder with 10-ft variations at some locations
- A 12-ft wide outside shoulder (10-ft paved and 2-ft unpaved) with 10-ft variations at some locations
- A 1.25-ft wide shoulder barrier wall on each side

The typical section for the CD roads serving vehicles from the SW 10 Street and Hillsboro Boulevard arterials include:

- Two 12-ft wide travel lanes
- Two 6-ft paved shoulders

The typical section for the SB connector ramps between I-95 and SW 10 Street connector lanes consist of the following:

- One 15-ft travel lane
- One inside 8-ft shoulder
- One outside 4-ft shoulder

The typical section for the NB connector ramps between I-95 and SW 10 Street connector lanes consist of the following:

- Two 15-ft travel lanes
- One inside 8-ft shoulder
- One outside 4-ft shoulder

7.4.2 SW 10 Street

The preferred alternative typical section for SW 10 Street includes:

- Three 11-ft wide WB through lanes from Natura Boulevard intersection to Military Trail
- Two 11-ft wide EB through lanes from Military Trail that add one additional 11-ft wide through lane with the connection of the EB egress ramp from the SW 10 Street Connector.
- Raised median 40 to 60-ft wide
- A 7-ft buffered bike lane from Natura Boulevard until Military Trail (in WB direction)
- A Shared use path from west of Military Trail until SW Natura Blvd/FAU Research Park Boulevard (in EB direction)
- A 6-ft sidewalk along the north side from East Newport Center Dr. to east of Natura Boulevard
- Two 12-ft elevated connector lanes, with 12-ft inside and 12-ft outside shoulders in each direction connecting to the connector ramps from I-95.

7.5 Horizontal and Vertical Geometry

7.5.1 Horizontal Geometry

7.5.1.1 Interstate 95

The I-95 mainline contains one horizontal curve within the study limits. The curve occurs at the Hillsboro Boulevard interchange. The curve radius meets design criteria for a 70 mph with 3% superelevation rate of cross slope.

The connector ramps at SW 10 Street are designed to meet criteria for a 50-mph design speed.

7.5.1.2 SW 10 Street

There are two proposed grade lines (PGL) along SW 10 Street local lanes within the study limits. All horizontal curves are designed for 35 mph. There are three Profile Grade Line (PGL) along the SW 10 Street Connector lanes within the study limits. There is one PGL in the EB direction and two PGL's in the WB direction. For the PGL's in the WB direction, one serves I-95 NB to WB SW 10 Street connector lane traffic. The other PGL serves I-95 SB to WB SW 10 Street Connector lane traffic.

7.5.2 Vertical Geometry

7.5.2.1 I-95

The I-95 mainline contains one vertical crest curve with two sag vertical curves on either side of the crest at the overpass of Hillsboro Boulevard. The sag vertical curves have K-Values of 262 & 274 respectively and meet FDM (Table 211.9.2) design criteria K-Value for 65 mph for Interstate sag curves (K-Value = 181). The existing crest vertical curve for I-95 mainline over Hillsboro Boulevard does not meet the new construction (K-Value=401) criteria but does meet the resurfacing criteria (K-Value=247) with a K-Value of 262 and length of curve of 1,169-ft (Minimum Length of vertical curve = 900-ft, FDM Table 211.7.1). A design variation will not be needed for this crest vertical curve since the existing I-95 bridges are being maintained and this area of I-95 only requires widening and resurfacing to maintain the profile of I-95 avoiding reconstruction. To meet the new construction criteria for the crest vertical curve I-95 would need to be raised by reconstruction and the bridges over I-95 replaced.

7.5.2.2 I-95 Express Lane Direct Connect Ramps

The direct connect ramps are designed using a 50-mph design speed criteria with a maximum grade of 5%. There NB to WB is the highest-level ramp over all the other direct connect ramps.

7.5.2.3 SW 10 Street

The SW 10 Street corridor contains two vertical crest curves with three sag vertical curves within the study limits. The sag vertical curve at Military Trail intersection has a length of curve of 220-ft, with a K-Value of 37 and grades of 0.05% and 6.00%. The crest curve that occur over the SFRC railroad crossing have a length of curve of 800-ft, with a K-Value of 74 and grades of 6.0% and -4.9%. The crest curves meet design criteria for a 35-mph urban arterial (FDM Tables 210.10.3, 210.10.4). The sag vertical curve at Newport Center Drive intersection has a length of curve of 1,100-ft, with a K-Value of 117 and grades of -4.85% and 4.5%. The crest vertical curve over I-95 has a length of curve of 800-ft, with a K-Value of 84 and grades of 4.5% and -5.0%. The sag vertical curve east of I-95 has a length of curve of 600-ft, with a K-Value of 123 and grades of 5% and 0.13%. From FDM for and urban low speed arterial roadway with a 35 mph design speed, the minimum vertical curve length is 105, minimum K-Value is 47 crest vertical curve and 49 for a sag with a maximum grade of 7%.

7.6 Access Management

No changes to the existing Access Management classification are needed for the proposed improvements for I-95, SW 10 Street, and Hillsboro Boulevard. The Access Management classification will remain as Class 1.2, Freeway in an existing urbanized area with limited access for the I-95 corridor. SW 10 Street will remain as Access Management Class 3 and Hillsboro Boulevard will remain as Class 5.

7.7 Preliminary Drainage

A Pond Siting report and Location Hydraulics report were prepared for this project and are included here by reference. Except for SW 10 Street west of the railroad tracks to west of Military Trail, the project will discharge to the BCWCD#2 C-1 canal. Along SW 10 Street, Hillsboro Boulevard, and portions of I-95, the discharge will be through a closed storm drain system. The remaining portions of I-95 will sheet flow and discharge directly into the BCWCD#2 C-1 canal. Proposed wet and dry storm water management facilities will provide the required attenuation and water quality

treatment per the SFWMD (2016) and FDOT (2019) standards. Moreover, additional storm water ponds are proposed in Basin 2, Basin 25, Basin 26, and Basin 27 within the limits of the project. The location and size of all cross drains will be determined in the design phase.

7.8 Maintenance of Traffic

The recommended alternative traffic control plan proposes to keep all travel lanes open during construction. Lane closures will be required during off-peak hours to modify or change construction phasing. Advanced notice of any lane closure should be given to minimize disruption to roadway users. Figures 7-4 to Figure 7-9 show the construction phases typical sections for I-95 and SW 10 Street.

7.8.1 I-95 Mainline (under SW 10 Street)

Phase I – Shift SB traffic to the outside.

The intent of Phase 1 is to provide a work zone on I-95 for foundation construction of the SW 10 overpass bridge. See Figure 7-4.

- Remove SB connector lane designation. The connector lanes will become a general-purpose lane.
- Perform temporary widening to the outside in the SB direction.
- Reduce the SB inside shoulder width to 2-ft and the outside shoulder width to 10-ft.
- Reduce the NB inside shoulder with to 2-ft and the outside shoulder width to 10-ft.
- Shift SB traffic to temporary widened roadway.
- NB traffic to remain in existing configuration.
- Place temporary concrete barrier as need to protect work zone and construct foundations.

Phase 2 – Shift NB and SB traffic to the east.

The intent of Phase 2 is to shift NB and SB traffic under the NB span of overpass bridge in order to construct the direct connect foundations in the I-95 median. See Figure 7-5.

- Perform temporary widening to the outside in the NB direction and median of I-95.
- Reduce the SB inside shoulder width to 2-ft and the outside shoulder width to 2-ft at median foundations.
- Reduce the NB inside shoulder with to 2-ft and the outside shoulder width to 6-ft.
- Shift NB and SB traffic onto temporary widening and

- Place temporary concrete barrier as need to protect work zone.

Phase 3 – Shift SB traffic to final condition.

The intent of Phase 3 is to shift SB traffic to the final condition. See Figure 7-6.

- Shift SB traffic under the west side of SW 10 Street overpass.
- Under nighttime lane closures overbuild and reconstruct the NB pavement under SW 10 Street overpass.
- Place temporary concrete barrier as need to protect work zone.

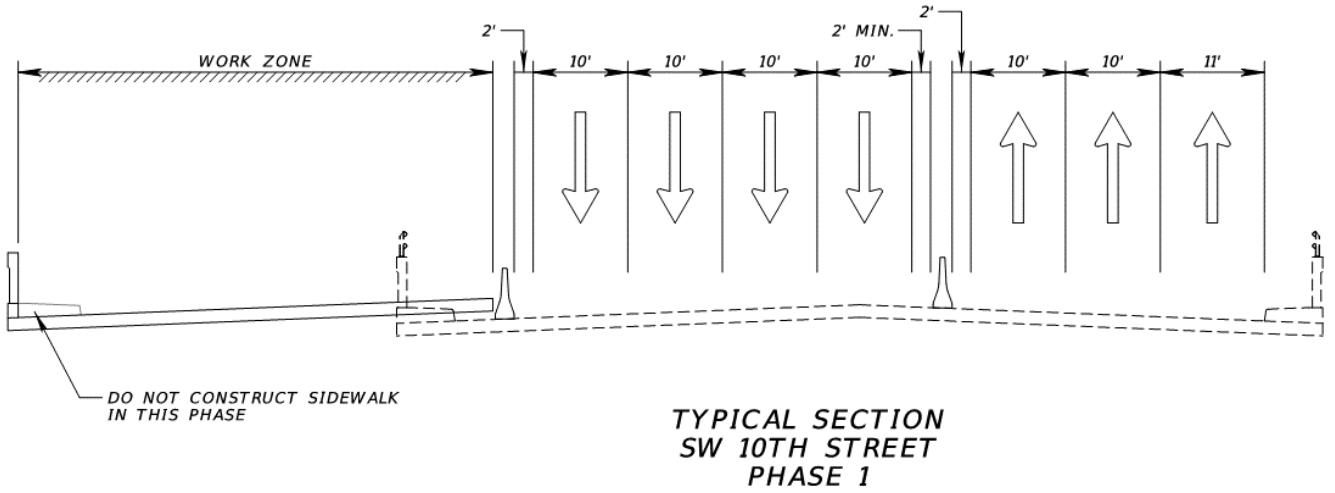

Figure 7-4 TCP Typical Section SW 10 St – PHASE 1

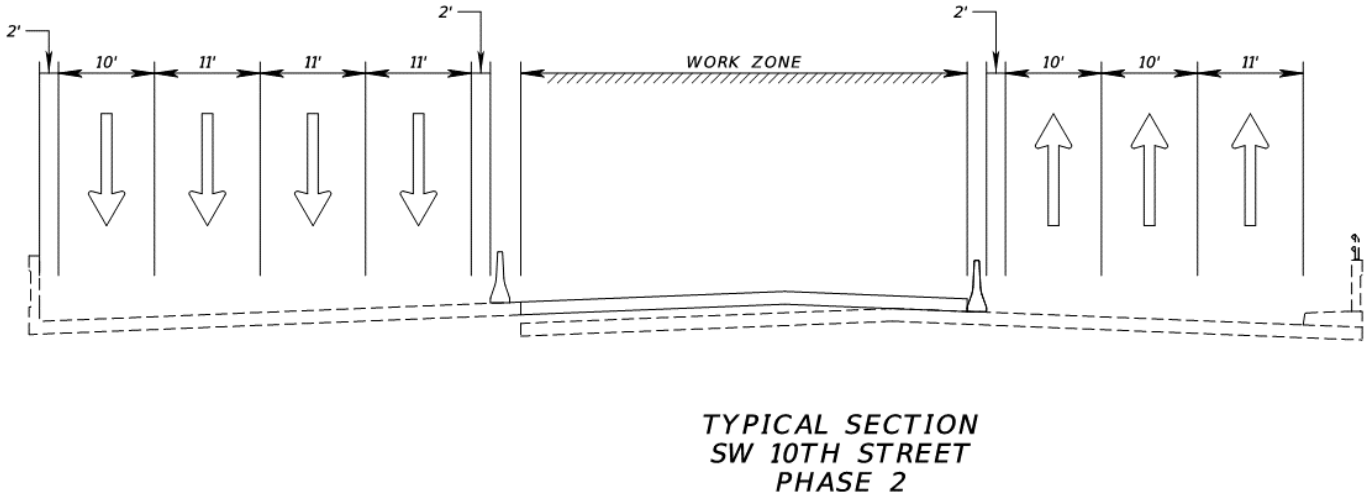

Figure 7-5 TCP Typical Section SW 10 St – PHASE 2

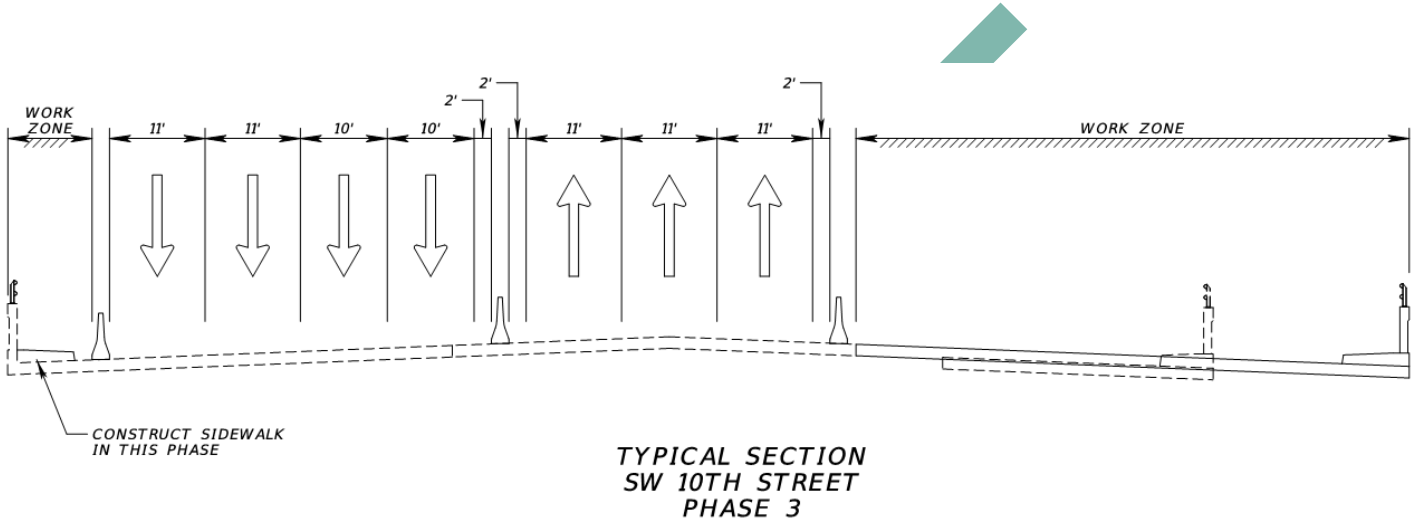

Figure 7-6 TCP Typical Section SW 10 St – PHASE 3

7.8.2 SW 10 Street (over I-95 Mainline)

Phase I – Shift traffic to the southside of existing bridge.

The intent of Phase 1 is to provide an offset for constructing the foundations and portion of the proposed SW 10 Street overpass bridge. See figure 7-7

- Remove existing traffic separator on the bridge of SW 10 Street.
- Shift lanes to the south and reduce lane width to 10-ft.
- Construct north section of proposed bridge.

Phase 2 – Shift WB traffic to the portion of the constructed bridge in Phase 1.

The intent of Phase 2 is to continue construction of the proposed SW 10 overpass. See figure 7-8.

- Shift WB traffic to portion of the proposed bridge constructed in Phase 1.
- Keep EB traffic in Phase 1 location.
- Construct center section of proposed bridge.

Phase 3 – Shift EB traffic to the portion of the constructed bridge in Phase 2.

The intent of Phase 3 is to finalize construction of the proposed SW 10 Street overpass. See figure 7-9.

- Shift EB traffic to portion of the proposed bridge constructed in Phase 2.
- Keep WB traffic in Phase 2 location.
- Construct south section of proposed bridge.

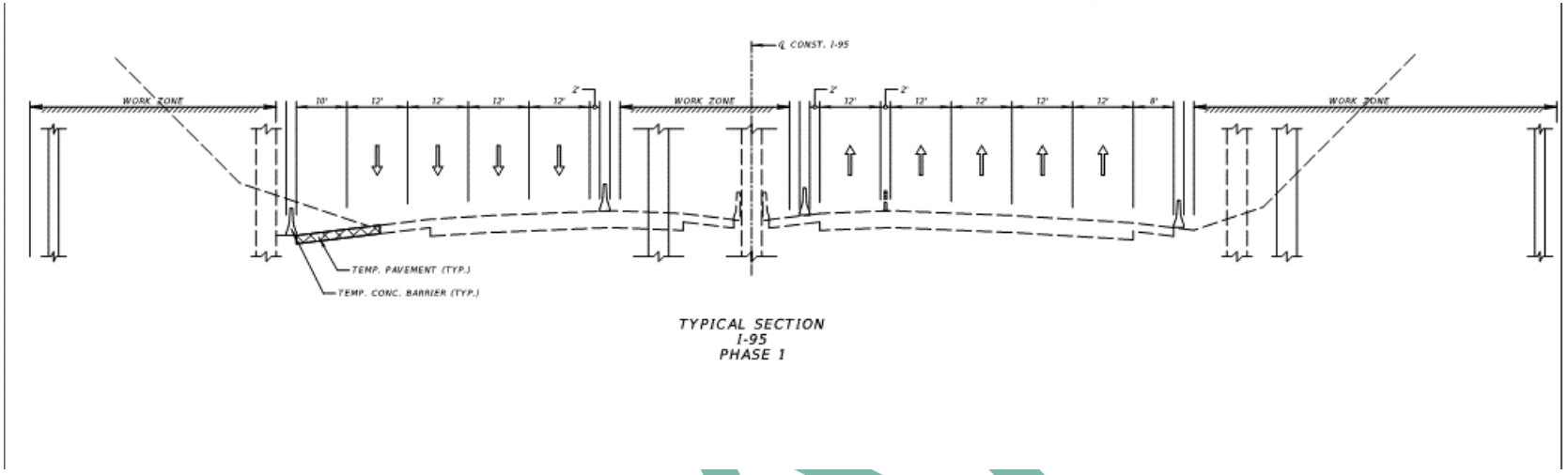

Figure 7-7 TCP Typical Section I-95 – PHASE 1

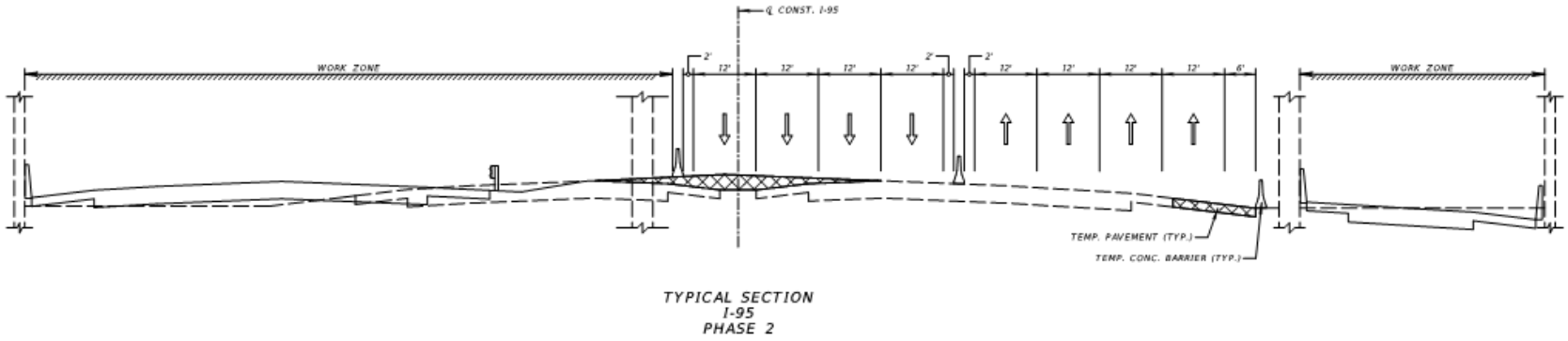

Figure 7-8 TCP Typical Section I-95 – PHASE 2

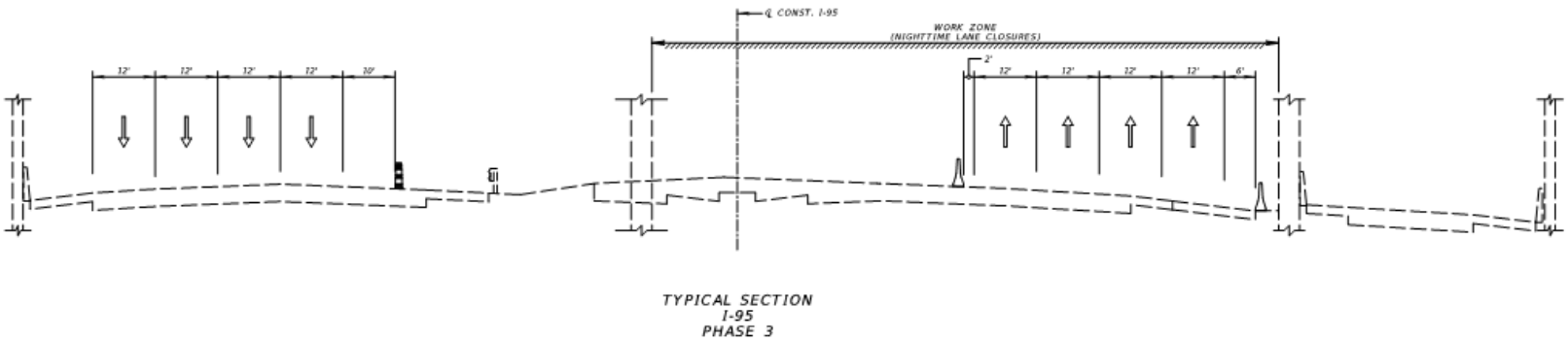

Figure 7-9 TCP Typical Section I-95 – PHASE 3

7.9 Variations and Exceptions

7.9.1 I-95

The anticipated design variations for I-95 are as follows:

Horizontal Curve Length (Ramps)

Horizontal Curve Radius (Ramps)

Border Width

Stopping Sight Distance (Express lane Tubular Markers)

Horizontal Stopping Sight Distance for direct connect ramps

Outside shoulder width for I-95 bridge over Hillsboro Boulevard.

Outside shoulder width of SB connector to SW 10 Street

Inside Shoulder width for direct connect ramps

Buffer width of express lanes and general-purpose lanes

7.9.2 SW 10 Street

The anticipated design variations for SW 10 Street are as follows:

Horizontal Curve Length

Horizontal Curve Radius

7.9.3 Hillsboro Boulevard

One design variation is anticipated for Hillsboro Boulevard for:

Vertical Clearance at I-95 bridge over Hillsboro Boulevard.

7.10 Utilities

7.10.1 I-95

Eight utility owners were identified to be impacted by the proposed improvements. **Table 7-1** shows the potential utility impacts.

Table 7-1 Utility Impacts along I-95	
Utility Owner	**Impacts**
AT&T Distribution	Underground Copper and Fiber Cable may be present on under proposed SB I-95 On Ramp at SW 10 Street
Broward County Water and Wastewater Services	Water main crosses I-95 around 2,200 ft south of bridge at SW 10 Street over I-95 (BL I-95 - Sta. 1337+00)
City of Deerfield Beach	Water and Sewer main crosses I-95 about 2,200 ft south of bridge over Hillsboro Boulevard (BL I-95 - Station 1388+60)
FDOT ITS	West side of I-95: Underground ITS fiber optics. • Crosses I-95 SB on-ramp from EB Hillsboro Boulevard. • Attached to the westside of the I-95 bridge over Hillsboro Boulevard. • Crosses I-95 SB on-ramp from WB Hillsboro Boulevard. • Crosses I-95 SB off-ramp to Hillsboro Boulevard.
FPL Distribution and Transmission	• Buried Electric – Along eastside of I-95 off ramp to SW 10 Street • Overhead and Buried Electric – Along southside of SW 10 Street bridge over I-95. • Overhead and Buried Electric – Along northside of I-95 bridge over Hillsboro Boulevard. • Overhead Electric – Across I-95 about 400 ft south of Hillsboro Canal.
Comcast Cable	• Buried Fiber optic cables along I-95
Sice, Inc	• Buried Fiber optic cables along I-95
Crown Castle Fiber	• Fiber optic lines buried along the North side of NE 48th ST

7.10.2 SW 10 Street

Thirteen utility owners were identified to be impacted by the proposed improvements. **Table 7-2** shows the potential utility impacts.

Table 7-2 Utility Impacts along SW 10 Street	
Utility Owner	**Impacts**
AT&T Distribution	• Overhead Fiber Optic along northside of SW 10 Street along R/W between just west of Military Trail and Newport Center Drive. The same line appears to become buried and goes across SW 10 Street on the west side of Newport Center Drive. • Underground Duct along the northside of SW 10 Street (just along the edge of pavement) between Military Trail and just east of Natura Boulevard) • Buried Copper along southside of SW 10 Street along R/W (between Military Trail and SFRC Rail Road) • Various feeders
Florida Power and Light- Broward	• Transmission line along Military Trail and north and south side of SW 10 Street

Table 7-2 Utility Impacts along SW 10 Street	
Utility Owner	**Impacts**
Broward County Water and Wastewater Services	• Water main along the southside of S.W. 10 Street along R/W. Main crosses S.W. 10 Street just east of Military Trail. • Sewer main along Military trail (crosses S.W. 10 Street)
City of Deerfield Beach	• Water main along the northside of SW 10 Street along R/W between Military Trail and Natura Boulevard (includes, various laterals/feeders across SW 10 Street) • Water main along the southside of SW 10 Street along R/W west of Military Trail (includes, various laterals/feeders across S.W. 10 Street) • Water main along east and westside of Military Trail (northward from SW 10 Street) • Water main along East Newport Center Drive and West Newport Center Drive (including the intersection).
FPL Distribution and Transmission	• Overhead Electric – Along the south side of SW 10 Street (along R/W) west of Military Trail (feeder goes North and South along west side of Military Trail). • Overhead Electric – Along the northside of SW 10 Street (along R/W) from west of Military Trail to East of Newport Center Drive). Feeders go South under S.W. 10 Street just east of bridge over SFRTA RR. • Overhead Electric – Along the southside of S.W. 10 Street (along R/W) east of Newport Center Drive to just west of Natura Boulevard). Feeders go across SW 10 Street just east of Newport Center Drive and just west of Natura Boulevard). • Various other feeders.
Sprint	• Fiber optic lines are installed along the south side of SW 10 Street
Comcast Cable	• CATV & Fiber Line are installed along SW 10 ST
CVE Master Management Co Inc	• Water and Irrigation Systems installed along SW 10 St
Crown Castle Fiber	• Fiber lines installed along SW 10 St
Level 3 Communications	• Fiber optic lines installed along SW 10 St
MCI	• Underground Duct lines installed along SW 10 St
TECO People Gas South Florida	• Gas line installed along SW 10 St
Sice, Inc	• Buried Fiber optic cables along SW 10 St

7.10.3 Hillsboro Boulevard

Seven utility owners were identified to be impacted by the proposed improvements. **Table 7-3** shows the potential utility impacts.

Table 7-3 Utility Impacts along Hillsboro Boulevard	
Utility Owner	**Impacts**
AT&T Distribution	• On the Northside of Hillsboro Boulevard: Underground Duct crossing the SB On-Ramp from WB Hillsboro Boulevard and NB On-Ramp from WB Hillsboro Boulevard.
Crown Castle (Fibernet Direct)	• Northside of Hillsboro Boulevard: Overhead fiber crossing Northside of the roadway.
FDOT ITS	• Northside of Hillsboro Boulevard: Underground ITS crossing Northside of the roadway. • Westside of Hillsboro Interchange: Underground ITS running along westside of I-95.
TECO Gas	• On the Southside of Hillsboro Boulevard along R/W line.
Comcast Cable	• Comcast lines installed along Hillsboro Boulevard.
MCI	• Fiber optic lines installed along Hillsboro Boulevard.
FPL	• Electric lines installed along Hillsboro Boulevard.
City of Deerfield Beach Water and Sewer	• Water main along the sides of Hillsboro Boulevard along R/W. • Sewer main along Military trail (crosses Hillsboro Boulevard)

7.11 Proposed Structures

There are seven (7) existing bridges within the project limits that were evaluated in Section 2.7.

As part of this PD&E study, each of the existing bridges, which are impacted by proposed improvements, was further evaluated to determine if widening or replacement is required. Where feasible, the widening or retrofitting of existing bridges is recommended. All existing bridges except for I-95 NB over Hillsboro Boulevard are determined to be replaced due to proposed roadway geometrics and alignments. The I-95 NB overpass over Hillsboro Boulevard is to remain in place.

Within the limits of the PD&E study, twenty-seven (27) new bridges for the preferred alternative are proposed. The proposed bridges are depicted in **Figures 7-10 through 7-13**.

The vertical clearances of the proposed bridges are specified in the following for each proposed bridge/bridge widening.

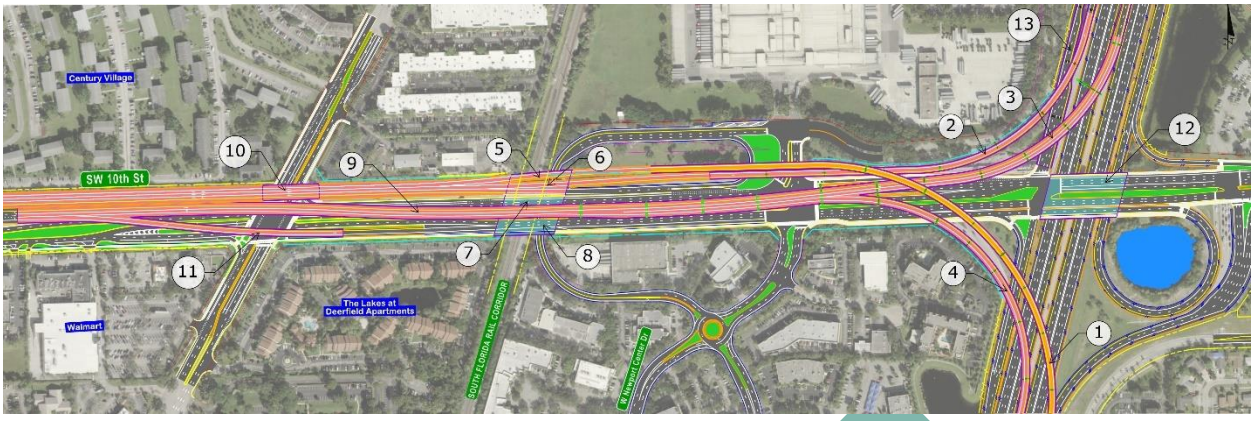

Figure 7-10 Proposed Bridge Locations (1 of 3)

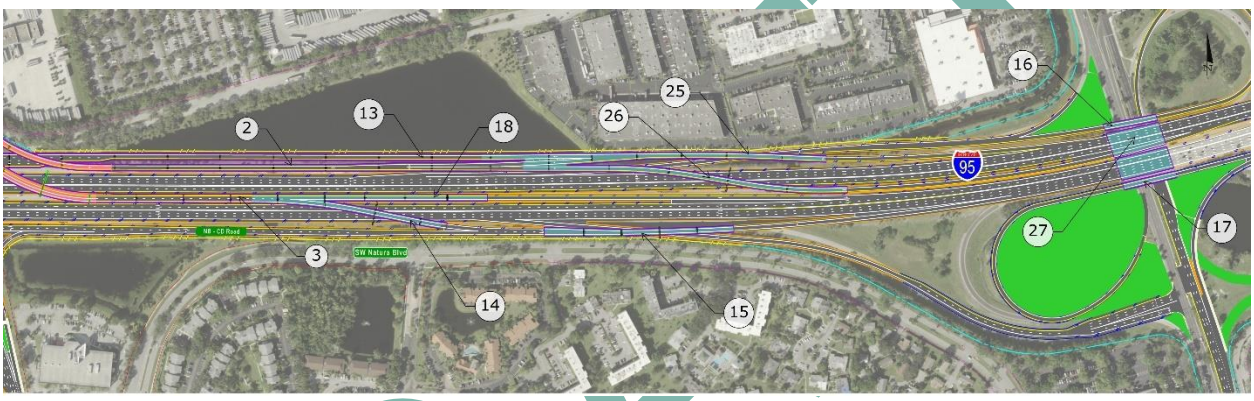

Figure 7-11 Proposed Bridge Locations (2 of 3)

Figure 7-12 Proposed Bridge Locations (3 of 3)

The proposed bridges are divided into the following categories:

- Flyovers of direct connect ramps between SW 10 Street and I-95 (4 new bridges)
- Elevated viaduct (1 new bridge)
- Interchanges/Grade separation (16 new bridges)
- Braided ramp (6 new bridges)

7.11.1 Flyovers - Direct Connect Ramps Between SW 10 Street and I-95

7.11.1.1 Flyover - Direct Connect Ramp from I-95 NB to SW 10 Street WB (Bridge No. 1)

Bridge No.1 carries one (1) 15-foot connector lane from I-95 NB to SW 10 Street in the WB direction with 6-foot shoulders. A 36" single slope traffic railing is at both sides of the bridge with an overall bridge width of 29'-8".

Bridge No.1 is a level 4 bridge that overpass I-95 SB and NB, SW 10 Street, Bridge No. 2 and 3, and Newport Center Dr. The bridge has multiple spans with a curved alignment.

A viable option for the superstructure is steel tub girders. Steel tub girders are slightly more expensive than steel plate girders. However, steel tub girders offer several advantages over the latter. The shape of steel tub girders is more efficient in resisting torsional forces while providing a more aesthetically pleasing form with shortened construction time. Therefore, steel tub girders are the preferred alternative for all direct connect ramps and the elevated viaduct.

The proposed bridge is classified as a long bridge and the minimum 8 ½" thick CIP deck is required. The minimum height of the tub girder shall be 6-foot per FDOT Structure Design Guidelines (SDG), Structures Manual, Volume 1, Section 5.6.2. Maintenance access to the girder and interior lighting shall be provided per SDG, Section 5.6.2.

Hammerhead piers normal to the bridge alignment are proposed for the bridge substructure.

7.11.1.2 Flyover - Direct Connect Ramp From I-95 SB to SW 10 Street WB (Bridge No. 2)

Bridge No.2 carries one (1) 15-foot connector lane from I-95 SB to SW 10 Street in the WB direction with 6-foot shoulders. A 36" single slope traffic railing is at both sides of the bridge with an overall bridge width of 29'-8". This bridge overpasses I-95 SB off-ramp to SW 10 Street, SW 10 Street WB, Newport Center Dr., and runs underneath Bridge No.1. This is a level 3 bridge and will provide a minimum vertical clearance of 16'-6" over the roadway underneath.

The bridge has multiple spans. Similar to Bridge No.1, the superstructure consists of continuous curved steel tub girders with a substructure consisting of pile end bents, hammerhead piers.

7.11.1.3 Flyover - Direct Connect Ramp from SW 10 Street EB to I-95 NB (Bridge No. 3)

Bridge No.3 carries two (2) 12-foot connector lanes from SW 10 Street in the EB direction to I-95 NB with an 6-foot inside shoulder and 12-foot outside shoulder. A 36" single slope traffic railing is at both sides of the bridge with an overall bridge width of 44'-8".

Bridge No.3 overpasses I-95 SB, I-95 SB off-ramp bridge to SW 10 Street (Bridge No. 13), SW 10 Street WB, and connects to the viaduct bridge (Bridge No. 9) on the east side of Newport Center Dr. This is a level 3 bridge and will provide a minimum vertical clearance of 16'-6" over the roadway underneath.

The bridge has multiple spans. Similar to Bridge No.1, the superstructure consists of continuous curved steel tub girders with the substructure consisting of a hammerhead pier.

7.11.1.4 Flyover - Direct Connect Ramp from SW 10 Street EB to I-95 SB (Bridge No. 4)

Bridge No. 4 carries one (1) 15-foot connector from SW 10 Street EB to I-95 SB with a 6-foot inside shoulder and 10-foot outside shoulder. The overall bridge width is 33'-8". This flyover has multiple spans with a maximum span length of approximately 287'.

Bridge No.4 overpasses SW 10 Street WB & EB, SW 10 Street EB on ramp to I-95 SB, and I -95 SB. It connects to the viaduct bridge (Bridge No. 9) on the east side of

Newport Center Dr. This is a level 3 bridge and will provide a minimum vertical clearance of 16'-6" over the roadway underneath.

Similar to Bridge No.1, the superstructure consists of curved steel tub girders and a minimum 8 ½" thick CIP deck. The substructure consists of hammerhead piers.

7.11.2 Elevated Viaduct

7.11.2.1 SW 10 Street EB Elevated Viaduct (Bridge No. 9)

The proposed viaduct bridge (Bridge No. 9), running from the west of Military Trail, will carry two (2) 12-foot connector lanes in the EB direction over SW 10 Street with 12-foot inside and outside shoulders to the direct connect ramps towards I-95 NB and I-95 SB (Bridge No. 3 and Bridge No. 4) respectively. A 36" single slope traffic railing is at each side of the bridge with an overall bridge width of 50'-8". The viaduct has multiple bridge spans on a curved alignment. This bridge overpasses Military Trail, SW 10 Street local lanes in the WB and EB directions, SFRC railroad, and Newport Center Dr. It is the longest bridge within the limits of the project, and the longest bridge span length is approximately 276-foot. Similar to Bridge No.1, steel tub girders are recommended for the superstructure. The bridge superstructure consists of three (3) curved steel tub girders and the minimum 8 ½" thick CIP deck.

For the bridge substructure, hammerhead piers or multi-column piers are proposed within the SW 10 Street median where adequate space is available to accommodate the proposed piers. On the west end of the viaduct, in the close vicinity of Military Trail, several integral straddle bents would be required because of the limited available vertical clearance over SW 10 Street general-purpose lanes in the WB direction. On the east end of the viaduct, due to proposed roadway geometric constraints, two straddle bents would be required where it overpasses Newport Center Dr. An additional straddle bent would be required where the viaduct splits into two flyovers towards I-95 in the NB and SB directions (Bridge No. 3 and Bridge No.4 respectively).

It is anticipated that no phased construction will be required for this bridge. However, most of the piers are within the limit of the existing road (SW 10 Street), and thus the construction of the proposed piers will take place within the work zone under appropriate MOT phases along SW 10 Street.

7.11.3 Interchanges/Grade Separation

7.11.3.1 SW 10 Street Connector Lane WB Ramp Over SFRC Railroad & SW 12 Avenue. (Bridge No. 5)

Bridge No. 5 carries one (1) 15-foot connector lane in the WB direction (from Bridge 1) over SFRC railroad, with an 8-foot inside shoulder and 4-foot outside shoulder. A 36" single slope traffic railing is at both sides of the bridge with an overall bridge width of 29'-8".

The bridge has three spans with a center span of approximately 167' over SFRC railroad. The superstructure consists of prestressed Florida-I Beams (FIBs) and an 8 ½" thick CIP deck. The bridge substructure consists of end bents and two hammerhead piers supported on prestressed concrete piles. The first pier on the west side of SFRC is oriented parallel to the existing SFRC railroad to avoid encroaching into the existing SFRC right of way (ROW), in order to keep center span length within the span limits of FIBs. The second pier is proposed towards the east side of the proposed SW 12 Avenue and is oriented parallel to the proposed SW 12 Avenue to avoid encroaching into SW 10 Street, in order to keep center span length within the span limits of FIBs. The bridge will require minimum vertical clearance (MVC) of 23'-6" over SFRC railroad and an MVC of 16'-6" over SW 12 Avenue. Permanent Mechanically Stabilized Earth (MSE) walls are proposed at the end bents.

This bridge will not require phased construction since it is located outside of the existing SW 10 Street. However, construction activities including, but not limited to, staging, excavation, temporary sheet pile installation, structure demolition, girder placement, and deck pouring shall comply with the requirements of the railroad agency. In addition, a deck longitudinal construction joint is anticipated within the west and center spans between Bridge Nos. 5 and 6 due to the merger of the two bridges.

7.11.3.2 SW 10 Street Connector Lane WB Over SFRC Railroad & SW 12 Avenue. (Bridge No. 6)

Bridge No. 6 carries one (1) 15-foot connector lane (from Bridge 2) and one (1) 15-foot connector lane (from SW 12 Avenue) in the WB direction over SFRC railroad with a 6-foot inside shoulder and 8-foot outside shoulder. There is a gore area between the lanes.

The bridge superstructure consists of FIBs and 8 ½" thick CIP deck. The bridge substructure consists of end bents and two (2) multi-column piers supported on prestressed concrete piles. The first pier on the west side of SFRC is oriented parallel to existing SFRC railroad to avoid encroaching into existing SFRC right of way (ROW) while minimizing the center span length. The second pier is proposed towards the east side of proposed SW 12 Avenue, oriented parallel to the proposed SW 12th Avenue to avoid encroaching SW 10 Avenue, in order to keep center span length within the span limits of FIBs. The bridge will require minimum vertical clearance of 23'-6" over SFRC railroad and an MVC of 16'-6" over SW 12 Avenue.

Permanent MSE walls are proposed at the end bents.

Bridge No. 6 is anticipated to require one phase of MOT on SW 10 Street to complete the bridge replacement over SFRC.

- Phase 1: Shift traffic on SW 10 Street in the EB direction to the newly constructed Bridge No. 8 (See Section 7.8.3.4 below), keep existing SW 10 Street EB bridge over SFRC carrying traffic in the WB direction, demolish existing WB bridge, and construct the proposed bridge.

In addition, deck longitudinal construction joint is anticipated within the east and center spans between Bridge No. 6 and Bridge No. 7 due to merger of the two bridges.

7.11.3.3 SW 10 Street General Purpose Lanes WB over SFRC Railroad and SW 12 Avenue (Bridge No. 7)

Bridge No. 7 carries three (3) 11-foot local lanes in the WB direction with a 4-foot inside shoulder and 7-foot outside shoulder. Overall bridge width is 46'-8" and a 36" single slope concrete traffic railing is at each side of the bridge.

The bridge superstructure consists of FIBs and 8 ½" thick CIP deck. The bridge substructure consists of end bents and two (2) multi-column piers supported on prestressed concrete piles. The first pier on the west side of SFRC is oriented parallel to existing SFRC railroad to avoid encroaching into existing SFRC right of way (ROW) while minimizing the center span length. The second pier is proposed on the east side of the proposed SW 12 Avenue and is oriented parallel to the proposed SW 12 Avenue to avoid encroaching SW 10 Street while minimizing the center span length. It will require two phases of MOT on SW 10 Street to complete the bridge replacement over SFRC.

- Phase 1: Shift the traffic on SW 10 Street in the EB direction to the newly built Bridge No. 8 (See section 7.8.3.4 below). Keep the existing SW 10

Street EB bridge over SFRC carrying traffic in the WB direction. Demolish the existing WB bridge and construct the northern portion of the proposed bridge.

- Phase 2: Shift SW 10 Street traffic in the WB direction to the newly built Bridge 6 and the northern portion of Bridge No.7. Demolish the existing EB bridge and construct the remaining southern portion of the proposed bridge.

The detailed MOT for the construction of the bridge replacement will be further developed during the final design phase.

7.11.3.4 SW 10 Street Local Lanes EB over SFRC Railroad and SW 12 Avenue (Bridge No. 8)

Bridge No.8 carries three (3) 11-foot local lanes and one (1) 7-foot bicycle lane in the EB direction. The overall bridge width is 54'-4" with a 4' inside shoulder and 2'-0" outside shoulder. The bridge has a 6'-0" sidewalk and a 36" single slope traffic railing on the north side and a 32" traffic railing (vertical shape) the south side.

The bridge superstructure consists of FIBs and 8 ½" thick CIP deck. The bridge substructure consists of end bents and two (2) multi-column piers supported on prestressed concrete piles. The first pier on the west side of SFRC is oriented parallel to existing SFRC railroad to avoid encroaching into existing SFRC right of way (ROW) while minimizing the center span length. The second pier is proposed on the east side of the proposed SW 12 Avenue and is oriented parallel to the proposed SW 12 Avenue to avoid encroaching SW 10 Street while minimizing the center span length

The proposed bridge will not require phased construction since it is located outside of the existing SW 10 Street. However, construction activities including, but not limited to staging, excavation, temporary sheet pile installation, structure demolition, girder placement, and deck pouring shall comply with the requirements of the railroad agency.

7.11.3.5 SW 10 Street WB Connector Lanes Over Military Trail (Bridge No.10)

Bridge No. 10 is proposed to carry three (3) 12-foot connector lanes on SW 10 Street in the WB direction over Military Trail. A 36" single slope traffic railing is on each side of the bridge with an overall bridge width of 62'-8" and 12-foot shoulders. The proposed bridge superstructure consists of single-span (span length of approximately 226-foot) steel tub girders or plate girders and a minimum 8 ½" thick deck. The proposed bridge substructure consists of end bents supported on prestressed

concrete piles. The bridge will provide a MVC of 16'-6" over Military Trail. Permanent MSE walls will be required at the end bents.

It is not anticipated that construction of the bridge requires phased MOT except for overnight closures of Military Trail during steel girder placement and deck pouring.

In addition, portions of the proposed end bents are within the limits of existing roads (SW 10 Street), and thus the construction of the proposed end bents will take place within the work zone created by appropriate MOT phases along SW 10 Street.

7.11.3.6 SW 10 Street EB Connector Lane Off-Ramp Over Military Trail (Bridge No.11)

Bridge No.11 is proposed for SW 10 Street off-ramp over Military Trail carrying one (1) 15-foot connector lane in the EB direction with 6-foot shoulders. A 36" single slope traffic railing is at each side of the bridge and the overall bridge width is 29'-8" including the 6-foot shoulders. The proposed bridge has multiple spans with a maximum span length of approximately 272'-6" over Military Trail on a curved alignment merging with the viaduct at its end. The proposed bridge superstructure consists of multi-span steel tub girders. The proposed bridge substructure consists of an end bent supported on prestressed concrete piles, a hammerhead pier at the east side of Military Trail, and straddle bents on the west side of Military Trail due to roadway geometrics and alignment. The bridge will provide a MVC of 16'-6" over Military Trail and SW 10 Street EB. Permanent MSE walls will be required at the end bents.

It is not anticipated that construction of the bridge requires phased MOT except for overnight closures of Military Trail during steel girder placement and deck pouring.

In addition, most of the proposed end bent, hammerhead pier, and straddle bent piers are within the limits of existing roadways (SW 10 Street), and thus construction of the proposed end bent, hammerhead pier, and straddle bent piers will take place within the work zone created by appropriate MOT phases along SW 10 Street.

7.11.3.7 SW 10 Street Over I-95 (Bridge No.12)

The existing SW 10 Street bridge over I-95 could not accommodate the proposed roadway geometrics of I-95 and SW 10 Street. WB towards the I-95 NB on-ramp, thus it will be replaced with a new 3-span concrete bridge with a maximum span length of approximately 127'-8" on a tangent alignment.

The proposed bridge superstructure consists of FIBs and an 8 ½" thick CIP deck. The substructure consists of two (2) multi-column intermediate piers and end bents founded on prestressed concrete piles. The first pier will be located within the proposed median between I-95 NB and I-95 SB. The second pier is to be placed between the edges of shoulders on proposed SW 10 Street EB to I-95 NB on-ramp and I-95 NB. The column will be designed for vehicle collision load and protected by roadside concrete barrier per FDM Sections 215.4.5.4 and 215.4.5.1.

It is anticipated that phased MOT is required on SW 10 Street and I-95 to complete the bridge replacement over I-95.

MOT on I-95:

- Phase 1- Shift I-95 SB traffic to the west and install temporary concrete barriers along the edges of the shoulders and existing median barrier at I-95 NB. Construct the western pier within the work zone between the temporary concrete barriers.

- Phase 2- Shift I-95 SB to the east side of the newly built western pier. Install temporary concrete barrier along the shoulder of I-95 NB and construct the eastern pier and end bents.

MOT on SW 10 Street:

- Phase 1- Install two temporary concrete barriers in order to separate traffic between four (4) 10-foot lanes in the running WB direction and three (3) lanes (two (2) 10-foot & one (1) 11-foot) in the EB direction to create the designated work zone per traffic control concept plans. Demolish the northern portion of the existing bridge and construct the northern portion of the proposed bridge.

- Phase 2- Install temporary concrete barriers to shift 4 lanes of traffic in the WB direction to the newly built bridge. Demolish the center portion of the existing bridge and construct the center portion of the proposed bridge.

- Phase 3- Install temporary concrete barriers on the newly built bridge to provide work zones for constructing the northern sidewalk and the remaining southern portion of the proposed bridge per traffic control concept plans. Shift four (4) lanes of traffic in the WB direction and three (3) lanes of traffic in the EB direction onto the newly built bridge. Demolish the remaining portion of the existing bridge and construct the remaining southern portion of the proposed bridge and sidewalk. See temporary traffic control concept plans for additional information.

7.11.3.8 I-95 SB Off-ramp to SW 10 Street (Bridge No.13)

The existing I-95 SB off-ramp to SW 10 Street is in the way of the proposed I-95 SB general purpose lanes and will need to be removed to accommodate the proposed I-95 SB geometrics. A new bridge (Bridge No. 13) is proposed for the off-ramp carrying two right turn lanes and two left turn lanes.

The proposed bridge has multiple spans with the superstructure consisting of Steel Plate Girders and an 8½" CIP deck. The substructure consists of a multicolumn piers and hammerhead piers. The Western portion of the proposed bridge will be over the existing C-1 Canal to the west of I-95 SB.

Construction of the bridge will need phased MOT that will be finalized in the design phase.

7.11.3.9 I-95 SB On-Ramp Over Hillsboro Blvd. (Bridge No.16)

The existing I-95 SB bridge over Hillsboro Boulevard exhibits a substandard minimum vertical clearance. Widening the bridge on the outside to accommodate proposed additional lanes would further decrease the MVC. Moreover, widening would require a phased construction with more impacts on traffic and MOT costs. Therefore, a new bridge (Bridge No. 16) is proposed on the west side of the existing I-95 SB bridge to achieve a MVC of 16'-6". Construction of the proposed bridge will not require phased construction.

The proposed bridge has two spans with the superstructure consisting of FIBs and an 8 ½" thick deck. The bridge substructure consists of a hammerhead pier and end bents founded on prestressed concrete piles. Permanent MSE walls will be required at the end bents. It is not anticipated that the construction of the bridge will require phased MOT except for overnight closures of Hillsboro Blvd. during girder placement and deck pouring.

7.11.3.10 I-95 NB Over Hillsboro Boulevard (Bridge No.17)

The existing bridge of I-95 NB over Hillsboro Blvd. (Bridge No. 17) is to remain. A new bridge is proposed to the east side of the existing bridge.

The proposed bridge has two spans with the superstructure consisting of FIBs and an 8 ½" thick deck. The bridge substructure consists of a hammerhead pier and end

bents founded on prestressed concrete piles. Permanent MSE walls will be required at the end bents. It is not anticipated that the construction of the bridge will not require phased MOT except for overnight closures of Hillsboro Blvd. during girder placement and deck pouring.

7.11.3.11 I-95 SB Over Hillsboro Blvd. (Bridge No.27)

The existing I-95 SB bridge over Hillsboro Boulevard exhibits a substandard minimum vertical clearance. Widening the bridge on the outside to accommodate proposed additional lanes would further decrease the MVC, as previously noted for Bridge 16. Therefore, a new bridge (Bridge No. 27) is proposed in the same location as the existing I-95 SB bridge to achieve a MVC of 16'-6". Construction of the proposed bridge will require phased construction.

The proposed bridge has two spans with the superstructure consisting of FIBs and an 8 ½" thick deck. The bridge substructure consists of a hammerhead pier and end bents founded on prestressed concrete piles. Permanent MSE walls will be required at the end bents.

7.11.3.12 Direct Connect Ramp from SW 10 Street EB to I-95 NB (Bridge No.18)

Bridge No.18 is proposed for Direct Connect Ramp from SW 10 Street EB to I-95 NB, beginning at the end of Bridge 3. The bridge carries one (1) 15-foot connector lane in the NB direction with 6-foot shoulders on both sides. A 36" single slope traffic railing is at each side of the bridge and the overall bridge width is 29'-8" including the 6-foot shoulders. The proposed bridge superstructure consists of multi-span Florida-I beams. The proposed bridge substructure consists of an end bent supported on prestressed concrete piles and hammerhead piers. Permanent MSE walls will be required at the north end bent.

7.11.3.13 Direct Connect Ramp from SW 10 Street EB to I-95 SB (Bridge No.19)

Bridge No. 19 is proposed for Direct Connect Ramp from SW 10 Street EB to I-95 SB, beginning at the end of Bridge 4. The bridge carries one (1) 15-foot connector lane

from SW 10 Street EB to I-95 SB with 6-foot shoulders on both sides. The overall bridge width is 29'-8". A 36" single slope traffic railing is at each side of the bridge. The proposed bridge has multiple spans. The proposed bridge superstructure consists of steel tub girders and a minimum 8 ½" thick CIP deck. The substructure consists of end bent and hammerhead piers. The bridge shares a pier with Bridge No. 4 and Bridge No. 20. Permanent MSE walls will be required at the south end bent.

7.11.3.14 Direct Connect Ramp from I-95 NB to SW 10 Street WB (Bridge No. 21)

Bridge No.21 connects I-95 NB and I-95 NB Express Lane to the Direct Connect Ramp from I-95 NB to SW 10 Street WB. The Bridge carries one lane from I-95 NB and one (1) lane from I-95 NB Express Lane along with a gore, a 6-foot inside shoulder, and an 8-foot outside shoulder. A 36" single slope traffic railing is at both sides of the bridge with an overall average bridge width of approximately 51'-10". The bridge superstructure consists of curved steel tub girders and a minimum 8 ½" thick CIP deck. The substructure consists of, end bent and hammerhead piers. The bridge share a pier with Bridge Nos. 22 and 23 as well. Permanent MSE walls will be required at the north end bent.

7.11.3.15 Direct Connect Ramp from I-95 NB to SW 10 Street WB (Bridge No. 22)

Bridge No.22 connects I-95 NB to the Direct Connect Ramp from I-95 NB to SW 10 Street WB and ends at the beginning of Bridge 21. The bridge carries one (1) 12-foot lane from I-95 NB with a 6-foot inside shoulder, and an 8-foot outside shoulder. A 36" single slope traffic railing is at both sides of the bridge with an overall bridge width of 31'-8". The bridge superstructure consists of curved steel tub girders and a minimum 8 ½" thick CIP deck. The substructure consists of, an end bent and hammerhead piers. The bridge share a pier with Bridge Nos. 21 and 23 as well. Permanent MSE walls will be required at the south end bent.

7.11.3.16 NE 48th Street Over I-95. (Bridge No.24)

The existing NE 48th Street bridge over I-95 could not accommodate the proposed roadway geometrics of I-95. Thus, it will be replaced with a new 2-span prestressed

concrete bridge with a maximum span length of approximately 157'-9"; for a total bridge length of 315'-9". The proposed bridge will be constructed in the same location as the existing bridge. The new bridge end bents will be moved away from I-95 to achieve minimum horizontal and vertical clearances on both sides of I-95.

The proposed bridge superstructure consists of Florida-I Beams and an 8 ½" thick CIP deck. The bridge substructure consists of a multi-column pier and end bents founded on prestressed concrete piles. Permanent MSE walls will be required at the end bents. Construction of the proposed bridge will require phased construction.

7.11.4 Braided Ramps

7.11.4.1 SW 10 Street EB to I-95 NB Braided On-ramp (Bridge No.14)

Bridge No.14 is proposed for SW 10 Street to I-95 NB braided on-ramp. The bridge carries one (1) 15-foot lane with 6-foot shoulders on both sides. A 36" single slope concrete traffic railing is on each side with an overall bridge width of 29'-8". The proposed bridge has multiple spans, and is on a curved alignment.

The bridge superstructure consists of multiple span steel plate girders and a minimum 8 ½" thick CIP deck. The bridge substructure consists of an end bent and hammerhead piers The bridge also shares a support with Bridge Nos. 3 and 18 as well. Permanent MSE walls will be required at the northern end bent.

It is anticipated that prestressed concrete piles would be used for the foundation. It is not anticipated that construction of the bridge requires phased construction. However, construction will take place within the work zone created by appropriate MOT phases along I-95.

7.11.4.2 SW 10 Street WB to I-95 NB Braided On-ramp (Bridge No.15)

Bridge No. 15 is proposed for SW 10 Street WB to I-95 NB Braided On-ramp. At the begging of the bridge, the bridge carries two (2) 12-foot lanes, which merge into one (1) 15-foot lane.

The bridge has 6-foot shoulders. A 36" single slope concrete traffic railing is on each side with an overall bridge width of 29'-8" Minimum. The proposed bridge has multiple spans, and is on a slightly curved alignment.

The superstructure of the bridge consists of Florida-I beams with a substructure consisting of end bents and hammerhead piers. The bridge will have a minimum

vertical clearance of 16’-6” over I-95 NB egress lane. Permanent MSE walls will be required at the end bents.

It is not anticipated that construction of the bridge requires phased construction. However, construction will take place within the work zone created by appropriate MOT phases along I-95.

7.11.4.3 SW 10 Street to I-95 SB Braided On-ramp (Bridge No.20)

Bridge No. 20 is proposed for SW 10 Street to I-95 SB Braided On-ramp. The bridge carries one (1) 15-foot lane with 6-foot shoulders. A 36” single slope concrete traffic railing is on each side with an overall bridge width of 29’-8”. The proposed bridge has four (4) spans with a maximum span length of approximately 235’ on a curved alignment.

The superstructure of the bridge consists of steel plate girders and a minimum 8 ½” thick CIP deck. The substructure consisting of an end bent, hammerhead piers (supporting Bridge No. 19 as well), and two (2) integral straddle piers. The bridge will have a minimum vertical clearance of 16’-6” over I-95 SB roadway. Permanent MSE walls will be required at the southern end bent.

7.11.4.4 I-95 NB to SW 10 Street Braided Off-ramp (Bridge No.23)

Bridge No. 23 is proposed for I-95 NB to SW 10 Street Braided Off-ramp. The bridge carries one (1) 15-foot lane with 6-foot shoulders. A 36” single slope concrete traffic railing is on each side with an overall bridge width of 29’-8”. The proposed bridge has multiple spans and is on a curved alignment.

The superstructure of the bridge consists of steel plate girders and a minimum 8 ½” thick CIP deck. The substructure consisting of an end bent, and hammerhead piers. The bridge shares a pier Bridge No. 22 as well. The bridge will have a minimum vertical clearance of 16’-6” over I-95 NB roadway. Permanent MSE walls will be required at the southern end bent.

7.11.4.5 I-95 SB Off-ramp to SW 10 Street Braided Off-ramp (Bridge No.25)

Bridge No. 25 is proposed for I-95 SB off-ramp to SW 10 Street Braided Off-ramp, and begins at the end of Bridge No. 13. The bridge carries one (1) 15-foot lane with

6-foot shoulders. A 36” single slope concrete traffic railing is on each side with an overall bridge width of 29’-8”. The proposed bridge has multiple spans, and is on a slightly curved alignment.

The superstructure of the bridge consists of steel plate girders and a minimum 8 ½” thick CIP deck. The substructure consisting of an end bent, and hammerhead piers. The bridge shares a pier Bridge Nos. 2, 13, and 26 as well. The bridge will have a minimum vertical clearance of 16’-6” over I-95 SB ingress ramp. Permanent MSE walls will be required at the northern end bent.

7.11.4.6 I-95 SB Express Lane Off-ramp to SW 10 Street Braided Off-ramp (Bridge No.26)

Bridge No. 26 is proposed for I-95 SB Express Lane off-ramp to SW 10 Street Braided Off-ramp, and begins at the end of Bridge No. 13. The bridge carries one (1) 15-foot lane with 6-foot shoulders. A 36” single slope concrete traffic railing is on each side with an overall bridge width of 29’-8”. The proposed bridge has multiple spans, and is on a curved alignment.

The superstructure of the bridge consists of steel plate girders and a minimum 8 ½” thick CIP deck. The substructure consisting of an end bent, and hammerhead piers. The bridge shares a pier Bridge Nos. 2, 13, and 25 as well. The bridge will have a minimum vertical clearance of 16’-6” over I-95 SB roadway and ingress ramp. Permanent MSE walls will be required at the southern end bent.

7.11.5 Conceptual geotechnical data

The Geotechnical Services Report recommends classifying the evaluated bridges under the slightly aggressive environmental classification for substructures. Precast prestressed concrete piles and drilled shafts are recommended for bridge foundation in the report.

7.11.6 Aesthetic Level for Bridge and Bridge Approaches

The level of aesthetics for the proposed bridge and bridge approaches is anticipated to be Level Two per FDM 121.9.3.2.b.

7.11.7 Bridge Deck Drainage Considerations

Bridge deck drainage is anticipated to be required for direct connect ramps and elevated viaduct bridges. It will be further developed in the design phase.

7.12 Intersection and Interchange Concepts

The following **Figure 7-13** depicts the proposed roadway and lane configurations for the I-95 corridor including interchanges with Hillsboro Boulevard and SW 10 Street. The SIMR prepared for this project includes the traffic analysis evaluation and is included here by reference.

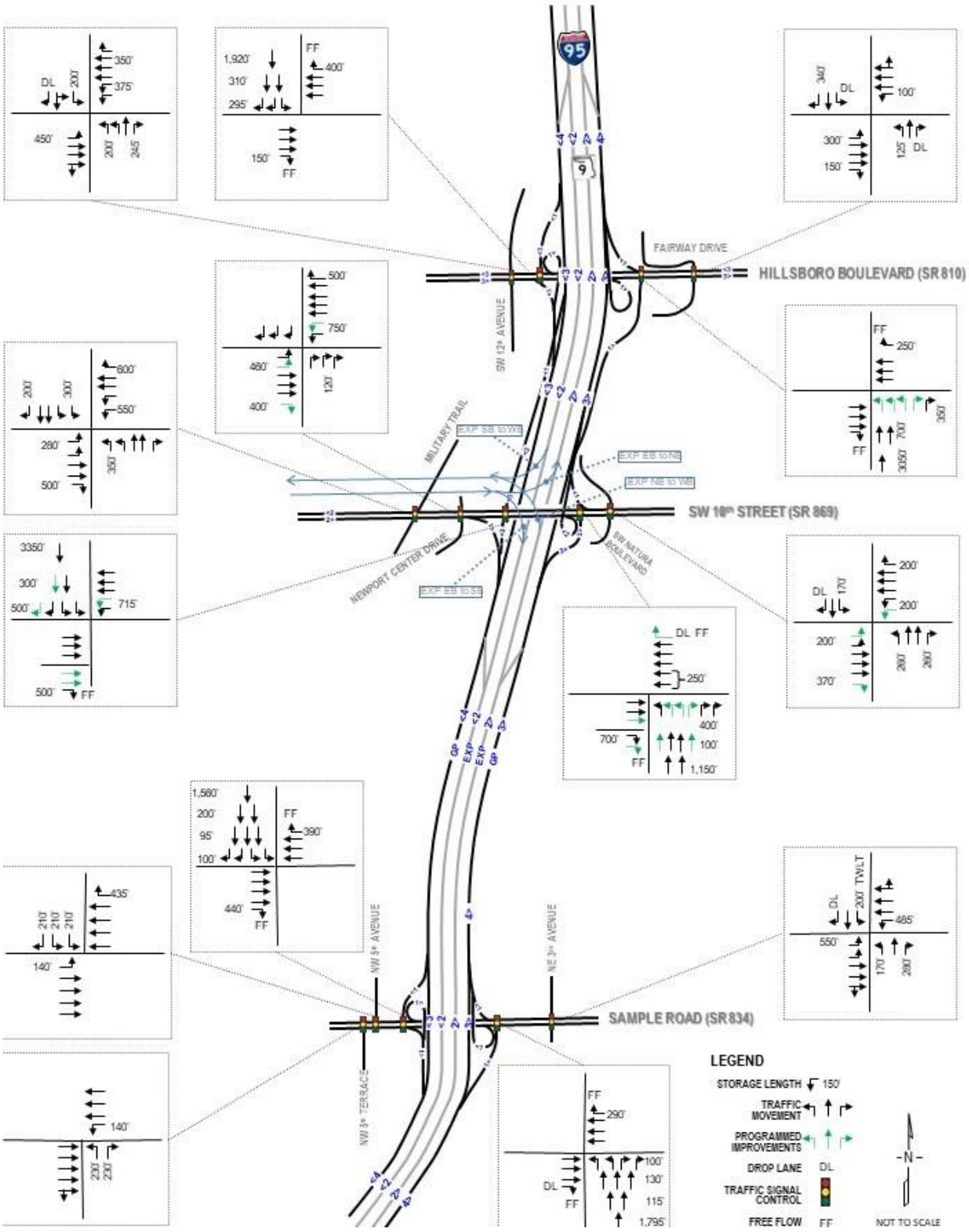

Figure 7-13 Roadway and Intersection Lane Configurations

7.13 Right-of-Way

Right of way is needed along the west side of I-95 near Hillsboro SB on-ramp for the proposed improvements along I-95. Minor right of way acquisition is needed on the north and south side along SW 10 Street. Additional temporary construction easements will be required.

7.14 Lighting

Lighting should be upgraded to Light Emitting Diode (LED) light sources where required by the proposed roadway construction. The new lighting system options include a conventional lighting system or a mix of conventional and high-mast lighting to provide efficient lighting for ground and upper level structures.

7.15 Landscaping

A separate Landscaping project is currently funded and will follow construction of the PD&E proposed improvements.

7.16 Preliminary Cost Estimates

Preliminary project costs for construction, preliminary engineering (PE), right-of-way and construction engineering and inspection (CEI) costs were developed for the Preferred Alternative.

Table 7-4 Preliminary Cost Estimates

Cost Components	Total Costs
Base Construction Cost	**$222,964,484.78**
Mobilization	$17,837,158.78
Maintenance of Traffic	$24,080,164.36
Construction Subtotal	**$264,881,807.92**
Design/Build (9 percent)	$23,839,362.71
Partnering (non-bid)	$6,000
Contingency (non-bid)	$150,000.00
TOTAL PROJECT COST	**$288,877,170.63**

8 List of Technical Reports

Below is a list of technical reports prepared during this PD&E Study and on file at FDOT.

Technical Reports

- Natural Resources Evaluation
- Air Quality Technical Memorandum
- Social Cultural Effects Evaluation
- Cultural Resources Assessment Survey
- Noise Study Report
- Contamination Screening Evaluation Report
- Floodplain Hydraulics Report
- Systems Interchange Modification Report
- Public Involvement Plan
- Geotechnical Services Report

Appendix A – Concept Plans